Making good progress

SwissEnergy 2nd Annual Report 2002/03

swiss energy

what keeps you going?

This report covers the 2002 calendar year as well as the most important activities up to the middle of 2003.

■ Documents contained in the enclosed CD-ROM

Published by
Federal Department of the Environment, Transport, Energy and Communications (DETEC)
SwissEnergy Programme Management
Swiss Federal Office for Energy SFOE, CH-3003 Bern

Concept, contents and layout
naturaqua pbk, Bern/upart grafikwerkstatt, Bern

Available in German, French and Italian as well as English

Distribution
BBL, Distribution, Publications
Fax 031 325 50 58
www.bundespublikationen.ch
BBL order nos.:
805.950.02 d, 805.950.02 f, 805.950.02 i, 805.950.02 e

Bern, September 2003

10.03 1000 bim 03022

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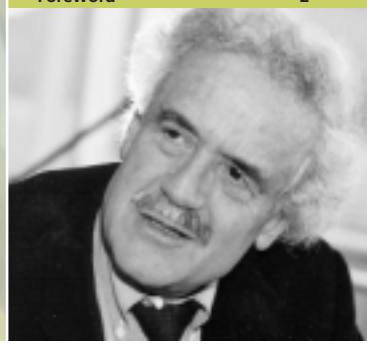


Foreword

SwissEnergy 2nd Annual Report

SwissEnergy is a partnership programme designed to implement national energy and climate policy as defined by the Swiss Constitution, the Energy Act and the CO_2 Act, by significantly improving energy efficiency and promoting the use of renewable energy sources.

This report shows that despite its increasing effectiveness, SwissEnergy alone will be unable to meet our objectives. Additional efforts will be required.

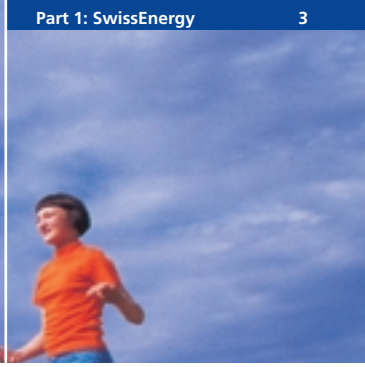
The report contains the most essential information on SwissEnergy:

- Part 1 briefly describes the main purpose, the various objectives, the strategy and the measures adopted.
- Part 2 presents the achievements in the programme's second year together with the conclusions, a summary, and a look ahead.
- An accompanying CD-ROM provides more detailed information and data on the activities of SwissEnergy partners and their projects, together with an analysis of the impact.

SwissEnergy would not be possible without the co-operation of its many partners, in particular the cantons and local authorities, public and private sector agencies, various networks and centres of excellence, and of course the federal authorities themselves. It is thanks to their unflagging efforts in many fields that this report is able to present many new success stories and model projects – among them more than 2000 low-energy buildings, 36 000 persons newly trained in ecological driving techniques, an agreement that will reduce CO_2 emissions in the cement industry by between 44 and 55% by 2010, more than 7500 heat pumps sold (a new record) with even higher performance levels, an increase in the number of "energy towns" to 94, and promotional programmes in 24 cantons with a total budget of CHF 56 million. We would like to thank SwissEnergy partners for their efforts in the year under review and their commitment to the future.

Together, we shall achieve the targets of the programme.

Hans-Luzius Schmid, SwissEnergy Project Manager



Part 1

The SwissEnergy programme

Mandate and objectives:

Implementation of Switzerland's climate policy

Switzerland is pursuing clearly defined climate policy objectives in line with its obligations under the Kyoto Treaty and the CO_2 Act: to reduce carbon dioxide emissions by 10% from the level of 1990 by the year 2010. The SwissEnergy programme, created for this purpose, was launched on 30 January 2001 by Energy Minister Moritz Leuenberger as the follow-up to the Energy 2000 programme. Like its predecessor it will have a duration of 10 years. Its purpose is to put Swiss energy supplies on a "sustainable" footing, i.e. to use energy more sparingly and more efficiently, meeting ecological as well as economic requirements, ensuring security of supplies and promoting renewable sources of energy. All of these objectives are enshrined in the Swiss Constitution. A number of quantitative objectives have been set for the programme. These include slowing the growth of electricity demand, maintaining the dominant position of hydropower and increasing the use made of renewables (wood, biomass, sewage gas, solar power, geothermal energy, ambient heat, wind energy) for the production of both electricity and heat.

Strategy:

Energy efficiency and renewables

The main objective, to reduce CO_2 emissions by 10%, is above all to be achieved through greater energy efficiency. If the most efficient technologies available on the market today were put to use, the energy consumption of conventional buildings, appliances and motor vehicles could be reduced by 50 or as much as 80%. Swiss Energy intends to harness this enormous potential, for example by promoting generalisation of the MINERGIE standard in buildings. The energy requirement of buildings which meet this standard, which usually make use of renewables in one form or another, is between 50 and 70% less than that of conventional buildings.

By promoting domestic, CO_2-neutral renewable energy sources in place of imported fossil fuels it is possible not only to combat climate change, but also to reduce Switzerland's foreign dependence in the energy sector. The economic benefits from greater use of domestic energy sources are not to be underestimated. Their use for the production of both electricity and heating has already increased considerably and the potential for long-term development – or in some cases even short-term – is greater still. Principal among these is hydropower, which is already the mainstay of Swiss electricity generation. Picking up where "Energy 2000" left off, the SwissEnergy programme is the second big step towards the long-term objective of a "2000 Watt society" in

Fig. 1
SwissEnergy objectives for 2010

Efficient energy use

	Objectives
Consumption of fossil fuels[1/2]	–10%
Electricity consumption[2]	≤ +5%
CO_2 emissions[1/3]	–10%
from heating oils and other fuels[3]	–15%
from motor fuels[1/3]	–8%

Renewable energies

	Objectives
Hydropower production[2]	stable
Other forms of renewable energy[2]	
Electricity[2]	+0.5 TWh (+1%)
Heat[2]	+3.0 TWh (+3%)

[1] Excluding international flights [2] Compared to 2000 [3] Compared to 1990

which the consumption of energy per capita will be just a third of what it is today, and carbon-rich fossil fuels will have extensively been replaced by renewable forms of energy.

Measures:

Focus on voluntary efforts

SwissEnergy operates at three complementary levels. First and foremost are the voluntary measures for implementation of the Energy Act and the CO_2 Act, through the creation of private sector agencies to monitor the performance of specific sectors of the economy, and the companies in these sectors, on the basis of binding contractual agreements as to the objectives per sector.
The voluntary measures are actively supported by information and advice, through training and further education. The products and networks already developed by "Energy 2000" (energy model for large consumers, Eco-Drive®, the "energy town", renewables networks), have been strengthened and extended.
The necessary framework for the above is provided by legislative measures and in particular the Energy Act and its accompanying ordinance, and the CO_2 law. Worth mentioning in this context are federal regulations on the energy consumption of motor vehicles and electrical appliances. Similar regulations on the energy consumption of buildings are the responsibility of the cantons.
If these legal and voluntary measures fail to achieve the desired result, then in accordance with the CO_2 law the government will introduce a CO_2 tax.

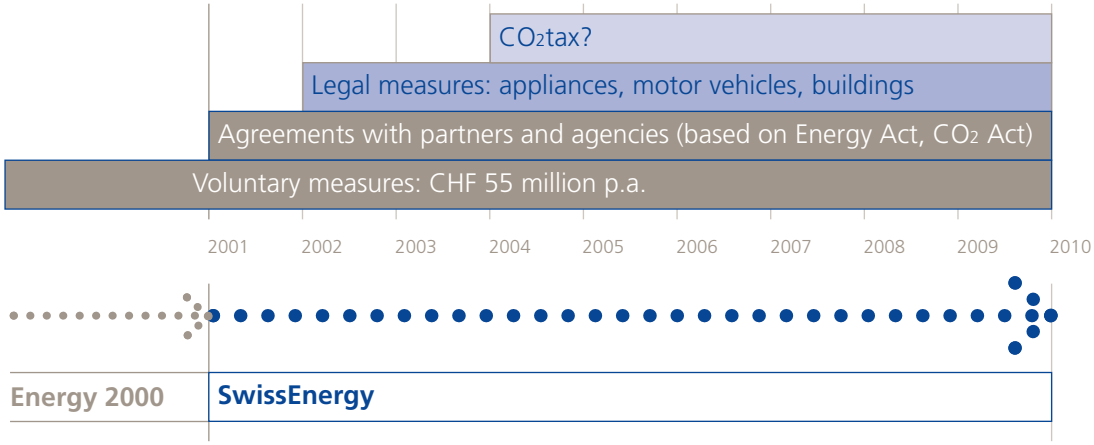


Fig. 2
SwissEnergy strategy: priorities as defined by Energy Act and CO_2 Act

Organisation:

The four sectors

SwissEnergy is a national programme in which the government, the cantons, local authorities, the private sector, consumer and environmental organisations, as well as public and private-sector agencies work together as partners.
The programme managed by the Swiss Federal Office for Energy (SFOE), which is responsible for co-ordination, controlling and general marketing. The actual implementation of the various measures is in the hands of SwissEnergy's many partners. The programme is divided into four sectors that cover all energy applications: the public sector and buildings (public and private), trade and industry, mobility, renewables.

The SFOE has an annual budget of CHF 55 million to cover all the needs of the SwissEnergy programme. As much again is spent by the cantons and third parties at the level of implementation.

Public sector and buildings

About 45% of total Swiss energy consumption is in the buildings sector, where there is clearly considerable potential for reducing CO_2 emissions. This sector is therefore one of the top priorities of the SwissEnergy programme.
The programme's most important partners are the cantons, which being responsible for the buildings sector have introduced regulations designed to make buildings more energy-efficient, and have also launched promotional programmes to help achieve the objectives of the SwissEnergy programme.
The "Energy Town" label, which dates back to the time of Energy 2000, today covers more than 90 towns with proven achievements in the energy field.
MINERGIE standard buildings combine low energy consumption with increased comfort for the occupants. The MINERGIE association monitors the correct application of this standard on behalf of SwissEnergy. The Standard is supported in the cantonal programmes.
Another association, energho, promotes energy efficiency in public buildings.
The "Infrastructure Systems Energy programme" offers consulting services aimed at optimising energy consumption in sewage treatment plants, water supply systems and waste incineration

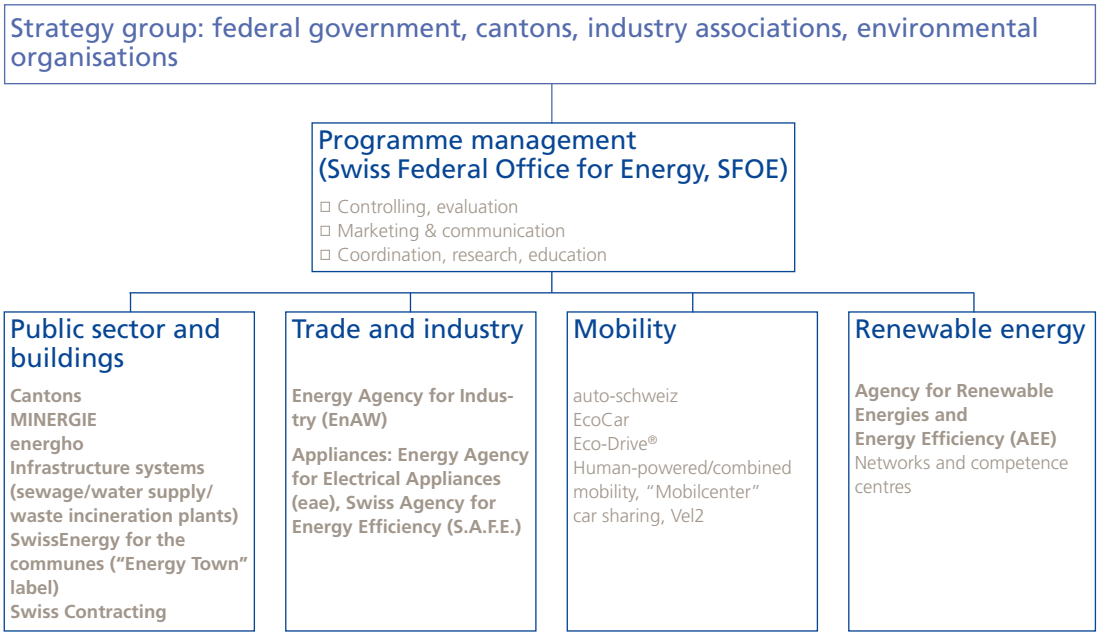


Fig. 3
SwissEnergy organisational chart

plants, which collectively account for approximately half the electricity requirements of municipal buildings and installations. In a number of cases, it has been possible to improve energy efficiency by as much as 50%.
Energy "contracting", in which an energy specialist undertakes to solve the energy needs of a building by providing know-how and financing solutions, is often the easiest way to achieve energy efficiency in this sector. It is for this reason that SwissEnergy supports the Swiss Contracting Association in its development of the necessary products.

Trade and industry

There is much to be done to reduce CO_2 emissions in the trade, industry and services segments, applying measures which not only cut energy costs but also make companies more competitive in the most innovative sectors of the economy.
The Energy Agency for Industry, which works closely with SwissEnergy on the basis of a performance contract, helps companies to successfully develop, negotiate and implement binding agreements for the reduction of energy consumption and CO_2 emissions. Companies which meet the agreed targets will be exempted from any CO_2 tax (CHF 210/tonne of CO_2 max.) that may eventually be introduced. The Energy Agency for Industry actively supports these companies in defining targets and implementing the necessary measures, with tools for drawing up target agreements, energy audits, monitoring aids and other instruments and products.

Labels indicating the energy consumption of household appliances and light bulbs have been obligatory in Switzerland since 2002. The various agencies, consumer and environmental organi-

Useful links:

Pubic sector and buildings
Cantonal energy policy:
www.energie-schweiz.ch
⇢ Energy in my canton

Minergie: www.minergie.ch

energho: www.energho.ch

Energy Town label:
www.energiestadt.ch

Swiss Contracting:
www.swisscontracting.ch

Infrastructure systems (sewage treatment/water supply/waste incineration plants):
www.infrastrukturanlagen.ch

Trade and industry
Energy Agency for Industry:
www.energie-agentur.ch

eae: www.eae-geraete.ch
www.energyBrain.ch

S.A.F.E.: www.energieeffizienz.ch

Energy label:
www.energieetikette.ch

Topten: www.topten.ch

Fig. 4
Energy label
Left: energy label for household appliances.
Right: energy label for motor vehicles.

sations joined SwissEnergy in an information campaign to promote energy-efficient appliances. SwissEnergy supports the following consumer-oriented Internet sites: www.topten.ch, which is operated by the Swiss Agency for Energy Efficiency (S.A.F.E.) and lists the most efficient electrical appliances available on the market, and www.energyBrain.ch, which is run by the Energy Agency for Electrical Appliances (eae) and provides comprehensive information about energy-efficient appliances. The eae and affiliated companies also support SwissEnergy objectives by including helpful information sheets in their documentation, operating manuals, and training programmes.

Mobility

SwissEnergy is doing its best to make mobility more sustainable in the future. Measures in the area of mobility include an agreement on objectives for the reduction of fuel consumption in new cars, reached between the Department of the Environment, Transport, Energy and Communications and the Association of Swiss Automobile Importers (auto-schweiz) and signed in February 2002.

An energy label informing the public about the fuel consumption and CO2 emissions of new models, introduced on 1 January 2003, should help the automotive industry to achieve this objective.

SwissEnergy is also promoting ecological driving lessons to improve energy efficiency in this sector. Tens of thousands have attended Eco-Drive® courses or have been trained on special simulators.

The programme also encourages car sharing. Combined with public transport and even simpler solutions (walking, cycling) car sharing has proven itself to be another environment-friendly, cost-saving and energy-efficient transport solution.

Useful links:

Mobility
Energy label:
www.energieetikette.ch

Eco-Drive courses
www.eco-drive.ch

Car sharing: www.mobility.ch and www.raillink.ch

Veloland Schweiz (Cycling in Switzerland): www.veloland.ch

Mobilservice:
www.mobilservice.ch

Verkehrsclub der Schweiz (Swiss Traffic Club):
www.autoumweltliste.ch

Association of Swiss Automobile Importers: www.auto-schweiz.ch

Touring Club der Schweiz (Swiss Touring Club):
www.infotechtcs.ch

Local authorities are actively promoting energy-efficient mobility. A good example is the "model city" of Burgdorf (canton Bern) where the town centre is now legally reserved for the use of pedestrians and cyclists as a traffic-free zone. SwissEnergy supported the "energy towns" by organising "energy-efficient mobility" events throughout the country on the occasion of the Europe-wide "car-free cities" day on 22 September.

SwissEnergy promotes new products developed by "Veloland Schweiz" (Cycling in Switzerland): nine national cycling paths covering a total of 3300 kilometres now link all regions of the country and provide attractive opportunities for cycling holidays and excursions. This benefits not only the environment, but also the hotel and catering sector. These new national cycling paths are being linked to existing cantonal cycling paths.

Renewable energies

Renewable sources of energy such as hydropower, wood, biomass, sewage gas, wind, solar power, ambient heat and geothermal energy are destined to become increasingly important in the future. These "renewables" offer many advantages. They are climate-friendly and at the same time reduce Switzerland's dependence on imported and rapidly dwindling fossil fuels, at increasing prices. The Agency for Renewable Energies and Energy Efficiency (AEE) serves as a network for the various players, capitalising on synergies and co-ordinating the various activities. SwissEnergy actively supports the efforts of those who wish to switch to "green power", heat pumps, wood-fired heating, solar and wind installations, geothermal energy, biomass and sewage gas, in particular through cantonal promotional programmes.

SwissEnergy continues to support hydropower as the most important source of renewable energy. Hydropower indeed accounts for 60% of Switzerland's electricity production, while wood has a 5% share of the heating market. Other renewables as yet contribute very little to the Swiss energy balance. Their exceptional rate of growth and medium-term potential do suggest however that "the future will belong to renewables".

Finally, SwissEnergy supports research and development, not just in renewables but also in the area of energy efficiency, directly promoting innovation and new technologies that are of particular interest to the small-to-medium enterprises (SMEs) that are the backbone of the Swiss economy. Examples include fuel cells, energy-efficient buildings vehicles and appliances (heat pumps, insulation materials, electronic control devices).

Useful links:

Renewable energies
Agency for Renewable Energies: www.erneuerbar.ch

Solar power: www.swissolar.ch

Heat pumps: www.fws.ch

Wood energy: www.holzenergie.ch

Biomass: www.biomasse-schweiz.ch

Sewage gas, use of sewage heat: www.infrastrukturanlagen.ch

Geothermal energy: www.geothermal-energy.ch

Wind energy: www.suisse-eole.ch

■ Annual report on SFOE spending for SwissEnergy
■ Annual Report, list of mandates

Part 2

Activities in 2002/03

Economic and policy developments

Finances

SwissEnergy has an annual budget of CHF 55 million, as per the federal government resolution of 17 January 2001. In 2002 the programme received CHF 54 million, plus CHF 9.7 million of extraordinary funding for the "Lothar" programme to promote the use of wastewood from the hurricane Lothar (2001: CHF 23 million) and CHF 4 million granted by parliament for the additional promotion of renewable forms of energy (2003: CHF 2 million).

SwissEnergy is based on a clearly-defined strategy aimed at reducing energy consumption and meeting demand through renewable and domestic energy sources as much as possible. For cost/benefit reasons and to satisfy the requirements of the Energy Act, the programme's emphasis will shift from the promotion of renewables to promoting energy efficiency.

In 2002, CHF 29.9 million was spent on energy efficiency measures and CHF 28.1 million on renewables (excluding the "Lothar" programme). The figures for 2001 were CHF 23.8 million and CHF 30.7 million respectively. These sums include the spending by the Swiss Federal Office for Energy for management, marketing, controlling and further education (CHF 5.8 million). CHF 13 million went to the cantons in subsidies, and the cantons spent an additional CHF 43 million on their programmes. Expenditure by third parties amounted to around CHF 20 million (■ Annual report on SFOE spending for SwissEnergy ■ Annual Report, list of mandates).

Government funding of SwissEnergy programme

	2001	2002
Efficient energy use	23.8	29.9
Renewables	30.7	28.1
Lothar (wastewood)	23.0	9.7
Total	**77.5**	**67.7**

Trend in energy prices

General economic conditions have a significant influence on the ability of SwissEnergy to achieve its objectives. Economic and population growth, together with fluctuating energy prices, can neutralise these achievements or even cancel them out entirely.

Switzerland's gross domestic product (GDP) rose by 0.1% in 2002. Population growth of 1.2% had a greater influence on energy consumption, which nonetheless fell by 2.1% (consumption of fossil fuels including aviation fuel fell by 3.3%, while electricity demand increased by 0.5%). Consumer prices for the various energy types fell in real terms compared to the previous year, as follows: extra-light heating oil by 13.6%, petrol by 4.3%, natural gas by 6.9%, diesel by 4.1% and electricity by 1.3%. They are thus well below the levels recorded prior to the first oil crisis in 1973: extra-light heating oil down 25%, petrol, down 17%, electricity down 13%.

International energy policy

The Kyoto Protocol of 1997 calls for a reduction in emissions of greenhouse gases (CO_2, CH_4, N_2O, HFC, PFC, SF6) in the industrialised countries by an average of 5.2% from the 1990 level, in the period from 2008 to 2012. In ratifying it in June 2003 the Swiss parliament clearly demonstrated the country's acceptance of its international obligation to help combat climate change. The CO_2 Act, which came into effect in Switzerland in 2000 and is the basis for implementation of the Kyoto Protocol in Switzerland, calls for a 10% reduction in CO_2 emissions from the 1990 level by the year 2010. As the United States decided against ratification, it is now essential that

- Annual Report, International Affairs
- Rapport sur les énergies renouvelables et l'efficacité énergétique au Royaume-Uni, Japon et Allemagne

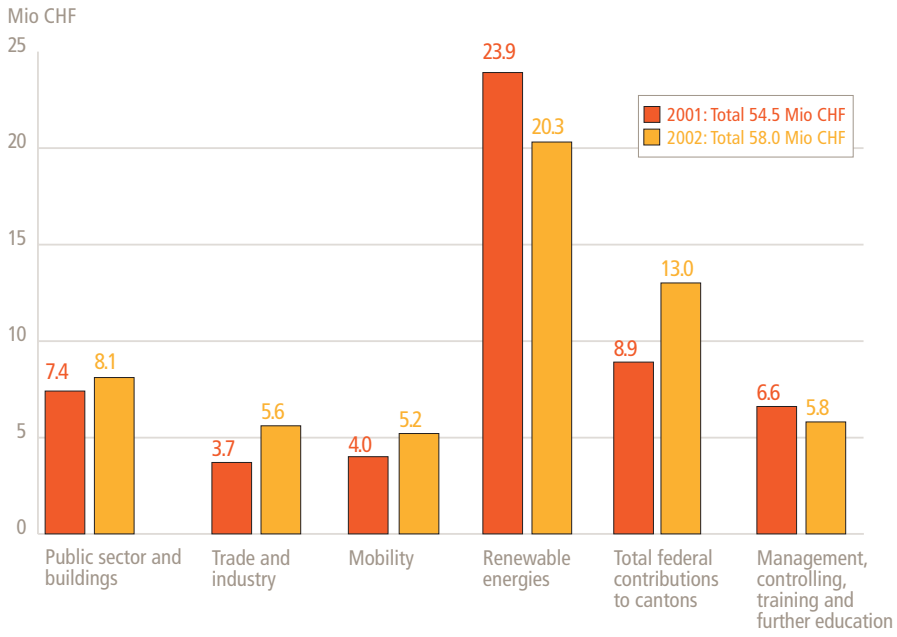


Fig. 5
Government funding of SwissEnergy, 2001/2002 (excluding Lothar 9.7 Mio CHF).

Russia ratify to reach the quorum required for the Protocol to take effect.

Switzerland's CO_2 balance, with a reduction of 0.7% between 1990 and 2002, compares favourably with that of other countries (■ Annual Report, International Affairs). During this period CO_2 emissions rose by 16% in the USA and by 10.5% in Japan. In 2000, the most recent year for which official statistics are available, CO_2 emissions in the European Union (Kyoto target for all greenhouse gases of minus 8%) were 3.5% below the 1990 level. This is primarily due to the reduction in coal-fired electricity production in Germany, where energy-related CO_2 emissions between 1990 and 2001 fell by 13.8%, and similar efforts in the UK (–7.1%).
Per capita primary energy consumption in Switzerland in 2000, at 3.7 tonnes of oil equivalent, was slightly below the EU average (3.86 toe), while annual electricity consumption per capita was higher in Switzerland (7843 kWh) than in the EU (6547 kWh).
EU countries are either offering new incentives to promote renewables and energy efficiency (e.g. Belgium, the UK, the Netherlands), or companies are being exempted from additional taxes if they meet the targets specified in energy consumption agreements (e.g. Climate Change Levy in the UK). Renewable energies are being promoted in a number of EU member states through favourable tariffs, trade in green power certificates and other incentives, the most recent examples being France, Austria and the UK.
Government expenditure per head of population for the promotion of energy efficiency and renewables in 2001 amounted to 2.30 in Japan, CHF 16.00 in the UK and CHF 24.40 in Germany, compared to CHF 12.00 in Switzerland (■ Rapport sur les énergies renouvelables et l'efficacité énergétique au Royaume-Uni, Japon et Allemagne).

- Annual Report, Marketing and Communication
- Energy Research, 2002
- Rapport annuel Encouragement de l'innovation et de la technologie
- Brief SwissEnergy examples

Project management

Marketing and communication

The main objective of the Marketing and Communication section (■ Annual Report, Marketing and Communication) is to improve the image of the SwissEnergy programme as a "centre of excellence" for energy efficiency and renewables. A survey carried out in mid-2002 showed that more than 40% of the Swiss population had become aware of the existence of SwissEnergy. The programme's recognition value thus increased by almost 10% in the year under review (rising to 51% in mid-2003). There is less awareness of the programme's specific objectives and activities, but the communication concept for 2003–2005, stressing SwissEnergy's role in promoting energy efficiency and renewables, addresses this problem. The Marketing and Communication section provides a "communication platform" that includes a newsletter, the SFOE publication "energie extra", SwissEnergy's own web site which receives 500 000 visits a month, press releases and reports, details about trade fairs and exhibitions, plus a SwissEnergy brochure.

The section also organises campaigns to highlight specific themes at particular times, defining and co-ordinating procedures and bringing Swiss Energy partners into closer contact. An evaluation of these campaigns at the end of 2002 (Annual Report, Evaluation) concluded that they would be more effective if their duration were longer than a few months. The buildings campaign to be launched in 2004 will thus extend over two years.

Past and future campaigns:
2001: Green power
2002: Energy label for household appliances
2003: Energy label for motor vehicles
2004–05: Buildings

SwissEnergy participated in Europe's mobility day for the first time on 22 September 2002, with the motto, "Into town without my car". More than 70 cities and towns (primarily holders of the Energy Town label) presented measures designed to promote energy-efficient mobility. Swiss Energy used the Swiss national exhibition (Expo.02) to increase public awareness of energy efficiency and renewables. In the year under review, a further three institutions were awarded the "Energy Partner" label: Biomass-Energie, the Swiss Association for the Promotion of Heat Pumps (FWS) and MINERGIE®.

Promotion of technology and innovation

The Swiss Federal Office for Energy spent CHF 17.9 million on energy research in 2002, not counting the CHF 4.5 million spent in specific sectors, and CHF 11.7 million on "pilot and demonstration" projects. CHF 12.6 million (42%) of the amount was invested in energy efficiency projects, CHF 14.9 million (50%) on renewables and CHF 2.1 million on the socio-economic aspects of these developments. Altogether the SFOE supported 892 projects. The results have been published in a separate annual report (■ Energy Research, 2002).

SwissEnergy tries to accelerate the use of research findings in the field, in particular through pilot and demonstration projects. These in turn help SwissEnergy to achieve its objectives. Typical examples of pilot projects in the year under review include the testing of low-energy home components; demonstration of low-consumption, non-polluting drive systems; practical uses for fuel cells; special solar, wind, geothermal and biomass systems (■ Rapport annuel, Encouragement de l'innovation et de la technologie) (■ Brief SwissEnergy examples).

■ Annual Report, Training and Further Education
■ Annual Report, Public sector and buildings
■ Annual Report, MINERGIE
■ Annual Report, Status of Energy Policy in the Cantons

Training and further education

A large proportion of fossil fuels is consumed for building heating applications. Professionals who influence the energy consumption of buildings, installations and appliances in their daily work are therefore the main target group for training and further education (■ Annual Report, Training and Further Education). In the year under review priority was given to the following: continued promotion of the post-graduate course on sustainable energy use in buildings (NDS EN-Bau), which was completed by 62 students; the release of a CD-ROM called "Energy in vocational training"; the compilation of course material and launch of the PENTA PROJECT (course on renewables for fitters and technicians in co-operation with industry associations and trade organisations); three more editions of the Energy Calendar; a summary of training programmes currently available in the energy sector.

The "energho" courses on energy management in buildings are intended for operators of the relevant technical installations and systems. (funding by SwissEnergy in 2002: CHF 1.1 million.)

Public sector and buildings

The strategy of the cantons is to achieve the SwissEnergy objectives for buildings by increasing their energy efficiency as much as possible and increasing the use of ambient heat and renewables (■ Annual Report, Public sector and buildings).

MINERGIE

A performance agreement with the MINERGIE association is intended to improve promotion of the MINERGIE standard (■ Annual Report, MINERGIE). Existing MINERGIE standards have been adapted to the revised SIA 380/1 norm to ensure widespread application. MINERGIE standards have now been defined for all 12 SIA 380/1building categories, so that they now apply to more than just residential-type buildings. A new standard (MINERGIE P) has been created for so-called "passive" systems. A total of 2074 MINERGIE certificates had been awarded by the end of 2002. The total certified energy-relevant surface area was divided equally among residential and service buildings. The proportion of renovated buildings – 135, compared to 1939 new buildings – needs to be increased. (SwissEnergy funding in 2002: CHF 1 million; declared equity and third-party contribution: CHF 2.1 million.)

Cantons

In 2002, CHF 13 million of federal subsidies to the cantons was matched by CHF 43 million of the cantons' own funds, to fund cantonal programmes promoting energy efficiency, renewables and ambient heat (■ Annual Report, Status of Energy Policy in the Cantons). Of this amount, approximately CHF 20 million was spent on cantonal buildings, which as of 2003 are no longer eligible for federal subsidies.

Promotional programmes exist in all cantons except Schwyz and Obwalden, which lack the necessary legal basis. The energy laws in other can-

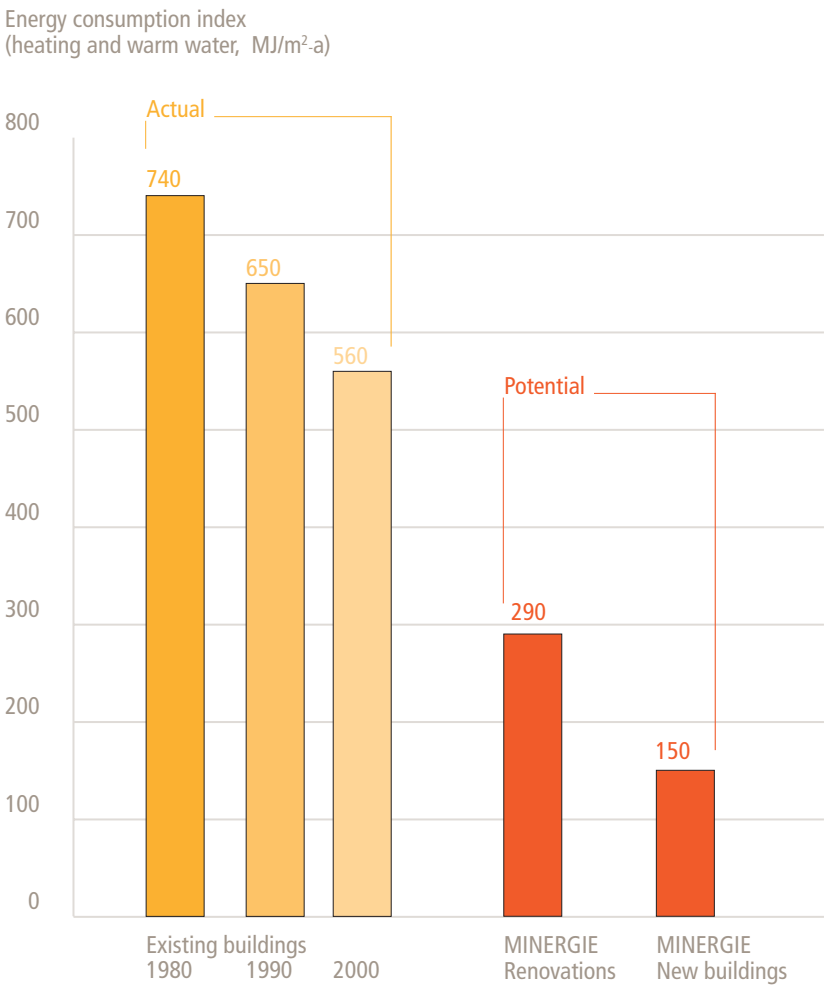


Fig. 6
Energy efficiency potential: residential buildings

tons have been adapted to the so-called "cantonal energy regulations model". Fifteen cantons have adopted the basic model, while eight (Zurich, Basel-Landschaft, Basel Stadt, Appenzell Ausserrhoden, Appenzell Innerrhoden, St Gallen, Ticino and Geneva) have included additional requirements for new buildings. Further efforts are required however. Many cantons have ended their commitment to individual billing of heating costs in existing flat blocks after elimination of this requirement from the Energy Act of 1 January 1999. MINERGIE standards are being directly or indirectly promoted by 17 cantons.

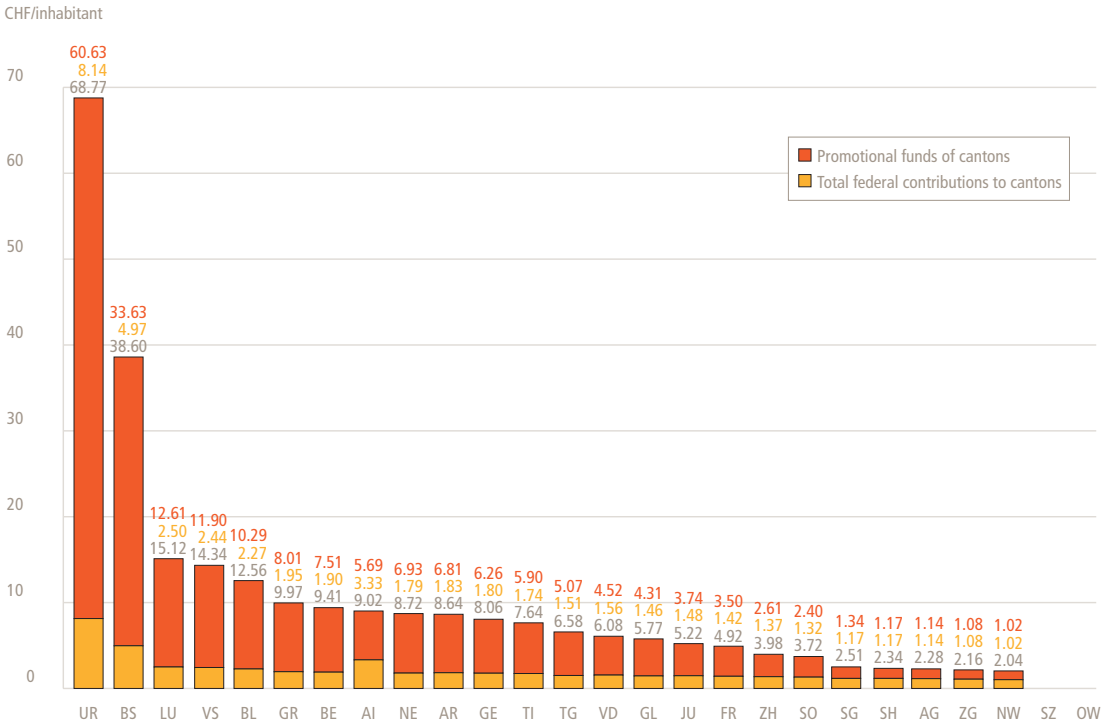
More than two-thirds of the cantons are participating in the "energho" scheme, which supports the cantons' efforts to optimise energy efficiency in their own buildings. Energy requirements have been made stricter for cantonal buildings, in view of their exemplary function (e.g. MINERGIE, SIA 380/4 standard for electricity consumption in buildings, energy surcharges, factoring in external costs).

"The aim of the MINERGIE programme is to significantly reduce energy consumption in Switzerland's buildings, while at the same time improving comfort for the occupants."

Peter C. Beyeler, executive member of the Aargau cantonal government , President of the MINERGIE Association

ex-post analysis

Fig. 7
Promotional programmes in the cantons in 2002



An evaluation of the energy data for new buildings carried out during the year clearly demonstrated the importance of insulation regulations, which vary considerably from one canton to another. Other success factors include proper enforcement of the regulations, and user behaviour.

The assessment for 2002 clearly shows the importance of implementing energy-related regulations: measures adopted in the year helped reduce energy consumption in buildings by approximately 1.1 PJ[1], which is equivalent to 25 000 tonnes of heating oil. This corresponds to about a quarter of the "total additional impact" of the measures taken in 2002.

Major energy consumers within the federal administration

In 2001 Swiss energy minister Moritz Leuenberger asked divisions of the federal administration that are major energy consumers[2] to develop their own concepts for implementing Swiss Energy objectives. Swiss Post and Swisscom have begun to take the necessary steps and prepare budgets. All divisions agreed to adopt the MINERGIE standard for both new and renovated buildings as an objective. Other strategies for achieving these objectives include the "Resource and environment management in the federal administration" programme (RUMBA), ISO 14001 environment management systems, environmental reports, agreed CO_2 objectives and membership of the "energho" association. However a number of major government consumers have

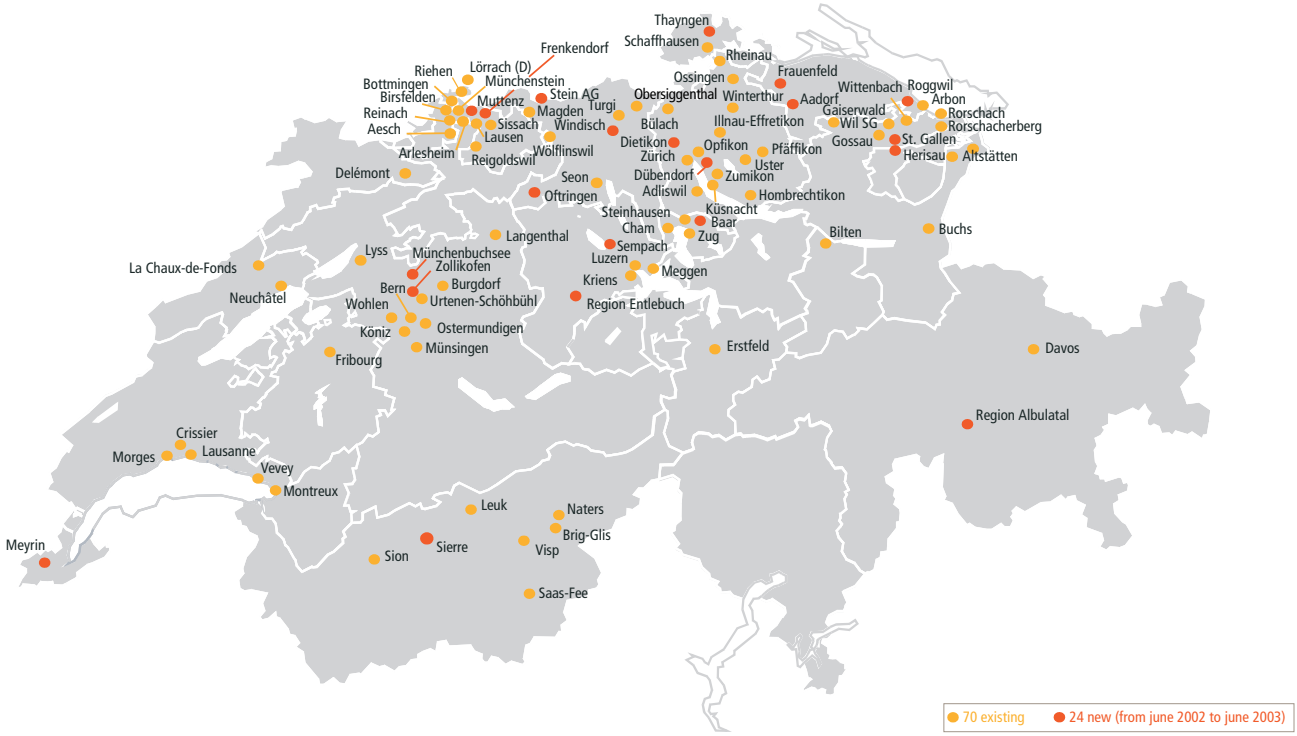
1 As per the Prognos ■ ex-post analysis

2 The following divisions are concerned: Federal Office for Buildings and Logistics (BBL), Federal Institutes of Technology in Zurich and Lausanne, Paul Scherrer Institute, Federal Materials Testing and Research Laboratories, Agency for Water Supply, Sewage Treatment and Water Protection, Federal Institute for Forest, Snow and Landscape Research; Federal Department of Defence, Civil Protection and Sport; Federal Railways; Swiss Post; Swisscom.

■ Annual Report, Major Consumers within the Federal Administration

■ Annual Report, energho

Fig. 8
The 94 Swiss Energy Towns



not yet decided on concepts or budgets, and lack the complete data set needed for assessing the rate of success in meeting SwissEnergy objectives. These include the Federal Office for Buildings and Logistics, Federal Railways, the Federal Institutes of Technology, the Federal Department of Defence, Civil Protection and Sport). (■ Annual Report, Major Consumers within the Federal Administration).

energho

The "energho" association (■ Annual Report, energho) enrols major government consumers in a scheme for reducing energy consumption by at least 10% within a period of five years. Its activities focus cost-effective renovations and optimising building energy systems. Members of energho are responsible for public buildings (as of the end of 2002: 17 cantons, 9 local authorities, 3 federal offices and 25 individual building operators).

Its products include a building statistics model ("energhostat") and an energy management agreement guaranteeing 10% savings in existing buildings. In 2002, each kWh saved by this scheme cost the government 2.4 centimes). The current aim is to increase the number enrolled in the scheme from 32 (end of 2002) to 140 by the end of 2003. Special seminars, conferences and training courses ensure know-how transfer in energy-efficient systems, with the help of weekly energy controls. (funding by SwissEnergy in 2002: CHF 1.2 million; declared equity and third-party contribution, CHF 0.1 million.)

- Annual Report, SwissEnergy for Towns
- Annual Report, Energy in Sewage Treatment Plants
- Annual report, Energy in Water Supply Systems
- Annual Report, Energy from Waste
- Annual Report, Swiss Contracting

Swiss Energy Towns

The number of "Energy Towns" increased by 24 between June 2002 and June 2003, to reach 94. For the first time, the label was also awarded to regions, Albula Valley and Entlebuch, and to a town beyond Swiss borders – Lörrach in Germany (■ Annual Report, SwissEnergy for Towns). By June 2003, the programme involved about a quarter of the Swiss population, living in the 94 certified Energy Towns. SwissEnergy for the communes is managed by 25 certified consultants and 11 mobility experts. Three new products were developed in the course of 2002: energy/CO_2 declarations for improved assessment of the success rate in Energy Towns, adoption of the European Energy Award as a benchmark, and the introduction of "Factor 21" for sustainable development. Forty three special Energy Town events were held for the purpose of know-how transfer. An impact analysis shows that SwissEnergy for the communes activities achieved savings of about 1100 TJ, equal to 35% of the impact of SwissEnergy voluntary and promotional measures in the year under review (based on a rough estimate of impact in six towns). A more in-depth evaluation of these estimates will attempt to identify any overlapping of impact from other market sectors. (funding by SwissEnergy in 2002: CHF 1.8 million; declared equity and third-party contribution, CHF 2.1 million.)

Infrastructure systems

The measures relating to sewage treatment plants (■ Annual Report, Energy in Sewage Treatment Plants), water supply systems (■ Annual report, Energy in Water Supply Systems) and waste incineration plants (■ Annual Report, Energy from Waste) were incorporated into a performance contract for the purpose of co-ordination at the end of 2002, under the heading "Energy in infrastructure systems". Since 1990, such systems have contributed 95% of the electricity generated by renewable sources (excluding hydropower) and 30% of the heat production. The remaining economically feasible potential, which is considerable, will be tapped over the next few years on the basis of the same successful marketing strategy. (funding by SwissEnergy in 2002: CHF 0.4 million; authorised equity and third-party capital, CHF 0.6 million.)

During the year, measures to generate electricity and utilise waste heat from sewage treatment plants saved a total of 46 TJ. An information campaign ("Water medal for energy-awareness in sewage treatment plants") was launched to focus national attention on the energy potential of infrastructure systems.

The first efforts to closely study the energy potential of communal waterworks showed that the energy requirements of such installations can be halved through economically sensible measures. Informational, motivational and educational activities will be continued over the next few years.

Due to the ban on disposal of residential waste in landfill sites now in force, the volume of waste available for incineration is expected to stabilise as of 2004. However, the first systematic analysis of two typical incineration plants indicate that the untapped energy potential remains great even with the present level of waste.

Swiss Contracting

The Swiss Contracting section involves particularly close collaboration with private sector energy companies (■ Annual Report, Swiss Contracting). The advantage to the client firm is to be able to pass on the technical risks to the contractor, at the same time ensuring the greatest possible energy efficiency while reducing costs. Contractors benefit by establishing long-term relationships with such clients, and the increased value added this implies. After the Electricity Market Act was defeated in the referendum of September 2002, interest in Swiss Contracting products and services waned considerably. It is hoped that the introduction of a contracting label will help to reverse this trend. (funding by SwissEnergy in 2002: CHF 0.2 million; declared equity and third-party contribution, CHF 0.3 million.)

■ Annual Report, Energy Agency for Industry
■ Annual Report, Industry and services/Optimisation of complex systems
■ Annual Report, Electrical appliances

Trade and industry sector

Energy Agency for Industry

Voluntary measures have been adopted throughout the private sector since introduction of the "Energy 2000" programme over a decade ago. Experience has shown however that in the absence of legal and financial incentives, only a few companies are sufficiently motivated to take concrete action.

That situation has been changed by the CO_2 Act, which foresees the introduction of a CO_2 tax if voluntary measures fail, possibly as early as 2004. This provides a new incentive to reduce emissions. The Energy Agency for Industry created in 2001 (■ Annual Report, Energy Agency for Industry) was able to treble in 2002 the number of companies agreeing to binding CO_2 objectives. There are now 46 groups involved with the "major consumers energy model", and six groups with the small-to-medium enterprises (SMEs) benchmark model. By the end of 2002 more than 600 companies were involved in all categories, accounting for about 25% of all private sector emissions. Agreements on objectives were at different stages of development in the various categories at the end of 2002, with some still in the early stage of negotiations and others already finalised. The development work proved to be more costly than expected however. By the end of the year, six groups totalling 121 companies, including four in the major consumers category and two in the small-to-medium enterprises (SMEs) category, successfully completed a formal government audit designed to ensure that the agreed CO_2 reduction objective is compatible with the requirements of the CO_2 Act and is suitably high. The CO_2 reductions agreed with the groups already audited are significantly greater than the 15% target for heating fuels required in the CO_2 Act. The first binding agreement on objectives, signed on 10 February 2003 with the cement industry (Cemsuisse), calls for a reduction in fossil fuel CO_2 emissions of 44% from the 1990 level (voluntary target: –55%).

By the end of 2003 it is expected that agreed objectives will cover some 40% of private sector CO_2 emissions. Assuming that the level of co-operation with the Energy Agency for Industry remains satisfactory, the private sector is confident of meeting the requirements of the CO_2 Act.

Practical guidelines were made available in 2002 as support tools for the optimisation of complex production systems (■ Annual Report, Industry and services/Optimisation of complex systems), and energy-efficiency weeks as well as various informative events were organised.

The Energy Agency for Industry's expenditures in 2002, amounting to CHF 4.3 million, was covered by CHF 2.3 million received from the companies concerned (membership fees and payment for direct services), and the CHF 2 million agreed in the performance contract with the Swiss Federal Office for Energy (SFOE). The spending in real terms by the companies is believed to have been of a similar amount. The impact in terms of energy saving and CO_2 reduction was more than double that of the previous year.

Appliances

Labels indicating the energy consumption of household appliances were the subject of a campaign by SwissEnergy's Marketing and Communication section in 2002, in support of their introduction as a legal requirement as of 1 January 2002. A survey at the end of June 2002 indicated an energy label awareness level of 40%, thanks to TV commercials, information brochures, advertisements and presentations at trade fairs and exhibitions. The campaign and broad support for the label in the retail sector ensured that consumers' attention was focused on these energy-efficient appliances (■ Annual Report, Electrical appliances).

The next step for the promotion of energy-efficient appliances involved four-year "framework agreements" on related projects and their financing, which the SFOE signed in May 2002 with the Energy Agency for Electrical Appliances, representing trade and consumer organisations, and the Swiss Agency for Energy Efficiency, representing environmental and consumer organi-

"Close co-operation with the private sector is essential if we are to make any real progress in combating climate change. This is the path SwissEnergy has chosen."

Carol Franklin, partner in an organisation called "Thinking ahead – for a responsible attitude to the future"

■ Annual Report of the eae
■ Annual Report, S.A.F.E.

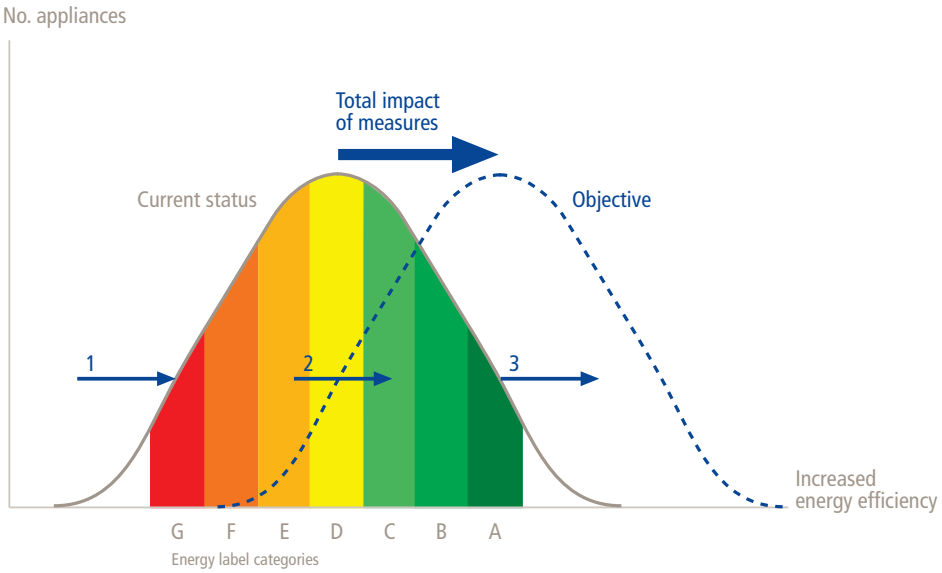


Fig. 9
Strategy for household appliances

1 Import restriction on appliances with high power consumption, as per EU guidelines

2 Promotion of energy-efficient appliances (A) by providing information (energy label), encouraging replacement of older models, and through education and consulting

3 Development of high efficiency appliances (A+, A++)

sations. The agreements are based on an agreed strategy for stabilising the total electricity consumption of household appliances through the continued promotion and development of more energy-efficient appliances, while encouraging the replacement of older models, promoting general use of the energy label and defining criteria for restricting the approval of the least energy-efficient appliances in accordance with European Union guidelines.

The Energy Agency for Electrical Appliances (■ Annual Report of the eae) promotes awareness of the energy label for household appliances. The main aim is to ensure that consumers think of energy consumption when choosing an electrical appliance and use such appliances as sparingly as possible. At international conferences, the Agency ensures that Switzerland's views on energy efficiency are heard, and takes note of the best practices in other countries. Two web sites (www.eae-geraete.ch and www.energyBrain.ch) and a special hotline launched at the end of 2002 answer questions from consumers and the trade concerning the energy consumption of electrical appliances. Another project provides information on the internet to help consumers choose refrigerators, freezers, washing machines and clothes dryers that consume the least energy. The trade also provides data for determining the energy consumption of various appliances. Energy efficiency has been incorporated into training modules.

The www.topten.ch web site of the Swiss Agency for Energy Efficiency (■ Annual Report, S.A.F.E.), which provides information about the most efficient electrical appliances, was visited 250 000 times in the year under review. It also produces an information bulletin in printed form, and on the www.energybox.ch web site it provides homemakers with advice on how to reduce electricity consumption. It prepared a competition ("Golden Plug") to be held in 2003, distributed a brochure on lighting, launched a market control instrument for assessing the success of energy labels for household appliances and light bulbs over the long term, and began testing the twelve low-energy light bulbs found on the market, to be completed in autumn 2003.

The authorised equity capital of both S.A.F.E. (72%) and the eae (over 90%) clearly exceed the 60% level required by the Swiss Federal Office for Energy. (funding by SwissEnergy in 2002: for the eae, CHF 0.8 million; for S.A.F.E., CHF 0.7 million; declared equity and third-party contribution: eae, CHF 8.4 million, S.A.F.E., CHF 1.8 million.)

Annual Report, Mobility
Annual Report, e'mobile

Mobility sector

Approximately one-third of total CO_2 emissions in Switzerland are due to road traffic. Striving for energy efficiency in mobility is therefore one of the main priorities of SwissEnergy (■ Annual Report, Mobility). The objective is to reduce CO_2 emissions caused by the consumption of motor fuels by 8% from the 1990 level by 2010. In the meantime the trend is still in the opposite direction: between 1990 and 2002, CO_2 emissions from the consumption of motor fuels rose by almost 7%. There is thus an urgent need for action. In the year under review, while continuing to use the most successful products, the Mobility section expanded its sphere of activities and managed to double its impact on energy efficiency compared to 2001.[1]

Co-operation within the Federal Department of Environment, Transport, Energy and Communications (DETEC), notably with the Human-powered Mobility section of the Federal Roads Authority and the Federal Office for Spatial Development, and with external partners was intensified in the course of the year. The possibility of making the SwissEnergy programme an integrated part of federal transport policy is currently being evaluated.

The objective agreed with Swiss car importers ("auto-schweiz") calls for a reduction of the average fuel consumption of new cars from 8.4 litres per 100 kilometres in 2000 to 6.4 litres by 2008. In 2002 average consumption fell by 2.3% to 8.1 litres (objective: 7.9 litres). Looking ahead to 2008 it is clear that greater efforts will be needed to reach the 6.4-litre objective. Appendix 3.6 of the energy ordinance, which took effect on 1 January 2003, requires the declaration of fuel consumption, CO_2 emissions and energy efficiency of new motor vehicles, and this should help. The energy label will make it easier for shoppers to identify the most energy-efficient models. For the launch of this new energy label SwissEnergy mounted a publicity campaign with TV commercials, posters, presentations at trade fairs and exhibitions, and a special brochure. A fuel consumption catalogue published by the Touring Club of Switzerland and a similar guideline edited by the Road Traffic Club of Switzerland will provide valuable support for the new label as will the expanded energy label homepage (www.energieEtikette.ch). A survey conducted in June 2003 showed that the campaign reached 46% of the population, thanks to successful co-operation with SwissEnergy partners.

The promotion of motor vehicles fuelled by compressed natural gas (CNG) will also help reduce traffic-related CO_2 emissions, since CNG emissions are 20% lower than those of petrol-fired vehicles. In June 2003, parliament took an important step in this direction by approving a motion calling for a reduction in the taxation of natural gas used as fuel for motor vehicles, by at least 40 centimes per equivalent litre of petrol (100% reduction for biogas). In the same month, the Swiss Gas Industry Association (VSG) and the Agency for Renewable Energies and Efficient Energy Use (AEE) signed an agreement according to which the gas industry will expand its network of compressed natural gas (CNG) and biogas filling stations from 30 to 100 by the time the tax reductions take effect. The VSG also guarantees to buy biogas equal to 10% of the volume of CNG sales, at attractive prices. Biogas producers will correspondingly expand production to ensure adequate supplies. Another aim is to increase the number of hybrid vehicles able to run on either petrol, CNG or biogas from the 600 at present to around 50 000 by 2010. This would help reduce CO_2 emissions by about 52 000 p.a. The e'mobile association (■ Annual Report, e'mobile), which also promotes energy-efficient motor vehicles, included electric, hybrid and efficient conventional vehicles as well as cars that run on gas in its 2002 range, for example on its information stand at the Geneva car show. SwissEnergy provided about 38% of total e'mobile's funds amounting to CHF 1 million. (funding by SwissEnergy in 2002: CHF 0.4 million; declared equity and third-party contribution: CHF 0.6 million.)

[1] Communication measures for the promotion of energy-efficient vehicles were given priority. While their impact is extremely difficult to quantify, as of 2003 a new set of evaluation tools may overcome this problem.

"Half of all the journeys made by car are less than five kilometres. By persuading people to travel by bicycle or on foot we can significantly reduce our reliance on fossil fuels."

Yves Christen, President of Veloland Schweiz and President of the National Council in 2002/03

- Annual Report, Eco-Drive® Quality Alliance
- Annual Report, VEL2
- Annual Report, Mobility CarSharing Switzerland, 2002

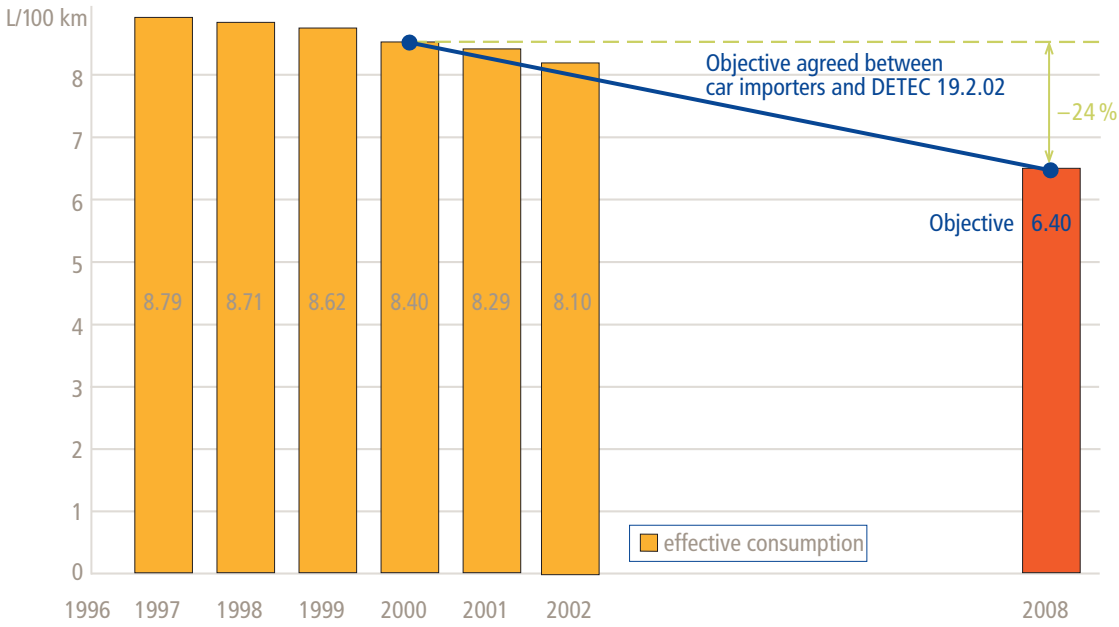


Fig. 10
Agreement regarding the specific fuel consumption of new cars

In 2002, a total of 36 000 people attended Eco-Drive® courses to learn "ecological driving", a technique with the potential to reduce fuel consumption by 10–15% (■ Annual Report, Eco-Drive® Quality Alliance). Most of the 107 000 tonnes of CO_2 emissions saved in 2002 was in the heavy goods vehicle transport sector. The fact that this technique is required to pass the driving test in Switzerland – as of 1 April 2003 when a new road traffic ordinance took effect – is a clear indication of the success of Eco-Drive®. Nearly 80% of all proven motor fuel savings in 2002 resulted from the activities of Eco-Drive® Quality Alliance. (funding by SwissEnergy in 2002: CHF 1.2 million; declared equity and third-party contribution: CHF 1.8 million.)

The "Associazione VEL2" (■ Annual Report, VEL2) has been given the task of promoting energy-efficient vehicles by the canton of Ticino. About 25% of its financing is provided by Swiss Energy. By the end of 2002, VEL2 had met the canton's objective, with 600 newly registered energy-efficient vehicles (max. 120 grams of CO_2 per kilometre; Euro 4). Further efforts are necessary if SwissEnergy is to be successful in its goal of making Ticino a mobility showcase, in particular through projects promoting human-powered mobility and combined mobility. (funding by SwissEnergy in 2002: CHF 0.9 million; declared equity and third-party contribution: CHF 1.3 million; contribution from canton Ticino: CHF 1.8 million.)

Another organisation which promotes energy-efficient, environment-friendly motor vehicles is the Swiss Road Traffic Association, which has compiled a complete handbook of ecological vehicles in German and French for its members and for fleet operators. Thanks to the Associazone VEL2, this is also available in Italian.

In the area of combined mobility, SwissEnergy supported four of the Mobility sector's projects (■ Annual Report, Mobility CarSharing Switzerland, 2002) designed to appeal to new client categories. In the year under review more than 50 000 members of the Mobility association used the 2000 vehicles (status as of spring 2003) placed at their disposal. The "Mobile Switzerland" project to promote sustainable leisure-time and tourism transport, had to be scaled down when the federal government decided not

- Annual Report, NewRide
- Annual report, Cycling in Switzerland, 2002/2003
- Annual Report, Renewable energies
- Annual Report, AEE

to provide 50% of the funding. Support is being provided however for a sub-project ("MobilCenter") aimed at creating an information platform for combined mobility. The project leader is the Public Transport Association, in collaboration with Swiss Federal Railways and "Veloland Schweiz" (Cycling in Switzerland). Support is also being provided for a similar project, "MobilService" (www.mobilservice.ch), an information platform for transport professionals interested in sustainable mobility. SwissEnergy is also promoting developments in the area of human-powered mobility, including the "NewRide" project in which canton Bern and several towns including Zurich, Basel and Neuchâtel have joined together to promote cycling (■ Annual Report, NewRide), Cycling in Switzerland (■ Annual report, Cycling in Switzerland, 2002/2003); other activities include "Fussverkehr Schweiz" (promotion of walking), and models for sustainable mobility strategies at the communal and cantonal levels (e.g. in Ticino).

The renewable energies sector

The production of electricity and heat from renewable forms of energy (excluding hydropower) amounted to 900 GWh and 7960 GWh, respectively, in 2002. One-fifth of the way through the SwissEnergy programme (2000–2010), 10% of the target of increasing by 500 GWh the electricity generated by renewables has been achieved, and 20% of the heat production target of an extra 3000 GWh. There is need for further effort in renewable electricity generation (■ Annual Report, Renewable energies).

In 2002, hydropower production was down by about 5700 GWh on the previous year due to weather-related factors, and was slightly below the level of the year 2000. Even so, given the estimated average expected production, the objective of stabilising hydropower production at its 2000 level is still comfortably within reach. The estimated average expected production increased by 545 GWh between 2000 and 2002.

Thanks to a supplementary credit of CHF 4 million approved by parliament the promotion of renewables was given an extra boost. The networking of the various players was improved by the Agency for Renewable Energies and Energy Efficiency (■ Annual Report, AEE). An evaluation showed that marketing efforts need to be more sharply focused on target groups, and that centres of excellence are needed to help consolidate the wind, geothermal and small hydro sectors.

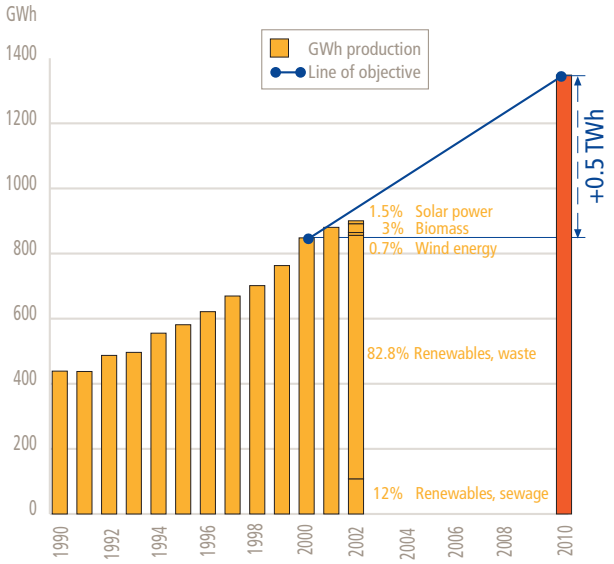
Much of the success achieved is thanks to the promotional programmes of the cantons. The Energy Act stipulation that after a period of transition, as of 2004 federal subsidies are to be divided among cantonal promotion programmes on the basis of performance, began to influence the priorities of these programmes in the course of 2002. This resulted in a change of emphasis, from subsidizing specific types of renewable energy to whichever measures were the most effective. The main loser was photovoltaics (–40%), while the winners included wood energy, energy efficiency and MINERGIE projects (+170%).

"Promoting renewable forms of energy means taking concrete steps to combat climate change and simultaneously creating jobs."

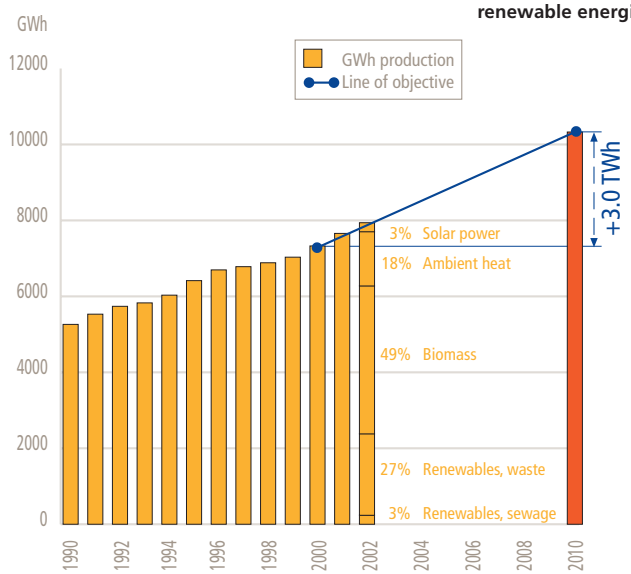
Regine Aeppli, executive member of the Zurich cantonal government

- Annual Report, Wood energy
- Annual Report, Swiss Association for the Promotion of Heat Pumps
- Annual report, Geothermal network
- Annual Report, Solar energy

Fig. 11
Production of electricity and heat in Switzerland by renewable energies



Electricity generation (excl. hydropower)



Heat production

The renewables sectors

Wood is the most important renewable energy source for the production of heat (■ Annual Report, Wood energy). In 2002, wood heating systems benefited from special promotion measures financed by what remained from the extraordinary credit granted following hurricane Lothar (CHF 9.7 million). The main beneficiary was automated boilers fuelled by wood pellets, with 537 new units commissioned (+70.2%). New capacity included 193 other automated boilers (+4.1%). The gross consumption of wood energy rose by 2.5%, compared to the previous year (+3.0%). This is equal to 90 000 cubic metres of wood, replacing about 18 000 tonnes of heating oil and reducing CO_2 emissions by 52 000 tonnes. Communal waste incineration plants which support district heating grids rank second in the production of heat from renewables.

The sale of heat pumps in 2002 (■ Annual Report, Swiss Association for the Promotion of Heat Pumps) rose by 5.4% to a record 7554 units. Approximately 45% of all new single-family dwellings now operate heat pumps. Their use in renovated buildings, where investment costs are higher, has remained constant. A new approach based on larger heat pumps may prove successful. Of particular interest as a source of heat in the short term, attested by the success of many projects, are the communal sewage systems of towns with more than 3000 inhabitants. As for borehole heat exchangers, their total length has grown to over 490 000 metres and is now out of proportion to the number of installed units. The Swiss Association for the Promotion of Heat Pumps and the Swiss Geothermal Energy Association (■ Annual report, Geothermal network) have increased their level of co-operation.

In an effort to end four years of stagnation, SWISSOLAR launched a campaign in 2003 focusing on specific target groups to promote the use of solar energy for heating (■ Annual Report, Solar energy).

The Electricity Market Act, which was rejected in the referendum of 22 September 2002, would have improved the outlook for "green power". As an alternative the Agency for Renewable Energies and Energy Efficiency and RECS (Renew-

Annual Report, "Suisse Eole"

able Energy Certificate System Switzerland) joined forces to promote trading with green certificates. Around 60% of the population now have access to green power. One of the best examples of its growing success in the market is the "naturemade" product range, offered by various utilities and supported by SwissEnergy as a model for the promotion of renewables. In the case of pure solar power, up to 5% of subscribers are willing to pay a surcharge of as much as one Swiss franc per kWh. The volume of green power sold trebled in 2002 from the 49 GWh of the previous year to 174 GWh – an impressive success rate.

The vast majority, 83%, of electricity production from renewable energy sources other than hydropower comes from the incineration of waste, roughly half of it wood or other vegetable matter. Energy from sewage treatment plants accounts for 12% (cf. Infrastructure systems, page 16).

New wind turbines on Mont Crosin (canton Bern) and Gütsch near Andermatt in canton Uri increased Switzerland's total installed wind capacity to about 5.3 MW (■ Annual Report, "Suisse Eole"). The 5.4 GWh of wind-powered electricity in the year under review is equal to about 10% of the objective set for this type of energy by the Federal Department of the Environment, Transport, Energy and Communications (DETEC) in November 2001, to be achieved by the year 2010. Although the cantons support this policy there is a certain amount of resistance from nature and "national heritage" protection groups.

Despite the winding down of official promotional efforts, the installed output capacity for photovoltaics in the year 2002 rose by 5%, while green power sales increased significantly (e.g. "naturemade"). Renewables have also benefited from the spread of the MINERGIE standard and the introduction in eight cantons of legislation restricting the use of fossil fuels for heating in new buildings to a maximum of 80%.

2002 (in CHF million)	Funding by SwissEnergy	Declared equity & third-party contributions
Biomass	1.2	0.2
Geothermal	1.0	0.1
Wood (excl. "Lothar")	1.4	3.0
Small hydro	0.3	0.1
Photovoltaic	1.3	0.6
Solar (thermal)	2.3	1.1
Heat pumps	2.3	2.1
Wind	1.1	0.1
Total	**10.9**	**7.3**

■ Impact Analysis SwissEnergy 2002
■ SwissEnergy impact analysis 2002, the effectiveness of promotional measures and their economic impact
■ Report on the development and basis for calculation of energy consumption in 2002 compared to 2001 and 1990

Impact in 2002

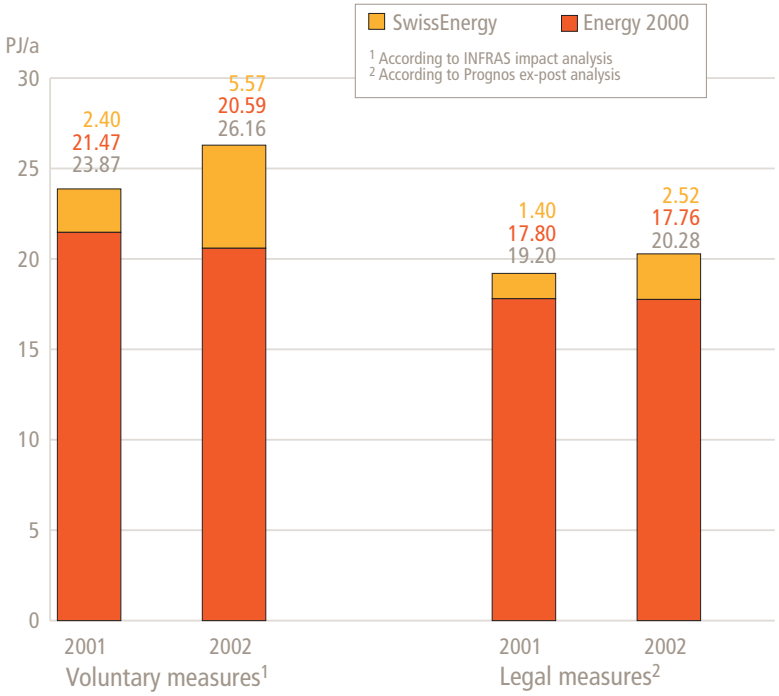


Fig. 12
Impact in 2001 and 2002 of measures taken since 1990 in the context of the Energy 2000 and SwissEnergy programmes

Evaluation procedures

In accordance with the Energy Act, which requires the government to regularly check the extent to which the objectives of Energy 2000, and subsequently SwissEnergy, are being achieved, the impact of these programmes has been evaluated each year. The evaluation methodology is constantly refined. In addition to detailed evaluation of specific activities, two important assessments have been made of the programme as a whole:

- The SwissEnergy impact analysis (■ Impact Analysis SwissEnergy 2002) carried out by INFRAS examines the programme's impact on energy consumption, employment and the environment, focusing on voluntary measures and using mathematical models developed for the purpose by INFRAS. The economic and financial impact is also assessed. The impact analysis for 2002/03 was evaluated by the Center for Energy Policy and Economics at the Federal Institute of Technology, Zurich (■ SwissEnergy impact analysis 2002, the effectiveness of promotional measures and their economic impact).
- The ex-post analysis carried out by Prognos (■ Report on the development and basis for calculation of energy consumption in 2002 compared to 2001 and 1990) looks at the annual variations in the consumption of energy in all its forms, and tries to find the reasons for these and the influence exerted by Swiss Energy legal and voluntary measures. Specially developed "bottom-up" models are used for assessing the trend in each sector.

■ annual evaluation conference on 19–20 June 2003 in Lucerne

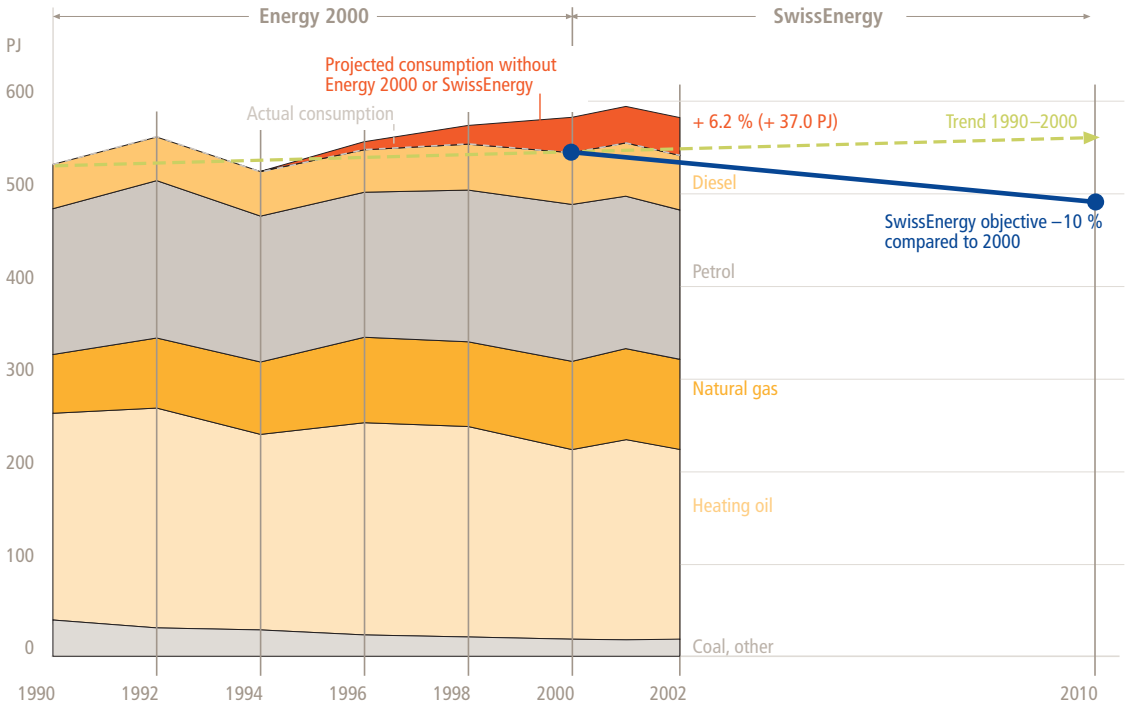


Fig. 13
Consumption of fossil fuels

These reports were discussed during a workshop at the ■ annual evaluation conference on 19–20 June 2003, in the presence of an external specialist.

The impact of SwissEnergy in the energy market and its contribution to climate policy

The overall impact of SwissEnergy has increased significantly in the programme's second year. While the energy savings achieved through voluntary, promotional and legal measures taken in 2001 amounted to around 3.8 PJ or 0.4% of total final consumption in 2001, the savings in 2002 was some 13% higher at 4.3 PJ or 0.5% of final consumption. The improvement is mainly due to the voluntary and promotional measures, the impact of which increased by about 30%. As for the impact of legal measures, this fell by 20% from 1.4 to 1.12 PJ, partly due to mild weather. Many legal measures indeed are intended to reduce heating fuel requirements. But it also reflects the fact that technical standards for heating systems have improved to such an extent that the clean air ordinance no longer has a meaningful impact.

Thanks to the cumulative impact of measures taken since 1990 in the context of Energy 2000 (1990–2000) and SwissEnergy, energy consumption in the year under review was reduced by 46.5 PJ, a figure which includes the substitution of fossil fuels by renewable sources. This is equal to 5.9% of total Swiss energy consumption (2001: 5.2%). The saving in energy costs amounted to CHF 1.4 billion.

Between 2001 and 2002 the consumption of fossil fuels (excluding aviation gas) fell by 2.6%. Although this was again mainly due to mild weather (3.7% fewer heating-degree days) and falling industrial production (down by 5.3%), SwissEnergy also contributed. According to the evaluation experts (Prognos and INFRAS) the legal, voluntary and promotional measures taken between 1990 and 2002 reduced total energy consumption by 6.2% in the year 2002, i.e. without these programmes the consumption of

Savings achieved by Energy 2000 and SwissEnergy as a percentage of total energy consumption (in %)

	2001	2002
Voluntary measures	3.0	3.3
Legal measures	2.2	2.6
Total	5.2	5.9

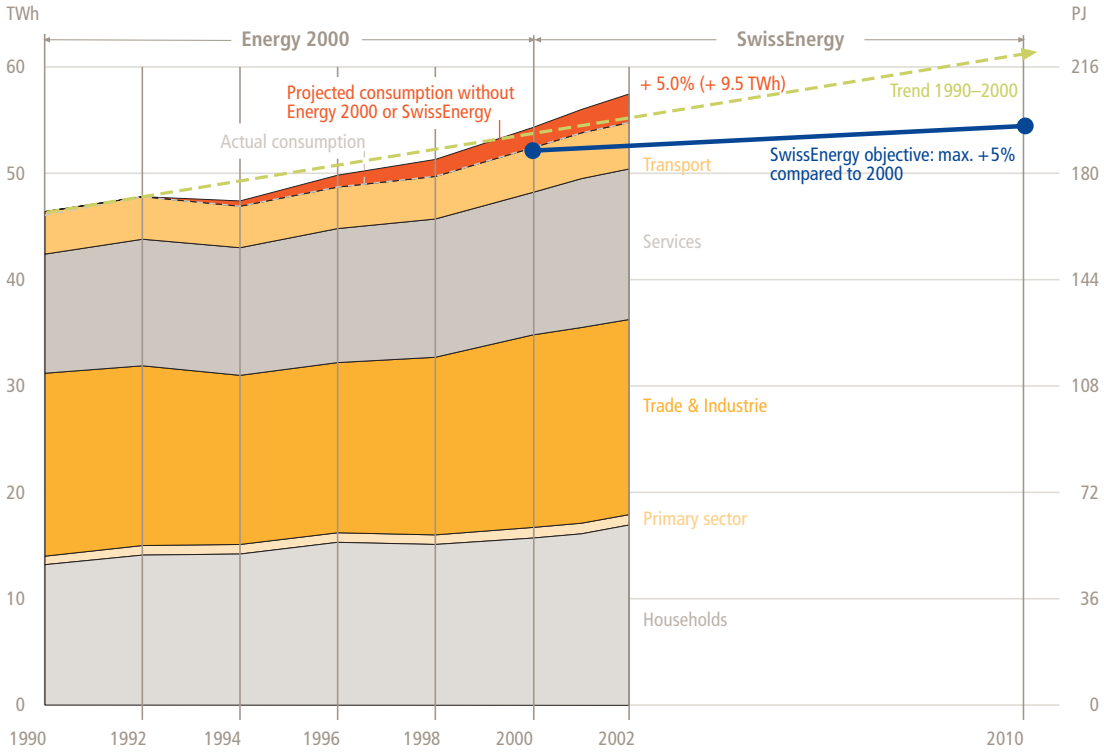
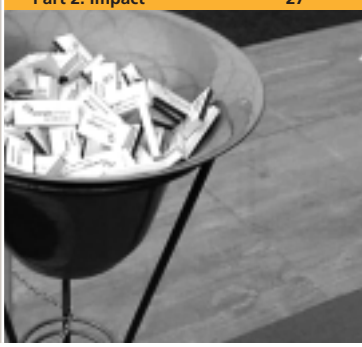


Fig. 14
Consumption of electricity

fossil fuels would have been 6.2% higher. Even so the actual consumption of fossil fuels between 1990 and 2002 increased by 3.7%.
The implication is that it will only be possible to achieve Switzerland's target of a 10% reduction in fossil fuel consumption by 2010 if additional measures are taken to significantly increase the impact of SwissEnergy.
Electricity consumption increased by 0.5% in 2002. Since 2000 it has increased by 3.2% and since 1990 by 16%. SwissEnergy is therefore failing to have the desired impact in this area, i.e. to limit growth to a maximum of 5% till 2010 compared to 2000. However, the above-mentioned impact and ex-post analyses show that electricity consumption would have been 5% higher still in the year under review without the contributions of Energy 2000 and SwissEnergy.

In 2002, emissions of carbon dioxide in Switzerland (40.8 million tonnes) were 0.7% lower than in 1990 after adjustment for climate factors. The CO_2 Act calls for a reduction of CO_2 emissions resulting from the consumption of fossil fuels by 10% from their 1990 level in the period up to 2010. The trend with respect to CO_2 emissions from combustibles and motor fuels shows that there is an urgent need for action in the area of transport. As for heating oils and other fuels, emissions have been reduced to 5.1% below the 1990 level. The ultimate target, a 15% reduction, therefore seems feasible, assuming that the programme impact will continue to increase.
The situation with motor fuels is considerably less promising. The growing volume of traffic and increase in average vehicle weight are two reasons why the energy saved through increased efficiency has failed to provide the desired result: CO_2 emissions from motor fuels in 2002 were 6.6% above the 1990 level.

Although significant, the reductions in CO_2 emissions achieved by Energy 2000 and SwissEnergy are by no means sufficient. Legal measures



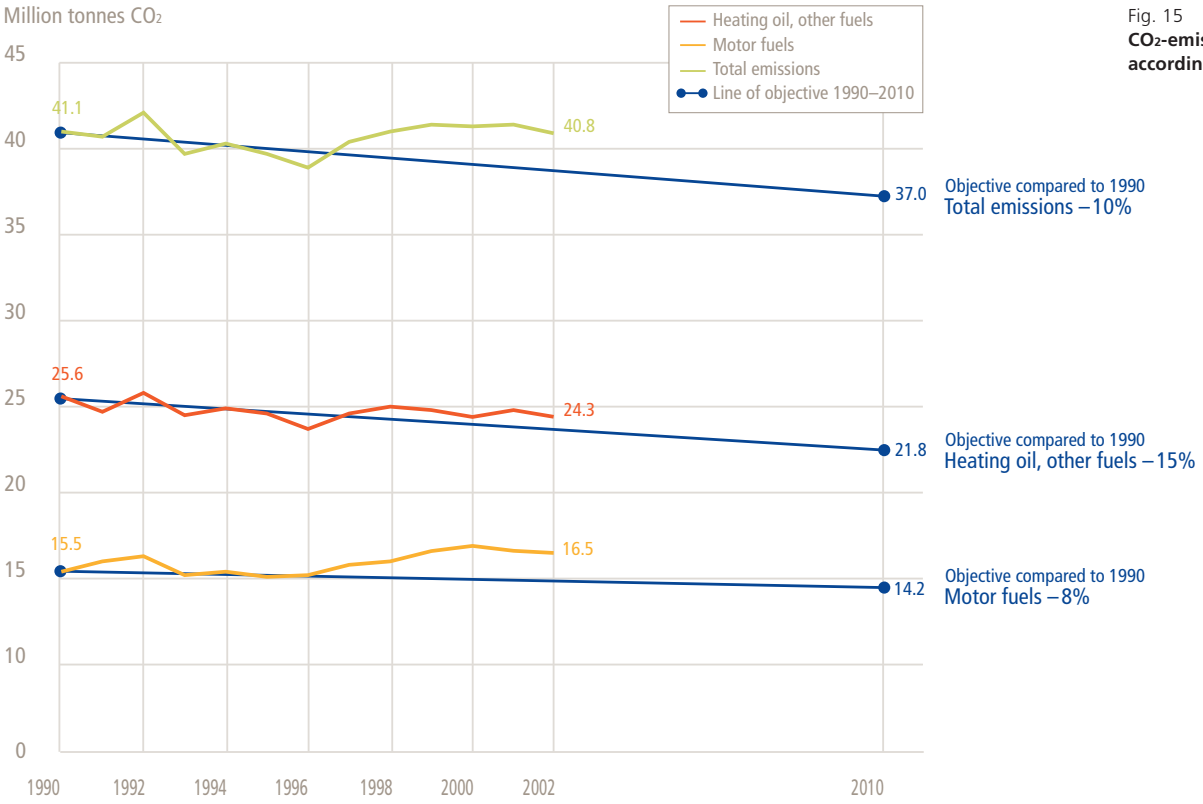


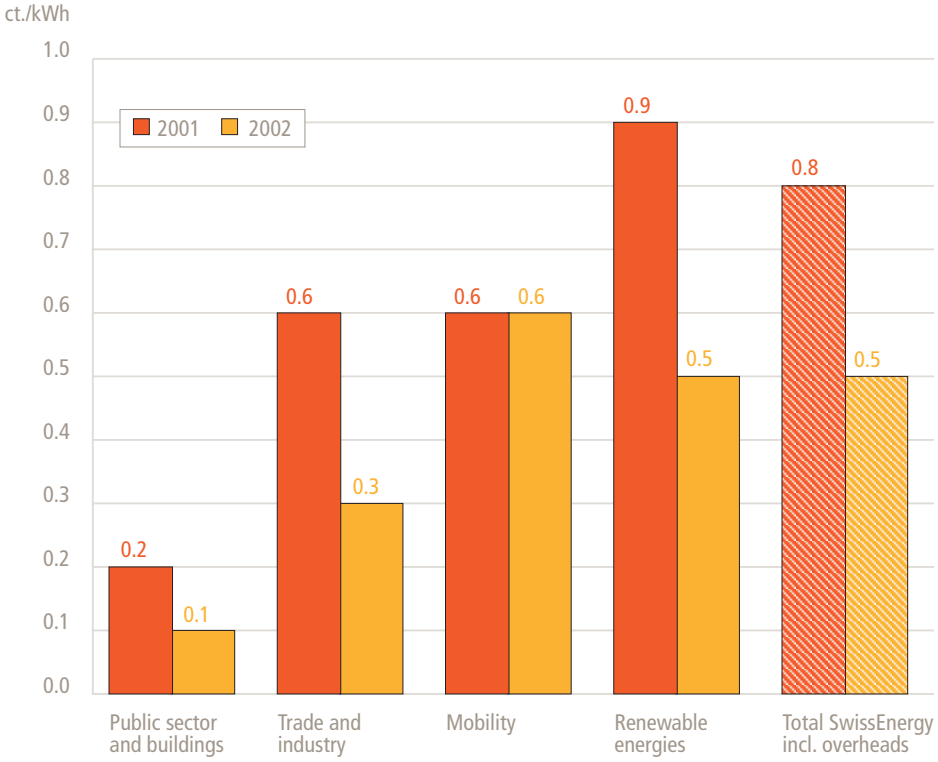
Fig. 15
CO_2-emissions and objectives according to the CO_2 Act

caused CO_2 emissions to fall in 2002 by between 1.1 and 1.6 million tonnes (depending on the CO_2 evaluation of electricity), voluntary measures by between 1.4 and 2.2 million tonnes. Without these efforts overall CO_2 emissions in Switzerland would have been 6–9% above the actual figure.

Cost-effectiveness – higher efficiency

The cost-benefit ratio of government spending on voluntary and promotional measures improved considerably during the year under review: the 0.8 centimes spent for each kWh of energy saved in 2001 was reduced in 2002 to 0.5 centimes. This improvement can primarily be attributed to the shift in emphasis to energy efficiency, programme optimisation in the transition from Energy 2000 to SwissEnergy, and the broader impact of various products. A significant contribution was made by products and networks developed by Energy 2000. In order of importance these are: Energy Towns, wood, Swiss energy model, heat pumps, MINERGIE, cantonal promotion programmes, Eco-Drive® and sewage treatment plants.

A glance at the figures for the various sectors in 2002 shows that the cost-benefit ratio discrepancies from the previous year, ranging from 0.2 centimes per kWh for the public sector and buildings to 0.9 centimes per kWh for renewables were reduced (from 0.1 cts/kWh in the public sector and buildings, to 0.6 cts/kWh in the mobility sector). The low cost of just 0.1 centime government spending per kWh of energy saved for the public sector and buildings, and for the "energy model" in the industry sector was due mainly to the long-term nature of the measures concerned. Cost-effectiveness in the area of renewables is heterogeneous, and was increased by cuts in some of the more cost-intensive segments. Other shifts, e.g. towards the production of renewable energy from sewage gas, waste incineration, drinking water and large heat-pumps also improved efficiency.



Grafik 16
Government spending per kWh of energy saved in 2001 and 2002

Impacts on investment and employment

SwissEnergy benefits the economy by replacing fossil fuel imports with investments in innovative, energy-efficient technologies "made in Switzerland". The impact analysis shows that public funding of around CHF 111 million – CHF 68 million in federal subsidies plus CHF 43 million million from the cantons (not counting direct federal contributions to the latter) – created investments totalling CHF 660 million through voluntary and promotional measures in the year under review. Factoring in the impact of legal measures, estimated at CHF 264, brings the total investment to CHF 924 million. Public funding in the energy sector thus clearly stimulates innovation and investment in the economy as a whole, creating export opportunities with direct or indirect benefits for many: the big companies, the construction sector, innovative small-to-medium enterprises (SMEs) in the services sector and elsewhere.

SwissEnergy legal measures provided employment for about 2100 people in 2002 according to the ex-post analysis, while according to the impact analysis voluntary and promotional measures provided jobs for another 3900. This adds up to 6000 full-time jobs in innovative sectors of the economy – in many cases these were new openings created at a time of general economic weakness.

Impact on public finances and unemployment insurance

The jobs created by SwissEnergy are an additional source of income tax and value added tax revenues, although not enough to compensate for the spending on the programme by the federal government and the cantons. The same is true if unemployment insurance is taken into account, since the federal contribution to the unemployment insurance scheme is determined by the total of all wages, and any loans made come from the federal treasury. Since the remaining contributions are made by employees and employers, any reduction of unemployment insurance directly benefits the economy. In the currently unfavourable economic situation, the ex-

KOF/ETH assessment of the INFRAS report

Expenditure	(CHF million)	Investments	(CHF million)
Federal government[1]	68	Voluntary measures[2] Total	**660**
Cantons (excluding direct federal subsidies)	43	of which	
		Public sector and buildings	155
		Trade and industry	20
		Mobility	10
		Renewables	475
		Legal measures[3]	264
Total (fed. govt. & cantons)	**111**	**Total investments**	**924**

[1] Incl. federal contributions to cantons (CHF 13m), Lothar programme (CHF 9.7m) and additional credit for renewables (CHF 4m)
[2] According to INFRAS impact analysis
[3] According to Prognos ex-post analysis

Fig. 17
Expenditures and investments in 2002

tra employment provided by the programme helps to reduce the unemployment rate. These additional reductions of payments to unemployment insurance have been estimated at between CHF 156 million and CHF 286 million a year by the INFRAS impact analysis. These estimates have been confirmed by the Economic Research Centre of the Federal Institute of Technology, Zurich (■ KOF/ETH assessment of the INFRAS report).

Scientific accuracy of the impact analysis

The companion evaluation by the Centre for Energy Policy and Economics (CEPE) of the Federal Institute of Technology, Zurich, confirmed that the impact analysis methodology used conformed to state-of-the-art international scientific practices. There are ways of both overestimating (e.g. double counting, pulling effects, unclear reference developments) and underestimating (e.g. imitation effects, lack of impact analysis for energy labels and indirect measures) the energy-related impact. In the view of the CEPE, the impact on fossil fuels and CO_2 emissions is fundamentally plausible, while the impact on electricity consumption and renewables has rather been overestimated.

The positive side-effects of many measures (e.g. additional comfort in MINERGIE homes, increased road safety resulting from energy-efficient driving techniques) have been neglected in the impact analysis. Likewise it has not been possible to quantify the medium-term impact on competitiveness of increased efficiency and innovations, or the reduction of external costs (e.g. in the health sector thanks to less smog in the summer and the reduced impact on the climate by CO_2 emissions). The CEPE found that Swiss Energy's impact on employment in real terms was underestimated because the evaluation method did not take secondary or external effects into account. It went on to state that "the evaluation of the energy policy programme, in the case of SwissEnergy, is very well done in the light of international standards, and there is every reason to believe that the programme is being carried out efficiently and effectively, according to changing circumstances. The recent report of the Paris-based International Energy

SwissEnergy: impact on employment, 2002 (public and private sectors)

	Man-years
Voluntary measures	
Pubic sector and buildings	1624
Trade and industry	177
Mobility	84
Renewables	2015
Total[1]	**3900**
Total, legal measures[2]	**2092**
Total	**5992**

[1] According to INFRAS impact analysis
[2] According to Prognos ex-post analysis

Fig. 18
Impact on public finances and unemployment insurance in 2002

Agency (IEA), after in-depth examination of Switzerland's energy policy in 2002, expressed the Agency's view that the results of SwissEnergy measures, together with cost-benefit ratios, have been carefully monitored and made public, and used to steer the programme.

Summary

SwissEnergy made significant progress in its second year, having a greater impact both in the energy sector and on the national economy in general.

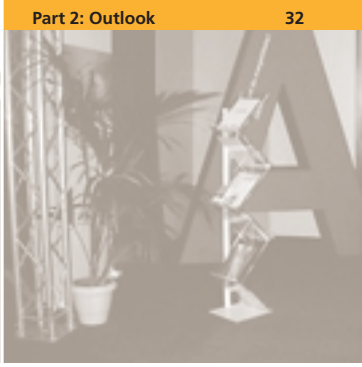
Despite this fact it is failing to meet its objective: reliance on non-renewable forms of energy is still increasing, with consumption of fossil fuels up by 3.7% since 1990 (–0.5% since 2000), and electricity consumption up by 16% (+3.2% since 2000).

Conclusions and outlook

The government's austerity budget calls for significant reductions in the funding of many programmes including SwissEnergy. The final decision will be taken by parliament this autumn. The parliamentary commissions of both houses have recommended cutting the funding of Swiss Energy from the usual CHF 55 million p.a. to CHF 32 million (–42%), as of 2006. The programme would be maintained as a co-ordination platform for energy and climate policy. A cut of this magnitude would reduce the programme's effectiveness, unless other measures were taken. The drying up of funds for pilot and demonstration projects, which help channel successful research findings to the marketplace, would have a negative impact on the development of energy-efficient technology, and above all on energy and CO_2 balances in the medium and long term, and also on Switzerland's standing as an innovative technology centre. The effect of reduced funds for voluntary measures and for federal contributions to cantons would almost certainly be quickly noticeable in terms of falling energy efficiency improvements and rising CO_2 emission levels. The objective of reducing CO_2 emissions as required by Switzerland's CO_2 Act and by the International Convention on Climate Change remains. But its achievement requires increasing efforts:

1. SwissEnergy's remaining funds will have to be employed even more efficiently and effectively. The leaner programme, entirely deprived of direct federal government subsidies after 2006, will need repositioning. Spending on publicity and information campaigns would be reduced as the programme refocuses its efforts on energy efficiency and in particular on systematic solutions such as CO_2 reduction objectives agreed with the private sector, diffusion of the MINERGIE standard and the Energy Town label. Renewables development will concentrate on the most promising technologies.
2. Co-operation with the existing partners (cantons, local authorities, agencies) will be intensified. New partners, particularly in the energy sector, shall be recruited to act as additional agencies for SwissEnergy activities such as "a centime for the climate" and the promotion of new technologies.
3. Existing legal measures shall be fully exploited, in particular labels indicating the energy efficiency of appliances and motor vehicles and related import restrictions (in step with the EU). Greater efforts will be needed in applying the Model cantonal energy regulations. Framework conditions for electricity generation from renewables shall be improved in accordance with the new Nuclear Energy Act which is due to take effect next year (labelling as to source, and compensation for autoproducers feeding the grid).

If it becomes clear that the CO_2 objectives cannot be met, despite these efforts the government will introduce a CO_2 tax. The greater the impact of SwissEnergy, the lower this tax will be.



SwissEnergy: priorities for 2004/05

Area	Partners	Measures
Buildings, energy efficiency	Cantons, MINERGIE	New/renovated buildings: – Implementation of the Model cantonal regulations – Promotion programmes (MINERGIE) – Cantonal buildings (to set an example)
	energho	Existing public buildings: Optimisation of operation of systems, subscription to energho
	SIA, S.A.F.E., eae, VUE	SIA 380/4, category A appliances, green power
Communes	SwissEnergy for the Communes (patron of Energy Town label)	Award of Energy Town label; CO_2 declaration
Infrastructure systems	VSA, SVGW, VBSA, FES	Renewable energy from sewage gas; Large heat-pumps (waterworks); Optimisation of operation
Trade and industry	Energy Agency for Industry, Cantons	Industry-wide agreement on objectives; implementation of module 8 of cantonal regulations model (major consumers)
Appliances	eae, S.A.F.E.	Promotion of energy label incl. categories A+ and A++; adoption of EU campaign to encourage replacement of older models
Mobility	auto-schweiz, AGVS, TCS, VCS	Implementation of agreed "–24%" objective: – Bonus/penalty clause for the motor vehicle tax – Reduction of tax on CNG/biogas
	Eco-Drive® Quality Alliance	Eco-Drive® driving test requirement, 2-stage instruction for learners. Co-operation with road safety organisations.
	Federal Office for Spatial Development, Federal Roads Authority, Federal Railways, Swiss Post, Energy Towns	Combined and human-powered mobility – Energy Towns – 22 September mobility day – SwissMobil, mobility centres
Renewable energies	Cantons, AEE and networks	Model cantonal energy regulations: max. 80% non-renewable energy NEL (Nuclear Energy Act): source identification/payment by grid operator Green power exchanges Promotional programmes
All areas	Oil importers Electricity & gas industries	"Centime for the climate", promotion of new technologies

2nd Annual Report of the SwissEnergy programme (2002/03)

Summary

The SwissEnergy programme has had a growing impact in its second year. Swiss Energy, and its predecessor, Energy 2000, reduced final consumption of energy in Switzerland by 5.9% in 2002. This enabled consumers to save around CHF 1400 million on energy costs. The programme stimulated investment in new technologies and renewable sources of energy, estimated at some CHF 900 million, while the impact on employment was an additional 6000 man-years.

SwissEnergy is a programme based on partnership between the federal, cantonal and local governments, various agencies, private sector and consumer organisations. In accordance with its government mandate, the programme must achieve Switzerland's energy and climate policy objectives and start putting energy supply on a sustainable basis through intelligent energy use and with greater use of "renewables".

Highlights of 2002

SwissEnergy – the "Energy 2000" follow-up programme – reinforced and expanded its activities in 2002. Some of the year's highlights:

- The first agreement on objectives with the industrial sector (cement industry) calls for a reduction of CO_2 emissions by up to 55% from the 1990 level by 2010
- Campaigns for the introduction of labels to indicate the energy efficiency of household appliances and motor vehicles, to achive greater transparency in electricity and fuel consumption
- Cantonal promotion programmes totalling CHF 56 million, on the basis of a federal contribution of CHF 13 million, with new priorities (e.g. the MINERGIE building energy efficiency programme).
- Increase in the number of communes participating in the Energiestadt ("energy town") programme (to 94, as of June 2003); in the number of companies (to more than 1000) developing agreed CO_2 reduction targets; and in the number of "green power" electricity exchanges (access of over 60% of all consumers).
- "Ecological" driving instruction (Eco-Drive®) to be an obligatory part of the driving licence test programme as of 1 April 2003.

Increased impact on energy use

SwissEnergy voluntary and legal measures introduced in 2002 increased the programme's effectiveness compared to the previous year by about 13%, to 4.3 PetaJoules (PJ). This is equal to approximately 0.5% of total Swiss energy consumption, with a corresponding saving in energy costs of about CHF 120 million. Taking into account the cumulative impact of both Energy 2000 and SwissEnergy in the 1990–2001 period, the savings in the year 2002 amounts to 5.9% of total energy consumption or around CHF 1400 million in energy costs, plus a reduction in CO_2 emissions of between 6 and 9%, depending on the electricity mix. In other words, had it not been for these two programmes, CO_2 emissions in Switzerland would have been 6–9% higher than at present.

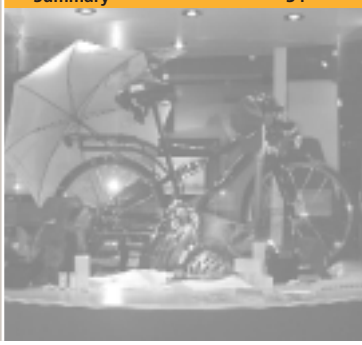


Fig. 19
SwissEnergy programme objectives and results

	Objectives	Status 2002	Status without SwissEnergy/ Energy 2000[4]
Efficient energy use			
Consumption of fossil fuels[1/2]	–10%	–0.5%	+5.7%
Electricity consumption[2]	≤ +5%	+3.2%	+8.2%
CO_2 emissions[1/3]	–10%	–0.7%	+5.6 to +8.8%[6]
from heating oils, and other fuels[3]	–15%	–5.1%	+3.5 to +8.4%[6]
from motor fuels[1/3]	–8%	+6.6%	+9.1 to +9.4%[6]
Renewables			
Hydropower [2/5]	Stabilisation	+1.6%	not available
Other renewables			
Electricity[2]	+ 0.5 TWh (+ 1%)	+0.051 TWh	0.0265 TWh
Heat[2]	+3.0 TWh (+ 3%)	+0.63 TWh	0.18 TWh

[1] Excluding international flights; within Switzerland, as per law on CO_2
[2] Compared to 2000
[3] Compared to 1990
[4] Impact analysis estimate
[5] Mean expected production
[6] Depending on electricity mix (Switzerland or EU)

In 2002, the effective level of CO_2 emissions was 0.7% below that of 1990, so efforts will need to be significantly intensified if Switzerland is to meet its target of a 10% reduction by 2010. As for the target of reducing CO_2 emissions caused by motor fuels by 8%, that will scarcely be possible without the adoption of new measures, e.g. a CO_2 tax.

Between 2001 and 2002, the consumption of fossil fuels fell by 3.2%. Although this was mainly due to milder weather and a slowdown in industrial production, SwissEnergy also contributed to the result. Even so, SwissEnergy clearly needs to have a greater impact if consumption is to be reduced by 10% compared to 2000.

Electricity consumption increased by 0.5% in 2002, and has thus risen by a total of 3.2% since 2000. This means that SwissEnergy is failing to meet its target in this area, the objective being to limit the increase in demand to a maximum of +5% in the period 2000–2010. However, without the two programmes, electricity consumption in 2002 would have been 5% higher.

In the renewables field, the goal of increasing their contribution to the production of heating energy by 3 TWh between 2000 and 2010 looks achievable at this point, as does the objective of stabilising the level of hydropower production. However, the goal of increasing the contribution of non-hydro renewable energy sources to electricity production is still 90% short of the targeted 0.5 TWh at this stage.

Improved cost/benefit ratio and economic impact

It cost 0.8 centimes in federal funds to save one kilowatt-hour (kWh) of energy through SwissEnergy measures in the first year, compared to just 0.5 cts/kWh in 2002. This indicates a significant improvement in the programme's efficiency.

According to the impact analysis, the CHF 111 million provided by the federal government and

the cantons for voluntary and legal measures – CHF 54 million federal funds, CHF 43 million from the cantons, CHF 9.7 million special credit for the "Lothar" wastewood programme, CHF 4 million for the promotion of renewables – triggered investments of over CHF 900 million. Swiss Energy thus benefited the economy considerably through innovations and investment, not to mention the export opportunities which directly and indirectly benefit not just the bigger companies but also hundreds of innovative small and medium-sized companies in the construction, trade and services sectors. The impact on employment of SwissEnergy measures, voluntary and legal, is equal to around 6000 man-years. This in turn has a positive impact on public finances in the form of additional fiscal revenue and value added tax (VAT), although not sufficient to pay for the total cost to the federal and cantonal governments of the SwissEnergy programme. Unemployment insurance, which is jointly financed by employers and employees, has also benefited at a time when the economic environment has been relatively poor: According to the impact analysis, the direct benefit to the economy, including both employers and employees, amounted to between CHF 156 million and CHF 286 million in 2002. The total net impact of SwissEnergy on the economy (public finances and unemployment insurance) has thus been positive.

Extra effort required

If Switzerland is to meet the requirements of its own energy and CO_2 laws, as well as its international obligations under the Kyoto Protocol, an extra effort is going to be needed. The more that can be accomplished with SwissEnergy through voluntary measures, promotional efforts and and by providing appropriate legal framework conditions, the lower the rate of the CO_2 tax that may eventually have to be introduced in accordance with the provisions of the CO_2 Act.

More about SwissEnergy

Periodicals and other publications

- ☐ 2001 Annual Report ("A Flying Start") First SwissEnergy Annual Report, including a CD-ROM with supplementary documents (free of charge – limited quantity available)
- ☐ SwissEnergy folder: informative pocket-sized brochure (16 pages, available free of charge in German, French and Italian)
- ☐ Energy Extra: journal of the Swiss Federal Office for Energy, published every 2 months (available free of charge in German and French)
- ☐ SwissEnergy – follow-up programme to Energy 2000: organisation of SwissEnergy, its objectives, strategies, measures (available in English, German and French)
- ☐ Final report of the Energy 2000 Action Programme: description and evaluation of the activities (available in English German and French)
- ☐ ENET news: information on energy research published quarterly (available free of charge in German and French)
- ☐ Energy Calendar: training courses and further education for energy specialists (free of charge). Published twice a year. May be downloaded from the following web site: www.energie-schweiz.ch
- ☐ SwissEnergy projects (updated by participants). Information may be downloaded from the following web site: www.misinteractive.ch
- ☐ SwissEnergy handbook: containing contact information and addresses for SwissEnergy partners (free of charge)

PR material

A broad range of SwissEnergy material is available for public presentations, exhibitions, lectures, etc., including display panels (in German and French), modules, give-aways, etc.

Internet sites and links

office@bfe.admin.ch · www.energie-schweiz.ch
www.energieforschung.ch · www.infoenergie.ch
www.misinteractive.ch

Ordering PR material

PR material and an up-to-date list of publications may be ordered from the Swiss Federal Office of Energy, 3003 Bern
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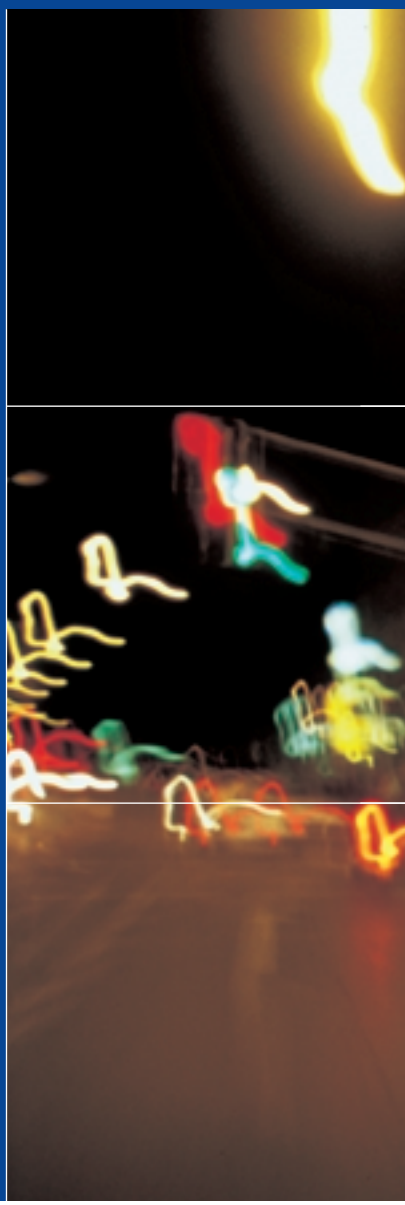
Contents of the CD-ROM

– SwissEnergy 2nd Annual Report 2002/03

– 13 documents Controlling, evaluation, impact analysis
– 16 documents Federal government and cantons
– 21 documents Agencies and networks
– 12 documents Towns, companies, organisations

"SwissEnergy: relentlessly on target!"

Walter Steinmann, Director of the Swiss Federal Office for Energy SFOE



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