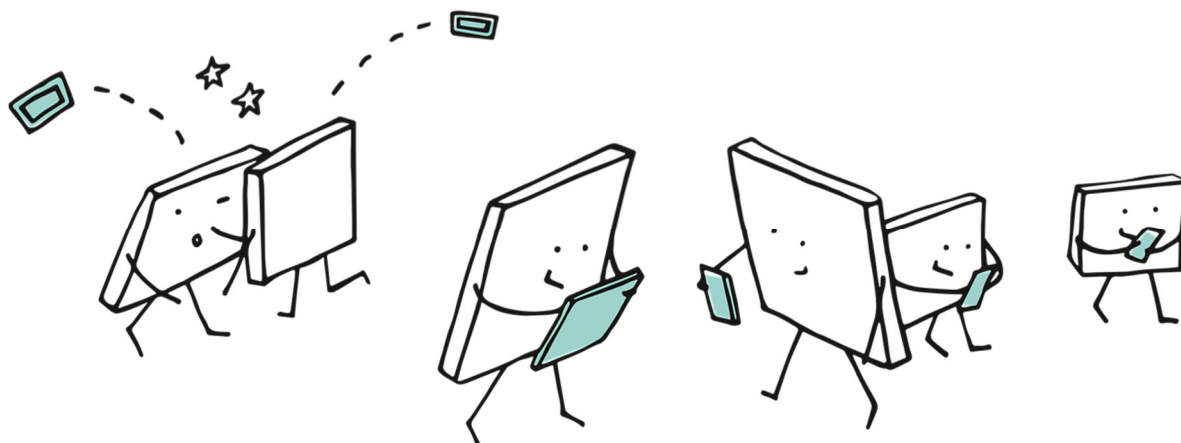# SMARTEES Policy Sandbox IT tool and workshop concept

June 2021

Picture under creative common licence. © pixabay.com

Project full title	Social innovation Modelling Approaches to Realizing Transition to Energy Efficiency and Sustainability
Project acronym	SMARTEES
Grant Agreement No.	763912
Coordinator	Norwegian University of Science and Technology (NTNU)
Project duration	May 2018 – October 2021 (36 months, plus 6 months extension)
Project website	www.local-social-innovation.eu

Work Package	8. Exploitation and Dissemination
Deliverable	8.2 SMARTEES Policy Sandbox IT tool and workshop concept
Delivery Date	24.06.2021 (month 38)
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Dissemination level:	Public (PU)	X
	Confidential, only for members of the consortium (CO)	

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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, mobility and sustainability transitions. The current document presents the work that has been and will be carried out until the end of the project to develop 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 further differentiates between the online Policy Sandbox Tool and the pro tool service offer, and provides a detailed overview of each.

List of abbreviations

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ABM	Agent-based Modelling
ACE	Agent-based Computational Economics
BEPA	Bureau of European Policy Advisers
CoR	European Committee of the Regions
COVID-19	Coronavirus Disease 2019
CSOs	Civil Society Organisations
DG CLIMA	Directorate-General for Climate Action
DG Energy	Directorate-General for Energy
DG Environment	Directorate-General for Environment
DG MOVE	Directorate-General for Mobility and Transport
EC	European Commission
EIJKU	Energy Institute - Johannes Kepler University of Linz
EP	European Parliament
EU	European Union
ICLEI	ICLEI – Local Governments for Sustainability, European Secretariat
INEA	Innovation & Networks Executive Agency
JH	James Hutton Institute
KPIs	Key Performance Indicators
K&I	Knowledge and Innovation
NGOs	Non-governmental Organisations
NTNU	Norwegian University of Science and Technology
SET-Plan	Strategic Energy Technology Plan
UDC	The University of A Coruña
UOT	University of Timișoara
UG	University of Groningen

1. Introduction

Since the project kick-off in May 2018, the SMARTEES partners have carried out a wide range of activities that would bring the project closer towards the development of the Policy Sandbox tool. The SMARTEES Policy Sandbox Tool 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. Based on the research on and modelling of pioneer European cities that have been involved in the SMARTEES project since the beginning, the tool provides local policy makers with insights into what kinds of processes could take place and what kind of policies could be implemented to increase citizens' acceptance.

Immense effort is being dedicated to developing the tool to be as user-friendly as possible and helpful for local governments that are interested in relevant energy and mobility-related energy transitions at the local level. An online version of the tool, showcasing the SMARTEES pioneer case studies, will be made publicly available and hosted on the SMARTEES project website[1]. It will allow users to choose from pre-selected factors, i.e. influences such as changes in opinion, in fuel prices, or in communication measures taken by an actor regarding the respective Social Innovation. Against the baseline model, which reconstructs citizens' real-world behaviour in the past, these changed influences or factors will make what is called a policy scenario. These policy scenarios shall create to an insight as to whether the course of events could have been different, had a policy decision by the researched city been different.

There are two ideas for using a Policy Sandbox Tool: The online version of the tool, which is referred to as "light version" and a consultancy service provision, where in a workshop context and coaching process, a customized Policy Sandbox Tool is developed and applied. This version is referred to as the "pro version". To give an overview, this deliverable is divided into three chapters:

Chapter 2 provides a detailed overview of the Policy Sandbox Tool in the light version that is accessible through the SMARTEES website and the main work that was carried out thus far in the project in relation to it.

Chapter 3 describes the input that is still needed to feed into the tool, how ICLEI will work together with the case study researchers and modelers to gather missing information, and the timeline of events for the planned activities.

Chapter 4 outlines the options that have been elaborated in relation to the "pro version" of the Policy Sandbox Tool-based service provision to cities.

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[1] https://local-social-innovation.eu/

2. The Policy Sandbox Tool – light version

The SMARTEES Policy Sandbox Tool (PST) 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 key target audience are local authorities and technical staff as well as decision-makers responsible for energy and mobility policy. The PST light version can, however, only serve as an introduction to the methods and outcomes of the project. It should be understood as a teaser for the services that could be provided in the pro version. This chapter illustrates the main work that has been carried out in relation to the PST in the light version, i.e. an online tool openly accessible through the project website.

Development of the PST began in summer 2019 under Task 8.5, with exchange of information and planning of activities in the work packages (WP) relevant to the PST development (especially WP5 and WP7). The first discussion that took place focused on questions of design, potential outputs, and the inputs needed from the work packages. The first design was discussed around the structures shown in figure 1 and 2 below. On the one hand, they show the backend of the PST, namely the social simulation of alternative policy scenarios using Agent-based Modelling (ABM) (greyish box in figure 1). On the other hand, they show the frontend of the PST, i.e. the online tool visible to the user and, here, the related input and output-choices.
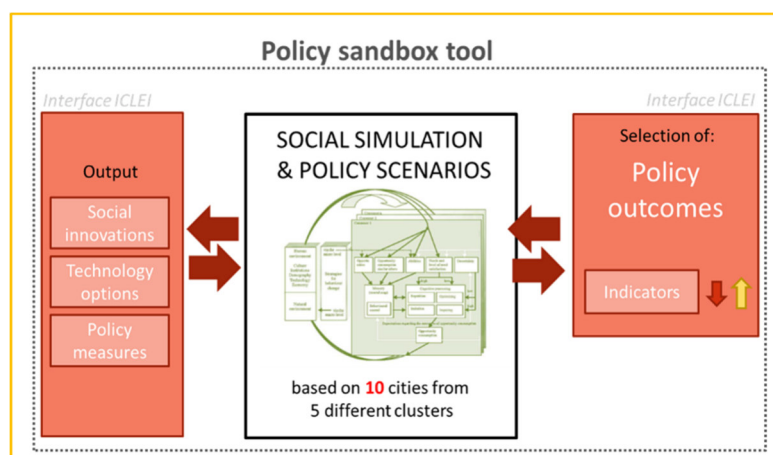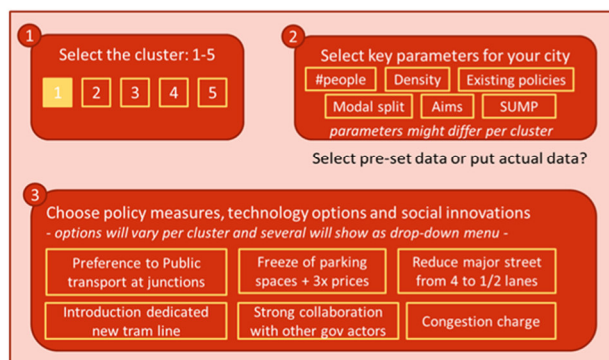

Figure 1: PST frontend and backend, early version

Figure 2: First schemas for input and output options

In the second half of 2019, in some workshops from the second round of follower city study visits, a session about the PST was incorporated into the agenda. The aim of the session was to gather expectations and feedback on the tool concept and inform its further development (this session was included in study visits to Barcelona, Malmö, and Timisoara; cf. to D8.3 "Documentation Report of the Follower Cities Workshops" (due in October 2021)). In the Timisoara site visit, for the first time a concrete illustration of an ABM simulation was discussed. The session also aimed to allow follower cities to generate input for the development of the tool, including about:

- Input and outcome indicators/data/variables to the tool that would be most useful;
- Relevance of the models to tackle the respective clusters' challenges and beyond;
- Importance of policy scenarios and the need to include their central parameters into the light version of the tool.

In late 2019, ICLEI set up an ad-hoc working group on the PST, which started its work based on a concept note developed by ICLEI. The discussions were based on previous ideas (cf. figure 1 and 2) and the information provided by SMARTEES modellers (from the James Hutton Institute and the University of Groningen) as well as related deliverables. The latter included the ABM building blocks (see figure 3)[2], which were eventually also used for the development of the PST (see figure 4). Here it is important to mention that policy scenario simulations are not "future predictions", but ABM builds upon past experiences and simulates citizens' responses to alternative (past) scenarios. Thus, two layers were discussed: the factual past and the fictive future (i.e. alternative past scenarios) – always asking the question "what could have been different, if…".

Figure 3: Building blocks of SMARTEES ABM architecture (D7.2, p.11)
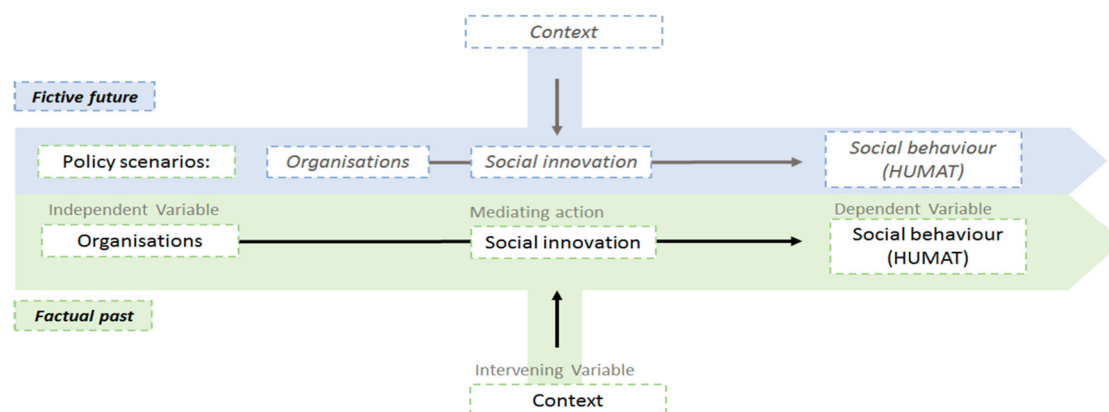

Figure 4: Logic and building blocks of the PST, based on D7.2 (see figure 2)

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[2] HUMAT refers to the computer simulation architecture developed in SMARTEES (see D7.2 "Simulation model implementing different relevant layers of social innovation, human choice behaviour and habitual structures")

At the end of 2019, it was decided to start prototyping the PST with the three cases most advanced in the development of the ABM models at that time: the Groningen case (modelled by UG), and the Aberdeen and Stockholm/Malmö cases (modelled by JH). Following the first meetings of the ad-hoc working group, in 2020 all available project deliverables were screened to extract relevant information for the prototype development of the PST, i.e. variables, structure, and topical foci that were supposed to be used in the ABM simulations. Further bilateral discussions with the prototype cases were held on a regular basis.

By mid-2020, the simple PST structure (see figure 1) had been developed into more detailed draft structures of the potential front and backend (see annex A-D). In further workshops with the SMARTEES partners an extensive list of inputs and outputs that were a) desired and b) feasible was developed for each of the 10 reference cases (see annex E). This list was based on the framework for alternative policy scenarios developed in WP5, including contextual, political, and agency factors.

A milestone event for the PST development was a tool-testing session organized by ICLEI as part of the 9th European Conference on Sustainable Cities & Towns (ECST), which took place as an online event, hosted by the city of Mannheim (Germany), from 30 September to 02 October 2020. ECST was a large-scale event for urban policy makers and sustainability practitioners and thus represented an excellent opportunity for a premiere interactive presentation of the PST. As the prototype cases' ABMs were not ready to be implemented in a PST prototype version, the session presented the idea of the PST and glimpses into how the models worked at that time (for an illustration, see figure 5 below). Furthermore, through a feedback round, the session provided participants with an open space to exchange their thoughts on the potential of the PST to support local policy-design, decision-making and eventually successful transitions.
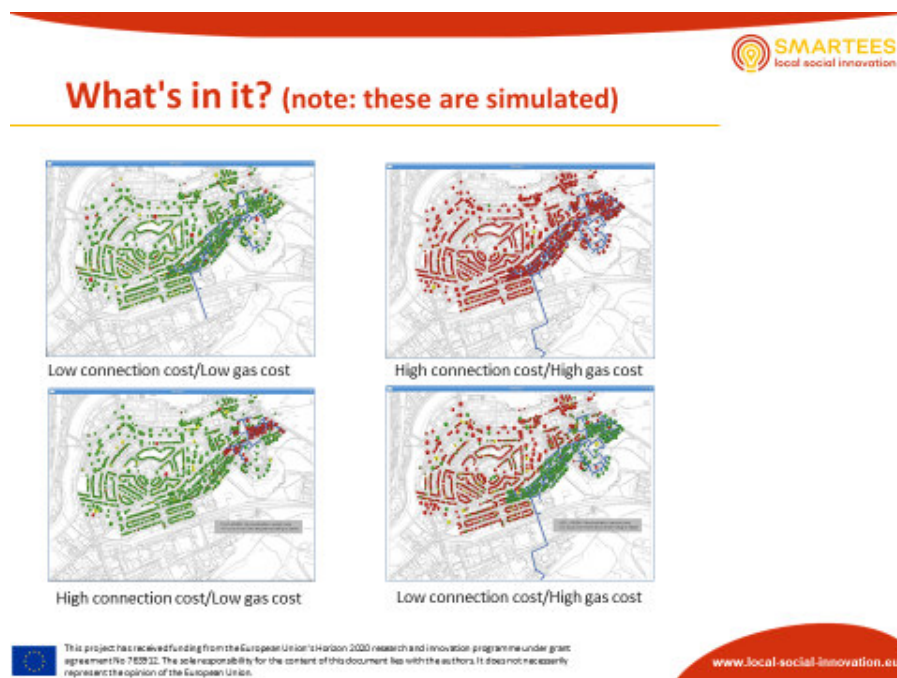

Figure 5: Model presentation for Aberdeen during the ESCT 2020 conference

In the remaining months of 2020, mock-up model runs were collected and an initial mock-up of the PST was set up by ICLEI's programmers. This included the first prototype structure: an introductory page, timeline/storyline pages (see figure 6 below), and a scenario page for both the Groningen and Aberdeen case. The first round of policy scenario workshops, organized under WP5, took place and ICLEI presented the latest ideas on the functions and design of the PST to the reference cases and participating partners to collect feedback (cf. to D5.2 "Policy recommendations for each cluster of case studies and an online tool for the co-production of energy policy and simulations" (due in August 2021)).
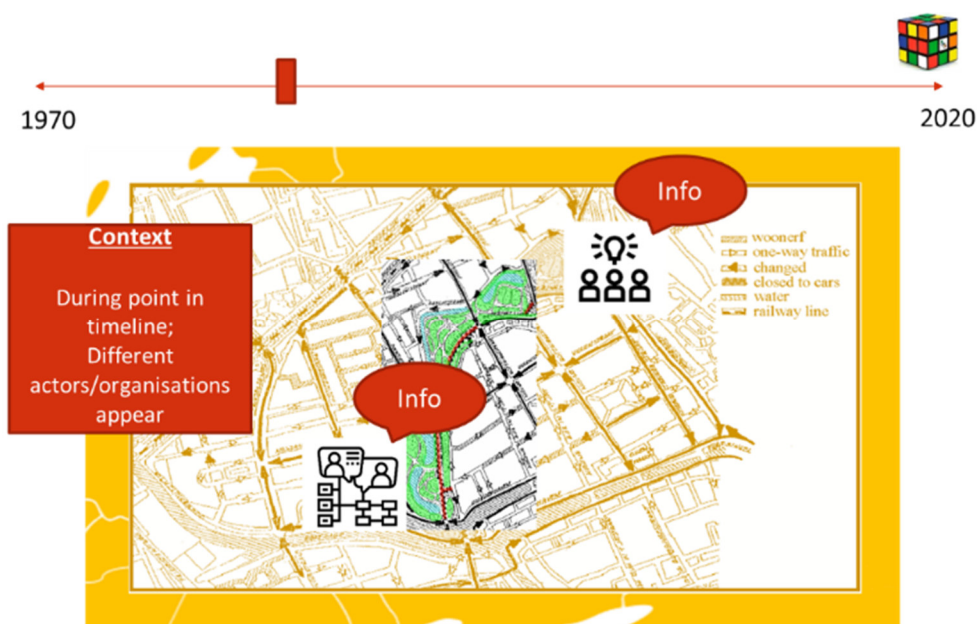
Figure 6: Visualisation example for the PST during working phase

The year 2021 continued the regular follow-up work with the 3 modelling teams. The focus continued to be on the cases of Groningen and Aberdeen, but now also included the case of Vitoria-Gasteiz. ICLEI developed the available material and information into so-called "storyboards"[3]. From there onwards an iterative process began with the input of the responsible case researchers and modellers to adapt and complete the storyboards for the respective cases. Furthermore, an external graphic designer was contracted for support in developing the design of the PST's online user interface (see figure 7 below).

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[3] Following storyboard methods in script writing or film making.
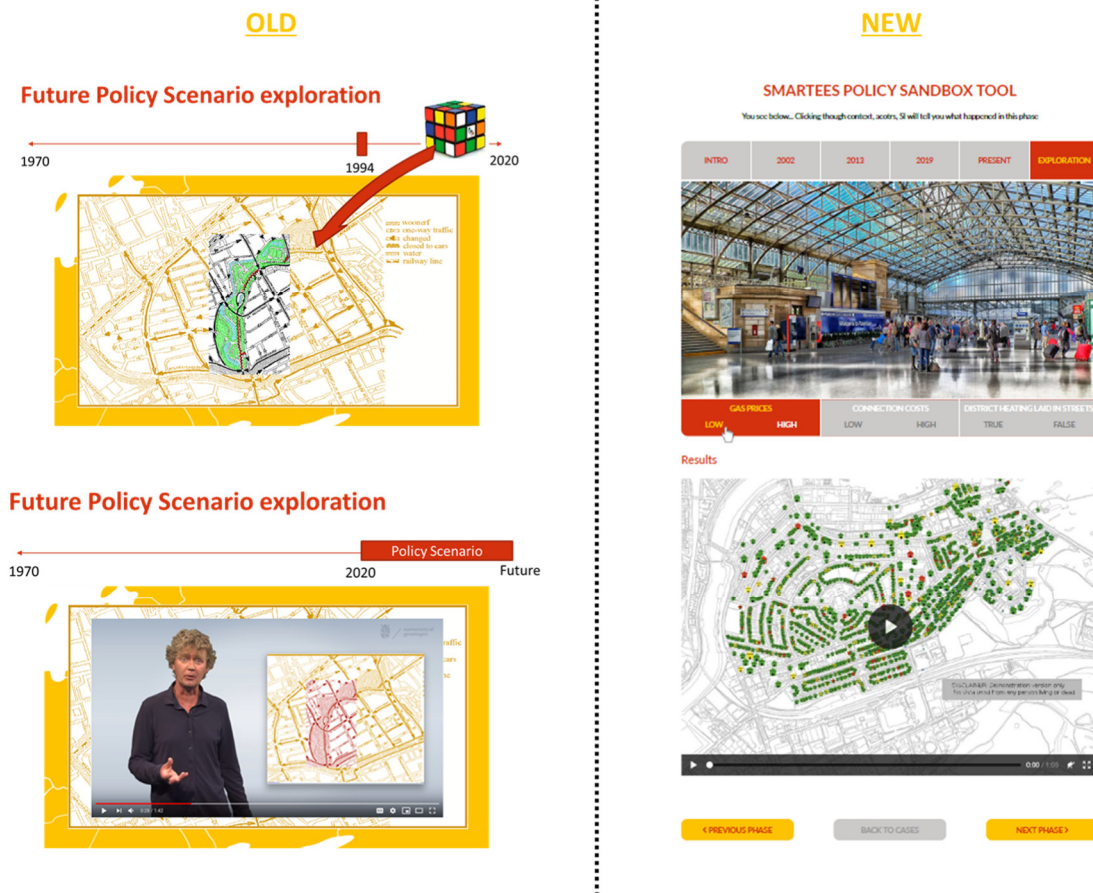
Figure 7: PST storyboard pages, policy scenario/exploration section - old draft VS new design

Lastly, ICLEI presented an online prototype to the reference cases during the second round of policy scenario workshops, organized under WP5. Here feedback on the PST and potential ideas for exploitation, as developed by Urbanisland (T8.6 lead), was gathered (cf. to D5.2 "Policy recommendations for each cluster of case studies and an online tool for the co-production of energy policy and simulations" (due in August 2021)). The results of the surveys and feedback collection from these workshops, with regards to the PST (both the light and the pro version), will be analysed and presented in D8.4 "Business plan for the SMARTEES policy Sandbox IT tool and workshop concept".

3. Finalizing the Policy Sandbox Tool

Until now, ICLEI has extensively worked together with research partners to develop storyboards for the respective cases that will be detailed in the tool. The objective of the storyboard section is to present the key events, actors, and social innovation as well as local context that characterized the case study during a particular and important period of time. This section retells the story as to what really happened to enable the pioneer cities highlighted in the tool to make progress with regard to the local energy or mobility transition. As depicted in Figure 8, a user will be able to make their way through key years on a timeline. Moreover, a user will be able to click on three different boxes (cf. to figure 8, the yellow boxes below the map) that provide more information about what the local context was like, which actors constituted key stakeholders at the time, and the nature of the social innovation, including the activities to shape and support or hinder it.

Case 9 - Aberdeen

| INTRO | 2002 | 2003-2012 | 2013-2015 | 2016-2019 | PRESENT | EXPLORATION |

2003-2012: Extending the network across the city

Legend
— Aberdeen Heat Network 2003 - 2012
▨ Heat network areas
▬ Water bodies
Infrastructure
⋯ Aberdeen City Boundary

Aberdeen Heat Network provided by Aberdeen Heat & Power Ltd and Aberdeen City Council
© Crown copyright and database right (2021)
Ordnance Survey Licence Number 100019294
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| CONTEXT | ACTORS | SOCIAL INNOVATION |

The first phase of heat network development took place in the Stockethill area of Aberdeen in the period between 2003 and 2005. Within this short period of time, a combined heat and power system serving four high-rise blocks of flats was delivered, and thereby connected 268 households to district heating. The network was partly funded by the United Kingdom's Community Energy Programme (CEP), which offered a grant to finance up to 40% of the capital costs of district heating projects. The area of Stockethill was selected on the basis of the condition of the building fabric, the technical feasibility of installing the infrastructure, and considerations of political and social acceptability.

Building on the example at Stockethill, a combined heat and power system was developed at Hazlehead Academy in 2006, providing heat to the school, a sheltered housing scheme, council premises and four multi-storey blocks comprising 209 properties. A subsequent development in the Seaton neighbourhood reached a further 14 blocks and more than 1,000 properties in two phases (2007-2008 and 2011-2012), as well as a health village, leisure centre and the city council headquarters.
As with the Stockethill development, the Hazlehead heat network and the first phase of the Seaton network were also partly funded by the United Kingdom's Community Energy Programme. Due to the short-lived nature of the CEP (2002-2007), however, other sources of funding had to be secured to enable further development of the heat network.

Figure 8: PST storyboard page example

The Aberdeen storyboard has been completed and the information uploaded in the relevant boxes and sections of the PST, as an example to showcase during the second round of policy scenario workshop that took place in late Spring 2021. The same will be done for the remaining case study examples to be included, namely Vitoria-Gasteiz, Groningen, and Stockholm.

The Vitoria-Gasteiz storyboard has gone through a couple of revisions and is currently undergoing final revision on the part of ICLEI. It will thereafter be shared with the relevant case study researchers for validation. The Groningen storyboard has also undergone several revisions and the text will be shortened to ensure that it is easy to read from a user perspective and includes only the most important pieces of information.

With regard to the Stockholm storyboard, ICLEI is currently in the process of developing the first draft. Inspiring the content of the storyboard are different deliverables and reports of the study visit to Stockholm that took place on 11 December 2018. Following the completion of the draft, it will be shared with the NTNU researchers responsible for the case for further input and clarification, and ultimately validation. All storyboards are planned to be finalized by the end of June 2021, to allow sufficient time to integrate the information into the PST.

The storyboards lay the foundation for the policy scenario runs that users will be able to select from in the exploration section of the PST. For this reason, it is critical that all key information pertaining to context, actors, social innovation, and the timeline are accurate. While the storyboard section of the PST will provide users with insights into what actually happened (the "factual past", cf. to figure 4) in each of the cases illustrated in the tool, the exploration section will provide users with an opportunity to understand what the situation would have been like if one or more variables had been different and how that would have impacted public reaction and policy (the "fictive future", cf. to figure 4).

To illustrate what the situation could have been like under a different policy scenario, the exploration section of the tool will consist of graphs and videos, as seen in Figure 9. It has been agreed that case study modelers will send all policy scenario variables and runs to ICLEI by the end of June 2021, so that ICLEI can upload these in the relevant exploration sections.
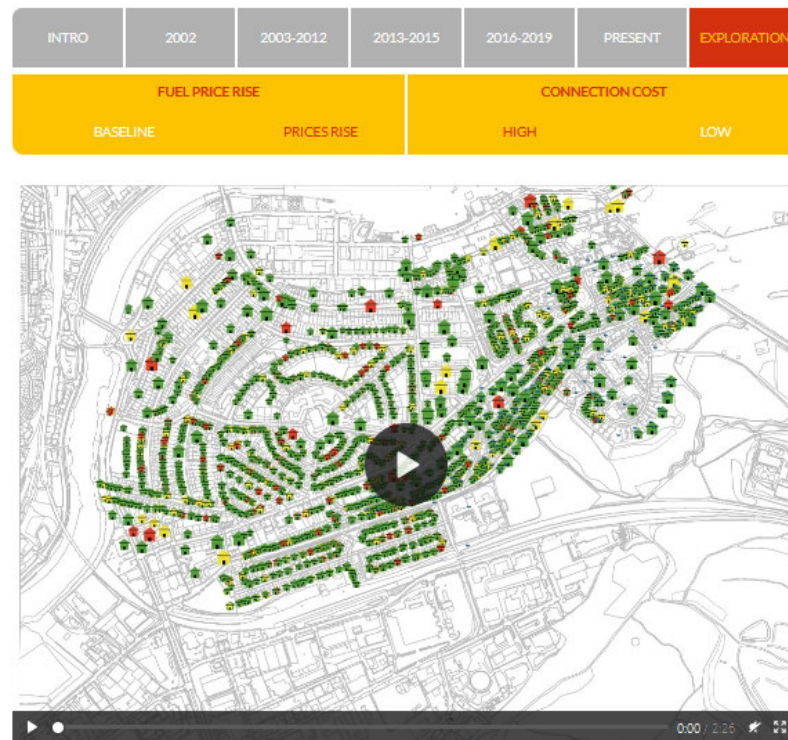
Figure 9: PST storyboard page example

As videos might not always be straightforward to interpret and understand, even with a legend, ICLEI will set up a meeting to record short video commentaries for the policy scenarios together with the relevant case modellers in the first week of July 2021. The commentaries are intended to explain the variables in a policy scenario and what changes are taking place in the scenario, in light of these variables, over a period of time. In doing so, these commentaries will help tool users to understand more clearly what is happening in a scenario.

The scenario runs that are being developed by the case modelers will be combined together with the recorded video commentaries into one single video, with the former integrated into the latter as visualized in the bottom left image in Figure 7. These videos will be included under the exploration section of the PST.

To ensure consistency across all video commentaries and that all key aspects are included, ICLEI has developed and shared video guidelines with all case modelers, which can be seen in Table 1. The guidelines provide instructions related to how many parts each video will be divided into, the focus and duration of each part, and what questions should be answered for each part. In order to ensure a smooth flow in the video and that key points are summarized concisely, case modelers are requested to develop a script following these guidelines for each policy scenario prior to the meeting that will be scheduled with ICLEI to record the video commentaries.

Table 1 Script guideline for scenario model runs

Focus	Duration (sec)	What to discuss?
Introduction	5	Name of the scenario, e.g. scenario of change in trust, or scenario x
	15	Identification of the variables that are considered in the scenario
Legend	15	Mention of the critical elements in the model run/graph/etc. (legend), which you will refer to in the explanation. For example, which colors or icons/markers represent which variable?
Focal point	60	Explain what is happening in this scenario and how this is illustrated in the model run. Take a step-by-step approach to explain what is happening, i.e. how the variables are influencing the process over time.
Probability	10	Provide information that highlights the likelihood that this scenario would occur, e.g. *Out of x runs, this occurred x% of the time.*
Contextualization	15	Reflection as to why the outcome was as it was – what factors played an important role in this outcome and why?

ICLEI will additionally work with the relevant case study modelers to record a separate video for each case study, which will also be done during the same meeting as the recording of the video commentaries. This second video will seek to highlight any recommendations or key messages the modelers have for decision and policy makers, based on the implemented policy scenarios and model runs. Similar to the process for the video commentaries, the relevant modelers have been asked to develop a short script prior to the meeting for recoding the videos. The recommendations videos will be added under the "Summary" page of the relevant case study section of the tool.

In addition to the video commentaries and recommendations videos, ICLEI will further work together with the modeler of the Groningen case study, Wander Jager, to develop a general video that explains agent-based modelling and how this works. This video will be recorded with a professional camera person, and ICLEI will then edit the video to ensure that all videos have a similar look and feel. This video is planned to be recorded in the first week of July 2021.

Once all the materials from the case researchers and modellers are collected and videos are finalized, ICLEI will be able to move forward in developing the PST. The tool is expected to be finalized by the end of July. A short (2-3 minute), animated video will be produced once the tool is finalized and will act as a tutorial for those interested in learning about the tool as well as its different features and abilities. The tool will likewise also be featured in another video that will be developed to provide a general overview of the project, its accomplished activities, and impacts.

A number of events will be organized to present the tool and collect input to be able to make final changes to it before the project concludes in October 2021. Included as part of these events is a workshop that ICLEI will organize, likely in July or August, with the project's Premium Follower Cities that participated in the study visits. ICLEI will furthermore organize a public online seminar/workshop, to which all other SMARTEES follower cities will also be invited, to gather more impressions related to the tool and understand the related thoughts of representatives who have not been involved in the project. A workshop will also be organized to present the PST to representatives of the European Commission.

4. The Policy Sandbox Tool – pro version

The pro version of the PST was planned as a PST-based service provision to interested local authorities, specifically cities, restricted to a customized application of the Social Innovation perspective and the development of ABM simulations to be used in a workshop context. For this workshop context a concept is being developed, which will be fully available as part of the project's exploitation strategy (D8.4). The workshop concept is developed and amended on the basis of the different workshop formats carried out with the project's reference cities, i.e. mainly the policy scenario workshops (rounds 1 and 2) as described in greater detail in D5.2 "Policy recommendations for each cluster of case studies and an online tool for the co-production of energy policy and simulations" (due in August 2021).

Two options have been elaborated together with Urbanisland. These options can be described along with their aims and the IOOI-dimensions, i.e. Input – Output - Outcome – (Impact)[4].

Option 1: "Policy sandbox innovation workshop"

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

Table 1: PST service option 1

Aim of the service:	Quick support for interested client cities
Duration / Effort:	Half-day workshop, including preparation and follow up work
Inputs – Activities carried out:	
Preparation:	- Interviews with key city staff to identify: a) the key challenge, b) stakeholders, c) potential social innovations to the respond to the challenge - Interviews with key stakeholders of the respective social innovation(s) in the city - Identification of a benchmark using a SMARTEES reference case - Identification of key consultants from the SMARTEES team - Matching with partner cities / other cities for deeper technical / policy support - Preparation of client city challenges in a briefing paper as reference point in communication and agreed services
Workshop:	- Online workshop with client city (2-3h) - Presentation of client city's challenges - Learning journey based on SMARTEES reference case - ABM inputs based on the SMARTEES reference cases from the SMARTEES modelling teams

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[4] Impact is unlikely to be realised within the frame of the services envisioned here and is consequently left out of the description.

	- Discussion on user city challenges, policy / practice approaches, ABM potential
Output – products resulting from the service:	- Summary policy paper, including the challenge and potential responses, the pros and cons of different policy scenarios and policy recommendations - ABM runs as reference material attached to the policy recommendations
Outcome – changes achieved by the service:	- The client city has gained new insights into potential responses to its challenge - Based on the SMARTEES ABM simulations different policy scenarios have created more substantial insights and a stronger basis for decision making

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

The second option is the in-depth version for customized service provision from the SMARTEES partners.

Table 2: PST service option 2

Aim of the service:	- Mid-term, social innovation foresight service - More intense support for interested client cities (coaching)
Duration / Effort:	Work process over 1-6 months, consisting of multiple meetings, workshops, and adaptation of services provided
Inputs – Activities carried out:	
Preparation:	Same as option 1, plus additionally: - A longer development process based on client city's own challenge(s), allowing for a more differentiated analysis - ABM service for customized model development
Process services:	- 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) - 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 Energiakademie, Urbanisland, ICLEI, and others
Workshop:	- At least one workshop will be held as in option 1 - Additional work meetings with smaller groups of actors are anticipated

| Output – products resulting from the service:	- Summary policy report describing the social innovation foresight journey, including the concerning challenge(s) and potential responses, the pros and cons of different policy scenarios and policy recommendations - Customized ABM runs as reference material attached to the policy recommendations
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)

As stated above, D8.4 "Business plan for the SMARTEES policy Sandbox IT tool and workshop concept" will further explore these options, including the costs associated, and the results of initial market research.
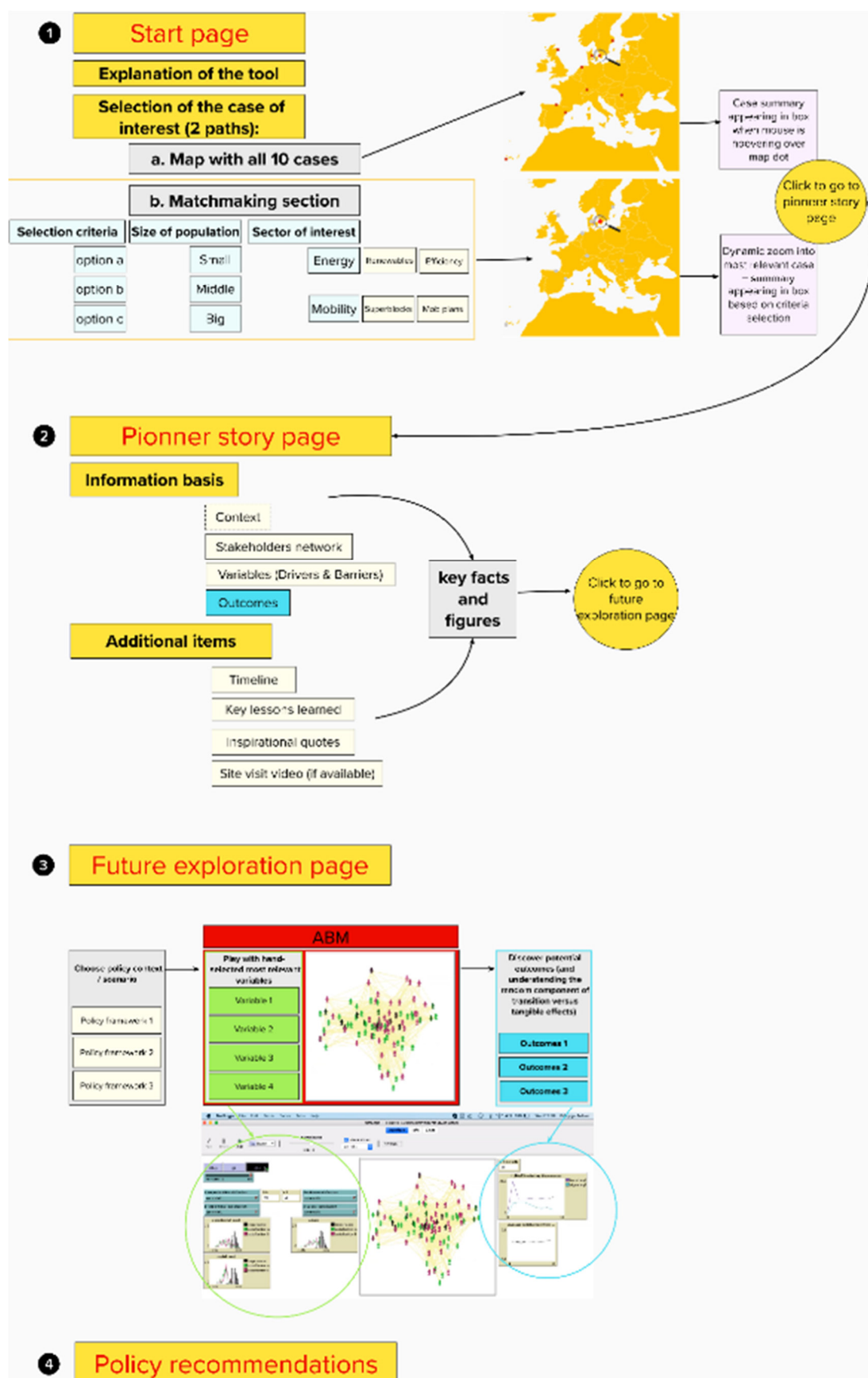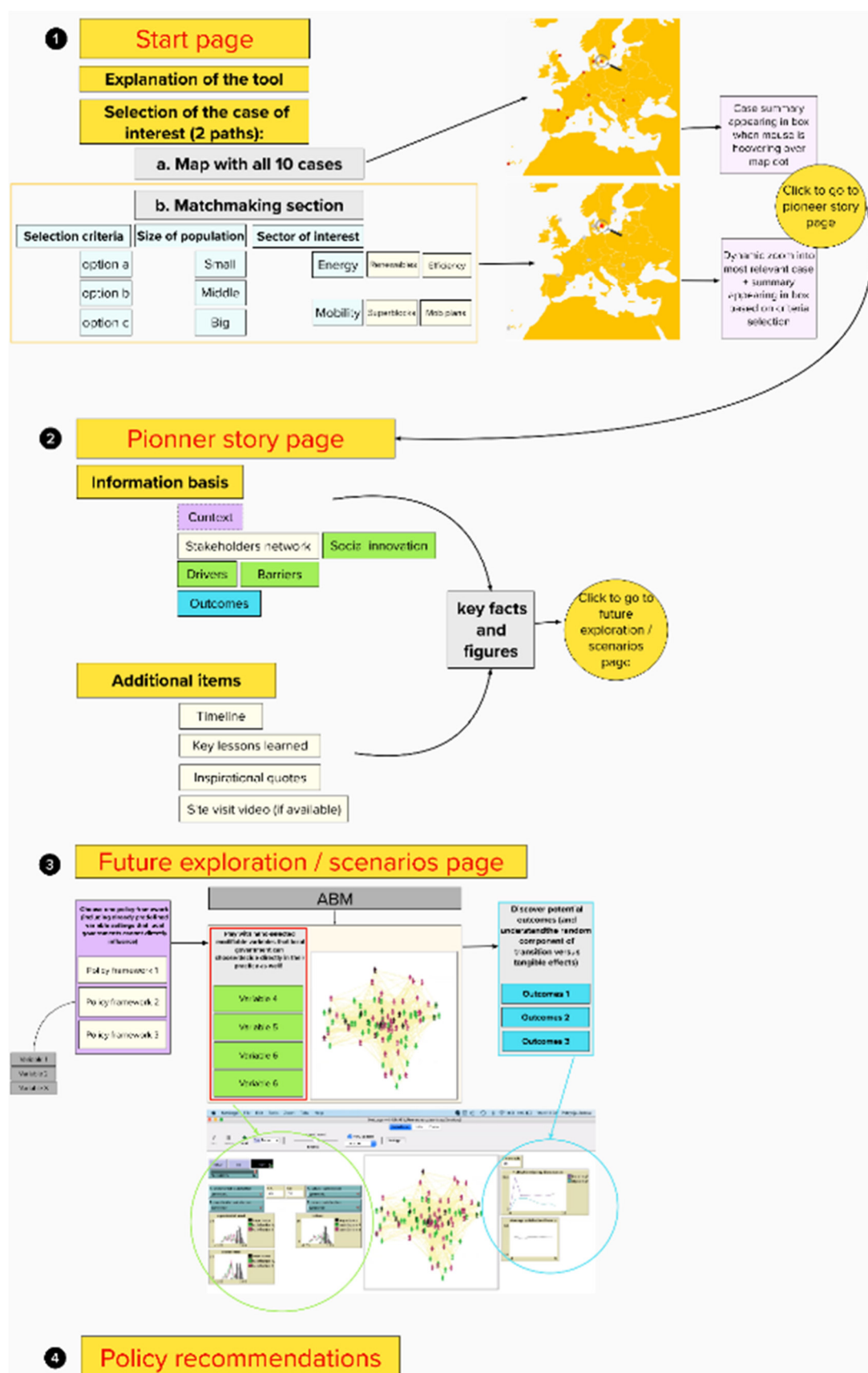
Annex

A. Online tool skeleton, version 1
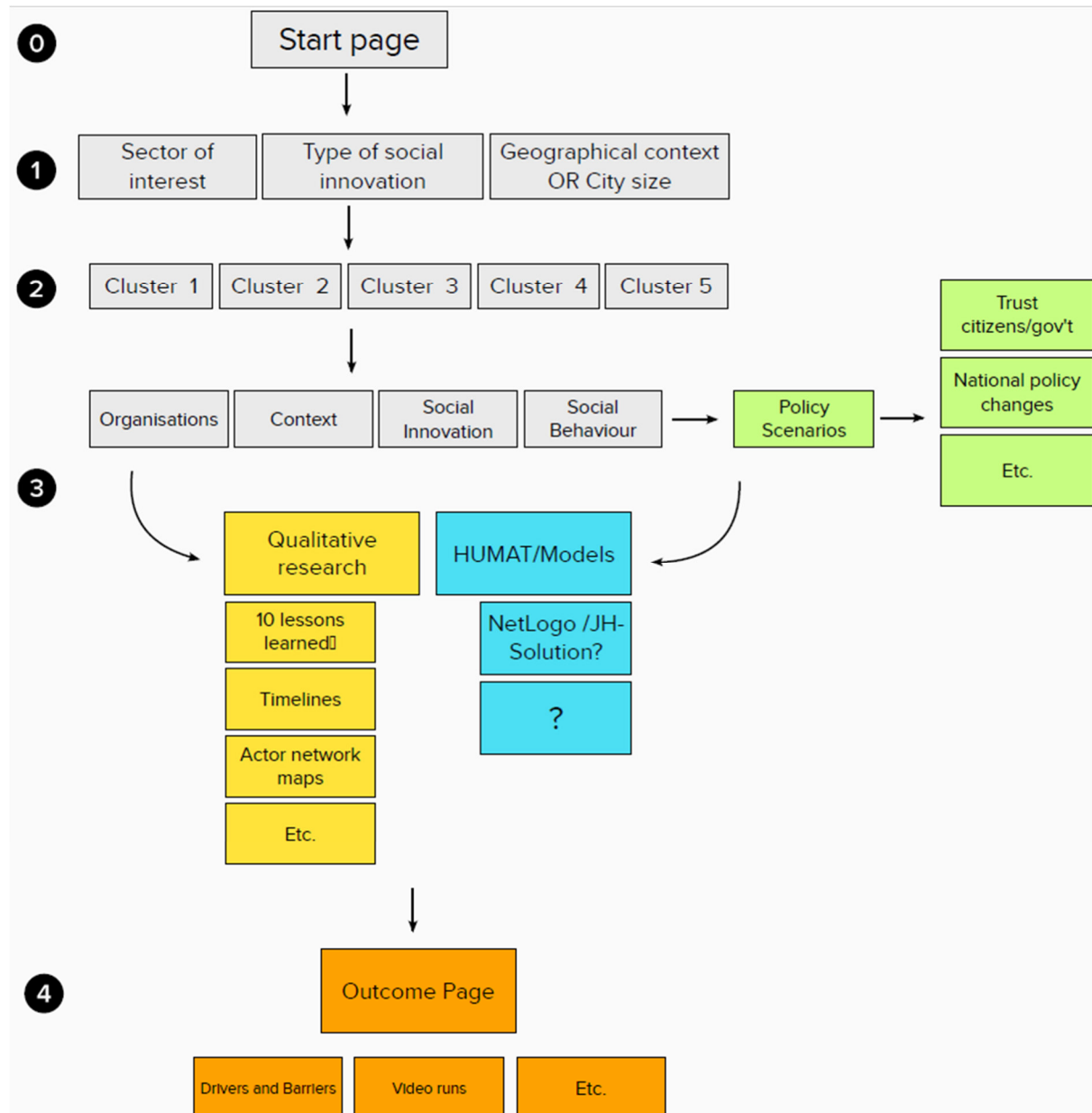
B. Online tool skeleton, version 2
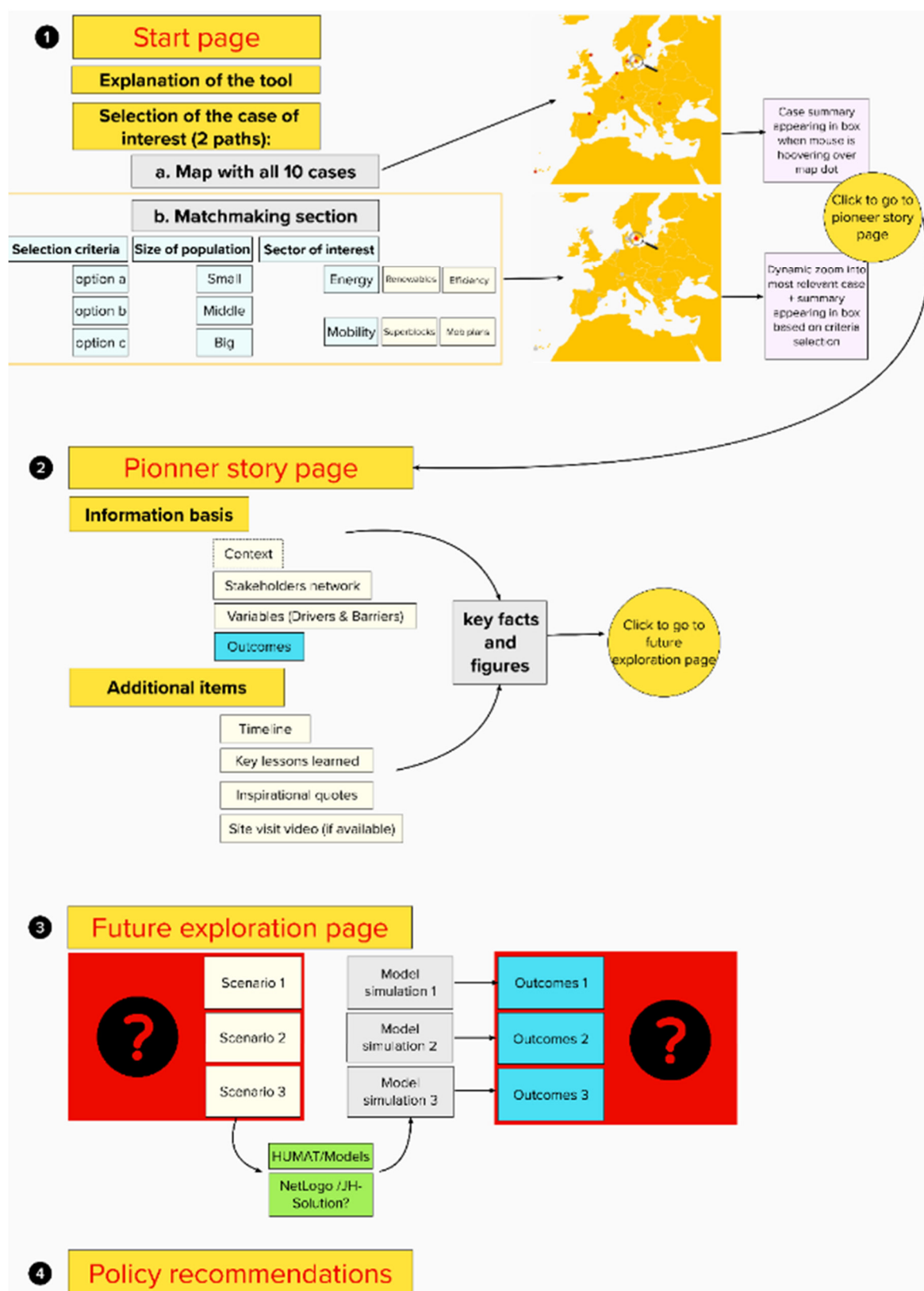
C. Online tool skeleton, version 3

D. Online tool skeleton, version 4

E. First checklist with feedback on potential policy scenario variables for the PST (collected in June 2020)

Dimensions (drivers & barriers)	Groningen	Stockholm	Malmo	Timisoara	Vitoria-Gasteiz	El Hierro	Zurich
Internal resistance	It's important to the case study partners; It's important to the case study researchers	It's important to the case study partners	It's important to the case study partners; It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners	It's important to the case study partners; It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners; It's important to the case study researchers; It's important to the case study modellers	Internal resistance – within the driving organizations or associations (e.g. city council and canton): different visions regarding the process of design and implementation of the SI – Moderately Important
	I cannot see an easy way for me to include it in the model	There's no way I will include it in the model	It would be reasonably easy for me to include it in the model	I cannot see an easy way for me to include it in the model	It would be reasonably easy for me to include it in the model	It would be reasonably easy for me to include it in the model	no info yet
Political resistance and conflict	It's important to the case study researchers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	Moderately Important
	It would be reasonably easy for me to include it in the model		I am already planning that something like this will be in the model	I cannot see an easy way for me to include it in the model	It would be reasonably easy for me to include it in the model	It would be reasonably easy for me to include it in the model	no info yet
Citizen resistance and conflict	It's important to the case study modellers		It's important to the case study partners;It's important	It's important to the case study researchers; It's	It's important to the case study partners;It's important	It's important to the case study partners;It's important	Citizen resistance and conflict (few actors; Types of contestation:

			to the case study researchers; It's important to the case study modellers	important to the case study modellers	to the case study researchers; It's important to the case study modellers	to the case study researchers; It's important to the case study modellers	a) from business; b) from people living in rural areas of the Canton, having different priorities (e.g. a large use of the car), compared to people living in the City; c) from part of young people that consider that what is done for dealing with environmental issues is not enough) - Slightly Important
	There are already entities in the model that I think capture it		There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	It would be reasonably easy for me to include it in the model	It would be reasonably easy for me to include it in the model	no info yet
Existing non-supporting local and social norms	It's important to the case study partners		It's important to the case study partners;It's important to the case study researchers;It's important to the case study modellers	It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers	It's important to the case study partners;It's important to the case study researchers	Not Important
	I cannot see an easy way for me to include it in the model		There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	It would be reasonably easy for me to include it in the model	It would be reasonably easy for me to include it in the model	NA
Lack of confidence in the use/effectiveness of the SI	It's important to the case study partners		It's important to the case study partners;It's important to the case study researchers;	It's important to the case study partners;It's important to the case study researchers;	It's important to the case study partners;It's important to the case study researchers;	It's important to the case study partners;It's important to the case study researchers;	Not Important

			It's important to the case study modellers	It's important to the case study modellers	It's important to the case study modellers	It's important to the case study modellers	
	I cannot see an easy way for me to include it in the model		There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	It would be reasonably easy for me to include it in the model	It would be reasonably easy for me to include it in the model	NA
Low adoption of new energy behaviours	It's important to the case study researchers; It's important to the case study modellers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers	Very Important
	I am already planning that something like this will be in the model		There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	There's no way I will include it in the model	There's no way I will include it in the model	no info yet
Need for safety	It's important to the case study researchers; It's important to the case study modellers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	Slightly Important
	I am already planning that something like this will be in the model		I cannot see an easy way for me to include it in the model	I am already planning that something like this will be in the model	There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	no info yet

Place identity and place attachment	It's important to the case study partners		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study researchers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	Important
	I cannot see an easy way for me to include it in the model		There are already entities in the model that I think capture it	I am already planning that something like this will be in the model	I am already planning that something like this will be in the model	I am already planning that something like this will be in the model	no info yet
Concerns for the impact on local economy and job	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners	It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers	Not Important
	I am already planning that something like this will be in the model		I am already planning that something like this will be in the model	There's no way I will include it in the model	There's no way I will include it in the model	There's no way I will include it in the model	NA
Satisfaction of the need for autonomy (i.e., self-sufficiency)	It's important to the case study partners		It's important to the case study partners;It's important to the case study researchers; It's important to the case	It's important to the case study partners	It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers	Not Important

			study modellers				
	I cannot see an easy way for me to include it in the model		It would be reasonably easy for me to include it in the model	There's no way I will include it in the model	There's no way I will include it in the model	It would be reasonably easy for me to include it in the model	NA
Commitment of relevant social actors through the process	It's important to the case study partners		It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	Moderately Important
	I cannot see an easy way for me to include it in the model		It would be reasonably easy for me to include it in the model	There are already entities in the model that I think capture it	I am already planning that something like this will be in the model	I am already planning that something like this will be in the model	no info yet
Satisfying the need for status (i.e., social prestige and recognition)	It's important to the case study researchers; It's important to the case study modellers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners	It's important to the case study researchers; It's important to the case study modellers	It's important to the case study researchers; It's important to the case study modellers	Not Important
	I am already planning that something like this will be in the model		It would be reasonably easy for me to include it in the model	There's no way I will include it in the model	There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	NA

Concern for quality of living conditions	It's important to the case study researchers; It's important to the case study modellers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study mod	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	Not Important
	I am already planning that something like this will be in the model		It would be reasonably easy for me to include it in the model	There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	NA
Satisfying the need for belonging (social cohesion of the community)	It's important to the case study researchers; It's important to the case study modellers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	Slightly Important
	I am already planning that something like this will be in the model		There are already entities in the model that I think capture it	There's no way I will include it in the model	There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	no info yet
Satisfying the need for trust in the project and in institutional representatives	It's important to the case study partners		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	Moderately Important
	It would be reasonably easy for me to include it in the model		There are already entities in the model that I think capture it	There are already entities in the model that I think capture it	It would be reasonably easy for me to include it in the model	It would be reasonably easy for me to include it in the model	no info yet

Satisfying the need for recognition (as an environmentally sustainable and/or innovative place)	It's important to the case study researchers; It's important to the case study modellers		It's important to the case study partners;It's important to the case study researchers; It's important to the case study modellers	It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers	It's important to the case study partners;It's important to the case study researchers	Important
	I am already planning that something like this will be in the model		There are already entities in the model that I think capture it	There's no way I will include it in the model	It would be reasonably easy for me to include it in the model	It would be reasonably easy for me to include it in the model	no info yet
Satisfying the need for competence in carrying out new behavior	It's important to the case study partners		It's important to the case study partners	It's important to the case study partners	It's important to the case study partners	It's important to the case study partners;It's important to the case study researchers	Not Important
	I cannot see an easy way for me to include it in the model		I cannot see an easy way for me to include it in the model	There's no way I will include it in the model	There's no way I will include it in the model	There's no way I will include it in the model	NA
Any comments on the barriers, drivers and needs as a whole?	Overall I tried to fill in as much as I could without spending a lot of time thinking about it - because each of those questions could (at least for me) require a day of thought. It is hard to say anything is not of interest and/or not includable in a model. It only makes sense related to a given research question, model design/ontology and at least some idea of how these words map to that. My concern is that as modellers we have not been clear enough to the non-modellers on what we can actually offer and how we need to go about doing it.						
	Added dimensions: • Not in my backyard (NYMBY) - Moderately Important • Different interests and goals among interested actors - Moderately Important • Satisfaction of the high quality of public transports - Important • Rooted tradition of citizens engagement - Important • Vision of the future (strategy existence) - Moderately Important • Slowing down of the decision-making (e.g need for waiting for a referendum result) - Moderately Important • Strong competences within the driving group - Moderately Important						