Jari Kaivo-oja
Finland Futures Research Centre

Objectives of the study

The primary aim of the FINSKEN is to develop state-of-the-art scenarios of changes in environmental and related factors that may be of importance for natural ecosystems, the national economy and human health and welfare in Finland in the future, along with information on their uncertainties.

The role of Finland Futures Research Centre in the research project is to interpret SRES marker scenarios for Finland using various modelling methodologies as well as expert team evaluations. Multiple scenarios allow for multiple assumptions about the future, including potential changes in the structure of the relationships among the critical components of the national socio-economic system. Thus, multiple scenarios allow also decision makers to formulate climate change strategies and test them in alternative future environments. Scenarios provide a framework for identifying variables to be monitored in order to provide early warning system of potential climate change impacts, and they also serve as a guide for the developing contingency plans.

The main task of the FINSKEN research project is to present and analyse future projections of Finnish population and economic development, as well as to apply technological and social foresight studies of land use and land cover changes. In the study different scenarios are provided to incorporate a diverse array of factors including economic, demografic and technological elements. One of the major challenges of the study is to make explicit the correlations between these fundamental systemic elements (economic activity, demografic structure and land use). Naturally, a lot of attention is paid to the future oriented analysis of the community infrastructure development and the changing role of different economic sectors. Special task of Finland Futures Centre are to:

- Interpret internationally agreed global scenarios of the socio-eonomic and demographic driving factors of environmental change up to 2100 at national scale in Finland;
- Develop mutually consistent scenarios of many of the environmental factors, with reference to the driving factors, using models and expert judgement and accounting for the key uncertainties;
- Provide new theoretical perspectives to socio-economic modelling work in the context of a long-run climate change analysis;
- Present socio-economic scenarios for Finland using IPCC framework as a general framework;
- Develop a new evaluation model for socio-economic snenario analysis
- Utilise relevant backround knowledge in the IPCC scenario analysis (political, economic, technological, social and eclological factors)
- Try to solve propblematic consistency problems; and
- Connect experts' policy statements to Finnish climate change policy discussion.

Achievements

The research work done in Finland Futures Research Centre is connected to long run scenario analysis. In the research activities both theoretical and empirical analyses have been done. The main research effort in empirical field has focused on data collection and sectoral macroeconomic accounting model development. In the field of theoretical analyses research has focused on:

- Theoretical scenario approaches (especially Total Environmental Stress (TES) approach),
- climate change policy analysis in international contexts (European Union, Nordic countries),
- comparative empirical energy sector analysis, and
- Integrated Assessment tools.

At current stage of research modelling work is reaching the level where alternative scenarios can be produced. Some extra modelling work is still needed in the field of long run demographic and population scenarios and in the field of technological development scenarios. During the spring 2001 first round SPRES marker scenarios will be available.

The project has done some publishing work. The list of publications is the following.

Publications in 1999-2000

Vehmas, Jarmo, Luukkanen, Jyrki & Kaivo-oja, Jari (1999) Kansainvälisen ilmastopolitiikan muotoutuminen ja Suomi. Ulkopolitiikka. Vsk. 36. No. 1, 5-21.

Kaivo-oja, Jari (1999) Alternative Scenarios of Social Development: Is Analytical Sustainability Policy Analysis Possible? How? Sustainable Development. Vol. 7, No. 3, pp. 140-150.

Kaivo-oja, Jari (1999) Analytical Sustainability Policy: Theoretical Views. A seminar paper presented at the International Centre for Integrative Studies at the University of Maastricht. 2nd September 1999. Summer course "Puzzle-solving for policy" on Integrated Assessment in co-operation with European Commission. 25 pages.

Malaska, Pentti & Kaivo-oja, Jari & Luukkanen, Jyrki (1999) Sustainability and Economic Growth: A Theoretical Framework and Empirical Demonstrations. Futu-publication 4/99. Finland Futures Research Centre. Turku School of Economics and Business Administration.

Kaivo-oja, Jari (2000) Integroitu sosio-ekonomisten ja ekologisten vaikutusten arviointi alue- ja yhteiskuntasuunnittelun haasteena. Teoksessa Sami Kurki, Reija Linnamaa & Markku Sotarauta (toim.) 14 näkökulmaa alueelliseen kehittämiseen. Seinäjoen I aluekehittämissminaarin julkaisu. Tampereen yliopisto. Alueellisen kehittämisen tutkimusyksikkö. SENTE-julkaisuja 5/2000, Tampereen yliopistopaino, Tampere, s. 116-139.

Hoffrén, Jukka, Luukkanen, Jyrki & Kaivo-oja, Jari (2001) Decomposition Analyses of Material Flows: The Case of Finland 1960-1996. Forthcoming in Journal of Industrial Ecology. ©MIT Press.

Malaska, Pentti, Luukkanen, Jyrki & Kaivo-oja, Jari (2001) A New Sustainability Evaluation Framework and Alternative Analytical Scenarios of National Economies. Forthcoming in Population and Environment. Journal of Interdisciplinary Studies. ©Kluwer Academic Publishers

Luukkanen, Jyrki, Kaivo-oja, Jari, Vehmas, Jarmo & Tirkkonen, Juhani (2000) Challenges of Climate Change and Emission Trade Policies in the European Union: Trend Extrapolations and Decomposition Analyses. A Contributing Paper. Second EFIEA Climate Policy Workshop 'From Kyoto to The Hague - European perspectives on making the Kyoto Protocol work', Amsterdam, 18-19 April, 2000.

Luukkanen, Jyrki, Kaivo-oja, Jari, Vehmas, Jarmo & Tirkkonen, Juhani (2000) Climate change policy options for the European Union: Analyse of Emission Trends and CO2 efficiency. TUTU-publications 1/2000. Finland Futures Research Centre. Turku School of Economics and Business Administration. Turku. 49 p.

Malaska, Pentti, Luukkanen, Jyrki & Kaivo-oja, Jari (2000) A New Sustainability Evaluation Framework and Alternative Analytical Scenarios of National Economies. A paper presented at ESEE 2000 Conference. Transitions Towards a Sustainable Europe Ecology - Economy - Policy. 3rd Biennial Conference of the European Society for Ecological Economics. Vienna, 3. - 6. May 2000. Session Ib3. Theme: Ecological Economics Modeling and Material and Energy Flows. 19 p.

Kaivo-oja, Jari (2000) Thinking of Our Moral Responsibility to Future Generations. Economic Perpectives to Equity Problems in Climate Change Policy. In Haukkala, Ville (Ed.) Every Human has an Equal Right…? Equity Problems and Climate Policy and Politics. University of Tampere. Department of Regional Studies and Environmental Policy. Environmental Policy Publications 1. Tampere, pp. 35-71.

Malaska, Pentti & Kaivo-oja, Jari & Luukkanen, Jyrki (2001) Advanced Sustainability Analysis. Forthcoming in Perspectives and Overview of Life Support Systems and Sustainable Development. Encyclopedia of Life Supporting Systems. UNESCO. EOLSS Forerunner Volume. EOLSS Publishers Co. Oxford, UK. 45 p.

Kaivo-oja, Jari (2000) Challenges of Visionary Management in Multilevel Planning Environment: How Murphy's Laws May Emerge in Global Sustainability Policy? *A* paper at the Methodology Seminar the Quest for the Futures 2000, in Turku, Finland. June 13-15, Finland Futures Research Centre. Organised by World Futures Studies Federation in co-operation with the Finnish Society for Futures Studies and the Finland Futures Academy, Turku, Finland. 23 p. Forthcoming in the Conference Proceedings.

Luukkanen, Jyrki & Kaivo-oja, Jari (2000) Comparison of Nordic Energy and CO_2 Efficiency Dynamics in the Years 1960-1997. Submitted.

Luukkanen, Jyrki & Kaivo-oja, Jari (2000) HILMA-long run accounting model for socio-economic scenarios. Version 3. CD-ROM.

Jari Kaivo-oja & Jyrki Luukkanen (2000) Domestic Emission Trading and Liberalized Electricity Markets: How to meet the Challenges of Future? A manuscript submitted a book editor.

Luukkanen, Jyrki, Kaivo-oja, Jari et al (2000) Domestic Actions or Flex Mex to Meet European Climate Target? A manuscript of a book. University of Tampere. Department of Regional Studies and Environmental Policy. Tampere. Forthcoming in 2001. 105 p.

Rough timetable

Time	**Research activities**
Spring 2001	Emprical modelling work and SRES marker scenarios Research report writing Article writing Bechmarking with other analyses
Summer 2001	Detailed SRES scenario analyses Bechmarking with other climate scenario and socio-economic analyses Research report writing Article writing Nordic scenarios workshop in Turku, June 2001 International co-operation with other scenario modellers and experts: TERRA2000 and Ecostat -research teams Scientific co-operation meetings with Marjolein von Asselt, Barry Hughes etc.
Autumn 2001	Expert checkings of the modelling work Expert meetings Article writing Research report writing Comparisons of scenarios/climate change policies Bechmarking with other climate scenario and socio-economic analyses
Year 2002	Article writing together with FINSKEN research team members Dissemination of results Final report International projects in the field (TERRA2000, Ecostat etc.)