

# SCIENTIFIC SECTION

MAIN LANGUAGE SELECTED = ENGLISH

<b>Type of instrument</b>	PDR-WISD <i>Research Project – Walloon Institute for Sustainable Development</i>
Shortened title of the project (40 characters max., including spaces)	Formative scenarios for sustainability
SEMAPHORE Application ID	29101351

Submission under the topic:

1. Projects dealing with sustainable development and process of change, which aim to better define the nature, criteria, conditions of existence, the dynamics and transition paths towards sustainable development

## Formative scenario analysis for societal co-construction of transition pathways

The political culture in advanced industrial democracies has witnessed a significant shift since the 1980s: decision-making today is less top-down, and it is less based on strict separation between norm formulation and norm application, than thirty years ago (Giddens 2009; see also Peters et al., 2010; De Young and Princen, 2012). This transformation has been particularly visible in environmental policy-making. The result of this “down-shifting” has been, in particular, that municipalities and other local authorities now act more autonomously than in the past. In this context, various “climate-conscious” measures have been adopted at the local level through local regulations, public service delivery, property management and convening of local stakeholders (Richardson, 2012).

However, because of the complex multi-dimensional and multi-scale nature of climate change policy, local law- and policy-making must take into account the vertical and horizontal linkages to other policy domains. Moreover, since combating climate change requires the transformation of complex socio-ecological systems, it requires linking social sciences to the natural sciences; and since it requires lifestyle changes in addition to technical innovations, it calls for involving addressees in policy-making and basing reforms on their motivations and understandings of the challenges societies face (Folke 2006, Scholz and Binder 2011). Indeed, many local initiatives fail because they treat scientific analysis and public deliberation in isolation from each other, as documented for instance in the 2008 report of the US National Research Council on *Environmental assessment and decision making* (NRC, 2008).

The objective of this project is to draw the lessons from past failures of local climate change governance, by building upon frontier research efforts on multi-stakeholder planning and scenario analysis in local sustainability transition processes. **The key hypothesis of the project** is that the use of contextualized scientific scenarios in multi-stakeholder vision processes has to be understood as a **process of “formation” of preferences**, where new collective preferences and values are built on future visions and socially legitimate implementation paths. Through combining the framework of “formative” scenario analysis (Brand et al., 2013; Scholz and Stauffacher, 2007) and the insights from the literature in transition theory on the role of common visions in local and regional policy making (Grin, Rotmans and Schot, 2010), the research aims at producing a set of design principles for effective planning for local climate change policy.

To test this hypothesis, the proposed research project will (1) conduct a **meta-analysis of case studies on formative scenario analysis in local sustainability transitions** and (2) conduct an in depth case study of **the use of scenario tools in local climate change policy** in the province of Walloon Brabant in Belgium, with the view to (3) **assessing collective learning on pathways for local sustainability transitions**. The following research questions will be addressed through this research:

- what are the best available **methods to combine “multi-stakeholder visioning”** approaches as developed in transition theory and **formative scenario analysis**?
- what is the **contribution of this integrated method to three selected local transition processes** related to climate change policy: energy production and consumption, sustainable food production and consumption and land use planning ?;

- what are the most effective and legitimate **policy models for using integrating formative scenario analysis** in local climate change policies focusing efforts on three key areas?

This proposed research project will be accomplished by a 4 year PhD researcher, in collaboration with the work of the two main project PI's on this project. In addition, an interdisciplinary advisory board will provide supervision and data input for the realization of the in depth case study, based on their recognized expertise in areas most relevant to the selected local-level transitions.

### **Local governments in climate change transition processes**

Over the past two decades, numerous subnational climate change initiatives have emerged in an attempt to fill policy gaps at the national and international level (Richardson, 2012, p. 31). Some of these initiatives embrace the power that local governments can exert over major sources of greenhouse gases (GHSs), including emissions related to transportation and energy consumption in buildings. As a result, local governments have been among the most active jurisdictions on the climate change front (Ibid., p. 66).

Systematic comparative analysis of these initiatives has highlighted a series of strengths of regional and local climate policy. First, cities and localities have proven to be better equipped to **combine policies within and across sectors** than higher levels of government, given the interconnectedness at local community level of sectors such as land use planning, regulation of building standards and local food sourcing through collective catering programs (Powers, 2012). Second, localities can serve as a locus of **experimentation on climate policy packages**. If successful, innovative policy solutions developed locally can then be scaled "out" through horizontal exchanges of experiences and scaled "up" to regional and national levels (Allan and Stankey, 2009; Betsill and Bulkeley, 2006).

On the other hand, local climate action faces various challenges. Major obstacles are the lack of sufficient expertise and knowledge, the difficulties of inter-municipal cooperation for trans-boundary issues and the need to account for interdependencies between levels of decision making. Multi-stakeholder visioning processes have been proposed in this context as a useful method for achieving a better convergence of visions across levels of decision making and to mobilize knowledge and expertise from various stakeholder groups (Grin et al., 2010). Nevertheless, although these visioning methods often use the best available scientific knowledge as an input, they can result in strategies for sustainability transitions that are not optimal for the specific regional context. Major difficulties are the lack of **integration of the visioning process with policy analysis** (as documented for instance in the Netherlands, cf. Kern and Smith, 2008) and the lack of **collective learning on feasible implementation pathways** in the given territory (Rotmans and Fischer-Kowalsk, 2009; Coenen et al., 2012).

In response to these insufficiencies, scholars have developed planning tools that better take into account the complexity of the implementation process (Jaeger et al., 2001; Scholz and Tietje 2002; Poteete et al., 2010). However, at present these tools have mainly been used for national (or global) scenario analysis and only rarely integrate in a systematic way the design of local transition pathways. In addition, as also highlighted in a recent overview provided by the IUCN international

academy of law, systematic comparative assessment of the use of these methods in local contexts is still lacking (Richardson, 2012).

## **Research project**

As highlighted in the state of the art, nor the scientific/technological focus of the conventional scenario building approaches – focused on quantified and objective foresight exercises, nor the focus on the societal aspects of building and implementing common visions alone are sufficient to build effective local climate change policies. That's why the project will analyze and build on two sets of advances in local scenario analyses that are especially well suited to be combined with multi-stakeholder visioning processes.

**The first set of advances** are based on “**formative scenario analysis**” (Brand et al., 2013). It aims to confront the intuitively developed future visions in local multi-stakeholder planning with the analysis of the expected impacts of multiple resource use scenarios and various technological pathways that are likely to occur and/or are feasible in a given territory by using a set of analytic tools. This first family of tools is based on various optimization tools over the set of possible combinations of resource use and technological choices, under cost constraints and environmentally related regulatory requirements (Scholz and Tietje, 2002).

Formative scenario analysis has been applied to a wide variety of case studies (Njoroge et al., 2015). It has shown to be able to generate learning processes amongst the stakeholders by confronting them with the “consistency” of their proposed future visions, to widen their perspective by integrating multiple technological pathways in the visioning process and to clarify crucial decision points in the light of a variety of possible futures (Brand et al., 2013).

**The second set of advances** are related to the integration of “**institutional fit analysis**” (Young, 2002) into the visioning processes. This second family of analytical tools is based on the qualitative comparative analysis (Rihoux and Ragin, 2009) of various policy models, with a view to assessing to what degree these support the proposed transition pathways that have been elaborated in the multi-stakeholder visioning process. Typically the input to these analytical tools is provided by structured interviews on the impact of policy models and meta-analysis of existing studies and reports.

Institutional fit analysis has been conducted at a national level in various fields of sustainability transitions such as renewable energy (Reichardt and Rogger, 2014), electric mobility (Mazur et al., 2015) and climate change policy (Schmidt et al., 2012). However, with the exception of studies reported in Njoroge et al. (2015), rarely have these innovative analytic approaches been integrated into the multistakeholder visioning processes to support territorial transition processes.

In order to apply these methodological advances to local sustainability scenario building, this project aims to contribute to building an integrated methodology, which combines the multi-stakeholder “visioning” approaches as developed in transition theory and the analytic tools from formative scenario and institutional fit analysis.

To this purpose the project will:

- conduct a meta-analysis of the literature on multi-scale scenario and visioning processes in the selected thematic areas of the project (WP1.1.);
- develop innovative methodologies for integrating multiple technical implementation pathways into the multi-level approach to governing socio-technological transitions (WP1.2.);
- conduct an in depth case study analysis to test and evaluate the proposed approach, through a real-world foresight exercise in the province of Walloon Brabant in Belgium, where the research team has built an extensive network of contacts in the field of sustainability transitions (WP2); and
- compare the findings on the collective learning that occurred in the case (through an ex-ante and ex-post survey) to lessons learned from other cases reported in the literature (WP3).

## Work plan

To realize these objectives, the research will be organized in three work packages.

**WP1: meta-analysis and process design (M1 to M12).** The first work package will consist in a meta-analysis of territorial scenario analysis processes. WP1.1. will **build a database** of available case studies, **code the case studies in terms of criteria of effectiveness and legitimacy** of the process and make a comparative assessment. WP1.2. will conduct a literature review with the purpose to **select a sub-set of methods** that have proven effective and are most appropriate for building an integrated methodology. The expected outcome of the work package is an integrated model that can be used in territorial transition processes.

**WP2: in depth case study (M13 to M36).** The second work package will conduct a case study analysis of transition dynamics in the 3 interrelated fields of energy, food and land use planning, in the Walloon Brabant region. This region has been chosen both because of its diversity (as it includes both urban and rural areas, and includes low-income and high-income groups of the population and neighborhoods) and because the research team already has collected data on the 3 selected sub-fields in this area. Additional case study material that will serve as an input to the analytic tools will be provided through partner projects of members of the advisory board. In particular data will be provided on land use planning for supporting and provisioning ecosystem services that are relevant to the energy – such as biomass – and food production policies – such as access to land for agro-ecological initiatives (team of Marc Dufrière), on energy transition pathways in Walloon Brabant (team of Hervé Jeanmart) and on local food provisioning scenario's in the Walloon Brabant region (team of Olivier De Schutter, based on the project Food4Sustainability).

The first phase (WP 2.1.) will be to **organize and evaluate a multi-stakeholder visioning process (M13 to M18)**, using the best available methodologies as analyzed under WP1. In particular, WP 2.1. will build a set of 4 contextual scenarios for the Walloon Brabant region in the field of energy, land-use and food production and consumption (by using the data from the partner projects). Envisioned scenarios are GDP growth (business as usual), green growth (GDP growth combined with mitigation and adaptation policies), territorial development (green growth with priority given to economic returns to the region) and strong sustainability (policies and implementation of strict environmental regulations). For conducting this visioning process, a set of core stakeholders will be selected from 3 municipalities that provide a sample of the broad diversity of realities in the region, along with

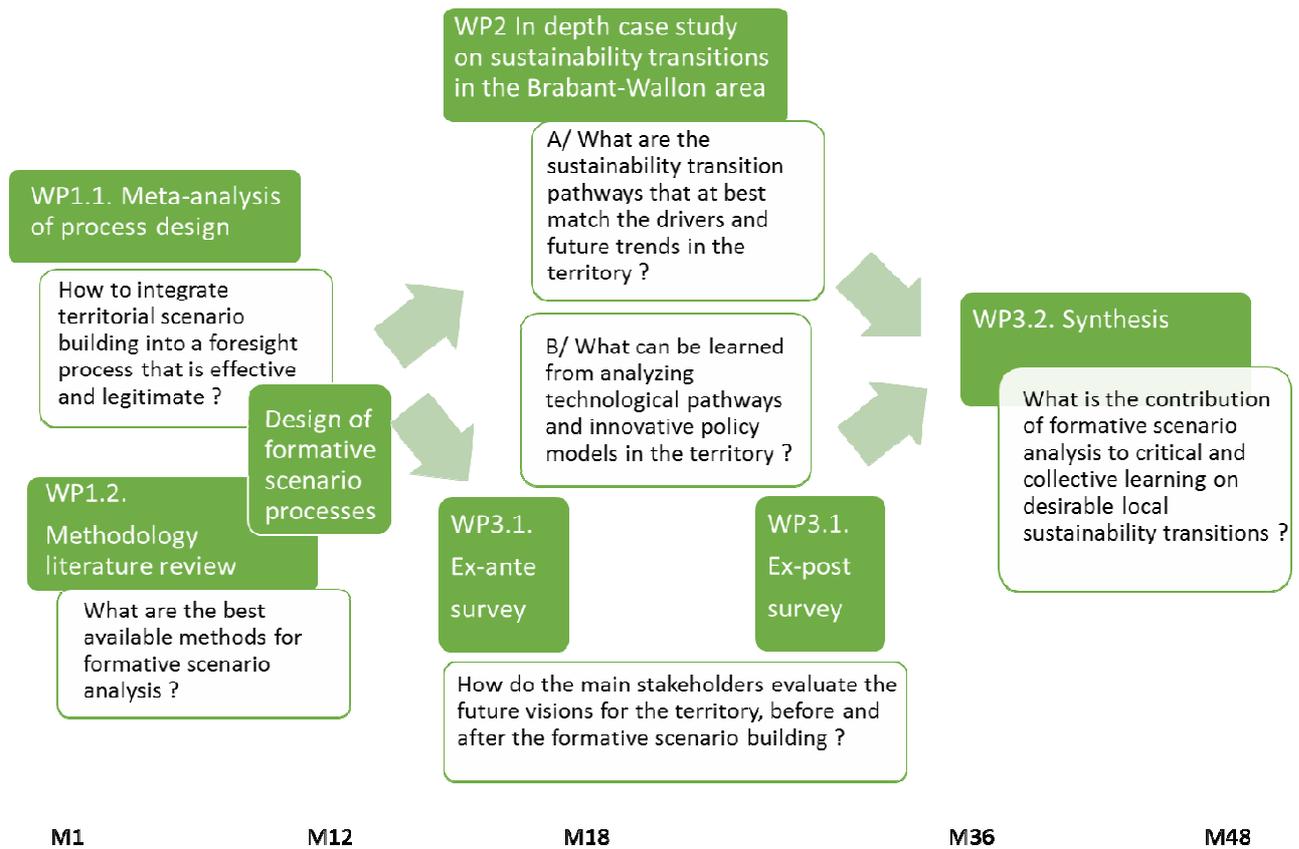
provincial authorities and associations active in promoting transition in each of the three thematic areas (energy, land use and food)

The second phase (WP 2.2.) will build on these 4 contextual scenarios to organize and evaluate the use of the proposed analytical tools for **formative scenario analysis** developed in WP1 (**M19 to M29**) (as illustrated in figure 2 and 3). This purpose of this second phase is to select a sub-set of technological implementation pathways based on proximity analysis to the analysis of the future states and to each of the 4 contextual scenarios, within a chosen cost constraint and compliance with the environmental regulations (facilitated through scenario software, cf. for an overview Tietje 2005).

The third phase will then conduct an **institutional fit analysis (M30 to M36)** for the selected implementation pathways, with the view to identify effective and legitimate policy models. For this three prominent local institutional models will be analyzed, with the view to have a good coverage of initiatives taken by the private sector, civil society and public authorities : (1) local planning developed by the members of the “Covenant of Mayors” (with 249 municipalities who signed in Belgium and 37 already successfully finalized a first set of plans) ; (2) the transition towns and eco-villages/neighborhoods model ; (3) the local monitoring of national-level industry standards (in building, agriculture, restauration, etc.). Each of these models are already developed in municipalities in the Walloon Brabant area.

**WP 3. Synthesis (M37 to M48).** The third work package will consist in **assessing the collective learning that occurred** and in **summarizing the findings** of the various tasks of the project. The collective learning that occurred in the in depth case study will be assessed by conducting an ex-ante and ex-post survey (in **M12** and **M36**) of the stakeholders’ perceptions of the desired transition pathways, the main blockages and their views on the feasible technological and institutional options. The expected outcome of WP3 is the definition of a set of design principles for the use of integrated planning tools in effective and legitimate local climate change policy.

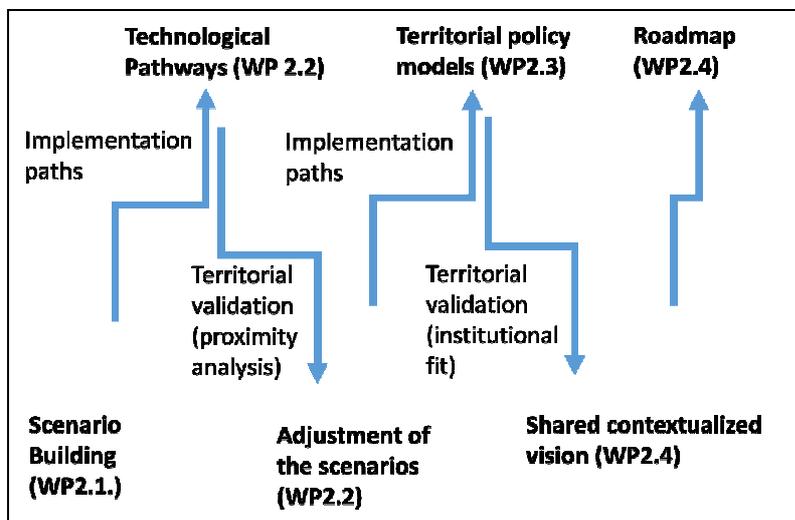
**Figure 1. Project planning**



**Figure 2. Linear vision of technology and policy implementation**



**Figure 3. Collective learning through iterative adjustment of the shared visions**



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## DESCRIPTION AND MOTIVATION OF THE VALORISATION POTENTIAL AND/OR THE POSSIBLE SOCIETAL IMPACT

We expect the research to have significant impacts at three levels. First, at the level of the province of Walloon Brabant which provides the case study the research will focus on, the project will deliver and apply foresight methodologies for collective learning on the feasible technical and policy implementation pathways for transition in the area of energy, food consumption and production and the related land use planning choices.

Second, the Walloon Region as a whole may gain an improved understanding of the challenges associated with the ecological transition, and the benefits of developing a form of transitional governance that involves a visioning process through the construction of scenarios, that can allow the territorial actors involved (and the broader public) to become active participants in the reform process.

Indeed, the brand of transitional governance addressed in the project is a form of *reflexive* governance. In the version in which we understand it, it refers to a capacity of actors to be active participants in governance processes that allow them to reshape their preferences in the light of a broadened range of alternatives<sup>1</sup>. Whereas it is increasingly acknowledged that participation is a condition both of effectiveness and of legitimacy of processes of change, simply registering what stakeholders say about their condition, and about what motivates them to change, is also to accept the risk that their evaluation will be dependent on the existing social norms<sup>2</sup>, on the psychological tendency to adapt one's preferences to one's situation<sup>3</sup>, or on the (possibly limited) range of possibilities people imagine for themselves. Therefore, participation (which should ensure that collective choices are derived from preferences) should be combined with reflexivity (which should ensure that such preferences are not simply reflecting the baseline expectations and limited opportunities that derive from existing institutional arrangements). Whether and how such reflexive mechanisms for transitional governance can be designed for the Walloon Region is part of the inquiry we propose.

Third, in addition to the contribution to ecological transition in the Region, the propositions made for local-level formative scenario analysis, may support the establishment of other local-level democratic processes, some of which have already begun to emerge through the action of "l'Union de Villes et des Communes de Wallonie" and an increasing number of municipalities in the Walloon Region (including in the province of Walloon Brabant) that joined the European Covenant of Mayors for Climate and Energy<sup>4</sup>.

Beyond these direct societal impacts however, it is anticipated that the research project can make a major contribution to the theory of ecological transition itself, and in particular to the role of

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<sup>1</sup> De Schutter, Olivier, and Jacques Lenoble. 2010. *Reflexive Governance: Redefining the Public Interest in a Pluralistic World*. Oxford and Portland, OR: Hart Publishing.

<sup>2</sup> Da Cunha, P.V., and Junho Pena, M.V. 1997. *The Limits and Merits of Participation*, Washington, D.C., World Bank

<sup>3</sup> Elster, Jon. 1983. *Sour Grapes: Studies in the Subversion of Rationality*. Cambridge: Cambridge University Press

<sup>4</sup> [http://www.covenantofmayors.eu/index\\_en.html](http://www.covenantofmayors.eu/index_en.html)

participatory visioning processes, in allowing for the revision of preferences, thus improving the potential for lifestyle changes to accompany and support the ecological transition.

**An interdisciplinary advisory board** will provide supervision and data input for the realization of the in depth case study, based on their recognized expertise on local climate change scenarios' or one of the 3 thematic areas of the project (local renewable energy, land use planning and transformation of food production and consumption practices). The following already available case study material will be contributed as an input to the analytic tools that will be tested in WP2 :

- Case study material on supporting and provisioning ecosystem services that are relevant to the energy and food production policies in the Walloon Brabant study area
- Case study material on energy transition pathways in Walloon Brabant
- Case study material on local food provisioning scenario's in the Walloon Brabant region