

Bold Ideas to Accelerate Sustainable Energy Innovation

Third Mission Innovation Ministerial Meeting (MI-3)
Malmö, Sweden 23 May 2018

In collaboration with KPMG

Context

As part of the on-going collaboration between the World Economic Forum and Mission Innovation (MI), this briefing paper presents three “bold ideas” with the potential to trigger a step change in sustainable energy innovation. The ideas herein are intended to spark discussion at the Third MI Ministerial Meeting (MI-3). They were developed by the World Economic Forum in collaboration with KPMG, with input from Mission Innovation and many expert interviews and public-private dialogue events. These concepts and other insights are part of the Forum’s white paper on [Accelerating Sustainable Energy Innovation](#) that will be officially launched at the Third Mission Innovation Ministerial Meeting (MI-3) in Malmö.

After the Third MI Ministerial Meeting, the World Economic Forum and KPMG stand ready to further develop these concepts and explore implementation opportunities in collaboration with Mission Innovation and its member countries.

The bold ideas

1. Develop instruments for public-private R&D co-investment
2. Establish an independent international sustainable energy innovation accelerator fund
3. Mainstreaming energy innovation through strategic public procurement

1. Develop instruments for public-private R&D co-investment

The proposal is to establish public-private co-investment vehicles to support and finance deep-tech energy innovations, reduce risks and improve the effectiveness of available public and private funding.

Challenge

The development of new technologies for a low-carbon future is associated with substantial technological risk and long R&D processes before solutions are market ready. Private investment in early-stage energy innovation is often insufficient to cover capital needs and to provide a fast track to commercialization. Investors and industrial companies face high risks when investing in deep-tech developments, shouldering both technology and market risks. Public grant systems – significant enablers of early-stage innovation – are challenged to select the right projects to fund and to establish efficient direct funding processes aligned with private financing rounds. Public authorities struggle in leading investment and due diligence processes. Entrepreneurs encounter substantial administrative burden to apply for public grants with no guarantee of obtaining the funding required within the necessary time frame. This results in a gap in the interface between public and private funding at critical stages of energy technology development, inefficient allocation of direct public grants, and high transaction costs incurred by the public authorities in identifying grantees and managing portfolios.

Proposal

This bold idea recommends developing public-private co-investment funding vehicles. According to this approach, the public authority pre-selects and pre-qualifies a number of high-quality private investors on the basis of pre-determined eligibility criteria. This enables the public authority to “pick partners” (i.e. high-quality private investors) instead of “picking winners” (i.e. technologies or start-up ventures). The pre-qualified private investors would be responsible for deal sourcing and investing, on the understanding that any private investment automatically attracts co-investment from the public sector. Such co-investment funding mechanisms already exist. Yet existing mechanisms are rarely targeted to energy and mostly operate with angel investors for seed funding. Current strategies leave a gap for innovators seeking amounts too large for angel investors, but too low or too early-stage for venture capital investment. Considering the unique attributes of energy innovation, the proposed co-

investment vehicles should have a clear focus on sustainable energy technology innovation. To be effective, co-investment vehicles should possess sufficient scale and range to ensure abundant deal flow, provide transparency on governance and funded technologies, and offer technical and commercial support through a network of experts.

Benefits

The proposed idea could significantly improve efficiency in allocation of public funding owing to improved preliminary targeting by leveraging private-investor expertise and by lowering transaction costs for all parties. It could also reduce risks for private investors and thereby attract greater private investment, ultimately increasing the capital available to investee companies. Alignment with private investors will also increase the likelihood of funding being attributed to companies with the greatest commercial potential.

Stakeholders

For successful implementation of a public-private co-investment mechanism, the following stakeholder groups should be involved:

 Public authorities	 Private investors	 Entrepreneurs
to select and engage in discussions with private investors, propose investment criteria. and provide co-funding	(from angel investors to established VCs) with a broad network and experience / interest in energy innovation (e.g. Breakthrough Energy Coalition)	to take into account their experiences, requirements and needs

The project sponsor leading the implementation process could be either a public authority (at national or international level) or a group of private investors (e.g. VC or Angel Fund associations).

Questions for discussion:

- How should the investment criteria be set and how should active decision-making be distributed between the private and public sectors?
- How can a high success rate of investment be ensured, considering the inherent risks in the innovation stages that co-investment instrument would fund?
- How is it possible to ensure that the public-private co-investment vehicle increases private funding in energy deep tech rather than becoming a subsidy to private investors?

2. Establish an independent international sustainable energy innovation accelerator fund

This bold idea proposes establishing an international fund to finance innovative energy technology projects, blending public and private sources of capital.

Challenge

A secure and focused financing mechanism for sustainable energy R&D has been missing from the global architecture of climate finance. Large investment in breakthrough innovation in technology areas such as Carbon Capture, Utilization and Storage (CCUS), advanced nuclear and hydrogen technology bears risks that are greater than those that most individual countries or companies can undertake. Clearly, international coordination and the sharing of risks and costs are required to accelerate the innovation process.

Proposal

The proposed international fund for energy innovation would be an independently managed lean entity charged with providing financial support and pooled expertise for R&D in innovative energy technologies and could potentially enhance international coordination of efforts. The fund, initiated through pooling of funding from interested countries, could potentially unlock larger amounts of funding from private companies, philanthropies and institutional investors with long-term capital that are looking to share risks and drive projects at scale. The fund could be associated with an existing multilateral institution or fund with necessary capabilities, and also potentially include payback

mechanisms for successful ventures to lower the long-term costs. The proposed fund would require a needs-driven and evidence-based funding strategy by highly competent managers, mechanisms for monitoring and evaluation to ensure effectiveness and efficiency, and a lean and an effective governance structure.

Benefits

By diverting a portion of domestic clean energy R&D funding or international climate-related funding to an international fund pool with a targeted focus on energy innovation, countries could benefit from synergies and provide wider market access to innovative technologies and solutions. Such a global entity could help identify high-potential investment opportunities across different technology areas globally and promote effective allocation of R&D funds to support the development of solutions too large, costly or risky for most individual nations or companies. It could also foster cross-border collaboration of experts and knowledge exchange in specific technology areas in the pre-competitive stages of innovation.

Stakeholders

The feasibility of such an entity will depend on a critical mass of contributing countries and interest from non-state actors (the private sector, philanthropies, entrepreneurs, etc.), and a steady flow of investment opportunities. The international fund would need to be designed to prevent duplication with other, existing, mechanisms, while overcoming IP rights and licensing concerns.

Questions for discussion:

- How can the fund be set up to efficiently support broad-scale technology research and development in energy innovation, and create positive market incentives?
- How can countries overcome national interest to align and take the first step forward?
- Can existing international institutions or funds be leveraged to establish an international fund dedicated to clean energy?

3. Mainstreaming energy innovation through strategic public procurement

This bold idea seeks to mainstream the use of public procurement to accelerate development and commercialization by providing first markets for innovative energy technologies and solutions that are ready for commercial deployment or in the pre-commercial stages of development.

Challenge

Public R&D expenditure has so far mainly sought to address the supply side (research push) through grants, soft loans and other incentives. Yet, innovative solutions face the market entry challenges of securing first buyers while competing with established alternatives. Most R&D and innovation programmes operate independently of public procurement programmes, which are often limited to off-the-shelf procurement of least-cost, secure and proven solutions, e.g. for efficient lighting and in the transport sector. The life-cycle value of solutions and positive multiplier effects of public procurement on new technologies are often neglected.

Proposal

The public sector, at central and local levels, is a powerful off-taker of large volumes of energy solutions. Public procurement can be an enabler of innovation for technologies

at all stages of development, from early pre-commercial stages to the later stage.

In the early stages, Pre-Commercial Procurement (PCP) serves as a mechanism of competitively sourcing R&D for design, development and prototyping of solutions for public sector use that do not exist in the market. It allows the public sector to actively shape the research agenda, and helps the most efficient and cost-effective solutions attract necessary early-stage capital. In the later stages, Public Procurement of Innovation (PPI) helps the public sector act as a test market or first buyer for newly developed and market-ready solutions, thereby helping them achieve cost effectiveness and economies of scale. Strategic public procurement, combining these two mechanisms, can allow the public sector to fast-track innovation for technologies and solutions at different stages of maturity.

To facilitate the diffusion of innovative solutions through public procurement, one initial step could be to specify the binding and quantifiable targets, as well as developing good public procurement practices that can be shared with various authorities.

Furthermore, the public procurement tender criteria should step away from a pure lowest-purchase price approach, to consider credible life-cycle cost as well as sustainability and efficiency aspects. Strategic public procurement should exist in combination with other demand-side policy instruments, such as green procurement regulations, equipment certifications, tax incentives, etc.

Benefits

Competitive pre-commercial activity allows for cost-effective solutions and improves the effectiveness of public service and operations. It offers innovative solutions the possibility of reaching necessary commercial scale at a faster pace by triggering a positive multiplier effect for sales. A good example for PCP is Wave Energy Scotland¹, a public procurement programme that effectively supports innovative tidal energy solutions in reaching commercial scale. One example of a PPI practice is the procurement of 200 million LED lightbulbs by the Indian Government in 2017 to support "Make in India", and as part of a wider scheme to replace 770 million incandescent bulbs, which had a substantial impact on energy savings and CO₂ reduction.²

Stakeholders

The implementation of the proposed mechanisms requires the involvement of various stakeholders such as policy-makers, public procurers, technology experts and entrepreneurs. The project sponsor could be a public authority or consortium at the national, regional, city or local level.

Questions for discussion:

- How can administrative hurdles for public procurement programmes be reduced to allow them to be more widely used to provide first markets for pre-commercial, proven sustainable energy technologies?
- How can issues of public acceptance and risks to the public sector be minimized?

1 <http://www.waveenergyscotland.co.uk/>

2 http://www.indiainvestmentguides.com/article_en/government-india-procure-200-million-led-bulbs-2017-order-be-placed-india-based