

My last blog post looked at some of the steps taken to implement the Inflation Reduction Act. Confirming initial projections when the law was passed, models now predict that IRA will significantly cut emissions by 2030. The impact by 2035 is likely to be even greater. Despite the IRA's substantial assist to emission cuts, we will need additional policies to push emissions 50% below 2005 levels.

The immediate impact of the IRA has been dramatic. According to the [Rhodium Group](#), "there was \$213 billion in new clean investment across the economy—a 37% increase from the previous year and a 165% increase from five years ago." Rhodium reported that "the most rapid investment growth has been in clean technology manufacturing—with annual investment growing 125% year-on-year to \$39 billion—and particularly within electric vehicle and solar manufacturing. Investment in clean energy production and industrial decarbonization rose 15% year-on-year to \$61 billion." Moreover, "household and business retail investment in purchasing and installing clean technologies like heat pumps and zero-emission vehicles (ZEVs) rose 32% year-on-year to \$113 billion."

Similarly [Utility Dive](#) reported that "the impact of the IRA on the U.S. manufacturing industry is clear, with 39 states seeing factory and other project announcements worth more than \$86 billion." "Solar, in particular, has seen significant investment, with nearly 30 factories across 18 states. There were at least 18 wind turbine factories or wind product facilities announced, totaling \$1.7 billion in investment."

At the time of IRA's passage, there were several studies estimating the impact of IRA on emissions. They [showed](#) major effects on reductions, with emission cuts in the 30-40% range by 2030. A mid-August 2022 [report](#) from a Princeton research group, concluded that IRA would close two-thirds of the remaining emissions gap between current policy and the nation's 2030 climate target (50% below 2005).

What about the updated models today? Here are some recent findings:

- **The Princeton group that did the earlier study** now projects that IRA plus the earlier Infrastructure Bill would roughly double the pace of U.S. decarbonization. The result will be a 520-780 megaton reduction in annual emissions by 2030, cutting U.S. emissions 37-41% below 2005 levels.
- **A peer-reviewed study by EPA** found that IRA would most likely drive emissions from the electricity sector 34% below what they *would* have been in 2030 without the IRA. Using a different benchmark, EPA also projects a range of 49-83% reduction in the level of electricity sector emissions below 2005 levels.
- A year after its initial IRA report, **the Rhodium group** released an [update](#). Rhodium

found that “the full suite of current policies on the books as of June 2023 drives US emissions to 32-51% below 2005 levels in 2035. Along the way, the US will achieve a 29-42% reduction in GHGs in 2030—a meaningful departure from previous years’ expectations for the US emissions trajectory.”

- In terms of specific sectors, **Rhodium** says: “The power sector in particular looks quite different in 2035 compared to today, with zero- and low-emitting power plants making up 63-87% of all generation that year, up from around 40% in 2022.”
- **An article published in Science**, a top scientific journal, used nine independent models to estimate the IRA’s effect. The authors found that economy-wide emissions would be 33-40% below 2005 levels with the IRA. By 2035, those emissions reductions will be 43-45% below 2004 levels. In the power sector, by 2035, emissions will 66-87% below 2005 levels.

These numbers may be a little confusing. As this table shows, there are significant variation between them, particularly in how much uncertainty they express about the outcomes. Nevertheless, the stories they tell are roughly similar.

<u>Emission decreases below 2005 levels</u>	<i>EPA</i>	<i>Princeton</i>	<i>Rhodium</i>	<i>Science</i>
2030 electricity	49-83%	53-57%	—	~45-82%
2030 total economy	35-43%	37-41%	29-42%	~40%
2035 electricity	67-87%	77-79%	45-74%	66-87%
2035 total economy	36-55%	46-53%	32-51%	43-45%

In terms of similarities, all of the models show that progress accelerates sharply between 2030 and 2035. They also show that cuts in electricity emissions lead the way. That is not surprising because the main way to reduce emissions from other sectors is to electrify them, which is only effective if the electric power system itself is low-emission. All of the models show at least a gap of 10% between 2030 emissions and the 50% level in the U.S. climate pledge. By 2035, however, the gap will close by half.

As I’ve noted before, the models only consider IRA’s direct impacts. But there are some extremely important dynamic effects. These are a few of those effects:

- **Money draws innovation.** As the market for emission-reducing technologies grows, there's an increased incentive to invest in R&D. New technologies in turn drive more business, creating a "virtuous circle" of feedback between expanding markets and increased innovation.
- **Subsidies indirectly promote stronger regulation.** Agency regulations are typically based on which emissions reductions are feasible or on applying cost-benefit analysis. In the year since IRA was passed, we've already seen EPA relying on IRA to justify more stringent regulation, and states have tightened their own regulations in response to IRA.
- **Federal subsidies create new national political dynamics.** Renewable energy policies create stronger renewable industries, which then push for even stronger policies.

In a nutshell: IRA promises to have a dramatic short-term impact on carbon emissions, but will have an even greater long-term impact due to dynamic effects.