WP0. Future Policy Scenarios & Alternative Pathways for LETS

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Summary

The main objective of the LETS program is to investigate how the transition towards low carbon energy and transport systems can be managed, governed and implemented in effective and legitimate ways. In WP0 we will elaborate on possible paths towards LETS and derive a set of alternative storylines for such transformations based on a critical assessment of existing scenarios in the field. Tentatively, two types of storylines are considered – *Technological regime shifts* and *Lifestyle changes* – that represent fundamentally contrasting views on how to manage and implement the necessary changes. In contrast to previous studies, the objective is to identify and analyze the political, economic and social challenges associated with each of the alternative storylines. As such, WP0 will offer a *leitmotif* or a point of reference for the subsequent tasks of the research program. This will be developed successively through a series of seminars involving other researchers in the program as well as key stakeholders. The research tasks in WP0 further comprise a comparative review of existing scenarios and models; assessments of impacts on key socio-economic factors and the environmental quality objectives; and a comparative analysis of policy implications building on a synthesis of the findings in the subsequent work packages (WP1-4). The aim is to present alternative pathways towards LETS and to give recommendations for future Swedish climate, energy and transport policy strategies.

Sammanfattning

Huvudsyftet med HET programmet är att studera effektiva och legitima sätt att hantera, styra och genomföra övergången mot hållbara energi- och transportsystem. I WP0 vill vi undersöka möjliga vägar mot HET och utveckla ett urval alternativa handlingsvägar för denna omställning på basis av en kritisk analys av befintliga teknik- och policyscenarier inom området. Preliminärt finns i åtanke två typer av handlingsvägar – *Teknologiska regimskiften* respektive *Livsstilsförändringar* – som representerar i grunden kontrasterande synsätt för att hantera och genomföra nödvändiga förändringar. I motsats till tidigare studier, är syftet att identifiera och analysera de politiska, ekonomiska och sociala utmaningar som är förknippade med olika handlingsvägar. WP0 erbjuder på så vis ett *ledmotiv* eller en referenspunkt för övriga delar av forskningsprogrammet och kommer att utvecklas successivt inom ramen för en serie seminarier med forskare inom programmet och andra nyckelaktörer. Forskningsuppgifterna i WP0 innefattar även en jämförande genomgång av befintliga scenarier och modeller, konsekvensanalyser avseende socioekonomiska nyckelfaktorer och miljökvalitetsmålen, samt en jämförande analys och syntes av policyimplikationer med utgångspunkt i resultaten från övriga delprojekt (WP1-4). Målet är att presentera alternativa vägar mot HET och att ge rekommendationer för framtida svenska klimat-, energi- och transportpolitiska strategier.

Project idea and objectives

The objective of this overarching work package (WP0) is threefold;

(1) to critically assess existing technological and policy scenarios and derive alternative storylines for the transition towards LETS and the 2 °C target,
(2) to identify and analyze the different political, economic and social challenges associated with each of the alternative storylines,
(3) to offer an overarching analytical framework for the programme and to enable integration and synthesis between different tasks and projects.

A central issue in contemporary debates is whether technological change is sufficient to prevent dangerous climate change from occurring or if behavioural changes will become necessary as well to reach considerable emissions reduction by 2050 and beyond. Our hypothesis is that there are broadly two strategies available for reaching the 2 °C target; through technological shifts and through behavioural changes. We will take such notions as a point of departure for deriving and analyzing alternative pathways towards LETS.

The program has made an intentional decision to combine the development of qualitative storylines with a critical assessment of existing scenarios, instead of ourselves elaborating new detailed quantitative scenarios. This decision is based on several considerations. First, there already exist a wide range of quantitative scenarios, both on a Swedish and a global level, and yet another effort in this direction would not contribute much. Second, because of difficulties in predicting how different technologies will develop our interest is not to offer input on which specific technologies to support. Rather we are interested in the general and long-term potential for technological change and the associated societal challenges implied. Third, existing scenario studies often take a rudimentary approach when discussing the highly problematic and complex issues of governance, policy, implementation, power conflicts and economic impacts that are implied in the transition to a low-carbon future. The strength of this research programme is that it devotes explicit attention to these issues.

Since the main research task of WP0 is to develop alternative storylines it is not possible, at this stage, to describe them in any detail. However, we can tentatively sketch out two types:

- *"Technological regime shifts"*. This storyline relies mainly on technological solutions, shifts and leaps, but assumes fewer restraints on consumption and behaviour, although changes in prices will, of course, lead to changes in consumption patterns. The aim of considering this storyline is to explore how far we can reach in terms of emission reductions if we rely on technological solutions ("fixes") while existing trends in consumption are assumed to continue. This storyline can be varied in different ways, e.g. it is possible to emphasize renewables (e.g. biomass energy) in one version of the storyline (cf. Krewitt et al, 2007) and other technological options in other versions.
- *"Lifestyle changes"*. This storyline focus on dramatic changes in consumption patterns that will significantly lower the use of energy and greenhouse gas emissions, while it is assumed that the technological changes of the first storyline will be largely implemented. The aim of considering this storyline is to assess the potential for additional emission reductions if radical changes in consumption are combined with technological improvements. This storyline can also be varied with e.g. a focus on changes in demand with lower technological development, on different types of changes in consumption or by imperfect implementation (e.g. due to rebound effects).

The storylines chosen are deliberately extreme in the sense that they stretch the imagination of possible changes. The first storyline will give us an idea of whether technological solutions are sufficient enough to reach the 2 °C target. While some put faith in revolutionary technological change (e.g. IEA, 2008; ITPS, 2008), others argue that changes in consumption

are also needed (e.g. Åkerman et al, 2007: 69-71). The second storyline implies much lower emissions and possibly a target below that of 2 °C. Such a scenario is worthwhile to include since there are uncertainties (e.g. due to climate sensitivity) regarding which targets will actually be needed. It should be emphasized again that our focus is not on technological issues but on societal transitions. Thus, a main didactic point is to define storylines that differ fundamentally when it comes to the type of political, social and economic changes implied.

In the *Technological shifts* storyline the main challenge will be to steer technological development towards higher efficiency and carbon neutral solutions. This will demand strong government support and probably have turbulent effects on the economy since some sectors and actors will loose and others will gain. While it is a formidable task to manage such drastic technological change (in a certain desired direction) the storyline can be said to be broadly in line with the dominant policy discourse of today, where a main goal is to combine economic growth and environmental protection (i.e. ecological modernization). Central values of industrialised liberal market economies (e.g. mass consumption, global trade, economic growth, individual autonomy) are not challenged in this storyline. An analysis based on this storyline will thus focus on how to design and implement policy instruments (both 'technology push' and 'demand pull') that contribute effectively to technological innovation and on how to manage conflicts and mitigate negative effects of different policies.

In the *Lifestyle changes* storyline the major challenge will be to develop institutions that halt and turn consumption patterns that contribute to an increasing use of energy (e.g. car travel, aviation, freight transport, animal diet, electricity, consumer goods). Such a development necessitates more fundamental changes in values and priorities of governments, societies and individuals. To take one example, the scenarios in Åkerman et al (2007) project considerable behavioural changes to occurr, such as drastic reductions in aviation, car travel, consumption of meat and fish (Åkerman et al 2007, Ch. 3). However, neither this nor other scenario studies analyze *how* such changes might occur. Without a thorough and critical reflection on the political, societal and economic changes that are needed for such drastic transformations (i.e. through so-called reflexive (e.g. Beck, 1994) or strong (Christoff, 1996) ecological modernization), such scenarios will represent nothing more than idle wishes far removed from the realities of contemporary political contexts.

Practical relevance, outcomes and results

The main outcome of WP0 will be a detailed assessment of future scenarios and alternative pathways for the transition towards LETS, with emphasis on policy implications. More concretely, the WP0 will offer the following policy relevant outcomes and deliverables:

- Alternative pathways (and storylines) to be used as strategic decision tools for future Swedish climate policy strategies
- Detailed assessment of implications for policy and implementation of different pathways
- Detailed assessments of impacts on socio-economic factors (e.g. incomes, consumption, distributional effects) and on the environmental quality objectives (EQOs)
- Recommendations on alternative policy strategies (also building on the other WPs)

Deliverables		
D0.1	Dec 2008	Iconic storylines for transition towards LETS
D0.2	Jan 2009	First seminar on (iconic) storylines with other WPs and key stakeholders
D0.3	Dec 2009	Report on comparative review of scenarios ('state-of-the-art' model comparisons), technological and policy implications, and revised storylines
D0.4	Jan 2010	Second seminar on revised storylines based on the comparative review of scenarios and on implications for policy and implementation
D0.5x	Dec 2010	Publications: Impact assessments of meeting the 2 °C target on key socio-

		economic factors as well as the EQOs (1-2 reports/publications)
D0.6	April 2011	Third seminar on impacts of alternative storylines
D0.7	Dec 2011	Report on full storylines for transition towards LETS
D0.8	Autumn 2012	Synthesis: Alternative pathways for the transition towards LETS and possible Climate Policy Strategies (final report)
D0.9	Autumn 2012	Final LETS seminar (conference) for key stakeholders and the scientific community to present and appraise synthesis

Communication activities and target groups
A central element of WP0 and the LETS programme will be a series of seminars/workshops in order to inform and discuss the storylines, alternative pathways and policy implications with both internal (researchers, funding agencies) and external target groups. Particular target groups for WP0 are policymakers, national authorities, policy advisors, analysts and organizations involved in strategic planning and design of (Swedish) climate, energy and transport policy. In order to communicate the research proceedings with a wider audience, key stakeholders and users will be invited as well to seminars (or webinars) and be kept informed through popularised publications on the program website, in newsletters and through media.

How the project relates to the programme objectives and other projects

The assessment of storylines in WP0 will be a central part of the LETS program that will be carried out in parallel to the other work packages. This will be a step-wise and iterative process that also involves other researchers in the program as well as key stakeholders. As such WP0 will both offer a *leitmotif,* or point of reference, for the other WPs and operate as a separate research task continuously informed by the proceedings in the projects. WP1-4 will specifically relate to the (probably quite different) governance dilemmas and challenges posed by the alternative storylines. The interaction between WP0 and WP1 will be particularly important since WP1 contributes with expertise on governance dilemmas from the perspectives of political theory and economics. WP1-4 will mainly focus on policy instruments and institutional changes that are possible (and needed) in the short term. An important aim of WP0 is, therefore, to discuss and analyse which role these policy initiatives might play over the long term and for the more drastic changes needed to reach LETS.

Review of the research field (Theory)

The 2 °C temperature target and associated stabilisation level of 400-450 ppm CO_2-eq requires that emissions are reduced by 70-90% in the next 40 years. Achieving such deep cuts in emissions will be extremely challenging. Previous studies have indicated a set of available technological options that are technically feasible and economically viable, e.g. fuel switches, CCS, renewables, and advanced energy efficiency. However, implementing such options at large scale will put modern societies under pressure and, hence, be administratively and politically challenging both in terms of policy adoption and policy implementation. Such policy implications are however rather unexamined, or overlooked, issues in the literature. Therefore, our emphasis is on the political and institutional challenges and dilemmas associated with the shifts necessary for the transition towards LETS.

While existing models of the baseline (reference scenarios of 'frozen policy') are divergent, some general trends and projections are indicated. For example, energy demand are expected to increase and total energy consumption to roughly double until around 2050, while energy intensity will be reduced to around half due to autonomous technological and structural changes and even faster economic growth. However, since the corresponding growth in energy supply will be dominated by fossil fuels (in particular coal, but gas and unconventional oils as well), greenhouse gas emissions will continue to increase considerably without additional policy efforts (e.g. EC 2003; EC 2007; IEA 2007; Russ et al, 2007).

Predicting the future is a difficult and delicate task, especially over longer time horizons., where key model assumptions typically do not seem to hold (cf. Lucas, 1976). Nevertheless, the attempts to map out and model future scenarios and quantify the amplitude of the (technological) challenge of climate change mitigation are plentiful (e.g. IPCC, 2000; Criqui et al, 2003EEA, 2005; Boeters et al, 2007; WEC, 2007; Wesselink et al, 2008; van Vuuren et al, 2007). As mentioned above such approaches are, however, problematic in several respects. In particular, they are seldom sufficient in addressing necessary policy responses for realizing and implementing low-carbon futures (Khan and Åstrand, 2004).

Another set of studies instead focus on policy scenarios with potential to handle transitions towards LETS (e.g. Bruggink, 2005; Russ et al, 2007). In such studies different governance or policy regimes are described, such as "Global Sustainability", "World Markets" or "Local Stewardship" (Lorenzoni et al, 2000), with subject to type of institutional arrangements in place (e.g. government vs. market driven; global climate regime vs. local climate regimes) and policy instruments applied. While these scenario studies highlight the importance of appropriate forms of governance, they still tend to neglect the pressing issue of *how* to achieve the necessary institutional changes. In short, they often have a simplified view of the political complexities and the difficulties of achieving radical political change.

A more detailed treatment of governance and implementation dilemmas can be found in the Transition Management approaches that are used to study the challenges of achieving a low carbon economy (cf. Loorbach and Kemp, 2008). A main objective of LETS is to investigate how such transitions can be managed, governed and implemented in effective and legitimate ways and we thus intend to build on the experience from this approach.

Description of work: Implementation, Research Approach and Methodology

In order to qualitatively assess and describe alternative pathways (storylines) for the transition towards LETS, we will critically assess and analyze the rich diversity of existing long-term scenarios through a comparative review of previous models and studies. This will be done in a step-wise and iterative process that involves and allows for input from researchers in the other WPs through a series of annual seminars about the storylines. This entails the following tasks:

(1) Iconic storylines (year 1); the purpose is to sketch out at least two hypothetic storylines for the transition towards LETS that works as a point of reference for the subsequent research.
(2) Comparative review of scenarios (year 2); the aim is to identify key features and policy implications of existing scenarios and models, and to arrive at a first revision of storylines.
(3) Impact assessments (year 3); the aim is to assess how key socio-economic factors (incomes, consumption, distributional effects, etc) as well as the environmental objectives (EQOs) are affected under various scenarios; second revision of storylines.
(4) Comparative analysis and synthesis (year 4): Comparing the assessments in WP0 with findings in WP1-4, we will arrive at a full description of storylines and present alternative pathways towards LETS and recommendations for future climate policy strategies.

Research approach and Methodology

In WP0 we will map out and describe a selection of qualitative scenarios using 'storylining' methodology (such as foresight analysis; cf. e.g. Berkhout and Hertin, 2002). The critical assessment will be conducted as a comparative review of previous scenario studies based on meta-analysis methodology for qualitative model comparisons. Further, the assessment will entail literature reviews and stakeholder deliberations, e.g. expert interviews and workshops, in order to extract policy relevant and well-informed opinion as well as to ensure scientific significance of the analysis. In the impact assessments qualitative analysis will be combined with quantitative empirical and econometric methods.

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