

# Inflation Reduction Act: Key Implications for the Cleantech Industry in the US

Landmark climate and energy security bill supercharges  
cleantech industry in the United States



# What is the Inflation Reduction Act?

# Executive Summary

The Inflation Reduction Act (IRA) is a reconciliation bill that unlocks \$370 billion in climate and energy investment in the United States, supporting a diversity of technologies and solutions. It was passed by the US Senate on 7 August 2022, was passed by the House of Representatives on 12 August 2022, was signed by President Joe Biden on 16 August 2022, and will now become law.

In addition to bolstering renewables, the IRA is a historical win for clean energy technologies with a significant improvement of economic conditions for emerging technologies like carbon capture, utilization, and storage (CCUS) and hydrogen.

## Key Takeaways



### Solar and Battery Energy Storage:

- Two major components of the bill are the technology-neutral extensions of the Investment Tax Credit (ITC), which now includes standalone storage for the first time, and the solar Production Tax Credit (PTC).
- The IRA dramatically improves PV project economics across all segments triggering a major upward review of the installation outlook.
- The inclusion of standalone energy storage in the ITC will reshape the energy storage market overnight. The bill also provides long awaited incentives to develop local manufacturing for both solar and batteries.



### Carbon Sequestration:

- The IRA dramatically improves CCUS project economics.
- The IRA eases the capacity requirements for carbon capture facilities and extends the construction deadline by 7 years.
- The IRA will provide hydrogen production with CCUS projects with the option to choose between two different tax credits, giving flexibility to one of the sectors leading the CCUS pipeline of projects.

### Hydrogen:

- The IRA creates a clean hydrogen PTC that can provide up to \$3/kg of hydrogen produced for 10 years.
- When stacked with the IRA's clean electricity credits, the hydrogen PTC can make green hydrogen production cheaper than grey.

# Solar PV

Implications of the IRA

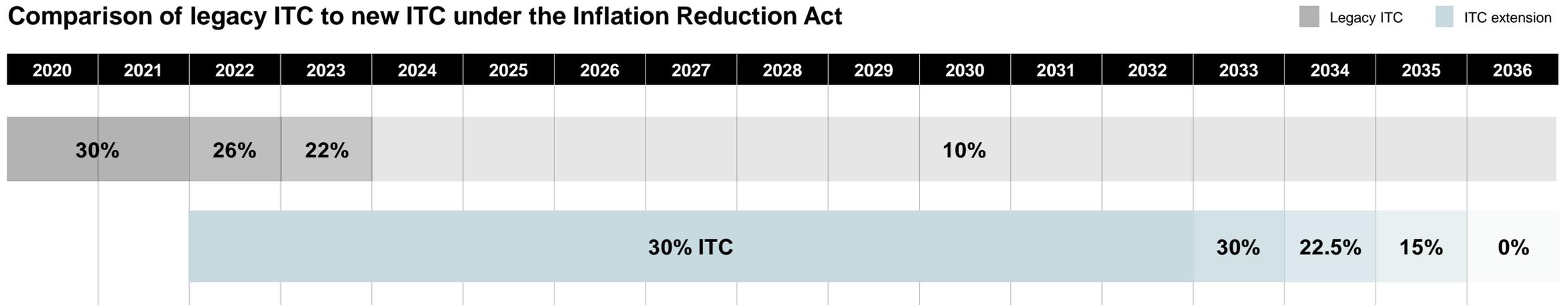
# Solar PV

## Main components of the IRA policy

The main bill provisions impacting the solar PV industries:

- **Extension and expansion of the Investment Tax Credit (ITC):** This incentive has been a key driver of the US solar and energy storage market. It was previously scheduled to fall to 10% in 2024, but will now remain at 30% until 2033 at the earliest. It has also been expanded to include standalone energy storage facilities.
- **Extension and revitalization of the Production Tax Credit (PTC):** The PTC extension gives a 1.5 cent/kWh base incentive to generate from qualified resources until 2033. Solar is now a qualified facility and has not been since 2006. The PTC has been a major driver for wind and was successful at helping it to be competitive and scale when it was a less mature market.

### Comparison of legacy ITC to new ITC under the Inflation Reduction Act



Note: The current residential ITC is set to expire in 2024 to 0% and does not have the indefinite 10%  
 Source: S&P Global Commodity Insights

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# Solar PV

## Main components of the IRA policy

**A two-tiered structure which has minimum requirements to achieve the full credit value.** Moreover, the structure also includes new categories of “bonus” credit percentage adders, which could theoretically boost the ITC to 50% and increase the PTC value by 20%, and establishes provisions for direct pay and transferability.

**Introduction of incentives for domestic production of renewable energy components**, including tax credits for production of critical battery minerals, battery cell manufacturing, as well as for the full solar supply chain (solar-grade polysilicon, wafers, thin film or crystalline cells and modules, inverters, and other components).

## Section 45X incentives for solar PV:

### Module-related

Solar-grade polysilicon	\$3/kg
Wafers	\$12/sq m
Thin film or crystalline cells	\$0.04/W (DC)
Thin film or crystalline modules	\$0.07/W (DC)

### Inverter-related

Central inverter	\$0.0025/W (AC)
Utility inverter	\$0.015/W (AC)
Commercial inverter	\$0.02/W (AC)
Residential inverter	\$0.065/W (AC)

### SBOS-related

Torque tube	\$0.87/kg
Structural fasteners	\$2.28/kg
Polymeric backsheet	\$0.40/sq m
Micro inverter	\$0.11/W (AC)

Source: S&P Global Commodity Insights

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# Solar PV

## Key Implications on Demand-Side

IRA dramatically improves solar PV economics, leading to a significant increase in the demand outlook:



### Utility Scale

When combined with “adders” for additional incentives around domestically produced components, low-income communities, and “energy communities,” projects could be eligible for a 50% ITC or 20% greater PTC rate per kilowatt-hour. The renewal of the PTC means that the solar developers will need to choose between claiming the ITC or PTC according to individual project economics.



### Commercial & Industrial

Interconnection costs have created a financial hurdle in the commercial and community solar space. Relative to the size of a project, necessary interconnection upgrades account for a far larger proportion of the total system cost than in the utility-scale sector. The IRA now enables interconnection costs for projects less than 5 MWac to be included as part of the “qualified investment” covered under the ITC.



### Residential

As with other sectors, the US residential solar market is poised to experience explosive growth. If the IRA is signed into law, installations in the top 10 states in 2030 would increase by 25–35%.

**25-35%**  
increase in  
the installation  
outlook to 2030.

Developers can  
apply to claim for  
**ITC or PTC**  
incentives.

# Solar PV

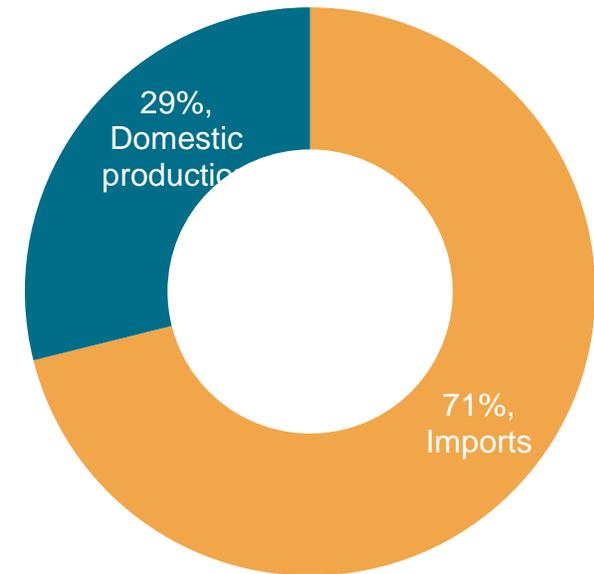
## Key Implications on Local Manufacturing

### **Policy stability to boost local manufacturing investments and reduce supply chain bottlenecks caused by a massive surge in demand.**

The IRA introduces policies that aim to reduce reliance on imported goods and promote the buildout of a local supply chain. This historic change in the global solar manufacturing landscape will be further reinforced by mechanisms and initiatives beyond the incentives contained in the Advanced Manufacturing Production and Advanced Energy Project tax credits.

The IRA creates an interlinkage between domestic supply chains and PTC and ITC projects via the 10% domestic content adder, which stimulates procurement of solar components derived from domestically sourced materials.

US module shipments in 2021



Source: S&P Global Commodity Insights

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# Battery Energy Storage

Implications of the IRA

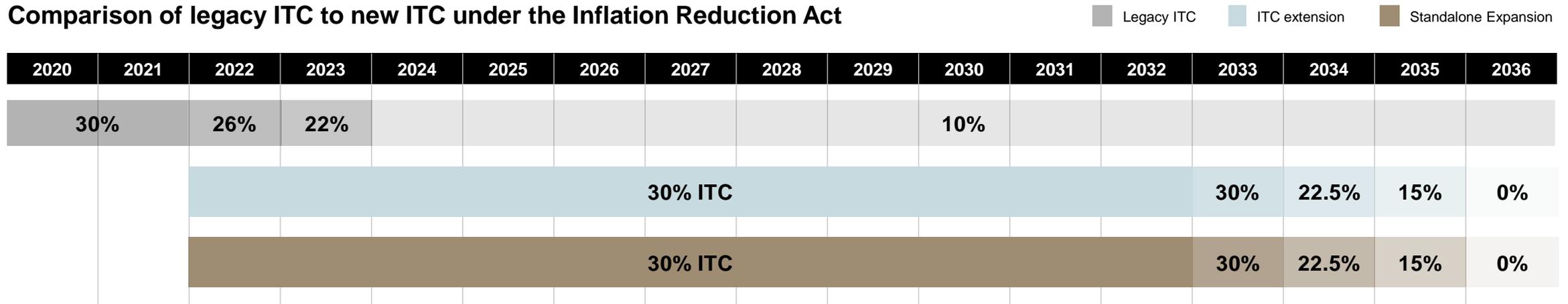
# Battery Energy Storage

## Main components of the IRA policy

The main bill provisions impacting the energy storage industries:

- **Extension and expansion of the Investment Tax Credit (ITC):** This incentive has been a key driver of the US solar and energy storage market. It was previously scheduled to fall to 10% in 2024, but will now remain at 30% until 2033 at the earliest. It has also been expanded to include standalone energy storage facilities.
- **A two-tiered structure which has minimum requirements to achieve the full credit value, now implemented for both the ITC and PTC.** Moreover, the structure also includes new categories of “bonus” credit percentage adders, which could theoretically boost the ITC to 50% and increase the PTC value by 20%, and establishes provisions for direct pay and transferability.

### Comparison of legacy ITC to new ITC under the Inflation Reduction Act



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# Battery Energy Storage

## Main components of the IRA policy

**Introduction of incentives for domestic production of renewable energy components**, including tax credits for production of critical battery minerals, battery cell manufacturing, as well as for the full solar supply chain (solar-grade polysilicon, wafers, thin film or crystalline cells and modules, inverters, and other components).

**Expansion of the existing \$7500 credit for EVs beyond the existing 200,000 vehicle cap per manufacturer**, and the introduction of stringent requirements that 40% of the critical minerals used in the batteries should be extracted and processed in the United States or with a free trade agreement (FTA) partner, or recycled in North America, and that final assembly of the vehicle must take place in the US.

## Section 45X incentives for batteries

Battery cells	\$35/kWh
Battery modules	\$10/kWh
Electrode active materials	10% of costs
Critical minerals	10% of costs

Source: S&P Global Commodity Insights

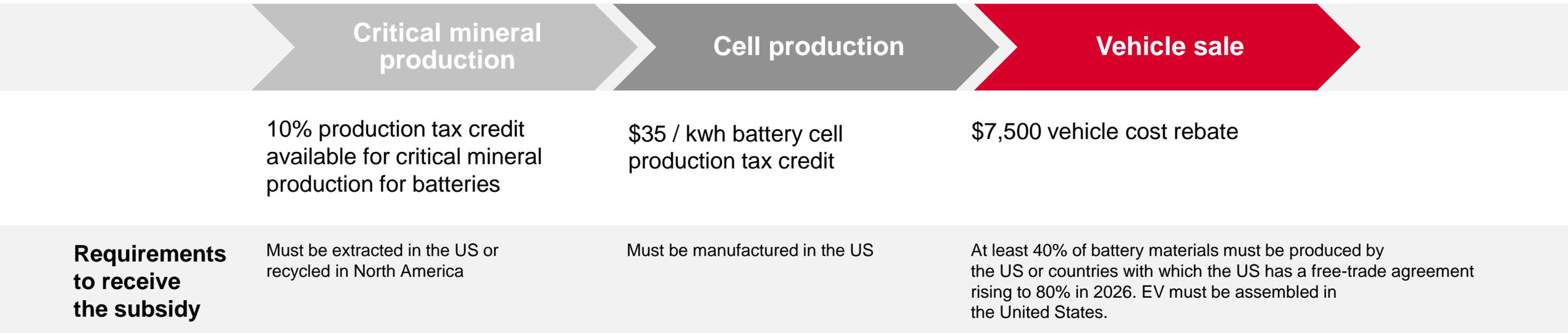
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# Battery Energy Storage

## Key Implications on Local Manufacturing-Side

Battery supply chain support included in the Inflation Reduction Act 2022:

### Coverage of entire battery supply chain



# Battery Energy Storage

## Key Implications on Demand-Side

### Big increases to the Battery Energy Storage outlook

#### Front-of-the-meter energy storage installation outlook

**The extension of the ITC to 2030 and inclusion of standalone storage facilities will change the front-of-the-meter energy storage landscape overnight.**

The storage landscape in the United States will change overnight due to standalone facilities becoming eligible for a 30% credit for the first time and the extension of the existing solar-plus-storage ITC through 2030. Overall, front-of-the-meter energy storage projects will benefit in every state and market. Areas with lucrative solar irradiation, transmission constraints, and opportunities for arbitrage will experience a notable benefit.

The expansion of the ITC to include standalone storage levels the playing field between standalone and solar-plus-storage installations and may enable new applications to become cost effective.

Solar-plus-storage installations will continue to form an important part of the outlook

#### Behind-the-meter energy storage installation outlook

**The expansion of the ITC will slightly increase demand for residential storage in the short term and lead to sustained growth past 2030**

Retrofitting energy storage could become a major driver for residential installations as they will be eligible for the standalone ITC

The standalone energy storage ITC will tip the scale of previously financially unfeasible commercial and industrial (C&I) energy storage projects

Behind-the-meter energy storage installations will become more geographically diverse

Potential headwinds lead to less bullish updates to the forecast in the short term

# Battery Energy Storage

## Key Implications on Local Manufacturing-Side

**Multiple measures across the battery supply chain will provide a strong incentive to expand cell manufacturing facilities in the United States, but uncertainties remain regarding whether this is significant enough to draw the wider supply chain away from China:**

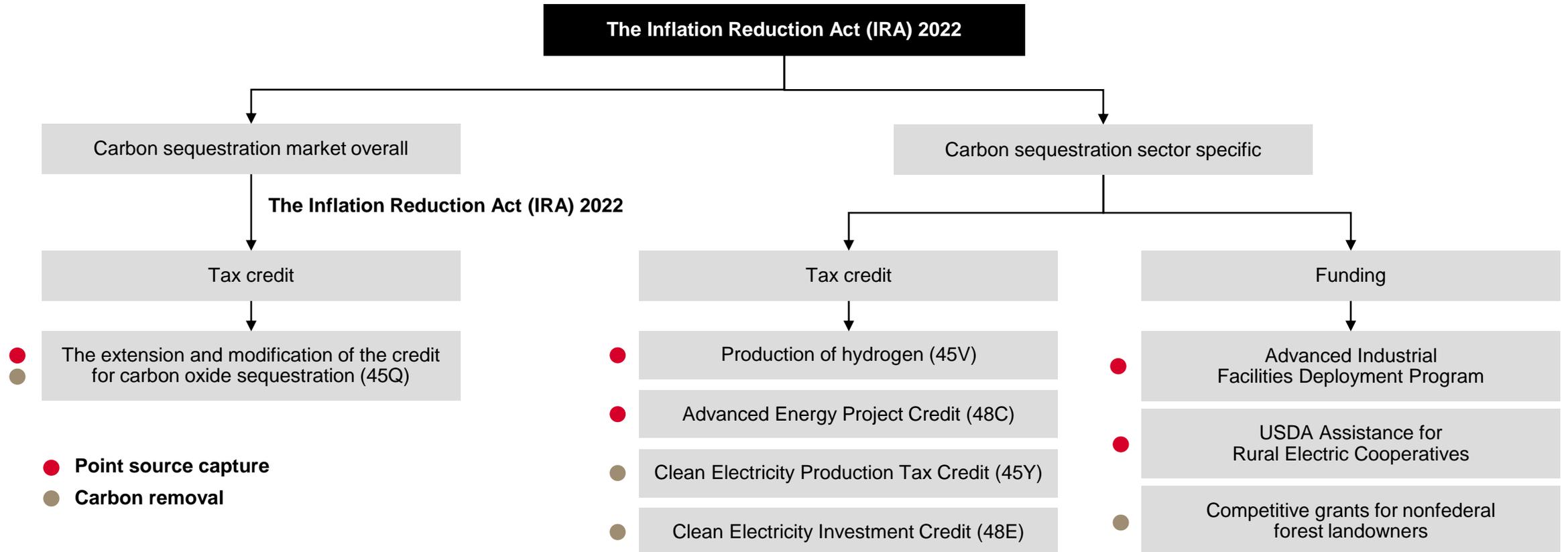
- Cell manufacturing expansion is likely to be strongly favored as a result of the \$35/kWh subsidy and the fact that it can be scaled up relatively quickly.
- The more challenging and time-consuming aspects of scaling the battery supply chain lie further upstream, with mines typically requiring at least a seven-year lead time.
- A number of key countries in the battery supply chain do not have free trade agreements (FTAs) with the United States, strengthening the drive to onshore raw material production through increased investment in recycling or mining.
- The supply of batteries to the stationary storage sector will continue to be heavily influenced by EV demand, and the proportion of US produced cells eligible for the vehicle grant will dictate availability in the longer term

# Carbon Sequestration

Implications of the IRA

# Carbon Sequestration

## Main components of the IRA policy



Note: Sector-specific components of the IRA bill refer to incentives that only apply to specific sectors or projects for carbon sequestration. USDA = United States Department of Agriculture.  
 Source: S&P Global Commodity Insights, formerly IHS Markit

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# Carbon Sequestration

## Key Implications

The extension and modification of the credit for carbon oxide sequestration (45Q) enhances four key areas: credit amount, broader qualified facilities, extended deadline for qualification, and direct pay for the first five years.

### The extension and modification of the credit for carbon oxide sequestration (45Q):

Type of CO <sub>2</sub> storage/use	Credit breakdown	2022	2023	2024	2025	2026	2027 - 2033
<b>Current 45Q credit (\$ per metric ton)</b>							
Storage	Baseline	39	42	45	47	50	2026 numbers adjusted by inflation
	Bonus	-	-	-	-	-	
Enhance oil recovery (EOR)	Baseline	26	28	31	33	35	2026 numbers adjusted by inflation
	Bonus	-	-	-	-	-	
Other utilization	Baseline	26	25	31	33	35	2026 numbers adjusted by inflation
	Bonus	-	-	-	-	-	
<b>IRA 45Q credit (\$ per metric ton)</b>							
Storage	Baseline		17	17	17	17	2026 numbers adjusted by inflation
	Bonus*		85	85	85	85	
Enhance oil recovery (EOR)	Baseline		12	12	12	12	2026 numbers adjusted by inflation
	Bonus*		60	60	60	60	
Storage and DAC	Baseline		36	36	36	36	2026 numbers adjusted by inflation
	Bonus*		180	180	180	180	
EOR and DAC	Baseline		26	26	26	26	2026 numbers adjusted by inflation
	Bonus*		130	130	130	130	

\*This amount applies if prevailing wage, hour, and apprenticeship requirements are met.  
Source: S&P Global Commodity Insights, formerly IHS Markit

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# Carbon Sequestration

## Key Implications

### The IRA dramatically improves CCUS project economics across various industries reducing uncertainty around projects pre-2030

- The increased 45Q tax credit under the IRA will reduce the cost to capture CO<sub>2</sub> from all sectors for both carbon utilization and permanent storage. Without 45Q, depending on the concentration of CO<sub>2</sub> in the gas stream, technology design, financing situations, and regional factors, the levelized cost of CO<sub>2</sub> capture in the United States ranges from around \$47 per metric ton of CO<sub>2</sub> captured in natural gas processing or ethanol production, to around \$280 per metric ton in DAC.
- The new IRA 45Q will increase the tax credit by 71% for permanent storage projects and by 70% for carbon utilization projects. Owing to the wide range of costs associated with CCUS projects, this will have different implications by sector, with a common improvement in project economics.



**Power  
Generation**



**Direct Air Capture  
(DAC)**

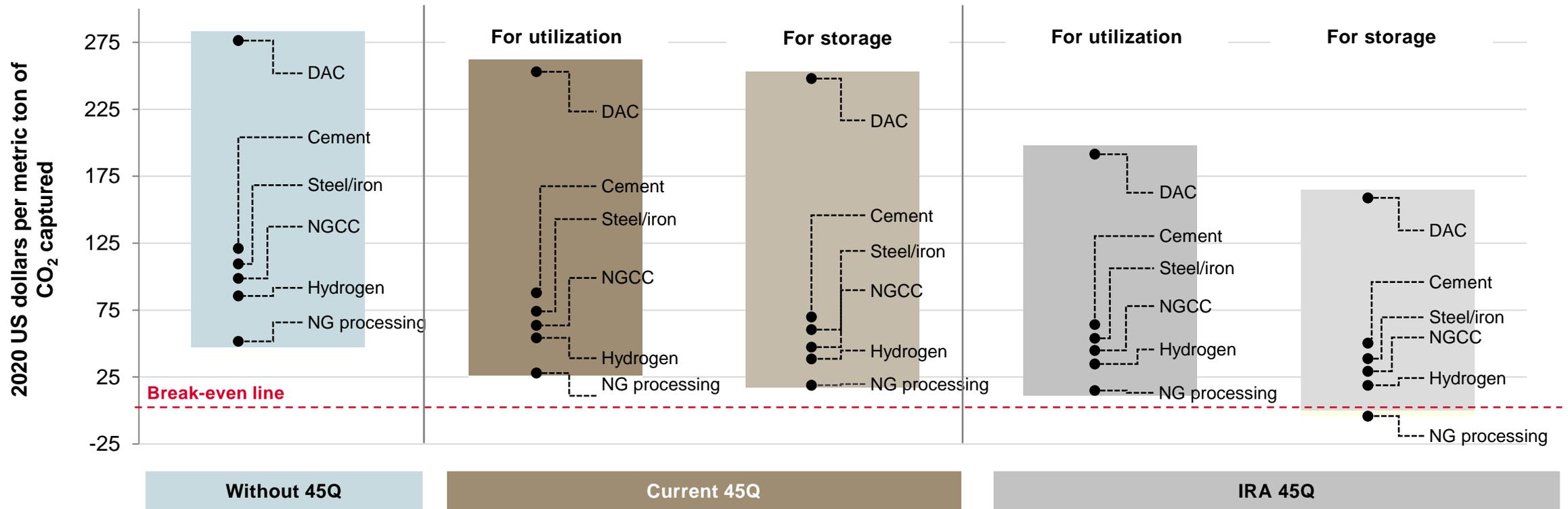


**Other CCUS projects**  
(e.g. industrial applications Steel and Cement)

# Carbon Sequestration

## Key Implications

Levelized cost of CO<sub>2</sub> capture ranges for various applications:



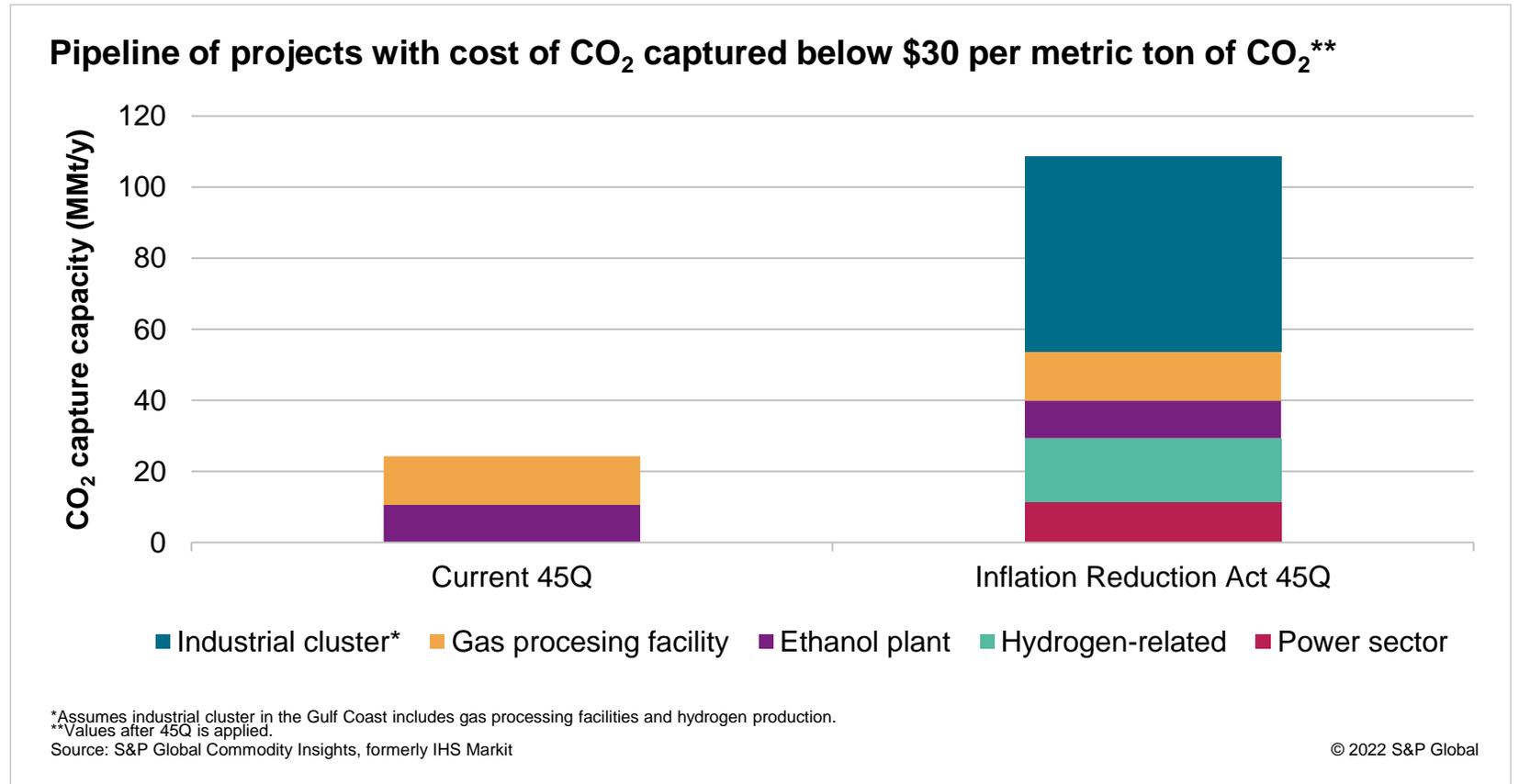
Note: DAC = direct air capture; NGCC = natural gas combined cycle; NG processing = natural gas processing.  
Source: S&P Global Commodity Insights, formerly IHS Markit

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# Carbon Sequestration

## Key Implications

The IRA impacts the eligibility of the CCUS projects reducing the capture capacity requirements and extending the construction deadline by seven years.



# Carbon Sequestration

## Key Implications

The impacts of 45Q changes on the eligibility of the projects in the pipeline:

Type of CO <sub>2</sub> storage/use	Number of eligible projects	Total capture capacity eligible (Million metric tons per year)
<b>Current 45Q*</b>		
Power sector	10	34.1
Direct air capture	2	1.1
Other CCUS projects	60	64.14
Total	72	99.34
<b>IRA 45Q**</b>		
Power sector	12	34.7
Direct air capture	6	1.41
Other CCUS projects	67	117.25
Total	85	153.36

\*Assumes the projects planning to be online before 2030 begin construction before 1 January 2026. \*\*Projects without expected operational year are assumed to be eligible for IRA 45Q.  
Source: S&P Global Commodity Insights, formerly IHS Markit

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# Hydrogen

Implications of the IRA

# Three recent federal policies seek to accelerate the adoption of hydrogen

The IRA's hydrogen PTC will shore up policy uncertainty for producers of low-carbon hydrogen

## Recent federal hydrogen-related energy policies

### Energy Earthshots Initiative

- **“Hydrogen Shot”** launched by the Department of Energy on 7 June 2021.
- **Goal:** Reduce the cost of clean hydrogen to \$1/kg by 2030.
- **Request for information on approaches issued.**

### Bipartisan Infrastructure Law

- **Signed into law on 15 November 2021.**
- **Goal:** “Accelerate research, development, demonstration, and deployment” of clean hydrogen.
- **\$9.5 billion** for “clean hydrogen” infrastructure and research including \$8 billion for hydrogen hubs.
- **Defines clean hydrogen as 2 kg of CO<sub>2</sub>e produced at the site of production.**

### Inflation Reduction Act

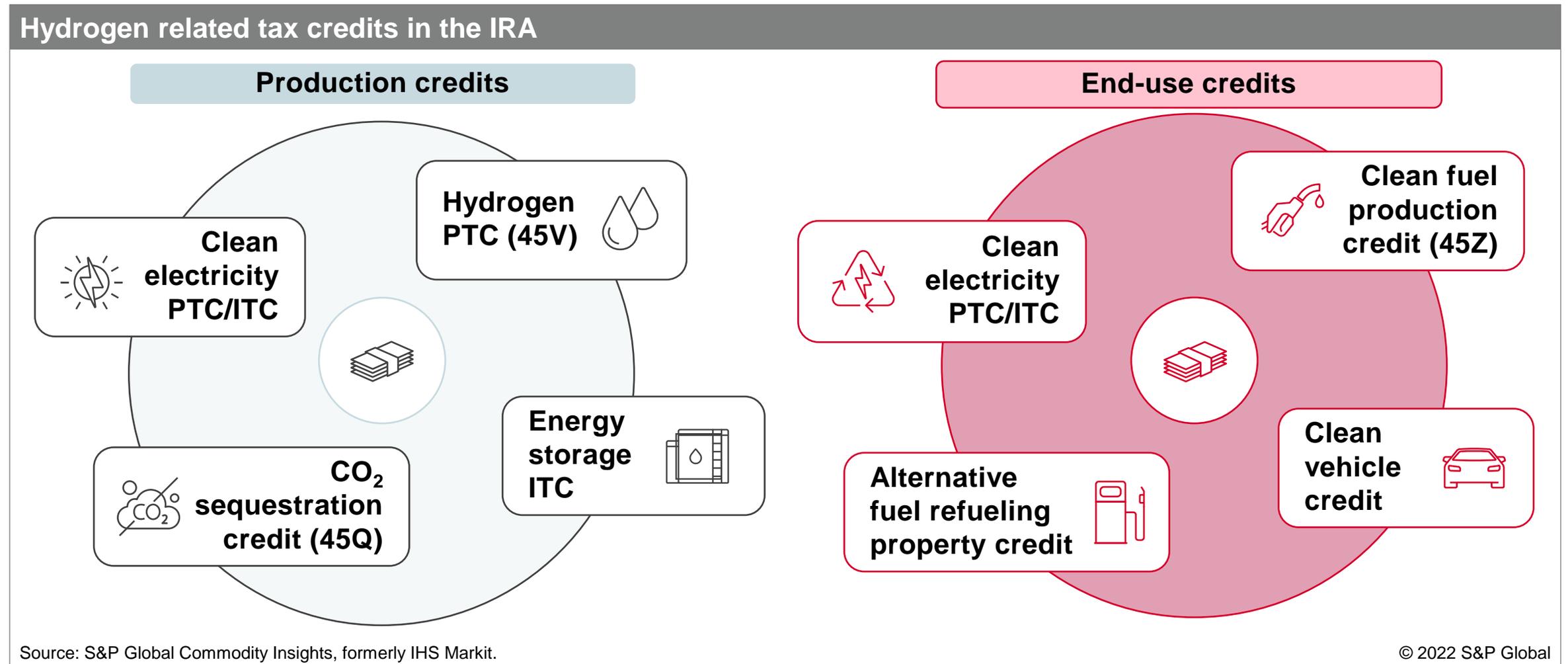
- **Signed into law on 16 August 2022.**
- **Goal:** “Reduce deficit spending, invest in US energy production, and lower carbon dioxide emissions 40% by 2030”.
- **Total of \$437 billion in spending.**
- **Includes a 10-year hydrogen PTC.**
- **Includes an amended 12-year carbon sequestration credit (45Q).**

Source: S&P Global Commodity Insights, formerly IHS Markit

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# There is a plethora of tax credits hydrogen companies could qualify for

Stacking credits allows multiple chances to benefit



Source: S&P Global Commodity Insights, formerly IHS Markit.

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# Global Clean Energy Technology & Clean Energy Technology Analytics Services

# The Global Clean Energy Technology subscription provides comprehensive coverage of clean energy technologies to mitigate against climate change

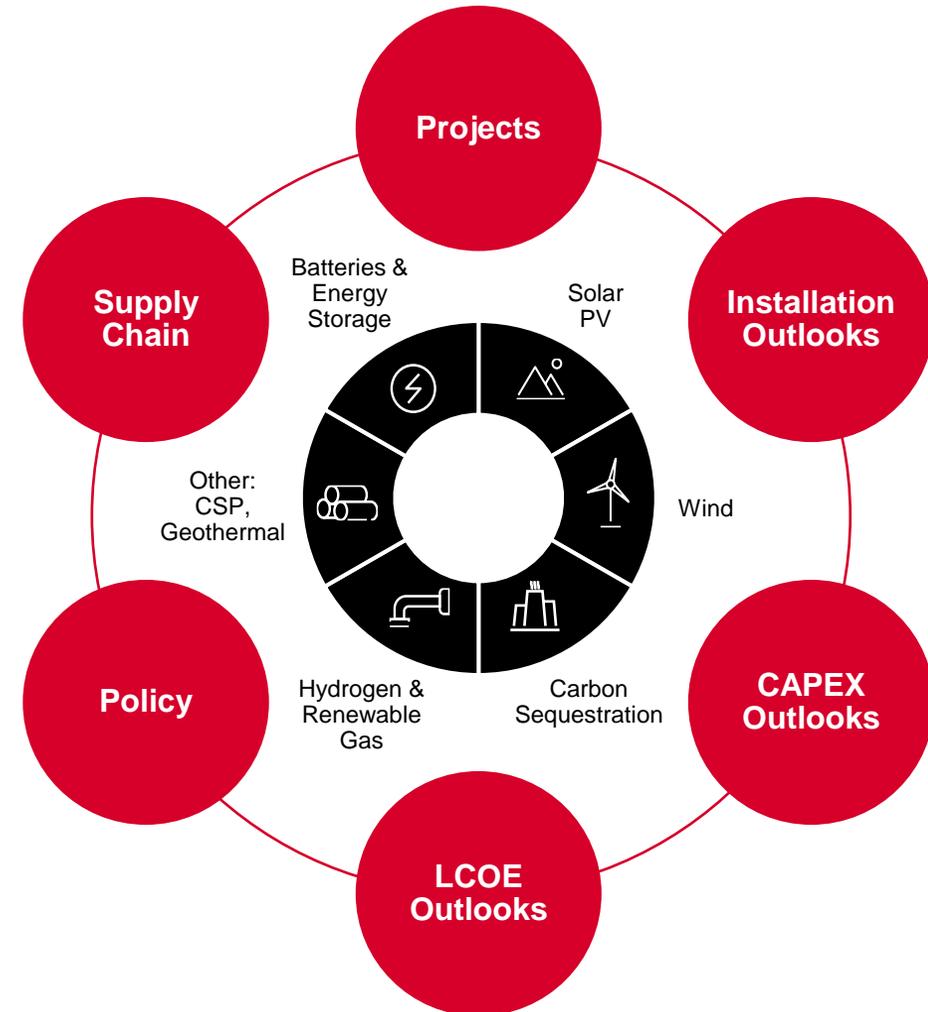
Clean Energy Technology research scope:	Key benefits of research deliverables
Solar	<ul style="list-style-type: none"> <li>• Understand market fundamentals, drivers and challenges</li> <li>• Anticipate market and technology turning points</li> <li>• Assess effects of policy and regulatory changes</li> <li>• Understand supply chain trends and market dynamics</li> <li>• Analysis and forecast of technology and component pricing</li> <li>• Support strategic planning and market entry</li> <li>• Track competitor strategies and stakeholder landscape</li> <li>• Keep track of individual projects</li> </ul>
Wind	
Batteries & Energy Storage	
Hydrogen & Green Gas (inc. Carbon Capture)	
Carbon Sequestration	
Other Low Carbon Technologies*	

Note: Coverage of "Other Clean Technologies" is occasional and high-level. It includes geothermal, CSP, SMR.

# Clean Energy Technology Analytics, an integrated technology visualization dashboard

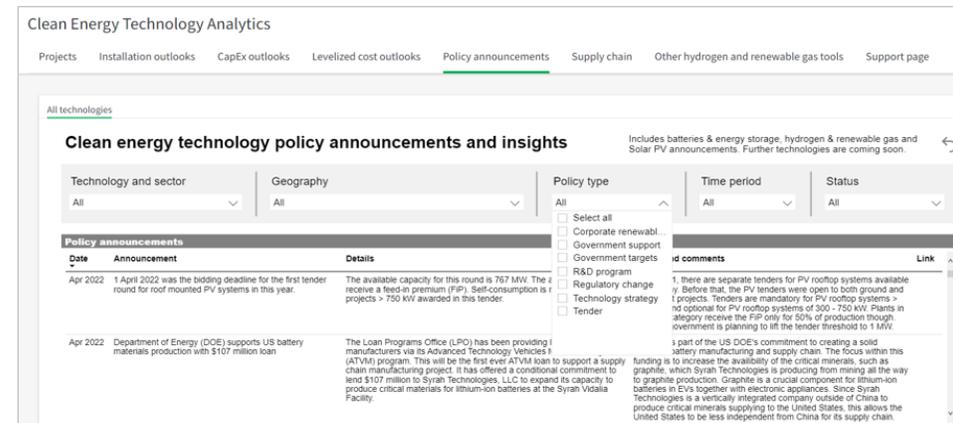
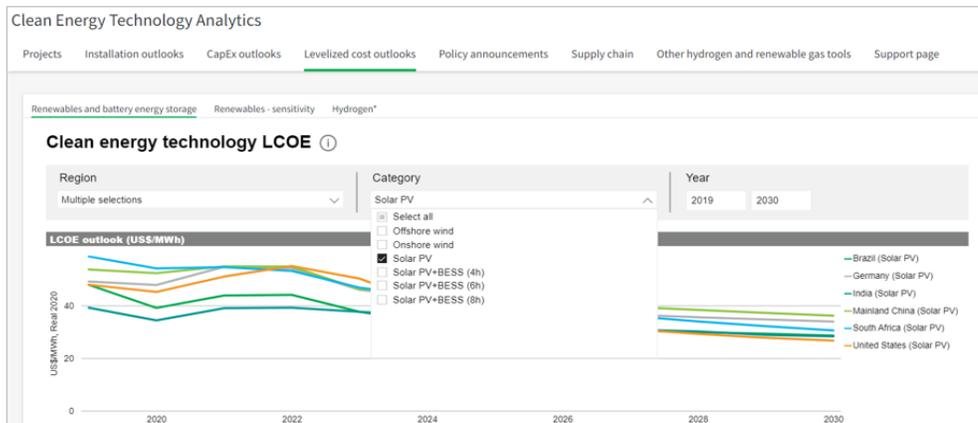
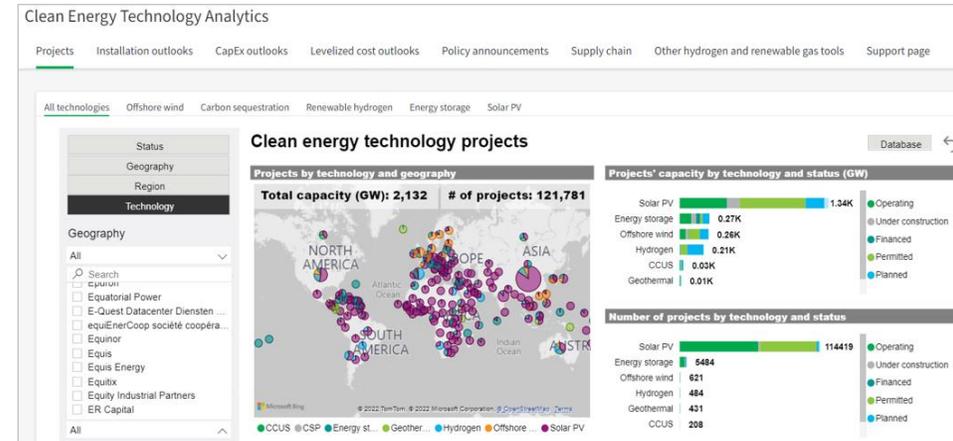
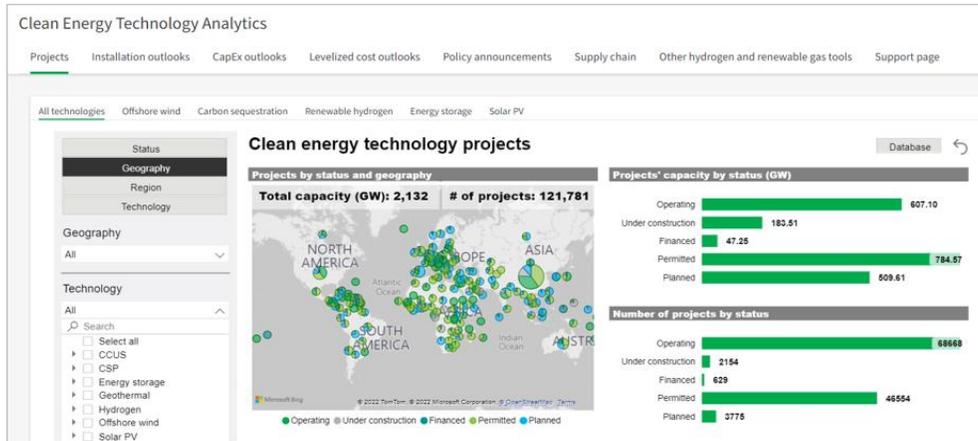
Clean Energy Technology Analytics (CETA) is a premium interactive data visualization platform that facilitates workflows for users interested in comparing data across clean energy technologies, including Batteries and Energy Storage, Carbon Sequestration, Hydrogen and Renewable Gas, Solar PV, Onshore and Offshore Wind, and other technologies with lighter coverage such as Concentrated Solar Power and Geothermal.

Clients can navigate through different types of data across technologies in an **integrated dashboard**, including



# Clean Energy Technology Analytics

## Integrated Dashboard



# Global Clean Energy Technology Service

Selected **Clean Energy Technology Service** research is available to access at your own convenience on **our Climate & Sustainability Demo Hub**.

For more information regarding the service and to request demo access to see the service for yourself, [click here](#).

## Contact Us

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