Input to the Talanoa Dialogue, 24 October 2018, by

SWEDISH INCUBATORS & SCIENCE PARKS

Summary

At **the Nordic Clean Energy Week and Mission Innovation 3 (MI3) meetings that took place in Malmö, Sweden in May 2018**, WWF, Swedish Incubators & Science Parks (SISP) and other partners held a series of activities that also provide significant inputs to the Talanoa Dialogue. As part of the collective result of these activities, we would like to highlight five important steps that can help leverage innovation's significant role in meeting the ambition of limiting global warming to 1.5 degrees as established in the Paris Agreement:

1. **Urgently support policy frameworks and mechanisms to develop high impact bankable projects** to scale existing successful and replicable high impact innovation areas. Building on experience from those areas where solutions today are bankable and implementable, such as solar PV, wind power and electrified light-duty transport, we are involved in The Mission Innovation Solutions Framework that was launched after MI3. The Framework can become the platform that take these activities to the next level. We invite interested parties to join us (see https://www.misolutionframework.net). The approach should also be adapted to support the value-chain of innovation from R&D to Demonstration and through the 'Valley of Death' to early commercialisation, i.e. a high impact innovation approach across Technology Readiness Levels (TRLs), geographies, cross-sectorial value-chain cooperation and relevant financial vehicles.

2. **Establish a global marketplace to invest in, support and scale up the most promising exponential technologies and business models with very significant positive climate impact**. And we should no longer exploit technology and business models with negative climate impact.

3. **Bolster a policy, corporate, investor and public understanding of how current technologies can help meet the 1.5-degree limit** but require roadmaps to ensure their alignment to this limit. Roadmaps are vital to support these technologies to mature and succeed in displacing polluting alternatives on the market fast enough.

4. **Support challenge-driven innovation** to accelerate the shift to fossil-free transportation and 100% renewable energy by bridging the gap between demand for solutions by large decision-makers in society and supply from continually more innovative and sustainable solution providers such as entrepreneurs and researchers. Providing 1.5-degree pathway aligned innovations with aggregated demand,

procurement offers, testing, implementation and access to investors is being explored by many actors such as A Challenge from Sweden, ERA-Net Smart Energy Systems (SES), Smart Grid Arena and Affordable District Energy Challenge, CommonPool and others. Meanwhile the appetite from non-state actors (e.g. Corporates, Investors, Cities) to set ambitious and science-based climate targets is increasing very rapidly. A global, challenge-driven innovation programme would carry out needs analyses, design challenges, provide capacity building, and mobilize resources for bankable projects. Non-state actors would provide living labs across the cities, corporate and investor space. We are looking to develop such a programme but currently a globally coordinated approach for matching increasing demand for ambitious climate action with supply of high impact innovations across sectors does not yet exist, despite the compelling potential.

5. **Support accelerators and incubators as they play a central role** in helping to accelerate change exponentially. Increasing accelerator learning across borders on best practice acceleration as well as on increasing deal flow of our most promising high-impact climate innovations is key. With partners we are therefore pursuing to establish a global accelerator network connecting hundreds of thousands of entrepreneurs with the common objective of staying below 1.5 degrees global warming.

Background to this Submission

At the **Nordic Clean Energy Week and Mission Innovation 3 (MI3) meetings that took place in Malmö, Sweden in May 2018,** WWF gathered input by dedicated personnel from several different events to capture points that can inform the Talanoa Dialogue. Specifically, the Swedish Energy Agency, Swedish Incubators & Science Parks (SISP), UN-Habitat, ERA-Net SES, WWF, IDEO and Common Pool hosted a half day event during Mission Innovation – **Speeding up for Change**. The event was designed for people and organisations to get insights in driving the required change, especially in the energy sector, to meet the goals of the Paris Agreement (PA) and teaming up to make it happen faster. The event united cities, investors and other influential organisations within the areas of mobility, urban planning, smart grids, heating and cooling to build networks, invest and deploy programmes to raise ambition at all levels to meet the PA 's goal of keeping global warming way below 2 degrees with the ambition of limiting it to 1.5 degrees.

How Do We Get There? How actions can help in expediting sustainable transitions to climate neutral societies

During **Nordic Clean Energy Week and Mission Innovation 3 (MI3)**, stakeholders highlighted areas where more support and guidance would be required to expedite the large scale take up of innovative solutions that can support local scale actions to meet the 1.5 degrees goal. These include:

- Urgently support policy frameworks and mechanisms to develop bankable projects to scale existing successful and replicable high impact innovation areas.
- Highlight that existing technologies and business models can support meeting the 1.5-degree goal but that there is an urgent need to promote a policy, corporate, investor and public understanding of those technologies and that they need road maps to help guide them to mature and succeed in displacing polluting alternatives on the market fast enough.
- Increase the adoption curve of pressure-tested and currently effective approaches.
- Support new business and revenue models, especially those that access funding for project implementation.

Concrete solutions and case studies that are in line with the 1.5/2 degrees' goal and can support the Parties in achieving their NDC goals and enable higher ambition

MI3 highlighted concrete solutions developed by innovation start-ups, many of which would have strong potential to support parties to align with the 1.5/2 degrees goal. For example, a workshop session on **WWF's Climate Solver programme** highlighted the following start-up climate innovations:

- Reducing water flow from taps by 98% using Altered ‘s tap head - If Altered’s innovation, or others like it, penetrates 15 percent of the target market by 2028, the global greenhouse gas emissions would be reduced by 27 million tons of CO2e annually

- Wind propulsion for large ships by Norsepower - If Norsepower’s innovation, or others like it, penetrates 30 percent of the target market by 2028, the global greenhouse gas emissions would be reduced by 10 million tons of CO2e annually.

- Turning low grade waste heat into electricity by Againity - If Againity’s innovation, or others like it, penetrates 10 percent of the target market by 2028, the global greenhouse gas emissions would be reduced by 24 million tons of CO2e annually.

- Cloud-based Smart Heating by Fourdeg - if Fourdeg’s innovation, or others like it, penetrates 20 percent of the target market by 2028, the global greenhouse gas emissions would be reduced by 25 million tons of CO2e annually.

- Electric vehicle charging as real estate service by Parking Energy - If Parking Energy’s approach, or others like it, accelerates the introduction of EVs by two years it would make annual emissions saving of 17 million tons by 2028.

The Climate Solver programme has developed the Climate Solver Tool (www.climatesolvertool.org), which has assessed the avoided emissions potential of the above innovations as well as around 300 others. Climate Solver uses the tool to support its goal to find high impact early stage commercialised innovations that can avoid at least 10-20 million tonnes of GHG emissions over the next 10 years. Exponential action to grow only 100 of these innovations would contribute to 1-2 Gigatonnes of avoided GHG emissions.

Collaboration models that can support achieving commitments and address barriers

MI3 led to an agreement on **The Mission Innovation Action Plan 2018 – 2020**. This identified the need for increased private sector engagement and investment in energy innovation, particularly through collaborations in innovation challenges. Those that were presented at the **Speeding Up for Change** session include:

- **A Challenge from Sweden**. An initiative from the Swedish Energy Agency promoting challenge-driven innovation. The goal is to accelerate the shift to fossil-free transportation and 100% renewable energy by bridging the gap between supply and demand. Together with partners such as UN Habitat, the aim is to mobilize investment to implement innovations that contribute to the goals by addressing system challenges with transformative potential - avoiding millions of tonnes of CO2e. Through a series of competitions, events and other initiatives, A Challenge from Sweden encourages collaboration in innovation procurement, testing and implementation, and provides innovators and entrepreneurs with access to investors and opportunities to commercialise sustainable solutions.

- **The ERA-Net Smart Energy Systems (SES)**: Integrated local and regional energy systems (RegSys) is a 40USD million research, development and innovation call to develop sustainable local and regional energy systems. The call aims to matchmake research with local energy needs and solution providers from European countries. The 2018 calls closes on 2nd November and selected projects will be announced in March 2019. Moreover, ERA-Net SES wants to support Mission Innovation IC#1 and IC#2, to develop a joint programming platform for multilateral funding of RD&I projects.

- **The Smart Grid Arena**, highlighted the importance of smart grids to support the energy transition as aligned to the Paris Agreement. The session highlighted the work of the National Stakeholder Coordination Group (NSCG), an exchange platform for smart energy systems and networks on the national level.

- Another initiative within A Challenge from Sweden, the international innovation contest **Affordable District Energy Challenge,** will promote sustainable local energy systems, which have strong potential to support global climate goals. Recent research among global stakeholders show a large demand for solutions within this area. The initiative's approach to bundle demand in this area could have a substantial impact on shortening time to market and on finding new business and revenue models that make renewable energy accessible and affordable to all.

- Mission Innovation has recently launched the development of a **framework to support investors and funders to identify system solutions and technologies** that have significant ability or potential to contribute to reduced greenhouse gas emissions in society, so called, avoided emissions. The two-year framework is being developed in a unique collaboration between technology research institutes, energy agencies, carbon accounting firms, environmental NGOs, including WWF, and government institutes from EU, Sweden and India as part of the Mission Innovation process supported by Energy Ministers in 23 countries and the European Union.

Opportunities to further scale up action through collaboration/cooperation opportunities, lessons learnt and public and private financing models

The **Speeding Up for Change** event presented several collaboration and cooperation opportunities. In particular, governments, at local and national levels, showed a willingness to collaborate to help drive the transition to a low carbon economy. For example:

- Several innovation companies with early commercial offers present at MI3 expressed a need to test their solutions in real life environments with customers such as cities. The city of Belo Horizonte, Brazil, offered to provide technical staff and opportunities to test innovative technologies in living labs across the city.

- The Government of India's Ministry of Housing and Urban Affairs outlined its Green Mobility Scheme and associated fund that is under development and suggested that the global challenge-driven innovation programme could support the scheme by

carrying out needs analyses in cities, designing challenges, providing capacity building and mobilizing resources for bankable projects.

A range of **public-private financing models** are needed through the value-chain of innovation from R&D to Demonstration and through the 'Valley of Death' to early commercialisation and large-scale deployment & market maturity. From large dependency on public financing and 'push policies' at earlier stages of the value chain of innovation towards larger dependencies of private test bedding and market demand through 'pull policies'. There is thus an unprecedented opportunity to leverage: ambitious, full decarbonization efforts happening across all sectors (including the technically most difficult ones such as heavy transport, machinery and steel production); the increased competitiveness & better health across Technology Readiness Levels (TRLs), geographies, cross-sectorial value-chain cooperation and relevant financial vehicles; and the overall strong sense of urgency on climate change.

Professional accelerators (generally public/private financed) play a key role globally to develop 'home-grown' business. They play the important role of connecting our most promising start-ups to bigger corporate and city/regional test beds. Accelerators thus need to be central in the climate change journey for any chance to accelerate change exponentially. Increasing the accelerator learning across borders on best practice acceleration as well as on increasing the deal flow of our most promising high impact climate innovations is thereby key. Some issues brought up by accelerators present at MI3 include:

- **Infuse Ventures**, a blended financing platform to support climate & energy entrepreneurs in India, noted that half of investments were lost as they failed to return capital as fast as the market expected them. Thus, market failures need to be addressed otherwise acceleration efforts will be in vain.

- **Climate KIC**, funded by EU innovation and developing Knowledge Innovation Communities, including universities, cities, business, and NGOs reported that there is no more time for incremental solutions and the focus should be on transformational change. Big systems changes in cities, food systems, and landscapes are required, while climate issues need to be mainstreamed in financial markets.

- **Loudspring**, a small business reporting avoided emissions and water use through their portfolio on the NASDAQ stock exchange, has questioned whether this should not be a mainstream NASDAQ approach.

- **SEB Bank** from Sweden, which is a large issuer of green bonds, argues for avoided emissions reporting as part of their pilots in the Nordic region. Thus, there is strong potential to expand the scope of avoided emissions reporting.

Impact if actions by national level governments and the UN Climate Change process and other opportunities are implemented

As set out in the recently launched **Exponential Climate Action Roadmap** (http://exponentialroadmap.org), launched by Christiana Figueres and Johan Rockström at the Global Climate Action Summit in September 2018, there is an opportunity to halve global

emissions by 2030 while increasing prosperity (and the potential exists to reduce emissions even further by about 70% in the same period) through rapid diffusion of existing technologies and behavioural change. Solutions exist in energy, industry, buildings, transport, food, and agriculture and forestry to halve emissions by 2030, but they must be accelerated to reach the necessary scale through climate leadership, policy and exponential technology.

The Low Energy Demand (LED) Scenario by the Tyndall Centre et al[1], delivers a similar message and contributed to the official part of the IPCC 1.5 report and the UNEP Emissions Gap 2017 report on global emissions reduction potential[2]. The IPCC 1.5 report[3] also shows that 1.5°C pathways that include low energy demand, low material consumption, and low GHG-intensive food consumption have the most pronounced positive synergies and the lowest number of trade-offs with respect to sustainable development and the Sustainable Development Goals (SDGs) at large. We also note that pathways limiting warming to 1.5°C are estimated to see an increase in total energy-related investments of about 12% relative to 2°C pathways[4]. Average annual investment in low-carbon energy technologies and energy efficiency are upscaled by roughly a factor of four to five by 2050 compared to 2015[5]. It is thus very clear that we need to raise ambition in terms of investments and technology very significantly.

The Exponential Climate Action Roadmap suggests that to fully harness the potential of innovation, national level governments and the UN climate process should focus their efforts to bolster climate related innovation by driving technology leadership in three ways:

1. **Support the launch of an accelerator** to align the digital revolution with the goal to halve emissions rapidly. Such an accelerator can: support development of exponential roadmaps for industries, businesses, cities, regions and nations; support scale-up of circular economy business models to reduce material and energy use; and, given many decisions and actions are mediated through digital tools, create solutions that remove friction to climate action and make emissions reduction the easy, attractive, default choice for businesses and consumers.

2. **Establish a global accelerator network** connecting hundreds of thousands of entrepreneurs with the common goal of halving emissions every decade or faster. This accelerator network should enable unprecedented exchange between accelerators and best practice learning across borders.

[1] Nature Energy Vol 3 June 2018: A low energy demand (LED) scenario for meeting the 1.5 °C target and sustainable development goals without negative emission technologies - https://doi.org/10.1038/s41560-018-0172-6
[2] Emissions Gap Report 2017, UNEP, TableES1 - https://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf?isAllowed=y&sequence=1
[3] Global Warming of 1.5 °C - an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, http://ipcc.ch/report/sr15/
[4] Ibid.
[5] Ibid.

3. **Establish a global marketplace** to invest in, support and scale up the most promising exponential technologies and business models with very significant positive climate impact. Do not exploit technology and business models with negative climate impact.