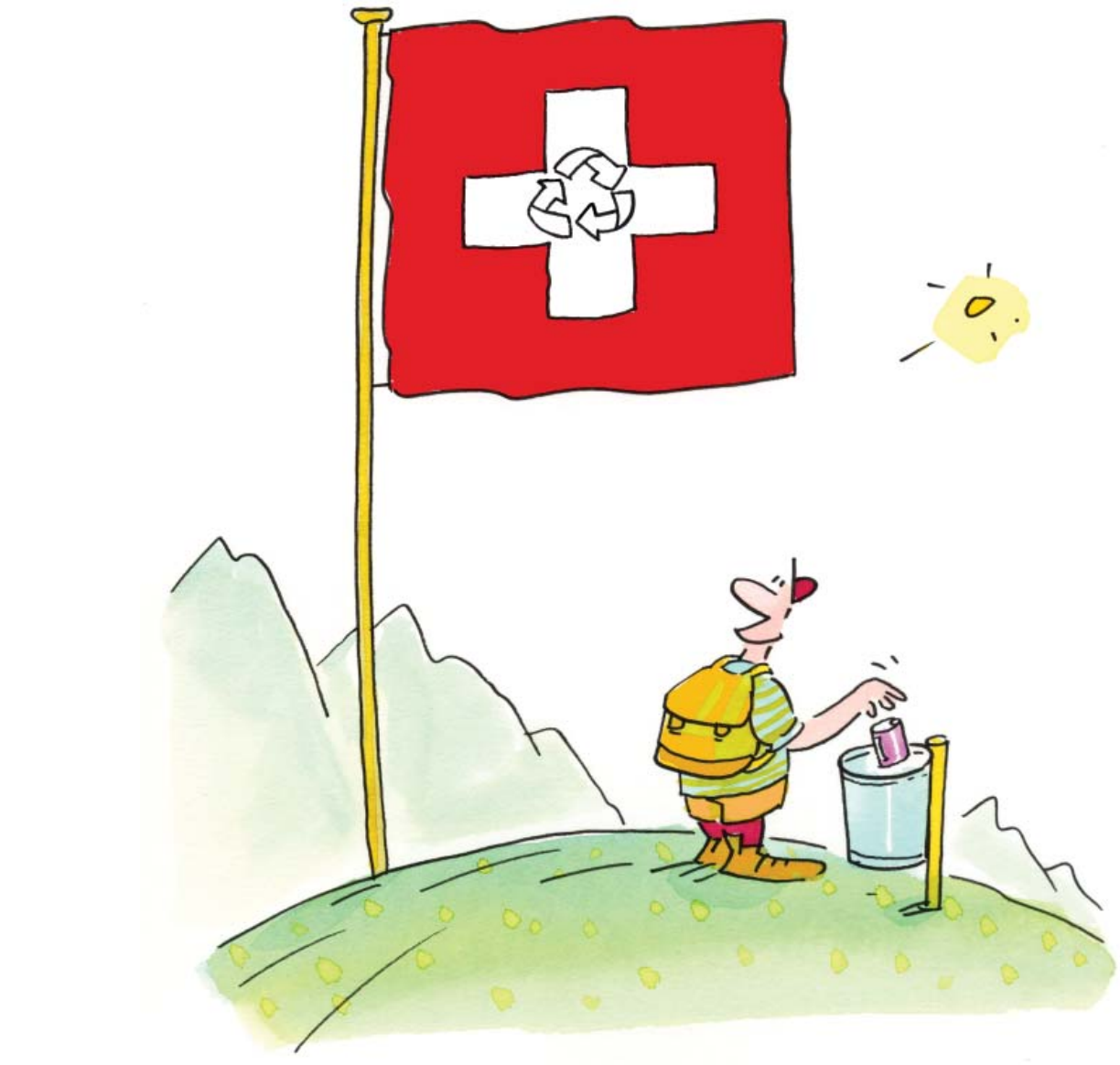
CLEANTECH MASTER PLAN

A FEDERAL GOVERNMENT'S STRATEGY TO IMPROVE RESOURCE EFFICIENCY AND PROMOTE RENEWABLE ENERGIES



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Economic Affairs FDEA

Federal Department of the Environment, Transport,
Energy and Communications DETEC

CONTENTS

Editorial 3
Why cleantech? 4
Purpose of the Cleantech Master Plan 5
Cleantech in Switzerland – Facts and Figures 7
Federal government objectives 10
THE VISION 10
THE OBJECTIVES 11
The five strategic areas of action 12
Overview of measures and recommendations 14
Federal government measures 15
Implementation and further development 17

EDITORIAL

Cleantech is the future. Countries around the world are launching strategies to encourage the use of renewable energy and increase energy efficiency. There is huge market potential out there for innovative Swiss companies.

The federal government sees itself as a creator of opportunities. The Cleantech Master Plan is a means of providing support to businesses and promoting resource efficiency and the use of renewable energy in Switzerland. But we ask the cantons, businesses and the world of science to join us in our efforts.

In recent months, our awareness of the need to use resources carefully has dramatically increased, as has the know-how required to use clean technologies. We now need to create the right conditions so that innovation can flourish and more activity can take place across disciplines.

With this cleantech project we hope to overcome barriers both on a large and small scale and work together to pool resources.

We require ideas which take us to new places. We need showcase projects which demonstrate what can be achieved. We require action which leads us on a straight path towards greater resource efficiency and sustainability.

Economy and ecology are not opposing terms – they complement each other perfectly, providing the basis for sustainable growth policies and a green economy. Let us join together to exploit our innovative strength for the good of all.

Johann N. Schneider-Ammann
Federal Councillor, Head of the Federal Department of Economic Affairs (FDEA)

Doris Leuthard
Federal Councillor, Head of the Federal Department of the Environment, Transport, Energy and Communisations (DETEC)

WHY CLEANTECH?

Greater competitiveness with cleantech

Reducing energy consumption with more efficient machines, improving processes to manufacture products using fewer materials, making solar energy more competitive thanks with new technologies… we need join together to rise to these and similar challenges. Cleantech applications are not restricted to one particular sector: they have relevance across the whole business spectrum.

Cleantech applications share one important feature: cleantech – that is to say, a more efficient use of resources and energy – reduces costs and increases competitiveness. **As consumers become more environmentally aware, the demand for efficient solutions grows.**

Cleantech is a key to sustainability

Cleantech is an international growth market.

- Some cleantech sub-sectors are expected to grow at a rate of 3-8 per cent by 2020.
- **Renewable energies and material efficiency are the areas currently showing the greatest market growth.** Improvements in these areas lead to lower production costs and less environmental pollution.
- Swiss businesses should be able to benefit from this market of the future. It is a sector in which jobs can be retained and created, and it will make us less dependent on non-renewable resources.

Cleantech will ensure future generations' quality of life

Resource-efficient technologies, manufacturing processes and services play a key role in overcoming challenges facing the world such as climate change, diminishing raw materials and increased levels of pollution. **Switzerland's economic strength lies in innovation and technology, and so the country is well set to help find solutions for which there is a demand on international markets.** These solutions will also ensure that future generations can enjoy a high quality of life.

Cleantech unites the economy and ecology

For decades, the economy and ecology were viewed as two opposing concepts. Recently there has been a change in thinking, which has, if anything, become stronger in the light of current events. An increasing number of people understand that economic and ecological considerations are closely linked. **State regulations such as standards, subsidies and incentive taxes in line with the market all play an important role** in encouraging the development and increased use of cleantech products. Cleantech unites economic and ecological considerations to create a green economy.

Economic and ecological considerations

Cleantech combines economic and ecological considerations: with new technologies we have a better chance of overcoming challenges facing the world such as climate change and environ-mental pollution. At the same time, Swiss businesses can benefit from the cleantech global growth market and create new jobs.

PURPOSE OF THE CLEANTECH MASTER PLAN

Pooling resources and creating synergies

The main objective of the Cleantech Master Plan is to strengthen busines ses involved in developing and producing cleantech applications. This can be achieved through greater coordination of science, business, government and policymaking.

The Master Plan is a political instrument which aims to **concentrate resources and exploit synergies between the main players,** for example by encouraging dialogue between the world of business and the authorities, improving links among cantonal cleantech initiatives, setting up complementary state incentive programmes and optimising knowledge and technology transfer between SMEs and universities.

Creating the right setting for economic expansion

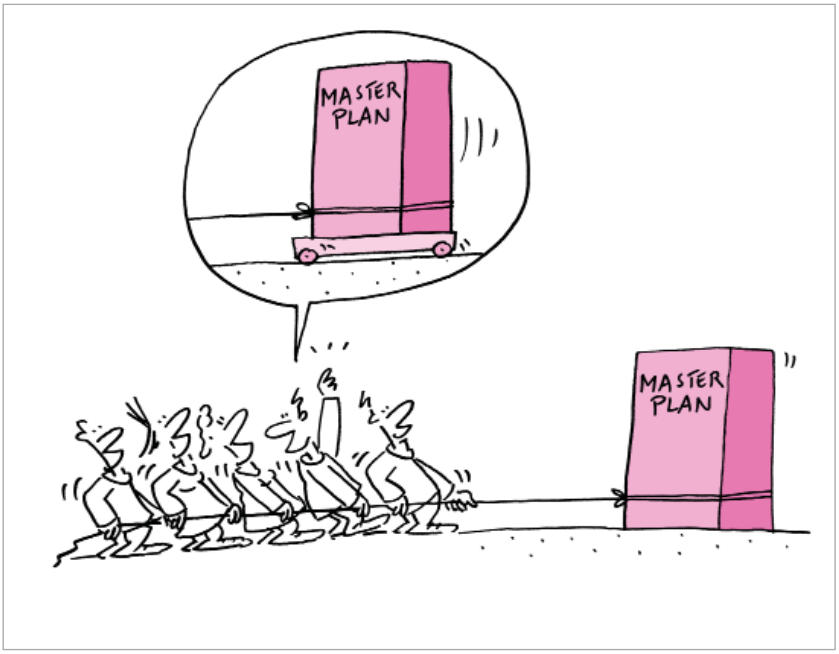
The Cleantech Master Plan describes Switzerland's innovative strength and position (patents, exports) on the global cleantech market, and sets out a series of objectives, areas of action, measures and recommendations. It describes ways in which Switzerland's economy can be made more competitive.

The federal government's vision, aims and measures provide a basis upon which policies can be developed in a range of areas, for example education and research, environment and energy, and economic and fiscal policy.

Investment gains, but not industrial policy

The federal government strategy for resource efficiency and renewable energies is **not an industrial policy designed to promote a specific branch of the economy.** The business world is well aware in which market segments the largest potential lies, and it decides where to invest in order to achieve the greatest gains. It is not the aim of the federal government to prohibit and decree, but rather to create incentives and **motivate the players to join forces and increase Switzerland's innovative strength with cleantech.**

The Cleantech Master Plan
The Cleantech Master Plan is a political instrument which encourages discussion and provides a basis upon which all players can work together towards the same ends.



Encouraging dialogue

With this initiative, the federal government hopes to encourage widespread debate among the general public and among the various players in the cleantech sector. We do not only need new products, processes and services to get Switzerland on the path towards greater resource efficiency in all areas of our lives. We also need to change our behaviour and become more aware of the fact that we will benefit in the long term from a resource-efficient way of life, particularly in a country lacking in raw materials.

Influence of Switzerland's new energy policy

Following the earthquake and subsequent nuclear disaster in Japan in March 2011, **the federal government carried out a new political assessment of its cleantech strategy.** The Federal Council's decisions on the Energy Strategy 2050 and the results of parliamentary debates on nuclear energy and renewables have had the effect of focussing the concept to date.

A large catalogue of federal measures organised into five strategic areas of activity and twenty recommendations to the cantons, business and science partners aims to encourage greater dynamism in a wide range of areas.

Governemental measures
The measures were selected on a range of criteria: their likely contribution to the achievement of the federal government's cleantech aims, the sustainable use of renewable energies, and their economic effect. They are intended to provide a considerable contribution to resource- and energy-efficient growth. (vgl. p. 13ff.).

CLEANTECH IN SWITZERLAND – FACTS AND FIGURES

Definition

Clean technologies are a significant economic factor in Switzerland; numerous businesses in all sectors are involved in developing and producing cleantech products and services.

- **They generate** a gross value added of around 20 billion francs, accounting for 3-3.5 per cent of Switzerland's gross national product.
- There are an estimated 160,000 people in this sector, or around **4.5 per cent of the work-force.**

Losing ground on the world stage

Empirical findings show that Switzerland is generally well positioned in the cleantech sector. How-ever, in terms of patents and share of world trade, it is losing ground.

- Between 2000 and 2007, **Switzerland's share of cleantech patents worldwide fell compared with the period 1991-1999.**
- **The country's initial advantage in terms of volume of global trade** in the cleantech sector has also steadily eroded since the mid 1990s, to the point where it **no longer exists.**

Above-average export volume

A large proportion of Swiss companies dealing in cleantech export their products abroad; **38 per cent also sell their products and services in foreign countries.**
Export is like top-level sport, constantly encouraging innovation. However, the high level of exports means the cleantech industry is heavily dependent on global demand for capital goods and from the strength of the Swiss franc.

- According to foreign trade statistics, **cleantech in some form or other accounted for an average of 15 per cent of all Swiss exports between 1996 and 2008,** during which period the share of trade increased considerably.
- **About 1.5% of all cleantech goods and services sold in the world originate in Switzerland.** Switzerland exports more cleantech services than it imports.

Improving knowledge and technology transfer

However, companies often find it difficult to access the knowledge available in universities because of the wide diversity of the research and the fact that knowledge is often spread between a range of institutions. Various measures are being introduced to improve the transfer of knowledge and technology between research institutes and businesses.

Cleantech knowledge in Swiss universities and research activities

Swiss businesses are able to benefit from a strong and broad base of cleantech knowledge in Swiss universities. However, there has been a slight drop in research activities and findings in the cleantech field over the past ten years.

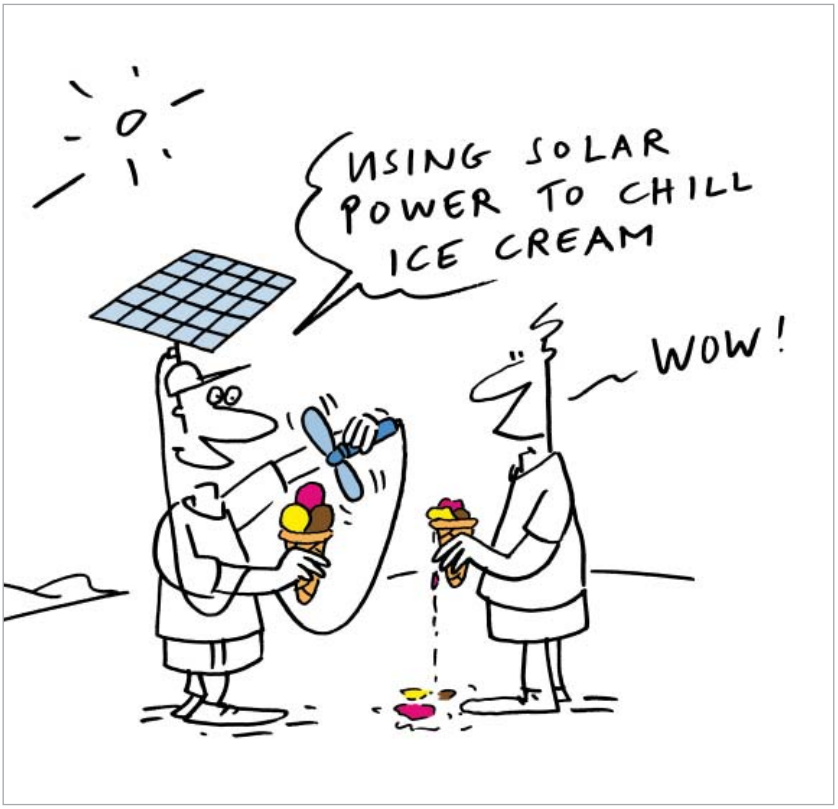
In some areas, Swiss research is a global leader and makes an invaluable contribution to the development of successful cleantech goods, as **the Examples of Best Practice in solar energy research and waste management demonstrate.**

EXAMPLE OF BEST PRACTICE
Excellence in solar energy research

*One of Switzerland's great strengths is **research into photovoltaics, in particular into thin-film solar cells.** Less material is required in their manufacture and they can be produced much more cheaply than conventional solar modules.*

The leading research centre in the world for thin-film silicon-based technology is part of the Federal Institute of Technology in Lausanne (EPFL). The knowledge gained over recent years is being successfully marketed by two Swiss companies.

Empa in Dübendorf holds the world efficiency record in CIGS cells, another thin-film technology, which achieves high efficiency levels of over ten per cent. This is an example of a start-up company successfully applying knowledge in an industrial context. There has also been considerable success in applying findings from research into solar module integration in buildings.

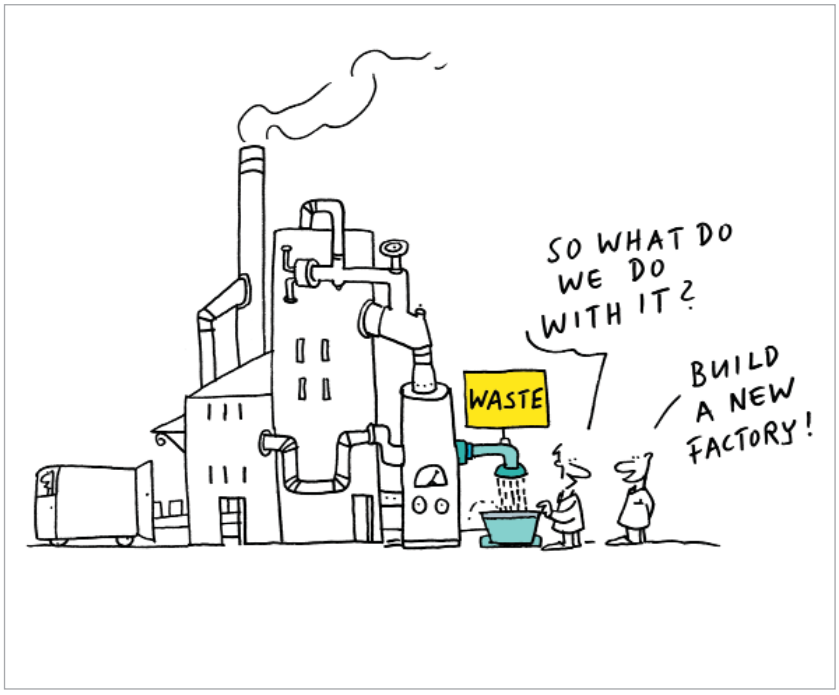


Expected growth on domestic market

Just 62 per cent of Swiss companies involved in producing cleantech ap plications are active on the domestic market. The greatest activity can be found in renewables and material efficiency.

- In Switzerland, the large majority of companies in these fields expect to experience growth; **85 per cent expect their cleantech product or service turnover to increase.**
- In the cleantech mass markets (e.g. solar energy, energy storage etc.), domestic economic conditions involving high labour costs mean that Swiss companies operate in a highly competitive environment.
- **The federal government's decision to abandon nuclear energy (25th mai 2011)** and the subsequent long-term reorganisation of energy supply in Switzerland promises to bring new life to our cleantech industry.

Strong foundations
In the area of cleantech, Switzerland is building on strong foundations: research enjoys a strong position and companies are able to compete in the marketplace. However, there must be a reversal in the slight decline experienced over recent years.



EXAMPLE OF BEST PRACTICE
Leading position in waste management

*Switzerland has been **a world leader in the area of waste management and recycling** for many years. Research and industry work closely together in developing and optimising new technologies, of which there are many.*

For example, the University of Applied Sciences Rapperswil is doing research in conjunction with the waste management industry into processes to recover rare metals from waste slag and to separate concrete waste and tile fragments.

The ETH Zurich, EPF Lausanne and University of Applied Sciences Wädenswil have been able to refine processes to ferment organic waste. This technology has allowed a Swiss company to become global market leader in biogas production from kitchen waste, and another to conquer the Swiss and European agricultural biogas plant markets.

FEDERAL GOVERNMENT OBJECTIVES

CONSIDERATIONS AND PRINCIPLES

In the last ten years, Switzerland's position in the cleantech sector has worsened relative to other countries. This is one of the reasons why **greater commitment is required from the public sector, the science community and industry.**
The following considerations are also significant:

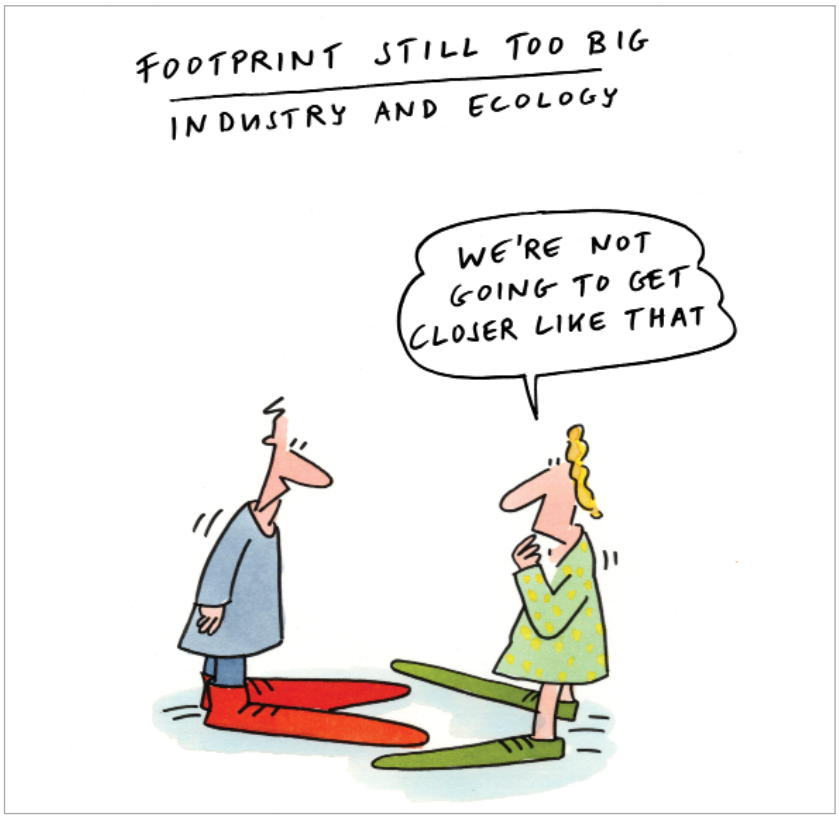
- Modern patterns of production, distribution and consumption are not sustainable; the use of natural resources and energy is rising.
- Trends in Switzerland are in stark contrast to the strong and dynamic growth anticipated for cleantech activities worldwide.
- Switzerland has strengths at the beginning of the research – innovation – market value-added chain, and even greater strengths at the market end. There is room for improvement in knowledge and technology transfer, in particular.
- Despite the above, Switzerland is an international leader in innovation and so in a strong position to develop and sell cleantech products and services on international markets.

In the light of these considerations, the federal government has formulated a vision, objectives and measures for the next ten years.

THE VISION

The vision is to reduce **Switzerland's use of resources to a sustainable level (footprint 1)** and so become a leading business location and centre for innovation in the cleantech sector. **Switzerland will set a global example in resource efficiency and resource management.**

Strategic objectives for all
The vision and these four objectives provide policy makers, administrators, businesses and scientists with clear guidelines on which to act. The objectives are to be achieved by promoting the five strategic areas of action. These areas of action indicate to policymakers, scientists and businesses along the value added chain and in the cleantech environment the areas to which they need to devote greater attention in order to reach the established objectives.



THE OBJECTIVES

The aim is for the Swiss economy to have achieved a strong position in the global growth market for resource-efficient technologies, products and services and renewable energies by 2020.

Leading position in cleantech research

By 2020, research activities will have led to improvement in Switzerland's knowledge base in the cleantech sector. Switzerland will enjoy a world-class position in selected cleantech sub-sectors.

Considerable progress in knowledge and technology transfer

By 2020, there will have been demonstrable improvement in the general conditions for research, knowledge and technology transfer and education, so that Swiss companies will be able to effectively use the knowledge gained by higher education institutions in their cleantech innovations.

Leading position in cleantech products and services

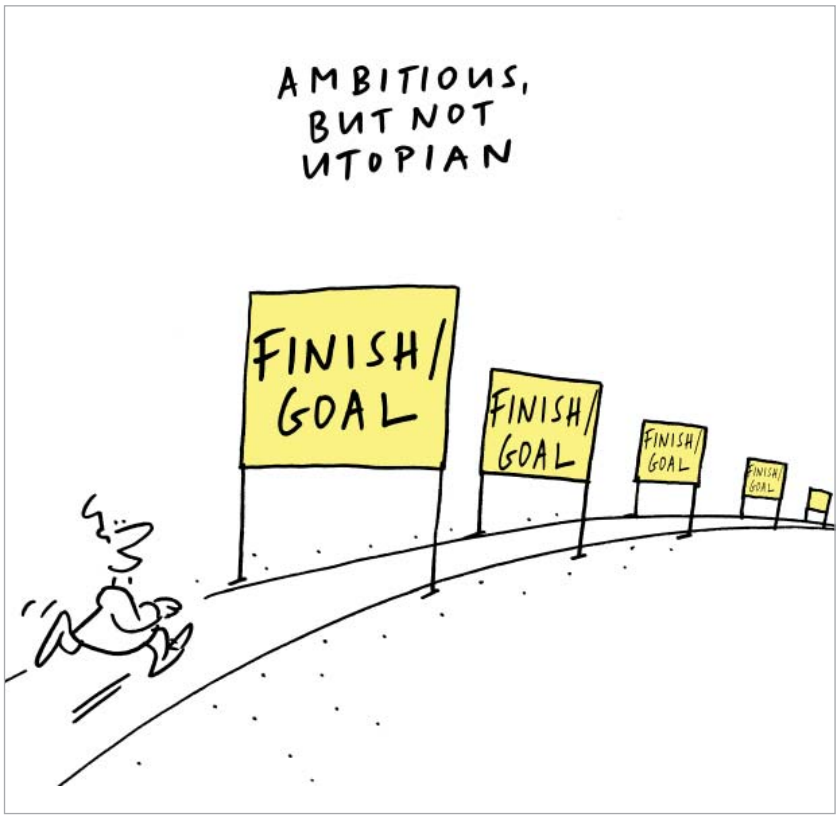
By 2020, resource-efficient technologies, processes and products in the field of environment and energy will increasingly be developed, in demand and in use.

Cleantech stands for Swiss quality

By 2020, Switzerland will become a leading location for the production and export of cleantech products and services. Cleantech will be associated with Swiss quality and 'Swissness'.

Federal Council's sustainable development strategy

The Cleantech Master Plan is dovetails with the Federal Council's sustainable development strategy and with a range of international initiatives, including UNEP's Green Economy Initiative, the Federal Council Decision on a Green Economy and the OECD's Green Growth strategy. Cleantech thus forms a major strategic factor in environment and energy policy and plays a key role in boosting Switzerland's economy.



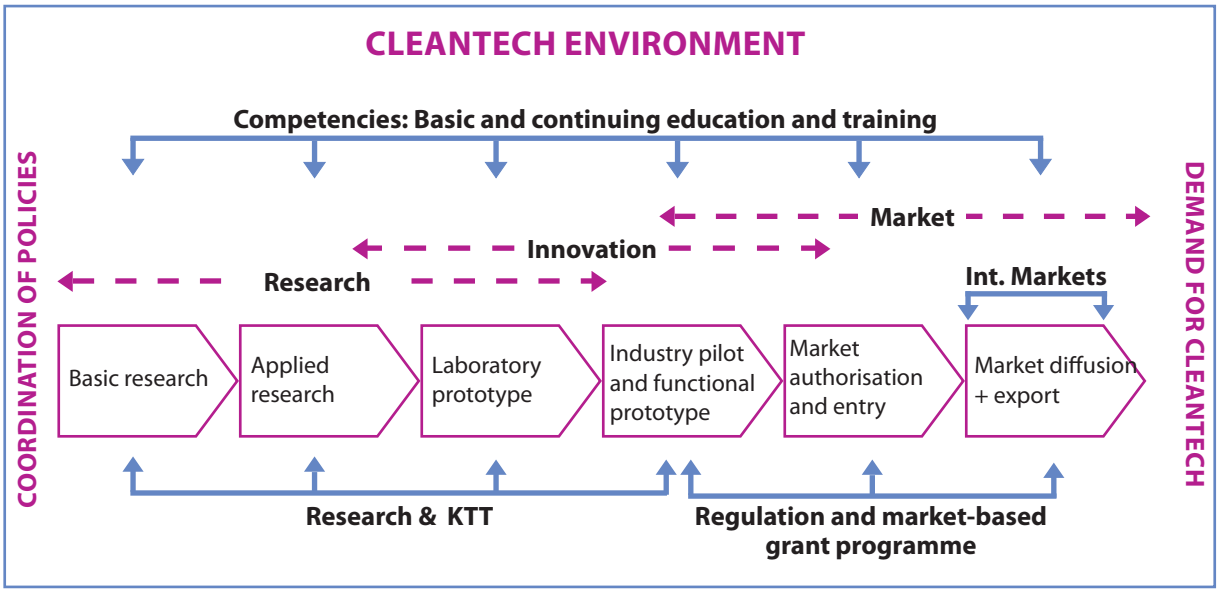
THE FIVE STRATEGIC AREAS OF ACTION

The objectives can be successfully achieved if everyone – the federal government, cantons, industry, science and the general public – becomes involved. There must be research and development into new cleantech goods and these must be launched on global markets and used by industry and, indeed, by us all.

The five strategic areas of action indicate to policymakers, scientists and businesses along the value added chain and in the cleantech environment the areas to which they need to devote greater attention in order to reach the established objectives.

For each of the areas of action, the Cleantech Master Plan first sets out the current situation in Switzerland, then analyses the strengths, weaknesses, opportunities and risks faced by Switzerland in each area. On the basis of this, recommendations are then made for measures to be taken by the federal government, cantons and private individuals, in each case taking account of who is responsible for which particular aspects.

VALUE-ADDED CHAIN AND STRATEGIC AREAS OF ACTION IN THE CLEANTECH ENVIRONMENT



1 Research and knowledge and technology transfer

The measures and recommendations in this area of action are intended to help **expand knowledge in research areas associated with cleantech.** They should also make it easier for businesses to access research findings more quickly, so that new products and services can be created.

2 Regulation and market-based promotion programmes

This area of action focuses on **creating incentives for and removing barriers to innovation in environment and energy policy** and implementing regulatory instruments which are compatible with a market economy.

3 International markets

This area of action envisages **measures to encourage exports, promote Switzerland as a business location and improve networking with scientists abroad** in order to ensure the Swiss cleantech economy retains a strong competitive position internationally.

4 Cleantech innovation environment

Favourable economic conditions must exist for cleantech innovations to be successful. The measures in this area of action aim to **shape economic policy in a way which encourages innovation.**

5 Skills and training

It is essential for Swiss companies to employ well-qualified professionals and staff for inhouse research and development if they are to retain a competitive position on the market. **This area of action proposes measures to optimise training and education at all levels.**

Resource efficiency and renewable energies
The federal government's strategy for resource efficiency and renewable energies can be successfully implemented if everyone – the federal government, cantons, industry, science and the general public – becomes involved.
Well-qualified professionals provide the foundation of this value-added chain.

OVERVIEW OF MEASURES AND RECOMMENDATIONS

The series of measures was drawn up with the aim of improving Switzerland's innovative strength long-term in the field of resource efficiency and renewable energies.
The measures comply with existing federal policy strategy. Over the coming months they will be tested and implemented as part of regular activities in several government departments.

Prioritising measures

- Priority measures involving **research, knowledge and technology transfer and education** are given consideration in the federal dispatch on the financing of education, research and innovation (BFI dispatch 2013-2016).
- New funding models in the field of environmental technology are proposed to the Federal Council – e.g. for pilot and demonstration installations or other exemplary projects – and **an inventory drawn up of existing regulations which hinder innovation in the field of resource efficiency.**
- More **far-reaching studies will be carried out** to provide a basis for decisions on possible measures to be introduced later on, such as **expanding the system of compulsory recycling of further products.**

Recommendations to the cantons, industry and science partners

The Cleantech Master Plan makes over twenty recommendations to the cantons, industry and science partners on how to support the aims of this strategy. **The cantons in particular are to play a key role in implementing the measures.** As can be seen from the growing number of cantonal cleantech initiatives and funding programmes, they already take this task very seriously.

FEDERAL GOVERNMENT MEASURES

Federal government measures also take account of the **results of the Cleantech Master Plan consultation with interested economic, political and scientific parties in March 2011. The universally accepted proposals** largely form the basis of the federal government measures.

AREA OF ACTION: RESEARCH AND KNOWLEDGE AND TECHNOLOGY TRANSFER (KTT)

1. Improve coordination between **instruments to promote resource efficiency** and renewable energies.
2. Improve coordination in **promotion of KTT institutions** within the federal administration and with the cantons and make funding **more transparent.**
3. **Encourage promotion of pilot and demonstration projects** in the field of green technologies.
4. Continue to develop **model national competence centres** and improve links between institutions.
5. Encourage further research into innovative solutions so that the **raw materials strategy** can be expanded.

AREA OF ACTION: REGULATION

6. Make active use of **opportunities in procurement** within the federal administration and in the cantons by purchasing environmentally friendly and energy-efficient products in order to promote innovative, low-resource technologies.
7. Compile **information** on the best efficiency standards **(technological progress in electrical goods).**
8. Draw up an **inventory of the main federal and cantonal regulations hindering innovation** in resource-efficiency terms and of the main private sector standards.
9. **Extend compulsory recycling** to a broader range of resource-relevant products.
10. **Develop model projects (showcase projects)** including funding models and coordinate these with international initiatives.

AREA OF ACTION INTERNATIONAL MARKETS

11. **Strengthen interdepartmental cooperation in foreign economic policy** in the fields of environment and energy.

AREA OF ACTION – CLEANTECH-INNOVATION ENVIRONMENT

12. **Establish feasibility of drawing up statistics on cleantech.**
13. **Identify obstacles to the funding** of company start-ups and innovation and develop proposals for improvement.

AREA OF ACTION: EDUCATION AND TRAINING

14. Implement **recommendations of the MINT report** in the BFI-dispatch 2013–2016.
15. Launch **a 'resource and energy saving' ideas competition** at all levels of education.
16. Review **all vocational education and training (VET) courses** in terms of resource efficiency and renewable energies and provide support to VET partners.
17. Examine possibility of creating **a continuing education and training (CET) programme in resource efficiency and renewable energies.**

IMPLEMENTATION AND FURTHER DEVELOPMENT

Cooperation among all players

The Cleantech Master Plan is the starting point in a process intended to foster networked thinking and action, interdisciplinary problem solving and inter-institutional cooperation among all players.
Federal government, the cantons, business and science partners are invited to share the vision, work towards common objectives and take responsibility for implementing the recommended measures.

Joining forces

A core group comprising several federal offices and cantons and set up by the FDEA and DETEC coordinates implementation of the measures and the strategic processes. **An advisory board advises the core group and ensures that business and science experts and representatives of other interest groups** (e.g. NGOs) are involved. This concentrates resources and avoids overlap. Both the FDEA and DETEC report periodically to the Federal Council on how far measures and strategies have already been implemented.

Shared responsibility

The measures and strategic processes are not implemented centrally; this responsibility is shared by the federal government, cantons, universities and private economy within their area of competence.

A concentrated and well coordinated approach ensures that public funds are efficiently used to improve the framework within which innovation in cleantech can take place in Switzerland.

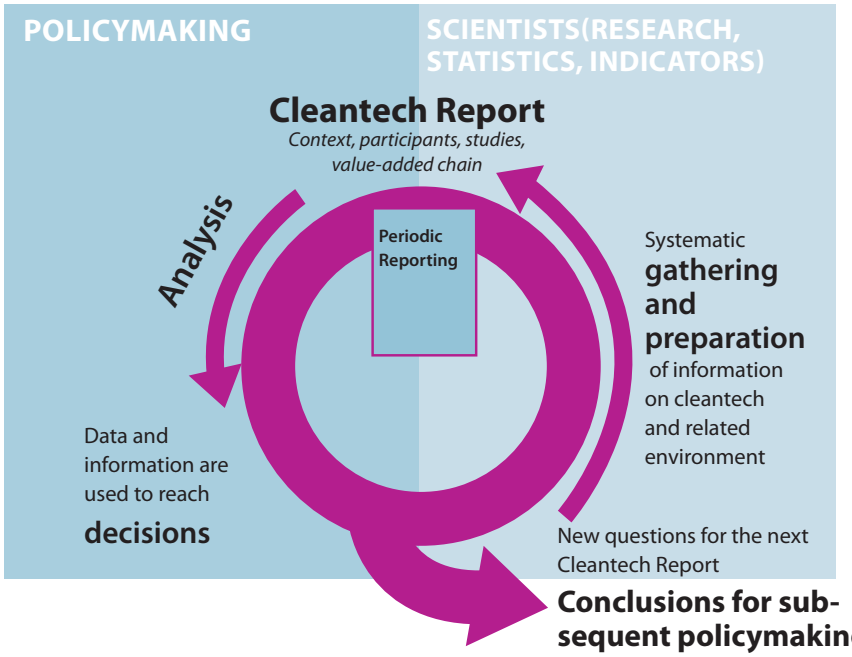
Business associations

- *Economiesuisse: Chance für die Schweizer Wirtschaft, 2011*
- *Swisscleantech: Cleantech Strategie Schweiz, 2010*

Cantonal initiatives and focus programmes

- *I-net Basel*
- *Cleantech Fribourg*
- *Cleantech Alps*
- *Cleantech Genève, pôle d'excellence*
- *Zurich Green Region*
- *Kanton Bern, Wirtschaftsstrategie 2025*
- *Hightech Aargau*
- *WERZ – Wissen, Energie und Rohstoffe Zug*

MONITORING PROCESS AND REPORTING



Developing a monitoring process

A monitoring system is being created to ensure that the measures are duly implemented and objectives attained. Information about cleantech in Switzerland will be systematically collected and collated over the long term. **The results of this monitoring will form the basis for drawing up new measures, political decision-making and public debate.**

Main implementation partners are: Federal government, Cantons, Towns and cities, Communes, Business associations, Businesses, Science, Non-governmental organisations.

www.cleantech.admin.ch

Information on the federal government's strategy for resource efficiency and renewable energies can be found on the Confederation's cleantech information platform.

The results of consultation and analyses arising from the Master Plan are published on this site. Information, studies and documents are available for download.

The Internet platform is also intended to encourage debate between the players and provide a forum where they can make their services available to a broader public.

Impressum

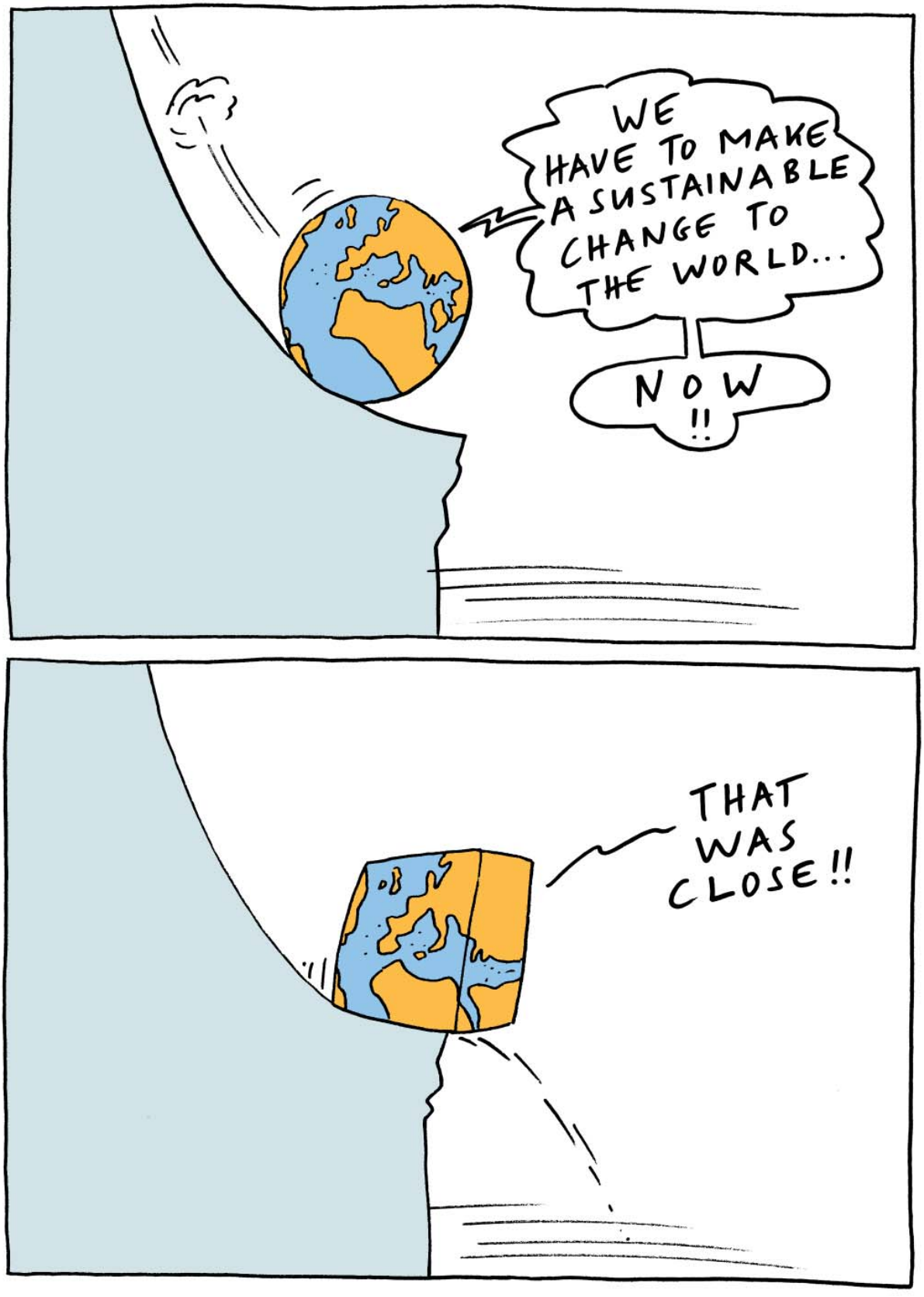
Publisher: Federal Office for Professional Education and Technology (OPET) © 2011
Images: Pfuschi-Cartoon, Bern
Printed by: Federal Office for Buildings and Logistics FOBL

Additional information

Cleantech Master Plan – a federal government's strategy to improve resource efficiency and promote renewable energies, September 2011, available from: cleantech@bbt.admin.ch

Contact

Federal Office for Professional Education and Technology, Effingerstrasse 27, 3033 Bern
Tel: +41 (0)31 322 21 24, cleantech@bbt.admin.ch, www.cleantech.admin.ch


WE HAVE TO MAKE A SUSTAINABLE CHANGE TO THE WORLD...
NOW !!
THAT WAS CLOSE!!