LETS 2050

Mid-term review

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- Mid-term review report

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Contents

Summary

The core mission of LETS is to identify, explore and suggest pathways to reach ambitious climate policy objectives for energy and transport systems by 2050. A central research theme is challenges for governance that follow from the changes in technical systems and behavioral patterns implied by the climate policy objectives and outlined in the two LETS scenarios "New technologies in focus" and "New patterns of behavior". Scenarios provide the common basis for all LETS' research. It is a way to identify conflicts, challenges as well as opportunities. They also provide a good basis for communicating results. This approach was outlined in the program plan and has proved to work well in practice as the scenarios have guided research in five different projects (WP1-WP5). At this half-way point, the progress has been highly satisfactory in terms of deliverable according to plan, internal and external communication, and LETS' relationship with the funding agencies and reference groups. We also have some interesting results reflected in our deliverables so far, including:

A comparative review of scenarios affirms that issues related to governance have been poorly addressed and WP0 suggested ways to better integrate such aspects into scenario analysis. Specific transition challenges are how to decarbonize industry, develop power grids, shift transport to electricity and/or hydrogen, transform the building sector, and govern limited biomass resources. Bioenergy is likely to play an important role in the transition. So far results in WP3 show some level of reorientation in the industry resulting from policy but there is no support for the notion of radical reorientation implied by the scenarios. Through mapping freight and passenger transport costs for industries and regions in Sweden, WP2 identified the industries that are most vulnerable to increased transport costs due to CO2-restrictions.

Specifically relating to governance issues, WP0 has explored the role of scenarios as a tool for government led transition that could bring in institutions and politics into for example, energy future studies. Results in WP1 have pointed to the need to reform institutional and governance frameworks and that there are benefits to society of committing early to the climate objectives for example through a centralized environmental institution that can ensure time consistent climate policy. Voluntary instruments are frequently precursors to more binding policy instruments and WP4 studies the role of voluntary action of citizen-consumers in lowering CO2. They suggest that status and group pressure is an under-researched aspect of climate-friendly change, aside from marketing of eco-chic products and services.

The research in the five projects stand alone as scientific results. However, for the LETS program as a whole the main aim is to integrate the results through scenarios. That work is well on the way. The yearly conference in November of 2010 is dedicated to include discussions, perspectives and results of LETS' five projects and planned to be published in a common midterm scenario report.

The LETS scenario work will continue to be an important arena for LETS communication, both internal and external. More research results will be published the coming years and we will increase our communication activities and the dissemination of these results. We will also continue to support the individual the researchers in their communication with different user groups.

Sammanfattning

Kärnfrågan i LETS är att identifiera, utforska och föreslå vägar framåt för att nå ambitiösa klimatmål för energi- och transportsystemen år 2050. Två olika vägar framåt illustreras i LETS-scenarierna ”Ny teknik i fokus” och ”Nya beteendemönster”. I fokus är de styrningsutmaningar som följer på de förändringar i tekniska system och beteendemönster som scenarierna visar. Scenarierna är också en gemensam utgångspunkt för all LETS-forskning. Genom scenarierna identifieras konflikter och utmaningar men också möjligheter. De är dessutom en viktig utgångspunkt för kommunikation av resultat från LETS. Detta angreppssätt, som angavs i programplanen, har visat sig fungera bra och scenarierna har varit vägledande för forskningen i WP1-WP5. Vårt samlade intryck är att LETS har varit mycket framgångsrikt i termer av producerade resultat (deliverables), kommunikationsaktiviteter, samt samverkan med finansiärer och referensgrupper. Intressanta resultat exemplifieras nedan.

En jämförande kritisk analys av scenarier bekräftar att styrning är en eftersatt fråga och i WP0 ges förslag på hur styrningsaspekter kan integreras i scenariostudier. Exempel på specifika styrningsutmaningar är avkarbonisering av industrin, utveckling av kraftnät, övergång till el/vätgas i transporter, omställning av bebyggelsen, och hanteringen av begränsade bioenergi- och markresurser. Bioenergi kommer att spela en viktig roll i en omställning och redan nu kan skönjas en omorientering i skogsindustrin. Men steget är långt till den förändring mot bioraffinaderier som scenarierna inbegriper (WP3). En kartläggning inom WP2 visar vilka industrier och regioner som är mest sårbara för ökade transportkostnader till följd av en koldioxidrestriktion.

WP0 har undersökt vilken roll scenarier kan ha som verktyg i en statligt ledd omställning och hur institutionella och politiska faktorer kan integreras i dessa. Resultat i WP1 pekar på behovet att reformera institutionella ramverk för styrning och att det finns fördelar med att tidigt göra långsiktiga åtaganden för utsläppsminskningar, exempelvis genom en centraliserad miljöinstitution som kan säkerställa en stabil och långsiktig klimatpolitik. Frivilliga åtgärder föregår ofta mer tvingande styrning och WP4 studerar frivillighet hos medborgare och konsumenter för minskade utsläpp. Frågor kring social status, normer och grupptryck är ett eftersatt forskningsområde i jämförelse med studier av marknader för gröna produkter och tjänster.

Resultat från de fem delprojekten står vetenskapligt på egna ben. För LETS-programmet som helhet är det dock viktigt att integrera och syntetisera resultaten med utgångspunkt i scenarierna. Detta arbete är på god väg. Årskonferensen 2010 kommer att fokusera på hur olika medverkande kan bidra med olika perspektiv i en gemensam LETS-rapport kring styrningsutmaningar baserat på scenarierna.

LETS scenariearbete kommer även fortsättningsvis att vara en viktig utgångspunkt för den interna och externa kommunikationen. Fler forskningsresultat kommer att publiceras under de kommande åren och genom ett intensifierat kommunikationsarbete kommer LETS att verka för spridningen av dessa resultat. Vi kommer även fortsätta att stödja de enskilda forskarna i deras egen kommunikation med berörda målgrupper.

Introduction

The LETS research program (Governing transitions towards low-carbon energy and transport systems) started with a kick-off meeting February 2-3, 2009 at Lund University. The initial research team includes ten academic research groups and a research based consultant (c.f. original LETS proposal). A fifth work package (WP5) focusing on logistics and goods transport was added in early 2010 and includes two additional groups.

The core mission of LETS as formulated in the original proposal is to identify, explore and suggest ways forward, i.e., *roads to implementation of low-carbon energy and transport systems for 2050*, in order to reach ambitious climate policy objectives such as expressed by the 2°C target. The overarching research question was formulated as:

What societal transitions are implied by low-carbon futures and how can these transitions be governed and implemented to meet challenging climate policy objectives?

A vantage point for LETS is the multitude of scenario studies that have suggested that low-carbon futures are possible from a resource, technology and economic point of view. Our research focus is on transition governance, i.e., a reflective and strategic steering by the public sector in collaboration with other societal actors in order to make the transition to a low carbon society. For practical purposes, this implies essentially zero greenhouse gas emissions in Sweden by 2050. The focus of LETS' research is on the goal conflicts, conflicts of interest and other governance challenges that follow from the necessary changes in technical systems and behavioral patterns that are implied by the climate policy objectives.

Our intention was never to produce new quantitative low-carbon scenarios because such scenario studies were already plentiful in the literature. Yet, we made an observation early on that quantitative scenarios fulfill several important roles in LETS. Scenarios are part of the LETS method: a common basis for carrying out interdisciplinary research and a way to identify governance challenges. Scenarios are important tools for the communication of results, internally but also in stakeholder dialogues, etc. LETS will also make a contribution to scenario method development by including political and institutional implications, and thereby follow through on a backcasting ambition that has hitherto been neglected in scenario studies. This includes exploring the potential and role of scenarios as a tool for state-led transition governance.

The scenarios in WP0 have been guiding the research in the five other WP:s from the start. An interim scenario report was published and discussed at a workshop in early September 2010. This work will continue by exploring implications and develop more fine-structured scenarios at the WP-level.

This will feed back into a comprehensive scenario report late 2011 where governance challenges in different areas will be anticipated, described and analyzed for the purpose of informing policy makers and other stakeholders.

Rather than trying to cover each and every aspect of a transition, the original proposal identified four main areas of research organized in WP1-WP4 (with WP5 added in 2010 through additional funding). These WP:s represent one of many possible ways of "slicing the cake". But it is one which we find purposeful and aligned with the ambitions of the program to generate new inter- and multidisciplinary research into key governance challenge areas. They were formulated so that a suitable number of disciplines could gather around a common set of research questions. Herein lies what we consider an important added value of LETS: entirely new constellations of research groups have been created. To some of those groups the concept of a low-carbon society was entirely new at the outset. The task of unpacking the implications of a major transition in the next forty years is thought provoking and has generated a great deal of excitement and enthusiasm.

Another important added value follows from the sincere interest and engagement of the four funding agencies. The level of involvement has been high from the start and an inspiration to the LETS researchers who feel that the research and the results matter. It also helps ensure the practical relevance and usefulness of the research. Communication, within LETS, with funding agencies, other stakeholder and the scientific community, has been a high priority from the start and benefited the program.

The topical nature of the research has presented the LETS researchers with several opportunities to reach a broader audience through op-eds, interviews in newspapers, invited participation in debates and seminars, etc. In early spring 2009 Lund University was invited to host the first high level workshop organized by Atomium Culture (a Brussels based network of research universities and newspapers in Europe). The workshop in December (scheduled before COP-15 and under the patronage of the Swedish Presidency) provided us with an excellent opportunity to bring our research questions to a broader audience, including representatives from academia, business and media.

The strong interest in the workshop was for us an indicator of the growing interest in the research areas covered by LETS. We have also observed how the Dutch transition management research, one of the inspirations to LETS, has moved in the direction of governance in recent years, with ambitions to develop prescriptive frameworks for interactive transition governance. Another example is the UK research program Transition Pathways to a Low Carbon Economy involving eight UK Universities. Our interaction with these and other research communities is important to maintain a position in the international research front and pave the way for future international cooperation. Another such opportunity presented itself in 2009 when Lund University was approached by the long-term international

research program on Earth System Governance under the auspices of the International Human Dimensions Programme on Global Environmental Change (IHDP) and asked to and have agreed to host its program secretariat. The program's interest for Lund University was based on the extensive research on environmental, sustainability and climate governance which is conducted in a number of research programs at LU, including LETS.

In this mid-term program report we describe (i) how the program is organized and has proceeded, (ii) the communication plan and activities, (iii) the research focus and activities in the WP:s (with condensed reporting for WP5 which is formally not covered by this mid-term evaluation). Finally (iv) we give an account of results for the first 18 months of LETS and outline our future plans.

Organisation and internal activities

The LETS program involves more than 30 researchers organized in six WP:s covering a broad range of disciplines and individual researchers with different expertise. The formal organization mirrors the idea that the scenarios constitute the common framework and basis for the inter- and multidisciplinary research that takes place across LETS. In that sense, the scenarios provide a method for the inter- and multidisciplinary interaction in addition to facilitating external communication and being, in themselves, part of the results. This basic approach was part of the original program plan and has proved to work very well. In the following we present the program organisation and management, the research groups and staff that are involved, activities and mechanisms for internal communication, progress and status in relation to plan, and an overview of how LETS relates to some other ongoing research activities.

Organisation and management

The program is organised in six WP:s where WP0 is responsible for developing the common low-carbon scenarios and for synthesising and reporting overall results. The original WP1-WP4 are built around four jointly identified critical issue areas, and was later complemented with WP5 through additional funding. Each WP has a WP-leader and a Deputy – a twinning approach with shared responsibility that has been useful and made us less vulnerable to changes in staff. The basic program structure and management is shown in figure 1.

The executive management group is responsible for the operative management of the program as described in the original program proposal. The role of the steering group, similar to a board, has been less formalised and the constellation changed somewhat from the original plan. Meetings have been held between the executive management and the funding agencies regularly in connection to the yearly program meeting and also on a number of other occasions. So far, there have not been any critical issues that needed discussion in the "board". We have found that in the steering group organization, which deals with the general direction of the research of the program, the inclusion of WP leaders is superfluous because each WP has their own contacts with the funding agencies through reference groups and reference persons. The executive management meets with WP-leaders regularly.

The set-up of the executive management group means that the Director and Deputy Director can focus their effort on the scientific leadership of the program, and the management of administrative matters and information is handled by specialists from the research based consulting company Trivector. The leadership philosophy is to allow a great degree of academic freedom within the realms of the program plan. LETS is providing a relatively small share of funding for many of the researchers involved and

our success is partly contingent on our ability to draw on and synthesise research in the context of LETS. For our self-evaluation and feedback an internal web-based questionnaire in mid-2010 shows that a strong majority of researchers are very satisfied with the management of LETS.

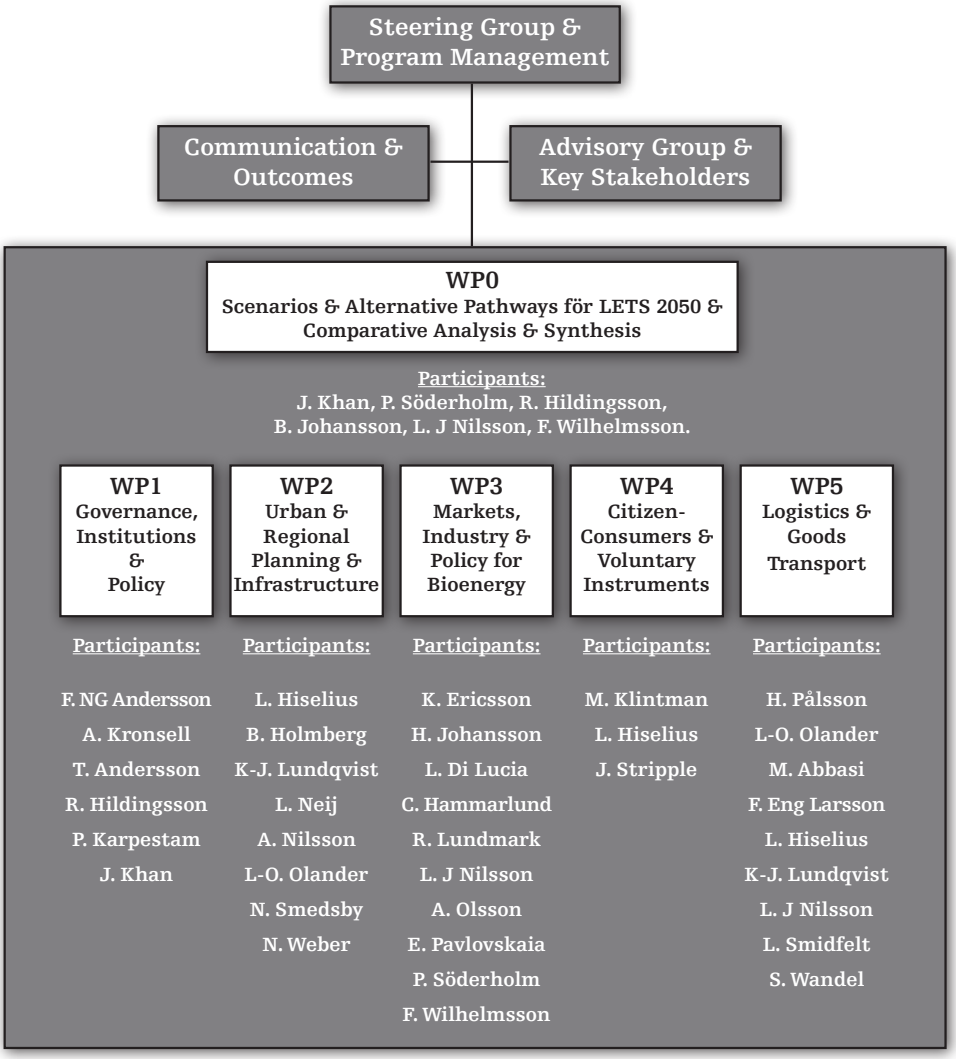

Figure 1: LETS program structure & management

Research groups and staff

The LETS research network consist of researcher from the following departments within Lund University (except the last two organisations):

- Environmental and Energy Systems Studies
- Political Science
- Economics
- Traffic planning
- Social and Economic Geography
- Environmental law
- Packaging Logistics
- Engineering Logistics
- Research Policy Institute
- International Institute for Industrial Environmental Economics

- Sweden Institute for Food and Agricultural Economics
- Luleå Technical University, Economics
- Trivector

The staff consists at present of 33 researcher working directly in different sub projects of LETS. Of those, 21 are men and 12 women. 22 are senior researchers, 3 are junior researchers and 8 are graduate students. In addition another 5-10 researchers participate in different activities within the LETS network. More information about LETS staff is presented in Appendix 2.

Internal communication

Communication and interaction between the steering group members is plentiful and takes place in a variety of program activities. As a way to further encourage academic activities across WPs we initiated a number of seminars where we present research results within the program and discuss it across disciplines and WP:s. WP 1 and WP 4 held seminars during the spring and these activities will continue during the fall. Meetings, e-mail, internal and external website are the main channels for internal communication to the program as a whole.

Progress and status

At this half-way point in LETS' research process the overall impression is that the progress is highly satisfactory. The progress can be attributed to a number of success factors: an excellent collaboration with many representatives from the funding agencies, which have continued to be involved and interested in the progress of LETS. The collaboration between and support of the administrative organization to the academic leadership and researchers is very conducive to the research process. The research goals and deliverables expected at the half way mark have been fulfilled and in many cases single deliverables have multiplied, for example to a set of conference papers. This should be attributed to the fact that the program involves a number of excellent and highly productive researchers who are involved in a number of different projects and the synergies that can be gained by this has resulted in more publications than expected. However, some deliverables have been postponed in time, in respect to the original plan. This has to do with the fact that the LETS program had a late start (February 2009) and that LETS researchers were committed to other tasks. Another problem has been changes in staff and difficulties arising from this. From the start the LETS program engaged excellent senior researchers who have been offered attractive positions elsewhere. Although this can be expected in all programs of LETS' size it has created some difficulties because the researchers originally involved often had a specialty which also affected the design of the WP. The biggest problem in this respect has been in WP2.

Relation to other research

As mentioned previously LETS' success is partly contingent on our ability to draw on and synthesize research in contexts outside LETS' immediate research community. That is why we nourish links to other research networks and adjacent or similar research fields. This is an explicit strategy of LETS. More concretely it means that we include researchers not employed in the LETS program in different activities. For example, at Lund University there are other researchers working on bioenergy issues who we invited to workshops, seminars and discussions taking place in WP3 and in LETS. Although such external researchers are not salaried through LETS, their contributions raises the academic quality of the LETS program, makes our research known in a larger context at the same time as it provides these researchers with a valuable network and a chance to get feedback on their own research. In a similar vein LETS also encourages students to write their exam papers on LETS related topics by providing the student with a topic, an audience, and research contacts.

Many of the senior researchers in LETS are involved in other research programs, networks and constellations. This is a resource in LETS and helps provide the synergies that we think are important to answer our research questions. To exemplify, WP 2 has developed external contacts while presenting their work at conference like NGIL (a VINN excellence Centre based at Lund's Institute of Technology), CEFOS (a center for multidisciplinary social science research at the University of Gothenburg) and in an International Workshop on the Future Development of Green Logistics Research (EPSRC Green Logistics Consortium, VINNOVA and the EU Smartfreight Consortium). The other WP:s have established similar links within their fields of expertise as described in more detail in the separate WP reports.

Here we would like to specifically point to research links of more general relevance to the program. The Earth System Governance Project (ESG) is such an example. It is a long term international research program under the International Human Dimensions Programme on Global Environmental Change (IHDP), a global academic network supported by a number of international institutions. The secretariat of ESG has recently been placed at Lund University. This is because cutting edge research on environmental and climate governance is conducted at a number of departments at Lund University including LETS researchers. This we foresee will enable more synergies relating to governance issues between researchers in the ESG network and a way to make LETS research known in the global research community. Another for us fruitful contact was made with the Knowledge Network for Sustainability transitions and innovation (KSI) established at a conference in Amsterdam in 2009. Their next conference in 2011 will be hosted by Lund University and many LETS researchers will present their research results in this context.

Communication

Because LETS involve so many different researchers, spanning several academic disciplines and want to take in to account an audience (target groups) beyond the research sphere – both internal and external communication plays a very important role. In order to achieve comprehensible and congruent communication both the internal and external communication, within LETS, is based on the communication strategy that was developed before the program start (see Appendix 3). The aim of the strategy is to make the program visible to adequate target groups, to facilitate the work of all LETS-members and to build credibility for the program as a whole. It is from – and because of – this strategy we have created the following channels and activities:

The primary communication channel for external communication is the program's website (www.lets2050.se). The website is the main hub for all communication and has had over 6600 hits (main page and subpages) between 1 of January and the 8 of August this year. The site includes:

- **News:** We keep the site updated by posting news of events that has occurred or will occur within the program. Old news is stored under "archives", for the sake of traceability. Interested visitors can also subscribe to the news that is published on the site through the RSS feature that is offered.
- **Events:** On the Web site's front page is a calendar of upcoming activities. Here, visitors can quickly get an overview of what happens within the context of LETS. When activities are completed, they are all saved in the archive for the sake of traceability.
- **Information about LETS:** There are relatively detailed descriptions of the program's background, organization, goals and objectives on the site. You'll also find descriptions of each WP. There are also contact details (e-mail and phone) for all participants, just in case someone wishes to contact an individual LETS-member.
- **LETS in the Media:** The archive contains a list of the media publicity LETS as a whole, or individual LETS members, has managed to achieve. The list includes links to the original articles (if they are published on the internet).
- **Newsletter:** On the site you can download all the newsletters created by LETS (more about the newsletter below).
- **Reports & Articles:** The site offers an overview of the reports and articles produces within the program. Under the heading "Published" is the material that has already been published. Under the heading "Underway" is the material that is not yet completed or not yet been published. The last category is called "LETS-related" and lists the reports and articles that are not exclusively produced within LETS, but where one or more LETS members often contributed in one way or another.
- **Project Documentation:** In order to achieve the greatest possible

transparency much of the initial project documentation is available on the site. One can download the communication strategy or the initial application documentation among other things.

- **Power Point Presentations:** Available PPT-presentations from various meetings with LETS can be downloaded from the site.
- **Logos & Templates:** LETS has a logo to be included in all external communications. We have also developed a PPT template that LETS members use when giving presentations to external target groups. There is also a standard presentation about LETS that can be used – in whole or in part – when presenting the program, or read by interested visitors on the site.
- **Language:** LETS target groups are located in Sweden. Therefore, the site is in Swedish. But there is also an English subpage where it is possible to read comprehensive information about LETS and about news that could have an international interest (for example, reports written in English etc.).
- **Internal:** LETS members and funders have access to internal pages on the site. On the internal sites are meeting documents and other materials for internal use.

Another important channel for external communication is LETS members' participation in various events (seminars, conferences, etc.). Below are some examples of meetings where the program or individual LETS members have been involved (for full list of activities, see "Past activities" on www.lets2050.se):

➲ [100113-14] Transport Forum 2010
LETS attended the annual Transport Forum with a special session on the theme "A CO_2-efficient transportation future and the means of governance to get there". LETS research was presented by Kronsell and Johansson and then debated by a panel of all participant speakers.

➲ [090604-0] LETS in Amsterdam
"Greening the state for low carbon futures: The role of reflection in transition governance" was adopted as presentation at the first European Conference on Sustainability Transitions, held in Amsterdam on 4-6 June.

➲ [100413-14] International scenario workshop in Copenhagen
Lars J Nilsson (LETS program director) and Henrik Pålsson (WP-leader of WP5) participated in the international workshop "Transport Scenario Building Methodology" organized by DTU – Transport Institute in Copenhagen.

➲ [100202-03] LETS at OECD
LETS researchers Helena Johansson and Mikael Klintman participated in the OECD workshop on "The Economic and Trade Implications of policy Responses to Sociotal Concerns" in Paris.

To assist LETS members marketing of the program (during their participation in different contexts), a number of flyers have been produced. Each WP has its own flyer showing the logo, the WP's core question and a reference to the website for more information. There is an english version of the flyer and we also have roll-ups.

The program has its own newsletter: *LETS-Nytt*. The newsletter is published three times per year and consists of articles and general information about what is going on in the program. Until now 270 people have signed up as subscribers, and more are sure to come as the program progresses. So far, four newsletters have been produced. All newsletters can be downloaded from the website.

To help LETS members in their communication ambitions and be of most assistance and support, a survey was carried out at the program startup. The ambition was to capture the views and wishes regarding the communication management of the program. A follow-up survey is carried out to reconcile and capture any new requirements that have arisen during the program.


LETS-NYTT
Nr 4 2010

LETS 2050

Governing transitions towards Low-Carbon Energy and Transport Systems for 2050

Frivillighetens betydelse

LETS fokuserar på olika styrformer och menar att de tillsammans, men på olika sätt, kan bidra till den omställning som krävs för att nå klimatmålen för 2050. Att det finns en mångfald i styrformerna tror jag gör oss bättre rustade för det osäkra och oväntade.

Är det då inte en motsättning; det som är frivilligt kan väl inte styras? Nej, det är riktigt. Men frivillighet kan uppmuntrats och göras möjlig, vilket är angeläget. Frivilliga styrmedel representerar ofta nytänkande, är innovativa och kan på så sätt fungera som experiment. De kan bli goda exempel som sprids till att bli mer generellt användbara. Frivilliga styrmedel anses också ha hög legitimitet, inte minst för att de kanaliserar engagemang från medborgare och sociala rörelser.

"Det som är frivilligt kan väl inte styras?"

Här vill jag lyfta fram en styrningslogik som kan kopplas till frivilliga styrmedel. Det handlar om styrning baserat på *deliberation*. Förenklat betyder det att människor diskuterar och samtalar med varandra för att komma till en överenskommelse. Under processen, som präglas av öppenhet, får deltagarna ny kunskap och förståelse för olika infallsvinklar vilket bidrar med legitimitet.

Jag tror att den samhälliga styrningen kan förbättras genom att ta till sig lärdomar från frivilligområdet. Det kan vara ett sätt att göra samhällsstyrningen mer reflekterande och inkluderande samt bygga institutioner som är reflexiva och möjligen bättre anpassade för en större omställning.

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Homo Carbonicus:
Vad krävs för att vi frivilligt ska bli klimatsunda?

För att förstå klimatsunda handlingars förutsättningar blir det avgörande att undersöka vilka krav som ställs på människor i olika frivillighetsprojekt. I en kommande artikel undersöker vi tre fall:

A) *Klimatkompensering av resor*
– resenären betalar en summa i tillägg för att kompensera för resans utsläpp.

B) *Klimatmärkning av varor och tjänster*
– antingen som siffror om klimatgasutsläpp eller som sigill för en varas "klimatvänlighet".

C) *Mobility Management*
– informations- och uppföljningsåtgärder för att människor ska resa mer klimatsmart.

Vad innebär då de olika frivillighetsinstrumenten? Som vi ser det är klimatkompensering inriktat på *status quo*, klimatmärkning handlar om modifierad konsumtion och Mobility Management kräver en transformering av individens vardagshandlingar. Trots dessa "nivåskillnader" är det viktigaste att undersöka vilken miljö- och klimatrelaterad potential respektive instrument faktiskt har.

Värt att notera är att olika frivillighetsinstrument också kräver skilda intressen hos individen. Inom klimatkompensering krävs ofta ett intresse av att vidta en ögonfallande klimatåtgärd, liksom av att markera ekonomisk ställning. Inom klimatmärkning är hälsa en faktor som människor ofta blandar in, tillsammans med social status, genom att ha råd och genom att vara insatt i samhällsfrågor. Inom Mobility Management betonas hälsoaspekten mer än klimatet.

Sammanfattningsvis skiljer sig typerna av frivilliga åtgärder starkt åt – i omfattning och i de drivkrafter som krävs. Sociala drivkrafter verkar finnas inom samtliga åtgärdstyper. Här kan flera olika styrinstrument öka sin kraft, genom att utformas så att påverkan stärks mellan kollegor, grannar, föreningsmedlemmar, hushållsmedlemmar såväl som mellan medborgare i stort.

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LETS finansieras av Naturvårdsverket, Energimyndigheten, Vinnova och Trafikverket

Research focus and activities

The six WP:s in LETS each have an overarching research question that captures the overall focus and purpose of the respective WP0-WP5:

- Which alternative pathways lead to a low carbon society?
- What governance approaches, in terms of institutions and policy, are needed?
- What changes are needed to (re)organise the built environment and the transport system?
- What are the sustainability challenges, policy options and commercial opportunities involved in governing the transition to an increased share of biomass in energy supply?
- What is the role of voluntary instruments among citizens and consumers to induce change?
- What logistics and goods transport configurations result in low emissions and how can they be implemented?

In the following we provide a brief overview of the research focus, results and research activities in each WP during the LETS program's first years. The coordination and inter-linkages between WP:s is described in more detail as well.

WP0: Future policy scenarios and alternative pathways

WP0 elaborates possible scenarios towards a low-carbon energy and transport system (LETS) in Sweden by the year 2050, and identifies the main societal and governance challenges associated with alternative scenarios. An important objective is to offer an overarching analytical framework for the LETS program and to enable integration and synthesis between the different work packages. The research team consists of seven researchers from environmental and energy systems studies, political science and economics. This combines expertise in scenario development, policy evaluation and governance studies which are three essential components of the work package. Two parallel and interlinked research activities have dominated the first one and a half years. The first has been an extensive review of existing transport and energy scenarios, both quantitative and qualitative, with the aim to learn from experience and by critically examine past scenario efforts. The second, and main, activity has been the development of the LETS scenarios. Since the scenarios provide the overarching framework for all WP:s this work has been guided by an open and continuous dialogue with all participants in LETS as well as the funding agencies (e.g., through the reference group). The two main scenarios – "New technologies in focus" and "New patterns of behaviour" – have very different policy implications but provide a common basis for LETS researchers to explore the governance challenges in their respective WP:s. The scenarios are intentionally "exaggerated" in order to pin-point potential governance challenges associated with different pathways. The interactive

and iterative aspects of scenario development in WP0 should be emphasized. The scenario work continuously feeds into other WP:s and findings from the WP:s contribute to modifying and improving scenarios. WP0 also makes a contribution to scenario method development through integrating governance and implementation issues in backcasting scenarios.

WP1: Governance – developing institutions and policy

WP1 analyzes the problem of governance from institutional perspectives in political science and economics through three key questions 1) How do we ensure a credible long term commitment to reduce emissions of GHG:s? 2) What are the key governance dilemmas facing policy makers? 3) Which main conflicts of interest may arise and how can they be dealt with? WP1 combines the competence of six researchers from three disciplines; economics, political science and environmental and energy systems studies. The research for the first one and a half years has followed two tracks. First, we have worked at developing a common understanding of transition governance associated with steering society towards climate neutrality. We have considered different rationales for alternative governance methods. We designed an empirical study comparing three existing institutional set-ups geared toward climate neutrality namely; UK Climate Change Act, the Dutch Transition Approach and the Swedish Environmental Objectives. We have asked how they work, and which rationales govern them. The lessons drawn from this comparative analysis will give us insights about how future political institutions need to reform. Second, we have taken another institutional approach to look into practical implementation problems that policy makers face. We have shown under weaker assumptions concerning discount rates than previously considered, that action against climate change today brings long term benefits to society in the future. Defining a policy rule today, and maintaining the policy for the future increases long term welfare compared to the scenario of making no commitment at all. We have also seen that emissions of GHG:s fluctuate, and it is questionable if the private sector can carry the entire burden of meeting these fluctuations without negative effects on socioeconomic indicators such as GDP and employment. Jointly, these results support that the creation of a centralized environmental institution may be an applicable policy path in order to meet the long-term commitment of reducing GHG emissions and at the same time secure a stable socio-economic development in the short-run. Future research will analyze how an effective environmental institution may be established and which goals and tools it shall have to ensure a successful transition towards a low carbon society.

WP2: Urban and regional planning and infrastructure

In WP2 we analyze how urban and regional planning and changes in infrastructure can be used as a means for reducing CO_2 emissions. This provides the basis for developing tools, instruments and recommendations that support the implementation of LETS and more sustainable planning. The research is carried out in three main areas: (i) regional and urban planning for mobility and accessibility – our focus is on analyzing factors and measures in the built environment and transport system that pro-

motes access to functions and activities while keeping levels of *mobility* low; (ii) Tools and instruments for the planning of the built environment – here we analyze various options and combinations of options for legal instruments and additional local and regional tools to reduce energy use in the built environment; (iii) Industrial and regional development, structural changes and climate impact – our focus is on how radical change can affect the competitiveness of various industries, structural change and regional development. Specific examples include a case study of the energy declarations scheme, and a study of business localization, transport costs and regional vulnerability. The team is multidisciplinary and consists of nine researchers from the International Institute for Industrial Environmental Economics, Faculty of Law, Department of Social and Economic Geography and the Department of Technology and Society. Due to the character of the research areas in WP2 the work involves close interaction with various stakeholders ranging from national agencies to companies and local administrations. The topics also entail strong inter-linkages with WP4 and WP5. A collaborative broad assessment of the current institutional and policy context in transport planning will be carried out in the next 10-12 months.

WP3: Markets, industry and policy for bioenergy

Bio-energy is likely to play an important role in the transition to a low-carbon energy and transportation system. This is also manifested in the LETS scenarios. WP3 is focused on the challenges and opportunities that follow from such an increased use of agricultural and forest biomass for energy purposes. An increased demand for biomass will affect the forest and agricultural sectors through enhanced competition for land and biomass raw material. We explore the impacts of an increased demand for biomass on the agricultural and forest sectors in order to identify risks and opportunities for various actors in these sectors. This includes, for example, effects on the competitiveness of the pulp and paper industry as well as the opportunities for bio-refineries and other industries, and associated policy implications. A critical issue is what quantities of bio-energy that can be provided in a sustainable and efficient way and what forms of governance that are suitable for ensuring sustainable biomass production (including effects of Swedish policy outside Sweden as in the case of bio-fuels). Policy experiences thus far have been analysed in various publications and due to the important role of bio-energy in the scenarios a special memo on the pulp and paper industry has been produced for WP0. The team consists of nine researchers from economics, environmental and energy systems studies and law.

WP4: Citizen-consumers and voluntary instruments

The purpose of WP4 is to analyse possibilities and challenges for voluntary action of citizen-consumers to manage the emissions of GHG:s. Voluntary instruments are frequently precursors to more binding policy instruments. The results are particularly relevant in the context of the scenario that involves “new patterns of behaviour” and for issues concerning policy legitimacy, processes and forms of governance as dealt with in WP1. Sug-

gestions are made for how policy makers, planners, companies and various other organisations can help to identify effective combinations of voluntary and mandatory forms of governance. It is impossible to cover all parts of people's daily lives and we focus therefore on three specific cases: Mobility management (aimed at influencing how people travel), climate labelling (helping consumers make climate-informed choices), and climate offsetting (enabling people to compensate for their carbon footprint). The team consists of three researchers coming from three different disciplines within the social sciences: sociology/research policy, economics (geared towards individual and group behaviour) and political science. The breadth is important when trying to capture the preconditions for voluntary action among citizen-consumers. The different methodological traditions (from interviews through document analysis of quantitative and qualitative data) have forced WP4 to bridge the methodologies into something close to triangulation: to study similar phenomena using several methods. In our view these methodological efforts help to substantially strengthen our material.

WP5: Logistics and goods transport

WP5 started in early 2010. Based on a clearly expressed freight transport and logistics perspective, the purpose is to contribute practical, applicable knowledge that serves as a foundation for decision making for authorities and industry in order to contribute to long-term sustainable energy and transport systems. The project has two goals. The first is to identify, develop and present innovative logistics and freight transport solutions and governance and their consequences. This includes the structural changes needed in order to meet the CO_2 targets that have been set regarding freight transport. The second goal is to identify critical factors in the interaction between companies, authorities and citizens in the implementation of the innovative logistics and freight transport solutions that are developed.

WP5 is carried out in three consecutive and partly overlapping parts; 1) freight transport, accessibility and supply chain structure, 2) control systems, models and policy, and 3) implementation challenges and dilemmas. The team consists of researchers from logistics, social and economic geography, traffic and roads, and environmental and energy systems studies. This facilitates linking matters such as micro and macro logistical considerations, the interplay between logistics and freight transport, and interactions between freight and passenger transport. Furthermore, the work in the project is continuously evaluated in workshops with participants from funding agencies, industry, interest organisations and authorities.

Integration between WP:s

One important function of the scenario work in WP0 is to provide a common basis and framework for carrying out research in WP1-WP5. The iterative and interactive scenario building process is in that sense more important than the final scenarios. This is a continuous process throughout the program but an important step will be taken at the 2010 annual

program conference in November where one objective is to develop a scenario report that will include contributions from most of the researchers involved concerning their perspectives on the governance implications of the scenarios.

The integration between WP:s takes place in many forms and at different levels. One level is in the context of WP0 but much of the integration takes place directly between WP:s, often motivated by common interests in research topics. The report and the workshop conducted jointly by WP0 and WP1 in September 2010 is a recent example. In addition, all WP:s have researchers that are involved in at least one other WP. As noted in the previous section, the WP:s organise seminars dedicated to finding common issues and interests. WP1, for example, has picked up ideas, cases and examples concerning governance through such interaction with the other WP:s. WP2 has clear linkages with WP4 through the case of mobility management (relevant to traffic planning) and, of course, with WP5. WP3 is tightly linked with WP0 and WP1 both through common research interests and through the representation of individual researchers in those WP:s. WP4 is closely linked also to WP1 through issues concerning the role of citizens and consumers in governance. WP4 ties with WP3 and quantitative resource oriented aspects will be strengthened through, for example, the recruitment of A. Carlsson-Kanyama as Adjunct Professor. WP5 entered the program relatively late and has focused its efforts on integrating with WP0, whereas links with WP2 come natural through common interests and staffing.

Results and planned activities

The LETS Research Program proposal was submitted in June 2008 in competition with two other proposals and a decision on funding was expected in September 2008. The preliminary decision came in November, followed by clarifications, a contract in December, and a kick-off meeting 2-3 February 2009. The add-on WP5 kick-off meeting was in March 2010. Hence, effectively the LETS program has been up and running for only about 18 months, of which the first 6-12 months was a ramp-up phase for many of the partners. As a result, the original program plan, which started in Q4 2008 has been shifted forward by about 6 months, to start in Q2 2009 (for details see attached program plan deliverables list, Appendix 1).

Against this background, we think that LETS has performed better and delivered more than expected and planned at the outset. One challenge in this type of inter- and multidisciplinary project, based on previous experiences, is to get the partners on the same page in terms of a shared understanding of the overall research problem, objectives and approach. A good process behind developing the original proposal is part of the explanation why internal cooperation and processes have been smooth. In terms of deliverables we have produced more publications than planned (see Appendix 1) and a similar amount of communication & dissemination activities as planned. As the program is now working at full speed we are confident that LETS will continue to perform at a high level throughout 2011 and 2012.

WP results and deliverables

In WP0 there has been steady progress in the development of the LETS scenarios. They have been subject to workshops and discussions in May 2009, November 2009 and September 2010 (in collaboration with WP1 a workshop was held 7 September 2010). The scenarios identify transition challenges such as how to decarbonize industry, develop power grids, shift transport to electricity and/or hydrogen, transform the building sector, and govern limited biomass resources. Important feedback from the stakeholders in the most recent workshop was that we could pay more attention to local and regional levels (multilevel governance issues), pinpoint conflicts more clearly, be more specific about the solutions, and explicitly treat also the processes by which new institutions and policies can be formed. The comparative review of scenarios has been completed and one (expected) finding is that governance challenges are typically poorly addressed. Suggestions are made for how to better integrate such aspects into scenario analysis. In December 2009 a WP0/WP1 workshop was held in collaboration with the Brussels based NGO Atomium Culture, and the associated workshop report on “Governance for a Low Carbon Society” was published. This cooperation provided us with an unexpected opportunity to involve leading European researchers in a dialogue on LETS research questions. A second workshop will take place in Brussels 18-19 November

2010, in collaboration also with El Pais and Le Soir, with the purpose of elaborating what a low carbon transition will entail for the average citizen (c.f. WP4). In addition to dissemination of results, these activities also provide impetus for early stage synthesis work in LETS.

Under the main tracks in WP1 a number of conference papers, articles, and book chapters have been produced. Many of the deliverables are the outcomes of LETS only but in some cases they rely also on research in related projects. Conferences include the 1st European Conference on Sustainability Transitions, 9th Nordic Environmental Social Sciences Conference and the 2nd UNITAR/Yale Conference on Environmental Governance and Democracy. Some of the work is closely related to WP0. For example, the role of scenarios as a tool or mechanism for government led transition governance is discussed in one of the conference papers (and was also discussed at a LETS-meeting at the Swedish EPA on January 20, 2010). This is based on the idea of scenarios as learning and strategizing tools and the observations that their use is often detached from actual decisions and operations. In one paper (forthcoming in Futures) we make a contribution to scenario backcasting methodology by developing and testing an approach to bring in institutions and politics into energy future studies. The analysis was possible through including results from related projects such as ADAM (www.adamproject.eu) and CANES (www.fni.no/canes). On the economic aspect of dynamically consistent policy we have shown that early action on policy can increase long term welfare and that carbon price volatility leads to problems. These results support the idea of a centralized environmental institution that can ensure time consistent climate policy.

In WP2 the work has progressed according to plan except for delays in the research area focusing on regional and urban planning due to staff changes that are beyond our control. Since summer 2010 we have new dedicated staff (Professor Bengt Holmberg and PhD student Fredrik Pettersson) and a plan for how to proceed with Deliverable 2.3 (the focus of which has been discussed with the Swedish EPA). In the area of tools and instruments for planning of the built environment a starting point has been the building energy declaration scheme. This focus was formulated in cooperation with the WP2 reference group. In a resulting publication for a Nordic journal on environmental law, some suggestions are made for how this instrument more effective, for example by introducing some degree of coercion. In the area of industrial and regional development, in collaboration with WP5, we have interesting results that will be presented at the workshop scheduled for autumn 2010. Freight transport costs as well as passenger transport costs for detailed industries and regions in Sweden have been mapped. The importance of transport costs for localization and profitability of industries has been studied in regression models. Industries, vulnerable to increased transport costs due to CO_2-restrictions have been identified. The issue whether regional policy, through localization imperatives or restrictions, can contribute to reduced $C0_2$-emissions is discussed. A report will be published in October, preliminarily called “Localization, transport costs and regional vulnerability.” The work has benefited from related research (e.g., NGIL, a VINN excellence centre at Lund) and been

presented at conferences (e.g., International Workshop on the Future Development of Green Logistics Research, Brussels 2010).

WP3 is also making progress according to plan. A joint report on markets and policy for biofuels, in Swedish, was published in June 2010. Another report in Swedish dealing with agriculture, greenhouse gases and policy was also published in June. Due to the high complexity of land use and bio-based value chains for food, fibre, fuel, etc. approaches to policy and governance is an important aspect which is treated in those reports. In a submitted paper (Energy Policy) we analyse the combined effects of policy instruments on energy related investments in the pulp and paper industry. The results show some level of reorientation in the industry resulting from policy but we have found no support for the notion of radical reorientation in the direction of biorefineries which is implied by the scenarios in WP0. Due to the importance of the forestry industry for the Swedish energy system, today and in the future, a special memo was prepared as an input for the scenarios. WP3 is in many cases drawing on results from related research projects and individuals not directly engaged in LETS, for example Pål Börjesson at Lund University concerning land-use and environmental goal conflicts. Although LETS has a focus on Sweden, the markets for fuel, food and fibre are international and the interconnections between geographic regions through trade and policy are important to consider. One study (under LETS but funded by Lund University faculty funding) therefore focus on external governance and the EU policy for sustainable fuels, showing how the effectiveness of EU policy may deteriorate due to lack of inclusion of the subject in the policy process, in our case Mozambique.

The strong interest in the research areas of WP4 has provided opportunities to publish results in edited books as well as journals. In the area of climate offsetting the one planned article has developed into three publications, one of which is a joint publication ("Homo Carbonicus") by the three researchers in this WP which synthesizes work in the three streams under WP4. One observation is that status and group pressure has so far been an under-researched aspect of climate-friendly change, aside from in marketing of eco-chic products and services. The limited use of the wider range of drivers is a reason – beyond the democratic one – for involving groups of citizen-consumers in future governance developments on a bottom-up basis. In a similar vein D4.2c shows how climate policy is not just about the state and it encourage policy-makers and academia to look beyond events such as the UNFCCC intergovernmental negotiations. There are signs of gradual institutionalization of a transnational public sphere in world politics where norms and rules are devised and implemented independently from the intergovernmental negotiation process. Linking to WP2, a paper on mobility management (for presentation at The European Transport Conference, 11-13 October 2010) deals with spill-over of pro-environmental behaviour and concludes that the potentials for spill-over are considerable.

WP5, although starting late (and technically not part of this evaluation) got off to a flying start in early 2010. A workshop, including various sta-

keholders, was organised on 26 April 2010. This event included about 25 participants from Swedish industry, authorities including project sponsors, interest groups as well as researchers (D5.1). The workshop resulted in visions for future structures and requirements for CO_2-efficient logistics and freight transport solutions for 2050 from a goods-owner perspective. It also resulted in a critical review of three recently published future studies. Several initial publications will be completed during the fall. So far, the work conducted in WP5 has focused on synthesising the current situation of CO_2-efficient solutions for freight transport and its interplay with logistics in two major literature reviews. One makes a synthesis and an analysis of potential medium-term and long-term logistics solutions in order to meet the target of 75-90% reduction of CO_2-emissions from freight transport by 2050. The other explores themes and challenges in making supply chains environmentally sustainable. The initial work also involves participation and creation of linkages to related projects (such as, DTU Drivers&Limits project, Fossilfritt Skåne 2020, and Green Logistics Workshop in Brussels). The research also includes development of a decomposition model which facilitates identification and explanation of factors which affect CO_2-emissions from freight transport. Macro logistical analyses aiming at calculating the impact of different drivers using this decomposition model on CO_2-emissions from freight transport in Sweden 1990-2008 have been conducted (D5.2).

Planned activities

The main focus of WP0 for the coming period is to further develop the scenarios and integrate them with the research in the other WPs. A report presenting the scenarios and outlining the governance and policy challenges will be published in October 2010 (D0.13e). A draft version was the basis for a workshop with policy makers on September 7, 2010 (D1.2) and inputs from the workshop will be used for the final version. The annual meeting in November 2010 will have as a main aim to develop ideas for a more extensive report on governance and policy challenges (D0.7) building on D0.13e and involving contributions from nearly all LETS researchers. As part of the scenario development two other reports will be prepared by WP0 during 2010 and 2011: One about the impacts of the LETS scenarios on key socio-economic factors and the Environmental Quality Objectives (D0.5), and one containing an overview of potentials and challenges for technologies that are key components in the LETS scenarios (D0.11e). In 2012, the work in WP0 will focus on creating a synthesis of the results of all WPs, which will conclude with a final LETS seminar with stakeholders and researchers in the autumn of 2012.

The results in WP1 so far have shown the need to change the institutional framework and that there are benefits to society of committing early to the goal of reducing green-house-gas emissions. Future research in WP1 will analyze how an effective environmental institution may be established and which goals and tools it shall have to ensure a successful transition towards a low carbon society. Potential conflicts of interest and other governance issues will be analyzed parallel to this work. We will also analy-

ze empirically, lessons that can be drawn from different institutional set ups, how they work, and which rationales that govern them and how we can learn from these lessons when we build future political institutions.

Future research in WP2 will analyze how urban and regional planning and changes in infrastructure can be used as a means of reducing CO_2-emissions. Potential conflicts of interest and organizational issues will be taken into account. The main focus of WP2 for the coming period is to integrate the scenarios into the subprojects and cooperation with other WPs, e.g. WP4 and WP5 which will contribute strongly to the analysis of sub-project of urban and regional planning and infrastructure.

The work of the subproject on industrial and regional development, structural changes and climate impact has produced interesting research especially in collaboration with WP5, which will be presented at the workshop scheduled for autumn 2010. Based on the developed knowledge on the importance of transport costs for localization and profitability of industries interesting will be analyzed and communicated and serves as an important input to the scenarios. The issue whether regional policy, through localization imperatives or restrictions, can contribute to reduced $C0_2$-emissions will be further discussed. A report (D2.7) will be published in October preliminary called "Localization, transport costs and regional vulnerability". The two main scenarios in LETS will mean different demands on the development of transport infrastructure and the ambition is to briefly illustrate what a development in line with the Technical and Behavioral Change scenario might have on the various consequences. Governance of infrastructure planning is also a central issue. The lack of formal, regional planning is a problem that deserves attention and which will be illustrated by a description of the Swedish planning system, focusing on the process of infrastructure planning and what links this process to other land-use planning. During spring 2011 a workshop will be organized on the subject Transport, Mobility and Accessibility based on a report by the same name (D 2.2 and D2.3).

In the final stage of the project the research findings will be summaries as tools, instruments and recommendations that support the implementation of LETS and more sustainable planning (D2.12). The results will be communicated through seminars and reference group meetings with key stakeholders i.e. local and regional planners, the representatives from the industry and relevant authorities at national, regional and local levels and a final seminar will be organized (D 2.13).

Future work in WP3 will focus on modeling as well as technology policy. The agricultural sector will be modeled by using CAPRI, an economic model of the European agricultural sector, to analyze the impact of increased demand for biofuels on agricultural markets (D3.3). Olsson and Lundmark will apply a similar model on the forest sector and analyse the interactions between different users of forest raw material, i.e. the sawmills, the pulp and paper mills and the energy sector (D3.6). As a complement to the CAPRI modeling of the agricultural sector, the relationship between CO_2-

prices and the cost of land will be analysed at farm level using an opportunity cost approach (D3.12e). Technology policy, both from a theoretical perspective and related to the Swedish development of biorefineries will also be addressed. Different perspectives on technology policy will be elaborated and applied on the development of biorefineries in a Swedish context (D3.10e). Future work will also address appropriate policies for bioenergy production and use.

In WP4 a change of plans has been made concerning D4.1: Stakeholder workshop. It has been postponed from May 2009 to February 2011. It has become very clear that we needed to work in the order of (A) collect the *initial* inputs from the general LETS meetings and from the reference persons on these meetings, (B) elaborate on these inputs and relate these to our specific studies, before (C) developing a more general research overview to which the Stakeholder workshop (consisting of our reference group as well as other researchers and practitioners who are interested) will help us by providing concrete, illustrative examples to highlight certain patterns. Nevertheless, we have continuous contact with WP4's reference group, for instance by having a preparatory meeting for the Stakeholder workshop in September 2010. WP4 will continue to 'fill in' the Deliverables, by having further papers published, by writing a research review, etc. Continued dissemination will take place in several contexts, including the Brussels workshop organised by Atomium Culture referred to above.

In WP5 the near term future activities involve four areas. In the first area, the review of current literature will be completed. The second area is investigation of drivers, barriers, logistics structures and business models from a company perspective. This is done through a survey study (D.5.7) regarding barriers and drivers of companies to obtain CO_2-efficient logistics and freight transport solutions. These results will then be elaborated on in a workshop (D5.5) which includes innovative business models based on green logistics solutions. The third area deals with supply chain structures and links micro and macro perspectives. This involves macro logistical analyses estimating changes of CO_2-emissions from freight transport in Swedish economy in the middle term (2008-2020) and then in the long term (2020-2050). It also involves an interview study of transport companies' view on future supply chains and transports (D5.3). Finally, this first part of WP 5 will be synthesised. Starting in 2011 more attention will be turned to issues concerning governance, control models and policies with sufficient effect, relevance and viability to make freight transport sustainable.