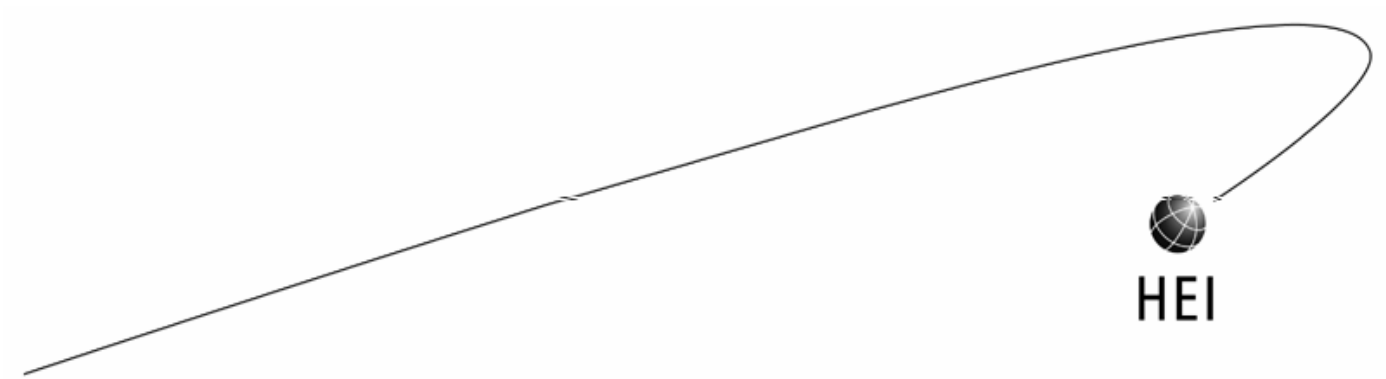
Political Social and Economic Boundary Conditions for the Enactment of Measures to Improve Energy Efficiency: Under Which Circumstances can Switzerland Go at it Alone?

Urs Luterbacher IUHEI



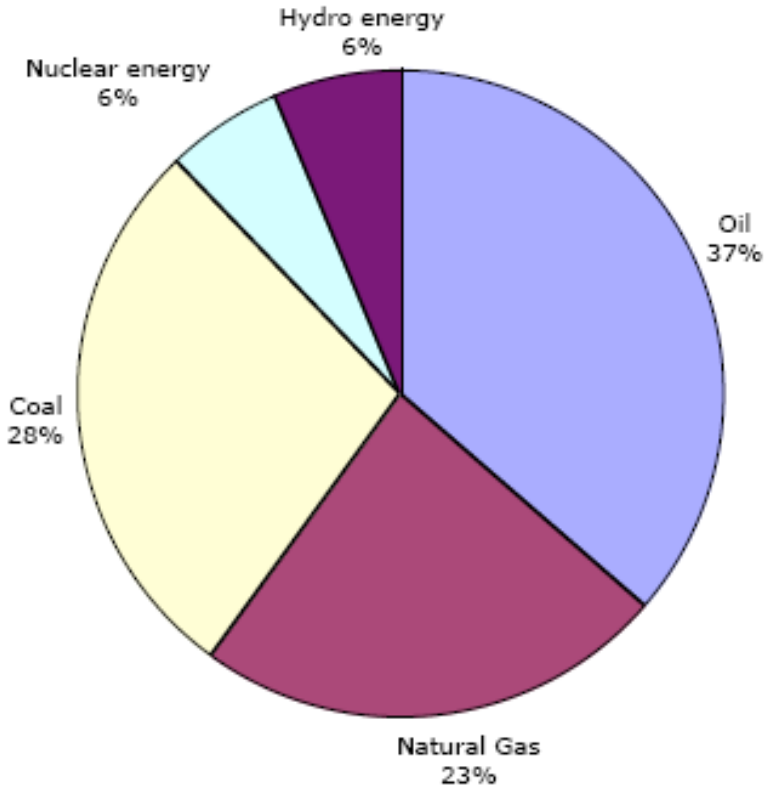
Basic Trends and Their Significance

- The recent hike in oil and gas prices combined with the publication of a relatively alarming report by the IPCC about the increasing reality of climate change and the release by the British government of the Stern Review have once again put the question of energy production, conservation, and efficiency in its use at the center of the public debate
- According to a statistical review of energy done by BP, energy consumption for the year 2005 amounted to 11’000 million tons of oil equivalent (TOE), which represents about 4.7 1020 joules (or 440 quads). Over 85% of this energy comes from fossil fuels

This Tendency Illustrates a Current Increase in Greenhouse Gas Emissions

- A more rapid increase in greenhouse gas emissions in the current decade than in the 1990's is observed
- In 2006 alone CO2 concentrations in the atmosphere have risen by 2 ppms (from 388 to 390)
- The growth in energy consumption is likely to continue and to increase
- Equalizing energy usage per capita throughout the world will greatly increase demand

Distribution



Worldwide primary energy use by source

Energy Consumption World Wide

- Energy consumption has risen exponentially since the industrial revolution 250 years ago and it continues to rise today.
- World energy use grew by 2.7% during 2005.
- This increase is mainly due to a rise in oil consumption of 1.7%, a rise in natural gas of 2.4% and a rise in coal consumption of 5%
- This latter figure is particularly alarming because it signals a shift from oil and gas to coal because of its lower relative price and great availability in particular in emerging countries such as India and China.

Energy Use and Externalities

- Energy use in and of itself is not necessarily a problem
- What matter are the negative externalities that energy production and use generate
- Climate change stands out as an example of a particularly worrying negative externality of energy use: Stern in his review calls it a "gigantic market failure"

However, this does not mean that energy and climate change issues are identical

- Fighting global warming can be achieved in part without drastic increases in energy efficiency and achieving greater energy efficiency does not necessarily help in reducing greenhouse gases
- What has to be achieved is mostly a substitution of energy use that generates considerable quantities of greenhouse gases by an energy use that produces little or no greenhouse gases

Energy Efficiency and Negative Externalities

- Striving for energy efficiency for its own sake makes little sense and may prove to be a costly and low rewarding enterprise
- A market economy should achieve optimal efficiency in terms of input use into its productive processes. Firms, but also households, have no incentive to waste resources or to manage them inefficiently
- Efficient energy use should therefore be a "natural" consequence of an efficient market

When does such an efficient market not work?

- Access to a crucial resource is essentially open and free and thus its scarcity value representing its correct cost of usage is not taken into account in economic processes. E.G. the atmosphere, whose use is mostly free and open, thus the market failure evoked by Stern
- The negative externalities generated by the use of the resource are not incorporated in its price which means that its true cost is not included in its market value
- Markets are not efficient because they are not allowed to function properly: Monopoly, State Regulation, Closed economies (e.g. excessive border tax adjustments)

Corrective Measures

- Corrective policies should therefore not be centered upon energy per se but on these aspects
- Corrective measures should always be politically feasible and in the international arena not unilateral
- Unilateral measures such as border tax adjustments may disrupt an existing international order with little gain especially for a small country

International Considerations

- The international community has elaborated a relatively intricate network of institutions to deal with energy climate change and trade issues
- It is important that these continue their work without disruptions

International Climate Agreements

- Policy measures to deal with climate impacts are addressed within the United Nations Framework Convention on Climate Change (UNFCCC) (1992) and then turned into binding commitments through the Kyoto Protocol in 1997
- The UNFCCC only obliges countries to report on their greenhouse gas emissions and to recommend that parties develop climate change policies that, for industrialized countries, would lead to a stabilization of emissions to their 1990 levels by 2012

Climate change agreements

- The Kyoto Protocol rests upon a dual foundation for climate change mitigation policies:
  - Legally binding reduction targets of greenhouse gases (six gases are enumerated in the KP) for each industrial country or country grouping (such as the EU) with respect to their 1990 levels by the end of the first time period 2008-2012
  - The use of "flexible mechanisms" to achieve this goal. These can take the form of emission reduction, trading, and joint implementation of these between industrialized countries. More important, reductions can be achieved through the Clean Development Mechanism (CDM) incorporating developing countries

Working out Kyoto

- Developing countries can be incorporated into the Kyoto reduction process even before they are part of a reduction agreement
- The flexible mechanisms also define the only explicit exclusionary principle contained in the KP: the prohibition of non-members or firms from non-member countries from participating (e.g. the US)

Kyoto: Success or Failure

- An important and crucial aspect of the development of Kyoto will be determined by the success or failure of the emission reduction trading market set up by the EU Commission, and when the organization of the CDM market will be complete and linked to the EU market (For the moment Kyoto is working!)
- From an efficiency of climate policies point of view, a large degree of participation by most countries in the World is highly desirable. Any action resulting in more (rather than fewer) inclusions is thus greatly beneficial.
- It is better, as demonstrated in the works of several authors (Nordhaus, Schmalensee, Barrett) to have a shallower accord that everybody follows rather than a very narrow one observed scrupulously by a few

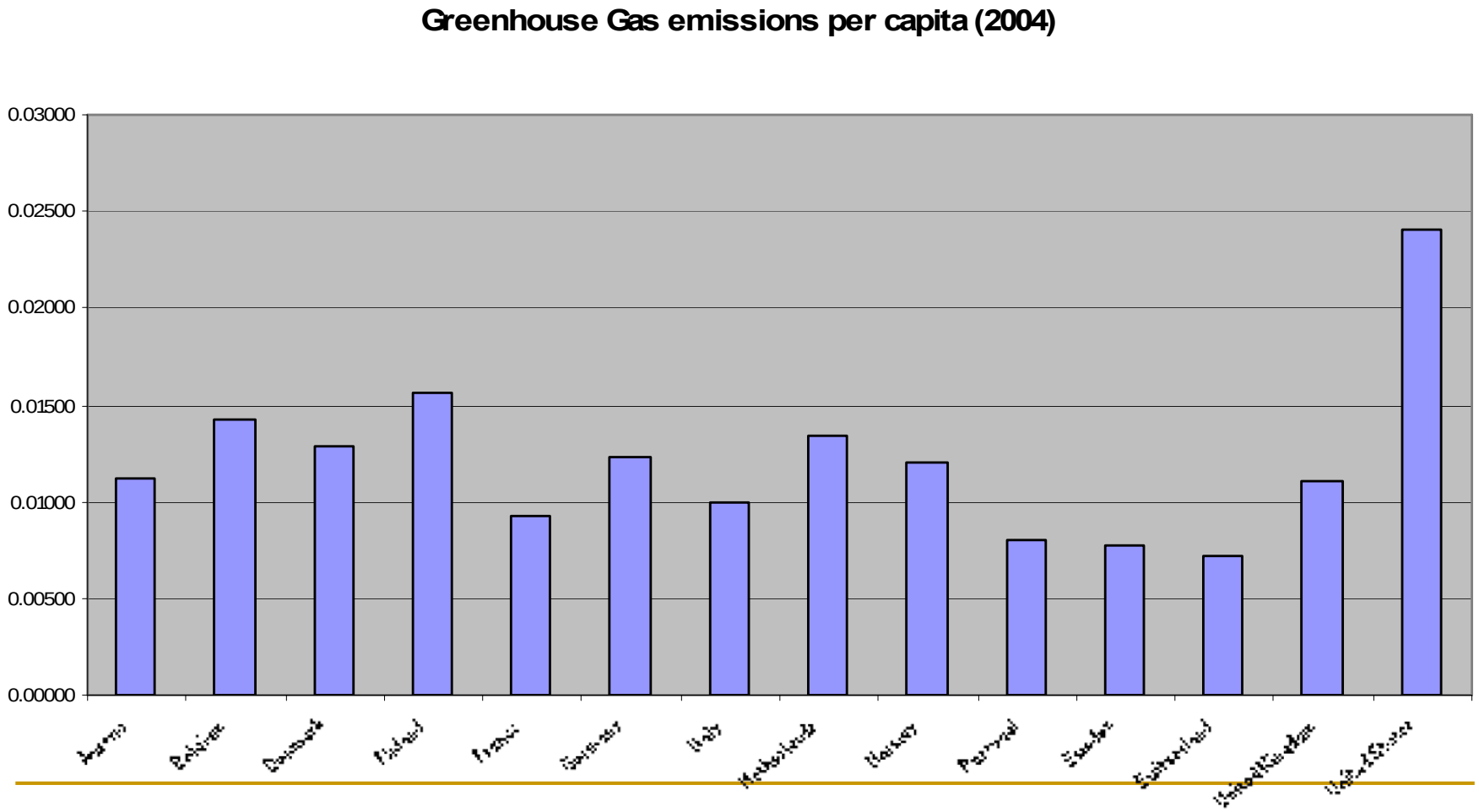
International Role For Switzerland

- Climate change will not be solved by Swiss Energy Policy
- An important international role for Switzerland would be to contribute massively to the Kyoto inclusionary process as it quite clearly represents the most efficient way to fight climate change

Switzerland's Position

- Switzerland, like the EU as a whole, was assigned a – 8% reduction target
- The EU (15) is a "bubble" where the reduction target is distributed in terms of differentiated sub-targets to the member countries:
  - E.G. France has a 0% reduction target and Sweden is allowed to increase its greenhouse gas emissions by 4%

Switzerland is one of the lowest per capita greenhouse gas emitters is the industrial world



Obvious conclusions

- Given its low level of present per capita emissions, any further reductions in emissions for Switzerland will be extremely costly to achieve domestically
- This relatively low level is largely realized through the present Swiss energy mix and especially the current almost completely “decarbonized” nature of its electricity production based on nuclear and hydroelectric plants.
- Any plan to “recarbonize” Swiss electricity is bound to make a reduction strategy even more complicated

Future Perspectives

- It appears in fact desirable to increase rather than decrease future decarbonized electricity production since an efficient climate change policy will result in part in the progressive substitution of energy from fossil fuels by energy from sources that produce little or no greenhouse gases (other substitution effects are also present up to a point)
- It will be desirable in the future to preserve as much decarbonized electricity as possible for the substitution tasks outlined above. However, such measures will best be achieved if, on the one hand, the Swiss electricity market gets decartelized and that such liberalization is accompanied by government requirements of strong domestic reserve capabilities in order to avoid excessive price volatility
- The present electricity production mix should not only be preserved but allowed to expand (this might be difficult in the short run)

Further reflections on Swiss Policies

- Switzerland will always have trouble meeting its reduction targets domestically and will have to engage in reductions abroad by joining international reduction certificate markets
- Such a strategy is not only convenient but also desirable
- It is regrettable that the current Swiss climate change legislation makes not only connections with international certificate markets difficult to realize but fails to take full advantage of the possibilities of the Kyoto Protocol: e. g. Agriculture 1.2% of GDP 11% of emissions→ Further Liberalization

Swiss Energy Scenarios

- These scenarios are relatively opaque in terms of their assumptions and objectives (there is no rationale given for the reduction targets for the country, why the same as EU?)
- They contain an allusion to the inclusion of Switzerland in an international certificate market without a full scale study of how this policy would work out domestically
- They also fail to explicitly present all the possible substitution effects between the various forms of energy
- What is the goal of the energy policy? Is it a goal in itself or are mostly externalities targeted?

Even so these scenarios confirm the following

- Purely domestic reductions of greenhouse gas emissions are extremely costly
- Strong reduction scenarios require heavy forms of taxation, which, initially, can be close to 5% of GDP (the Stern Review with drastic assumptions estimates the costs of climate mitigation, if undertaken quickly, at 1% of GDP or less
- Isolationism is costly as the difference between international trading and purely domestic measures can multiply costs tenfold

Isolationism is sometimes justified by a push for innovation

- This argument as shown by Dasgupta and Heal is not necessarily valid
- The market for information is not perfect
- Scale effects are important, they are lacking for Switzerland

General Conclusions

- Policies to enhance participation of most countries are more effective than domestic reduction policies.
- The structure of the Swiss economy and its energy mix require a large international involvement in the form of participation in a European and world reduction certificate market. Participation in the EU trading system would be a first step in the right direction.
- This would require the abandonment of current public and private taxation schemes (centime climatique).
- A full use of all the possibilities provided by the Kyoto Protocol is desirable.
- Energy and climate "Alleingang" policies are possible but prohibitively costly
- A greater coordination with EU energy markets is desirable and ultimately profitable to the Swiss economy (e.g. full participation in a European electricity market with strong reserve capacity requirements).