A Flying Start

SwissEnergy 1st Annual Report 2001/02

swiss energy

what keeps you going?

This report covers the 2001 calendar year, but it also deals with the main activity carried out up to the middle of 2002.

Reference documentation available on CD-ROM.

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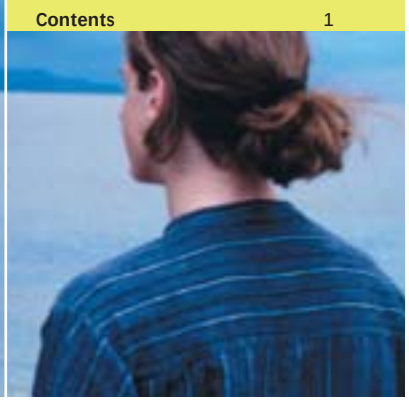


The first year
An overview

SwissEnergy was approved by the Federal Council on 17 January 2001, and on 30 January federal councillor and energy minister Moritz Leuenberger officially launched the programme as a "platform for an intelligent energy policy". The principal goals of SwissEnergy are to meet constitutional and legislative mandates to promote efficient energy use and use of renewable forms of energy, to achieve the objectives of the country's energy and climate policies and, thus, to pave the way for a sustainable energy supply.

The biggest challenge to be met in the first year was to make the transition from the previous program, Energy 2000, to its replacement, SwissEnergy, without losing momentum. To achieve this we continued to promote successful measures originated by Energy 2000, namely the Energy City concept, Switzerland's energy model for industry, Eco-Drive®, "e'mobile" ("EcoCar") and car-sharing, and expanded our partnership with cantons, municipalities and industry.

But we were also keen to learn from having identified weak spots in the Energy 2000 programme. We set out to streamline the organisation of SwissEnergy, create new symbols for energy efficient standards and define a new marketing and communications concept. We reinforced and standardised our controls and we integrated research and education more effectively.

In accordance with the Energy Act, we handed over certain major tasks to cantonal authorities and private agencies. The cantons went on to approve a joint SwissEnergy strategy and launch their own promotional programmes. We concluded various service agreements in the form of long-term contracts with energy agencies and other organisations active in the energy sector.

The Swiss Federal Office of Energy and the Swiss Agency for the Environment, Forests and Landscape jointly drew up guidelines for target agreements in accordance with the CO_2 Act and the Energy Act. An initial agreement was concluded with car importers in February 2002. On 1 January 2002 the Federal Council brought an energy efficiency label for the most important household appliances into effect. A campaign is currently in progress to promote this tool. A similar label for motor vehicles came into force on 1 October 2002.

We were not able to achieve all of our goals in the first year. The process of agreeing performance targets is taking longer than anticipated. There is little incentive for agreement on targets for buildings. Our relationship with our various partners needs to be improved,

SwissEnergy is a platform for an intelligent energy policy.

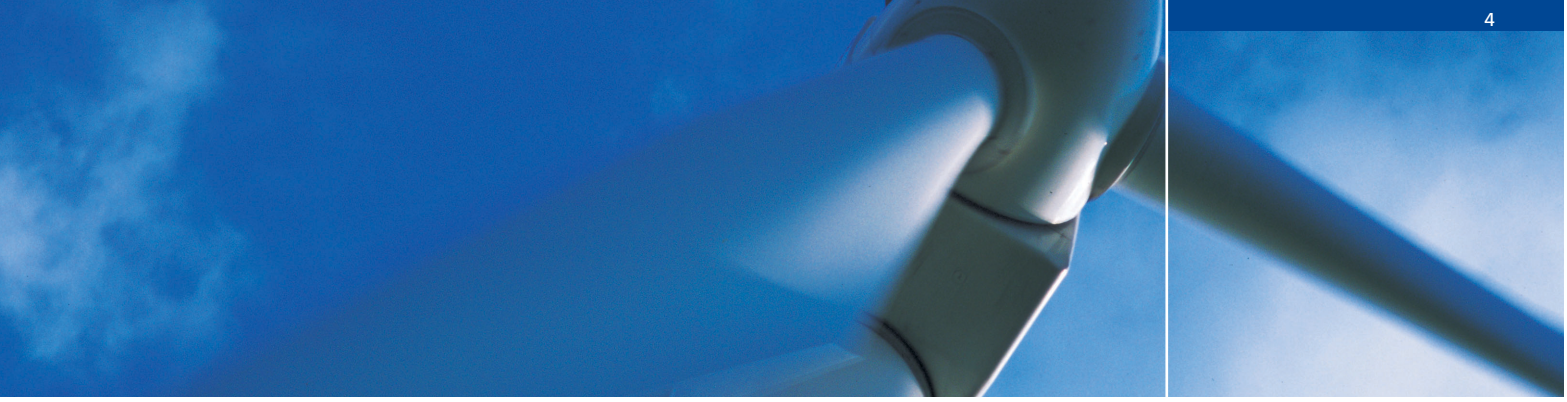
especially in connection with the presentation of successfully implemented projects. In many cases, the necessary public funding for realising sound models is lacking. With a budget of around 55 million Swiss francs per annum, it is extremely difficult to encourage an energy market worth 24 billion, a construction market worth 18 billion, and an automobile market worth 78 billion Swiss francs, to change habit for the sake of energy efficiency. After our first year of activity, we are able to report savings of 5.2 percent (versus 4.6 percent in 2000) in terms of overall energy consumption, of which 3 percentage points may be attributed to voluntary and promotional measures and 2.2 percentage points to legislative measures, mostly thanks to programmes successfully launched by Energy 2000 and adopted by SwissEnergy. In 2001, energy saved as the result of voluntary measures cost the federal government around 0.3 cents per kilowatt hour to promote, while the corresponding figure for renewable energy generated was 0.9 cents per kilowatt hour. In 2001 Switzerland was able to reduce CO_2 emissions by between 2.4 and 3.4 million tonnes (5 to 8 percent), through the influence of SwissEnergy. Between 260,000 and 380,000 tonnes were attributable to new measures implemented in the course of the year. According to our own estimates, we probably triggered investments worth 800 million Swiss francs and generated labour worth 4,700 man-years. Thanks to the widely publicised launch campaign, more than a quarter of the Swiss population were aware of the existence of SwissEnergy in June 2001. One year later, this figure had risen to 37 percent.

So we have succeeded in slowing down the increase in energy consumption, but not in halting it. With the exception of our impact on renewable energy, we are not yet on target. In 2001, consumption of fossil energy rose by 1.3 percent, while electricity consumption increased by 2.6 percent. For buildings, if we are to achieve a reduction of CO_2 emissions by 15 percent, it will be necessary to extensively implement the MINERGIE standard as well as optimise the operation of energy systems without delay. For transport, we will need to implement agreement on targets with automobile importers as well as significantly change the behaviour of road users, and we will need to set more effective targets with other trade, industry and services sectors.

The objectives of SwissEnergy are achievable. There is sufficient energy-efficiency potential and the Federal Council's strategy is sound. Next year, the main priorities are to reach comprehensive agreement on targets with industry, define a strategy for electrical appliances, provide incentives for the use of more economical motor vehicles, promote the use of human-powered mobility and combined transport, introduce regulations governing ecological driving behaviour and implement MINERGIE and "energho" programming for buildings. If we are unable to reinforce the SwissEnergy programme quickly and substantially, then the Federal Council will introduce a CO_2 fee as early as 2004 to make sure that objectives are achieved.

Hans Luzius Schmid, Head of the SwissEnergy programme, September 2002

With the exception of our impact on renewable energy, we are not yet on target.



The programme for implementing Switzerland's energy and climate policies

Objectives, strategy, organisation

On 17 January 2001 the Federal Council gave the go-ahead for SwissEnergy with its quantitative objectives and clear strategy for implementing Switzerland's energy and climate policies. The Federal Council regards SwissEnergy as an instrument for achieving the goals of its energy and climate policies as well as securing a sustainable energy supply.

Objectives and mandate

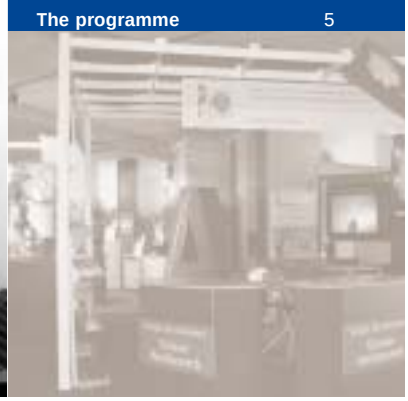
The objectives of the programme are based on the Kyoto international climate agreement, the Energy Act and CO_2 Act, and on the findings of Energy 2000. The strategy is to achieve these goals with more energy-efficient technologies and renewable forms of energy. The most efficient technologies currently available on the market require only 20 to 50 percent of the mean energy consumption of conventional buildings, appliances and motor vehicles. This means that, in the short-to-medium term, the most important contribution towards achieving CO_2 objectives will come from a more efficient use of energy. The most important source of renewable energy is hydropower, the backbone of Switzerland's electricity production. Other forms of renewable energy (wood, biomass, solar, geothermal, ambient heat, wind) still only represent a very small proportion of overall energy production. But some of them are nonetheless making rapid progress. They possess enormous potential.

SwissEnergy is intended to serve as an instrument to help us fulfil a constitutional mandate in accordance with the Energy Act and CO_2 Act, and especially to reduce CO_2 emissions by 10 percent in 2010 versus the reference year (1990), combustibles by 15 percent, motor fuels by 8 percent.

In the area of renewable energy, the aim is at least to stabilise electricity production from hydroelectric power plants, while increasing the proportion of other renewable energy forms for meeting the country's heating requirements by 3 percentage points, and its electricity requirements by 1 percentage point.

The objectives of SwissEnergy are achievable through the application of energy-efficient technologies and the use of renewable forms of energy.

One of the goals of SwissEnergy is to reduce CO_2 emissions by 10 percent by 2010 versus the reference year (1990), combustibles by 15 percent, and motor fuels by 8 percent.



Efficient energy use

	Targets		Status 2001
Consumption of fossil energies[1]	-10%	(versus 2000)	+ 2.2%
CO_2 emissions	-10%		+ 0.8%
from fossil fuels	-15%	(versus 1990)	- 3.7%
from motor fuels	- 8%		+ 7.3%
Electricity consumption	≤ + 5%	(versus 2000)	+ 2.6%

Renewable energy

Hydropower production	stable		+ 0.170 TWh
Other forms of renewable energy			
electricity	+ 0.5 TWh (+ 1% pt)	(versus 2000)	+ 0.032 TWh
heat	+ 3.0 TWh (+ 3% pts)		+ 0.411 TWh

1 excluding international flights; domestic principle as per CO_2 Act

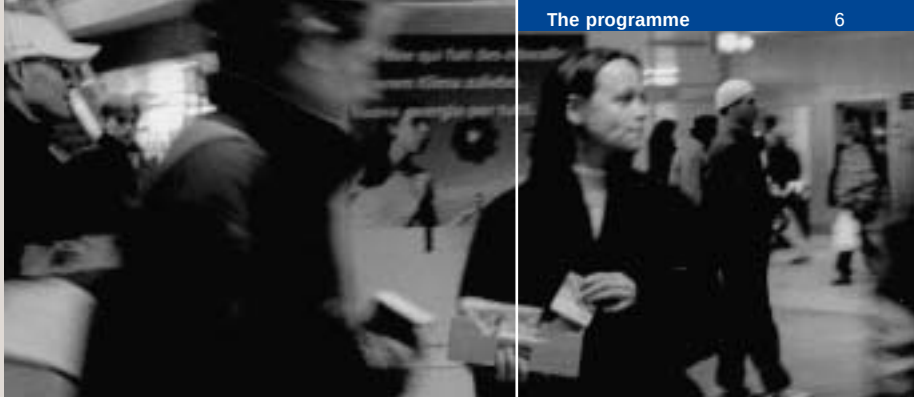
Fig. 1
Objectives of the SwissEnergy programme for 2010

Strategy

SwissEnergy's strategy comprises three main components:

- Its primary focus is on voluntary measures and agreements with the respective sectors and agencies. The various agreements are to contain jointly defined goals and measures that are binding for all contractual partners.
- On the other hand, federal legislation (Energy Act, Energy Ordinance, CO_2 Act) calls for (and enables) more comprehensive promotional and legislative measures in the area of energy. In particular, these include regulations governing energy consumption by buildings, motor vehicles and electrical appliances.
- If the various measures do not lead to the targeted results, then in accordance with the CO_2 Act, the Federal Council will introduce a CO_2 fee as early as 2004.

The SwissEnergy Strategy Committee convened twice in 2001. In the spring, it approved the programme's marketing and communications plans, labelling strategy and a training/further education concept. And at its autumn meeting it recommended a concentration of effort based on an initial analysis: the Energy Agency for Industry should focus on trade, industry and services, the cantons on buildings with the aid of a buildings agency; and the federal government on transport.



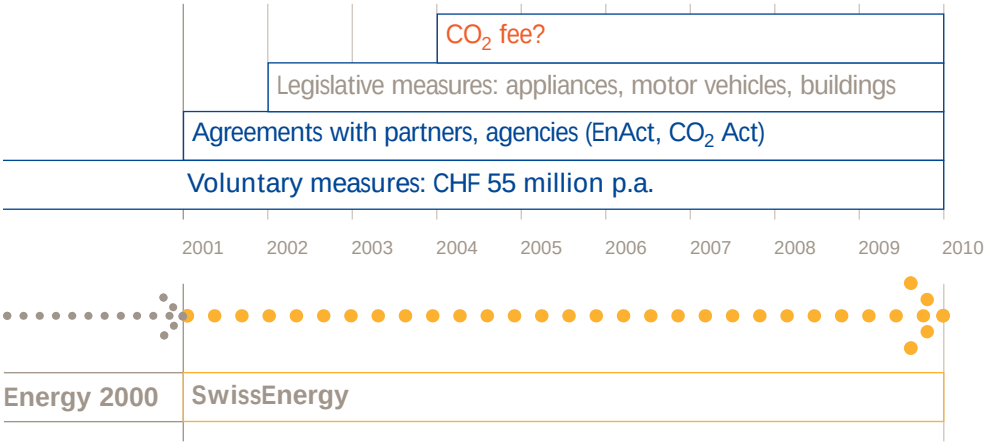


Fig. 2
SwissEnergy strategy

Organisation and partnerships

SwissEnergy is a federal government programme that involves cantons and municipalities, plus industrial, consumer and environmental associations. Its management (co-ordination, control and marketing) is the responsibility of the Swiss Federal Office of Energy. Partnerships are decisive for its success. All partners are integrated into the SwissEnergy programme and carry out significant implementation activities.

The programme is divided into four sections, as follows:

- Public sector and buildings: This primarily concerns activities on the part of the cantons in the buildings sector (e.g. enforcement of energy legislation, promotion programmes). The various activities are supported by SwissEnergy for Municipalities ("Energy City" label), the MINERGIE association for widespread implementation of efficient energy use and the use of renewable forms of energy – mainly with the aid of the MINERGIE standard – and "energho" as partner for efficient energy use in public buildings. Other important partners here are the Agency for Renewable Energies, the SIA and Swisscontracting.
- Industry: The main activities here are carried out by the Energy Agency for Industry, which brings the various sectors and users into the programme through target agreements. Other agencies (e.g. Swiss Agency for Energy Efficiency, and the Energy Agency for Electrical Appliances) also make an active contribution in the area of electrical appliances.
- Mobility: The main objectives here are to improve the energy efficiency of motor vehicles and transport systems in close co-operation with the federal transport authorities and participants in the "Energy City" programme, and to promote more efficient behaviour on the part of road

The management of SwissEnergy (control, marketing, co-ordination) is the responsibility of the Swiss Federal Office of Energy. It is its partnerships with the cantons, municipalities, energy agencies, the industry and numerous trade associations that are decisive.

Link to report (in original language)

■ Summary of SwissEnergy evaluation conference in Burgdorf, June 2002

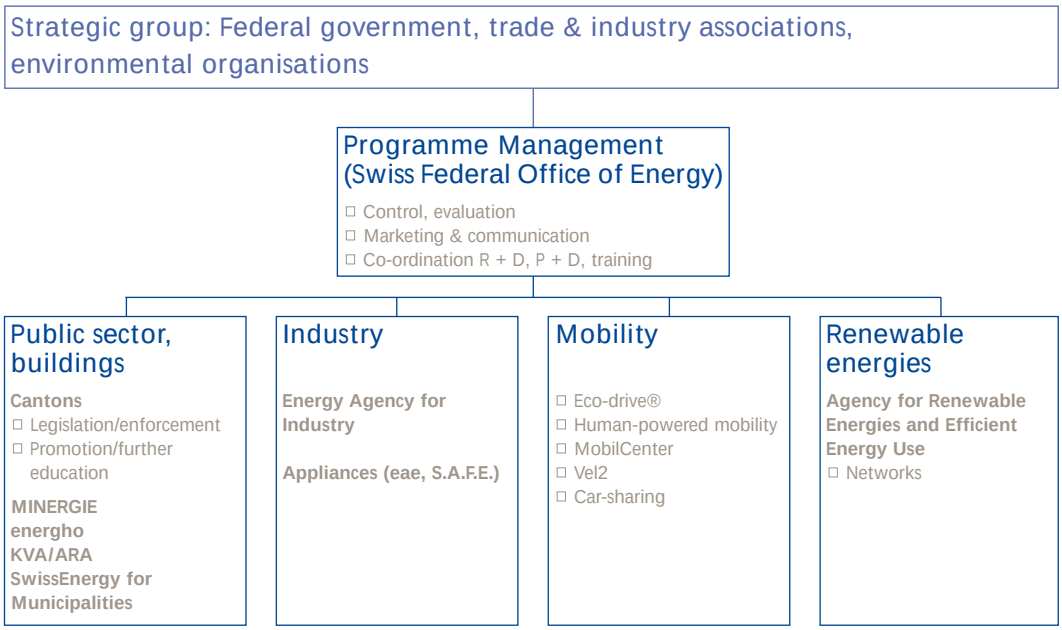


Fig. 3
SwissEnergy organisational chart

users (especially with the support of the "Eco-Drive®" Quality Alliance).

□ Renewable energies: The Agency for Renewable Energies and Efficient Energy Use is building up an ever more comprehensive network of all interest groups involved in the promotion of renewable forms of energy.

Various players and partners exchange ideas and findings at sector conferences, an annual evaluation and strategy conference and at other specific events (e.g. SwissEnergy Communication). The first strategy conference was held on 28/29 November 2001 in Vevey and was attended by representatives of all partners of SwissEnergy. Its purpose was to provide an opportunity for an exchange of information and an assessment of the current situation. At the first evaluation conference held in Burgdorf on 20/21 June 2002, study was made of the activities carried out during 2001 at eight workshops with a variety of guest speakers (■ Summary of SwissEnergy evaluation conference in Burgdorf, June 2002).

SwissEnergy is able to benefit from the findings obtained from Energy 2000 over a period of 10 years, and through its agencies it continues to promote and enhance the successful products and networks introduced by its predecessor. The tasks of the former sectors of Energy 2000 have been adopted by new agencies and organisations as follows:

□ Energy Agency for Industry: industry, trade, services, optimisation of operation of complex systems

□ MINERGIE: residential buildings, optimisation of basic systems

□ energho: hospitals, public sector

Links to reports (in original language)

- MIS Annual Report
- SwissEnergy impact analysis 2001
- Annual evaluation report
- www.energie-schweiz.ch/bfe/en/statistik

- □ Agency for Renewable Energies: renewable energies
- □ Mobility: motor fuels
- □ SwissEnergy for Municipalities: public sector, "Energy City"
- □ Eco-Drive® Quality Alliance: Eco-Drive® from the Fuels sector

This organisational structure was consolidated in the course of the year under review and proved to be both practical and efficient. Various instruments such as project and programme control, an electronic management information system [(■ MIS Annual Report) an impact analysis (■ SwissEnergy impact analysis 2001), evaluation processes (■ Annual evaluation report), and surveys among the general public are all intended to help secure the proper and efficient operation of the programme throughout the year, and the use of its funds in an efficient manner and in keeping with the programme's priorities, as well as provide comprehensive information about the programme's progress.

Economic conditions

The general economic conditions have a significant influence on the outcome of the activities of SwissEnergy and the degree to which it is able to achieve its objectives. Economic growth and fluctuations in energy prices have the potential to neutralise the impact of SwissEnergy, or even to cancel it out. This means that the programme's various measures and instruments have to be constantly adapted in line with economic trends.

Economic growth and energy consumption

Consumption of fossil energy and electricity is still increasing.

With an increase in the population of 6.8 percent since 1990, Switzerland's gross domestic product rose by 10.3 percent between 1990 and 2001. Energy consumption overall increased by 11 percent (of which 2.6 percent was attributable to electricity). Energy consumption increased by 2 percent (fossil energy, 1.3 percent; electricity, 2.6 percent) in 2001.
In the area of renewable energies, the energy consumption trend in 2001 was somewhat more satisfactory: hydropower + 11.7 percent (thanks to highly favourable hydrological conditions); wood + 6.7 percent; solar energy, environmental heat, geothermal energy and wind + 12.3 percent (combined). However, these figures (excluding hydropower) only account for 3.25 percent of overall energy consumption (detailed statistics: ■ www.energie-schweiz.ch/bfe/en/statistik).

Link to report (in original language)

■ "International" section of the Annual Report

Energy price trends

Measured against real consumer prices, prices for oil (-8.4 percent), gasoline (-4.3 percent) and diesel (-4 percent) fell sharply during 2001, while electricity prices fell by 1.0 percent and the price of gas rose sharply (+ 17.7 percent).

International energy and climate policies in transition

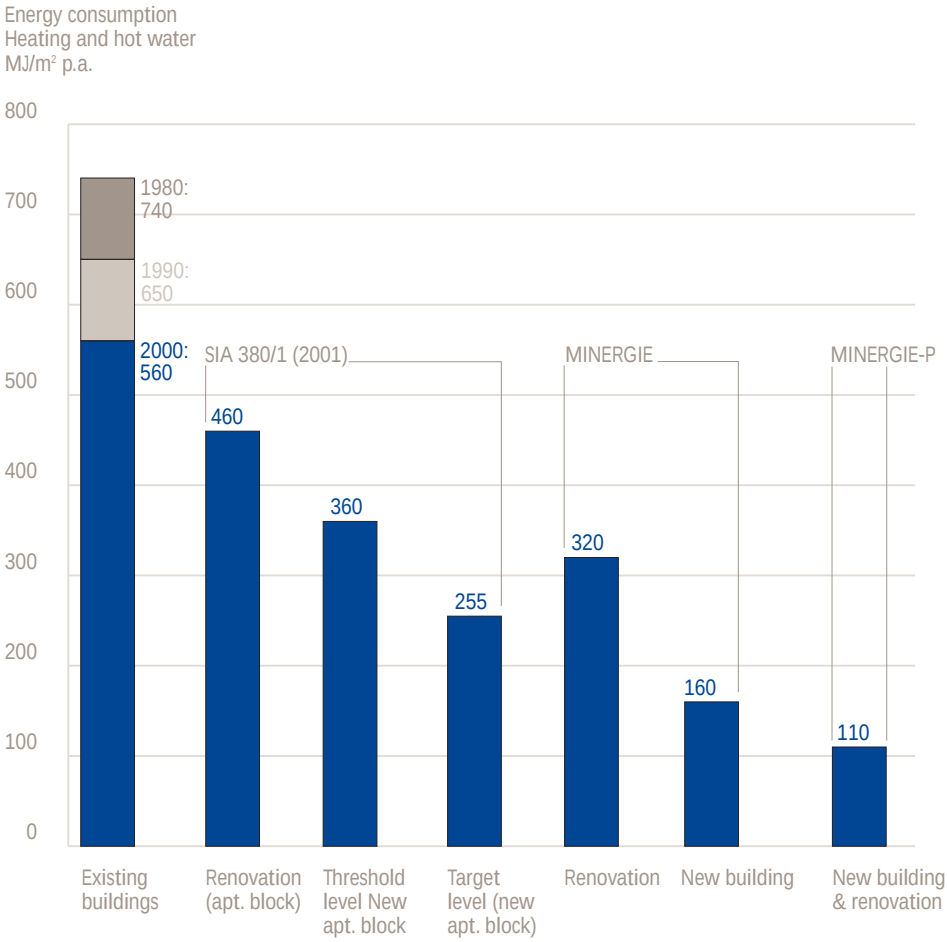
At the international level, there are five main areas that greatly influence Switzerland's energy and climate policies:

- Ever since the Kyoto treaty (1997), climate policy has been high on the agenda in the area of energy policy. However, subsequent negotiations in Bonn (summer 2001) and Marrakech (autumn 2001) proved to be increasingly problematic. As a result of the announcement by the USA in March 2001 that it was withdrawing from the whole process, many countries pulled back their declared climate policy objectives. The EU and Switzerland want to ratify the Kyoto treaty as quickly as possible. Switzerland's third Country Report to the UN Climate Convention met with a warm reception in spring 2002.
- Energy plays a major role in association with sustainable development. The UN Commission for Sustainable Development declared energy its main topic for its meeting in April 2001, and prepared a paper with the aim of promoting energy technologies that help reduce negative impact on the climate.
- The efficient use of energy and the use of renewable forms of energy are currently being promoted in industrialised countries, and especially within the EU, through a broad range of government measures. In the same way as in Switzerland, solutions involving agreements with energy-intensive sectors are gaining in importance.
- At the EU level, the formation of a single market for electricity and gas is making good progress. In September 2001, the EU issued a directive on the promotion of the production of electricity from renewable forms of energy within the single electricity market in order to take due account of changing conditions. The aim here is to more effectively exhaust the potential of renewable forms of energy within the EU by formulating national targets, harmonising promotion regulations and introducing a requirement for a certificate of origin. Another priority set by the EU concerns efforts aimed at enhancing supply security. Within the scope of a "green book", it initiated a widespread debate on the options with respect to future energy supply. In addition to bringing about increased diversification in energy supply, it also wants to steer demand more effectively by increasing the level of energy efficiency and providing tax incentives.
- In some countries, the introduction of emissions trading and the award of "green" certificates for renewable energy sources (ecological electricity) are constantly gaining momentum. In practice, some EU countries (e.g. Germany) have already introduced corresponding certificates and standards.

(For further information, please refer to the ■ "International" section of the Annual Report).

The EU and Switzerland want to ratify the Kyoto treaty as quickly as possible.

Fig. 4
Energy efficiency potential in residential buildings



Potential for efficient energy use and the use of renewable forms of energy

The potential for efficient energy use and the use of renewable forms of energy is enormous but often not exploited. For example:

- Twice as much timber is felled in Switzerland's forests as is actually used. If this reserve were to be fully exploited, it would be possible to substitute approximately 8 percent of non-renewable fossil energy consumption.
- The energy requirement of MINERGIE housing is less than 50 percent that of "normal" buildings.

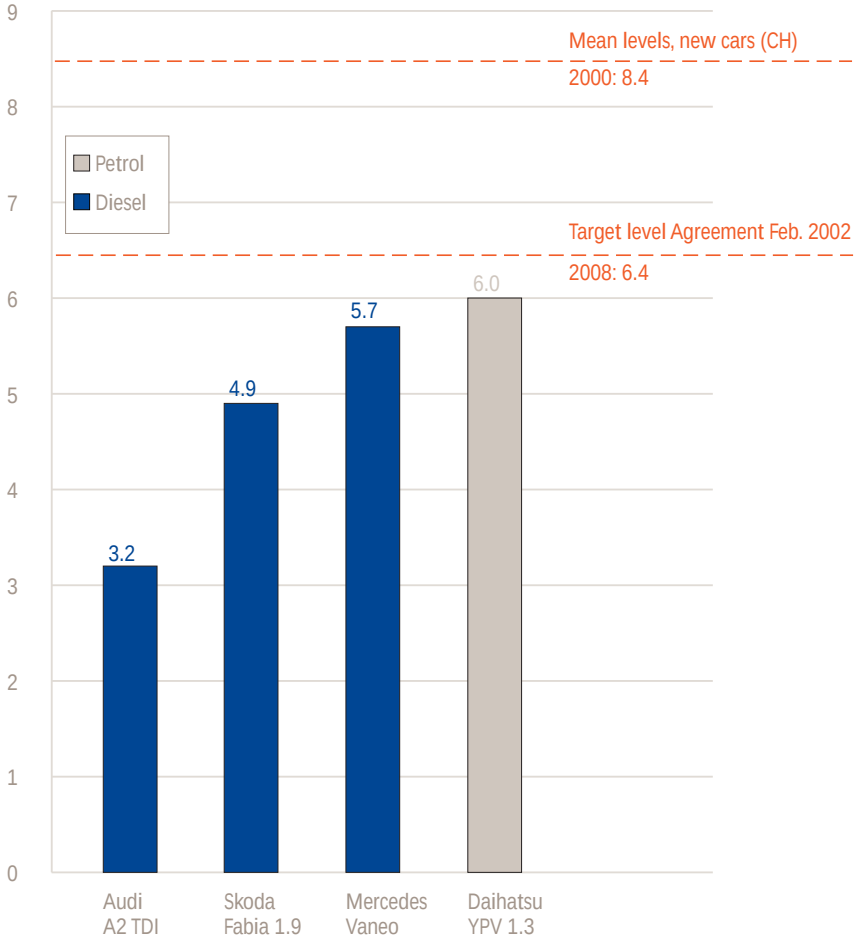


Fig. 5
Energy efficiency potential in motor vehicles (fuel consumption)

- It would be possible to reduce fuel consumption by 10 to 15 percent if road users were to consistently adopt the behaviour defined by Eco-Drive®.
- The average fuel consumption of new motor cars is 8.4 litres per 100 kilometres. The most efficient cars on the market consume less than 4 litres per 100 kilometres.
- In the area of mobility, it would be possible to achieve energy savings of between 50 and 100 percent through the use of combined transport or human-powered mobility.
- Low-voltage lamps only consume 15 percent of the electricity required by normal light bulbs.
- Since 1990, the degree of efficiency of heat pumps has risen by around 40 percent thanks to promotion of this technology (including by Energy 2000 and SwissEnergy). The potential technology is equal to all the heating in Switzerland.

Gaining a foothold

Finances

According to the Resolution of the Federal Council dated 17 January 2001, the budget for SwissEnergy is to remain the same as for its predecessor, Energy 2000 (i.e. 55 million Swiss francs p.a., excluding research). But there are extraordinary credits, e.g. for the production of wood energy from areas of forest destroyed by hurricane Lothar (45 million Swiss francs for the period from 2000 to 2003); 5 million Swiss francs in 2001 for the Federal Office of Buildings and Logistics for implementation of exemplary projects in the area of federal government buildings; and 4 million Swiss francs in 2002 for additional promotion activities, primarily relating to renewable forms of energy. In their turn, the cantons spend 39.1 million Swiss francs on their research programmes, while spending by SwissEnergy partners (booked figures) amounts to at least a further 16.6 million.

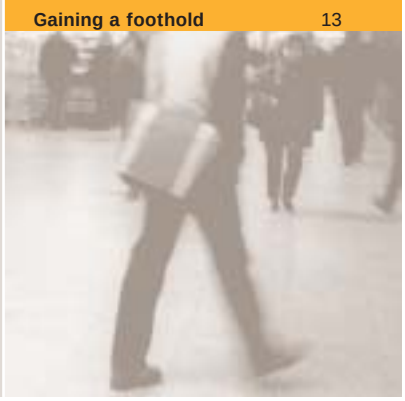
Focus on renewable energies

In 2001, total expenditure by the Swiss Federal Office of Energy for SwissEnergy was 77.5 million Swiss francs, of which 46.9 million (or 60.5 percent) went on the promotion of renewable energies. It had already become apparent from Energy 2000 programming that each Swiss franc spent on promoting renewable forms of energy yields less than each one spent on promoting efficient energy use. But in view of the resolution on energy use, the direct support provided by the federal government within the scope of Energy 2000 was restricted to renewable forms of energy and the use of waste heat. It was only following the enactment of the Energy Act that it became possible to directly promote efficient energy use, though promotion is not carried out by the federal government, but rather through cantonal programmes that receive support from the government in the form of global contributions (8.9 million Swiss francs in 2001 and 13 million in 2002). The overall proportion of funding for the promotion of efficient energy use will continue to increase to the detriment of spending on renewable energy. This trend is to be reinforced in the future when the funds associated with the "Lothar credit" (45 million Swiss francs for wood energy) and the one-time budget increase of 4 million Swiss francs for renewable energies in 2002, have been used up.

Exploitation of efficiency potential

In 2001, the Swiss federal Office of Energy had a total of 15.1 million Swiss francs at its disposal for promoting efficient energy use.

With the Energy Act and SwissEnergy, the competencies for promotional activities were transferred from the federal government to the cantons, and the funding priority was switched from renewable energies to efficient energy use.



Public sector and buildings required 7.4 million Swiss francs, the industry sector received 3.7 million Swiss francs (including 0.8 million for electrical appliances), and the mobility sector 4.0 million Swiss francs.
Contributions by the cantons amounted to 24,8 million Swiss francs.

The funds included 11.9 million Swiss francs (Swiss Federal Office of Energy) for pilot and demonstration projects (P+D), divided more or less equally between renewable energies and efficient energy use. A total of 6.6 million Swiss francs was required for communications, control and evaluation purposes in 2001.

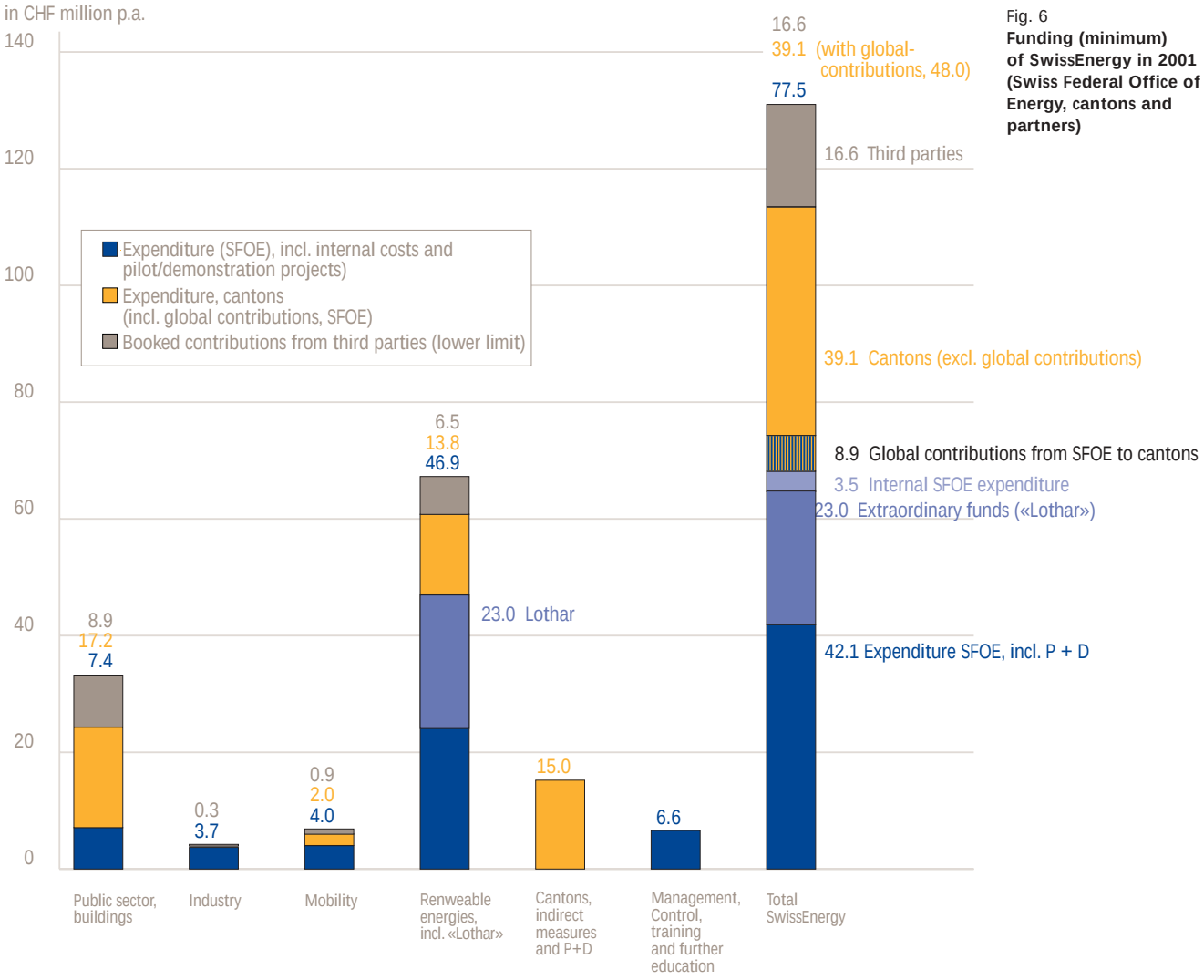


Fig. 6
Funding (minimum) of SwissEnergy in 2001 (Swiss Federal Office of Energy, cantons and partners)

Link to report
(in original language)

■ Annual Report, Marketing and Communication

Communications and marketing measures

An efficient communications culture is essential. This has to ensure that the main messages of the programme reach their intended target public. SwissEnergy set itself two principal goals:

- □ Ensure that, by the end of 2002, 60 percent of the population are familiar with the programme
- □ Ensure that, by 2008, 60 percent of the population act in accordance with the principles of SwissEnergy and thus contribute towards achievement of its objectives.

A communications strategy was defined. The target public was divided into three groups: first, employees of the Swiss Federal Office of Energy and the Federal Department of Environment, Transport, Energy and Communications (DETEC); second, the partners of SwissEnergy, and, third, the general public. The initial goal is that the first two groups should be well informed by the end of 2002, while efforts aimed at providing the third with more detailed information are foreseen for a later stage, with the aid of partners of SwissEnergy as multipliers. Different ways of providing information have been defined according to target group.

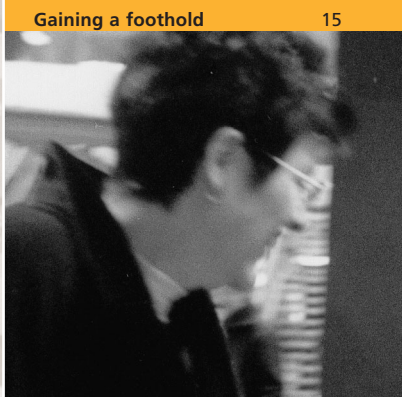
The various media include the journal of the Swiss Federal Office of Energy (Energie Extra); a publication entitled Energie et Environnement, which is distributed to all households in the French-speaking area of the country; an electronic newsletter for all partners approximately every two months describing the most important developments in SwissEnergy programming; and the Management Information System (MIS). It provides information via the Internet and Intranet for the general public and for partners as well as the various networks and contractors.

From the point of view of media coverage, SwissEnergy got off to an excellent start at the end of January 2001 (■ Annual Report, Marketing and Communication). Federal councillor Moritz Leuenberger and representatives of the industry and cantons strongly emphasised to journalists that SwissEnergy would have to achieve even more than its predecessor, Energy 2000. It should do it with voluntary measures, with the support of its partners, through gentle pressure and, if necessary, through legislative measures, notably a CO_2 emissions fee.

As a visual support to its communications strategy, SwissEnergy has a uniform market presence in brand design. It has produced a first image brochure and a special SwissEnergy folder and operates its own web site for the purpose of keeping all interested parties up to date with its activity. A variety of SwissEnergy give-aways (caps, umbrellas, etc.) were also produced during the year under review and handed out to the general public at various PR events.

In October 2001, a first large-scale campaign was launched. It focused on a specific topic: A total of 65 events, plus a competition, were organised throughout the country, aimed at drawing attention to the existing supply of environment-friendly electricity from renewable energy sources.

SwissEnergy is visually supporting its communications strategy with a uniform brand design.



SwissEnergy was also presented at a variety of trade fairs and exhibitions, notably at the "Habitat et Jardin" in Lausanne, and at public exhibitions such as the MUBA in Basel and the BEA in Berne.
SwissEnergy supported ten pilot and demonstration projects at the Swiss national exhibition, Expo.02, costing 1.1 million Swiss francs. These included production of electricity from renewable forms of energy with the "naturemade star" label to meet the 11.5 gigawatt hours electricity requirement on the exhibition sites ("Arteplages"), four solar catamarans to link Murten Arteplage with a floating monolith, and 30 vehicles powered by natural gas or biogas for travel within and between the exhibition sites. SwissEnergy also participated in two special actions: "Flying Fish", the award of an eco-label for Expo.02 for innovative energy solutions, and ExpoEnergy in Swiss municipalities and cities, at which 7,500 free tickets to Expo.02 were issued in exchange for new initiative in energy economics proportionate to the energy consumption (34 gigawatt hours) of the four exhibition sites.

Own labels

SwissEnergy introduced two seals of approval (Energy Partner and Energy Awareness) as communications instruments. The first of these is intended for organisations, institutions, programmes and companies which show unusual commitment to efficient energy use and the use of renewable forms of energy. To date it has been awarded to the following organisations: Agency for Renewable Energies and Energy Efficiency (AEE), Energy Agency for Industry (EnAW), Wood Energy Switzerland, Eco-Drive® Quality Alliance, Swiss Association for Geothermal Energy (SVG/SSG®), Suisse Eole, Swissolar, Energy City® Label Association, BiomassEnergie, Swiss Association for the Promotion of Heat Pumps (FWS) and MINERGIE®. The second label is in preparation and will be awarded in recognition of activity and processes that meet particularly high demands. By contrast with citation for manufactured product (e.g. Energy Label), display of these two labels is voluntary. But they are intended to enhance the holder's image and create added value.

Survey concerning degree of awareness of SwissEnergy

Surveys were carried out in the middle of 2001 and 2002 with the aim of assessing awareness of the SwissEnergy programme and the effectiveness of our communications measures (for further details, please refer to "Surveys among the general public" on page 34).

Links to reports (in original language)

- Annual Report, Promotion of technology and innovation
- Annual Report, Training and further education

Promotion of technology and innovation

Putting the findings obtained from energy research into practice is one of SwissEnergy's most important tasks. Public funding for energy research amounted to 173 million Swiss francs in 2001 (cf. ■ Annual Report, Promotion of technology and innovation), of which 30 percent was allocated to renewable forms of energy, 32 percent to efficient energy use, 29 percent to safety in the area of nuclear energy, and 9 percent to energy fundamentals and implementation activities.

Research of relevance to SwissEnergy is carried out in close collaboration with industry. Projects are market-related and are intended to lead to new or improved products. Two projects of exemplary nature were initiated in 2001: a pilot wood gasification plant that produces 60 kilowatt hours of electricity and 120 kilowatt hours of heat from 60 kilograms of wood per hour, and the Solrif and AluTec photovoltaic modules, which have generated around 5 megawatts throughout Europe up to 2001.

Quantifiable contributions to the objectives of SwissEnergy can only be calculated from pilot and demonstration projects, and are estimated with impact analyses. During 2001, the Federal Office of Energy supported 114 new demonstration projects with funding totalling 11.9 million Swiss francs: 60 projects in the area of renewable forms of energy, and 54 projects in the area of efficient energy use.

Training and further education

Widespread use of energy-efficient technologies and renewable forms of energy calls for technical and specialised know-how, particularly in the buildings and household technology sectors. A work group specialising in training and further education (■ Annual Report, Training and further education) was already established by the Conference of Cantonal Energy Directors in 1980. A commitment on the part of the federal government and the cantons is necessary since no other institution systematically provides education in the area of more efficient and ecological use of energy. The main focus here is now on a post-graduate course in energy and sustainability in the construction sector, which is offered jointly by Switzerland's institutes of technology, and the Penta Project, the aim of which is to provide know-how on renewable forms of energy to specialists in plumbing, heating, ventilation and electricity.

Promotion of technology and innovation supports research into new energy-efficient products and helps bring them onto the market.

Links to reports (in original language)

- Principles for voluntary CO_2 agreements and commitments in the buildings sector
- Determining the heating energy requirements of residential buildings

The four market sectors

Four market sectors – the public sector and buildings, industry, mobility and renewable forms of energy – are the pillars of SwissEnergy (cf. Fig. 3, page 7). Here, intensive cooperation takes place between the Federal Office of Energy, the cantons, Energy Cities, energy agencies, trade and industry associations and other exponents of the SwissEnergy programme. Sector conferences are held at least once a year together with the programme management. Ninety-two percent of the funds available to SwissEnergy flow into these market sectors (cf. Fig. 6, page 13).

Public sector and buildings

Buildings account for approximately 45 percent of Switzerland's energy consumption (heating oil, gas and electricity). The savings potential (insulation, heating and lighting technologies, "A" appliances) is enormous. So is the potential for the use of renewable forms of energy (wood, solar and ambient heat).

Focus of efforts: MINERGIE

More than 100 partnerships were formed with property management companies, and convincing results were achieved with hospitals. A study (■ Principles for voluntary CO_2 agreements and commitments in the buildings sector) carried out together with the Association of Swiss Home Owners and the Energy Agency for Industry has revealed that, primarily in view of the provisions of the Tenancy Law and CO_2 Act, there are very few incentives for concluding agreements on efficiency targets. And another study (■ Determining the heating energy requirements of residential buildings) indicated that it is likely to be extremely difficult to achieve the various objectives in this area (-15 percent CO_2 emissions and maximum growth of 5 percent in electricity demand). For example, to meet the declared CO_2 objective it would be necessary to comply with the MINERGIE standard for new construction and renovated buildings in its entirety (present-day level of compliance, around 10 percent), as well as continue substituting heating oil with gas.

In view of this, in November 2001 the SwissEnergy Strategy Committee recommended focusing efforts on forming a buildings agency. For this purpose, in January 2002 the Conference of Cantonal Energy Directors re-

Buildings account for around 45 percent of Switzerland's energy consumption (primarily heating oil, gas and electricity).

Link to report (in original language)

MINERGIE Annual Report

solved to support the existing MINERGIE Association (■ MINERGIE Annual Report) in the form of a federal government service mandate, according to which the MINERGIE Association is to further the objectives of SwissEnergy in the buildings segment through the broad promotion of the MINERGIE standard, the use of renewable forms of energy and the efficient use of electricity (SIA 380/4 and "A" appliances), and through closer co-operation between partners of SwissEnergy active in the segment.

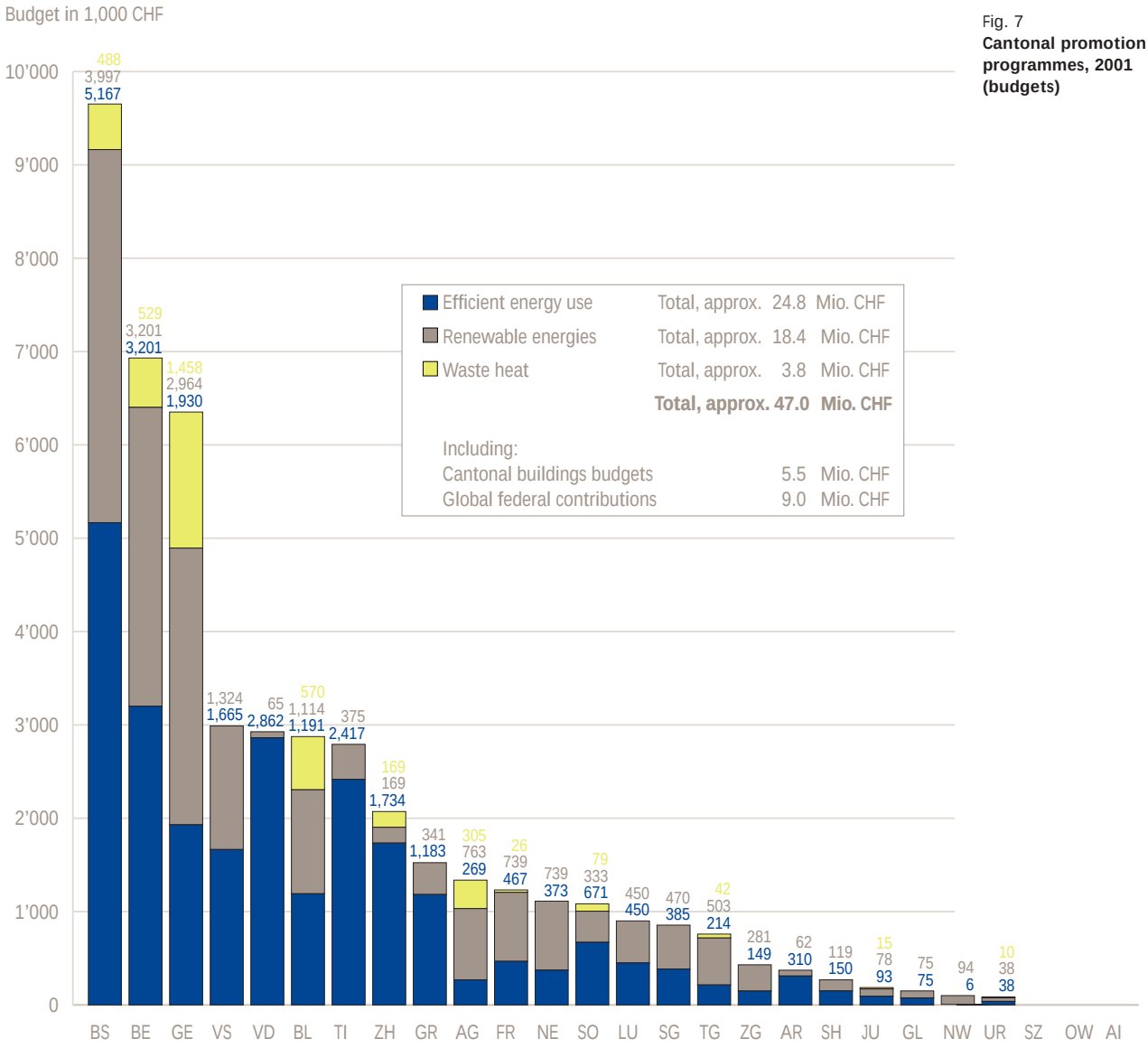


Fig. 7
Cantonal promotion programmes, 2001 (budgets)

Links to reports (in original language)

- Annual Report, Status of energy policy in the cantons
- Annual Report of energho

Promotional measures and priorities on the part of the cantons

It is the cantons that are primarily responsible for the buildings sector (■ Annual Report, Status of energy policy in the cantons), and in 2001 they resolved to act on this responsibility by defining their own SwissEnergy strategy. The main priority here is to reduce energy consumption in buildings to the greatest possible extent by applying the MINERGIE standard, while setting out to stabilise the remaining demand through the use of renewable forms of energy. For this purpose, cantonal energy legislation is to be harmonised on the basis of model cantonal regulations on energy (MuKen) approved by the cantons, promotion programmes to be drawn up jointly by the federal government and the cantons. Twenty-four cantons have implemented promotion programmes at their own initiative in the meantime, and various cantons are also implementing optional energy legislation modules, most notably the new SIA recommendations (380/1 and 380/4), whose provisions stipulate that fossil energy may not account for more than 80 percent of the energy requirements of new buildings, and call for user-based billing of heating and water-heating costs and systematic performance control in existing buildings. Fifteen cantons monitor the use of energy in public buildings and are thus able to measure the impact of their efforts. Sixteen cantons are members of "energho", an association specialising in large-scale energy consumption in public buildings.

Large-scale energy consumers in the public sector

In view of the results achieved by the Energy 2000 Hospitals sector, the federal government and the cantons decided to apply the model to the entire sphere of public buildings, and this led to the formation of "energho" (■ Annual Report of energho) as a partner of SwissEnergy for public buildings. This institution offers a special service aimed at reducing energy consumption in complex public buildings by at least 10 percent in five years, in particular by optimising the operation of systems in combination with further education and exchanges of findings (cf. www.energho.ch). Savings achieved in the first year amounted to 5 percent for heating and 3 percent for electricity. Energho is also examining the possibility of basic target agreements on the basis of the statistical model.

Research, development and case histories on the federal experience

The federal government's energy savings activities in the area of buildings are mainly limited to the promotion of research and development, marketing, communications, control, co-ordination and setting a good example within the federal administration.

In May 2001, Federal Councillor Moritz Leuenberger requested those sections of the federal administration that consume energy on a large scale to set a good example and help SwissEnergy achieve its objectives by applying the MINERGIE standard, complying with the principles of Rumba (a programme aimed at supporting the management of resources and protection of the environment), and by developing and implementing internal energy concepts.

Areas of federal administration that consume energy on a large scale are setting a good example.

The following authorities and institutions are involved: Federal Office for Buildings and Logistics (BBL); Federal Institute of Technology, Zurich; Federal Institute of Technology, Lausanne; Paul Scherrer Institute; Swiss Federal Materials Testing and Research Laboratories; Swiss Federal Institute for Environmental Science and Technology; Swiss Federal Institute for Forest, Snow and Landscape Research; Federal Department of Defence, Civil Protection and Sport; Swiss Federal Railways; Swiss Post Office; Swisscom.

Links to reports (in original language)

- Annual Report, SwissEnergy in the municipalities
- Annual Report, waste heat
- Annual Report, energy from sewage treatment plants

In accordance with a motion submitted to Parliament, the federal government is taking the MINERGIE standard as the basis for its objectives with respect to its own new buildings and renovation projects, and for buildings to be co-subsidised by the government. The aim of the Rumba programme is implementation of measures for the protection of the environment and the promotion of efficient energy use throughout the entire federal administration by 2005.

Areas of the federal administration in which large quantities of energy are consumed keep their own energy statistics, and have either already drawn up concepts for achieving the objectives of SwissEnergy or are currently doing so. The post office has budgeted 27.7 million Swiss francs for the purpose. Although a total of 180 million Swiss francs was reserved within the scope of Energy 2000 for exemplary projects within the federal administration, only 5 million were actually spent on the task in 2001 (Federal Office for Buildings and Logistics budget), and this amount went on the implementation of 25 renovation projects. As far as other large-scale consumers in the federal administration are concerned, the necessary budget decisions are still pending.

SwissEnergy for Municipalities

The municipalities play an important role within SwissEnergy (■ Annual Report, SwissEnergy in the municipalities). In the majority of cantons, they are responsible for the implementation (and thus for the effectiveness) of cantonal energy legislation in the buildings sector. They receive support from the cantons in the form of information, consulting and education. However, municipalities often lack the necessary specialised personnel and financial resources, especially for carrying out on-site controls.

In most cantons, municipalities enjoy considerable scope for manoeuvre with respect to defining their own energy policy. They receive support in this area in the form of an Energy City label, which was initiated at the end of the 1980s by environmental organisations and adopted in the 1990s by Energy 2000, and has meanwhile undergone considerable development and intensification under the auspices of SwissEnergy. More than 70 municipalities (as of June 2002) with a combined population of over 1.5 million are now holders of the Energy City label, and therefore pursue a municipal energy policy that has officially been certified as progressive. Processing of the overall Swiss market is the responsibility of around 40 Energy City consultants acting on behalf of SwissEnergy for Municipalities. The Swiss Federal Office of Energy has concluded a service agreement with the latter, according to which the label is to be intensively promoted.

In the year under review, only one major project was supported in the area of district heat (as a result of the transfer of responsibility for promotional activities to the cantons), namely the expansion of the Siggenthal waste heat plant (■ Annual Report, waste heat). For the use of waste heat from sewage treatment and refuse incinerators, the most important support alongside PR activities takes the form of personal consulting for existing and future plant operators. It is estimated that an annual total of 60 to 70 gigawatt hours of electricity is generated in these plants (■ Annual Report, energy from sewage treatment plants).

The Energy City certification expanded in 2001: 67 municipalities implemented a broad variety of energy policy measures in the course of the year.

Link to report (in original language)

■ Annual report of the Energy Agency for Industry

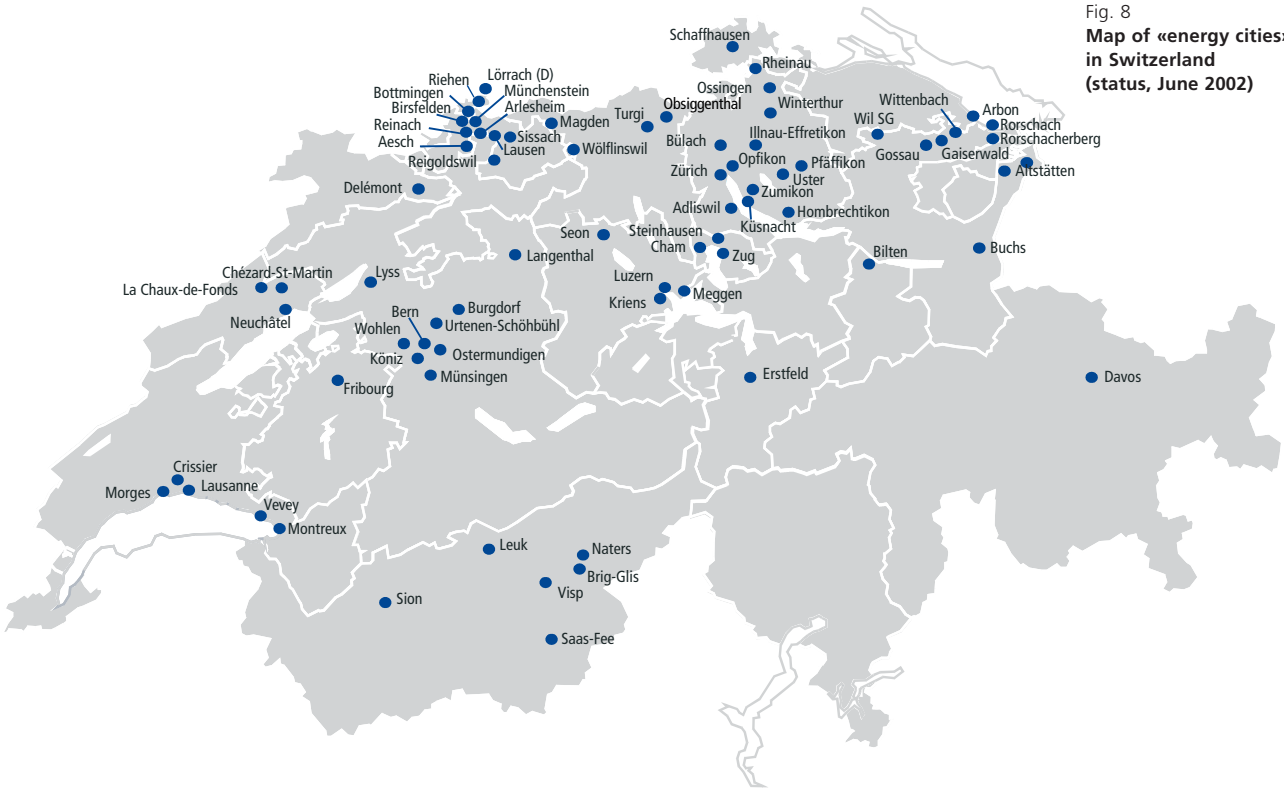


Fig. 8
Map of «energy cities» in Switzerland (status, June 2002)

Industry

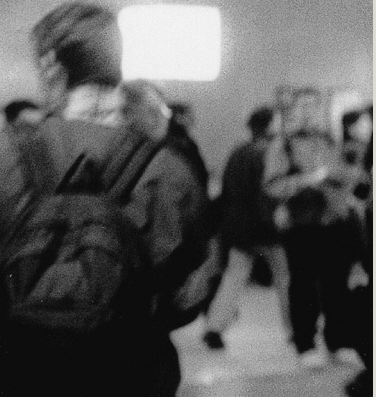
Energy Agency for Industry

There is also enormous potential for more efficient energy use in trade, industry and services – potential that, when realised, would also bring financial benefits. Industry takes a critical approach towards new regulations and restrictions. But the objective of the Energy Agency for Industry (■ Annual report of the Energy Agency for Industry), which was established in November 1999, is to make a significant contribution towards the goals of SwissEnergy through voluntary measures.

Findings obtained from the industry, trade and services sections of Energy 2000 revealed that, without specific legal obligations or financial incentives, very few companies are willing to enter into binding commitments. Here the potential introduction of a CO_2 fee on fossil energy carriers as foreseen by the CO_2 Act provides new impulse.

The guidelines of the Swiss Agency for Environment, Forests and Landscape and the Swiss Federal Office of Energy dated 2 July 2001 govern such agreements, while the framework agreement of the same date regulates the service mandate awarded to the Energy Agency for Industry by the Swiss Federal Office of Energy. The idea behind tar-

Industry primarily wants to contribute towards the goals of SwissEnergy in the form of voluntary measures.



Link to report (in original language)

Annual Report, industry and services

get agreements is that companies can be obliged to reduce their energy consumption, thereby making a contribution towards the avoidance of a CO_2 fee, and, if they meet the agreed targets, release themselves from an obligation to pay other related fees (■ Annual Report, industry and services).

For 2001 as transition year, quantitative targets were defined together with the Energy Agency for Industry. Goals for 2001 were only partially met, since the preparation of the guidelines governing the target agreement was delayed: this was mainly because target agreements represented entirely new territory, and a firm basis first had to be established. We can only expect to see concrete results at the end of 2002 in the form of the conclusion of the first series of target agreements.

The Energy Agency for Industry is able to count on those companies incorporated into Energy Model for Switzerland, which defined their energy efficiency targets within the scope of Energy 2000 and went on to introduce the corresponding measures internally. As of the end of 2001, there were 16 active groups and a further 21 were in the process of being formed. A benchmark model is currently being developed for small and medium-sized companies. The Energy Agency for Industry took over three former Energy 2000 sections (major consumers/industry and services, small and medium-sized companies and optimisation of complex systems).

New activities in the area of appliances

Both the Energy Agency for Electrical Appliances (representing the respective sector organisations) and the Swiss Agency for Energy Efficiency, which represents a variety of environmental organisations, are anxious to achieve the objectives of SwissEnergy in the area of appliances, i.e. stabilisation of electricity consumption despite a constantly growing number of applications. They are currently in the process of defining a suitable strategy. Successful negotiations by these partners have led to service mandates as well as specific mandates on the preparation of a statistical basis for control purposes, the provision of Internet consulting for households and support for the "Top 10" web site, which lists the most energy-efficient appliances and vehicles available on the market (cf. www.topten.ch). Following the revision of the Energy Ordinance, an energy label for the most important household appliances (refrigerators and freezers, washing machines, clothes dryers, combined washing machines/dryers, dish washers and lamps) was brought into effect in accordance with EU directives on 1 January 2002, with a one-year transition period. A campaign aimed at promoting the energy label was launched in the first half of 2002.

Links to reports (in original language)

- Annual Report, mobility
- Annual Report, Eco-Drive®
- Annual Report of the e'mobile association
- Annual Report, mobility
- Veloland Schweiz

Mobility

Since it accounts for more than one-third of the overall energy consumption and 50 percent of CO_2 emissions, the Mobility sector possesses the highest potential for achieving objectives for reduction of CO_2 emissions. SwissEnergy is focusing on promoting more energy-efficient motor vehicles and more environment-friendly behaviour on the part of all road users.

Difficult situation

Slightly more than half the consumption of fossil energy in Switzerland is in the form of motor fuels. This means that transport is the biggest and fastest growing source of CO_2 emissions.

After a period of ten years, Energy 2000 succeeded in cutting fuel consumption in 2000 by 2 percent (of which half through voluntary measures), while actual consumption during the same period was five times higher, i.e. up by 10 percent. If the current trend continues uninterruptedly, this would mean, in 2010, around 20 percent more motor fuel being consumed than in 1990. The forecast is for the traffic volume to grow by 20 to 60 percent by 2020. This trend runs contrary to the declared objective of cutting CO_2 emissions from motor fuels by 8 percent by 2010 versus 1990.

There is still a potential for savings in this sector: 50 percent of all journeys by car are shorter than 5 kilometres. Many could therefore be made on foot, by bicycle, by public transport, etc. This could result in a reduction in fuel consumption amounting to between 10 and 15 percent. Vehicles with a fuel consumption of only 3 to 4 litres per 100 kilometres are also available on the market today, and if drivers were to abide by the principles of Eco-Drive®, this could lead to additional savings of between 10 and 15 percent. However, it is hardly going to be possible to exploit the potential through voluntary measures alone. The SwissEnergy Strategy Committee recommends that the federal government should focus on the area of transport and intensify its co-operation with the various transport authorities.

Voluntary measures as priority

The main goal in the area of mobility is to cut the average fuel consumption for new vehicles coming onto the market from 8.4 litres per 100 kilometres (= level in 2000) to 6.4 litres in 2008. This target agreement with the Association of Swiss Automobile Importers (Auto-Schweiz) was signed in February 2002. If the target is achieved, it will mean a reduction in fuel consumption by 3 to 4 percent by 2010. The planned energy label for motor cars will support this objective.

In 2001, measures adopted from Energy 2000 were redefined and incorporated into a new Mobility section (■ Annual Report, mobility). SwissEnergy continued or intensified already successful projects from the Fuels section of Energy 2000, in particular activity in the areas of Eco-Drive® (■ Annual Report, Eco-Drive), e'mobile (■ Annual Report of the e'mobile association), mobility (■ Annual Report, mobility), ■ Veloland Schweiz ("Cycling in Switzerland") and mobility in municipalities.

Market analysis carried out in the second half of the year gave rise to an intensification of activity. The main target group here was private households and their decisions with respect to investment (choice of means of transport, choice of place of residence and workplace, etc.) and mobility (choice of vehicle, choice of destination, etc.) in connection with journeys to work, for shopping purposes and for leisure-time activities. New activities were initiated intended to improve the overall mobility chain: for example, the SAC project in the area of tourism, and the MobilCenter project aimed at improving interfaces. In future, models with different geographical di-

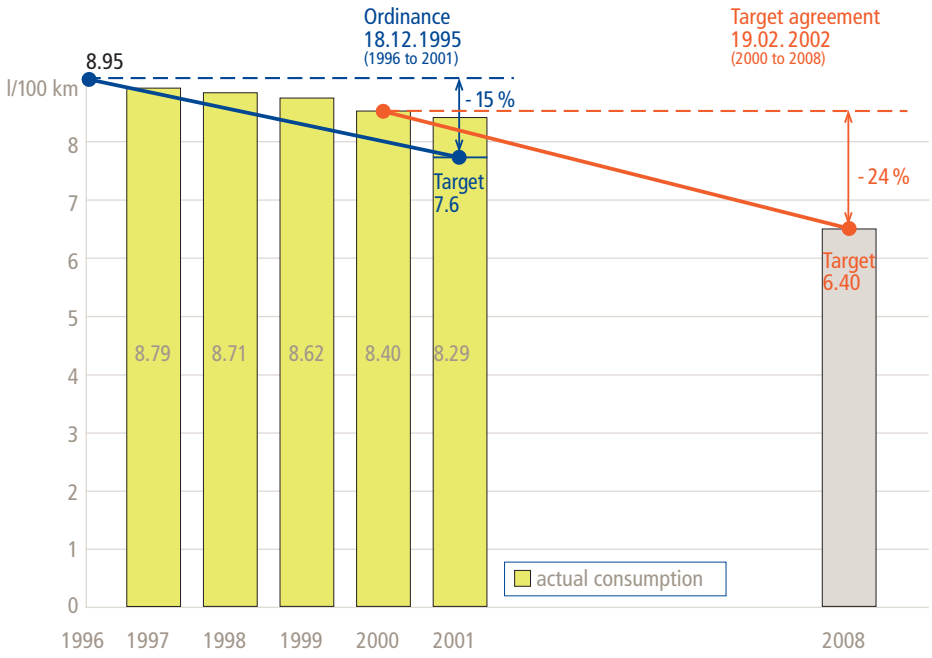


Fig. 9
Target agreement: specific fuel consumption of new motor cars

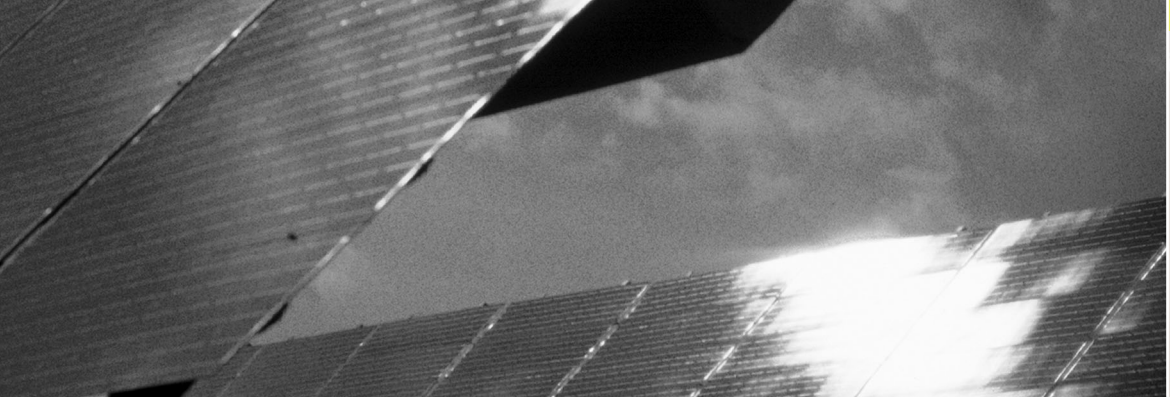
mensions are to be supported, e.g. the "Vel2" project in the canton of Ticino, or model municipalities and residential zones. And new activities are also to be promoted in the area of communication (MobilService).

On top of this, activities were intensified in the French-speaking area of the country, since the presence of SwissEnergy here needed to be intensified.

One of the declared goals is to reduce the average fuel consumption of motor cars, and for this purpose an ordinance is currently in preparation (an energy label) that will apply to new cars. A project initiated by the "e'mobile" association to promote energy-efficient vehicles and drives, plus a fuel consumption list published by Touring Club of Switzerland (TCS) and a similar list published by the Swiss Automobile Association (VCS), will support the objective.

The process of institutionalising co-operation with other federal authorities also confronted with issues relating to sustainable mobility was intensified in 2001.

A variety of research, pilot and demonstration programmes are setting out to develop lighter, smaller vehicles and more efficient drive systems. In the area of light vehicle construction, the Modultec II project was launched in 2002 with the aim of developing a lightweight chassis made of plastic. Other innovative projects are studying ways to increase the degree of underload efficiency of drive systems, hydrogen drives, light electric vehicles, three-wheelers for use in towns and cities, smart bicycles, etc.



Links to reports (in original language)

- Renewable energies annual report
- Annual Report, heat pumps
- Annual Report, geothermal energy
- Annual Report, wood, SwissEnergy
- Annual Report, wind energy
- Annual Report, biomass

Renewable energies

The use of renewable forms of energy is on the increase, with higher production figures for electricity and heat in all areas.

Increasing subsidies

An increase in heat production by 410.7 gigawatt hours in 2001 means that a targeted annual average increase of 300 gigawatt hours was surpassed significantly. Electricity production rose by 31.6 gigawatt hours, which was slightly below the targeted annual average of 50 gigawatt hours. The chances that this sector will still meet its objectives are intact (■ Renewable energies annual report). However, electricity consumption rose by 2.6 percent (approx. 1,500 gigawatt hours) during 2001, so if SwissEnergy's declared target for electricity from renewable forms of energy of 500 gigawatt hours by 2010 were to be achieved, it would only be possible to meet one-thirtieth of an annual increase in electricity consumption of 2.6 percent as in the period from 2001 to 2010 (in all, 26 percent). Therefore the main problem here is the constant increase in consumption. If we do not succeed in halting this trend, renewable forms of energy will have little chance in the foreseeable future of meeting a substantial proportion of overall consumption.

Sales of heat pumps rose by 7.6 percent versus the prior year to reach a new record level of 7,815 units (■ Annual Report, heat pumps). Given the present-day situation, SwissEnergy looks set to reach its target of 120,000 installed heat pumps by 2010. The approximately 65,000 heat pumps in operation in Switzerland as of the end of 2001 save more than 180,000 tonnes (215 million litres) of heating oil per annum, and reduce CO_2 emissions by around 600,000 tonnes. The proportion of heat pumps used for the purpose of renovating existing heating systems also rose in 2001, with a total of 1,265 new installations. A new record level was also reached with the installation of 410,000 linear metres of geothermal sensors (■ Other activities, Annual Report, geothermal energy).

Subsidies totalling 23 million Swiss francs (federal government and cantons) for the promotion of wood-fired heating systems in association with the programme that was launched following hurricane Lothar gave rise to recovery in the demand for wood-burning systems (■ Annual Report, wood, SwissEnergy). Small, fully-automated wood pellet stoves succeeded in gaining a foothold in market segments that had previously been firmly in the hands of oil and gas. Thanks to the Lothar programme, the annual consumption of wood energy increased by around 100,000 cubic metres, giving rise to a reduction in the consumption of heating oil of around 20,000 tonnes p.a. (or 65,000 tonnes CO_2).

In 2001, two new installations were added to Switzerland's largest wind power plant on Mt Crosin, thereby increasing its capacity by 60 percent. A number of smaller facilities were also constructed. A total of 4 gigawatt hours of wind energy (■ Annual Report, wind energy) are now generated, which is equivalent to an increase of 33 percent versus the prior year. The production target for wind energy is 50 to 100 gigawatt hours by 2010 at locations that meet the requirements on protection of the landscape.

Three large biogas plants were put into operation in the course of the year under review (■ Annual Report, biomass), and these produce 1.8 gigawatt hours of heat and 2.8 gigawatt hours of electricity per annum.

Links to reports (in original language)

- Annual Report, solar energy
- Report on Swiss solar energy prize
- Annual Report, AEE

The use of solar energy increased too, by 16 gigawatt hours for heat production and 1.5 gigawatt hours for electricity (■ Annual Report, solar energy). 18 cantons promote the use of solar energy for heating purposes, and 10 for electricity. The aim behind the award of a solar energy prize (■ Report on Swiss solar energy prize) is to increase the overall level of awareness of this form of energy.

The proportion of hydropower to overall electricity production in Switzerland was 60.2 percent (42,300 gigawatt hours) in 2001. This is the most important source of domestic and renewable energy. The energy production potential of medium-sized hydropower plants remains constant, though the slight increase of 0.4 percent is equivalent to approximately 170 gigawatt hours, i.e. one-third of the ten-year target for electricity production from other renewable sources.

In view of the prevailing electricity surplus throughout Europe and uncertainties associated with the liberalisation of the electricity market, the volume of new investment by the electricity industry (especially for the purpose of maintaining and renovating existing hydropower plants and expanding their capacities), has fallen by around 1 billion Swiss francs per annum, while write-offs have been increased in order to enhance competitive capacity. Write-offs totalled more than 2 billion Swiss francs p.a. over the past few years. In the period from 1997 to 2001, the total volume of fixed assets within the electricity industry fell from 35.5 to 30 billion Swiss francs (-18.6 percent). During 2001, the average electricity price for consumers was 15.8 cents per kilowatt hour.

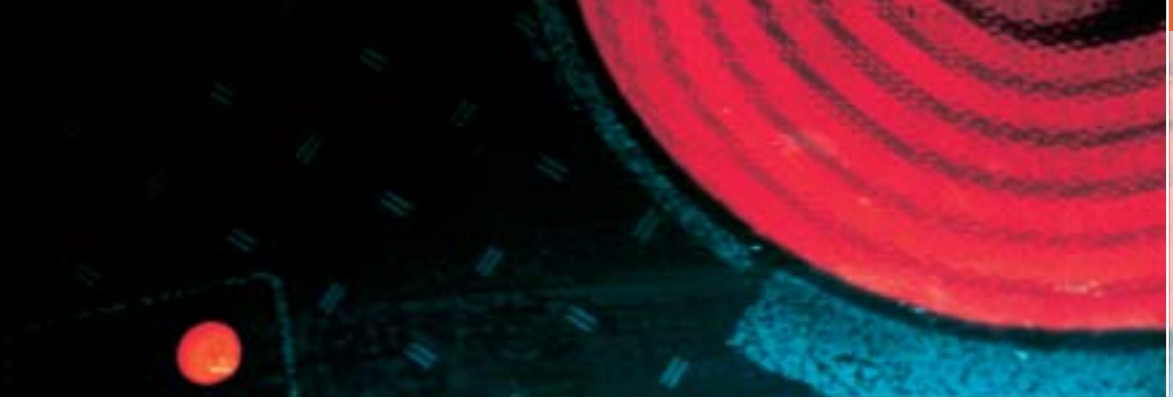
If the production of hydropower is to be stabilised up to 2010, when operating licences are renewed, it will be necessary to compensate the higher volumes of surplus water in accordance with the Water Protection Act. The Electricity Market Act foresees government loans for non-amortised investments and for the maintenance and renovation of hydropower plants, as well as for the promotion of small-scale hydropower plants. In view of efforts on the part of SwissEnergy to increase the use of renewable forms of energy, any reduction in the capacity of hydropower would not be in line with objectives.

Agency and networks

The distribution of tasks among the umbrella organisation, the Agency for Renewable Energies and Energy Efficiency (AEE) (■ Annual Report AEE), and various networks has been optimised by this agency. It represents the interests of the sector at the political level, carries out marketing activities, works together with the other SwissEnergy sections and the cantons, organises training and further education courses, and co-ordinates the various activities of its members and networks.

The idea of initiating a Swiss trade fair for renewable energies in 2001 failed to reach fruition, but instead the AEE attended the Swiss Hausbau und MINERGIE Messe together with its networks.

The agency succeeded in securing an increase in the budget for renewable energies for 2002 in the form of a one-time supplement of 4 million Swiss francs in federal government funds. Almost 60 percent of the population already have the opportunity today of buying environment-friendly electricity.



Links to reports (in original language)

- Synthesis Report on the Development of Energy Consumption and its Determining Factors
- Impact analysis SwissEnergy
- Annual Report, evaluation

Positive impact of SwissEnergy

Impact analysis and evaluation

Provisions of the Energy Act stipulate that the federal government periodically examine the extent to which the the SwissEnergy programme's objectives have been achieved. For this purpose, three separate analyses are carried out:

- An ex-post analysis (■ Synthesis Report on the Development of Energy Consumption and its Determining Factors) evaluates the changes in energy consumption and the various factors governing the trend.
- An impact analysis (■ Impact analysis SwissEnergy) examines the impact of the activities of SwissEnergy on energy consumption, employment and the environment.
- Detailed evaluations serve to assess the implementation of the various activities of SwissEnergy and their impact correlations. In the year under review, a total of nine evaluations were completed, primarily concerning activities adopted from Energy 2000 (■ Annual Report, evaluation).

Ex-post analysis: detailed evaluation of energy consumption

Overall energy consumption in Switzerland increased in 2001 by 2 percent over 2000, or 17 petajoules (PJ), to reach 873 PJ. Consumption of fossil energy rose by 8 PJ (1.3 percent). Electricity consumption increased by 5 PJ (2.6 percent). While the consumption of heating oil rose by 5 percent, consumption of motor fuels fell by 2.6 percent.

The impact of the main influencing factors on energy consumption is calculated with the aid of special models, then compared with statistical results. Over the short term (2001 versus 2000), the relevant influencing factors are climate, volume components (consumption-related statistical changes, e.g. in the population, industrial production, housing, vehicle fleet, electrical appliances), technology and legislation. The colder weather in 2001 versus 2000, combined with change in the volume components, led to an increase in consumption of around 1 percent, while influence from technology and legislation (including SwissEnergy's efforts) led to a reduction of almost 1 percent. The extraordinary decrease in the consumption of motor fuels, probably largely attributable to a decline in tourism as a result of significantly lower fuel taxes in northern Italy, and to less travel in general following the events of 11 September 2001 (con-

Scientific analyses demonstrate the impact of the SwissEnergy programme.

sumption of aviation fuel fell by 5.7 percent), was not reflected in modelling.

Over the longer term (2001 versus 1990), increases in the volume component, which exceeded the efficiency improvements attributable to technological progress and government action (Energy 2000) by 60 percent, were the most significant influencing factor. This trend was particularly pronounced in motor fuels, electricity and gas, whereas the reduction in the consumption of heating oil thanks to technological developments and government policy – most notably as a consequence of ever-increasing substitution through gas and heat pumps – outweighed the increase from volume components.

Impact analysis: what SwissEnergy achieved in its first year

The data for assessing effectiveness of the programme are supplied by the various partners of SwissEnergy (cantons, agencies, networks and participants in projects). These figures revealed that, in SwissEnergy's first year of activity, it was possible to substitute a total of 3 PJ (0.5 percent) of combustibles and motor fuels, and approximately 0.8 PJ of electricity (0.4 percent) with renewable forms of energy, as the result of voluntary measures and promotional activities at the cantonal level, and through legislative measures. This is equivalent to 0.44 percent of Switzerland's overall energy consumption, and represents an effect similar to that achieved with the Energy 2000 programme. The transition from

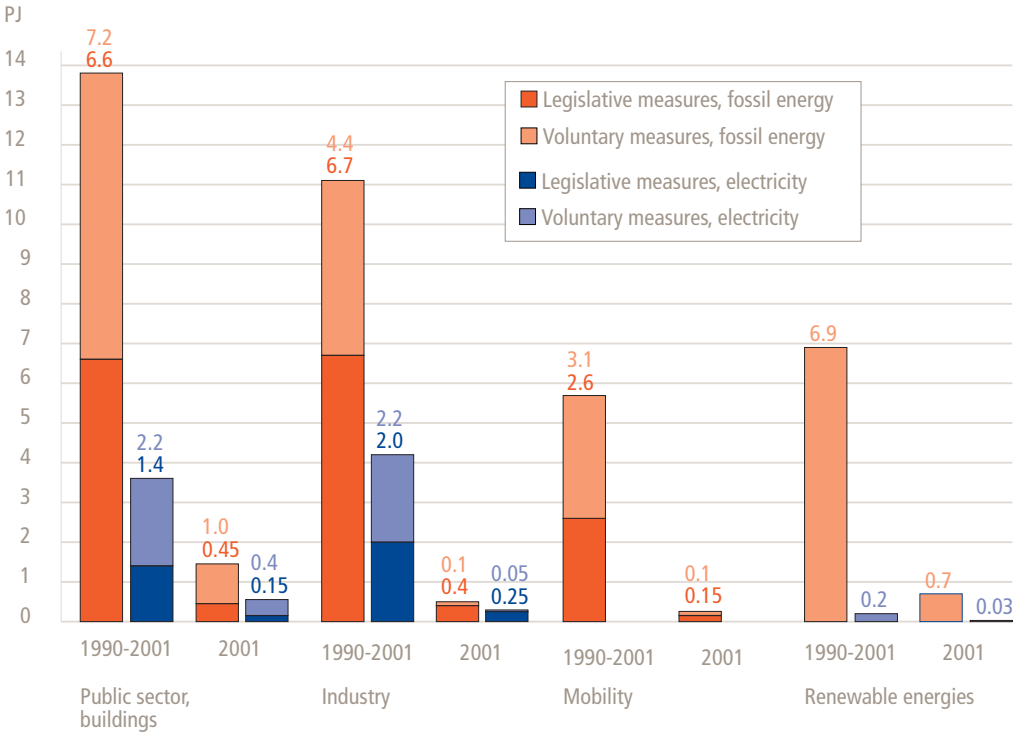
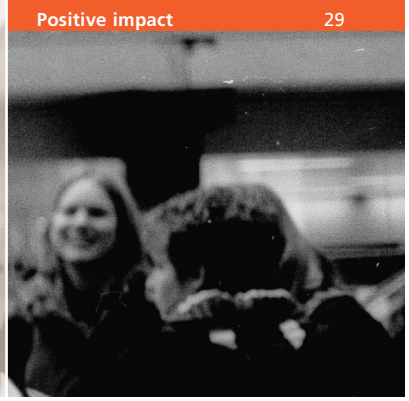


Fig. 10
Impact of energy policy measures of Energy 2000 and of SwissEnergy (2001)

Measures, 1990 to 2001 (in PJ)

	Legisl.	Vol.	Total
Fossil en.	15.8	21.6	**37.4**
Electricity	3.4	4.6	**8.0**
Total	**19.2**	**26.2**	**45.4**



Energy 2000 to SwissEnergy was therefore more or less seamless.

Savings of around 33 PJ were achieved thanks to measures initiated in the course of 2001. Overall energy savings achieved by SwissEnergy in 2001, including measures initiated by Energy 2000 and subsequently implemented by SwissEnergy, amounted to 37.4 PJ of fossil fuels and 8.0 PJ of electricity, or 5.2 percent of the overall energy consumption. Voluntary and promotional measures led to savings of 3 percent, while legislative measures accounted for the remaining 2.2 percent.

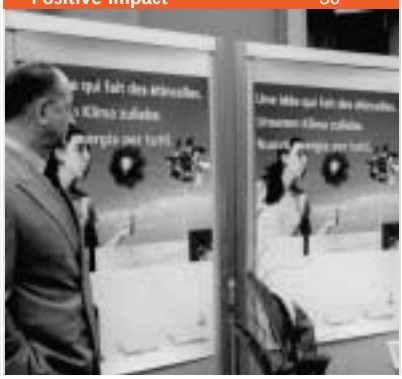
The public sector and buildings segment was responsible for the biggest impact from SwissEnergy campaigning in 2001. Here it was the voluntary activities of SwissEnergy for Municipalities (Energy City), cantonal promotion programmes (including MINERGIE) and "energho" that yielded the most notable results. However, the impact of SwissEnergy on municipalities needs to be closely re-examined in the form of a special evaluation. The cantonal promotion programmes focused on MINERGIE, building regulations and renewable forms of energy, though the impact of these activities, and of related voluntary measures, cannot be separated.

The decline in impact on the industry segment from the last year of activity of Energy 2000 may primarily be attributed to the fact that effort in this sector underwent reorganisation in 2001 (formation of the Energy Agency for Industry) and concentrated on paving the way for future agreement on targets. We can expect to see renewed impact from 2002 onwards.

As was the case from Energy 2000 evaluations, relatively satisfactory results were achieved in the area of renewable energies, primarily thanks to the initiation of a programme to promote the use of wood energy following the destruction of large areas of forest by hurricane Lothar.

If we analyse the impact of the various SwissEnergy projects, we find that SwissEnergy for Municipalities, wood energy, heat pumps, the large-scale energy consumers model and Eco-Drive® are the most effective by far. These projects gave rise to 80 percent of the programme's impact on energy consumption. The most successful in terms of cost-effectiveness (impact per Swiss franc spent) are SwissEnergy for Municipalities, energy in sewage treatment plants, residential buildings and small-scale hydropower plants. If we calculate the overall costs in relation to impact on energy consumption over the full service life, SwissEnergy for Municipalities, mobility, Eco-Drive® and residential buildings yield the best results. In 2001, each kilowatt hour saved cost the federal government 0.3 cents (average for market sectors, excluding renewable energies), while each additional kilowatt hour of renewable energy cost the government 0.9 cents. The overall costs (federal government, cantons and contributions from partners) of energy saved by the programme were equivalent to 2.0 cents per kilowatt hour in 2001, and the figure for renewable energies was 12.6 cents per kilowatt hour (13.9 cents per kilowatt hour including costs for programme management). These differing cost/benefit ratios justify a partial shift of promotional activities from renewable ener-

The savings attributable to SwissEnergy, including measures initiated by Energy 2000 and pursued by SwissEnergy, amounted to 37.4 PJ of fossil fuels and 8.0 PJ of electricity in 2001, or 5.2 percent of the overall energy consumption.



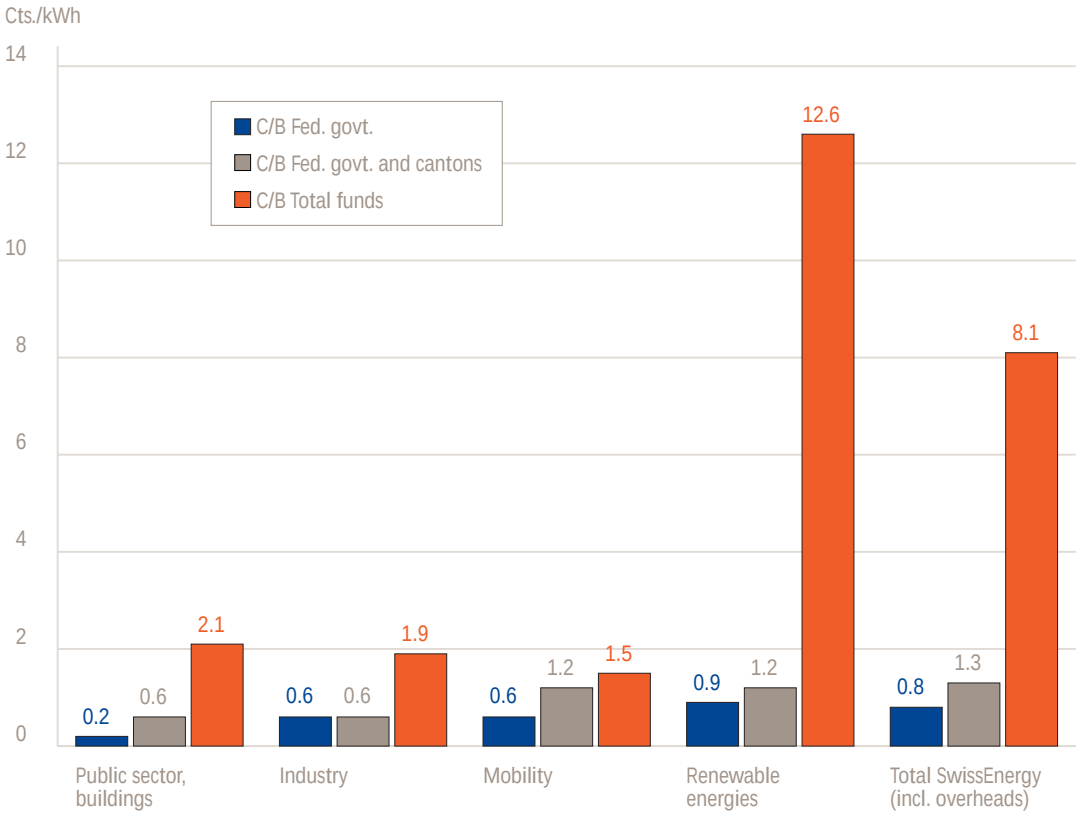


Fig. 11
Cost-effectiveness of voluntary and promotional measures (SwissEnergy)

gies to measures aimed at enhancing energy efficiency. However, in view of their long-term potential, it is important to continue to promote renewable forms of energy.

For the federal government and the cantons, regulations (for example, cantonal energy legislation with 0.02 cents per saved kilowatt hour, followed by voluntary measures, with 0.8 cents per kilowatt hour) and promotion (1.9 cents per kilowatt hour) are generally the most cost-effective measures.

CO_2 emissions and other air pollutants

Measures introduced in the course of 2001 led to a reduction of carbon dioxide (CO_2) emissions by 260,000 to 380,000 tonnes (0.6 to 0.9 percent), depending on whether the calculation of electricity saved is weighted on the Swiss (~0 percent fossil) or European (more than 50 percent fossil) mix. If we include impact of those measures initiated by Energy 2000 and adopted by SwissEnergy, then the reduction in 2001 amounted to between 2.4 and 3.4 million tonnes (5.5 to 7.8 percent). Emissions of other air pollutants fell by between 0.1 percent (particles) and 2 percent (sulphur oxide, SO_x) solely as a result of

Link to report (in original language)

■ Expenditures, Swiss Federal Office of Energy

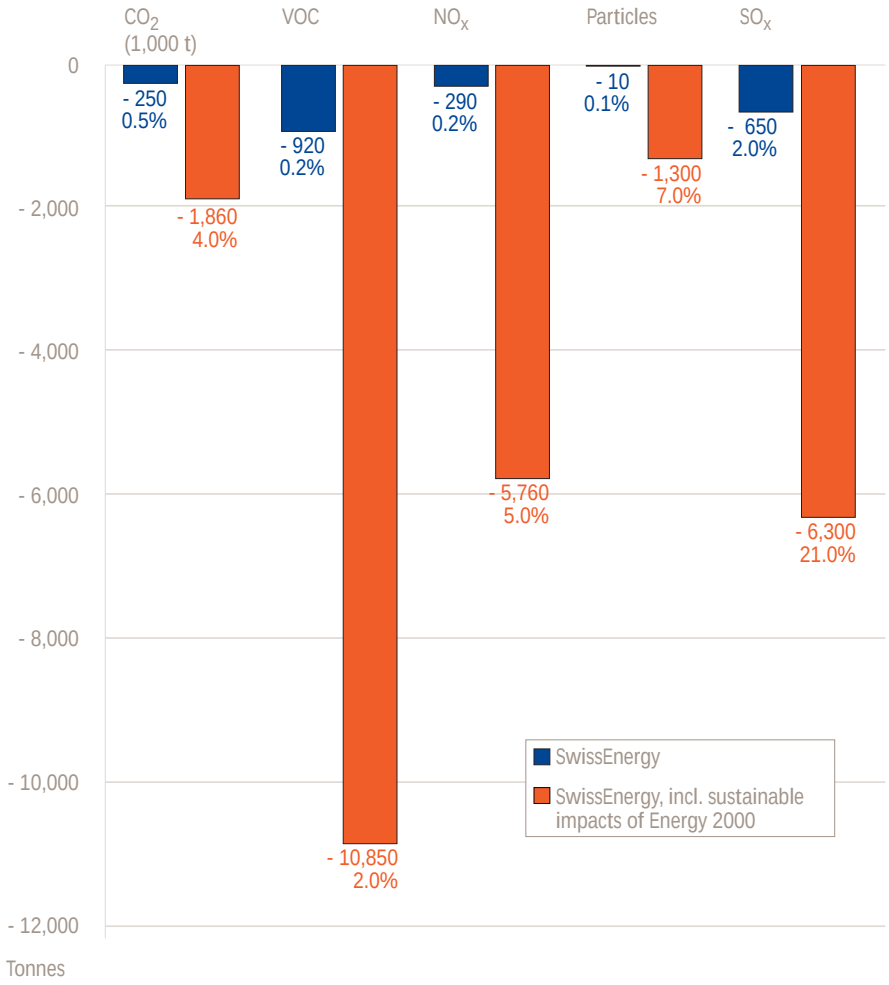


Fig. 12
SwissEnergy: impacts of voluntary and promotional measures on emissions of CO_2 and other pollutants

the voluntary and promotional measures that were introduced in 2001, and if we include the measures introduced by Energy 2000, the figures are 2 percent (volatile organic hydrocarbons) to 21 percent (SO_x). A significant proportion of these savings is attributable to upstream processes abroad. The figures here are as follows: for CO_2 and nitric oxides (NO_x), approximately 33 percent, and for SO_x and volatile organic hydrocarbons, an impressive 79 to 90 percent of the total reduction in emissions.

Economic impact of SwissEnergy

For 2001, the total funds available to the Swiss Federal Office of Energy amounted to around 77 million Swiss francs (■ Expenditures, Swiss Federal Office of Energy), of which 55 million were allocated from the general budget, 23 million from the extraordinary and one-time budget for wood energy ("Lothar credit") and 3 million from the Swiss Federal Office of Energy itself. Nine million Swiss francs were paid to the cantons in the form of

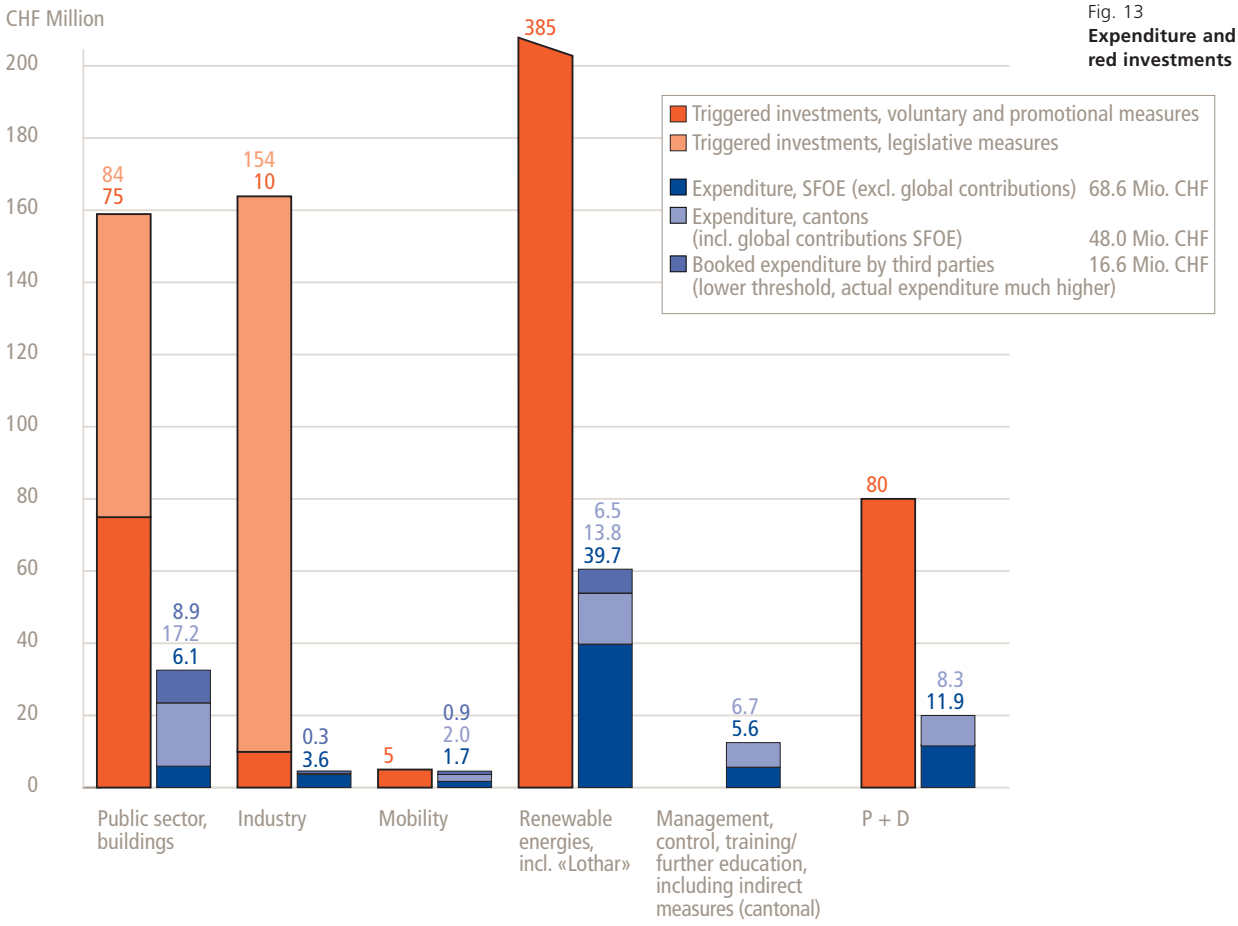
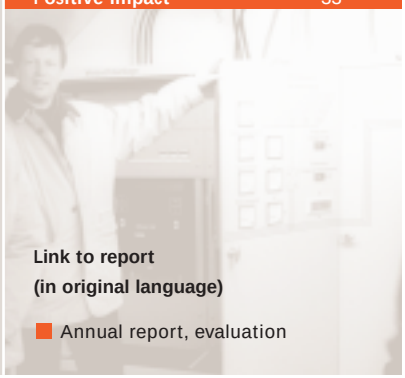


Fig. 13
Expenditure and triggered investments (2001)

global subsidies, and the cantons in turn spent an additional 39 million on their own promotional measures. Including the various market partners, legislative measures (above all, cantonal building regulations) and the respective target groups, a total of around 790 million Swiss francs of investments (including operations and maintenance) and other expenditure was triggered, of which 385 million were spent on renewable energies alone. The energy savings of 0.44 percent correspond to savings in expenditure for energy of somewhere in the region of 100 million Swiss francs.

The estimated impact of SwissEnergy on employment in 2001 amounted to an equivalent of 4,680 man-years, of which 2,750 resulted from voluntary and support measures and 1,930 from legislative measures. Once again it was the area of renewable energy that indicated the highest level of investment and impact on employment. Most of the measures in the area of buildings concern renewable energies and are structural.



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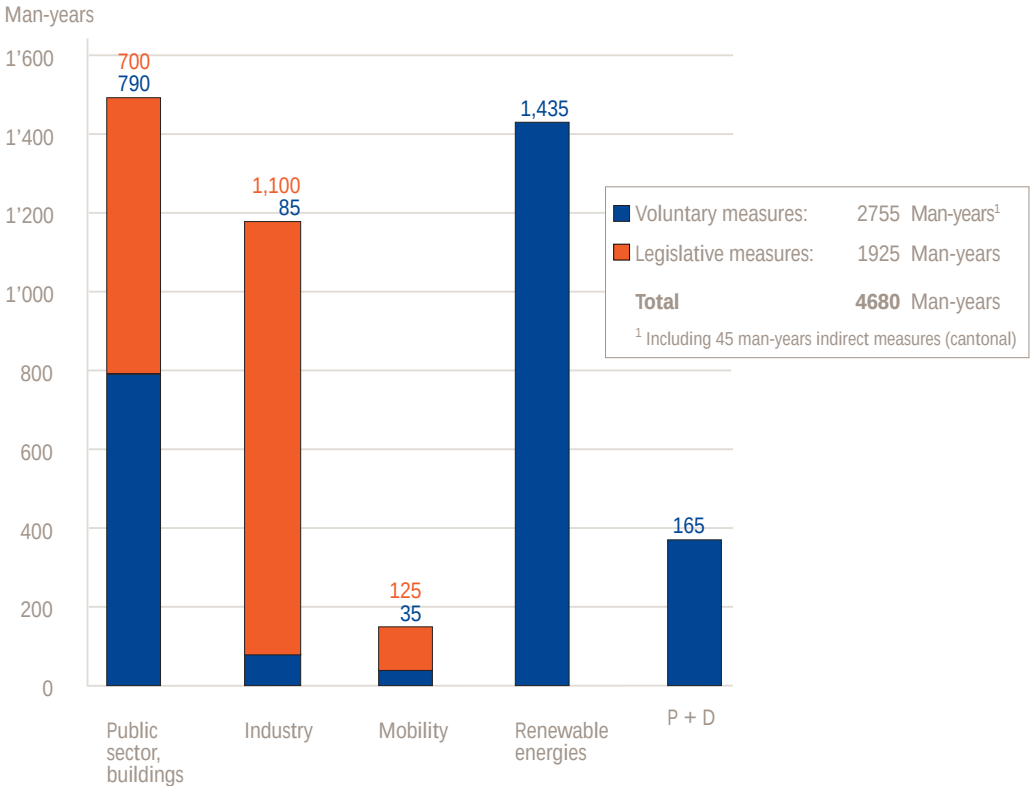
■ Annual report, evaluation

Fig. 14
SwissEnergy: impact on employment



Evaluation

Evaluation of SwissEnergy with Energy 2000 was intensified through creation of an independent support team, and by assessment of strategic evaluations by the SwissEnergy Strategic Committee. The objectives are to continue optimising the programme and make it more transparent to the Federal Council, Parliament and the general public. All conclusions have been published and most of the resulting recommendations have since been implemented.

Evaluations completed in 2001 yielded the following findings (■ Annual report, evaluation):

The impact of federal government regulations on water heaters, hot water and heat storage devices is very low; the evaluation of the resulting uniform market conditions is positive.

The simulator courses yield the same positive results as the conventional Eco-Drive® courses, i.e. savings of between 10 and 15 percent.

At 12 percent, the reduction in consumption achieved through optimisation of complex household systems was below the targeted level of 20 percent, but by way of compensation, market penetration was higher than the declared target (60 percent versus 20 percent).

Savings attributable to the Clean-Air Ordinance amount to 10 PJ, or approximately 1 percent of the overall end energy consumption. Substitution of gas for heating oil is included here. Scientific assessment of the two research areas, "furnaces and combustion" and "efficient energy use in buildings", is very positive.

In the area of combustion, the transfer of know-how to the market has been described as very efficient, but the transfer process in the area of furnaces has been interrupted, and a broader dissemination of know-how is also necessary in the area of buildings.

There is still room for improvement with respect to participation by the Swiss Federal Office of Energy at trade fairs: here, core messages need to be presented in a more visible manner, and closer involvement of visitors more actively sought.

The 50 million Swiss francs of support funds for the "use of waste heat" programme initiated by Energy 2000 were a significant contribution towards the realisation of the various systems concerned, and this also meant that blockages of other financial sources were eliminated. Familiarity with the various training and further education courses is still very limited; only 18 percent of the target groups stated that they were familiar with the range of courses on offer. Within the scope of a meta-evaluation, evaluation activities are seen as a major step forward, and co-operation is an essential requirement for a "learning organisation".

The results of SwissEnergy for 2001 were presented at a conference held on 20/21 June 2002, in eight workshops under the leadership of external speakers and moderators. Here various weak points were identified and proposals for improvements put forward (e.g. standardisation of annual reports of partners, including direct comparisons showing the degree of achievement of declared targets). Others can only be dealt with at government level (target/means discrepancy).

As was the case with Energy 2000, efficiency gains were more than offset by increasing applications.

Surveys: how many people know about SwissEnergy?

In the week from 3 to 10 July 2001, a telephone survey concerning SwissEnergy was conducted among 800 Swiss citizens between the ages of 15 and 74. Just 1 percent of the participants in the survey knew that the current programme is called SwissEnergy, while 4 percent thought it was called Energy 2000. When both programme names were cited, 68 percent were familiar with Energy 2000, and 27 percent with its successor, SwissEnergy. (By July 2002, this figure had risen to 37 percent). Familiarity with the programme was at its lowest in the 15 to 34 age group.

Fifty-six percent of those people who were familiar with SwissEnergy had read about it in

Link to report (in original language)

■ Annual Report, marketing and communication

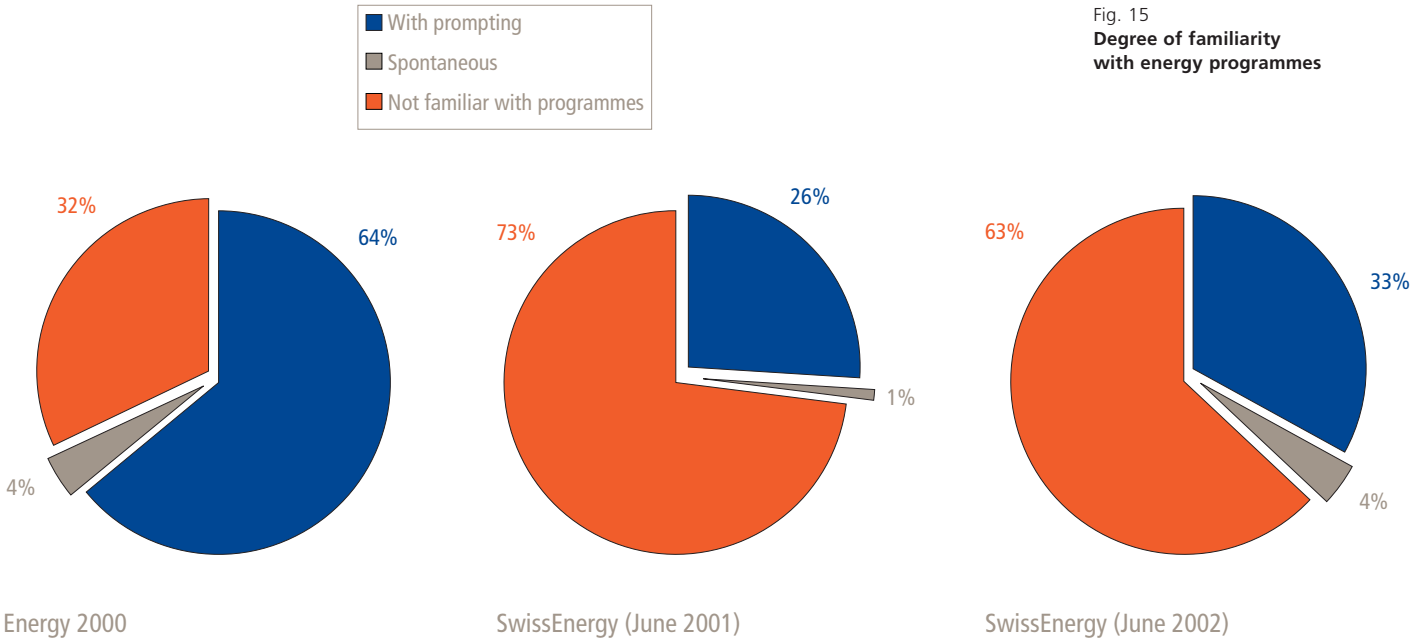


Fig. 15
Degree of familiarity with energy programmes

newspapers and magazines, 45 percent had heard about it on TV, and 24 percent had heard about it from radio reports. Thirty-one percent of the French-speaking population learned about the programme from the journal "Energie et Environnement".

Approximately half the people who were familiar with either Energy 2000 or SwissEnergy were unable to spontaneously list the specific objectives of the programme. When given a list of five objectives, the most widely recognised (84 percent) was the targeted reduction of CO_2 emissions, while the least known (48 percent) concerned the targeted limitation of growth in electricity consumption to 5 percent.

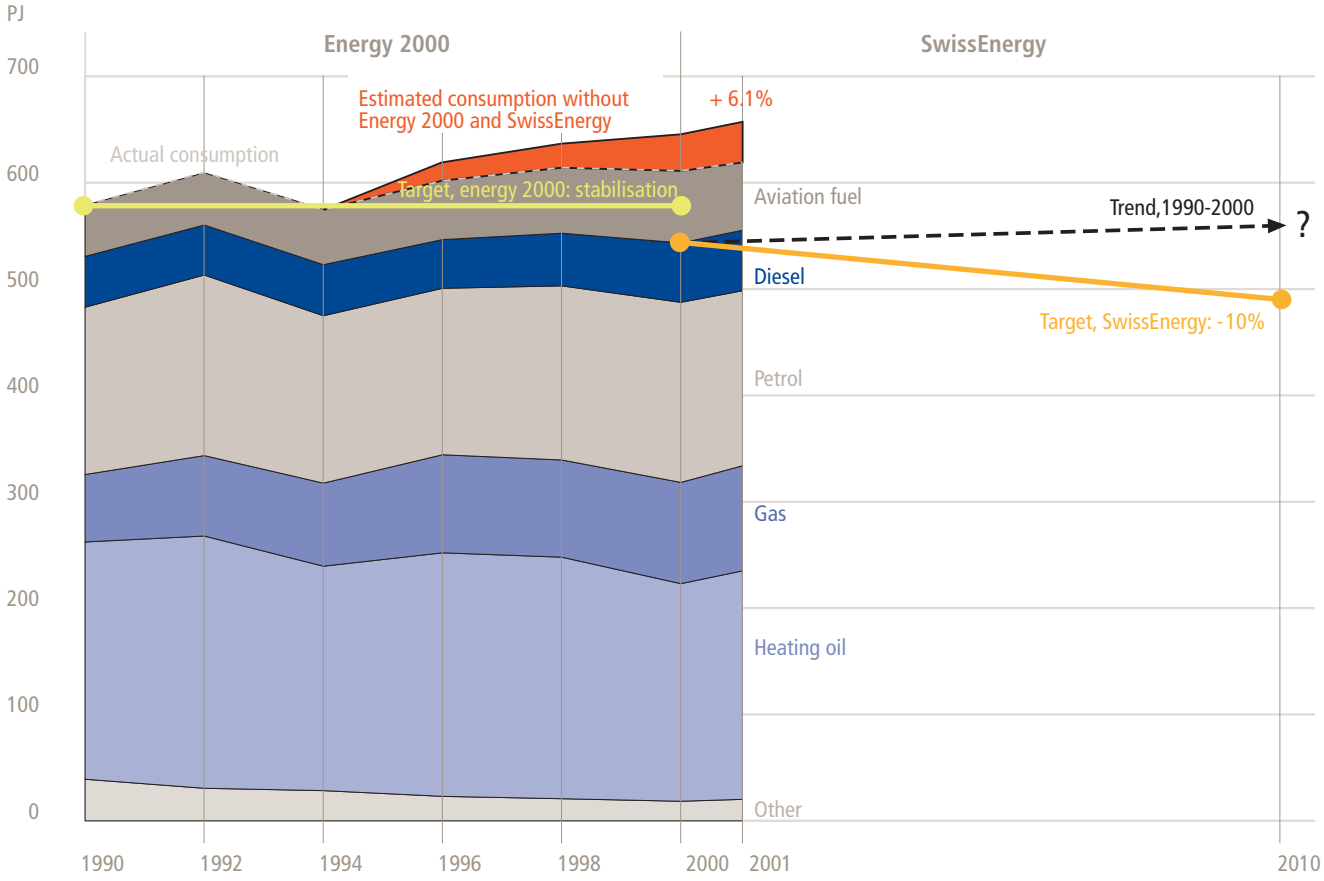
Need for action, outlook

Two categories of questions arise over assessment of the degree to which SwissEnergy has achieved its objectives (■ Annual Report, marketing and communication):

- □ How can the impact of SwissEnergy in its first year be assessed in relation to the objectives? Is the programme on target? How can the degree of achievement of objectives to date be assessed against energy consumption trends?
- □ Are the energy and climate objectives achievable through the various measures to be implemented by SwissEnergy? What consequences can be drawn after the programme's first year of activity?

It is essential to distribute information about SwissEnergy as widely as possible, since the general public is a major factor in achievement of the programme's objectives.

Fig. 16
Consumption of fossil energy

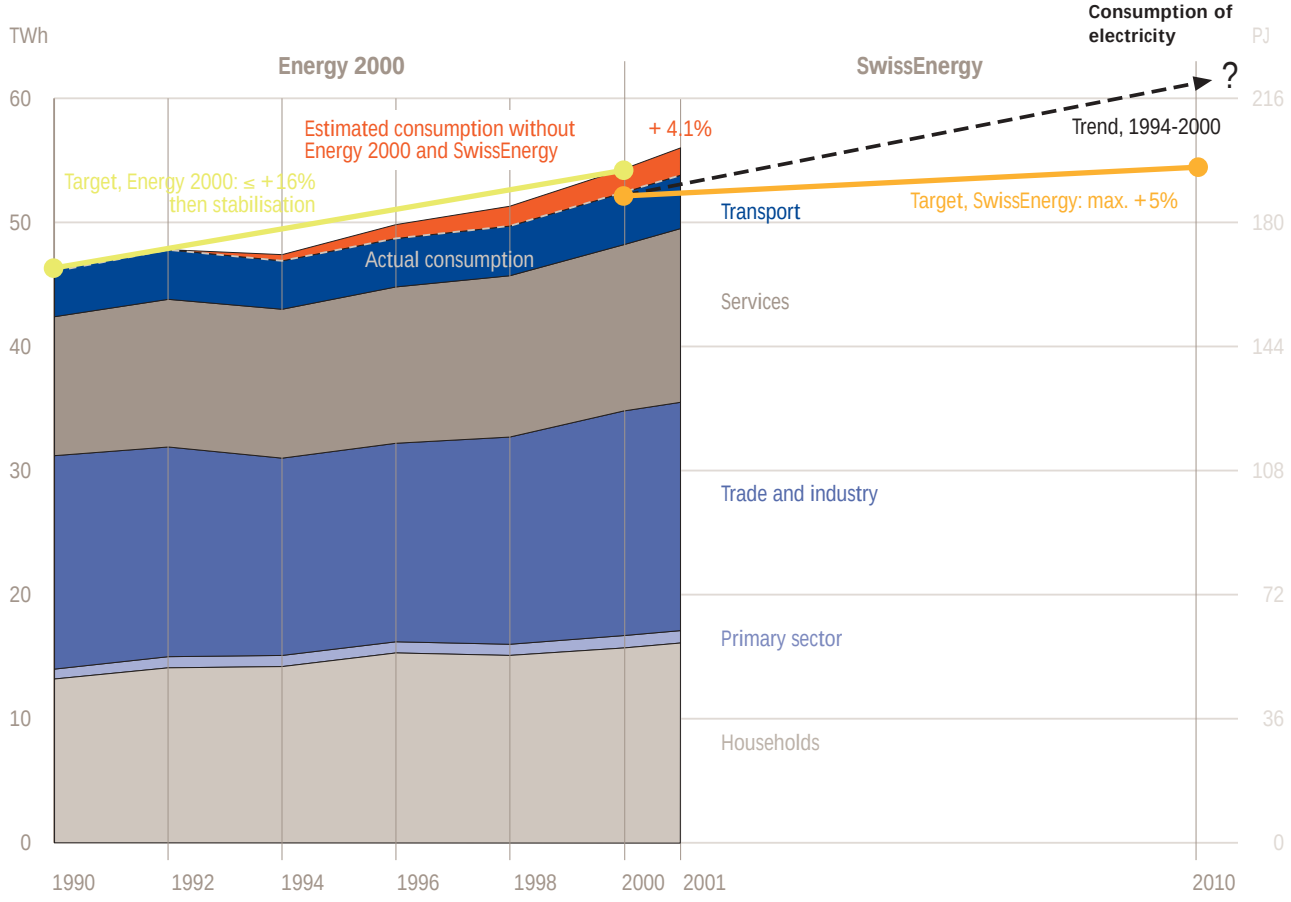


Differentiated assessment of achievement of objectives

In 2001, consumption of fossil energy in Switzerland rose by 1.3 percent (excluding aviation fuels, by 2.2 percent), and electricity consumption increased by 2.6 percent. By contrast, the linear target path foresaw a reduction of 1 percent and an increase by a maximum of 0.5 percent respectively. This means that the programme is therefore not on target as far as its energy-efficiency goals are concerned. However, greater impact is to be anticipated from voluntary measures (partly as a result of agreements on targets), as well as from regulations and support programmes.

The trend in the area of renewable energies is considerably more satisfactory. The production potential for hydropower increased by 0.4 percent, or 170 gigawatt hours; heat production from other renewable forms of energy increased in 2001 by 411 gigawatt hours, and electricity production by 31.6 gigawatt hours. This means that, during the first year of SwissEnergy, 13.7 percent of the

Fig. 17
Consumption of electricity

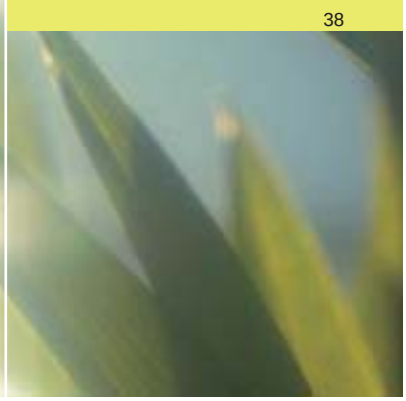


10-year target of 3,000 gigawatt hours for heat was achieved, as was 6.3 percent of the 10-year target of 500 gigawatt hours for electricity.

Energy consumption: halting the trend

Experience to date has indicated that it is likely to be extremely difficult to halt the upward trend in energy consumption that goes hand-in-hand with the growing demand for mobility, housing and use of consumer appliances, etc., even though technological and economic potential clearly exists. Action needs to be taken with respect to the use of fossil fuels and electricity. Although SwissEnergy was able to achieve positive results in its first year, its impact will have to be greatly increased if it is to meet its objective of bringing about the required turnaround in the consumption trend, especially in the area of fossil energies, otherwise additional measures will have to be introduced (e.g. CO_2 fee).

SwissEnergy needs to become more effective if it is to achieve energy and climate objectives for 2010.



Outlook for the next two years

Given the initial findings, evaluations, impact analyses and balance sheet drawn for the first year at the conference in June 2002, the following programme priorities for the next two years were defined and approved on 2 September 2002 by the Strategy Committee:

Pubic sector and buildings

- Implementation of the buildings strategy defined by the *cantons* through harmonised and reinforced cantonal energy laws based on the 10 modules of the model provisions for cantons in the area of energy, and through harmonised and optimised cantonal promotion programmes based on newly developed impact analyses
- Implementation of the service agreement with the *MINERGIE* Association
- Approval and implementation of *demonstration programmes in public buildings* (federal government, cantons and municipalities)
- Promotion and intensification of the *SwissEnergy in Municipalities programme*, especially the Energy City label
- Increasing *incentives* on the basis of existing legislation

Industry

- *Target agreements* negotiated by the Energy Agency for Industry with a large proportion of companies in the trade, industry and services sectors (at least 40 percent of industrial energy consumption)
- Definition and implementation of a *strategy relating to electrical appliances* aimed at stabilising their consumption, notably by extending the requirement on labels and examining the possibility of introducing more stringent approval requirements
- Greater utilisation of synergies between *electricity research* and the electrical appliances market segment
- Expansion of *information, consulting and incentive activity* with the co-operation of the Swiss Agency for Energy Efficiency and the Energy Agency for Electrical Appliances

Mobility

- *More economical vehicles*: Implementation of the target agreement with the Association of Swiss Automobile Importers (Auto-Schweiz) through the use of the energy label, bonus/penalty clauses in motor vehicle taxes (promotion of "A" category vehicles), and cuts in taxes on fuels such as gas and biogas
- *More economical driving*: above all, mandatory instruction and testing for learner-drivers from the point of view of environmental-friendly driving (according to the principles of Eco-Drive®)
- *Improvement of mobility chains*, especially the interfaces between various forms of transport. Here efforts are to be focused on the promotion of mobility centres and sustainable leisure-time and tourism services, as well as on the promotion of human-powered mobility and public transport
- *Closer collaboration* with transport authorities within the *Department of Environment, Transport, Energy and Communications*

Renewable energy

- *Increase in electricity production* from renewable energy sources, and support for *electricity exchanges*
- At least *stabilisation of hydropower production*, despite licence renewals and liberalisation of the market
- *Increased efficiency in the area of heat production from renewable energy sources*, through more effective co-operation among networks and optimum use of the Agency for Renewable Energies and Efficient Energy Use
- Intensification of *co-operation with other sectors*

By focusing on these priorities, the effectiveness of SwissEnergy shall be rapidly enhanced. A decision as to whether a *CO_2 fee* will be required in order to meet the objectives of SwissEnergy will have to be taken on the basis of results of these efforts.

Additional information about SwissEnergy

Publications and periodicals

- □ Order forms and up-to-date lists of publications, including brochures and reports on various programmes, are available from the Swiss Federal Office of Energy
- □ "New Energy for All" (SwissEnergy image brochure): Goals, messages and priorities of SwissEnergy (available in German, French, Italian and English)
- □ Energie Extra: Journal of the Swiss Federal Office of Energy, published every two months, free of charge (available in German and French)
- □ Final report of the Energy 2000 action programme: Description and evaluation of the activities of Energy 2000 (available in German, French and English)
- □ SwissEnergy – follow-up programme to Energy 2000: Objectives, strategies, measures and organisation of SwissEnergy (available in German, French and English)
- □ ENET news: Information on energy research – published quarterly, free of charge (available in German and French)
- □ Energy calendar: Overview of training and further education courses for energy specialists (free of charge). Published twice a year. May be downloaded from the following web site: www.energie-schweiz.ch
- □ SwissEnergy project: a description of the project with periodical updates by involved parties may be downloaded from the following web site: www.misinteractive.ch.

CD-ROM with corporate image

Our corporate image includes a variety of design rules aimed at presenting a strong image of the Swiss Federal Office of Energy and SwissEnergy.

PR material

SwissEnergy has a broad range of material on the topic of energy for public appearances, exhibitions, lectures, etc. , including display panels (in German and French), modules, sets of slides, give-aways, etc.

Internet sites and links

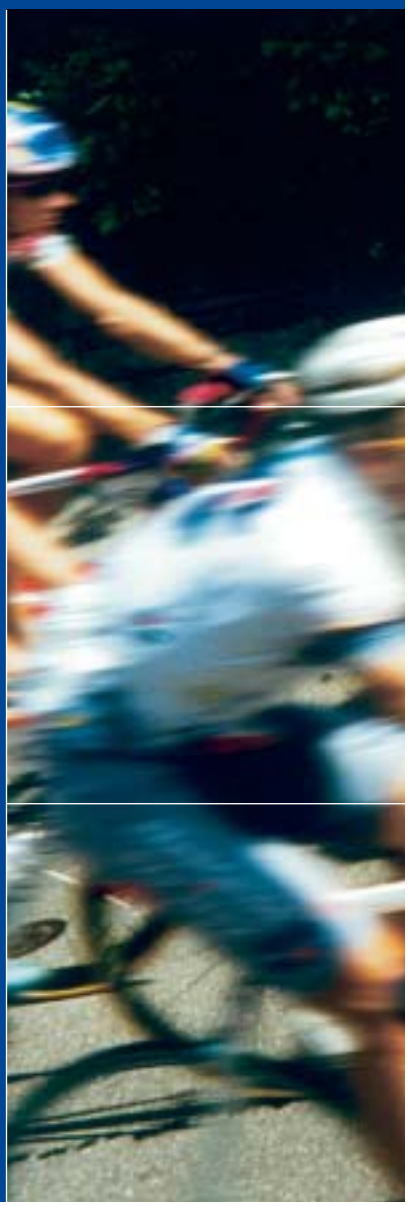
www.energie-schweiz.ch
www.energieforschung.ch
www.infoenergie.ch
www.misinteractive.ch

Ordering PR material

PR material and the most recent list of publications may be ordered from the Swiss Federal Office of Energy, 3003 Berne
phone no. 031 324 41 68 or 031 322 56 22
fax no. 031 323 25 00
e-mail office@bfe.admin.ch

«Hope for a sustainable energy policy lies with SwissEnergy.»

Federal Councillor Moritz Leuenberger



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