



Executive
Perspectives

US Inflation Reduction Act: Significant Cost Savings for Corporate Decarbonization

September 2022



Introduction to this document

The BCG Executive Perspective **Part 1 | US Inflation Reduction Act: Climate & Energy Features and Potential Implications** shared an overview of the US Inflation Reduction Act and implications on the energy, transportation, clean tech, and manufacturing sectors. It also included four action items for executives across industries to take full advantage of the policy's value to:

- Reduce costs
- Re-evaluate decarbonization plans
- Capture early mover advantage
- Pursue new value pools

This new Executive Perspective further investigates the significant opportunities that these incentives provide for industries across the economy to achieve cost savings and greenhouse gas emissions reductions

Future editions will investigate expected supply and other bottlenecks, the opportunity of new value pools created by these incentives, and international implications on US competitiveness for net-zero



The IRA helps most companies reduce operating costs and carbon emissions

1

The IRA provides significant opportunities to reduce operating costs as well as carbon emissions

- Incentives can help lower absolute costs: Incremental ~15%+ of emissions are cost-saving to abate, i.e., have positive returns today
- Incentives can help lower carbon abatement costs: Average industry abatement costs are up to 100% cheaper, though actual cost will vary by supplier and geographic footprint
- As a result, companies must reconsider net-zero goals and timelines: New incentives could shift immediate priorities, and companies can use initial savings to "fund the journey" to net-zero

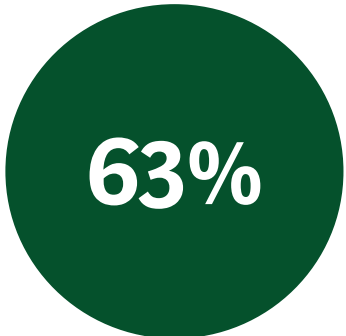
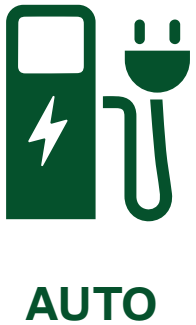
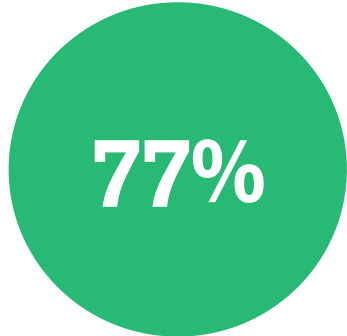
2

However, acting fast is critical

- Lock in available supply now: Supply scarcity is expected due to large demand growth for key technologies and IRA domestic sourcing requirements; companies must act now to access needed supply
- Plan ahead for future needs: Decarbonization efforts have long lead times; work with suppliers to prepare for future needs and mitigate future bottlenecks

1.1 The IRA helps companies reduce emissions at significantly lower cost

Note: Values represent upper limits, as analysis assumes all levers capture US incentives and reach technoeconomic cost estimates



... incremental emissions now cost-saving to abate due to IRA

... of emissions are cheaper to abate post-IRA

... abatement cost pre-IRA vs post-IRA (\$/t CO₂e)

... cheaper average abatement cost

Note: Only includes own and embedded emissions (Scope 1, Scope 2, and upstream Scope 3). Cost estimates are for 2030. Cost savings assume sourcing of each component to capture IRA incentives and may not be representative of value captured by end user due to market inefficiencies, global supply chain, or other factors

1.2 Background | Nine common decarbonization levers across industries

Illustrative

Mitigation Levers

Removal Levers



Recycling/ circularity

Reduce use of material and primary feedstock by reusing inputs



Efficiency

Improve energy, materials, or process efficiency, e.g., by optimizing transport distances



Renewable electricity

Substitute conventional fossil-energy based power generation with renewables



Renewable heat

Substitute conventional fossil-energy based heat generation with renewables



Fuel or feedstock switch

Substitute current fuels or other inputs with lower or zero-carbon sources, e.g., switch to electric vehicles



Technology substitution

Stand up new processes with lower emissions, waste, and material usage, e.g., green hydrogen



Regenerative Agriculture

Invest in ecosystem protection and other carbon-minimizing land-use approaches



CCUS¹

Capture process-related carbon byproduct and store or use them to prevent emissions



Carbon Removal

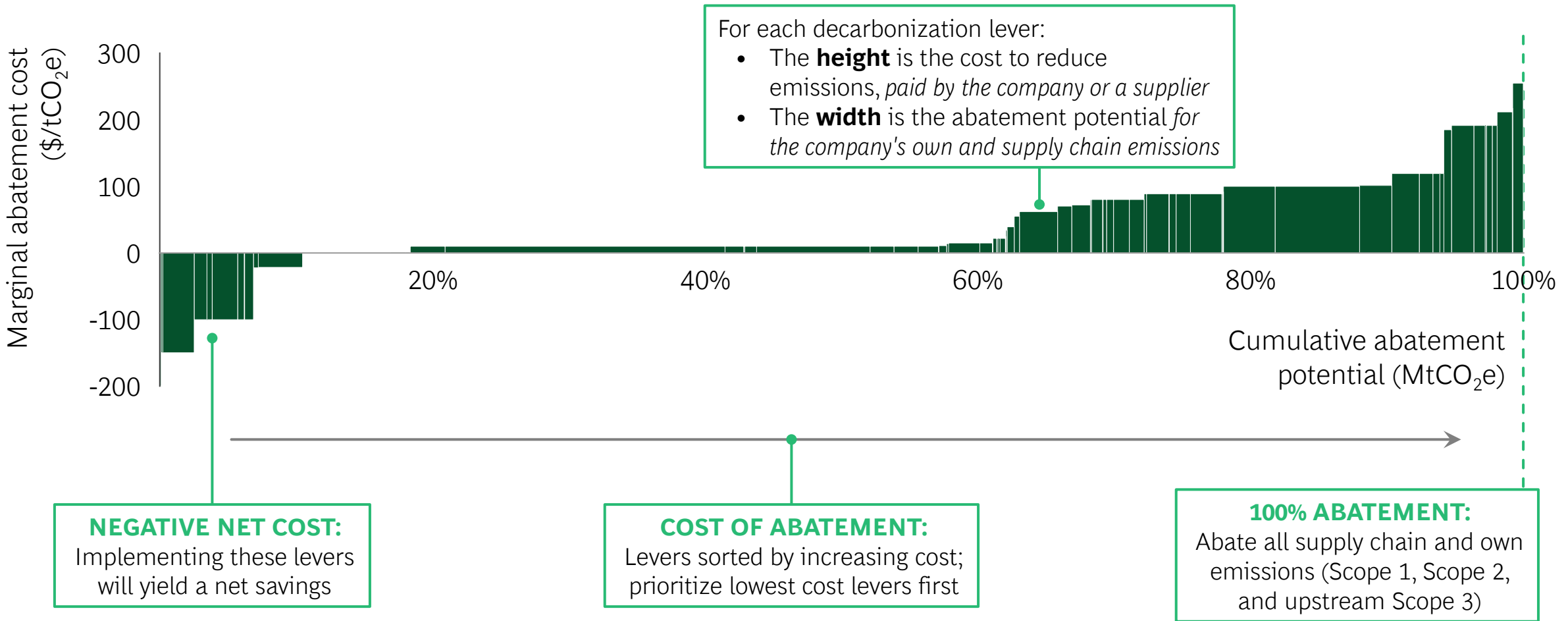
Removing remaining emissions out of the ecosystem, e.g., direct air capture (DAC)

1. Carbon capture, utilization, and storage
Source: BCG analysis

1.3

Background | A marginal abatement cost curve (MACC) helps prioritize decarbonization levers by showing their cost and abatement potential

Illustrative



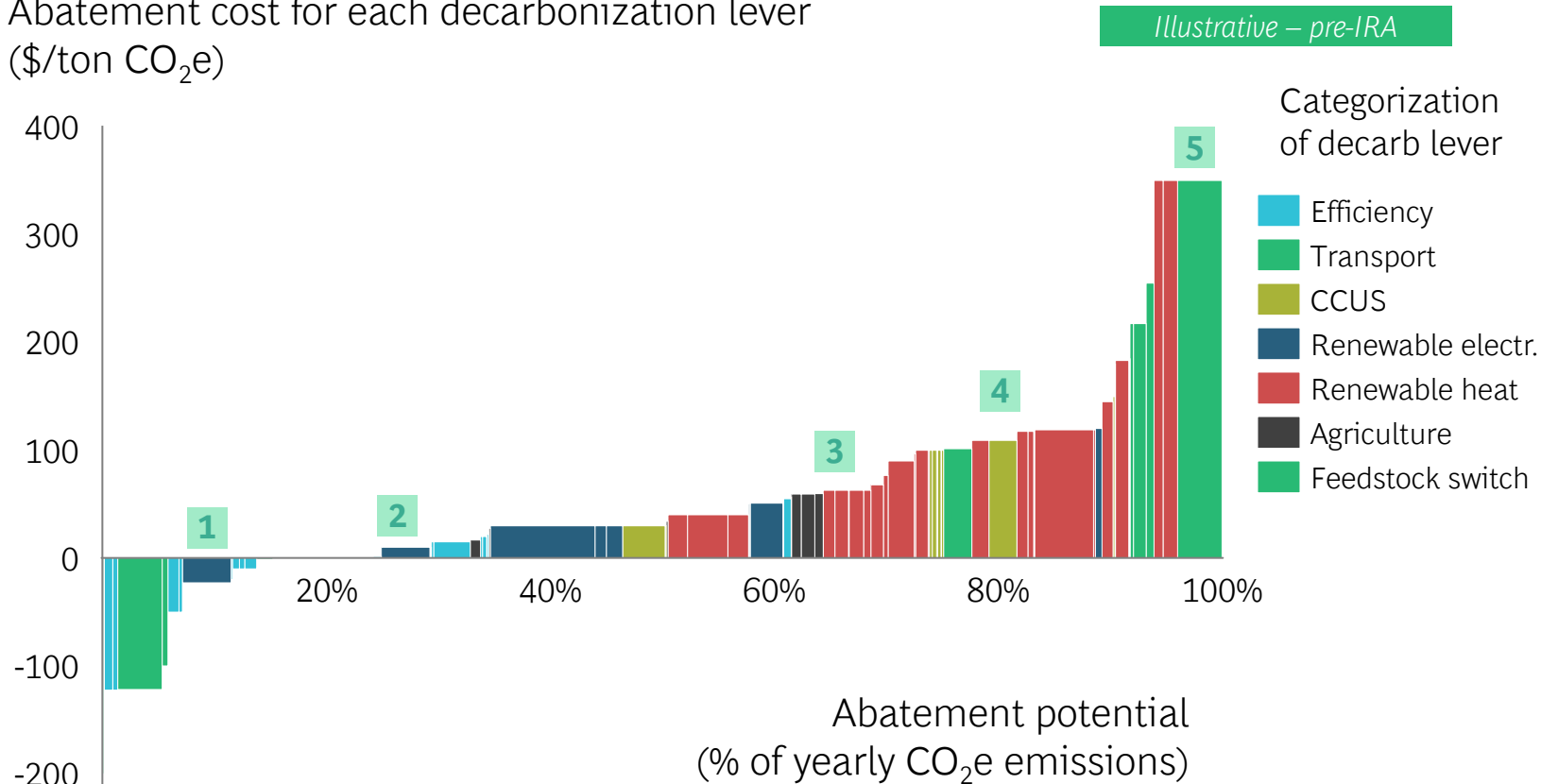
Note: Downstream Scope 3 emissions not included

1.4

Example 1 | Pharmaceutical company abatement curve shows range of technologies required to abate emissions

Marginal abatement cost curve for illustrative pharmaceutical company

Abatement cost for each decarbonization lever (\$/ton CO₂e)



Note: Only includes own and embedded emissions (Scope 1, Scope 2, and upstream Scope 3). Abatement curve shown is an illustrative representation of typical curves within industry; specific company curves may vary
 Source: BCG Decarbonization tool; BCG analysis

Example decarbonization levers

- 1 Switch to **renewable electricity** for finished drug manufacturing
- 2 Switch to **electric trucks** for on-road transport
- 3 **Restore cultivated organic soils** to increase carbon levels on soil
- 4 **Capture CO₂ (CCUS)** at aluminum processing plant where packaging material is produced
- 5 Use **sustainable aviation fuels** for air transport of products

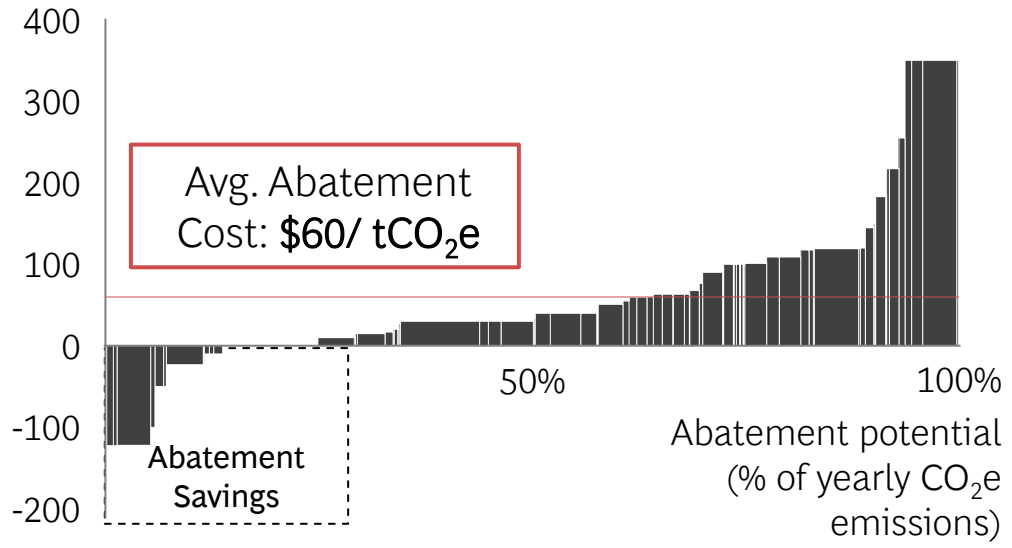
1.5

Cost saving levers | IRA reduces abatement cost of more than half of pharma emissions

Marginal abatement cost curves for illustrative pharmaceutical company

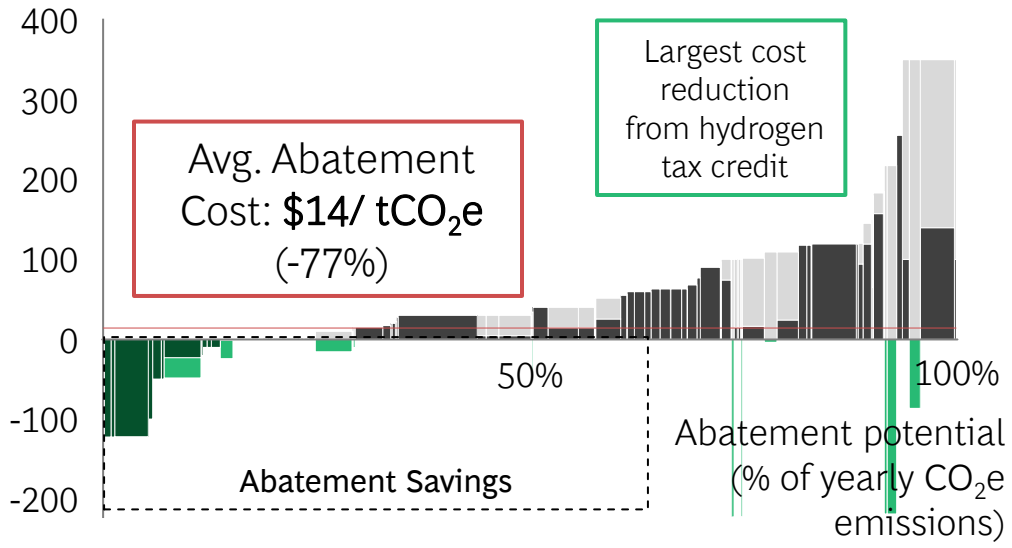
Pre-IRA

Abatement cost for each decarbonization level (\$/ton CO₂e)



Post-IRA¹

Abatement cost for each decarbonization level (\$/ton CO₂e)



■ Abatement Cost post-IRA ■ Abatement saving post-IRA
■ Abatement Cost pre-IRA ■ Abatement saving pre-IRA

2.3x

More abatement savings post-IRA

77%

Overall abatement cost reduction post-IRA

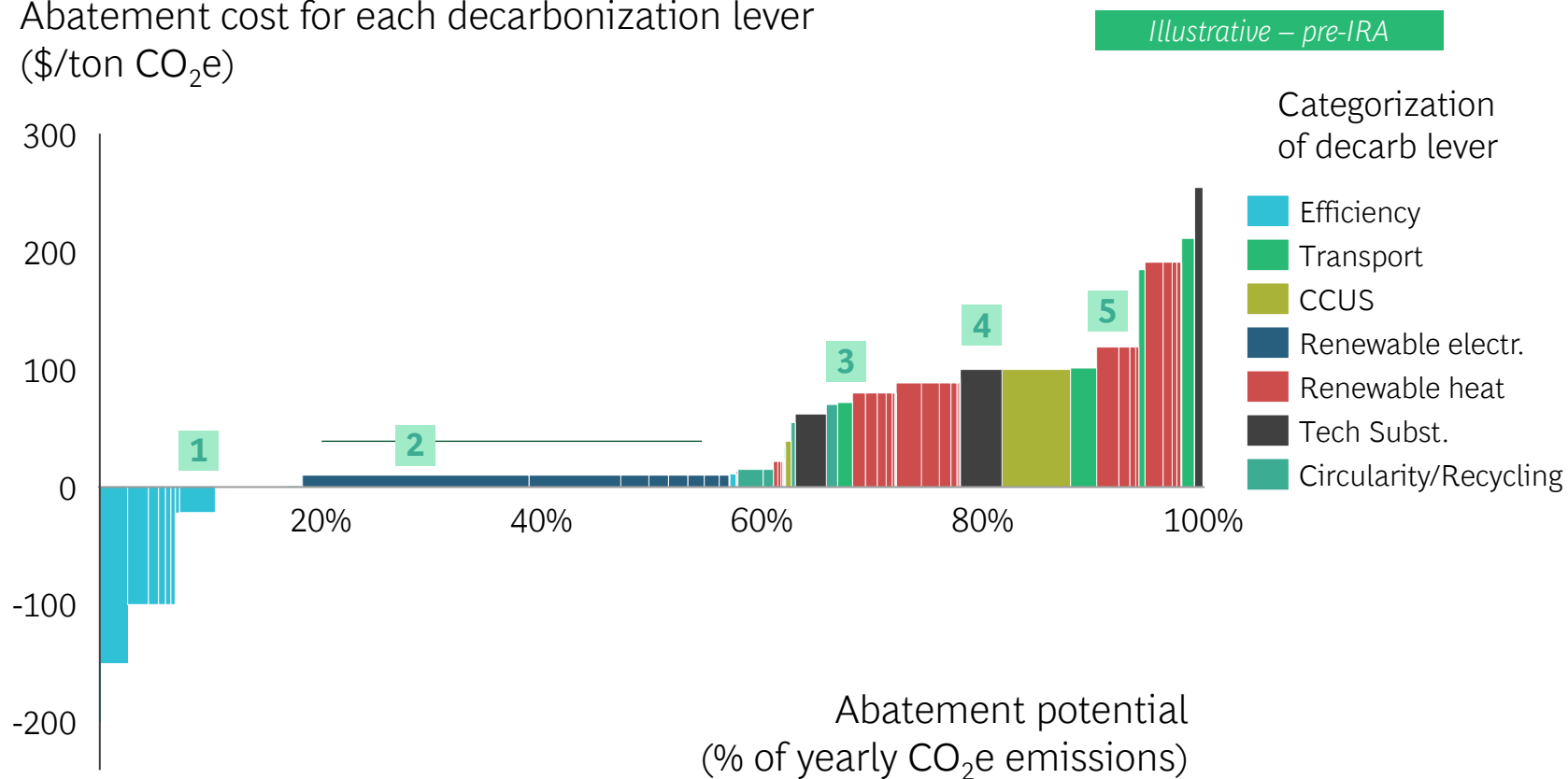
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1.6

Example 2 | After energy efficiency and renewable electricity, several techs required to reduce auto manufacturing emissions

Marginal abatement cost curve for illustrative automotive manufacturer

Abatement cost for each decarbonization lever (\$/ton CO₂e)



Note: Only includes own and embedded emissions (Scope 1, Scope 2, and upstream Scope 3). Abatement curve shown is an illustrative representation of typical curves within industry; specific company curves may vary
 Source: BCG Decarbonization tool; BCG analysis

Example decarbonization levers

- 1 Increase process efficiency in new plastics production
- 2 Switch to renewable electricity for all manufacturing and assembly
- 3 Switch to EVs for remaining light commercial on-road transport
- 4 Electrify and use hydrogen for steel manufacturing
- 5 Switch to biogas for high-temp heat in aluminum production

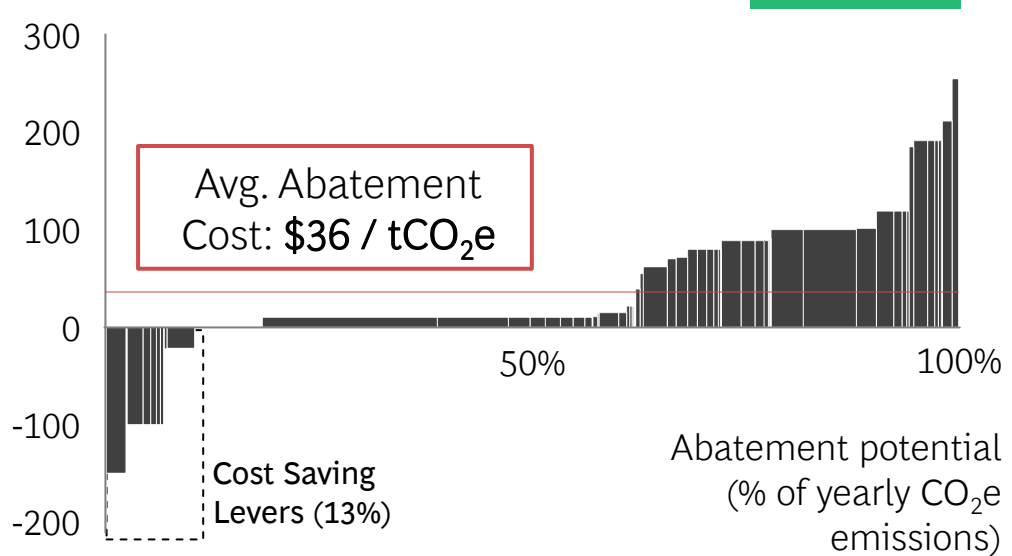


1.7 Abatement costs | Post-IRA, carbon abatement is cost-neutral for auto manufacturer

Marginal abatement cost curves for illustrative automotive company

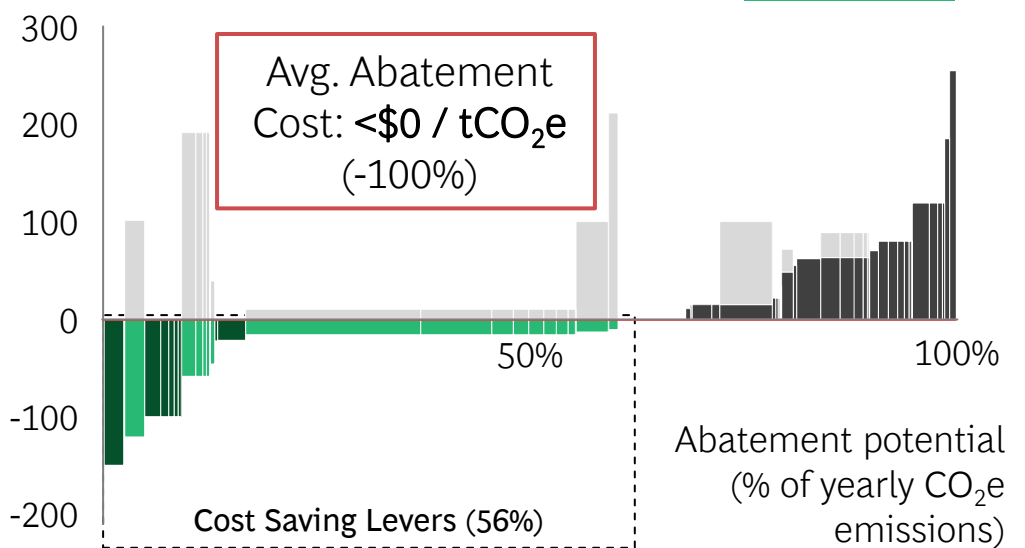
Pre-IRA

Abatement cost for each decarbonization level (\$/ton CO₂e)



Post-IRA¹

Abatement cost for each decarbonization level (\$/ton CO₂e)



Abatement Cost post-IRA
 Abatement Cost Reduction due to IRA
 Abatement Savings pre-IRA
 Incremental Abatement Savings due to IRA

50%

Of emissions that are newly cost saving post-IRA

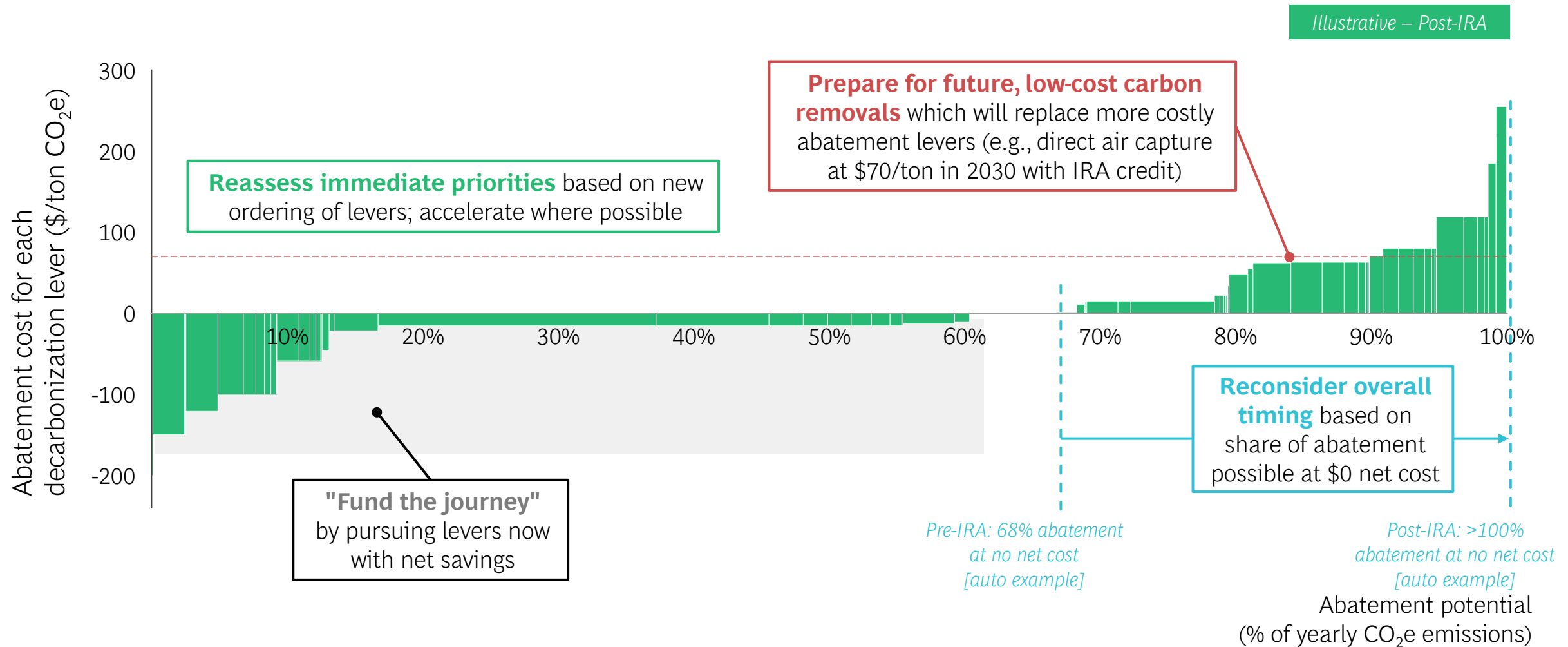
~100%

Overall abatement cost reduction post-IRA

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1.8

Prioritization | Cost changes shift prioritization of decarbonization levers, impacting decarbonization plans



Note: Only includes own and embedded emissions (Scope 1, Scope 2, and upstream Scope 3). Abatement curve shown is an illustrative representation of typical curves within auto industry; specific company curves may vary
Source: BCG Decarbonization tool; BCG analysis



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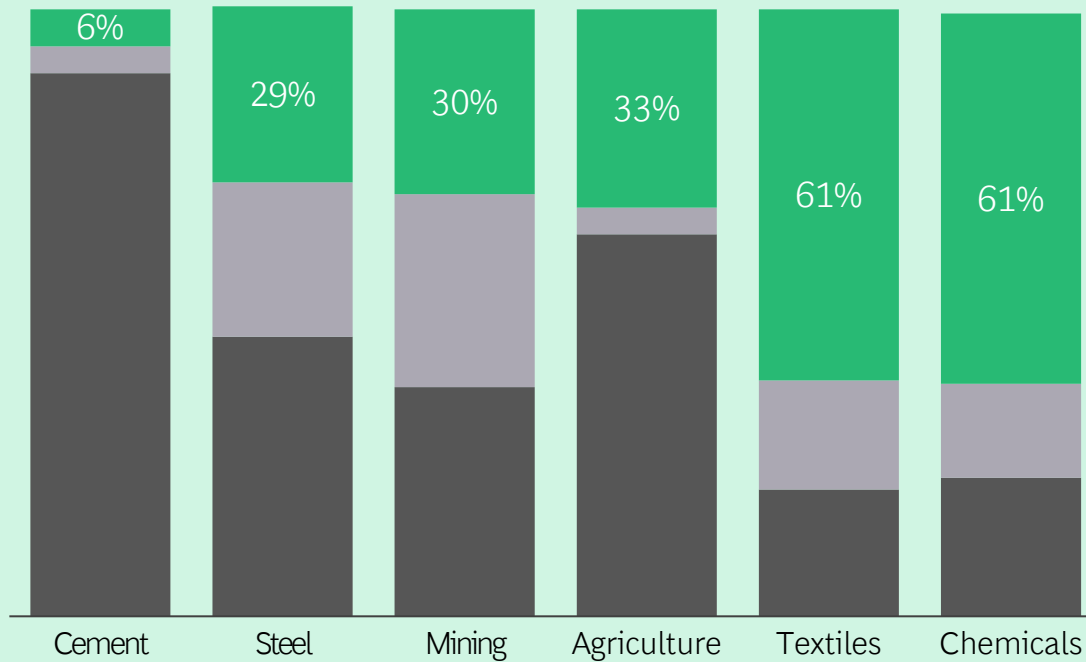
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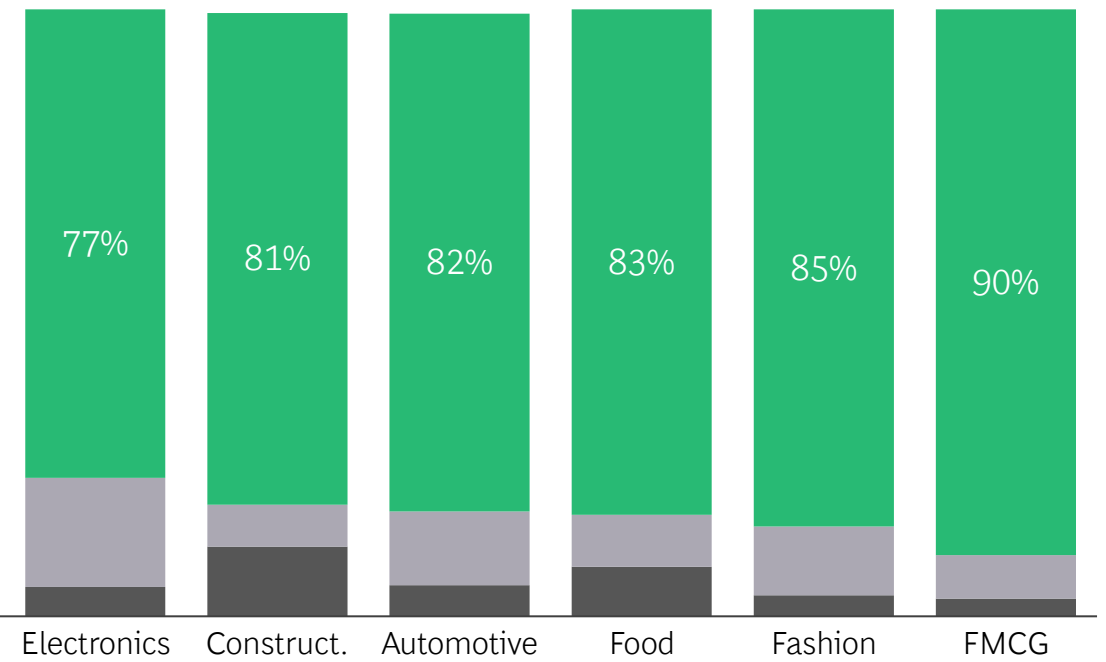
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2.1 Suppliers are key to address majority of emissions for end-use industries

Raw material producers will rely on suppliers of nascent technologies to decarbonize...



...whereas nearly all emissions are embodied for key end-use industries



Operations
 (Scope 1)

Consumed Power etc.
 (Scope 2)

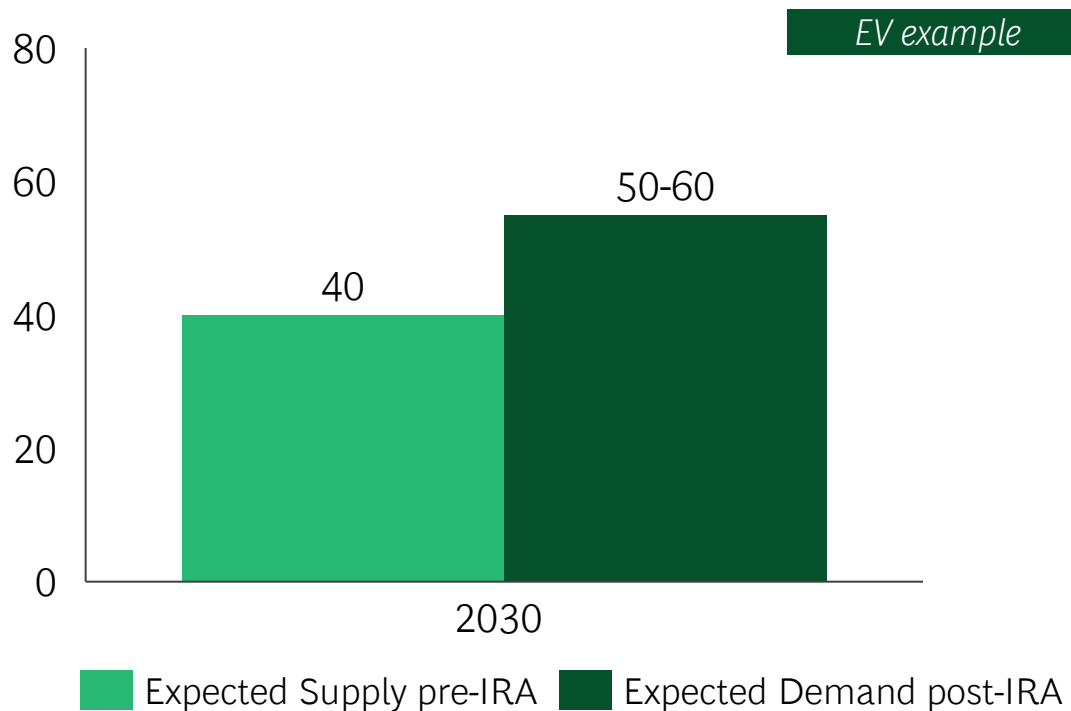
Embodied/Supply Chain
 (Scope 3 upstream)

Note: Top companies selected based on number of reported Scope 3 upstream categories and industry fit; FMCG = fast moving consumer goods
 Source: WEF Net-Zero Challenge report

2.2 Supply Scarcity | Demand is likely to outpace supply for both mature and emerging technologies in the near term, putting pressure on adoption

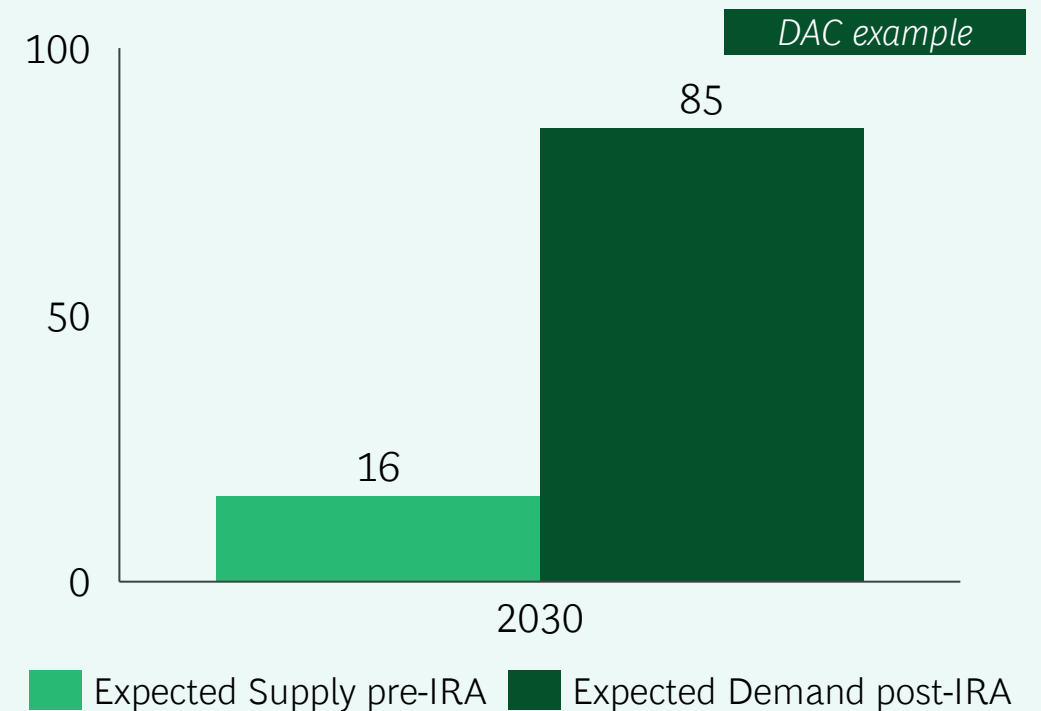
For mature climate technologies, increasing demand will outpace supply, particularly given domestic sourcing requirements

Electric vehicle sales (MM Units)¹



For emerging climate technologies, existing scarcity is expected to worsen

Direct air capture (DAC) Capacity (MtCO₂)²



1. IHS Markit Sales and Production Data, BCG Analysis 2.2030 Demand based on IEA 1.5C Scenario

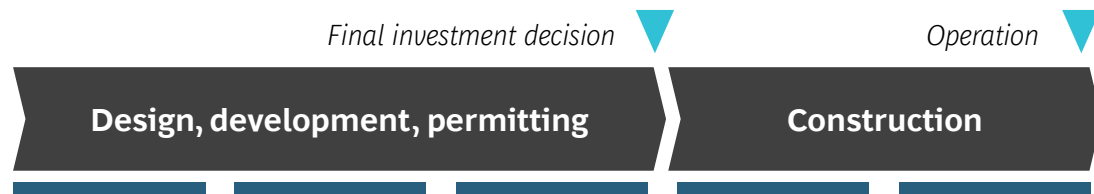
Long lead times | Start now to capture early value and de-risk the path forward

Long lead times typical...

Typical solar project timeline



Typical carbon capture project timeline



...and several risks to timelines



Supply chains

Increase in demand will put pressure on supply chains, creating a short-term squeeze on upstream capacity



Global trade flows

Domestic requirements and global regulations will affect trade flows in and out of the U.S., shifting supply/demand economics



Raw materials sourcing

Demand for batteries and other technologies will increase, depleting finite material supply



Domestic political uncertainty

Incentives could expire or change, requiring companies to act soon to get known value



Permitting

For projects requiring permits, lead times can be extremely long (although legislation may reform this process in near future)

These and other potential bottlenecks investigated further in future report

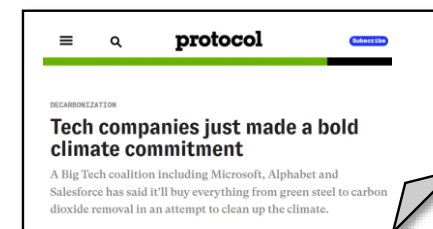
2.4 Engage Suppliers | Several ways to engage suppliers of new technologies and/or decarbonized materials

Demand signals

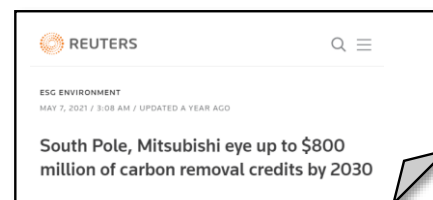
- **Form coalition of peers**, including industry or tech coalitions and pooled procurement
- **Make advanced market commitments** to purchase specific tech



Group of solar developers with pooled module procurement



First Movers Coalition signals demand for nascent climate technologies



Mitsubishi-South Pole commitment to purchase carbon removal credits

Strategic investments

- **Invest in specific partners**, via concrete volume agreements or other partnerships
- **Provide capital** with lower expected return



British Airways' offtake agreement for Sustainable Aviation Fuel



Breakthrough Energy Catalyst supports nascent climate tech



Business ecosystem of renewable energy credits

2.5 First movers are already acting to capture value post-IRA

First Solar says it will spend up to \$1.2 billion to expand U.S. production.

August 30, 2022

Toyota adds \$2.5 billion to its investment in a North Carolina battery plant.

August 31, 2022

PIEDMONT LITHIUM SELECTS TENNESSEE FOR NEW LITHIUM HYDROXIDE PROJECT

September 1, 2022

VW and Mercedes-Benz ink agreements with Canada for raw materials vital to US battery manufacturing

August 23, 2022

Amazon signs green hydrogen supply deal with Plug Power

August 25, 2022

Tesla Supplier Panasonic Plans Additional \$4 Billion EV Battery Plant in U.S.

August 26, 2022

Further reading

Sustainability Strategy & Innovation



[The Next Generation of Climate Innovation](#)



[The Strategic Race to Sustainability](#)



[Creating Shareholder Value From C&S Commitments](#)



[The Challenges of a Sustainability Transformation](#)



[Companies Need to Integrate Climate into Their Strategies](#)

MACCs



[Net-Zero Challenge: The supply chain opportunity](#)

Business Coalitions & Ecosystems



[When a Business Ecosystem Is the Answer to Sustainability](#)



[How to Build a High-Impact Sustainability Alliance](#)



[Ecosystems for Ecosystems](#)

Sustainable Resource Scarcity



[Identifying Resource Scarcities in the Race to Sustainability](#)



[Solving the Puzzle of Sustainable Resource Scarcity](#)



[The Green Economy Has a Resource-Scarcity Problem](#)

Glossary of key terms

Term	Definition
Marginal Abatement Cost Curve (MACC)	A MACC presents the costs or savings expected from different emissions abatement opportunities (or levers), alongside the potential volume of emissions that could be reduced if the opportunities are implemented. MACCs measure and compare the financial cost and abatement benefit of individual actions. They use the metric of dollars per tonne of carbon dioxide equivalent – usually represented as \$/tCO ₂ e. ¹
Direct air capture (DAC)	Direct air capture (DAC) technologies extract CO ₂ directly from the atmosphere. The CO ₂ can be permanently stored in deep geological formations (thereby achieving negative emissions or carbon removal) or it can be used, for example in food processing or combined with hydrogen to produce synthetic fuels. ²
Scope 1 Emissions	Covers the emissions from operations under a facility's control, including onsite fuel combustion. ³
Scope 2 Emissions	Covers the emissions from usage of electricity, steam, heat and/or cooling purchased from third parties. ³
Scope 3 Emissions	Covers upstream and downstream value-chain emissions. Scope 3 upstream emissions, or supply-chain emissions (also called "Embodied Emissions"), cover procured products, transport of suppliers and business travel. For example, this covers emissions in the production of steel used in the car that an automotive original equipment manufacturer (OEM) produces. Scope 3 downstream emissions cover transport of products, usage of sold products and product disposal. For the same automotive OEM, this refers to the emissions from its cars being driven by customers. ³

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