

# Guidelines for Climate-KIC PhD proposals

## A. Background Information

The European Climate Knowledge and Innovation Community (Climate-KIC) brings together private, public and academic partners with the aim to jointly develop innovative technologies and services that counteract the adverse effects of climate change and facilitate adaptation on national and global scales. Climate-KIC also supports young innovators and entrepreneurs through educational training and venture incubation, part of this remit is the support of PhD students through internships and entrepreneurial activities.

## B. What is a Climate-KIC PhD Label?

The PhD Label for Climate-KIC PhD candidates aims at developing the next generation of Climate innovators. The Climate-KIC PhD label has been developed to provide the PhD with valuable additional skills and support services to foster entrepreneurial thinking and more market-relevant research projects. By becoming a Climate-KIC PhD, you have the opportunity to get involved in the European-wide network of Climate-KIC community and develop valuable contacts for your professional future.

The added value courses are designed to support but not disrupt the focus on the PhD work. For this reason the elements of PhD Label are concentrated to form blocks rather than stretching over a longer period of time. For the doctoral education the extent of the added value components can be measured by its duration or its workload instead of by the ECTS that often are not awarded for the activities named (e.g. internships, research visits, transferable skill courses).

In order to receive the Climate-KIC PhD Label all PhD candidates are expected to participate in the Climate-KIC arranged following activities:

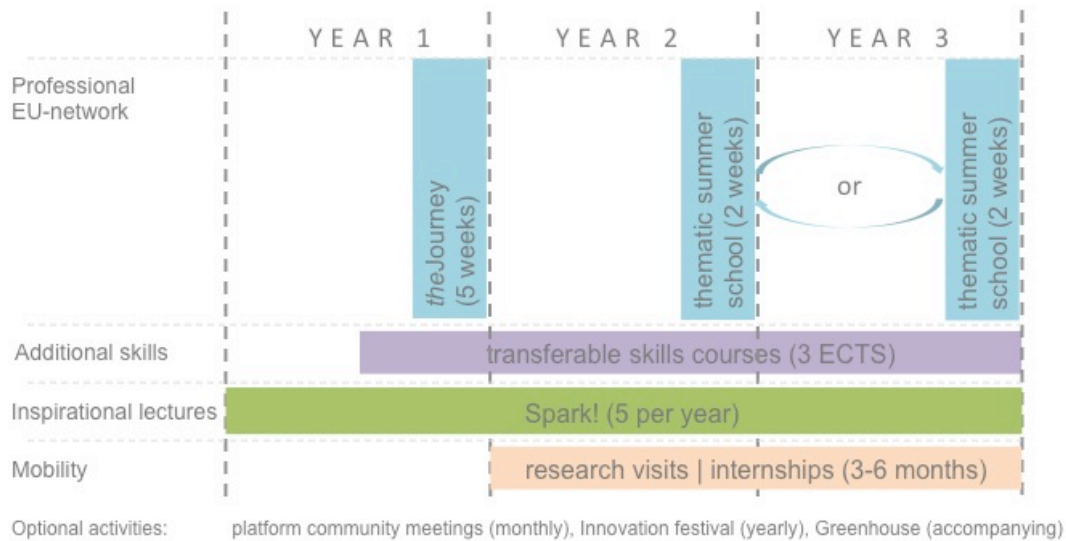
- *theJourney* (a five-week summer school, taken in year 1)
- SPARK! seminars and discussions (at least 3 per year)
- Thematic summer schools (1 – 2 week duration, years 2 or 3)
- A 3-6 months international and/or cross mobility (with additional funding of approximately 1000 € per month for up to six months)
- Transferable skills short courses

Students will also have access to

- Business coaching
- Greenhouse funding (business model incubation support)
- Climate-KIC Festival
- Our community and its activities
- The Alumni network



## Doctoral Programme Climate Innovation - Structure



### C. Supervisor Eligibility

Climate-KIC Partners: Academic and non-academic Climate-KIC partners can submit a PhD proposal. However, at least one of the supervisors must hold a full academic position at one of the Climate-KIC academic partner institutions and be tenured for the complete period of the project<sup>1</sup>. This person should fulfill the national and local criteria for eligibility to act as a PhD supervisor.

### D. Project requirements

It is essential that all Climate-KIC PhD projects:

- **Demonstrate a strategic fit within one of the eight Climate-KIC thematic challenge areas** (please refer to Section I below)
- Are equivalent to one full-time PhD work contract (36 months), if 100% funded is requested
- Are well structured and appropriate for a PhD as defined by the Doctoral School of the hosting institution
- Have a clear path to climate innovation or deliver support for an existing innovation project
- Combine elements of research, education, commercialisation and public policy
- Include 3 to 6 months international mobility (work/study abroad) consistent with the PhD objectives.

It is desirable that all Climate-KIC PhD projects:

- Have the potential for commercialisation
- Include multidisciplinary and systemic challenges
- Provide joint supervision amongst partners

<sup>1</sup> If this is not possible another supervisor from a Climate-KIC academic partner would have to be added who could continue the student supervision if the original supervisors' tenure was not extended

## E. Application Process

### Defining your topic and writing the application

**Your proposed topic should strategically fit with one of the Climate-KIC thematic challenge areas (platform)** . (See Section H below). Before defining your research topic and writing your proposal, it is essential that you carefully read the description of each PhD Call as articulated under each thematic challenge area, paying careful attention to any special application requirements . We also strongly suggest that you read up on the strategic focus and activities currently conducted under each correlating thematic area on the Climate-KIC Website at: <http://www.climate-kic.org/themes/>

When filling in the application form it is important to demonstrate that your proposed project meets all the criteria listed in the application form. Proposals should clearly outline the innovative aspect of the research counterbalanced by its achievability in terms of time and funds. Please specify your research infrastructure, including the access to resources already in place and any additional needs.

Please complete your proposal by entering text directly into the application form. Restrict your application to the space provided (additional pages will be rejected).

Written project proposals should be submitted by email to [phd@climate-kic.org](mailto:phd@climate-kic.org) by **March 15, 2014**.

## F. Funding

The amount of the Climate-KIC subsidy for successful project proposals will depend on the financial needs expressed in the application form. Please fill out the funding needs section of the application form carefully, listing how much funding you are looking for for a three-year period. Please indicate whether or not you have secured other source(s) of funding for your project.

In 2014, the maximum amount that can be funded by Climate-KIC is the full salary and up to a 40% overhead. However, moving on to 2015 and according to the Horizon 2020 programme, Climate-KIC will reduce its funding of overhead costs to 25%. In addition to project funding, Climate-KIC finances all of the activities where student's attendance is required as part of the Climate-KIC/EIT label.

Climate-KIC would like to maximize outcomes and impact of the funded activities. Hence, to be able to support as many PhD projects as possible, co-funded projects will be preferred. It is therefore *desirable to have already identified other source of funding and to only request a participation of 25%-50% from Climate-KIC*.

Once your application has been selected, Climate-KIC will review your funding needs and propose a subsidy amount accordingly. The Climate-KIC funding is made yearly for a three year period (the amount remaining the same for each year).

Please note that the candidate you selected has to start his/her thesis as early as possible in the course of the Fall semester and in no event later than by December 31<sup>st</sup>, 2014 or he/she will be losing the funding entirely.

## G. Application process: a 2-step process

- 1) The proposals will first be reviewed by thematic experts and then by a committee composed of Climate-KIC Education Leads. Only the applications which most clearly meet the assessment criteria will be selected.

Funding needs for each proposal will be evaluated and the amount of the Climate-KIC's subsidy will be adjusted accordingly. You will be notified of the proposed funding amount and duration of funding (generally 3 years), during the decision making process.

Decision will be communicated to each supervisor via email by **15 May 2014**.

- 2) Once a proposal has been accepted it is the responsibility of the supervisors to fill the position with a suitably qualified candidate to carry out the research and the associated Climate-KIC activities by **1 August 2014**.

**Criteria for students selection:** the selected candidate must have an excellent undergraduate Master's degree, have sufficient command of the English language to be able to participate fully (as all Climate-KIC activities are carried out in English), and demonstrate a keen interest in entrepreneurship and innovation.

## Summary of relevant dates in 2014

<b>15 March 2014</b>	<b>Application Deadline</b>
<b>15 March – 1 May</b>	Applications are reviewed by thematic experts
<b>1 May – 15 May</b>	Climate-KIC Education panel makes decision
<b>15 May</b>	Announcement of funding decisions

## H. Introduction to Climate-KIC Thematic Challenges

Our activities are driven by eight themes of climate change. Under these eight themes, we have identified specific challenges to address climate change mitigation and adaptation. All our activities are attached to these specific challenges.

**Transforming the built Environment:** Accelerate the transformation of the built environment targeting energy and resource efficiency and emission reduction measures in new and existing buildings by fostering innovation on building components and building concepts in order to help meet ecological and climatic targets.

**Sustainable City Systems:** Support the transition from centralised but separate city systems such as energy, waste, water and public transport to decentralised, integrated smart and sustainable city system solutions.

**Making Transitions Happen:** Build an adaptive and low-carbon culture to engage companies, communities and citizens in the development of a low carbon society, to reduce GHG emissions and connect to global issues related to climate change.

**Industrial Symbiosis:** Increase resource efficiency and turn waste –including food waste and CO<sub>2</sub>- into resource.

**Greenhouse Gas Monitoring:** Enable mitigation action through GHG measurements, reporting and verification and associated financial tools.

**Bio-Economy:** Support the development and adoption of a bio-based economy that is resource-efficient, aims to 'close the loop' and produces one or more of the following products, polymers, chemicals and bioenergy (bioelectricity, bioheat and biofuels).

**Land and Water Engineering for adaptation:** Support the adaptation of water engineering and agriculture to climate change and link it to enhanced land use and ecosystem services delivery.

**Climate Adaptation Services:** Climate Adaptation Services: Increase adaptation capacity and resilience of societies, infrastructure, cities and services.

# 1. Transforming the Build Environment

Call in Solutions for Creating Resource-efficient Buildings

## Main topic area

Buildings represent 40% of global anthropogenic greenhouse gases and approx. 10% of global gross domestic product and 8% of all global jobs. Climate-KIC aims at accelerating the transitions needed to significantly cut these emissions and create jobs by combining experiences on technologies, different building sectors and geographic and socio-cultural particularities.

The TBE platform is currently starting up its flagship Building Technology Accelerator and a connection to one of the participating LivingLabs is seen as an asset.

## Targeted research areas for PhDs

Transforming the built environment platform looks out for supporting PhD theses that can be related to the following areas:

**(A) “Innovative Building Components”:** components that enable better performing buildings especially regarding the user – technology interface

**(B) “Low Carbon Building Materials”:** Materials that substantially lower a buildings or infrastructure life cycle environmental impact or/and tools to visualize and monitor this

**(C) “Cost optimized buildings”:** Building or structure concepts that realize high emission saving for low costs to ensure massive market uptake

## Contact person:

For more information, please see our website <http://platformtbe.org/>

For questions from interested applicants (supervisors, not students), please send a *short* paragraph explaining your university’s PhD proposal idea and any questions you may have via email to Dr. Anaïs Sägesser.

Anaïs Sägesser: [anais.saegesser@climate-kic.org](mailto:anais.saegesser@climate-kic.org)

## 2. Sustainable City Systems

### Main topic area

Please note that while there are three challenge areas under the Sustainable City Systems (SCS) theme (1) Urban design, planning and management, (2) Integrated utilities and public transport, and (3) Resource efficient cities & closed loop systems. For the SCS PhD Call for 2015, we are specifically and only seeking PhD applications for the third focus area: Resource Efficient Cities. To note is that in addition to this PhD Call, we are also announcing an Innovation Project Call for 2015 that will focus on this same topic. In this manner, we hope to help develop a rich exchange between PhDs and Innovation Projects going forward.

In recent years, resource efficiency and closed-loop production has emerged as a focal point for policy, research and business strategies. The increasing interest in the subject is partly due to the range of advantages that can be gained by creating a metabolically balanced urban economy. Efficient use of resources can (1) diminish the economic and political risk of resource scarcity, (2) lead to cost reductions and new innovations for businesses and (3) reduce the environmental pressures of consumption by limiting the amount of waste and emissions. In this context, Climate-KIC especially looks at potential resource efficiency measures and effective validation methods that significantly reduce the amount of energy embodied and used along value chains as well as the related greenhouse gas emissions.

Cities are the main stage for avoiding resource scarcity through improved resource efficiency since the consumption of end products and resources largely occurs by companies and consumers living in or near cities. While technology serves as an enabler, changes in internal organizational processes; supplier collaborations, and financial structures along with behavioral changes are needed for gaining market uptake and local impact.

### Targeted research areas for PhDs

Sustainable City Systems is seeking PhD topics that look at concepts, indicators, tools and services in the following areas:

- (A) **“Learning to measure/evaluate/assess”** the life cycle wide resource efficiency in cities
- (B) **“Applying and demonstrating”** closed-loop resource efficient urbanised economies
- (C) **“Avoiding trade-offs and sub-optimisation”** of greenhouse gases and the use of natural resources

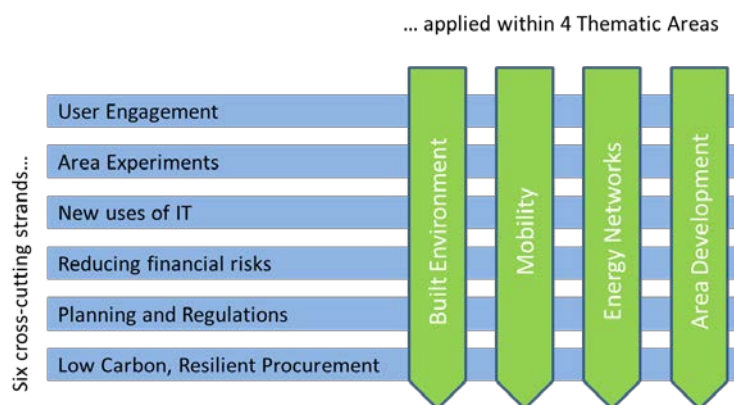
### Requirement and contact information

For more information, please see our website: <http://www.climate-kic.org/themes/sustainable-city-systems/>  
For questions from interested applicants (supervisors, not students), please send a *short* paragraph explaining your university's PhD proposal idea and any questions you may have via email to Kristine Köhler [kristine.koehler@climate-kic.org](mailto:kristine.koehler@climate-kic.org)

### 3. Making Transitions Happen

#### Main topic area

There is increasing recognition that a **broad model of social and technological innovation** is key to delivering the Climate-KIC's agenda as well as the EU Low Carbon Roadmap 2050. MTH is a cross-disciplinary platform which acts as an **enabler and accelerator** in this transition to a low-carbon economy resilient to climate change. The MTH approach addresses **transformative, socio-technical innovation using a system approach**. To this end, the platform has identified six cross-cutting strands together with four of the most substantial areas where Europe needs to make major reductions in its carbon emissions (see below):



The goal of the platform will be to develop new initiatives and experiments which add to our overall understanding and enable a **deepening, broadening and scaling-up of these initiatives in cities and regions across Europe**. The platform will draw on funding from a range of regional, national and European programmes and will collaborate with a number of relevant European networks to promote the up-take of new solutions.

#### Targeted research areas for PhDs

- **Transition Cities.** This is the main programme of the platform from 2014-2016 within the Area Development area. The proposal focuses on the ways cities can become more effective in making low carbon transitions in their buildings, energy networks and mobility. The proposal is led by 6 city authorities. We are keen to support PhD proposals that explore the governance, neighbourhood and sectoral dimensions on a cross-city basis.
- **User engagement:** The platform wishes to develop a portfolio of models, methods and approaches related to user engagement in different settings e.g. household and community energy schemes, neighbourhood mobility schemes, energy management in commercial and public buildings. We are keen to supplement this activity with suitable PhD topics.
- **Finance and Procurement:** Similarly, the platform would consider PhD which explore the development of new financial and business models in these thematic areas together with new models of procurement which stimulate innovation.

#### Requirement and contact information

Those interested in applying are asked to log their interest with Stuart Bowles [stuartb@innovationbham.com](mailto:stuartb@innovationbham.com) and to discuss their proposal with Professor Fred Steward [f.steward@psi.org.uk](mailto:f.steward@psi.org.uk)

**Applicants who fail to do this will not be considered eligible for consideration by the MTH platform.**



## 4. Industrial Symbiosis

### Main topic area

The Industrial Symbiosis Platform supports the roll out of demand-led innovation and enables Europe to proactively identify solutions that address regional priorities and reduce greenhouse gas emissions. Additionally, the Platform works with business to optimise resource efficiency across the value chain delivering cross sectorial innovative Industrial Symbiosis solutions. The development of educational tools across new, existing hubs and communities will round up the activities of the Platform.

### Key areas

The Industrial Symbiosis Platform encourages Industrial leadership in resource efficiency innovation. Cross-sectoral linkages are particularly relevant to addressing market needs to optimize resource flows. The Platform matches large and small enterprises, and it links climate challenges with solution providers. This approach will establish new markets.

The Industrial Symbiosis platform invites proposals for Innovation and Pathfinder projects aligned with one of our thematic areas:

- Resource efficient industry through material and energy flows
- GHG reduction and utilization
- Process and product redesign

### Targeted research areas for PhDs

#### 1) Identification of potentials for closing the CO<sub>2</sub> loop

- Identification of priority products and processes that should accommodate the reuse of CO<sub>2</sub>.
- Project the potential CO<sub>2</sub> consumption in such products and processes.
- Quantification of CO<sub>2</sub> emissions from large stationary sources.
- Map potential CO<sub>2</sub> sharing symbiosis clusters geographically.
- Investigation of the most suitable flue gas cleaning and catalyzing techniques to reuse CO<sub>2</sub> streams at medium scale.
- Create a business model for the closed loop supply chain of CO<sub>2</sub> based products with several types of industries and with several categories of stakeholders.

#### 2) MFA based method for Industrial Symbiosis design

- Discover the production and consumption network based on knowledge of resource flows between economic actors.
- Suggest possible symbiosis clusters based on physical input-output flows of 28 types of materials (MFA method).
- Using international list of successful cases of symbiosis clusters suggest first-phase priority for implementation in the studied economy.
- Quantify societal gains of the implemented cases, including CO<sub>2</sub> reduction.

#### 3) EIA/LCA methodology

- Life cycle assessment or environmental impact analysis for CCR (carbon capture and reuse).

#### 4) Technology acceptance and implementation

- Increasing technology acceptance among different stakeholders and ensuring successful stakeholder management for new industrial symbiosis cases on CCR (carbon capture and reuse) requiring new technical infrastructures such as pipelines.
- Develop smart utility networks and their underlying business models to ensure stable connections between companies and between industry and the urban environment.

#### 5) Open Data and Information Systems

- Define information and find data that supports the development of industrial synergies and improves the connections between various types of information.

### Contact person:

Gijsbert Korevaar: [g.korevaar@tudelft.nl](mailto:g.korevaar@tudelft.nl)

## 5. The Greenhouse Gas Monitoring, Reporting and Verification

### Main topic area

You cannot control what you cannot measure

Measuring greenhouse gas emissions is not only crucial to meet the 2°C target by 2050, but ensures that money currently spent on mitigation is used in a cost efficient way.

Our knowledge of anthropogenic emissions has been steadily increasing over the last decades. Science can now provide policy makers and companies with accurate ghg data to report. Unfortunately, the technology transfer from science to the industry has been

slowed by ignorance of the current technological capabilities and a lack of stringency from regulations. The GHG MRV Platform is a unique collaboration between high-end research entities and key industry players, working together towards the development of ground-breaking GHG monitoring solutions.

### 4 strategic challenges met by the platform

FORESTRY AND AGRICULTURE	POINT SOURCES AND FUGITIVE EMISSIONS	CITIES AND TERRITORIES	NEW BUSINESS MODELS
Remove the barriers to create value on GHG mitigation and accounting services for “new” sectors or project types, in particular within the forestry and agricultural sectors,	Create marketable cost-effective GHG emission measurement solutions for the niche markets of large GHG emission sites, and oil and gas sector fugitive emissions	Demonstrate the creation of value for “wall to wall” GHG emission measurement services and application oriented decision making tools for GHG mitigation by cities, regions and countries	Improve the current GHG emission accounting data and software in order to make MRV systems more efficient, robust and effective for companies, investors and decision-makers

### Targeted research areas for PhDs

- 1- Attribution of climate change to economic sectors of emissions for a range of IPCC emissions and climate scenarios, in the context of the Brazilian proposal
- 2- Future direct and indirect GHG emissions associated with land use change in the NEXUS global compact land use economics model
- 3- The radiative forcing effects of urbanization in China on climate over the past decade : direct surface energy budget alteration, GHG and aerosols emissions, and land use change impacts on ecosystem carbon stocks.
- 4- Analyzing the effectiveness of climate related policies and assessment of their impact on the economic cycles
- 5- Investigating the linkage between market based mechanisms/instruments (such as carbon taxing, ETS and etc) and GHG emission reductions at city level.
- 6- Leaky C - Analysing the effect of carbon fluxes as dissolved organic carbon (DOC), particulate organic carbon (POC) and their inorganic counterparts on the carbon balance from forests and agricultural to understand their role/impact for carbon accounting/reporting systems
- 7- Urban green counts carbon - developing remote sensing and modelling tools to quantify the carbon sequestration of urban green/agricultural areas as a service for cities and urban farmers.

### Contact person:

Victor Gancel: [victor.gancel@climate-kic.org](mailto:victor.gancel@climate-kic.org) or + 33 (0)1 69 33 77 39

## 6. Developing a Bio-Economy

### Main topic area

The strategic challenge for Europe's Bioeconomy (BIOE) is to transition to a sustainable bio-based economy that reduces our carbon footprint and continues to provide supporting services such as food, energy and ecosystem services. Specifically, we address:

- Sustainable feedstock production: Develop sustainable and optimal feedstock production and supply chains
- Biorenewable products: Develop and bring to the market biorenewable products from a variety of feedstocks – including wastes – through integrated biorefining.

Resource efficiency: Accelerate the development and delivery to market of new biobased products with improved functionality.

We aim to contribute critical technical and organizational innovation that enables the transition to a bio-based economy which has a low or even negative carbon footprint. This vision will require an integrated, holistic approach across the entire value chain from feedstock production to efficient processing and conversion, and ultimately the production and marketing of bio-based products.

This will involve devising ways to efficiently produce and use biomass resources, eliminating waste along the value chains and providing manufacturing itineraries that will provide both adequate food and all of the non-food products that are required for modern societies.

Our partners are ideally positioned to catalyse innovation in this field and to select techniques having economic and climate impacts so as to contribute to developing the market.

We are especially interested in this area because it is suited to a distributed production and service structure, where SMEs can play a much stronger role along the value chains, unlike the current fossil based economy based on large-scale technologies.

### Targeted research areas for PhDs

- 1) Integrated land use for the production of biorenewables (materials, chemicals, fuels, etc.), with focus on sustainability and increasing the soil carbon pool. Integrated land use should be interpreted as land use and associated agronomic practices for production of above while increasing food and feed production.
- 2) Sustainable feedstock production: Developing sustainable and optimal feedstock production pathways
- 3) Biorenewable products: Develop and bring to the market biorenewable products from a variety of feedstocks – including waste – through integrated biorefining

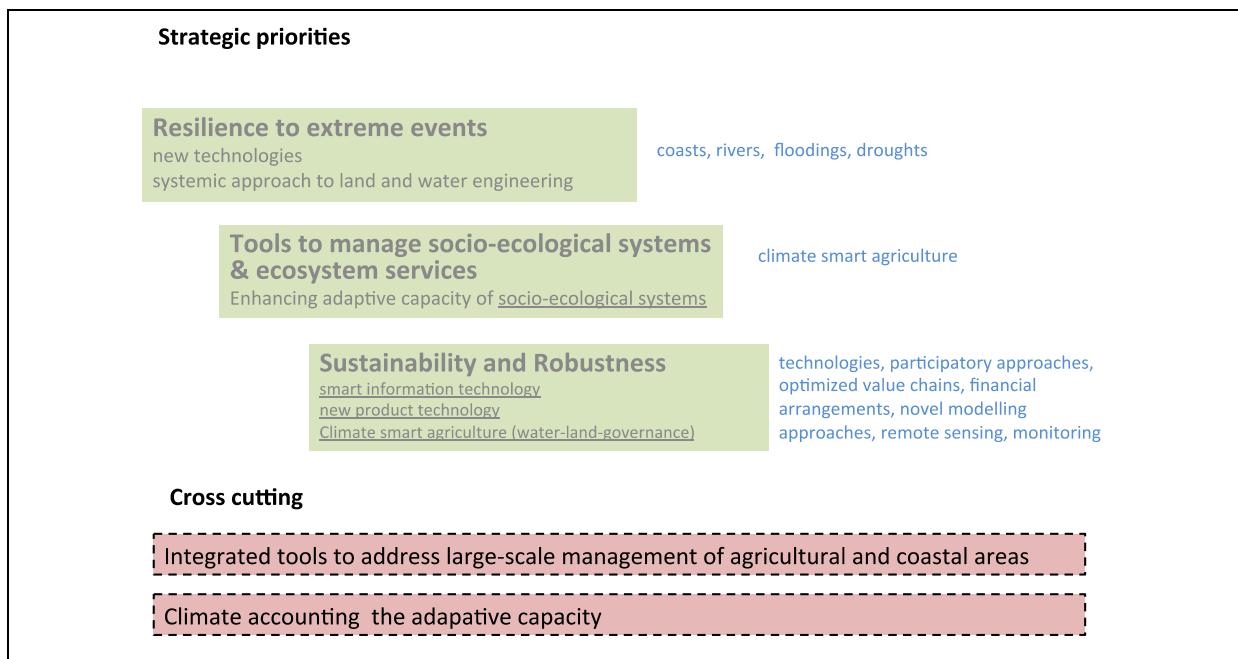
### Contact person:

Zsolt Gémesi : [z.gemesi@imperial.ac.uk](mailto:z.gemesi@imperial.ac.uk)

## 7. Land and Water management and Engineering

### Main topic area

The Land and Water ME Platform's value proposition targets an audience comprised of water and land authorities, the agricultural sector, the water supply sector, land and city planning authorities and all other related businesses. The platform focuses on the transformation to a climate-resilient society through targeted management and engineering of water and land resources in a cost-effective way, to raise the adaptive capacity of regions, to integrate ecosystem-oriented solutions in the portfolio of adaptation strategies, and to facilitate European businesses to develop climate resilient integrated for water and land resources.



The goal of the platform will be to develop approaches, technologies, tools, to enable a climate smart management, support ecosystem resilience and value ecosystem services, coping with climate pressures and extreme events. The value proposition targets a large audience of businesses, that have "ownership" in the domain of land use and water resources. The platform will promote collaboration with a number of relevant international institutions and networks to strengthen innovation value and mobilise resources.

Priority areas where Europe needs to make major investment for a transition were identified by the Platform as being **Coastal areas and climate smart agriculture**

### Targeted research areas for PhDs

- **Smart engineering and climate-adaptive innovation in management and protection of coastal zones.** This is one of the two main programmes of the platform for the 2014-2016. We will consider proposals in the range of adaptation and protection measures and systems, new and integrated technologies, hydrological modelling and simulation, erosion, flooding and climate-related hazards.
- **Climate smart solutions for agriculture.** The platform wishes to boost the adoption of technical climate-smart innovations in European agriculture and foresees climate-smart agriculture as a driver for green transformative growth in food security. We are keen to support this with PhD topics focused on sustainable increases of productivity and resilience (adaptation), reduction of greenhouse gases (mitigation), and enhancement of food security.
- **Climate accounting.** PhD on carbon management accounting tools, methods, procedures, standards for application in the above priority areas will also be considered.

### Contact persons:

Eric Schellekens: [eric.schellekens@arcadis.nl](mailto:eric.schellekens@arcadis.nl) / Federica Rossi: [f.rossi@ibimet.cnr.it](mailto:f.rossi@ibimet.cnr.it)

## 8. Climate Adaptation Services

### Main topic area

The strategic challenge Adaptation Services (AS) is to increase the capacity of society, cities and infrastructure to be able to adapt to climate change.

Specifically, we address:

- Sectors: developing markets for the different economic sectors
- Climate information: ensure the information available is used responsibly
- Time: influence decision makers to reduce the time taken to act and implement climate change adaptation strategies

We develop innovative tools and services to increase the adaptation capacity and resilience of societies, infrastructure, and cities to the anticipated climate change impacts. This is challenging because decision-makers – despite a general knowledge of the potential medium to long-term importance of climate impacts for their operations – find it extremely difficult to incorporate these factors in today's investment decisions.

This is due to the widely dispersed information, limited understanding of involved uncertainties, and the still underdeveloped expertise of translating climate data into concrete impact chains for different sectors. Whereas Climate Services are a rapidly emerging field strongly influenced by WMO, we will focus on taking this knowledge and translating it to concrete services and solutions further downstream to make a real impact.

### Targeted research areas for PhDs

We have four priority areas for PhDs that aim to innovate products and services:

- Insurance sector
- Energy and water utility sector
- Local authorities/public bodies which manage coastal zone risks
- Adaptation metrics ( projects that allow the KIC and others to measure the extent of adaptation/resilience that has been achieved or is proposed)

### Contact person:

Zsolt Gémesi : z.gemesi@imperial.ac.uk