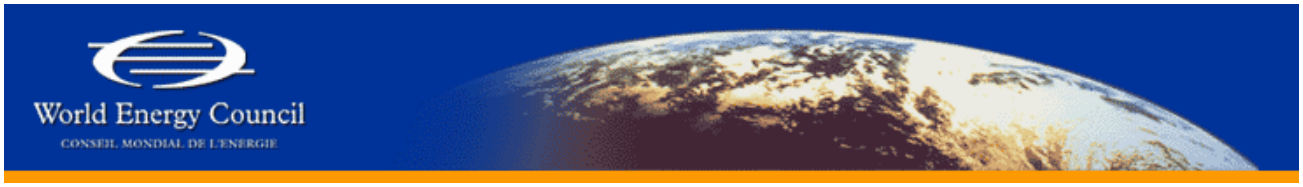

ENERGY and CLIMATE CHANGE
Study 2005 – 2007

Policy Report SWITZERLAND

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1 INTRODUCTION

The aim of this report is to summarise the main elements that characterize current energy and climate change mitigation policies in Switzerland.

A characteristic feature of Switzerland, playing a role also in energy and climate policy-making, is the direct democracy with the right of referendum and the influence of the citizens on local, cantonal and federal policies. In this decentralised and relatively slow policy-making framework, the cantons elaborate their own energy policies (e.g. regarding the promotion of renewables or energy efficiency) whenever legislation does not specifically transfer the competence to the federal government. The latter is the case for nuclear power, energy issues related to transport, and CO_2 policy-making.

Despite the fact that Switzerland plays an important role in the international energy research arena in a number of disciplines, thanks mainly to the Swiss Federal Institutes of Technology (ETH Domain), a number of top universities, and private research institutions, it has nevertheless struggled in several areas to gain and maintain a competitive edge and to put effective and efficient energy and climate policies in place. A major reason lies in the slow and often cumbersome political system, which is strongly influenced by the country's federalist structure. In particular, in many cases the 26 cantons have imposed their own policies and regulation, often partially complementing federal policies and regulation, so that existing support programmes are often quite heterogeneous. However, a detailed account of this heterogeneity must be beyond the scope of this overview report.

2 LEGAL FRAMEWORK AND GLOBAL TARGETS

2.1 Kyoto Protocol

Switzerland is one of the early signatory countries of the Kyoto Protocol, which entered into force on 6 February 2005. On 23 March 2005, the Swiss Federal Council announced that the obligation of Switzerland under the Kyoto Protocol (-8% of GHG emissions by 2008/12, relative to 1990) has to be met by a combination of targeted policy measures:

- Introduction of a CO_2 levy on fossil fuels for stationary use (35 CHF[2] per tonne of CO_2), as foreseen in the CO_2 Act 2000 (see section 2.2 below);
- Provisional introduction of a climate centime ("Klimarappen") on fossil motor fuels (cf. section 3.1). Here, the Federal Council declared that it wants to give this option – which was put forward by trade and industry representatives – a chance. If it does not have a sufficient impact by 2007, the Federal Council may introduce a CO_2 levy on fossil motor fuels, as foreseen in the CO_2 Act. Revenues from collecting the climate centime are to be invested cost-effectively in emissions trading and in climate change mitigation projects in other countries, while a certain portion is also to be used for suitable climate protection measures in Switzerland.

2.2 CO_2 Act (2000)

The Swiss CO_2 Act entered into force on 1 May 2000. It stipulates that by 2010 the emissions of CO_2 must be reduced to 10% below the 1990 level. For fossil motor fuels the objective is a reduction of 8%, while for fossil fuels for stationary uses, a reduction of 15% is foreseen (CO_2 Act 2000).

[2] 1 Swiss Franc (1 CHF = 100 Rappen) equals about 0.66 Euros or 0.81 USD.

Measures to reduce CO_2 emissions include a consumption-dependent heavy duty vehicle tax ("verbrauchsabhängige Schwerverkehrsabgabe"), the Energy Law (Energiegesetz), and the Energy Programme and Action Plan "SwissEnergy" (see section 2.3 below). If it turns out that Switzerland is not on track to meet its Kyoto targets via the voluntary measures foreseen as part of the SwissEnergy Programme, then the CO_2 Act stipulates that a CO_2 levy of between 35-210 CHF/t CO_2 may be introduced (in 2004 at the earliest, which did not happen).

2.3 Energy Programme "SwissEnergy" („EnergieSchweiz")

SwissEnergy, an Energy Programme and Action Plan, was launched in 2001, succeeding the Programme "Energy2000" ("Energie2000") (cf. SFOE, 2001; 2003). The objectives of SwissEnergy are to reduce the consumption of fossil fuels, to slow down the growth of electricity demand, and to increase the contribution of renewables to energy supply (see section 3.5).

The specific targets of the SwissEnergy Programme and Action Plan are to:

- reduce consumption of fossil fuels by about 10%, compared to 1990;
- cap electricity demand growth at 5%, compared to 2000;
- increase the use of renewable energies in heat production by about 3,000 GWh (+3%);
- increase the use of renewable energies in electricity production by about 500 GWh (+1%).

The targets are to be reached by means of extensive co-operation with both the cantons and the private sector. The main elements of SwissEnergy are voluntary agreements; funding measures favouring energy conservation; promotion of renewables; dissemination of research information; and energy consumption standards for buildings, equipment, and vehicles.

Subordinated targets are: (1) building modernisation, (2) renewable energies, (3) energy-efficient devices and engines, (4) rational energy and waste heat use in economy, and (5) energy-efficient and low-emission mobility.

2.4 Other

Other energy laws and decrees worth mentioning are the Electricity Act (EleG) of 1902, the Energy Act (EnG) of 1999, the Energy Ordinance (EnV) of 1999, and the Nuclear Energy Act (KEG) of 2003 (see the reference list for publication details).

3 POLICY INSTRUMENTS

3.1 Climate Centime („Klimarappen")

The climate centime, a surcharge on motor fuels, was introduced on 1 Oct 2005. To begin with, the rate has been set at 1.5 Swiss cents per litre of petrol and diesel oil. At an estimated rate of between 1.3 and 1.9 Swiss centimes per litre of petrol and diesel oil, the Foundation "Klimarappen" will have a yearly budget of around 100 million Swiss Francs at its disposal, which will be used for funding effective (in terms of greenhouse gas mitigation) energy projects in Switzerland and for purchasing CO_2 emissions permits abroad. While the Foundation may select projects at its own discretion, these must complement existing projects of SwissEnergy and of the cantons in an optimal manner. The purchase of international CO_2 emissions permits from abroad is, in accordance with the subsidiarity principles of the Kyoto Protocol, restricted at a yearly maximum of 1.6 million tonnes of CO_2. As a consequence, the Foundation must achieve a reduction of at least 0.2 million t of CO_2 through domestic greenhouse gas mitigation projects.

3.2 CO_2 Levy

At the moment a CO_2 levy of CHF 35 per tonne of CO_2 emitted by fossil fuels for stationary use (e.g. heating oil, natural gas) is discussed in parliament, which is equivalent to approx. 0.09 CHF per litre of heating oil extra-light.

3.3 GHG Emission Certificate Trading

Trading of GHG emission certificates creates the basis for a free market economy to reduce CO_2 emissions in a cost-effective manner. By mid-2006, a national register will be established for keeping track of transactions and emissions credits. It will enable Switzerland to participate in international GHG emission certificate trading in the future.

3.4 MINERGIE® Label for buildings

The MINERGIE® standard is a quality label for new and refurbished buildings. This registered trade mark is mutually supported by the Swiss Confederation and the Swiss cantons, along with trade and industry. It has been registered to prevent misuse.

Comfort of the users living or working in buildings is the central theme. This level of comfort is made possible by high-grade building envelopes and the systematic renewal of air. Specific energy consumption is used as the main indicator to quantify the required building quality. In this way, a reliable assessment can be assured. Only the final energy consumed is relevant.

The MINERGIE-P® standard, introduced in February 2003, is the passive energy house standard of the MINERGIE® family of labels. Still being a niche product of MINERGIE®, it requires an independent building concept that is orientated at a very low energy use. High demands on comfort, serviceability and aesthetics are further characteristics. Strong requirements have to be met in the following areas: (1) specific warmth and heat capacity demand; (2) weighted energy index; (3) airproof level of the building envelope; and (4) energy efficiency of household appliances.

By 2006, a total of 5,493 Swiss buildings fulfilled the MINERGIE® and 72 the MINERGIE-P® standard. The total heated floor space of MINERGIE-certified buildings amounts to more than 4,890,000 m^2.

3.5 Green Power Label “naturemade”

The certified green power label *naturemade* has the backing of the VUE, a Swiss association established to promote environment-friendly electricity, which enjoys support on a uniquely broad scale. The association’s advisory board consists of representatives from environmental organisations, renewable energy associations, the Swiss Association for Water Management (SWV), electricity producers, distributors and suppliers, as well as bulk power users.

The *naturemade* label recognises two distinct qualities of green electricity: *naturemade basic*, which stands for electricity from renewable sources, and *naturemade star*, which is a designation reserved for green power whose superior ecological status is tied to the fulfilment of several highly ambitious criteria.

Consumers choosing to use *naturemade* electricity automatically increase the amount of electricity certified with the label *naturemade star*, generated in Switzerland from the sun, wind, biomass, or hydropower.

The *naturemade* label is composed of different elements, taken from both quality and environmental management. According to an independent study by the Swiss Agency for Efficient Energy Use, the *naturemade* star seal meets the highest ecological requirements:

- It satisfies clear, scientifically defined criteria for an ecologically superior product, particularly in the case of hydro power;
- It is based on a transparent, rigorously tested supply model;
- It enjoys high-level credibility because it has such wide support and involves a two-stage certification process (an audit by an accredited certification institute, together with the issuance of the label by the VUE);
- It guarantees coherence between production and sales through certification at both producer and supplier levels.

3.6 Label "Energy City" („Energiestadt")

Cities and communities, irrespective of their size, may receive the label "Energiestadt", if they decide to implement selected energy policy measures in a broad process. This label is a document of achievement of a consequent und target-oriented energy policy. It is awarded by an independent commission.

The most important issues are:

- Development planning and land use regulation
- Community buildings and constructions
- Supply and disposal
- Mobility
- Internal organisation
- Communication and co-operation

For achieving the label "Energiestadt", cities must have realised at least 50% of the measures deemed feasible.

Today, some 2.2 million inhabitants of Switzerland live in 128 EnergyTowns (29.2% of the Swiss population of 7.4 million).

3.7 "Energy Label" ("EnergieEtikette") for appliances

The Energy Label, aiming at reducing energy consumption levels, has been adopted from the European Union and is granted for certain electrical devices and passenger cars. Specifically, since 1 January 2002 energy consumption and further characteristics of a variety of electrical household appliances that are being offered in Switzerland have to be declared with the Energy Label. Particularly, the label currently applies to (1) fridges and freezers, (2) washing machines and dryers, (3) dishwashers, (4) ovens, and (5) lamps. Moreover, there is an Energy Label for cars, by means of which potential buyers of new passenger cars receive information about energy efficiency and CO_2 output. This energy declaration increases transparency and gives consumers the possibility to compare different vehicles on the basis of energy criteria. The Swiss Energy Label ordinance was put into force on 1 October 2002.

3.8 Energy Agency of the Economy ("Energie-Agentur der Wirtschaft")

In 1999, various alliances of the Swiss economy founded the service platform "Energie-Agentur der Wirtschaft". It stands for collaboration in partnership between state and economy to attain the set energy and climate policy goals. Furthermore, it supports its members in implementing the CO_2 Act, and in particular to fulfil the voluntary agreements.

3.9 Energho

Energho is a cornerstone of SwissEnergy. It aims to save 10% of the energy use in public buildings with high energy consumption within 10 years. Furthermore, on the basis of a performance-related financing system, it offers several services that utilise the major findings of the energy policy programme “Energy2000”. Finally, it unites policy-makers contributing to energy saving in public buildings with high energy consumption at the level of the Federation, the Cantons, and the local authorities.

3.10 ETH Vision “2000 Watt Society” (“2000-Watt-Gesellschaft”)

In 1998, The ETH Council (ETH-Rat) has started promoting the vision of a 2000 Watt per Capita Society as a sustainable development pathway that could possibly be achieved from a purely technological viewpoint by the middle of the 21st century (Jochem, 2004). A yearly energy demand of 2000 Watt per capita corresponds to 65 GJ per capita and annum, which is one third of today’s per capita primary energy use in Europe, and an annual emission of greenhouse gases of one tonne per capita. Assuming a growth of GDP (gross domestic production) per capita of two third within the next 50 years, the 2000 Watt per Capita Society implies improving primary energy use by a factor of four or five, admitting some influence of structural change in less energy intensive industries and consumption patters. The vision of a 2000 Watt Society poses a tremendous challenge for R&D to improve energy and material efficiency. It is obvious that completely new technologies and supporting organisational and entrepreneurial innovations are needed to achieve this goal. It is assumed that in industrialised countries the 2000 Watt Society can be realised by means of technical measures without any need to abandon, or sacrifice, current lifestyles.

3.11 Tax Break for Environmentally Benign Fuels

A tax break for environmentally sound fuels will probably be introduced by 2007.

Finally, it should be noted that in the past the effectiveness of a number of energy policies have been evaluated either on a regular (e.g. bi-annually) or irregular (ad hoc) basis. Moreover, since cantonal energy policies sometimes differ substantially, there exist a number of comparative surveys in which the main features and differences are summarized. Finally, the so-called **“Energy Tables” (“Energietische”)** ought to be mentioned. At roundtable meetings stakeholders form local learning networks, where they can exchange ideas, views and experiences regarding the implementation of energy efficiency measures. The success of these roundtables has received considerable attention and is by many experts considered a very effective policy instrument.

4 ENERGY R&D

4.1 Energy R&D Programs

Energy R&D in Switzerland has two long-term and two short-term objectives. The government’s long-term objectives are to reduce CO_2 emissions to one tonne per capita in 50 years and to reduce total primary energy supply (TPES) from 4,800 W to 2,000 W per capita. The short-term objectives are to reduce the environmental burden from energy production, transformation and use (without quantitative targets) and to increase technical and economic efficiency using publicly acceptable technologies. One of the main objectives of Swiss energy R&D is to achieve sustainable development through significant reductions of CO_2 emissions.

The SFOE, advised by the Federal Commission for Energy Research (CORE), is responsible for periodical updating of the concept and its implementation, and for ensuring that results find practical applications. National energy research conferences are held every three to four years, in order to bring together industry leaders, representatives of the cantonal and federal agencies, politicians and energy experts for reviewing national priorities, and for recommending corrections deemed necessary. To achieve the objectives, the publicly funded programs concentrate on applied R&D as well as pilot and demonstration projects in four priority research areas, namely: (1) rational use of energy; (2) renewable energy sources; (3) nuclear energy; and (4) energy policies and economics (SFOE, 2004a; 2004b).

4.2 Energy R&D Budgets

From 1992 through 2000, publicly funded energy R&D decreased steadily and significantly by about 30%. In 2001, funding slightly increased again. The government spent 20% of its R&D budget on pilot and demonstration projects, and 20% on basic (i.e. long-range) research. Both the public and private sectors fund energy R&D. In 2001, public sector funding amounted to CHF 173 million and private sector funding to 725 million, adding up to a total of CHF 898 million. Despite declining energy R&D budgets in absolute terms, the Swiss energy R&D budgets remained relatively high when compared to GDP. In 2001, Switzerland ranked second among IEA member countries in total energy R&D and first in non-nuclear energy R&D (IEA, 2003; 2004).[3]

Notwithstanding the ongoing tense financial position of the confederacy, the continuous decline since 1992 could be stopped in 2001. For 2007, an increase in the public sector funded R&D by about 20% to CHF 213 million in real terms (2001 prices) is planned. This suits an annual rise of 3-4%, as required in the Federal Declaration on Energy R&D 2004–2007.

The following table shows the allocation of the public sector R&D funds of 2001 (actual expenses) and 2007 (benchmark) in real terms (2001 prices) as an overview.

Table 1. Allocation of public sector funds for energy R&D and P&D in Switzerland, 2001

	2001 [mio CHF]		2007 [mio CHF]		Differerce [%]
	R&D	P&D	R&D	P&D	
Rational use of energy	40.5	14.2	53.0	22.0	+37.1
Renewable energy sources	38.5	13.9	59.0	22.0	+54.6
Nuclear energy	51.0	0.0	40.0	0.0	-21.6
Energy policies and economics	12.9	1.7	16.0	1.0	+16.4

Source: Konzept der Energieforschung des Bundes 2004–2007 http://www.bfe.admin.ch/themen/00519/00521/index.html?lang=de&dossier_id=00798,
Note: R&D = research and development, P&D = pilots and demonstrations objects

In the category “rational use of energy” the emphasis is put on buildings, combined heat and power generation (CHP), combustion processes, and electricity storage and transmission. In the category “Renewable energy sources” the emphasis is on solar energy and biomass. In 2007, solar energy will receive about two thirds of all funding for renewable energy sources, representing about 18% of the total of publicly funded energy R&D. Public funding for nuclear energy R&D budget is essentially split equally between nuclear fission research, which concentrates on ensuring the

[3] Publicly funded energy R&D is performed at many organisations. In 2001, approximately CHF 173 million went to the Paul Scherrer Institute (PSI) (28%), the Federal Institute of Technology Lausanne (EPFL) (22%), universities (17%), the Federal Institute of Technology Zurich (ETHZ) (9%), the Federal Research and Test Laboratory (EMPA) (2%), other federal and cantonal bodies (3%), and private-sector organisations (19%).

safety of operating power plants and waste disposal, and nuclear fusion research, searching for a long-term alternative energy source.

5 Policy Areas and 3A Assessment

In this section we briefly introduce the contribution of different energy sources to total energy production, existing policy targets and measures, as well as a very preliminary 3A assessment in the form of a star rating (ranging from one to five stars, one being the lowest grade).

5.1 Biomass

- Relative contribution of biomass to Swiss energy production in 2004: wood 2.5%, biogas from wastewater treatment 0.18%; other biomass (biogas from agriculture, etc.) 0.056%.
- Targets / measures: SwissEnergy and the Coop Naturaplan standard together aim at fostering biogas from biodynamic agriculture from to date one up to a minimum of 50 plants by 2010.
- Associations (selection): Biomass Energy Switzerland with the aim to convey energy from different sources of biomass (e.g: compost, dung, sludge); Wood Energy Switzerland; Biogas Switzerland.

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	**	still rather expensive, technically reliable
Availability	****	high, currently just a little fraction of the theoretical potential is used
Acceptability	****	high acceptance due to CO_2 neutrality, cleanness and regional availability

5.2 Heat Pumps

- Relative contribution of heat pumps to Swiss energy production in 2004: unknown, but nowadays in 60% of all new buildings heat pumps are being installed.
- Targets / measures: In some cantons there exist targeted support programs for heat pumps.
- Associations (selection): Swiss Association for the Promotion of Heat Pumps (Fördergemeinschaft Wärmepumpen Schweiz FWS).

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	****	low operating costs, technically reliable
Availability	*****	Very high
Acceptability	****	High acceptance due to uninterrupted service and cleanness

5.3 Hydropower

- Relative contribution of hydropower to Swiss energy production in 2004: 12.8% (55.3% of electricity production – storage: 30%, run-of-river: 25.3%).
- Targets / measures: The federal government and the cantons can promote small scale hydropower plants with funds for project examinations, pre-studies and pilot and demonstration plants.
- Associations (selection): Swiss Association for Water Management.

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	*****	very low generating costs, technically reliable
Availability	****	high, although weather-dependent
Acceptability	****	highly accepted due to CO_2 neutrality, cleanness, and domestic availability. However, there are concerns because of strong impacts on the landscape and the natural water circulation

5.4 Geothermal power

- Relative contribution of geothermal power to Swiss energy production in 2004: at present, no electricity from geothermal sources is produced in Switzerland.
- Targets / measures: the deep heat mining project in Basel, the first of its kind in the world, aims at the construction of a facility that is capable of producing 3 MW of electricity and 20 MW of thermal output (scheduled to commence operation in 2008).
- Associations (selection): Swiss Geothermal Society (SGS, SSG, SVG).

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	**	still expensive
Availability	****	very high, but technical feasibility yet to be proven
Acceptability	****	highly accepted due to CO_2 neutrality, cleanness and domestic availability

5.5 Solar

- Relative contribution of solar energy (photovoltaic and solar thermal) to Swiss energy production in 2004: ca. 0.11%.

5.5.1 Photovoltaics

- Relative contribution of photovoltaic power to Swiss energy production in 2004: ca. 0.006% (ca. 0.026% of electricity production).
- Targets / measures: In most cantons of Switzerland the investment costs for a new photovoltaic installation on an existing building can be deducted from the taxes. Many cantons provide funds to private investors of PV installations.
  The quantitative targets for 2007, set by solarch, are:
  - Module cost 2.5 CHF/W_p
  - System cost 5 CHF/W_p
  - Efficiency coefficient 12%
  - Increasing energy economic importance of PV: 5–10% in 2030
- Associations (selection): Swissolar.

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	*	rapidly decreasing collector prices, but still very expensive, technically reliable
Availability	**	limited due to relatively low solar irradiation
Acceptability	****	highly accepted due to CO_2 neutrality and cleanness

5.5.2 Solar thermal collectors

- Relative contribution of photovoltaic power to Swiss energy production in 2004: ca. 0.10%
- Targets / measures: The focus lies on solar water warming together with building renovation. An adequate program has to be persecuted (SFOE 2005a).
- Associations (selection): Swissolar.

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	***	decreasing collector prices, technically reliable
Availability	***	relatively high in combination with building renovation and/or the erection of new buildings
Acceptability	*****	highly accepted as a complementary heating system due to CO_2 neutrality, cleanness and increasing efficiency

5.6 Waste incineration

- Relative contribution of waste incineration to Swiss energy production in 2004: ca. 1.6% of the Swiss energy supply.
- Measures / targets: Improvement of the energy efficiency of waste incineration systems.
- Associations (selection): Swiss Energy for Infrastructure Systems

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	*****	low generating costs due to economical combustion, technically reliable
Availability	***	limited through available amount of waste (import of waste finds low acceptable)
Acceptability	*****	highly accepted due to CO_2 neutrality and cleanness insofar as CO_2 and pollutant emissions are independent of whether the energy is used or not

5.7 Wind power

- Relative contribution of wind power to Swiss energy production in 2004: ca. 0.003% (ca. 0.01% of electricity production. Total installed capacity was 9 MW. At the end of 2005 were 26 locations with 31 plants in use with a total installed capacity 11.57 MW. These produce about 15 million kWh of green electricity per year, corresponding to the electricity consumption of about 4,300 households.
- Targets / measures: The aim till 2010 is the realisation of 5-10 additional wind energy plant locations. With an installed capacity of more than 50 MW, they shall produce between 50-100 GWh of electricity annually, corresponding to the electricity consumption of 15,000 to 30,000 households.
- Associations (selection): Suisse Eole.

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	**	still expensive, technically reliable
Availability	**	limited due to low wind power potential
Acceptability	****	highly accepted due to CO_2 freeness and cleanness. However, there are serious concerns about the visual impact and, to a lesser extent, noise intrusion

5.8 Renewable energies in general

- Fraction of Swiss energy production 2004: 16.5% (56.85% of electricity production).

Hydropower is a traditional and important renewable energy source in Switzerland. But also “new” renewable energy sources, like solar, wood, biomass, wind, geothermal energy, and ambient heat, make up an increasing fraction of the Swiss energy supply (cf. Appendix). The long-term potential of national renewable energies shows that the prospects in the electricity and heat sector are very

good in almost all sectors. On the other hand, it is evident that the large technical potentials of PV and geothermal energy can only be largely exploited in about 30 years mainly because of economic barriers. Wood and other biomass, ambient heat, electricity from small-scale hydro plants and in a small range also wind energy are available in the short-term, and partly already economically competitive today.

The Swiss policy aims for an increase of renewable electricity production of 5,400 GWh or 10% of today's electricity consumption until 2030. Today, about 58% of the total Swiss electricity production comes from renewable energy sources. By far the largest part (97%) stems from hydropower.

Today already 400 electricity supply companies offer certified electricity products from renewable energies, thus covering 4.6% of the Swiss electricity demand. The new renewable energies only account for 2% of the Swiss electricity production. The main part of that derives from the utilisation of waste incinerations (about 80%) and biogas (about 15%). Smaller parts derive from wood utilisation, solar energy, and wind energy.

Renewable energy sources: 0.6 million tonnes of CO_2 can be saved by means of renewable energies, mainly wood and biogas. Together with other sources, like thermal utilisation of waste and burnable waste from industry, a substantial amount of 12% can be reached (Energie-Spiegel, 2003).

5.9 Nuclear

- Relative contribution of nuclear power to Swiss energy production in 2004: 9.24% (40% of electricity production, in five plants).

In 2003, the people's referenda "Strom ohne Atom" (Electricity Without Nuclear) and "Moratorium Plus" were rejected by the sovereign. "Strom ohne Atom" planned a stepwise, but rapid phasing out of nuclear energy, while "Moratorium plus" wanted to limit the operating lifetime of the plants. Nevertheless, there is a strong opposition against nuclear energy in Switzerland, particularly because of its unsolved waste storage problem and the small, but far-ranging risks of major nuclear accidents. Planning and construction of new plants seem rather unlikely and lacks a political majority.

3A Assessment (preliminary, not to be quoted or cited):

Accessibility	****	low generating costs, technically reliable
Availability	****	High
Acceptability	**	accepted due to CO_2 neutrality and cleanness. However, there are very strong concerns because of the unsolved waste storage problem and the small, but far-ranging risks of major nuclear accidents

6 TRANSPORT SECTOR

6.1 Convention on fuel consumption

Automobile importers agreed to a convention with the Swiss Federal Confederation in 2002, stipulating that they engage in reducing the average fuel consumption of cars put in circulation from 8.4 litres (2000) to 6.4 litres until 2008. This convention is subsidised by the "Energy Label" described above.

6.2 Eco-Drive®

Quality Alliance Eco-Drive® is a widely supported association of driving instructors, traffic alliances, and federal agencies. Eco-Drive® is a driving technique, which abates fuel consumption and toxic emissions by speedy accelerating, early stepping up and tardy stepping down, driving in the highest possible gear and foresighted, steady driving.

6.3 EcoCar

The Agency for Energy Efficient Vehicles aims at the promotion of the market launch of new propulsion systems and biogen fuels. These are electrical or hybrid driven vehicles as well as cars with combustion engines that use alternative fuels und save the environment as much as possible from damage. Energy efficient vehicles are characterised to reduce fuel consumption. They support the implementation of the Kyoto target by abating the CO_2 emission in Switzerland. In addition, they help in urban areas to reduce other pollutant emissions, such as particulate matter.

6.4 Climate Centime on Petrol and Diesel

See section 3.1 above.

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http://www.bfe.admin.ch/themen/00526/00541/00543/index.html?lang=de&dossier_id=00772

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http://www.bfe.admin.ch/energie/00552/index.html?lang=en&dossier_id=00721

SFOE (2005b). SwissEnergy 4th Annual Report 2004/2005, Gaining momentum (4. Jahresbericht Energie Schweiz 2004/2005, mit Schwung in die 2. Etappe), Swiss Federal Office of Energy (Bundesamt für Energie, BFE), 1 November 2005 (in German)

WWW Links

Energy and climate policy

ProClim/OcCC: http://www.proclim.ch

Swiss Federal Office of Energy (Bundesamt für Energie, BFE): http://www.bfe.admin.ch

Swiss Federal Office for the Environment (FOEN): http://www.buwal.admin.ch

Swiss energy policy overview: http://www.bfe.admin.ch/themen/00526/index.html?lang=en

Federal Energy Research Commission (Commission fédérale pour la recherche énergétique, CORE): http://www.bfe.admin.ch/themen/00519/00520/index.html?lang=de

Energy-related research and lobbying institutions

Association for Environment-Friendly Electricity (Verein für umweltgerechte Elektrizität, VUE): www.naturemade.ch

Centre for Energy Policy and Economics (CEPE), ETH Zurich: www.cepe.ethz.ch

Paul Scherrer Institut (PSI): http://www.psi.ch

Swiss Agency for Efficient Energy Use: http://www.energy-efficiency.ch/e/IndexAktuell.html

Policy instruments and initiatives

CO_2 Act: http://www.admin.ch/ch/d/sr/6/641.71.de.pdf

Energho: http://www.energho.ch/

Energy Agency of the Economy: www.enaw.ch

Energy City: http://www.energiestadt.ch/page.asp?DH=100

Energy City – Memorandum: http://www.energiestadt.ch/images/9_K_Reglement_TV_06_d.pdf

Energy Label: www.energieettikette.ch

MINERGIE® label: http://www.minergie.com/

MINERGIE-P® label: http://www.minergie.ch/index.php?standards-6

naturemade: http://www.naturemade.ch/e/naturemade/index.htm

Renewable energy sources and institutions

Renewable energy sources: http://www.bfe.admin.ch/themen/00490/index.html?lang=en

Biomass: http://www.bfe.admin.ch/themen/00490/00496/index.html?lang=en

Biomass Energy Switzerland (association): http://www.biomasseenergie.ch

Wood Energy Switzerland (association): http://www.holzenergie.ch/

Wood energy: http://www.bfe.admin.ch/energie/00559/00560/index.html?lang=en

Ambient heat: http://www.bfe.admin.ch/themen/00490/00502/index.html?lang=en

Geothermal energy: http://www.bfe.admin.ch/themen/00490/00501/index.html?lang=en

Geothermal energy (deep heat mining): http://www.dhm.ch/dhm.html

Swiss Association for the Promotion of Heat Pumps: http://www.fws.ch/

Swiss Geothermal Society (SGS, SSG, SVG) http://www.geothermal-energy.ch/

Hydro power: http://www.bfe.admin.ch/themen/00490/00491/index.html?lang=en

Swiss Association for Water Management: www.swv.ch

Swiss Gas and Water Association (SGWA): http://www.svgw.ch/

Sewage and waste: http://www.bfe.admin.ch/energie/00559/00562/index.html?lang=en

Swiss Energy for Infrastructure Systems: http://www.infrastrukturanlagen.ch

Solar energy: http://www.bfe.admin.ch/themen/00490/00497/index.html?lang=en

Solar Energy Switzerland (association): http://www.solar.ch

Swissolar: http://www.swissolar.ch/

Suisse Eole: http://www.wind-energie.ch/default-d.htm

Wind energy: http://www.bfe.admin.ch/themen/00490/00500/index.html?lang=en

Fossil fuels

Fossil fuels: http://www.bfe.admin.ch/themen/00486/index.html?lang=en

Further interesting links

E-bicycles: www.newride.ch

Ecocar – promotion for the market diffusion of energy efficient vehicles: www.ecocar.ch

Mobility car sharing: www.mobility.ch

Car environment list: www.autoumweltliste.ch

CO_2 offsetting initiative “myclimate”: www.myclimate.ch

Energy-saving in business: www.energiesparwochen.ch

Advisor for housekeeping with electricity: www.energybox.ch

Energy Navigator of ETH Zurich:
http://www.lav.ethz.ch/about/projects/actual_projects/Numericals/energy_nav/index

APPENDIX – Swiss Energy Statistics 2004 (Overview)

Energy use by energy source	
Fuels	31.3%
Crude oil burnings	25.7%
Electricity	23.1%
Natural gas	12.1%
Other	7.8%
Energy use – renewable fraction	16.5%
composed of:	
Electricity	11.97%
Wood	2.59%
Renewable waste fraction	0.64%
Ambient heat	0.59%
District heating	0.45%
Biogas	0.17%
Solar	0.11%

Electricity use by energy source	
Nuclear	40%
Hydro, storage	30%
Hydro, run-of-river	25.3%
Conventional thermal and other	4.7%
Electricity use – renewable fraction	56.9%
composed of:	
Hydropower	55.3%
Waste	1.3%
Biomass (biogas from waste water treatment)	0.18%
Biomass (wood, biogas from agriculture)	0.056%
Solar	0.026%
Wind	0.01%

Sources: SFOE (2004c, 2004d)