A turning point of US climate action
Assessing the Inflation Reduction Act

TRANSATLANTIC NETWORK | DECEMBER 13, 2022

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The IRA builds on a 30-year US policy trend
Major tax credit extensions and GHG regulatory actions (lots of other regs with GHG benefits)

**Tax Credits**

- Energy Policy Act
- Job Creation and Worker Assistance Act
- Working Families and Tax Relief Act
- The Tax Relief and Health Care Act
- The American Recovery and Reinvestment Act
- The American Taxpayer Relief Act
- The Emergency Economic Stabilization Act
- Consolidated Appropriations Act
- Further Consolidated Appropriations Act

**GHG Regulations**

- Energy Policy Act
- Obama LDV MY2017-2025
- Obama Clean Power Plan
- Obama O&G NSPS
- Trump ACE Rule
- Trump O&G NSPS
- Biden LDV MY2021-2026
- Obama LDV MY2012-2016
- Obama MDV/HDV Phase I
- Obama Power NSPS
- Obama MDV/HDV Phase II
- Trump LDV MY2021-2026
- Biden O&G NSPS
- Biden HDV Standards

Source: Rhodium Group
## Major IRA policies explicitly modeled

<table>
<thead>
<tr>
<th>Target Sector</th>
<th>Policies</th>
</tr>
</thead>
</table>
| **Electric power** | • Extension and modification of existing production tax credit and investment tax credit  
• New clean electricity production and investment credits  
• Extension and modification of carbon capture tax credits  
• New zero-emissions nuclear power production credit  
• Tax credit direct pay provisions and transferability  
• USDA assistance for rural electric cooperatives  
| **Transportation** | • New clean vehicle credit for light-duty vehicles and qualified commercial clean vehicles  
• Extension of biofuel incentives  
• New clean fuel production tax credit  
• New sustainable aviation fuel credit  
• New clean hydrogen production tax credit  
| **Industry** | • Extension and modification of carbon capture tax credits  
• New clean hydrogen production tax credit  
• New clean fuel production tax credit  
| **Buildings** | • Extension and modification of energy efficiency commercial buildings deduction  
• Extension and modification of nonbusiness energy property credit  
• Extension and modification of residential clean energy credit  
• Extension and modification of new energy efficient home credit  
• New performance based, whole-house rebates  
• New high-efficiency electric home rebates  
| **Oil and gas** | • Methane emissions reduction program  
• Increases in onshore and offshore oil and gas royalty rates  
• Required lease sales from the 2017-2022 Outer Continental Shelf Leasing Program  
• Required minimum onshore and offshore lease sale acreages and timing provisions  
| **Carbon removal** | • Agricultural conservation investments  
• Non-federal land forest reforestation projects  
• State and private forestry conservation programs  
• Extension and modification of carbon capture tax credits to include a new tier for direct air capture  

IRA analysis scenario design

- We assess the impacts of the IRA by comparing emissions under our three core Taking Stock 2022 emissions scenarios, which reflect all policy on the books as of June 2022, with emissions under those same scenarios plus the IRA.
- To conduct this analysis, we used RHG-NEMS, a version of the Energy Information Administration’s (EIA) National Energy Modeling System modified by Rhodium Group.

<table>
<thead>
<tr>
<th>TS 2022 Main Scenarios</th>
<th>Low Emissions</th>
<th>Central</th>
<th>High Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas &amp; oil prices</td>
<td>High</td>
<td>Mid</td>
<td>Low</td>
</tr>
<tr>
<td>Clean technology costs</td>
<td>Low</td>
<td>Mid</td>
<td>High</td>
</tr>
<tr>
<td>Economic growth</td>
<td>Baseline</td>
<td>Baseline</td>
<td>High</td>
</tr>
</tbody>
</table>
The Inflation Reduction Act puts the 2030 target within reach...
Net million metric tons (mmt) of CO$_2$e

Source: Rhodium Group. Note: The range reflects uncertainty around future fossil fuel prices, economic growth, and clean technology costs. It corresponds with high, central, and low emissions scenarios detailed in Taking Stock 2022.
US emissions in 2030 under the IRA, compared to current policy

Percent reduction in 2030 from 2005 levels

Source: Rhodium Group. Note: The high, central, and low emissions scenarios reflect uncertainty around future fossil fuel prices, economic growth, and clean technology costs, and are detailed in Taking Stock 2022.
Sector-level changes in emissions

Additional emissions reductions from the IRA by sector, 2030
Net million metric tons (mmt) of CO₂e

Source: Rhodium Group

US greenhouse gas emissions by sector, 2005-2035
Net million metric tons (mmt) of CO₂e. Central scenario

Source: Rhodium Group
### Clean electricity shares in 2030

#### Percent of total generation

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Uncontrolled fossil</th>
<th>Clean</th>
<th>Source: Rhodium Group.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Policy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>28%</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>42%</td>
<td>58%</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>54%</td>
<td>46%</td>
<td></td>
</tr>
<tr>
<td><strong>IRA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>19%</td>
<td>81%</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>24%</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>40%</td>
<td>60%</td>
<td></td>
</tr>
</tbody>
</table>

**Current Policy**

46-72% clean generation share

**IRA**

60-81% clean generation share
Industrial sector emissions and installed carbon capture capacity

**Industrial sector emissions, 2030**
Million metric tons, % change relative to 2005 levels

- Low emissions: -14%
- Central: -8%
- High Emissions: -11%

** Installed carbon capture capacity, inclusive of the IRA**
Million metric tons of capture capacity per year

Source: Rhodium Group. Note: For the figure on the right, results reflect the impacts of future energy market conditions and current policy, as well as the impacts of the IRA.
Electric vehicles as a share of all LDV sales, 2021-2030

Percent share of total

Source: Rhodium Group.
Sustainable aviation fuel and green hydrogen prices

Wholesale sustainable aviation fuel prices, 2027
US dollars per gallon

- Current Policy
- IRA

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Low Cost</th>
<th>High Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fossil Jet Range</td>
<td>$3.80</td>
<td>$6.70</td>
</tr>
<tr>
<td>Conventional Hydrogen Range</td>
<td>$2.05</td>
<td>$4.95</td>
</tr>
</tbody>
</table>

Green hydrogen prices, 2030
US dollars per kilogram

- Current Policy
- IRA

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<th>Scenario</th>
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<th>High Cost</th>
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</thead>
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<tr>
<td>Conventional Hydrogen Range</td>
<td>$3.39</td>
<td>$4.92</td>
</tr>
<tr>
<td></td>
<td>$0.39</td>
<td>$1.92</td>
</tr>
</tbody>
</table>

Source: Rhodium Group. Note: (1) Sustainable aviation fuel estimates reflect HEFA and ATJ processes. (2) Green hydrogen assumed to be produced with utility-scale solar. Other zero-emitting electricity sources will lead to different costs.
Change in household energy costs from the IRA in 2030

US dollars

Source: Rhodium Group
Domestic oil and gas production is flat or decreased

**Domestic crude oil production in 2030**
Million barrels per day

<table>
<thead>
<tr>
<th></th>
<th>Current Policy</th>
<th>IRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Emissions</td>
<td>9.4</td>
<td>9.4</td>
</tr>
<tr>
<td>Central</td>
<td>13.3</td>
<td>13.2</td>
</tr>
<tr>
<td>High Emissions</td>
<td>17.7</td>
<td>17.7</td>
</tr>
</tbody>
</table>

Source: Rhodium Group

**Domestic natural gas production in 2030**
Trillion cubic feet

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<th>IRA</th>
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<tr>
<td>Low Emissions</td>
<td>29.3</td>
<td>28.7</td>
</tr>
<tr>
<td>Central</td>
<td>36.7</td>
<td>33.9</td>
</tr>
<tr>
<td>High Emissions</td>
<td>43.4</td>
<td>40.9</td>
</tr>
</tbody>
</table>

Source: Rhodium Group
What’s left now that the IRA has been enacted?

2030 GHG emissions (MMT CO$_2$e) with and without the IRA, central emissions scenario

Source: Rhodium Group
### IRA implementation priorities

Making sure projected reductions happen

<table>
<thead>
<tr>
<th>Transferability rules</th>
<th>Direct pay rules</th>
<th>Bonus credit guidance</th>
</tr>
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<tr>
<td>Clear, traceable, flexible and simple rules to facilitate a flood of new investment into clean energy projects.</td>
<td>Simple, streamlined rules to bring non-profit and government players into the clean energy project development space.</td>
<td>Guidance on where and how to qualify for bonus credits that amplify market signals for clean energy projects.</td>
</tr>
</tbody>
</table>

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<tr>
<th>Domestic content and labor guidance</th>
<th>Lifecycle GHG accounting guidance</th>
<th>Company awareness raising</th>
</tr>
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<tr>
<td>Clear guidance and tracking requirements for achieving minimum content, supply chain and labor provisions to maximize credit payouts.</td>
<td>Reasonable procurement and documentation of upstream emissions for clean fuels and clean hydrogen and other credits.</td>
<td>Raise awareness among companies not usually engaged in federal clean energy tax credits about IRA-created opportunities.</td>
</tr>
</tbody>
</table>
Key takeaways

• The IRA is a major step forward for US climate action and provides a strong foundation for further decarbonization over the next decade and beyond

• Net GHG emissions cut down to 32-42% below 2005 levels

• Consumers save as much as $112 per household on a national average basis in 2030

• Clean technologies surges in the electric power, industrial and transportation sectors

• Emerging clean technologies have the potential to get to cost parity with fossil incumbents

• The IRA results in US oil production is unchanged and natural gas production declines in 2030

• Quick implementation is critical

• The US needs to do more, quickly to meet or exceed climate commitments

• EVERY TON COUNTS!
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