

EIT Climate-KIC Priorities

Informing our 2018 Call for Proposals

December 2017



Climate-KIC is supported by the
EIT, a body of the European Union

EIT Climate-KIC 2018 Priorities

Contents

A. Purpose	2
B. Context.....	2
C. Innovation for System-wide Impact.....	4
D. Our Call to Action.....	5
Impact Goal 1: Promote Retrofit and Decentralised Energy	6
Impact Goal 2: Create Green, Resilient Cities.....	8
Impact Goal 3: Accelerate Clean Urban Mobility.....	10
Smart Sustainable Districts	12
Impact Goal 4: Make agriculture climate-smart.....	14
Impact Goal 5: Transform food systems.....	16
Impact Goal 6: Nurture forests in integrated landscapes.....	19
Impact Goal 7: Recast Materials Production	22
Impact Goal 8: Reduce Industry Emissions.....	25
Impact Goal 9: Reboot Regional Economies.....	27
Impact Goal 10: Mainstream climate in financial markets.....	29
Impact Goal 11: Democratise climate risk information.....	31
Impact Goal 12: Foster Bankable Green Assets in Cities	32

Publication Date: 19 December 2017

Version: 1.5

A. Purpose

This document presents EIT Climate-KIC's programmatic priorities for 2018, acting as a guide for our Calls for Proposals. For further information about the call and selection process, eligibility criteria, assessment criteria and the proposal form, please refer to the *Proposal Guidelines* document available on our website:

www.climate-kic.org/calls-for-proposals.

B. Context

Preventing catastrophic climate change and achieving the 'well below 2°C' Paris Agreement target requires a speed of decarbonisation at least six times faster than anything the global community has achieved so far. Continuing to work through gradual, incremental changes will not be enough. We need innovation, and at this stage we need innovation to stimulate a fundamental transformation of economic, social and financial systems that will trigger exponential change in decarbonisation rates and strengthen resilience to climate change impacts. Rather than an economy based on growth-consumption-obsolescence-disposal that continually exploits the planet's resources, we need a circular economy where waste is feedstock, recycling rates are 100% and fossil carbon stays in the ground. Rather than relying on large, polluting energy systems, we need to switch to local clean energy production and consumption. For mobility, the shift must be to walking, cycling, and clean mobility-as-a-service, which may require us to change the way we live and work. Within financial systems, our attention must shift away from short-term returns towards patient capital designed to value fully the social and environmental benefits of investment. To strengthen our resilience, we need pro-active, ex-ante adaptation of our cities and food systems rather than just responding to damage once it has incurred.

Strategic innovation is at the heart of prompting and enabling such transformation. By strategic innovation we refer to a portfolio of deliberate innovation experiments that intervene within and across whole systems – designed to generate alternative business and industrial models and create options for choice and momentum. Such a portfolio needs to nurture supply-side innovation that helps to introduce avalanches of new ideas and perspectives, and connect those ideas to demand-side, challenge-led innovation. This demand emerges from identifying existing assumptions, habits and value generation models that need to change.

EIT Climate-KIC's aims to become a climate innovation movement that can instigate and catalyse such strategic innovation at the systems level. Our common ambition is to **create a prosperous, inclusive, climate-resilient society with a circular, zero-carbon economy**¹, where our long-term impact is to achieve deep decarbonisation and strengthen climate resilience through innovation. The EIT Climate-KIC community is a pioneer in testing and delivering such innovative solutions and a movement for rapid change.

During 2017 we have been working across our community to explore how EIT Climate-KIC can speed up impact on whole systems through innovation. This theory of change:

- Provides a common narrative that clearly states 'why we are doing what we are doing', and shows how our interventions will lead to the zero-carbon and resilience outcomes we need;
- Focuses our output by allowing us to understand exactly where within our established thematic areas we think innovation will stimulate transformational climate action; and
- Develops a stronger framework for evaluating success in terms of change so that we can compare our actual performance to what was hypothesised and adjust as required.

¹ This ambition is designed to deliberately echo the Sustainable Development Goals, with *prosperous* highlighting that there is no contradiction between what we need to do for climate change and creating jobs. *Inclusive* implies giving citizens agency to appropriate this agenda for themselves and being empowered to move it forward. It also makes clear that any change which leads to exclusion of many citizens will not be sustainable. *Resilience* points out that even a 1.5°C temperature rise will create significant climate change adaptation challenges. *Circular* states that we want a world where the only inputs are the re-use of existing materials or renewables and outputs are biodegradable. *Zero-carbon* as a short-hand for zero-fossil-carbon, points with clarity to the radical change that needs to take place in the economy if we are to reach our goals and protect the climate – a vital public good.

This work has led us to establish a series of climate innovation impact goals² (see Table 1) that are: (i) integrated with our thematic approach; (ii) consistent with the three 2015 international agreements³; (iii) aligned with science-based climate targets; (iv) directly relevant to areas of action required in Europe’s Paris Agreement commitments and its 2030 Climate and Energy Framework; and (v) located within domains in which significant innovation is required. To ensure we have a framework for measuring progress for each impact goal, we are working to establish 2030 targets consistent with the needs of the Paris Agreement, and a pathway to achieve those marked by measurable outputs in 2020 and interim outcomes in 2022.

While these climate innovation impact goals provide a framework for rallying action and assessing our success, any approach to innovation that tries to tackle systemic problems on a siloed, sectoral or geographical basis will fail to produce the scale and depth of change we need. Instead our theory of change is that progress will be shaped by innovation influencing intermediary driving forces, notably: (a) individual behaviour (demand, changed expectations and moral switches); (b) organisational governance (key stakeholders and decision-makers); (c) policy (multi-level governance, regulatory frameworks); (d) finance (supply of funding, effective carbon and resilience accounting); (e) technology; (f) skills; (g) market structures (alternative models and values); and (h) information flows. Rapid transformational change across whole systems can be achieved when innovation acts on and across these driving forces, particularly where they act as blockers to change.

Table 1: EIT Climate-KIC’s Climate Innovation Impact Goals

Theme	Climate Innovation Impact Goals
Urban Transitions	<ul style="list-style-type: none"> • Goal 1: Promote retrofit and decentralised energy: Drive a significant increase in urban retrofit rates and enable district-scale clean energy production, paving the way for deep cuts in emissions. • Goal 2: Create green, resilient cities: Harness the force of nature in infrastructure design to build livable climate-resilient cities. • Goal 3: Accelerate clean urban mobility: Trigger the switch to clean urban mobility to achieve considerable cuts in urban transport emissions.
Sustainable Land Use	<ul style="list-style-type: none"> • Goal 4: Make agriculture climate-smart: Instigate a substantial increase in the application of climate-smart agriculture solutions. • Goal 5: Reform food systems: Transform climate-damaging food value chains and enhance the climate resilience of food supply. • Goal 6: Nurture forests in integrated landscapes: Grow carbon sequestration in forests and linked value chains, while avoiding deforestation.
Sustainable Production Systems	<ul style="list-style-type: none"> • Goal 7: Recast materials production: Catalyse a switch to a circular economy and transform production for fossil-energy intensive materials. • Goal 8: Reduce industry emissions: Partner with key industry stakeholders in cutting scope 3 emissions to reach science-based targets. • Goal 9: Reboot regional economies: Transition carbon-intensive regions to become zero-carbon innovation hotspots.
Decision Metrics and Finance	<ul style="list-style-type: none"> • Goal 10: Mainstream climate in financial markets: Advance metrics, standards and instruments that enable transparent, true-cost and benefit accounting for a well below 2°C pathway • Goal 11: Democratise climate risk information: Enhance access to risk information through capacity building and a major expansion of the climate services market • Goal 12: Foster bankable green assets in cities: Develop capacity in preparing projects and investment vehicles to boost the availability of sustainable investment assets in cities.

² The climate innovation impact goals have been chosen based on expert judgement and contributions from our community through our theory of change process. During 2018 we will investigate these challenges in more detail to ensure 2030 targets are based on the latest scientific analysis and assessment, and develop baselines against which progress can be measured. We will review these periodically to ensure they remain fit-for-purpose.

³ The Sustainable Development Goals, the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction.

Education and skills

Our education programme spans all 12 climate innovation impact goals, where along with other driving forces like policy and finance, innovation in shaping the skills and behaviours needed to catalyse change is a critical part of progress toward our impact goals. By 2030, we aim to:

- Pioneer capacity-building programmes that equip those participating in EIT Climate-KIC innovation initiatives with the skills and competencies needed to make a difference.
- Help train 125,000 people to make a positive contribution to the new climate economy by boosting the innovation and entrepreneurship skills.
- Increase the membership of EIT Climate-KIC's alumni association to 25,000 people, engaging them as active, mission-focused advocates and change agents.

C. Innovation for System-wide Impact

Since 2010, EIT Climate-KIC has developed entrepreneurship, education and innovation activities, and since 2015, combined these around our five themes (Urban Transitions, Sustainable Land Use, Sustainable Production Systems, Decision Metrics and Finance, and Education). Through our calls for proposals, we have commonly supported and co-created innovation projects that help to test and mature climate-positive technologies and developed education formats that nurture entrepreneurship and climate innovation skills. This approach has been impactful and a valuable learning opportunity, but alone it is not enough to address the scale of the decarbonisation and resilience challenge now facing Europe and other global regions.

For 2018 and beyond, we will be taking a whole community approach to driving systems change to help achieve our Climate Innovation Impact Goals. Accordingly, our activities are organised by their purpose, representing seven different ways of how EIT Climate-KIC intervenes to create change. We turn:

- **Places and networks into climate innovation hotspots** (including our work to strengthening climate innovation ecosystems)
- **Innovative ideas into robust propositions and climate-positive businesses** (encompassing our entrepreneurship and earlier stage innovation activities)
- **Innovation demonstrations into game changers at scale** (covering our later stage innovation activities)
- **Diverse actors into disruptive innovation communities** (describing our *Flagships* and how they mobilise groups of EIT Climate-KIC partners around tightly defined, common objectives)
- **Bright minds into climate innovation leaders** (spanning our graduate, professional, online and executive education work).
- **Knowledge into levers of change** (incorporating research, thought leadership and two-way communication, outreach and ideas exchange across our community and beyond).
- **We are also turning ourselves into sustainable, high impact change agents** (including initiatives to build our monitoring, evaluation and learning capacity, and invest in our community as a self-organising and adaptive change agent).

Our 2018 Calls for Proposals

With our calls for proposals in 2018, we are looking to support ambitious initiatives with a clear pathway to impact, consistent with the Paris Agreement targets and at least one of our Climate Innovation Impact Goals. We are seeking proposals for priorities as described in Section D in the following areas (see *Proposal Guidelines* for further information):

- A. To turn *places and networks into climate innovation hotspots*, we would like to **strengthen the capacity of innovation ecosystems** to experiment with systems innovation and connect those ecosystems to help trigger decarbonisation and resilience at the speed and scale we need.
- B. To turn *innovative ideas into robust propositions and climate-positive businesses*, we shall enhance our **portfolio of earlier stage innovation interventions** (Pathfinder and Partner Accelerator programmes) at

the level of whole systems – for example by targeting innovations that influence driving forces for change, such as policy, behaviours, finance and skills.

- C. To turn *innovation demonstrations into game changers at scale*, we will further develop our **portfolio of later stage innovation interventions** (Demonstrator, Scaler and Urban Challenges programmes) at a systems level, where there is a clear route to scaling the impact of the innovation.
- D. To turn *bright minds into climate innovation leaders*, we will extend our suite of **online and professional education formats** to drive the skills and capacities needed to support systems transformations and achieve our Climate Innovation Impact Goals. Those competencies generically include: accelerating transitions, transformative leadership, promoting systemic innovation, driving sustainable entrepreneurship, establishing approaches to scaling and developing the respective proficiencies aligned to our individual Climate Innovation Impact Goals.

As a European organisation, our major focus is on Europe. However, the challenge and context of climate change is global. Our Climate Innovation Impact Goals are therefore applicable worldwide and for many of these, both the underlying value chains and opportunities for scaling and systemic innovation are global. Some proposals may therefore wish to include components that go beyond Europe⁴.

Those preparing proposals may wish to leverage the following EIT Climate-KIC learning points and assets:

- We often find that successful systems innovation can result from:
 - Combining the knowledge and insights of different types of organisations, such as those from (i) research and higher education, (ii) business, (iii) communities and (iv) public bodies, NGOs, cities and regions.
 - Bridging supply and demand.
 - Collaborating across multiple location and contexts across Europe and beyond.
 - Innovating to act on the driving forces that change systems, such as finance, policy, skills, and behaviours.
- EIT Climate-KIC supports a series of experimental test beds, living labs and innovation ecosystems. Such places and networks may offer an opportunity to test or trial innovations. For example, these include our Smart Sustainable Districts programme that links together ambitious districts in 12 cities across Europe (described in Box 1) and our Regions Transitions programme aligned to Impact Goal 9. More detail on these can be found on EIT Climate-KIC's website.

Note: Innovation projects narrowly focused on progressing single-point technologies will have to demonstrate a compelling route to scale in order to have a chance at contributing to the type of systems transformation we seek to instigate and catalyse.

D. Our Call to Action

This section presents each climate innovation impact goal in turn, highlighting:

- Why it is important for climate action,
- What we have learned from our existing portfolio of experiments and what levers of change can trigger transformation, and
- What types of proposals we are looking to support and which are out of scope.

As stated before, our Climate Innovation Impact Goals are not designed to create siloes, but rather act as a guiding framework in which innovation experiments should influence driving forces that act on whole systems. Consequently, one intervention may help achieve progress in multiple impact goal areas.

⁴ Noting information referred to in the *Proposal Guidance* with respect to eligible costs and EIT Partners.

Urban Transitions

Impact Goal 1: Promote Retrofit and Decentralised Energy

Drive a significant increase in urban retrofit rate and enable district scale clean energy production, paving the way for deep cuts in emissions.

Importance

The built environment plays a crucial role in mitigating climate change and is directly linked to the resilience of neighbourhoods, districts and cities. With 80% of the current building stock in Europe likely to still be operational in 2050, systemic and scalable deep retrofit (near zero net energy/CO₂ emissions) solutions have a vast potential to contribute to a low/zero carbon built environment. There is an urgent need for cities to bring about a significant increase in current retrofit rates to realise the ‘well below 2 degrees’ Paris goal. An integral part of the pathway are innovative and systemic retrofit solutions that go beyond what is ‘business-as-usual’ in today’s market.

Learning and levers of change

Accelerating deep retrofit requires systemic innovation enabled by financial, technical, behavioural and organisational (including policy) drivers of change. To address this and achieve deep retrofit at scale, we need a systemic approach which brings together the following elements:

- Reducing energy demand through high-performing, resilient and adaptable envelope solutions (‘fabric first’);
- Integrated supply chains, benefiting from the economies of scale of prefabrication and offsite manufacturing;
- Business models that enable investments into deep retrofit and help overcome barriers;
- Maximising operational performance through smart integration and interfacing of energy using systems;
- Solutions and value propositions that are user-centric and balance occupant health and well-being with optimal energy efficiency as a lever of change for decision-makers;
- Energy supply and distribution designed at the district level, to capitalize on district scale solutions;
- A regulatory framework which enables deep retrofit; building regulations at EU (Energy Performance Building Directives), national, regional, city levels and incentives.

Our research has shown the following barriers to scale deep retrofit and decentralised energy:

1. Retrofit projects are often **not ambitious enough**. Technology and systems exist to achieve zero carbon retrofit but projects tend to focus on a small number of measures perhaps halving the energy use but not achieving zero emissions (e.g. glazing replacement or boiler upgrade). This piecemeal approach results in retrofit fatigue and lock in. There is no clear roadmap for owners and occupants outlining options to achieve deep integrated and systemic retrofit solutions at competitive cost and there are barriers as to who pays for the retrofit and who benefits.
2. Deep renovation of the building stock is **insufficiently embedded in plans for future-proofing at the level of neighbourhoods/districts** thus preventing implementation of collective solutions and “fair” distribution of costs and benefits across different parties;
3. The **organisational structures and culture in the building sector** render it cumbersome to accelerate the integration of innovative solutions. Relevant examples include: highly-fragmented market in terms of supply offering, demand needs, and knowledge skills, risk averse investment policy, rigid procurement policies which do not stimulate the supply side in bringing the ‘best-for-purpose’ solutions, contractual agreements which prevent co-operation and innovation.
4. Current modes for legal and **financial arrangements** are insufficiently based on longer term benefits for various stakeholders and do not enable intervention pooling. EU **macroeconomic conditions and public**

deficit rules deter public investments into building retrofit at scale. The Energy Services Companies' (ESCOs)'risk buffer' is hampering innovation.

5. **The regulatory framework** at European, national and local level is **not ambitious enough** to accelerate deployment of decentralised energy generation and deep retrofit;

Priorities

We would like to support ambitious proposals in the areas described in Section C, Page 6 that:

- Demonstrate **systemic deep retrofit** by accelerating user and industry acceptance and implementation of deep retrofit technologies and decentralised energy generation models. Such demonstrations could use technology implementation in parallel with social innovation. Initiatives in the area include supporting actions to develop and scale urban circular retrofit approaches, supporting the deployment of bio-based materials in the built environment, and continuing to invest in late stage projects specifically aiming to integrate multiple Key Deep Retrofit elements (see above) into one coherent approach. The Living Labs we work closely with have a special role in co-creating with, and showcasing to users how these multiple aspects can be integrated in real life cases.
- Promote **delivery at scale**, by innovating around deep retrofit and decentralised energy generation and distribution at neighbourhood, district and city scale. This would engage demand-side stakeholders (e.g. local government, housing associations, large commercial real estate owners) to deliver impact to scale. Initiatives in this area include identifying stakeholders delivering pioneering retrofit solutions, and market-leading off-site manufacturers who can provide retrofit solutions at scale, delivering open innovation through our Urban Challenges Programme, supporting activities that scale Building Technologies Accelerator Flagship start-ups, collaborating with others in the space of decentralised energy generation (e.g. utilities providers, municipalities owning energy systems) to enable district scale energy production, identifying test-beds for deep retrofit and decentralised energy upscaling pilots (e.g. utilizing the district network within the Smart Sustainable Districts Flagship) and creating and making visible a pipeline of bankable projects with LoCaL.
- **Build capacity** through educating senior level municipality/local government representatives and portfolio owners to adopt low carbon innovation. This will enhance market understanding and political support to create demand-side pull and assess low carbon investments from a long-terms cost perspective rather than capital cost. Initiatives in this area include educating decision makers (this can link to activities both in the SSD Flagship and the wider Education theme), creating a deep retrofit and/or decentralised energy cluster utilising the Smart Sustainable Districts Flagship, increasing buy-in from the demand side via matchmaking and roundtable events, and project preparation and finance training activities supported by LoCaL.
- Stimulate **investment**, where financiers, entrepreneurs, corporations and citizens decide to invest in zero carbon, circular economy assets and to divest from high carbon risk investments. This will increase access to finance for deep retrofit and decentralised energy, and increase the creditworthiness of cities. Initiatives in this area include dissemination of best practice finance and business model delivery examples achieving deep energy cuts (examples can include case studies from the SSD, BTA and LoCaL flagships) and collaboration with LoCaL on innovative financial instruments (e.g. retrofit fund) and potential for trigger mechanisms when over 50% of households agree to retrofitting their block.
- Create an ambitious **regulatory framework** at European, national and local level to support transition to a zero-carbon urban environment. This will help to influence decision-makers, and builds on our research into barriers and opportunities for scaling. Initiatives in this area include commercializing the Building Market Briefs, commissioning market research into hot spots in Southern and Eastern Europe and building on our network of EU policy makers using alliances such as the International Energy Agency (IEA).

Where appropriate, we encourage applicants to leverage (i) the Smart Sustainable Districts network as an innovation ecosystem to trial and test innovations (see Box 1) and (ii) the existing body of work of the Buildings Technology Accelerator flagship.

Impact Goal 2: Create Green, Resilient Cities

Harness the force of nature in infrastructure design to build livable climate-resilient cities.

Importance

Between 1980-2010 Europe lost €300 billion due to storms, landslides, floods and mud flows, and saw 75,000 deaths as a result of heatwaves ⁵. In Copenhagen alone, extreme rainfall in 2011 caused widespread flooding and damage when the sewers could not cope with the huge volume of water. Insurance damages alone were estimated at € 650–700 million ⁶. Climate change will have far-reaching impacts and consequences for urban Europe (such as severe floods, droughts and heat waves). These events can spell disaster for cities and the inhabitants in them.

Adaptation to climate change is the adjustment in natural or human systems (e.g. cities) in response to actual or expected climatic stimuli or their effects. It moderates harm or exploits beneficial opportunities of climate change ¹. The Paris Agreement, Sustainable Development Goals (especially Goal 11 on sustainable cities), Sendai Framework for Disaster Risk Reduction, and the New Urban Agenda place unprecedented importance on actions to help society adapt, and confirm expectations that all countries and cities will do their part to promote greater climate resilience.

Adaptation involves a range of interventions, such as nature-based solutions (NBS), that can be taken to reduce the vulnerability of society and to improve urban resilience. NBS are natural, service providing infrastructures that are often more resilient and more capable of meeting social environmental and economic objectives than 'grey infrastructure'. They offer several opportunities for cities: improved air quality and comfort levels (health benefits), improved water management, improved climate resilience, improved land and property values, aesthetic improvements, noise reduction, and improved biodiversity. Research by Lendlease, RICS and others has shown an increase in property values for homes on tree lined streets (10% more) and increased dwell time in retail areas with high amounts of 'green'. Our own research with Imperial, Arcadis and Deltares in the Blue Green Solutions guide yielded a near-zero-energy campus, by applying a NBS approach to the Zagreb University Campus: with overall energy savings of 88% for heating, 92% for cooling and 60% for electricity. The energy consumption of the campus buildings was 26% lower. Additionally, the increased efforts needed for urban climate change resilience and adaptation present a major business opportunity; a huge market that is expected to grow fast ^{7,8}.

Learning and levers of change

EIT Climate-KIC is currently researching the levers that can create the scale and speed of change needed for NBS implementation within European cities. This research should be finalised in Q1 of 2018. In the meantime, we have identified the following four barriers to radically upscaling NBS in the market:

1. Lack of demonstration success stories and a clear evidence base to provide NBS proof points. Resulting in a lack of best practice references that are transferable and applicable to other cities with similar contexts.
2. Lack of demand and limited market understanding (from urban planners, designers and developers, civil engineers, civil servants, citizens, etc.) around the key benefits of NBS. There is no lack of NBS solutions, but a lack of insight on how urban professionals can be inspired and informed to integrate them in their practice. Decision makers and professionals take risk-averse tactics when planning, as there is a lack of awareness

⁵ <https://ec.europa.eu/research/environment/index.cfm?pg=nbs>

⁶ https://www.eea.europa.eu/publications/urban-adaptation-to-climate-change/at_download/file

⁷ www.ebrd.com/documents/climate-finance/building-an-evidence-base-on-private-sector-engagement-in-financing-climate-change-adaptation.pdf

⁸ <https://www.oecd.org/...climate/synthesis-investing-in-climate-investing-in-growth.pdf>

and evidence-based information on the(long-term) effects and benefits of adaptation measures they are often viewed as more risky than traditional approaches.

3. Lack of **political awareness and willingness** to implement NBS, which means that the policy framework at European, national and local level is not ambitious enough for rapid NBS deployment.
4. Misunderstandings and/or misevaluation of the **financial payback of NBS**. Short term misunderstandings around the implementation costs of NBS (often viewed as expensive Capex with little focus given to the increased property values). The long term 'benefits' of NBS are often not accounted for and complex to measure due to their inter-sectorial in nature (e.g health benefits of citizens, quality of living environment, or biodiversity and ecosystem services, property values, reductions in life-cycle costs, or increases in resource efficiency).

Priorities

To overcome these barriers, we would like to support ambitious proposals in the areas described in Section C, Page 6 that:

- **Demonstrate nature-based solutions** for urban climate resilience at scale, with all key stakeholders (e.g. financiers, entrepreneurs, corporations, engineers, planners, cities citizens and policy makers) engaged in robust NBS demonstration sites, offering a clear evidence base of the environmental, social and economic successes of NBS. Such demonstrations should pull from a range of scalable models: from large scale infrastructure, building retrofits, nature based 'living labs' to develop an evidence base through monitoring, to bottom-up approaches.
- **Build the capacity** of planners, urban designers and developers, and civil servants to put adaptation and long-term planning first through increased understanding and implementation of NBS. Peer-to-peer (or city-to-city) learning, or professional training courses, could be utilised to help cities gain a better understanding of climate resilience, the adaptation challenge and the benefits of NBS. Capacity building proposals could explore how digital technologies, and other mediums, can be used to raise awareness of urban climate risks (such as scenario modelling of flooding or heat waves) and support decision making.
- Create an **ambitious policy framework** at European, national and local level. A key lever of change will be when city policy makers introduce laws, regulations, procurement rules and budgets to further NBS for healthy climate resilience. This political support will help foster the demand-side pull required for scaling.
- **Stimulate investment**, where financiers, entrepreneurs, corporations, engineers, planners and citizens decide to deploy and invest in NBS ventures and urban resilience and to divest from high carbon grey urban infrastructure. Proposal may: test new business models that are interested in long-term, inter-sectorial 'payback' schemes; deploy and scale urban climate risk information and its application by the insurance industry; and, capture and disseminate the inter-sectorial benefits of NBS (for example, natural capital accounting, or cost-benefit assessments of large scale NBS implementation).

Where appropriate, we encourage applicants to leverage the Smart Sustainable Districts (SSD) network or other EIT Climate-KIC living lab sites as innovation ecosystems in which to trial and test NBS approaches (see Box 1). Furthermore, we will support proposals that explore how urban agriculture can be used as a catalyst for community led NBS in collaboration with the SSD network and seek to pilot and prove the NBS approach and its long-term business case at the district level.

Impact Goal 3: Accelerate Clean Urban Mobility

Trigger the switch to clean urban mobility to achieve considerable cuts in urban transport emissions

Importance

Mobility is one of the vital eco-systems of a city: indispensable to its smooth functioning; to enabling its inhabitants to live healthily; and to go about their daily lives in relative comfort without undue stress and congestion. Our ambitious target is a response to the reality that transport is one of the arenas that until now has been the most resistant to emissions progress in Europe. At the same time, cities are key to tackling this challenge as they are faced with the mobility trilemma of clean air, carbon and congestion whilst facing ever increasing demands to move people and goods around the city. Moving to low carbon mobility is a crucial dimension of the EU's overall carbon reduction programme. Cutting carbon emissions arising from mobility is a complex task with a range of different financial, technological and social dimensions.

EIT Climate-KIC sees its role not as an overseer or sponsor of the large capital investments, but rather as an instigator of the mobility transition through innovating around its social, organizational and behavioural dimensions. While we believe the upcoming **EIT Mobility-KIC** may focus on emission reductions from vehicles, EIT Climate-KIC's ambition is to create an urban enabling environment for the mobility transition with a focus on *mobility-as-a-service* solutions and *modal shift* which should reduce the number of vehicles on the road as well as their carbon footprint. **Mobility as a Service (MaaS)** is defined as the integration of different forms of transport services into a single mobility service accessible by demand⁹. **Modal shift** is defined as the replacement of saturated means of transport with other means to make the first less congested. EIT Climate-KIC focuses on modal shift from private car to public transport, cycling and walking and the last mile delivery for freight transport.

Learning and levers of change

The transport and mobility challenge in cities cannot be met in an ad-hoc fashion. Piecemeal actions will not do. It is crucial to tackle the urban mobility challenge through system innovation.

The **key barriers** to an urban mobility transition are:

1. The EU **policy**, regulatory and legislative work in this arena is not particularly well developed. This also translates into **planning regulations** on a local level which are not conducive to MaaS and modal shift.
2. **Robust business case** analysis is a critical step in any decision-making process. The specialist nature of new innovations can result in a lack of available information and uncertainties which translates into risk adverse management and redirect intent back to business-as-usual.
3. The travel survey data collection techniques traditionally used do not give an accurate picture of travel behaviour. Multiple ticketing and payment operations as well as the lack of integrated mobility services are not conducive for the promotion of MaaS and modal shift.
4. **Behavioural change** is key as the mobility transition 'requires citizens to change their mobility patterns and accept more responsibility for current problems and that, through changing their own behaviour, they can be 'part of the solution' ¹⁰.
5. Customers for new technologies are not aware of the innovations that can meet their urban mobility challenges. Hence, invitations to tender are not conducive for innovations.

⁹ <https://maas-alliance.eu/homepage/what-is-maas/>

¹⁰ <http://www.gov.scot/Publications/2003/09/18164/26190>

Priorities

To overcome these barriers, we would like to support ambitious proposals in the areas described in Section C, Page 6 that:

- Forge policy innovation, where the result is that EU legislation and regulations are in place that support the urban mobility transition to MaaS and modal shift. Similarly, define local planning regulations that support the creation of liveable neighbourhoods to promote cycling and walking.
- Develop robust business cases for MaaS and modal shift programmes that attract investment.
- Experiment with digital technologies that help to demonstrate that MaaS is the best value proposition for users, helping them meet their mobility needs and solve the inconvenient parts of individual journeys as well as the entire system of mobility services. Such digital technology supports accurate travel data collection across different modes to take informed decisions and support cities to create open-source sharing and payment platforms.
- Trigger behaviour shifts through social innovation, resulting in privately owned cars being taken off the streets and cities taking a proactive stance in last mile freight delivery by creating consolidation centres for commercial and private deliveries. Such social innovation will mean citizens change their mobility patterns and accept responsibility for tackling air pollution, emissions and congestions. Similarly, cities will feel empowered to take a pro-active stance in last mile delivery.
- Help bring together stakeholders in ambitious, innovative cities and districts to foster local mobility innovation ecosystems, and connect these places and groups together across Europe to accelerate learning. Creating rapid change will require customers to be aware of the innovations that can meet their needs, be able to secure investment buy-in towards those innovations and translate that into action (e.g. tenders, investment and implementation).

Where appropriate, we encourage applicants to leverage the Smart Sustainable Districts network or other EIT Climate-KIC living lab sites as innovation ecosystems in which to trial and test mobility innovations (see Box 1). We will only support single-point technology NBS innovation projects that demonstrate a strong route to scaling adoption.

Smart Sustainable Districts

Box 1: The opportunities provided by EIT Climate-KIC's Smart Sustainable Districts programme

Smart Sustainable Districts

Many of EIT Climate-KIC's twelve 2030 climate innovation impact goals are relevant to cities, and all demand systemic approaches, but cities will fail to achieve meaningful systems transformations if they try to tackle each challenge in isolation. Cities require integrated approaches that weave together solutions to multiple challenges at once. The Smart Sustainable Districts programme supports cities to develop and deliver such transformative sustainability initiatives at a district scale, bringing the complexity of whole-city urban challenges down to a more viable neighbourhood unit, 'transforming cities one district at a time'.

Integrated urban sustainable systems are inherently complex however, and challenge existing social, commercial, political and economic structures that can be significant barriers to transformational change. Therefore, smart sustainable district initiatives should plan, pilot and prove holistic approaches that overcome these challenges by addressing a mixture of the following key enablers of systemic change:

- Leadership and governance
- Appropriate partnerships, business models and delivery/implementation structures that both enable investment and maximise community benefits
- Citizen participation and community engagement
- Appropriate financing along with enabling local economic systems
- Integrated data systems
- Planning and land-use policies
- Social, environmental, health and climate impact assessments and evaluation frameworks

Smart sustainable district initiatives also need to be developed through a robust process to:

- Stimulate community participation and ownership
- Formulate a clear and measurable district aspiration that is framed in a locally-relevant way
- Analyse and prioritise opportunities for urban systems initiatives
- Develop locally appropriate business models to enable successful delivery and long-term operation
- Translate plans into assets that are ready to access appropriate finance

Municipalities and other key city stakeholders often lack the necessary capacity and experience to structure complex initiatives that address the above enablers of change and multiple innovation challenges in an integrated way. Thus, the Smart Sustainable District programme offers a platform for engaging city-district scale initiatives that pilot, prove and scale models and approaches for use by all cities

The Smart Sustainable Districts programme wish to engage proposals that:

1. Help municipalities and other key city stakeholders to translate their sustainability aspirations into concrete plans and more integrated sustainable urban systems initiatives.
2. Aid cities to address the above listed key enablers of systemic change in a way that will best enable implementation in their context.
3. Require a 'test bed' approach to taking integrated action across one or more climate innovation impact goals.
4. Gather, collate and share of knowledge and lessons learned; and translation of this into guidance, advice and education to expand the capacity of city actors to deliver sustainable urban systems initiatives.

The programme can offer access to a series of districts across European cities, where district stakeholders have committed to being at the forefront of sustainability and climate change initiatives.

In addition to helping consortia connect with district testbeds, the Smart Sustainable Districts programme is also looking to identify **earlier stage innovation initiatives** at the district level looking to engage with their communities to achieve the steps outlined above. Such initiatives should generate a clear agenda for systems change. We are particularly interested in early stage district innovation proposals from cities:

- In Southern and Eastern Europe and 'Regional Innovation Scheme' countries
- Working together to develop a regional cluster approach to systemic urban transformations at the city-district scale (this could be a set of linked applications for each city)
- Of medium size that have less resource, experience and network connections to draw on.
- Wishing to pilot the [EcoDistricts Protocol](#) as a guide for their initial smart sustainable district development journey (there is an expectation that the selected consortia will contribute to costs for their team to attend the [EcoDistricts Incubator](#) in Portland USA in May 2018.)
- Aligned to our 12 Climate Innovation Impact Goals.

Later stage innovation proposals should enable city-districts to take bolder steps in the delivery against their overall strategy. Such proposals should:

- Be focused on addressing the above key enablers of systemic change through potentially replicable models for implementation and long-term operation.
- Include multiple districts.
- Generate a breadth of lesson-learning and outputs that will easily translate into best-practice guidance for others in the future.
- Harness significant investment from non-EIT sources, including eligible co-funding.

All Smart Sustainable Districts-linked proposals should:

- Be supported by strong local leadership and stakeholder support for taking innovation action
- Be implemented by project consortia that include the local municipality, private sector and community; along with relevant expertise and solutions providers from the EIT Climate-KIC community.
- Enable integration across multiple district systems/climate innovation impact goal areas
- Deliver 'investment grade' plans for smart, sustainable city-district assets that will be able to secure appropriate funding and finance.
- Make use of EIT Climate-KIC's [Climathon](#), 'Urban Challenges' and 'Demand-Led Innovation Brokerage' programmes where appropriate.
- Measure potential or actual project impacts in economic, social, ecological and climate terms; with outputs produced ready for wider communication and dissemination.

More information about how to engage with the Smart Sustainable Districts programme can be found on the programme website linked above.

Sustainable Land Use

Impact Goal 4: Make agriculture climate-smart

Instigate a substantial increase in the application of climate-smart agriculture (CSA) solutions.

Importance

Climate change is exacerbating the challenges faced by the agriculture sector. Climate change-induced increases in temperatures, rainfall variation and the frequency and intensity of extreme weather events are adding to pressure on the global agriculture system – which is already struggling to respond to rising demands for food and renewable energy. The changing climate is also contributing to resource problems beyond food security, such as water scarcity, pollution and soil degradation. Overall, productivity levels are expected to be lower than without climate change – due to changes in temperatures, crop water requirements and water availability and quality. Agriculture is also contributing a significant share of the greenhouse gas (GHG) emissions that are causing climate change – 17% directly through agricultural activities and an additional 7% to 14% through changes in land use. The main direct agricultural GHGs emissions are nitrous oxide emissions from soils, applications of fertilisers, dejections from grazing animals, and methane production by ruminant animals (enteric fermentation) and paddy rice cultivation. Currently accounting for 58% of total anthropogenic nitrous oxide emissions and 47% of total anthropogenic methane emissions, agriculture is expected to remain the main source of these non-CO2 gases in the coming decades. This trend is particularly concerning given the significantly higher global warming potential of nitrous oxide and methane relative to CO2. In addition, the sector generates emissions indirectly due to changes in land use, including land clearing and deforestation.¹¹

The scaling by an order of magnitude of CSA solutions in Europe is in line with the impacts expected from our CSA booster flagship. It is interesting to note that increasing resilience is often an “easy entry point” for farmers who are used to cope with risk and understand what climate change means. Technical solutions increasing resilience may be a good approach to create momentum and motivation to deal with climate change. For mitigation however, many solutions are not easy to implement because of the investments required or because many solutions are not profit-positive for farmers. It is therefore necessary to develop value chain approaches i.e. to work with other actors interested in climate smart solutions such as retailers or companies willing to demonstrate their commitment to climate related action.

Learning and levers of change

According to the IPCC, the main mitigation options within the agriculture sector are the following strategies: reduction/prevention of emissions to the atmosphere by conserving existing carbon pools in soils or vegetation that would otherwise be lost or by reducing emissions of CH4 and N2O; sequestration—enhancing the uptake of carbon in terrestrial reservoirs, and thereby removing CO2 from the atmosphere. Demand-side options (e.g., by lifestyle changes, reducing losses and wastes of food, changes in human diet, changes in wood consumption), though known to be difficult to implement, may also play a role¹²

The following leverage points have been identified:

1. Increased resilience is a key leverage point for farmers who are confronted daily with climate risks and provides an important entry-point for getting their attention and winning their trust.

¹¹ Agriculture and Climate Change, OECD, Sept 2015: <https://www.oecd.org/tad/sustainable-agriculture/agriculture-climate-change-september-2015.pdf>

¹² IPCC, Chapter 11, AFOLU https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter11.pdf

2. Information technologies including data analytics and tools can reduce the costs of production? and facilitate the implementation of climate-smart solutions.
3. Innovation in insurance and financing mechanisms for farmers, helping to de-risk investment in implementing CSA solutions.
4. Value-chain actors and decision makers are key levers for scaling CSA solutions, especially for mitigation solutions.
5. Public policies, at all levels can support or be barriers to new solutions

Training and education help raise awareness of farmers and value chain actors for CSA solutions and contribute to activate behavioural change. Action on scaling CSA also has important synergies with other 2030 climate innovation challenge areas, such as on innovation goal 5 around food systems, where CSA tends to be more focused on production and food systems more on demand-side dynamics. Nonetheless, connecting supply and demand is vital for food systems transitions. A second connection is with innovation goal 11 for example, where scaling specific risk management or insurance tools devoted to agriculture production can help meet both challenges.

Priorities

To innovate around these levers of change and achieve progress in multiple challenge areas, we would like to support potentially impactful proposals in the areas described in Section C, Page 6 that:

- Influence policy: EIT Climate-KIC will proactively be giving feedback to policy makers as agriculture is part of the most regulated industries (and a very political industry in most countries).
- Create changes through experiments combining mitigation and adaptation solutions and/or where the principle of circular economy in agriculture (e.g. closing the loops for different nutrients or for basic elements) is developed.
- Digitising agriculture: Test innovations in water and soil technologies, alongside land satellite analysis, more effective seeding practices (e.g. sensors/precision agriculture), and the use of big data to optimise farming practices. New solutions that increase the soil carbon content are especially expected.
- Develop innovative insurance products and financial mechanisms that aim to help scale the deployment of CSA solutions. EIT Climate-KIC already has an innovation portfolio that is working on the development, structuring and execution of CSA relevant risk and data analytics, monitor and evaluation tools, insurance mechanisms, and blended financing schemes, but de-risking solutions and innovative financial mechanisms are critical to the further scaling of CSA solutions.
- Develop tools that bring stakeholders along the entire value chain together to ensure a fair sharing of the value, develop pricing mechanisms taking into account the climate impacts.
- Capacity building of decision makers and farmer advisors: CSA booster has already developed a MOOC on Climate-smart Agriculture. Priorities will be to expand on-line training modules, using the lessons from the initial courses delivered.

Proposals to address energy *production* systems such as biogas production or any other energy production system are out of scope for 2018, but tools that can improve *energy efficiency* in agriculture (e.g. in the milk production sector) could be examined.

Impact Goal 5: Transform food systems

Transform climate-damaging food value chains and enhance the climate resilience of food supply.

Importance

The world's food production has increased substantially in the past century, as has calorie intake per capita. However, after a regular decrease in the proportion of undernourished people for at least three decades, the absolute number has recently increased to over 963 million. By 2050, population growth by an estimated 3 billion more people will increase food demand. Increased fertilizer application and more water usage through irrigation have been responsible for over 70% of the crop yield increase in the past. Yields, however, have nearly stabilized for cereals, partly because of low and declining investments in agriculture. In addition, fisheries landings have declined in the past decade mainly as a result of overfishing and unsustainable fishing methods.¹³ How with the current resources, we will be capable of sustainably feeding the increased population is a massive challenge. Furthermore, modern agriculture has led to a massive increase of intensive agriculture relying heavily on pesticides and fertilisers (to over 90 Million tons/year presently). It has also led to a massive decrease in biodiversity: since the beginning of agriculture, humans have cultivated 7,000 plant species; today only 150 plant species (2%) are agriculturally relevant for food and clothing and only 10 plant species are cultivated today to provide 95% of food and feed.¹⁴ This key value chains put a lot of pressure on the resources and the climate. Finally, currently 30% of the food gets wasted (in majority at the farm level in developing countries and to a large extent at the consumer level in developed markets).

By 2030 our goal is to have deeply transformed several climate-damaging food chains and to have significantly improved the climate resilience of food supply. If successful, we believe that beyond the direct impact on food, agricultural practices could also be transformed. The development and application of sustainable and inclusive food value-chain approaches will enable significant climate performance along the value-chain from input supply and food production to post-harvest handling and storage, processing, distribution, marketing and retail, as well as generation and disposal patterns of waste. Consumers' awareness should be raised regarding reduction, recovery and recycling of food waste that is still fit for human or animal consumption or other purposes (e.g. to create biomaterials or bioenergy). Impacts on agricultural production and on the whole food system are in turn expected to translate into increasing resilience, food security and reduced carbon footprints. Specific impact points are e.g. the development of sustainable and resilient solutions (technological or non-technological) to increase resilience and sustainability of food systems such as the development of insurance mechanisms, the development of alternative protein production systems from both terrestrial and aquatic origin, the reduction and valorisation of waste in the food production and the use of ICT solutions to enhance traceability and sustainability of agri-food systems, and consumer behaviour change.

Learning and levers of change

Consumer behaviour change, often induced by marketing and retailer practices, is a key driver and leverage point. Such change is happening at unprecedented levels for example in the shift from milk to plant-based drinks. How do we encourage farmers to adapt to this and consumers to buy from quality producers, maximizing nutritional quality? Correlated with these changes, the consumer purchasing behaviour, more and more online and local, is also changing, and so is that of the farmers who seek to sell directly. How do we create viable platforms for this, as transparently as possible? Cities are also important actors and they often wish to be active on food in various ways: local production in their surrounding territories, reduction of waste, diet changes. At city level, it is important to develop relevant metrics, address capacity building of civil servants and to empower community-led initiatives to accompany and accelerate change.

¹³ The environmental food crisis- the environment's role in averting future food crises, UNEP (2009). <http://old.unep-wcmc.org/medialibrary/2010/09/07/51d38855/FoodCrisis.pdf>

¹⁴ Wilhelm Gruissem, ETHZ, The Food Security Challenge: What's Next?, 2017

Educational programmes of consumers and legislation are key in the food waste reduction. Industries and entrepreneurs –as demonstrated by our start-up accelerator programme- are critical for the food waste valorisation and in the development of resource efficient agri-food systems. The vibrant food-tech ecosystem is also a key leverage point since it demonstrates significant entrepreneurial momentum. EIT Climate-KIC accelerated start-ups are an essential part of our ecosystem in the food area, which need to be supported for the scaling of their solutions.

The actions that address food systems are linked to technologies and methodologies that cut across other 2030 climate innovation challenge areas. For example, development of resource efficient agri-food chains with the fractionation, re-utilisation and valorisation of food wastes for biomaterials, contribute to the optimisation and efficiency of industrial processes and circular economy principles developed within the SPS Theme. Development of integrated and sustainable urban food systems and innovative approaches for urban food waste recycling and valorisation will benefit and support the transition to sustainable and greener cities as developed by the UT Theme. More generally, we expect synergies between agriculture and food to be developed, since reconnecting production and consumption is critical for the transformation of the global food system.

Priorities

To innovate around these levers of change and achieve progress in this challenge areas, we would like to support ambitious proposals in the areas described in Section C, Page 6 around:

1. **Food security and systems: enhancing food security by improving resilience and sustainability of food systems**
 - **Development of sustainable and resilient solutions (technological or non-technological)** to increase resilience and sustainability of food systems, by developing de-risking and sharing value mechanisms, and diversified products and processes to mitigate (financial) risks for supply chain actors.
 - **Innovative and citizen-driven food system approaches in cities:** demonstration and first application in the market of innovative solutions, co-created with citizens and cities with the involvement of public authorities, economic actors and non-for-profit organisations.
 - **Development of integrated and sustainable urban food systems:** addressing metrics for monitoring, measuring, reporting and communicating, civil servant trainings and integrated communication at city level.
 - **Holistic food systems analysis and assessment,** including environment, social and economic indicators, addressing data availability and quality, and methods for social sustainability assessment.
 - **Assessment of consumer behaviour change drivers,** addressing marketing and retailers' strategies.
2. **Food waste: enabling circular and bio-based economy development by reducing, recovering and reusing food waste for biomaterials and bioenergy**
 - **Reduction of preventable food waste,** through changing consumer habits and awareness of food consumption and waste generation, improvement of stock management (through technological solutions), marketing strategies for retailers, and legislation & policy issues.
 - **Valorisation of unavoidable food waste,** addressing fractionation, re-utilisation and valorisation of wastes for biomaterials and bioenergy (including industrial food waste).
 - **Development of integrated system innovation approach in urban food waste recycling and valorisation for the production of high-value bio-based products,** validating technical and economic viability of the proposed approaches, new business and organizational models on cities, improved perception and participation of citizens/consumers through social innovation initiatives.
3. **Foodtech: catalysing food innovations that increase the connections between food production and consumption for greater climate impact**
 - **Developing high quality proteins for food** from both terrestrial and aquatic origin. Future-proofed protein supply chains based on the principles of diversity, sustainability and resilience, addressing trust and consumer acceptability for alternative protein sources and processes.

- **ICT-Enabled agrifood systems**, developing big data pilot platforms enabling ICT applications to assist consumers and other food chain actors to enhance traceability, sustainability, less waste and better nutrition; new data-driven ICT solutions and business models across the whole food system to reduce the environmental footprint, increase system resilience and empower consumers; and addressing societal and human components and acceptance, data-sharing amongst actors, and EU regulation.

Furthermore, we are looking for later stage innovation proposals that support:

- Innovations that contribute to the development of alternative food value chains, in particular if they take a systemic approach and support the creation of new connections between actors and contribute to disrupt climate-damaging ones.
- Innovation mechanisms and tools that contribute to scale climate-relevant innovations in the Foodtech sector, particularly if developed in cooperation with EIT Food or Food Nexus activities.

For skills development, we are looking to further develop the following activities:

Education and capacity building innovative activities are needed, particularly to help transform the consumer behaviour regarding food waste reduction at source, and for building a sustainable and resilient food system.

Within our portfolio on food value chains, urban agriculture will not be considered as a priority, given its uncertain impact on climate as a food production mechanism. Such activities can indeed contribute to greening the cities but as such relate more to Impact Goal 2. The resilience of food value chains is already addressed within our current demonstrator and scaler projects Winners and therefore will not be developed unless different and innovative. In general, we will not support technological developments without a clear context that supports a coherent innovation path for change in food value chains change with a clear climate mitigation impact. We are also not pursuing purely academic or educational programmes, i.e. teach-ins, new MOOCs, or other modules without clear commercial upside and mass distribution (supported by marketing budgets).

Impact Goal 6: Nurture forests in integrated landscapes

Grow carbon sequestration in forests and linked value chains, while avoiding deforestation.

Importance

By 2030, our goal is to significantly reduce net GHG emissions through carbon sequestration in forests and associated value chains and through avoided deforestation. The forestry systems and their climate-related functions in biomass production, conservation of ecosystems, sequestration of carbon and downstream substitution of fossil carbon, are critical to the achievement of the Paris Agreement. These functions need to be enhanced in Europe while their degradation needs to be stopped in tropical countries. Today, forests in Europe capture annually 450 Mt CO₂, or 10% of total EU emissions. To this contribution should be added the substitution effect of wood construction and bio-economy solutions to account for their overall climate change mitigation effect equivalent. Recent studies suggest that this contribution could be doubled if the right incentives would be provided to support afforestation, forest management and the substitution of fossil-based products by forest-based solutions. There is however a lot of debate on the best ways to quantify the substitution function, which requires clarification to influence decision and action.

Learning and levers of change

From a sustainable land use perspective, six important leverage points have been identified in the Forest sector:

- 1. Improved connections between sustainable forestry management, marketing and downstream value creation by substitution of fossil carbon in bio-based products including wood construction products.** The lack of such connections, (often facilitated by the global standards FSC and PEFC) makes it doubtful whether the wood entering the downstream value chains, contributes to climate change mitigation. Measures facilitating traceability or transparency in the marketing of wood remain highly desirable.
- 2. Increased value creation from the wood and biomass harvested.** Innovation is already active in that area with several solutions developed to either increase the value of wood or to diversify the products. The first transformation industries (sawmills in general) are however not often well equipped or knowledgeable about these solutions. Without better value generation from wood, many smallholder foresters will not be interested to exploit their forests better.
- 3. Long term scenarios for wood availability in quantity and quality are critical for policy decisions and investors.** Wood industry investments are long-term and capital intensive. Without confidence in the long-term availability of wood, policies and investments are difficult. This difficulty is made even more acute with climate change, which pleads for an explicit inclusion of adaptation measures in these scenarios.
- 4. Substitution of fossil carbon in downstream value chains should be better understood and assessed.** For instance, the residence time in the value chains remains unknown and unaccounted for. Substituting carbon from cement products or from plastic bags is definitely different from a climate perspective. This also shows that circular economy, that increases the residence time in a series of products needs to be connected with bio-economy. Without a good substitution framework, the development of new downstream value chains will be difficult and will not necessarily have the best possible climate impact.
- 5. Citizens' and customers' behaviour and preferences are changing and need to further change.** Wood based products are increasingly consumed while citizens in Europe see forests mostly as conservation landscapes. The risk is that the productive functions of our forests remain under-developed and that an increasing part of our forestry carbon footprint be outsourced, which would probably mean increased deforestation in tropical countries.
- 6. Finally, integrated landscape approaches are gaining traction globally and will expand beyond the priorities.** Landscapes and territories are the places where tensions between land uses are managed and where zero-sum games between them are occurring. Holistic approaches to landscape management are currently seen as the way to maximise environmental, social, climatic and sustainable economic benefits for the societies they host. They will be also a framework to develop resilience based approaches that balance

different land-use requirements and overcome competing interests that currently only favor economically viable approaches.

There are a series of connections between forestry and other innovation challenge areas – for example to agriculture in Impact Goal 4, where agriculture is often in competition with forestry for land and this pleads for integrated agro-forestry measures that can increase the economic benefits for farmers or foresters. There are connections to urban transitions issues, such as those in Impact Goal 2, where cities are connected to their surrounding territories for ecosystem services that can offer climate resilience benefits. Other key interactions relate to finance, which plays a key role in the integrated landscape approach, covered in Impact Goals 10-12 and to water that cuts across a series of challenges. Finally, the development of downstream value chains in wood construction and bio-circular economy interact with the activities of UT on retrofit in Impact Goal 1 (and BTA flagship) and SPS on circular economy production systems around Impact Goal 7.

Priorities

To innovate around these levers of change and achieve progress in this challenge areas, we would like to support ambitious proposals in the areas described in Section C, Page 6 around:

- 1. Increase downstream substitution of carbon by developing new supply/value chains while enhancing the sustainable management practices of forests that maintain or increase their natural carbon sink;**
 - Monitor forest evolution and assess wood availability in the future to unleash confidence and financial investments;
 - Refine the knowledge around the substitution effect to help decision making in bio-economy and raise incentives to develop the value chains
- 2. Maintain or increase resilience and sustainability of European forests**
 - Develop new business models integrating the accounting methodologies and financial instruments for risk management to enhance the harvesting of unmanaged forests, principal areas concerned by the extreme events and pest risks;
 - Facilitate decisions of all actors, particularly in the territorial institutions at regional level and increase awareness of forest sustainable management measures
- 3. Connect landscapes and territories, especially those that support economic, social and environmental functions and are the playgrounds of competing interests.**
 - Connect cities with their surrounding territories for food and biomass production and for ecosystem services management. The need here is for innovative tools and solutions for cities and local authorities willing to develop or maintain relations with their surrounding territories and ensure they can source products, reduce environmental (including carbon) footprints, develop socially inclusive approaches with their local communities.
 - Unlock finance for integrated landscape approaches to tackle deforestation and enhance landscape conservation and restoration. Tackling deforestation requires a more systemic approach including the agriculture value chains, the land tenure problems and the governance issues. One key point in this field will be to help the adoption of sustainable land management practices in territories affected by deforestation and land degradation. Another one is to develop financial tools and public and private partnerships to accelerate and scale projects in this field.

Within these systems, actions that relate to the 5 leverage points or the integrated landscape approaches identified above are expected to be proposed. Tools related to prevention or monitoring of deforestation are also prioritized, but as much as possible in connection with integrated landscape approaches.

We are looking for earlier stage innovation proposals that:

- Combine different metrics to help integrate land uses in a given territory; these relate in particular to food, biomass, ecosystems, natural capital and biodiversity. Innovative tools using remote sensing or big data to develop and integrate these metrics are also welcome.

- Develop tools for valuing natural capital and ecosystem services and possibly connect them with tools valuing the other resources of a given territory.
- Develop integrative tools capable of optimizing land uses in a territory combining production and protection functions
- Reinforce traceability tools and services, using certification, blockchain or other tools, aiming to avoid deforestation
- Prepare new framework(s) for fossil carbon substitution in downstream value chains
- Innovate with technical solutions, allowing the value extracted by forest biomass to be maximised.
- Aim to increase the resilience of European forests

We are looking for later stage innovation proposals that:

- Develop scenarios for future wood availability in quality and quantity in relation to tackling climate change.
- Develop and implement blended finance approaches, especially for integrated landscape approaches.
- Implement integrated landscape approaches and test new models for such integration, including the development of ad-hoc methodologies and visualisation tools to facilitate decision making for land management

Sustainable Production Systems

Impact Goal 7: Recast Materials Production

Catalyse a switch to a circular economy and transform production for fossil-energy intensive materials.

Importance

Resource productivity is still underexploited as a source of wealth, competitiveness and innovation. According to recent studies, Europe loses 95 per cent of material and energy value, while on average using materials only once. The adoption of the EU Commission's Circular Economy Package provides a clear indication of the transition of the European economy towards closed-loop systems. It foresees a transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised. This is an essential contribution to the EU's efforts to develop a sustainable, low carbon, resource efficient and competitive economy. The prevailing one-way 'extract, produce, consume, and dispose' model is not just wasteful – it also has a significant climate impact that means a closed-loop system revolution is needed to meet the climate challenge. In a circular economy, economic growth would be decoupled from resource use. Research on the built environment, food and automotive sectors shows that a closed-loop economy could reduce carbon emissions by as much as 48 per cent by 2030 and 83 per cent by 2050 (compared with 2012 levels)¹⁵.

Learning and levers of change

The key levers of change include:

- **Business Models and Digitalisation** – This circular economy provides multiple value creation opportunity to scale mechanisms decoupled from the consumption of finite resources. New digital technologies and business models could address much of the structural waste in many sectors and create new consumer choices. Increasing utilisation and longevity would have significant economic upside and go far towards avoiding negative system effects.
- **Finance and Metrics** - The circular economy transition would involve considerable costs, such as R&D and asset investments, stranded investments, subsidy payments to promote market penetration of new products, and public expenditure for digital infrastructure. New capital flow will unlock circular economy infrastructure. Sharing and digitization, for example, have potential to increase consumer utility but are not well captured in GDP. Cities, business and policymakers might adopt a more balanced set of metrics to measure the success of its economy.
- **Policy** – Shifting to a new economy model will affect all policy domain given the systemic nature of the circular economy. The current fragmentation of policy regulation and legislation addressing the various parts of the circular economy system present a barrier to the scalability of circular solutions. European, national, regional, and city levels policymakers should promote clear long-term circular policies so that decision makers adopt and support this new system, including ambitions, targets, investments, and trade-offs.
- **Consumer Behaviour** - The circular economy represents a new societal and economy model. The value-system and consumer behavior of our current society are a barrier for the scaling and uptake of circular economy. Europe is amid an irreversible shift in consumer behavior, where products as a service and refurbishment of high-value products acknowledges customers support of a new economy.

¹⁵ Ellen McArthur Foundation(2016): Growth Within: A Circular Economy Vision for a Competitive Europe. https://www.mckinsey.com/~media/mckinsey/business%20functions/sustainability%20and%20resource%20productivity/our%20insights/europes%20circular%20economy%20opportunity/growth_within.ashx

Priorities

To innovate around the levers of change and achieve progress in multiple impact goal areas, we would like to support ambitious proposals in the areas described in Section C, Page 6 that enhance the commercial maturity and technology feasibility of circular economy solutions as follows:

End-of-Life Projects:

- **Lean Secondary Flows** - Increase the percentage of by-product streams and re-used waste flowing into value chains. Open smart-digital platforms for matchmaking high-emissions waste materials with value chains in urban and industrial areas through symbiotic relationships.
- **Low-Carbon Recycling innovation** - Increase the percentage of sustainable secondary and renewable feedstocks into the production of new high-value products in urban areas.
- **Natural Capital value maximisation** - Maximise valorisation of bio-economy in waste systems. Enhances the value creation bio-based products and materials by cascading them through other applications.
- **Urban mining projects** - Scale the use, repurpose and recovery of material, of compounds and elements in urban landfills for different products or the built environment.
- **EoL Digitalization** - Catalyse big open data platforms, smart assets, electronic data exchange, blockchain Internet of things, sensing and automation to develop hyper-connected, traceable and smart waste management networks.

Circularity of products and materials proposals: They aim to increase materials and products circularity in the upstream and use-phase of the value chain.

- **Materials level:** Address persistent and toxic substances by promoting pure material inputs for new products and streamlining/standardizing feedstocks.
- **Products level:** Create new open design requirements endorsed by large value chains or regions. Scale Design for Product Integrity strategies to improve the durability and long use of the product. Innovations on manufacturing 4.0 processes such as low-carbon closed-loop additive manufacturing.
- **Urban value-chains level:** Explore projects that create through material flows symbiotic relationships within EU cities. Innovations that build and connect cross-EU regions/cities open materials stocks dynamics and explore matchmaking synergies.

Dematerialisation of urban demand Projects: They aim to maximise the value to society of products and services to meet urban demand with the minimum resources input/output.

- **Digitalisation lever:** Develop EU-level big data open platforms to foster materials' information exchange and symbiotic relationships within EU value chains leveraging artificial intelligence, blockchain and internet of things protocols.
- **Business model lever:** Explore the implementation of a circular business model lab where it brings to market Products Service Systems (PSS) and personalisation projects and start-ups. Implementation of high-impact sharing platforms across EU to promote collaborative lifestyles, re-thinking consumption patterns and redistribution markets.

Metrics and financial Instruments - experiments that raise the awareness of the role of financing instruments to unlock close-loop technologies. Initiatives that boost the flow of capital into close-loop solutions in urban areas by de-risking the profile of circular business models.

Capacity Building and Policy Awareness - Solutions that promote policies and raise the understanding of the role of circular economy next to policymakers. Solutions that boost the engagement of consumers into a Circular economy society through activities, products, education, e.g. leveraging local living labs and eco-centers in relevant communities.

SPS is transitioning from sectoral and single technologies to a more systemic approach with cities and regions as innovation test beds (e.g. Smart Sustainable Districts), working on finance, skills, policy organisational governance and technology as drivers of change. Our aim will be accelerating the go to market for scalable, open source, shared IP innovation and business models through collaboration between different knowledge triangle stakeholders (e.g. corporates, SMEs, academia, NGOs). Therefore, we will not support projects that test or scale

one individual technology without placing this in the context of the wider system changes needed to create net-zero carbon cities and regions and are not leading to an added value among different stakeholders. Additionally, given the composition and strategic ambition of the Loop programme portfolio there are types of proposals that this impact goal will not scout in 2018, namely (a) textile, logistics and paper industries, (b) 1st generation biomass, Waste-to-Energy solutions, CCU/CCS, energy efficiency.

Impact Goal 8: Reduce Industry Emissions

Partner with key industry stakeholders in cutting value chain emissions to reach science-based targets.

Importance

The Paris Agreement has the long-term goal to reduce global Greenhouse Gas (GHG) emissions by at least 60% below 2010 levels by 2050, and to set out clear, specific, ambitious and legally binding mitigation commitments that would keep the increase in global average temperature to well below 2°C above preindustrial levels. The aim is to limit the increase to 1.5°C, since this would significantly reduce risks and the impacts of climate change. To meet this ambitious goal, all sectors and industries must leverage this opportunity to innovative and explore new ways to generate value to society decoupled from GHG emissions. The 2,500 largest global corporations account for more than 20% of global GHG emissions, and emissions resulting from corporate operations are typically exceeded by those associated with their value chains on an average ratio 4:1 of indirect supply chain emissions compared to direct operational emissions ¹⁶.

Complementing these facts, the potential for industry to reduce its GHG emissions is significant, particularly because of its use of fossil fuels as its primary energy supply. Industry is also the largest sector in terms of energy consumption. According to the International Energy Agency (2016)¹⁷, total final consumption of energy by industry amounted equivalent to 35% of the global total demand. High-emissions industry leadership in setting GHG targets (scope 1, 2, 3) aligned with the carbon mitigation pathway is essential to unlock the innovation potential, supply chains transformation and investment into carbon-neutral technologies towards the 'well below 2°C' goal (science-based).

Impact Goal 8 seeks to accelerate the understanding and uptake of science-based CO₂ targets by high-emission industries value chains, and scale climate-ready innovation services that enable game-changing deep decarbonization pathways.

Learning and levers of change

To make the adoption and implementation of CO₂ science-based target (SBT) mainstream in high-emission industries, it is necessary to have robust and sector-accepted SBT methodologies and standards. We have identified the following four priority leverage points to push decarbonization and resilience in energy intensive industries aligned with climate-science:

- **Technology:** Market-ready SBT services and tools supporting carbon-intensive industry in developing transformation roadmaps and matching innovation projects.
- **Information/Metrics:** Technical work and modelling that support global GHG scope 3 SBT methodologies, standards and guidelines. Uptake of metrics based on science based targets encompassing scope 3 emissions by key value-chain organizations and cascading it in their procurement requirements.
- **Finance/Policy:** National and local regulations that promote and encourage science-based value-chains and products.
- **Skills:** Stakeholders knowledge and understanding of SBT methodologies, framework and science-led industry opportunities.

Priorities

To advance SBT update and high-emissions industry transformation, we are introducing the Well-Below 2°C Pathway programme. This long-term transformative innovation programme focuses on industrial decarbonisation roadmaps towards science-based carbon neutrality. The programme will support EIT Climate-KICs long-term goals

¹⁶ Carbon Disclosure Project (2017) Supply Chain Report - Missing link: Harnessing the power of purchasing for a sustainable future. [Link](#)

¹⁷ International Energy Agency (2016) Tracking Clean Energy Progress 2016. [Link](#)

of net-zero-carbon use in industrial processes in the EU through developing transformative roadmaps for high-emission industries. We will prioritise the following sectors: cement, metals (iron, aluminum and steel), chemicals/petrochemicals and automotive, because these are the crucial industrial sectors for decarbonisation of cities and regions (construction, manufacturing of goods and passenger cars). To innovate around the levers of change and achieve progress in multiple impact goal areas, we would like to support ambitious proposals that:

- **Innovation Ecosystems:** strengthen the capacity to connect SBT-driven industries and respective innovation solution ecosystems and supply chains.
- **Innovation Experiments:**
 - advance an innovation demonstration with automotive, construction or manufacturing sector stakeholders, and learn from the demonstration to co-design and co-create EIT Climate-KIC sector-wide service offerings.
 - develop deep decarbonisation roadmaps, tools and methodologies covering GHG scope 3 emissions, aligned with science-based targets, for carbon-intensive industrial stakeholders.
 - enable high-emission industries to understand the financial and strategic opportunity of potential SBT climate transition pathways, and leverage learnings to co-create EIT Climate-KIC service offerings.
 - co-create an EIT Climate-KIC service offerings to measure, reduce and declare high-emissions industry progress towards carbon neutral products, brands and companies.
- **Skills Development:** create training modules and courses that support relevant stakeholders in the automotive, construction or other manufacturing sectors to measure SBT scope 3 emissions and implement innovations and changes to reduce these.

Sustainable Production Systems is transitioning from sectoral and single technologies to a more systemic approach with cities and regions as innovation test beds, working on finance, skills, policy organizational governance and technology as drivers of change. Our aim will be accelerating the go to market for scalable, open source, shared IP innovation and business models through collaboration between different knowledge triangle stakeholders (e.g. corporates, SMEs, academia, NGOs). Therefore, we will not support projects that test or scale one individual technology without placing this in the context of the wider system changes needed to create net-zero carbon cities and regions and are not leading to an added value among different stakeholders.

Impact Goal 9: Reboot Regional Economies

Transition carbon-intensive regions to become zero-carbon innovation hotspots.

Importance

Achieving the 2050 targets for net-zero emissions will require a region-by-region decarbonisation plan. Drawing on lessons learned by the Smart Specialisation and European Regional Development Fund directed by DG Regio, the EU recognises that the transition towards a sustainable economy will not affect all cities and regions equally. Regions that are today economically dependent on fossil fuels (e.g. coal-mining communities or ports with oil refineries) and energy intensive industries will see their economies upended as the shift toward decarbonisation makes these fossil resources un-burnable. Managing the industrial transition toward the “prosperous and inclusive” elements of EIT Climate-KIC’s overall ambition will require entrepreneurial innovation experiments at the interface of decarbonisation and economic development. We need to begin now to apply this innovation at scale as 2050 approaches.

Learning and levers of change

The overarching leverage logic is as follows:

- Apply a systematic approach toward the understanding the regions that are most at risk for economic disruption because of decarbonisation;
- Draw on lessons learned from our experiments and interventions to develop repeatable, scalable offerings applicable to a variety of carbon-intensive industries and regions, with the flexibility to allow regions to make the most of their existing knowledge and human and natural assets into new sectors with higher added value;
- Use these offerings to unlock larger sources of funds – such as the European Regional Development Fund – through smart specialisation that creates growth in low-carbon opportunities.

The Re-industrialise cause-related programme is a new area of work for 2018. While EIT Climate-KIC has had some experience in this area already – for example, in the RIS and Smart Sustainable Districts – the programme aims to aggregate existing EIT Climate-KIC and external knowledge (for example from DGs REGIO and JRC) and build upon it.

Specific key leverage points, or roles for EIT Climate-KIC and Partners to play, that support the logic above include:

1. **European Re-industrialise Network Platform:** Be a knowledge and brokerage platform for ensuring that the transition to a decarbonised Europe is achieved in a way that is inclusive and prosperous.
2. **Solutions Lab and Accelerator:** Create a space for controlled experimentation and innovation in win-win solutions for economically inclusive decarbonisation, in partnership with a set of cities and regions committed to being leading-edge test beds for transformative climate action.
3. **Policy and Finance Catalyser:** By serving as an enabler, facilitator, and knowledge broker, develop mechanisms that raise awareness on the role of financing and policy to unlock key solutions that link decarbonisation with economic vitality.
4. **Capacity Building and Knowledge Hub:** Promote and deliver proven skills and learning programmes targeted not just at industry and political decision-makers, but those in regions who need to transfer, build, and adapt existing skills in carbon-intensive work to a decarbonised future.
5. **Custom Services Provider:** Provide tailored knowledge and consulting services to organisations and regions at the intersection of decarbonisation and economic development, as well as policymakers and influencers who want to inform their perspective with the rigor and experience the flagship will develop.

Reducing or eliminating the economic downsides of industrial transition will remove a major political barrier to decarbonisation, allowing some of Europe’s most carbon-intensive regions and industries to achieve faster climate progress. There is also a strong link between the kinds of industries that are most difficult to decarbonise and the

potential of economic disruption. For example, while a *power plant* can switch from coal to gas or biomass, keeping its jobs, closing a *coal mine* means that at the very least, its workers will need to re-train. The story is similar for steel and cement, which are point sources of emissions that cannot be decarbonised via fuel switching, since CO₂ is an emission inherent in their production.

Priorities

The main priority for 2018 in the Re-industrialise programme is its flagship. Its call for proposals was developed and launched in Q4 2017 and will be awarded by the beginning of February. In early 2018, the flagship will establish its governance model, including an aligned multi-annual plan, clear roles and responsibilities, and a concrete self-sustainability business model. It will begin its initial projects, perhaps including benchmarking and deep dives into finance, skills, policy and technology. An additional strategic objective is to deepen the connections within the broad EIT Climate-KIC community to consolidate our efforts on Re-industrialise, bringing them under one tent. We are fortunate to have several related past and current activities, with an opportunity to organise these and new work under a cohesive approach. Key linkages between the flagship team and EIT Climate-KIC include:

- Geographies, because Re-industrialisation is fundamentally a place-based issue.
- The Urban Transitions theme, whose Smart Sustainable Districts (SSD) flagship is expert in developing relationships with city and regional authorities, and has received a proposal regarding the conversion of the former Gela oil refinery in Sicily into a bio-refinery.
- Education and Entrepreneurship, which provides the training and support needed for capacity building and a new generation of leaders and companies.
- The Eco-Clusters workstream of the SPS theme, which is investigating how innovation and capacity building can support industrial clusters in driving systemic change.
- The EIT Regional Innovation Scheme (RIS), which already focuses on some of Europe's most carbon-intensive regions and seeks to deepen collaboration with DG Regio on its Smart Specialisation Strategies agenda and other ways to help it deliver on its mission.
- Strategic partners to provide expert guidance on topics and join forces to pitch new sources of funding. An example is the European Climate Foundation (ECF), which has indicated it could provide guidance on policy (e.g., the role that Carbon Capture and Utilisation (CCU) can play in the environmental and economic transition of regions) and already shares our worldview that systemic change is needed.

Sustainable Production Systems is transitioning from sectoral and single technologies to a more systemic approach with cities and regions as innovation test beds, working on finance, skills, policy organisational governance and technology as drivers of change. Our aim will be accelerating the go to market for scalable, open source, shared IP innovation and business models through collaboration between different knowledge triangle stakeholders (e.g. corporates, SMEs, academia, NGOs). Therefore, we will not support projects that test or scale one individual technology without placing this in the context of the wider system changes needed to create net-zero carbon cities and regions and are not leading to an added value among different stakeholders.

Some regions categorised as “less developed” or “transition regions” by EU statistics also show the lowest energy efficiency performance. Thus, the allocation of the European Regional Development Fund (ERDF) in strategic priorities is a clear indication for exploiting opportunities in emergent markets. While the link between energy efficiency measures, job creation, and economic vitality is clear, these topics are for now out of scope: Deep retrofit, other energy efficiency measures, and decentralised energy production fall under the Climate Innovation Impact Goal 1.

Decision Metrics and Finance

Impact Goal 10: Mainstream climate in financial markets

Advance the metrics, standards and instruments that enable transparent, true-cost and benefit accounting for a well below 2°C pathway

Importance

By 2030 our goal is to close the climate finance gap for adaptation and mitigation so that finance flows will be to low-carbon and resilient assets. Given our global carbon budget (590-1 240 GtCO₂ from 2015 to the time of peak warming) compatible with a 66% likelihood of remaining below 2°C, we have roughly 15 to 30 years of fossil-fuel-related CO₂ emissions at current rates. To keep warming well below 2°C we will require not only reducing emissions of all GHGs but also “net negative” emissions later this century (OECD, 2017). Consequently, the investment challenge is significant; according to the HLEG interim report (2017), over the next two decades Europe needs about €180 billion in additional yearly investment, notably in clean energy, to keep the increase in global temperatures to well below 2 degrees Celsius. On a worldwide scale, this is a US\$12.1 trillion investment opportunity over the next 25 years (BNEF, 2016) whilst adaptation costs are likely to be in the range of US\$140-300 billion per annum (UNEP, 2016).

The current financial markets and economic system have not systematically included the costs of climate change, resulting in the critical need to reallocate finance to climate investments, and simultaneously work towards integrating the costs of climate change into business as usual. This work is compounded by the fact that climate effects and impacts are difficult and contentious to monetize and value. Global carbon pricing, though fraught with political and economic complexities, has the potential to systematically change the relative prices of all goods and services: those with a higher carbon content (and thereby polluting) become more costly than cleaner alternatives. Where a clear metric exists in mitigation efforts, pricing risk is even more challenging because of lack of accepted metrics as well as the uncertainty associated with climate impacts. Whilst the degree of adaptation needed may change resulting from mitigation pathways, significant global warming and impacts are already locked in making planning for adaptation crucial. As a result, understanding risk is a key foundation to allow planning and thereby investment into adaptive measures.

Impact Goal 10 seeks to advance financial decision-making tools and financial instruments that enable transparent, true cost and benefit accounting and to integrate metrics, standards and targets compatible with the Paris Agreement into corporate and financial investment decision-making, to shift financial flows. With the lack of an accepted price for carbon, novel metrics and ratings that are integrated into existing corporate and financial investment decision-making are essential. Moreover, standards and targets that include climate considerations are critical for the financial markets as a benchmark against which performance needs to be measured that will keep the world well below 2 degrees and minimize impacts of climate change. New investment vehicles and novel financial instruments that also channel financial flows to pro-climate bankable assets are also essential.

Learning and levers of change

To close the finance gap, key root causes that need to be addressed include:

- Internalising externalities, such carbon pricing, and valuing intangibles, particularly co-benefits.
- Developing adaptation and risk metrics.
- Facilitating and scaling how to leverage public funding to crowd in private investment.

For advancing decision making tools and financial instruments, key leverage points are:

- Capacity building and education of individuals in the financial industry on climate mitigation and adaptation, as well as climate action proponents in finance, as these gaps in capacity cause blockages in the project-investment pipeline.
- Development of regulation and incentives that support climate friendly investments while recognizing the broader regulatory challenges that financial institutions face is necessary.
- Disclosure, standards and transparency to make corporate accountable to their shareholders for investments taken on their behalf.

Unlocking finance in general is a transversal challenge to support the movement towards a world well below 2 degrees along all other impact goal areas. Testing, demonstrating and scaling innovations for real economy applications require investment and channels through which these investments flow.

Priorities

For advancing decision making tools and financial instruments, we welcome proposals in areas described in Section C, Page 6 focused on:

- **Innovations that work towards valuation of externalities** - We are looking for innovative methods or techniques that can adequately and robustly incorporate climate considerations into financial accounts and valuation. These can be *metrics, ratings and standards that allow uptake and scaling of finance*. These however need be positioned complementarily within the emerging market of metrics and ratings. These can also be innovations that update the generally accepted academic theories that underpin financial decisions and economic policies and decisions at any level – individual decision-making, level of the firm, or macroeconomic level.
- **Innovations for promoting transparency and accountability** - may include applications of blockchain, and also around promoting disclosure of financial and other risks, and can be innovations in **climate accounting and reporting methodologies e.g.** scope 3, future impacts and actions, resilience, among others), but also in tailoring the available and newly produced data into practical information and services for climate action.
- **Innovations that scale finance: Financial products and novel fund structures** that aggregate or scale investments, particularly with a view to mainstreaming climate finance more broadly. **Also mechanisms to expand and scale blended climate finance** are needed
- **Innovations that enable scaling of finance:** While climate finance needs to be scaled very quickly, **the integrity of nascent markets and emerging asset classes as they scale needs to be safeguarded**. In the case of the market for green bonds, there are needs to develop better standards, improve verification, and integrate aspects such as resilience, but also tie this to enabling regulatory environments. Innovative offerings to accelerate the development of sovereign green bonds could help in financing Nationally Determined Contributions (NDCs).
- **Programmes that educate climate proponents on finance, or financial industry individuals on climate.** Capacity building and understanding of the climate and finance nexus is a key lever we seek to address. We are looking for best-in-class curricula, modules, programmes, or other forms of training content developed by consortia rather than individual institutions that can then be scaled quickly throughout Europe and globally.

In all activities, we look more favourably on collaboration – e.g. consortia from various sectors rather than single -organisation proponents, as collaboration, particularly across sectors, enhances the quality of projects both in terms of outputs and market traction, and ultimately systems change. Innovations in the above must have a clear link to addressing a lever of systemic change in the finance space. DMF is looking to reduce the proliferation of metrics, ratings and standards that are not connected to existing standards, or that address a group of decision metrics that are not currently on the market, as a key challenge we seek to address is the lack of widely accepted metrics and standards. New accounting methodologies should build upon state-of-the-art methods.

Impact Goal 11: Democratise climate risk information

Enhance access to risk information through capacity building and a major expansion of the climate services market

Importance

By 2030, we want to democratise access to risk information on impacts of climate changes and climate-related natural disasters and foster an expansion of the global market for physical climate risk information that will allow extensive adaptation planning, supporting adaptation innovation and investment. Understanding physical risk is the first part of adequate adaptation planning and allocation of financing to adaptive measures. Models that assess the severity and probability of loss from climate-related risk are often proprietary to the insurance industry, but such models and data are needed aid informed planning and risk reduction activities, as well as appropriate risk transfer products, by city governments, energy modellers, commodity traders, infrastructure investors and engineers, health systems planners and a range of supply-chain dependent businesses. An expansion of this market demand means a wide variety of stakeholders and end-users (including and beyond insurance) will have an improved understanding of climate risk through access to transparent and standardised analytics, which can facilitate pro-resilience investment, planning and risk transfer decisions.

Learning and levers of change

For democratising access to risk information, key leverage points are:

- **Expanding the availability of data, models and tools**, including coverage of available data
- **Supporting new users** for maximum uptake at project and market-scale, including capacity building
- **Mainstreaming of standardisation and transparency in risk models and tools** (including assumptions around uncertainty) in key market segments.

Priorities

For democratising access to risk information, we welcome proposals that enhance the work of the Climate Risk Information (CRI) Flagship aligned with the areas described in Section C, page. 5, by:

- **Building support with supply side actors to incentivise and embed a culture of standardisation and interoperability**, including working with data and model suppliers, and public funders supporting data, model and tool developments to incentivise and embed a culture of standardisation and interoperability. CRI will also support translational and enabling products such as data visualisation, toolkits that unlock existing models and data, capacity building, and configuration tools. The aim is that open access, interoperable model development is as normal as open access publishing.
- **Increasing demand for climate risk information** by improving climate risk literacy of decision-makers across key sectors with training, capacity building tools and education, in collaboration with other multipliers and funders. CRI will allocate dedicated resources to grow the application of climate risk information by participating in large calls and development focused institutions, as the need for improved climate risk information is especially urgent outside of Europe, however strongly supported by European policy.
- **Disrupting and disclosing existing physical risk approaches to develop improved cutting-edge financial and policy innovation**, for example through sovereign credit risk assessment, parametric triggering and risk pooling facilities, or blockchain technologies for pay-outs.
- **Curate a set of projects** co-developed with diverse end-users and beneficiaries that aims at demonstrating the use of climate risk information (in the form of data and models) for concrete end-use investment and planning decisions with a focus on the following areas: Cities, Land Use and especially agriculture; Health; and other applications such as Critical Infrastructure outside of cities.

Impact Goal 12: Foster Bankable Green Assets in Cities

Develop capacity in preparing projects and investment vehicles to boost the availability of sustainable investment assets in cities.

Importance

We want to accelerate the supply of bankable green assets to meet the growing demand for climate-conscious investment in cities, through capacity building, novel financial and investment vehicles, and project preparation. In the real economy, the challenge of financing climate action is immense. The EU funding gap towards investment into sustainable infrastructure is of the order of 170B€/yr and globally this amounts to more than 93 trillion USD over the next 15 years. A key problem for investors willing to invest in cities is the lack of bankable assets, business models of transformative actions and deal flow. Focusing on novel investment vehicles to channel financing to these sectors, as well as project preparation and capacity building will allow investors to be matched to bankable green assets in cities.

Learning and levers of change

In accelerating the supply of bankable green assets and sustainable business models, key leverage points are:

- **Investment mechanisms:** ratings, de-risking instruments, project pooling, funds for transformative city actions
- **Skills:** empowering city officials in designing 2°C compatible climate investment plans, structuring bankable investment cases, understanding and attracting private finance
- **Policy, standards and regulatory frameworks:** addressing barriers to large scale investments in cities (including multi-city approaches), through development or improvement of national and EU-level programmes, standards for sustainable city actions
- **City Governance and operations, citizen engagement:** climate financial planning, green procurement and greening municipal budgets, crowdfunding for climate action
- **Market structures:** bridging the gap between the city and investors, creation of communities of practice aiming to unlock climate investments in cities,

Priorities

Accelerating the supply of bankable green assets and sustainable business models in cities, we welcome proposals, aligned with the areas described in Section C, Page 6, that enhance the work of the Low Carbon City Lab Flagship (LoCaL):

- **Innovative methods to create bankable assets in cities:** project pooling, methodological frameworks for project preparation, creation of communities of practices
- **Innovations that scale finance for cities: *Financial products and novel fund structures*** that aggregate or scale investments, particularly with a view to mainstreaming climate finance into cities more broadly. **Also *mechanisms to expand and scale blended climate finance in cities*** are needed, innovative regulatory and contractual frameworks accelerating green finance in cities.
- **Innovation for promoting transparency and accountability in city investments and decisions**
- **Relevant training programmes aimed at city officials**