The Insightful Leader Live:
What Your Need to Know About the New Climate Bill
The topic of today’s talk is a piece of legislation known as the Inflation Reduction Act
Poll: The Inflation Reduction Act ...

1. Is a health care bill ... and a tax reform bill ... and a climate policy bill ... and a deficit reduction bill

2. Will have a negligible effect on inflation

3. Will have a very small effect on global greenhouse emissions and temperature rise

4. Is a “big f ...ng deal”: excellent public policy that does more good than harm

5. Requires permitting reform to be optimally effective
Outline of the talk

- Inflation Reduction Act of 2022 (IRA): a high-level overview
- Will the IRA make a difference?
  - To the budget deficit?
  - To inflation?
  - To global temperature rise?
- Why the climate provisions of the IRA are a “big f ...ng deal” (BFD)
  - Important innovative policy provisions
  - Incentives and opportunities for U.S. to build a robust climate economy
  - Social benefits exceed social costs ... by a lot
- A key next step
- Q&A
Inflation Reduction Act

- Overview
- Will it make a difference?
- Why the climate provisions of the IRA are a BFD
- A key next step
- Q&A
Candidate Joe Biden proposes Build Back Better Plan: plan for public investment in social and physical infrastructure, social safety net, environmental protection rivaling New Deal and Great Society in scope

Biden administration introduces American Jobs Plan (AJP) and American Families Plan (AFP)

Spring 2020

April-May 2021

Summer 2021

Fall 2021

December 2021

January-July 2022

July 2022

- Physical infrastructure provisions of AJP spun off and eventually becomes the Infrastructure Investment and Jobs Act ($>1 trillion in spending over five years), passed and signed into law in November 2021
- Build Back Better Act introduced as a budget reconciliation package to fulfill remaining aspects of AJP and AFP, with an initial scope of $3.5 trillion in additional (gross) spending over 10-years

- Following negotiations to win support of Senators Manchin (D-WV) and Sinema (D-AZ) in the Senate and a group of moderate Democrats in the House, scope was reduced to a $2.2 trillion package.
- Passed House by a vote of 220-213 in mid-November 2021

- Senator Manchin pulls support for the bill

- Behind-the-scenes, Sen. Manchin and Senate Majority leader Chuck Schumer negotiate provisions of the Inflation Reduction Act

- Passes Senate by 51-50 margin with Vice President Kamala Harris breaking the tie
- Passes House by 220-207 margin
- Signed into law by President Biden on August 16, 2022
IRA: Overview

- Health care
- Taxation
- Climate provisions
Increased revenue or decreased spending: $765 billion, 2022-2031

- IRS enforcement: $180.39 billion
- Medicare drug price negotiations: $98.52 billion
- Excise tax on share repurchases: $79.60 billion
- Medicare drug price caps: $56.34 billion
- Delay Trump administration drug rebate rule: $122.15 billion

Decreased revenue or increased spending: $489 billion, 2022-2031

- Clean energy tax credits: $235.67 billion
- Climate-related investments: $83.51 billion
- IRS enforcement: $79.60 billion
- ACA premium subsidies: $32.82 billion

Clean energy tax credits in the Inflation Reduction Act

Additional spending, 2022-2031 (in billions)
Total: $235.67 billion

Clean energy investments in the Inflation Reduction Act

Additional spending, 2022-2031 (in billions)
Total: $83.51 billion

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Inflation Reduction Act: CBO estimates of budgetary implications—year-by-year budgetary implications

## Inflation Reduction Act: CBO estimates of budgetary implications—10-year budgetary implications

<table>
<thead>
<tr>
<th>Item</th>
<th>Change, 2022-2031 (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Change in direct spending, new spending provisions</td>
<td>$50.58</td>
</tr>
<tr>
<td>(2) Change in revenue, new tax provisions</td>
<td>$108.66</td>
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<tr>
<td>(3) Change in revenue, IRS enforcement</td>
<td>$180.39</td>
</tr>
<tr>
<td>Change in budget deficit: (1) − (2) − (3)</td>
<td>($238.49)</td>
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## Inflation Reduction Act: CBO estimates of budgetary implications—10-year budgetary implications in context

### U.S. federal government projected outlays and revenues (baseline) and changes due to IRA, 2022-2031

<table>
<thead>
<tr>
<th></th>
<th>Actual, 2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
<th>2031</th>
<th>Total 2022–2031</th>
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<tbody>
<tr>
<td><strong>Outlays, baseline</strong></td>
<td>$6,822.4</td>
<td>$5,871.8</td>
<td>$5,873.6</td>
<td>$5,979.8</td>
<td>$6,299.8</td>
<td>$6,643.5</td>
<td>$6,957.8</td>
<td>$7,440.7</td>
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<td>Change in direct spending from IRA (0.62)</td>
<td>$ (0.62)</td>
<td>$24.79</td>
<td>$33.80</td>
<td>$27.11</td>
<td>$24.98</td>
<td>$14.74</td>
<td>$(7.47)</td>
<td>$(12.52)</td>
<td>$(23.51)</td>
<td>$(30.72)</td>
<td>$50.58</td>
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<tr>
<td>Percentage change</td>
<td>-0.01%</td>
<td>0.42%</td>
<td>0.57%</td>
<td>0.43%</td>
<td>0.38%</td>
<td>0.21%</td>
<td>-0.10%</td>
<td>-0.17%</td>
<td>-0.29%</td>
<td>-0.36%</td>
<td>0.07%</td>
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<td><strong>Revenues, baseline</strong></td>
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<td>$4,836.0</td>
<td>$4,889.6</td>
<td>$4,923.9</td>
<td>$4,981.5</td>
<td>$5,279.7</td>
<td>$5,548.4</td>
<td>$5,715.6</td>
<td>$5,934.0</td>
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<td>$6,401.8</td>
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<td>Change in revenues from IRA, tax provisions</td>
<td>$ -</td>
<td>$30.6</td>
<td>$20.0</td>
<td>$3.8</td>
<td>$(4.3)</td>
<td>$20.6</td>
<td>$28.7</td>
<td>$10.8</td>
<td>$(0.2)</td>
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<td>Change in revenue from IRA, IRS enforcement</td>
<td>$ -</td>
<td>$2.0</td>
<td>$5.1</td>
<td>$11.1</td>
<td>$16.1</td>
<td>$21.7</td>
<td>$26.3</td>
<td>$31.2</td>
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<tr>
<td>Change in revenue from IRA, total</td>
<td>$ -</td>
<td>$32.6</td>
<td>$25.1</td>
<td>$15.0</td>
<td>$11.9</td>
<td>$42.3</td>
<td>$55.0</td>
<td>$42.0</td>
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<td>$30.4</td>
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<td>0.67%</td>
<td>0.51%</td>
<td>0.30%</td>
<td>0.22%</td>
<td>0.76%</td>
<td>0.96%</td>
<td>0.71%</td>
<td>0.56%</td>
<td>0.48%</td>
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<td><strong>Deficit, baseline</strong></td>
<td>$2,775.3</td>
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<td>$984.0</td>
<td>$1,055.9</td>
<td>$1,318.3</td>
<td>$1,363.8</td>
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<td>$1,725.1</td>
<td>$1,650.8</td>
<td>$1,912.2</td>
<td>$2,067.4</td>
<td>$17,297.9</td>
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<tr>
<td>Change in deficit from IRA</td>
<td>$(0.62)</td>
<td>$(7.82)</td>
<td>$8.66</td>
<td>$12.16</td>
<td>$13.11</td>
<td>$(27.60)</td>
<td>$(62.48)</td>
<td>$(54.54)</td>
<td>$(58.21)</td>
<td>$(61.15)</td>
<td>$(238.49)</td>
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<tr>
<td>Percentage change</td>
<td>-0.06%</td>
<td>-0.79%</td>
<td>0.82%</td>
<td>0.92%</td>
<td>0.96%</td>
<td>-1.96%</td>
<td>-3.62%</td>
<td>-3.30%</td>
<td>-3.04%</td>
<td>-2.96%</td>
<td>-1.38%</td>
<td></td>
</tr>
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</table>

Effect on inflation:

“The Act would have no meaningful effect on inflation in the near term but would reduce inflation by around 0.1 percentage points by the middle of the first decade. These point estimates, however, are not statistically different from zero, indicating a low level of confidence that the legislation would have any measurable impact on inflation.”

Effect on real GDP:

“Relative to current law, the Act would slightly reduce GDP in the first decade while slightly increasing GDP by 2050. These estimates include the impact of debt reduction, carbon reduction, and tax incentives on investments and working hours.”

How much difference will the Inflation Reduction Act make for reducing global warming?

- Climate Interactive baseline scenario consistent with projections in the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment “business as usual” emissions scenario

- Assumes 2.5% decrease in annual emissions in U.S. due to IRA

- Roughly consistent with Princeton University REPEAT model forecast

Inflation Reduction Act

- Overview
- Will it make a difference?
- Why the climate provisions of the IRA are a BFD
- A key next step
- Q&A
Why the climate provisions of the Inflation Reduction Act are a BFD: Three reasons

1. Important innovative policy provisions
2. Incentives and opportunities for U.S. to build a robust climate economy
3. The social benefits exceed social costs ... by a lot
Example #1: Technology-neutral clean energy tax credits—production tax credit

- IRA extends traditional ("Section 45") PTC for renewable electricity facilities (e.g., wind or solar plants) that begin before end of 2024:
  - PTC provides a credit against a firm’s corporate income tax based on amount of electricity produced in the qualifying facility

- For new plants begun in 2025 or afterwards, IRA creates new technology-neutral production tax credit:
  - Power plants would qualify for production tax credit irrespective of technology used, provided that GHG emissions ≤ 0

- Important for two reasons:
  - Effectively extends PTC to, among other things, electricity storage facilities
  - Emissions-based subsidies have incentives that replicate those of a carbon tax:
    - Carbon tax: You pay if you have positive carbon emissions
    - Emissions-based subsidies: You pay (by foregoing the subsidy) if you have positive carbon emissions
    - Creates incentives for fossil-based electricity producers to find ways to eliminate emissions, such as retrofitting natural gas plants with carbon removal technologies
Example #2: Methane emissions fee

- Begins at $900 per metric ton of methane (CH₄) in 2024, increases to $1,200 per ton CH₄ in 2025, and $1,00 per ton CH₄ thereafter

- This is a big deal!
  - First time the U.S. has imposed a fee on emissions of a greenhouse gas (GHG)
  - One ton of CH₄ has 25× the global warming potential (GWP) of one ton of CO₂
  - The level of the fee is very sensible:
    - $900 per metric ton of CH₄ is equivalent to $36 per ton CO₂
    - $1,200/ton CH₄ = $48 per ton CO₂e
    - $1,500/ton CH₄ = $60 per ton CO₂e
    - Consistent with lower bound estimates of the social cost of carbon

- Facilities in red (with two exceptions) are subject to the charge
- Almost 2,200 facilities accounting for about 78 million metric tons of CO₂e in 2019 are subject to the fee

Example #3: Greenhouse Gas Reduction Fund

- First federal-level green financing model, akin to a national version of state-level or local-level green banks (such as the Connecticut Green Bank or the Montgomery County Green Bank)

- Provides $27 billion of competitive grants to state, local and tribal governments and non-profit institutions in three tranches:
  - $12 billion in competitive grants for investments in and financial support for qualified projects that reduce emissions or promote renewable energy
  - $8 billion in funding specifically directed toward low-income and disadvantaged communities to support zero-emissions projects
  - $7 billion in funding specifically directed toward low-income and disadvantaged communities to support renewable energy projects

- Recipients are non-profit organizations that provide capital for green projects:
  - Also can be used by state and local governments to set up their own green banks

- This is a big deal:
  - Not only provides capital for projects that are socially valuable but which could not, on their own, attract sufficient private capital to be viable ...
  - But also they can work synergistically with tax credit provisions of IRA (more below)
BUILD ROBUST U.S. CLIMATE ECONOMY?

Why having a robust climate economy in the U.S. is important

- Allows U.S. better control over its own fate in global energy markets, e.g., more buffered from oil price shocks
- Increases U.S. credibility in climate diplomacy
- Gives the U.S. the ability to affect emissions reductions outside the U.S. through technology transfer
My analysis of CBO scoring of IRA suggests that additional “spending through the tax code” of tax credits will be $236 billion over 10 years.

But the amount could be higher than this since there is no “budget limit” on the tax credits—they are open ended.

If renewable electricity investment and production is higher than CBO forecasts, the spending could be higher than this.

Credit Suisse analysis from August suggests that total tax credits earned could be twice the CBO estimate … suggesting tax credit incentives may be more powerful than is currently assumed.*

*Source: Meyer, Robinson, “The Climate Economy is About to Explode,” The Atlantic (October 6, 2022)
New tax credits and new sources of clean energy funding

- New or substantially expanded clean energy tax credits
  - Alternative fuel refueling property tax credit (e.g., for electric vehicle charging stations)
  - Previously owned electric vehicles tax credit
  - Sustainable aviation fuel credit
  - Production tax credit and investment tax credit for clean hydrogen
  - Nuclear production tax credit
  - Direct air capture tax credit
  - Qualified commercial clean vehicles tax credit

- New or substantially expanded public investment and loan programs
  - Advanced manufacturing tax credit for clean energy components (e.g., photovoltaic cells)
  - Advanced Industrial Facilities Deployment Program $5.8 billion
  - Greenhouse Gas Reduction Fund $27 billion
  - Department of Energy Loan Program: $4.3 billion in additional funding and authorization for $40 billion in loan guarantee commitments
IRA extends the plug-in EV tax credit for new EVs, worth up to $7,500 for income-qualifying individuals

To qualify for the credit, final assembly of vehicle must take place in North America

To qualify for $3,750 of the credit, a certain % of battery components must be manufactured and assembled in the U.S. (from 50% in 2023 to 100% by 2029)

To qualify for $3,750 of the credit, a certain % of minerals used in batteries must be processed in free-trade agreement country or recycled in North America (from 40% in 2023 to 80% by 2027)
  - No minerals can be obtained from Russia, China, North Korea, and several other “entities of foreign concern”

U.S. has had a long tradition for domestic content regulations for federal government procurement and for federal transportation and water funding grants to states, but it is novel to promote domestic sourcing via tax credits
Princeton University Zero Lab REPEAT Model: Forecast impact of IRA on private investment in energy supply infrastructure

Annual capital investment in U.S. energy supply related infrastructure

- Baseline: no IRA
- With IRA

Princeton University Zero Lab REPEAT Model: Forecast impact of IRA on use of carbon capture

Annual CO₂ capture for transport or storage

Baseline: no IRA

With IRA

Princeton University Zero Lab REPEAT Model: Forecast impact of IRA on employment

Changes in employment by sector due to IRA

Thousands of jobs

2024 2026 2028 2030 2032 2035

coal
oil
natural gas
biomass
CO2 transport & storage
grid
nuclear
solar manufacturing
solar other
wind manufacturing
wind other

BUILD ROBUST U.S. CLIMATE ECONOMY?
Inflation Reduction Act: Impact on carbon emissions

**2005 U.S. emissions**

\[ \approx 6.6 \text{ billion tons CO}_2 \text{ equiv.} \]

**Estimated emissions**

2021 U.S.

\[ \approx 5.6 \text{ billion tons CO}_2 \text{ equiv.} \]

**Biden administration**

2030 target: 50% below 2005

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No IRA:

2030 emissions

\[ \approx 4.8 \text{ billion tons CO}_2 \text{ equiv.} \]

27% reduction

IRA:

2030 emissions

\[ \approx 3.8 \text{ billion tons CO}_2 \text{ equiv.} \]

42% reduction

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Sources of U.S. greenhouse gas emissions

U.S. greenhouse gas emissions, 2020 (million metric tons CO$_2$-equivalent)

- Transportation, 1615, 27%
- Electric power, 1495, 25%
- Industry, 1435, 24%
- Agriculture, 658, 11%
- Commercial and residential, 778, 13%

Emissions reductions, 2022-2030 by source (million metric tons CO₂-equivalent)

- Transportation, 280, 29%
- Electric power, 360, 37%
- Industry, 130, 13%
- All other: buildings, methane emissions reductions, and land carbon sinks, 210, 21%

Significant amount of reduction (about 100 million tons CO₂) expected to come from carbon capture

• EV adoption is accelerated due to
  — Continuation of new EV tax credits, plus removal of manufacturer caps
  — EV tax credits for used vehicles
  — Declining costs of batteries and fuel cells
  — Declining costs of charging stations

• Increase in pace of renewable capacity additions
  — 2× 2020 pace of increase for wind in 2025-26
  — 5× 2020 pace for solar in 2025-26

• Some of this reduction comes from carbon capture in new natural gas-fired plants and retrofitted natural gas and coal plants

CO₂ emissions reductions due to IRA

Estimated emissions reductions due to IRA, 2024-2035: REPEAT Model

Social benefit of CO₂ emissions reductions due to IRA

Social benefit of estimated emissions reductions due to IRA, 2024-2035

Social cost of carbon: $185/ton CO₂e*  
Total social benefit: $1,457 billion

Social cost of carbon: $51/ton CO₂e  
Total social benefit: $524 billion


IRA reduces emissions of PM2.5, primarily through:
- Shift from coal-based electricity production to renewable-based electricity production
- Reduced usage of gasoline due to shift from internal combustion engine vehicles to electric vehicles

PM2.5 is a deadly pollutant, so reducing it reduces the risk of premature death

Estimated reduction in premature deaths from PM2.5 due to IRA, 2023-2035: REPEAT Model

Social benefit of avoided premature deaths from PM2.5 due to IRA

Social benefits from reduced carbon emissions
≈ $500 billion to $1,500 billion

Social benefits from reduced mortality from PM2.5
≈ $240 billion to $500 billion

Other benefits or costs
- Increase in consumer welfare due to lower prices (electricity, EVs)
- Increase in business profitability of "winners" (e.g., firms in clean energy sectors) less decrease in business profitability of "losers" (e.g., firms in fossil-based sectors)
- Other benefits to U.S. from expansion of clean energy economy (e.g., reduced exposure to shocks in global oil markets)
- Other public health benefits of reduced air pollution (e.g., reduced incidence of asthma)
≈ $465 billion - $1,725 billion (at least)*
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We need long-distance high-voltage transmissions line

- The IRA does not change two fundamental aspects of renewable-based electricity generation:
  - Intermittency
  - Geography of wind and sunshine resources versus geography of demand
- More high-voltage power lines needed to deal with both problems
- Princeton University Zero Lab* estimates that:
  - 80% of potential emissions reductions due to IRA will not be realized if growth in transmission line capacity remains at current rate of about 1% per year
  - 25% will not be realized if transmission line capacity increases at 1.5% annually
  - Need growth in transmission line capacity of 2.3% to realize estimated reductions shown earlier in this presentation
- Key public policy challenge:
  - Unlike interstate natural gas and oil pipelines which are regulated by the federal government (through Federal Energy Regulatory Commission or FERC), long-distance transmission lines are regulated by individual states

Manchin “permitting bill”

- Expedites Mountain Valley pipeline through West Virginia
- Places two-year limit on time to conduct environmental impact assessments for oil and gas pipelines and other infrastructure projects under the National Environmental Policy Act
- Places limits on time for court challenges under NEPA
- Extends some federal government authority over high-voltage, long-distance power lines by allowing the President to designate up to 25 high-priority energy infrastructure projects that would receive priority federal review
- Though imperfect, it does more good than harm (I believe), but for the moment it is now dead
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Thank You!