

Mission Innovation Public-Private Breakfast: “Investing in Transformative Change” Discussion Paper on Public-Private Co-Investment in Clean Energy Innovation

1.0 THE CASE FOR CO-INVESTMENT

The Problem

Despite progress to-date, observers – including the International Energy Agency (IEA),¹ the Intergovernmental Panel on Climate Change (IPCC),² and the World Economic Forum (WEF)³ – have noted that the pace and scale of technological change and investment in clean energy need to go further faster in order to support the clean energy transition and provide affordable energy access to all.

Clean energy technologies and solutions can address environmental and economic priorities; however, clean energy innovators are often confronted by financing gaps and regulatory barriers at key points in the innovation cycle.⁴ Although innovators in any sector may struggle to attract financing during this long transition from early concept to commercialization, these challenges are especially acute in the clean energy sphere, where energy systems are complex, capital intensive, and, at times, prone to slow and incremental change.⁵ Moreover, clean energy innovators often have high capital requirements that involve long time horizons to fully reach market potential.⁶

Innovative strategies and programs are necessary to lower risks for investment in clean energy solutions – from early stage of development to project finance.

The Opportunity

Leveraging the respective expertise of the public and private sectors can enable governments and business leaders to unlock investment and to move innovations from lab to market in an accelerated manner.

Through strategic partnerships, governments can contribute technical expertise, de-risk unproven clean energy technologies, prompt action to revise regulations, and leverage their networks to crowd in private investment. Meanwhile, private investors can channel financial resources toward new technologies and lend business expertise to help bring innovative concepts to domestic and global markets.

¹ The IEA concluded in its 2018 World Energy Outlook that the global transition to clean energy is not occurring fast enough to hold global warming to 2°C. (International Energy Agency, 2018).

² The IPCC issued an urgent call to action with its Special Report on 1.5 Degrees. (Intergovernmental Panel on Climate Change, 2018).

³ WEF’s white paper on “Accelerating Sustainable Energy Innovation” highlighted that a number of barriers to innovation remain, making it difficult for innovators to develop and scale-up solutions at the pace required. (World Economic Forum, 2018).

⁴ Early in the innovation cycle, public funding often supports research and development. Later in the process, private investors are well-positioned to finance proven, cost-competitive solutions. However, between the demonstration and commercialization phases of technology development exists the so-called “Valley of Death,” where governments may lack the resources and expertise to help turn an idea into a scalable product, while private investors may be deterred by significant market risks. At the demonstration and commercialization phases, regulatory barriers may also impede access to markets.

⁵ IHS Markit and Energy Futures Initiative, 2019; and Adams et al., 2016.

⁶ Smart Prosperity Leaders’ Initiative, 2018.

Ultimately, not only does co-investment help to attract private investment in energy innovation by decreasing market, technology, and policy risks, it also helps governments to orient funding toward technologies and solutions with the greatest market potential.

2.0 EXAMPLES OF CO-INVESTMENT MODELS

Public-private co-investment can take a number of different forms, including co-funding models, tax incentives, technology de-risking programs, loan programs, and green bank technology carve outs. The adoption of various models will depend on what is politically, legally, financially, and structurally feasible. While not exhaustive, this section focuses predominantly on co-funding models (e.g. matching funds, fund of funds, joint challenges/prizes, and international joint funds) and highlights some of the innovative ways that the public and private sectors can jointly invest in clean energy innovation.

2.1 Matching Fund

These arrangements match private financing with government funds (or vice versa). Under a matching fund, investors can benefit from government technical expertise and a strong pipeline of de-risked technologies. Meanwhile governments can benefit from follow-on investments for the emerging clean energy innovators they have supported in early stages of development. Together, these efforts can shorten the cycle for developing new clean energy technologies and bringing them to market, and increase total investment going into the clean energy sector.

Example: Breakthrough Energy Ventures Europe (BEV-E)

BEV-E is a pilot investment fund that pools €50 million in funding from the European Commission (EC) (via InnovFin) with €50 million from Breakthrough Energy Ventures (BEV).⁷ The EC's and BEV's contributions will capitalize an independent fund manager who will deploy equity financing to innovative European companies that reduce greenhouse gas emissions in five areas: electricity, transportation, agriculture, manufacturing, and buildings. BEV and the EC formed this strategic partnership in order to provide clean energy entrepreneurs with greater access to risk-tolerant financing – facilitating the low-carbon energy transition with patient capital.

2.2 Fund of Funds

This model pools public and private capital in a fund of funds – in other words, as the name suggests, fund of funds provide financing to other clean energy funds, rather than investing in clean energy projects directly. In doing so, the fund-of-funds structure is catalytic, helping to crowd in further investment from the private sector and raise the total amount of investments targeting a particular area.⁸

Example: European Angels Fund (EAF)

The EAF is administered by the European Investment Fund (EIF), which is part of the European Investment Bank group. The EAF provides equity to business angels and other non-institutional

⁷ European Commission, 2018.

⁸ Monk and Provaggi, 2013.

investors, thereby increasing their capacity to invest in innovative companies in Europe. Under the EAF model, business angels benefit from lean administrative processes, including the use of long-term contractual agreements between the EIF and business angels, rather than structuring co-investment on “a deal-by-deal basis.” Business angels are also given considerable freedom when making decisions and managing their investments.⁹ While the EAF and EIF do not have a carved-out budget for the clean energy sector, the EAF could be an interesting tool to unlock investments in this space.

2.3 Joint Challenge/Prize

Joint challenges combine public and private resources to incentivize solutions to a specific problem, with challenge winners earning a prize. Prizes can be issued in one of two ways: (1) as a “pure prize,” with winnings issued at the end of the competition (i.e. pay-for-results format), or (2) as a “grant/incubator hybrid,” with the prize giver lending technical and business support to innovators throughout the development process. Challenges can raise the profile of participating innovators, lending credibility to winning ideas and generating additional private sector interest. Not only are prizes an innovative way to target an ambitious goal, but they may also help to crowd in private sector investment greater than the initial prize value.¹⁰ It is important to note, however, that challenges need a clear strategy for measuring results and judging competitors. Challenges also need clear objectives, supporting expertise, and a sufficiently sized prize to motivate innovators to participate.¹¹

Example: NRG COSIA Carbon XPRIZE

The NRG COSIA Carbon XPRIZE is a global competition with a prize of US \$20 million that seeks to accelerate breakthrough technologies that convert CO₂ into marketable products (e.g. building materials, fuels, chemicals, and plastics).¹² The Carbon XPRIZE features collaboration between the public sector, the XPRIZE Foundation, industry associations, and private companies. Notably, the public sector provides funding for demonstration facilities, addressing a common problem that innovators encounter: a lack of available testing facilities to demonstrate their products.¹³

2.4 International Joint Fund

International joint funds pool funding from a variety of sources, including governments, multilateral organizations, foundations, climate funds, development banks, and institutional investors. These funds often focus on catalyzing private investment for clean energy in developing countries and emerging economies – though, so far, these funds tend to focus on clean energy *deployment* and are not extensively used in the realm of clean energy *innovation*. International joint funds may use different mechanisms for encouraging investment in projects, including direct equity and debt financing as well as indirect support (e.g. guarantees or insurance).¹⁴ These funds seek to lessen political and technical risk for private investors. They can also amalgamate technical expertise from different countries.

⁹ European Investment Fund, 2018.

¹⁰ Ballantyne, 2014; and GCCollab

¹¹ Ballantyne, 2014

¹² XPRIZE Foundation, 2018.

¹³ IHS Markit and Energy Futures Initiative, 2019.

¹⁴ Tonkonogy et al., 2018.

Example: Global Sustainable Energy Innovation Fund (SEIF)

Led by the World Economic Forum and KPMG, the SEIF is a proposal to develop the first global fund supporting clean energy innovation, broadening energy innovation funding from a national to international scale. It seeks to use blended finance techniques, leveraging government and multilateral funding to unlock private capital. Run by a global investment manager and potentially complemented by sub-managers for specific markets or technology areas, the SEIF would directly invest in early- to late-stage energy innovation projects and target applications in middle- and low-income countries.¹⁵ Collaboration is fundamental to the implementation of such a model: governments, in partnership with academic institutions, would contribute technical expertise and knowledge regarding the pipeline of innovators in their respective countries; meanwhile, private investors would contribute capital and offer opportunities for project developers to test and demonstrate their innovations.¹⁶

3.0 POLICY CONSIDERATIONS

Enabling policy environments can support the implementation of various co-investment models and attract private investment for clean energy innovation. Notably:

- The need for investor certainty is common to all models. For example, market risk is often cited as a key issue from an investor standpoint. Policies related to a clear carbon price signal, market carve outs (or targets), and/or public procurement of cleantech innovation can provide useful signals to investors.
- Regulatory constraints in certain sectors may hinder the ability of innovators to bring their solutions to market. Similarly, systems that favour conventional technologies may be an added challenge for project developers. Policymakers may want to consider strategies or mechanisms to test the impact of a policy environment on a new area of technology.
- Policymakers need to consider other issues that could impact the level of private investment in clean energy technologies, including information asymmetries between the public and private sectors, the managerial capacity of the public sector, and the crowding out of private capital as a result of too much government involvement in the sector.

4.0 GUIDING QUESTIONS

- What lessons can we draw from existing public-private co-investment initiatives?
- From your perspective, which models best address the sense of urgency for a sustainable, resilient, and accessible energy future?
- How can the public and private sectors orient their investments toward technologies that are most likely to reduce emissions, enhance the reliability of energy sources, and/or promote affordable energy solutions?

¹⁵ World Economic Forum, 2019.

¹⁶ Ibid.

- From the perspective of investors, what kind of policies can governments implement to attract private sector buy-in for co-investment initiatives?
- What is government's role in reducing risks for private investment in the clean energy sector?
- How can we increase the types and sources of patient capital (e.g. venture capitalists, institutional investors, development banks, philanthropic organizations) that participate in co-investment initiatives related to clean energy innovation?
- What do investors look for when investing in clean energy projects?

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