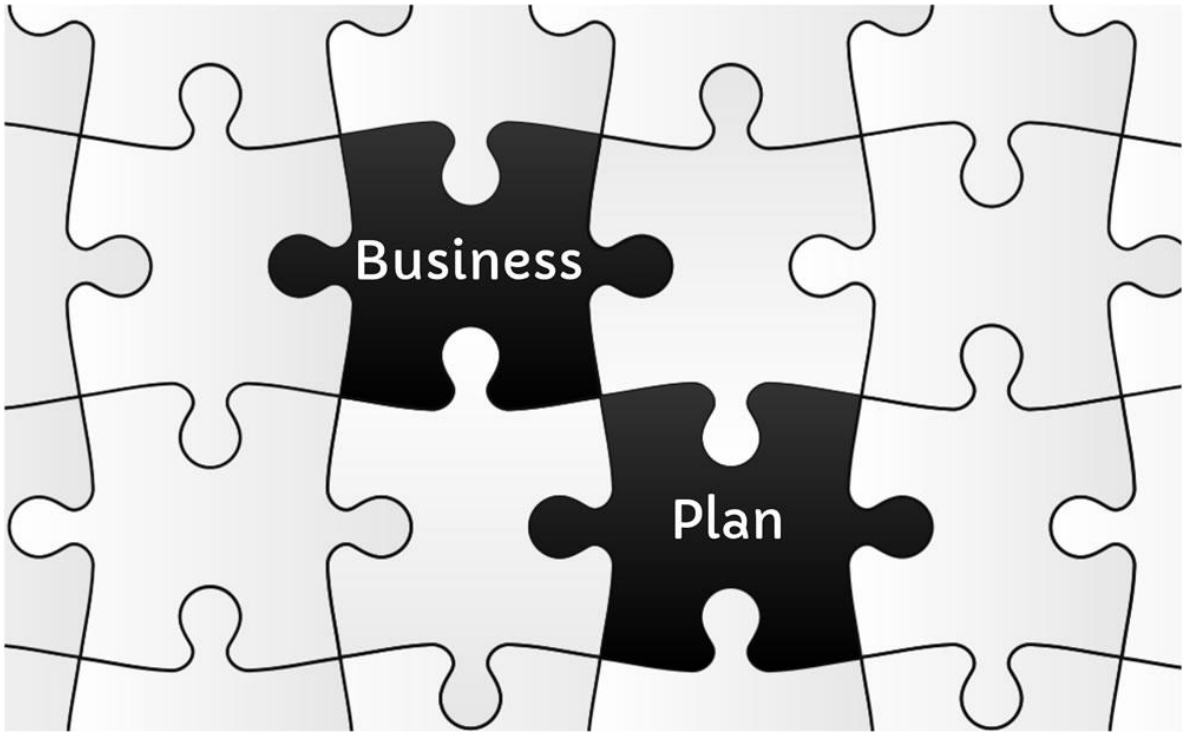
SMARTEES
local social innovation

SMARTEES: Deliverable 8.4 (Report)

SMARTEES
Exploitation Business Plan

October 2021



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Executive summary

The SMARTEES project aims to support the success of the Energy Union by developing alternative, more robust policy pathways that foster citizen inclusion and gain citizen acceptability. It does so by improving our understanding of the role of social innovation in renewable energy and mobility transitions. The current document presents the work that has been carried out to develop the Business plan for the SMARTEES Policy Sandbox Tool, a tool which aims to support local governments in making decisions by allowing policy and decision makers to explore social dynamics in a local context and to test different effects that social innovations could have on policy outcomes and citizen behaviour. The document considers product maturity, demand, ability to pay, costs, marketing and partner roles for the delivery of a post-project exploitation service.

List of abbreviations

ABM	Agent-based Modelling
COVID-19	Coronavirus Disease
EU	European Union
ICLEI	ICLEI – Local Governments for Sustainability, European Secretariat
NGOs	Non-governmental Organisations
NTNU	Norwegian University of Science and Technology

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Introduction

This document builds on the earlier work of the project and of the exploitation plan and considers how the results of the SMARTEES project can be used post project completion. In order to do this we need to better understand the SMARTEES output in terms of a marketable product, the constraints of that product and the current market demand. We also explore the expected resource use and client costs entailed in the Policy Sandbox workshop models identified in Deliverable D8.2, “SMARTEES Policy Sandbox IT tool and workshop concept” and considers also opportunities to use the workshop experiences as captured in D5.3 "Handbook with guidelines for the co-production of future policy scenarios and interventions".

Product potential analysis

Knowledge development in SMARTEES

The primary output of a knowledge-based research project such as SMARTEES is, not surprisingly, knowledge. In the specific case of SMARTEES this knowledge comes in a number of forms related to social innovation and the energy transition. It builds in the first instance on the lived experience and embodied knowledge of practitioners and policy makers in local governments and related organisations in cities and islands across Europe. It analyses and augments this knowledge with social science research from a number of disciplines in order to understand the dynamic of the lived experience and embodied knowledge of the case studies in a wider social science context. It then takes this combined knowledge and applies it in prototype agent-based models (ABM) with an aim to ultimately support policy and practice at the local level.

As such there are three distinct fields of knowledge within the SMARTEES project (lived experience, social science and modelling) which provide the base for project development and delivery, project outputs and ultimately the exploitation of the project results. However, there is a multitude of similar resources that are based upon the sharing of lived experience and embodied knowledge in cities, or academic analysis of these experiences in a technical and social context. The unique aspect of SMARTEES is therefore the combination of this knowledge into a prototype agent-based model as a supporting tool for policy and practice.

All tools are only as good as the craftsperson using them. The integration of the three levels of knowledge within SMARTEES in the exploitation and dissemination of the results are essential to hone the tool and also help the user to apply it as skilfully as possible. Lived experience, academic research and modelling expertise for applied use are therefore the integrated outputs on which we have focussed in the development of the dissemination and exploitation strategy.

Preparedness for knowledge transfer

There is a strong culture within these fields of knowledge of transfer to other parties in the same field. City networking, best practices and conferences are common forms of knowledge transfer between municipal organisations at a national and European level. Academic papers, publications and conferences are the base of research knowledge transfer. Knowledge transfer between these fields is not, however, always as developed as it could be. At times, practice lags behind research. In other instances, changing societal needs drive practice ahead of a clear scientific understanding of the work

being undertaken. This is not least the case in work related to climate change which relies on a strong grounding in science, but a pragmatic dynamic of action, evaluation, research and policy that drives mitigation work.

Outside of these established forms of knowledge transfer, there is limited scope within city administrations and academia, to invest more time and resource into knowledge dissemination. It has therefore been important to consider the limited resources of project partners post-project completion to invest in dissemination and exploitation, and understand possible economic scenarios that can facilitate this to a higher degree.

Similarly, at a practitioner level, there are limited resources available for the application of new knowledge. Budgets are tight, diaries are fully booked, expectations are high, resources are limited.

There is therefore a significant challenge in designing a product with sufficient real-world experience and scientific rigour, that is of high use for the user whilst remaining easy to use and affordable.

A highly developed and intricate product of great theoretical value may be too costly for the user and too complicated to use in the limited time available and therefore of limited practical value. A highly affordable and user-friendly product may have entailed so much compromise in detail and content that the theoretical value is too weak and whilst it may be easy to apply, its practical value is also low.

The challenge for SMARTEES is therefore to identify an approach that meets the realistic aspirations of the project partners, remains within the realm of reasonable expectation regarding their future mobilisation, and not least, provides a service to practitioners and policy makers that is useful, useable and affordable.

ABM and readiness for market

The unique feature of the SMARTEES output is the development of agent-based modelling as a tool to support policy and practice and attempts to understand potential behavioural and social dynamics in climate-related working. The potential for a tool that can be used to explore the range of plausible outcomes from future alternative scenarios, as part of a wider collaborative design process, is highly interesting. However, a number of questions arise as to the maturity of ABM in an urban development / climate policy context.

There is little or no awareness amongst users of the potential for ABM to become a useful tool in their work. There has been little or no proof-of-concept of ABM in an applied transdisciplinary context despite a long history of development work. There is insufficient experience of ABM with this application and thereby the scientific base and accuracy is based on limited data, and the nascent application is still being developed on a bespoke basis which entails higher costs than can be expected for most market applications.

In the absence of a more generic ABM infrastructure into which city-specific data can be easily imported, the cost-benefit ratio of bespoke modelling solutions is likely to prove a significant barrier to market adoption in all but a handful of major project contexts. It is clear that the most significant role of SMARTEES is then to enable cities to start to understand the concept and potential of ABM and use it to gain a better understanding both of the case studies and their own current challenges. As such, the Sandbox Tool becomes a key link from the concept development of SMARTEES, to a more generic ABM that can be developed to suit market conditions in the future.

Policy sandbox tool

The Sandbox Tool has been developed to meet this demonstration purpose enabling practitioners and policy makers to understand the concept of ABM in a social innovation and energy transition context. It allows for a different exploration of the city projects in a way that a normal case study does not and it can raise questions about the social and policy parameters of influence in the user city context and thereby add value with regard to understanding the range of issues needed to be considered and different scenarios for consideration.

The Policy Sandbox Tool can therefore become a guide to the opportunities of ABM that could be utilised both as a self-guided learning tool or a guided learning tool in a broader context of skills development and support. Work in this task has therefore focussed on understanding what the demand for this kind of tool could be and how the sandbox tool needs to be developed and used within a broader setting to fulfil this potential.

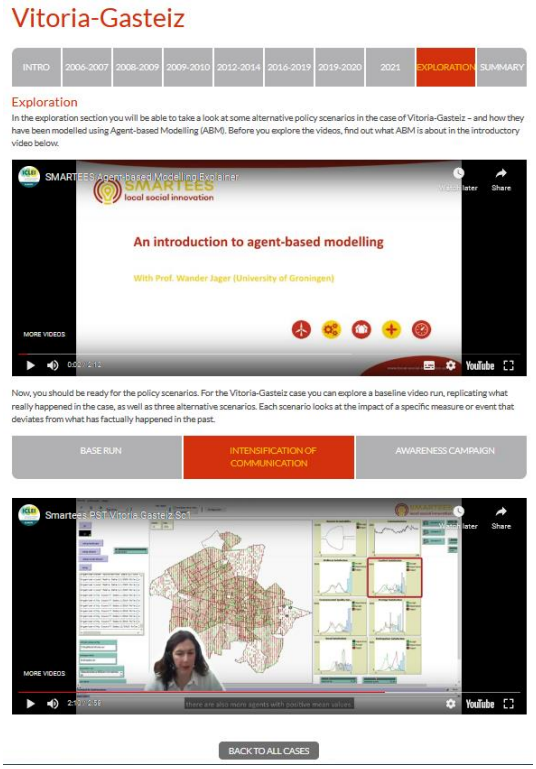

Figure 1: Exploration page of the SMARTEES Policy Sandbox Tool, showing one of the modelled policy scenarios in the case of Vitoria-Gasteiz

Market assessment

Potential Clients

The main assumption in the design of the SMARTEES project has been that the primary end user of the Sandbox Tool would be practitioners and policy makers in local government. With the exploratory nature of the project, this is a reasonable assumption. Work to understand market interest within this task has therefore focussed on city administrations as the main client. Work to understand this market

and get continuous input has taken place in an iterative approach during the development of the Sandbox Tool and broader dissemination package outlined in the sections below.

However, in a future scenario in which a more scaleable ABM infrastructure is developed it is important to note that there may be multiple potential clients operating in a city who are interested in aspects of behavioural change, social innovation and energy transition. These may be utilities (public and private), but potentially also mobility solutions providers (i.e. e-scooter businesses, car pools, public transport operators etc.), property companies and organisations or even larger businesses seeking to model employee responses to changes to stimulate more sustainable energy use, mobility patterns etc in the work place. This is important to consider for future development work as a higher commercial value outside of the municipality sector may provide better financing options and enable a faster development of a tool of benefit to both public and private partners.

Market Constraints

ABM anonymity

The use of agent-based modelling is still relatively nascent and there are very few examples of ABM use in a municipal context, let alone a municipal climate change context. There is therefore no real demand for ABM services and a general lack of awareness of ABM and its potential to support policy and practice in this field. Recent exposure of ABM in behavioural modelling during the Covid-19 pandemic may provide a more general increase in awareness of the potential of ABM, but it is still a long way from general awareness to market demand for applied solutions. One of the effects of SMARTEES is therefore to start defining this link and potential for behavioural modelling in a climate change social innovation context.

Rigour vs accessibility

As previously highlighted there is a tension between the need for scientific rigour and reliability of model outcomes, with the need for user-friendliness and affordability. In theory, it may be possible through extensive data collection, profiling and research to develop quite accurate and detailed models. However, the costs, time constraints and organisational challenges associated with this would in most cases prove prohibitive.

Similarly, an approach that is easy and cheap to apply may not provide much added value if the results are unreliable due to insufficient data input and background research. The challenge therefore is to strike a balance between rigour and accessibility that can be “good enough” but that could also learn over time. The potential therefore of a more generic base with feedback mechanisms and AI learning could be a realistic way of developing ABM as an affordable and increasingly reliable tool.

Financial

The financial constraints have already been referred to. Local government finances and operational budgets vary dramatically between cities and countries within the EU, but generally speaking, it is fair to assume that both financial and personnel resources are limited in most cities and contexts. However, there may be exceptions such as large infrastructure projects, in which the added value of an ABM may be significant whilst the cost is less significant in relation to the overall project spend. At this stage of pre-market development, however, the SMARTEES approach is not yet mature to be able to offer such a service at anything other than pilot scale.

Standing out in a wider marketplace

There are many best practice guides, case studies and similar resources available for cities and it is often difficult to negotiate the multitude of options available. The unique selling point of SMARTEES has therefore been defined as its use of Agent Based Modelling as an analysis tool to facilitate the implementation of social innovation concepts at a local level. However, as the ABM approach is not developed beyond a proof-of-concept level, the roll-out of an ABM-based exploitation plan is not feasible. The SMARTEES exploitation concept therefore needs to combine practice and research and demonstrate the *potential* of ABM as a possible tool for development in the future.

Market testing

Throughout the duration of SMARTEES, there has been a process of dialogue with local government stakeholders to better understand their needs, their perceptions of Agent-Based Modelling, the potential to use the results of the SMARTEES project, and their willingness/ability to pay. This analysis has taken the form of informal dialogue and discussion with individuals in cities, and a series of workshops.

Initially, the 10 follower city workshops that were carried out in 2018 and 2019 provided useful reflections from project stakeholders into the relevance of the cases and the market awareness of ABM. Furthermore, a workshop was held at the European Sustainable Cities and Towns Conference in Mannheim 2020 in which the SMARTEES project was presented and participants discussed the potential of ABM and the Policy Sandbox Tool in their city contexts. With the support of the results from this meeting, the Pro-Sandbox Tool options were refined and presented in a series of thematic workshops with cities interested in areas of SMARTEES research during 2020 and 2021. In these workshops questions were asked specifically about the kinds of services that would be relevant and willingness to pay.

The results show a clear interest in the Pro-tool concept and a demand for advisory support for both policy and practice development. The interest in agent-based modelling is also apparent although not as strong and qualified around concerns about reliability and cost. The financial constraints are the most apparent and there is uncertainty about the willingness/ability to pay for any significant services.

Responses to Sandbox services	
Does the sandbox tool prototype offer a clearer understanding of the case studies and ABM potential	82% positive response
Interest in Sandbox brainstorming workshop	71% positive response
Willingness / ability to pay for Sandbox brainstorming workshop	16% positive response 27% negative response 57% undecided
Do you think there is a potential market for a customised service (Out of the Sandbox)	57% positive response 5% negative response 38% undecided

Figure 2: Overview of survey of cities on interest in sandbox services, early concept development

Figure 3: Overview of survey of cities on interest in sandbox services, final concept development

Conclusions of market assessment

It is clear that there is a strong interest in and need for learning and support in policy and practice for social innovation in the energy transition. The SMARTEES test cases and cities are seen as interesting models from which to learn. The cost-benefit challenges of the nascent climate and social innovation application of ABM in cities is seen as a barrier, as is the relative anonymity of ABM use in this context. As ABM is identified as the unique selling point of SMARTEES, differentiating it from other best practice databases etc., this is a significant challenge.

The focus for the dissemination and exploitation package has therefore been to develop a series of services to the client that can be appropriate for different levels of understanding and need and different budgets. The aim has been to create a zero-cost introduction to ABM and the SMARTEES outputs, a low cost deeper-dive into project results and a more comprehensive package of tailor-made solutions which may include bespoke ABM services.

Options development and short-term business model

In the development of the different exploitation options for the SMARTEES results, it has been important to understand clearly the outputs of the project, the limitations of those outputs, the market demand and the market limitations. It has also been important to understand the ability and willingness of project partners to participate actively in post-project dissemination activities.

ICLEI have confirmed that they would be able to host the sandbox tool on their website and can absorb the operating costs for this within their budget as it is within the core aims of the organisation.

It is clear that there is a need to cover the direct costs of partner participation post-project in Pro-Tool workshop activities, but the aim has been to keep this cost as low as possible in order to facilitate take-up. It becomes relatively straight forward to then provide an approximate cost for the delivery of a Policy sandbox innovation workshop based on the thematic cases. D5.3 "Handbook with guidelines for

the co-production of future policy scenarios and interventions" can provide an important resource for use in these processes.

Option 1: "Policy sandbox innovation workshop"

A policy sandbox innovation workshop would cost the client city €2-4000. This cost would include a degree of co-ordination by ICLEI, the identification of a relevant team from the project partnership (or potentially third parties), preparation time, workshop delivery and follow-up.

This first option is the entry level for customized service provision from the SMARTEES partners.

Aim of the service:	Quick support for interested client cities
Duration / Effort:	Half-day workshop, plus preparation and follow up work
Inputs – Activities carried out:	
Preparation: **Total time** **18hrs**	- interviews with key city staff to identify: a) the key challenge, b) stakeholders, c) potential social innovations to the respond to the challenge (ICLEI - 2hrs) - interviews with key stakeholders of the respective social innovation(s) in the city (ICLEI - 2hrs) - identification of a benchmark using a SMARTEES reference case (ICLEI/NTNU - 2hrs) - identification of key consultants from the SMARTEES team (ICLEI/NTNU - 3hrs) - matching with partner cities / other cities for deeper technical / policy support (ICLEI - 5hrs) - preparation of client city challenges in a briefing paper as reference point in communication and agreed services (ICLEI/NTNU - 4hrs)
Workshop: **Total time** **14hrs**	- online workshop with client city lasting 2-3h - presentation of client city's challenges - learning journey based on SMARTEES reference case - Agent-Based Modelling (ABM) input from SMARTEES team - Discussion on user city challenges, policy / practice approaches, ABM potential - (SMARTEES staffing – 1 workshop lead, 1 city rep, 1 research rep. Workshop lead 3 hrs preparation time, 3 hrs delivery time. City and research rep 1hr + 3hr)
Output – products resulting from the service: **Total time** **12+6hrs**	- Summary policy paper, including the challenge and potential responses, the pros and cons of different policy scenarios and policy recommendations (Workshop lead 8hrs, city rep 2 hrs, research rep 2 hrs) - Optional ABM runs as reference material attached to the policy recommendations (ABM rep 6hrs)

Outcome – changes achieved by the service:	- The client city has gained new insights into potential responses to its challenge - Based on ABM simulations different policy scenarios have created more substantial insights and a stronger basis for decision making
Total SMARTEES time	- 44+6hrs
Total cost	- Hourly rate €40-€70 - €2000-€3500

Figure 4: Policy Sandbox Tool Option 1

Option 2: "Out of the (Sand)box-service"

The Out of the (sand)box concept would be tailor-made according to the requirements of a partner city. Realistically, the cost of creating a tailor-made ABM is unlikely to be below €25,000 and may be significantly higher. However, there are other opportunities for more detailed policy support and project development that could be provided at a lower cost, based again at covering normal hourly rates within partner organisations.

Due to the budgetary constraints already identified it is therefore expected that the demand would be primarily for the policy sandbox innovation workshop and possibly some additional follow-up work. It is not expected that there will be a significant demand for the Out of the (sand)box service but this cannot be ruled out, and if the ABM process is further developed with a more affordable generic base, it could be that a market develops. It would therefore be reasonable to consider the policy sandbox innovation workshop as a way of raising awareness for ABM in a climate and social innovation context in order to prepare the way for a possible ABM product in the future.

Aim of the service:	- Mid-term, social innovation advisory service - more intense support for interested client cities (coaching)
Duration / Effort:	Work process over period of at least one month, consisting of multiple meetings, workshops, and adaptation of services provided
Inputs – Activities carried out:	
Preparation:	- dialogue with client city to understand aspirations, challenges, needs - identify synergies with SMARTEES and opportunities to assist - identify relevant process services and potential partners / delivery agents - scoping report to agree content, services, outputs
Process service examples:	- longer development process based on client city's own challenges - strategic advisory support by the SMARTEES partners (where suited also external partners) at key points in time of the service provision (e.g. kick-off, interim, and final workshop) - access to research input and academic mentoring

	- peer to peer support by a mentoring city - on demand consulting support where needed in the process and as agreed upon, by SMARTEES partners such as Energiakademiet, Urbanisland, ICLEI, and others - Agent-Based Modelling (ABM) service for customized model development
Output – products resulting from the service:	To be identified in initial scoping report
Outcome – changes achieved by the service:	- The client city has gained new insights into potential responses to its challenge(s) - Based on the customized ABM simulation, different policy scenarios have created more substantial insights and a stronger basis for decision making - The client city has made progress throughout the process of service provision in responding to its challenge(s)
Total SMARTEES time	- To be agreed on specific project basis
Total cost	- To be agreed on specific project basis

Figure 5: Policy Sandbox Tool Option 2

Marketing

There are a number of potential marketing avenues for a for the SMARTEES offering, but the primary opportunity to reach the target audience of cities addressing sustainability would be through ICLEI and its existing communications channels – web page, newsletters, conferences and partnerships. Other project partners, however, have their own communications platforms and opportunities. Academic partners can therefore also have a marketing role by making clear in their communications (papers, conferences etc) that follow-on services are available.

A review of progress and interest should be included in the autumn of 2022 to consider response, interest and options for the future. In order for a viable service into the future, there should be a clear documented interest by this time.

A simple reference page should be included in the SMARTEES web resources so that interested cities or other potential clients can be directed to a platform to find more information and contact details for the contact point within ICLEI.

Ownership

In the short-term development process it is not expected that the commercial demand for SMARTEES policy sandbox support will be significant enough to warrant the establishment of a separate legal entity. The basic policy sandbox innovation workshop lies sufficiently closely to the core business of ICLEI to enable this lower-level of activity to take place with ICLEI as the co-ordinating party and commissioning input from other project partners as necessary. ICLEI should provide regular feedback to other parties as and when approaches for Sandbox workshops arise.

If the development of a more generic ABM model was to take place, it is expected that this would be either in a new partnership with finance from a third party, or alternatively led by a single ABM academic party. In either case, the organisational and IP issues would be addressed at that point in the coming constellation.

Longer-term development potential

The SMARTEES project has been a useful development vehicle for agent-based modelling for social innovation and climate change. The project results can have a significant impact in raising awareness of the potential that ABM offers, and has also helped refine an understanding of the application of models in this area of work amongst the modelling community. However, further development work is needed to refine the cost-benefit relationship that is beyond the scope of SMARTEES.

With the knowledge accumulated through SMARTEES, it would be interesting to explore the development of a more generic model that could be used as a base into which city-specific data could be added and the results fed back into the model using machine learning. In this way, it may be possible to develop an initial tool that has constraints in reliability but is useful enough and affordable enough to receive wider use. If feedback loops and machine learning is linked into this, then the reliability constraints could be increasingly overcome over time without compromising the affordability. In this way it could, in theory, be possible to develop a useful indicative tool that becomes more reliable and increases therefore its cost benefit over time.

It is apparent that local government is severely constrained in financial availability for knowledge development and application. Developing a service with focus on potential commercial partners can provide more financial resource for development and economy of scale, greater exposure and faster roll out of ABM. Therefore, one potential avenue to explore for the further refinement of ABM would be to consider adapting it to the needs of public enterprises and private business in the fields of transport and housing primarily. This could provide strong societal outcomes, but be more realistic to find the resources necessary to develop a next level of ABM tool that could then become the generic base for a wider roll-out in local government.

It is likely however that the added cost of creating a generic model would not be able to be borne by a commercial contract alone. It could therefore be that external innovation finance would be necessary for this.

With a more refined process it may also be interesting to consider whether ABM could be for example a tool for maximising social impact in major infrastructure and development projects. An option for future development could therefore be to consider approaching major institutions such as the European Investment Bank to discuss the potential of the SMARTEES experience in the context of a climate investment financial instrument in a partnership development approach.