

## Think Tank Report – Mission Innovation Financing Masterclass Financing Clean Energy Demonstrations Dialogue Series

### Executive Summary and Key Takeaways

As Mission Innovation members launch new clean energy demonstration projects, financing to de-risk and scale-up these emerging technologies is critical. To bring together expert voices on this topic with interested MI member governments – **Mission Innovation** and the **United States Department of Energy** hosted an MI Financing Masterclass – the first MI Think Tank event. During the event, guest speakers from the Australian Government, U.S. Department of Energy, First Movers Coalition, Energy Transitions Commission, ArcelorMittal, Volvo Group, and HINT.CO GmbH shared their perspectives. MI will continue to explore opportunities to support knowledge exchange on financing emerging clean energy technologies, recognizing its cross-cutting importance to the work of MI and its members. MI's facilitating of these discussions through the Think Tank will contribute to continued best-practice sharing and the scaling-up of financing mechanisms to de-risk clean energy demonstration projects globally.

#### **Key takeaways from the Financing Masterclass:**

- Public sector investments from MI Member Governments must stimulate significant private sector follow-on investments. The public sector cannot fund the energy transition alone.
- Early demand signals are critical to scale-up emerging technologies across hard-to-abate sectors. The First Movers Coalition is pulling together this demand signal from 85 top global corporations and non-profits – working across many sectors of interest to MI's Missions and other work programmes.
- Tailored financial solutions are needed at different stages of a project's maturity level, recognizing that risk exposure and cost of capital are reduced as projects scale.
- Corporates are taking steps to support innovative technologies and approaches, including in hard-to-abate sectors. Government policy that can provide increased certainty and security can help to accelerate these actions.
- Innovative financial approaches to stimulate both the demand and supply side in support of technology and market ramp-up are being deployed today in key sectors (e.g. hydrogen). Continued testing of these instruments and knowledge sharing of best practices will support the effectiveness and scale-up of these mechanisms globally.

Resulting from the Financing Masterclass, this first **Think Tank Report** provides a record of discussion and a lasting document to support knowledge sharing and dissemination among the MI and broader clean energy communities on this topic.

## Context

On October 30, 2023, **Mission Innovation** and the **United States Department of Energy’s Office of Clean Energy Demonstrations** convened an MI Financing Masterclass - bringing together experts



working to de-risk early-stage clean energy projects with policymakers designing funding programs that leverage mechanisms to reduce the risk for both producers and consumers of low carbon technologies. As MI member countries continue to deploy demonstration projects, improving understanding of the mechanisms that can de-risk project finance for emerging technologies will be critical to continue to scale-up these investments.

*The **MI Think Tank** was launched in July 2023 to supercharge knowledge sharing and dissemination on high-impact clean energy RD&D topics among the MI Community and beyond. Through member-driven workshops and events, the Think Tank accelerates collaboration and best-practice exchange between the MI Community and partners on cross-cutting issues.*

*Recognizing the cross-cutting relevance of the financing topic to MI’s work – the Financing Masterclass is the first MI Think Tank event.*

## Event Overview

The Financing Masterclass brought together perspectives from international associations, industry, and MI Members. Guest speakers included:

- Peta Olesen – Director, International Climate and Energy – Australian Department of Climate Change, Energy, the Environment and Water
- Leslie Biddle – Senior Advisor to the Undersecretary for Infrastructure, United States Department of Energy
- Nancy Gillis – Programme Head, Climate Action and First Movers Coalition, World Economic Forum
- Alasdair Graham – Head of Industry Decarbonization – Mission Possible Partnership, Energy Transitions Commission
- Brad Davey – Executive Vice President – Head of Corporate Business Optimization, ArcelorMittal
- Niklas Gustafsson – Head, Public Policy and Regulatory Affairs, Volvo Group
- Timo Bollerhey – Chief Executive Officer, HINT.CO GmbH

The Financing Masterclass had two parts, presentations from expert speakers and an open discussion period where speakers took questions from attending MI member representatives.

## Event Summary

Following an introduction by Peta Olesen, Australia’s Senior Representative to MI, Leslie Biddle,

***“We need a step change in capital investment (\$10 trillion) by 2050 to reach net-zero. Each Dollar or Euro or Pound we spend must stimulate many times that in private sector follow-on. The public sector cannot fund the energy transition alone.”***

- Leslie Biddle, Senior Advisor to the Undersecretary of Infrastructure, U.S. DOE

Senior Advisor to the Undersecretary for Infrastructure at the U.S. DOE provided keynote remarks, situating the topic of financing clean energy demonstrations and the importance of international collaboration – in the context of recent U.S. policies and investments, including those related to the Inflation Reduction Act, and the DOE’s recent \$8 billion Hydrogen Hubs investment. The need to match high level pledges with real investments and to ensure public sector investments spur significant private sector follow-on was emphasized.

Nancy Gillis shared her perspectives from the **First Movers Coalition** (FMC) – the only buyers club to scale emerging technologies across hard-to-abate sectors through early demand signals. Nancy highlighted that when investments and government support increases – aggregate demand follows. The FMC is supporting the scaling of technologies from the demonstration phase into early deployment. Nearly all the sectors covered by the FMC are also in scope of MI’s Missions and initiatives. To date, FMC has driven 111 total demand commitments from 85 members from top global corporations and non-profit organizations, resulting in \$15B in demand for near-zero-emission products, supported by 13 government partners representing over 50% of global GDP. FMC is delivering complementary initiatives to recruit demand, surface supply, streamline procurement, and build an enabling ecosystem to help its members achieve offtake. Finally, Nancy highlighted two FMC global challenges – in the aviation and steel sectors – designed to lead to procurement opportunities.

**Sectors in scope of the First Movers Coalition include:**

- Aviation
- Steel
- Shipping
- Trucking
- Aluminum
- Carbon Removal
- Cement / Concrete
- Chemicals (yet to be launched)

Alasdair Graham, Head of Industry Decarbonization at the **Energy Transitions Commission** (ETC) shared the ETC’s perspective on financing clean energy demonstrations – with specific attention to the steel sector. Alasdair highlighted the policy options for systematically decarbonizing steel, noting direct subsidies with CAPEX and OPEX support (e.g. through loan guarantees and carbon contracts for difference, respectively). Alasdair also highlighted approaches to developing a voluntary premium market, recognizing that lifecycle emissions standards and a business case for premium green steel are critical. Depending on the maturity of a project, Alasdair highlighted the need for tailored financial solutions – rather than a one-size-fits-all approach. This outline of tailored mechanisms is highlighted in Figure 1. Alasdair

highlighted 5 key parameters to make one such financial mechanism - advanced market commitments (marked with a red star in Figure 1) - efficient in the steel sector:

- 1) Demonstratable climate benefit of commercial value. For example, a clear and accepted definition of low-carbon steel.
- 2) Offtake to enable investment certainty.
- 3) Premium proportional to production cost increment – on both sides. While low-carbon steel is produced at a higher cost, it is also of higher value to buyers.
- 4) Optionality to handle uncertainty – the premium will need to be adjusted as conditions change.
- 5) Nature of the Transaction (i.e. a dematerialized or physical transaction).

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

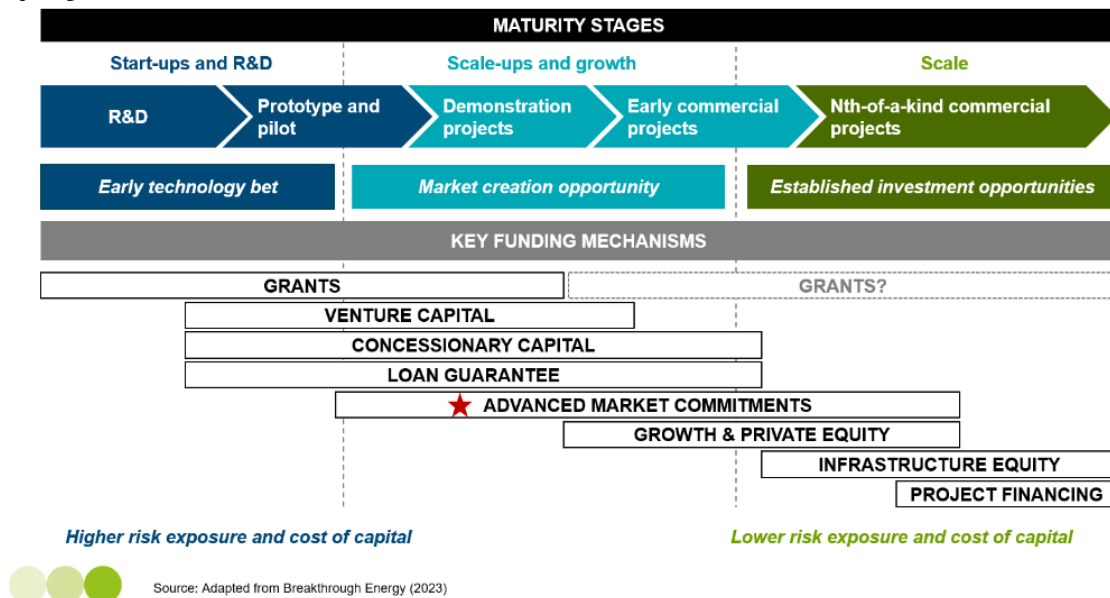


Figure 1 - Tailored Financial Mechanisms Across a Project's Maturity (Energy Transitions Commission)

Brad Davey, Executive Vice President and Head of Corporate Business Optimization at **ArcelorMittal**, highlighted the company's decarbonization priorities. Brad emphasized that steel is a key enabler of decarbonization in other sectors (e.g. renewable energy, battery electric vehicles, and low-carbon buildings) as a material input. Steel's popularity has created a carbon challenge, accounting for ~7% of global GHG emissions and with the market expected to grow to 2.5 billion tonnes produced by 2050. However, there will be opportunities to maximize steel's circularity – recognizing that primary steelmaking is a hard-to-abate process. Smart carbon approaches through injection/recirculation, bioenergy and CCUS; innovative direct reduced iron (DRI) through hydrogen, and direct electrolysis are all being trialed to support the company's decarbonization. Brad noted that steel will be produced differently in different parts

of the world, and that the right technologies should be used in the right region, at the right time. To accelerate the sector’s transition – governments have an important role to play to incentivize low and zero-carbon steelmaking, including through creating a fair competitive landscape, providing financial supports to innovate, and making long-term investments that can neutralize higher operating costs of low and zero carbon steelmaking.

From the transportation sector, Niklas Gustafsson – Head of Public Policy and Regulatory Affairs at the **Volvo Group** – shared his perspective. The Volvo Group is aiming for 100% fossil free vehicles by 2040. During their transition, Volvo sees their fleet running a mix of battery electric vehicles fueled by clean electricity, fuel cell electric vehicles running on green hydrogen, and internal combustion engine (ICE) vehicles running on green fuels, including hydrogen. This transition to carbon neutral transportation is highlighted in Figure 2. While Volvo sees a future for ICE vehicles, it will be critical to make them greener. Volvo is making commitments – including for Steel, Aluminum, and Trucking as a part of the First Movers Coalition. To achieve zero emission transport – vehicles, infrastructure, green energy, and the business case must all play a role.

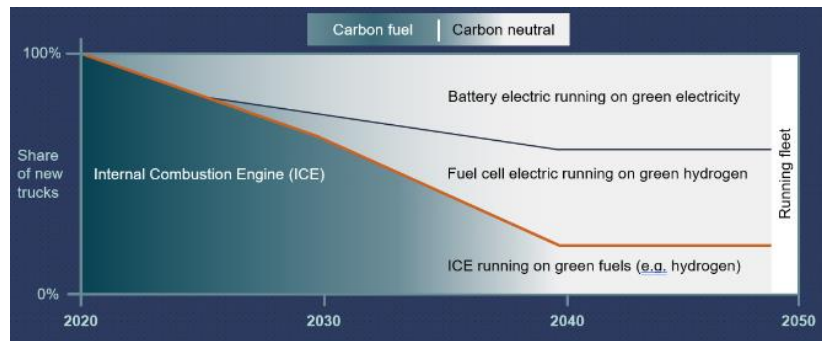


Figure 2 - Volvo Group's Transition 2020-2050

While Volvo sees a future for ICE vehicles, it will be critical to make them greener. Volvo is making commitments – including for Steel, Aluminum, and Trucking as a part of the First Movers Coalition. To achieve zero emission transport – vehicles, infrastructure, green energy, and the business case must all play a role.

Timo Bollerhey, the CEO of Germany’s **HINT.CO** (Hintco), provided the final presentation. Hintco is the implementing entity of H2Global – an innovative instrument to promote timely and effective technology and market ramp-up of clean hydrogen and its derivatives. H2Global is

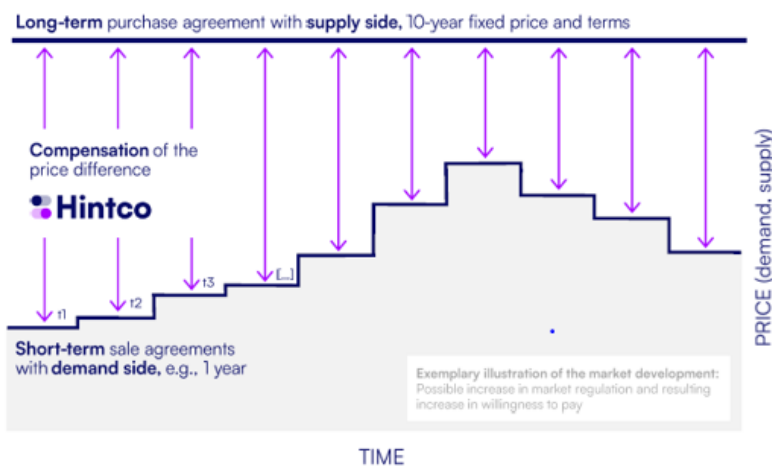


Figure 3 - Hintco's Short-term and Broad-Based Price Signals

working to bridge the gap between hydrogen demand and supply, creating a stimulated market on both sides. H2Global provides a defined system, with long-term purchase agreements over 10 years, and has set up an intermediary – Hintco – to provide Contracts for Difference. H2Global is also competition based through a “double-auction” approach – creating market-based

bidding procedures on the supply and demand side. Hintco's long-term purchase agreements (10-year fixed price and terms) with the supply side, coupled with short-term sale agreements (e.g. 1 year) with the demand side and annual auctions will help close the gap between supply and demand, create liquidity, and support hydrogen market development. This mix of short-term and broad-based price signals is illustrated in Figure 3. Hintco's flexibility empowers governments to shape the global hydrogen market through a customized funding windows – and is looking globally (including in Asia and Africa) to generate supply. Timo highlighted the 900 million euro grant to Hintco from Germany's Federal Ministry of Economic Affairs and Climate Action as an example of the approach. First, definitions and criteria were set, and the bidding process for products produced based on renewable hydrogen (e.g. Ammonia, Methanol, e-SAF) is beginning. Hintco is fully owned by the H2 Global Foundation, and can be protected from interference, allowing Hintco independence to evolve and adapt to market developments.

## Discussion

Following presentations, Leslie Biddle moderated a discussion period, where speakers took questions from the audience.

Two major gaps were highlighted– financing technologies across the “valley of death” and decarbonizing hard-to-abate sectors. The speakers were asked which of these they see as the greatest priority. ArcelorMittal's Brad Davey noted that there is no difference between these – and that with enough support and security, there is pathway to decarbonization. However, inconsistencies globally in policy and regulatory environments are a challenge for industry. Niklas Gustafsson noted that speed is critical at this stage of the transition. While the financial incentives for these challenges can be very different – so long as we use the tools available to get it done is all that matters. Alasdair Graham also highlighted the important role that regulatory certainty to help narrow down investment decisions.

Speakers were then asked their views on how to ensure the sustainability and eventual commercialization of technologies that are successfully demonstrated, considering that financing mechanisms may change as projects mature. Niklas Gustafsson noted that de-risking is critical, and that regulatory certainty in the context of systems transitions is important. The systems transition in Europe for example, is heavily regulated on the O&M side, but this can't happen if the business case and demand are not met. Leslie Biddle noted that the U.S. DOE is taking on these transition risks head-on, leveraging grant programs to de-risk projects at this stage and take on costs. Brad Davey noted that all levels of government are acting – but that up-front incentives will be needed to get projects off the ground. Timo Bollerhey highlighted that OPEX and CAPEX funding is a balance that Hintco is also trying to achieve. There is a need to invest in CAPEX up front to get security for hydrogen investments.

To close the discussion, Niklas Gustafsson was asked how Volvo is working to enhance the cost-effectiveness and efficiency of green hydrogen fuel cell technology for electric vehicles. Niklas emphasized that Volvo does not have all the answers – and that there is no single “silver bullet” technology for the transportation sector’s transition. A system transition for green hydrogen has been expensive, but if the hydrogen market can scale-up, the transport sector will be around 10% of the hydrogen transition. As such, cross-sectoral collaboration is key.

### MI and Financing Demonstrations

MI Member governments are continuing to make investments into critical demonstration projects needed to achieve collective net-zero goals. As of the 8<sup>th</sup> MI Ministerial in July 2023, more than \$33 billion has been allocated towards clean energy demonstration projects by the 16 countries (including 14 MI Members) that committed to the \$94 billion Clean Energy Technologies Demonstration Challenge. In addition, MI’s Seven Missions are continuing to advance collaboration on clean energy demonstration projects globally, in their respective sectors – shipping, hydrogen, power, biorefineries, industry, carbon dioxide removal, and urban transitions. As these demonstrations advance globally, many of the financing mechanisms discussed by speakers at the Financing Masterclass – from advanced market commitments to contracts for difference – will play an important role in de-risking emerging technologies through the demonstration stage on a pathway to broader deployment.

### Learn More

- [Mission Innovation](#)
- [U.S. DOE Office of Clean Energy Demonstrations.](#)
- [International Energy Agency – Clean Energy Demonstrations Database](#)