

Contemporary case studies: Societies in transition, particularly in the South, in a comprised and distorted way experience changes in society-nature interactions similar to the past of highly industrialized countries but in a very different context. What chances are there for them to choose alternative paths? (Case studies: Brazil, Venezuela, Columbia, Bolivia (Subproject 1), Philippines, Laos, Vietnam, Thailand (5), Sang Saeng, Thailand (3), Nicobar Islands, India (4))

Synthesis: There are strong interactions between local, regional and global processes and interdependencies between societies or communities in different stages of these transition processes. Resource exploitation, division of labor and trade are code words for this. To identify these interdependencies and to support capacities for intervention towards more equitable and sustainable choices is the basic goal of synthesis. (Subproject 7 + 8)

The base to provide the necessary interconnectedness and consistency has been built by the theoretical concepts of society's metabolism and colonization regimes.

See the [project web site](#) for more information.

Project report: [Long-term industrial Transformation: A Comparative Study on the Development of Social Metabolism and Land Use in Austria and the United Kingdom 1830-2000, Fridolin Krausmann, Heinz Schandl, Niels.B.Schulz, Vienna, August 2003.](#)

The Competitive Uses of Advanced Manufacturing Technologies for Sustainable Purposes - Workshop

IT Contributing Project

No. E/2001/04

Organiser:

- [Maastricht Economic Research Institute on Innovation and Technology](#) (MERIT), the Netherlands

This research was performed under the Competitive Uses of Advanced Manufacturing Technologies for Sustainable Purposes (CUSP) Project, an EU-supported Fifth Framework project within the Competitive and Sustainable Growth Programme. The project's objective was to better understand how manufacturers can turn investments in new production technology into competitive advantages and improvements in sustainability.

The CUSP Project supplied the need for an empirically tested theory of technological change that explains the interdependency of market demand and the strategic use of advanced manufacturing technologies (AMTs). The application of computer and electronics-based technologies in production is creating profound changes in the ways firms compete with consequence for the ways we consume. These parallel changes in the production and consumption systems exemplify the emergent socioeconomic theory that

technology systems and their environments co-evolve. To move away from current unsustainable patterns in the production of material goods, we need to consider whether the strategic uses of AMTs can be used to create technological momentum, not only in the direction of greater competitiveness, but also greater sustainability.

The Workshop report is available [here](#)

Toward Clean Shared Growth in Asia

IT Research Project No.

E/2001/06

Partners:

- [Clark University](#), USA

Many economies in the Asia Pacific region are in the middle, rather than the end, of their industrial revolutions. Because of this, the next twenty-five years will likely witness the largest expansion of industrial output in the histories of the economies of this region. Absent technical changes that reduce the energy, materials, water and pollution intensities of industrial production, these absolute increases in industrial output will presage equally large, if not larger, increases in energy, materials, and water use and in pollution loads. The consequences for the environment, locally and globally — as measured by ambient air and water quality, energy and materials use, and greenhouse gas emissions of this trajectory are likely to be enormous. Energy use in developing Asia, including India and China, is predicted to increase from 84.5 quadrillion Btu in 2000 to 177.9 quadrillion Btu in 2020. Greenhouse gas emissions are expected to more than double in Asia over the next twenty years, and Asia will likely overtake the OECD as the largest source of greenhouse gas emissions worldwide sometime between 2015 and 2020.

Understanding the factors that determine the rate of adoption by industry of technologies that are less energy and materials intensive is thus a critical policy priority, especially in countries experiencing rapid industrial growth. Efforts to strengthen existing policy toward the adoption of technologies that are less energy and materials intensive are constrained by a paucity of data on the environmental footprint of investment and by a lack of systematic research on the effectiveness of different policy options. To date there is little more than anecdotal information available on the energy and materials intensity of new investment in Asia. Some have claimed that because of the volume of new capital investment taking place in industrializing economies in Asia, the rate of adoption of technologies that are less energy and materials intensive is relatively high (industrial investment is cleaner simply because it is newer). Efforts to model future environmental quality in Asia by the World Bank and others typically presume a substantial gain in energy and pollution efficiency through this ‘new investment’ effect. Others have argued that the structure of regulatory policy within a country, the resources available for sustained technology upgrading (not just technology adoption) at the national and regional scale, and the organization of firms and industries are crucial in influencing the

technology and investment choices of firms, and the energy and materials intensity of industrial activity.

The research program examines:

4. approaches to measuring the energy and resource intensity of industrial investment, including the availability of requisite data in Asia Pacific;
5. policies currently used by the public and private sectors to influence the investment and technology choices of firms, focusing on investment in newly industrializing countries of East Asia;
6. detailed empirical research that assesses the impact of ongoing systemic changes in economic processes upon the environmental performance of industry.

The ultimate purpose of the study is to identify the processes and policies that influence the adoption of technologies in Asia Pacific that are less energy, resource and pollution intensive.

See the [project paper](#) by Angel, Rock and Feridhanusetyawan for more information.

Transitions to Sustainability Through System Innovations

IT Contributing Project

No. E/2001/07

Partners:

- [Universiteit Twente](#), The Netherlands.

Over the past few years, the necessity of ‘system innovation’ to attain sustainability has become increasingly acknowledged among researchers from various backgrounds as well as by policy makers. It is mentioned, for instance, in the recent new Dutch ‘National Environmental Policy Plan’ (NMP4). System innovation is analysed by a variety of disciplines using a range of concepts describing the phenomenon like ‘regime transformation’, ‘technological transition’, ‘socio-economic paradigm shift’. Since system innovation is such a complex phenomenon it is quite likely that important steps forward could be made when creating synergies between insights developed in separate disciplines. In this project, the first step in developing these synergies will be made through an expert meeting with people from different disciplinary backgrounds to identify common themes, potential synergies and a research agenda. Since this is only intended as a first step, the project seeks to disseminate the results from the expert meeting widely, to researchers as well as to stakeholder audiences.

Background

The key starting point for this proposal is that any transition to sustainability will imply a high level of social-cultural change coupled to a similar high level of technological

change. This is what we call a 'system innovation'. System innovations are defined as major changes in the way societal functions such as transportation, communication, energy supply, feeding, housing and water management are fulfilled. The need for system innovations that lead to more sustainable development paths has been recognised in various policy networks and research programmes. The body of knowledge about such system innovations is still limited, however; although there are research insights and policy experiences that can be drawn on.

An Expert Meeting and its focus

As a first step towards systemisation and elaboration of such a body of knowledge this proposal seeks to organise an Expert Meeting to bring these insights and experiences together, to develop an overview of the state-of-the-art and, by doing this, to construct a research agenda relevant for policy-making. The concept of a transition implies a structural change in our society. Such changes take place at the level of systems of production, distribution and consumption and are thus the result of what we define as system innovations which share the following characteristics:

- They will involve a wide range of actors, including firms, consumers, NGOs, knowledge producers and governments;
- They are not caused by a change in a single factor but are the result of the interplay of many factors and actors that influence each other; but they can also have their own trajectories of development. Mismatches occur, creating lags and tensions;
- They imply change at various levels: at the micro-level of individual actions, at the meso-level of structuring paradigms and rules and at the macro-level comprising a deep structural level of trends such as individualisation and globalisation.

At the Expert Meeting we propose to address *two main issues and questions* and *four main areas/cases* for emerging system innovations:

Our two main issues are:

- Understanding the dynamics of system innovations leading into a transition to sustainability.
- Understanding what government agencies and other actors can do to encourage and influence such system innovations.

Our four main areas/cases are:

13. Energy
14. Mobility
15. Agriculture and Food
16. Water management

We focus on these four areas because pressing problems and new opportunities have already led to prospects for system innovations which could lead to transitions to sustainable development. The questions and cases will be discussed from several different disciplines and perspectives, which will be reflected in the background of the participants. In addition to disciplinary perspectives, we will seek participation from policy-makers who will bring in their experiences and ways of framing insights.

Questions for the Meeting to Answer

The two main issues above consists of the following set of questions:

Understanding System Innovations

17. What *are* system innovations? How can they be characterised?
18. What do we know about system innovations from historical examples?
19. What is the role of ‘system builders’ in different phases?
20. How are problems and costs that are tied up with system innovations encountered?
21. How do local initiatives disrupt existing structures?
22. What is the role of changes in consumption preferences in system innovation ?

Influencing Transitions

23. What kinds of interventions can governmental agencies most effectively make to ‘manage’ system innovations?
24. Identification of roles of the public and private sectors; redefinition of the public / private divide.

Organisation and sponsors

The workshop is organised by an international committee and funded by the RMNO (The Dutch Advisory Council for Research on Nature and Environment), the Dutch National Council for Agricultural Research (Innovatienetwerk Groene Ruimte en Agrocluster), the Dutch Ministry of Housing, Spatial Planning and the Environment and the Industrial Transformation Project of the International Human Dimensions Programme (IHDP IT).

Participants

In total, we aim for about 35 participants. Most of them will be researchers while about 25% will policy people and experts from the four area/case domains described above.

Follow-up

The results of the meeting will be disseminated to scientific as well as stakeholder audiences. For the scientific audience, a scientific book will be published and a research agenda will be drafted. For stakeholders, a paper will be written with recommendations intended to be of relevance for policy-makers, business and NGOs.

Click [here](#) for the workshop key note paper.

Results

- [Summary report from the workshop](#), by Dr. Ir. Boelie Elzen, October 2002.
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International Workshop Series "Shaping Sustainable Transformation"

Network building and joint project development in the area of transdisciplinary sustainability research

IT Contributing Project

No. E/2002/02

Partners:

- [Öko-Institut, Institute for Applied Ecology](#), Germany.

Industrial Transformation Research is a broad subject comprising different aspects and sub-problems (e.g. innovation studies, technology assessment, ecological design, environmental management, motivation research, lifestyle typology, demography, environmental policy, governance analysis). However, much of the relevant ongoing research is without explicit reference to the broader conceptual questions of Industrial Transformation. It uses different wording to formulate conceptual frameworks and questions, which are often adapted to specific research communities or target groups. Also, much of the work is still bound within national communities or within certain sectors of the research system (such as academic or practically oriented research).

The international workshop series "Shaping Sustainable Transformation" aims at the integration of diverse knowledge resources for fostering research on complex transformation processes in socio-techno-ecological systems and developing social capacities for their sustainable shaping.

The specific challenges of shaping sustainable transformation are:

- to understand dynamics of structural change in socio-techno-ecological systems and to anticipate future transformation paths (knowledge about system dynamics)
- to assess and evaluate the impacts of specific paths of transformation (knowledge about sustainability goals), and
- to develop visions, strategies and collective action capacities to shape transformation processes (knowledge about transformation strategies)

For this purpose, a series of four two-day workshops gathers 20 researchers from different fields of expertise, disciplinary backgrounds, countries, and sectors of the research system. Over a period of one year the workshops provide a platform to discuss research approaches and methods and to identify common topics and research questions in the area of Industrial Transformation. Three parallel working groups are each to work out a proposal for a joint follow-up project.

The workshops are preliminarily scheduled on the following dates:

- 26-27 September 2002: Blackforest, Germany
- 9-10 December 2002: Berlin, Germany
- 27-28 February 2003: Brussels, Belgium
- 15-16 May 2003: Lago di Como, Italy

See the [project web site](#) for more information.

Sustainability Strategy

Improvement of sustainability strategy elaboration for economic, environmental and social policy integration in Europe:

IT Contributing Project

No. E/2002/03

Partners:

The objective of the Project is to use the diversity of scientific approaches to problems of sustainability as a resource for improving sustainability strategy development, especially the further elaboration and implementation of the European Sustainability Strategy. This requires the creation of a trans-disciplinary project focused on sustainable development, bringing together technical, economic and political science insights, and capable of monitoring sustainability strategies, while building a bridge to experts' and civil society projects committed to policy co-ordination. The creation of such a project does not only contribute to the achievement of sustainable development in Europe, its functioning as a more and more continuous discursive space will furthermore strengthen the strategy development and implementation process amongst all the partners involved. In particular the exchange with non-Europeans will help to facilitate self-reflection and a better understanding of the cultural basis of sustainable development strategies.

To achieve the overall objective *three sub-objectives* will be pursued:

34. A *first sub-objective* is the clarification and comparative analysis of the historical and on-going development of sustainability strategy elaboration on the level of the EU, as well as on the level of the respective member states and candidate countries, considered before the background of global and broader European commitments. The focus of the debate will be on the explicitation of the underlying implicit and explicit models of development;
35. A *second sub-objective* is the elaboration of improved procedures and mechanisms for the refinement and implementation of sustainability strategies at the international level, and the necessary co-ordination with the national implementation efforts. This will regard likewise the underlying assumptions about coherent development models and paths of development, and the analysis of the methodology and the indicators used for monitoring the strategy. If effective, the strategy will implement the European Union's global environmental

commitments, while at the same time supporting sustainable development beyond the EU.

36. A *third sub-objective* is to establish close and continuous contacts between the project and the international scientific communities of the relevant disciplines, as well as a broad range of policy-makers, environment and development NGO and social movement projects on the European and international level. The outcome of this broadened dialogue process will be core proposals to a mode of governance adequate to the EU- sustainability strategy, activating citizen participation, across present gender and class barriers, and an exchange of experience with non-European actors as a mutual learning process.

These objectives will be pursued by organizing a series of workshops and conferences, bringing together scientists of different disciplines to contribute to key policy questions. These will be drafted based on historical and political analysis, and will be evaluated by active decision makers regarding their policy relevance. Thus a broader science based and politically relevant analysis will be synthesized helping to derive effective policy strategies for the benefit of the environment and social justice.

Complementing this approach by involving non-Europeans will help sharpen the perspective, making the discourse results available for critical evaluation outside Europe and for developing first elements of a joint strategic sustainability perspective.

See the [project page](#) on the SERI website for more information.

Corporate Roundtable on development of strategies for the Environment and sustainable development.

Business Council for Sustainable Development, India (CoRE-BCSD, India)

IT Contributing Project

No. E/2002/04

Partners:

- [TERI- The Energy and Resources Institute](#), India.

The goal of sustainability is no longer an option, but one that is integral to the long-term survival of the human society. Corporate agendas, therefore, increasingly need to address this concern. As environmental problems increase in intensity and complexity, there is growing appreciation and need for collaborative approaches to develop strategies for industrial sustainability. In India, a vast body of knowledge and experience is lying untapped within the industry which could be used to implement the sustainability agenda. Room exists for building on this latent knowledge and expertise and transform it into an agent for change. With this in mind, Tata Energy Research Institute (TERI) have set up the initiative called CoRE-BCSD, India (Corporate Roundtable on Development of Strategies for the Environment and sustainable development -Business Council for

Sustainable Development), India. CoRE-BCSD, India is a network of motivated and leading corporates, coming together to identify key problem areas in the field of industrial sustainability and to develop strategies for addressing them. Functional experts from these corporates identify and conceptualize projects. A team of industry members and TERI researchers then works to develop appropriate solutions/strategies for use by the industry. The work undertaken by CoRE-BCSD, India is devoid of any ideological or political bias. CoRE-BCSD, India is a partner to the WBCSD and member of its regional network. Through this partnership, CoRE-BCSD, India shares its proactive approach towards environmental management, with the international community and aids in the advancement of the global sustainability agenda.

See the [project page](#) on the TERI website for more information.

Is Europe sustainable? Modelling Opportunities and limits for Restructuring Europe towards Sustainability (MOSUS)

**IT Contributing
Project
No. E/2003/01**

Partners:

- [The International Institute for Applied Systems Analysis \(IIASA\)](#), Laxenburg, Austria.
- Gesellschaft für wirtschaftliche Strukturforschung mbH (GSW), Osnabrück, Germany.
- [Sustainable Europe Research Institute \(SERI\)](#), Vienna, Austria.
- Charles University Prague (CUP), Prague, Czech Republic.
- London School of Economics (LSE), London, U.K.
- Austrian Institute of Economic Research (WIFO), Vienna, Austria.
- Institute for Sustainable Development (ISD), Warsaw, Poland.
- National Institute for Engineering and Industrial Technology (INETI), Lisbon, Portugal.
- Centro de Investigacao Sobre Economia Portuguesa (CISEP), Lisboa, Portugal.
- Centro de Investigacao e Estudos de Sociologia (CIES), Lisboa, Portugal.
- University of Lodz (TAES), Lodz, Poland.
- Center for International Climate and Environmental Research (CICERO), Oslo, Norway.

The MOSUS project aims to integrate three major themes of European policies within a macroeconomic, multi-sectoral framework representing the interrelation of economic, social and environmental domains.

These policy themes are:

- Sustainable development,
- Competitiveness and social cohesion in the knowledge-based society and
- Globalization and international trade.

Based on an existing economic model, this project will develop and apply an integrated ecological-economic simulation model in order to quantify the interrelations between socio-economic driving forces and the state of the environment. The analysis will be done within a multi-country, multi-sectoral macroeconomic framework, including trade flows within Europe as well as between Europe and all other economically relevant parts of the world. The model will be the first such tool to directly integrate comprehensive bio-physical data (material and energy flows as well as land use data) in European and global simulations up to the year 2020 and put them in relation to structural indicators of social and economic developments.

Thus, this tool will allow for formulating and evaluating scenarios of the economic and social/distributional impacts of key environmental policy measures and for presenting validated policy recommendations for responding to environmental changes. Applying this model for the evaluation of sustainability scenarios for Europe will significantly enhance the knowledge on the interactions between environmental changes and socio-economic trends that often are the driving force of undesirable environmental impacts.

The 4 key objectives and targets of this project are: Assessing and quantifying the European use of resources (scale), including “ecological rucksacks” induced by international trade. Formulating and evaluating sustainability scenarios, linking economic performance with resource use and environmental deterioration. Refining environmental indicators to assess resource productivities, material and energy intensities and labour intensities of resource use for the EU. Elaborating policy strategies and actions that reconcile long-term economic development, international trade and environmental protection.

Project duration: February 2003 - January 2006

See the [MOSUS webpage](#) for more information and download of all project documents.

Knowledge-Network on System Innovations: Transitions to a Sustainable Society (KSI)

IT Contributing

**Project
No. E/2003/02**

Partners: ○ [Universiteit van Maastricht](#)

This project is based on the amalgamation of the Knowledge Network on System Innovations (Kennisnetwerk SysteemInnovaties — KSI): Transition to a Sustainable Society and the National Initiative for Sustainable Development (Nationaal Initiatief Duurzame Ontwikkeling — NIDO). The two combine their strengths along a path of mutual development, combining theoretical research and insight with practical experience and competence.

Transition science is a young scientific field that aims to derive general methods, models, insights, success factors et cetera by studying past, existing and future transitions and system innovations. [Transitions and the underlying interrelated system innovations that together form, or could form, a transition are grouped under the name of “transitions.”] from all types of social systems. Linking scientific research to real life means that this knowledge will be used to achieve an effect on society. Such concerted action is the only way to accelerate the learning curve. The idea is to eliminate the need to continually try to find the same knowledge about transitions and transition management in various sectors. Instead, earlier experiences already evaluated from completely different sectors can be used. As a result, transitions will proceed more rapidly and reach their aims more accurately. Moreover, beginners’ mistakes will be avoided and the utility of different types of interventions will be clearer. All in all, parties will work together more effectively. One of KSI-NIDO’s most important roles is to place these types of knowledge and experiences in an international context and make them generally applicable and interchangeable between systems.

See the [project page](#) for more information.

Determining the feasibility of transition trajectories using technology specific innovation systems approach

**IT
Contributing
Project
No.
E/2003/03**

Partners: ○ [Universiteit van
Utrecht](#)

The total program focuses on improving the back casting methodology and applies this method to the case of sustainable transport chains. Back casting can be seen as determining desired future images and describing ways (transition trajectories) to reach these future images. In this project we focus in detail on designing transition trajectories and determining the feasibility of these trajectories. While project A focuses on the technical design of these trajectories, this project B focuses on all those processes that influence the creation and implementation of new knowledge in order to make a transition from a current transport system to a desired future transport system possible. An important concept from innovation studies that covers many aspects of this transition process is the concept of Innovation Systems. These can be defined as a set of interrelated institutions; its core is made up of those institutions that produce, diffuse and adapt new technical knowledge.

The back casting approach covers different future images and therefore different transition trajectories. To determine the feasibility of these trajectories we study technology specific innovation systems. This is an important difference with traditional innovation system studies that often study systems at a national level. The advantage of using technological systems is that these may explain differences in technology specific development and implementation rates.

By studying the dynamics of the technology specific innovation system over time we aim to create insight in the barriers and drivers of these transition trajectories. Next to this case oriented output, the project will deepen the theoretical notions regarding technology specific innovation systems in order to make a sound mapping of these systems possible. The most important goals of this project can be summarized as follows:

- How can we map the main characteristics and performance indicators of technological systems?
- What can we learn about the feasibility of transition trajectories towards a sustainable transport - energy chains when we have insight in the strength's and weaknesses of technology specific innovation systems?