



Swiss Biomass Strategy

Strategy for the production, processing and use of biomass in Switzerland

1 Foreword

The global community currently faces great challenges: the constantly growing population must be supplied with food and clean drinking water. At the same time, non-renewable raw materials and energy resources are being depleted. Natural ecosystems and biodiversity are coming under pressure from the growth in demand for land for built infrastructures, and from pollutant emissions and climate change. In the long-term interests of safeguarding the natural resources that support life and prosperity, Switzerland is keen to play its part in overcoming these challenges. It has therefore made a commitment to sustainable development in the Swiss Federal Constitution.

Particularly in the form of foods, biomass¹ is a vital renewable resource worldwide. It is also very significant as a building material, a feedstock for the production of essential goods and an energy source. On the global and national levels, the production, processing and use of biomass make a substantial contribution to the economy. Although Switzerland's domestic biomass potential is considerable, it cannot be expanded at will because of the country's high settlement density, limited proportion of productive land and difficult topography. The combination of the diverse possible uses of biomass coupled with this overall limitation on potential production harbours a risk of conflicts over use. Therefore the question arises as to how biomass should be produced and used in Switzerland, giving due consideration to societal, ethical, ecological and economic aspects.

¹ The totality of organic material produced directly or indirectly by photosynthesis and unmodified by geological processes. This includes all derivatives and by-products, residues and wastes with an energy content of biomass origin.



The present strategy for the production, processing and use of biomass in Switzerland contains the most important objectives as recognised and adopted by the main Federal Offices concerned. In response to technological, economic, ecological and societal developments, this strategy must be subject to periodic critical review, adjusted, and possibly developed further. The present document is another important step towards responsible management of biomass.

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2 Introduction

The potential uses of biomass are virtually unrivalled in diversity and complexity. Biomass is used to make foods, construction materials and a host of other essential products including clothing, toiletries, paper and furniture. These production processes generate huge quantities of by-products and biogenic wastes, which can be re-used as materials or recovered as energy sources.

Accordingly, there is also a wide range of technologies for biomass production (in agriculture and forestry) and processing (in the food, timber, paper and other industries) and for biomass conversion into energy. The numerous stakeholders involved often represent widely divergent interests. This can lead to conflicts over use and to the overexploitation of natural resources. Switzerland's domestic potential for the sustainable production, processing and use of biomass is considerable and remains to be fully tapped. Nevertheless, it is limited.² For this reason, many sectors also make use of imported biomass (e.g. the agriculture, food, timber and paper and energy industries).³

As a consequence of rising prices in agricultural, feedstock and energy markets, there are growing incentives both for biomass energy use and for food production. Furthermore, efforts to make greater use of renewable resources give rise to new challenges, concerning not only the production, processing and use of biomass but also research and policy. In this regard, it is paramount to look holistically at the potential for use, the needs of consumers and the demands made on the environment.

With a vision of biomass production, processing and use that is sustainable and optimal, the Confederation has developed the present top-level biomass strategy and set appropriate objectives. The next step will be to review the different policy areas (spatial development, environment, energy, agriculture, etc.) and ensure that future policy is framed to be coherent with this biomass strategy.

The Swiss Biomass Strategy serves as a basis for any detailed strategies formulated by federal agencies or cantons.

² With regard to energy: *Potenziale zur energetischen Nutzung von Biomasse in der Schweiz*, Oettli et al. 2004

³ Swiss biogenic products - masses and energy flows: *Biogene Güter Schweiz: Massen und Energieflüsse*, FOEN/FOAG/SFOE 2008



3 Vision

Biomass production, processing and use – both as material feedstock and energy source – are optimal in relation to the three dimensions of sustainability, i.e. the ecological, the economic and the social dimension. The quantity and quality of the land areas available for biomass production are at least maintained at today's levels.

In its Sustainable Development Strategy for Switzerland (2008) the Federal Council formulated the following guidelines:⁴

1. "Taking responsibility for the future"
Responsibility for the future means that the public sector promotes the precautionary principle, the 'polluter pays' principle and the liability principle wherever possible. For these principles are an important condition for ensuring that economic, environmental and social practices are informed by the vision of long-term sustainability.
2. "Balanced consideration of the three target dimensions"
When formulating policy, care must be taken to take appropriate account of all three target dimensions, namely 'environmental responsibility', 'economic performance' and 'social solidarity', and of all the criteria of sustainable development. An additional foundation for Swiss sustainability policy is the 'capital stock' model. This concept is based on the idea that the Earth's 'capital' consists of three capital stocks – the environment, the economy, and society. The available 'capital' may not simply be consumed but must be renewed continuously. Sustainability means living off the interest in the long term and not off the capital.
3. "Incorporating sustainable development into all areas of policy"
Sustainable development is not an extra policy area. Instead it is a philosophical approach that has to be incorporated into all material actions and policy areas, and into all Swiss Federal Council and federal administration processes.
4. "Improving coherence and coordination between policy areas"
Sustainable development requires the three target dimensions to be incorporated at an early stage, tackling problems by means of a cross-agency approach that favours solutions with long-term viability. It is necessary to ensure that the proposals on which important political decisions are based have been assessed transparently and at an early stage to determine their social, economic and environmental impacts. This calls for transparent decision-making processes, full involvement of the different stakeholders, disclosure of conflicts and reasoned explanation of the assessments made.

⁴ Sustainable Development Strategy: Guidelines and Action Plan 2008-2011, Swiss Federal Council 2008



5. “Forging sustainable development partnerships”

Sustainable development is not just a matter for state authorities nor for the Confederation alone. Many of the problems our country faces can only be resolved if all three institutional levels (communes, cantons and the Confederation) work together constructively. Therefore it is extremely important to raise awareness about sustainable development and to promote sustainability processes at cantonal, regional and municipal levels, i.e. the interfaces between the state and civil society. Furthermore, civil society and the private sector must also be involved in sustainable development policy.

One of the specific approaches adopted by Switzerland is that of the **2000 Watt Society**.⁵ Biomass has an important contribution to make – according to Scenario IV of the Swiss Federal Office of Energy’s “Energy Perspectives”⁶ – within this approach.

On that basis, economical, prudent and efficient use of resources is the foremost priority.

⁵ Sustainable Development Strategy: Guidelines and Action Plan 2008-2011, Swiss Federal Council 2008; speech by Federal Councillor Leuenberger of 20 April 2007, EU-G8 Energy Efficiency Conference, Berlin

⁶ Energy Perspectives 2035 issued by the Swiss Federal Office of Energy: *Energiaperspektiven 2035*, SFOE 2007



4 Strategy

4.1 Strategic objectives

In formulating detailed policy in the relevant areas, the Confederation will take its guidance from the following top-level strategic objectives:

Strategic objective	Short description
I. Domestic biomass makes a high contribution to security of supply	To safeguard the domestic supply of foods and feedstuffs, material products and energy, biomass produced in Switzerland shall make the greatest possible contribution.
II. The land area available for biomass production, especially food production, is maintained. Steps are taken to avoid displacement effects.	Land areas used for the production of biomass, particularly land within the scope of the "Sector plan on rotation land", ⁷ shall be maintained both quantitatively and qualitatively at their present levels. The development of such land for other uses shall be regulated accordingly: balanced land use shall be practised to ensure that development is not detrimental to food production or ecologically valuable sites.
III. Biomass is produced, processed and used with optimal input of resources.	The production, processing and use of biomass is efficient, i.e. the input of resources is optimal, and environmentally sound. Losses are minimised and the most efficient technologies are applied in each case.
IV. Biomass generates significant added value through cascade utilisation.	In the production and processing of biomass, all products and by-products shall be exploited sustainably and at the highest possible quality grade, applying the cascade principle. Macroeconomic effects shall be taken into account, and synergies utilised both in the production and conversion of biomass and between different types of use of land resources.
V. Biomass is utilised according to the closed-loop principle.	Biomass should be fully exploited and – as far as contaminant contents allow – returned to the natural material cycle.
VI. The life-supporting natural resource base is preserved.	The long-term preservation of the life-supporting natural resource base – soil, water and air – and of biodiversity is to be ensured through sustainable management. Harmful or detrimental impacts are to be avoided or reduced.

⁷ Sector plan on rotation land, defining the minimum land area required for agricultural rotation and its distribution among the cantons: *Der Sachplan Fruchtfolgeflächen (FFF), Festsetzung des Mindestumfanges der Fruchtfolgeflächen und deren Aufteilung auf die Kantone*, Materialien Raumplanung, ARE/FOAG 1992



Strategic objective	Short description
VII. Social responsibility is exercised.	Minimum social standards are adhered to in the production, processing and use of biomass. This applies equally to imported biomass. Switzerland advocates the realisation of the right to food.
VIII. In the further development of legislation, coherence with the Biomass Strategy is ensured.	The law in force shall be continually developed with due regard to technological, ecological, economic and social factors, international policies and instruments of international law, and on the basis of new scientific knowledge and technologies. Any contradictions between statutory requirements and the aims of this strategy are to be corrected.

4.2 Notes and examples

On I.

Biomass is to be produced and exploited within the same region as far as possible in order to minimise transportation, for example, and to promote regional value creation. This principle applies to all products, by-products and wastes of biomass origin. In this way, a contribution is also made to maximising the country's self-sufficiency. Currently the gross self-sufficiency rate in foods is around 59%. For energy, Switzerland's dependency on other countries is far greater since almost 80% of the supply is imported.

On II.

With regard to the land areas available for biomass production, both their quantity and quality are to be maintained. Zones for building and infrastructure development are to be limited accordingly. Efforts are to be made to utilise biomass production potential to the full while avoiding competition with or displacement of food production or land under biodiversity management agreements.

On III.

Particular attention is to be paid to the economical use of non-renewable resources such as fossil fuels and mineral fertilisers. Residues and by-products from biomass conversion shall be used to best effect (as material feedstock and/or as energy resource) and energy losses minimised. For the production, processing and use of biomass, the most efficient and environmentally sound technologies are to be promoted and implemented, based in each case on a life-cycle assessment that also takes grey energy into account.

On IV.

Cascading: in line with the principle of resource economy (cf. Objective III.) the aim of biomass use shall be to achieve optimal added value, by prioritising the production of high-grade products such as foods, construction materials etc. The resulting by-products and waste products shall be re-used as material feedstock or as energy resource to best effect.



In the production and conversion of biomass, available synergies shall be utilised systematically. For example, by-products and wastes from the food industry can be used to feed livestock.⁸ Livestock wastes in turn can be used for biogas-facility energy generation, and material residues (digestate) used as fertilisers in agriculture. The heat arising in the course of electricity production can be used in meat production, in industry, or for space heating.

There are further synergies between different types of use of land resources (sites under biodiversity management agreements, tourism, recreation, energy, natural hazard protection), and these should also be utilised. For example, a forest may be a recreational space and a defence against natural hazards, on the one hand, and a source of high-grade timber for construction, industrial production and energy generation, on the other.

On V.

Contamination of biomass streams with pollutants (e.g. heavy metals) is to be avoided or reduced as far as possible at all points in the process chain, so that the material residues can be returned to the natural material cycle with the least additional effort and cost.

On VI.

It is necessary for the assessment of products or systems to take a holistic approach (total life-cycle of a product, including phases outside Swiss territory where applicable, risk analysis, etc.). The impacts on other sectors are also to be taken into account as part of this assessment.

The basis of biomass production is the availability of sufficient areas of land of good quality. Only site-appropriate, soil-conserving management can protect the land in the longer term or even raise its quality and thus safeguard biomass production. Accordingly, among other things, measures shall be implemented on a continuing basis to reduce erosion, rain-wash and soil compaction.

For the production of biomass, the use of native, site-appropriate species and organisms is to be preferred.

In order to reduce the harmful impacts as a consequence of the production, processing and use of biomass, primary measures to reduce emissions (pollutant releases, noise, odours, etc.) by addressing the causes at source are to be preferred over “end-of-pipe” solutions.

On VII.

The use of biomass also extends to trade (and hence import and distribution). In this regard, attention is also drawn to the provisions in the Swiss Mineral Oil Tax Act.⁹ The use of sustainability assessments in connection with the import of biomass for other types of uses or the adoption of rules analogous to the mineral oil taxation legislation are desirable.

On VIII.

Production, processing and use of biomass must be carried out in compliance with the law in force. Both at Confederation and at cantonal level, this is to be adapted in line with the strategy and giving due consideration to new scientific knowledge, technical advances and changing ecological, economic and social conditions.

⁸ Swiss Ordinance of 23 June 2004 on the Disposal of Animal By-Products (DABO): SR 916.441.22 *Verordnung über die Entsorgung von tierischen Nebenprodukten (VTNP)*

⁹ Swiss Mineral Oil Tax Act of 21 June 1996 (MinOTA, as per 1 July 2008): SR 641.61 *Mineralölsteuergesetz (MinöStG)*



5 Outlook

The respective federal offices undertake to review their relevant policies on the basis of this strategy and to adapt them where necessary. They will motivate the cantons to undertake corresponding activities within their remits.

Under the “Action plan on renewable energies”¹⁰ adopted by the Federal Council in February 2008, the Swiss Federal Office of Energy is mandated to develop a strategy on the use of biomass **for energy production** in Switzerland in accordance with this top-level biomass strategy.

For other policy areas (particularly environment, spatial planning and agriculture), corresponding detailed strategies will be developed and coordinated with one another. Attention should be paid to mainstreaming the objectives of the Swiss Biomass Strategy in the fields of research, development and innovation as well as the training sector.

The implementation of the Swiss Biomass Strategy must be periodically evaluated and its strategic objectives continuously examined, adapted and further developed on the basis of changing social, economic and environmental challenges and on the basis of new scientific knowledge and technologies. The implementation of the present strategy shall first be evaluated five years after its publication.

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¹⁰ Action plan on renewable energies: *Faktenblatt 6: Aktionsplan Erneuerbare Energien*, Swiss Federal Council 2008