

Global Power and Renewables Insight

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Inflation Reduction Act will spark a new era for clean energy technology in the United States

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Key implications

On 16 August 2022, President Joe Biden signed the Inflation Reduction Act (IRA). The bill represents the first multidecade greenhouse gas legislation passed by Congress. This Insight addresses several major clean energy components of the compromise legislation, including

- Long-term tax credit extensions for wind and solar, as well as other clean energy technologies. These credits remain available until power sector greenhouse gas emissions reach 75% below 2022 levels. If developers meet prevailing wage requirements, as expected, credits are at their “full” historical value of \$26/MWh for the production tax credit (PTC) and 30% for the investment tax credit (ITC).¹
- Qualification of stand-alone battery storage for the ITC.
- Eligibility of nuclear for a new zero-emission nuclear power PTC of up to \$15/MWh, tied to market electricity prices (if prevailing wage requirements are met).

Beyond the above, substantial tax credits and grants will now become available to emerging clean energy technologies, including new nuclear, carbon capture and storage (CCS), and hydrogen. A significant expansion of the electric vehicle (EV) tax credit was also negotiated, although new critical mineral and battery country-of-origin requirements could limit the number of EV models that are eligible. Many other end-use electrification technologies are eligible for enhanced tax credits, residential energy efficiency, heat pumps, and heat pump water heaters. Together, these many components represent a concrete and meaningful legislative effort to address greenhouse gas emissions across the US economy.

¹ Prevailing wage is defined as the average wage paid to similarly employed workers in the locality in which the facility is located, as determined by the Secretary of Labor.

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The IRA will reduce levelized costs for wind and solar dramatically

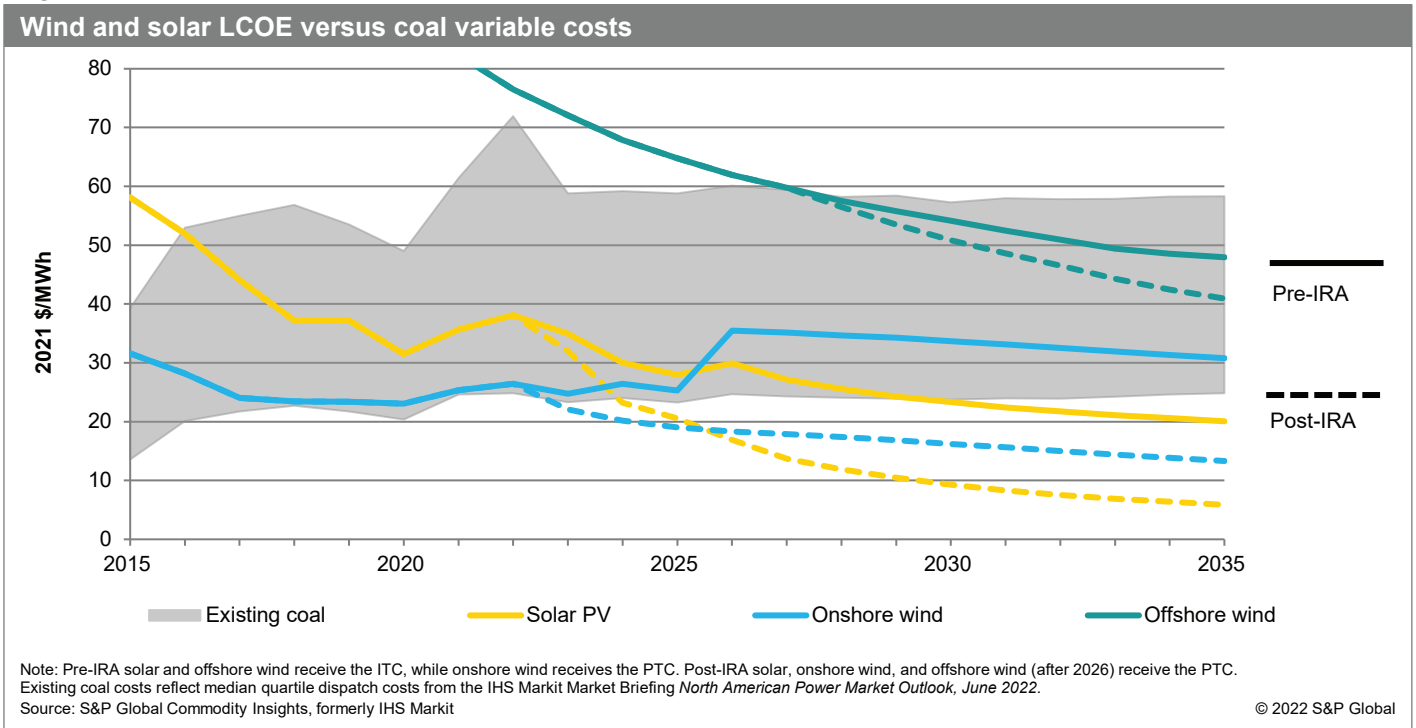
Onshore wind and solar photovoltaic (PV) were already the least cost source of new energy on a levelized cost of energy (LCOE) basis across the United States and were increasingly competitive with the variable costs of existing natural gas and coal. The tax credits in the Inflation Reduction Act (IRA) accelerate those trends.

The impact of the tax credits is immediate as new projects are able to claim the full value of the production tax credit (PTC) in 2023 and beyond, rather than the gradual wind down schedule that was in place prior to the IRA. This translates to a \$3–5/MWh reduction in LCOE through 2025, when pre-IRA tax credits were at partial levels, and a \$10–15/MWh reduction in LCOE after 2025 when pre-IRA tax credits would have expired or reached their minimum.¹

The post-IRA outlook for solar and onshore wind LCOEs is now well below the variable costs of existing coal and gas in many regions of the United States. Although LCOE has limitations as a comparative metric, this simple LCOE comparison is likely to embolden utilities seeking to replace aging coal plants with wind and solar, as well as corporations that increasingly procure their own energy directly from renewables.²

The LCOE outlook for offshore wind lags its onshore counterparts but is on course to break into the range of coal and gas variable costs in the early 2030s—a trend that could encourage states to strengthen their offshore wind ambitions given the long planning horizons of the technology.

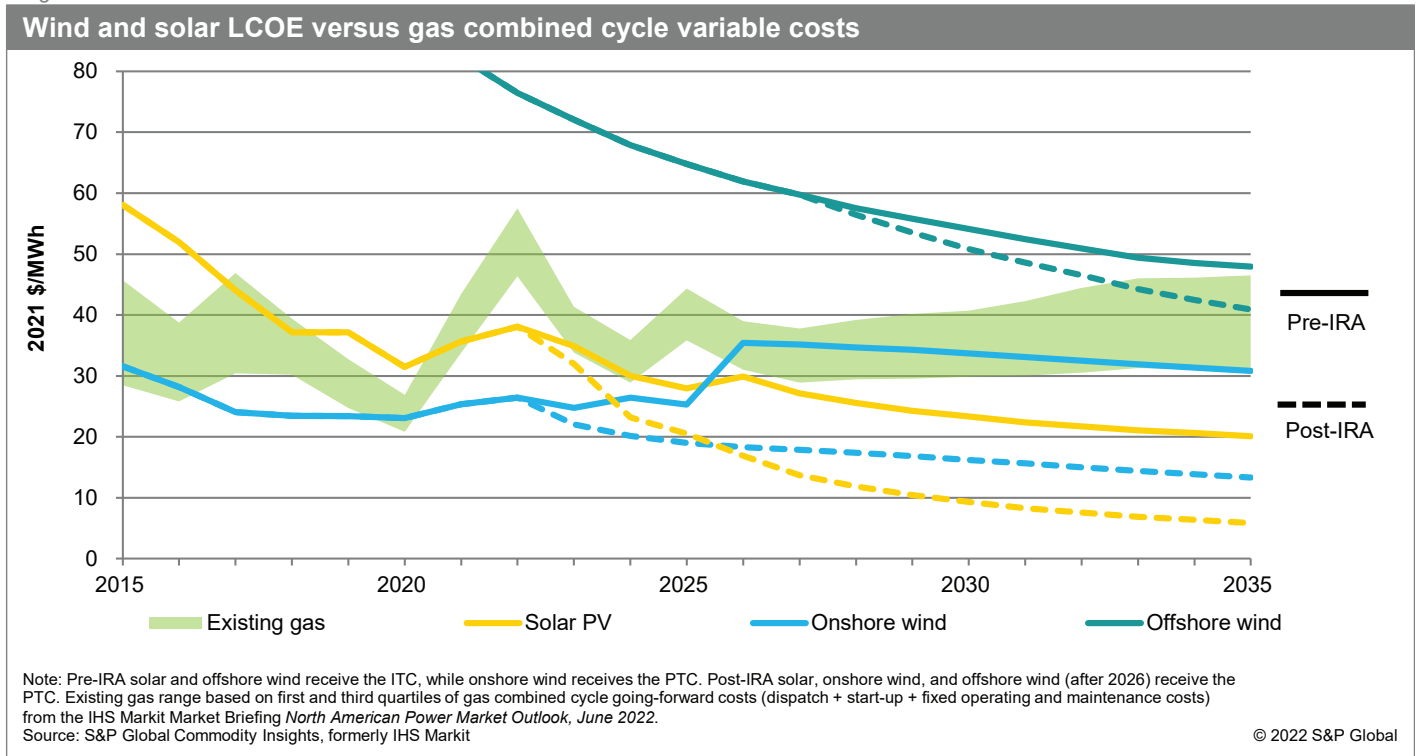
Figure 1



1. All tax credits in the IRA are modeled at the base rate plus the prevailing wage bonus which achieves levels similar to the traditional “full value” of the investment tax credit (ITC) (30%) and PTC (\$26/MWh). The base rate is 20% of the full credit value. If new wind or solar projects are sited in “energy communities” and/or meet domestic content thresholds, projected LCOEs could be even lower.

2. See the IHS Markit Strategic Report *From cost to value: Going beyond LCOE in assessing the competitiveness of renewables—The US perspective*.

Figure 2



Solar PV and offshore wind benefit from their new eligibility for the PTC, whereas pre-IRA they had only been eligible for the ITC. The ITC can be more valuable than the PTC to capital intensive resources, but cost declines of solar over the past decade have tipped the scales decisively in favor of the PTC—indeed, in all of the regions we modeled, even those with relatively poor capacity factors, the LCOE outlook for solar is lower with the PTC than with the ITC.

The picture is less clear for offshore wind. At today’s costs, the ITC is clearly preferable to the PTC for offshore wind, and thus the IRA does little to change the economics. However, our reference case outlook for offshore wind (east coast, fixed bottom) has capital costs declining rapidly over the next decade, making the PTC the better option toward the end of the decade. Floating offshore wind, which will retain a cost disadvantage to fixed bottom for the foreseeable future, will prefer the ITC even longer.

A knock-on effect of solar and offshore wind taking the PTC is the possibility of more negative pricing in wholesale energy markets. The PTC, because it is tied to production, creates an opportunity cost which, combined with solar and wind’s near-zero marginal cost to generate, drives negative bidding behavior. The cost of this market distortion tends to be borne disproportionately by inflexible “baseload” generators, such as nuclear and coal, which cannot ramp down fast enough in the face of renewable oversupply. Although the prospect of more negative pricing—and general price suppression more broadly—does not bode well for the economics of baseload units, in the case of nuclear at least there is an offset in the IRA in the form of a nuclear PTC.

The IRA is set to create a new zero-emission nuclear PTC, to be available to existing nuclear plants. The nuclear PTC is established at \$15/MWh but would phase down in relation to electricity prices.³ With generation costs

3. Credits would be reduced as annual average revenue from electricity and related products exceed \$25/MWh. This includes revenue from state zero-emissions credit programs. Like other provisions in the IRA, nuclear units must meet prevailing wage requirements to qualify for the full PTC value.

for nuclear power plants in competitive markets averaging less than \$30/MWh, the new PTC represents substantial financial support.⁴ The credit will start in 2024 and is set to terminate on 31 December 2032.

While most technologies covered by the IRA stand to benefit from some form of PTC, batteries in contrast will be focused on the ITC. The IRA extends coverage of the ITC to stand-alone batteries, removing the pre-IRA requirement that batteries be collocated with solar to access the tax credit. This provision unlocks significant new opportunities for batteries as they are often most valuable when sited near load, which is difficult to do with a solar farm attached. While batteries will continue to pair with renewables owing to cost and operational synergies, other battery applications such as peaker replacement, transmission and distribution support, demand charge management, and backup power will grow faster thanks to the cost reduction the ITC provides.

Incorporation of the IRA is expected to increase new renewable capacity by 10–20% this decade and accelerate fossil retirements

Wind and solar capacity growth has accelerated dramatically over the past several years and will reach an expected 15% of generation in 2022. The extension of tax credits at their full value adds substantial fuel onto the fire and will avoid another boom-and-bust cycle associated with the phaseout of existing tax credits, resulting in an expected boost of 30 GW of wind and solar capacity by 2030 (preliminary, relative to our June 2022 outlook), which represents a roughly 10% increase in expected additions this decade, concentrated in the latter half of the decade. This will result in a doubling of the share of renewable energy generation on the grid by 2030, relative to current levels. This increase is expected to result from a combination of utility procurement backed by carbon reduction ambitions or state policy mandates combined with continued acceleration of corporate buying to take advantage of increasingly low-cost power. This increase is expected to be tempered by a number of unresolved challenges in developing new resources at the pace required, discussed in the following section. If these barriers are successfully overcome, this increase could be doubled or even tripled.

We expect few of these incremental additions to come on the coasts, where state policy mandates are already strong and numerous challenges to development are currently constraining resource expansion. Parts of the country ripe for further development include ERCOT, SPP, MISO, and the Southeast, and we expect the lion's share of incremental additions from the IRA tax credit extensions to occur in these regions.⁵ Potential future expansions of state policy ambitions are not included in this estimate.

Alongside the expansion of new low-cost renewable energy supply, coal retirements will continue to accelerate, even absent new Environmental Protection Agency (EPA) regulations. Further deployment of wind, solar, and battery storage will reduce the revenue available to existing coal plants in wholesale energy markets. Of the remaining 201 GW of coal-fired capacity today in the United States, nearly 50 GW have already announced plans to retire by 2030. Successful implementation of the IRA is expected to accelerate retirements substantially—potentially an incremental 50 GW of retirements by 2030.

Given that the technology-neutral tax credits included in the IRA will continue until emissions reach 75% below 2022 levels, the IRA represents (in our view) the first multidecade greenhouse gas legislation passed by Congress. The nature of “business as usual” has evolved, and so will our North American Power Market Planning Case assumptions. In our upcoming outlook release, we plan to fully incorporate the IRA—and at the

4. According to the Nuclear Energy Institute, the average cost of power from nuclear plants operating in wholesale markets stood at \$27.46/MWh in 2020. See Nuclear Energy Institute, “Nuclear Costs in Context,” November 2021, <https://www.nei.org/resources/reports-briefs/nuclear-costs-in-context>.

5. ERCOT = Electric Reliability Council of Texas; MISO = Midcontinent Independent System Operator; SPP = Southwest Power Pool.

same time move away from the long-term development of a federal carbon pricing program in favor of a “tax credits only” approach. Importantly, the IRA is unlikely to represent the final word on federal climate policy, and we plan to consider a carbon pricing sensitivity case, based on a future need to support market revenues and incorporate climate policy into wholesale market structures.

While the IRA will make substantial progress in achieving the Biden administration’s targets of 50% emissions reductions by 2030 and net zero by 2050, it is unlikely to be sufficient to achieve those ambitious goals alone. Although the Supreme Court’s ruling earlier in 2022 reduced regulatory options available to the EPA, new power sector regulations are still expected next year.⁶ Further policy efforts—both legislative and regulatory—will be required to decarbonize transportation, home heating, and industry. The electrification of those sectors in the IRA will be studied in a future Insight but is unlikely to be sufficient given the constraints on the incentives offered in the bill.

Further efforts will be required to unlock the full potential of the IRA

Although the IRA solidifies both wind and solar as the least-cost sources of new generating supply in the United States, the industry is not without headwinds. Deployment of wind and solar slowed in both the first and second quarters of 2022, relative to the same periods in 2021, stemming from both supply chain constraints and trade disputes. Although the US government declared a 24-month tariff moratorium on solar modules manufactured in Cambodia, Malaysia, Thailand, and Vietnam in June 2022, supply chain constraints will likely continue to present a challenge to the industry, particularly with Europe also expected to accelerate renewable deployment as part of REPowerEU.

Meanwhile, sluggish interconnection processes and escalating network upgrade costs are slowing the deployment of wind and solar in some regions and pose a looming threat in others. State permitting efforts have also proven to be challenging for many developers of both new generating capacity and transmission infrastructure. Early efforts to streamline permitting face pushback for overriding local control. Stakeholders have yet to find effective ways to manage the process.

Absent reforms, these challenges could restrain the growth of renewable energy despite attractive economics. For instance, the amount of new electric capacity in interconnection queues across the United States exceeded 1,400 GW by the end of 2021—roughly equivalent to the total operating capacity today. Expediting the interconnection queue process will be essential to substantially accelerate the deployment of wind, solar and batteries.

Addressing the challenges associated with expanding transmission capacity on the bulk power grid will also be key to unlocking the full potential of the IRA. To that end, the Federal Energy Regulatory Commission (FERC) has taken several important steps over the past 12 months. In December 2021, FERC issued Order 881, which is intended to increase the efficiency of the grid by improving the accuracy and transparency of transmission line ratings and followed up in February 2022 with a Notice of Inquiry to explore whether a further step to increase the accuracy of transmission line ratings through the implementation of dynamic line ratings is necessary. In April, FERC issued a Notice of Proposed Rulemaking (NOPR) to improve transmission planning and cost allocation and, finally, in June 2022, issued a NOPR focused on expediting the process for connecting new generating facilities to the grid. All of these initiatives, while potentially very impactful, will take several years to implement, meaning that several of the key hurdles facing rapid deployment of renewables are likely to persist at least through the mid-2020s.

6. See the IHS Markit Insight [West Virginia ruling constrains EPA’s regulatory flexibility, but uncertainty persists](#).

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