HEARING ON THE U.S. TAX CODE SUBSIDIZING GREEN CORPORATE HANDOUTS AND THE CHINESE COMMUNIST PARTY

HEARING

BEFORE THE

COMMITTEE ON WAYS AND MEANS
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTEENTH CONGRESS

FIRST SESSION

APRIL 19, 2023

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United States House Committee on
Ways & Means
CHAIRMAN JASON SMITH

FOR IMMEDIATE RELEASE
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CONTACT: 202-225-3625

Chairman Smith Announces Hearing on the U.S. Tax Code Subsidizing Green Corporate Handouts and the Chinese Communist Party

House Committee on Ways and Means Chairman Jason Smith (MO-08) announced today that the Committee will hold a hearing on the U.S. Tax Code Subsidizing Green Corporate Handouts and the Chinese Communist Party. The hearing will take place on **Wednesday, April 19, 2023, at 10:00am in 1100 Longworth House Office Building**.

Members of the public may view the hearing via live webcast available at https://waysandmeans.house.gov. The webcast will not be available until the hearing starts.

In view of the limited time available to hear the witnesses, oral testimony at this hearing will be from invited witnesses only. However, any individual or organization not scheduled for an oral appearance may submit a written statement for consideration by the Committee and for inclusion in the printed record of the hearing.

DETAILS FOR SUBMISSION OF WRITTEN COMMENTS:

Please Note: Any person(s) and/or organization(s) wishing to submit written comments for the hearing record can do so here: WMSubmission@mail.house.gov.

Please ATTACH your submission as a Microsoft Word document in compliance with the formatting requirements listed below, **by the close of business on Wednesday, May 3, 2023**. For questions, or if you encounter technical problems, please call (202) 225-3625.

FORMATTING REQUIREMENTS:

The Committee relies on electronic submissions for printing the official hearing record. As always, submissions will be included in the record according to the discretion of the Committee. The Committee will not alter the content of your submission but reserves the right to format it

according to guidelines. Any submission provided to the Committee by a witness, any materials submitted for the printed record, and any written comments in response to a request for written comments must conform to the guidelines listed below. Any submission not in compliance with these guidelines will not be printed but will be maintained in the Committee files for review and use by the Committee.

All submissions and supplementary materials must be submitted in a single document via email, provided in Word format and must not exceed a total of 10 pages. Please indicate the title of the hearing as the subject line in your submission. Witnesses and submitters are advised that the Committee relies on electronic submissions for printing the official hearing record.
All submissions must include a list of all clients, persons and/or organizations on whose behalf the witness appears. The name, company, address, telephone, and fax numbers of each witness must be included in the body of the email. Please exclude any personal identifiable information in the attached submission.

Failure to follow the formatting requirements may result in the exclusion of a submission. All submissions for the record are final.

ACCOMMODATIONS:

The Committee seeks to make its facilities accessible to persons with disabilities. If you require accommodations, please call 202-225-3625 or request via email to WMSubmission@mail.house.gov in advance of the event (four business days' notice is requested). Questions regarding accommodation needs in general (including availability of Committee materials in alternative formats) may be directed to the Committee as noted above.

Note: All Committee advisories and news releases are available on the Committee website at http://www.waysandmeans.house.gov/.

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THE U.S. TAX CODE SUBSIDIZING GREEN CORPORATE HANDOUTS

AND THE CHINESE COMMUNIST PARTY

Wednesday, April 19, 2023

House of Representatives,

Committee on Ways and Means,

Washington, D.C.

The committee met, pursuant to call, at 10:04 a.m. in Room 1100, Longworth House Office Building, Hon. Jason Smith [chairman of the committee] presiding.

*Chairman Smith of Missouri. The committee will come to order.

We are here today to examine what has happened with the mountain of green special interest tax breaks in the President's so-called Inflation Reduction Act. In the eight months since that law's passage, three things are clear.

Number one, taxpayers are footing a bill for these tax breaks that are hundreds of billions above what they were told. Some estimates reach as high as one trillion, over three times more than originally estimated. Other economists estimate the battery manufacturing credits alone will cost over 196 billion, a 542 percent increase -- 542 percent increase.

Number two, the White House opened up convenient loopholes to make not only foreign countries, but even our adversaries like China eligible to claim these taxpayer-funded subsidies.

And number three, the design of these credits has allowed large companies, big banks, and the already wealthy to make billions off the backs of hard-working American taxpayers.

Ultimately, the White House and my colleagues on the other side pushed through these corporate welfare subsidies that cost more than three times as much as they told us it would, while paying big dividends to big business and China.

While the wealthy and politically connected get a massive windfall from the Democrats' taxpayer-subsidized handouts, working families, small business owners, and farmers, they are struggling. Witnesses at Ways and Means field hearings have told us of the challenges they face to hire, make payroll, afford input materials because of the President's inflation crisis. I anticipate we will hear more of these challenging stories at our hearing Friday in Georgia.

President Biden, he may succeed in strengthening the manufacturing sector, but for China, not the U.S. Solar cells manufactured in China and assembled into panels in the U.S.

will qualify for these special interest tax breaks, even if they are implicated in human rights abuses. The world's largest solar manufacturer is a Chinese company that just had its solar shipments confiscated at the border last fall over forced labor concerns. They are now planning to partner with a business in Ohio to utilize these very credits to build a facility here in the United States. Are these the type of businesses that we should be rewarding?

This is just one area where the Biden Administration has opened the door to China. To develop projects like EV battery manufacturing, U.S. companies are partnering with Chinese Communist Party-controlled companies that control over 50 percent of the processing capacity of key battery ingredients. Meanwhile, White House regulations and red tape make it difficult for America to develop critical resources for EV battery ingredients right here at home.

As congressional scorekeepers now realize, this money will get spent faster than expected. The Biden Administration is creating even new loopholes to benefit foreign companies and foreign workers. The latest example is the Administration's new critical minerals agreement with Japan that evades IRA safeguards and allows benefits to flow to foreign companies. No wonder USTR did not let the American people see the text of the agreement before signing it. This is a low-emission tax subsidy fire sale only Washington and Wall Street would love.

These special political tax breaks flow to big companies and big banks, with congressional scorekeepers estimating that large corporations today receive over 90 percent of them. These are companies with sales in excess of $1 billion. Financial institutions receive three times more than any other industry. Financial institutions receive three times as any industry, that is correct.

And when it comes to the 15 percent minimum tax on corporations that Democrats touted last year to look tough on big business, and to make sure everyone pays their fair

share -- that is what they say, but guess what? They exempted their special interest tax breaks from that rule, creating a loophole for their friends, their donors, their buddies, and politically favored corporations.

American workers should not have to send money to Washington in order to subsidize big corporate virtue signaling about climate commitments and woke agendas. We cannot ignore these facts among misleading marketing about good intentions and climate change. Democrats sold America a bill of goods with the Inflation Reduction Act. And the sad part is, once again, America and the American worker will pay the price.

*Chairman Smith of Missouri. I now turn to Ms. Chu for the purpose of an opening statement.

*Ms. Chu. Thank you, Mr. Chair, for gathering us to discuss how, in just eight months, the Inflation Reduction Act has done more for American workers and families than the Tax Cuts and Jobs Act has done in almost six years.

The climate crisis is real, and its effects are only becoming more extreme. In California, all but one of the state's 10 largest wildfires in history have occurred since 2017, and years of severe drought have now been followed by months of extreme rain and snow.

Democrats did something about this, and we made sure that the clean energy transition will mean more jobs, more manufacturing, and higher wages here in the United States. The Inflation Reduction Act is the single-largest clean energy investment in U.S. history, with first-of-their-kind requirements to strengthen American supply chains and create quality, high-paying jobs. This legislation is proving that green jobs are good jobs, and putting the country on a path to responsible, sustainable energy independence.

So far, the green tax credits have spurred over 100,000 jobs for U.S. electricians, mechanics, construction workers, technicians, support staff, and others. Just in the law's first 6 months, 90 new clean energy projects have been announced in 31 states. These projects include battery manufacturing, electric vehicle manufacturing, and wind and solar manufacturing sites. If this isn't delivering results for the American people, then what is?

Along with the Bipartisan Infrastructure Law and the CHIPS and Science Act, these landmark laws have led to companies committing more than $200 billion to U.S. manufacturing. Our investments in semiconductor and clean tech are nearly double what they were in 2021, and nearly 20 times the total in 2019. The result is less reliance on vulnerable supply chains overseas and offshoring of well-paying jobs: just another way that Democrats are growing the economy from the bottom up and the middle out.

Meanwhile, Republicans are over 100 days into the Congress, and the American people can see that their priorities include shielding tax cheats from accountability, proposing a 30 percent tax increase on everything Americans buy, and threatening to drag the country into an unnecessary economic crisis that would decimate Social Security and Medicare. What we have not seen is any plan that would reinvest in American workers and families.

If they were serious about these goals, they would support the Inflation Reduction Act's work to onshore critical supply chains and revitalize communities. But instead, we get hearings like this one, which use China as a way to distract from their own policy failures. It is dishonest, because the truth is that the Inflation Reduction Act is one of the most impactful laws in our nation's history to reduce our reliance on China and other foreign markets and move jobs and supply chains back here to the United States. And it is reckless and false rhetoric that has consequences. As we have seen since the pandemic, this rhetoric contributes to dangerous anti-Asian hate that hurts Asian Americans here in the United States.

In the last 100 days, notwithstanding all their America-first rhetoric, one of the most consistent themes of our committee's majority has been to put foreign interests ahead of the American people. Last month we marked up a bill in this committee that would put the interest of foreign bondholders, including Chinese bondholders, ahead of veterans, seniors on Medicaid that are in nursing homes, Pell Grant recipients, and every American awaiting a tax refund. And this is a pattern. The Republican tax scam gave more benefit to foreign investors than the bottom 60 percent of Americans. We didn't hear any America-first concerns at that time.

I am disappointed that we are once again spending valuable time on political posturing against our clear successes, instead of working together to create American jobs,

shore up our domestic supply chains, or catapult our nation to leading in the new green energy economy. It is a waste of our time, a waste of the American people's time, and it is all in the service of extending another round of handouts to the wealthy and well-connected.

*Ms. Chu. I yield back the balance of my time.

*Chairman Smith of Missouri. Thank you, Ms. Chu.

I want to welcome the witnesses and thank you for taking your time out to be before the best committee in Congress, the House Ways and Means Committee. I will now be pleased to introduce each and every one of you.

Daniel Turner is the founder and executive director of Power The Future.

Drew Horn is the founder and CEO of GreenMet, and formerly associate director of policy for the Office of the Vice President.

Kenny Stein is policy director at the Institute for Energy Research.

And Vance Ginn is senior fellow at Americans for Tax Reform, and formerly the chief economist at the Office of Management and Budget.

And Ben Beachy is vice president of manufacturing and industrial policy at the BlueGreen Alliance.

Mr. Turner, you are now recognized.

STATEMENT OF DANIEL TURNER, EXECUTIVE DIRECTOR, POWER THE FUTURE

*Mr. Turner. Thank you. Chairman Smith, Ranking Member Neal, and members of the Ways and Means Committee, good morning and thank you for the opportunity to appear before you.

My name is Daniel Turner, and I am the founder of Power of the Future, a group that advocates for the millions of energy workers, especially those in rural America. These men and women produce the energy which powers our homes and our nation, and their jobs are under constant attack.

Energy undergirds everything from our economy to our national security. Everything grown, manufactured, transported requires energy. And as energy prices go up, food and consumer goods have become more expensive. Our current state of high inflation is driven largely by administrative actions designed to significantly raise the cost of fossil fuels. No one has been hit harder than working-class and rural Americans.

We are producing less oil than we have in years because we have an administration that has promised no new drilling. As a result, gas prices are still nearly $1.50 higher, on average, than when President Biden took office. The proposed government solution: $7,500 tax rebate on new electric vehicles. For most Americans who cannot afford an EV, which averages $60,000, that is not clearly a solution at all.

So who is benefiting from these tax rebates? Data shows the average EV owner earns over $100,000, more than double the average salary. The tax benefits for going green are anything but equitable.

The other beneficiary is the Chinese Government. My organization has previously authored two studies, one showing how 70 percent of EVs and green technology are

manufactured in China; the other showing how 90 to 95 percent of the rare earth elements in those technologies are sourced from markets dominated by China. As a consequence, every tax break, subsidy, or government program meant to incentivize the purchase of EVs is really a direct benefit to China.

It does not have to be this way. President Biden has spoken often about a supply chain that starts in America, a goal with which I wholeheartedly agree. Yet, along with that lofty rhetoric comes a sobering truth. Efforts to open the U.S. mines needed for the green supply chain have been thwarted. Mines in Minnesota, Arizona, Alaska, and many other states are stopped, while the Biden Administration has made deals for these same materials from foreign countries, some of which have records of slavery and child labor and disastrous environmental practices.

Yes, the metals and the rare earths to "go green" are still needed, but the jobs and the tax revenue are being outsourced, rather than coming to Americans.

I have been to Alaska Native villages fighting the government to open a mine, where the unemployment rate currently runs around 80 percent, where mothers pour soda into their babies' bottles because milk, if they can even find it, costs $12 a half gallon, and there is no running water. These communities are pleading for the mine to open for the jobs, electricity, infrastructure. But most of all, the dignity and hope. These communities deserve the chance to utilize their land for their much-needed benefit.

And we have done this for decades to coal communities. All across America, the war on coal has closed mines and plunged once thriving communities into poverty. Radical environmental groups, many of whom have been investigated for their ties to Russian and Chinese funding, launch glitzy ad campaigns to close coal mines. And when they win, they return to their headquarters and leave those towns struggling with systemic poverty. Yet we still use coal, it is just more expensive. And eventually, like the metals and the rare earths, it

will be imported from other countries, where child and slave labor often mine it.

Fossil fuels are not going away. The government is just making them more expensive and, as a result, making life more expensive. The burdens grow harder. The natural gas tax this Congress passed last year will not have companies "pay their fair share," as proponents claim. The American people will just face higher costs. Even the discussed bans on gas stoves and gas hot water heaters will do nothing for climate change, they will just make life harder for struggling Americans.

I am here today to talk about policies that unleash American energy and, by extension, American prosperity and the American dream. I look forward to taking your questions and having a robust and honest conversation.

[The statement of Mr. Turner follows:]

**********COMMITTEE INSERT**********

Chairman Smith
Ranking Member Neal
Members of the Ways and Means Committee,

Good morning and thank you for the opportunity to appear before you. My name is Daniel Turner and I am the Founder of Power The Future, a group that advocates for the millions of energy workers especially those in rural America. These men and women produce the energy which powers our homes and our nation, and their jobs are under constant attack.

Energy undergirds everything, from our economy to our national security. Everything grown, manufactured, transported, requires energy, and as energy prices go up, food and consumer goods have become more expensive. Our current state of high inflation is driven largely by administrative actions designed to significantly raise the cost of fossil fuels. No one has been hit harder than working class and rural Americans.

We are producing less oil than we have in years because we have an Administration that has promised "no new drilling". As a result, gas prices are still nearly $1.50 higher on average than when President Biden took office. The proposed government solution? A $7,500 tax rebate on new Electric Vehicles. For most Americans who cannot afford an EV, which averages $60,000, that is clearly not a solution at all.

So, who is benefitting from these tax rebates? Data shows that the average EV owner earns over $100,000, more than double the average salary. The tax benefits for "going green" are anything but equitable. The other beneficiary is the Chinese government.

My organization has previously authored two studies: one showing how 70% of EVs and green technology are manufactured in China; the other showing how 90-95% of the rare earth elements in those technologies are sourced from markets dominated by China. As a consequence, every tax break, subsidy, or government program meant to incentivize the purchase of EVs is really a direct benefit to China.

It does not have to be this way. President Biden has spoken often about a supply chain "that starts in America," a goal with which I whole-heartily agree. Yet along with that lofty rhetoric comes a sobering truth: efforts to open U.S. mines needed for the green supply chain have been thwarted. Mines in Minnesota, Arizona, Alaska, and many other states all stopped production while the Biden Administration has made deals for these same materials from foreign countries, some with records of slavery and child labor and disastrous environmental practices. Yes, the metals and rare earths to "go green" are still needed, but the jobs and the tax revenue are being outsourced rather than coming to Americans.

I have been to native Alaskan villages fighting the government to open a mine where unemployment currently runs around 80%, where mothers pour soda into their babies' bottles because milk, if they even can find it, costs $12 a half gallon and there is no running water. These communities are pleading for the mine to open: for the jobs, electricity, infrastructure,

and most of all, dignity and hope. These communities deserve the chance to utilize their land for their much-needed benefit.

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Yet we still use coal. It's just more expensive, and eventually, like the metals and rare earths, it will be imported from other countries often where child and slave labor mine it. Fossil fuels are not going away; the government is just making them more expensive, and as a result, making life more expensive, too.

The burdens grow harder. The natural gas tax Congress passed last year will not have companies "pay their fair share," as proponents claim. The American people will just face higher costs. Even the discussed bans on gas stoves and gas hot water heaters will do nothing for climate change; they will just make life even harder for struggling Americans.

I am here today to talk about policies that unleash American energy and, by extension, American prosperity and the American dream. I look forward to taking your questions and having a robust and honest conversation.

*Chairman Smith of Missouri. Thank you, Mr. Turner.

Mr. Horn, you are now recognized.

STATEMENT OF DREW HORN, CEO, GREENMET

*Mr. Horn. Thank you, Chairman Smith, members of the committee. Thank you for the opportunity to testify today. My name is Drew Horn, and I am president and CEO of GreenMet, a private company working to develop American critical mineral and green energy supply chains. I am here today to explore the connection between our domestic energy supply chain policy and our national security.

The intent of the Inflation Reduction Act, signed by the President in 2022, was to invest in companies whose focus is domestic energy production and manufacturing. As we have seen in recent headlines, implementation of the IRA has been inconsistent with congressional intent.

The Treasury Department is responsible for ensuring compliance with the IRA. It is imperative that Treasury close loopholes that currently enable foreign adversaries to circumvent U.S. law. Treasury has already announced guidance pertaining to the qualification of critical mineral requirements, highlighting the need for supply chain transparency and sourcing requirements. However, industry stakeholders are still waiting for Treasury guidance on what countries qualify as a foreign entity of concern.

In the meantime, Chinese-backed companies are taking advantage of U.S. tax credits by establishing quasi-Chinese subsidiaries on U.S. soil within U.S. supply chains. Nationwide, industry and financial leaders are waking up to the threat that this presents to America and to our allies.

Chinese dominance and continued incursion of our energy supply chains is the most significant national security threat that the United States and other friendly countries are facing in the 21st century. I want to emphasize the fact that when Chinese-backed companies are allowed to do business inside the U.S., we must assume Chinese intelligence

agencies are illegally collecting sensitive U.S. information, stealing intellectual property, and doing everything they can to continue Chinese Communist Party dominance in this sector. In effect, a Trojan horse is introduced into our nation's industrial and manufacturing sectors.

The CCP's approach is to conceal its ownership or influence. U.S. companies and universities that present themselves as homegrown domestic entities dedicated to promoting U.S. commercial and national interests is one method of that disguise. In some instances, Chinese-backed companies or universities have filed for and were actually granted U.S. Government funding. All of this is supported by CCP national policies.

Current U.S. control mechanisms like CFIUS are insufficient to protecting U.S. industry from this subterfuge. I emphatically urge each Federal agency and department to take this issue seriously by, one, defining foreign entities of concern; two, solidifying congressional free trade agreements with our allied partners; and three, investing in true American companies. Doing all these things will secure and diversify America's supply chains.

To begin, Congress should push Treasury to provide clear definitions of foreign entities of concern. Look to current law for our National Defense Industrial Base, which prohibits acquisition of sensitive materials from non-allied foreign nations in the interests of national security. Foreign entities of concern should match the definition of covered nations as defined in U.S. law. The case for applying this definition to our domestic mineral supply chains is now.

Next, Congress should continue to play an active role in ratifying ongoing free trade agreements and giving clear mandates for cooperation with allies. At any point, the PRC may limit global access by restricting trade of these critical minerals, all of which have China as the dominant global mineral and metal producer. Therefore, trade policy plays a

key role in decreasing our import reliance on foreign entities of concern.

In the short term, the U.S. will need to engage with allies and free trade partners to secure our mineral supply chains. The solidification of free trade partnerships, even with the current patchwork of agreements, ensures our continual cooperation with longstanding allies, and buys us time to bring more American supply online.

And finally, we all must commit to building domestic supply chains, thereby reducing our reliance on other nations.

I truly believe this is a bipartisan issue, and one that affects the entire industry. We must incentivize true U.S. alternatives to support our national security and policy goals. Our energy security is our national security. Strong policy will continue to de-risk domestic energy production, creating pathways for willing Wall Street investors and patriotic companies to unleash American energy production again. Domestic options, when paired with the right mix of prudent government support and time, can organically grow without foreign interference.

We must control our own destiny. But the window of opportunity to rebuild domestic supply chains is closing if we don't take action now.

Thank you for the opportunity to testify today. I look forward to your questions.

[The statement of Mr. Horn follows:]

**********COMMITTEE INSERT**********

WRITTEN TESTIMONY BEFORE THE
HOUSE WAYS & MEANS COMMITTEE
U.S. HOUSE OF REPRESENATATIVES

FULL COMMITTEE HEARING ON THE
"U.S. TAX CODE SUBSIDIZING GREEN CORPORATE HANDOUTS AND THE CHINESE COMMUNIST PARTY"

DREW HORN
PRESIDENT & CEO
GREENMET

April 19, 2023

Chairman Smith, Ranking Member Neal, Members of the Committee: Thank you for the opportunity to testify today on this important topic of securing America's supply chains through oversight of tax policy.

My name is Drew Horn, and I am president and CEO of GreenMet, a private company working to develop American critical mineral and green energy supply chains, thereby reducing U.S. reliance on foreign adversaries. I am also a former U.S. Army Special Forces officer and a Marine officer who served this country for over 10 years in uniform. During my time as an officer, I successfully completed three combat deployments to Afghanistan as a Green Beret, and one to Iraq as a Marine. After my military service I had the privilege to serve as a senior policy executive at the Departments of Defense and Energy, the Office of the Vice President, and the Office of the Director of National Intelligence. Our GreenMet team is made up of decorated veterans, former public servants, and industry experts.

GreenMet was founded in 2021 to build substantial U.S. solutions with a technological advantage over U.S. adversaries that supports domestic production of premium products that are cost-efficient with full accountability and transparency. Our company is currently involved in multiple mineral resource projects that will strengthen domestic critical mineral supply chains.

GreenMet's focus is on developing the required infrastructure for sustainable and uninterruptable critical mineral supply chains to meet U.S. and North American energy and technology needs. We are a mission-driven team, serving as an important connection between Wall Street investment and U.S. Government decisionmakers during this essential time in U.S. industrial and energy and mineral resource policy.

Our team works to demonstrate that the U.S. has the ability to produce domestic energy in a *cleaner* and *technologically superior* way compared to foreign adversaries. America has a de facto tendency toward ESG (Environmental, Social, and Governance), given that our nation's 21st century mining and metalmaking practices are governed by the highest and best standards in the world. As we unleash our domestic energy production according to these standards, true sustainability and secure supply will follow.

Bolstering domestic critical mineral supply chains is vital for economic stability and national security. Our company mission is guided by Executive Order 13817, Executive Order 13953, and Executive Order 14017. These presidential orders acknowledge the imperative to build domestic production capabilities for materials critical to our defense industrial base, advanced energy systems, and our everyday consumer needs. By taking steps toward vertical integration of these supply chains, our nation minimizes risk of supply chain disruptions such as those we witnessed during the early months of the COVID-19 pandemic and Russia's invasion of Ukraine.

I am here today before a Committee that understands the deep connection between our domestic energy supply chains and our national security. The 2022 Inflation Reduction Act (IRA) signed by the President intended to invest in companies whose focus is domestic energy production and manufacturing to strengthen our energy security.[1]

We Must Close Loopholes in the IRA Policy Implementation

As we have seen in recent headlines, the agencies' execution of IRA has been incongruent with the intent of Congress in writing the law. The changes and expansions to Tax Credits in Sections 30, 45, and 48 of the IRS tax code aimed at securing domestic supply and incentivizing investors and suppliers to expand the domestic critical minerals and battery materials markets.[2] Yet, as of the submission of this testimony, small and large companies lack key guidance on what entities would qualify and what process would quantify the percentage of "applicable critical minerals."

Given that the U.S. Department of the Treasury (Treasury) is responsible for ensuring compliance with the IRA's full intent through its previous and future guidance, it is imperative Treasury close loopholes that currently enable Chinese companies to move operations to U.S. soil by partnering with U.S. companies. Such arrangements will create intense issues for the American energy industry regarding security of intellectual property or "IP", among other security issues.

I wish to highlight the section 30D Clean Vehicle Credit expansion as a prime example of a loophole. Treasury has announced guidance regarding the qualification of critical mineral requirements, highlighting the need for supply chain transparency and sourcing requirements.[3]

[1] https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/08/16/remarks-by-president-biden-at-signing-of-h-r-5376-the-inflation-reduction-act-of-2022/

[2] https://www.hklaw.com/en/insights/publications/2022/10/the-inflation-reduction-act-provisions-and-incentives-for-local

[3] https://www.irs.gov/newsroom/irs-issues-guidance-and-updates-frequently-asked-questions-related-to-the-new-clean-vehicle-critical-mineral-and-battery-components

However, as of this week's hearing, stakeholders in the mineral industry are still waiting for Treasury guidance on what countries qualify as a "foreign entity of concern."

Nevertheless, I am pleased to see American companies responding to this 30D credit expansion by securing North American binding commitments to meet domestic mineral requirements by 2025. Industries such as American auto manufacturing will play a critical role in the use of domestically sourced critical and other minerals. Companies including General Motors (GM) have been very vocal and transparent in their support for policies within the IRA that incentivize domestic critical mineral production and requirements. As GM and other manufacturers look to Treasury for 30D guidance on compliance requirements, I urge Treasury to immediately seek clear guidance on definitions from subject matter experts (SMEs) who understand the state of the market. This required guidance will enable much needed incentives for companies and investors to participate in the domestic supply chain sooner rather than later.

Trade policy has become a focus of the IRA landscape. The EU and others reacted with outrage and countering legislation to the huge shift in global market incentives for U.S. investment as a result of the IRA and its investment in America's supply chains. Our nation saw responses like the EU's Critical Raw Materials Act. Also, Canada and Japan stepped up to solidify bilateral trade agreements with the U.S.

The U.S. does not have a free trade agreement with the Chinese Government, or the People's Republic of China (PRC). The unfortunate consequence of global realignment of investment incentives was that Chinese state-owned enterprises (SOEs) are taking advantage of U.S. tax credits by establishing Chinese subsidiaries on U.S. soil within U.S. supply chains. The clear and present example of this was when the massive Chinese tech company Contemporary Amperex Technology (CATL) announced after the IRA became law that it would build a new EV battery plant in Michigan in partnership with Ford Motor Co..

National Security Imperative in Creating Strong Industrial Policy

Domestic supply chains mean economic stability and are national security imperatives. The lack of secure and uninterruptible critical mineral supply chains is, in my professional opinion, the most significant national security threat that the United States and other friendly countries are facing thus far in the 21st century.

Nationwide, industry and financial leaders are finally waking up to the massive importance of the supply chain problem and the threat that it presents to America and our allies. JPMorgan Chase CEO Jamie Dimon recently warned in his annual letter to shareholders, by "using subsidies and its economic muscle to dominate batteries, rare earths, semiconductors, or EVs, [the PRC] could eventually imperil national security." Dimon stated the U.S. "cannot cede these important resources and capabilities to another country."[4]

Such a scenario is at our doorstep and will continue if we do not close these loopholes in IRA implementation.

[4] https://reports.jpmorganchase.com/investor-relations/2022/ar-ceo-letters.htm

In the true spirit of Executive Order 14017 (America's Supply Chains), I emphatically urge each federal agency and department to secure and diversify America's Supply Chains through continual IRA guidance. As the President declared, "more resilient supply chains are secure and diverse — facilitating greater domestic production, a range of supply, built-in redundancies, adequate stockpiles, safe and secure digital networks, and a world-class American manufacturing base and workforce."[5]

The bipartisan and bicameral congressional pushback on lack of Treasury guidance demonstrates incongruity of administration implementation compared to original congressional intent—with respect to IRA language. Without question, this is the most critical, truly bipartisan, and whole-of-industry impactful issue of our time.

Breaking Down the Chinese SOE Economy

I reiterate this undeniable point: the most consequential incongruity of the IRA implementation is that Chinese SOEs are able to take advantage of U.S. tax credits on U.S. soil within U.S. supply chains.

As I told reporters who asked about this issue, the PRC and CATL are essentially the same thing. There's really no separation.[6] It's just the nature of the way business is done in PRC, that the Chinese Communist Party (CCP) has influence and control over all of its state-owned companies.

Understanding the PRC market economy as it applies to critical minerals and metals can be broken down into hard subsidies, soft subsidies, and structural advantages over free markets.

The PRC deploys their own system of hard and soft subsidies in critical mineral supply chains. They apply value-added export taxes to finished magnets and added taxes for shipping mineral oxides, metals, or alloys. These hard subsidies create an incentive for Chinese companies to keep the supply chain for early-stage minerals in China and add a premium on trade in any mineral products.

Soft subsidies include Foreign Direct Investment (FDI) through the Belt & Road Initiative (BRI), reduced labor and environmental costs, and intellectual property and technology transfer.

Structural advantages of the PRC's critical mineral economy and larger energy systems include dominant SOEs and orchestrated coordination across the SOE ecosystem, all at the direction and discretion of the CCP. When a company like CATL takes any action, it is acting in lockstep with the CCP.

The PRC's mineral and metal producing sector is heavily dominated by SOEs. In 2015, the Congressional Research Service (CRS) reported Chinese government officials proposed that rare earth producers be merged into six firms: Boatang Group (Baotou Steel and Rare Earth),

[5] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/02/24/executive-order-on-americas-supply-chains/

[6] https://www.foxnews.com/politics/ccp-backed-tech-companies-poised-cash-in-bidens-climate-bill-national-security-experts-warn

Chinalco (Chalco Rare Earth), Minmetals Rare Earth, Ganzho Group, Fujian Changting Jinlong Rare Earth Co., Ltd., and Guandong Rising Non Ferrous Metals.[7] In 2021, this consolidation was furthered by merging of China Minmetals Rare Earth Co. with two other state-owned giants, Chinalco Rare Earth and Metals Co and Ganzhou Rare Earth Group, to form a new group under the direct control of the central government.[8] Similar government-directed consolidations have occurred in Chinese iron and steel markets, as well as the aluminum sector.

Chinese SOEs are artificially supported and protected by CCP-state funding combined with practices that pit them against each other creating hypercompetitive productivity. This market scenario results in high efficiency, oversupply, and low prices. They then flood the market with cheap goods. This is the opposite of U.S. experiences with monopolies in our capitalist free market, where monopolies are inefficient and tend to undersupply goods to assure high prices.

When state-funded companies such as CATL are allowed to do business inside the U.S., we must assume PRC intelligence agencies are illegally collecting U.S. sensitive information, stealing intellectual property, and doing everything they can to continue their dominance in this sector. **This is the major 21st century threat to our domestic manufacturing and industrial capabilities.**

The PRC's offshoring of its battery manufacturing capacity to the U.S. is a direct extension of the BRI. This is but one example of a Trojan horse inserted into our nation's industrial and manufacturing sectors and our national policy development.

The many geopolitical advantages gained by the PRC's critical materials monopoly will be used to prevent any meaningful competition in downstream rare earth element production outside of the PRC's control. We already see evidence of this in the form of "Dragonbridge," a Chinese misinformation campaign launched against U.S. government-contracted rare earth project in Texas.[9]

The Role of Foreign Direct Investment (FDI) and Response of CFIUS

FDI is not a tool that is unique to the PRC. FDI occurs when an entity of one country obtains a lasting financial interest in and a degree of influence over the management of a business enterprise in another country. FDI is commonly defined as 10% or more of voting securities or equivalent interest.

FDI can take the form of establishment of new operations ("greenfield investments"), the purchase of existing operations (through mergers and acquisitions), or the infusion of capital to existing operations. It is distinct from portfolio investment, for example, ownership of stocks, bonds, or other financial assets.

The evidence for increasing FDI is the extraordinary track record of approvals by the Committee on Foreign Investment in the U.S. (CFIUS). Reviews by CFIUS identify and address any

[7] https://crsreports.congress.gov/product/pdf/R/R43864/6
[8] https://www.ft.com/content/4dc538e8-c53e-41df-82e3-b70a1c5bae0c
[9] https://www.defenseone.com/technology/2022/06/chinas-disinformation-warriors-may-be-coming-your-company/368791/

consequent national security risks posed by potential foreign "control" of a U.S. business or creating undue "harm" within an economic sector such as mining or mineral processing or metallurgy. A CFIUS Risk Assessment considers three issues: 1) Threat posed by the foreign investment in terms of intent and capabilities. 2) Aspects of the business activity that pose vulnerabilities to national security, and 3) National security consequences if the vulnerabilities are exploited.

CFIUS decisions involving FDI in American critical mineral supply chains can have long-term economic and geopolitical implications. As CFIUS has resource and scope limitations, senior-level decision-making capabilities regarding mineral supply chain issues in the U.S. will usually be limited in their effectiveness.[10]

The PRC's modus operandi is to conceal its ownership or influence over U.S. companies and universities that present themselves as home-grown domestic entities dedicated to promoting U.S. commercial and national interests. In some instances, these companies or universities have filed for and were granted U.S. government funding, as in the case of routine DOE awards for critical mineral research.

For example, a federal grant was awarded to the company Microvast despite the company having documented ties to the CCP and operating primarily out of China.[11] The grant was part of the Infrastructure Investment and Jobs Act (IIJA), which aimed to secure America's domestic supply chains by being less reliant on the PRC for materials such as lithium-ion battery cells or critical minerals.

According to Reuters, over 200 companies competed for DOE grants under the IIJA last year, but only 20 companies were awarded, including CCP-backed Microvast.[12] In a press release the company describes itself as "a leading global provider of next-generation battery technologies for commercial and specialty vehicles."[13] In a December 14, 2021 Securities and Exchange Commission (SEC) filing the holding company of Microvast called Microvast Holdings Inc. stated, "We are a holding company, and we conduct all of our operations through our subsidiaries, and principally through our subsidiary in China."[14]

The PRC will continue to rely on U.S. companies via FDI and voluntary compliance with CFIUS to manipulate the U.S. political system to maximize their economic advantage. Many SOEs are taking equity positions in resource companies abroad supported by CCP national policies. Elizabeth Economy reported in her article "By All Means Necessary" that nearly 40% of Chinese mining companies involved in foreign projects are state-owned.[15] No doubt this number has exponentially grown since that 2014 report. Strategic FDI is observable in the largest

[10] https://home.treasury.gov/policy-issues/international/the-committee-on-foreign-investment-in-the-united-states-cfius/cfius-overview
[11] https://finance.yahoo.com/news/microvast-200-million-us-grant
[12] https://www.reuters.com/business/republican-lawmakers-criticize-us-grant-battery-company-with-china-ties-2022-12-07/
[13] https://ir.microvast.com/node/6966/html
[14] https://www.sec.gov/Archives/edgar/data/1760689/000121390021065178/fs12021a3_microvast.htm
[15] https://allchinareview.com/by-all-means-necessary-how-chinas-resource-quest-is-changing-the-world/

manufacturing companies in the world that require rare earth elements, other critical minerals, or critical material dependent components for their systems.

Maintaining a Balanced Understanding of Trade

In the short-term, the U.S. will need to engage with allies and free-trade partners to secure our mineral supply chains. The solidification of our free-trade partnerships, even with the current patchwork of agreements, ensures our continual collaboration with North American countries and observance of longstanding allies. Congress should be involved in ratifying such free-trade agreements with clear mandates for allied cooperation.

A recent report from Commerce Department on the imports of critical minerals highlighted the value of multilateral engagement on critical minerals which can help transition the U.S. and allies from reliance on a potential adversary and national security threats.[16] One ongoing bilateral engagement is the U.S.-Canada Joint Action Plan on Critical Minerals (2019). GreenMet recently participated in a panel at the Canadian Embassy to highlight continued U.S. collaboration on critical minerals and supply chains. Other multilateral agreements with G20 and QUAD countries can also facilitate efficient coordination on supply chain resiliency issues.

Defining foreign entities of concern in coordination with current national defense laws and other agency guidance like the U.S. Export-Import Bank (EXIM) and U.S. International Development Finance Corporation (DFC) will not preclude any continuation of U.S. trade. Under the Defense Production Act, Canada is considered a "domestic source" which shows the flexibility in U.S. policy to look beyond our borders for our critical needs especially in reducing the nation's reliance on foreign supply chains.[17]

Foreign entities of concern as a definition should include "covered nations" as defined in U.S. law.[18] Additionally, entities in other markets where covered nations have a controlling interest should be excluded from tax advantages. Such entities can include groups that receive "soft subsidies" from regimes such as PRC and the Russian Federation – including several countries receiving significant investment through the BRI and other FDI. This includes Democratic Republic of Congo and their Chinese affiliates as well as Belarus with their Russian affiliates.

This definition of a foreign entity of concern already exists in U.S. law as guidance for rebuilding our defense industrial base and calling for the prohibition on acquisition of sensitive materials from non-allied foreign nations. The case for application of this definition to our domestic mineral supply chains is now. Our energy security must be viewed as national security.

In the global market, the PRC has disproportionate control over the upstream production and downstream processing of many critical minerals such as cobalt (65%), lithium (55%), copper (40%), nickel (35%), graphite (99%), synthetic graphite (78%), polysilicon (80%) as well as

[16] https://www.bis.doc.gov/index.php/documents/section-232-investigations/3141-report-1/file
[17] https://www.businessdefense.gov/ai/dpat3/index.html
[18] 10 USC § 2533c(d)(2): The term "covered nation" means— (A) the Democratic People's Republic of North Korea; (B) the People's Republic of China; (C) the Russian Federation; and (D) the Islamic Republic of Iran

92% of the global cathode capacity, 91% of global anode capacity, and virtually 100% of the rare earth market. When combined with the PRC's near 100% control over the production of EV grade high-temperature rare earth magnets, the PRC owns the EV space and most other technologies that are dependent on these critical materials.

Other elements and materials where the PRC is the global dominant supplier include aluminum (55%), antimony (84%), arsenic (61%), bismuth (70%), fluorspar (59%), gallium (96%), germanium (72%), indium (57%), manganese (93%), mercury (89%), vanadium (60%), tantalum (40%), and tungsten (83%). At any point, especially in light of recent sanctions threatened by the CCP, the PRC may limit global access by restricting trade to these and other critical minerals, all of which have the PRC as the dominant global producer or mineral processor and metal producer.

According to the 2023 U.S. Geological Survey (USGS) Mineral Commodity Summaries, the U.S. is over 50% import reliant for 51 minerals, which is up from 47 minerals in 2021. Furthermore, it is 100% reliant on imports for 15 minerals, 12 of which are listed on the USGS' 2022 Final List of Critical Minerals.[19] Of all the countries with which the U.S. trades, the PRC is the nation that we are most reliant on for critical mineral imports.

Therefore, trade policy will be key in decreasing our import reliance on foreign entities of concern. Successful trade policy is also key in identifying our friendly partners for defense purposes, diplomatic purposes, and economic stability.

Recovering Real Investment Solutions in Domestic Energy Production and Manufacturing

Existing tax credit policy lacks specificity at each step of the process in determining eligibility for receiving these new and expanded green energy tax credits. If we allow this policy to remain unchanged, we ignore the massive vulnerability for the PRC to exploit the current U.S. tax code on U.S. soil under the disguise of assisting U.S. industry when in reality, they are actively undermining U.S. industry. We are preventing the birth of legitimate U.S. alternatives in our nation's energy and critical mineral resources and the other economic sectors that rely heavily on them. This is a disastrous loophole that must be closed.

Strong industrial policy closes loopholes in economic subsidies. Closing loopholes by defining foreign entities of concern as non-allied foreign nations and other markets where covered nations have a controlling interest will strengthen the case for subsidies as strong incentives for the industry. Closing loopholes will de-risk domestic energy production for willing Wall Street investors and patriotic American companies looking to unleash American energy production again.

What our foreign adversaries have understood very effectively is that when they're able to control the lion's share of the critical mineral supply chain—even 80% of the key components — then they can affect legislation, find other political and economic loopholes, and in general

[19] https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf

maintain resource “supply chain control” where they have the ability to restrict supplies to the U.S. thus providing massive geopolitical leverage to our adversaries.

A portfolio of options exists inside the U.S. today that, if given even a small amount of time and government support, can organically grow with minimal foreign interference. We must control our own destiny, but the window of opportunity to rebuild domestic supply chains is closing if we don’t take action now.

Thank you again for the opportunity to testify today. I look forward to your questions.

*Chairman Smith of Missouri. Thank you, Mr. Horn.

Mr. Stein, you are recognized.

STATEMENT OF KENNY STEIN, POLICY DIRECTOR, INSTITUTE FOR ENERGY RESEARCH

*Mr. Stein. Mr. Chairman, thank you for the opportunity to testify at this hearing.

The subsidies in the misnamed Inflation Reduction Act which we are examining today are worse than merely misguided industrial policy because the industries singled out for the most generous subsidy, which -- namely, the wind, solar and batteries industries -- are not actually domestic industries. The inputs and components that will build the subsidized green energy system envisioned by the IRA will be coming from foreign countries, especially China, which thoroughly dominates both the solar and battery industries, and is a major part of the wind industry.

The IRA thus discards even the usual justifications for industrial policies such as domestic industry or security. This green industrial policy actually seeks to destroy domestic energy and replace it with foreign energy. The policy set forward in the IRA will tax our children to pay China for green energy to replace the oil, natural gas, and coal that we currently produce here in the United States. Because of the uncapped nature of the IRA tax credits, there is actually no way to know how much taxpayers are eventually going to be on the hook for.

Additionally, despite some of the IRA subsidies getting firm end dates, both the Production Tax Credit and the Investment Tax Credit could hang around for decades, as they are set to phase out only after a certain emissions target has been met. Most forecasts don't see that threshold being met until the 2040s, or even later.

If the prospect of our children and grandchildren paying for these vast subsidies for decades to come isn't bad enough, these subsidies will ultimately be funneled into the hands of Chinese companies.

The problem with wind, solar, and batteries is that they require an enormous amount of minerals to build in the first place. For example, a typical electric car requires six times the mineral inputs of a conventional car, mainly due to the battery module. An onshore wind plant requires nine times more mineral resources than a gas-fired plant. Because of this, since 2010 the average amount of minerals needed for a new unit of power generation capacity has increased by 50 percent, as the share of renewables in new investment has been rising.

Unlike oil and natural gas, which are found and produced around the world, the production of the main green minerals is quite concentrated. In 2019, for example, the top 3 extractors of copper and nickel produced more than half of global production alone. And the top 3 extractors of cobalt rare earths and lithium produced 75 to 85 percent of global production. In contrast, the top 3 producers of oil and natural gas, which both include the United States, produce less than 50 percent of total global production.

But this mining concentration actually pales in comparison to the concentration in processing, where China thoroughly dominates. China now processes the majority of the world's nickel, cobalt, lithium, graphite, manganese, and rare earths, which are all key inputs for wind turbines, solar panels, and batteries. For several of those categories such as graphite, manganese, and rare earths, China accounts for 80 to 100 percent of global production.

China's dominance goes beyond the processing itself. China also controls the manufacturing and production of lithium ion battery cells, anodes, and cathodes, and polysilicon wafers, crystalline silicon cells, and solar modules. What this means is that green energy is truly made in China. Thus, the vast spending from IRA subsidies will be spent on Chinese products and inputs, and enrich Chinese companies.

Now, the IRA did include some incentives to try and bring back many of these inputs

domestically. But the process of opening a new mine stretches for many years, if not decades. New processing facilities will -- unlikely to meet U.S. environmental standards, which, frankly, is part of why a lot of this production happens in China today. Some final assembly of imported Chinese components will probably happen in the U.S. and often foreign-owned facilities in order to gain the IRA subsidy eligibility. But that facade cannot hide what is actually happening, which is a long way of saying that green energy will not be made in the USA any time soon. To subsidize green energy today is to subsidize China.

For decades, the primary goal of American energy policy has been security of supply to ensure that the United States can rely on itself for energy supplies in the event of a conflict or crisis. Just in the last five years, we have just about achieved that energy security that had been so elusive for so long. The U.S. is a net exporter of oil, natural gas, coal, and refined products, and what oil we still import mostly comes from Canada and Mexico. Yet the avowed goal of the IRA is to throw away that hard-earned security and replace our entire energy system with inferior green alternatives sourced from overseas.

To put this in context, at the peak, in 2001, the United States relied on the Middle East for 23 percent of our oil needs. That was viewed as a national security crisis. The U.S. currently imports 74 percent of our rare earth needs from China, with many other green metal needs over 50 percent. There is no prospect of that changing in the near future. Yet we are intentionally seeking to increase reliance on these Chinese energy sources.

The security issue goes beyond merely China's control of the inputs of the green energy system. An electric grid that is more reliant on intermittent sources is more fragile and expensive. This weaker, more expensive grid is more susceptible to failures, be they weather events, human error, or deliberate damage, because there is not a strong reserve of stable, dispatchable generation.

The IRA energy subsidies are pushing the U.S. towards more expensive and less

reliable electricity, while also discarding America's energy security in favor of dependence on China. That -- we get this supposedly in return for a small degree of reduction in carbon dioxide emissions, even though the magnitude of that reduction is questionable once you calculate Chinese manufacturing and the overbuilding of the grid.

It might seem incredible to the average voter to believe that we would be consciously replacing domestic energy with unreliable, expensive, foreign-controlled energy, but that is the net effect of the subsidies in the IRA.

Thank you for the opportunity.

[The statement of Mr. Stein follows:]

**********COMMITTEE INSERT**********

IER INSTITUTE FOR ENERGY RESEARCH

Testimony before the House Ways and Means Committee

Hearing on the U.S. Tax Code Subsidizing Green Corporate Handouts and the Chinese Communist Party
Wednesday April 19, 2023

Kenneth Stein
Policy Director, Institute for Energy Research

Mr. Chairman, thank you for the opportunity to testify at this hearing.

My name is Kenny Stein, I am the Policy Director for the Institute for Energy Research, a free-market organization that conducts research and analysis on the function, operation, and regulation of energy markets.

Vast subsidies for politically-favored industries are rarely a wise use of taxpayer funds. Politicians are very bad at identifying the most productive technologies or foreseeing future economic trends. This means industrial policy is distortive and often leads to inefficient and wasteful resource allocation as industries chase government money and mandates rather than catering to customers or working to innovate for the future. The copious suite of subsidies crammed into the misnamed Inflation Reduction Act (IRA) shares those usual deficiencies. However, the IRA goes further than merely misguided industrial policy because the industries singled out for the most generous subsidy – namely wind (electricity generation), solar (electricity generation), and batteries (both for electricity storage and electric vehicles) – are not domestic industries. The inputs and components that will build the subsidized green energy system envisioned by the IRA will come from foreign countries, especially China, which thoroughly dominates both the solar and batteries industries, and is a major part of the wind industry. The IRA thus discards even the usual justifications for industrial policy such as supporting domestic industry or security. This green industrial policy actually seeks to destroy domestic energy and replace it with foreign energy. The policy set forward in the IRA will tax our children to pay China for green energy to replace the oil, natural gas and coal that we currently produce here in America.

Numerous recent cost estimates make very clear that the CBO estimates for the tax credits in the IRA were deeply underestimated. Because of the uncapped nature of the IRA tax credits, there is no way to actually know how much taxpayers will be on the hook for. Additionally, despite some IRA subsidies getting firm end dates, both the Production Tax Credit and the Investment Tax Credit could hang around for decades as they are set to phase out only after a certain emissions target have been met. There is vanishingly little chance that emission

threshold will be met by 2032, most forecasts don't see that threshold being met until the 2040s or even later. With the social security trust fund projected to be exhausted by 2034, we face the prospect of social security benefit cuts coming before these special interest industries lose their subsidies. If the prospect of our children and grandchildren paying for these vast subsidies for decades to come isn't bad enough, these subsidies will ultimately be funneled into the hands of Chinese companies.

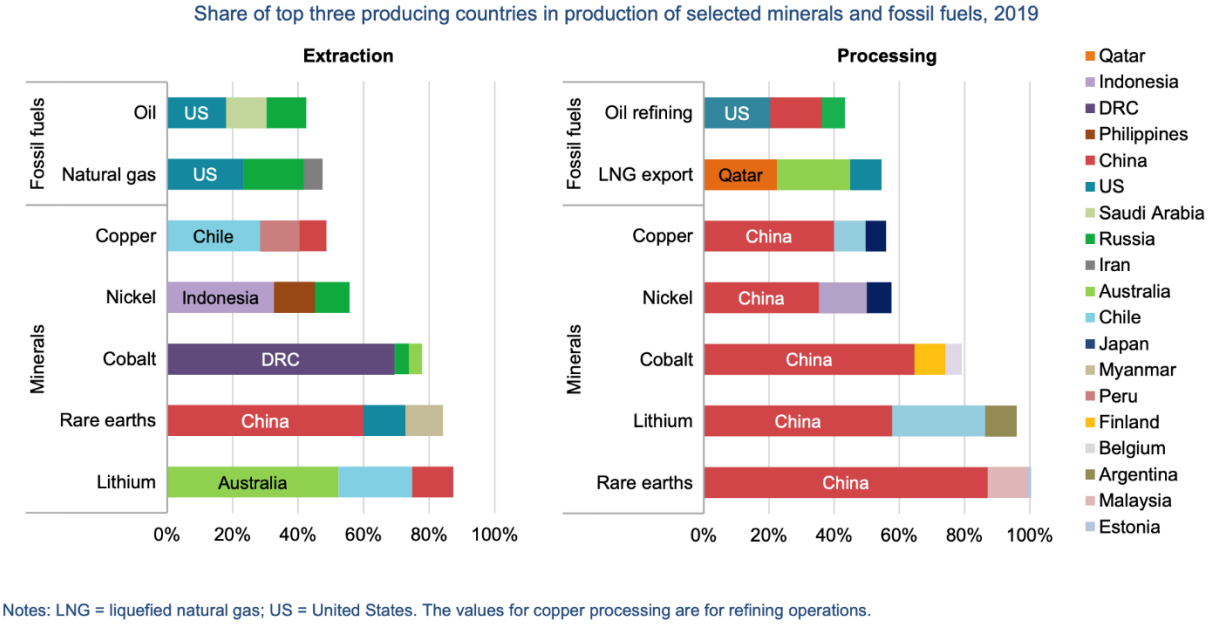
Green Energy Is Made In China

The problem with wind, solar and batteries is that while they don't require ongoing fuel like other electricity sources, they require an enormous amount of materials to build in the first place. For example, a typical electric car requires six times the mineral inputs of a conventional car mainly due to the battery module, and an onshore wind plant requires nine times more mineral resources than a gas-fired plant. Since 2010 the average amount of minerals needed for a new unit of power generation capacity has increased by 50% as the share of renewables in new investment has risen.[1]

These minerals have to come from somewhere, dug up out of the ground and processed into a usable form. Unlike oil and natural gas, which are found and produced around the world, the production of the main green minerals is quite concentrated. In 2019 for example, the top three extractors of copper and nickel produced more than half of global production, and the top three extractors of cobalt, rare earths, and lithium produced 75-85% of global production. In contrast, the top three producers of oil and natural gas (both of which include the United States) produce less than 50% of global production. But this mining concentration pales in comparison to the concentration in processing, where China dominates.

[1] International Energy Agency, *The Role of Critical Minerals in Clean Energy Transitions,* May 2021, https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

Production of many energy transition minerals today is more geographically concentrated than that of oil or natural gas



Notes: LNG = liquefied natural gas; US = United States. The values for copper processing are for refining operations.

Source: IEA World Energy Outlook Special Report[2]

China now processes a majority of the world's nickel, cobalt, lithium, graphite, manganese and rare earths, which are key inputs for wind turbines, solar panels, and batteries. For several of those categories, such as graphite, manganese and rare earths, China accounts for 80-100% of global production. China's dominance goes beyond the processing itself; China also controls the manufacturing and production of many green energy products: around 80% of lithium-ion battery cell production; 80-90% of anode and cathode production; between 60-80% of polysilicon, wafers, crystalline silicon cells, and solar modules.

What all this means is that green energy is truly made in China. Thus, the vast spending from IRA subsidies will be spent on Chinese products and inputs and enrich Chinese companies. Now the IRA did include some incentives to try to produce many of these inputs domestically, but the process of opening a new mine stretches for many years if not decades. And that is assuming all goes well with the permitting and approval process, which has not been the case under the Biden administration, with mines such as Twin Metals and Polymet in Minnesota, Resolution and Rosemont in Arizona, and Pebble and the Ambler Mining District in Alaska, just to name a few prominent examples, all facing obstacles or outright disapproval. The processing of these minerals is also a very dirty and energy-intensive business, which is part of why so much of it is done in China where what minimal environmental standards as may exist are easily ignored if you have the right connections and cheap coal-powered electricity is on offer. Trying to build these processing facilities in the United States will inevitably be stymied by the National Environmental Policy Act or other environmental regulations, to say nothing of the

[2] International Energy Agency, *The Role of Critical Minerals in Clean Energy Transitions*, May 2021, https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

lawsuits from every green organization under the sun (organizations which ironically also support increased use of green energy). Some final assembly of imported Chinese components will probably happen in the US in foreign-owned facilities in order to game IRA subsidy eligibility, but that façade cannot hide what's really happening. Which is all a long way of saying that green energy will not be made in the USA anytime soon. To subsidize green energy today is to subsidize China.

What About National Security

For decades the primary goal of American energy policy has been security of supply, to ensure that the United States can rely on itself for energy supplies in the event of conflict or crisis. Just in the last 5 years we have just about achieved that energy security that was so elusive, the US is a net exporter of oil, natural gas, coal, and refined products, and what oil we still import mostly comes from Canada and Mexico.[3] We are so secure that we were able to aggressively sanction the oil industries of two major producers (Iran and Venezuela) without worrying about domestic energy impacts. After Russia invaded Ukraine, US natural gas has been able to replace Russian supplies to our friends and allies in Europe. The energy posture of the United States is the envy of the world, even now with a hostile administration trying to shut down domestic production of oil and gas. Yet the avowed goal of the IRA is to throw away that hard earned security and replace our entire energy system with inferior green alternatives sourced from overseas.

To put this in context, at the peak in 2001 the United States relied on the Middle East for 23% of our oil needs.[4] That was viewed as a national security crisis, that we were running out of oil and reliant on countries that hated us. The US currently imports 74% of our rare earth needs from China, with many other major green mineral needs over 50%.[5] The entire solar and battery supply chains are controlled virtually end to end by China. There is no prospect of that changing in the near future. Yet we are intentionally seeking to increase reliance on these Chinese energy sources.

The security issue goes beyond merely China's control of the inputs to a green energy system. An electric grid more reliant on intermittent generation sources is much more fragile and expensive. Intermittent energy frequently goes to zero, requiring expensive backup capacity and vast spending on transmission and duplication to even attempt to support the electricity demands of a modern economy. Wind and solar generation sources also do not last very long, usually needing to be replaced within 20 years (in contrast to coal, gas, nuclear or hydro power which all measure their service life in multiples of decades). This weaker, more expensive grid is

[3] U.S. Energy Information Administration https://www.eia.gov/tools/faqs/faq.php?id=727&t=6
[4] Oil Price, How the United States has Reduced Its Dependence on Middle East Oil, January 15, 2020, https://oilprice.com/Energy/Energy-General/How-The-US-Has-Reduced-Its-Dependence-On-Middle-East-Oil.html
[5] U.S. Geological Survey Mineral Commodity Summary 2023 https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf

more susceptible to failures, be they weather events, human error, or deliberate damage, because there is not a strong reserve of stable, dispatchable generation.

IRA Subsidies Deliberately Weaken Both Our Electric Grid And Our National Security

The IRA energy subsidies are pushing the US towards more expensive and less reliable electricity, while also discarding America's energy security in favor of dependence on China. All that we supposedly get in return is some small degree of reduction in carbon dioxide emissions, though even the magnitude of that reduction is questionable once you factor in the emissions from manufacturing in China plus the emissions from overbuilding the grid to support renewables. It might seem incredible to the average voter to believe that we would be consciously replacing reliable domestic energy with unreliable, expensive and foreign-controlled energy, but that is the net effect of the energy subsidies in the IRA. It is a scandal that we would so deliberately harm ourselves to the benefit of our greatest geopolitical adversary and a course correction is desperately needed.

*Chairman Smith of Missouri. Thank you, sir.

Mr. Ginn, you are recognized.

STATEMENT OF VANCE GINN, SENIOR FELLOW, AMERICANS FOR TAX REFORM

*Mr. Ginn. Chairman Smith, members of the committee, my name is Dr. Vance Ginn. I am the president of Ginn Economic Consulting, senior fellow at Americans for Tax Reform, and chief economist at the Pelican Institute for Public Policy. I was also the associate director for economic policy at the Office of Management and Budget in 2019 and 2020.

And when -- yesterday was Tax Day. And we have got an issue here where we are looking at taxes, what was in the Inflation Reduction Act and the massive amount of debt, excessive government spending that is hitting the nation. I think this is a major fiscal crisis that we are looking at, an economic threat that is very large for the American people across the nation that is driven by excessive spending.

But at the same time, we do have a tax problem in this sense -- usually excessive spending problem, which it is, but now we are seeing how taxes are also influencing the economy and taking a pretty big hit, overall. We have got about $31 trillion in national debt, which amounts to $95,000 owed per tax -- per American, or $250,000 per taxpayer.

The CBO estimates we are going to have an average of $2 trillion a year in -- just in the deficit annually, and nearly $1 trillion pretty soon on the net interest payments on the debt. This is a massive amount of an issue. Along with rising interest rates, we are also seeing slow economic growth. Last year, when you look at the fourth quarter of 2021 to the fourth quarter of 2022, there was 0.9 percent growth, and the overall economy was the slowest from Q4 over Q4 on record during a so-called recovery.

So I think what we really need to be focused on, as well, is reining in government spending, passing responsible American budgets that grow no more than the means of the --

of taxpayers across the country. And I think we would be in a much better position.

And that fiscal crisis has been increased dramatically by the so-called Inflation Reduction Act, which -- inflation is still at a multi-decade high of over five percent, still running pretty hot. I think we have still got some increases in inflation that is moving forward, as well. So it is something that really needs to be looked at.

And so when you are breaking down what is in the Inflation Reduction Act, the CBO's estimate of $391 billion last year, there have been more estimates that have come out that show this is closer to $1.2 trillion, more than 3 times as much as what was initially estimated just last year at a huge cost to the American taxpayer over time, along with a lot of the green energy agenda, other things that are a part of this for unreliable sources of energy that are putting money into the situation of picking winners and losers throughout this overall economy.

Some of this has been because of, you know, the incentives matter. When you start handing out taxpayer dollars, there will be an increase in EV production, and we have seen that. So those estimates have been changed compared to what was done last year.

There is also Treasury guidance that has changed some of the dynamics of how much the costs were going to be within the Inflation Reduction Act, and also looking at the electric vehicle, you know, battery cells and modules and what those costs were going to be. CBO initially estimated those to be $30 billion, and now the estimate, when you look at $45 for these batteries per kilowatt hour, are being closer to $196 billion, nearly $200 billion, nearly 7 times what CBO initially estimated just last year. This is quite remarkable when you think about it, that -- the cost to taxpayers of what this is going to do.

And there is still a lot more that is going to be done. I mean, even Senator Manchin said recently, when he looked at the Treasury's recent guidance, he said in a press release, "The guidance released by the Department of Treasury completely ignores the intent of the

Inflation Reduction Act. It is a pathetic excuse to spend more taxpayer dollars as quickly as possible, and further control -- cedes further control to the Chinese Communist Party in the process."

And so, as has been mentioned before, this will mean more production in other countries, one of those being in China. So what are the concerns with that?

There are a lot of concerns that have been discussed over time. But also looking at the defining eligibility, there are still going to be additional eligibility requirements coming out of Treasury. What sort of effects will those have on the estimates that were done?

You know, in economics trade-offs matter, incentives matter. The amount of money that is being spent of taxpayer dollars continues to matter. And we want more money in the pockets of taxpayers, so that way they can put food on the table, save for a rainy day, and things of that nature. And as we are spending more, running up deficits and debt, we are crowding out the productive private sector of our economy, and we are picking winners and losers in the process.

So our hope is that Congress and others will look at re-estimating the high cost of the Inflation Reduction Act, and finding ways to start to look at what those costs really mean to taxpayers in the process as you move forward here in this committee and in others.

So, you know, given the economic situation that is happening right now, slowing growth, slow growth last year, you know, Americans have faced 24 consecutive months of declining real wages in inflation-adjusted wages year over year. This is not a good situation. So I hope that you will take a re-look at the -- estimating the Inflation Reduction Act's cost.

Thank you for your time, and I look forward to your questions.

[The statement of Mr. Ginn follows:]

**********COMMITTEE INSERT**********

Statement of

Vance Ginn, Ph.D.
President, Ginn Economic Consulting
Senior Fellow, Americans for Tax Reform
Chief Economist, Pelican Institute for Public Policy

House Committee on Ways and Means
Hearing on the U.S. Tax Code Subsidizing Green Corporate Handouts and the Chinese Communist Party

April 19, 2023

Chairman Smith, Ranking Member Neal, and Members of the Committee, thank you for the opportunity to testify before you today.

My name is Dr. Vance Ginn, and I am President of Ginn Economic Consulting, Senior Fellow at Americans for Tax Reform, Chief Economist at Pelican Institute for Public Policy, and former associate director for economic policy of the White House's Office of Management and Budget from June 2019 to May 2020. In these capacities, my work provides high-quality research and economic insights that champion free-market solutions to let people prosper. It is a pleasure to be here today to testify on an issue hindering prosperity in the U.S. and could continue to do so in the future if things don't change. You can find my full policy brief on the costs of the so-called Inflation Reduction Act's (IRA) tax credits for electric vehicle (EV) battery cells and modules in the Appendix.

Need for Responsible American Budget

Congress has a fiduciary responsibility to be good stewards of taxpayer dollars and practice fiscal discipline when it comes to spending on federal programs. Unfortunately, that has not been the case for many years. This has been magnified from excessive government spending especially since the COVID-19 pandemic and shutdowns, including the IRA, which as I'll discuss will not reduce inflation. There are stark underestimates of the IRA which are costly for Americans driven in part by underestimates of the costs of tax credits for EV battery cells and modules that should be re-estimated and consideration of eliminating them. But before I explain the details, let me note the irresponsible federal spending situation which is destroying economic prosperity.

The national debt is more than $31 trillion, amounting to about $95,000 owed per American or almost $250,000 per taxpayer, and is far more than our country's entire economic output. The Congressional Budget Office (CBO) has projected that the budget deficit will average $2 trillion annually over the next decade, further adding to the national debt and net interest payments that with higher interest rates will likely surpass $1 trillion per year soon. This fiscal crisis from excessive government spending has been contributing to multi-decade high inflation, the slowest economic growth from a fourth quarter to the next fourth quarter of only 0.9% from 2021 to 2022 on record without a recession, and 24 consecutive months of negative year-over-year inflation-adjusted average weekly earnings.

We need a different direction with responsible budgeting to stop excessive spending and start spending within our means. Ultimately, Congress should pass a strict spending limit with the maximum growth rate better matching the average taxpayer's ability to pay for government spending, as measured by the rate of population growth plus inflation, which is what I've called the Responsible American Budget. Had Congress simply matched this maximum spending growth

rate from 2003 to 2022, there could have been only a cumulative $500 billion debt increase instead of the actual increase of $18.5 trillion, providing $18 trillion in static savings for taxpayers. In short, Congress should restrain spending now as it is pro-growth and will support more economic prosperity.

Higher Costs of Inflation Reduction Act

The U.S. Congress passed and President Biden signed into law the so-called "Inflation Reduction Act" (IRA) in August 2022. Given updated data and new rules, the IRA will likely cost more than three times more at $1.2 trillion than CBO's initial cost estimate of $391 billion. This will contribute to slower economic growth, higher inflation, and less economic prosperity. Contributing to this is higher costs of the tax credits for electric vehicle (EV) battery cells and modules, which subsidize manufacturing of EV batteries and modules by many large U.S. corporations and oftentimes production in China and other countries.

Details of Tax Credits for EV Batteries

Section 13502 of the IRA titled "Advanced Manufacturing Production Credit" includes tax credits for domestically manufactured battery cells and modules. EV producers are currently taking advantage of this new initiative. In 2022, investments in U.S. EV manufacturing grew from $24.3 billion in 2021 to $73.6 billion, indicating a much larger cost from these new tax credits than were initially estimated by the CBO. These EV battery production tax credits artificially reduce the cost of producing these battery cells and modules through direct subsidies of taxpayer money to businesses. The amount of a tax credit to the producers of these batteries depends on kilowatt hours (kWh). Battery cells can receive a $35 tax credit for every kWh of energy the battery produces, while battery modules can receive $10 per kWh, or $45 in the case of a battery module that does not use battery cells.

Underestimated Costs

The CBO estimates that funding these tax credits over the next decade (2022-31) could cost $30.6 billion. Given that the market growth for domestic energy production cannot be fully forecast, the CBO's projected costs for this initiative are unlikely. New estimates by Mercatus Center and Goldman Sachs based on the current growth of the EV market in the U.S. show that the actual cost could be substantially higher. For instance, a manufacturer utilizing the $35 per kWh tax credit could accrue nearly $2.5 billion in credits in one year just by producing 70-kWh batteries for one million vehicles. This calculation is consistent with recent EV sales.

Examples of Costs

Last year, Tesla's Model Y was the most-sold EV in America, selling 234,834 units. The Model Y battery starts at 75-kWh. Given these figures, Tesla could have received over $616 million in tax

credits for its 2022 sales of the Model Y alone. In 2023, Tesla is estimated to produce close to two million EVs, with Model Y production alone anticipated to reach one million units this year. These estimates match Tesla's first-quarter financial report for 2023, which shows that Tesla produced more than 440,000 EVs then. EV production at this level could amount to more than $5 billion in annual tax credits for Tesla, a single auto manufacturer. Additionally, Ford's Michigan plant with Chinese battery maker CATL alone could cost $1.5 billion annually in credits.

Updated Cost Estimates

Given these calculations based on just Tesla and GM, the CBO's cost estimate of $30.6 billion to fund these tax credits is too low. This was recently noted in estimates by Christine McDaniel of the Mercatus Center, who incorporated the full $45 tax credit across the market over the next decade in her calculations which result in a cost estimate of $196.5 billion, which is 540% higher than the CBO's estimate. However, using the $10 and $35 production credits, "the value drops to $43.7 billion and $152.8 billion, respectively." These calculations are based on 75% capacity utilization at battery plants according to announced plant capacity growth in a recent report by Argonne National Labs (ANL). Specifically, ANL notes that the announced capacity increases of "planned battery plants will increase the battery manufacturing capacity in North America from less than 100 GWh in 2021 to approximately 1,000 GWh by 2030."

Additionally, the CBO's original cost estimate was conducted without knowing the guidance from the Biden administration regarding the implementation of the IRA's EV provisions. In December 2022, the Treasury Department delayed plans to issue guidance for sourcing requirements for EV battery incentives under the IRA. This delay increased the pool of EVs eligible for tax credits as models not expected to comply with IRA's sourcing standards continued to be eligible for the credits. On March 31, 2023, the Treasury finally issued draft guidance on the IRA's EV provisions. This draft guidance reportedly weakens mineral sourcing requirements for EV battery production and could allow the Treasury to consider free trade agreements that could include mineral agreements with the European Union and Japan. This would greatly increase the pool of EVs eligible for the IRA tax incentives beyond what was understood during the passage of the IRA, increasing the demand for EVs and the cost of their taxpayer subsidies.

Even Democrat Sen. Joe Manchin (D-WV) who voted in support of the IRA has criticized Treasury's guidance while warning of the increased cost to taxpayers. Sen. Manchin stated in a press release that "the guidance released by the Department of the Treasury completely ignores the intent of the Inflation Reduction Act...It is a pathetic excuse to spend more taxpayer dollars as quickly as possible and further cedes control to the Chinese Communist Party in the process."

Guidance from the U.S. Treasury Department defining eligibility will play a significant role in understanding the cost of the IRA's EV tax provisions. The CBO's original estimate could not have foreseen the Treasury's proposed expansion of eligibility. New cost estimates should account for the Biden Administration's rule-making that will increase costs for taxpayers.

Conclusion

While the growth of markets is beneficial for overall economic welfare, the expansion of the EV market could easily burden the economy more than it will support it due to these expensive tax credits (and subsidies) provided in the IRA. Although the EV industry in the U.S. is growing, it is still a relatively small player in the overall U.S. economy. Given the over $31 trillion national debt, the potential costs of these subsidies must be properly understood, especially given the strained economy of high inflation and increasing likelihood of a deeper recession.

Considering these concerns and the fact that it is difficult to define how big the EV market could be over the next decade, policymakers must carefully consider the true costs and benefits of EV tax credits. As such, it is in the public interest of the CBO, along with other nonpartisan agencies and committees responsible for providing Congress with revenue estimates and sound economic analysis, to reassess the original estimates conducted by the CBO. Therefore, these costly tax credits should be scrutinized and possibly eliminated because of their excessive costs and distortions to the marketplace. In short, the IRA will not reduce inflation but it will support higher deficits, higher inflation, and slower economic growth that will contribute to a deeper recession. This is why it would be better called the “Inflation Recession Act.”

Thank you for your time. I look forward to answering any questions.

APPENDIX: POLICY BRIEF

THE INFLATION REDUCTION ACT'S COSTLY NEW TAX CREDITS FOR ELECTRIC VEHICLE BATTERIES

AUTHOR: VANCE GINN, PH.D.

APRIL 5, 2023
AMERICANS FOR TAX REFORM

Americans for Tax Reform is a non-profit 501(c)(4) organization that represents the interests of American taxpayers at the federal, state, and local level. Founded in 1985 at the request of President Reagan, ATR has for nearly 40 years publicly advocated for a system in which taxes are simpler, flatter, more visible, and lower than they are today. ATR educates citizens and government officials about sound tax policies to further these goals.

Author's Biography:

Vance Ginn, Ph.D., is president of Ginn Economic Consulting, senior fellow of Americans for Tax Reform, and chief economist or senior fellow at several national and state think tanks. He earned his doctorate in economics at Texas Tech University and has an accomplished career as an economist and university lecturer with experience in public policy, academia, and government. From 2019 to 2020, Dr. Ginn served as the associate director for economic policy of the Office of Management and Budget (OMB) at the Executive Office of the President. He resides in Round Rock, Texas.

Issue:

The Inflation Reduction Act that was passed in August 2022 includes tax credits for battery production for electric vehicles (EV) to help lower the cost and boost domestic production. Due to the rapid expansion of the domestic EV market, the Congressional Budget Office's estimated costs for these tax credits are well below more realistic costs through 2032.

Main Points:

- The Inflation Reduction Act (IRA) passed in 2022 includes battery production tax credits to boost domestic production for Electric Vehicles.
- The Congressional Budget Office (CBO) estimates that these tax credits will cost $30.6 billion over the next decade.
- New information for the growth of the EV market indicates that the CBO's estimates for these tax credits are well below more current and accurate projections, which show the cost could be nearly $200 billion.
- This is just one of the underestimated costs of the IRA, and every initiative in the act should be scrutinized, including these costly tax credits that distort the market and hinder economic growth.

Recommendation:

Policymakers should advocate for less government spending and fewer distortions of markets like eliminating the tax credits for the domestic production of EV batteries. Nonpartisan agencies and committees responsible for providing Congress with accurate revenue estimates and sound economic analysis should reexamine their initial cost estimations.

Executive Summary

The U.S. Congress passed and President Biden signed into law the so-called "Inflation Reduction Act" (IRA) in August 2022. The IRA includes many provisions which are now estimated to cost $1.2 trillion over a decade per Goldman Sachs' more recent analysis compared with the Congressional Budget Office's (CBO) initial estimate of $391 billion.

Part of this substantially higher estimated cost is because of the new cost estimates for tax credits for electric vehicle (EV) battery cells and modules manufactured in the U.S. Instead of the initially estimated cost of $30.6 billion by the CBO, new estimates based on more precise projections and growth in the EV market indicate that this could be as high as $196.5 billion (540% higher than initially estimated) per the Mercatus Center and Goldman Sachs. This higher estimate appears more accurate than the original CBO estimate given the large increase in the EV market and the expanding use of these tax credits.

Given that the cost of these subsidies passed by Congress and communicated to the public appears to be substantially undervalued, the CBO and other nonpartisan agencies and committees responsible for providing Congress with accurate revenue estimates and sound economic analysis should reexamine their calculations.

Introduction

In 2023, 60% of Americans are living paycheck to paycheck and credit card debt is soaring to nearly $1 trillion partially due to persistently high inflation from Congress' over-spending and the Federal Reserve's over-printing of money over the last few years. Increased spending, and therefore taxes, disincentivize work as people keep less of what they earn, thereby reducing economic growth and subsequently resulting in less tax revenue. Given these facts, a thorough cost-benefit analysis should be applied to every new government initiative.

In this brief, we consider a new government initiative in the so-called "Inflation Reduction Act" (IRA) to incentivize the production of battery cells and modules to boost the domestic production of electric vehicles. But we also note how this comes at a substantially higher cost than initially sold to the public, and these tax credits represent a rising cost to taxpayers and a growing burden on their futures.

The Inflation Reduction Act (IRA) and How It Funds EV Batteries

In August 2022, the IRA was signed into law with the reported purpose of fighting inflation by theoretically reducing the deficit through increased taxes and increased government outlays. Supposedly, the IRA will improve equity by reducing domestic "greenhouse gas emissions in 2030 by about 40% from their 2005 peak" and investing in domestic energy production, an estimated "$369 billion in Energy Security and Climate Change programs over the next ten years." The IRA was also created to target health care costs; however, its greatest expenses go toward spending more on domestic manufacturing on unreliable renewable energy.

In short, the IRA was a costly expenditure bill that raised taxes to implement much of the "Build Back Better" plan desired by the Biden administration, which implements a green energy agenda via increased spending, substantial taxpayer subsidies, and added regulations.

Section 13502 of the IRA titled "Advanced Manufacturing Production Credit" includes tax credits for domestically manufactured battery cells and modules. By making it more affordable for manufacturers to produce EVs, ideally, consumers will be able to purchase them at a lower cost, supporting more domestic battery production and consumption. EV producers are currently taking advantage of this new initiative. Driven by the new tax credits, Tesla is moving its battery production away from Germany to Texas, as doing so could "offset more than a third of the cost of EV battery packs." Additionally, in 2022, investments in U.S. EV manufacturing grew from $24.3 billion in 2021 to $73.6 billion, indicating a much larger cost from these new tax credits than were initially estimated by the CBO.

Latest Costs of the EV Subsidies

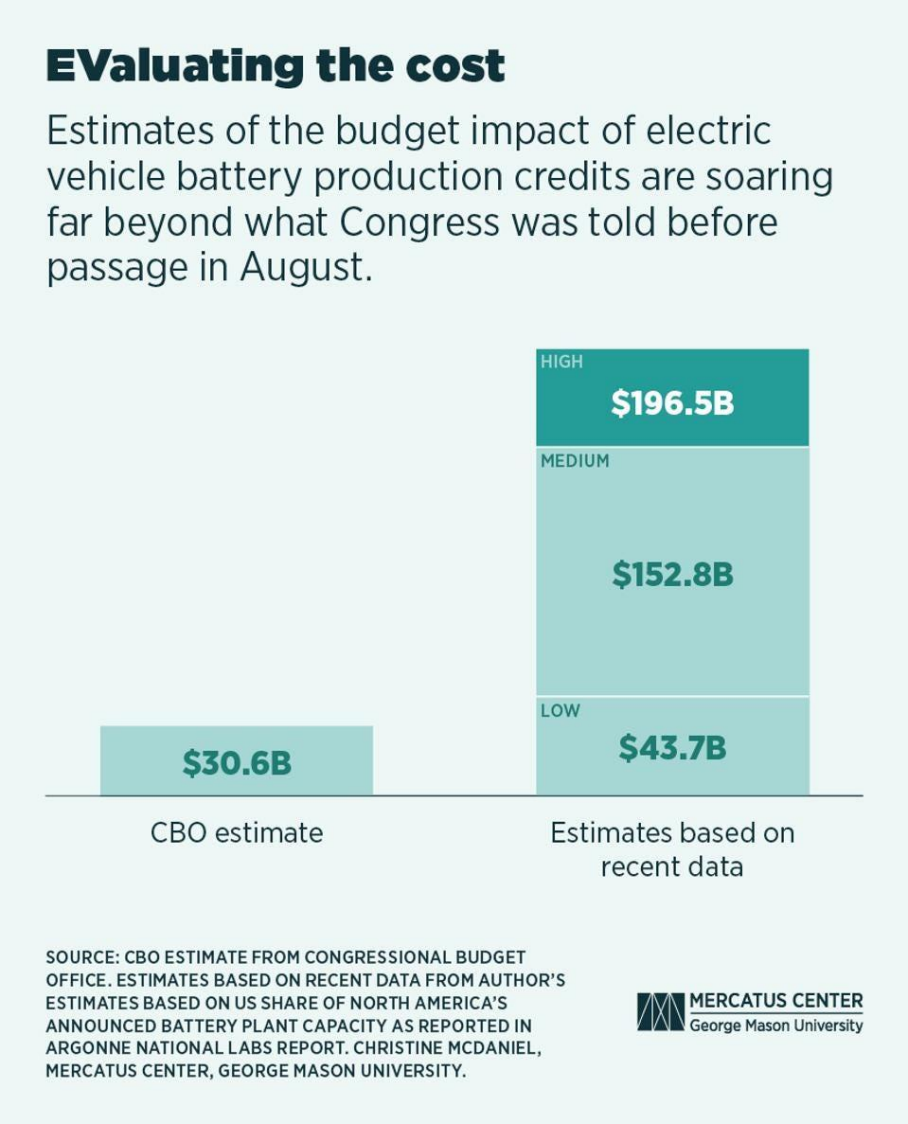
These EV battery production tax credits artificially reduce the cost of producing these battery cells and modules through direct subsidies of taxpayer money to businesses. The amount of a tax credit to the producers of these batteries depends on kilowatt hours (kWh). Battery cells can receive a $35 tax credit for every kWh of energy the battery produces, while battery modules can receive $10 per kWh, or "$45 in the case of a battery module that does not use battery cells."

The CBO estimates that funding these tax credits over the next decade (2022-31) could cost $30.6 billion. Given that the market growth for domestic energy production cannot be fully forecast, the CBO's projected costs for this initiative are hypothetical at best. New estimates based on the current growth of the EV market in the U.S. show that the actual cost could be substantially higher. For instance, a manufacturer utilizing the $35 per kWh tax credit could accrue nearly $2.5

billion in credits in one year just by producing 70-kWh batteries for one million vehicles. This calculation is consistent with recent EV sales.

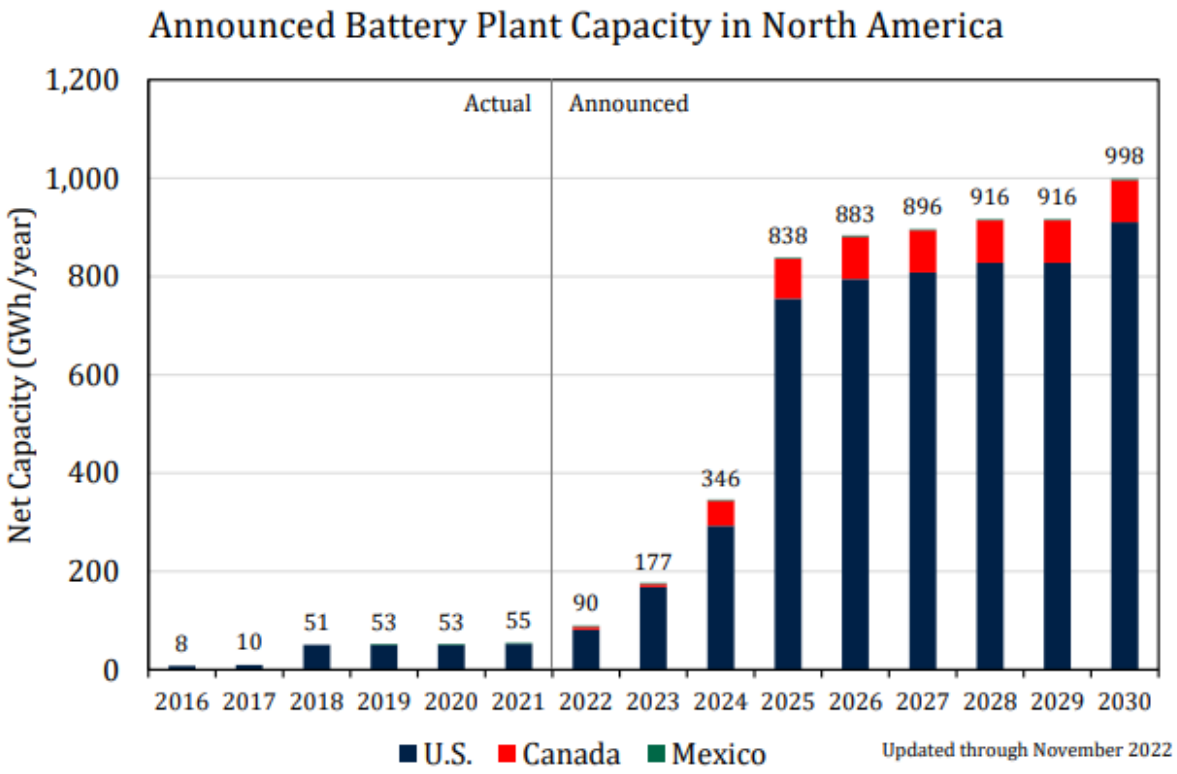
Last year, Tesla's Model Y was the most-sold EV in America, selling 234,834 units. The Model Y battery starts at 75-kWh. Given these figures, Tesla could have received over $616 million in tax credits for its 2022 sales of the Model Y alone. This is based on a conservative estimate that each purchase was for a 75-kWh battery, as the Model Y batteries can be up to 81 kWh. This was also before the IRA tax credits could be fully utilized, as the initiative was only passed in August 2022. In 2023, Tesla is estimated to produce close to 2 million EVs, with Model Y production alone anticipated to reach 1 million units this year. These estimates track with Tesla's first-quarter financial report for 2023, which shows that Tesla produced more than 440,000 EVs then. EV production at this level could amount to more than $5 billion in annual tax credits for Tesla, a single auto manufacturer. Additionally, Ford's Michigan plant with Chinese battery maker CATL alone could cost $1.5 billion annually in credits.

Given these calculations based on just one manufacturer, Tesla, and the potential tax credits in the billions for GM each year over the next decade, the CBO's cost estimate of $30.6 billion to fund these tax credits is too low. This was recently noted in estimates by Christine McDaniel of the Mercatus Center, who incorporated the full $45 tax credit across the market over the next decade in her calculations which result in a top cost estimate of $196.5 billion, which is 540% higher than the CBO's estimate. However, using the $10 and $35 production credits, "the value drops to $43.7 billion and $152.8 billion, respectively."



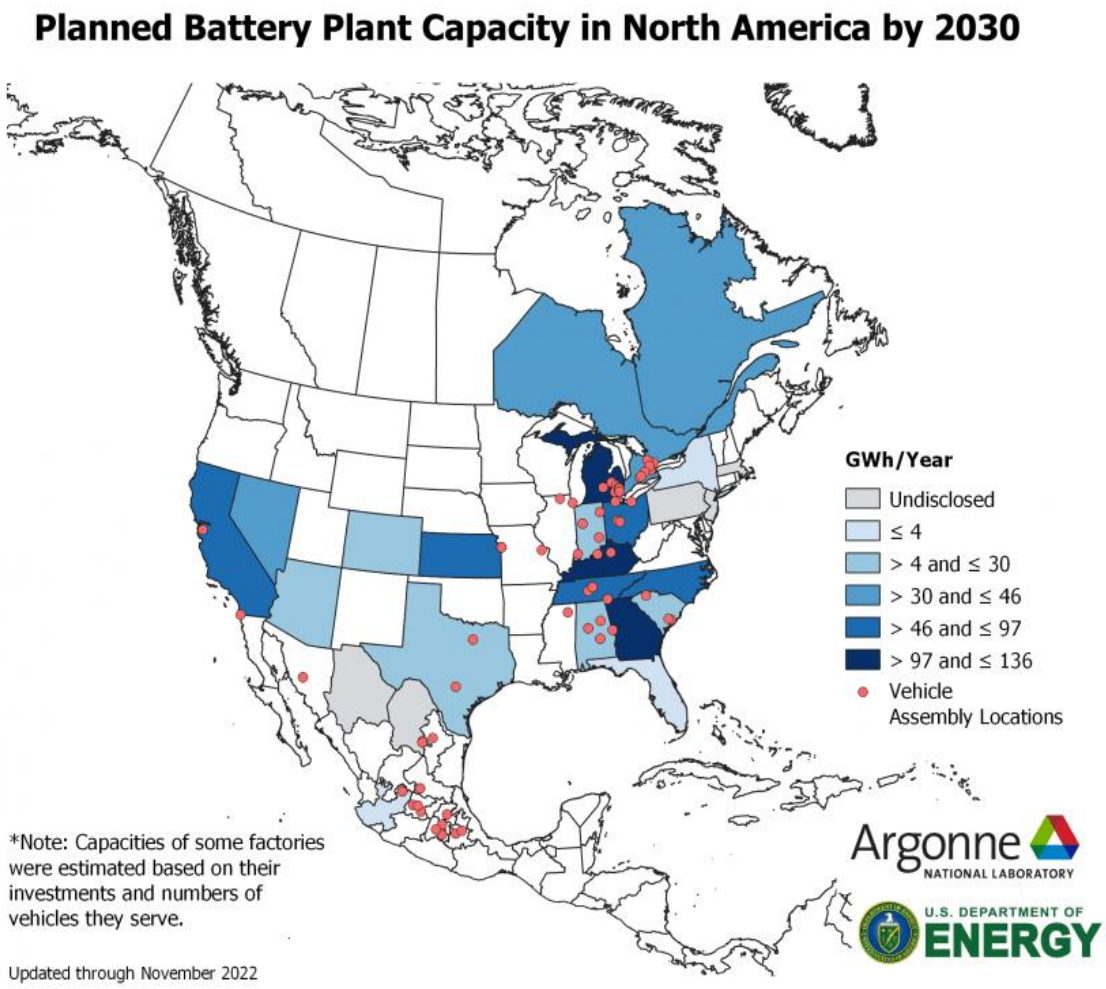
Source: Forbes article by Christine McDaniel at Mercatus Center.

These calculations are based on 75% capacity utilization at battery plants according to announced plant capacity growth in a recent report by Argonne National Labs (ANL). Specifically, ANL notes that the announced capacity increases of "planned battery plants will increase the battery manufacturing capacity in North America from less than 100 GWh in 2021 to approximately 1,000 GWh by 2030."



Source: Argonne National Labs

This ten-fold increase in capacity substantially increases the likelihood that there will be more tax credits provided than what was assumed by the CBO, even at the 75% capacity utilization rate. This rate is reasonable given projections by the Office of Energy Efficiency and Renewable Energy that by 2030 "production capacity will be capable of supporting the manufacture of roughly 10 to 13 million all-electric vehicles per year," representing a 20-fold increase from 2021.



Source: Office of Energy Efficiency and Renewable Energy

Additionally, the CBO's original cost estimate was conducted without the knowledge of important guidance from the Biden administration regarding the implementation of the IRA's EV provisions. In December, a few months after the IRA was signed into law, the Treasury Department delayed plans to issue guidance for sourcing requirements for EV battery incentives under the IRA. This delay increased the pool of EVs eligible for tax credits as models not expected to comply with IRA's sourcing standards continued to be eligible for the credits.

On March 31, 2023, the Treasury finally issued draft guidance on the IRA's EV provisions. This draft guidance reportedly weakens mineral sourcing requirements for EV battery production and could allow the Treasury to consider free trade agreements that could include mineral agreements with the European Union and Japan. This would greatly increase the pool of EVs eligible for the IRA tax incentives beyond what was understood during the passage of the IRA, increasing the demand for EVs and the cost of their taxpayer subsidies. Even Democrat

lawmakers who voted in support of the IRA, have criticized Treasury's guidance while warning of the increased cost to taxpayers. Sen. Joe Manchin (D-WV) issued a press release stating "the guidance released by the Department of the Treasury completely ignores the intent of the Inflation Reduction Act...It is a pathetic excuse to spend more taxpayer dollars as quickly as possible and further cedes control to the Chinese Communist Party in the process."

Guidance from the U.S. Treasury Department defining eligibility will play a significant role in understanding the cost of the IRA's EV tax provisions. The CBO's original estimate could not have foreseen the Treasury's proposed expansion of eligibility. New cost estimates should account for the Biden Administration's rule-making that will increase costs for taxpayers.

Conclusion

While the growth of markets is generally beneficial for overall economic welfare, the expansion of the EV market could easily burden the economy more than it will support it due to these expensive tax credits provided in the IRA. Although the EV industry in the U.S. is growing, it is still a relatively small player in the overall U.S. economy. Given the over $31 trillion national debt, the potential costs of these subsidies must be properly understood, especially given the strained economy of high inflation and increasing likelihood of a deeper recession. Considering these concerns and the fact that it is difficult to define how big the EV market could be over the next decade, policymakers must carefully consider the true costs and benefits of EV tax credits.

For policymakers to assess the true costs and benefits of the IRA's EV tax credits, accurate cost estimates and economic information are required. Several estimates from respected economic forecasters, as outlined in this brief, are now warning that the true costs of the IRA's electric vehicle incentives hold a substantially higher price tag for taxpayers than was initially projected by the CBO prior to the IRA becoming law. As such, it is in the public interest of the CBO, along with other nonpartisan agencies and committees responsible for providing Congress with revenue estimates and sound economic analysis, to reassess the original estimates conducted by the CBO. The IRA was represented to the American public as legislation that would reduce the national debt and by doing so, help reduce inflation. New analyses raise substantially more doubt that this legislation will reduce deficits and the national debt. The ballooning costs of the "Advanced Manufacturing Production Credit" alone warrant concern, as the cost of this single provision may be well over $100 billion more than the public understood at the time of the IRA's passage.

Therefore, these costly tax credits should be scrutinized and possibly eliminated because of their excessive costs and distortions to the marketplace.

*Chairman Smith of Missouri. Thank you, sir.

Mr. Beachy, you are recognized.

STATEMENT OF BEN BEACHY, VICE PRESIDENT OF MANUFACTURING AND INDUSTRIAL POLICY, BLUEGREEN ALLIANCE

*Mr. Beachy. Thank you, Chair Smith, Ranking Member Chu, and the distinguished members of the committee. My name is Ben Beachy, and I am the vice president of manufacturing and industrial policy at the BlueGreen Alliance, which is a national partnership of labor unions and environmental organizations.

At the BlueGreen Alliance it is our belief that we should not have to choose between good jobs, a livable climate, and a fairer economy. The Inflation Reduction Act is the nation's most full-throated embrace to date of this essential truth.

Addressing climate change requires us to build a clean economy, and that offers real opportunities to create good jobs for workers and to invest in hard-hit communities. This win-win-win for climate, jobs, and justice is embedded in many of the IRA's more than 100 climate and clean energy programs. I will zoom in on the law's investments in manufacturing.

As we build the growing clean energy economy, we face a clear choice. We can continue to hitch our climate goals to vulnerable overseas supply chains that are marred by labor abuses, higher levels of pollution, and shipping bottlenecks, or we can build our clean energy future on a foundation of good jobs, clean manufacturing, a reliable industrial base, and greater equity. The investments in the Inflation Reduction Act decisively put us on the latter path, offering more than $50 billion in landmark investments to revitalize manufacturing for the clean economy.

The IRA's clean manufacturing investments alone will create an estimated 900,000 good jobs over the next decade, according to recent economic analysis. The law's total climate investments are expected to create more than nine million jobs. This offers an

unparalleled opportunity for hard-hit workers and communities to reap the economic gains of climate action. Many of the jobs will be in communities in both Republican and Democratic districts that have been hollowed out by decades of divestment and de-industrialization.

By creating good manufacturing jobs in the hardest-hit -- for the hardest-hit workers, including Black and low-income workers, we have the opportunity to counter the racial and economic inequality fed by manufacturing job losses; the opportunity to build the clean economy with union labor, not forced labor overseas.

And we are already starting to see the results. As Ranking Member Chu named, within six months of President Biden's signature on the Inflation Reduction Act, companies have announced a wave of solar, battery, and other clean tech manufacturing investments that will create more than 100,000 jobs across 31 states. That is faster than anyone predicted.

The IRA's onshoring incentives also support our climate goals. You know, much has been said already this morning about the extreme concentration of clean tech manufacturing overseas, that 97 percent of the wafers used in solar panels are made in China, that China also makes 3 out of 4 of the world's electric vehicle batteries. The IRA's historic domestic manufacturing investments are squarely aimed at solving that very problem. The law rightly recognizes that ensuring access to clean energy means making more of the nuts and bolts here at home.

The pandemic has taught us much about the dangers of heavy dependency on vulnerable supply chains for essential goods. That is as true for clean energy as it was for N95 masks. Overseas corporations also tend to produce more emissions than U.S. factories in making the aluminum and steel that go into our clean energy goods. Solar panels, for example, are about 85 percent aluminum, and producing the average ton of aluminum in

China causes 65 percent more climate pollution than in the United States.

To meet our climate goals, we need to invest in clean, reliable domestic supply chains for clean energy. That is what the IRA does. In short, it changes the game. The law finally reverses the untenable status quo. It attaches clean energy expansion to manufacturing job growth, while detaching clean energy from vulnerable imports. It marks an overdue return to smart industrial policy by investing in industries that are strategically imperative not only for climate action, but also a thriving and more just economy. That is a win-win-win: a win for the workers now taking good union jobs; for the hard-hit communities seeing investments for the first time in decades; and for all of us who seek a livable climate.

Thank you again for the opportunity to speak today.

[The statement of Mr. Beachy follows:]

**********COMMITTEE INSERT**********

BLUEGREEN ALLIANCE

CREATING GOOD JOBS, A CLEAN ENVIRONMENT, AND A FAIR AND THRIVING ECONOMY

Testimony of Ben Beachy,
Vice President of Manufacturing and Industrial Policy, BlueGreen Alliance
Before the 118th U.S. Congress
House Committee on Ways & Means
"U.S. Tax Code Subsidizing Green Corporate Handouts and the Chinese Communist Party"
Wednesday, April 19th, 2023

Thank you, Chair Smith, Ranking Member Neal, and distinguished members of the committee. My name is Ben Beachy, and I am the Vice President of Manufacturing and Industrial Policy with the BlueGreen Alliance, a national partnership of labor unions and environmental organizations. The BlueGreen Alliance unites the nation's labor unions and environmental organizations to solve today's environmental challenges in ways that create and maintain quality jobs and build a stronger, fairer economy.

At BGA, it's our belief that we shouldn't have to choose between good jobs, a livable climate, and a fairer economy—we can and must secure each of these. The Inflation Reduction Act's landmark investments can help to turn this belief into reality. With strong implementation, the law will reduce climate pollution up to 42% by 2030, support cleaner air and water, create the good-paying, union jobs that workers need for economic security, and advance economic, racial, and environmental equity.[i]

Over the last decade, our communities have experienced worsening droughts, storms, wildfires, floods, heatwaves, and other climate impacts. Lower-income communities and communities of color are hit the hardest and have fewer resources to deal with the damage. To avoid the catastrophic consequences of climate change, we must rapidly reduce greenhouse gas emissions—based on the latest science and in line with our fair share—to put the United States on a pathway of reducing its climate pollution to net zero emissions by 2050, and to ensure we are solidly on that path by 2030.

Meanwhile, we also must reduce local air and water pollution and exposure to toxins to redress environmental and health burdens, which also disproportionately impact communities of color and low-income communities. For example, due to decades of environmental injustice, predominantly Black neighborhoods bear twice as much cancer risk from industrial air pollution as primarily white neighborhoods.[ii]

While grappling with climate change and environmental injustice, our nation continues to face the interwoven crises of deep economic and racial inequality. According to the Economic Policy Institute, wages from 1979 to 2018 increased by just 24% for the bottom 90% of the U.S. workforce, while the top 1% saw wage growth of 158%.[iii] There is a direct

correlation with the decrease of worker power over this time, as the share of workers in a union fell from 27% in 1979 to under 12% in 2019.[iv]

Structural racism also contributes to the high level of economic inequality, just as it is knotted into virtually all of the challenges we must face to build a clean, healthy, and thriving economy for all. Workers of color have endured particularly slow wage growth, given persistent racial disparities in pay.[v] From 1979 to 2020, while white workers saw a more than 30% increase in wages, Black and Latino workers saw wage growth of less than 19% and 17%, respectively. The median Black worker in 2019 earned 24% less than the median white worker.[vi]

In these interconnected challenges lies an opportunity for intersecting wins: using public investments to support climate action, good jobs, and greater equity at the same time. The Inflation Reduction Act is the nation's most full-throated embrace to date of an essential truth: addressing climate change requires us to build a clean economy, and that offers real opportunities to expand access to good jobs, clean air, and economic security for hard-hit workers and communities. This win-win approach to climate change—a new U.S. industrial policy that knits together climate, jobs, and justice—is long overdue. After decades in which many considered "industrial policy" a four-letter word, the Inflation Reduction Act offers a historic course correction by investing in industries that are strategically imperative for not only a livable climate, but also a thriving and more just economy.

The Inflation Reduction Act includes more than 100 programs that will invest more than $360 billion to expand access to clean energy and clean vehicles, make our homes more energy efficient, protect our natural resources, boost community resilience, and build a domestic manufacturing base for the clean economy.[vii] This testimony focuses on the clean energy and clean manufacturing provisions, and the benefits they offer for supporting access to good jobs and justice for hard-hit communities.

Jobs: Creating Millions of Jobs While Increasing Job Quality and Access

How many jobs will the Inflation Reduction Act create? Analysis from the Political Economy Research Institute at the University of Massachusetts Amherst, commissioned by the BlueGreen Alliance, finds that the law's climate, energy, and environmental investments *will create more than 9 million jobs over the next decade*—an average of nearly 1 million jobs each year (see Table 1).[viii] Few laws this century have come close to such sweeping potential for good job creation.

Table 1: Job Creation Estimates from Investments in the Inflation Reduction Act

Policy Area	Job Creation Potential over 10 Years
Clean Energy Investments	5,000,000
Clean Manufacturing Supply Chains	900,000
Electric Vehicles and Clean Transportation	400,000
Energy Efficient Homes and Offices	900,000
Environmental Justice and Climate Resilience	150,000
Natural Infrastructure	600,000

Political Economy Research Institute at the University of Massachusetts Amherst.

Job quality is just as important as job quantity. Access to unions has been one of the most consistent means of ensuring high-quality jobs. On the whole, union jobs pay better, have better benefits, and are safer than non-union jobs. Across all relevant industries and occupations, workers who are members of or are represented by a union earn significantly more than those who are not, with especially pronounced benefits for low-wage workers, workers of color, and women.[ix] While white union members earn on average 18% more than their non-union counterparts, Black union members earn 20% more and Latino union members earn 35% more. Female union members earn 23% more than non-union female workers. In addition, research has shown that through the collective bargaining power of unions, workers are able to get more and better benefits such as health insurance and pensions, and are able to fight for more enforcement of the labor protections they have a right to under the law, such as enforcement of overtime, safety, and health regulations.[x]

While we work to grow clean energy jobs, we must ensure that these are not only good jobs, but also *accessible* jobs. This effort includes supporting and growing pathways into good union jobs for workers of color, women, and others historically left out of such jobs. One mechanism for building career pathways and increasing access is through registered apprenticeship, pre-apprenticeship, and other union-affiliated training programs. Registered apprenticeships and other labor-management training programs offer workers a combination of classroom and on-the-job skills training. Pre-apprenticeship programs, meanwhile, are a tool for improving equitable access to jobs by offering underrepresented workers on-ramps to apprenticeship and other training programs.

Community Benefits Agreements are another key opportunity to expand access to quality jobs, while ensuring that federally funded projects deliver tangible economic, environmental, and health benefits to workers and communities alike. These are collective bargaining agreements that businesses negotiate with both union and community partners. Done right, these agreements include early and meaningful worker and community involvement in a project's design and the negotiation of a legally-binding commitment for the company to deliver specific benefits in exchange for worker and community support.

Such benefits can include local hire provisions; targeted hire of low-income workers, workers of color, women, or other underrepresented workers; the creation of pre-apprenticeship pathways for careers; labor standards to guarantee good pay and benefits; reductions in local pollution; health and safety standards; and payments from a business into a fund that a community manages for its own development.

The Inflation Reduction Act helps to advance job quality and job access in critical clean energy sectors by tying clean energy incentives to high-road labor standards, as described below. In addition, federal agencies are starting to produce guidance for many of the law's programs—including several of the clean manufacturing programs outlined below—that explicitly prioritize funding for projects that include high-road labor practices, investment in disadvantaged communities, and Community Benefits Agreements that enable local workers and communities to secure economic and environmental benefits.

Justice: Investing in Hard-Hit Communities

To ensure that new policies like the Inflation Reduction Act help dismantle structural racism and direct federal resources to the workers and communities that need them most, President Biden established the Justice40 Initiative. Justice40 aims to ensure that at least 40% of the benefits from federal investments for climate and clean energy support disadvantaged communities. Disadvantaged communities include those enduring a combination of:

- Environmental injustice from disproportionate exposure to air, water, and land pollution;
- Disproportionate risks from storms, droughts, flooding, and other climate impacts;
- Low income, job insecurity, barriers to basic needs, and other forms of economic injustice due to deindustrialization, energy transitions, divestment, and status quo policies favoring the wealthy; and
- Structural racism that disproportionately exposes Black, Latino, Native American, and other people of color to higher levels of all of the above burdens.

The application of Justice40 to the Inflation Reduction Act varies by program. Some programs include funding explicitly set aside for disadvantaged communities. Other grant and loan programs include guidance that states funding will prioritize projects that invest in disadvantaged communities and/or uphold the goals of Justice40. The Council on Environmental Quality has created a mapping tool to help identify "disadvantaged communities" for the purposes of fulfilling the goals of Justice40.[xi]

The Inflation Reduction Act also includes funding allocations and incentives for communities facing energy transition.[xii] Working people have too often felt the pain of shifts in technology. We can't leave workers or communities behind as necessary climate action spurs changes in our economy. The law rightly recognizes that an energy transition that is fair for workers and communities needs to be a deliberate policy choice.

The Inflation Reduction Act includes several provisions to drive investments into communities impacted by energy transition, including the following:

- The law's clean energy tax credits, as described below, include a 10% bonus credit for clean energy investments in energy communities, including those that have experienced a recent closure of a coal mine or coal-fired power plant.

- The law expands the 48C manufacturing tax credit, as described below, with $4 billion for communities experiencing coal mine or plant closures. This investment will help establish, expand, or retool clean technology factories in regions that have faced job losses and economic hardship due to the decline of coal.

- The law creates a new Energy Infrastructure Reinvestment program to help retool existing energy infrastructure for the clean economy. With $5 billion in funding and $250 billion in loan authority, the program will offer loans for projects that redevelop energy facilities for new purposes—which could support economic redevelopment in communities impacted by energy transition.

Energy: Boosting Clean Energy Projects that Support Good Jobs and Greater Equity

The Inflation Reduction Act delivers robust investments in clean energy that will create nearly 5 million jobs, particularly in hard-hit communities, while helping us reach our climate goals and reduce local pollution. The law strengthens and establishes durable tax credits for clean energy, which will not only help dramatically reduce emissions, but also boost job quality and job access for clean energy workers.[xiii]

The law extends and establishes clean energy tax credits for various clean energy technologies, including onshore and offshore wind, solar, geothermal, and battery storage. For the first time ever, the law pairs high-road labor standards with clean energy deployment. To receive the full value of the tax credits, developers will have to pay a prevailing wage and use a certain percentage of registered apprentices in the projects.

By incentivizing clean energy investments that support good wages and workforce development pathways, this law will help:

- Grow and diversify the middle class;

- Eliminate disparities in job quality between clean and traditional energy sectors;

- Increase diversity in the construction workforce by expanding access to women, people of color, veterans, and formerly incarcerated people;

- Equip the construction workforce with the skills needed to build clean energy; and

- Promote hiring of local workers to build projects in their communities.

The empirical data show that the inclusion of these high-road labor standards will not deter clean energy deployment. Researchers from Princeton University find that increasing wages for workers in the clean energy sector by 20% would only increase the capital costs of solar and wind projects by 2-4% and operations and maintenance costs by about 3-6%.[xiv] The researchers conclude that these costs would have no recognizable impact on the deployment of clean energy. They would, however, offer increased economic security for tens of thousands of clean energy workers and a stronger link between good jobs and climate action.

The clean energy tax credits will also help address racial and economic inequality through two separate "bonus" tax credits. The Low Income Communities Credit provides a bonus tax credit for projects located in low-income housing projects or communities that have a significant share of the population below the poverty line. The Energy Communities Credit provides a bonus tax credit for projects located in communities that have a brownfield site, significant fossil fuel dependency and unemployment, or recent closures of coal mines or coal-fired power plants.

With these investments, we can meet our clean energy and climate goals while also ensuring that workers are paid fair wages and that hard-hit communities benefit from cleaner air, access to affordable energy, and increased economic security.

Manufacturing: Building Reliable and Equitable Supply Chains for the Clean Economy

The Inflation Reduction Act invests an unprecedented more than $50 billion to revitalize manufacturing, which will create more than 900,000 jobs over the next decade. That includes investments to ramp up manufacturing of clean technology—the nuts and bolts of the growing clean energy economy.[xv] These investments will help to build out more reliable, equitable, clean, job-creating domestic supply chains for solar panels, wind turbines, electric vehicle batteries, and other technologies that are powering our clean energy future. See below for six reasons we need to onshore clean technology manufacturing.[xvi]

The law also includes historic investments to reduce emissions from aluminum, steel, cement, and other energy-intensive materials that form the backbone of our economy. These mark the first major investments in cutting U.S. industrial emissions. The industrial sector produces nearly a third of U.S. climate pollution, when accounting for electricity use.[xvii] Without transformative changes, government estimates project industrial emissions will remain essentially flat through 2050—the date by which we must achieve a net-zero emissions economy to avoid the worst consequences of climate change.[xviii] Industry is also responsible for toxic air pollution that exposes a quarter million people to elevated cancer risks each year, primarily in Black communities.[xix] Yet, policy measures to meaningfully reduce industrial emissions have been sparse, until now. The Inflation Reduction Act invests billions to cut industrial emissions while supporting good manufacturing jobs and increased global competitiveness in fundamental industries.

The law strategically includes both supply-side measures, which directly invest in clean manufacturing facilities, and demand-side measures, which create a market for the goods those facilities produce. By marrying a supply-side "push" with a demand-side "pull," the law boosts our capacity to revitalize our manufacturing base.

Supply-side investments include grants, loans, and tax credits that are directly available to the factories that make solar, wind, battery, and other clean technologies and the materials that go into them. These investments include:

- A new 45X manufacturing production tax credit, worth more than $30 billion, to fill critical supply chain gaps by supporting the expansion of solar, wind, and battery manufacturing and critical minerals processing. This credit will create an estimated 560,000 jobs over the next decade.

- A $10 billion expansion of the 48C tax credit to support manufacturing of a wide array of clean technologies, of which $4 billion is reserved for investments to boost job growth in communities facing economic hardship from energy transition. The law also makes the tax credit available—for the first time—for manufacturers to install equipment that achieves an at least 20% reduction in climate pollution. This expanded credit will create about 110,000 jobs over the next decade and cut an estimated 7 million metric tons of annual climate pollution— equivalent to the yearly emissions of about 1.5 million gasoline-powered vehicles.

- A new, nearly $6 billion program to help manufacturers carry out emissions-reducing upgrades at steel, aluminum, cement, and other energy-intensive industrial facilities. This program will create nearly 120,000 jobs over five years and cut nearly 70 million metric tons of annual climate pollution—the equivalent of running over 18,000 wind turbines for a year.

- A $3 billion expansion of the Advanced Technology Vehicle Manufacturing program, which has a proven record of creating and protecting good auto manufacturing jobs by offering loans to facilities that manufacture clean vehicles. This investment will create nearly 50,000 jobs over the next decade.

- A $2 billion expansion of the Domestic Manufacturing Conversion Grants Program, which provides grants to recently closed or at-risk auto manufacturing facilities to transform production lines that once built gasoline-powered vehicles so that they build the clean vehicles of the future. This investment will create more than 30,000 jobs over the next 10 years.

The law's demand-side measures include funding and incentives to expand the market for clean, domestic manufacturing of solar panels, wind turbines, and electric vehicles, and of aluminum, steel, and other energy-intensive materials. These provisions include:

- More than $4 billion in new investments to support the Biden administration's Buy Clean initiative, which will use the U.S. government's vast purchasing power to drive demand for low-emissions manufacturing of construction materials, such as by buying clean steel and cement for public buildings and bridges.[xx]

- A bonus 10% domestic content tax credit that clean energy developers can add on to the law's clean energy tax credits if they use domestically made iron and steel and manufactured components in which U.S. production accounts for roughly half of the value. As the tax credits propel expanded clean energy deployment, this bonus will stimulate parallel growth in U.S. manufacturing of clean technology parts and materials.

- A more than $7 billion expansion and update of a tax credit for new clean vehicles, with standards to catalyze North American manufacturing of electric and fuel cell vehicles and their components.[xxi] The credit will reduce the cost of new electric vehicles by up to $7,500, while incentivizing the establishment of a resilient supply chain in North America for essential electric vehicle battery components. It also will help to ensure the critical minerals that comprise these batteries are not sourced from countries relying on child and forced labor or countries where supply chain disruptions threaten the electric vehicle transition.

Why Investments in U.S. Clean Technology Manufacturing Are Important

The Inflation Reduction Act's push to onshore clean energy manufacturing is an about-face from decades of unfair policies that saw the outsourcing of factories as good for efficiency. That ill-advised logic *detached* clean energy expansion from manufacturing job growth while *attaching* clean energy to vulnerable imports made with exploitation and high pollution.

We cannot and need not hitch our climate goals to overseas production that is marred by labor abuses, pollution, and shipping bottlenecks. Years from now, we may look back on the investments in this law as the moment we started building more reliable clean manufacturing supply chains to equitably create good jobs.

The Inflation Reduction Act's manufacturing investments help to advance economic, environmental, and equity goals. Here are three ways that these investments support increased economic security and equity:

- **High-paying jobs:** By investing in our economy's clean energy manufacturing capacity, we can finally link climate progress with growth in manufacturing jobs. The law's clean manufacturing investments will create an estimated 900,000 jobs over the next decade. Manufacturing jobs tend to offer above-average wages, benefits, and union access. With equitable targeting, these jobs could boost economic security in deindustrialized communities that have been hollowed out by factory closings, job cuts, and lost tax revenue. By offering opportunities for hard-hit workers and communities to reap the economic gains of climate action, these

investments also could expand public support for further climate policies.[xxii]

- **Racial and economic equity:** These manufacturing investments could put a dent in racial and income inequality if we ensure equitable access to the new jobs and use strong labor standards to ensure they are good union jobs. Numerous studies have found that the decline in U.S. manufacturing has exacerbated U.S. income inequality.[xxiii] Laid-off manufacturing workers have been forced to compete for lower-paying service sector jobs, putting downward pressure on middle class wages across the economy. Less well known is that this decline has contributed to racial inequality, as Black workers have endured some of the biggest manufacturing job losses.[xxiv] Black manufacturing employment has fallen more than 30% since the late 1990s. If we grow clean manufacturing in an equitable way, it can help to reverse these trends as part of a strategy to build a more just economy.

- **Labor rights:** By boosting U.S. clean technology manufacturing, these investments will cut our dependency on clean energy components made overseas with labor abuses. From forced labor in China to child labor in the Democratic Republic of the Congo, major overseas clean energy supply chains are currently plagued with labor and human rights violations.[xxv,xxvi] The clean energy economy cannot be built on the backs of exploited workers abroad. By onshoring clean energy manufacturing, we can stop feeding such labor abuses and start to counter them.

The onshoring of clean technology manufacturing also supports our climate goals. Here are three ways that the Inflation Reduction Act's investments in domestic clean technology manufacturing offer a better recipe for climate progress than continuing to heavily depend on imports:

- **Long-term price stability:** Right now, 97% of the world's wafers for solar panels are made in China.[xxvii] China also makes about three out of every four of the world's electric vehicle batteries.[xxviii] The list goes on. Just like a corporate monopoly, when one country controls most of the supply of a critical clean energy good, they gain the power to increase the price of that good. We should not pin our climate goals on trust that the world's monopoly producers will maintain low prices. Instead, growth of clean energy manufacturing in multiple countries, including the United States, helps to promote global competition and innovation, which are needed to continue driving down clean energy costs. The Inflation Reduction Act's domestic manufacturing investments and incentives are an important step towards that goal.

- **Reliable supply chains:** The status quo of extreme supply chain concentration also exposes our climate goals to shipping bottlenecks and geopolitical conflict. The COVID-19 pandemic and the war in Ukraine have spotlighted the risks of deep dependency on imports for essential goods. That is as true for clean energy as it was for N95 masks. The Inflation Reduction Act's onshoring incentives rightly recognize that ensuring access to clean energy means making more of the nuts and bolts here

at home.

- **Reduced industrial emissions:** Making clean energy components at home also helps to reduce global industrial emissions, the world's largest source of climate pollution when accounting for electricity use.[xxix] Overseas corporations tend to be more emissions-intensive than U.S. factories in producing the aluminum and steel that goes into solar panels, wind turbines, and other clean energy goods. Solar panels, for example, are at least 85% aluminum.[xxx] Producing the average ton of aluminum in China causes about 65% more climate pollution than in the U.S.[xxxi] As we expand solar power to achieve our climate goals, we cannot afford to depend on highly-polluting aluminum production overseas that moves us in exactly the opposite direction. Onshoring the solar supply chain, with support from Inflation Reduction Act incentives, will help to reduce these emissions. Meanwhile, the law's investments will also directly support further emissions reductions in U.S. factories.

Conclusion

Within six months of President Biden's signature on the Inflation Reduction Act, companies announced a wave of solar, battery, and other clean technology manufacturing investments that will create more than 100,000 jobs across 31 states to make the nuts and bolts of a clean energy economy.[xxxii] Many of the job openings will be in communities that have endured decades of divestment, deindustrialization, and economic insecurity.

That response to the Inflation Reduction Act's unprecedented federal funding is faster than anyone predicted. It offers an early validation of the strategy behind the law: to wield public investments to support climate action, good jobs, and greater equity at the same time. With strong implementation, the benefits of this win-win strategy will continue to grow as new investments arrive in communities in the months and years to come.

And those wins matter—for the workers now taking good union jobs, the hard-hit communities seeing investments for the first time in decades, and all of us who seek a livable climate.

Thank you again for the opportunity to speak today.

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*Chairman Smith of Missouri. I want to thank you all for your testimony, and we will now proceed to the question-and-answer session.

And I will first start with you, Mr. Turner. Rural, working-class communities, as taxpayers, will be on the hook to pay for these green energy subsidies. Meanwhile, analysis has shown that these special interest tax breaks in the Inflation Reduction Act overwhelmingly flow into the pockets of large financial institutions three times more than any other industry. Large corporations with sales in excess of 1 billion receive over 90 percent of all these tax breaks. Companies who make more than $1 billion received 90 percent of the Democrats' green handouts. That is not helping working-class families. That is not helping rural communities. That is helping their political buddies.

So will rural working-class communities benefit from these credits, Mr. Turner?

*Mr. Turner. Thank you for the question, Mr. Chairman. Rural Americans bear the brunt of these last couple of years since the pandemic.

A study I found out of Iowa State University talked about how rural Americans' cost of living have increased 9.2 percent. Their earnings have only increased 2.6 percent. Rural Americans are paying more than $2,500 a year in gasoline than they did a couple of years ago. And that makes sense: rural Americans have longer commutes to work, to the grocery store, et cetera. Expenses now consume 93 percent of rural take-home pay. Two years ago it was eighty-five percent. So there is a lot less available cash, just liquid cash for rural Americans to suffer -- to have at their advantage.

I used personal analysis of what the Biden Administration is offering to rural Americans. I like to think I am a good ambassador for rural America. I was up at 4:00 this morning to do a couple of hours of farm work before I drove here. So I am from rural America. I use the Virginia estimator -- because I live out in rural Virginia -- for their solar panels. The average cost for my solar panels for my farm would be around $38,500. Now,

with the Federal rebate it would be $26,900. But I still have to come out of pocket $26,900.

There is still a problem. That doesn't work at night-time, which is a drawback, I think you could say, to solar panel because there is a thing called night, and it is not going away anytime soon. So I would need to add another $12,000 worth of batteries on top of that.

Now, this would save me maybe about $125 a month in my electric bill. But to offset that cost, I need about 18 years, while the average lifespan of a solar panel is 20 years. And that is to assume that it doesn't break, it doesn't get hit by a hail storms -- which we have in rural America -- it doesn't have any roof damage, et cetera.

So what are my savings? And what they say to me as a response is, well, then you should go to the bank and get a loan. And to your point, Mr. Chairman, financial institutions receive the bulk of this. So they get the tax benefits on the upfront, but then I am supposed to take out a loan at 9.5 percent APR to pay for these solar panels.

And I can say the same about electric vehicles. Motortrend did a very good study on a famous pickup truck that the President drove around in. Not to knock the pickup truck, but the pickup truck was incapable of hauling 8,000 pounds more than 100 miles. I haul 900-pound steers often enough to know that that pickup truck is absolutely useless. Well, that pickup truck is close to $100,000. What is the response? Here is a $7,500 rebate, and finance the rest.

So it is not made for the farmer in mind. The green subsidies are not made for rural Americans in mind. We are paying with our tax dollars for benefits and subsidies that others -- the wealthy, quite frankly -- are getting.

*Chairman Smith of Missouri. Thank you.

Mr. Horn, the unfortunate truth is that, instead of making us more independent for the minerals and components needed in electric vehicles, the structure of the Inflation

Reduction Act credits and the subsequent regulation have actually supercharged demand in China and made us more reliant on them. Can you shed some light on how the Inflation Reduction Act and the Biden Administration's interpretation of the law is emboldening China, increasing the Chinese Communist Party's ability to spread its harmful influence?

*Mr. Horn. Mr. Chairman, I want to be clear about a few things. I am in no way, shape, or form against technological advancement, or energy efficiency, or any of these other developments. And I am not here today to debate or even speak so much on acting and standing U.S. law as I am to try and recommend closing loopholes and solutions that move things forward.

I think there is some intent that may have been missed in execution when we talk about some of the recent bills and legislation that has been impacted. And I think that it doesn't take into consideration the nature of some of the adversaries that we are dealing with around the world.

When you take the Chinese Communist Party -- and I want to take a moment to say Chinese Communist Party, not the Chinese people, but an extension of the government in communist China that looks to exploit and predatorily take advantage of folks all over the world -- you are dealing with a very complex and sophisticated entity. It is one that watches us, that has massive resources, that looks at everything we do, and looks for any moment of weakness or access to exploit a loophole so that it can take advantage and use it against us.

So while the Inflation Reduction Act is meant to build domestic energy supply chains, to build domestic green energy materials sourcing, what it has done in effect, without the proper enforcement, is allow workarounds for Chinese state-subsidized, state-owned entities to infiltrate inside our country, and to actually work against the very intent of the actual legislation and the IRA itself.

So what I would say is that it really comes down to proper enforcement. And what

we have right now is a situation where, with the loopholes, it is actually going to lead to a worsening of the problem if we don't close those.

And I would just like to summarize and finalize that by saying that American solutions do exist. And there is an effective lobby out there that tries to dissuade from the fact that they are not that far and not as far from coming online. But they have to be legitimate, they have to be truly American, and they have to be solutions that, once they have assistance in time that is initially given from government subsidies and involvement, can stand on their own. And those need to be given the true ability to grow and to flourish.

*Chairman Smith of Missouri. Thank you, Mr. Horn.

Adding on to the loopholes that Mr. Horn just was suggesting, Mr. Stein, both Chinese and American companies are getting creative in the ways in which they partner to exploit these taxpayer-funded credits to take advantage of this massive new windfall.

[Slide]

*Chairman Smith of Missouri. As you can see from the headline in the poster right beside me, Ford will build a U.S. battery factory with technology from China. That is in Michigan. Can you walk us through how a foreign company like the Chinese battery maker CATL, which is partnering with Ford on EVs, can gain economic benefits from this green handout regime?

*Mr. Stein. Sure. So the IRA has many tiers of stackable tax credits that go into all these incentives. And at the foundational level for this battery factory, there is a tax credit for manufacturing the batteries here. And that is open to anybody. There is no domestic input requirements. That is just having the factory physically located in the United States.

Now, there is additional requirements if you want to -- for the EV tax credits that -- you know, the national sourcing requirements, what countries they are coming from, and that sort of thing. But that is on top of other subsidies. So the -- there is already -- there is

an immediate economic benefit from the -- just having the physical factory here, even if it is assembling things that are all coming from China.

In the same sense, because they can count as a minority partner, when you start talking about foreign entity of concern issues, if they are a minority partner, and Ford is officially the majority owner, does that qualify as foreign entity of concern? I would be willing to bet that the Treasury is going to read that as broadly as possible.

So -- and again, the -- when we talk about critical minerals and mining, there is no requirements that those actually come from the United States. Those can be produced by affiliates of the Chinese company brought from China, or shipped from their mines in Indonesia or Congo through China, and eventually make it to here.

So we get a -- this is what I mentioned about there is a facade of domestic production of these things, but everything going on in the background, the entire supply chain, is still controlled by the China, Chinese companies, and, ultimately, the Chinese Government.

*Chairman Smith of Missouri. Yes, the Chinese Government is populating off of our green tax credits from the Inflation Reduction Act.

Mr. Ginn, the Inflation Reduction Act is at the heart of the tax credits we are talking about today. That bill was sold to the American public as a plan to do just that, bring down inflation by reducing our deficit. You recently penned a report looking at the cost of the Inflation Reduction Act, and specifically these tax subsidies. The projected costs to the American taxpayers have skyrocketed. To what do you attribute this increase, and how high could these costs go?

*Mr. Ginn. Mr. Chairman, you are right. This -- we recently looked at some of the data that is coming out, the latest information that wouldn't have been available last year when CBO was doing their estimates on the number of EV vehicles that are being produced.

I mean, if you give tax breaks -- incentives matter, right? And so you start to do

more production along those lines compared with others.

Also, some of the new Treasury guidance that has come out along the lines of what was in the Inflation Reduction Act, a combination of those things has contributed to an increasing cost of those EV tax credits for battery cells and modules. CBO initially estimated it to be $30.6 billion last year. There is a range of estimates now, but if you look at the $45 tax credit that goes for these electric vehicle batteries, the higher end along with the increasing number of them, there is a 100 -- that would be 196.5 billion, which is a 540 percent increase compared to -- or a higher amount compared to what CBO estimated just last year. And that is given some assumptions. And so it could be even higher than that, depending on how many vehicles -- or batteries are being produced, how many vehicles are sold, things of that nature.

And again, as has been mentioned earlier, a lot of this is going to upper-income folks, big businesses, and that sort of thing, at the same time not doing much to reduce inflationary pressures in the economy.

*Chairman Smith of Missouri. Thank you. I now recognize the acting ranking member, Ms. Chu, for any questions.

*Ms. Chu. Mr. Beachy, the IRA includes entirely new requirements in the tax code for domestic content, which incentivizes companies to onshore manufacturing of clean energy technology like solar panels, wind turbines, and electric vehicle batteries, just to name a few. How will this help the U.S. economy?

*Mr. Beachy. Thank you. I appreciate the question.

The first way it will help the U.S. economy is good jobs. You know, decades of bad policy saw the outsourcing of factories as good for efficiency. that logic was dead wrong. Workers lost a primary source of high-paying union jobs, communities lost tax revenue, and our nation lost the industrial base that is the backbone of most modern economies.

Now, I mentioned that the law's manufacturing investments alone are projected to create at least 900,000 good jobs over the next decade. Job quality matters just as much as job quantity, of course. And it is important to note that manufacturing jobs tend to pay better, have better benefits, and better access to unions than on average, particularly for workers without a four-year degree.

The second way that this would support our economy is these investments could help us to build a more equitable economy specifically by redressing the economic and racial inequality that has been fed by manufacturing job losses. You know, manufacturing job losses were actually concentrated among low-income communities and communities of color, particularly among Black workers. If we grow clean manufacturing in a targeted manner, it can help to reverse these trends as part of a broader strategy to build a more just economy.

The third thing I will name is energy security. You know, we need more reliable supply chains for energy security, which is a critical component of economic security. I had mentioned that, you know, the pandemic has taught us much here, and the need to have a local supply of essential goods is just as true for clean energy as it was for N95 masks.

In short, you know, we should not expose our clean energy future to shipping bottlenecks and geopolitical conflicts. You know, that -- those are three ways, essentially, that the IRA's manufacturing investments alone could support a stronger and fairer economy.

*Ms. Chu. Mr. Beachy, you mentioned that this will help those economies in communities that are low-income and communities of color. These environmental justice communities are more prone to flooding, extreme heat, and air pollution, and it is our responsibility to ensure that they experience the economic benefits of the clean energy transition.

Can you expand on the ways that the IRA is supporting communities impacted by environmental, economic, and racial injustice?

*Mr. Beachy. Yes, thank you.

I want to first make clear that we do not speak on behalf of any environmental justice groups. They speak for themselves. But we have been happy to support their leadership in this domain.

You know, the Biden Administration created the Justice40 Initiative to help dismantle the structural racism in our society, and ensure that investments such as those from the IRA go to the most hard-hit communities. That includes disadvantaged communities, and -- which is a broad category. It includes communities that have been enduring disproportionate air and water pollution and environmental injustice; communities that have been enduring disproportionate risks from flooding and storms and droughts, as you named; communities that have been experiencing economic insecurity, low-income, higher unemployment due to deindustrialization and divestment; and of course, structural racism that is interwoven through each of these burdens.

The application of Justice40 to the investments in the Inflation Reduction Act is -- sometimes it has explicit set-asides for disadvantaged communities, and in other cases we see the Biden Administration putting forth guidance showing that the projects will be prioritized to the extent that they invest in these hard-hit communities.

*Ms. Chu. And can you also say a few words about the IRA's requirements for prevailing wages and apprenticeships? How will these increased wages strengthen the clean energy transition?

*Mr. Beachy. Yes, it is critical to pair these investments in our clean energy future with high-road jobs. Clean energy is clearly the energy of the future. We want to make sure that the jobs in clean energy are also the jobs of the future. That requires that they be

prevailing wage -- prevailing wage standards be met, as well as apprenticeship programs. To get the full value of the tax credit, solar and wind developers simply have to pay their workers well, and they have to ensure pathways to longstanding careers that can sustain families.

That is -- for the first time in our history, we are tying clean energy to high-quality job standards.

*Ms. Chu. Thank you, I yield back.

*Chairman Smith of Missouri. I now recognize Mr. Buchanan from Florida.

*Mr. Buchanan. Thank you, Mr. Chairman, a critical hearing. And I want to thank all our witnesses.

Everybody wants to take a different tack, and I want to focus a little bit on the spending, because we got the debt ceiling, and what is really taking place here where we have got an estimate of 275 billion, and it ends up -- they are claiming -- Wall Street Journal and others are claiming it could be 1.3 trillion.

You look at the last 20 years, frankly, we have -- our taxes -- basically, spending has gone up $20 trillion in 20 years. So there is plenty of blame to go wrong. But I am talking about being competitive. It also -- your balance sheet, we are getting weaker and weaker as a nation.

I would like to -- Mr. Ginn, what is your thoughts? Just in terms of the fact that we get an estimate, it is a trillion over. As a business guy for a lot of years, it seems like you need to cap it. If you want to do 250 or 300, pick a number, you cap it. When the money runs out, it runs out. But in this case, it runs on, and it could run on 1.32 trillion, but it is going to add to the deficit and make us a weaker nation.

*Mr. Ginn. Thank you, Mr. Buchanan. You are correct, Congressman. This is a massive amount of spending that has been going on for a number of years now.

If you look at the last 20 years, the national debt has increased by $18.5 trillion. And if we had just matched something like population growth plus inflation, sort of a spending limit type of rule that even Colorado and many other states have, the increase in the debt would only have been 500 billion. So it would have been an $18 trillion swing in the direction that is positive for taxpayers in the process, because this debt matters. This debt has got to be paid back at some point. We are paying higher and higher interest on that debt as the overnight lending rate between banks set by the Federal Reserve is at five percent. It could continue to go up, given inflation is also elevated.

And so I think that these things are going to continue to have a larger and larger cost And if something like the Inflation Reduction Act, around $300 billion, can go up to $1.2 trillion in such a short period of time, we need to have a better handle of that --

*Mr. Buchanan. Let me real quick --

*Mr. Ginn. Yes, sir.

*Mr. Buchanan. This year interest is going to be on the debt 400 trillion; 10 years, 1.2 trillion. It will be bigger than our budget for national defense.

*Mr. Ginn. Yes, sir.

*Mr. Buchanan. Mr. Horn, let me ask you. In terms of looking at trade, it seems like we are not even on the field, we are not in the stand. I have been to Africa multiple times. You see the Chinese are very active and engaged, building roads and bridges and, of course, doing all the mining and other things that they are doing.

What is your sense in terms of where we are at from a trade standpoint, and are we competing at all with the Chinese and other countries?

But I look at primarily the Chinese and what they are doing with a billion people in Africa.

*Mr. Horn. That is a great point, Congressman. We are not in the game and we

need to get in the game.

The reality is that the Chinese, the Russians, other countries are making great strides forward by taking advantage of these massive resources throughout the globe.

The United States used to be the leader in this space. This was an area that we dominated and led the world in until we started offshoring it in the 1990s. And we have continued to do that since. We have the capability to lead the world again in this space, not only by developing resources abroad, but by processing them and exporting them from our own shores, as well, too.

*Mr. Buchanan. And let me just mention I am confident we have the companies and the capacity and potential leadership, but we have got to get in the game, and we are not in the game. We are not on the field. And I am very concerned about that. Nobody wants to spend any more money, but that is probably a pretty good investment. We have got a lot of people that are on the ground, but we have got to make sure we are committed to trade and competing. And I think, if we compete, we can be competitive, but we are not.

Mr. Stein, what is your thought in terms of the trade aspect, in terms of where we are at compared to the Chinese and others, in terms of what is going on in trade?

*Mr. Stein. Well, part of what the Chinese have done is a very deliberate policy, and it is driven by state, state-backed organizations and state-backed banks. And they have given out loans, and they have bought mines, they have built processing facilities. Even countries that have tried to -- like Indonesia -- tried to increase the amount of nickel processing that actually goes on domestically in order to improve their own trade balance, well, Chinese companies have come in and built a bunch of processing facilities that they own, and that product is then shipped on to China to be used.

So they -- this is a very active and conscious, state-driven policy all over the world to get access to these minerals to control their processing. And it is very much a forward-

looking, centrally-planned system.

So -- and it is something that, you know, as a free market, more free market country in the United States, we don't think that way. Our -- you know, individual companies might do long-term planning, but this is part of why this is dangerous to increase reliance on some of these --

*Mr. Buchanan. Yes. Let me just close and just say that I know we can compete with a lot of countries -- Japan, China, everybody else -- but we have got to get back on the playing field in an aggressive way. And we have got a lot of capacity, a lot of great people, but we don't have the leadership, for whatever reason, in this area, this space.

Thank you, and I yield back.

*Chairman Smith of Missouri. The gentleman from California, Mr. Thompson, is recognized.

*Mr. Thompson. Thank you, Mr. Chairman, and thank you to the witnesses for being here today.

You know, Mr. Chairman, I really seriously thank you for calling today's hearing. It is not every day that the minority gets such a generous opportunity to talk about all the good work that we have done.

I would like to start by making a simple point of comparison. In the last Congress Democrats on this committee advanced legislation, the Green Act, which ultimately served as the climate portion of the Inflation Reduction Act. It was the biggest investment in fighting climate change in our country's history.

That bill was specifically drafted to incentivize the use of domestically-manufactured goods. It includes very clear incentives for companies to use steel, iron, and other manufactured products sourced from right here in the United States. It includes very clear requirements that, to access these tax credits, companies must pay good wages. Credits for

solar energy, wind energy, geothermal energy for fuel cells, for hydropower, to maximize any of these credits companies have to use domestically-produced materials and pay domestic workers a good wage.

On the other hand, the last time the Republicans were in charge their sole legislative accomplishment was the 2017 Republican tax act/giveaway. It did not distinguish at all between the U.S. and Chinese businesses. In fact, according to JCT, foreign investors, including the Chinese Sovereign Wealth Fund, got a $345 billion tax cut.

And on top of that, because my Republican colleagues are completely unwilling to pay the debts they racked up when they slashed taxes for the very, very rich and for corporations, the majority's first markup of this Congress was a debt prioritization bill that prioritized -- wait for this -- the Chinese bondholders.

So just to recap, Democrats' signature bill invests in clean energy, directly boosts domestic manufacturing and energy production, moves us away from fossil fuels, and creates jobs here at home, while paying down $300 billion of our debt. The Republicans' signature bill in 2017 was fully available to Chinese companies and investors, added over $2 trillion to the debt, and primarily benefited very rich people and big corporations. And your first bill of this Congress prioritized Chinese debtors over America's seniors.

The contrast is pretty clear to me, and I appreciate the chance to lay that out for the American people.

Mr. Beachy, in your opening statement you said Americans shouldn't have to choose between good jobs and a livable climate and a fair economy. I agree with you 100 percent. Could you please talk a little more about how the incentives in the Inflation Reduction Act will create good-paying jobs for American workers?

*Mr. Beachy. Absolutely, thank you for the question. So I just mentioned that -- and when it comes to clean energy deployment, the bill explicitly makes ties -- the

expansion of clean energy deployment -- to high road labor standards for the first time in U.S. history. You know, for far too long we have seen a discrepancy in the quality of jobs between the clean energy sector and the traditional energy sectors. This bill, this law, the IRA, aims to close that gap.

Again, wind and solar developers, it makes good business sense for them to take advantage of the higher tax credit by ensuring there is a prevailing wage for workers and high road apprenticeship programs to ensure a pathway to sustainable careers.

In addition, for the manufacturing sector, $50 billion being invested in our -- in manufacturing to really turn the tide of de-industrialization that we have seen in recent decades.

Again, manufacturing jobs tend to offer higher wages, better benefits, and increased access to unions. So this is really an about-face for -- to decades of policy that have ignored and left many workers behind.

*Mr. Thompson. Thank you very much.

I just want to add, Mr. Turner, I read some of the things that you have posted online, talking about how there is no climate crisis, it is all communism. You know, just this week I have met with two oil companies, two major ag interests, one of which was grape growers from my area, and the shellfish growers, all of whom told me of deep concerns they have with climate change and everything that they are doing to having to deal with that. I don't think any of these people are communists. And I think saying something like this is pretty outrageous.

I yield back.

*Chairman Smith of Missouri. Thank you, Mr. Thompson. For the record, I want to clarify a statement that you made. The very first piece of legislation that passed out of this committee was the Protecting Taxpayers and Victims of Unemployment Fraud.

With that, Mr. Smith is recognized.

*Mr. Smith of Nebraska. Thank you, Mr. Chairman.

Certainly, thank you to our witnesses for your engagement here today. I think it is important that we hear from all of you, even with mixed viewpoints. I think that that can be very healthy.

I certainly appreciated the emphasis, Mr. Ginn, of your testimony on the ways the Biden Administration has exponentially grown the cost of the Inflation Act by ignoring, straight-up ignoring both the plain language of the bill, as well as the intent of its authors.

I don't agree much with much of what is in the IRA, the so-called IRA. There is nothing new there for anyone. But I do want to point out, however, that Senator Manchin has been extremely clear about his intent in negotiating the critical mineral requirements for the so-called Clean Vehicle Credit. That bill says critical minerals must be sourced in the U.S. or from a trade agreement partner, or recycled in North America. I appreciate that a number of my Democrat colleagues on this dais have expressed similar concerns about the Biden Administration's efforts to undermine that.

Trade agreements are negotiated using trade promotion authority, and they are enacted through legislation passed by Congress and signed by the President. These critical mineral agreements fail to meet the standard, while giving away their largest benefit access to U.S. tax credits, while accruing no new benefits for American manufacturers or consumers. I would say workers are hurt in that process, as well. Every time the Biden Administration takes administrative action like expanding the scope of these tax credits through critical mineral agreements, it increases the cost of that legislation. To state the obvious, that increased spending does not reduce inflation. In fact, it increases it.

Mr. Ginn, you covered some of my concerns about the Biden Administration's expansive view of trade agreements in your testimony. I appreciate that. The size of the

economies, let me say, that the Administration is negotiating with in these critical minerals agreements -- for example, UK, EU, and Japan -- have a combined GDP of more than $25 trillion, far outweighing the size of the economies of the countries we actually currently have comprehensive, true comprehensive trade agreements with. Those 20 countries have a combined GDP of just under $10 billion.

From those numbers alone, I would assume the cost of the credits flowing out to other countries would vastly increase. Mr. Ginn, can you speak to that?

*Mr. Ginn. Thank you, Congressman, and I think you are right. Part of this is going to other countries, especially with the new rules that are being put out, and going to countries that don't need these sort of benefits. I think this is something that we should ultimately be looking at. If it is really an inflation reduction act, you have got to look at reducing the debt, reducing how much we are spending at the end of the day, because, otherwise, this just increases the debt, crowds out the private sector, is inflated away, and it reduces our purchasing power in the process.

And at the same time that we are benefiting, you know, other countries and things of that nature, that is a huge trade-off for the American people as a whole, and I think it is another downside of the Inflation Reduction Act.

*Mr. Smith of Nebraska. Thank you. I have concerns that, even though I think there were probably some good intentions with the legislation that was passed last year -- of course, I certainly maintain my objection -- but some of those good intentions as they are applied to, as we heard, over 100 programs, intentionally going against what market forces there might be or market-based dynamics, whether it is wages, input costs, or even the output impacts, I just have concerns that there can be great intentions, but as has happened all too often around this place, actual results are sometimes opposite to what the intentions were. That is the foundation of my concerns.

And I hope that we can have the discussions we need to have to address the fact that, fiscally, this legislation is getting away from us. And I would hope that there is either an explanation of how we can rein that in with a strategy to do so, or certainly, I would hope, some acknowledgment that at least we need to have the conversations to do something legislatively to take a stronger, more fiscally responsible position.

Thank you. I yield back.

*Chairman Smith of Missouri. Mr. Larson is recognized.

*Mr. Larson. Thank you, Mr. Chairman, and I want to associate myself with the remarks of Mr. Thompson, and also start by asking Mr. Beachy and thanking you and all of our witnesses for your testimony.

But, Mr. Beachy, are you a card-carrying member of the Communist Party, or is the BlueGreen Alliance aligned with the Communist Party? Is the Sierra Club, are they aligned, to your knowledge, with the Communist Party?

*Mr. Beachy. I appreciate the question, sir. No.

*Mr. Larson. Well, thank you for that. And Mr. Beachy, Mr. Thompson was talking about a couple of points, but the Inflation Reduction Act, what is your estimate in terms of the jobs that the Inflation Reduction Act will create?

*Mr. Beachy. So it is not our estimate. We actually commissioned a proper economic analysis from the Political Economy Research Institute at the University of Massachusetts.

*Mr. Larson. Well, let me ask you before you go any further, are they a communist organization?

*Mr. Beachy. Thank you for clarifying. They are not.

Their analysis shows that, over the next decade, the climate and clean energy investments in this law would create over nine million good jobs, and that is across sectors.

I mentioned the 900,000 for manufacturing. There is actually about five million jobs that would be created in clean energy, thanks to the rapid expansion of clean energy deployment fueled by this bill. There is jobs to retrofit buildings to make them more energy efficient and healthier for residents. There is jobs to restore and protect our lands and build the resilience of our communities. There is jobs in agriculture for rural communities.

The expanse of this bill reflects the fact that we have to restructure the economy to meet the challenges of climate, jobs, and justice. And in so doing we are creating over nine million good jobs.

*Mr. Larson. Thank you, Mr. Beachy.

And let me say that I think that China does represent a threat, and one that should be taken seriously, and that, hopefully, in a bipartisan fashion, that we can focus on this.

I appreciated Mr. Horn's comments in terms of focusing on the industries of the future that we need to be investing in, and investing in it so that we regain our position that we have lost over decades. That will require Americans pulling together and making sure that we are making the kind of investments that will create 12 million new jobs and have unemployment at its current lowest level in 50 years.

More needs to be done, especially on the investment side in the industries of the future. And with that, Mr. Chairman, I yield back my time.

*Chairman Smith of Missouri. Mr. Schweikert is recognized.

*Mr. Schweikert. Thank you, Mr. Chairman. And I am going to direct this one to Mr. Stein, just because for some of us there is more than just the scale of industrial policy and the arrogance of Washington thinking. We understand what the next technological breakthrough is because, you know, we are all so brilliant up here.

But, Mr. Stein, I live in the desert. I live outside Phoenix. We actually have an excess of power every afternoon. So our, actually, power rates crash to almost zero, because

we produce excess photovoltaic, particularly in the summer months. But then this thing called the sun goes down, and we are still running our air conditioners.

So a project we are working on -- and it is bipartisan, you know, with my delegation -- is we have all these lakes up and through this really rugged mountain territory just outside Phoenix, and we are going to pump water up when power is basically free up on top of the cliff, and then run it back down. So water is a battery.

But the way the Orwellian-named Inflation Reduction Act definitions in -- what is it, 42, and is it 40 -- also 48 -- does my hydro battery actually count as a battery under their definitions?

*Mr. Stein. Well, not for the Battery Tax Credit in particular. It is the -- it is chemical batteries that are -- that count as --

*Mr. Schweikert. So it is not the elegance of what is storage and green, it was almost the elegance of, hey, we are going to give money to our favorite friends in industry.

*Mr. Stein. Right. It is subsidizing an industry, yes.

*Mr. Schweikert. So back to -- just another thing that has just driven me crazy is our brothers and sisters on the left promised us, hey, here is what these things are going to cost. And I would be willing to work with them saying, okay, can we hold everyone to our commitments? But we all see the information coming out. And yes, I couldn't do this without boards. So let's take a look.

The cost estimates on the battery production credits when this piece of legislation was moved, our brothers and sisters on the left told us it would be 30.6 billion. That is what CBO -- that is what we were told. We are now seeing estimates that it has as high as $196.5 billion. Would you be willing to take it back to what you told us it would be, what we told the American people it would be?

So let's actually take a look at wind. The cost estimate on wind was going to be

$11.2 billion. Now we are actually seeing that the scoring of the actual language -- not what we were told, not what the American people were told, but what is now 64 -- excuse me, 68.4 billion -- and look, whether you want to do Credit Suisse, which, actually, I am not sure I would use, considering they are pretty much gone now. But Goldman actually came back and said, hey, it is not like $280 billion of handouts to big green corporations; it may be 1.2 trillion.

Okay. Are you willing to actually put it back to the -- at least cap it at that 280, which you told the American people and told us? Or do we actually say, well, Goldman is saying that the actual language, when scored out, is 1.2 trillion?

Do I have anyone on the panel who has an expertise on explaining what happened here?

Why are we now seeing four times the exposure to the American taxpayers?

But can you imagine the distortive effects?

And the last bit of my rambling is I know most of us probably showed up at our basic economics class. We have seen the numbers of how many Americans intend to buy electric vehicles. We are now going to give these huge subsidies, mostly to the very wealthy. And it is not actually changing, really, the number of people who intend to buy electric vehicles. We chose to subsidize something people were already going to do. We didn't, like, say -- put in definitions saying, hey, we are going to focus on the research for iron air batteries, which could be done with all domestic, no foreign -- you know, isn't this -- be nice if you were actually concerned about a domestic product. Instead, we produced massive subsidies for very wealthy people for something they were already going to do. It is just the absurdity of what we are dealing with.

So thank you for tolerating me, Mr. Chairman, but I feel better getting that off my chest.

*Chairman Smith of Missouri. Thank you.

Mr. Blumenauer, you are recognized.

*Mr. Blumenauer. And it is important. We want you to feel better.

[Laughter.]

*Mr. Blumenauer. You know, some of us, we are of a generation -- in fact, this show is still being shown around the country, where Rocky and Bullwinkle -- there was a feature that had Mr. Peabody and his boy, Sherman, and they had a wayback machine. And I am listening to the chairman describe what is wrong with what we did, and I am having a moment where I feel like I am in that wayback machine, because what the chairman said attacking it was almost exactly what some of us were saying six years ago for the Republican tax bill, only it was more generous to foreign companies, and the American people got less back, and it was concentrated at those who needed it the least.

I am concerned about being trapped in the wayback machine. I started the week being concerned for the speaker, who was before the New York Stock Exchange sort of describing how we are going to dodge the bullet on dealing with the debt ceiling. And the poor guy could not explain what the Republican proposal is, because what he had to commit to be elected speaker was various things that don't pencil out.

And so we are kind of lurching towards a potential crisis here. We are ignoring some of the very tangible results that have taken place during the Biden Administration. We are currently at a situation where the recent inflation is 2.7 percent, the lowest that it has been in more than 2 years. The consumer price index increases have been the lowest since May 2021, at 5 percent. Gas prices have dropped 17.4 percent since the spike that was occasioned by the invasion of Russia into Ukraine. We have record labor participation. And some of my most conservative concerns -- friends are concerned about who is not working anymore. Labor participation is at its highest level in years. And in terms of the

unemployment, it is the lowest that it has been in 40 years. And Black unemployment is now the lowest that it has been in history.

I don't think the Biden economic proposals and management is a train wreck. Instead, it is very clear that this is working. It is not done yet. There are things that we want to do, things that we have put in place in the transition to a green economy, creating millions of jobs, some of which we are seeing in a number of the constituencies of my Republican friends. This is working.

And I don't think any amount of going back into the wayback machine, ignoring -- actually, that wasn't fair because the Republican bill actually included provisions that would have dramatically scaled back wind energy investment in their original bill, and had to be embarrassed by the committee to taking it out so that it really didn't wreck the proposals that we had going forward.

I hope that we can move forward.

I think it was you, Mr. Horn, that said something about responsible budgeting. I am all in favor of it. I hope that we will get an actual proposal from what the Republicans are going to do with their budget, what they are going to cut, how they reconcile it, and match it with the President and what we will do, and have an honest conversation instead of appearing in press statements, smoke and mirrors, and going back in the wayback machine. I don't think that gets us anywhere, and the American people deserve better.

I appreciate your tolerance for my walk down memory lane. It was quite jarring as we started the committee. I -- to quote Mr. Schweikert, I feel better getting that off my chest, and you can use my speech anytime.

Thank you very much, and I yield back.

*Chairman Smith of Missouri. We always want everyone to feel better in our committee. So thank you, Mr. Blumenauer.

[Laughter.]

*Mr. Blumenauer. Mission accomplished.

*Chairman Smith of Missouri. That is good.

According to a new analysis from the Coalition for a Prosperous America, I would like to submit to the record the Chinese Communist Party is likely to receive a windfall of 125 billion from these credits, which is more than half of what China plans to spend on their military this year.

[The information follows:]

**********COMMITTEE INSERT**********

JEFF FERRY 5 Minute Read | April 18, 2023

Chinese Manufacturers Could Earn Up To $125 Billion In U.S. Renewable Energy Tax Credits

U.S., European, and Chinese solar equipment manufacturers have rushed out announcements of investment in factories to make U.S. solar panels and related equipment

since the Inflation Reduction Act (IRA) was signed into law last year. The tax credits designed to spur a move to solar energy are generous and the U.S. could soon be producing up to half of the solar panels it deploys each year.

The problem is that as the IRA law is currently written, Chinese companies qualify for tax credits paid for by the U.S. taxpayers, just as American companies do.

A Goldman, Sachs analysis projected that "green energy manufacturing" could cost the U.S. taxpayer some $156 billion in payments to manufacturers of solar and wind power. With 8 of the 10 largest solar equipment makers headquartered in China and 10 of the 15 largest wind equipment makers Chinese, it is very likely that those Chinese companies could decide to build manufacturing facilities in the U.S. to profit from the IRA subsidies and the growing U.S. market. Chinese producers have about 80% of the global market for renewable energy equipment. If the Communist government directs those companies to replicate that market share in the U.S., Chinese companies could end up raking in $125 billion courtesy of the U.S. taxpayer.

An even worse thought is that if renewable energy serves as a model for the EV and battery industry, industries where Chinese companies already lead the world, Chinese companies could lay claim to those U.S. tax credits. The tax credits for EVs and batteries are some eight to ten times as large as those for renewable energy.

We counted six Chinese solar equipment makers who have already announced U.S. investment plans to take advantage of the IRA tax credits. Chinese solar equipment makers have easy access to capital, since the Chinese Communist government backs solar industry expansion with plentiful loans.

In the eight months since the IRA was signed by the president, these six companies have rolled out plans to build factories to assemble solar panels and other solar components in the U.S. In most cases the solar cells inside the panels will come from China, or Chinese-owned facilities elsewhere in Asia. Table 1 below tallies up the Chinese investment plans that have already been announced. We find those plans already bring Chinese profit from the U.S. taxpayer beyond the billion-dollar level.

This is objectionable on many grounds. First of all, Chinese solar makers benefit from slave labor in Xinjiang, since much of China's polysilicon, the raw material of which solar cells are made, is manufactured in Xinjiang. Secondly, electric power is a strategic resource in the U.S. It is dangerous and foolish to allow Chinese companies, already dominant in imported solar panels, to extend their reach even further by increasing their U.S. manufacturing presence.

Finally, it is foolish on economic grounds. China already operates its solar equipment industry as a government-controlled monopoly. The Communist government assigns companies targets for production and export. It regulates engineering parameters like the size of solar cells down to the millimeter, to help China's monopoly grow and squeeze out other nations' solar equipment industries. Allowing Chinese companies to own any chunk of the growing U.S.

solar equipment industry would only play into the Chinese government's long-term game plan for worldwide domination of the crucial renewable energy industry.

There are efforts in Congress to legislate to bar Chinese-owned companies from profiting from U.S. IRA tax credits.

Table 1. In Year One, Chinese solar manufacturers already break the billion-dollar threshold.

Chinese Solar Facilities, Announced U.S. Investments as of April 2023		
Solar Modules (Panels)		
Company	Capacity (Megawatts)	
Longi		5000
SEG Solar		2000
Jinko		1200
Hounen		1000
JA		2000
SPI Energy-Solar4America		2400
Total		13,600
Tax credit value	$	952,000,000
Solar Wafer Production		
SPI Energy-SEM Wafertech		3000
Tax credit value	$	144,000,000
Grand total, Year 1	$	1,096,000,000

Source: Corporate press announcements, press reports, CPA calculations

JEFF FERRY

MORE NEWS

Job Quality Index Down Slightly, Construction Hiring Remains Strong

CPA NEWSROOM | AUGUST 4, 2023

WASHINGTON — The Coalition for a Prosperous America (CPA) today announced that the U.S. Private Sector Job Quality Index (JQI) for June was 85.22, down 0.3% from May.

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China companies are put on Entity Lists for being in breach of certain laws. In this case, allegations of forced labor. That doesn't stop U.S. investors from buying their stocks.

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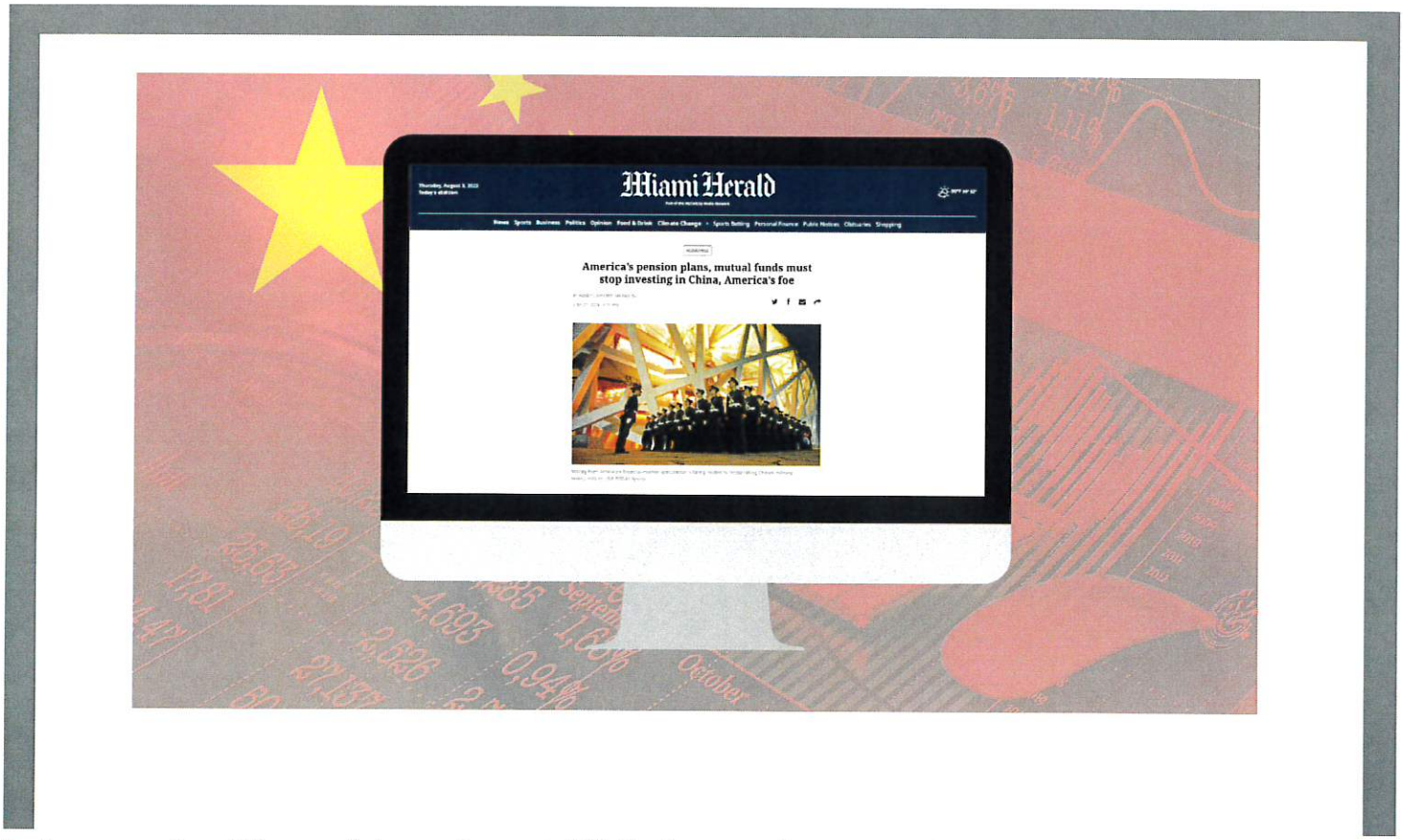

Explainer: Preventing State Pension Funds and Endowments from Funding China

ROBBY STEPHANY SAUNDERS | AUGUST 3, 2023

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Majority of Senate Votes to Prohibit Federal Retirement Savings from Funding China

CPA NEWSROOM | AUGUST 3, 2023

The majority of the Senate supports this legislation, and we will be working with lawmakers in the House to ensure this bill becomes law.

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*Chairman Smith of Missouri. Mr. Wenstrup is recognized.

*Mr. Wenstrup. Thank you, Mr. Chairman.

Thank you all for being here today. You know, one of the things we hear about today is the crisis, the climate crisis, and there is a crisis, especially if you have been a victim of a drought or a fire or a hurricane. They all kill people. They all destroy lives. Science is real.

Something to consider. You know, we use sunblock. Why? To prevent skin cancer from over-exposure to the sun. Yet at the same time, we need vitamin D. It is very important to our health, both situations. And, you know, I might be able to prescribe for someone a medication that would kill the virus or bacteria that is within you, but if it kills you too, it doesn't do much good.

I would -- will want to submit to the record an article here from the NOAA, the National Oceanographic and Atmospheric Administration that is entitled, "Study Reducing Human-Caused Air Pollution in North America and Europe Brings Surprise Result: More Hurricanes," a very scientific article from a Federal agency.

The point I am trying to make is you can over-prescribe sometimes, and we need to be careful about that. And if we over-prescribe to the point of killing people, it is a problem. And we need to take this very seriously.

Look, I have solar panels, and I am on the grid. I drive a hybrid. All of these things. I am for all of the above. I am all for new technology. I am all for clean air, clean water. But science is real.

And Mr. Beachy, you said win-win-win. It is not always a win, and this is clear evidence of that. If you look at what this says, what it says is where there has been too much diminished pollution, there is more hurricanes and more storms. Why? Because there is no longer a screen between the sun and the earth -- warms the oceans, kicks it up, it does

ATMOSPHERIC SCIENCE

Substantial global influence of anthropogenic aerosols on tropical cyclones over the past 40 years

Hiroyuki Murakami[1,2]*

Over the past 40 years, anthropogenic aerosols have been substantially decreasing over Europe and the United States owing to pollution control measures, whereas they have increased in South and East Asia because of the economic and industrial growth in these regions. However, it is not yet clear how the changes in anthropogenic aerosols have altered global tropical cyclone (TC) activity. In this study, we reveal that the decreases in aerosols over Europe and the United States have contributed to significant decreases in TCs over the Southern Hemisphere as well as increases in TCs over the North Atlantic, whereas the increases in aerosols in South and East Asia have exerted substantial decreases in TCs over the western North Pacific. These results suggest that how society controls future emissions of anthropogenic aerosols will exert a substantial impact on the world's TC activity.

INTRODUCTION

The effect of anthropogenic climate change on global tropical cyclone (TC) activity is of great interest for society because of the substantial adverse impacts that TCs can have in terms of natural hazards, water resources, ecosystems, economies, insurance, and mitigation policy. Hence, a large body of work has already been carried out by scientists with respect to how anthropogenic climate changes can potentially alter global TC activity, and this has been examined in the context of past, present-day, and future climates (*1*, *2*). Although the detection and attribution of changes in TC activity in the past is a challenging topic owing to the lack of long-term reliable observations, several studies have shown a potential impact of anthropogenic climate changes on global TC activity over the past 40 years (*1*–*6*). Specifically, Murakami *et al.* (*5*) revealed, using a large number of climate modeling simulations, that a climatological change in global TC activity over the period 1980–2018 can be detected in the spatial pattern of TC frequency of occurrence (i.e., TCF or TC density; "Observed data" section). They showed that TCF has decreased substantially in the South Indian Ocean and western North Pacific (WNP) since 1980, whereas it has increased in the North Atlantic (NA) and Central Pacific. They revealed that these changes were attributable to the changes in combined external forcing, including greenhouse gases, anthropogenic aerosols, and volcanic eruptions.

Meanwhile, Murakami *et al.* (*5*) showed substantial decreases in TCF over the NA in the experiments in which only CO_2 was increased while other external forcings were fixed. The sign of the changes in TCF in the NA was opposite to that in the experiments run with all anthropogenic forcings. These results indicate a substantial influence of anthropogenic aerosols on TC activity in the NA, which is a finding that is consistent with a previous study (*7*). Evan *et al.* (*8*) also reported a potential impact of anthropogenic aerosols from South Asia on TC activity over the Arabian Sea. However, these studies focused on the impacts of aerosols on TC activity at local scale. There is relatively less literature on how the changes in anthropogenic aerosols all over the world could have potentially influenced global TC activity over the past 40 years. Emissions of anthropogenic aerosols, specifically sulfate, since 1980 have been spatially inhomogeneous, with decreased levels in the Western Hemisphere (e.g., Europe and the United States) owing to pollution control measures and increased levels in the Eastern Hemisphere (e.g., South and East Asia) because of the economic and industrial growth in these regions. We hypothesize that this spatial contrast in the changes in aerosol emissions may have had substantial impacts on TC activity not only at local scales but also at the global scale, through global changes in large-scale circulation patterns. By analyzing the results from several idealized climate simulations, the present paper reveals how the global changes in emissions of anthropogenic aerosols since 1980 may have influenced the spatial distributions of TCs throughout the world.

RESULTS

Changes in TC spatial distributions

Figure 1A shows the observed difference in TCF ("Observed data" section) between the means of 2001–2020 and 1980–2000, revealing significant decreases in TCF over the WNP and Southern Hemisphere (SH) and increases in the NA (highlighted in the black rectangles in Fig. 1A). The observed changes in sea surface temperature (SST) over the same period show substantial warming globally (Fig. 1B). Specifically, the warming is larger over the mid-latitudes of the WNP, NA, and southern Pacific. The east-west spatial contrast in the warming over the Pacific Ocean, with a triangular-shaped cooling region in the east, resembles the known patterns of decadal variation in SSTs [e.g., mega El Niño–Southern Oscillation (*9*) or Interdecadal Pacific Oscillation (*10*)] such that the observed changes in TCF, as shown in Fig. 1A, could be a result of various factors including multidecadal internal variation and/or anthropogenic forcing such as greenhouse gases and aerosols, as reviewed by Murakami *et al.* (*5*).

To reveal the individual impacts of the regional distribution of changes in anthropogenic aerosols on TCs globally since 1980, we conducted idealized climate model experiments by imposing different spatial emission patterns of anthropogenic aerosols (including sulfate, black carbon, and organic carbon aerosols related to human activity), while the other experimental settings remained identical ("Model" and "Model experiments" sections). In the early-decade

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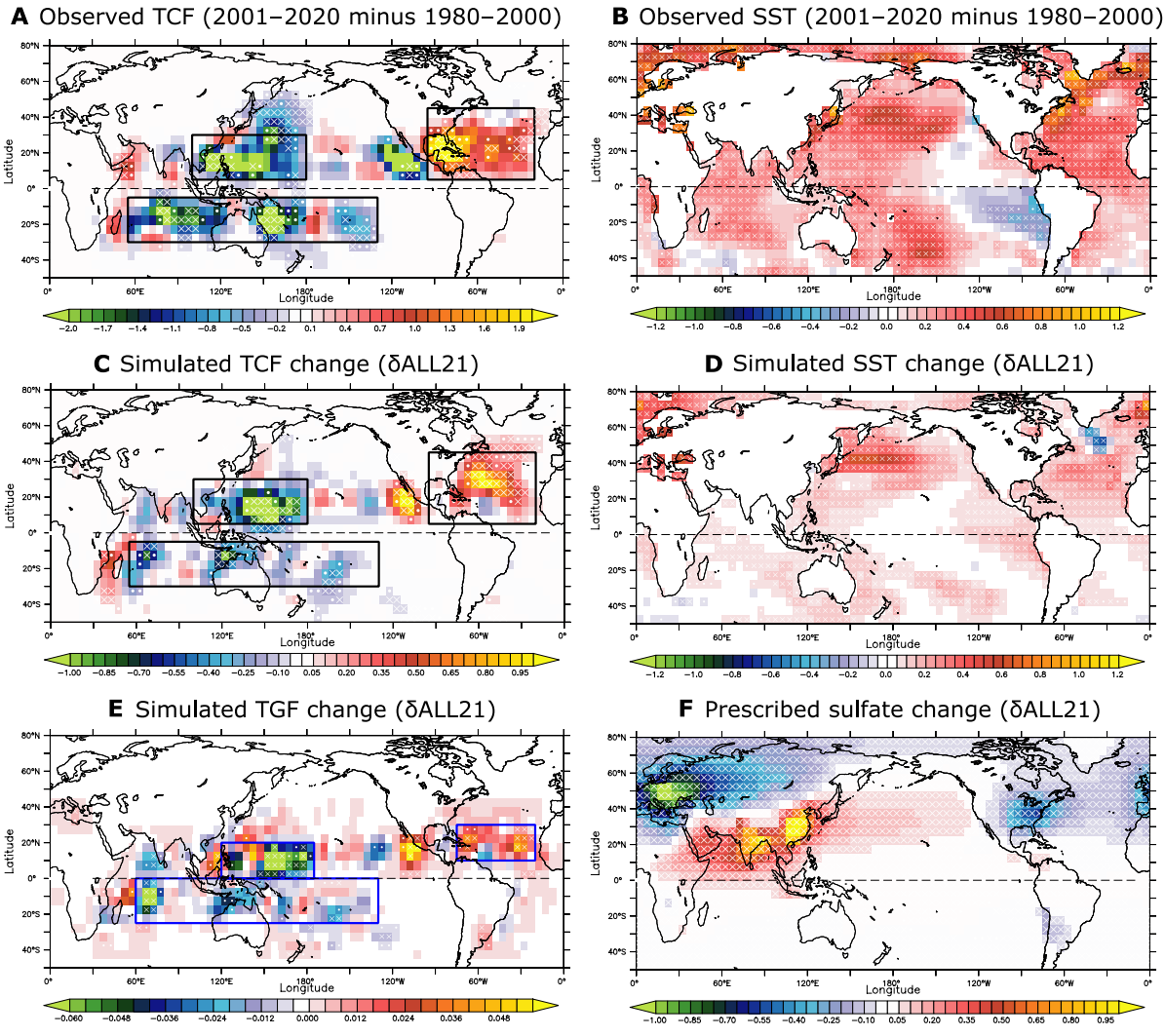

Fig. 1. Observed and simulated changes in SST, TCF, TGF, and sulfate. (**A**) Mean difference in the observed (A) TCF and (**B**) SST between 1980–2000 and 2001–2020. (**C** and **D**) As in (A) and (B) but for the simulated differences between ALL21 and CNTL. (**E** and **F**) As in (C) but for the simulated TGF and simulated column-integrated sulfate burden in response to the prescribed emissions of sulfate, respectively. Note that sulfate aerosols are just one type of aerosol emission included in the experiments, along with black carbon and organic carbon. White crosses (dots) indicate where the difference over the grid cell is statistically significant at the 95% (90%) level according to the bootstrap method. Units: number per year for TCF and TGF, K for SST, and kg m^{-2} for sulfate.

control experiment (CNTL), the mean emissions of anthropogenic aerosols for the period 1980–2000 were prescribed, whereas the mean values during 2001–2020 were adopted in the late-decade experiment (ALL21). The difference in the simulated sulfate aerosols between ALL21 and CNTL—namely, δALL21—is shown in Fig. 1F, revealing substantial decreases in anthropogenic sulfates over Europe and the United States and increases over South and East Asia. The resultant differences in the simulated TCF and SST reveal somewhat similar spatial patterns as observed, especially over the domains of interest (Fig. 1, C and D). These consistent changes in TCF and SST between observations and the model simulations reveal a substantial influence of anthropogenic aerosols on the global distribution of TCs and associated large-scale parameters.

The changes in TCF might be associated with the corresponding changes in TC genesis frequency (dg), TC track or motion (dt), and/or their nonlinear combinations (dn). We applied an empirical statistical method of passage frequency (*11*, *12*) ("Empirical statistical analysis for TCs" section) to quantify each factor's contribution to the total changes in TCF for each domain in Fig. 1C. The results reveal that the change in TC genesis (dg) was the primary contributor to the total change in TCF for all domains (Fig. 2A). The changes in TC genesis frequency of occurrence (i.e., TGF; "Observed data" section) for δALL21 (Fig. 1E) reveal similar changes to those for TCF (Fig. 1C).

Impact of anthropogenic aerosols on global TC genesis

To further elucidate what caused the TGF changes in the domains indicated by the blue boxes in Fig. 1E, we applied a recently developed (*13*) dynamic TC genesis potential index (DGPI) ("GPI and variational method" section). The DGPI consists of four dynamical factors, and the DGPI changes adequately reflect the TGF changes (Fig. 2B). By applying a variational method ("GPI and variational method" section), we were able to identify which element of the DGPI is responsible for the total changes in DGPI (Fig. 2, C to F). It turns out that the changes in upward midlevel motion (ω_{500}) is the

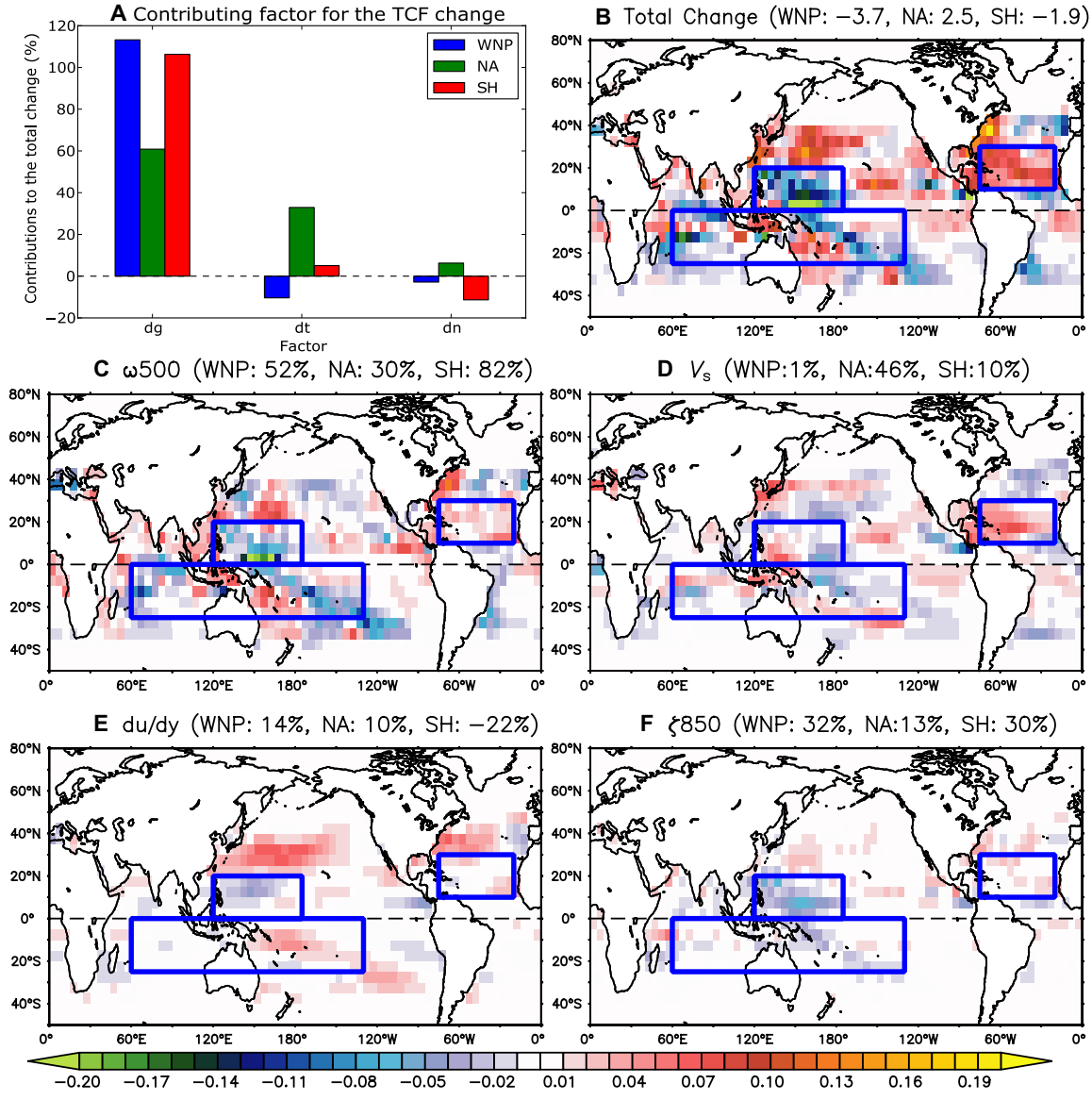

Fig. 2. Empirical and DGPI analysis to identify the causes for the TCF and TGF changes. (**A**) Fractional contribution of each term to the TCF changes. TCF changes over the three tropical domains (black rectangles in Fig. 1A) are decomposed into TC genesis change (dg), TC track change (dt), and other nonlinear effects (dn) through an empirical statistical analysis. (**B** to **F**) Fractional contribution of each term to the total DGPI change. The total DGPI changes (B) are decomposed into each term's contribution through a variational method by (C) ω_{500} (vertical velocity at 500 hPa), (D) V_s (vertical wind shear between 200 hPa and 500 hPa), (E) du/dy (meridional shear vorticity at 500 hPa), and (F) ζ_{850} (absolute vorticity at 850 hPa). The numbers in (B) denote the area mean changes in DGPI over the three tropical domains, while the numbers in (C) to (F) denote the fractional contributions to the total changes for each domain and each variable.

primary contributor to the decreases in DGPI in the WNP and SH, whereas the changes in vertical wind shear is the primary contributor to the increase in DGPI in the NA. These results suggest substantial changes in large-scale circulations caused by the changes in anthropogenic aerosols, which, in turn, have led to the changes in TGF.

To help us interpret what is indicated by the results of the DGPI analysis, Fig. 3 (A and B) shows the mean circulation at the 200-hPa level simulated in the CNTL experiment. The three domains of interest are actually located between the subtropical westerly jets in both hemispheres, and the simulated mean wind speed at 200 hPa is relatively weaker (Fig. 3A). The WNP and SH domains are also located near the center of divergence fields in the upper troposphere, whereas the NA domain is located where the convergence fields are in the upper troposphere climatologically (Fig. 3B). The changes in upper-tropospheric winds simulated by ALL21 show alternating patterns, revealing poleward shifts of the subtropical westerly jets (Fig. 3C). The tropical NA is subject to weakened westerly winds (Fig. 1C), which, in turn, lead to reduced vertical wind shear, resulting in increased TC activity. In contrast, the mean changes in the divergent winds show convergence anomalies over the WNP and SH domains (Fig. 3D), revealing that the mean upward motion was weakened over these domains, which, in turn, led to decreased TGF and TCF. Overall, these changes are consistent with the DGPI analysis and could be the primary reason for the changes in TC activity.

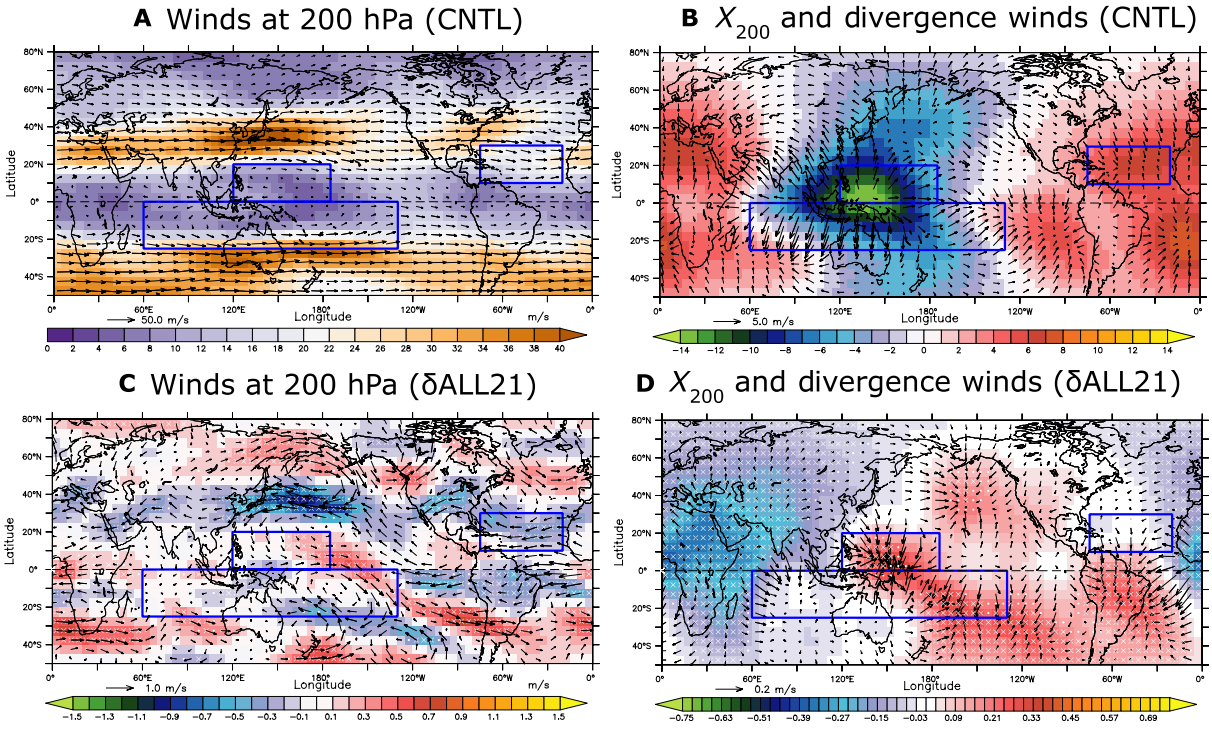

Fig. 3. Simulated mean large-scale circulation and the changes in the upper troposphere. (**A**) The mean winds at 200 hPa (vectors) and the wind speed for the zonal component (shading) simulated by the CNTL experiment. (**B**) The mean velocity potential (shading) and divergent winds (vectors) at 200 hPa simulated by the CNTL experiment. (**C** and **D**) As in (A) and (B) but for the simulated differences between the ALL21 and CNTL experiments. White crosses (dots) indicate where the difference in zonal wind over the grid cell is statistically significant at the 95% (90%) level according to the bootstrap method. Units: m s^{-1} for wind speed and divergent winds; 10^6 m^2 s^{-1} for velocity potential.

Impact of regional aerosol changes on TCs globally

As indicated in Fig. 1F, the decadal changes in anthropogenic sulfate aerosols since 1980 are not spatially homogeneous: They decrease over Europe and the United States but increase over South and East Asia. Therefore, these different signs of change may exert different changes in global TC activity. To investigate this hypothesis, we conducted two further climate model simulations like ALL21 but with separately prescribed decreased emissions of anthropogenic aerosols over Europe and the United States (W21; Fig. 4A) and increased emissions of aerosols over South and East Asia (IP21; Fig. 4E and Table 1). Figure 4 (B and F) reveals the changes in TCF simulated by the W21 and IP21 runs relative to the CNTL experiment, respectively. The simulated changes in TCF reveal somewhat similar changes between δW21 and δIP21; however, there are some substantial differences in the detail. For example, the increases in TCF in the NA are significant in δW21 but not in δIP21 (Fig. 4, B and F, and Table 2). On the other hand, both δW21 and δIP21 reveal decreased TCF in the WNP but more significantly in δIP21 than in δW21. The decreased TCF in the SH is significant in δW21 but not in δIP21. The changes in large-scale circulations also reflect these TCF differences (Fig. 4, C, D, G, and H). Although both δW21 and δIP21 show a poleward shift in the subtropical westerly jets in the Northern Hemisphere (NH), the shift is further extended to the NA in δW21 but is not extended in δIP21 (Fig. 4, C and G). Therefore, the increases in TCF in the NA in δALL21 are more attributable to the decreased anthropogenic aerosols in Europe and the United States, whereas the effect of increased aerosols in South and East Asia imposes minimal effects on the TCF and TGF changes in the NA. Meanwhile, the decreases in TCF and TGF in the SH simulated by δALL21 are more attributable to the decreased anthropogenic aerosols in Europe and the United States via the increasing convergence in the upper troposphere over the SH (Table 2 and Fig. 4D).

DISCUSSION

We speculate that the reduction in anthropogenic aerosols in Europe and the United States has caused hemispheric heating in the NH relative to the SH, which, in turn, has led to anomalous meridional atmospheric overturning circulation. More specifically, the NH acts as an ascending branch, whereas the SH acts as a descending branch, meaning convective activity is suppressed in the SH, leading to fewer TCs being generated there. As for the WNP, the effect of increased anthropogenic aerosols from India and China might have played a major role in the decreased TCF and TGF in the WNP relative to the decreased aerosols in Europe and the United States. The increases in anthropogenic aerosols might have led to a cooling over the Asian continent, thereby reducing the thermal contrast between the Asian continent and the Indo-Pacific oceans, in turn leading to a weakening of the Asian monsoon circulation in the boreal summer (Fig. 5). Accordingly, the monsoon trough, which is one of the major sources of TC genesis in the WNP (*14*), would be weakened in the summer, resulting in decreased TCF and TGF over the WNP (Fig. 5).

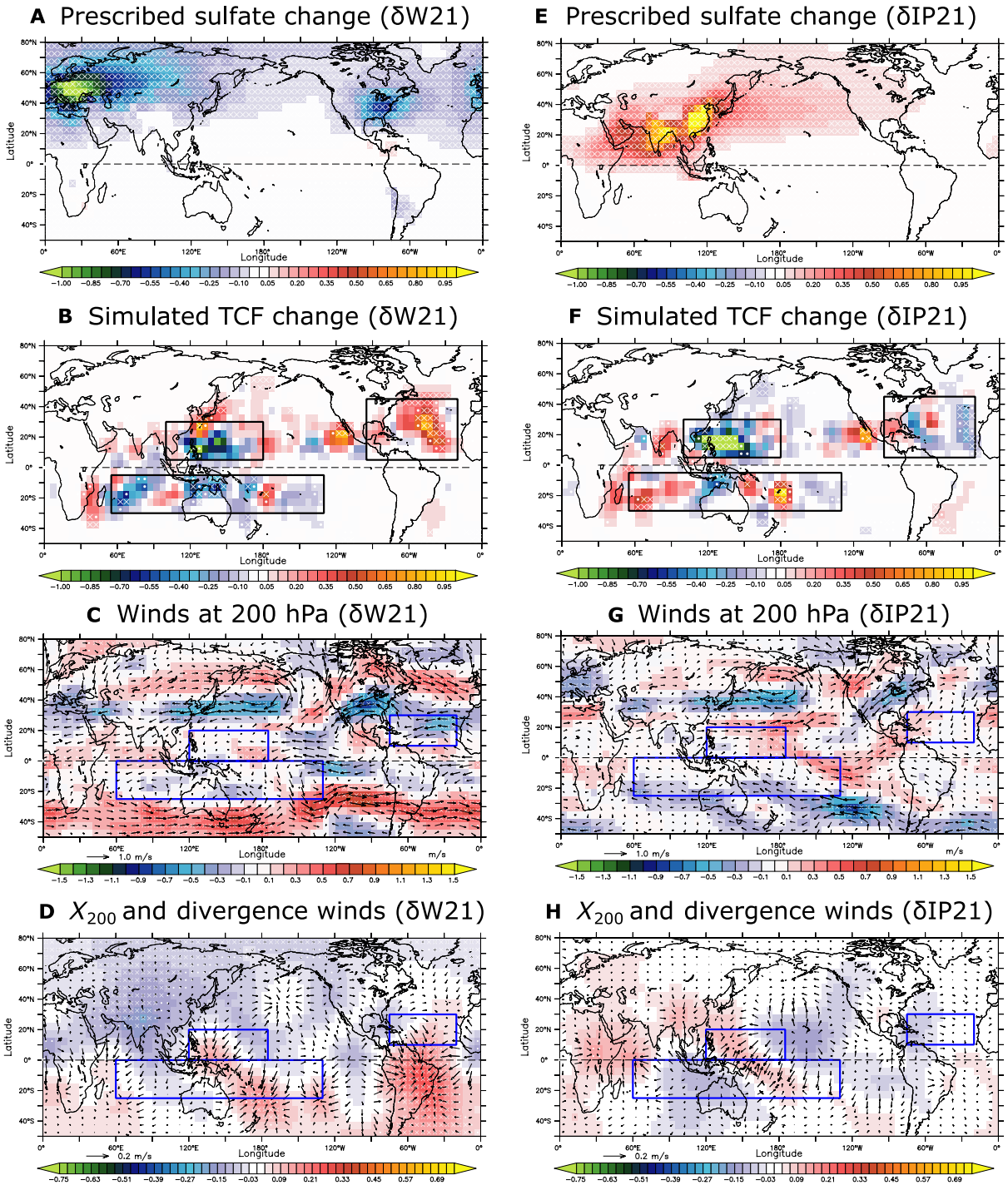

Fig. 4. Simulated changes by the additional idealized aerosol-prescribed experiments. (**A** to **D**) Idealized experiments prescribed with decreased emissions of anthropogenic aerosols over Europe and the United States only (W21). (**E** to **H**) As in (A) to (D) except for increased emissions of anthropogenic aerosols over South and East Asia (IP21). (A) and (E), (B) and (F), (C) and (G), and (D) and (H) are the same as in Figs. 1 (F and C) and 3 (C and D) but for W21 and IP21, respectively.

The weakening of vertical wind shear in NA could be partially the result of local ocean warming by the decreased anthropogenic aerosols through the wind-evaporation-SST feedback (*15*–*16*) as an analogy of Atlantic Meridional Mode (AMM) (*17*–*19*). The surface ocean warming might have caused a northward shift of the Inter-tropical Convergence Zone that, in turn, leads to a northward shift in ascending branch of the Hadley circulation that reduces upper-level westerlies around the main development region of Atlantic TCs. Meanwhile, it is argued that AMM is an intrinsic atmosphere-ocean coupled internal mode, and its decadal variation might have caused decadal variations in hydroclimate including TCs in the NA over the past 40 years (*16*, *19*). Because the SPEAR (Seamless System for

Table 1. Experimental settings. Listed are the experiment names, prescribed emissions of anthropogenic aerosols, prescribed level for other external forcings (e.g., greenhouse gases and ozone), and the number of simulation years.

Name	Prescribed anthropogenic aerosols	Other external forcing	Simulation years
CNTL	1980–2000 mean	Fixed level at 2000	200
ALL21	2001–2020 mean		
W21	As in CNTL except for the 2001–2020 mean over Europe and US		
IP21	As in CNTL except for the 2001–2020 mean over South and East Asia		

Table 2. Observed and simulated changes in TCF and TGF. Observed and simulated changes were computed over the tropical domains of the WNP, NA, and SH for TCF (black rectangles in Fig. 1A) and TGF (blue rectangles in Fig. 1E). The bold numbers indicate where the change is statistically significant at the 95% level based on a bootstrap method. Numbers in parentheses denote the *P* value.

TCF

	Period or difference	Fractional difference (*P* value)		
		WNP	NA	SH
Observations	2001–2020 minus 1980–2000	**−22.3**% (0.03)	**30.6**% (0.01)	**−34.5**% (0.00)
δALL21	ALL21 minus CNTL	**−4.8**% (0.01)	**8.7**% (0.00)	**−6.4**% (0.01)
δW21	W21 minus CNTL	−1.4% (0.46)	**6.5**% (0.03)	**−4.8**% (0.03)
δIP21	IP21 minus CNTL	**−4.1**% (0.04)	−1.8% (0.60)	1.9% (0.36)

TGF

	Period or difference	Fractional difference (*P* value)		
		WNP	NA	SH
Observations	2001–2020 minus 1980–2000	**−13.8**% (0.02)	**33.6**% (0.00)	**−15.9**% (0.01)
δALL21	ALL21 minus CNTL	**−5.9**% (0.00)	**8.1**% (0.01)	**−7.0**% (0.00)
δW21	W21 minus CNTL	−2.8% (0.11)	4.7% (0.13)	**−3.9**% (0.03)
δIP21	IP21 minus CNTL	**−4.6**% (0.01)	−2.0% (0.55)	2.4% (0.19)

Prediction and Earth System Research) model reasonably simulates AMM in terms of the amplitude and power spectrum as observed (fig. S1), we estimated how much the decadal variation in AMM can potentially affect the TCF increases relative to the effect of anthropogenic aerosol forcing (Fig. 6). Overall, the SPEAR experiments reveal that the decadal variation in AMM might have partially contributed to the increasing TCF over the NA, but the increases in TCF are not as large as the increases through the effect of anthropogenic aerosols.

In this study, we applied a newly developed DGPI to the analysis of TGF changes. This is because the simulated changes in DGPI were relatively more consistent with the simulated changes in TGF than those in the other conventional GPI formula. For example, another GPI commonly used is Emanuel and Nolan's GPI (*20*). Although this GPI also reproduced a similar spatial pattern in the changes to the changes in TGF and DGPI for δALL21, this GPI is markedly inconsistent with the total changes in TGF over the key domains of the tropical WNP and the SH (fig. S2). Most of the GPI formula had been optimized on the basis of the observed TGF and reanalysis data for the present-day climate but not on the basis of the different climates such as future projections. Therefore, particular attention should be directed to the uncertainty in the usage of GPIs for interpreting the changes in TGF in different climates.

As reviewed earlier, previous studies have reported the effects of anthropogenic aerosols on TC activity at local scales from a thermodynamical point of view. For example, aerosol loading over the open oceans can inhibit solar insolation at the surface, leading to cooler surface oceans that, in turn, lead to suppressed convection and decreased TC activity (*7*). This paper adds one more important aspect to the dynamical viewpoint. The decreased anthropogenic aerosols in Europe and the United States must have caused anomalous heating in the mid-latitudes of the NH, thereby causing reduced meridional gradients of atmospheric temperature. This, in turn, will have led to a poleward shift in the subtropical jets, thereby altering the vertical wind shear that is important for TC activity in the NA. The additional heating in the mid-latitudes in the NH might have also induced subsidence anomalies over the tropics in the SH, thereby reducing the frequency of TCs over the SH.

Note that although the signs of the changes in TCF and TGF in δALL21 are consistent with the observed changes over the past 40 years in most regions, quantitatively the changes are different from each other (Table 2). This is because other factors aside from anthropogenic aerosols might also have been involved in the observed changes in global TC activity since 1980. As reported in one of our previous studies (*5*), greenhouse gases, volcanic eruptions, and multidecadal natural variability might also have played important roles in the observed changes in TCs globally since 1980. Also, a rigorous estimate of quantitative contribution of anthropogenic aerosols to the observed changes in TCF remains challenging in this study. This is because the idealized experiments that we applied were so-called fixed forcing experiments in which long-term simulations were conducted with the fixed level of anthropogenic forcing. This allows modeled climate system to adjust more than it would via a transient response to forcing changes occurring over a 40-year period.

Another caveat is that the SPEAR model systematically underestimates intense TCs such as the Saffir-Simpson category 3–5 TCs (maximum wind speed $\geq$ 50 m s^{-1}) because the 50-km mesh horizontal resolution is not high enough to resolve the intense TCs. Because the observed changes in TCF for category 3–5 TCs are somewhat different from those for all storms including both weaker and intense TCs (Fig. 7), there might be uncertainty in the model results for which category 3–5 TCs are missing. However, we may be able to investigate whether the simulated changes of TCF in the relatively intense TCs for the SPEAR model are consistent with these in the observed category 3–5 TCs. It turned out that the threshold of 50 m s^{-1} for the observed category 3–5 TCs corresponds

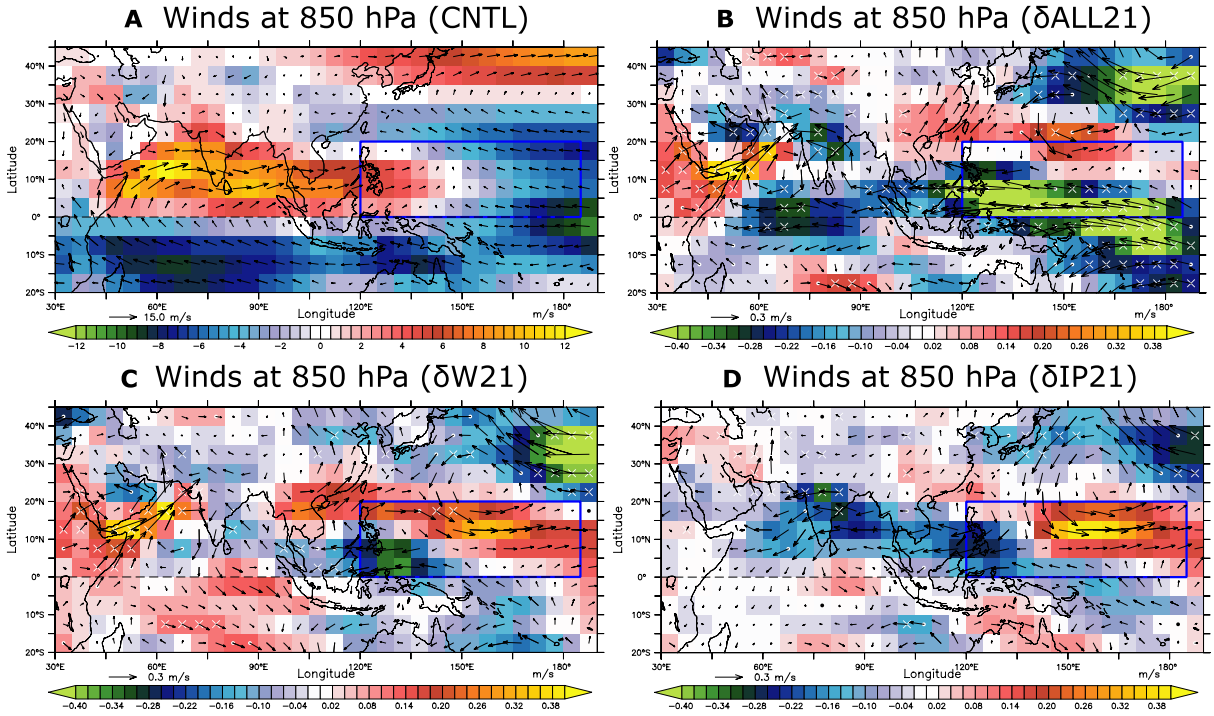

Fig. 5. Simulated Asian monsoon and its changes. (**A**) Mean winds at 850 hPa (vectors) and the wind speed for the zonal component (shading) during July–October simulated by the CNTL experiment. (**B**) As in (A) but for the simulated differences between the ALL21 and CNTL experiments. (**C** and **D**) As in (B) but for the W21 and IP21 experiments, respectively. White crosses (dots) indicate where the difference in zonal wind over the grid cell is statistically significant at the 95% (90%) level according to the bootstrap method. Units: m s^{-1}.

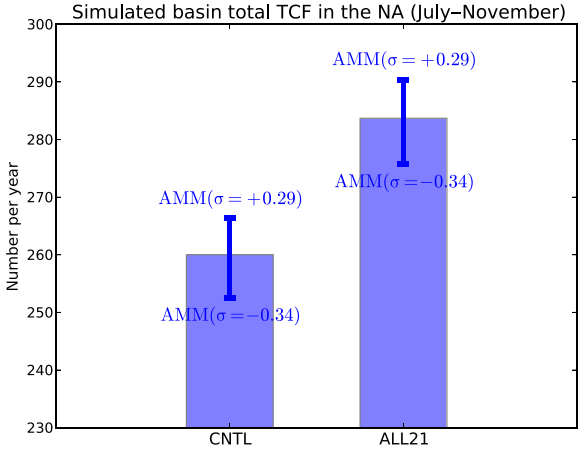

Fig. 6. Simulation basin total July–November TCF over the North Atlantic Ocean. (**A**) The histogram shows the July–November mean basin total TCF over the North Atlantic during July–November through the 200-year simulations (CNTL and ALL21) by SPEAR. The error bars show the regressed range of July–November basin total TCF between AMM index +0.29σ and −0.34σ in the SPEAR simulations. The simulated basin total TCF was linearly regressed onto the simulated AMM index. Then, the TCF values at the specific AMM index values were computed using the linear relationship. Given the fact that the observed July–November averaged AMM index was +0.29σ over the period 2001–2020 and −0.34σ over the period 1980–2000, the range of computed regressed TCF values between AMM index +0.29σ and −0.34σ is assumed to be the effect of decadal change in AMM on TCF variation in the SPEAR model. This figure highlights that AMM affects the basin total TCFs in the model, but the magnitude of the AMM effect, as measured by the length of error bars, is not as large as the mean difference caused by anthropogenic aerosols (i.e., mean difference between ALL21 and CNTL).

to the 87th percentile for the intensity of all storms in observations. The same 87th percentile of the storm intensity for all simulated TCs by the SPEAR model corresponds to 37 m s^{-1}. Therefore, the simulated storms with a maximum wind speed of 37 m s^{-1} or greater may be considered as "category 3–5 equivalent TCs" to represent intense TCs in the SPEAR model. The SPEAR model through δALL21 shows a similar spatial pattern of the TCF changes in the category 3–5 equivalent TCs to that of the observed category 3–5 TCs (Fig. 7). This indicates that, consistent with observations, the SPEAR model shows the different responses of TCF between weaker and intense storms to the aerosol forcing. Meanwhile, it would be preferable to use a high-resolution model that can simulate intense TCs to minimize uncertainty.

Last, it is important to emphasize that changes in anthropogenic aerosols, as well as greenhouse gases, apparently can exert substantial impacts on global TC activity, which delivers an important message to society regarding the seriousness of the impacts our activities are having and therefore the political decisions we make in the future in terms of changes in emissions and their potential impacts on TC activity on the global scale.

MATERIALS AND METHODS

Observed data

The International Best Track Archive for Climate Stewardship (*21*), version 4, was used over the period 1980–2020 for the TC data. We defined a TC by the lifetime maximum intensity being greater than or equal to 34 knots (i.e., 17.5 m s^{-1}) in the observations. As in our previous study (*5*), only TC positions with maximum surface wind speeds of 34 knots or greater were counted every 6 hours over each

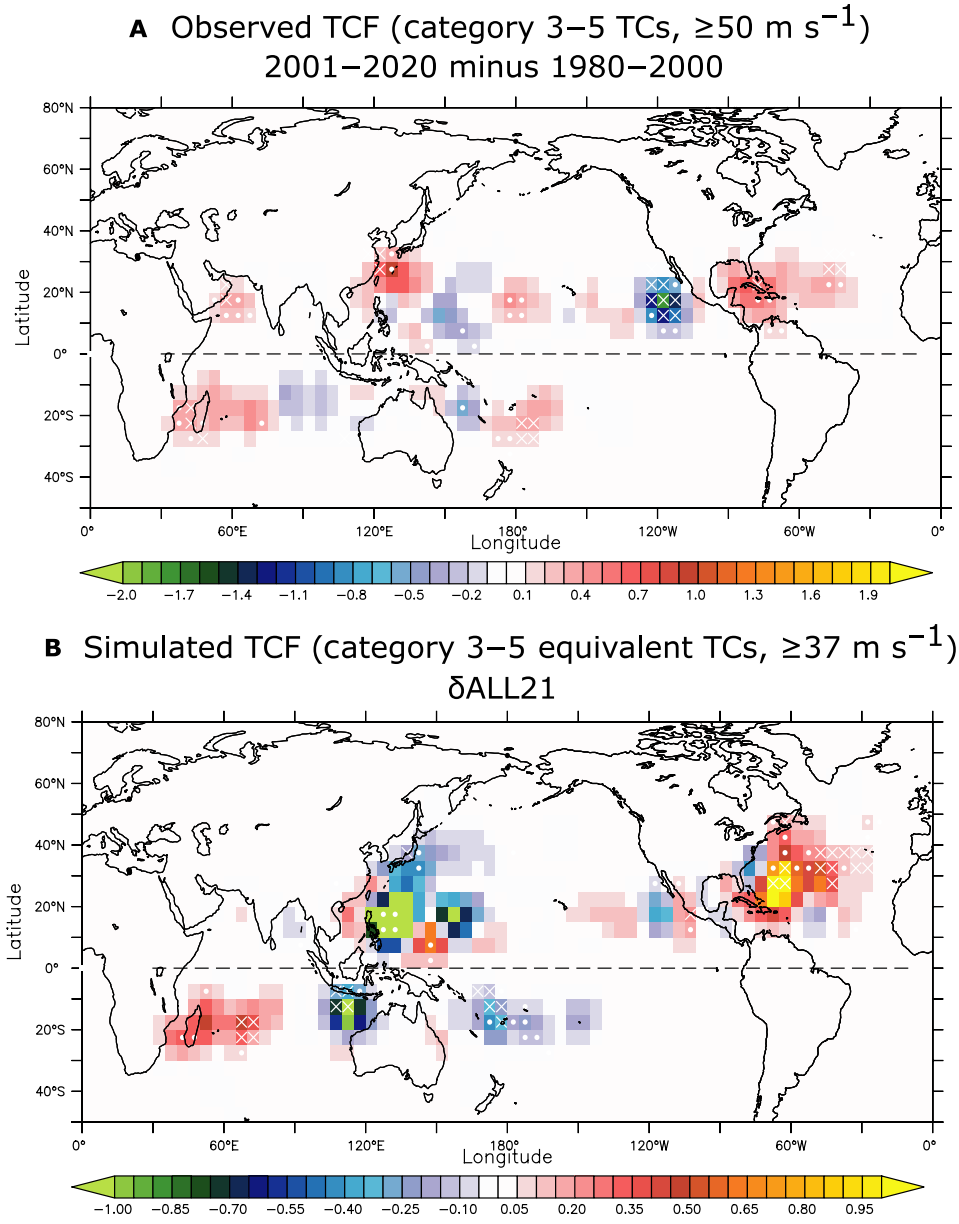

Fig. 7. Observed and simulated changes in category 3–5 TCs. (**A**) Mean difference in the observed TCF for the storm locations with maximum surface wind speeds of 50 m s^{-1} or greater. (**B**) As in (A) but for the simulated difference between ALL21 and CNTL in terms of the category 3–5 equivalent TCs (≥37 m s^{-1}). It turned out that the threshold of 50 m s^{-1} for the observed category 3–5 TCs corresponds to the 87th percentile for the intensity of all storms in the observations. The same 87th percentile in the SPEAR model corresponds to 37 m s^{-1}. Therefore, the simulated storms with a maximum wind speed of 37 m s^{-1} or greater are considered as category 3–5 equivalent TCs in the SPEAR model.

5° × 5° grid box globally. The total count for each grid box was defined as the TCF. The TCF fields were further smoothed using a nine-point moving average weighted by distance from the center of the grid box. The same computation was also applied to TC genesis (i.e., the TGF). The monthly mean large-scale parameters, such as 200- and 850-hPa winds, were derived from the Japanese 55-year Reanalysis (*22*) over the same period of 1980–2020.

Model

The Geophysical Fluid Dynamics Laboratory Seamless System for Prediction and Earth System Research (SPEAR) (*23*) was used for the climate model simulations. SPEAR consists of the new AM4-LM4 atmosphere and land surface model (*24*, *25*), the MOM6 ocean model (https://github.com/NOAA-GFDL/MOM6), and the SIS2 sea-ice model (*26*). The horizontal resolution of the ocean and ice components is 1° × 1° while that of the atmosphere and land surface is an approximate 50-km mesh. Note that SPEAR simulates the mass distribution of five aerosol types: sulfates, dust, black carbon, organic carbon, and sea salt. The concentrations in the model are calculated on the basis of the emissions, chemical production for sulfate and secondary organics, dry and wet deposition, transport by advection, and dry and wet convection (*24*). Specifically, SPEAR

includes a physical process that interacts between aerosols and convection (i.e., the aerosol indirect effect) (*24*).

Model-simulated TCs were obtained directly from 6-hourly outputs using the scheme documented by Harris *et al.* (*27*). In short, the flood fill algorithm is applied to find closed contours of sea level pressure anomalies along with 1-K temperature anomalies to identify the warm core. The storm detection must maintain above certain conditions, as well as a specified relaxed wind speed criterion (i.e., 15.75 m s^{-1}) due to the 50-km horizontal resolution, for at least 36 consecutive hours.

Model experiments

We conducted four types of climate simulations using SPEAR by prescribing various spatial patterns of emissions of anthropogenic aerosols. A summary of the experiments is provided in Table 1. These experiments are so-called long-term climate simulations prescribed with fixed anthropogenic forcing. The simulations were initiated from the random restart files derived from the 1000-year preindustrial control experiments. The simulation length was 210 years, but the first 10 years were disregarded as the spin-up period. In the experiments, the solar constant and all anthropogenic forcings except that of anthropogenic aerosols (e.g., greenhouse gases and ozone) were fixed at the year 2000 level. The only differences among the four experiments were the prescribed emissions of anthropogenic aerosols (i.e., sulfur dioxide, sulfates, black carbon, and organic carbon emissions caused by human activity including agriculture, industrial, transportation, residential, commercial, solvent production, and waste). In the model, in addition to the above anthropogenic aerosol emissions, dust emissions are calculated interactively using a threshold for wind erosion, and sea salt emissions are also computed interactively. The CNTL experiment was prescribed with the mean emissions of anthropogenic aerosols over the period 1980–2000, and a counter experiment (ALL21) was prescribed with the mean emissions of anthropogenic aerosols over the period 2001–2020. Therefore, the difference between ALL21 and CNTL (i.e., δALL21) represented the difference in the emissions of anthropogenic aerosols between 1980–2000 and 2001–2020. An idealized experiment, W21, was also conducted, which was identical to ALL21 except that only the changes in emissions of anthropogenic aerosols over Europe and the United States were included, with the rest of the world remaining unchanged from CNTL. Another idealized experiment, IP21, was also carried out. This was again identical to ALL21 except that only the changes in emissions of aerosols over South and East Asia were included.

Empirical statistical analysis for TCs

To reveal the relative importance of TC genesis, TC tracks, and their combinations for the changes in local TCF, we applied the empirical statistical analysis technique developed by Yokoi and Takayabu (*11*) and Murakami *et al.* (*12*). Full details of the method are of course available in those references; however, in short, the climatological mean TCF in a 5° × 5° grid cell can be written as follows

$$\overline{f(A)} = \iint_C \overline{g(A_0)} \times \overline{t(A,A_0)}\, dA_0 \tag{1}$$

where $f(A)$ is the TCF in a specific grid cell A, the overline indicates a climatological mean, $g(A_0)$ is the frequency of TC genesis in grid cell A_0, $t(A, A_0)$ is the probability that a TC generated in grid cell A_0 propagates to grid cell A, and C is the entire global domain over which the integration is performed. The change in TCF over grid A simulated by an idealized experiment relative to the reference experiment can be written as follows

$$\delta f(A) = \underbrace{\iint_C \delta g(A_0) \times \overline{t(A,A_0)}\, dA_0}_{dg} + \underbrace{\iint_C \overline{g(A_0)} \times \delta t(A,A_0)\, dA_0}_{dt} + \underbrace{\iint_C \delta g(A_0) \times \delta t(A,A_0)\, dA_0}_{dn} \tag{2}$$

where δ is the simulated change of an experiment relative to the reference experiment (e.g., δALL21). The simulated change in TCF can be decomposed into three factors: (i) TC genesis distribution change (first term, dg); (ii) TC track change (second term, dt); and (iii) the nonlinear effect (third term, dn). After computing these three terms for each grid, the area averages of these are computed for the domains of interests (blue rectangles in Fig. 1E) to reveal the factors responsible for the changes in local TCF over the domains (Fig. 2A).

GPI and variational method

A new GPI developed by Wang and Murakami (*13*) was applied to the climate simulations to quantify the large-scale parameters responsible for the changes in TGF. Unlike the conventional GPI formula, the new GPI, termed the dynamical GPI (DGPI), consists of four dynamical parameters only, as follows

$$DGPI = (2.0 + 0.1 \times V_s)^{-1.7} \left(5.5 - \frac{\mathrm{du}_{500}}{\mathrm{dy}} \times 10^5\right)^{2.3} (5.0 - 20 \times \omega_{500})^{3.4} (5.5 + |\zeta_{a500} \times 10^5|)^{2.4} e^{-11.8} - 1.0 \tag{3}$$

where V_s represents the vertical wind shear, which is defined as the magnitude of the difference in wind speed between the 200- and 850-hPa levels (units: m s^{-1}); ζ_{a850} is the absolute vorticity at the 850-hPa level (s^{-1}); ω_{500} represents the vertical p velocity (Pa s^{-1}) at 500 hPa; and du_{500}/dy denotes the meridional shear vorticity associated with the zonal wind at 500 hPa (u_{500}, s^{-1}). Wang and Murakami (*13*) revealed a reasonable representation of the climatological mean of global TGF in addition to the interannual variations relative to observations. Note that the DGPI is not completely independent of the thermodynamic factors. DGPI implicitly includes the thermodynamic effect by incorporating the vertical motion term (ω_{500}). ω_{500} is highly correlated with midlevel relative humidity. In general, mean upward motion is important for TC genesis because the boundary layer flows converge and the upward transfer of moisture increases the midlevel relative humidity (*13*). Both the dynamic and thermodynamic conditions are also conducive to the initiation of organized convection or incipient cyclonic circulation (i.e., the "seeds"). DGPI is also significantly correlated with SST and maximum potential intensity (*13*).

To quantify which of the changes in the four variables in the DGPI were responsible for the changes in the DGPI between the two climate simulations, we applied a variational method. The changes in DGPI can be decomposed into four factors, as follows

$$\Delta\mathrm{DGPI} = \Delta F1 \cdot \overline{F2 \cdot F3 \cdot F4} + \Delta F2 \cdot \overline{F1 \cdot F3 \cdot F4} + \Delta F3 \cdot \overline{F1 \cdot F2 \cdot F4} + \Delta F4 \cdot \overline{F1 \cdot F2 \cdot F3} \tag{4}$$

where the overbar represents the mean of a reference experiment (i.e., CNTL) and Δ represents the change of an experiment relative to the reference experiment. *F* represents each component term of the DGPI. Each term of Eq. 4 represents the fractional contribution to the total DGPI change. The total changes (left-hand side of Eq. 4) are shown in Fig. 2A, and each term's contributions are shown in Fig. 2 (C to F). The fractional changes relative to the total change are computed for each term and domain of interest (blue rectangles in Fig. 2, C to F), and the domain mean fractional changes are denoted by the numbers in each panel in Fig. 2 (C to F).

SUPPLEMENTARY MATERIALS

Supplementary material for this article is available at https://science.org/doi/10.1126/sciadv.abn9493

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ScienceAdvances

Substantial global influence of anthropogenic aerosols on tropical cyclones over the past 40 years

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the same thing over the land. So you can over-prescribe and do more damage than good is the point I am trying to make.

And let me just, you know, quote some things from this article. This is from 1980 to 2020. So without significant amounts of particulate pollution to reflect sunlight, the ocean absorbs more heat and warms faster. The decrease in pollution has led to a warming -- global warming, right? Have we done it to ourselves?

As I said, I am all for clean air, clean water, healthy people, especially as a physician. We have to take these types of things into consideration. It is creating more hurricanes and more storms. Here is a quote in the article: "The ironic results suggest the necessity of careful policy decision-making," which is what we do here. "The ironic results suggest the necessity of careful policy decision-making in the future that considers the pros and cons of the multiple impacts."

We have to do that, so don't make this a religion, make it a science. And let's do what is right. Don't make it a political point, make it a scientific point. So Mr. Beachy, it is not a win-win-win, it is not. And the proof is here. Facts don't lie. And I suggest we be more careful. And maybe as a body here, we can work together scientifically to do things that are better for America.

But my other grave concern in all of this is our dependence on an adversary. In so many ways our supply chains, our energy, everything else, we are going in the wrong direction. And I want to reiterate the national security risks that that brings.

Mr. Horn, I know your military background. Thank you very much. Could you maybe relate to this committee some of your concerns about the national security risks that we take with some of these policies that are being promoted?

*Mr. Horn. I think we have to be realistic about the world that we live in. And when we look at state actors, adversaries across the world, they don't necessarily have our

best interests in mind. There has been a number of articles that have come out just this week about the possibility of the People's Republic of China cutting off supply of a lot of these key materials which are needed not only for electrification and energy transfer, but defense critical uses, as well. We cannot afford to rely on them for our own capability to defend ourselves from them and others.

*Mr. Wenstrup. And we end up feeding their military through our acquisitions.

With that, I yield back.

*Chairman Smith of Missouri. Thank you. Mr. Pascrell is recognized.

*Mr. Pascrell. Well, I think, Mr. Chairman, that this hearing is a farce.

Let me start off very mildly. Republicans can't honestly attack the Inflation Reduction Act, so they are resorting to outright projection. The Inflation Reduction Act is the single largest investment -- that is a critical word. When we spend money, the people's money, that is a qualifier. It must be an investment not just for the moment, but for the future. That is what investments are all about, whether you are in business or whether you are in government.

So we are talking about manufacturing. We are talking about good union jobs, clean energy, and innovation. Read the law, what it says.

Democrats passed historic bills last Congress protecting American industry and blocking benefits to Chinese communist companies. Look, last month we were socialist. This month we are communist. And I take exception to what you say and what you write. What do you think, you are going to scare us? What are we going to be next month? What is that hate speech going to bring? How does it instigate violence in this country? Communists, you write. We were the Greens at first. Really? I am not a communist. I am not a socialist. But that is what you said, sir. I respect your professionalism, but I don't respect any of your ideas that insult anybody on this side of the aisle, be it that side or this

side.

So Republicans overwhelmingly opposed our agenda, and certainly are no Mother Teresa on the Chinese Communist Party. Republicans left domestic protections out of the 2017 tax bill, nowhere to be found in that bill, and we are still discovering what was in that bill. I guess we didn't read it at first.

The corporate tax breaks and offshore provisions were a boon to China. Read the bill.

In 2018 Donald Trump vowed to protect a Chinese communications company from going bust after the party approved trademarks for a member of his family. In 2019 Donald Trump sold out on Hong Kong. Last week the leader of the Republican Party called the Chinese communist dictator the top of the line and a brilliant man. I never heard him say anything like that about somebody in this country, except that meets his ideological standards. So who in God's name do you think you are kidding? Where is the outrage? All we hear is silence on those things.

The sad irony is the Democratic manufacturing agenda has benefited Republicans' own constituents. The Financial Times found that over 75 percent of the $204 billion in semiconductor and clean energy projects pledged since the Inflation Reduction Act, CHIPS Act have gone to GOP districts. Stop them. You don't want them? You didn't vote for them. But I bet you took a picture when I got some money, expand the business. How many of you took pictures with the infrastructure that voted no?

Look, the jig is up. Certainly, don't listen to me. Listen to the polling that has been going on after everything you put before us and the people of this country. Republican districts. That is over 58,000 jobs for their communities. So you should be celebrating. Look at those districts that got plenty of benefits. But every Republican in Congress voted against the jobs bill from the Inflation Reduction Act, every one of them.

Want to take on China? Let's do it. But we need genuine action, not another nonsensical hearing. And with that I yield back reluctantly, and I can assure you I have a lot more to say about what you have written and said. I hope I get that opportunity, Mr. Chairman.

*Mr. Turner. Mr. Chairman, may I respond to --

*Mr. Pascrell. I yield back --

*Mr. Turner. -- some of these comments, please?

*Chairman Smith of Missouri. Go ahead.

*Mr. Turner. Because I know they are all directed at me.

At no point did I call anyone on this committee or any Member of Congress a communist, and I resent the fact that it is being implicated that I did.

What I was talking about by saying the green agenda is communist in nature is this. We -- I do not applaud this government, this Administration, this Congress sending government jobs --

*Mr. Pascrell. It is your government.

*Mr. Turner. -- sending our --

*Mr. Pascrell. Just as much as it is mine.

*Chairman Smith of Missouri. Let gentleman respond to your accusations.

*Mr. Pascrell. I am sorry?

*Chairman Smith of Missouri. Go ahead, Mr. Turner.

*Mr. Turner. I do not applaud sending American jobs overseas in the name of a green agenda. America used to be the second largest coal producer in the world. We are now fifth. Why? Because we have closed more than half of our coal jobs. World coal supply is going up. So what are we saying? We are saying we need more coal, but it is not going to come from America.

I stood with Navajo elders in northwest New Mexico who looked at me and said in one of the most difficult conversations I have ever had, because we were fighting to keep that coal mine open, and he looked at me and said, "This is what you White people do to us all the time. You sent us to this reservation. It wasn't our land, but you put us here. But we found coal. And with that coal we built the entire southwest. And now the green energy has come, and now you tell us no more coal, and you plunge us back into poverty."

I have stood with mayors --

*Ms. Sanchez. Mr. Chairman, regular order.

*Mr. Turner. -- in small towns of West Virginia, where they look at their entire city that has been --

*Ms. Sanchez. Mr. Chairman, regular order.

*Mr. Turner. -- entire small town that has been decimated --

*Chairman Smith of Missouri. The gentleman has the floor. When any witness is ever attacked by one of these colleagues, I think that he needs the opportunity.

So go ahead, Mr. Turner.

*Ms. Sanchez. Mr. Chairman, excuse me --

*Mr. Turner. Thank you, Mr. Chairman.

*Ms. Sanchez. -- but I believe Mr. Pascrell said that his comments were not directed at any one person on the panel in particular.

*Chairman Smith of Missouri. That is not how I saw it. Mr. Turner?

*Ms. Sanchez. Well, that is your opinion, but Mr. Pascrell --

*Chairman Smith of Missouri. You are not recognized, Ms. Sanchez.

Mr. Turner, please finish.

*Mr. Turner. Mr. Chairman, I think that --

*Ms. Sanchez. Okay, Mr. Chairman, thank you for running such a democratic

process here in our democratic government.

*Chairman Smith of Missouri. You are not recognized, Ms. --

*Mr. Pascrell. [Inaudible] respond --

*Chairman Smith of Missouri. -- Sanchez.

*Mr. Pascrell. -- Mr. Chairman?

*Mr. Turner. I have stood in small towns in West Virginia that used to be thriving, that had communities with little leagues and schools that were well funded that are all closed because we have sent their jobs overseas.

There are billionaires who fund green groups in this country that invest in foreign coal, and they will tell you that they will be damned if a man in West Virginia works on a coal mine, but a nine-year-old girl in Malaysia or Indonesia or China they have absolutely no problem with.

And so when I call the green movement communist in its nature, maybe that is being too gentle of a term. What it is doing to rural America, oil jobs, coal jobs, fracking jobs, no one is asking them how they are paying for gas, how they are paying for 30 percent prices in food, 15 percent prices in consumer goods. They are absolutely and categorically denied.

And I respect the gentleman at the end of this table who is saying the jobs that will come, that will come. But the fact of the matter is the future is very different than the actual. Right now, rural American and rural American energy workers are struggling tremendously, and they are being ignored.

*Chairman Smith of Missouri. Thank you, Mr. Turner.

*Mr. Pascrell. Mr. Chairman --

*Chairman Smith of Missouri. Mr. Ferguson, you are recognized.

*Mr. Pascrell. -- may I respond, Mr. Chairman?

*Mr. Ferguson. Thank you, Mr. Chairman.

And, Mr. Turner, if I could just simply say amen to you. I am from a district that saw the devastation of a job market following NAFTA. We were home to the largest part of the textile industry prior to NAFTA. And because of decisions in D.C., we lost a generation of workers, and we plunged more people into poverty because of the insensitive nature of decisions that are made in Washington, D.C. Now we are doing it to more rural communities that are -- that have been producing the energy that America needs. Your comments are spot on.

Mr. Chairman, if I could submit for the record an article from the National Review, where John Kerry simply suggests -- and it is reported -- that oil workers laid off due to Biden policies should go make solar panels.

*Chairman Smith of Missouri. So ordered.

[The information follows:]

**********COMMITTEE INSERT**********

NATIONAL REVIEW | NEWS | WHITE HOUSE

John Kerry Suggests Oil Workers Laid Off Due to Biden Policies Should Make Solar Panels

U.S. climate envoy John Kerry speaks at a press briefing at the White House in Washington, D.C., January 27, 2021. (Kevin Lamarque/Reuters)

By **MAIREAD MCARDLE**
January 27, 2021 4:11 PM

White House climate czar John Kerry on Wednesday recommended that oil and gas workers should pivot to manufacturing solar panels if their jobs are eliminated as a consequence of the Biden administration's environmental policies.

During a press briefing at the White House on Wednesday, Kerry, who is serving as the U.S. Special Presidential Envoy for Climate, was asked what his message is to workers who are "seeing an end to their livelihoods" as a result of President Biden's plan to move away from traditional fuels and towards renewable energy.

"The president of the United States has expressed in every comment he has made about climate the need to grow the new jobs that pay better, that are cleaner," Kerry responded, emphasizing that Biden intends to "do what

needs to be done to deal with this crisis."

"What President Biden wants to do is make sure those folks have better choices, that they have alternatives, that they can be the people to go to work to make the solar panels," Kerry said.

Kerry noted that jobs in clean energy, such solar power technician and wind turbine technician, were growing rapidly before the pandemic hit.

"The same people can do those jobs," the former secretary of state said, adding that, "coal plants have been closing over the last 20 years."

Kerry also lamented that workers in traditional fuel industries have been a "false narrative."

"They've been fed the notion that somehow dealing with climate is coming at their expense. No, it's not," he said, adding that the tribulations of oil and gas workers are due to "other market forces already taking place."

Biden signed several executive orders on climate change on Wednesday aimed at achieving the goal of reaching net-zero emissions by 2050. Last week, the president reentered the Paris climate accord, from which the Trump administration withdrew the U.S. in 2017. Biden also canceled the permit on the Keystone pipeline, a project that would have created about 11,000 U.S. jobs this year, according to the Keystone XL website. Many of the workers are temporary, but 8,000 are union workers.

"Today is climate day at the White House, which means today is jobs day at the White House," Biden said at a White House ceremony. "In my view, we've already waited too long to deal with this climate crisis and we can't wait any longer. It is time to act."

Also on Wednesday, former Michigan Governor Jennifer Granholm testified at her confirmation hearing before the Senate Energy and Natural Resources Committee and promised to focus on creating U.S. jobs in clean energy while moving away from fossil fuels.

She cited her time as Michigan governor, saying that "when we focused on providing incentives for job providers to locate in Michigan in clean energy, they came."

However, she added, "I think it is important that as we develop fossil fuels that we also develop the technology to reduce greenhouse gas emissions."

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BACK TO NEWS

*Mr. Ferguson. Thank you, Mr. Chairman.

Ladies and gentleman, that shows the insensitivity of people that are making these policy decisions. Where -- what -- these people have grown up in these communities, they have built their lives there, they have built their families there, and now you are simply saying uproot and go move somewhere else. The devastation in our rural communities -- we have way too many people on this dais that don't care about rural America because there aren't enough voters there to get them reelected, and they are completely out of touch with so many of the problems that we are facing.

Washington, D.C. has done a hell of a job of turning rural America into an inner city. The two groups of people in this country that share the most in common all too often are rural America and the folks in the inner city: lack of economic opportunity, failing education, high drug use, high crime, and failing infrastructure. It is painful to watch our fellow Americans go through this.

And while they are gutting our communities for policies like this that -- promise of jobs that I promise you will never come back to this reservation that you described, it has taken a generation-and-a-half to get those jobs back in our district. And we have done it, and we have overcome Washington, D.C. in the great state of Georgia in the third district. But all the time that they are gutting our communities, 90 percent of these tax credits are going to the wealthiest corporations and to the wealthiest Americans, 90 percent of them going to companies that have over $1 billion in profit.

So while my colleagues on the other side of the aisle talk about how important it is that corporate America pay its fair share, and they say it over here, they then turn around and give them the largest tax break that basically drives down to zero their tax rate. What in the heck are they talking about? Oh, we want them to pay, but we are going to give them a huge tax break and a huge subsidy. This is lunacy.

And by the way, now we have under -- you know, Joint Tax apparently underscored this thing so badly that now we are talking about over $1 trillion. So they want to raise taxes on one hand, and then they want to -- almost $1 trillion in new taxes. Then they want to go ahead and give somebody a $1 trillion tax break. The hypocrisy is stunning, if not nauseating.

So I look at this and think to myself, why are we doing this? Why are we funding the Chinese Communist Party? The private investment firm CALT (sic) that is involved in automotive technology policy, the Chinese company, these tax credits through licensing could actually go to the Chinese Communist Party. This -- these folks mean to do us harm, and they mean to take down America. We have a bipartisan committee looking at competitiveness with China. Why in the world would we send $1, $1 of U.S. taxpayer dollars to the Chinese Communist Party? It makes absolutely no sense.

So when I look at these things, and I look at what they are doing, it is just mind boggling to me. We say that we want to fight China, yet we are going to fund China. We say that we want to help rural America, yet we gut rural America. We want major corporations to pay their fair share, and yet we are going to give them almost over $1 trillion in green energy tax credit to lower their tax liability. How else are you going to pay for all this other stuff if you are doing that? This makes no sense.

I just wish that my colleagues on the other side of the aisle, many of them, would understand the lives that they are -- that they will ruin in rural America and in rural districts like mine. It is hard to watch.

And Mr. Chairman, I yield back.

*Chairman Smith of Missouri. Mr. Davis is recognized.

*Mr. Davis. Thank you, Mr. Chairman, and I too want to thank all of our witnesses.

You know, my district is seriously impacted by structural racism. It contains many

low-income communities, and certainly it has people of color. It also suffers from economic divestment, a lack of manufacturing opportunities when it used to be a manufacturing Mecca. Almost anything that you could think of was being developed in that area.

Mr. Beachy, could you discuss how impactful the Inflation Reduction Act can be on dealing with communities like the ones that I serve?

*Mr. Beachy. Absolutely. I appreciate the question, sir.

When we talk about the loss of manufacturing jobs, sometimes there is a caricature that is presented, painting a picture as if it was only White workers who lost their jobs and suffered the economic impacts. Black workers were disproportionately impacted by the deindustrialization of the United States. Since the 1990s, Black manufacturing workers have lost 30 -- there has been a 30 percent drop in Black manufacturing employment. That is according to the Economic Policy Institute.

The IRA aims to start turning the tide by reinvesting in the communities that have been the hardest hit. It does this by, for the first time, channeling billions of the people's money into high-paying, good manufacturing jobs. And as mentioned, this is not just theory. It is actually -- the evidence is already being seen. In the first six months enough announcements of clean technology manufacturing to create 100,000 jobs, many in the heartland.

The critical premise of the IRA is that we do not have to choose between good jobs, economic, racial and environmental equity, and a livable climate. And it does this by choosing sectors of the economy that are strategically imperative for advancing each of these goals and fueling them. It is a welcome return of industrial policy that has been used in this country since the time of Alexander Hamilton. And by leveraging that policy now, workers like those in your district, communities like those in your district stand to gain from the benefits of higher wages, cleaner air, fewer climate-related impacts. In short, more jobs,

a livable climate, and a more just economy.

*Mr. Davis. Let me just ask in comparison to the characterization of spending, would one call this spending, or would they more appropriately call it investment?

*Mr. Beachy. It is absolutely investment, because there is a return on this investment. And that return is money in the pockets of manufacturing workers across this country that have been -- that have seen their jobs go away. It is a return in the form of investments in communities that have seen their own economic base de-industrialized.

I actually was born in the heart of West Virginia, in the middle of coal country. And for too long folks in this town have talked about energy transition and investing in hard-hit workers and communities. The IRA moves from words to action. There will not be fairness for workers that have been impacted by energy transition and communities that have been impacted by energy transition unless it is a deliberate policy choice.

The IRA, for the first time, invests real money in the communities like the one I was born into. There is a $10 billion pocket of money to spur more clean technology manufacturing; 4 billion of that is explicitly set aside for communities facing energy transition. This --

*Mr. Davis. Thank you, Mr. Chairman, and I yield back.

*Chairman Smith of Missouri. Mr. LaHood is recognized.

*Mr. LaHood. Thank you, Mr. Chairman, and I want to thank our witnesses today for your valuable testimony here today.

The Inflation Reduction Act, I think, is a great example for us here in Congress of why regular order is so important. Backroom deals, legislative texts thrown together at the last minute, and a lack of proper discussion and deliberation leads to all sorts of unintended consequences. Even Senator Manchin is seeing the effects of this kind of legislating as he got more of what he wanted out of it than anyone.

One particular area of concern that I have and want to highlight, as some of my colleagues have already touched on, is the lack of safeguards that were put in place to prevent these tax incentives from being enjoyed by our adversaries. Well, what do I mean by that?

In addition to serving on the Ways and Means Committee, I also serve on the Intelligence Committee and the newly-formed Select Committee on China, which is a bipartisan committee that we are addressing the malign activities of the CCP. As a part of that work on intel in the Select Committee on China, we learn every day about the growing threats from China. And the Inflation Reduction Act demonstrates how easy it is for us to literally let them in through the front door.

Before I get to my questions, Mr. Chairman, I would like to ask for unanimous consent to enter into the record this Fox News article dated February 20th, 2023, entitled, "CCP-Backed Tech Companies are Poised to Cash In on Biden's Climate Bill, National Security Experts Warn."

*Chairman Smith of Missouri. Without objection.

[The information follows:]

**********COMMITTEE INSERT**********

CCP-backed tech companies are poised to cash in on Biden's climate bill, national security experts warn

By Thomas Catenacci

Published February 20, 2023

Fox News

A series of national security experts and former U.S. officials are sounding the alarm that Chinese government-backed companies could exploit a workaround to benefit from taxpayer-funded electric vehicle (EV) subsidies in the Inflation Reduction Act (IRA).

The stark warning comes a week after Ford, the second-largest automaker in the U.S., announced it would partner with the massive Chinese tech company Contemporary Amperex Technology (CATL) to build a new EV battery plant in Michigan. As a result of the agreement, CATL could potentially benefit from taxpayer subsidies earmarked in the IRA which was intended to strengthen domestic supply chains.

"It's shocking that Ford is doing this," former White House National Security Advisor Robert O'Brien said in an interview with Fox News Digital. "We just had a Chinese spy balloon traverse the length and breadth of our country and violate our sovereignty. And Ford is partnering with our leading competitor, our adversary, to work on battery technology and build batteries here in America."

"On top of that, they're trying to work out a loophole to get U.S. taxpayers to support and subsidize their dealings with China and to bolster a Chinese company with U.S. tax dollars, the tax credits in the Inflation Reduction Act," he continued. "It's a total perversion of the Inflation Reduction Act which was intended to bring manufacturing home with U.S. supply chains and exclude the Chinese."

REPUBLICANS PLAN OVERSIGHT INTO HOW BIDEN ADMIN'S GREEN PUSH BENEFITS CHINA: 'NOTHING IS OFF THE TABLE'

Ford CEO Jim Farley announces the company's partnership with Contemporary Amperex Technology to build an electric vehicle battery plant in Marshall, Michigan, on Feb. 13. (Bill Pugliano/Getty Images)

O'Brien added that, like other Chinese companies, CATL falls under China's national security law making it "subservient" to the Chinese Communist Party (CCP). CATL's founder and CEO Robin Zeng also has ties to the CCP's "United Front" influence campaign.

The former national security advisor predicted the U.S. government would eventually intervene and prevent the Ford plant from being built.

A spokesperson for Sen. Joe Manchin, D-W.Va., who helped author the IRA, said the West Virginia lawmaker had "serious questions" with the partnership. The agreement was similarly questioned by Sen. Marco Rubio, R-Fla., the vice chairman of the

Senate Select Committee on Intelligence.

GREEN GROUP INFLUENCING BIDEN ADMIN HAS DEEP TIES TO CHINESE GOVERNMENT

"Senator Manchin has been clear about his grave concerns about vehicle supply chain reliance on China," Sam Runyon, a spokesperson for Manchin, told Fox News Digital. "Ford has serious questions to answer before Senator Manchin can fully evaluate the business partnership."

Under the IRA, EVs will be barred from receiving the $7,500 clean vehicle tax credit if they are assembled with a battery containing components sourced from a "foreign entity of concern" or containing minerals sourced from a "foreign entity of concern," beginning in 2024 and 2025, respectively.

Because China falls into that classification, the bill would disqualify EVs with Chinese-sourced components and minerals from being eligible for the credit. China currently boasts 78% of the world's cell manufacturing capacity for EV batteries, according to a Brookings Institution analysis released in July.

Sen. Joe Manchin, D-W.Va., claps after President Biden signs the Inflation Reduction Act at the White House on Aug. 16. (Drew Angerer/Getty Images)

"The intent behind the language was to decrease reliance on Chinese EV parts and Chinese rare earth materials and minerals," said Craig Singleton, a senior China fellow at the nonpartisan Foundation for Defense of Democracies.

"What we often see is, in the absence of very clear regulatory language, companies like Ford will make up their own rules and sort of test and see what's possible," he added. "This is just, I think, an attempt at a creative workaround."

BIDEN'S ENERGY SECRETARY MET WITH CHINA-CONNECTED GROUP FUELING GAS STOVE BANS IN US

A Ford spokesperson told Fox News Digital that the company will maintain full control of the new battery facility and that the plant will be wholly owned by Ford with no foreign investment.

The spokesperson added that CATL would have "limited involvement" as a contractual service provider and licensor of technology to Ford.

"Ford is helping to strengthen the U.S. supply chain for EVs, a core goal of the Inflation Reduction Act, and the $3.5 billion we're investing in a new battery plant is a huge example of that," spokesperson Melissa Miller said in an email. "Instead of only importing batteries made in China and elsewhere like other automakers do, Ford is bringing the technology, 2,500 jobs and production to the United States."

"The plant will be fully owned and operated by Ford," she continued. "CATL's only involvement will be as a licensor of technology to Ford and a service provider on a contractual basis. They will receive no U.S. tax dollars."

A Ford F-150 Lightning electric truck is assembled at Ford's Rouge Electric Vehicle Center in Dearborn, Michigan, on Sept. 20, 2022. (Jeff Kowalsky/AFP via Getty Images)

However, Singleton cast doubt on Ford's characterization of the agreement, saying that CATL would likely receive royalties on the batteries produced at the facility.

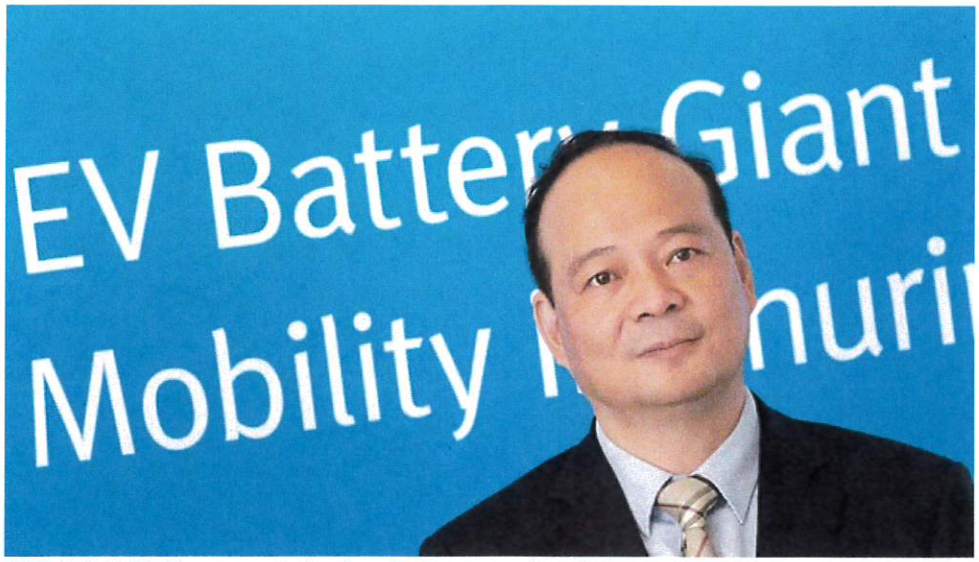
"CATL is not working for Ford for free," he said. "CATL can enter into this partnership with Ford, receive financial compensation however determined by its contract with Ford at the same time that Ford itself can claim taxpayer subsidies. That seems like a pretty clear line to me of where Ford is able to take advantage of taxpayer subsidies, but a Chinese company stands to benefit as a result."

CHINA'S TOP DIPLOMAT CALLS US RESPONSE TO BALLOON INCIDENT 'HYSTERICAL'

Meanwhile, Chinese state-run media outlets have touted the Ford-CATL agreement as potentially setting a precedent for how to skirt the IRA provision. The partnership may pave the way for future partnerships between CCP-linked companies and U.S. automakers vying for tax credit eligibility, the outlets have noted.

CATL has notably entered into agreements to provide batteries for Tesla, Volkswagen, Honda and BMW.

"This cooperation model kills two birds with one stone. It not only enables Ford to obtain various subsidies promised in the [IRA] but also helps CATL to avoid foreign investment security reviews to reduce some risks," Lyu Xiang, a researcher at the state-run Academy of Social Sciences in Beijing, told China Daily, an outlet owned by the CCP's Central Propaganda Department.



CATL CEO Robin Zeng presents the plans for the construction of a battery factory. Zeng is worth tens of billions of dollars, making him one of China's three wealthiest men, according to Forbes. (Paul Zinken/picture alliance via Getty Images)

Chinese officials are planning to probe the CATL-Ford deal to ensure the battery maker's technology isn't taken by Ford, Bloomberg

reported on Thursday.

EXPERTS SLAM PETE BUTTIGIEG'S COMMENTS ON EVS: 'A CON JOB'

And in the coming weeks, the Biden administration is slated to issue highly-anticipated guidance on how it will interpret and implement the EV tax credit changes that the IRA lays out for 2023. The Treasury Department guidance will clarify language in the IRA surrounding EV eligibility requirements.

In addition to the "foreign entity of concern" rules set for 2024 and 2025, to be eligible for the tax credit, EVs must have undergone final assembly in North America; cost less than $55,000, or $80,000 for larger vehicles; and be purchased by an individual with an annual income of less than $150,000 or a family with an annual income of $300,000.

Ford, Hyundai and various industry groups like the Zero Emission Transportation Association, which includes companies including Tesla, Rivian and Uber, have implored the Treasury Department to issue looser guidance to ensure more vehicles are eligible. They have taken particular issue with an expansive interpretation of what constitutes a "foreign entity of concern."

Treasury Secretary Janet Yellen listens as President Biden speaks on March 3, 2022, at the White House. (Anna Moneymaker/Getty Images)

Ford wrote in November that it supports goals to bolster U.S. mineral and battery supply chains, but that an "overly expansive interpretation of this provision risks undermining that very same objective by making the clean vehicle credit largely unavailable." The company's partnership with CATL could signal an effort to sidestep such an interpretation.

"The [People's Republic of China (PRC)] and CATL are the same thing. There's really no separation," Andrew Horn, a former senior official in the Office of International Affairs at the Department of Energy, told Fox News Digital in an interview. "It's just the nature of the way business is done in China, that the PRC has influence and control over all of its companies."

"If we allow this to go forward, we are allowing a loophole to be exploited for any Chinese, PRC company to come in and basically operate on U.S. soil under the guise of supposedly helping U.S. industry, but in reality preventing legitimate U.S. alternatives from actually giving birth and growing," Horn said.

DEPARTMENT OF ENERGY TO SPEND $3 BILLION ON BATTERY PRODUCTION TO MEET BIDEN'S ELECTRIC VEHICLE GOAL

After departing the Trump administration, Horn founded GreenMet, a private firm working to develop onshore critical mineral and green energy supply chains, slashing reliance on foreign entities. The company is currently involved in six critical mineral projects that it says will strengthen domestic supply chains.

Horn — who also formerly led policy on critical mineral strategy at the White House and served at the Department of Defense — said his company's work demonstrates the "U.S. not only has the ability to do this in a cleaner way, but in a technologically superior way" compared to foreign competitors. He argued that bolstering domestic supply chains is vital for national security.

A Chinese-owned open pit copper mine is pictured on June 11, 2021. (Oliver Bunic/Bloomberg via Getty Images)

"It is what I would say is the most significant national security threat that the United States and other friendly countries are facing right now," Horn told Fox News Digital.

"The other thing that has to be understood is that when PRC, CCP, state-funded companies such as CATL are allowed to do business inside the United States, you have to assume that PRC intelligence agencies are collecting information, ripping off [intellectual property] and doing everything they can to assert dominance as a part of that action. It's a major threat."

Horn said it's the Treasury Department's responsibility to ensure the IRA's full intent is recognized in its guidance. He added that it was important for the agency to close loopholes enabling Chinese companies to move operations to U.S. soil by partnering with a U.S. company, an arrangement he said would create more issues for American industry.

BIDEN ADMIN QUIETLY ADDS WORKAROUND, MAKING PRICEY SPORTS CARS ELIGIBLE FOR EV TAX CREDITS

"China's offshoring of its battery manufacturing capacity to the United States is a direct extension of the Belt Road Initiative. It's a Trojan horse into our entire industrial sector and our industrial policy development," he continued

"What they've understood very effectively is that if they're able to control 100% of the supply chain — even say 80% of the key components — then they can play around with legislation, finding loopholes to ensure that they still maintain control and have the ability to shut off supply in a way that gives them massive geopolitical leverage."

President Biden shakes hands with Chinese President Xi Jinping in Bali, Indonesia, on Nov. 14. (Reuters/Kevin Lamarque)

A Treasury Department spokesperson told Fox News Digital that it was committed to ensuring that foreign investments don't infringe on U.S. national security.

"One of the most important goals of the Inflation Reduction Act is to spur investments that translate into good-paying jobs and

economic growth in communities all over the country while strengthening our energy security," the spokesperson said.

"As U.S. companies attract foreign investment, we remain laser focused on ensuring that any foreign investment made in the United States does not infringe on our national security, which remains our top priority."

Overall, green energy technologies like electric vehicle batteries, battery storage facilities, solar panels and wind turbines require a massive amount of cobalt, copper, lithium, nickel, graphite, zinc and other mineral production, according to the International Energy Agency.

DOES CHINA'S PURPORTED GREEN ENERGY PUSH SIGNAL A COMING CONFLICT WITH THE US?

For example, an electric vehicle requires 500% more mineral resources than a traditional gas-powered car while a single onshore wind turbine plant requires 800% more minerals than a typical fossil fuel plant.

China and other hostile nations dominate the global mineral supply chain even as the U.S. and Western nations rapidly push a transition to green energy technologies. According to a White House report published in 2021, China alone controls about 55% of global mining capacity and 85% of refining capacity.

By comparison, the U.S. mined just 5.9% of global copper supplies, 6% of global zinc supplies, 0.55% of the global nickel supplies, 0.42% of global cobalt supplies and 0% of global graphite supplies in 2022 despite having large untapped reserves, federal data showed.

Citing environmental concerns, the Biden administration recently issued a 20-year mining ban across 225,504 acres in and around the Boundary Waters Canoe Area Wilderness in northern Minnesota which is home to massive reserves of cobalt, copper, nickel and platinum-group elements. (Salwan Georges/The Washington Post via Getty Images)

In 2015, the Chinese government unveiled a plan to dominate green energy markets as part of its Made in China 2025 initiative.

"These autonomous vehicles and electric vehicles are at the very heart of China 2025 which is Beijing's economic policy to dominate the world in tech," O'Brien told Fox News Digital. "Not just compete, but to dominate the world in tech and become a sole supplier of leading tech, robotics, EVs in the world."

"Ford is now becoming a partner in China 2025."

CATL didn't respond to a request for comment.

Thomas Catenacci is a politics writer for Fox News Digital.

*Mr. LaHood. Thank you.

Mr. Horn, you were actually quoted in this article, so I will begin with you as I direct my questions. Can you talk about the China 2025 initiative, and how aspects of the IRA play right into CCP's efforts to gain advantage over the United States as it relates to our allies?

*Mr. Horn. Absolutely, and thank you for the question.

I think, before I answer just briefly, I want to state a couple of things that I think everyone in this country hopefully can agree upon, which is that the Chinese Communist Party and the Russian Federation engage in practices that are not only bad, in my opinion, for their own people, but are dangerous to partner with, certainly for the United States or any of our allies.

And so when we look at what the CCP is doing, I think that it should serve as a threat to all of our interests everywhere. They have been relatively overt in terms of what their plans are for expansion and suppression of U.S. and other potential competitive interests around the globe and as they expand.

What they have also telegraphed that we have failed to properly acknowledge and react to is that they are planning to use our own actions against us. They are planning to use our government funding, our universities, our infrastructure, anything that is exploitable against us in any means possible.

So when we look at aspirations of technological development, I don't think there is anyone out there that would disagree that we want to see technological development, economic growth, commercial development, and economic activity. But we have to be careful, as we look at driving catalysts to drive U.S. industry and U.S. innovation, that we don't open ourselves to a Trojan horse to come in and work against us because the CCP is an expert at doing this. They know exactly how to exploit what we do. They have been doing

it for decades, and their plan is to suppress us and prevent us from being a competitor to their world domination.

I say again, their world domination is their goal. And if we look at how they are exploiting and mistreating their own people, they wish to do that to the entire world. And if we allow loopholes without the proper oversight and enforcement, we enable them to do so.

*Mr. LaHood. Thank you for that, Mr. Horn.

I think one of my frustrations with the IRA is the Federal Government putting their thumbs on the scale as it relates to certain industries, and subsidizing those. Just to follow up on that, when -- can you share on how these types of incentives that are made part of the IRA actually prevent U.S. alternatives and competing companies from growing and thriving domestically?

*Mr. Horn. I will give an example to try and put it into context. So in the rare earth industry, there are, unbeknownst to a lot of people, several U.S. alternatives that are actually not as far from coming online as people would realize. However, they stand a threat to the global hegemony and monopoly that the Chinese Communist Party has on the industry, and they will do everything possible to prevent those options from coming online, from price fluctuation, flooding the market, everything measurable.

So when the resources that are designed to go to U.S. companies to allow them to compete on a fair stage with the Chinese Communist Party are diverted, it allows the Chinese Communist Party not only to take those funds, but to suppress any possible legitimate competition for a better service provider.

*Mr. LaHood. Thank you.

I yield back, Mr. Chairman.

*Chairman Smith of Missouri. Thank you. Mr. Estes is recognized.

*Mr. Estes. Well, thank you, Mr. Chairman, and thank you for our panelists for

being here today.

I know we have talked a lot about good tax policies, and I just wanted to highlight, you know, when the Tax Cuts and Jobs Act was passed in 2017, that was a good tax policy because it actually ended up in more jobs for minorities and people of color than had been in the previous decades. So it was so important to help get the economy growing, and it didn't pick and choose jobs for some people, and then doing away with jobs in other industries. And so that is why it is so important as we talk about issues like that in our hearing.

One of the great misnomers of the -- of last year's so-called Inflation Reduction Act -- in fact, even C-SPAN titled the bill "Taxes, Health Care, and Climate Change" on the screen when we were voting on the bill. It didn't reduce taxes, but it was full of special-interest Green New Deal provisions that are billions of dollars more expensive than initially proposed.

The official CBO score for the so-called Inflation Reduction Act's energy and climate provisions was $391 billion over the 2022 to 2031 time period. However, because the EV tax credits are uncapped, that estimate is drastically low. An estimate by Credit Suisse is that -- double the estimate at $800 billion, and Goldman Sachs has provided an even grimmer outlook at $1.2 trillion.

Mr. Chairman, I would like to submit for the record an article from the Wall Street Journal titled, "The Real Cost of the Inflation Reduction Act Subsidies: $1.2 trillion."

*Chairman Smith of Missouri. Without objection.

[The information follows:]

**********COMMITTEE INSERT**********

OPINIONREVIEW & OUTLOOK Follow

The Real Cost of the Inflation Reduction Act Subsidies: $1.2 Trillion

Goldman Sachs says the uncapped tax credits will cost three times what Democrats claimed.

By The Editorial Board Follow

March 24, 2023 at 6:50 pm ET

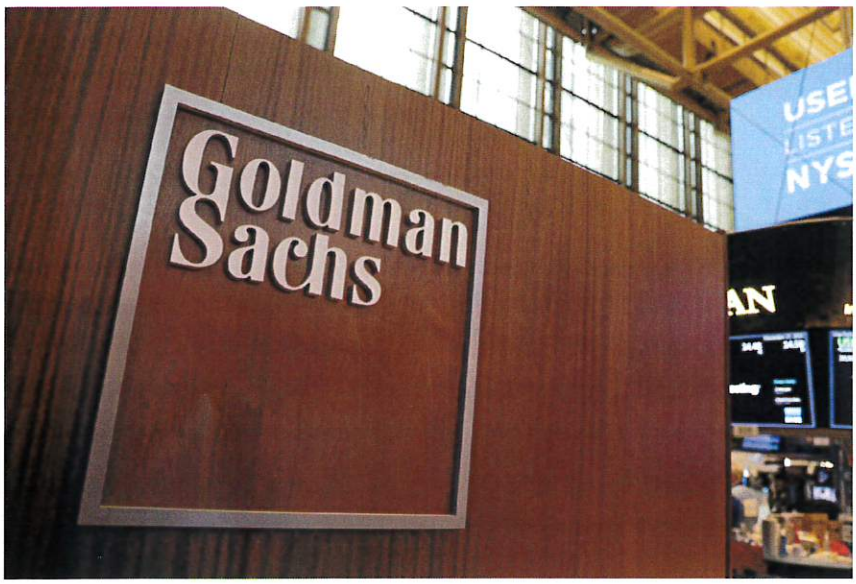


PHOTO: ANDREW KELLY/REUTERS

The Inflation Reduction Act may go down as one of the greatest confidence tricks on taxpayers in history. Democrats used accounting gimmicks to claim the partisan law would reduce the budget deficit. But now a Goldman Sachs report projects its myriad green subsidies will cost $1.2 trillion—more than three times what the law's supporters claimed.

The Congressional Budget Office forecast that the IRA's energy and climate provisions would cost $391 billion between 2022 and 2031, but this appears to be a huge under-estimate. One reason is companies are rushing to cash in on tax credits that aren't capped. The Biden Administration is also loosely interpreting conditions for the credits.

By Goldman's estimate, the IRA tax credits will cost tens to hundreds of billions more than CBO estimated over 10 years. The forecast misses include electric vehicles (difference: $379 billion), green energy manufacturing ($156 billion), renewable electricity production ($82 billion), energy efficiency ($42 billion), hydrogen ($36 billion), biofuels ($34 billion) and carbon capture ($31 billion).

Goldman says the difference in the EV credit estimates owes to its projection that more vehicles will meet the law's "self-sufficiency" mineral and battery material conditions for the partial $3,750 consumer credit and full $7,500 credit. But even Goldman's estimate for the EV credit could be low if Treasury loosely interprets the credit conditions, which is what auto makers are lobbying for.

Auto makers are also racing to take advantage of a tax credit for locally manufactured battery cells and modules by setting up plants in the U.S. Similar to Goldman's estimate, an analysis last month by Mercatus Center fellow Christine McDaniel projected that the tax credit for battery production could cost up to $196.5 billion.

Ford's Michigan plant with Chinese battery maker CATL alone could cost $1.5 billion annually in credits. Goldman estimates the tax credit could shave the cost of battery production by 35% to 42%, though EVs would still cost 17% more than vehicles with internal combustion engines. While tax credits will improve auto maker EV margins, it's not clear whether they will make EVs profitable.

Goldman predicts the IRA will "drive" $3 trillion in climate investments—that is, reallocate $3 trillion in capital across the economy. Oil and gas companies will spend less on increasing production and more on developing carbon capture technologies, hydrogen and biofuels that are profitable only with the IRA's rich tax credits. Expect energy prices to rise.

Goldman says green subsidies will benefit companies across the economy—from aluminum manufacturers to agriculture producers. This will make it politically more difficult for Republicans to roll back the subsidies if they gain control of the White House and Congress. Subsidies will also be "deployed meaningfully" in states like Texas with large GOP Congressional caucuses, Goldman notes.

Eliminating the tax credits, Goldman adds, would constitute an "effective tax increase," which Republicans may be loath to vote for. Florida Gov. Ron DeSantis last year vetoed a bill that would have scaled back rooftop solar subsidies after the solar lobby denounced it as a "tax." Will Republicans have the courage to claw back the green handouts going to their business friends?

Democrats have created an enormous new corporate entitlement whose costs will increase on autopilot and blow up the deficit while raising energy prices for average Americans. Congratulations, Sen. Manchin.

Appeared in the March 25, 2023, print edition as 'The Inflation Reduction Act Trick'.

THE FUTURE OF COMMUNITY DESIGN

New Evidence Links Transit Cuts With Poverty and Unemployment[1]

When bus service was eliminated for five years in Clayton County, in the Atlanta metro area, residents endured substantial increases in poverty and unemployment rates.

April 18, 2023 Jared Brey

In Brief:

- Clayton County, Ga., saw poverty and unemployment rise during a five-year period when it had no transit access to Atlanta, according to a new study.
- The study's findings support the "spatial mismatch" theory, which holds that poor transit access leads to fewer job opportunities and lower incomes for residents.
- Researchers say there are strong links between transit access and economic outcomes, with important differences in bus, rail and other transit modes.

In 2010, amid budget pressures stemming from the 2008 housing market crash and ensuing recession, Clayton County, Ga., canceled its bus service.

Clayton is a majority-Black county in the southern part of the Atlanta metropolitan area, with a poverty rate of almost 20 percent. It's not connected to the city by rail, and before 2010, bus service was its only major means of public transit. The buses cost about $10 million a year to run and only collected about a fifth of that amount back in fare revenue, according to a report in the *Los Angeles Times*.

For the five years following the demise of the service, which was called C-Tran, Clayton County residents had no public transit access to Atlanta. MARTA, the city's larger transit service, began running buses in the county again in 2015. In the half-decade interim, the county endured "substantial increases in poverty and unemployment rates" which are explained by the loss of bus access, according to new research published last month in the journal *Urban Studies*.

The cancellation of bus service was a blow to Clayton County. For researchers, however, it was a rare opportunity to study the links between access to public transit and economic outcomes like poverty and unemployment, says Fei Li, an assistant professor in the Urban Studies Institute at Georgia State University and lead author of the paper. The circumstances provided a kind of "natural experiment," the paper says. It's often hard to isolate the economic effects of certain events, like the pandemic or natural disasters, because they happen over large areas and affect lots of communities in the same way. But in the case of Clayton County, the researchers were able to compare census tracts that initially had bus access and then lost it with demographically similar tracts that weren't affected by the cuts.

Li and her co-author, Christopher Kajetan Wyczalkowski, used a "difference-in-difference" method to observe how poverty and unemployment rates changed between 2010 and 2014 in different census

[1] https://www.governing.com/community/new-evidence-links-transit-cuts-with-poverty-and-unemployment

tracts. They found that "losing all bus stops in a census tract leads to a 5.1 percentage point increase in the poverty rate and a 4.5 percentage point increase in the unemployment rate," according to the paper.

The findings explore two divergent but overlapping theories in urban research. One is known as spatial mismatch, which holds that lack of transit access limits access to jobs and puts low-income residents at an extra disadvantage. The other, residential sorting, holds that lower-income households tend to move to areas with better transit access over time. The Clayton County experience suggests that both phenomena could be at play, but shows stronger evidence for spatial mismatch, Li says. While it's not possible to conclude exactly how the loss of bus access affected individual families, it's likely that some residents lost access to existing jobs or job opportunities because of the cuts.

Especially for low-income people and communities of color, transit is "an essential part of the infrastructure, and for now it's underprovided in most American cities," Li says.

It can be tough to separate the effects of mismatch and sorting trends, but it's really "a long-term/short-term question," says Justin Tyndall, an assistant professor in the University of Hawaii Economic Research Organization. In the short term after service cuts, people lose access to jobs and opportunities; but over a much longer timeline, people tend to choose neighborhoods that suit their economic needs and that they can afford, Tyndall says.

Tyndall published a study in 2017 looking at how the temporary loss of the R subway line in New York City after Hurricane Sandy affected poverty and unemployment. His study found similar results to the Clayton County study, though the changes were smaller, possibly because New York generally has more transit options.

"Reductions in transit service are definitely harmful to economic outcomes. In these cases, people have already made location decisions based on the assumption of transit access," Tyndall says.

The mode of transit service matters though. While poor families tend to live closer to bus service, the effects are reversed with flashier and more expensive services like urban light rail, Tyndall says. Higher-educated and higher-paid workers tend to congregate around light rail-accessible neighborhoods, which raises employment rates — and rents — in those areas, while lowering poverty. But the displacement impacts of light rail amenities can actually reduce overall employment across a wider area, by pushing lower-income people to neighborhoods with worse transit access, Tyndall has found.

In general, there's strong evidence from a variety of research fields that transit access supports good economic outcomes, and that cuts to transit service are economically harmful. It's important to highlight evidence of those links as U.S. transit agencies face some of their most dire financial challenges in years, Li says.

"This is a hard time for transit overall," Li says. "I don't think we can afford as a country or a region to have public transit fail because of the pandemic. I think that will have really long-term consequences."

*Mr. Estes. Thank you.

Part of why the EV tax credits in the IRA would be so much more expensive than CBO has projected or predicted is because the Biden Administration has been working overtime to expand which foreign countries are eligible for the credit. Republicans and Democrats on this committee were recently told by the Administration that they have entered into a new trade deal with Japan under the guise of a critical minerals agreement, which conveniently allows Japan to qualify for EV tax credits paid for by the American taxpayers. The Biden Administration has been working overtime to expand eligibility for the EV tax credit for foreign countries, all without the approval of Congress.

Mr. Stein, do you have any knowledge of the Biden Administration working with third-party groups on ways to get around congressional intent regarding eligibility rules for the EV tax credits contained in the IRA?

*Mr. Stein. Well, that is actually a big problem. The way Treasury has been making these decisions and the IRS has been making these decisions has been behind closed doors. It is not clear who is lobbying them on these things. Certainly, there is big companies that are lobbying, but who they are all meeting with, that is not public information. We actually have been FOIAing Treasury to try and find out who is taking these meetings. But right now we don't really know.

*Mr. Estes. So we have also seen the Biden Administration attack American energy production under the guise of climate conservation.

I can tell you that the Kansans I represent are really the ones who care about conservation. The farmers, ranchers, and energy producers who work the land are caring for our natural resources. Instead, the -- President Biden and my colleagues on the left have done everything they can to end hydrocarbons, decimating American energy production, and relying on dirtier fuel from foreign adversaries. The result has been higher costs for

Americans, and that is even when President Biden admits that we will be continuing to use hydrocarbons for years to come into the future.

Just last week the EPA announced their new emission standards, which will force Americans into more expensive vehicles that are simply impractical for families -- rural Kansans and Americans who aren't in areas with access to EV charging stations, or that have to drive long periods of time.

In the same time, adding these new EVs will put a greater strain on our energy grid, weakening American energy production, and strengthening the world's largest battery producer, China.

Mr. Stein, can you help my colleagues understand the detrimental impact of strengthening China by forcing Americans to buy electric vehicles?

*Mr. Stein. So we have seen -- we have already seen examples just in California, I think last year, when they were having wildfire and electricity shortage issues, and they said, "People, don't charge your electric vehicles in order to protect the grid." So the problem is that, if you are having problems with the electricity grid and your cars also run on the electricity grid, then you don't have that redundancy that you have if you can get in your car and get away from the wildfire, for instance.

And so it ultimately -- the -- making a greener grid, it becomes more fragile to begin with. That is the problem that California is already facing. Texas is facing the same problem. But then you increase the load on the grid, too, by adding -- trying to add all your transportation onto the grid. It is only compounding that weakness that you have created.

*Mr. Estes. Yes, that is why it is so important to have a strong base load, even to support the sustainable energy that we produce. So thank you all.

And I yield back, Mr. Chairman.

*Chairman Smith of Missouri. Thank you. Ms. Sanchez is recognized.

*Ms. Sanchez. Yes, I am just -- wow. I have heard a lot of talk from my colleagues today about standing up to China, and I will just say that talk is cheap, but making generational investments to reshore good-paying jobs and create supply chains within the United States and making those investments, that is not cheap. And rebuilding our infrastructure and modernizing our energy systems to keep our economy competitive with China, that is not cheap either.

But when my colleagues on the other side of the aisle talk tough on China, sadly, their talk is cheap. Most of them were here to spend more than $2 trillion on a tax windfall that overwhelmingly benefited the wealthiest in this country and multinational corporations. And the Republican tax scam didn't do one single thing, nothing to prevent foreign individuals and businesses from reaping the benefits of that windfall.

Mr. Beachy, it hasn't been even a year since we passed the Inflation Reduction Act, but there are clear differences in the results of the IRA and the 2017 tax scam. Can you tell us just briefly what are some of the results that we have seen from the IRA so far?

*Mr. Beachy. I am happy to. So I mentioned at the top that in the first six months of the -- since President Biden signed the IRA we saw companies announce clean technology manufacturing investments. That totaled about $90 billion. And those investments will take place in 31 states, and they will create about 100,000 jobs. That is due -- according to a report by Climate Power.

*Ms. Sanchez. So we are already seeing early investments because of the IRA, and aren't those investments designed to pay dividends over time for American workers, as well?

*Mr. Beachy. Indeed, they are.

*Ms. Sanchez. Can you talk a little bit just briefly about how the prevailing wage, and apprenticeship, domestic content, and assembly requirements across the IRA's credits work together to create good-paying, union jobs here in the United States and keep them

here?

And can you also answer whether these kinds of jobs that they are creating would be available for workers who are transitioning out of traditional energy sectors?

*Mr. Beachy. Yes, I appreciate the question.

On -- so first is the actual deployment of solar and wind power. You know, the IRA invests a historic amount to deploy more clean energy to meet our climate goals. But for the first time, critically, it pairs those investments with the high road labor standards of prevailing wage and apprenticeship programs to ensure that clean energy workers can enjoy family-sustaining jobs.

In the same time, the IRA includes, like, as you noticed, as you mentioned, the domestic content bonus, which creates a demand pool paired with all of the supply push investments for clean domestic manufacturing of the nuts and bolts of clean energy, everything from EV batteries to solar panels and all their component parts, wind and all of its component parts. That is a durable investment because those jobs will be around for a long time. Smart industrial policy means investing in the technologies of the future, and that is what we are doing.

*Ms. Sanchez. I appreciate that because we don't use gas lamps to light our homes anymore. We use energy-efficient light bulbs, and we must progress. So traditional energy sectors may have job losses, but there are jobs that are being created. And it is not crazy to think that perhaps they can transition into some of the new jobs that are being created.

*Mr. Beachy. I mentioned that the policy takes seriously that the fairness for workers and communities impacted by technology shifts won't just happen organically. It has to be a deliberate policy choice. I mentioned the $4 billion investment for clean manufacturing in coal communities.

In addition, there is a bonus credit to encourage solar and wind developers to invest

in hard-hit energy-transition communities across the country.

There is an additional program that will have $250 billion in loan authority to retool existing energy infrastructure for new purposes, providing an opportunity for economic development in some of the hardest-hit regions in the country by the energy transition.

*Ms. Sanchez. I appreciate that.

Mr. Stein, I just want to make you aware that in the IRA hybrid cars also count. And so hybrid cars which run on gasoline can also be a cheaper alternative for families that can't afford purely electric cars.

Mr. Ginn, I just want to be clear that the 2017 Republican tax scam bill cut taxes across the board to a rate lower than anybody was even asking for, with no restrictions to prevent foreign corporations from getting a tax cut. Did the 2017 tax scam bill do anything at least to make sure that those foreign corporations spent their tax windfall on building U.S. manufacturing facilities with good-paying jobs?

*Mr. Ginn. I am not sure about that specific provision, but I do know that there were trillions of dollars that were sent back, repatriated from other countries back to the United States, along with more --

*Ms. Sanchez. No, the question was whether or not the bill did anything to make sure that foreign companies who got this big tax windfall had to reinvest that in building U.S. manufacturing facilities with good-paying union jobs.

*Mr. Ginn. I was not a part of those discussions, and so I am not advised.

*Ms. Sanchez. I will take that as a no, and I yield back my time.

*Chairman Smith of Missouri. Thank you.

For my colleagues on the other side of the aisle who continue to disregard the Tax Cut and Jobs Act and what it did for hardworking Americans, today under the Tax Cut and Jobs Act a family of 4 who make $64,000 or less will pay 0 in Federal taxes. And in a

congressional district with the median household of $50,000 a year that I represent, that is a substantial tax cut for working class -- hard-working-class families. And that is the fact, and that needs to be in the record.

Mr. Smucker, you are recognized.

*Mr. Smucker. Thank you, Mr. Chairman, for holding today's hearing.

It really is important that we revisit the true cost of the Inflation Act. And I know many of my colleagues have raised the new $1.2 trillion price tag of the tax credits in the Inflation Act, but I also want to draw attention to another area that was just mentioned about the true cost of these credits.

The inflation -- the IRA is chock full of requirements to utilize unionized labor, prevailing wage mandates, and union apprenticeship ratios. And I would never -- I respect labor unions and the choice that workers have to participate in a labor union, but in my district and across the country, as well, about 90 percent of our workers have chosen not to be part of a labor union. And in that regard, this policy is discriminatory against most of the workers in my district, in addition to increasing costs when we limit competition only to union companies.

I want to also mention two things that were brought up in the hearing. One was labor force participation rate. I think Mr. Blumenauer brought this up, and he mentioned that we are at record highs. And I would like to submit for the record, Mr. Chairman, a chart posted by the Saint Louis Fed, if I can do so.

*Chairman Smith of Missouri. So ordered.

[The information follows:]

**********COMMITTEE INSERT**********


FRED
Labor Force Participation Rate
63.5
63.0
62.5
62.0
61.5
61.0
60.5
60.0
Percent
May 2020
Sep 2020
Jan 2021
May 2021
Sep 2021
Jan 2022
May 2022
Sep 2022
Jan 2023
1960
1980
2000
Source: U.S. Bureau of Labor Statistics
fred.stlouisfed.org

*Mr. Smucker. This chart shows that, just prior to the pandemic, February 2020 labor participation rate was at 63.3 percent, and the latest, March 2023, it was 62.6 percent. But -- so still not at pre-pandemic participation rates. Very important. And -- but it shows that Democrat policies have failed to have workers return to the workforce in the numbers they were prior to COVID. That has a lot of different policy impacts.

And one additional thing. Social Security was mentioned, and Democrats are fond of saying that Republicans are taking actions that would hurt the beneficiaries of Social Security. I want to remind people listening that the Biden Administration recognizes that within 9 years the trust fund will be insolvent, which would result in individuals relying on Social Security getting about 80 percent of their total benefits that are owed to them. And they have chosen in their budget to not address that in any way, no policy proposals that would fix Social Security to ensure that we can keep the promises that were made to people relying on Social Security.

We talked a lot -- and, Mr. Turner, I appreciated some of your comments. You talked about the impact of the policies on rural Americans. Certainly I am seeing the impact of rising gas prices on people all across my district. I have had individuals talk to me saying they have had to make tough decisions about buying food or gasoline. And interestingly, President Biden has characterized our rising gas prices as -- an "incredible transition" is what he called it. Interior Secretary Deb Haaland refused to say gas prices were too high when prices had surpassed $6 per gallon in some parts of the U.S. It really appears that driving prices higher on traditional energy may be intentional on the part of those who want to see us move to renewable energy faster that the market would allow for.

Do you think that is true? Do you think this is intentional, that this Administration wants to see higher gas prices that are hurting American people?

*Mr. Turner. Yes, Congressman, thank you for the question. Absolutely, it is

intentional because fossil fuels are very, very popular in America. And even if people may use them as a pejorative, Americans love the fossil fuel economy that it has created. They love the convenience. They love the comfort. It is the reason why millions of people, legally and illegally, are trying to get into this country, because fossil fuels have made us an incredible country.

To make fossil fuels unpopular --

*Mr. Smucker. I am going to stop you, because --

*Mr. Turner. -- you have to make them expensive.

*Mr. Smucker. -- I am running out of time. Thank you. I think the case can be made this is intentional on the part of the Administration to see higher gas prices, and the impact on the American people is devastating.

Mr. Ginn, you talked about industrial policy, government picking winners and losers, and we certainly see that in the IRA. Talk a little more about the impacts of that. How does that affect -- you talked about the importance of economic growth. I could not agree more, but how does industrial policy impact economic growth?

*Mr. Ginn. It simply crowds out other, more productive purposes that were chosen by the marketplace compared with government planning or the use of taxpayer dollars for propping up specific industries or businesses overall. But that should be done based on profitability, not based on the taxpayer's dime.

*Mr. Smucker. Thank you.

*Chairman Smith of Missouri. Mr. Hern is recognized.

*Mr. Hern. Thank you, Mr. Chairman, for holding this hearing today.

My main concern is that the Democrats don't understand the monster they have created. Goldman Sachs's new $1.2 trillion score of this bill should scare every single American, regardless of party. I fear that there has been an over-subsidization of a market

that is not capable of producing the intended result.

I know it is hard for some in Congress to wrap their heads around $1.2 trillion, but that kind of subsidization involves massive global input to produce the needed output, and it is concerning that Democrats didn't understand what would have happened when you unleashed this type of impact on the marketplace.

To think that the Chinese Communist Party would not benefit from this poorly-formed policy is both naive and foolish, especially in the highly-integrated global marketplace that we see today.

I see a lot of talking about both sides of our mouth from the Administration and my Democrat colleagues. My Democrat colleagues say that they want to drive energy costs down and look for cleaner solutions. Guess what? I do, too. But to spend $1.2 trillion in taxpayer money to fund green energy while also attacking the oil and natural gas industry will only drive energy costs up. The unintended consequences of these actions will have consequences that far outweigh the pros.

Driving investment out of less expensive, reliable, traditional energy into expensive renewables will further drive up costs, creating energy poverty across this great nation. Time and time again, this Administration has put the cart before the horse on extreme policy without thinking about the unintended consequences. It will be a tough road ahead. And I beg to question how will my Democrat colleagues explain to their voters why energy prices go up drastically in the next decade due to poor decision-making here in this committee.

Ronald Reagan once said, "If you want more of something, subsidize it; if you want less of something, tax it." We do not know what the true American consumption of renewable energy is. An unprecedented $1.2 trillion in subsidies for renewable energy both -- is both reckless and wasteful. This Administration, with the help of Congress, has created an apocalyptic market distortion in our energy markets that will have a devastating effect on

the American people who rely on less expensive traditional energy.

Mr. Ginn, I, like every Republican that I know, is an all-of-the-above energy supply individual representative here in Congress. I believe that there is a place in the market for renewables to compete on a level playing field with the traditional energy sources. That being said, can you tell us what the unintended consequences of the IRA are in respect to the unprecedented subsidization of green energy, and what the means of the economics of the energy industry are and the provisions in the IRA inflationary (sic)?

*Mr. Ginn. Yes, sir. Thank you for the question, and you are right. You are putting your thumb on the scale more towards renewable, unreliable sources of energy over a longer period of time. And there should be a level playing field for all energy sources to whatever is going to be profitable. That means it is best for the American people and the process, as well.

And so this sort of industrial policy does not allow for there to be more economic growth, prosperity. And there is a lot of talk today about, well, there will be a transition. The transitions are best based on market forces, not based on government direction and mandates. That is taken straight out of what communist countries like China do, not what America should do, based on free market capitalism that is the best path to let people prosper. We need to get back on that path, and this is what the Inflation Reduction Act leads us more towards, the direction of the economy instead of letting markets work.

*Mr. Hern. Thank you.

Mr. Stein, what do these massive subsidies mean for our energy costs and our grid security as these hand-picked winners in the IRA are untested as reliable sources?

*Mr. Stein. Well, that is a key, is reliability. Ultimately, unreliable sources increase costs to the electricity grid as a whole. And that is the key, that wind and solar look very cheap at the specific turbine because when the wind blows it is very cheap. But grid-wide,

you have to pay more for transmission, you have to build extra wind turbines for backup, you have to build gas plants for backup. There is -- the overall cost to the grid increases electricity costs, and you see that around the world. You see that in California, you have seen that in Germany, in Denmark, in parts of Australia. Higher -- the renewables penetration means higher --

*Mr. Hern. Mr. Stein, if I may -- and thank you so much for your response, but I want to give a great example of that. The largest -- we think of Google being a green company. Their largest or near-largest data server farm in the world sits 25 miles to the east of Tulsa, Oklahoma, 1,000 yards from a gas-fired/coal-fired energy production facility. And when asked why they are there, they need reliable energy, reliable energy.

So for all the talk that my colleagues across the aisle are talking about, this is not reliable energy. The fossil fuel industry has always provided that, and will continue to do so.

Mr. Chairman, I yield back.

*Chairman Smith of Missouri. Mr. Higgins is recognized.

*Mr. Higgins. Thank you, Mr. Chairman.

The United States, according to a study out of Brown University, spent $6.2 trillion in 3 Middle East wars in the past 20 years. The Middle East is made up of 17 countries. It has a population of about 480 million people, all in. And if you were to take oil off the table, the entirety of the Middle East has an economy equal to Finland. We lost 7,000 American soldiers in wars in Iraq and Afghanistan, again, because of our addiction to oil. So the oil age won't end because we run out of oil. The oil age will end when we find a better, more efficient way to power everything, including automobiles, a way to power them that is quicker, quieter, and eventually cheaper.

There has been a lot of talk here about jobs and the economy. Let's talk about jobs

and the economy. Fortune Magazine, January 11th, 2001: "Trump to leave office with the worst jobs record since Herbert Hoover. The number of employed Americans fell by 3 million during the Trump time in office, including the loss of 300,000 manufacturing jobs." Don't lecture me on job creation, particularly in the manufacturing industry. Fortune Magazine.

Bloomberg Analytics, February 23rd, 2023: "Biden Administration, 12 million jobs created in 14 months." To quote them, "Biden is on track to be the greatest jobs-producing President in the history of the country," 12 million jobs in 14 months, including 800,000 new manufacturing jobs. Unemployment, 3.4 percent, the lowest unemployment rate in 54 years. Inflation forecasted -- it is high now, it is over 5 percent -- at 2.5 percent at this time next year, consistent with historical trends as it relates to inflation.

The Inflation Reduction Act, probably misnamed, but it did provide incentives not only for American manufacturers, but also American citizens to bring the cost of electric vehicles to parity with gas-powered vehicles. This is beginning to turn a trend that we are 15 years late in addressing.

You know, China, we need to be tough on China. They cheat on their currency, they steal our intellectual property, they treat their people poorly, they treat their environment poorly. But we need to be tougher on ourselves about China. All of the rare earth minerals that go into manufacturing batteries, most of them are in Africa. China spent $1 trillion in infrastructure investment not to help the people of Africa, but to allow them to exploit the continent of Africa so that they could control all of the rare earth minerals. China now refines 68 percent of the world's nickel, 40 percent of the copper, 59 percent of lithium, 74 percent of cobalt.

So the Inflation Reduction Act is an effort to encourage domestic manufacturing of electric vehicles, and we have a long way to go. It is not solving the problem right away,

but it represents a beginning. Mr. Beachy, you have talked about the Inflation Reduction Act in terms of jobs, in terms of economic development. But also could you talk briefly on the efforts to make electric vehicles more affordable for Americans, but also incentivizing domestic manufacturing of those electric vehicles?

*Mr. Beachy. Absolutely. Thank you for the question.

So there are historic tax credits available for the manufacture of electric vehicles, and making those vehicles more affordable at the same time. It is critical to pair those two goals together, swift deployment and good manufacturing jobs making the component parts. The $7,500 tax credit will make electric vehicles more affordable, and the use tax credit will make them $4,000 cheaper for your average family.

Meanwhile, though, it invests -- those tax credits are built to make sure that those component parts are made here, and that is critical for jobs. It is also critical for our clean energy goals and our climate goals. You know, when one country produces the vast majority of the supply of a critical energy good in the world, we should treat it as the same way we treat a corporate monopoly. We should not pin our climate goals on hope that the world's monopoly producers maintain prices low forever.

The IRA responds to that problem by investing in the clean manufacturing of the technologies of the future here, including electric vehicles, solar panels, wind turbines, et cetera. That is as good for our jobs goals as it is for our climate goals.

*Chairman Smith of Missouri. Mrs. Miller is recognized.

*Mrs. Miller. Thank you, Chairman Smith, and thank you all for being here today.

Last year Republicans were united in warning the Democrats that their out-of-control spending was going to come back to bite the American people. And that is certainly the case with the spending that has gone on, the so-called Inflation Reduction Act, which has ballooned in cost, empowered the Biden Administration to ignore Congress, and most of all,

it supercharges the inflation crisis that the American people were already bearing.

The bill was portrayed as a promise to help our struggling economy, but as soon as it was forced through Congress in the backroom deals, the truth came out. Instead of a bill to help the middle-class Americans, the IRA is welfare for billionaire-dollar businesses, handouts to well-connected Democrat donors, and tax breaks for luxuries for the upper class to enjoy.

My constituents in West Virginia will pay the price for liberal elitists to feel self-righteous for buying an electric vehicle that contains parts made with child and slave labor, and is sourced directly from the Chinese Communist Party.

Everyday Americans will also pay the price through higher electricity prices because the IRA increased the already perverse incentives to produce less power for more expensive means.

When we have such abundant natural resources, we must ask why radical liberals are picking winners and losers in the process, trying to tax us back into the Dark Ages.

Mr. Turner, I represent the major energy-producing state of West Virginia. We are the second-largest producer of coal in the United States, and an important producer of natural gas and oil. I want to thank you for your comments, because our coal communities applaud you for standing up for them in Washington, D.C. Washington, D.C. tends to denigrate those people as insignificant. I know what bad policies from Washington, D.C. do. I have a county in my state, in my district, that has gone from 100,000 people down to 14. We understand bad policy is bad policy.

The Inflation Reduction Act creates incentives for unreliable electricity sources, namely wind and solar. While renewables can play an important role powering the grid, they fail to provide affordable baseload power that is essential for our families, our businesses, and our emergency services.

Most wind and solar products are not made in the United States, while our traditional energy is sourced from states like mine. What will the impact be on rural communities if these credits are not repealed?

*Mr. Turner. Thank you, Congresswoman. These jobs will continue to move overseas. Like I said earlier, we are still producing more coal than ever before. Estimates for coal production and -- coal consumption, excuse me -- are continuing to go higher. But America's share of that pie is just getting smaller. West Virginia's share of that pie is getting smaller. These tax credits will go to companies that just produce coal in India, in China, in Malaysia.

So my question is, if we still need coal and we are admitting we need coal -- solar panels are made with coal, all these wind turbines are made with coal. EVs require coal. So if we need coal, why can it not be American coal? Why is it green to send the coal jobs to a foreign country, and then plunge communities like the great communities in West Virginia, plunge them into poverty, claiming that we are somehow protecting the environment? It makes no sense. Not only are West Virginia's environmental standards far superior than anything you would see in Southeast Asia, but the jobs and the tax revenue stay in your community, as well.

*Mrs. Miller. You are exactly right. Thank you so much.

Mr. Horn, before President Biden's Treasury Department announced the rules regarding the Electric Vehicle Tax Credit, which clearly ignores the intent of Congress, I led a letter with several of my Ways and Means colleagues warning the Treasury of major concerns with Ford's partnership with China's largest battery manufacturer, CATL. I would like to submit that letter for the record.

*Chairman Smith of Missouri. So ordered.

[The information follows:]

**********COMMITTEE INSERT**********

Congress of the United States

Washington, DC 20515

March 30, 2023

The Honorable Janet Yellen
Secretary
Department of the Treasury
1500 Pennsylvania Ave NW
Washington, D.C. 20220

The Honorable Danny Werfel
Commissioner
Internal Revenue Service
1111 Constitution Ave NW
Washington, D.C. 20220

Dear Secretary Yellen and Commissioner Werfel:

We write to you gravely concerned about implementation of certain provisions within the "Inflation Reduction Act" (IRA) that would directly benefit the People's Republic of China (PRC). The IRA provides over $270 billion in tax credits for the wealthy and corporations, and in no case should these taxpayer dollars flow to a geopolitical adversary.

It has come to our attention that the Department of Treasury and the Internal Revenue Service (IRS) are being pressured to draft guidance on the critical minerals and EV battery components requirements for Section 30D (Clean Vehicle Credit) of the Internal Revenue Code that would allow Chinese companies to benefit from U.S. taxpayer dollars.[1] Such guidance would turn the Section 30D tax credit into a boon for companies affiliated with the Chinese Communist Party (CCP). One example of a proposed venture that is seeking to benefit from relaxing the "foreign entity of concern" definition is the agreement between Ford Motor Company and Chinese company Contemporary Amperex Technology (CATL) to build an EV battery plant in the United States.[2] This plant will be owned by Ford but will rely on CATL technology and services. CATL would receive royalties and fees, revenue bolstered by the IRA's consumer EV tax credit. This proposed venture represents a significant national security concern. On January 20, 2023, Virginia Governor Glenn Youngkin halted this project in Virginia, calling it a "Trojan Horse " for China. We urge you to minimize the threats to our national security by ensuring that U.S. tax dollars do not fund the CCP's genocide of the Uyghur people, military aggression, or other malign activity.

As Treasury and the IRS develop guidance on critical minerals and EV battery components, the guidance must include an expansive and precise definition of a "foreign entity of concern" that sufficiently protects U.S. economic and national security interests without harming our allies. This definition must prohibit vehicles that include batteries that have critical minerals or components extracted, processed, recycled, manufactured, or assembled by a foreign entity of concern anywhere in the world from receiving any U.S. tax credits, including the following entities:

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1 David Shepardson, "Automakers, foreign governments seek changes to U.S. EV tax rules", Reuters, 09 November 2022, accessed 21 March 2022, web, https://www.reuters.com/business/autos-transportation/automakers-foreign-governments-seek-changes-us-ev-tax-rules-2022-11-08/.

2 Michael Wayland, "Ford to move forward with $3.5 billion EV battery plant with Chinese company", CNBC, 2023 February 13, accessed 21 March 2023, web, https://www.cnbc.com/2023/02/13/ford-ev-battery-plant-china-catl.html

John R. Curtis
Member of Congress

Larry Bucshon, M.D.
Member of Congress

Greg Pence
Member of Congress

Mike Carey
Member of Congress

Robert E. Latta
Member of Congress

*Mrs. Miller. Can you detail the national security risks of these types of partnerships with CCP companies, as well as the broader risks that come from continuing the U.S. reliance on China for our EV batteries and critical minerals?

*Mr. Horn. Congresswoman, I cannot overstate the complexity and the ability to work around us that the Chinese Communist Party has. They will continue to exploit every loophole. So when they see an opportunity to use a Trojan Horse approach to get a Chinese state-subsidized company in -- partnered with an American company, it is nothing short of an infection by a foreign body.

*Mrs. Miller. Thank you.

I yield back.

*Chairman Smith of Missouri. Mr. Murphy is recognized.

*Mr. Murphy. Thank you, Mr. Chairman.

Gosh, I think in every committee on this Capitol Hill we are talking about China, China, China. We are at war with China. Let's just call it that way. They are trying to destroy our way of life. They have balloons. They are -- viruses, they are -- everything. They are stealing our intellectual capital, everything.

Let me try to be non-partisan here, and point out three points I think everybody would agree with. My Democratic colleagues, maybe they will look at the film.

Number one is a clean environment. We all want that, right? Okay.

Number two, where -- everybody is against slave labor. We talk about it horribly in our country 150 years ago. It shouldn't happen.

Number three, we want to cut CO2 emissions, correct?

We can all agree on those things. But let's actually dive down on those.

A clean environment. Why would my Democratic colleagues want to promote the destruction of the earth in mining policies in countries that it is much dirtier, absolutely

poorer for the environment, rather than the U.S.? Perplexing, beyond my understanding.

Two, slave labor. In the pursuit of the moral authority or the moral high ground of saying I feel better about my EV, we are having -- we are promoting child labor in the Congo, but it is okay, we are just not going to talk about that.

And then, third, CO2 emissions. So we want to pretend we are doing great for the world with our EV vehicles, when China, to feed our appetite for energy, clean energy, is now growing two coal plants a week -- a week -- and we are exporting that to them. So we are making our small little incremental change here, and we are blowing it out on the other side of the world. So in actuality, it doesn't mean a damn thing.

So let me offer a suggestion. Oliver Stone, you know, that Hollywood guy, he and I are just buddies. He and I agree on something: clean energy. It is called nuclear power. That satisfies every single thing here: we are not giving jobs to China; we are not throwing money to China; we are not using slave labor; it gives us a clean environment, and no CO2 emissions. So why don't we gather around that? So I know that is a little bit off topic. It helps with the environmentalists. It stops funding communist China.

And I actually have a question for Mr. Beachy.

You said the Sierra Club was not happy with the CCP, correct?

*Mr. Beachy. I said they were not a communist. That is correct.

*Mr. Murphy. Okay. Would they be happy -- are they happy with the fact that China is now producing two coal plants a week to feed our appetite for clean energy?

*Mr. Beachy. No, they absolutely would not. And that is why they support global engagement so as to reduce emissions across the world.

*Mr. Murphy. Okay. I mean, I just think it is -- we are blinding ourselves. We are not understanding, one, that China wants to take over the world, and we are feeding them for it.

And by the way, they don't give a damn about climate. They are not doing anything about climate because they are pushing, pushing, pushing coal.

Anyway, I just don't get it, guys. Come on, wake up, and let's get to the table. The United States is literally giving our competitive advantage away to China as they race to cheat American companies.

Mr. -- I am sorry here, I am just a little -- I just can't believe sometimes. You all, wake up.

Mr. Horn, you served under the former President Trump during a time when the U.S. became the global energy superpower. Can you describe how our energy security and energy affordability have changed since this President Biden took office?

*Mr. Horn. Well, Congressman, I want to say that I think there has been attempts by both presidents to try and combat communist Chinese policy and the CCP. I think a lot of it comes down to what we are talking about in this hearing, which is moving beyond intent to actual execution and impact of policy.

The problem that we have currently with looking at some of the loopholes in the Inflation Reduction Act is that it basically plays to the Chinese Communist Party's ability to work our own policy against us --

*Mr. Murphy. Absolutely.

*Mr. Horn. -- and exploit loopholes. To quote what you said about them wanting to take over the world, that is absolutely their priority, and they have clearly stated it. And we have given them a variety of tools for them to do that with Federal support if we don't look to close those loopholes and to close those workarounds.

And I would say just one final piece on this. The ultimate tragedy here is that there are a plethora of American opportunities and American projects that can actually move the ball forward on this front, on other energy fronts, as well. You referenced nuclear. That is a

separate subject, but there is obviously massive amounts of American opportunity in the mineral space there, as well. All we have to do is unleash our own capabilities, and the market will correct this itself.

*Mr. Murphy. Absolutely. And I think we can do it in America cleaner, absolutely cleaner. We are not feeding our world's greatest adversary, and we are creating our own American jobs. It is not that hard. We just have to wake up and understand that we have somebody -- a country on the other side of the world that wants to see our demise, and we are feeding them with our own pursuit of clean energy, when we could be doing it at home.

Thank you, Mr. Chairman. I will yield back.

*Chairman Smith of Missouri. Ms. Sewell is recognized.

*Ms. Sewell. Thank you, Mr. Chairman.

As we work to create a more equitable economy emerging from the pandemic, we must look to addressing climate change within our tax jurisdiction, and the impact it will have on all communities across America. Use of the Tax code to allow for the expansion of section 45Q is just one example of sound bipartisan policy that will allow for future large-scale carbon capture and sequestration projects to develop over the next decade.

I am proud that my bill, Carbon Capture and Sequestration Expansion Act, was incorporated last year into the Inflation Reduction Act, but there is still much work to be done.

It is no secret that air quality measurements over the last three decades show that low-income communities of color face some of the worst pollution rates. This has been proven through science, and ignoring such facts will continue to lead to an array of life-shortening health outcomes for many in my communities. It is for this reason that I am serving as the Democratic lead sponsor on the Carbon Capture and Utilization Parity Act this Congress. Working with Congressman Schweikert, our bill works to establish parity

between 45Q carbon capture tax credits for sequestration, while at the same time support using captured carbon in the creation of products to reduce emissions.

In other words, we can make communities healthier, and simultaneously establish good-paying jobs.

Earlier this year, Climate Power released a study which compiled investment announcements made by the private sector companies along with the anticipated job creation such investments would make. And it showed that lots and lots of jobs will be created. In my home state of Alabama alone, projections show $1.3 billion worth of outside investment coming to the state, resulting in over 1,200 new jobs. These manufacturing investments serve as a great starting point in addressing racial inequality related to income in Alabama. But like our tax code, there is still much work to be done.

Last Congress I had the distinct honor and privilege of being co-chair of the Ways and Means Racial Equity Initiative. Our two years of work further highlighted why many in the African American community have known for years, and that is that the loss of manufacturing jobs in the United States has disproportionately affected people of color.

My question is to you, Mr. Beachy. With my remaining time, can you further elaborate on the research that you and your colleagues have conducted at BlueGreen Alliance on how U.S. investments within the IRA have the ability to create a new workforce in places like Alabama and in communities like the ones I serve?

*Mr. Beachy. I am happy to. So I already mentioned that there is over $50 billion of investments in clean manufacturing in this bill, which is truly historic, offering an opportunity to rebuild solid manufacturing jobs and our nation's industrial base at the same time, while better equipping us to have more reliable supply chains for clean technology needs.

It is also true that a lot of the investments in the IRA are dedicated to reducing the

kinds of emissions you spoke to. Industrial emissions I will just name. There is a new $6 billion program created at the Department of Energy to slash industrial emissions from steel, cement, and aluminum facilities while making these facilities more competitive. I mean, these are facilities that produce the backbone of our economy, materials that go into all of our infrastructure and our clean technology.

I mentioned that solar panels are 85 percent aluminum. There is also a lot of steel that goes into our wind and solar. And so we have to produce these materials more cleanly. Right now they are in -- many of them are made in China with a much higher degree of climate pollution. What the IRA proposes is to make those materials here, and that $6 billion is invested not only to reduce the greenhouse gas emissions that come out of those facilities, but the air pollution, as well, that disproportionately impacts Black folks and communities of color and other low-income communities.

Meanwhile, that will invest in good paying jobs in these same facilities, including in your home state of Alabama and in many others across the country.

*Ms. Sewell. Thank you, and I yield back the balance of my time.

*Chairman Smith of Missouri. Mr. Kustoff is recognized.

*Mr. Kustoff. Thank you, Mr. Chairman. Thank you for calling today's hearing, and thank you for the witnesses for appearing today.

Dr. Ginn, if I could, with you and some of these figures have been cited previously, but if I can -- and I may be covering ground that was covered, but maybe a little bit more in detail. So when the CBO issued its forecast, and they -- their number was 391 billion, we have heard about Goldman Sachs, that they see the total cost of the green credits as exceeding a trillion, and we have talked about Credit Suisse. If I can, to you, somebody who has been in OMB and Budget, how did they get it so wrong? Where is the disconnect?

*Mr. Ginn. Congressman, it is a great question, and it is one that I think is kind of a

common problem when we score some of these, or they score some of these at CBO without looking at dynamic effects, and they look more at the static analysis.

Whenever you throw this kind of money at particular things -- this being EV batteries -- what do you get? You get more of it, and on the back of taxpayers.

And one thing that I have heard quite a bit today is that this is an investment for the future. But government can't invest. Government only spends other people's money. It is not their money to invest at the end of the day. That money should be in the private sector, where you can allocate resources better along the way.

And so whenever you are looking at what the CBO did, there is a lot of new data that has come out since they made these estimates last year, 381 billion -- or sorry, the $30 billion. That was the overall amount, but the $30 billion here, just for the EV batteries. That new information, the number of batteries that are being built, and some of the changes that have been made at Treasury since then, the rules that have been put in place, that has increased the cost dramatically to where -- closer to the $200 billion mark, almost 7 times greater than what they estimated last year.

*Mr. Kustoff. You may be saying this; I am going to ask this in a different way. In theory, if this were being scored today based on what we know, based on some of the things you just talked about, obviously, it wouldn't be 391 billion.

*Mr. Ginn. Correct.

*Mr. Kustoff. Okay. It might be a number closer to what Goldman Sachs has concluded.

*Mr. Ginn. I believe so. Yes, sir. And that is one reason why, you know, we are looking at Americans for Tax Reform to have this re-estimated based on the latest information that is available, potentially even having a pause of some of this that is going out there.

I mean, something needs to be looked at because this was sold as an amount to the American people. And the amount that is actually going out the door of their tax dollars, it is all adding to the national debt, interest on the national debt and so forth, is not that amount anymore. And so we need to have a close look at these dollars.

*Mr. Kustoff. All right. So let's assume there is another review, whether it is ATR or whomever, CBO came out with a different number, and the number came back along the lines of, again, what Goldman has talked about and Credit Suisse. What remedy or remedies should Congress look at?

*Mr. Ginn. Congressman, it is another great question. I mean, this is currently the law of the land. So, you know, you have to look at that and say, okay, should we pass another law that starts to strip some of this out with these tax credits, EV tax credits, or something along those lines?

I think it will need to be some form of a legal change along those lines.

*Mr. Kustoff. Thank you. If I could just briefly, I want to read you a portion from a Forbes magazine article dated February 24th of this year. "Chinese companies in the green energy space are allowed Federal tax incentives and other benefits to the tune of millions of dollars, thanks to the Inflation Reduction Act passed by Congress and signed into law by President Biden last year. If you are making solar panels or EV car batteries, the government will help you. This -- that includes China's companies. From tariffs to product dumping and commercial lawsuits, solar is the one China sector under constant pressure from U.S. trade law, yet the U.S. taxpayer will subsidize them anyway."

Number one, do you think that is accurate, Dr. Ginn?

And two, if it is, who are the biggest losers under the Inflation Reduction Act?

*Mr. Ginn. Congressman, the benefits certainly went more towards upper-income folks, larger businesses. They are the ones that are benefiting from the Inflation Reduction

Act. It is not the families. I mean, they are getting hit hard by this of increased inflation.

I mean, I think this is a misnomer. It is still called the Inflation Reduction Act, but it is contributing to more inflation, increasing the debt, and things of that nature. And it is also counter to economic growth. In fact, it -- maybe it should be called the Inflation Recession Act, because that is ultimately what we are getting from it.

*Mr. Kustoff. Thank you.

My time is expired. I yield back.

*Chairman Smith of Missouri. Mr. Arrington is recognized.

*Mr. Arrington. Thank you, Chairman.

Thank you, panelists. I am especially delighted that we have a Red Raider-trained, I think, engineer here. And so I know I can trust your numbers, Mr. Ginn.

*Mr. Ginn. Economist, not engineer, but economist. Thank you, sir. Wreck 'em.

*Mr. Arrington. Wreck 'em. Look, I am the Budget chairman, and my perspective may be a little different than some of my colleagues. I want to talk about the overselling of the so-called Inflation Reduction Act. Hopefully, we can all agree that was false advertisement, and it is misleading the American people with respect to the outcomes.

Secondly, the underscoring of the so-called Inflation Reduction Act and the impact on our nation's financial health, which is in serious decline, and what our children will inherit in terms of the amassing debt, or what I call deferred tax on our children as a result of passing the IRA under certain cost assumptions or budget assumptions.

Today the debt for this great country is 25 percent larger than the entire economy of the United States, the largest economy in the world. Two years under this Administration and my Democrat colleagues, $10 trillion in spending, 6 trillion of which was deficit spending adding to the national debt in a volume we have never experienced in the history of this country.

CBO projects it will add $20 trillion more, based on current policy. They say we will double the annual deficit. They say we would triple the interest payments. In 10 years we will be paying a trillion and a half. But in February -- and this was -- the last time they revised their numbers was May of 2022, but in February of this year they said we have to upwardly revise the projections of the cumulative deficit based on the policies of this Administration and the cost of those policies, along with the interest costs, which I would submit are soaring because of the spending-induced inflation. They had to revise in just several months the cumulative deficit by $3 trillion, based on spending and interest costs, $3 trillion.

This bill that was advertised as a deficit reducer, not a deficit increase, was included -- $400 billion of climate-related policies, mainly tax-related; 100 billion in expansion of government subsidies for health care.

I would submit to you that the pay-fors that CBO scored to give this a deficit reduction number of 155 billion, they were -- some of them were total gimmicks. Others you could debate whether they were a gimmick, like the IRS and $80 billion and 87 billion in IRS agents. But there was a rebate rule that never went into effect from the previous Administration that would have cost 122 billion, according to CBO. Never implemented. That was just a cost on a piece of paper if you implemented. That was used to supposedly offset the cost of IRA.

So I don't even believe it was cost neutral. Certainly, I don't believe it was going to reduce the deficit even before this conversation. Now we are talking about this underscore of tax credits for green industry, batteries, solar, electric vehicles. We could be talking, Mr. Ginn, Dr. Ginn, about hundreds of billions of dollars more on the debt and this unsustainable trajectory, and the potential of a debt crisis for this country, and the enormous recklessness and the burden we are putting on our children.

Dr. Ginn, is it hundreds of billions? Is what I am saying jiving with your economic analysis?

*Mr. Ginn. Congressman, yes, it is. I mean, I think this will be hundreds of billions of dollars added to the national debt.

There were a lot of gimmicks that were in there with CBO's estimates. Some of them weren't out for a 10-year budget window that they were looking at, what those cost estimates were going to be. I remember, you know, if we had done something like that in the Trump Administration, we would have heard that a lot in the media, and we haven't heard any of that going on within this so-called Inflation reduction Act now.

*Mr. Arrington. Thank you, and I yield back.

*Chairman Smith of Missouri. Thank you. Ms. DelBene is recognized.

*Ms. DelBene. Thank you, Mr. Chairman, and thank you everyone, for being here today.

Some of my colleagues on the other side of the aisle can't even agree that we are in a climate crisis, so I guess it is not surprising that they are holding this hearing attacking the single most important Federal investment we have made in fighting climate change.

It is critically important to me that we ensure a livable planet for future generations, and that is why I worked so hard with my Democratic colleagues last Congress to enact the Inflation Reduction Act. And through the IRA, we are investing in American goods and American jobs. And the benefits from these investments are already having a tangible impact on families in our communities.

Mr. Beachy, thank you for sharing your expertise with us today. In passing the Inflation Reduction Act Democrats sought to address climate change, create jobs, and advance equity. And I wondered if you could explain how it is possible for a single set of investments to achieve all of these three goals.

*Mr. Beachy. Thank you, I appreciate the question. A single set of investments achieving multiple of our society's largest goals is the secret sauce of industrial policy.

After decades in which industrial policy was seen as a four-letter word, we have the IRA offering a historic course correction by investing in industries that are strategically imperative not only for our climate action, but also for a more just and thriving economy, and this rebirth of U.S. industrial policy is really long overdue.

I can name one example. There are a lot of examples in the law that talk about how that -- show how we can achieve climate jobs and justice goals at the same time. One is the program I just named in response to Congresswoman Sewell's question, a $6 billion investment in clean manufacturing. The guidance recently came out from the Department of Energy for this program, suggesting that the businesses that will be prioritized for receiving Federal investments to make our aluminum, steel, and cement more cost competitive and cleaner will be those companies who not only reduce their greenhouse gas emissions, but also cut local pollution, including air pollution, also engage meaningfully with community groups and unions, also create high-quality jobs, also sign community benefit agreements to ensure that local communities and workers are getting real health, economic, and environmental benefits from those investments.

Now, that might seem like a very long checklist, but the secret here is that those are mutually reinforcing criteria, offering potential for overlapping wins. And when we see opportunities for win-wins, seizing them is simply smart strategy. As one example, 60 percent of our unionized steel and aluminum plants in this country, all of which are very high greenhouse gas emitters, are also located in disadvantaged communities, the communities that have been hardest hit by the unjust status quo. Investing in those facilities offers a win-win-win opportunity for cutting a major source of greenhouse gases, for investing in good, high-paying union jobs, and for redressing historical injustices. That is

one example.

*Ms. DelBene. Thank you. You know, this has been critical legislation. And unfortunately, we have seen ongoing efforts by my colleagues on the other side of the aisle to repeal all or some of the Inflation Reduction Act, and most recently through the polluters over people act last month.

You talked about some of the investments that have already been announced as a result of the Inflation Reduction Act, and the impact its potential repeal could have on our climate goals, the American energy industry, and jobs, and on energy prices for American families. Can you talk about what the impact would be if the legislation was repealed?

*Mr. Beachy. Well, we certainly don't see repeal in the offing, because voters don't tend to reject job-creating proposals. Voters don't tend to reject proposals that allow them to breathe clean air. Voters don't tend to reject proposals that allow us to make the technologies of the future. Those tend to be popular.

And I would -- if we look at the numbers just so far, I mentioned that -- the report that -- in the first six months, new investment announcements will create over 100,000 manufacturing jobs. I mean, those are spread across the country. You know, 20,000 of those jobs are in Kansas; 16,000 in Georgia; 11,000 in Tennessee; another 11,000 in Arizona. I do not think voters will reject that job creation.

*Ms. DelBene. Thank you, and thank you, Mr. Chairman. I yield back.

*Chairman Smith of Missouri. Mr. Fitzpatrick.

*Mr. Fitzpatrick. Thank you, Mr. Chairman. I think the sooner off that we all start rejecting this false narrative that you have to choose between energy independence and environmental preservation, the better off we are going to be. That is not a mutually exclusive choice. You can accomplish both. I am a huge conservationist, a huge environmentalist. However, I voted against the Inflation Reduction Act for the very reason

that many of my colleagues here are offering up, that you can't ignore the impacts of dealing with a nation like China has negative impacts on our environment.

I will ask, I suppose, Mr. Ginn. Is it not common knowledge that auto manufacturers that qualify for the EV production tax credit can claim the credit, even if they license their technology directly from Chinese companies?

*Mr. Ginn. I believe that is correct, Congressman. I -- something else that I think was mentioned earlier, too, is a lot of these tax credits are going to financial institutions. And so why are we continuing to prop up different areas of our economy? It doesn't make sense, and especially if some of that is going to places like China or others that haven't been very friendly with us for a while.

*Mr. Fitzpatrick. And they are -- China is dominating the battery manufacturing market. According to the International Energy Agency -- this was last year or two years ago, rather, the most recent year they have data for -- China produced about 75 percent of the world's lithium ion batteries. That is compared to 7 percent produced by the United States, 75 percent to 7 percent. And yet my reading of the Inflation Reduction Act, which I believe is accurate, will only continue to help these Chinese battery manufacturers benefit through the collection of royalty payments that are funded by the American taxpayer.

And yet, inexplicably, the Administration proceeds full steam ahead on implementing these troubling provisions of the IRA. And it is the troubling provisions that we are zooming in on here, which, in turn, financially benefits Chinese companies, rather than focusing on protecting, promoting, and growing American manufacturers here at home, where we have fair labor standards, where we have environmental protections, which they have neither of in communist China.

My last question, Mr. Ginn. What is -- if you could, just opine or provide your reaction to the issue that I am raising: Chinese battery manufacturers profiting off of the

U.S. taxpayers?

*Mr. Ginn. Congressman, it is an unfortunate situation that shouldn't exist. It should not be on the back of taxpayers, especially with our fiscal crisis the way that it is right now. I mean, I think that is the largest threat that we have right now, moving forward and what that is going to mean to not only us and our grandkids, and yet we are funding communist China and others through the process of the EV batteries.

What happens to the lithium whenever these batteries are done? That is a whole other environmental issue that is going on.

What about the particulate matter that has been on the decline for many years in the United States, along with CO2 emissions going down in the United States, compared with a lot of these other countries? And you are contributing to them building more in countries that, as has been mentioned here before, that do not have the same sort of environmental rules and regulations and just cleanliness like we have that is also provided by systems that are more based on free market capitalism, and not by government direction, socialism.

*Mr. Fitzpatrick. How would these lithium ion batteries be disposed?

*Mr. Ginn. Great question. I don't have all the details on that one, but it is not pretty, from what I understand. It is not something that actually degrades like other types of -- there are issues there. Yes.

*Mr. Fitzpatrick. Okay. Mr. Chairman, I yield back. Thank you.

*Chairman Smith of Missouri. Mr. Steube.

*Mr. Steube. Thank you, Mr. Chairman.

President Trump said, "I don't want American -- America to be energy independent. I want America to be energy dominant." To accomplish this, Trump lifted drilling restrictions, sped up fossil fuel production, gave the green light to domestic pipelines, blocked extreme environmental regulations, and reduced reliance on foreign oil. The U.S.

was producing more oil than we were consuming, and producing more oil than Russia and Arab nations.

Once Biden took office, we went from energy independence to energy dependence. Biden reversed almost all of Trump's policies by focusing on climate change, wind and solar power, and electric vehicles. After Biden's action, gasoline prices rose more than $5 a gallon, which was a direct result of his green energy policies.

A Goldman Sachs report projects that green subsidies in the Inflation Reduction Act will cost $1.2 trillion, more than 3 times what my Democratic colleagues claimed.

The Wall Street Journal stated the Inflation Reduction Act may go down as one of the greatest confidence tricks on taxpayers in history. And my colleague, Mr. Estes, put that article into the record.

The Congressional Budget Office forecasted the Inflation Reduction Act's energy and climate provisions would cost 391 billion between 2022 and 2031. This appears to be a huge under-estimate. By Goldman's estimate, the Inflation Reduction Act tax credits will cost tens to hundreds of billions more than CBO estimated over 10 years. The forecast misses include electric vehicles, green energy manufacturing, renewable electric -- electricity production, energy efficiency, hydrogen, biofuels, and carbon capture.

Biden's disastrous climate policies and his environmental, social, and governance standards are crippling the United States economy.

Mr. Turner, can you elaborate on these statistics and its effect on the U.S. economy?

*Mr. Turner. Congressman, thank you for the question. You absolutely nailed it, especially when it comes to oil and gas production.

You know, for years we heard this talking point, 9,000 leases, 9,000 leases. How come they are not using the 9,000 leases? Well, the Willow Project was a wonderful example of that, and I am glad the Biden Administration gave approval for this huge oil and

gas lease in Alaska's North Slope. I have been to Willow several times. I will be back in a couple of months.

But that was an example of one of the 9,000 leases that still requires government cooperation. And we don't have government cooperation from this Administration. For every one Willow, there are hundreds and hundreds of other companies waiting just to produce oil and gas. And instead, the Biden Administration makes deals with Venezuela. We make deals with OPEC. The President himself goes to Saudi Arabia to ask for oil.

I just want to know why the American oil and gas workers have to suffer, while we look to other countries, some of them hostile, for our energy needs.

*Mr. Steube. Thank you for that. I agree with you 100 percent.

In 2018 the USTR, as part of an investigation under section 301, concluded that China engages in forced technology, transfer theft of U.S. IP and trade secrets, discriminatory and non-market licensing practices, and state-funded strategic acquisitions of U.S. assets. USTR then imposed tariffs on an estimated $370 billion worth of U.S. imports from China. China countered with tariffs on 110 billion worth of U.S. products. Most tariffs remain in effect today. China's imports from 2020 and 2021 fell below its commitment to buy at least $502 billion of U.S. goods and services over 2 years. In 2021, China's global exports grew by 30 percent over 2020. Its exports to the United States grew by 28 percent over 2020. China is pressing the USTR to lift U.S. tariffs, while sustaining its concerning practices.

Mr. Stein, what actions are needed to address China's trade, coercion, and efforts to sidestep U.S. policies?

*Mr. Stein. I think that is -- it has to work at multiple levels. Like, there is -- certainly, there is opportunities through the WTA and through retaliatory tariffs to approach these things.

There is also legal mechanisms. There -- Chinese companies invest in the United States, and we don't have to let them do so if they are not competing fairly in their home countries or even in third-party countries.

*Mr. Steube. Many of my Republican colleagues have expressed concern about the irregularities in economic ties, U.S. ties to PRC firms violating human rights and China's practices that may force or unfairly incentivize the transfer of U.S. technology and data to China. These issues are evolving into broader concerns about U.S. competitiveness and national security.

Mr. Horn, can you provide types of Chinese threats and/or national security implications with green credit access?

*Mr. Horn. Congressman, any time we allow Chinese subsidized or owned entities into the United States, we have to assume that they are not only stealing IP. They are collecting intelligence, and they are finding ways to use every piece of our system against us.

*Mr. Steube. My time is expired. Thank you for -- the witnesses for being here today.

*Chairman Smith of Missouri. Mr. Evans.

*Mr. Evans. Thank you, Mr. Chairman.

Rather than promoting fossil fuel and the aggressive pursuit of deregulation, I stand with my Democratic colleagues and understand that we must continue investing in a more substantial future. This is the best approach to revitalizing communities and neighborhoods in Pennsylvania and across the country.

So far, the Inflation Reduction Act has invested -- are working to revitalize communities across the country. The Inflation Reduction Act green tax credit are helping address climate change by supporting renewable energy technology. These green

investments carry domestic content requirements that will strengthen U.S. manufacturing in our nation chains. These green investments also help prevailing wages and the apprenticeship requirements that will support our American workers' need.

Mr. Beachy, how can you, with the Inflation Reduction Act, help address environmental justice that has hurt communities of color and low-income neighborhoods?

*Mr. Beachy. Thank you for the question. I appreciate it. I mentioned before that we, of course, do not speak on behalf of environmental justice groups, but we gladly partner with them as they are leading on making sure these investments do support communities that have endured decades of environmental injustice.

There is the Justice40 Initiative, which says that at least 40 percent of the benefits from these investments need to go to the communities that have been hard hit by years of disproportionate exposure to air pollution, water pollution, and other environmental hazards. That applies across a whole slew of programs.

Then there are specific programs that offer very specific benefits to communities that have endured environmental injustice, economic injustice, and racial injustice. One of them, for example, the Greenhouse Gas Reduction Fund, which has about $7 billion designated for competitive grants, specifically for low-income and disadvantaged communities, for -- with a priority for, like, community solar and other investments. There is another 8 billion in there for financial and technical assistance for these same communities.

Another program, Environmental and Climate Justice Block Grants. For the first time, the government is investing real money in communities that are disproportionately exposed to both environmental injustice and climate impacts by providing block grants for communities to decide how they can best spend these investments. They can invest this money in reducing air pollution, in remediation of toxic sites, as well as investments in low emissions technologies that will support both jobs, clean air, and a livable climate.

*Mr. Evans. I would like to ask you a follow-up. We know that a lot of Inflation Reduction Act subsidies go to business initially. But Mr. Beachy, how can workers and communities secure economic and environmental benefits of the Inflation Reduction Act?

*Mr. Beachy. Yes, it is a great question. So as an example, many of the investments I have been talking about in clean manufacturing will go first to businesses. At the same time, the Biden Administration has been making clear that the businesses that will be prioritized for these investments are those that sign -- that partner with unions and ensure high road jobs, and also that sign community benefits agreements with both workers and communities.

And what community benefits are, they are legally binding agreements between the company and the local workers and local communities to ensure tangible economic, health, and environmental benefits on the ground, both for the workers inside the factory and for the communities living outside the factory.

You know, we have existing examples of these community benefits agreements. They can include local hire provisions, targeted hire for workers of color, for women, for other under-represented workers. They can include community -- business investments into a community controlled fund, reductions in air pollution, higher labor standards. It is, at the end of the day, a binding legal agreement that puts communities and workers in the driver's seat of determining the path of these investments, and it is actually being attached to many of these investments that are going to businesses.

*Mr. Evans. Thank you, Mr. Chairman. I yield back the balance of my time.

*Chairman Smith of Missouri. Ms. Tenney is recognized.

*Ms. Tenney. Thank you, Mr. Chairman, and thank you to the witnesses today.

I have heard it said by my colleagues across the aisle that -- I just call it the Inflation Act and the Green New Deal, because that is what it was touted as, even before it was

signed into law -- represents an attempt at industrial policy. If so, I think it is a pretty poor attempt. The truth is this isn't industrial policy, it is ideological policy.

The industrial policy would be bipartisan, and this was not a bipartisan act, which is why we are trying to fix this today. It would be well thought out. It would be the -- have proper safeguards in place to ensure adversaries did not benefit. Well, we know that didn't happen. So the Democrats failed on all three fronts.

Perhaps the most concerning of all is China will reap significant rewards from the Inflation Act Green New Deal, as I call it. Foreign entities of concern, including those controlled by the Chinese Communist Party, will receive billions of U.S. tax dollars under this giveaway program. It is difficult to imagine anything more irresponsible than forcing U.S. taxpayers to foot the bill for subsidies flowing directly to those controlled by the Chinese Communist Party.

On top of that, the Biden Administration is hard at work creating additional loopholes that will benefit foreign companies at the expense of workers here in America. Instead, America should be working to become energy independent, not rewarding bad actors like China, as you have heard my colleagues talk about: intellectual property theft, spy balloons, TikTok.

And industrial policy is fundamentally about using policy to encourage investment in critical sectors of our economy. This has been done successfully in the past, and I think that we all would support and advocate for some kind of targeted industrial policy that puts American industry and, yes, American workers first.

This is something both Republicans and Democrats should be able to support, and it is what many of my constituents in the rural Rust Belt region of upstate New York care about. And we are an area that was basically, you know, the beginning of everything. The Empire State has become the exodus state. Everyone has left, they have gone to Asia, they

have gone to China. And China is benefiting from our bad policies. And right now, as a state, we face among the highest tax and regulatory burdens in the country. And we are -- we have been saddled and our taxpayers are being saddled with giving up and propping up the government of the Chinese Communist Party with their tax dollars.

And for their -- you know, for industrial policy to be successful, it should be thoughtfully developed, carefully implemented, and, most importantly, it should be unified. The Inflation Act Green New Deal, as I call it, failed on all these fronts.

And it was a rushed piece of legislation that wasn't well understood by anyone at the time, which all of my colleagues have pointed out, the almost 1.2 trillion potentially, as stated by Goldman Sachs, and the costs, including many of those responsible for drafting it, which is why it was a one-size-fits-all and one-party-dominated bill.

We are already seeing the negative effects, as pointed out by my colleagues. The Joint Committee on Taxation scored it at 271 billion. We have seen beautiful charts showing all that, unfortunately for us, and likely a real dynamic scoring of 1 trillion. And it is no surprise that this has been a mess, based on the way it was put through.

So my question -- and I come from an area where we are facing catastrophic changes in energy policy that will destroy the economy of upstate New York. My district, the New York 24, is the largest agricultural district in the northeast, the largest dairy district. We have very harsh winters. We have a wonderful soil and water conditions, and a very short growing season. And I wanted to just give my first question to Mr. Turner.

You talked about agricultural policy. Can you give us -- just quickly, because I am using up my time -- how the Chinese Communist Party's dominance in the supply chains will further be cemented by the Inflation Reduction Green New Deal, and how it will affect my rural communities in upstate New York, who we depend on for our economic strength?

*Mr. Turner. It is a wonderful question, Congresswoman -- and I say this often on

social media, and I know my social media is well followed on this committee -- but people who have a farm like I do, you cannot find farm equipment that is hardly not made in China. Giving China subsidies for more, this just puts all of our farmers at an enormous disadvantage.

We have raised the cost of energy to the point that fertilizers are more expensive. Your constituents would know, as I would, hay was $7 a bale 2 years ago. I paid 11.75 at the beginning of this winter, right? I don't get any of those additional benefits when I sell my cattle. I just have to eat those costs.

So all these benefits going to China are weakening American rural communities, farm communities, and energy communities.

*Ms. Tenney. Thank you so much.

And I just want to ask Mr. Stein, will the green credits in the Inflation Act Green New Deal actually make us energy independent?

And how could we lower our energy costs?

And I am running out of time, so --

*Mr. Stein. Yes. Well, clearly, it is not going to make us energy independent. We are actually going to increase our dependence on China for the supplies of a lot of these things. So we are actually eliminating our current near-independent security that we have from our domestic resources, and changing -- we are actually making -- so the Inflation Act would make us less secure, as far as energy goes, certainly.

*Ms. Tenney. Thank you.

I am out of time. I yield back.

*Chairman Smith of Missouri. Mrs. Fischbach.

*Mrs. Fischbach. Thank you, Mr. Chair. I appreciate the opportunity.

And thank you to all of the witnesses today. I appreciate it, and I know it is a long

haul by the time you get to the bottom.

But, you know, as we have discussed today, the so-called Reflation Reduction -- or Inflation Reduction Act appeared to create incentives for domestic critical mineral production and domestic manufacturing. Yet instead of bolstering the American economy, the Biden Administration, as my -- as many of my colleagues have pointed out, has created carve-outs and loopholes to continue our reliance on foreign countries and foreign companies.

I am especially concerned with the Biden Administration entering into the critical mineral agreements with Japan, while at the same time continues to attack proposed copper and nickel mines located in my home state of Minnesota.

Mr. Horn, is it backwards to create tax incentives for domestic critical minerals without having a regulatory process that allows for the development of the domestic critical minerals?

*Mr. Horn. Congresswoman, it is a very difficult situation to try and fix all at once. And while I think there is a role for allied partnerships and for trade, I think we have to prioritize what we have in this country, primarily.

And when you look at the geology and the massive amount of resources inside the United States, you know, we could surpass our own internal demand very easily. Obviously, the great state of Minnesota has incredible battery material wealth, and it could be harvested and developed, refined, in my opinion, cleaner and in a more environmentally sound and responsible manner than anywhere else on the planet. But it comes with challenges.

And realistically, especially when you are dealing with public land or other government-regulated entities, it is difficult to find ways forward with the projects. I see projects every day, I talk to investors. And the scariest thing that any investor will hear is

that a project is on public land, to be quite frank.

So while we should look to have trade agreements that expand abilities to work with our allies -- you know, I have seen a lot of U.S.-Canadian collaboration, for example, that I think is fundamentally necessary, especially when it comes to defense industrial policy -- we have to put the primary focus on doing the work here in the United States to create the jobs that we have referenced, to use the cleanest, most technologically-advanced procedures, and to once again demonstrate to the world the right way to actually bring about this technological revolution.

*Mrs. Fischbach. Thank you, Mr. Horn. And I will just add, you know, if we want to become independent, we need to make sure that we are using all of those resources, and that we do it in a responsible manner, you know, making sure that we are addressing that, and that the regulatory process is reasonable when we do start to move towards using our own.

And also, I have serious concerns about the electric vehicle tax credits that were expanded in that -- in -- again, in the so-called Inflation Reduction Act. At the time when Americans saw their grocery budgets at an all-time high due to record inflation, Democrats spent billions of dollars on tax credits that benefit the wealthiest Americans. In fact, a JCT report in 2016 found that among individual taxpayers 78 percent of the EV tax credits claimed were by filers with an adjusted gross income of $100,000 or more.

So we have -- already know that the wealthiest earners would benefit the most from this tax credit. And now, because of the Biden tax -- Biden Treasury Department is implementing this bill, we are learning that China will be a significant beneficiary. And I know that we have talked about this, but I represent -- Mr. Ginn, I represent a very rural district in Minnesota, and the median household income of my district is less than $65,000 a year. That just came out the other day. But if Chinese companies are allowed to access

these tax credits -- this is an easy one, I think -- but who will benefit more from the Inflation Reduction Act, Chinese companies or my constituents?

*Mr. Ginn. Congressman, it is a good question, and I believe it is the Chinese, but also a lot of big businesses here. Financial companies are also getting a lot of these from the equity that is built into the tax credits. And so very little of it will trickle down, if you will, to the rural areas to benefit them.

*Mrs. Fischbach. And thank you, Mr. Ginn. I think they will continue to experience those issues with inflation in their grocery costs without seeing any of the benefits of this so-called Inflation Reduction Act. So thank you.

And with that I yield back.

*Chairman Smith of Missouri. Thank you.

Mr. Beyer.

*Mr. Turner. Mr. Chair, may I have one quick moment to address something the congresswoman said?

*Chairman Smith of Missouri. Very quick.

*Mr. Turner. Because I think it is very important. Thank you, sir.

From Minnesota, the two largest copper deposits found in American soil are Minnesota and Alaska. This Administration is pushing electric vehicles. Fine. Their standards last week, pushed by the EPA, want two-thirds of electric vehicles to be EVs. The average EV has 60 to 80 pounds of copper. So they are saying we need copper, and yet the same Administration that is pushing us to use EVs and copper is denying us the permission to open copper mines in America.

So that is not a sane policy. And if you are a miner in these two areas that you said are rural and need the jobs, you have to scratch your head and say, where is the sound policy coming when it comes to this issue?

*Mrs. Fischbach. And thank you, Mr. Turner. You put a bow on it. Thank you.

*Chairman Smith of Missouri. Thank you, Mr. Beyer. You are recognized now.

*Mr. Beyer. Mr. Chairman, thank you very much. And I really want to thank the witnesses for your testimonies, and I really have learned a lot from your answers, and to my Republican friends, too.

And I want to address one thing that has come up again and again, which is the impact of the last 40 years on rural America. I don't want to over-simplify, but for the sake of the five minutes, you know, impact number one was globalization and the free trade agreements. We had CAFTA and NAFTA under Clinton; we had KORUS under George Bush; we had USMCA under Donald Trump; and many others along the way. And add to that technology, because I have been visiting manufacturing firms for 50 years, and 50 years ago there were a lot of people in them, and now there are very few people in them because the impact of technology.

So that is part one, which is why, even though we struggle with it, you know, President Biden's commitment to a worker-centered trade policy was trying to reconcile our commitment to global trade with the fact that we have to defend American jobs at the same time.

And the second half is what has happened to fossil fuels, specifically coal. I was lieutenant governor of Virginia for eight years, so I spent nine-and-a-half years going to the coal fields. And even 40 years ago, it was really tough. The coal companies were going broke. They moved to longwall mining, which eliminated lots of jobs. The coal companies that existed couldn't pay for the health care and the retirement benefits. And we spent -- and then climate change comes along, and we have the trade-off between protecting those coal miners, whom we love, and protecting the planet and all the people who live everywhere else who were, you know, really hurt by it. And that is not easy.

And we have struggled with it for a long, long time, trying to figure out how do we bring rural America back.

The easiest throwaway is broadband, which we are all committed to, but it is much more than that -- and education, which we are all committed to.

Mr. Beachy, what is in the IRA that would actually help rural America adapt to the world we live in today?

*Mr. Beachy. I appreciate the question. Let me first concur with the deleterious effects of our trade agreements under the status quo under both Republican and Democratic administrations. We have seen trade agreements that have incentivized the outsourcing of our manufacturing to countries with lower labor and environmental standards, contributing both to job loss here and greater climate pollution.

That actually -- under-reported element of that is that when the most emissions-intensive factories in the world produce the steel and aluminum of the world, it means an increase in global industrial emissions. And the IRA aims to fix that by investing in clean manufacturing of bedrock materials like aluminum, steel, and cement in this country.

To your question of hard-hit communities, I named earlier that there is a -- I come from West Virginia. I take this question very seriously, as do many. And up until now, it has been a lot of talk. The IRA recognizes one essential truth, which is that while there has been a lot of hand-waving in the past, assuming that technological shifts will just naturally take care of workers and communities, we know that is absolutely not the case. Some communities and some workers are indeed left behind when policy allows them to be left behind.

The IRA takes a step in the right direction by dedicating funds -- 4 billion under a manufacturing program, a bonus tax credit for the wind and solar developments, a loan program worth $250 billion in loans -- to specifically invest in energy transition

communities to retool for the clean energy economy. And that is not -- those aren't words. Those are actions, really, for the first time that we have seen in a long time.

For the rest of rural America outside of energy communities, there is a $9.7 billion investment in rural electric cooperatives, allowing for rural communities to switch to clean energy not only for the benefits for clean air and climate, but also for the benefits for jobs and economic development in those communities.

There is investments for farmers to be able to increase their energy efficiency, cut down their energy bills.

There is investments that are going throughout the heartland right now. I mentioned that, of the 100,000 jobs that were documented in just the first 6 months since President Biden signed the Inflation Reduction Act, we have a lot of them -- in fact, the largest numbers -- are in rural states. My dad is from Kansas. The largest number of jobs we have seen created to date under new investments under -- since the IRA was signed is in Kansas, 20,000 jobs.

*Mr. Beyer. You used up all my time, but I am grateful, because you did a great job laying out all the positive things that have happened, and much more that we need to do.

I believe West Virginia is still 50th out of 50 states in per capita or family income. We would like it to be middle of the pack, and we will keep investing in it.

With that, Mr. Chairman, I yield back.

*Chairman Smith of Missouri. Mr. Moore recognized.

*Mr. Moore of Utah. Thank you, Chairman.

Gentlemen, thank you. Thank you for sitting through this and answering questions. Sometimes the five minutes goes by and you don't get to answer any questions. That is the way this place works. But welcome to the U.S. House of Representatives, a lovely place of constant contradiction.

Just today we have seen -- not related to this, but, you know, we saw an argument about, you know, we cannot default. So one side of the aisle says we can't default, and the other side of the aisle says we absolutely cannot default, so let's do a bill that ensures that we pay our bonded indebtedness to our creditors. And then the other side will say, well, you just want to pay our creditors only, or certain creditors more. Like, it is just this constant back-and-forth. And I actually relate that as an example to what we are dealing with here with respect to trying to embrace an all-of-the-above approach energy process, right?

I have never been against, you know, the concept of building an all-of-the-above approach, right? And a lot of the things in the Inflation Reduction Act were trying to get to that. But the lead person on this -- and President Biden, when he stands in front of the entire country and says, well, yes, we will need oil and gas for 10 more years, like, I don't -- I have never seen any type of predictions that can say that we can meet our energy demands with just 10 more years of oil and gas. I just met with a renewable gas organization that we are -- that are digging into this issue, and talking about all the amazing benefits that we get from natural gas.

And so, again, H.R. 1 becomes this debate. Personally, I hope that in this split government situation we are able to find an opportunity from -- permitting reform. I believe there are several Democrats, many Democrats, that would be open to the concept of permitting reform, because it is stymying anything that they are doing on renewable technology. We can't even build transmission lines because of NEPA and the archaic version of how we go about that regulation.

And so with that, Mr. Horn, I kind of wanted to just hear your thoughts on the ability to meet these demands. If there is such a motivation to produce solar panels, wind turbines, batteries, EVs, transformers, do we have the regulatory environment to produce the material needed for that domestically?

*Mr. Horn. Congressman, the regulatory environment is not easy to work with, to state the obvious. What I would say is we have the resource and technological capability to not only meet our own demand, but to export to the remainder of the globe if we were to unleash those resources.

What I do believe is that there can be a truly bipartisan agreement on common-sense regulatory reform that really looks to prioritize what is best not only for industry, for jobs, for possibly exploitable populations, but for the environment, as well. Because I think when you actually contrast, you know, to the earlier example, a copper mine in Minnesota with slave child labor in Congo that is being propped up artificially by our largest adversary, there is really no question as to which of those is preferential for all of our goals.

So I would say there needs to be a hard look at regulatory reform in terms of opening up U.S. resources. And if we do that, we can once again lead the world in this space like we did prior to the 1990s.

*Mr. Moore of Utah. Mr. Stein, it is easy to see why using American minerals helps American companies. It is easy to see why it could help produce some of this technology that so many people want to embrace. What about the consumers?

How does it -- can you describe how it will help consumers to embrace American-made or American-produced minerals more?

*Mr. Stein. Well, I think, ultimately, consumers are American citizens who get those jobs, and those communities, the funds that go into those communities, that helps consumers to purchase those products.

So I mean -- and ultimately, the sorts of efficiencies that we might look for to ultimately lower prices for some of these things like EVs that are still very expensive, that sort of innovation might happen in the United States in a capitalist, you know, economy, but if it was allowed for the market itself to actually take that action. This is part of the problem

when you have government subsidies creating things. They prop up existing technologies, existing ways of doing things because companies chase the money instead of innovating and looking for the next big thing, something that might actually lower costs.

*Mr. Moore of Utah. Thank you. And I will just quickly make a comment to Mr. Turner.

Your comment earlier about the 9,000 leases is something I have dug into. I have actually put legislation that would require a specific timeline and process that you need to follow for things that are, like, are existing.

So the Biden Administration says, okay, we are going to stop doing it entirely, Federal lands, secretarial order, all that stuff. And then, oh, but we have all these leases available, and then the slow-playing happens. And that is the most fundamentally difficult thing for our industry to actually navigate, and I think it is one of the most disingenuous things. So I appreciate you highlighting it.

And if the leases are available, well, then let's embrace it. Let's continue to do it. But then it is more of the slow-playing and the constant -- you know, all the roadblocks that get put in the way, and we are left with an impossible environment to navigate. So thank you.

*Chairman Smith of Missouri. Mrs. Steel is recognized.

*Mrs. Steel. Thank you, all the witnesses, today, and thank you, Chairman Smith, for hosting this hearing.

It should be alarming to all of us that Chinese Communist Party now develops a majority of the world's nickel, cobalt, lithium, graphite, and manganese, and rare earth minerals. Manufacturers need these raw materials to produce the clean energy future. But the United States has tied its own hands with restrictions that make it impossible to access our own natural resources.

The Inflation Reduction Act has forced our allies to make difficult decisions about investments in the United States, and many are being forced out of the United States market because the Administration has not included a realistic transition period for implementation.

Mr. Turner, we have heard today about significant investments being made and jobs created to be able to claim the tax credits available through IRA. But how can this growth be sustainable if we are missing the first step, having the natural resources available to continue to produce the products American and international customers need?

*Mr. Turner. Thank you, Congresswoman. It is a wonderful point. It is the equivalent of celebrating the fact that we are opening up lemonade stands, but we don't have any lemons, right? And so saying we are going to have all this processing, manufacturing, very good. I want manufacturing in America. I want processing in America. But if the rare earths, if the metals, the minerals are all found in other countries, then how valuable, how sustainable is that manufacturing?

And to highlight that, all of these metals, rare earths, metals, materials, et cetera, are found in America. As my colleague right to my left just said, we could sustain our own economy and export to our allies, if only we were allowed to unleash the fullness of our potential.

*Mrs. Steel. Thank you for that. In California we have over 1,000 applications to drilling in California. Twenty percent of the oil is actually coming from Russia. And since 1994, not even 1 permit were given out.

So in my home state the California Air Resources Board last year approved a new rule that would require 100 percent of new light and medium-duty vehicles sold in -- within California to be zero-emission vehicles by 2035. And now the EPA has announced that up to 60 percent of 2030 models and two-thirds of 2032 models sold nationwide need to be zero emissions. California's electrical grid cannot provide enough electricity to power all these

vehicles because we have rolling blackouts.

Do you have any concerns that these progressive zero emissions proposals from the EPA and California Air Resources Board?

*Mr. Turner. Yes, Congresswoman. And these goals are so far in the future -- that is because they are absolutely not achievable. They are not achievable by market forces. They are not achievable by technological forces. And we do not have the grid infrastructure to have a "electric vehicle fleet." And so that is why they are 5, 10, 15 years, because then it will be someone else's problem.

A lot of what governments sometimes, sadly, does is create problems for future generations to deal with. And what -- doing this is going to have huge market implications for the combustion engine vehicles. It is going to be a huge burden on rural and lower-income Americans, but it is also going to be a problem that future legislators and governors will have to deal with.

*Mrs. Steel. Yes. How it is low-income families, that they can afford to buy those vehicles?

The CCP has misreported its carbon emissions, and continues to open new coal plants. Yet the Inflation Reduction Act will pour American taxpayer dollars into their green companies. Can you explain how the CCP-backed companies will benefit from the taxpayer-funded credits, and can you share how this could make the CCP even more dominant in the supply chain?

And we want to be dominating those supply chains. But as of now the CCP has been, and they are very aggressive about that.

*Mr. Turner. I could definitely answer that, but I think Mr. Horn is more qualified, if that is okay with you.

*Mrs. Steel. Sure, thank you.

*Mr. Horn. Thank you.

It is really quite clear, unfortunately, that the CCP knows exactly what our playbook is. They know exactly how to exploit it, and we make it incredibly easy for them. So they have realized that they can essentially create a shell company or entity that meets whatever loose criteria we currently have, and completely exploit it, and crush any legitimate American competition in the process.

*Mrs. Steel. Thank you for all those answers, and thank you for coming today.

I yield back, Mr. Chairman.

*Chairman Smith of Missouri. Thank you. Kind of what is going on in Michigan.

Mr. Schneider?

*Mr. Schneider. Thank you, Mr. Chairman, and I want to thank the witnesses for being here today, for your patience, and sharing your perspectives.

Mr. Horn, I appreciate your optimism, and I share your view that we would be well served by a bipartisan approach to addressing our challenges and pursuing our opportunities. I think it is also critical. I spent my whole career in business before coming to Congress doing strategy, planning for the long term. I know if we are going to be successful in leading the world in the next generation and the generation after that, we need to have a long view, but also with a sense of urgency.

The Inflation Reduction Act made historical and critical investments in our country's future, both from a climate perspective and in our economy. Heeding scientists' warning, the Biden Administration in the 117th Congress set our country significantly down a path towards net zero emissions by 2050 through the passage of the IRA and the Infrastructure Investment and Jobs Act.

A study by the National Renewable Energy Laboratory evaluated the impacts of these two laws and what they will have on our utility sector, and demonstrated that clean

electricity, thanks to the efforts of the prior Congress, would represent as much as 90 percent of total generation in the next decade.

I ask unanimous consent that this NREL report be submitted for the record.

I have also heard from renewable energy companies in my district who, with assistance from the Illinois state legislature, have spent years making progress deploying renewable energy in our state, including more than $3 billion in solar development last year alone. We will see this progress rapidly increase as a result of the IRA.

These historic investments, and the positive advancements and quality jobs that follow are directly at risk from the Republican political attempts to derail the IRA. According to the American Clean Power, in a mere 8 months since we passed the IRA, more than $150 billion in utility scale renewable energy projects have been announced. That investment is only going to continue growing.

I could speak for hours here about the critical climate investments that the IRA will make, but what I want to talk about today is the tens of thousands of jobs that these investments are creating. The $150 billion of investment that I mentioned, that represents at least 18,800 jobs.

Mr. Beachy, to that end, you mentioned in your testimony a report from the University of Massachusetts Amherst that shows the climate investments in the IRA will create more than nine million total jobs over the next decade.

Yes, the IRA is the most historic Federal investment to combat climate crisis, but it is also a huge investment in domestic manufacturing and jobs in every state and every community. Can you expand how the IRA would improve workers' access to these high-quality jobs and clean energy sectors, and why it is so important?

And beyond that, beyond the context of climate, how the IRA is fundamentally a jobs bill.

Evaluating Impacts of the Inflation Reduction Act and Bipartisan Infrastructure Law on the U.S. Power System

Daniel C. Steinberg,[1] Maxwell Brown,[1] Ryan Wiser,[2] Paul Donohoo-Vallett,[3] Pieter Gagnon,[1] Anne Hamilton,[1] Matthew Mowers,[1] Caitlin Murphy,[1] and Ashreeta Prasana[1]

1 National Renewable Energy Laboratory
2 U.S. Department of Energy, on detail from Lawrence Berkeley National Laboratory
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Cover Photos by Dennis Schroeder: (clockwise, left to right) NREL 51934, NREL 45897, NREL 42160, NREL 45891, NREL 48097, NREL 46526.

Executive Summary

The Inflation Reduction Act of 2022 (IRA) and the Infrastructure Investment and Jobs Act of 2021, commonly referred to as the Bipartisan Infrastructure Law (BIL), collectively represent the largest commitment of the U.S. Federal Government to invest in the modernization and decarbonization of the U.S. energy system. The Congressional Budget Office (CBO) estimates that total support for the broad range of climate and clean energy programs, tax credits, and other incentives authorized through the two laws will exceed $430 billion from 2022 through 2031 (CRS 2022; CBO 2021, 2022). While the climate and clean energy provisions are numerous and have the potential to impact all aspects of the U.S. energy system from fuel and electricity production to final consumption in industry, transportation, and buildings, the provisions relevant to the electricity sector—in particular the suite of tax credits for clean generation, storage, and carbon dioxide (CO_2) capture and storage—are expected to be some of the most consequential in terms of emissions reduction and clean energy deployment (Larsen et al. 2022; Jenkins, Mayfield, et al. 2022; Mahajan et al. 2022; Zhao et al. 2022).

In this report, we detail the methods and results of a study estimating the potential impacts of key provisions of IRA and BIL on the contiguous U.S. power sector from present day through 2030. The analysis employs an advanced power system planning model, the Regional Energy Deployment System (ReEDS), to evaluate how major provisions from both laws impact investment in and operation of utility-scale generation, storage, and transmission, and, in turn, how those changes impact power system costs, emissions, and climate and health damages. While not exhaustive in capturing every provision, the analysis estimates the possible scale of power sector impacts that could result from the modeled provisions in IRA and BIL.

The study is structured around two scenarios to evaluate the potential impacts of both laws on the power sector:

- ***No New Policy***: A counterfactual scenario that reflects all federal and state policies enacted as of September 2022, *with exception to IRA and BIL*. Load growth is assumed to be consistent with the Energy Information Administration's Annual Energy Outlook 2022 (AEO22) *Reference case* (EIA 2022a).
- ***IRA-BIL***: A scenario that reflects all federal and state policies enacted as of September 2022, *including* key IRA and BIL provisions, most notably the investment and production tax credits for zero-carbon emitting electricity generation and storage (ITC and PTC), the tax credit for CO_2 capture and storage (45Q), and the tax credit for existing nuclear plants. To account for the impacts of IRA and BIL on electrification, the scenario includes increased load growth from a scaled version of the *Medium Electrification* scenario from the Electrification Futures Study (Mai et al. 2018).

These scenarios are simulated across seven sets of assumptions with varying projected future electricity market conditions, including technology costs and performance, natural gas prices, and the degree of availability, feasibility, and cost of development of renewable resources, electricity transmission, and CO_2 pipeline, injection, and storage infrastructure. In addition, we simulate two sensitivities on the 'policy' treatment in which we vary key assumptions pertaining to the realized value of the clean electricity ITC and PTC: 1) the cost of monetization of tax credits, and 2) the level of bonus crediting realized by project developers.

We demonstrate that IRA and BIL have the collective potential to drive substantial growth in clean electricity by 2030, while reducing net-costs, mitigating climate change, and decreasing the human health impacts of power sector emissions. In addition, we show that while the IRA and BIL provisions modeled drive increased clean electricity and associated emissions reductions across all future conditions analyzed, if projected clean electricity technology cost and performance improvements are not realized and/or barriers to deployment of clean electricity or supporting infrastructure (such as transmission) are not mitigated, then the share of clean generation achieved and the associated emissions benefits realized may be substantively reduced.

Most notably, we find:

- ***Clean electricity shares***[1] ***could increase substantially with IRA and BIL, rising from 41% in 2022 to a range of 71%–90% of total generation by 2030,*** across the range of scenarios considering uncertainties in future technology costs, fuel prices, policy impacts, and deployment constraints. This represents a 25 to 38 percentage point increase relative to the *No New Policy* cases evaluated. This increase in clean generation is primarily driven by increased deployment and generation from wind and solar capacity, that, in aggregate,

[1] Included in the clean electricity share is generation from nuclear, fossil generation with carbon capture and storage (CCS), and renewable technologies, including wind, solar, hydroelectric, geothermal, landfill gas, and biomass.

Table A. Ranges in Deployment, Total Installed Capacity, and Generation Share for Select Technologies Across the Suite of IRA-BIL Scenarios and Sensitivities.

Technology Category	Cumulative Deployment, 2023–2030 [GW or TW-mi][a]	Average Deployment Rate, 2023–2030 [GW/yr or TW-mi/yr]	Installed Capacity, 2030 [GW or TW-mi]	Generation Share, 2030 [%]
Wind and Solar	350–750	44–93	600–1000	40%–62%
Fossil-CCS[b]	5–55	<1–7	5–55	1%–8%
Battery Storage	40–100	5–12	50–100	–
Transmission	18–35	2.2–4.4	–	–

[a]Generation and storage capacity and deployment rates are reported in GW and GW per year, while transmission capacity and the associated deployment rate is reported in TW-mi and TW-mi per year.
[b]CCS = carbon capture and storage

reaches 40% to 62% of total generation by 2030 with smaller contributions from fossil generation with carbon capture capacity, which reaches 1% to 8% of total generation by 2030. The increase in wind and solar generation is supported by both increases in battery storage deployment as well as expansion of long-distance transmission—the latter of which increases by 9% to 24% from 2022 installed capacity. Finally, existing nuclear capacity, with exception to announced retirements, is maintained across all *IRA-BIL* scenarios through 2030.

- ***Annual power sector CO_2 emissions could decline to 72%–91% below the 2005 level across the range of policy scenarios by 2030.*** This is equivalent to annual avoided emissions of 600 Mt CO_2 to 900 Mt CO_2 by 2030 relative to the *No New Policy* case, with cumulative (2023–2030) avoided emissions ranging from 2,700 MtCO_2 to 3,900 MtCO_2. These reductions in emissions, if achieved, are estimated to result in avoided climate damages reaching $160 billion–$230 billion per year by 2030.[2] Furthermore, avoided nitrogen oxide (NOx) and sulfur dioxide (SO_2) emissions—precursors to particulate matter formation—are estimated to reduce human health damages as much as $20 billion–$46 billion per year by 2030.[3]
- ***IRA and BIL are estimated to lead to a net decrease in total and average annual bulk power system costs (inclusive of tax credit value).*** IRA and BIL spur substantial increases in bulk power system investment, but those costs are more than offset by the combination of decreased fuel expenditures and the increased scope and value of tax credits and other programs. Across all policy cases evaluated, clean energy, storage, and transmission investment contribute to an increase in cumulative capital and non-fuel operating expenditures, but the combined value of tax credits and fuel savings lead to net decreases in power system costs of $8 billion to $25 billion annually by 2030 and $50 billion to $115 billion cumulatively, from 2023 to 2030. These cost reductions translate to approximately a $3 per MWh to $6 per MWh (5% to 13%) reduction in average annual bulk system costs by 2030.
- ***The rates of deployment of wind and solar technologies could grow rapidly with the average annual combined rate of deployment (2023–2030) ranging from 44 GW per year to 93 GW per year***—representing more than a doubling of the historical maximum annual deployment rate in many scenarios. Under cases that use reference technology and fuel price assumptions, annual average deployment from 2023 to 2030 ranges from 26 to 29 GW per year and 43 to 47 GW per year for wind and solar, respectively, representing a 50%–70% and a 135%–160% increase relative to the historical maximum annual deployment (2010–2022). Under scenarios with limited improvement in the cost and performance of clean energy technologies and/or lower price natural gas, more moderate capacity additions occur, with annual average deployment ranging from 18–25 GW per

[2]The avoided climate damages are estimated using the "preferred mean" estimate of the social cost of CO_2 (SC-CO_2) from Rennert et al. (2022).

[3]These estimates are calculated using three reduced complexity air quality models (AP2, EASIUR, and InMAP) that incorporate exposure-response functions to estimate health impacts. We report values that apply the response function from the Harvard Six-Cities study (Dockery et al. 1993; Lepeule et al. 2012). We report additional estimates based on exposure-response functions from the American Cancer Society (ACS) (Pope III et al. 2002; Krewski et al. 2009) in the main body of the report.

year and 19–36 GW per year for wind and solar, respectively. Finally, a scenario capturing a range of deployment barriers demonstrates the potential for more limited, but sustained deployment of wind (18 GW per year) while solar deployment shows robust increases (reaching 49 GW per year) given the reduced market share of other clean technologies under these scenarios, most notably wind and fossil-CCS technologies.

- ***Fossil generation with CCS could be economically deployed at levels reaching the tens of gigawatts if such technologies achieve projected cost and performance levels and the required supporting infrastructure is successfully developed.*** Across the suite of scenarios, fossil generation with CCS capacity ranges from approximately 5 GW to over 50 GW by 2030—an order of magnitude difference. This range indicates the high degree of uncertainty in the level of fossil-CCS deployment induced by IRA and BIL, and demonstrates the sensitivity to assumptions about technology development, and feasibility and cost of deploying supporting infrastructure, primarily CO_2 pipeline and storage infrastructure.
- ***Though IRA and BIL are found to drive increases in clean technology deployment under all cases evaluated, existing and developing barriers to deployment of clean technologies and supporting infrastructure could materially reduce the rate of clean electricity deployment and the associated benefits.*** Barriers to deployment, such as siting and permitting challenges, supply-chain constraints, and social acceptance of electricity infrastructure development, could significantly reduce the rate of clean electricity deployment. Evaluation of a stylized suite of concurrently-implemented deployment constraints,[4] including more limited renewable resource access, constrained transmission development, and increased costs of CO_2 transport and storage infrastructure demonstrated the potential for a 10 percentage point reduction in the clean generation share (relative to the Mid case) and a 24% reduction in cumulative avoided emissions 2023–2030.

[4]While this suite of constraints explores some aspects of current and developing deployment barriers, it does not comprehensively address all potential deployment barriers.

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1 Introduction and Background

Over the past two years, the U.S. Congress enacted two laws that could have far reaching implications for the nation's energy system—the Inflation Reduction Act of 2022 (IRA) and the Infrastructure Investment and Jobs Act of 2021, the latter of which is commonly known as the Bipartisan Infrastracture Law (BIL).[5] The laws collectively establish a broad suite of programs and financial incentives designed to reduce emissions of greenhouse gases and other harmful pollution, advance clean energy technology manufacturing and deployment, increase U.S. energy security, and mitigate systemic environmental justice issues while increasing the affordability of energy. The Congressional Budge Office (CBO) estimates that the climate and clean energy support authorized through the two bills will total more than $430 billion, cumulatively, from 2022 through 2031 (CRS 2022; CBO 2021, 2022), representing the largest commitment of the federal government to invest in the modernization and decarbonization of the U.S. energy system.

While IRA and BIL include provisions relevant to each sector of the U.S. energy economy,[6] the provisions related to the U.S. power system comprise a majority of the estimated climate and energy support. Early analysis of the laws has shown that these provisions are likely to be responsible for the largest share of greenhouse gas emissions reductions resulting from the full suite of IRA and BIL provisions (Jenkins, Mayfield, et al. 2022; Larsen et al. 2022; Mahajan et al. 2022; Zhao et al. 2022).

In this report, we detail the methods and results of an analysis of the potential impacts of key provisions of IRA and BIL on the U.S. power sector from present day through 2030. The analysis employs an advanced power system planning model, the Regional Energy Deployment System (ReEDS), to evaluate how major provisions from both laws impact investment in and operation of utility-scale clean generation, storage, and transmission, and, in turn, how those changes impact power system costs and emissions.

We demonstrate that the provisions analyzed have the potential to drive rapid growth in clean electricity deployment while reducing average electricity costs and lowering harmful pollution. While IRA and BIL are found to drive substantial increases in the clean share of generation and associated declines in emissions across scenarios explored, we also show that potential constraints on deployment driven by factors such as siting and permitting challenges, supply-chain constraints, social acceptance of energy infrastructure development, and/or limited technology cost and performance improvement have the potential to slow the rate of clean energy deployment and the associated benefits that could be realized.

This report builds on preliminary results discussed in the 2022 Standard Scenarios Report (Gagnon et al. 2022), but focuses on the implications through 2030 and provides additional detail on the deployment, emissions, and power system cost outcomes across a range of scenarios designed to evaluate key drivers of the potential impacts of IRA and BIL. While the energy system implications of IRA, and to a lesser degree, BIL, have been explored using other models (Jenkins, Mayfield, et al. 2022; Larsen et al. 2022; Roy, Burtraw, and Rennert 2022; Mahajan et al. 2022), all models are designed with different scopes (e.g., entire energy system versus power-system only) and different emphases and, therefore, have different strengths and weaknesses. As such, it is valuable, if not crucial, to evaluate the potential implications of policies using multiple models. The models used in this study are focused solely on the power system and were designed with high spatial and temporal resolution that jointly enable a detailed treatment of the unique aspects of renewable generation and storage, carbon dioxide transport and storage, and a high degree of fidelity in power system operation for a national-scale planning model.

[5] H.R.5376 – 117th Congress (2021-2022): https://www.congress.gov/bill/117th-congress/house-bill/5376/text; H.R.3684 – 117th Congress (2021-2022): https://www.congress.gov/bill/117th-congress/house-bill/3684

[6] IRA and BIL together have provisions related to electricity generation and transmission, transportation and mobility, fuel and critical material production, buildings and energy efficiency, clean energy manufacturing, environmental and climate justice, sustainable agriculture and forestry, and climate research, among others. See CRS (2022) and Jenkins, Farbes, et al. (2022).

2 Methods

2.1 Overview and Scenario Structure

This analysis applies the ReEDS model to evaluate the potential impacts of key provisions of IRA and BIL on the evolution of the utility-scale power system in the contiguous Unites States. We simulate power system evolution under scenarios both with and without the suite of IRA and BIL provisions included (detailed in Section 2.3) and under a range of alternative future electricity market, infrastructure, and technology conditions. To account for changes in behind-the-meter solar adoption driven by IRA and BIL, we rely on projections from the Distributed Generation Market Demand Model (dGen).[7]

The analysis focuses on two core scenarios:

- ***No New Policy***: assumes federal and state policies enacted as of September 2022, with exception to BIL and IRA, and assumes load growth (0.7% increase per year compound annual growth (CAGR) 2023–2030) consistent with the Energy Information Administration's (EIA's) Annual Energy Outlook 2022 (AEO22) *Reference case* (EIA 2022a).
- ***IRA-BIL***: includes the IRA and BIL provisions as described below (Section 2.3) and, to account for the impacts of IRA and BIL on electrification, assumes increased load growth (1.1% CAGR 2022–2030) consistent with a scaled version of the *Moderate Electrification* scenario from the Electrification Futures Study (Mai et al. 2018).[8]

We evaluate the two core scenarios across seven sensitivities (Table 1), including a central or Mid case, to account for major sources of uncertainty including future cost and performance of clean generation and storage technologies, future natural gas prices, and future limitations on deployment related to potential supply-chain, regulatory, and/or social acceptance related constraints on deployment. Finally, we explore two policy sensitivities that vary assumptions about the realized value of the ITC and PTC tax incentives under IRA.

Although the Mid case represents a central reference scenario, it is not intended to be a prediction of the most likely outcome of the evolution of the power sector under IRA and BIL. Rather it represents a projection of the evolution of the power sector under a specific set of market, technology, and policy conditions. While the technology and fuel cost projections used in the Mid case (and other cases using the reference cost projections) do represent 'best guesses,' this scenario does not consider the full suite of drivers of investment decisions, in particular, those that are associated with behavior that deviate from least-cost optimization. As a result, the Mid case more closely represents the power system evolution that would occur if all economically optimal investment and retirement opportunities were executed.

While the ReEDS model includes a sophisticated representation of the U.S. power system, a variety of real-world constraints driven by institutional friction, market power, imperfect information, limited capital and labor liquidity, uncertainty, and human behavior, among others, would likely result in actual planning decisions deviating from those estimated by a national planning model.[9] We explore the implications of a set of key 'non-economic' drivers of system change in the Constrained sensitivity. This sensitivity attempts to capture the potential implications of regulatory or permitting challenges associated with renewable, transmission, and/or pipeline infrastructure development, the potential impacts of social opposition to energy infrastructure development, and limited inter-regional coordination between utilities and transmission operators; however, this sensitivity does not comprehensively capture all potential deployment barriers or their potential magnitude of stringency. We highlight both the Mid and the Constrained cases in the results given that they provide two projections of power system evolution that use central assumptions for fuel prices and technology costs and performance.

[7] For more information on dGen, see http://www.nrel.gov/analysis/dgen

[8] While we include a change in electricity load due to IRA-BIL, the demand impacts were not a focus of this study. There remains significant uncertainty in the realized impacts of IRA-BIL provisions on load growth, particularly at the sub-national level.

[9] Additional discussion of the limitations of the modeling approach is included in Section 2.4

Table 1. Scenario Structure and Definitions of Scenario Assumptions.

Sensitivity Type	Sensitivity	Abbrev.	Description
Mid case	Moderate cost and performance for all technologies, Reference natural gas price	Mid	• Cost and performance assumptions for all technologies except CCS-retrofits are from the 2022 Annual Technology Baseline (ATB) *Moderate* case; plant-level CCS-retrofit costs and performance impacts are from the EIA-NEMS model (EIA 2022b). • Power sector delivered fuel prices are from the AEO2022 *Reference* case
Technology cost and performance (C&P)	Advanced Renewable and Battery Technologies	AdvBRE	• Cost and performance assumptions for battery storage and renewable technologies are from the 2022 ATB *Advanced* case.
	Conservative Renewable and Battery Technologies	ConsBRE	• Cost and performance assumptions for battery storage and renewable technologies are from the 2022 ATB *Conservative* case.
	Advanced All Clean Technologies	AdvClean	• Cost and performance assumptions for battery storage, renewable, nuclear, and greenfield CCS technologies are from the 2022 ATB *Advanced* case; plant-level CCS-retrofit costs (from EIA-NEMS) assumed to decline from 2023 to 2030 at the same rates as the greenfield CCS technologies in the 2022 ATB.
Natural gas price	High natural gas price	HGP	• Power sector delivered natural gas prices are from the AEO2022 *Low Oil and Gas Resource* case
	Low natural gas price	LGP	• Power sector delivered natural gas prices are from the AEO2022 *High Oil and Gas Resource* case
Constrained deployment	Constrained	Constr.	• Reduced land area/resources available for renewable development (applies to wind, solar, geothermal, and bio) • New long-distance transmission builds restricted to the historical national average build rate (1.4 TW-mi per year) and to builds within transmission planning regions • Increased (2x) cost of CO_2 pipeline, injection, and storage infrastructure
Policy impacts	Low IRA Impact	LII	• Increased cost of monetization of tax credits: 10% to 15% for non-CCS techs and 7.5% to 11.25% for CCS techs • Eligible techs earn, on average, one-half of a bonus or 5% (decreased from 10%).
	High IRA Impact	HII	• Decreased cost of monetization of tax credits: 10% to 5% for non-CCS techs and 7.5% to 3.75% for CCS techs • Eligible techs earn, on average, one and one-half of a bonus or 15% (increased from 10%)

Notes: Both the *No New Policy* and *IRA-BIL* scenarios are simulated with all sensitivity assumptions listed here, with exception of the 'policy impacts' sensitivities which are only applied to the *IRA-BIL* cases. For each sensitivity, with exception to the differences noted in the "Description," assumptions are identical to the Mid case assumptions. Cost and performance projections for generation and storage technologies are from the National Renewable Energy Laboratory's Annual Technology Baseline (ATB) (NREL 2022), with exception to costs and performance impacts of plant-level CCS-retrofits which are from the EIA-NEMS model (EIA 2022b) and further modified for the *Advanced All Clean* scenario; fuel price projections are from EIA's 2022 Annual Energy Outlook (EIA 2022a). Consistent with the 2022 Standard Scenarios report (Gagnon et al. 2022) all scenarios include a near-term technology-neutral capital cost adjustment to reflect recent increases in costs associated with supply-chain constraints.

2.2 Model Description

ReEDS is an electricity system capacity expansion model of the contiguous United States that simulates the evolution of the utility-scale power system (Ho et al. 2021). The model projects the investment in, operation of, and retirement of utility-scale generation, transmission, and storage resources to meet load, grid operational requirements,[10] and all major federal and state environmental policies and regulations relevant to the power system.

The ReEDS model was designed to capture the unique aspects of renewable generation and storage technologies. This is achieved through a combination of high spatial and temporal resolution to capture variability in electricity load and renewable resource availability, explicit representation of power system operational constraints, and robust treatment of resource adequacy.[11] Furthermore, the most recent version of ReEDS[12] includes a spatially explicit representation of the potential for, costs of, and constraints on infrastructure for (CO_2) transport and storage (Irish et al. 2023) enabling a robust treatment of the costs and constraints associated with transport and geologic storage of captured CO_2. However, while ReEDS does include an explicit representation of the ability to develop and operate CO_2 transport and storage infrastructure, it does not capture potential shared use of such infrastructure by industrial (non-power) CCS facilities, nor does it represent the potential use and associated value of CO_2 for enhanced oil recovery.

The version of the model used here has been updated since the release of the 2022 Standard Scenarios report (Gagnon et al. 2022). The most relevant modification is an improvement to the representation of retrofits of existing fossil-fueled electricity generation facilities to include CCS equipment. While the previous version of ReEDS included a representation of the opportunity to retrofit existing natural gas and coal-fired generation facilities, it did not differentiate across existing units when specifying the costs of upgrading or the operational characteristics of an upgraded facility. Instead, uniform costs and operating impacts of retrofits were assumed. Applying uniform cost and performance assumptions does not capture the diversity in plant characteristics—including plant capacity, age, heat rate, emissions controls, and facility siting—and the associated implications for the costs and impacts of retrofitting. In contrast, the version of the model used in this report includes unit-specific estimates of the capital cost of retrofitting coal and natural gas facilities with carbon capture, as well as unit-specific impacts on the resulting (post-upgrade) facility's maximum operating capacity, heat rate, non-fuel operating costs, and fixed costs. The unit-level data for these characteristics comes from the National Energy Model System's (NEMS) Electricity Market Module (EIA 2022b).[13]

The scope of ReEDS is limited to the bulk power system; the model does not endogenously capture behind-the-meter adoption of generation or storage resources, such as photovoltaic and battery systems, nor does it capture costs or constraints associated with the distribution system. As such, to account for potential changes in adoption of behind-the-meter photovoltaic capacity driven by IRA and BIL, this analysis relied on a limited set of simulation results from the Distributed Generation Market Demand (dGen) model, a model of customer adoption of distributed resources.

2.3 Policy Implementation

IRA and BIL include numerous provisions directly relevant to investment in and/or operation of the electricity system, however many of those provisions are not feasible to represent within the structure of a long-term power system optimization model or are otherwise too small in magnitude to be resolved within a national-scale modeling framework. Thus, this analysis focuses on evaluating the implications of the key electricity sector incentives and programs authorized by IRA and BIL. Tax credit and associated provisions specifying transferability and direct pay options, as well as the extension and expansion of accelerated depreciation are explicitly represented within ReEDS. To account for the potential impacts of a select number of other IRA and BIL programs and provisions, we used

[10] ReEDS explicitly represents the provision of five key electricity services that must be met to maintain grid adequacy: energy, firm capacity, and three types of operation reserves (regulation, contingency, and flexibility reserves).

[11] ReEDS ensures that any identified future system meets a minimum level of resource adequacy—a component of system reliability—in all regions and years over the projected investment pathway.

[12] https://www.nrel.gov/analysis/reeds/

[13] While the NEMS values provide a comprehensive source for plant-level retrofit costs and the impacts on operating performance, there exists substantial uncertainty around the future costs of fossil generation with CCS technologies, and in particular, the cost of retrofitting existing fossil generation facilities with CCS given the diversity in plant age, capacity, efficiency, existing emission controls, and siting, among other characteristics. Further research is needed to improve such cost and performance projections and we note that the CCS deployment ranges reported could change with improved projections and/or inclusion of a representation of non-power sector drivers of CCS infrastructure development.

a set of simple assumptions to estimate the impact of those programs and assumed that a portion of those impacts were additional to the deployment and associated generation identified by the ReEDS model. The analysis results presented in this paper reflect the combined impacts of the selected key tax- and non-tax provisions of IRA and BIL.

2.3.1 IRA Tax Credit Representation in ReEDS

Gagnon et al. (2022) provides an overview of the IRA implementation, but for accessibility, we reproduce that description here with additional detail on the implementation.

Four tax credit programs are explicitly represented in ReEDS:

- ***Production Tax Credit (PTC)*** for renewable and other zero-carbon generation: $26 per MWh[14] over 10-years of operation plus a bonus credit that, under our reference policy conditions, is assumed to start at an average rate of 5% ($1.3 per MWh) in 2023 and increase to 10% ($2.6 per MWh) by 2028 (see below for further information). The representation in ReEDS captures both the modification and extension of the existing PTC (§45) for renewable generation and the creation of the new technology-neutral emissions based PTC (§45Y), including the associated technology eligibility limitations.
- ***Investment Tax Credit (ITC)*** for renewable and other zero-carbon generation: 30% plus a bonus credit that, under our reference policy conditions, is assumed to start at an average rate of 5% (35% for the total value) in 2023 and increase to 10% (40% total value) by 2028. As with the PTC, the representation in ReEDS captures both the modification and extension of the existing ITC (§48) as well as the new technology-neutral ITC for zero-carbon generating and storage technologies (§48E).
- ***Captured CO_2 Incentive (45Q)*** for CO_2 captured and stored in geologic formations: $85 per tonne of CO_2 and for 12-years of operation of a generation facility with CCS.[15]
- ***Existing Nuclear Production Tax Credit (45U)*** for generation from existing nuclear facilities: $15 per MWh, but it is reduced if the market value of the electricity generated exceeds $25 per MWh. As a simplification, the market-adjusted value of 45U was not directly represented in ReEDS. Instead, we assume that 45U, in combination with the Civil Nuclear Credit program under BIL, is sufficient to maintain cost-recovery of existing nuclear plants and, thus, nuclear plants are not subject to economic-based retirement in ReEDS until 2033.

Wage and Apprenticeship Requirements

To qualify for the above levels of the PTC, ITC, and 45Q, new projects must demonstrate that wages for the labor force used to construct facilities are equal to or exceed prevailing wages and that a minimum share of work is executed by individuals from registered apprentice programs.[16] While such requirements could increase the capital costs for facilities, particularly if current markets allow for labor rates below prevailing wage thresholds, for simplicity, we assume that all new projects meet these requirements with negligible impact to project costs, and therefore all projects are eligible for the full value of the incentives. Further exploration of the potential costs associated with meeting these requirements is warranted.

Bonus Crediting

Projects eligible for the PTC and ITC are also eligible to claim up to two bonus credits if they meet specific domestic content requirements, and/or are located in an "energy community."[17] For projects electing the PTC, each bonus credit increases the PTC value by 10% or $2.6 per MWh. For projects electing the ITC each bonus credit increases the value by 10 percentage points (i.e. from 30% up to a maximum of 50%). Under our reference policy assumptions, projects on average achieve one-half of a credit in 2023, increasing to a full-credit by 2028. In reality, projects cannot receive one-half of a credit; rather, they can receive zero, one, or two credits. However, given likely diversity in the number of bonus credits achieved and that developers will strive to increase the domestic content of

[14] All values reported are in 2022$. Note that since the time of this analysis, IRS provided new guidance increasing the value of the incentive from $26 per MWh to $27.5 per MWh. See https://www.irs.gov/pub/irs-drop/a-22-23.pdf for further information.

[15] The dollar values for the 45Q incentive are nominal through 2026 and inflation adjusted after that

[16] For additional information refer to Federal Register/Vol. 87, No. 229/Wednesday, November 30, 2022/Notices: Prevailing Wage and Apprenticeship Initial Guidance Under Section 45(b)(6)(B)(ii).

[17] See Inflation Reduction Act of 2022, 1 U.S.C §13101(g) for detailed definitions, and for additional discussion see Raimi and Pesek (2022).

facilities over time to recoup the domestic content bonus, we make the simplifying assumption that, on a fleet-wide basis, the average crediting rate increases over a 5-year period and then remains flat. Note that the U.S. Department of Treasury has not yet published final guidance on the specific requirements for eligibility for the domestic content and energy community bonuses, creating uncertainty in the degree of difficulty in qualifying. The *LII* and *HII* sensitivities evaluate the potential implications of lower and higher rates of bonus crediting.

Accelerated Depreciation

Any technology that qualifies for the new technology-neutral PTC or ITC—all zero-carbon generation and storage technologies—also qualifies for 5-year accelerated depreciation for any project placed in service beginning in 2025. This is directly captured in ReEDS within the financing calculations. See Ho et al. (2021) for details on how accelerated depreciation is handled.

PTC versus ITC

The changes to the PTC and ITC authorized through IRA allow eligible projects to elect either the PTC or the ITC. While many factors can influence the difference in the value of the alternatives for a particular facility, generally the two largest drivers of the value are the capital cost and the capacity factor that the facility is expected to achieve. All else equal, increasing capital costs will increase the ITC value relative to the PTC, and increasing capacity factor will decrease the value of the ITC relative to the PTC. Given that there is generally more variation in capital costs and capacity factor across technology types (e.g., offshore wind versus solar photovoltaic [PV]) than within technologies (projects of the same type in different physical locations), the technology type will largely determine which incentive has a higher value. In ReEDS, this determination was made exogenously to the model. Onshore wind, utility-scale PV, and biopower are assumed to elect the PTC while offshore wind, CSP, geothermal, hydropower, nuclear, pumped storage, battery storage, and distributed PV are assumed to elect the ITC.

Cost of Monetizing Tax Credits

Across most eligible technologies, tax credit values are reduced by 10% under the assumption that monetizing the credits results in some loss of their value. Clean energy project developers often do not have sufficient tax liability to enable use of all tax credits available. Financing structures have therefore evolved to allow a tax equity investor to jointly finance a project and receive full or partial distributions of the associated tax credits. These structures bear some cost, and therefore the full value of the credit is not retained by the project developer. The value lost is referred to here as the 'monetization cost.' The 10% value assumed is less than the reduction in the value historically used in ReEDS for the non-refundable tax credits (the pre-IRA PTC, ITC, and 45Q) as the IRA-authorized transferability of credits will likely result in greater fluidity (and reduce monetization cost) of credits. CCS credits are reduced by a lower fraction, 7.5%, due to the additional allowance for direct pay for 45Q tax credits under IRA. The policy sensitivities vary these values, as described in Table 1.

PTC and ITC Phase-out

Under IRA, the PTC and ITC are triggered to begin a phase-out schedule in the year that electricity sector emissions fall below 25% of 2022 levels or in 2032, whichever is later. Given that this study evaluates near-term impacts of IRA and BIL (through 2030), this provision does not impact results.

2.3.2 Distributed PV Adoption

While this analysis focuses on evaluating the bulk power system implications of IRA and BIL, deployment of customer adopted, behind-the-meter, generation and storage resources impacts the overall level of capacity, energy, and operating reserves required to meet electricity load reliably. To account for changes in distributed PV adoption driven by IRA and BIL we executed a limited scenario analysis using the dGen model. The dGen model simulates customer adoption of distributed energy resources for residential, commercial, and industrial consumers based on the empirically parameterized characteristics of the population of consumers and the likelihood of adoption at alternative rates of return on investment.

In the dGen model, distributed PV was assumed to receive the ITC: the §25D clean energy credit for residential customers, and the §48 and §48E credit for commercial and industrial customers. For residential projects the ITC was assumed to be 30%. For commercial and industrial projects, the ITC was assumed to have a total value of 40%

(assuming eligibility for at least one of the 10 percentage point bonuses). These representations are simplifications, as there can be greater diversity in captured value depending on factors such as ownership type and tax status.

We simulated three different scenarios using the dGen model in which distributed PV costs were varied up and down relative to a mid-case representation. Cost assumptions for all three cases (mid, low, and high) are from the 2021 Annual Technology Baseline (ATB) where low cost corresponds to the ATB Advanced scenario, mid cost corresponds to the ATB Moderate scenario, and high cost corresponds to the ATB Conservative scenario. The dGen cost cases were paired with the corresponding technology cost and performance sensitivity in this study. Sensitivities capturing advanced or conservative renewable cost and performance projections—the *Advanced Renewable and Battery Technologies*, *Conservative Renewable and Battery Technologies*, and *Advanced All Clean Technologies*—were associated with the relevant dGen low or high cost case. All other sensitivities were paired with the dGen mid-case. All state-level distributed PV incentive programs, such as net-metering and net-billing, were assumed to remain in place over the time period analyzed.

IRA includes additional bonus credits for the ITA (up to 20 percentage points) for up to 1.8 GW per year for facilities (including but not limited to solar) that are placed in service or directly benefiting lower income and Tribal communities. IRA also contains a Greenhouse Gas Reduction Fund, administered by the U.S. Environmental Protection Agency (EPA) and expected to, in part, support low-income solar development. The dGen model runs used in this analysis did not have an explicit representation of the additional bonus credits or the Greenhouse Gas Reduction Fund. Instead, 0.9 GW per year (50% of the maximum total annual capacity allowed to receive the low-income community bonus) of distributed PV was added to the dGen projections through 2032. The estimate of 0.9 GW reflects the assumption that the bonus credit program limit will be achieved, but that some of the projects capturing the bonus credit and benefiting from the Greenhouse Gas Fund may not be additional (i.e., they would have occurred anyway even if the bonus credit were not available).

2.3.3 Analysis of Other Provisions

Separate from ReEDS, we also assessed the potential impacts of a number of other IRA and BIL loan, grant, and other programs on the power sector. Following the basic approach in DOE (2022), in these cases, we generally assumed that a large majority of the prospective impacts of these programs are captured in ReEDS results and cannot be separately evaluated outside that context. In effect, these programs are assumed to help facilitate achieving modeled outcomes—without them, the modeled outcomes may not be practically feasible. However, we also assumed that a smaller portion is additional to otherwise modeled outcomes, applying simplifying assumptions to broadly estimate the potential incremental impacts of these provisions on capacity additions and retirements, electricity supply, and CO2 emissions. Provisions analyzed in this way include numerous grant, loan, and demonstration programs, including programs to support rural utilities and communities, energy communities, and energy reinvestment.

Based on this simplified approach, in aggregate, these programs are assumed to contribute to the modeled ReEDS results, and to additionally deliver power sector CO2 reductions beyond those already estimated in ReEDS, of roughly 25 Mt per year by 2030 (approximately 3% of those otherwise estimated with ReEDS). This estimate is not a projection of the unique impact of these provisions, as those impacts are largely implicitly embedded in the ReEDS results, but instead intends to roughly capture a portion of that possible impact—that which may be additional to otherwise modeled outcomes. Related, note that many other BIL and IRA programs are not directly assessed, but are assumed to help support modeled outcomes by addressing deployment barriers, building-out delivery infrastructure and supply chains, and driving technology advancements. These include numerous transmission authorities; various supply-chain and workforce investments; multiple R&D, demonstration, and loan programs; and various other hard-to-model programs and policies.

2.4 Key Caveats

2.4.1 Modeling Caveats

ReEDS is a linear program designed to identify the suite of investments in and operations of the power system to minimize the cost of meeting load. As such, the model will "choose" any investment, retirement, or operational change that will lower overall costs subject to electricity system physical and environmental constraints. In economic terms, the model represents a near-perfect market for the supply of electricity—"near-perfect," instead of "perfect," because the model is sequentially solved without perfect foresight of future conditions and accounts for some aspects of market friction.

In reality, electricity markets are far from "perfect" markets. Institutional interests, imperfect information, market power, barriers to entry, supply-chain constraints, and human behavior, among other drivers lead to market distortions that can result in non-optimal decision making or simply a departure from otherwise least-cost outcomes. As such, rather than treating results from a given ReEDS scenario as a prediction of specific real-world outcomes, the results should be viewed as projections of the suite of investment and operational decisions that lead to the lowest costs of meeting load while ensuring that all other power system operational (e.g., operating reserve requirements, firm capacity or resource adequacy requirements) and environmental/policy (e.g., emissions caps, renewable portfolio standards) constraints are simultaneously met. That being said, some scenarios—such as the Constrained scenario in this study—are formulated to capture, albeit, stylistically, aspects of "non-economic" behavior that can shape outcomes in the power sector.

As noted above, ReEDS has a highly spatially and temporally resolved representation of the power system for a national-scale planning model. Despite this, more aggregate representations of some aspects of the power system are necessary to ensure computational tractability. In particular, like all national-level power system planning models, ReEDS does not model specific transmission rights-of-way with detailed AC power flow simulation. Rather, transmission investment and operation is represented "zonally," captured through a representation of the aggregate transmission capacity between ReEDS regions (134 balancing areas across the contiguous United States). In addition, ReEDS only captures the bulk or utility-scale aspects of the power sector. Distribution system and distributed connected resource (e.g. distributed PV and storage) investment, operation, and associated costs, as well as efficiency and demand response program costs and impacts are not considered endogenously.

2.4.2 Analysis Caveats

In addition to the general model caveats noted above, we highlight other caveats, more specifically related to this study, here. First, this study evaluates the potential impacts of IRA and BIL across a broad range of future conditions. However, we have not exhaustively evaluated all potential conditions. As such, the realized future conditions could be outside the range of those captured within the suite of scenarios analyzed here, leading to potential IRA and BIL impacts that are beyond the range of those identified in the results reported below.

Second, the model generally allows the investment in and operation of new electricity transmission and CO_2 pipeline and storage infrastructure required to support new generation facilities and meet the needs of growing demand. Given potential challenges in siting new transmission and pipeline infrastructure, we constrain near-term (through 2028) transmission builds in all cases, and do not allow new CO_2 pipeline deployment until 2028.[18] Furthermore, we explore the implications of continued limitations and increased costs of constructing new transmission and pipeline infrastructure in the Constrained case. However, deployment barriers and extended construction timelines for such infrastructure could certainly extend beyond what is captured in the Constrained case, and if so, would likely further reduce the deployment of clean generation sources. This remains an important area of for further research.

Third, with respect to the IRA and BIL provisions modeled, there remains uncertainty in how the final criteria determining the eligibility or value of IRA credits will be specified. Further guidance from the U.S. Department of the Treasury could result in substantial shifts in the realized value and scope of tax credits. Uncertainties regarding two such issues—eligibility for domestic content and energy community bonuses under the ITC and PTC—are explored to a degree in this study, however, others remain.

Finally, while the analysis captures a number of key power sector provisions from IRA and BIL, there are many provisions that will likely directly or indirectly impact power sector evolution. Of particular importance, we capture neither the tax credit for clean hydrogen production (§45V) nor the §45Q tax credit for direct air capture (DAC) and storage of CO_2. In addition, while we have accounted for an expected moderate increase in load associated with IRA and BIL electrification provisions, there is substantial uncertainty in how IRA and BIL provisions will ultimately impact load, as well as broader uncertainty in the evolution of key drivers of demand, electrification, and efficiency that interact with the IRA and BIL programs, including population changes, consumer preferences, technology change, economic growth, policy change, and utility efficiency and demand response program changes. Realized electricity consumption could be above or below the projected levels used in this study.

[18] ReEDS tracks when plants or infrastructure comes online rather than when they begin construction. This constraint therefore allows 2028 to be the first operational year of pipeline that was assumed to be under construction prior to 2028.

3 Results

3.1 Deployment and Generation

The *No New Policy* Mid- and Constrained cases show only modest changes in the capacity and generation mixes between 2023 and 2030. Under the Mid case, we observe moderate cumulative deployment of wind (54 GW), solar (125 GW), storage (10 GW), and natural gas (57 GW) capacity from 2023 through 2030 with associated increases in generation, while capacity and generation contributions from coal and oil-gas-steam (OGS) facilities decline—coal and OGS capacity decline 46 GW and 40 GW, respectively (Figure 1). Constraints on resource accessibility and deployment results in only limited impacts under the *No New Policy* scenario. The *No New Policy* Constrained case shows a 14 GW reduction in wind deployment by 2030, as compared to the Mid case, which is primarily offset by additional deployment and generation from solar and natural gas capacity. Technology cost and performance and fuel price sensitivities to the *No New Policy* case demonstrate trends consistent with the Mid case, but show variation in the level of deployment of wind, solar, and gas (Figure 2), the extremes of which are generally associated with the advanced and conservative technology cases. The annual average deployment rate under the *No New Policy* Mid case is 7 GW/yr for wind (5 GW/yr–15 GW/yr, across all cases), 16 GW/yr for solar technologies (12 GW/yr–26 GW/yr, across all cases), and 7 GW/yr for gas (4 GW/yr–8 GW/yr, across all cases).

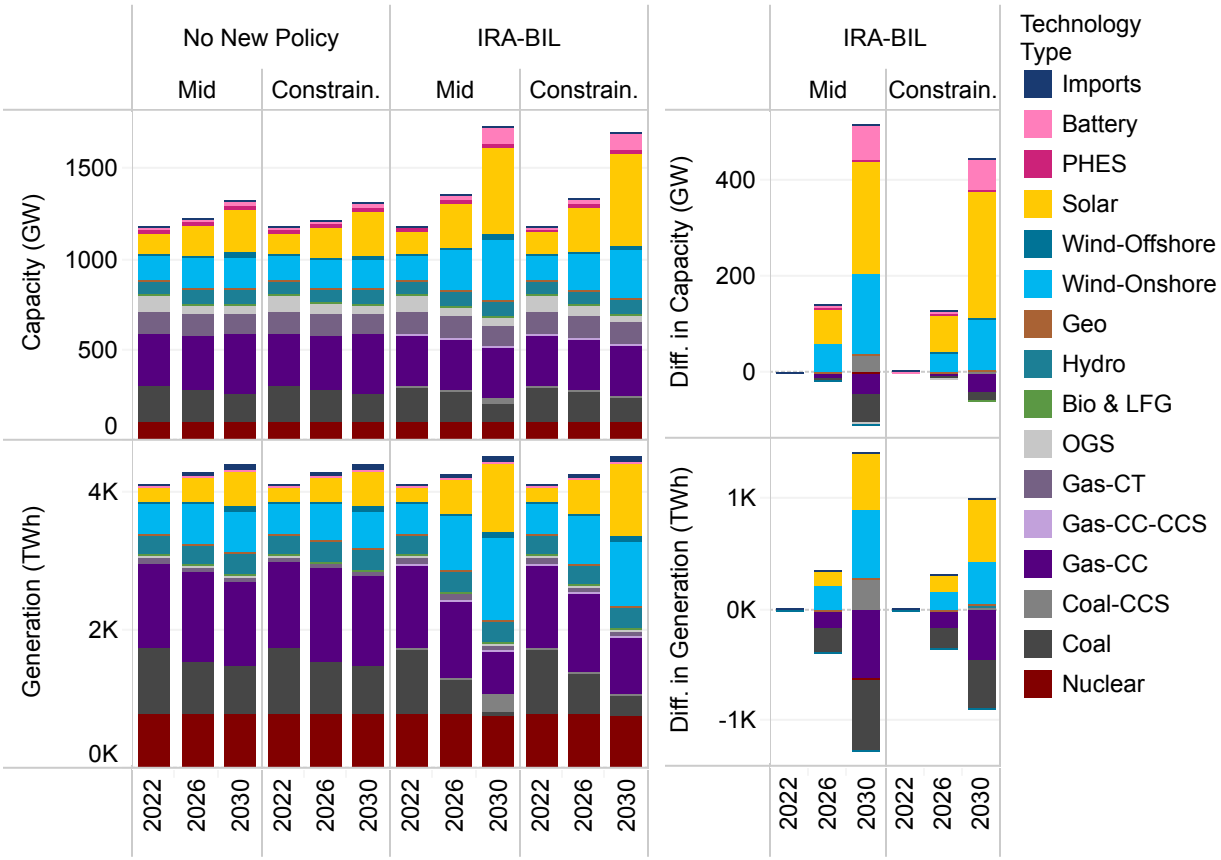

Figure 1. Left pane: capacity (top row) and generation (bottom row) 2022-2030 by technology in the Mid and Constrained *No New Policy* and *IRA-BIL* cases. Right pane: differences in capacity and generation in the *IRA-BIL* Mid and Constrained cases from the corresponding No New Policy case.

PHES=Pumped Hydroelectric Energy Storage; Geo=Geothermal; Hydro=Hydroelectric; Bio & LFG=Biopower and Landfill Gas; OGS=Oil Gas Steam; Gas-CT=Natural Gas Combustion Turbine; Gas-CC=Natural Gas Combined Cycle; CCS=Carbon Capture and Storage

IRA and BIL drive substantial increases in wind and solar deployment and generation. Cumulative deployment from 2023 to 2030 under the *IRA-BIL* Mid case totals 220 GW for wind (150 GW–320 GW across sensitivities) and over

360 GW of solar (150 GW–430 GW across sensitivities), representing average annual deployment rates of 45 GW per year and 27 GW per year for solar and wind, respectively. Associated with the deployment of wind and solar capacity is substantial deployment of battery storage, totaling 80 GW cumulatively from 2023 through 2030 in the Mid case and 40 GW–100 GW, across sensitivities. In addition, in the latter part of the decade, approximately 40 GW of existing fossil capacity is retrofit with CCS (5 GW–55 GW, across sensitivities). The deployment of fossil-CCS demonstrates the substantial value of the 45Q incentive for CCS projects, and the potential large implications for CCS deployment. Finally, although difficult to identify in Figures 1 and 2, capacity additions under all *IRA-BIL* cases include 1.4 GW of nuclear demonstration projects.[19]

Deployment barriers captured under the *IRA-BIL* Constrained case demonstrate a substantially larger impact on capacity and generation evolution than under the *No New Policy* case. New wind deployment falls from approximately 220 GW in the *IRA-BIL* Mid case to 150 GW in the Constrained case—a 70 GW decrease (32% reduction) in deployment by 2030. Similarly, new fossil-CCS builds decline from approximately 40 GW in the Mid case to 5 GW in the Constrained case. These results demonstrate the considerable impact that barriers or limitations to accessing wind resources and developing CO_2 transport and storage infrastructure could have on wind and CCS deployment. Reductions in deployment and generation from these two technologies are largely offset by increased generation from natural gas, coal, and solar technologies, the latter of which is deployed in greater quantities despite assumed reductions in the amount of land available for solar development.

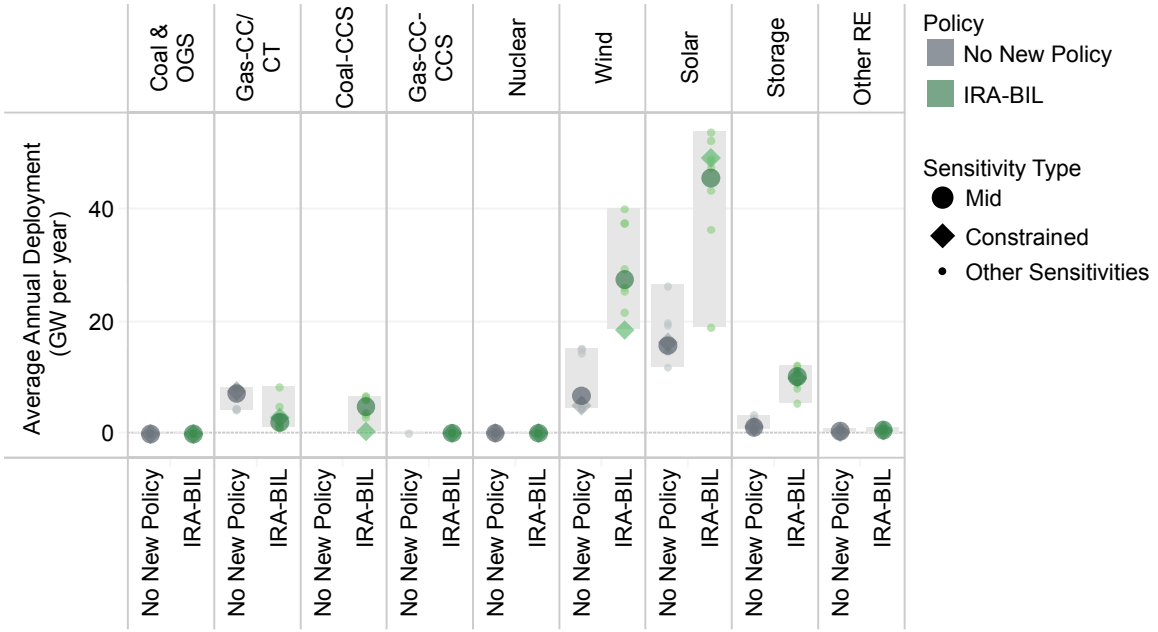

Figure 2. Ranges in average annual deployment (2023-2030) by technology category and scenario.

The light-grey shaded bars show the range of annual deployment observed within each scenario and across sensitivities. Shapes indicate the observed values for individual cases (scenario-sensitivity combination). Grey shaded shapes indicate values from the *No New Policy* cases and green shaded shapes indicate vales from the *IRA-BIL* cases. The large circle and diamond shapes show the Mid and Constrained sensitivities while the small circles indicate all other types of sensitivities, including the cost and performance, fuel price, and high/low IRA impact sensitivities.

The rapid deployment of wind and solar combined with the new deployment of fossil-CCS under the *IRA-BIL* scenarios leads to substantial shifts in the generation mix. Wind and solar technologies, in aggregate, reach 50% of total generation in 2030 under the Mid *IRA-BIL* scenario, while unabated fossil falls below 20%, and total clean[20] generation climbs to over 81%, up from approximately 41% in 2022 (Figure 3).

[19] All scenarios reflect the completion of the Vogtle units 3 and 4.

[20] "Clean" technologies here include all zero-CO_2 emitting generation—wind, solar, hydroelectric, geothermal, nuclear, biopower—as well as fossil technologies with CCS.

While the Constrained case has little implication for the clean and fossil shares of generation under the *No New Policy* scenario, under the Constrained *IRA-BIL* scenario, clean generation sources provide 71% of total generation—10 percentage points lower than in the Mid *IRA-BIL* scenario (81%). Additional sensitivities to the Mid case demonstrate that future technology cost and performance evolution and fuel prices can all substantially impact technology deployment and the clean share of generation. However, technology cost and performance assumptions and constrained deployment consistently have the largest impacts on the future generation mix across the suite of sensitivities evaluated.

Finally, the policy sensitivities explored, namely the assumed average PTC and ITC bonus crediting achieved and the cost of monetization of all tax credits, also impact levels of deployment, but to a lesser degree than the cost and performance or Constrained sensitivities.

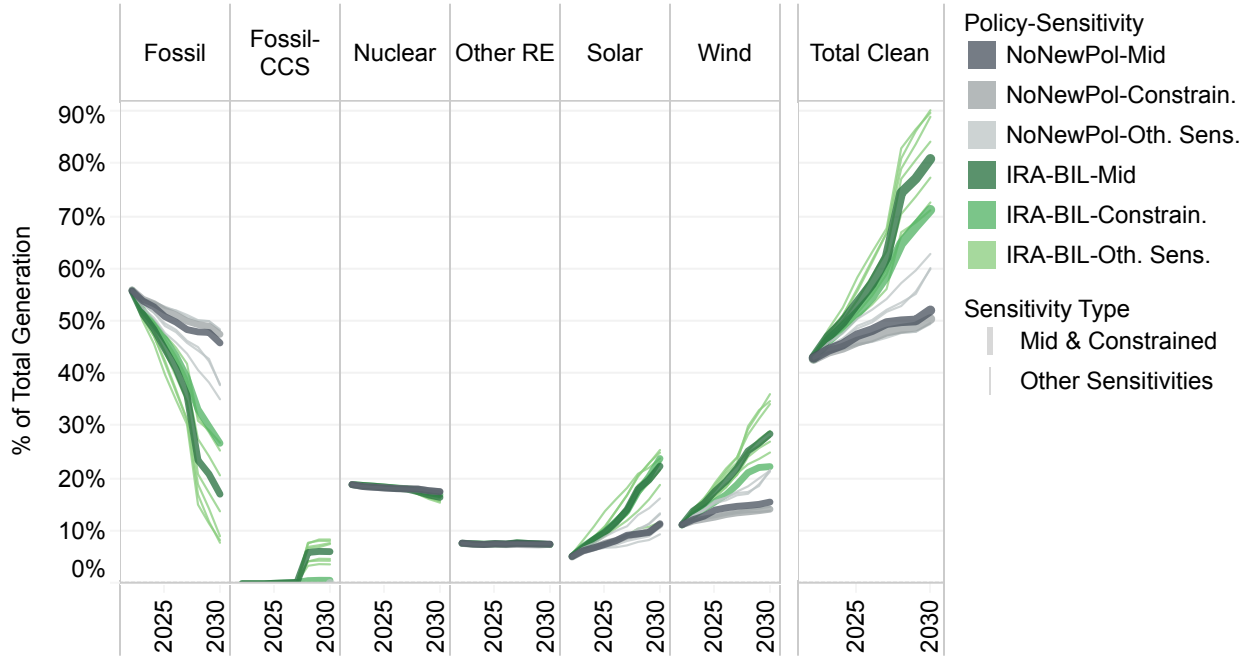

Figure 3. Share of total generation by technology category across all scenarios and sensitivities.

No New Policy cases are shown in grey and *IRA-BIL* cases are shown in green. Thick lines in the darkest shade show the Mid cases and thick lines in the lighter shade shows the Constrained cases. Thin lines in the lightest shade show all other sensitivities, including the cost and performance, the fuel price, and high/low IRA impact sensitivities.

3.2 Transmission

IRA and BIL contain several loan and grant programs to support new transmission infrastructure, which are not modeled here but are assumed to facilitate modeled outcomes. Although these programs are not directly modeled, we observe a substantial increase in transmission deployment across the IRA-BIL scenarios. Under the *IRA-BIL* Mid case, over 24 TW-miles of new long-distance transmission is deployed by 2030, a 16% increase in total installed capacity relative to today (Figure 4). This observed increase in transmission is largely driven by the increased deployment of wind (and solar) technologies in the *IRA-BIL* case. The additional transmission enables access to more remote, but high-quality renewable resources.

Under the Constrained case, in which new transmission is not allowed between 11 defined transmission regions[21] (but is allowed within a region) and total annual long-distance transmission additions are limited to the historical average annual build rate, total transmission growth falls to 12% by 2030, and we observe an associated response in wind deployment, which falls from 29% of generation in the Mid case to 22% in the Constrained case. Similarly,

[21] See Denholm et al. (2022) Figure B2 for map of regions.

sensitivities which show lower deployment of wind driven by changes in their projected costs also show lower reliance on new transmission. This suite of results demonstrates the value of transmission in achieving higher shares of clean generation, and, in particular, wind, and suggests that constraints and/or delays in developing new transmission could slow or reduce the level of clean electricity deployment achieved.

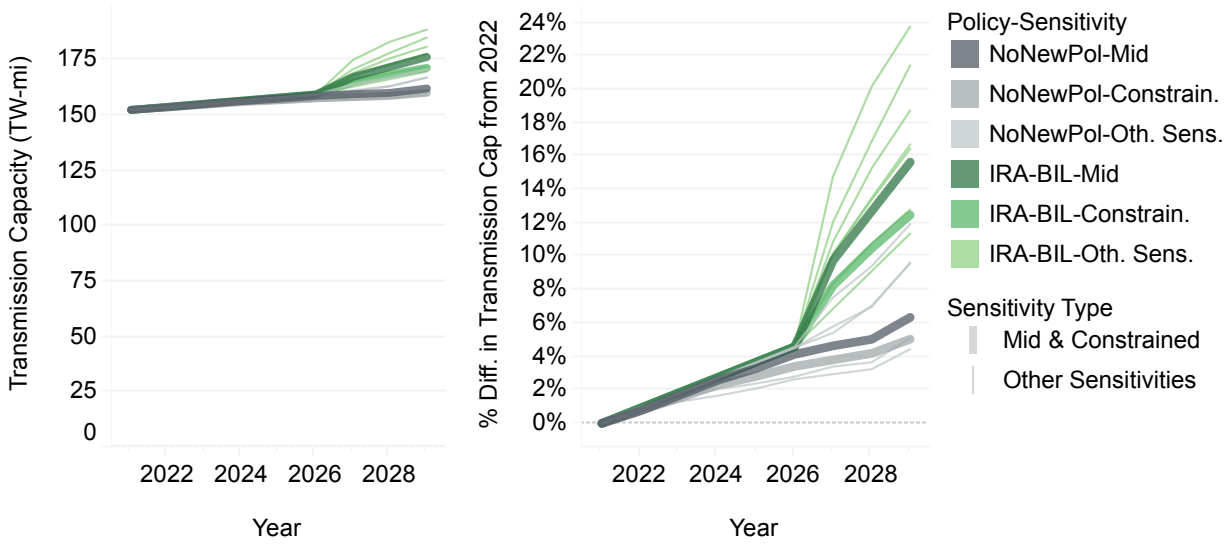

Figure 4. Transmission capacity (left) and percent change in transmission capacity from 2022 (right) across all scenarios and sensitivities.

3.3 Emissions

3.3.1 CO_2 Emissions

Power sector CO_2 emissions associated with combustion of fossil fuels decline under both the *No New Policy* and *IRA-BIL* scenarios, however, the rapid increase in clean generation under the *IRA-BIL* scenarios drives a corresponding increase in emissions reductions over the decade (Figure 5). By 2030, under the *IRA-BIL* Mid case, power sector CO_2 emissions fall to 390 Mt per year, equivalent to an 84% reduction in power sector CO_2 emissions from the 2005 level.

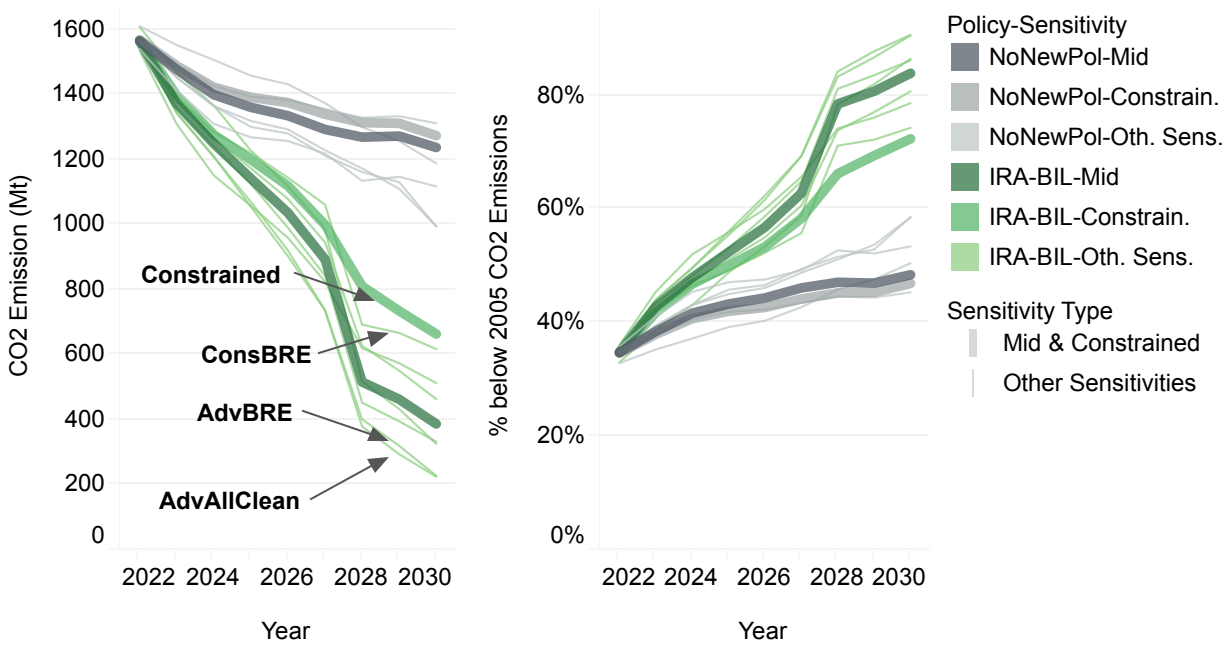

Figure 5. Projected power sector CO_2 emissions (left) and percent change in power sector CO_2 emissions below the 2005 level (right) across all scenarios and sensitivities.

Across the suite of *IRA-BIL* sensitivities, 2030 CO_2 emissions range from 230 Mt (91% below 2005) to 660 Mt (72% below 2005), primarily driven (at the extremes) by cost and performance assumptions and deployment constraints. Lower costs and higher performance of clean technologies lead to increased deployment and greater emissions reductions from displaced coal and natural gas. Deployment constraints lead to reduced wind and fossil-CCS deployment and the continued reliance on unabated fossil resources for a larger share of generation. It is under these latter conditions (constrained deployment) that we observe the highest level of emissions (and least emissions reductions) among the *IRA-BIL* cases.

Higher and lower natural gas price assumptions have less pronounced impacts on emissions, as changes in generation and associated emissions from natural gas capacity are generally offset by compensating changes in generation and emissions from coal capacity. Finally, assumed differences in the realized level of bonus crediting and the cost of monetization of tax credits also drive changes in emissions, mediated through their deployment effects, but the impacts are small relative to the technology cost and performance and constrained deployment sensitivities.

3.3.2 SO_2 and NOx Emissions

Under the *IRA-BIL* Mid case, annual SO_2 and NOx emissions fall from 1.2 Mt and 1.1 Mt to 0.31 Mt and 0.35 Mt, respectively, from 2022 to 2030, representing 60% and 57% reductions in these criteria pollutant emissions relative to the *No New Policy* case. Across the *IRA-BIL* sensitivities, reductions relative to the associated *No New Policy* case in 2030 range from 45% to 62% and 43% to 60% for SO_2 and NOx, respectively. The wide range of changes in SO_2 and NOx emissions observed across the sensitivities is driven primarily by the variation in the total share of fossil generation.

3.4 Bulk Electricity System Costs

Figure 6 shows changes in average annual bulk electricity system costs over time across scenarios and the percent change in average annual costs across each *IRA-BIL* scenario relative to the corresponding *No New Policy* case. Unless otherwise specified, all cost or value figures are reported in 2022$. "Bulk system costs" here includes all costs associated with investment, operations, and maintenance of utility-scale generation, transmission, and storage infrastructure, as well as the value (negative cost) of the PTC, ITC, and 45Q, but it does not include administrative

costs, costs associated with distribution infrastructure, distribution connected storage or generation assets, or costs associated efficiency and demand response programs operated by utilities. The tax credit component of bulk system costs represents the value of tax credits to project developers. The values are, therefore, net of the assumed cost of monetization of the tax credits, and account for the reduced pre-tax revenue requirement for corporate income tax payments. As such, the reported tax credit values are not equivalent to estimates of tax credit expenditures that may not incorporate monetization and income tax effects.

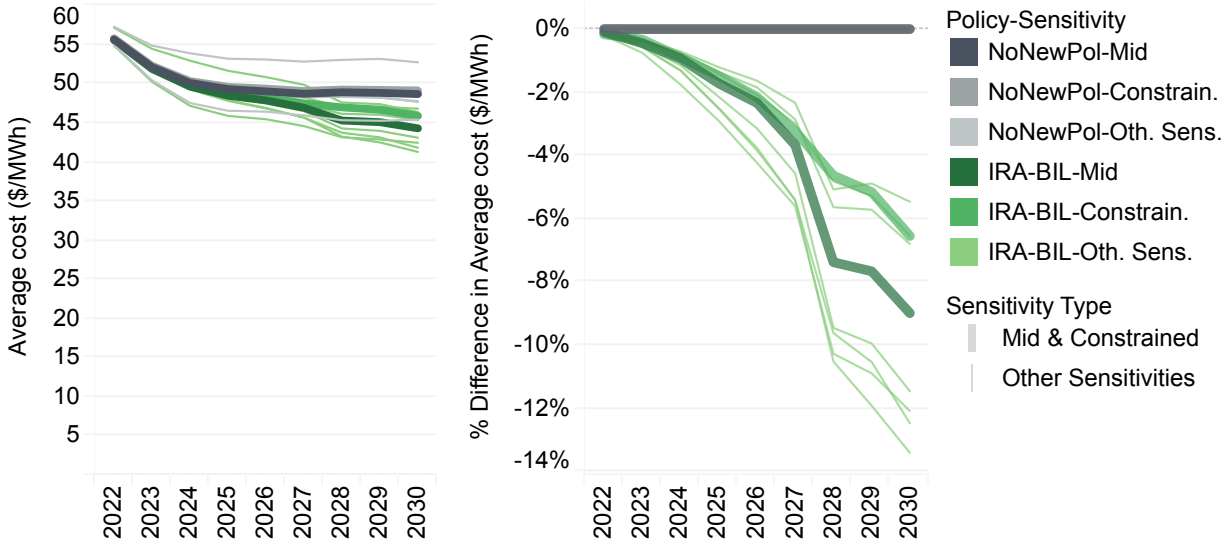

Figure 6. Average annualized bulk power system costs (left) and percent change in annualized cost (right) in all IRA-BIL scenarios relative to the corresponding *No New Policy* scenario.

Across all cases—both *No New Policy* and *IRA-BIL*—average costs decline (Figure 6) due to declining total debt, improvements in technology cost and performance, and growth in load that is largely met with lower cost energy resources (compared to the historical average), such as wind and solar. However, average costs under the *IRA-BIL* cases decline more rapidly. Under these cases, IRA and BIL induced investment in clean generation, storage, and transmission infrastructure drives increases in total capital and non-fuel operational expenditures, but these increases in expenditures are more than offset by decreases in fuel expenditures (resulting from reduced fossil generation) as well as the increased scope and value of tax credits (Figure 7). This leads to a net reduction in annual system costs of $16 billion by 2030 under the Mid case and a range of $8 billion to $25 billion across all sensitivities. Cumulatively, from 2023–2030, annual system costs are reduced by $50 billion to $115 billion (undiscounted) across all sensitivities. The present value of cumulative (2023–2030) system costs reductions using a 2% discount rate ranges from $46 billion to $105 billion.

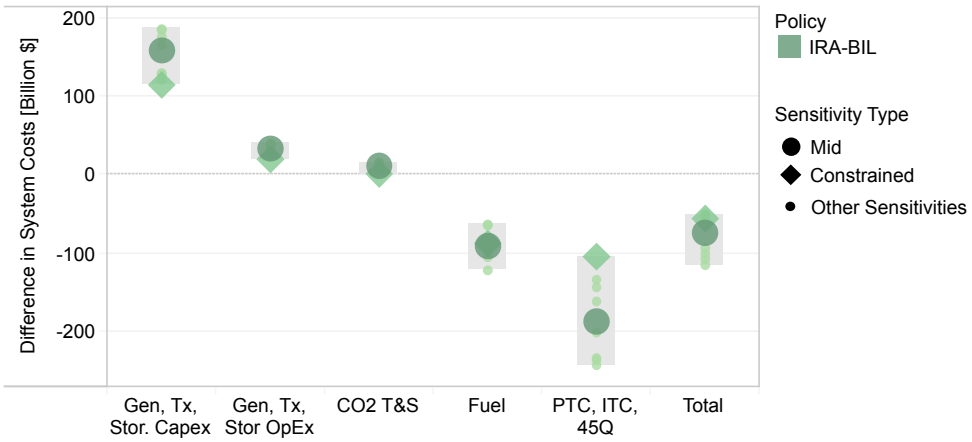

Figure 7. Ranges in the differences in cumulative bulk power system costs by category between the *IRA-BIL* cases and the corresponding *No New Policy* cases, 2023–2030. Positive values indicate higher costs in the *IRA-BIL* scenarios.

The categories reported are capital expenditures for generation, transmission, and storage (Gen, Tx, Stor. CapEx), non-fuel operational expenditures for generation, transmission, and storage (Gen, Tx, Stor. OpEx), total capital and operational expenditures for CO_2 transport and storage(CO_2 T&S), fuel expenditures (Fuel), and value of tax credits (PTC, ITC, 45Q). The far right bar shows the range in the net change in system cost, i.e. the sum of differences across all categories.

On an average cost basis, under the *IRA-BIL* Mid case, costs decline by approximately $4.3 per MWh by 2030 relative to the *No New Policy* case—equivalent to a 9% reduction. The overall range is from approximately a $2.7 per MWh (5%) decrease in the case with conservative cost and performance assumptions for renewable and storage technologies to a $6.3 per MWh (13%) decrease in the case with advanced cost and performance assumptions for all clean generation and storage technologies.

The resulting decrease in bulk system costs could lower retail rates by a similar absolute magnitude—i.e. $4.3 per MWh in the Mid case (assuming such savings are passed on to customers)—however the percent changes in retail rates would likely be lower as bulk system costs only make up a portion of total costs borne by customers.

3.5 Avoided Climate and Health Damages

3.5.1 Avoided Climate Damages

We estimate avoided climate damages by applying social cost of CO_2 (SC-CO_2) estimates from Rennert et al. (2022). Rennert et al. (2022) report values in 10-year increments beginning in 2020. Therefore, to estimate annual avoided damages for in each year evaluated in this study, we apply linearly interpolated SC-CO_2 values to emissions in each year based on the reported 2020 and 2030 values from Rennert et al. (2022). We calculate avoided damages using the "preferred mean" estimates of the SC-CO_2 which uses a 2% near-term discount rate. The preferred mean estimates for emissions in 2020 and 2030 are $185 per tonne CO_2 and $226 per tonne CO_2, respectively. In addition, we report more conservative damage estimates calculated using the mean SC-CO_2 based on a 3% discount rate ($80 per tonne in 2020 and $104 per tonne in 2030.[22]

The estimated annual avoided global climate damages grow to nearly $220 billion per year ($100 billion per year using the 3%-SC-CO_2 value) under the *IRA-BIL* Mid case with a range of $160 billion per year to $230 billion per year ($70 billion per year to $110 billion per year using the 3%-SC-CO_2) across sensitivities. Cumulative avoided climate damages (2023–2030) associated with the *IRA-BIL* scenarios are shown in Figure 8. Avoided cumulative damages in the Mid *IRA-BIL* case are $880 billion and $440 billion based on application of the preferred mean and 3% discount rate based SC-CO_2, respectively.[23] Across all sensitivity cases cumulative (2023–2030) avoided

[22]The SC-CO_2 values noted here are reported in 2020$ terms consistent with Rennert et al. (2022), but we report our resulting avoided damages in 2022$.

[23]Cumulative values are reported undiscounted. The present value of cumulative avoided damages using the 2% discount rate SC-CO_2 value and discounting at the same 2% discount rate yields a value of $780 billion.

damages range from $670 billion to $960 billion using the preferred mean SC-CO_2 value and $300 billion to $440 billion using the 3% discount rate based SC-CO_2.

Finally, the range of avoided climate damages (Figure 8) demonstrates that while all scenarios are associated with large climate benefits, alternative future market conditions could substantially reduce the climate benefits associated with the power sector IRA-BIL provisions. In particular, the Constrained case leads to 25% less avoided damages than those in the Mid case.

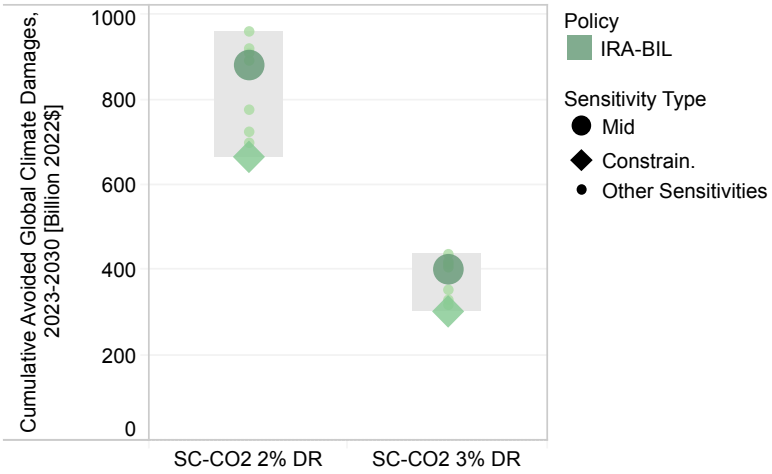

Figure 8. Estimated range in cumulative avoided global climate damages, 2023–2030, associated with reduced CO_2 emissions in the *IRA-BIL* cases.

The assumed SC-CO_2 values used to calculate the avoided damages are from Rennert et al. (2022). The left bar shows the range of avoided damages estimated using the "preferred mean" 2% near-term discount rate based SC-CO_2 of $185 per tonne CO_2 in 2020, increasing to $226 per tonne CO_2 in 2030. The right bar shows the range estimated using the 3% discount rate based SC-CO_2 of $80 per tonne CO_2 in 2020, increasing to $104 per tonne CO_2 in 2030.

3.5.2 Avoided Health Damages

Avoided health damages (avoided premature deaths) from reductions in sulfur dioxide (SO_2) and nitrogen oxides (NOx) emissions—precursors to particulate matter formation—are estimated using three reduced complexity air quality models (AP2, EASIUR, and InMAP). The air quality models track the dispersion and atmospheric chemistry of pollutants to estimate the change in exposure to particulate matter as a result of a change in emissions from a particular location. The models incorporate exposure-response functions developed from epidemiological studies to estimate the health impacts. In this study, we report the estimates based on application of the concentration response function from two widely referenced studies: the Harvard Six-Cities (H6C) study (Dockery et al. 1993; Lepeule et al. 2012) and the American Cancer Society (ACS) study (Pope III et al. 2002; Krewski et al. 2009). We report both given that the estimated mortality risk associated with an exposure to a given level of PM2.5 are about 2.5 times higher in the H6C study compared to ACS study. We translate mortality estimates into monetary value by applying a value of statistical life, using the U.S. Environmental Protection Agency's estimate of $9.9 million in 2021$ (EPA 2022). The range of values reported reflects both the range of precursor pollutant (NOx and SO_2) changes across the suite of IRA-BIL sensitivities as well as the range of estimates for particulate matter formation from each of the air quality models.[24]

Avoided SO_2 and NOx emissions under the range of *IRA-BIL* cases are estimated to reduce premature mortality by approximately 4,200 to 7,000 deaths, cumulatively, 2023–2030, using the ACS values and approximately 11,000 to 18,000, cumulatively based on the H6C study. These avoided deaths are estimated to lead to $45 billion to $76

[24] Additional information about the air quality models is provided at https://www.caces.us/data.

billion ($65 billion in the Mid case) in avoided health damages, cumulatively, 2023–2030, based on the ACS study, and $120 billion to $190 billion ($170 billion in the Mid case), cumulatively, based on the H6C study.[25]

[25] Cumulative values are reported undiscounted, in 2022$.

4 Conclusions

The results of this analysis demonstrate that IRA and BIL have the potential to drive transformative change in the U.S. power sector. Under the Mid case scenario explored, wind, solar, and storage deployment more than doubles historic maximum annual rates of deployment, clean electricity reaches over 80% of total generation by 2030, and emissions fall to 390 Mt CO_2 per year—over 80% below the 2005 CO_2 level. These potential emissions reductions are, in turn, estimated to lead to $880 billion worth of cumulative avoided climate damages (using the central 2%-discount rate SC-CO_2 value), while related reductions in criteria pollutants lead to an estimated $170 billion of cumulative avoided health damages.

Sensitivities structured to evaluate less favorable conditions for clean electricity deployment, including higher projected costs of clean electricity technologies and barriers to technology and infrastructure deployment, were shown to reduce the level of total clean electricity deployed. However, even in these cases, the IRA and BIL were still found to drive substantial increases in the clean electricity share, reaching over 70%, with power sector emissions falling to 72% below the 2005 level. Nonetheless, the lower rate of clean energy deployment in the deployment constrained and high clean cost cases highlights the potential value of continued research and development to drive advancements in clean electricity technologies as well as actions taken to mitigate existing and developing constraints on deployment of clean electricity, transmission, and pipeline and storage infrastructure.

Finally, while this suite of changes ultimately arise as a result of the overall increase in investment in clean electricity technologies, the increased capital expenditures (and non-fuel operating expenditures) are more than offset by a reduction in fuel expenditures associated with decreased fossil generation and increased value (and scope) of the tax credits. In aggregate, this leads to a net reduction in average bulk power system costs.

Irrespective of future market conditions we find that the IRA and BIL could spur substantial increases in clean technology investment in the U.S. power sector, driving down greenhouse gas emissions, all while lowering electricity costs. Fully realizing these modeled benefits will require action by all jurisdictions of U.S. government—federal, state, and local—the private sector, and civil society to support the beneficial deployment of clean energy technologies.

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ATMOSPHERIC SCIENCE

Substantial global influence of anthropogenic aerosols on tropical cyclones over the past 40 years

Hiroyuki Murakami[1,2]*

Over the past 40 years, anthropogenic aerosols have been substantially decreasing over Europe and the United States owing to pollution control measures, whereas they have increased in South and East Asia because of the economic and industrial growth in these regions. However, it is not yet clear how the changes in anthropogenic aerosols have altered global tropical cyclone (TC) activity. In this study, we reveal that the decreases in aerosols over Europe and the United States have contributed to significant decreases in TCs over the Southern Hemisphere as well as increases in TCs over the North Atlantic, whereas the increases in aerosols in South and East Asia have exerted substantial decreases in TCs over the western North Pacific. These results suggest that how society controls future emissions of anthropogenic aerosols will exert a substantial impact on the world's TC activity.

INTRODUCTION

The effect of anthropogenic climate change on global tropical cyclone (TC) activity is of great interest for society because of the substantial adverse impacts that TCs can have in terms of natural hazards, water resources, ecosystems, economies, insurance, and mitigation policy. Hence, a large body of work has already been carried out by scientists with respect to how anthropogenic climate changes can potentially alter global TC activity, and this has been examined in the context of past, present-day, and future climates (*1*, *2*). Although the detection and attribution of changes in TC activity in the past is a challenging topic owing to the lack of long-term reliable observations, several studies have shown a potential impact of anthropogenic climate changes on global TC activity over the past 40 years (*1*–*6*). Specifically, Murakami *et al.* (*5*) revealed, using a large number of climate modeling simulations, that a climatological change in global TC activity over the period 1980–2018 can be detected in the spatial pattern of TC frequency of occurrence (i.e., TCF or TC density; "Observed data" section). They showed that TCF has decreased substantially in the South Indian Ocean and western North Pacific (WNP) since 1980, whereas it has increased in the North Atlantic (NA) and Central Pacific. They revealed that these changes were attributable to the changes in combined external forcing, including greenhouse gases, anthropogenic aerosols, and volcanic eruptions.

Meanwhile, Murakami *et al.* (*5*) showed substantial decreases in TCF over the NA in the experiments in which only CO_2 was increased while other external forcings were fixed. The sign of the changes in TCF in the NA was opposite to that in the experiments run with all anthropogenic forcings. These results indicate a substantial influence of anthropogenic aerosols on TC activity in the NA, which is a finding that is consistent with a previous study (*7*). Evan *et al.* (*8*) also reported a potential impact of anthropogenic aerosols from South Asia on TC activity over the Arabian Sea. However, these studies focused on the impacts of aerosols on TC activity at local scale. There is relatively less literature on how the changes in anthropogenic aerosols all over the world could have potentially influenced global TC activity over the past 40 years. Emissions of anthropogenic aerosols, specifically sulfate, since 1980 have been spatially inhomogeneous, with decreased levels in the Western Hemisphere (e.g., Europe and the United States) owing to pollution control measures and increased levels in the Eastern Hemisphere (e.g., South and East Asia) because of the economic and industrial growth in these regions. We hypothesize that this spatial contrast in the changes in aerosol emissions may have had substantial impacts on TC activity not only at local scales but also at the global scale, through global changes in large-scale circulation patterns. By analyzing the results from several idealized climate simulations, the present paper reveals how the global changes in emissions of anthropogenic aerosols since 1980 may have influenced the spatial distributions of TCs throughout the world.

RESULTS

Changes in TC spatial distributions

Figure 1A shows the observed difference in TCF ("Observed data" section) between the means of 2001–2020 and 1980–2000, revealing significant decreases in TCF over the WNP and Southern Hemisphere (SH) and increases in the NA (highlighted in the black rectangles in Fig. 1A). The observed changes in sea surface temperature (SST) over the same period show substantial warming globally (Fig. 1B). Specifically, the warming is larger over the mid-latitudes of the WNP, NA, and southern Pacific. The east-west spatial contrast in the warming over the Pacific Ocean, with a triangular-shaped cooling region in the east, resembles the known patterns of decadal variation in SSTs [e.g., mega El Niño–Southern Oscillation (*9*) or Interdecadal Pacific Oscillation (*10*)] such that the observed changes in TCF, as shown in Fig. 1A, could be a result of various factors including multidecadal internal variation and/or anthropogenic forcing such as greenhouse gases and aerosols, as reviewed by Murakami *et al.* (*5*).

To reveal the individual impacts of the regional distribution of changes in anthropogenic aerosols on TCs globally since 1980, we conducted idealized climate model experiments by imposing different spatial emission patterns of anthropogenic aerosols (including sulfate, black carbon, and organic carbon aerosols related to human activity), while the other experimental settings remained identical ("Model" and "Model experiments" sections). In the early-decade

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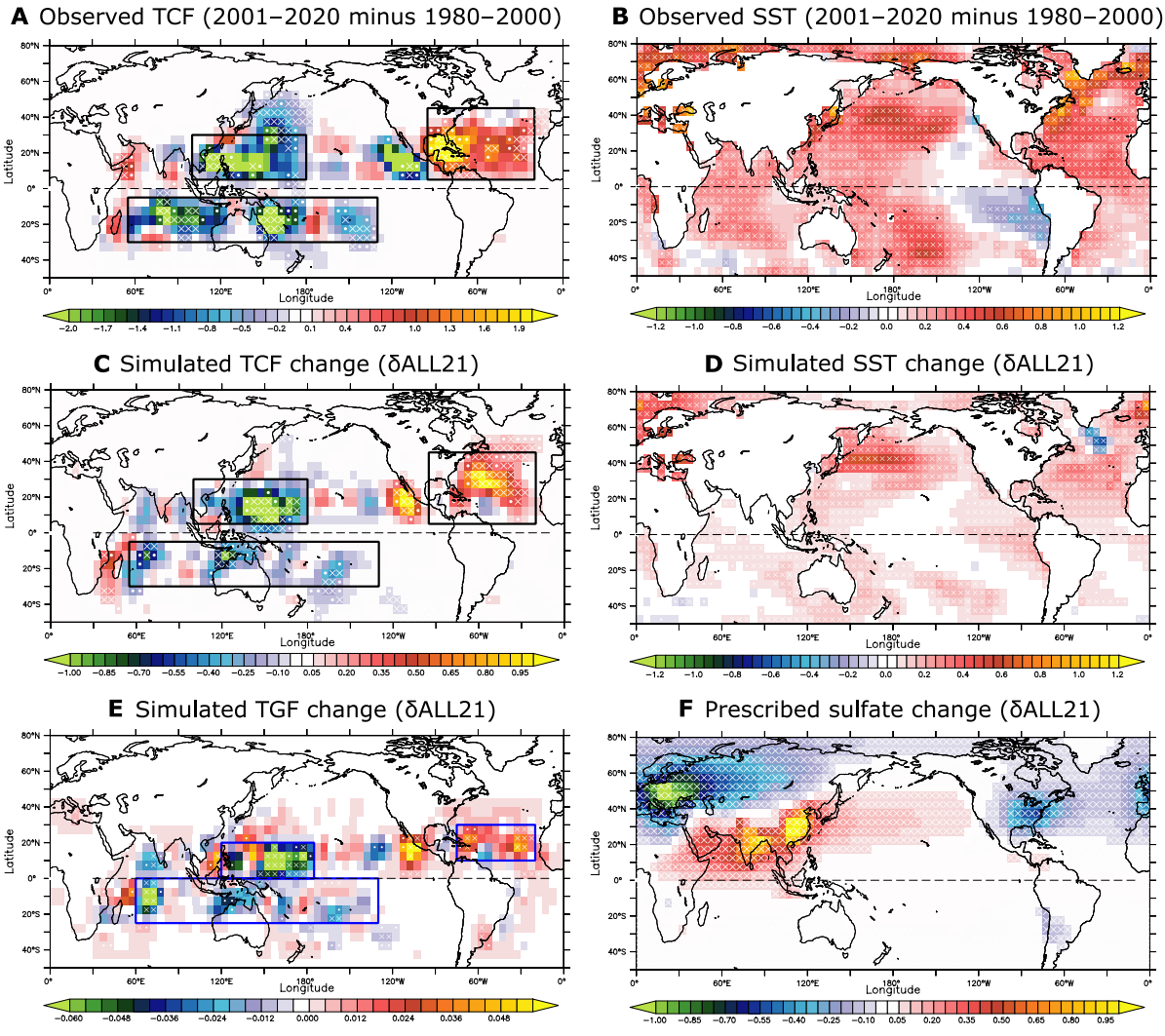

Fig. 1. Observed and simulated changes in SST, TCF, TGF, and sulfate. (**A**) Mean difference in the observed (A) TCF and (**B**) SST between 1980–2000 and 2001–2020. (**C** and **D**) As in (A) and (B) but for the simulated differences between ALL21 and CNTL. (**E** and **F**) As in (C) but for the simulated TGF and simulated column-integrated sulfate burden in response to the prescribed emissions of sulfate, respectively. Note that sulfate aerosols are just one type of aerosol emission included in the experiments, along with black carbon and organic carbon. White crosses (dots) indicate where the difference over the grid cell is statistically significant at the 95% (90%) level according to the bootstrap method. Units: number per year for TCF and TGF, K for SST, and kg m^{-2} for sulfate.

control experiment (CNTL), the mean emissions of anthropogenic aerosols for the period 1980–2000 were prescribed, whereas the mean values during 2001–2020 were adopted in the late-decade experiment (ALL21). The difference in the simulated sulfate aerosols between ALL21 and CNTL—namely, δALL21—is shown in Fig. 1F, revealing substantial decreases in anthropogenic sulfates over Europe and the United States and increases over South and East Asia. The resultant differences in the simulated TCF and SST reveal somewhat similar spatial patterns as observed, especially over the domains of interest (Fig. 1, C and D). These consistent changes in TCF and SST between observations and the model simulations reveal a substantial influence of anthropogenic aerosols on the global distribution of TCs and associated large-scale parameters.

The changes in TCF might be associated with the corresponding changes in TC genesis frequency (dg), TC track or motion (dt), and/or their nonlinear combinations (dn). We applied an empirical statistical method of passage frequency (*11*, *12*) ("Empirical statistical analysis for TCs" section) to quantify each factor's contribution to the total changes in TCF for each domain in Fig. 1C. The results reveal that the change in TC genesis (dg) was the primary contributor to the total change in TCF for all domains (Fig. 2A). The changes in TC genesis frequency of occurrence (i.e., TGF; "Observed data" section) for δALL21 (Fig. 1E) reveal similar changes to those for TCF (Fig. 1C).

Impact of anthropogenic aerosols on global TC genesis

To further elucidate what caused the TGF changes in the domains indicated by the blue boxes in Fig. 1E, we applied a recently developed (*13*) dynamic TC genesis potential index (DGPI) ("GPI and variational method" section). The DGPI consists of four dynamical factors, and the DGPI changes adequately reflect the TGF changes (Fig. 2B). By applying a variational method ("GPI and variational method" section), we were able to identify which element of the DGPI is responsible for the total changes in DGPI (Fig. 2, C to F). It turns out that the changes in upward midlevel motion (ω_{500}) is the

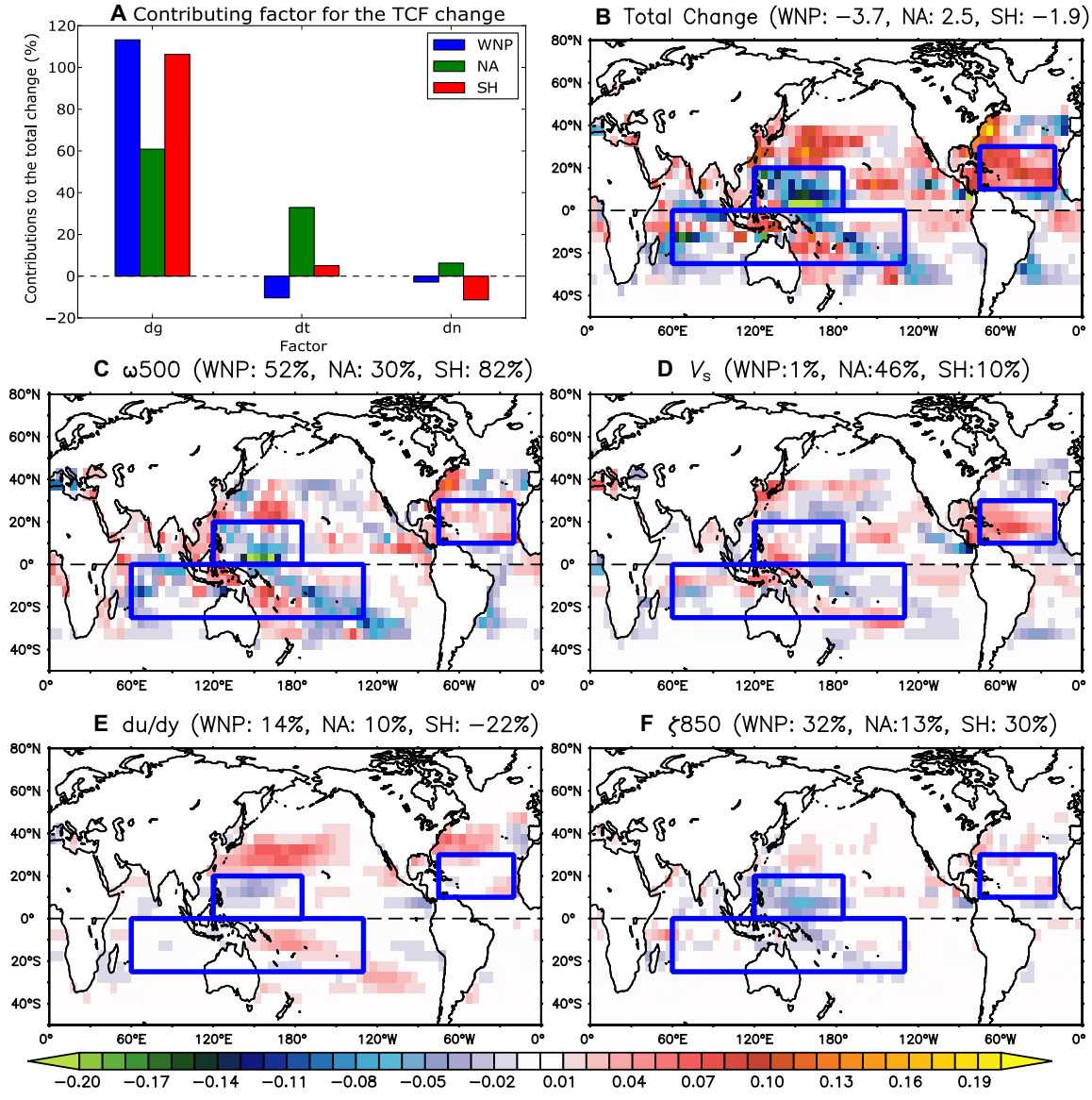

Fig. 2. Empirical and DGPI analysis to identify the causes for the TCF and TGF changes. (**A**) Fractional contribution of each term to the TCF changes. TCF changes over the three tropical domains (black rectangles in Fig. 1A) are decomposed into TC genesis change (dg), TC track change (dt), and other nonlinear effects (dn) through an empirical statistical analysis. (**B** to **F**) Fractional contribution of each term to the total DGPI change. The total DGPI changes (B) are decomposed into each term's contribution through a variational method by (C) ω_{500} (vertical velocity at 500 hPa), (D) V_s (vertical wind shear between 200 hPa and 500 hPa), (E) du/dy (meridional shear vorticity at 500 hPa), and (F) ζ_{850} (absolute vorticity at 850 hPa). The numbers in (B) denote the area mean changes in DGPI over the three tropical domains, while the numbers in (C) to (F) denote the fractional contributions to the total changes for each domain and each variable.

primary contributor to the decreases in DGPI in the WNP and SH, whereas the changes in vertical wind shear is the primary contributor to the increase in DGPI in the NA. These results suggest substantial changes in large-scale circulations caused by the changes in anthropogenic aerosols, which, in turn, have led to the changes in TGF.

To help us interpret what is indicated by the results of the DGPI analysis, Fig. 3 (A and B) shows the mean circulation at the 200-hPa level simulated in the CNTL experiment. The three domains of interest are actually located between the subtropical westerly jets in both hemispheres, and the simulated mean wind speed at 200 hPa is relatively weaker (Fig. 3A). The WNP and SH domains are also located near the center of divergence fields in the upper troposphere, whereas the NA domain is located where the convergence fields are in the upper troposphere climatologically (Fig. 3B). The changes in upper-tropospheric winds simulated by ALL21 show alternating patterns, revealing poleward shifts of the subtropical westerly jets (Fig. 3C). The tropical NA is subject to weakened westerly winds (Fig. 1C), which, in turn, lead to reduced vertical wind shear, resulting in increased TC activity. In contrast, the mean changes in the divergent winds show convergence anomalies over the WNP and SH domains (Fig. 3D), revealing that the mean upward motion was weakened over these domains, which, in turn, led to decreased TGF and TCF. Overall, these changes are consistent with the DGPI analysis and could be the primary reason for the changes in TC activity.

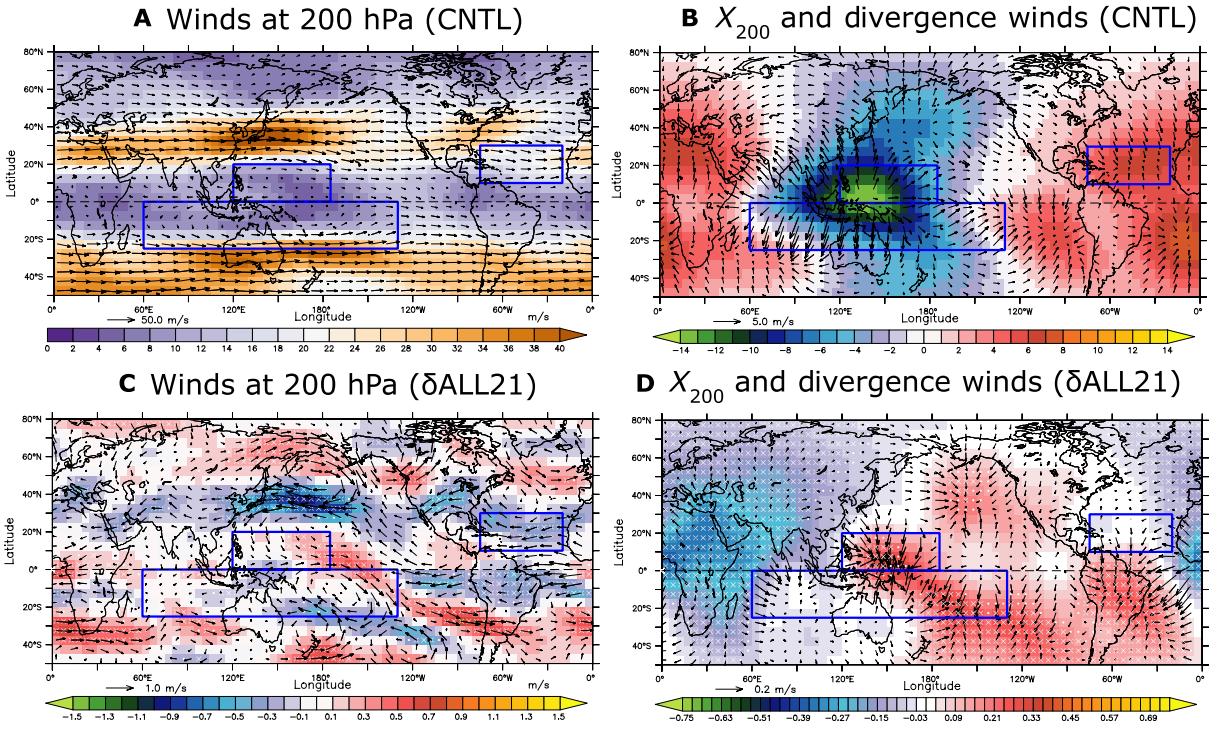

Fig. 3. Simulated mean large-scale circulation and the changes in the upper troposphere. (**A**) The mean winds at 200 hPa (vectors) and the wind speed for the zonal component (shading) simulated by the CNTL experiment. (**B**) The mean velocity potential (shading) and divergent winds (vectors) at 200 hPa simulated by the CNTL experiment. (**C** and **D**) As in (A) and (B) but for the simulated differences between the ALL21 and CNTL experiments. White crosses (dots) indicate where the difference in zonal wind over the grid cell is statistically significant at the 95% (90%) level according to the bootstrap method. Units: m s^{-1} for wind speed and divergent winds; 10^6 m^2 s^{-1} for velocity potential.

Impact of regional aerosol changes on TCs globally

As indicated in Fig. 1F, the decadal changes in anthropogenic sulfate aerosols since 1980 are not spatially homogeneous: They decrease over Europe and the United States but increase over South and East Asia. Therefore, these different signs of change may exert different changes in global TC activity. To investigate this hypothesis, we conducted two further climate model simulations like ALL21 but with separately prescribed decreased emissions of anthropogenic aerosols over Europe and the United States (W21; Fig. 4A) and increased emissions of aerosols over South and East Asia (IP21; Fig. 4E and Table 1). Figure 4 (B and F) reveals the changes in TCF simulated by the W21 and IP21 runs relative to the CNTL experiment, respectively. The simulated changes in TCF reveal somewhat similar changes between δW21 and δIP21; however, there are some substantial differences in the detail. For example, the increases in TCF in the NA are significant in δW21 but not in δIP21 (Fig. 4, B and F, and Table 2). On the other hand, both δW21 and δIP21 reveal decreased TCF in the WNP but more significantly in δIP21 than in δW21. The decreased TCF in the SH is significant in δW21 but not in δIP21. The changes in large-scale circulations also reflect these TCF differences (Fig. 4, C, D, G, and H). Although both δW21 and δIP21 show a poleward shift in the subtropical westerly jets in the Northern Hemisphere (NH), the shift is further extended to the NA in δW21 but is not extended in δIP21 (Fig. 4, C and G). Therefore, the increases in TCF in the NA in δALL21 are more attributable to the decreased anthropogenic aerosols in Europe and the United States, whereas the effect of increased aerosols in South and East Asia imposes minimal effects on the TCF and TGF changes in the NA. Meanwhile, the decreases in TCF and TGF in the SH simulated by δALL21 are more attributable to the decreased anthropogenic aerosols in Europe and the United States via the increasing convergence in the upper troposphere over the SH (Table 2 and Fig. 4D).

DISCUSSION

We speculate that the reduction in anthropogenic aerosols in Europe and the United States has caused hemispheric heating in the NH relative to the SH, which, in turn, has led to anomalous meridional atmospheric overturning circulation. More specifically, the NH acts as an ascending branch, whereas the SH acts as a descending branch, meaning convective activity is suppressed in the SH, leading to fewer TCs being generated there. As for the WNP, the effect of increased anthropogenic aerosols from India and China might have played a major role in the decreased TCF and TGF in the WNP relative to the decreased aerosols in Europe and the United States. The increases in anthropogenic aerosols might have led to a cooling over the Asian continent, thereby reducing the thermal contrast between the Asian continent and the Indo-Pacific oceans, in turn leading to a weakening of the Asian monsoon circulation in the boreal summer (Fig. 5). Accordingly, the monsoon trough, which is one of the major sources of TC genesis in the WNP (*14*), would be weakened in the summer, resulting in decreased TCF and TGF over the WNP (Fig. 5).

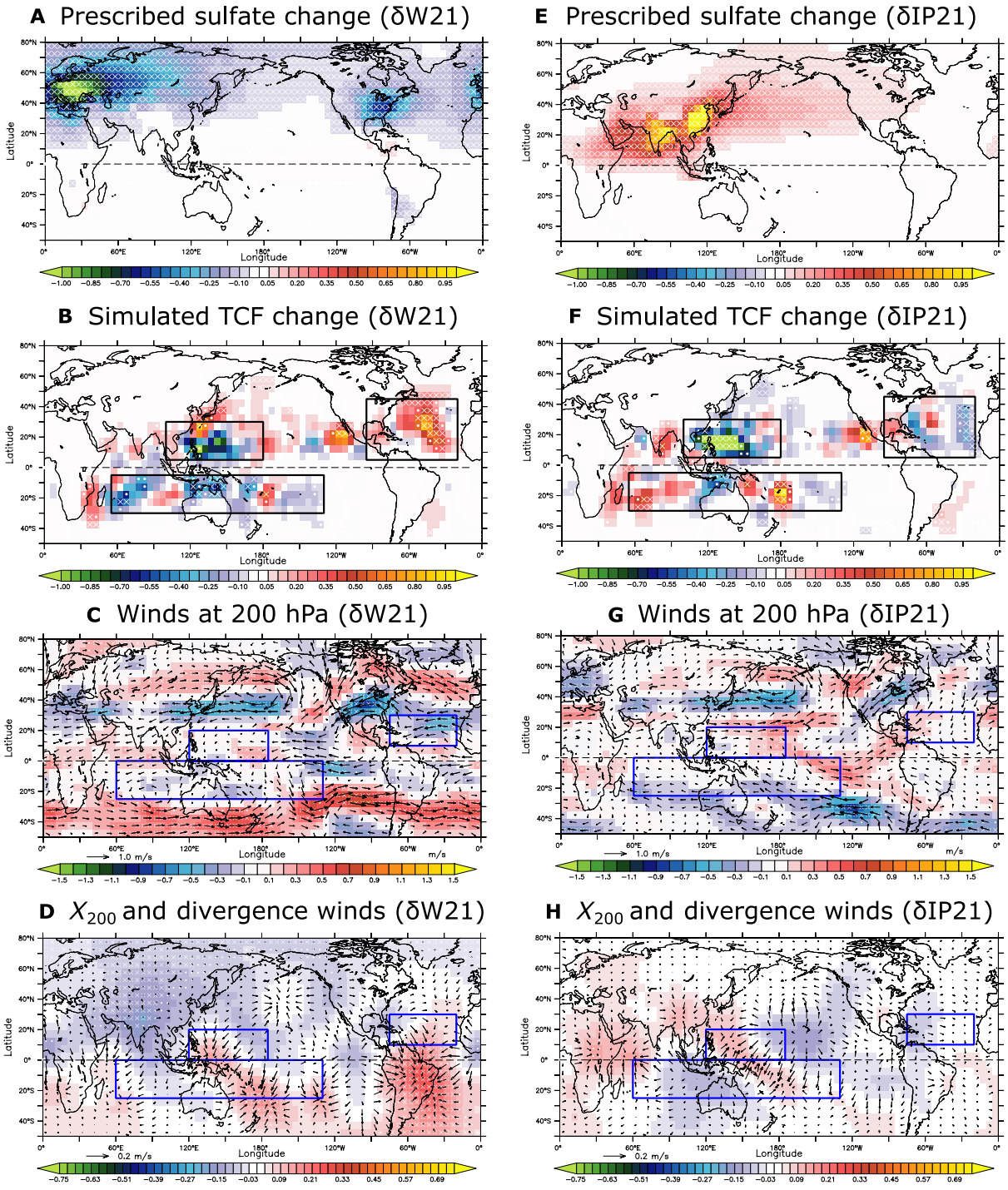

Fig. 4. Simulated changes by the additional idealized aerosol-prescribed experiments. (**A** to **D**) Idealized experiments prescribed with decreased emissions of anthropogenic aerosols over Europe and the United States only (W21). (**E** to **H**) As in (A) to (D) except for increased emissions of anthropogenic aerosols over South and East Asia (IP21). (A) and (E), (B) and (F), (C) and (G), and (D) and (H) are the same as in Figs. 1 (F and C) and 3 (C and D) but for W21 and IP21, respectively.

The weakening of vertical wind shear in NA could be partially the result of local ocean warming by the decreased anthropogenic aerosols through the wind-evaporation-SST feedback (*15*–*16*) as an analogy of Atlantic Meridional Mode (AMM) (*17*–*19*). The surface ocean warming might have caused a northward shift of the Inter-tropical Convergence Zone that, in turn, leads to a northward shift in ascending branch of the Hadley circulation that reduces upper-level westerlies around the main development region of Atlantic TCs. Meanwhile, it is argued that AMM is an intrinsic atmosphere-ocean coupled internal mode, and its decadal variation might have caused decadal variations in hydroclimate including TCs in the NA over the past 40 years (*16*, *19*). Because the SPEAR (Seamless System for

Table 1. Experimental settings. Listed are the experiment names, prescribed emissions of anthropogenic aerosols, prescribed level for other external forcings (e.g., greenhouse gases and ozone), and the number of simulation years.

Name	Prescribed anthropogenic aerosols	Other external forcing	Simulation years
CNTL	1980–2000 mean	Fixed level at 2000	200
ALL21	2001–2020 mean		
W21	As in CNTL except for the 2001–2020 mean over Europe and US		
IP21	As in CNTL except for the 2001–2020 mean over South and East Asia		

Table 2. Observed and simulated changes in TCF and TGF. Observed and simulated changes were computed over the tropical domains of the WNP, NA, and SH for TCF (black rectangles in Fig. 1A) and TGF (blue rectangles in Fig. 1E). The bold numbers indicate where the change is statistically significant at the 95% level based on a bootstrap method. Numbers in parentheses denote the *P* value.

TCF

	Period or difference	Fractional difference (*P* value)		
		WNP	NA	SH
Observations	2001–2020 minus 1980–2000	**−22.3**% (0.03)	**30.6**% (0.01)	**−34.5**% (0.00)
δALL21	ALL21 minus CNTL	**−4.8**% (0.01)	**8.7**% (0.00)	**−6.4**% (0.01)
δW21	W21 minus CNTL	−1.4% (0.46)	**6.5**% (0.03)	**−4.8**% (0.03)
δIP21	IP21 minus CNTL	**−4.1**% (0.04)	−1.8% (0.60)	1.9% (0.36)

TGF

	Period or difference	Fractional difference (*P* value)		
		WNP	NA	SH
Observations	2001–2020 minus 1980–2000	**−13.8**% (0.02)	**33.6**% (0.00)	**−15.9**% (0.01)
δALL21	ALL21 minus CNTL	**−5.9**% (0.00)	**8.1**% (0.01)	**−7.0**% (0.00)
δW21	W21 minus CNTL	−2.8% (0.11)	4.7% (0.13)	**−3.9**% (0.03)
δIP21	IP21 minus CNTL	**−4.6**% (0.01)	−2.0% (0.55)	2.4% (0.19)

Prediction and Earth System Research) model reasonably simulates AMM in terms of the amplitude and power spectrum as observed (fig. S1), we estimated how much the decadal variation in AMM can potentially affect the TCF increases relative to the effect of anthropogenic aerosol forcing (Fig. 6). Overall, the SPEAR experiments reveal that the decadal variation in AMM might have partially contributed to the increasing TCF over the NA, but the increases in TCF are not as large as the increases through the effect of anthropogenic aerosols.

In this study, we applied a newly developed DGPI to the analysis of TGF changes. This is because the simulated changes in DGPI were relatively more consistent with the simulated changes in TGF than those in the other conventional GPI formula. For example, another GPI commonly used is Emanuel and Nolan's GPI (*20*). Although this GPI also reproduced a similar spatial pattern in the changes to the changes in TGF and DGPI for δALL21, this GPI is markedly inconsistent with the total changes in TGF over the key domains of the tropical WNP and the SH (fig. S2). Most of the GPI formula had been optimized on the basis of the observed TGF and reanalysis data for the present-day climate but not on the basis of the different climates such as future projections. Therefore, particular attention should be directed to the uncertainty in the usage of GPIs for interpreting the changes in TGF in different climates.

As reviewed earlier, previous studies have reported the effects of anthropogenic aerosols on TC activity at local scales from a thermodynamical point of view. For example, aerosol loading over the open oceans can inhibit solar insolation at the surface, leading to cooler surface oceans that, in turn, lead to suppressed convection and decreased TC activity (*7*). This paper adds one more important aspect to the dynamical viewpoint. The decreased anthropogenic aerosols in Europe and the United States must have caused anomalous heating in the mid-latitudes of the NH, thereby causing reduced meridional gradients of atmospheric temperature. This, in turn, will have led to a poleward shift in the subtropical jets, thereby altering the vertical wind shear that is important for TC activity in the NA. The additional heating in the mid-latitudes in the NH might have also induced subsidence anomalies over the tropics in the SH, thereby reducing the frequency of TCs over the SH.

Note that although the signs of the changes in TCF and TGF in δALL21 are consistent with the observed changes over the past 40 years in most regions, quantitatively the changes are different from each other (Table 2). This is because other factors aside from anthropogenic aerosols might also have been involved in the observed changes in global TC activity since 1980. As reported in one of our previous studies (*5*), greenhouse gases, volcanic eruptions, and multidecadal natural variability might also have played important roles in the observed changes in TCs globally since 1980. Also, a rigorous estimate of quantitative contribution of anthropogenic aerosols to the observed changes in TCF remains challenging in this study. This is because the idealized experiments that we applied were so-called fixed forcing experiments in which long-term simulations were conducted with the fixed level of anthropogenic forcing. This allows modeled climate system to adjust more than it would via a transient response to forcing changes occurring over a 40-year period.

Another caveat is that the SPEAR model systematically underestimates intense TCs such as the Saffir-Simpson category 3–5 TCs (maximum wind speed $\geq$ 50 m s^{-1}) because the 50-km mesh horizontal resolution is not high enough to resolve the intense TCs. Because the observed changes in TCF for category 3–5 TCs are somewhat different from those for all storms including both weaker and intense TCs (Fig. 7), there might be uncertainty in the model results for which category 3–5 TCs are missing. However, we may be able to investigate whether the simulated changes of TCF in the relatively intense TCs for the SPEAR model are consistent with these in the observed category 3–5 TCs. It turned out that the threshold of 50 m s^{-1} for the observed category 3–5 TCs corresponds

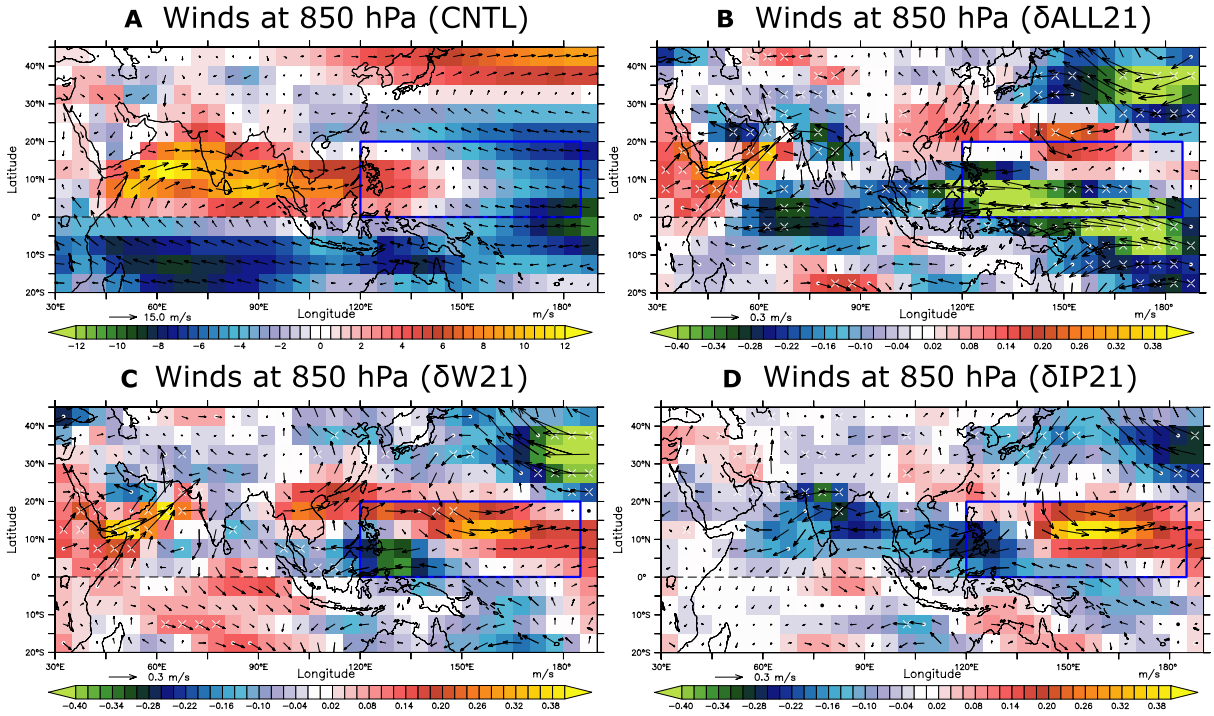

Fig. 5. Simulated Asian monsoon and its changes. (**A**) Mean winds at 850 hPa (vectors) and the wind speed for the zonal component (shading) during July–October simulated by the CNTL experiment. (**B**) As in (A) but for the simulated differences between the ALL21 and CNTL experiments. (**C** and **D**) As in (B) but for the W21 and IP21 experiments, respectively. White crosses (dots) indicate where the difference in zonal wind over the grid cell is statistically significant at the 95% (90%) level according to the bootstrap method. Units: m s^{-1}.

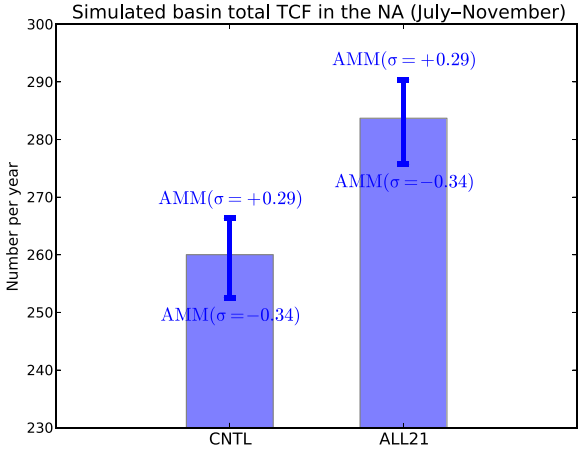

Fig. 6. Simulation basin total July–November TCF over the North Atlantic Ocean. (**A**) The histogram shows the July–November mean basin total TCF over the North Atlantic during July–November through the 200-year simulations (CNTL and ALL21) by SPEAR. The error bars show the regressed range of July–November basin total TCF between AMM index +0.29σ and −0.34σ in the SPEAR simulations. The simulated basin total TCF was linearly regressed onto the simulated AMM index. Then, the TCF values at the specific AMM index values were computed using the linear relationship. Given the fact that the observed July–November averaged AMM index was +0.29σ over the period 2001–2020 and −0.34σ over the period 1980–2000, the range of computed regressed TCF values between AMM index +0.29σ and −0.34σ is assumed to be the effect of decadal change in AMM on TCF variation in the SPEAR model. This figure highlights that AMM affects the basin total TCFs in the model, but the magnitude of the AMM effect, as measured by the length of error bars, is not as large as the mean difference caused by anthropogenic aerosols (i.e., mean difference between ALL21 and CNTL).

to the 87th percentile for the intensity of all storms in observations. The same 87th percentile of the storm intensity for all simulated TCs by the SPEAR model corresponds to 37 m s^{-1}. Therefore, the simulated storms with a maximum wind speed of 37 m s^{-1} or greater may be considered as "category 3–5 equivalent TCs" to represent intense TCs in the SPEAR model. The SPEAR model through δALL21 shows a similar spatial pattern of the TCF changes in the category 3–5 equivalent TCs to that of the observed category 3–5 TCs (Fig. 7). This indicates that, consistent with observations, the SPEAR model shows the different responses of TCF between weaker and intense storms to the aerosol forcing. Meanwhile, it would be preferable to use a high-resolution model that can simulate intense TCs to minimize uncertainty.

Last, it is important to emphasize that changes in anthropogenic aerosols, as well as greenhouse gases, apparently can exert substantial impacts on global TC activity, which delivers an important message to society regarding the seriousness of the impacts our activities are having and therefore the political decisions we make in the future in terms of changes in emissions and their potential impacts on TC activity on the global scale.

MATERIALS AND METHODS

Observed data

The International Best Track Archive for Climate Stewardship (*21*), version 4, was used over the period 1980–2020 for the TC data. We defined a TC by the lifetime maximum intensity being greater than or equal to 34 knots (i.e., 17.5 m s^{-1}) in the observations. As in our previous study (*5*), only TC positions with maximum surface wind speeds of 34 knots or greater were counted every 6 hours over each

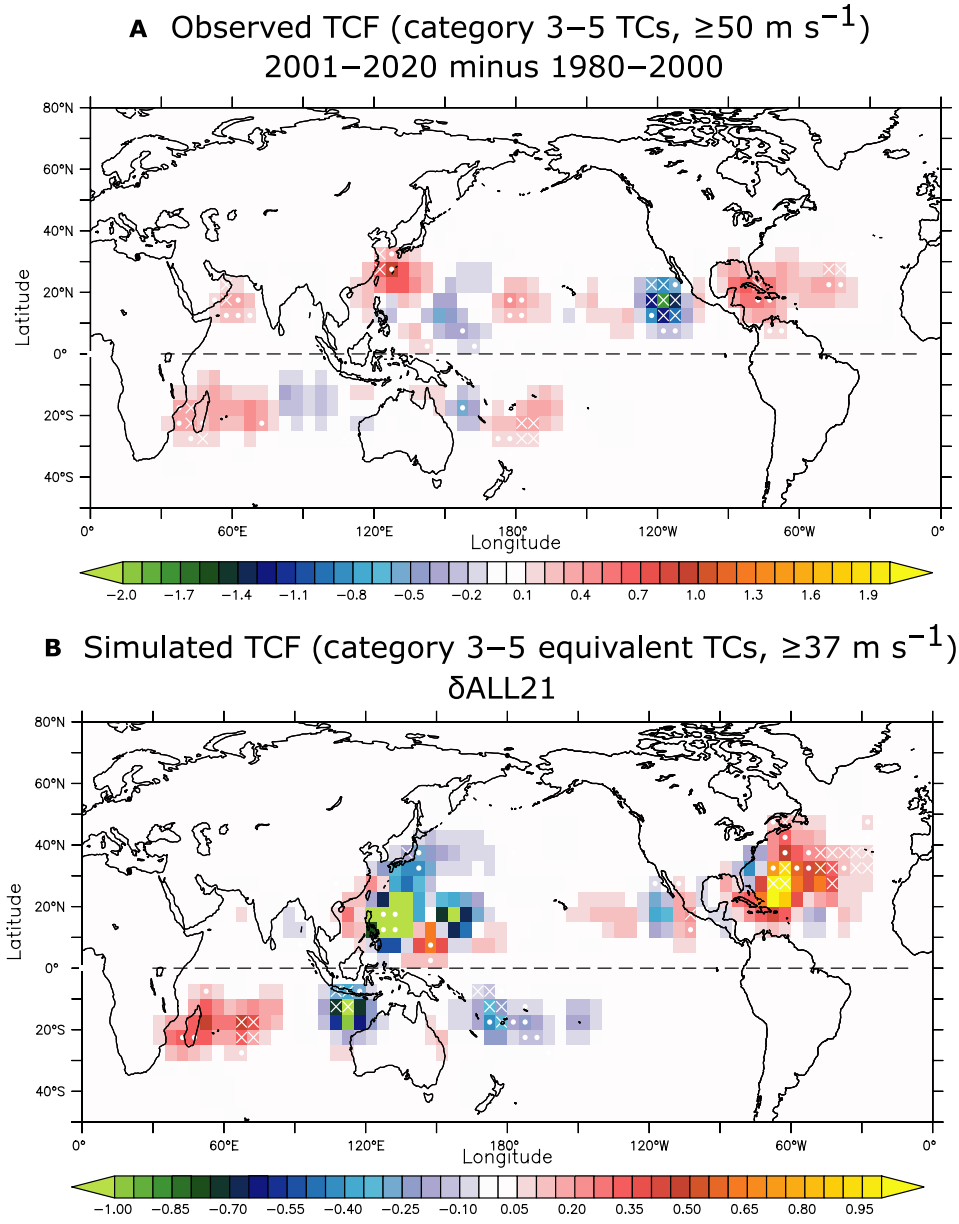

Fig. 7. Observed and simulated changes in category 3–5 TCs. (**A**) Mean difference in the observed TCF for the storm locations with maximum surface wind speeds of 50 m s^{-1} or greater. (**B**) As in (A) but for the simulated difference between ALL21 and CNTL in terms of the category 3–5 equivalent TCs (≥37 m s^{-1}). It turned out that the threshold of 50 m s^{-1} for the observed category 3–5 TCs corresponds to the 87th percentile for the intensity of all storms in the observations. The same 87th percentile in the SPEAR model corresponds to 37 m s^{-1}. Therefore, the simulated storms with a maximum wind speed of 37 m s^{-1} or greater are considered as category 3–5 equivalent TCs in the SPEAR model.

5° × 5° grid box globally. The total count for each grid box was defined as the TCF. The TCF fields were further smoothed using a nine-point moving average weighted by distance from the center of the grid box. The same computation was also applied to TC genesis (i.e., the TGF). The monthly mean large-scale parameters, such as 200- and 850-hPa winds, were derived from the Japanese 55-year Reanalysis (*22*) over the same period of 1980–2020.

Model

The Geophysical Fluid Dynamics Laboratory Seamless System for Prediction and Earth System Research (SPEAR) (*23*) was used for the climate model simulations. SPEAR consists of the new AM4-LM4 atmosphere and land surface model (*24*, *25*), the MOM6 ocean model (https://github.com/NOAA-GFDL/MOM6), and the SIS2 sea-ice model (*26*). The horizontal resolution of the ocean and ice components is 1° × 1° while that of the atmosphere and land surface is an approximate 50-km mesh. Note that SPEAR simulates the mass distribution of five aerosol types: sulfates, dust, black carbon, organic carbon, and sea salt. The concentrations in the model are calculated on the basis of the emissions, chemical production for sulfate and secondary organics, dry and wet deposition, transport by advection, and dry and wet convection (*24*). Specifically, SPEAR

includes a physical process that interacts between aerosols and convection (i.e., the aerosol indirect effect) (*24*).

Model-simulated TCs were obtained directly from 6-hourly outputs using the scheme documented by Harris *et al.* (*27*). In short, the flood fill algorithm is applied to find closed contours of sea level pressure anomalies along with 1-K temperature anomalies to identify the warm core. The storm detection must maintain above certain conditions, as well as a specified relaxed wind speed criterion (i.e., 15.75 m s^{-1}) due to the 50-km horizontal resolution, for at least 36 consecutive hours.

Model experiments

We conducted four types of climate simulations using SPEAR by prescribing various spatial patterns of emissions of anthropogenic aerosols. A summary of the experiments is provided in Table 1. These experiments are so-called long-term climate simulations prescribed with fixed anthropogenic forcing. The simulations were initiated from the random restart files derived from the 1000-year preindustrial control experiments. The simulation length was 210 years, but the first 10 years were disregarded as the spin-up period. In the experiments, the solar constant and all anthropogenic forcings except that of anthropogenic aerosols (e.g., greenhouse gases and ozone) were fixed at the year 2000 level. The only differences among the four experiments were the prescribed emissions of anthropogenic aerosols (i.e., sulfur dioxide, sulfates, black carbon, and organic carbon emissions caused by human activity including agriculture, industrial, transportation, residential, commercial, solvent production, and waste). In the model, in addition to the above anthropogenic aerosol emissions, dust emissions are calculated interactively using a threshold for wind erosion, and sea salt emissions are also computed interactively. The CNTL experiment was prescribed with the mean emissions of anthropogenic aerosols over the period 1980–2000, and a counter experiment (ALL21) was prescribed with the mean emissions of anthropogenic aerosols over the period 2001–2020. Therefore, the difference between ALL21 and CNTL (i.e., δALL21) represented the difference in the emissions of anthropogenic aerosols between 1980–2000 and 2001–2020. An idealized experiment, W21, was also conducted, which was identical to ALL21 except that only the changes in emissions of anthropogenic aerosols over Europe and the United States were included, with the rest of the world remaining unchanged from CNTL. Another idealized experiment, IP21, was also carried out. This was again identical to ALL21 except that only the changes in emissions of aerosols over South and East Asia were included.

Empirical statistical analysis for TCs

To reveal the relative importance of TC genesis, TC tracks, and their combinations for the changes in local TCF, we applied the empirical statistical analysis technique developed by Yokoi and Takayabu (*11*) and Murakami *et al.* (*12*). Full details of the method are of course available in those references; however, in short, the climatological mean TCF in a 5° × 5° grid cell can be written as follows

$$\overline{f(A)} = \iint_C \overline{g(A_0)} \times \overline{t(A,A_0)}\, dA_0 \tag{1}$$

where $f(A)$ is the TCF in a specific grid cell A, the overline indicates a climatological mean, $g(A_0)$ is the frequency of TC genesis in grid cell A_0, $t(A, A_0)$ is the probability that a TC generated in grid cell A_0 propagates to grid cell A, and C is the entire global domain over which the integration is performed. The change in TCF over grid A simulated by an idealized experiment relative to the reference experiment can be written as follows

$$\delta f(A) = \underbrace{\iint_C \delta g(A_0) \times \overline{t(A,A_0)}\, dA_0}_{dg} + \underbrace{\iint_C \overline{g(A_0)} \times \delta t(A,A_0)\, dA_0}_{dt} + \underbrace{\iint_C \delta g(A_0) \times \delta t(A,A_0)\, dA_0}_{dn} \tag{2}$$

where δ is the simulated change of an experiment relative to the reference experiment (e.g., δALL21). The simulated change in TCF can be decomposed into three factors: (i) TC genesis distribution change (first term, dg); (ii) TC track change (second term, dt); and (iii) the nonlinear effect (third term, dn). After computing these three terms for each grid, the area averages of these are computed for the domains of interests (blue rectangles in Fig. 1E) to reveal the factors responsible for the changes in local TCF over the domains (Fig. 2A).

GPI and variational method

A new GPI developed by Wang and Murakami (*13*) was applied to the climate simulations to quantify the large-scale parameters responsible for the changes in TGF. Unlike the conventional GPI formula, the new GPI, termed the dynamical GPI (DGPI), consists of four dynamical parameters only, as follows

$$DGPI = (2.0 + 0.1 \times V_s)^{-1.7} \left(5.5 - \frac{\mathrm{du}_{500}}{\mathrm{dy}} \times 10^5\right)^{2.3} (5.0 - 20 \times \omega_{500})^{3.4} (5.5 + |\zeta_{a500} \times 10^5|)^{2.4} e^{-11.8} - 1.0 \tag{3}$$

where V_s represents the vertical wind shear, which is defined as the magnitude of the difference in wind speed between the 200- and 850-hPa levels (units: m s^{-1}); ζ_{a850} is the absolute vorticity at the 850-hPa level (s^{-1}); ω_{500} represents the vertical p velocity (Pa s^{-1}) at 500 hPa; and du_{500}/dy denotes the meridional shear vorticity associated with the zonal wind at 500 hPa (u_{500}, s^{-1}). Wang and Murakami (*13*) revealed a reasonable representation of the climatological mean of global TGF in addition to the interannual variations relative to observations. Note that the DGPI is not completely independent of the thermodynamic factors. DGPI implicitly includes the thermodynamic effect by incorporating the vertical motion term (ω_{500}). ω_{500} is highly correlated with midlevel relative humidity. In general, mean upward motion is important for TC genesis because the boundary layer flows converge and the upward transfer of moisture increases the midlevel relative humidity (*13*). Both the dynamic and thermodynamic conditions are also conducive to the initiation of organized convection or incipient cyclonic circulation (i.e., the "seeds"). DGPI is also significantly correlated with SST and maximum potential intensity (*13*).

To quantify which of the changes in the four variables in the DGPI were responsible for the changes in the DGPI between the two climate simulations, we applied a variational method. The changes in DGPI can be decomposed into four factors, as follows

$$\Delta\mathrm{DGPI} = \Delta F1 \cdot \overline{F2 \cdot F3 \cdot F4} + \Delta F2 \cdot \overline{F1 \cdot F3 \cdot F4} + \Delta F3 \cdot \overline{F1 \cdot F2 \cdot F4} + \Delta F4 \cdot \overline{F1 \cdot F2 \cdot F3} \tag{4}$$

where the overbar represents the mean of a reference experiment (i.e., CNTL) and Δ represents the change of an experiment relative to the reference experiment. *F* represents each component term of the DGPI. Each term of Eq. 4 represents the fractional contribution to the total DGPI change. The total changes (left-hand side of Eq. 4) are shown in Fig. 2A, and each term's contributions are shown in Fig. 2 (C to F). The fractional changes relative to the total change are computed for each term and domain of interest (blue rectangles in Fig. 2, C to F), and the domain mean fractional changes are denoted by the numbers in each panel in Fig. 2 (C to F).

SUPPLEMENTARY MATERIALS

Supplementary material for this article is available at https://science.org/doi/10.1126/sciadv.abn9493

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Substantial global influence of anthropogenic aerosols on tropical cyclones over the past 40 years

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*Mr. Beachy. I am happy to. Maybe I will start by breaking down that nine million a little bit.

I mentioned already that five million of those nine million jobs will be going towards clean energy workers, which, for the first time, will be paid prevailing wages and offered apprenticeships that offer a pathway to middle-class careers. That is because, to take it full -- to take advantage of the full extent of the tax credit, developers need to pay those wages and offer those apprenticeships.

Clean manufacturing, 900,000 jobs; electric vehicles and clean transportation, 400,000 jobs; energy efficient homes and offices, another 900,000 jobs; environmental justice and climate resilience investments, 150,000 jobs; natural infrastructure, 600,000 jobs.

You asked about pathways to these jobs. It is critical that apprenticeships are explicitly named as one of the criteria that developers need to meet in order to get the full extent of the tax credit, because apprenticeships provide an on-ramp to high-quality jobs, a pathway to the middle class, particularly for workers without a four-year degree. And really, for the first time, again, we are marrying investments with that pathway.

*Mr. Schneider. Great, thank you. Let me take a little bit further and ask about the consequences if IRA would be repealed, whether it is a debt ceiling proposal or otherwise removing the investments that the IRA is trying to promote, what would be the consequences of that?

*Mr. Beachy. I mentioned earlier that I do not expect voters to reject good jobs or clean air or investment in clean technologies. I will just add to that.

What it would essentially mean is ceding investments in the clean technologies of the future to those who are currently controlling those technologies. Much has been said today about the -- that -- the fact that there is such extreme concentration of manufacturing of clean technology in China. If that is the problem we are trying to solve for, we should try to

invest in clean domestic manufacturing and clean technologies here at home. That is what IRA does.

*Mr. Schneider. Great, thank you.

I am out of time. I yield back.

*Chairman Smith of Missouri. Ms. Van Duyne.

*Ms. Van Duyne. Thank you, Mr. Chairman.

Last year Democrats provided hundreds of billions of dollars in green tax credits to benefit large corporations and Chinese-headquartered entities, even as American families, farmers, workers, and small businesses struggled under the weight and cost of increased cost of living under the Biden living crisis and broken supply chains.

Democrats have prioritized their extremist climate agenda. And yet last year, when we passed a so-called -- I love what you called it -- not the Inflation Reduction Act, but the Inflation Recession Act, not only did they claim that the bill would be paid for, but they actually claimed it would reduce the deficit by over $300 million.

We knew in 2019 that 83 percent of the credits were claimed by individuals making 6 figures and above. And last year Democrats decided that we needed to increase this credit even further. The electric vehicle tax credits will be a whopping $393 billion taxpayer subsidy. That is 28 times higher than the original estimate. And on top of that, we have seen analysis that the battery production of electric vehicle battery production credits projects a cost to taxpayers of over $196 billion. That is a 542 percent increase from the law's original sticker price.

This is sold as subsidizing an emergency? I am sorry, an emerging industry? But this bill was propping up an entire industry.

Mr. Ginn, you have analyzed this bill and the credits on this bill. Can you talk about how these numbers got so inflated, and how this bill is even worse than we thought?

*Mr. Ginn. Yes, Congresswoman, thank you. You know, a lot of it has to do with the changes that have happened just since last year.

Whenever you incentivize something through these tax credits, you get more of them. And so there have been a lot more in projections of what the costs are going to be, or the building -- the manufacturing of many of these vehicles, therefore the batteries. And so that has contributed to many more of the kilowatt hours -- you know, the $45-per-kilowatt-hour of these batteries of what is being produced. Multiply that by the number of new vehicles that is expected.

That is where you get the total amount of the $196.5 billion compared to the $30 billion that was initially assumed, along with some of -- like we mentioned earlier -- some of the Treasury's rules and guidance that has been put out now that has changed the -- fundamentally changed the calculations that were done last year. And that is one reason why we need to have these re-estimated, so we can know what the true cost is for taxpayers.

*Ms. Van Duyne. Thank you for that.

Mr. Horn, do these EV credits actually increase or decrease our dependence on China?

*Mr. Horn. Without the proper amount of enforcement and oversight, they are currently actually making the problem worse, and emboldening the Chinese Communist Party.

So what really needs to be done is closing all loopholes, avoiding any sort of workarounds or carve-outs, and truly prioritizing supporting the legitimate American opportunities that actually exist today and are not far from coming online into full-term production.

*Ms. Van Duyne. Thank you.

The IRA tax credit or energy credit I have seen the most excitement for is the section

45 hydrogen production credit. The level of the credit as -- per the IRA is based on a level of carbon intensity determined by life cycle analysis, and there is no reference to feedstock, fuel source in the text. So focusing on the end result, rather than the source, is the more tech-neutral approach. However, many environmental groups are hitting Treasury hard on this point, and trying to get any hydrogen produced with fossil fuel disqualified now from the credit.

So given that most hydrogen is produced from natural gas, this would essentially nip the technology in the bud before it even starts. So once again, we are seeing Treasury put its finger on the scale and picking winners and losers. Mr. Stein, can you elaborate on how Treasury guidance could shut down hydrogen production before it even really begins?

*Mr. Stein. Well, the key is what you mentioned about life cycle greenhouse gas analysis. That is really a bit of a made-up science. You can decide that methane has a certain value for greenhouse gas life cycle analysis. You can decide land use has a certain value, and it is very easy to put your finger on the scale if you have got -- if you have the ear of the Treasury officials that decide what counts as certain levels of emissions.

And it is very simple to say, well, the -- for instance, the natural gas production, you say that there is a certain amount of methane that is leaking throughout the system. We don't really know how much, but you say X amount, and that makes it not green enough to qualify for the credit.

*Ms. Van Duyne. So I am going to ask you, Mr. Turner. If you were in my position, what would your next step be?

*Mr. Turner. Congresswoman, I would look to unleash the full potential of America's energy, and that includes all fossil fuels. That includes all mining. If we are going to have this green transition, and it is going to be forced by government, then we might as well take advantage of it with the jobs and the tax revenue here.

My organization has put out numerous studies that show how California, Alaska have all of the metals and minerals necessary for this green transition, yet the same people pushing it are prohibiting us from opening up these mines. So I would just try to get some sanity in our energy policy and say, which one is it? Are we going to go green? Then let's do it with American ingenuity, American resources, and American jobs and tax revenue. Or are we going to support communist China? Because right now we seem to be doing both.

*Ms. Van Duyne. I appreciate that answer, and I yield back. Thank you.

*Chairman Smith of Missouri. Mr. Feenstra is recognized.

*Mr. Feenstra. Thank you, Mr. Chair, and thank you, witnesses, for all your testimony. I greatly appreciate it.

[Chart]

*Mr. Feenstra. As you can see behind me, as my colleague, Ms. Van Duyne noted, the cost of the green tax credits far outreached the originally-projected amounts. Goldman Sachs noted that the advanced manufacturing credit will be about 193 million. That is five times of what it was initially, what was noted by Joint Commission on Taxation.

Electric vehicles is going to be about 393 billion, compared to 14 billion -- again, noted by the Joint Commission on Taxation.

I mean, this is dramatic. This is huge, especially when the CBO said, hey, the deficit would be cut by 238 billion. Well, if that is the case, then look at what is happening here. So all of a sudden, we no longer have a deficit, we have a dramatic increase.

So, Mr. Ginn, the CBO budget and the economic outlook published in February of this year did not account for these revised costs of these new green energy credits. So are we likely to see deficit, debt, interest payments revised upward in the next CBO update as of this result?

*Mr. Ginn. Congressman, if they take an accurate analysis of the updated data, the

new Treasury guidance that is provided for IRA and the EV credits and everything else, it would certainly go up. Deficits would go up, debt would go up, interest payments would go up. And that is on top of already the expectation of an average of $2 trillion per year of deficits over the next decade.

*Mr. Feenstra. And how does that affect our economy?

*Mr. Ginn. Yes, it is a huge cost on the economy. It burdens us, it slows down our growth. It is higher interest rates than we would otherwise have, higher mortgage rates, higher car loan rates, just kind of through the process. And then, of course, if the Federal Reserve prints it, which they probably will do some of that, you will see higher inflation than we are already having.

I mean, some are saying we are having disinflation now, it has come off the peak from last year. But we still have five percent, the highest in multi-decades. And so I don't see that is -- this is the bottom. There is still more to it, especially with these kind of costs down the road.

*Mr. Feenstra. Thank you, Mr. Ginn, and I agree with you 100 percent. We are not at the bottom. We are literally not at the bottom, and we have a debt crisis right before us, and we have got to raise the debt ceiling.

Why do we got to raise the debt ceiling? Because of this wild spending spree that has happened in the last two years by the Inflation Reduction Act and many other things. And we, the people, our taxpayers, we got to pay for this. Our families that have to go to the grocery store all the sudden are seeing an increase in eggs and you name it. They are seeing an increase in gas, right, because of this outlandish spending spree that is now affecting all of us.

I want to change the topic and talk about the supply chain. You know, the Inflation Reduction Act, obviously, as we see on this bill -- on this board -- promoted tax credits for

electric cars. All right. Now, think about this. All right. Tax credits for electric cars. The EPA also just mandated that 54 percent of all new vehicles by 2030 must be electric. All right. All right. So there is this thumb on the scale, the thumb on the scale that says, all right, we are going to have electric vehicles, all right?

Side note, that really irritates me, because I am a biofuels guy, and they talk nothing about ethanol and biodiesel, which just infuriates me.

But anyway, the Department of the Interior, all right, the Department of the Interior, what do they do? They ban mining in critical materials in public lands. Mr. Turner, you noted that, right? This is an oxymoron. All right, we want to do electric vehicles, but we are going to ban critical materials.

And then the Department of Energy on the other side -- all right, this is how dysfunctional this Administration is -- the Department of Energy noted that 4 out of every 5 cars by 2050 will still use liquid fuels. Well, how does this happen?

This Administration is clueless.

I want to ask Mr. Horn, and then I will ask Mr. Turner how does this affect our economy when we can't buy critical materials in the U.S., and we have got to go across to China to make this all happen?

*Mr. Horn. When we are forced to buy Chinese-produced commodities, materials, resources in general, it is always hurting American consumers and American manufacturers. And the biggest shame, just to reiterate, is that better alternatives exist inside the United States if we can simply get out of our own way.

*Mr. Feenstra. Thank you.

Mr. Turner, you got 10 seconds.

*Mr. Turner. Congressman, if I could leave the committee with one lasting point, it is this: We are not using fewer fossil fuels, we are just using them differently. So going

green, EVs, wind, solar, whatever you want to call it, we are using as many and potentially more fossil fuels, we are just using them differently, and we are making it difficult to bring them from American markets.

*Mr. Feenstra. I agree 100 percent. Thank you for both of you noting that.

And we are destroying our families because they cannot afford to buy groceries, they cannot afford to buy gasoline, all right, because of this crazy idea of they all have to have a $70,000 electric vehicle.

Thank you, and I yield back.

*Chairman Smith of Missouri. Mr. Panetta is recognized.

*Mr. Panetta. Thank you, Mr. Chairman.

Gentlemen, thank you for being here as long as you have been. I appreciate all the information that you have provided.

For the past few decades, I think it is clear that we have become dependent on China, unfortunately. And then you had a pandemic that definitely exposed our weak supply chains. And of course, we have the climate crisis. And so I do believe that we were left with no choice but to make such significant investments to show that we were serious about the direction as to where we want to go when it comes to our energy and decarbonization.

But obviously, in order to do this, in order to make these advancements of what I will call an industrial policy, our permitting needs to be streamlined. Now, in order to meet many of the goals, the 2030 goals, we need to double our transmission line expansion. But to do that, it will take building massive amounts of new infrastructure on massive amounts of land that is often undeveloped.

Now, currently, any approval of high voltage transmission lines across multiple states is onerous, it is litigious, and it is long, taking up to 10 years. Heck, it takes seven years to get a permit for an onshore wind farm and five years to get a permit for a solar farm.

Now, what we have seen is that the permitting process has become the favored vehicle to block projects, and NEPA challenges make up the largest proportion of Federal climate change litigation in the U.S., taking years longer for implementation, and making it much more expensive.

It is understandable, as you heard my colleague Blake Moore talk about, why there is bipartisan consensus that it takes too long to build things in the U.S., and the belief that the permitting process is broken. That is why permit reform is a hot topic in the 118th Congress right now, because without it we risk losing the investments that we want to make, especially with the IRA.

Now, Republicans and Democrats have some ideas on reforms to permitting, such as standard timelines for environmental reviews; regional maps of areas for development, rather than the Endangered Species Act, on a case-by-case basis; empowering the Permitting Council to coordinate agencies; and giving the Federal Energy Regulatory Commission power to approve transmission lines. Obviously, these are big things that we have to do, though, in order to do big things, especially when it comes to our energy policy.

Now, Mr. Beachy, don't you agree that we need to streamline our permitting?

And if we do need to do that, how can we do it without undermining our environmental protections?

*Mr. Beachy. Thank you for the question. I will start by saying it is -- that I agree with the problem. It is certainly a problem, and one we must tackle.

Before this Administration, we were facing several barriers to achieving our climate goals, while also rebuilding our manufacturing base, while also investing in hard-hit communities. And I have mentioned the lack of the lack of investments was certainly one of those problems, and the IRA stepped in to help fill that gap. It is not the only barrier that we face, and certainly I think it is widely recognized that permitting is a barrier.

Our union and environmental partners are deep in discussions about the details of this right now. As you suggested, it is a hot topic. And the details matter immensely.

What we do believe is that any infrastructure review must have ironclad commitments to uphold public participation and strong environmental review of those projects, no matter the project.

We also believe that we must swiftly deploy all of this clean energy in our economy so as to meet our climate goals, but also so as to swiftly deliver real benefits to hard-hit workers and communities. Marrying those two will not be any easy task, which is why we are mired in the details right now.

So I will just say it is a critical topic of conversation. I am very glad Congress is taking it on, and it is one that we are also actively pursuing.

*Mr. Panetta. Good. And I look forward to continuing to have these types of conversations on this very tough topic. But it is something that does need to be done in order for us to take advantage of the authorization that we passed last Congress. And now it is time to actually get serious about the implementation. And in order to do that, I look forward to having these conversations.

Thank you, thanks to all the witnesses.

I yield back.

*Chairman Smith of Missouri. Ms. Malliotakis is recognized.

*Ms. Malliotakis. Thank you all for being here, and I want to thank the chairman for calling this hearing.

You know, here we are, eight months later after this bill was jammed through -- or a few months later since this bill was jammed through, and what we are finding now is this inflation act, as I would call it, really did create inflation. It was -- certainly put us in the situation we are right now, where we have a debt ceiling crisis. It has crushed American

energy, as is evident by your testimonies today. And it has become a slush fund to benefit large corporations, not just the wealthiest corporations here, but also those in communist China.

It is really interesting to hear my colleagues, who accuse Republicans of corporate welfare and giving out benefits to the rich, because they have spent hundreds of billions of dollars and provided benefits to companies where 90 percent of those companies benefiting have sales of over $1 billion. That is who they prioritized in this bill. Meanwhile, our constituents, working-class Americans, are suffering greatly. They are paying the price, both through taxes, through inflation, through high energy costs and what not.

I want to talk about not just what this bill has done, and also what the President's anti-policies (sic) have done, but in my home state of New York, okay -- and I fear that the country is going the way that New York has gone, and New York has closed a nuclear power plant, Indian Point, which provided 26 percent of the electricity for New York City. They are now denying permits for natural gas plants. They are banning gas vehicles, doing what California is doing. They want to mandate those EVs that people can't afford, because they are over $60,000 in costs. And they also now want to move towards banning stoves.

And we are talking about communities across America, where 60 percent of Americans are living paycheck to paycheck; 42 percent of Americans say they have less than $1,000 in savings. And individually, they hold credit card debt record highs.

I am left wondering how these green credits benefit Americans, the American people that we represent, people in Staten Island in Brooklyn who can't afford a 60,000, 70,000, $80,000 electric vehicle, while these big corporations doing business are receiving a windfall of their hard-earned money, taxpayer's hard-earned money.

So I would like to start with you, Mr. Turner, because I think you are a New York City native, if I am not mistaken, and I would love to hear your thoughts on are these

policies, both the Federal and the state that I mentioned, are these policies the reasons that my constituents are paying more for electricity and heat?

*Mr. Turner. Congresswoman, thank you. Absolutely. The previous governor -- and carried out by the current governor of New York -- implemented a series of policies that dramatically increased the cost of electricity by eliminating coal, by eliminating nuclear. All what -- the plans -- again, the future plans -- one day we will build solar, one day we will et cetera. But in the real time, the New Yorkers are suffering.

Case in point: in 2019 of -- the height of the summer heat, Mayor de Blasio was stuck with a grid that was faltering. And what did they do? They turned off some specific areas of the city to protect the overall integrity. What areas did they turn off? Brownsville, East New York, close to where I grew up in Queens, predominantly poor, predominantly African American neighborhoods. The Upper East Side was fine, Soho was fine, Tribeca was fine.

So their policies, the very people they claim to care about, are the ones they hurt the most.

*Ms. Malliotakis. Yes, and they are also seeing high food prices as a result, high gas prices as a result. This is all a result of the Democrat policies that we are seeing on the state and Federal level.

In the Department of Defense space, the specialty metals clause has required defense contractors and the suppliers to purchase cobalt-based alloys and steel products that have been exclusively produced here in the United States. Obviously, that is for security reasons. Dr. Horn, this is your, I think, area of expertise. Can you comment on that?

And should we expand that special metals clause to preclude companies manufacturing with critical minerals outside of the U.S. or its partners from obtaining tax incentives or credits like this, so these jobs truly stay in the United States?

*Mr. Horn. Congresswoman, thank you for raising this point. I think it is the most ridiculous idea that we would have critical defense components that we would rely on our biggest adversary for, and give them the leverage that, were we to get into a strategic conflict, which is certainly possible when you have spy balloons and other things going on, where they would have the ability to shut it off completely. If we don't have the ability to source ourselves with these critical national security and defense components, we are unbelievably vulnerable.

*Ms. Malliotakis. I appreciate this. And I will just conclude, because I am out of time, by saying that this Administration talks about Made in America, and then they do the exact opposite thing. And sadly, what we are talking about today is just another example of that. And I am glad that you all are calling them out on it. Thank you.

*Chairman Smith of Missouri. Mr. Carey is recognized.

*Mr. Carey. Thank you, Mr. Chairman, and thank you to the witnesses. Interesting testimony. I read through them all.

I want to point out a few facts, because those are tricky little things, aren't they?

From 2005 to 2018, the United States reduced its emissions by 12 percent, reduced our emissions by 12 percent. The rest of the world increased their emissions by -- guess what -- 25 percent.

Now, part of the reason this happened -- my dear colleague from Virginia pointed out what had happened to the coal industry. He is partially right. But what we saw was a rise in the use of natural gas to generate energy, so much so -- because we can burn it very cleanly here in the United States -- that my governor in the great state of Ohio, along with my colleagues in the house and senate, actually redefined natural gas as a green energy. So, it makes one wonder why we talk about all of these issues.

And I pointed out at the last hearing -- and I will say for all of you guys -- China

granted permits for over 106 gigawatts of capacity at 82 different sites across China. That is equivalent to starting two new coal plants a week. To put it another way, China has six times -- six times -- as many new plants that are being built than the rest of the world combined. It makes one wonder why this Administration has attacked the natural gas industry so much.

I want to go on to a couple of things with -- on the first day the President canceled the Keystone pipeline, which we all know drastically increased the price of gas. We know that. We also know that we have more energy reserves than any other country in the world, and we should be focused on exploring -- Mr. Turner, you brought this up -- exploring our natural resources, along with our mineable materials. But instead, the Administration has been focused on promoting these expensive renewable energies, which basically is giving China free reign. So Republicans on our side have worked very hard with H.R. 1.

I do want to highlight just a couple of things, because I thought it was important. When we were in West Virginia, we actually -- I didn't get a chance to bring this up. This Administration has been in an all-out war or assault on regulations. So far, and according to The Wall Street Journal, this Administration has issued over 517 regulatory actions which are costing all of us $318 billion. At this point in the Obama Administration, it would be over 1 million -- or 100 billion. Another 311 Biden regs are in the pipeline that will cost another 200 billion; 23 of the 311 regs will cost a billion a piece.

This doesn't create regulatory certainty. It creates regulatory terror, and it kills jobs. And we have gone out across this country under the chairman. We have been in West Virginia. We have been in Oklahoma. We are going to be in Georgia. And we are talking to energy producers, people that work in the oil and gas fields, people that work in the coal mining and mining industry. For every one mining job, there are four spin-off jobs, domestic jobs. For every one oil and gas job, there is another job that is related. This is

what grows the American economy.

We don't have a revenue problem in this country. We have a spending problem. And all the charts that have shown that -- we have got to get back to basics, what works, what makes America, and let's get this country moving forward.

I yield back the balance of my time, Mr. Chairman.

*Chairman Smith of Missouri. Thank you, Mr. Carey.

I would like to thank all of our witnesses for your marathon hearing, and for being here.

Please be advised that members have two weeks to submit written questions to be answered later in writing. Those questions and your answers will be made part of the formal hearing record.

And with that, the committee stands adjourned.

[Whereupon, at 2:06 p.m., the committee was adjourned.]

PUBLIC SUBMISSIONS FOR THE RECORD

April 19, 2023

The Honorable Jason Smith
Chairman
House Committee on Ways and Means
1139 Longworth House Office Building
Washington, DC 20515

The Honorable Richard Neal
Ranking Member
House Committee on Ways and Means
1102 Longworth House Office Building
Washington, DC 20515

Chairman Smith, Ranking Member Neal and members of the House Ways and Means Committee:

On behalf of Associated Builders and Contractors, a national construction industry trade association with 68 chapters representing more than 22,000 member companies, I write to comment on the committee's "Hearing on the U.S. Tax Code Subsidizing Green Corporate Handouts and the Chinese Communist Party" and express ABC concerns regarding the partisan tax provisions included in the Inflation Reduction Act.

ABC opposed the reconciliation package last Congress due to concerns that the increased spending and tax hikes included in the bill could further harm our nation's economy, exacerbate inflation and cost American jobs. Further, the new, restrictive labor policies included in the law make the IRA even more damaging to the thousands of U.S. small businesses in the construction industry.

The IRA's modification of several clean energy and energy efficiency incentives provides two different tax credit values: a base rate and an alternative or bonus rate. The bonus rate equals five times the base rate and applies to projects that meet both prevailing wage and apprenticeship requirements. ABC believes this new bonus credit penalizes employers that believe in fair and open competition and pay wages based on experience, quality and market rates. They also limit opportunities for thousands of construction workers who choose not to join a union and industry-recognized apprentices.

As the construction industry continues to face supply chain delays, high costs of materials and gas prices, workforce shortages and an overly burdensome regulatory agenda, ABC believes that the anti-competitive policies included in the IRA will continue to handicap open shop construction contractors and jeopardize the nation's energy projects at this critical time.

Repealing these ill-advised tax credits will not only save taxpayer dollars but will also give Congress a new opportunity to work toward bipartisan energy incentivizes to unleash America's potential and allow our entire qualified construction workforce to meaningfully participate in critical projects across the country. ABC appreciates the opportunity to comment on this important issue and appreciates the committee's consideration of our concerns.

Sincerely,

Kristen Swearingen
Vice President, Legislative & Political Affairs

Comments for the Record
United States House of Representatives
Committee on Ways and Means
Hearing on the U.S. Tax Code Subsidizing
Green Corporate Handouts and the Chinese Communist Party
Wednesday, April 19, 2023 at 10:00 AM.

By Michael G. Bindner
The Center for Fiscal Equity

Chairman Smith and the Ranking Member Neal, thank you for the opportunity to submit these comments for the record.

The Climate Crisis is real. It did not go away because La Nina rain events started again, likely due to the Tongan volcano disrupting the El Nino cycle. The fact that El Nino was stuck is likely due to climate change, however.

Florida is not saved by the new rains. Indeed, these have made coastal flooding caused by rising sea levels worse. That sea levels have risen due to arctic ice melt is definitely an artifact of global warming. If someting is not done, even The Villages will be under water before the century is out.

From comments presented to the Finance in April of 2021, on Climate Challenges *On warming in general, there is no doubt that it is man-made. While there was a warm period around the first millennium, we came to it gradually. Industrialization may have ended what is called the Little Ice Age, but that warming is sudden and has dire consequences. We do not know that it will stop the way it did in the Middle Ages, indeed, it is not likely to, which makes these hearings vital.*

Starting with the coasts, there will be sea level rise. Indeed, the flooding shown in Vice President Gore's latest film shows how bad it is getting. The wealthy don't seem to care, because they have flood insurance. The most basic step to at least get wealthier taxpayers on board (including the upper-middle class) is to cap flood insurance benefits to a level where beach houses properties can no longer be insured. Even that small step could never be enacted. Too many donors have beach houses.

This is a bigger problem for some than the catch of the day, particularly in the Indo-Pacific region. In comments to the Finance Committee on Strategic Climate Engagement in the Indo-Pacific Region in March 2022 *Warming in the United States is merely inconvenient. In the Indo-Pacific region, it will be deadly. Island nations and Bangladesh will simply be eliminated. This constitutes a large share of the global population. Java has 154 million people in the same space that the United States has 53 million in the Boston-Washington urban cluster. Visualize relocating them.*

We agree that the current tax benefits for electric cars and renewables are the wrong approach. That does not mean that the oil and gas companies deserve a free pass, as I discuss below. There are alternatives that do not rely on Chinese wind turbines or solar panels. To be clear, the reason China produces these things is because their labor is cheap. It is so cheap that they are likely to have a Marxist revolution where the peasants rise up against the Communist Party.

Of corse, such revolutions are stuff of myth. Without determined leadership, there are no peasant uprisings. Middle classes revolt, not workers. The Chinese economic revolution is creating a middle class as peasants in the countryside become peasants in the city, but without urban rights. One must actually own a home to have rights within the cities to health care and other human services. It harkens back to early America, where only White male landholders could vote.

As the Chinese middle class grows, it has not been added to the Communist Party. This will result in a revolution against it. Corrupt parties find it hard to broaden the base. If they were to do so, Chinese leaders would develop a sense of humor, which is absolutely necessary to go beyond tyranny and into freedom. The Party will either modernize or be overthrown. Its recent rollback on Covid testing shows that it has become sensitive to keeping its middle class happy. Now that there is blood in the water, evolution or revolution is certain.

China makes solar cells and turbines because its labor is cheap - although it will not remain that way. Other nations will be cheaper soon, although hopefully they will be advised by someone other than the International Monetary Fund so that their populations can more eailiy develop into consumer societies with empowered workers.

China has pulled back on the Belt Road initiative. It has its own financial crisis so, instead of extending new credit, it is turned into a debt collector. Were it not for a desire to sell consumer goods (and solar panels) to the United States, it would sell its supply of Treasury Bills.

Let me emphasize this. Goods sold in WalMart and solar and wind energy systems have the same profit flows to the soon-to-be-overthrown Communist Party. To condemn one and not the other DOES NOT EXACTLY DEMONSTRATE CLEAR THINKING BY THE NEW MAJORITY.

The solution to both problems is tax policy. Not repealing the Biden tax policies favoring renewable energy, but our allergy to conforming to tax policy in the rest of the developed world. These policies are a boon to consumers, especially wealthier consumers who are also donors. They are not so good for workers.

If the United States had a goods and services tax, the wealthy elite could not avoid taxation by borrowing from their asset portfolios to fund consumption. To end this tax dodge, tax consumption. Taxing asset value gains at sale rather than taxing end of the year results also leaves money on the table, but that is a discussion for another day. Please see our paper on taxes and trade policy in the first attachment for how credit invoice AND subtraction value added taxes will impact both trade policy and workers. The second attachment lays out our entire tax proposal.

The Biden energy provisions are not even a drop in the bucket. They were a (successful) olive branch to Senators Sanders and Markey. Not much more.

Burning gasoline has taken us over the line on warming, catching up with coal. The burning of coal, especially by China, creates acute pollution - the kind that gave me asthma when I lived downwind from an Ohio Edison Plant in Dayton, Ohio and the kind which your grandchildren will get if we continue to burn it. Coal is also a radiation danger. It turns out that when coal is burnt, more radioactive material is added to the environment than the entire nuclear power system emits.

Increasing nuclear power is an environmentally sustainable path, but it will only occur when the demand for more electricity rises as we move away from using gasoline in our cars. Getting this

enacted is as likely, for now, as improving environmental and labor trade enforcement and limiting flood insurance.

Employee-owners and forward thinking communities can step in where the market will not. In testimony to the Energy and Water Appropriations Subcommittee, I describe an experiment to build an integrated system for providing electric power for cars and trucks, while reinventing the grid, that relied on overhead roof decks to transfer power to vehicles in the same way electric trains and buses work. Please see an excerpt in the attachments.

We don't need to drill for or export more oil. We need much less. Electric vehicles run on roof covered overhead power lines (and with control from central computers) end the need to burn gasoline in urban areas WITHOUT the use of questionably resourced lithium ion batteries and without the need to expand our electric grid into the wind or by catching a ray of sunshine. Technology from 100 years ago, combined with the latest in nuclear energy can both clean the air and cool the planet down, and do so much more quickly than the entire Biden energy portfolio.

Thank you for this opportunity to share these ideas with the committee. As always, we are available to meet with members and staff or to provide direct testimony on any topic you wish.

Attachment – Trade Policy

Consumption taxes could have a big impact on workers, industry and consumers. Enacting an I-VAT is far superior to a tariff. The more government costs are loaded onto an I-VAT the better.

If the employer portion of Old Age and Survivors Insurance, as well as all of disability and hospital insurance are decoupled from income and credited equally and personal retirement accounts are not used, there is no reason not to load them onto an I-VAT. This tax is zero rated at export and fully burdens imports.

Seen another way, to not put as much taxation into VAT as possible is to enact an unconstitutional export tax. Adopting an I-VAT is superior to it's weak sister, the Destination Based Cash Flow Tax that was contemplated for inclusion in the TCJA. It would have run afoul of WTO rules on taxing corporate income. I-VAT, which taxes both labor and profit, does not.

The second tax applicable to trade is a Subtraction VAT or S-VAT. This tax is designed to benefit the families of workers through direct subsidies, such as an enlarged child tax credit, or indirect subsidies used by employers to provide health insurance or tuition reimbursement, even including direct medical care and elementary school tuition. As such, S-VAT cannot be border adjustable. Doing so would take away needed family benefits. As such, it is really part of compensation. While we could run all compensation through the public sector.

The S-VAT could have a huge impact on long term trade policy, probably much more than trade treaties, if one of the deductions from the tax is purchase of employer voting stock (in equal dollar amounts for each worker). Over a fairly short period of time, much of American industry, if not employee-owned outright (and there are other policies to accelerate this, like ESOP conversion) will give workers enough of a share to greatly impact wages, management hiring and compensation and dealing with overseas subsidiaries and the supply chain – as well as impacting certain legal provisions that limit the fiduciary impact of management decision to improving short-term profitability (at least that is the excuse managers give for not privileging job retention).

Employee-owners will find it in their own interest to give their overseas subsidiaries and their supply chain's employees the same deal that they get as far as employee-ownership plus an equivalent standard of living. The same pay is not necessary, currency markets will adjust once worker standards of living rise. Attachment Three further discusses employee ownership.

Over time, ownership will change the economies of the nations we trade with, as working in employee-owned companies will become the market preference and force other firms to adopt similar policies (in much the same way that, even without a tax benefit for purchasing stock, employee-owned companies that become more democratic or even more socialistic, will force all other employers to adopt similar measures to compete for the best workers and professionals).

In the long run, trade will no longer be an issue. Internal company dynamics will replace the need for trade agreements as capitalists lose the ability to pit the interest of one nation's workers against the others. This approach is also the most effective way to deal with the advance of robotics. If the workers own the robots, wages are swapped for profits with the profits going where they will enhance consumption without such devices as a guaranteed income.

Attachment - Tax Reform, Center for Fiscal Equity, March 24, 2023

Synergy: The President's Budget for 2024 proposes a 25% minimum tax on high incomes. Because most high income households make their money on capital gains, rather than salaries, an asset value added tax replacing capital gains taxes (both long and short term) would be set to that rate. The top rate for a subtraction VAT surtax on high incomes (wages, dividends and interest paid) would be set to 25%, as would the top rate for income surtaxes paid by very high income earners. Surtaxes collected by businesses would begin for any individual payee receiving $75,000 from any source at a 6.25% rate and top out at 25% at all such income over $375,000. At $450,000, individuals would pay an additional 6.25% on the next $75,000 with brackets increasing until a top rate of 25% on income over $750,000. This structure assures that no one games the system by changing how income is earned to lower their tax burden.

Individual payroll taxes. A floor of $20,000 would be instituted for paying these taxes, with a ceiling of $75,000. This lower ceiling reduces the amount of benefits received in retirement for higher income individuals. The logic of the $20,000 floor reflects full time work at a $10 per hour minimum wage offered by the Republican caucus in response to proposals for a $15 wage. The majority needs to take the deal. Doing so in relation to a floor on contributions makes adopting the minimum wage germane in the Senate for purposes of Reconciliation. The rate would be set at 6.25%.

Employer payroll taxes. Unless taxes are diverted to a personal retirement account holding voting and preferred stock in the employer, the employer levy would be replaced by a goods and receipts tax of 6.25%. Every worker who meets a minimum hour threshold would be credited for having paid into the system, regardless of wage level. All employees would be credited on an equal dollar basis, rather than as a match to their individual payroll tax. The tax rate would be adjusted to assure adequacy of benefits for all program beneficiaries.

High income Surtaxes. As above, taxes would be collected on all individual income taxes from salaries, income and dividends, which exclude business taxes filed separately, starting at $400,00 per year. This tax will fund net interest on the debt (which will no longer be rolled over into new borrowing), redemption of the Social Security Trust Fund, strategic, sea and non-continental U.S. military deployments, veterans' health benefits as the result of battlefield injuries, including mental health and addiction and eventual debt reduction.

Asset Value-Added Tax (A-VAT). A replacement for capital gains taxes and the estate tax. It will apply to asset sales, exercised options, inherited and gifted assets and the profits from short sales. Tax payments for option exercises, IPOs, inherited, gifted and donated assets will be marked to market, with prior tax payments for that asset eliminated so that the seller gets no benefit from them. In this perspective, it is the owner's increase in value that is taxed. As with any sale of liquid or real assets, sales to a qualified broad-based Employee Stock Ownership Plan will be tax free. These taxes will fund the same spending items as high income and subtraction VAT surtaxes. There will be no requirement to hold assets for a year to use this rate. This also implies that this tax will be levied on all eligible transactions.

The 3.8% ACA-SM tax will be repealed as a separate tax, with health care funding coming through a subtraction value added tax levied on all employment and other gross profit. The 25% rate is meant to be a permanent compromise, as above. Any changes to this rate would be used to adjust subtraction VAT surtax and high income surtax rates accordingly. This rate would be negotiated on a world-wide basis to prevent venue seeking for stock trading.

Subtraction Value-Added Tax (S-VAT). Corporate income taxes and collection of business and farm income taxes will be replaced by this tax, which is an employer paid Net Business Receipts Tax. S-VAT is a vehicle for tax benefits, including

- Health insurance or direct care, including veterans' health care for non-battlefield injuries and long term care.
- Employer paid educational costs in lieu of taxes are provided as either employee-directed contributions to the public or private unionized school of their choice or direct tuition payments for employee children or for workers (including ESL and remedial skills). Wages will be paid to students to meet opportunity costs.
- Most importantly, a refundable child tax credit at median income levels (with inflation adjustments) distributed with pay.

Subsistence level benefits force the poor into servile labor. Wages and benefits must be high enough to provide justice and human dignity. This allows the ending of state administered subsidy programs and discourages abortions, and as such enactment must be scored as a must pass in voting rankings by pro-life organizations (and feminist organizations as well). To assure child subsidies are distributed, S-VAT will not be border adjustable.

As above, S-VAT surtaxes are collected on all income distributed over $75,000, with a beginning rate of 6.25%. replace income tax levies collected on the first surtaxes in the same range. Some will use corporations to avoid these taxes, but that corporation would then pay all invoice and subtraction VAT payments (which would distribute tax benefits). Distributions from such corporations will be considered salary, not dividends.

Invoice Value-Added Tax (I-VAT) Border adjustable taxes will appear on purchase invoices. The rate varies according to what is being financed. If Medicare for All does not contain offsets for employers who fund their own medical personnel or for personal retirement accounts, both of which would otherwise be funded by an S-VAT, then they would be funded by the I-VAT to take advantage of border adjustability.

I-VAT forces everyone, from the working poor to the beneficiaries of inherited wealth, to pay taxes and share in the cost of government. As part of enactment, gross wages will be reduced to take into account the shift to S-VAT and I-VAT, however net income will be increased by the same percentage as the I-VAT. Inherited assets will be taxed under A-VAT when sold. Any inherited cash, or funds borrowed against the value of shares, will face the I-VAT when sold or the A-VAT if invested.

I-VAT will fund domestic discretionary spending, equal dollar employer OASI contributions, and non-nuclear, non-deployed military spending, possibly on a regional basis. Regional I-VAT would both require a constitutional amendment to change the requirement that all excises be national and to discourage unnecessary spending, especially when allocated for electoral reasons rather than program needs. The latter could also be funded by the asset VAT (decreasing the rate by from 19.25% to 13%).

Carbon Added Tax (C-AT). A Carbon tax with receipt visibility, which allows comparison shopping based on carbon content, even if it means a more expensive item with lower carbon is purchased. C-AT would also replace fuel taxes. It will fund transportation costs, including mass transit, and research into alternative fuels. This tax would not be border adjustable unless it is in other nations, however in this case the imposition of this tax at the border will be noted, with the U.S. tax applied to the overseas base.

Energy and Water Development Appropriation for FY 2024

This testimony to the Energy and Water Subcommittee for FY 2024 proposes spending for a Department of Energy solicitation(s) for $500 million in grants to prototype a tethered electric car system in the first year, first on a testbed and then in one or more small town. ...To pay for this project, I propose Congress ELIMINATE ALL FUNDING for designing intelligent cars and some of the funding for developing charging stations and better batteries.

Enough batteries have caught fire and have questionable supply chains and resource needs and enough automated cars have crashed into trees or humans to know that it is time to try something else. There are better modalities and they are available now. We said this a year ago and, at least as far as self-driving vehicles, this is still true. Indeed, projects to design these monsters are being ended left and right in industry.

Research funds can instead focus on the development of automated cars with central control (rather than its own AI) and energy distribution (rather than being hampered by economically damaging battery development). This is old and proven technology, i.e., electric trains and buses.

The first set of grants would be given to automotive companies with a matching funds requirement to develop the technical specifications, prototype design and testing.

The second set of grants would go to small cities or towns with one or two major employers. Employers, municipalities, financial institutions and local retailers, as well as a consortium of car companies who performed well on the first set of grants, as well as state government and existing road providers, power and internet companies would partner with the Departments of Energy and Transportation to install and implement the system tested in round one.

At least one grant consortium will be for cities in a predominantly rural area. This project will develop interfaces between urban/suburban and rural transportation systems, as outside of urban areas, use of the current gasoline based infrastructure will be required - or some form of hydrogen combustion with hydrogen produced by vehicles through electrolysis while attached to the electric grid system.

Second round projects will, if successful, be a guide for funding these systems in urban areas. A third round of grants (possibly concurrent) will design and prototype interstate systems with separate electrified roadways for passenger cars, high speed rail, busses and trucks and freight rail.

As in urban areas, these roadways would be covered with a roof deck upon which grass can be grown in climates that allow this, along with the deployment of solar panels over the grass. Such a mixture provides shade to the grass and cools the solar panels so that they can operate optimally. Irrigation systems may also be included to accomplish both.

The final project would integrate the system with the banking system and include both individual car ownership and cars for higher. Individuals could own cars, while some vehicles would be for hire (with monitoring, but not drivers). Car owners could even rent their vehicles to the system. Debit cards or a link to checking accounts would pay for the car itself (either to rent or own), the roadway and the use of energy and computer services.

Prices for accessing the road network would vary based on congestion and vehicles could be taken to a public transportation hub (which might be located at their children's school), with the vehicle returning home empty or going to the next fare. If congestion is low, it may be affordable to drive to work. If it is high, prices for public transit and commuting would be adjusted accordingly.

Energy infrastructure to power the system and facilitate communication would also carry energy and data services, so add xFinity and Cox to the consortium. This also gives us the incentive to improve the grid. We only need willingness to do this. The technology is already there.

Contact Sheet

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Committee on Ways and Means
Hearing on the U.S. Tax Code Subsidizing
Green Corporate Handouts and the Chinese Communist Party
Wednesday, April 19, 2023 at 10:00 AM.

All submissions must include a list of all clients, persons and/or organizations on whose behalf the witness appears:

This testimony is not submitted on behalf of any client, person or organization other than the Center itself, which is so far unfunded by any donations.

The Aluminum Association

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May 2, 2023

The Honorable Adrian Smith
United States House of Representatives
1139 Longworth House Office Building
Washington, DC 20515

The Honorable Earl Blumenauer
United States House of Representatives
1129 Rayburn House Office Building
Washington, DC 20515

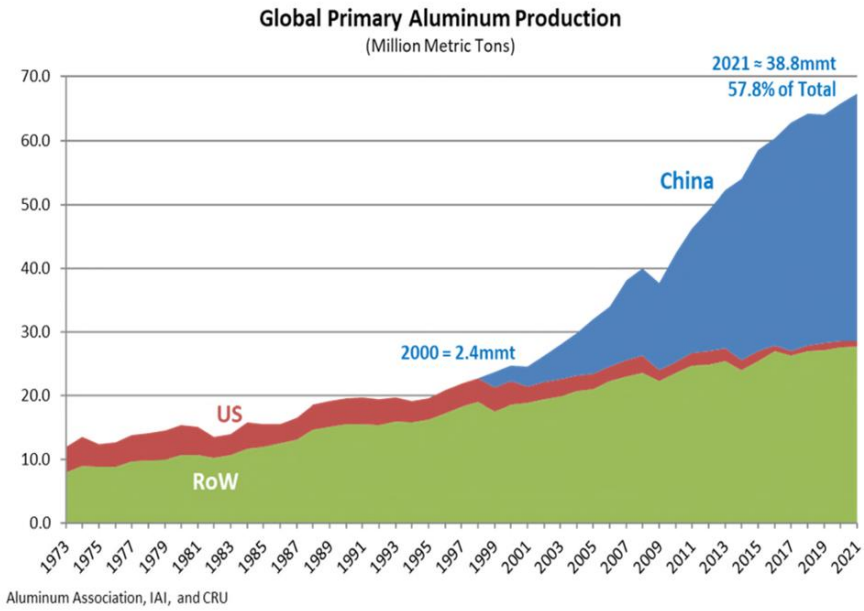
Dear Chairman Smith and Ranking Member Blumenauer,

On behalf of the Aluminum Association and its member companies, I appreciate the opportunity to provide written comments for the record in connection with the House Ways and Means Trade Subcommittee's hearing on "Countering China's Trade and Investment Agenda: Opportunities for American Leadership" that occurred on April 18, 2023.

The Aluminum Association is the voice of the aluminum industry in the United States, representing aluminum producing companies and their employees that span the entire aluminum value chain from primary production to value-added products to recycling, as well as suppliers to the industry. The Association is charged with developing global standards, business intelligence, sustainability research, policy positions, and industry expertise for its member companies, policymakers, and the public. Altogether, Association member companies produce over 70 percent of the aluminum and aluminum products shipped in North America, and the U.S. aluminum industry across the value chain directly employs more than 164,000 union and non-union workers and indirectly supports an additional 470,000 workers. Through its activity, the economic impact of the U.S. aluminum industry adds $176 billion to the economy annually.

Our member companies are committed to providing well-paying manufacturing jobs throughout the United States, strengthening the resilience of our industrial ecosystems, decarbonizing our sector, and reducing our impact on the environment. But our industry cannot do this alone. We need a level playing field that is free of non-market policies and practices that favor just a few firms at the expense of all others. We need global markets to be fair and open to competition.

The greatest threat to the U.S. aluminum industry – and, indeed, to aluminum producers operating in market economies throughout the world – is the massive growth in government-subsidized aluminum production in China over the last 20 years. As reflected in the chart below, around the turn of the century, China accounted for a miniscule percentage of global primary aluminum production. In the 20 years since, however, production of primary aluminum in China – aided by massive government subsidies – has grown exponentially, with China now accounting for nearly 60 percent of global primary aluminum production.



China's particularly egregious trade-distorting behavior and its structural uneconomic aluminum capacity are well-documented and have driven trade policy discussions in recent years. A 2019 report by the Organisation for Economic Cooperation and Development (OECD) found that between 1995 and 2020, China surged from being a relatively minor global player to become the world's largest producer, by a wide margin, of alumina, primary aluminum, and semi-fabricated aluminum products.[1]

In its recent report to the Congress on China's WTO Compliance, the Office of the U.S. Trade Representative reported that primary aluminum production capacity in China increased by more than 1,400 percent between 2000 and 2021, with China accounting for more than 80 percent of global capacity growth during that period. Today, China accounts for 58 percent of global output and has more than twice the capacity of the next ten aluminum-producing countries combined. This output growth continued during periods of global price declines, even as plants closed elsewhere.[2]

The OECD's analysis in 2019 highlighted that Chinese government support was responsible for much of this growth. From 2013-2017, 17 of the largest global firms operating along the aluminum value chain received up to $70 billion of government support. Fully 85 percent of this support went to just five Chinese-owned firms. In addition, firms operating in China at different stages of the aluminum value chain benefitted from a complex array of border restrictions, Value-Added Tax (VAT) rebates, and other forms of preferential treatment.

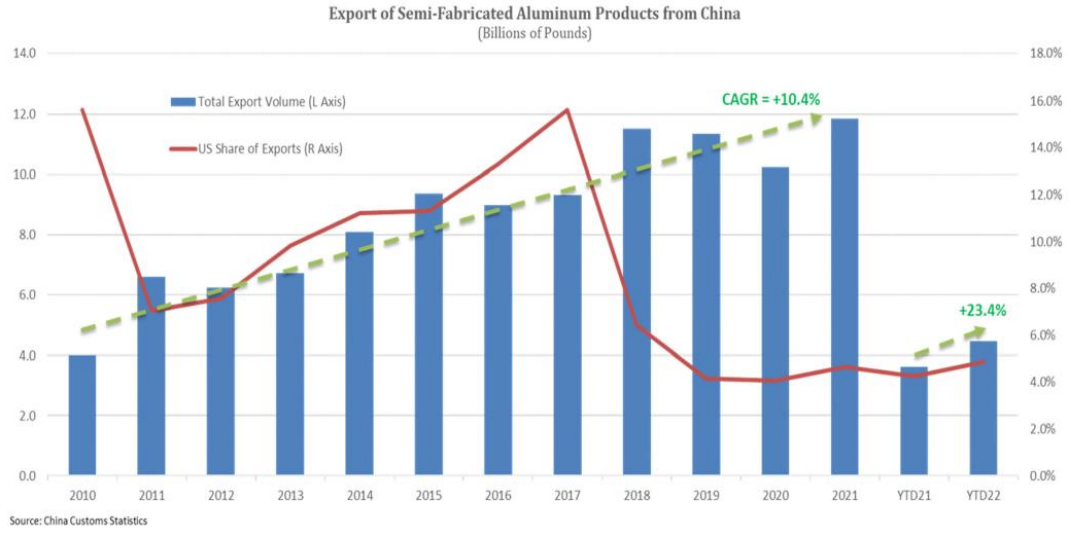
In 2021, the OECD completed an in-depth analysis of government support provided at below-market interest rates for more than 300 firms in 13 industrial sectors. This analysis included 32 aluminum companies with a combined 70 percent share of the global market. The report found that over the past decade, Chinese aluminum firms received up to 35 times more in government loans and other support

[1] OECD (2019), "Measuring distortions in international markets: the aluminium value chain", *OECD Trade Policy Papers*, No.218, OECD Publishing, Paris, https://doi.org/10.1787.c82911ab-en

[2] USTR (2023), "2022 Report to Congress on China's WTO Compliance United States Trade Representative", Washington https://ustr.gov/sites/default/files/2023-02/2022%20USTR%20Report%20to%20Congress%20on%20China's%20WTO%20Compliance%20-%20Final.pdf

compared to non-Chinese aluminum firms. These subsidies create major distortions in the global market, making it difficult – if not impossible – for others to compete.[3]

In April 2023, the OECD reiterated that industrial firms from China receive disproportionately more support overall than firms outside China, with aluminum being one of the most subsidized industrial sectors. The OECD found that the effects of industrial subsidies spread beyond targeted sectors and throughout the downstream supply chains. Specifically, aluminum smelters attract relatively more government support in the form of below-market borrowings and below-market energy inputs. Further, China's export taxes on primary aluminum, as well as its incomplete VAT rebates on exports of primary aluminum, have discouraged exports of this upstream product and provided a supply of relatively inexpensive primary aluminum that is utilized by Chinese producers of semi-fabricated products and downstream articles that involve aluminum inputs. Access to cheap primary aluminum has enabled downstream producers in China to compete in global markets at artificially lower cost,[4] as reflected in the chart below demonstrating the tremendous growth the volume of China's exports of semi-fabricated products.



The subsidies provided by the Chinese government to the aluminum industry in China, however, are just part of a larger strategy. As detailed in the *Made in China 2025* industrial plan released in 2015, China's economic planners have deliberately contributed to this massive excess capacity in China through various government support measures. Through the plan, the Chinese government is doling out hundreds of billions of dollars, seeking to create dominant Chinese companies in each of 10 advanced manufacturing industries, including advanced information technology, robotics and automated machine tools, aircraft and aircraft components, maritime vessels and marine engineering equipment, advanced rail equipment, new energy vehicles, electrical generation and transmission equipment, agricultural machinery, new materials and pharmaceuticals and medical devices.[5] Based on the recent history of the aluminum

[3] OECD (2021), "Measuring distortions in international markets: Below-market finance", *OECD Trade Policy Papers*, No.247, OECD Publishing, Paris, https://doi.org/10.1787/a1a5aa8a-en

[4] OECD (2023), "Government Support in Industrial Sectors: A Synthesis Report", *OECD Trade Policy Papers*, No.270, OECD Publishing, Paris, https://www.oecd-ilibrary.org/trade/government-support-in-industrial-sectors_1d28d299-en

[5] The People's Republic of China The State Council (2015), "'Made in China 2025' plan issued" Beijing, http://english.www.gov.cn/policies/latest_releases/2015/05/19/content_281475110703534.htm

industry, China's non-market distortions in these emerging sectors will likely result in artificially discounted oversupply, leading to loss of jobs and production in market economies.

In an attempt to counter the distortions resulting from the massive expansion of China's subsidized, state-supported primary aluminum production, a series of trade enforcement- and national security-related actions have been taken to address the challenges confronting U.S. aluminum producers across the value chain. The Aluminum Association and a number of its member companies have successfully pursued relief under the U.S. antidumping and countervailing duty (AD/CVD) laws against imports of flat-rolled aluminum products from China. In addition, U.S. producers of aluminum extrusions successfully obtained AD/CVD relief against such imports from China. These orders, however, did not provide complete relief to U.S. producers from the global distortions resulting from the Chinese government's subsidies to its aluminum industry.

Within months of the Commerce Department's publication of the AD/CVD orders on flat-rolled aluminum products from China, Chinese entities redirected products that were previously shipped to the United States to third-country markets, resulting in producers in those third-countries redirecting products from their own markets to the United States in an effort to sell into a market not distorted by large volumes of unfairly-traded Chinese products. Confronted with a second surge in flat-rolled aluminum products that were the indirect effects of Chinese subsidies, U.S. producers of flat-rolled aluminum products were forced to pursue a second round of unfair trade cases on U.S. imports of both common alloy sheet and foil from numerous third countries. These two subsequent rounds of unfair trade cases have provided vitally important relief to U.S. producers of flat-rolled aluminum products, providing domestic producers reason for cautious optimism that the prevailing favorable market conditions will continue into the future. This outlook, in turn, has resulted in numerous domestic producers of flat-rolled aluminum products having the confidence to pursue substantial capital investments to increase their capacity to manufacture greater volumes of aluminum products in order to meet the increasing needs of their customers, thereby creating a large number of well-paying manufacturing jobs.

The distortions in China's aluminum market have also spurred action by the U.S. government to counter the many problems posed by China's state-led, non-market approach to the economy and trade. For example, the United States has acted under Section 232 of the Trade Expansion Act of 1962 to increase tariffs on aluminum products after finding that excessive imports are a threat to U.S. national security. The Aluminum Association and its members did not request relief under this authority, which was focused largely on supporting U.S.-based primary aluminum producers. While the Section 232 tariffs have provided some level of stability for aluminum firms up and down the value chain, they have not addressed the fundamental and ever-evolving distortions resulting from China's rampant use of industrial subsidies in the aluminum sector.

In addition, the United States launched an investigation, and subsequently imposed several rounds of tariffs, under Section 301 of the Trade Act of 1974, on imports from China as a result of China's unreasonable and discriminatory acts, policies, and practices related to technology transfer, intellectual property, and innovation. The imposition of the Section 301 duties led to declines in overall levels of U.S. imports from China. As discussed in a recent economic analysis, the imposition of the Section 301 duties caused total imports from China to decline in 2019, 2020, and 2021. As of August 2022, China accounted for just 18 percent of total U.S. goods imports, a significant decline from the 22 percent figure at the time the Section 301 duties were first imposed in 2018.[6]

[6] Chad P. Bown, Oct. 20, 2022), "Four years into the trade war, are the US and China decoupling?" Realtime Economics, Peterson Institute for International Economics, Washington, https://www.piie.com/blogs/realtime-economics/four-years-trade-war-are-us-and-china-decoupling?gclid=Cj0KCQjwgLOiBhC7ARIsAIeetVAGkKy6ooo-7Vw84AXbzRgtrwtR-vhJbOWkj0B9kv2ucAsVXSHt-zwaAtUgEALw_wcB

The largest impact of the Section 301 trade action has been on those Chinese products on which the highest tariffs were imposed. As of August 2022, imports of articles identified in so-called Lists 1, 2, and 3, which were subject to 25 percent import duties, remained 22 percent below their pre-Section 301 levels in July 2018. By way of comparison, imports from China subject to the lower duty rate of 7.5 percent under List 4A (including many aluminum articles classified under Chapter 76 of the Harmonized Tariff Schedule of the United States) showed a significantly smaller decline of just 3 percent from August 2019 (the month before the imposition of Section 301 tariffs on List 4A items) to August 2022. Further, imports from China that were not subject to the Section 301 duties actually increased in the time between the initial imposition of the Section 301 duties and August 2022. To the extent Chinese producers have lowered their prices in an effort to continue to sell aluminum products into the U.S. market notwithstanding the Section 301 duty, it is possible that Chinese producers/exporters could overcome a relatively modest 7.5 percent duty. For this reason, the Aluminum Association has urged that the 7.5 percent Section 301 duty on most aluminum products imported into the United States from China (i.e., the aluminum products identified on List 4A) should be increased to 25 percent, consistent with a limited number of aluminum products identified on Lists 2 and 3.

These initiatives confirm that U.S. government officials understand the imperative of addressing the key sources of international aluminum market distortions – i.e., massive industrial subsidies given by the Chinese government to its aluminum industry. The beneficial effects of these efforts, however, are being undermined by excessive approvals by the Commerce Department of Section 232 exclusion requests, which inadvertently have made the United States a magnet for aluminum imports. The Aluminum Association and its members have long urged reforms to the Section 232 product exclusion process. As it is implemented today, the Section 232 exclusion process incentivize companies to turn first to imported aluminum products like sheet, plate, and foil, despite those products being manufactured in abundance in the United States. In addition to a number of badly- needed reforms to this process, which the Aluminum Association enumerated in comments submitted to the Department of Commerce, the Association has urged the agency to reverse the General Approved Exclusions (GAEs) that were created in December 2020 in order to re-examine whether the current list is appropriate and whether GAEs are consistent with the aims of the Section 232 remedy.

To address the distortions resulting from Chinese government subsidies in the aluminum sector, the Aluminum Association supports multilateral efforts to combat unfair trade practices. Multilateral rules, when consistently enforced, are the most effective way to combat the spread of unfairly subsidized aluminum. Such efforts, including negotiations between the U.S. and European Union (E.U.) to establish a *Global Arrangement on Sustainable Steel and Aluminium* (Global Arrangement), should prioritize coordination with long-term allies and other market economies to address subsidies and distorting practices in a way that creates a level playing field for the U.S. aluminum industry. In launching negotiations with the E.U. toward a Global Arrangement, the Biden Administration laid out its goal to address global market distortions that impact aluminum output by measuring both non-market excess capacity and carbon intensity of aluminum products that move through the supply chain. We urge the Committee to engage with the United States Trade Representative and with the aluminum industry to ensure that initiatives like the Global Arrangement are crafted to serve the interest of U.S. manufacturers, workers, and communities.

Lastly, trade policy and tariffs alone are insufficient to meet the legitimate national and economic security need for a robust domestic aluminum industry. As such, the Aluminum Association and its members support the implementation of national policies to ensure a resilient U.S. aluminum supply chain, including a comprehensive national strategy to modernize U.S. aluminum primary production that reflects the full value chain of the aluminum industry in the United States – including the important role of secondary production and recycling as well as semi-fabricated aluminum manufacturing. Such an effort would need to include long-term federal investments in research and development, infrastructure,

and critically, sensible energy and sustainability policies that create the framework conditions necessary for further capital investment in domestic aluminum manufacturing.

The Aluminum Association supports efforts to find common ground on new strategies to deal with the many problems posed by China's state-led, non-market approach to the economy and trade. We appreciate your leadership on this important issue.

Respectfully submitted,

Virginia Gum Hamisevicz
Vice President Government Relations & International Programs
The Aluminum Association

April 19, 2023

The Honorable Jason Smith
Chairman
House Ways and Means Committee
Washington, DC 20515

The Honorable Richard Neal
Ranking Member
House Ways and Means Committee
Washington, DC 20515

Dear Chairman Smith and Ranking Member Neal:

NATSO, Representing America's Travel Centers and Truckstops, and SIGMA: America's Leading Fuel Marketers, (together, the "Associations")[1] appreciate the Committee for examining renewable energy tax policies that are adversely impacting American consumers. We are grateful for the opportunity to highlight tax policies within the Committee's jurisdiction that will increase the cost of diesel and therefore goods that are hauled by truck.

The Associations represent more than 80 percent of retail fueling stations in the United States. Our membership includes national travel center and convenience store chains annually grossing billions of dollars, as well as smaller businesses, including single location operators.[1] The retail fuels and convenience industry provides 2.38 million jobs at approximately 120,000 retail establishments across the country. Fuel marketers should be viewed as surrogates for the consumer in that they identify the most reliable, lowest cost transportation energy available, and deliver that energy to every community in the country. In so doing, they compete with one another on price, speed, and quality of facilities and service.

Biofuel and renewable fuel incentives work to build and maintain a competitive marketplace, maximize the climate benefits of renewable fuels, and minimize fuel supply disruptions and inflationary consequences for consumers. The biodiesel blenders' tax credit has worked successfully to build a robust biodiesel and renewable diesel industry in the United States;[2] those products enhance our supply of transportation energy for heavy-duty trucks, limiting our exposure to global petroleum markets while improving the transportation sector's emissions footprint. As a

[1] NATSO represents nearly 5,000 travel plazas and truck stops nationwide, comprised of both national chains and small, independent locations. SIGMA represents a diverse membership of approximately 260 independent chain retailers and marketers of motor fuel.

[2] Generally, since 2004, Section 40A of the Internal Revenue Code has provided a credit of a fixed dollar amount per gallon of biodiesel and renewable diesel used, sold, or mixed in a trade or business. Initially, that credit was $0.50 per gallon, and was increased to $1.00 per gallon beginning in 2009 (Pub. L. 110-343); the $1.00 amount has not been adjusted for cost of living or inflation since that time. Most recently, those provisions were extended by Public Law 117-169 and are currently effective through December 31, 2024. This $1.00 per gallon blenders' credit for biodiesel and renewable diesel has resulted in lower prices and fewer carbon emissions associated with transportation energy. It has also promoted America's energy security.

result, the U.S. biodiesel and renewable diesel market has grown from roughly 100 *million* gallons in 2005 to approximately 4.6 *billion* gallons in 2022.[3] This number will continue to grow as new plants are built and continue to come online.[4]

Biofuel producers today convert used cooking oil, animal fats, vegetable oils and other "feedstocks" into renewable diesel and biodiesel. Those same feedstocks are used in the production of sustainable aviation fuel ("SAF") as well.[5] Because there is a limited supply of feedstocks – exacerbated by the ongoing War in Ukraine and global supply chain issues – many producers face trade-offs about which kinds of fuels to produce; these trade-offs are influenced by the tax incentive framework in place and the disparity between over-the-road ($1.00) and through-the-air ($1.75) maximum credit rates.

Due to limitations in the overall feedstock supply, the current law preferential tax treatment of SAF will result in higher diesel prices. It will disrupt the market for biodiesel and renewable diesel by diverting limited feedstocks to SAF. American consumers who are already suffering the effects of inflation will pay more for everyday household goods like groceries, electronics, and medication – all predominately transported by truck – if biodiesel and renewable diesel supply is adversely affected by this new market disparity.

Moreover, a shift from a blenders' credit to a producer's credit as contemplated by the currently scheduled 2025 shift to the "technology neutral" clean fuel production credit will further increase diesel prices in the United States.[6] That producer's credit will further distort the biodiesel product market by incentivizing domestic biodiesel producers to export product, thereby diminishing U.S. supply and further imperiling domestic energy security while raising costs for truck drivers.[7] In effect, the U.S. taxpayer will be subsidizing biodiesel consumption overseas, while paying higher costs for fuel domestically.

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[3] EIA Monthly Biofuels Feedstock and Capacity Update, available at https://www.eia.gov/biofuels/update.

[4] U.S. Energy Information Administration, "Domestic renewable diesel capacity could more than double through 2025," (February 2, 2023) available at https://www.eia.gov/todayinenergy/detail.php?id=55399#.ZAYwph4DPZI.

[5] PL 117-169 also enacted for the first time Section 40B, a distinct credit for the sale or use of SAF. That credit was pegged at a fixed dollar amount of $1.25, plus up to an additional 50 cents per gallon based on the lifecycle greenhouse gas emissions of the fuel in question for a maximum possible $1.75 per gallon credit. These provisions are also scheduled to expire after December 31, 2024.

[6] PL 117-169 enacted a separate domestic production incentive for clean fuels, Section 45Z. That provision incorporates a variable base credit amount based on lifecycle greenhouse gas emissions relative to a national emissions rate determined by Treasury, with a maximum credit amount of $1.75 per gallon for aviation fuels and $1.00 for other fuels. This provision is scheduled to go into effect on January 1, 2025, and expire after December 31, 2027, effectively shifting this group of incentives away from consumption (*i.e.*, the use, sale, or mixture of certain fuels) toward the production of those fuels.

[7] The biodiesel blenders credit applies to all biodiesel regardless of its source. While the vast majority of biodiesel product in the United States is domestically sourced, in certain markets, retailers rely on imported biodiesel to stabilize supply. This, in turn, imposes downward pressure on domestic biodiesel prices. Thus, the blenders credit currently in place makes it more attractive for fuel retailers to blend and sell biodiesel, and these savings are passed along to consumers.

The Associations believe it is best for the American consumer and America's industrial position in the world marketplace to have reasonably low and stable energy prices. Congress has an opportunity to lower the cost of fuel for commercial drivers and ensure market stability by promoting parity between credits for over-the-road and aviation renewable fuels that compete for the same feedstock. We look forward to working with the Committee on parity for alternative fuel incentives.

Sincerely,

NATSO, Representing America's Travel Plazas and Truck Stops
SIGMA: America's Leading Fuel Marketers

Attachment: NATSO SIGMA Comments on IRS Notice 2023-06-merged

cc: Members of the House Ways and Means Committee