

Energy Perspectives and CO₂-Mitigation-Potentials in Switzerland up to 2010

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9) Funding source(s):

- ETH internal grant
- Industry
- Own resources of the professorship

10) Partner organizations:

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11) Short Summary: To reach the targets of the Swiss CO₂ Act, energy efficiency contribute about 75%, renewable energies and natural gas 25%, as the bottom-up and the diffusion models show. Substantial policy measures are needed, but it is shown that additional costs are compensated by additional benefits.

12) Keywords: Econometry, Energy Economics, Energy Technology, Environmental Management, Environmental Policy and Decision Making, Model Creation and Simulation

13) Project description:

The research project Energy Perspectives and CO₂-mitigation-Potentials in Switzerland up to 2010 aims, on the one hand, at the techno-economic and environmental examination of the contribution of natural gas use in Switzerland for the achievement of the CO₂ mitigation target stipulated in the Swiss CO₂ Act 2000. On the other hand the possibilities to reduce the oil dependency of Switzerland and the impacts of electricity and gas liberalisation are going to be analysed. The project is divided into two phases. Phase 1 lasted from April 2001 to February 2002, while phase 2 is scheduled for March to November 2002. In phase 1 a reference scenario was developed as an exploratory projection to assess the evolution of the GHG emissions without any specific climate change policy. The development of the scenario was based on estimations of the drivers for energy demand in the residential sector, industry, services and farming, transportation, non-energetic consumption, and the conversion sector (sectoral modelling), of the substitution between the different energy sources, and of the development of cogeneration in the context of the liberalised European electricity sector. This scenario results in a reduction of CO₂ emissions until 2010 by 0.8% in comparison with 1999; a large part of this stagnation is due to an increase in the use of natural gas, but also a more efficient energy use. The results show that the targets of the Swiss CO₂ Act 2000 (reduction of CO₂ emissions by 10% until 2010, as compared to the reference year 1990) or of the Kyoto Protocol (reduction of greenhouse gas emissions by 8% until 2010, as compared to the reference year 1990), respectively, will be clearly missed without substantial additional policy measures. The aim

of phase 2 is to develop and evaluate two alternative policy scenarios to reach the target set by the CO2 Act 2000 or by the Kyoto Protocol. Policy measures to be included are stronger promotion of natural gas and renewables, and the enhancement of energy efficiency. The scenarios are compared to the reference scenario using economic and environmental criteria. The economic assessment is based on macroeconomic studies already used in related research projects. The ecological evaluation is conducted with life cycle analysis for the most important greenhouse gas emissions occurring in the production, transport, and distribution of energy (including indirect emissions resulting of energy imports).

To reach the targets of the Swiss CO2 Act, energy efficiency contribute about 75%, renewable energies and natural gas 25%, as the bottom-up and the diffusion models show. Substantial policy measures are needed, but it is shown that additional costs are compensated by additional benefits.

14) Popular description: no entry

15) Graphics: no entry

16) Publications:

- Jakob, M. 2004-03-05. Entwicklung des Erdgasabsatzes zwischen 1990 und 2010 und Perspektiven bis 2010 - Auswertung von zwei Umfragen bei Schweizerischen Gasversorgungsunternehmen, Dokumentierender Arbeitsbericht der empirischen Erhebungen. CEPE.

- Jochem, E., Aebischer, B., Bahn, O., Catenazzi, G., Frischknecht, R., Gutzwiller, L., Heck, T., Hirschberg, S., Jakob, M., Kypreos, S., Lienin, S., Madlener, R., Schwarz, J., Wickart, M. 2003. CO2 Reduktionspotential Erdgas, Projektphase 2: Nachhaltigkeitsszenarien. Schlussbericht. Studie im Auftrag der Schweizer Gaswirtschaft, CEPE / PSI / ESU services / schwarz&partners, Zurich / Villigen / Uster, 238.

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- Jochem, E.; et. al.; Jakob, M. 2003-01-01. Perspectives en matière d'énergie d'ici à l'an 2010, Potentiels de réduction des émissions de CO2 du système énergétique en Suisse. ETH, Zurich.

- Jochem, E.; Jakob, M. 2003-01-01. Energieperspektiven bis 2010, CO2-Reduktionspotentiale des Energiesystems in der Schweiz. GWA, Schweizerischer Verein des Gas- und Wasserfaches, (9), Zürich, 665-677.

- Madlener, R., Jakob, M. 2003. Perspectives for the Diffusion of Natural Gas, Renewable Energies and Energy Efficiency in a CO2 Mitigation Framework, The Case of Switzerland up to 2010. Proceedings of the 26th Annual Conference of the International Association for Energy Economics (IAEE) §New Challenges for Energy Decision Makers, 4-7 June 2003, Prague/Czech Republic, International Association for Energy Economics (IAEE).

17) Links to important web pages:

- <http://www.cepe.ethz.ch>