Mission Innovation Financing Masterclass

Financing Clean Energy Demonstrations Dialogue Series

Welcome and Introduction

Peta Olesen

Director, International Climate and Energy

Australian Department of Climate Change, Energy, the Environment and Water

Opening Remarks

Leslie Biddle

Senior Advisor to the Undersecretary of Infrastructure

United States Department of Energy

Association Perspectives

Nancy Gillis

Program Head, Climate Action and First Movers Coalition

World Economic Forum

First Movers Coalition

First Movers Coalition

September 2023

First Movers Coalition

First Movers Coalition launched at COP26

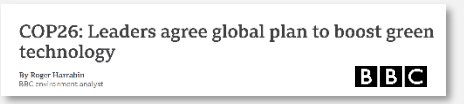
FMC was a top COP26 announcement, bringing together world leaders incl. Presidents Biden and von der Leyen, Secretary Kerry, & leading CEOs

… with significant media exposure


Launching the First Movers Coalition at the 2021 UN Climate Change Conference


AP Science Technology Business U.S. News World News Politics Entertainment Sports Oddities

GENEVA — U.S. climate envoy John Kerry says a new project trumpeted by U.S. President Joe Biden, in which companies underpin development of low-carbon technologies through their buying power, amounts to a "big transformation."

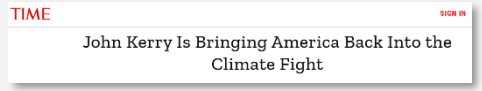

COP26: Leaders agree global plan to boost green technology

BBC


New coalition hopes to create demand drivers for sustainable solutions

First Movers Coalition brings together industry stakeholders, government to create demand and increase R&D for zero-emissions technologies


DHL, Apple, Boeing: Weltkonzerne wollen Null-Emissions-Technologien einkaufen


TIME

John Kerry Is Bringing America Back Into the Climate Fight


GreenBiz

These big corporations are pledging to accelerate purchases of climate tech


SUBJECT MATTER AREAS CLIMATE SECURITY

John Kerry Launches First Movers Coalition at COP26


abc NEWS VIDEO LIVE SHOWS CORONAVIRUS

No arm-twisting: Kerry says corporates back plan to cut CO2

U_S_ climate envoy John Kerry says a new project trumpeted by U_S_ President Joe Biden in which companies underpin development of low-carbon technologies through their buying power amounts to a "big transformation."


FINANCIAL TIMES

A new world is possible.
Let's not go back to what wasn't working anyway.

Opinion Renewable energy

John Kerry: Companies that quickly embrace green tech will clean up

The net zero transition is an unprecedented investment opportunity for early adopters

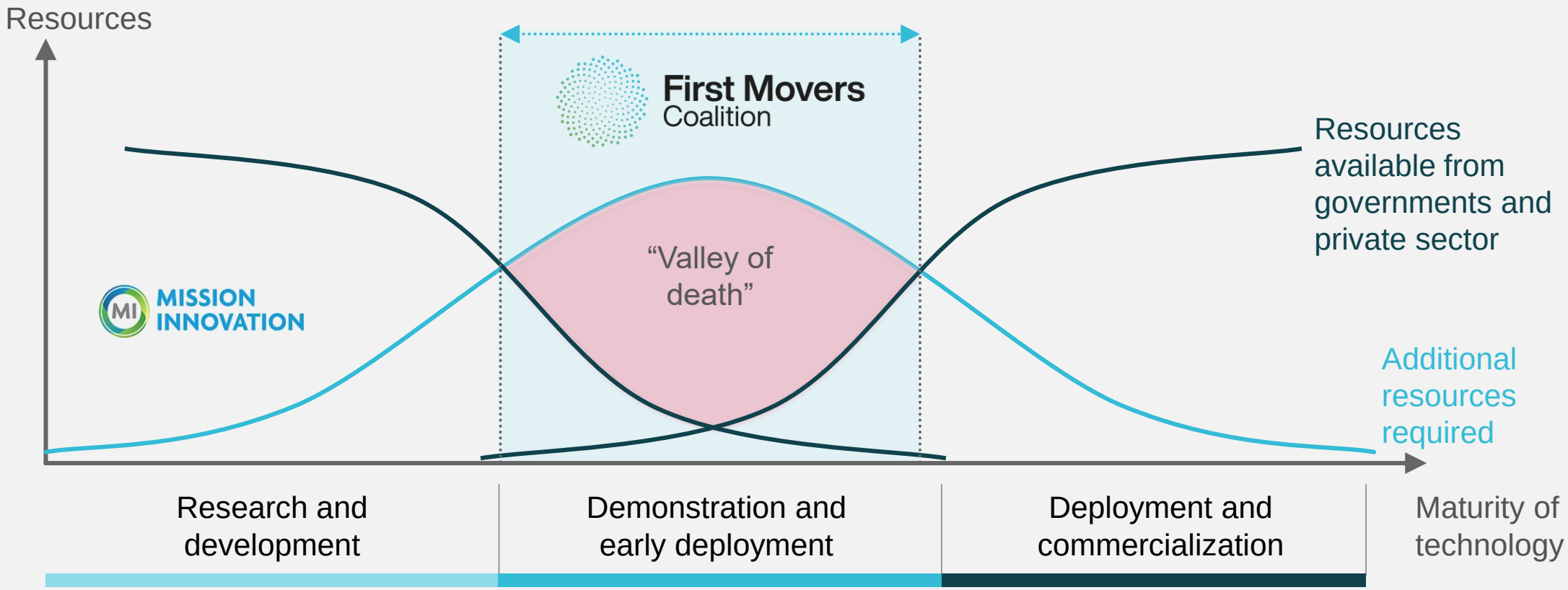

Bloomberg Green

Energy & Science

Kerry Lines Up Pledges to Scrub Emissions From Carbon-Heavy Industries

The First Movers Coalition wants to trigger demand for products like sustainable jet fuel and green steel to help make the clean technologies more affordable

FMC is the only buyers' club to scale emerging tech across hard-to-abate sectors through early demand signals

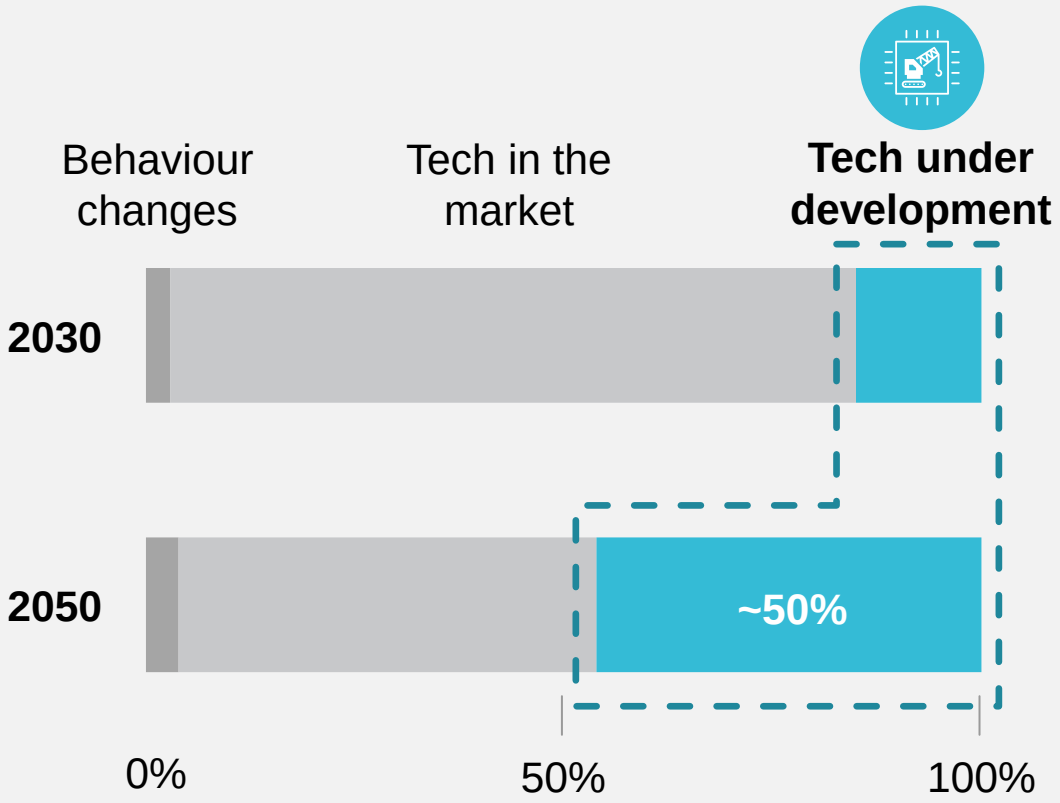


August 2023

First Movers Coalition

This decade, FMC will jumpstart the scale-up of the emerging technologies needed for net zero by 2050

Required emissions reductions for global net zero



FMC creates **early markets this decade**

FMC assembles **sectoral "buyers"** clubs

Commitment sends **demand signal** to suppliers

Suppliers **develop and scale new technologies**

Source: IEA

First Movers Coalition

Eight sectors in scope of the FMC, representing **>30% of global carbon emissions** today & most new tech needs

Launched at COP26 → Launched at WEF Annual Meeting 2022 → Launched at COP27 → **Still to be launched**

Aviation

Steel

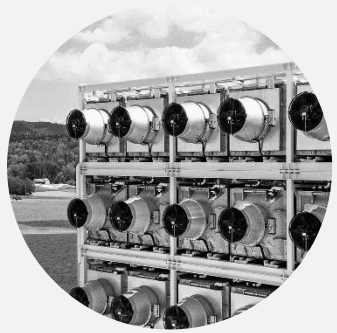
Aluminum

Cement / Concrete

Chemicals

Shipping

Trucking



Carbon Removal

First Movers Coalition

Driving impact through sector-specific demand commitments

111 **total commitments** from **85 members** from top global corporations and non-profit organizations across **7 sectors**

…resulting in…

$15B **in demand** for near-zero-emission products

…supported by…

13 **government partners** representing over 50% of global GDP

First Movers Coalition

Overview of current members

Aluminum – 14 members

- Apple
- Ball Corp
- Bang & Olufsen
- CBA
- Constellium
- Ford Motor Company
- General Motors
- Hydro
- Logitech
- Novelis
- PepsiCo
- Speira
- Trafigura
- Volvo Group

Aviation – 26 members

- Airbus
- American Express GBT
- Apple
- Autodesk
- Aveva
- Bain & Company
- Bank of America
- Boeing
- Boom
- Boston Consulting Group
- Deloitte
- Delta Airlines
- Deutsche Post DHL Group
- Eni
- EY
- FedEx
- Fortescue Metals Group
- Lufthansa Group Nokia
- PwC
- Rio Tinto
- Salesforce
- Schneider Electric
- United Airlines
- University of Michigan
- Vattenfall

Carbon Removal – 10 members

- AES
- Alphabet
- Boston Consulting Group
- Drax
- EGA
- Microsoft
- Mitsui O.S.K. Lines
- Salesforce
- SwissRe
- Trafigura

Cement & Concrete – 7 members

- CCC
- Etex
- General Motors
- RMZ
- Vattenfall
- Ørsted
- ZGF Architects

Shipping – 14 members

- A.P. Møller – Mærsk
- Agility
- Aker Biomarine
- Amazon
- BHP
- Fortescue Metals Group
- Höegh Autoliners
- Logitech
- Mitsui O.S.K. Lines
- Rio Tinto
- Schneider Electric
- Trafigura
- Western Digital
- Yara International

Steel – 25 members

- Aker Solutions
- Alfa Laval
- Bharat Forge
- Consolidated Contractors Group
- Ecolab
- EGUI
- Enel
- Engie
- Ford Motor Company
- Fortescue Metals Group
- General Motors
- Iberdrola
- Invenergy
- Johnson Controls
- Mahindra
- Mainstream Renewable Power
- Marcegaglia
- Ørsted
- ReNew Power
- Scania
- Trane Technologies
- Vattenfall
- Vestas
- Volvo Group
- ZF Friedrichshafen AG

Trucking – 15 members

- Agility
- Cemex
- Dalmia Cement
- Fortescue Metals Group
- Heidelberg Cement
- Holcim
- National Grid
- Norge Mining
- PepsiCo
- Rio Tinto
- Scania
- SSAB Swedish Steel
- Toll Group
- Vattenfall
- Volvo Group

First Movers Coalition

FMC **Government Engagement Pillar** addresses public-private levers to accelerate scaling of FMC technologies in-scope

How Government Partners support

Aggregating demand:

- Mobilizing demand in their countries by issuing invitations to relevant demand companies in your country to join FMC.

Surfacing Supply:

- Identifying domestic companies to include in the **supplier database.**
- Supporting **in-country workshops-** India, Brazil, South Africa.
- Invite Chief Procurement Officers from relevant companies to participate in the Procure Innovation Dialogues.

Supporting Enabling Ecosystem:

- **Action on key policy levers** identified by First Movers Coalition members across enabling ecosystem.
- **International collaboration to scale technology**: partnered with relevant international processes (CEM, COP, IDDI, Breakthrough Agenda).

August 2023

FMC Government Partners (13)

Steering Board (5)

United States
Ministry counterpart: Special Presidential Envoy for Climate (SPEC)

Japan
Ministry: Economy, Trade and Industry

Sweden
Ministry: Climate and the Environment

Germany
Ministry: Economic Affairs & Climate Action

India
Ministry: Commerce & industry

Other Government Partners (8)

Australia
Ministry: Department of Climate Change, Energy, the Environment and Water

Norway
Ministry: Trade and Industry

Singapore
Ministry: Transport; Minister-in-Charge

Canada
Ministry: Innovation, Science and Industry

Denmark
Ministry: Dev. Cooperation and Global Climate Policy

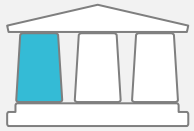
United Arab Emirates
Ministry: Industry and Advanced Technology

Italy
Ministry: Environment and Energy Security

United Kingdom
Ministry: Business, Energy and Industrial Strategy

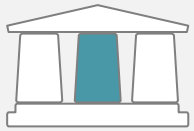
First Movers Coalition

Complementary set of initiatives structured to support members across multiple topics to achieve offtake



Recruit Demand

Targeted Recruiting: Aggregate sufficient demand signal to establish business case for supply-side investments and ensure participation across value chain to prevent bottlenecks



Surface Supply

In-Country Workshops: Stimulate creation of new FMC supply in local markets by driving visibility to FMC demand and discussing how to stimulate local green economies

Supplier Database: Vet proposals through technical partner and provide members with list of vetted suppliers and detailed project proposals

Streamline Procurement

Global Challenges & RFP: Launch global challenges to identify supply and provide access to 3rd party RFP to help FMC member procurement teams and incentivize suppliers

Procure Innovation Dialogue: Discuss best practices for procuring “innovation” including value of CTO/CPO partnership and featuring current examples

Build Enabling Ecosystem

Infrastructure Pillar: Seek commitments from ecosystem players to make critical investments in supporting infrastructure

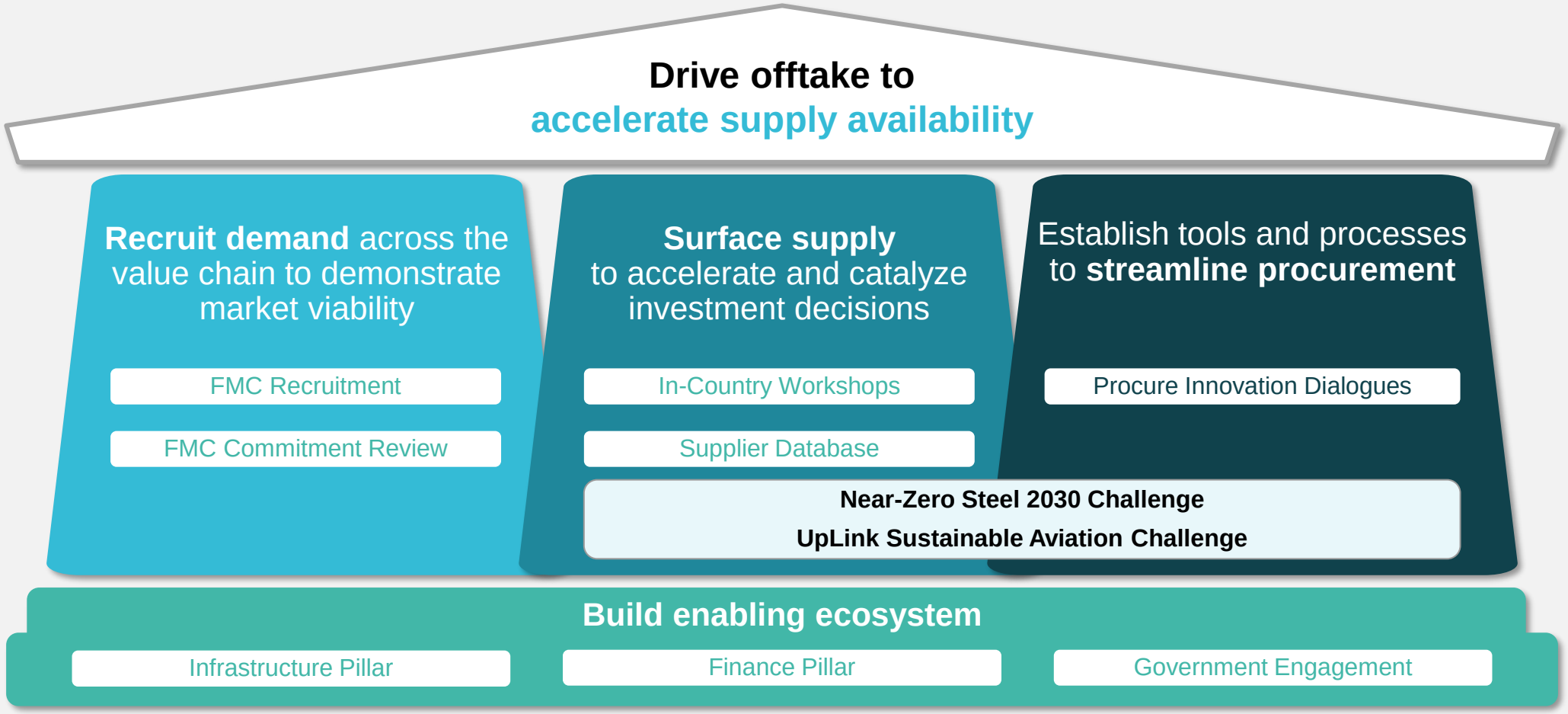
Finance Pillar: Seek development of financial products to support and accelerate member transition, with particular focus on concessionary financing from governments

Government Engagement: Compile sector perspectives for monthly report and establish targeted engagement with government partners

Details provided in following pages

First Movers Coalition

FMC focus is advancing the pillars and enabling ecosystem that will accelerate availability of clean tech

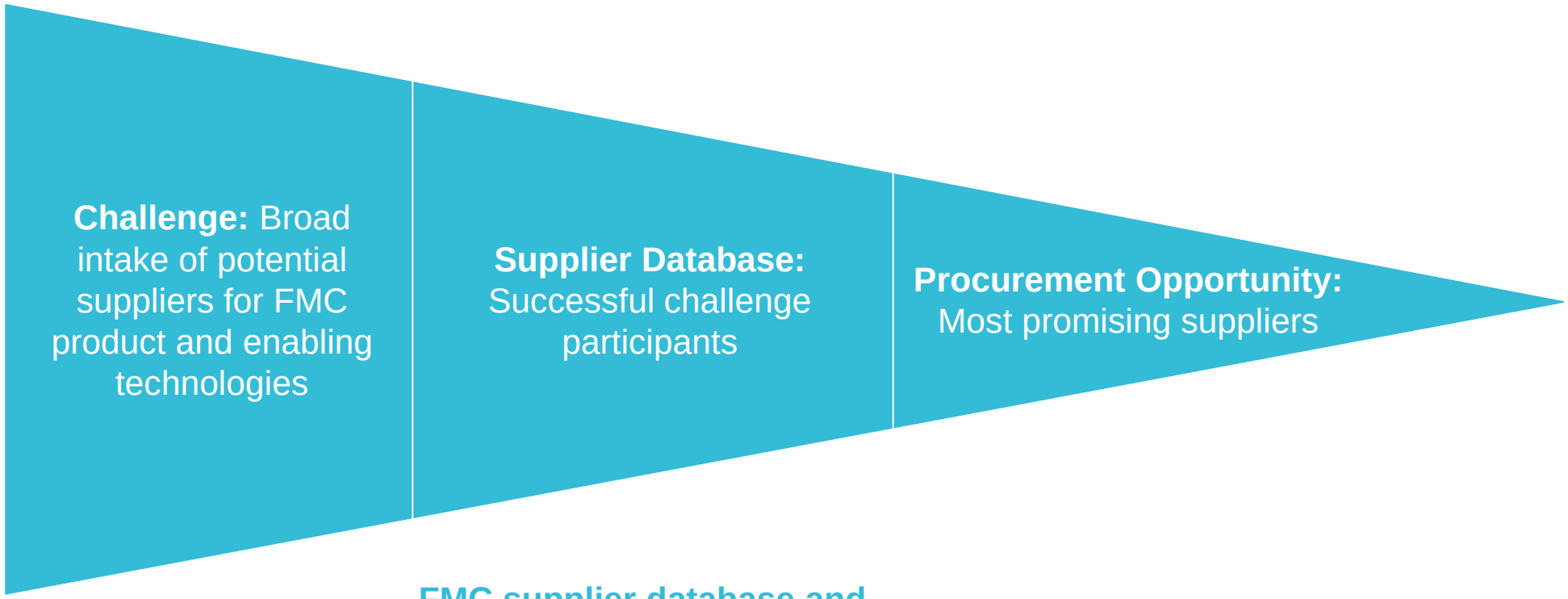


First Movers Coalition

Aviation and steel challenges are designed to lead to procurement opportunities

Aviation

Steel



Note: Further details later in materials expand on these challenges

First Movers Coalition

Sector commitments

First Movers Coalition

1-2% *global emissions today*	1-2% *global emissions by 2050*

Aluminum | Commitment scope

Technologies in-scope

Procurement of primary aluminum produced using breakthrough technologies, including

- **Inert anodes** to reduce direct process emissions
- Carbon capture, utilization and storage (**CCUS**) to capture process-related emissions at source
- **Green hydrogen** to feed thermal energy processes
- Mechanical vapor recompression (**MVR**) to recover and reuse waste heat

Optionally, increased use of recycled aluminum, which is 25 times less carbon-intensive than high-carbon primary aluminum

Focus: Ambition for purchasers of primary aluminum

> At least 10% (by volume) of all our primary aluminum procured annually will be near-zero emissions primary aluminum by 2030 (as per FMC definition)

Optional: Ambition for downstream users of recycled aluminum

> Additionally, we commit to ensuring that at least 50% of all aluminum we use annually is composed of recycled aluminum by 2030

*All companies making an FMC aluminum commitment **must sign up for the primary aluminum commitment**; companies willing to demonstrate leadership in recycling are encouraged to make the additional optional commitment*

Aluminum | Detailed commitment

Subject of demand signal

- The purchase of near zero-emissions primary aluminum, emitting <3t CO2 per ton of primary aluminum produced

  FMC research indicates that near-zero primary aluminum produced at this threshold will require the adoption of *at least one of many* breakthrough technologies in the aluminum production process, including but not limited to:
  - Inert anodes
  - Mechanical vapor recompression
  - Green hydrogen
  - CCUS

- The increased use of recycled aluminum, including both pre-consumer and post-consumer scrap, which can be facilitated through novel purification and sorting technologies and advances towards closed loop manufacturing systems

Ambition

At least 10% (by volume) of all our primary aluminum procured annually will be near-zero, emitting less than 3t CO2 per ton of primary aluminum, by 2030

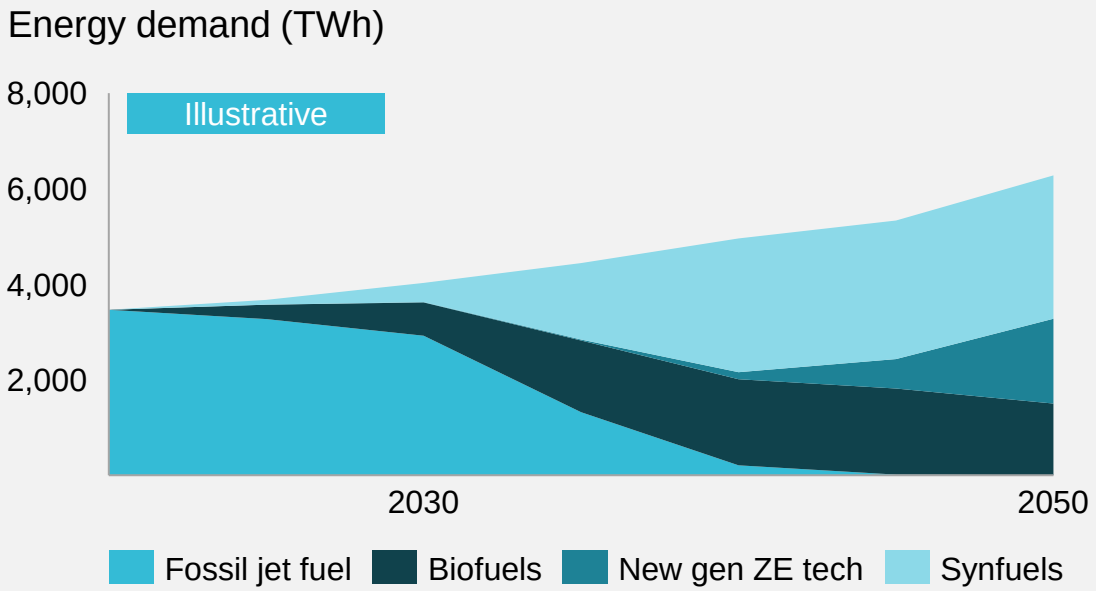
[Optional commitment]

Additionally, we commit to ensuring that at least 50% of all aluminum we use annually is composed of recycled aluminum by 2030

First Movers Coalition

2-3%	>4%
global emissions today	*global emissions by 2050*

Aviation | Commitment scope



Technologies in FMC scope

Sustainable Aviation Fuels[1] with LCA GHG reduction ≥ 85%

New generation near–zero emissions propulsion technologies, incl.
- Battery–electric
- Hydrogen turbine and fuel cells

Airline

"By 2030, we will replace at least 5% of conventional jet fuel demand with sustainable aviation fuels (SAFs) that reduce life–cycle GHG emissions by 85% or more when compared with conventional jet fuel, and/or using zero–carbon emitting propulsion technologies

Airfare/airfreight purchaser

"By 2030, we will partner with air transport operators to replace at least 5% of conventional jet fuel used for our air travel/freight with sustainable aviation fuels (SAFs) that reduce life–cycle GHG emissions by 85% or more when compared with conventional jet fuel, and/or zero–carbon emitting propulsion technologies

1. Neat SAF with >85% LCA, using the Schneider–Kildee–Brownley–Brown–Cantwell definition.
Disclaimer: the Climate Pathway scenario is the result of an analysis assuming aggressive cost reductions, progressive technology developments and future breakthroughs, and high investments from 2021 onwards

First Movers Coalition

Aviation | Detailed commitment

Subject of demand signal

Utilization of cutting-edge SAFs & propulsion technologies for air travel by 2030

In-scope:

- **Sustainable Aviation Fuels with LCA GHG reduction ≥ 85%**[1]
- **New generation near-zero emissions propulsion technologies**, incl. battery-electric, hydrogen turbine and fuel cells
- Other technologies with LCA GHG reduction ≥ 85%

Out-of-scope:

- More established SAFs – i.e. with LCA GHG reduction < 85%[1]
- Fossil jet fuels
- Carbon offsets
- Efficiency improvements

Ambition

Airline / Air freight - By 2030, we will replace at least 5% of conventional jet fuel demand with sustainable aviation fuels (SAFs) that reduce life-cycle GHG emissions by 85% or more when compared with conventional jet fuel, and/or zero-carbon emitting propulsion technologies

OR

Airfare / airfreight purchaser –
By 2030, we will partner with air transport operators to replace at least 5% of conventional jet fuel used for our air travel / freight with sustainable aviation fuels (SAFs) that reduce life-cycle GHG emissions by 85% or more when compared with conventional jet fuel, and/or zero-carbon emitting propulsion technologies

1. Neat SAF, using the Schneider-Kildee-Brownley-Brown-Cantwell definition – fuels that can be beneficial to worker health and safety in the airport environment and in the surrounding communities - safety and training of crews are vital activities to be built out further after COP26.

First Movers Coalition

Carbon Removal | Commitment scope

Technologies in-scope

Contracting **permanent and scalable** carbon removal that satisfies the following thresholds:

- **Permanence:** Solutions that demonstrably store captured carbon for 1,000+ years
- **Scalability**: Solutions that can potentially store at least 1MT of carbon by 2030 and 1GT by 2050

Solutions must satisfy the above thresholds and meet the FMC's environmental externality and risk mitigation criteria, to be developed by the FMC Secretariat and sector champions, in consultation with members and ecosystem partners

Ambition: Cumulative Commitment

> "In addition to our maximal direct emissions reduction efforts, we commit to contract for **at least 50,000 tons** of durable and scalable (per FMC definitions) net carbon removal to be achieved **by the end of 2030."**

As an alternative to contracting for 50,000 tons, companies joining the FMC can contract for **at least $25 million** of durable and scalable (per FMC definitions) net carbon removal, to be achieved **by the end of 2030.**

First Movers Coalition

Carbon Removal | Detailed commitment

Subject of demand signal

Durable and scalable carbon removal that satisfies the following thresholds:

- **Permanence:** Solutions that demonstrably store captured carbon for 1,000+ years
- **Scalability**: Solutions that can potentially store at least 1MT of carbon by 2030 and 1GT by 2050

Solutions with the potential to meet these durability and scalability criteria can come from the following categories

- Engineered solutions such as DACCS[1], BECCS[2]/BiCRS[3]
- Hybrid natural processes such as enhanced weathering and mineralization

Solutions must satisfy the above thresholds and meet the FMC's environmental externality and risk mitigation criteria

Ambition

Cumulative volume commitment

"In addition to our maximal direct emissions reduction efforts, we commit to contract for at least 50,000 tons of durable and scalable (per FMC definitions) net carbon removal to be achieved by the end of 2030."

Alternative: Cumulative $ commitment

As an alternative to contracting for 50,000 tons, companies joining the FMC can contract for **at least $25 million** of durable and scalable (per FMC definitions) net carbon removal, to be achieved **by the end of 2030.**

1. Direct Air Capture and Carbon Sequestration, 2. Bioenergy with Carbon Capture and Storage, 3. Biomass Carbon Removal and Storage, 4. Hybrid processes like biochar may also be included. While the decay rate of carbon stored in this manner is currently estimated at less than 1,000 years, it may improve in the future with different deployment techniques. Projects will need to be evaluated on a case-by-case basis

Cement and Concrete | Commitment scope

Construction & Engineering

> We commit to purchasing at least 10% (by volume) of our cement / concrete per year as near-zero cement / concrete[1] inclusive of any SCMs by 2030 and excluding fossil-based SCMs by 2035

Real Estate / Developers / Advisory

> We commit to ensuring / specifying that at least 10% (by volume) of the cement / concrete procured for our projects per year is near-zero carbon cement / concrete[1] inclusive of any SCMs by 2030 and excluding fossil-based SCMs by 2035

Breakthrough technological pathways

Procurement of cement or concrete produced using breakthrough technologies, including (but not limited to)

- Carbon capture, utilization and storage (**CCUS**) to capture process-related emissions at source
- Clinker substitution using **non-fossil-based SCMs** (i.e., SCMs other than GGBS and fly ash)
- **Alternative cement chemistries** reliant on raw materials other than limestone

1. As per FMC definition

Cement and Concrete | Detailed commitment

Subject of demand signal

First Movers will make a commitment for either cement or concrete:

1. Cement with embodied carbon below 184 kg CO_2e/ton
2. Concrete that meets the embodied carbon limits below

Specified compressive strength (f'c in psi)	Embodied carbon (kg CO_2e/m^3)
0 - 2500 psi	70
2501 - 3000 psi	78
3001 - 4000 psi	96
4001 - 5000 psi	117
5001 - 6000 psi	124
6001 - 8000 psi	144

Technological pathways

Solutions may include (but are not limited to):

- **CCUS**
- **Non-fossil-based SCMs**
- **Fuel switching**
- Renewable electricity
- Efficiency improvements
- Decarbonated raw materials
- Alternative cement chemistries
- CO_2 mineralization during curing

Out-of-scope:

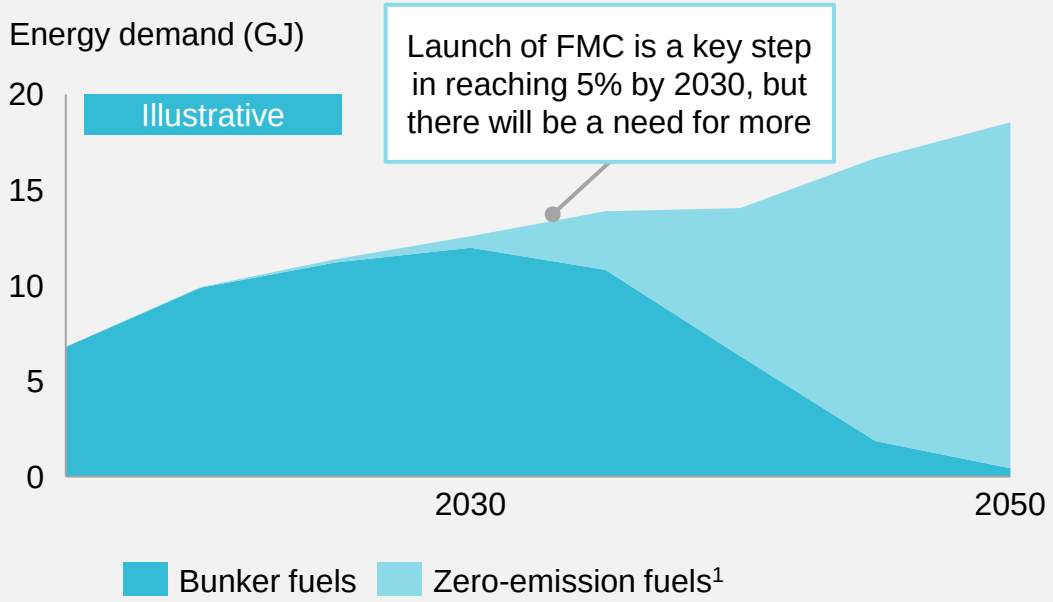
- [By 2035] Fossil-based SCMs (i.e., GGBS and fly ash)
- Carbon offsets

Bolded abatement technologies seen as most critical to meeting FMC targets according to FMC research

First Movers Coalition

3%	4-8%
global emissions today	*global emissions by 2050*

Shipping | Commitment scope



Technologies in FMC scope

Zero-emission fuels[1]

- Clean Ammonia
- Clean Methanol
- Hydrogen
- Battery

Coupled with vessels/engines capable of using zero-emission fuels

Carrier focus

> At least 5% of our deep-sea shipping will be powered by zero-emission fuels by 2030, enabled by ships capable of using zero-emission fuels

Cargo owner focus

> At least 10% of the volume of our goods shipped internationally will be on ships using zero-emission fuels by 2030; on the way to 100% by 2040

1. Technologies considered in scope will be reviewed over the course of the 2020s and potentially be updated based on new evidence; review of new fuels will consider lifecycle greenhouse gas emissions and scalability as well as the availability/supply of new fuels and the quantum of the commitment for different actors. Current list assumes in-scope fuels are used in accordance w/ generally accepted standards for safe handling and onboard use, and assumes mitigation of other potential environmental & social impacts of production, distribution, and use. In some cases those standards are currently under development

Source: S&P Global Platts; UMAS; Getting to Zero Coalition; Cargo Owners for Zero Emission Vessels; Energy Transitions Commission; Mission Possible Project; BCG analysis

First Movers Coalition

Shipping | Detailed commitment

Subject of demand signal

Utilization of zero-emission fuel[1] in new and retrofitted ships (clean ammonia, clean methanol[2], hydrogen, battery)[3]

In-scope:

- Fuels that have zero emissions on a lifecycle basis[4]
- Fuels that when blended or used as standalones are sufficiently scalable to decarbonize the entire shipping industry
- Fuels for which land use / sustainability concerns have been addressed
- Fuels that can be used safely in time[5]

Out-of-scope:

- Liquid natural gas and drop-in fuels
- Carbon offsets
- Efficiency improvements

Ambition

Carrier - At least 5% of our deep-sea shipping will be powered by zero-emission fuels by 2030, enabled by ships capable of using zero-emission fuels

OR

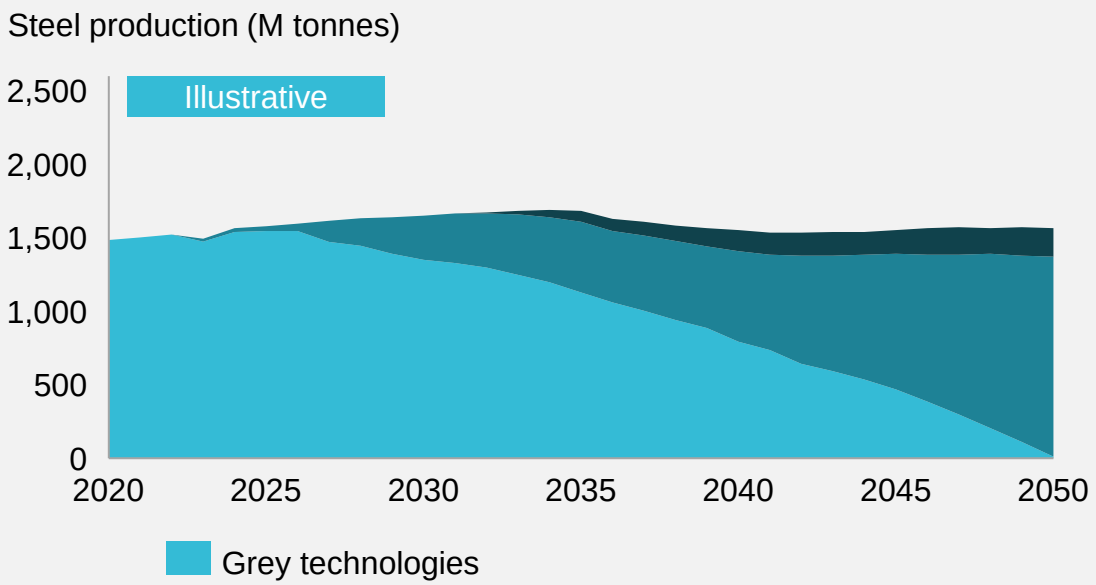
Cargo owner - At least 10% of the volume of goods shipped internationally will be on ships using zero-emission fuels by 2030; on the way to 100% by 2040

1. "Zero-emission fuel" defined as detailed in the Getting to Zero Coalition guidelines on "zero carbon energy sources" – see appendix for more details; 2. Methanol with non-biogenic carbon inputs; 3. Technologies considered in scope will be reviewed over the course of the 2020's and potentially be updated based on new evidence; review of new fuels will consider lifecycle greenhouse gas emissions and scalability as well as the availability/supply of new fuels and the quantum of the commitment for different actors. Current list assumes in-scope fuels are used in accordance w/ generally accepted standards for safe handling and onboard use, and assumes mitigation of other potential environmental & social impacts of production, distribution, and use. In some cases those standards are currently under development; 4. Net-zero emission fuels may not be be zero emissions in near future, but evidence needed that it will become zero by the time of shipping decarbonization. Source: Getting to Zero Coalition; Cargo Owners for Zero Emission Vessels; Energy Transitions Commission; Mission Possible Project; BCG analysis

First Movers Coalition

7%	8%
global emissions today	*global emissions by 2050*

Steel | Commitment scope



Technologies in FMC scope

- Nascent green technologies
  - E.g., Electrowinning, Electrolyzer
- Advanced green technologies
  - CCUS and CCS with existing processes (E.g., BF-BOF)
  - Green H2 use to reduce iron ore (E.g., H2-DRI-EAF)

Ambition for a component manufacturer/Final goods producer

> At least 10% (by volume) of all our steel purchased per year will be near-zero emissions by 2030

Note: representation excludes EAF volumes
Source: Net Zero emissions by 2050 'Tech Moratorium' scenario from Mission Possible Partnership for Steel (Oct 2021)

First Movers Coalition

Steel | Detailed commitment

Subject of demand signal

The purchase of near zero-emissions steel, satisfying the following criteria:

- Crude steel from breakthrough technology production facilities
- Emitting <0.4 (0% scrap inputs) to <0.1 t (100% scrap inputs) of CO_2 per tonne of crude steel produced[1]

Ambition

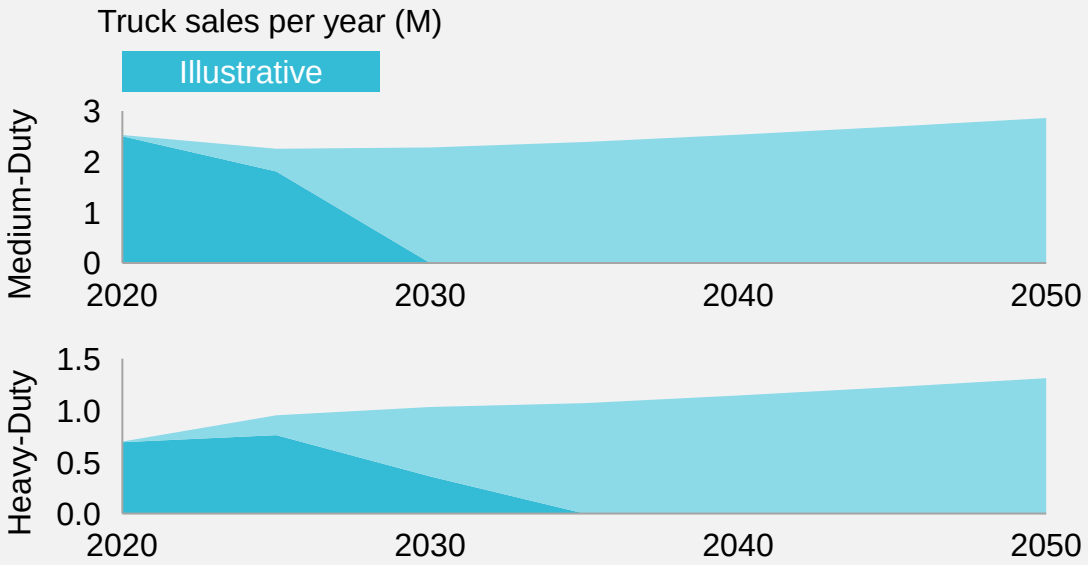
> "At least 10% (by volume) of all our steel purchased per year will be near-zero emissions (as per FMC definition) by 2030"

1. FMC set ambitious standards, including a fixed supply chain boundary inclusive of all raw material preparation through steelmaking and casting. This boundary was developed in coordination with partners and is similarly reflected in other standards, including IEA recommendations for G7 members. Maintaining alignment across standards helps FMC members stay in step with industry & customer expectations through 2030. FMC permits the use of virtual PPA to satisfy Scope 2 emission thresholds, if additionality is confirmed by independent expert third party.
Source: Mission Possible Partnership. Note: Commitment scope includes both flat and long steel.

First Movers Coalition

5%	11%
global emissions today	*global emissions by 2050*

Trucking | Commitment scope



Technologies in FMC scope

- Zero-emission vehicles
  - Battery electric vehicles
  - Fuel-cell electric vehicles
- Fossil fuel-powered trucks

Trucking owners and operators

> At least 30% of my heavy-duty and 100% of my medium-duty new truck purchases will be zero-emission trucks by 2030

Retailers and Manufacturers

> I require my trucking service providers to meet the commitment that at least 30% of heavy-duty and 100% of medium-duty new truck purchases will be zero-emission trucks by 2030

Trucking | Detailed commitment

Subject of demand signal

Purchase or contracting of zero-emission medium and heavy-duty vehicles

Note: Medium-duty is >14k lbs[1] and heavy-duty is >26k lbs[2]

In-scope:

- BEV – Battery electric vehicles
- FCEV – Fuel-cell electric vehicles (Hydrogen)
- Renewable sources of electricity and hydrogen for charging / catenary and refueling

Out-of-scope:

- Liquid natural gas and drop-in fuels
- Carbon offsets
- Efficiency improvements

Ambition

Trucking owner & trucking operators- At least 30% of my heavy-duty and 100% of my medium-duty truck purchases will be zero-emission trucks by 2030.

OR

Retailers & manufacturers - I require my trucking service providers to meet the commitment that at least 30% of heavy-duty and 100% of medium-duty truck purchases will be zero-emission trucks by 2030.

Source: EV100+; Road Freight Zero; Energy Transitions Commission; Mission Possible Project; BCG analysis
1. Corresponds to ~6.5 tonnes 2. Corresponds to ~12 tonnes

First Movers Coalition

Joining the FMC is an opportunity to take action on climate and build the clean supply chains of the future

Please contact

Nancy Gillis
Nancy.Gillis@weforum.org

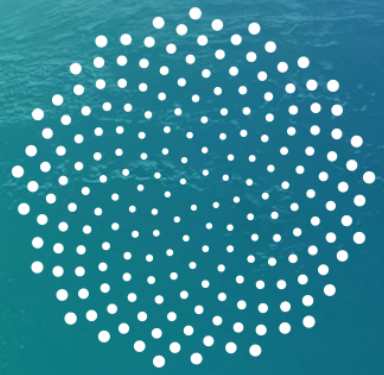
Pablo Burkolter
Pablo.Burkolter@weforum.org

Pelayo González
Pelayo.Gonzalez@weforum.org

if you are interested to learn more about the First Movers Coalition

We look forward to jointly making emerging clean technologies accessible and scalable

First Movers Coalition



First Movers Coalition

WORLD ECONOMIC FORUM

Association Perspectives

Alasdair Graham

Head of Industry Decarbonization, Mission Possible Partnership

Energy Transitions Commission

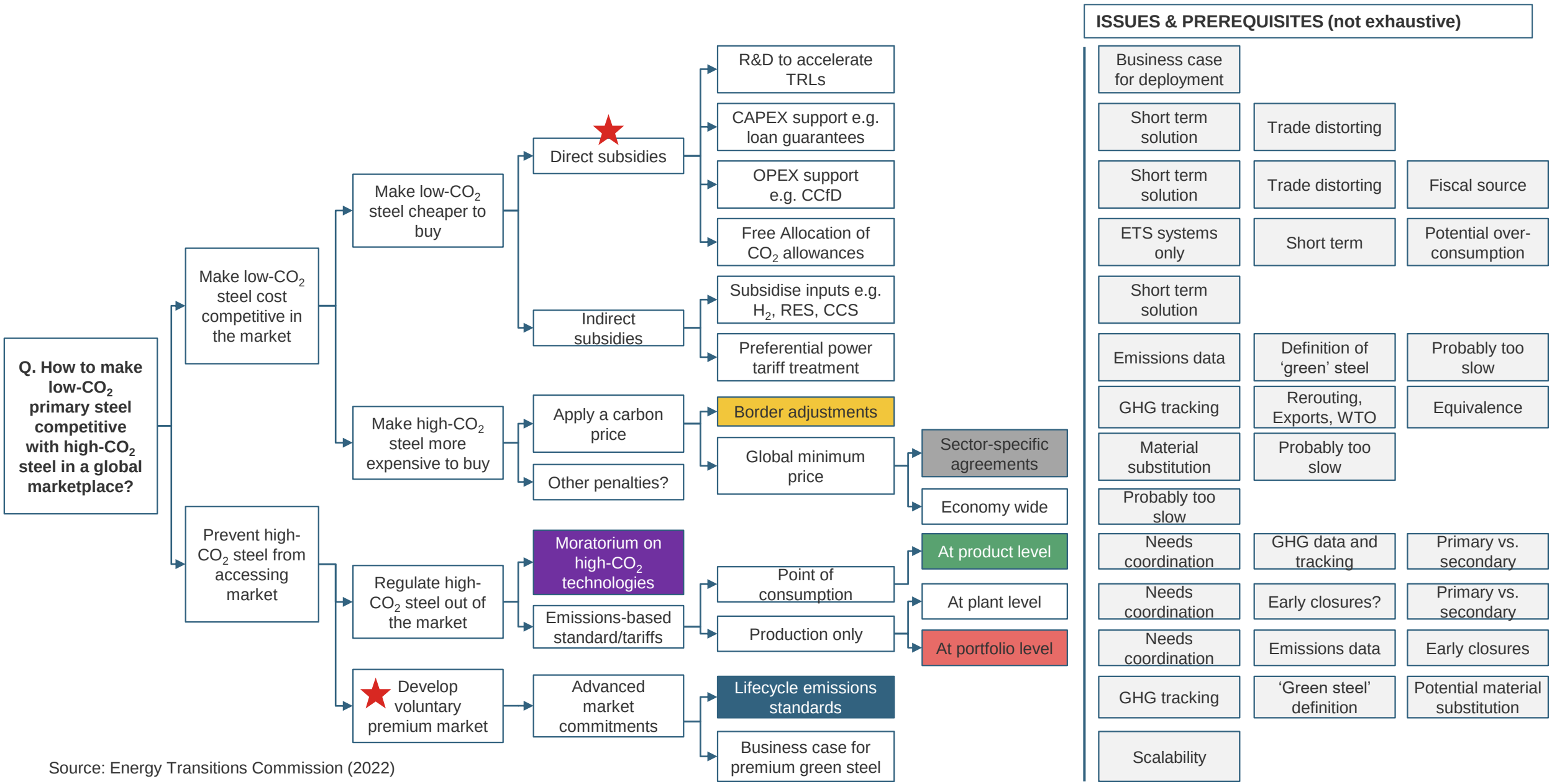
Energy Transitions Commission

Financing Clean Energy Demonstrations

Alasdair Graham, Head of Industry Decarbonisation,
Energy Transitions Commission

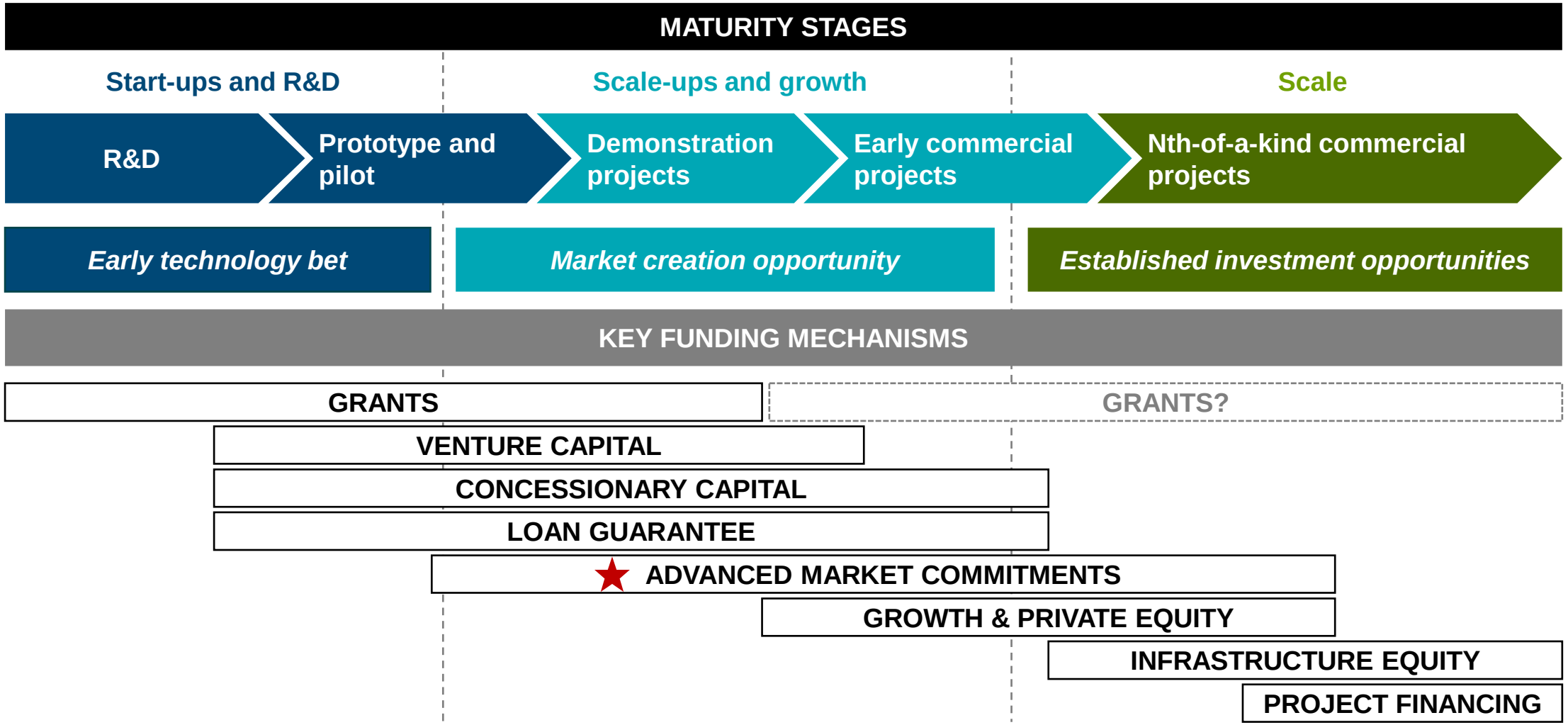
30th October 2023

The policy options for systematically decarbonising steel



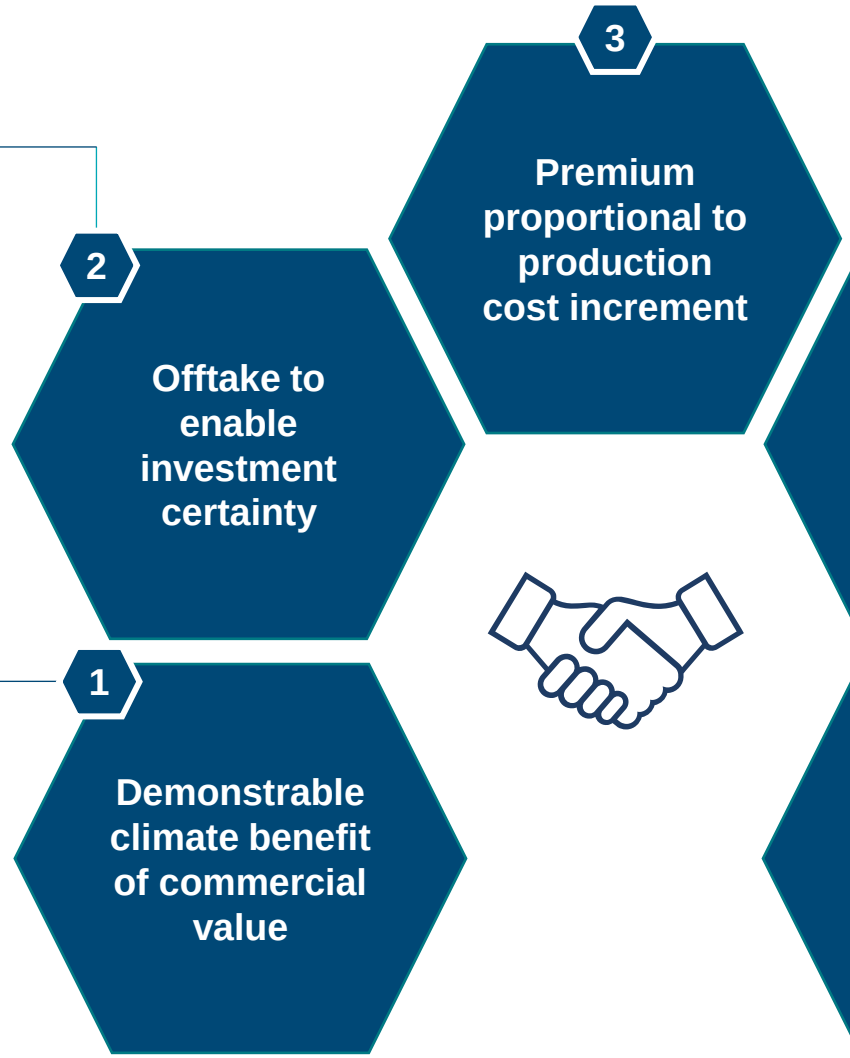
Source: Energy Transitions Commission (2022)

Tailoring financial solutions from early R&D efforts to commercial-scale projects



Source: Adapted from Breakthrough Energy (2023)

Five design parameters for efficient advanced market commitments for steel



A premium will be needed as low-CO_2 steel is a premium product with higher cost but also higher value to the consumer

To reach sufficient revenue certainty to enable a final investment decision and be attractive for the demand side, both scale and timing needs to be considered in the agreement to create sufficient demand certainty

The premium will need to be adjusted depending on policy development and likely support

A definition of low-CO_2 steel must be made that brings sufficient clarity to supplier, buyer and end consumer.

The agreement should define whether the transaction will imply physical delivery of be dematerialized.

Source: Energy Transitions Commission (2021)

Industry Perspectives

Brad Davey

Executive Vice President – Head of Corporate Business Optimization

ArcelorMittal

Smarter steels for people and planet

Brad Davey, Executive Vice President and Head of Corporate Business Optimisation

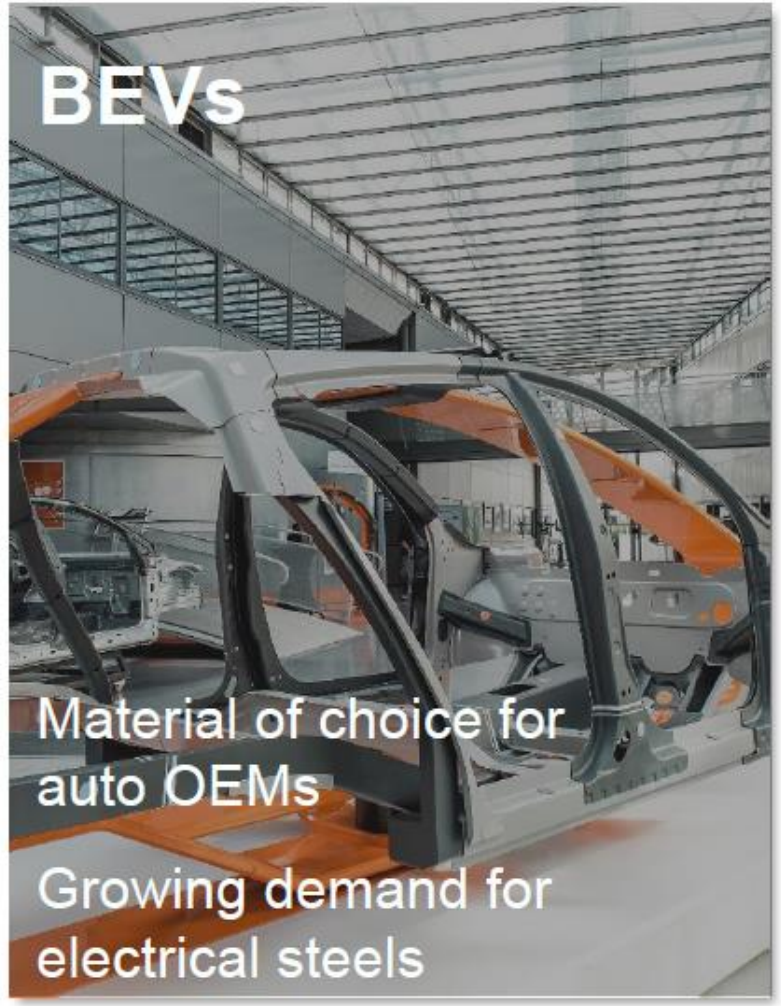
Mission Innovation Financing Masterclass
30 October 2023

The sustainable credentials of steel

The perfect material for a low-carbon, circular economy

- Infinitely recyclable without quality loss
- Recycling rates of c. 90 per cent
- Lower carbon footprint than competing materials

A key enabler in the decarbonisation of other sectors and a pivotal material for the energy transition



ArcelorMittal

Steel's carbon challenge

1.9bn

Tonnes of steel produced last year, with forecasts indicating that figure will grow to 2.5 billion by 2050

One of the most prolifically used materials in the world…
meaning our industry accounts for c. 7 per cent of global GHG emissions

Circularity will be achieved near the end of this century. Scrap steel is the input for 30% of steelmaking today and forecast to be 50% by 2050

Primary steelmaking (from iron ore) is a hard to abate process


Leading the decarbonization
of the steel industry
2050 NET ZERO

Our strategy

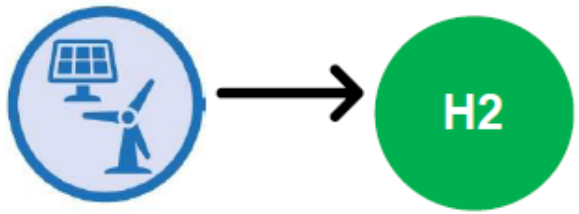
Steel will be made in different ways in different parts of the world

- **Circularity will be maximized**. ArcelorMittal is the global capacity leader in EAF and we will also lead in Primary Steelmaking decarbonization
- Broadest suite of decarbonization technologies
- Right technology in the right region at the right time
- All pathways to support net zero

Smart Carbon

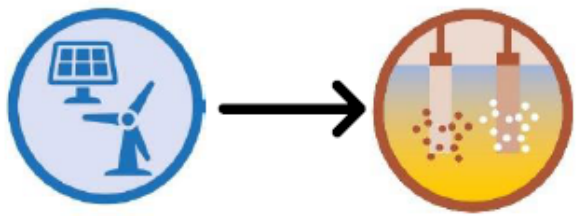
Modifies the BF-BOF route to take advantage of gas injection/recirculation, bioenergy, and CCU/S

Innovative DRI



Uses clean electricity to produce green hydrogen (via electrolysis of water) for the production of DRI

Direct electrolysis



Uses clean electricity to power the direct electrolysis of iron ore

In 2050, annual global steel demand is expected to exceed 2.5 billion tonnes, c. 50% of which will be produced with scrap / recycled steel

ArcelorMittal

Taking action: Testing and trialing technology

Torero: converting waste wood or end of life plastics to bio-coal

Steelanol: Capturing carbon rich waste gases and transforming them into ethanol

Carbon capture technologies: Several pilots underway to reduce cost of carbon capture and waste gas recycling

Successfully tested the partial use of green hydrogen at DRI plant in Quebec, Canada

Hamburg H2: Testing the ability of hydrogen to reduce iron ore and produce DRI on an industrial scale

Volteron™: Targeting world's first low-temperature iron electrolysis plant by 2027

ArcelorMittal

Taking action: Evolving our asset base, investing in renewables, and developing the green steel markets

Securing the metallics required for low-emissions steelmaking

Four scrap recycling businesses acquired in past 18 months

Securing the metallics required for low-emissions steelmaking

Acquisition of state-of-the-art HBI plant in Corpus Christi, Texas

Transitioning our asset base

Plans announced to transition to DRI-EAF steelmaking at several locations in Europe and Canada

Investing in renewable energy sources

Renewable energy projects in India, Brazil, Argentina and South Africa - total 1.9GW.

ArcelorMittal was the leader in the launching of lower carbon steel products under our Xcarb brand and we continue to grow the offerings

ArcelorMittal

Accelerating our industry's transition: the catalytic role policy can play

Policy needed to ensure that low-carbon emissions steelmaking is as competitive as higher carbon-emissions steel:

1. Measures to incentivise the transition to low and zero carbon-emissions steelmaking
2. A fair competitive landscape that accounts for the global nature of the steel market, ensuring domestic production, import and exports are subject to equivalent GHG reduction regulations
3. Financial support to innovate and make long-term investments and neutralise the higher operating costs of low and zero carbon-emissions steelmaking
4. Access to sufficient clean energies at affordable price level
5. Incentives to encourage the consumption of low and zero carbon-emissions steel over higher carbon-emissions steel


Committed to advancing our climate action agenda
Developing and deploying our industry's broadest suite of decarbonisation technologies
Investing to transform our asset base
Supporting our customers' decarbonization journeys and developing the green steel markets
Vocal advocate on initiatives that can support our industry's transition

Thank you

ArcelorMittal

Smarter steels for people and planet

Industry Perspectives

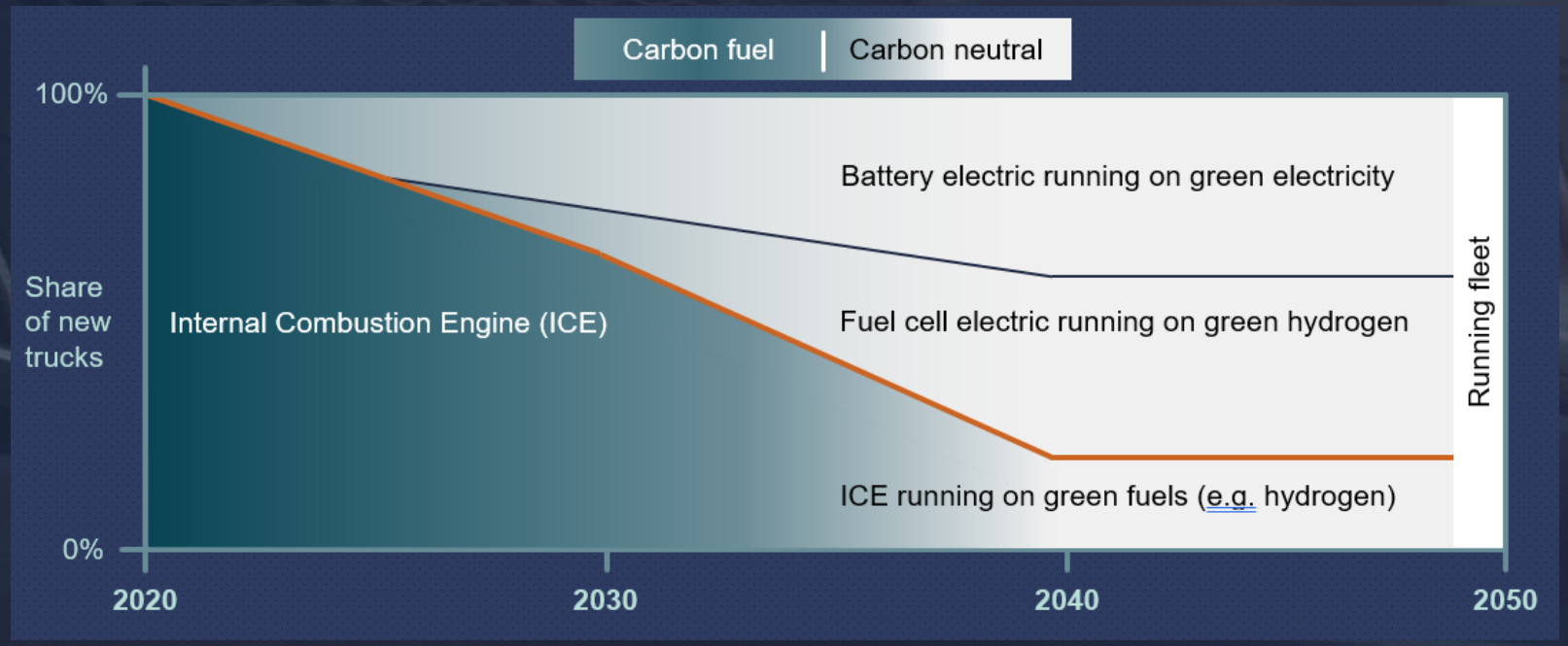
Niklas Gustafsson

Head, Public Policy and Regulatory Affairs

Volvo Group

VOLVO

100% fossil free Volvo Group vehicles 2040



VOLVO

First Movers Coalition

Steel Aluminum Trucking

Energy Transitions Commission

Zero

emission transport =

- Vehicles
- Infrastructure
- Green energy
- Business case

Country Perspective

Timo Bollerhey

Chief Executive Officer

HINT.CO GmbH

Shaping the global **energy transition.**

H2Global | Idea, Instrument and Intention

Oktober 2023

H2Global

H2Global — an innovative instrument to promote a timely and effective technology and market ramp-up of clean hydrogen and its derivatives

Key elements

Bridging

Creating business cases and investment security.

Shifting the timing of market creation by promoting the market ramp-up until a viable low-carbon market has developed.

Defined System

Long-term purchase agreements over 10 years.

Clear definition of max. funding volume, products, geography and (sustainability) criteria by funding body.

Contracts for Difference

Financial compensation in analogy to CfD mechanism.

Set up of an intermediary — the **H**ydrogen **Int**ermediary **Co**mpany.

Hintco

Competition-based

Double-auction: Market-based bidding procedures on the supply and demand side.

Minimization of the price difference to be compensated by funds.

H2Global

H2Global's catalytic effect shifts market creation forward allowing early market opening

H2Global **bridges** the **gap between supply** and **demand**

Immediate creation of **simulated market** on **supply** and **demand side**

Exemplary illustration of the market development

H2Global

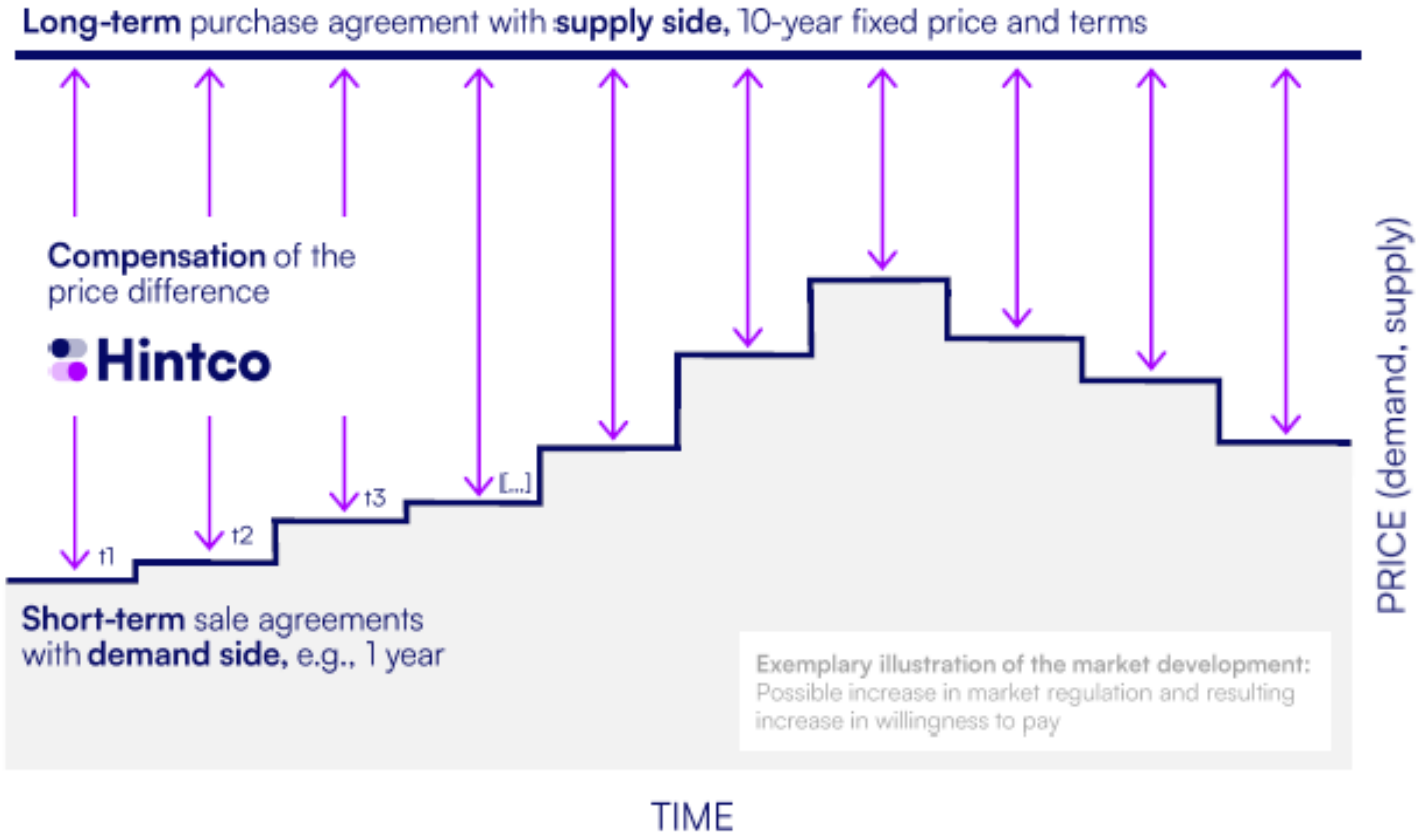
Competition-based auctions for the purchase and resale of clean hydrogen and its derivatives through the intermediary Hintco

H2Global

Unlocking the economic puzzle of sustainable hydrogen with the H2Global market-driven compensation mechanism

H2Global auctions **uncover supplier** and **offtake pricing dynamics**

Short-term and broad-based **price signals** are crucial to create **liquidity** and support market development.



H2Global

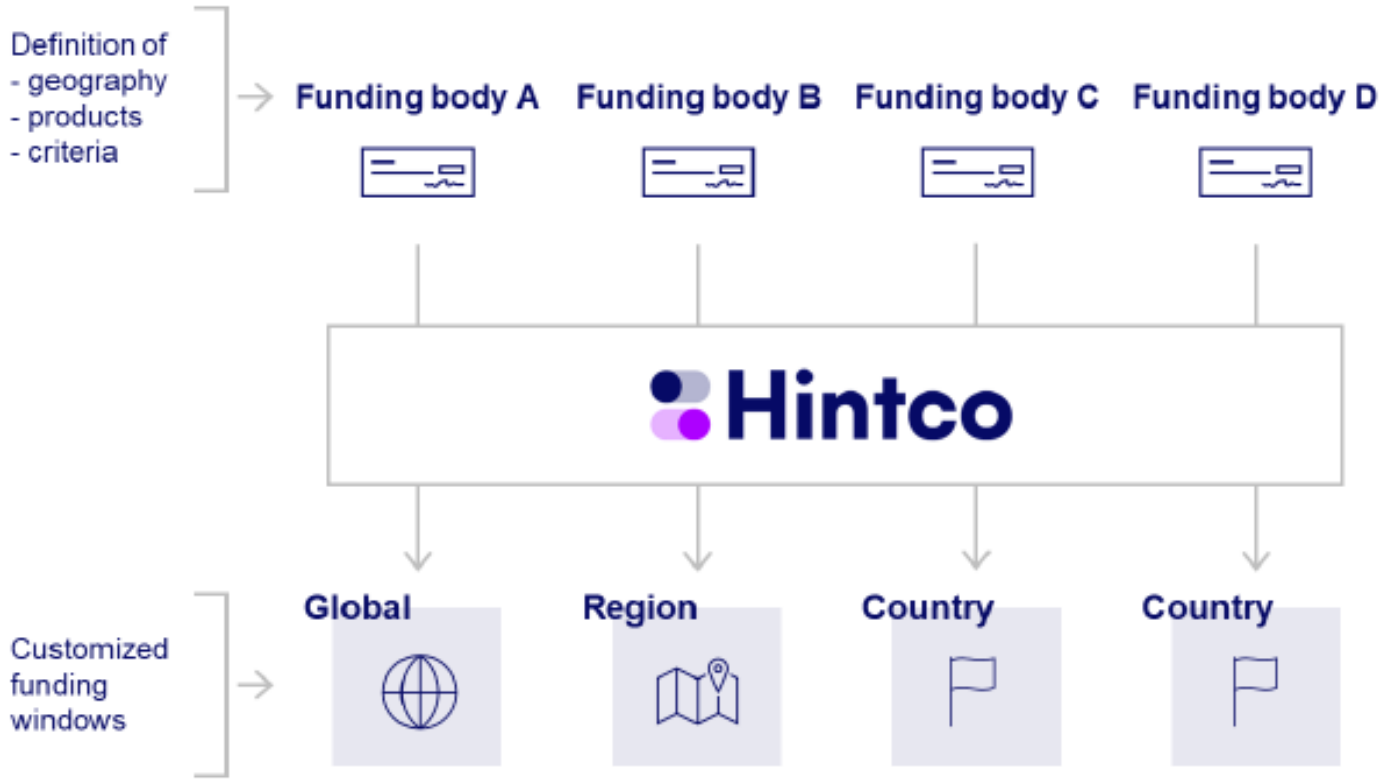
The flexible instrument empowers governments to shape the global hydrogen market through customized funding windows

Customized regarding:

- Geography (global, regions, countries)
- H2 product selection
- Product and sustainability criteria

Adaptable to targets:

- Price optimization
- Promotion of green technology
- Energy policy
- Decarbonization of specific sectors
- Development policy



H2Global

The first BMWK grant of 900 million euros showcases the modular system for tailored financing

Geography*

- Competition-based purchasing beyond EU and EFTA; delivery to Belgium, Netherlands or Germany.
- Competition-based sale to German and European companies; awarded to the highest bidder.

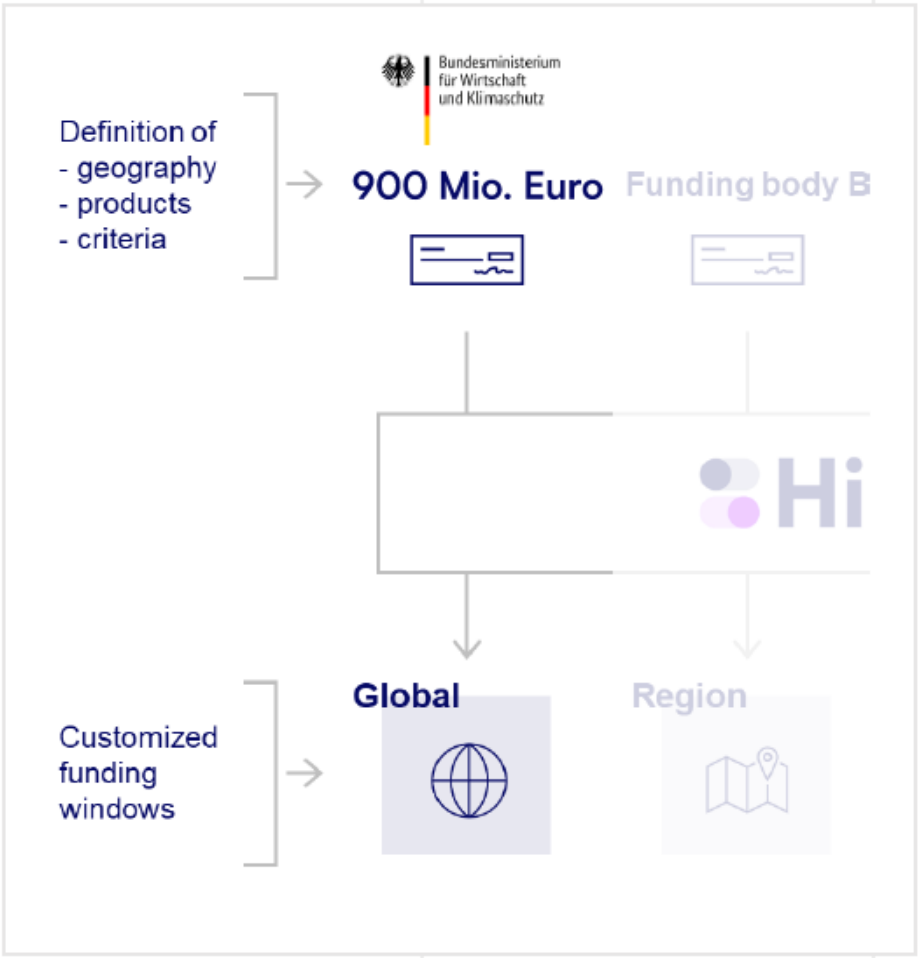
Products produced based on renewable H2*

- Ammonia
- Methanol
- e-SAF

Criteria*

- Electricity from renewable sources must be used for production.
- Criteria for renewability of electricity and greenhouse gas balancing are oriented towards REDII, resp. DAs.

*Incomplete information. All details are without guarantee. Details, see:
a) Zuwendung aus dem Bundeshaushalt, Einzelplan 09, Kapitel 0904, Titel 896 02
b) Anlage 2: Weitere Nebenbestimmungen und Hinweise



H2Global

The non-profit foundation effectively enables this public-private initiative, which is constantly evolving and adapting to market developments

H2Global Stiftung

The Donors' Conference elects →

Board of Trustees

Private Sector elects 13 Members

Funding Bodies send 7 Members

appoints, monitors ↓ ↕ advises, supports

Executive Board

H2Global Foundation holds 100% ownership of HINT.CO GmbH →

Hintco

← Stimulus Package 2021 **0.9 billion EUR** — Bundesministerium für Wirtschaft und Klimaschutz

← Federal budget 2023 **3.53 billion EUR** — Die Bundesregierung

H2Global

Follow us on LinkedIn

@H2Global Foundation

@HINT.CO GmbH

Markus Exenberger
H2Global Stiftung
Executive Director
Chair of the Executive Board
Trostbrücke 1
20457 Hamburg
+49 40 36197 500
markus.exenberger@h2-global.org

Susana Moreira, PhD
H2Global Stiftung
Executive Director
Co-Chair of the Executive Board
Trostbrücke 1
20457 Hamburg
+49 40 36197 500
susana.moreira@h2-global.org

Timo Bollerhey
HINT.CO GmbH
Chief Executive Officer
H2Global Lead Strategist
Trostbrücke 1
20457 Hamburg
+49 40 36197 500
timo.bollerhey@h2-global.org

H2Global

Moderated Discussion and Q&A

Leslie Biddle
U.S. DOE
Moderator

Nancy Gillis
First Movers Coalition

Brad Davey
ArcelorMittal

Timo Bollerhey
HINT.CO GmbH

Alasdair Graham
Energy Transitions Commission

Niklas Gustafsson
Volvo Group

Audience Questions

- Please **signal in the meeting chat** any questions and identify the speaker the question is for.
- Once called upon by the Moderator, please unmute and ask your question

MI INSIGHTS

E: secretariat@mission-innovation.net

T: +44 (0)000 002233

W: www.mission-innovation.net