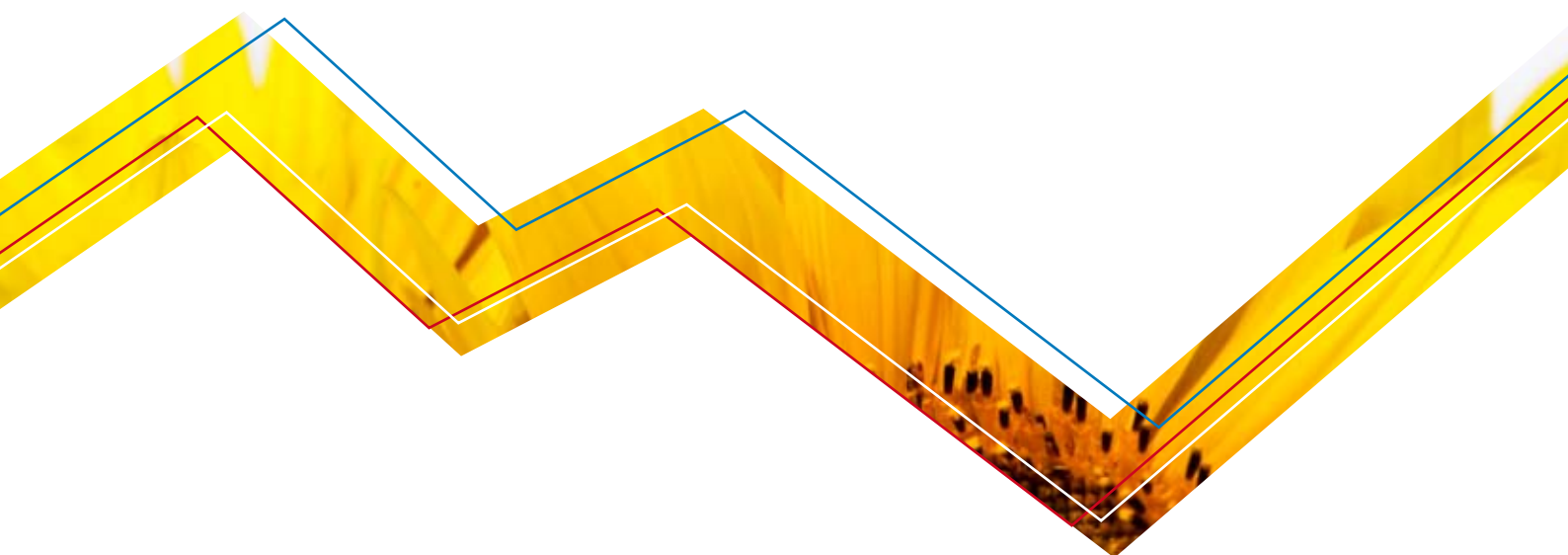


COMPACT NO 03/2010

ENERGY SELF-SUFFICIENT REGIONS

A CIPRA BACKGROUND REPORT



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August 2010

cc.alps in a nutshell

The Project “cc.alps – climate change: thinking one step further!” is organised by CIPRA, the International Commission for the Protection of the Alps, and financed by MAVA Foundation for Nature. Through the Project, CIPRA is helping to ensure that climate response measures in the Alpine region are in harmony with the principle of sustainable development.

<http://www.cipra.org/en/cc.alps/results-and-products/compacts>



The translations into English, French, Italian and Slovene have been generously funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.



Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit



FOREWORD

With its project “cc.alps – climate change: thinking one step further!” CIPRA (the International Commission for the Protection of the Alps) is evaluating existing climate measures in the Alps. CIPRA is collecting information on climate protection and climate change adaptation activities in the Alps (referred to below as climate measures) and analysing the impact they have on the environment, the economy and society. CIPRA’s aim is to identify those climate measures that are in line with the principles of sustainable development and make them accessible to a wider public and to issue a warning about those that have negative consequences – not just for nature and the environment but also for the social fabric and the economy.

This compact provides an overview of energy self-sufficient regions in the Alps. Chapter 2 describes in a nutshell CIPRA’s central concern to make the Alps energy self-sufficient. Chapter 3 explores the idea of energy self-sufficiency in more detail. The most common arguments in favour of creating an energy self-sufficient region are then summarised. Chapter 5 looks at the individual building blocks, networks and structures that make up the energy self-sufficiency process; details of regional energy concepts are outlined and the success factors that promote the development of energy regions listed. Chapter 6 draws conclusions and then presents a number of examples of good practice from the Alpine region: three predominantly rural regions, one urban initiative from Bolzano and the state of Vorarlberg representing a larger region. Finally, Chapter 8 contains further information, a bibliography and links to useful websites.

CIPRA compact is a series of publications, each exploring one particular theme, but all taking a critical look at climate measures in the Alps. In addition to this brochure on energy self-sufficient regions, the series includes other publications dealing with energy, construction and refurbishment, spatial planning, transport, tourism, natural hazards, nature protection, agriculture, forestry and water.

MAKE THE ALPS ENERGY SELF-SUFFICIENT!

CC.ALPS: CIPRA'S DEMANDS FOR ENERGY-INDEPENDENT REGIONS

Not having to depend on energy imports: this vision holds great fascination for many regions. Self-sufficiency is “in.” There are already many very positive approaches and examples of attempts to go down this road. At the heart of all the concepts is the idea of meeting demand through regional renewable sources of energy, saving energy and using energy more efficiently. Anyone who systematically takes this approach in an attempt to create an energy self-sufficient region changes the face of their region and its structures – to the benefit of their own economy, society and the environment.

Most regions that strive for energy self-sufficiency are motivated by the sustainability principle in its three dimensions. However, when it comes to fleshing out the theory with specifics, the economic and social aspects are often given priority whereas the ecological dimension tends to be given second-rate treatment. This problem becomes particularly obvious when conflicts of interest emerge between construction of facilities and nature protection issues, for example. But a region can only be classed as sustainable if the concerns of nature and landscape protection are also adequately taken into account.

CIPRA urges:

1. The Alps must become energy self-sufficient. There are already examples that illustrate that this aim can be achieved regionally by 2050. It is crucial that all levels of politics work towards this goal.
2. Create climate-friendly jobs. The path towards energy self-sufficiency is usually adopted when grants are available. For that reason, government funding must encourage the creation of jobs that have a positive effect on the climate. Start-up financing for energy self-sufficient regions is a good way of doing this: it creates jobs and increases the value added in the region.

3. The vision of energy self-sufficiency is all-embracing. It includes not only opting for renewables sources of energy, but also efficient, economical and innovative use of energy. Spatial planning and transport are core elements of this vision.
4. Get everyone on board. Reorganising the regions in this way needs good climate governance: the general public and all key interest groups must be involved in the decision-making and implementation processes. Sustainability concepts can only be successful if they enjoy broad-based acceptance.
5. Don't leave transport out of the picture. Its energy consumption is high. But that can be reduced through spatial planning concepts. Promoting public transport and slower forms of transport, such as pedestrian and bicycle transport, smoothes the way for energy self-sufficiency.
6. Do not act against the interests of nature. Renewable energy is important and creates jobs. But energy self-sufficiency must not be misused as a pretext for building hydro schemes that spoil the beauty of the last semi-natural water bodies or for covering large areas of untouched nature with wind turbines and solar power stations.
7. Research energy self-sufficiency. There is still a lack of empirical data and scientific studies. The process towards becoming an energy self-sufficient region must be accompanied by national and transnational research to ensure implementation is constantly improved.

ENERGY SELF-SUFFICIENCY: PIONEERS AND POTENTIALS

More and more areas are declaring themselves “energy regions.” Although they differ in many ways, they all pursue a single, ambitious vision: to become independent of fossil energy imports. Pioneering areas include Güssing in Austria’s Southern Burgenland, where the European Centre for Renewable Energy has its headquarters, the German bioenergy village of Jühnde and the Danish island of Samsø. These pioneers have shown us how to do it. Many regions in the Alps are seeking to follow their lead and not merely stop importing energy, but also use energy economically and efficiently, meet their own demand as far as possible with renewable energies and at the same time stimulate the regional economy. The objective of becoming a climate- and carbon-neutral region is closely linked with this.

Energy revolution, self-sufficiency, autonomy: these declarations are not necessarily meant in a scientific sense; regions use them to describe their way of doing things and distinguish themselves from others. They are the result of a political decision-making process, not of an academic discourse.

3.1

A BROAD RANGE OF ACTIVITIES AND TERMS

Below we shall discuss a number of problems that may arise in connection with terms such as “self-sufficient.” Germany’s standard reference dictionary Duden defines the German equivalent “autark” as “economically independent of foreign powers, self-supporting, reliant on no-one.” Applied to a region, this means that its entire energy demand is produced locally. Many concepts deviate to a greater or lesser extent from this definition:

“The self-sufficiency goal applies only to heat and process energy used in businesses, households and public facilities but not to transport energy.” (www.thalbeigraz.at)

“By “energy self-sufficient” and “energy independent” we mean meeting the energy consumption of a unit as far as possible with local renewable energy sources.” (www.deutschlandenergieautark.de)



Figure 1:

Energy self-sufficiency is not possible without energy savings. The energy efficiency of buildings plays an important role in this context.

Relativisations such as “as far as possible” or “largely” indicate that in some cases it is only possible to speak of partial self-sufficiency. Sometimes entire sectors are taken out of the equation, such as transport in the first example. The question also arises as to whether self-sufficiency is an absolute goal or a numbers game. Based purely on mathematics, self-sufficiency would be achieved if the deficits in one form of energy, such as vehicle fuel, were cancelled out by surpluses in another form of energy, such as electricity. Or if deficits at certain times, such as midday, were offset against surpluses at other times, produced by strong winds at night, for example. Absolute energy self-sufficiency does not allow for that kind of offsetting.

Self-sufficient also means that the energy is produced autonomously. This is about the financing arrangements and ownership in the broadest sense – two extremely important aspects, if the economic effects of an energy revolution hoped for are to be achieved in practice, including, for example, a reduction in capital flowing out of the region and an increase in value added.

But often the definitions also go beyond the actual meaning of self-sufficiency: “An energy self-sufficient region exploits as far as possible the potentials for saving energy and increasing energy efficiency and meets the remaining average annual energy requirement in purely mathematical terms from regional sources of renewable energy.” This definition by Saxony’s energy agency (www.saena.de) highlights one important point: energy self-sufficiency is not possible without energy saving and an increase in energy efficiency. After all, energy that is not consumed does not need to be generated. Furthermore, payback on investment in these two areas is fast, releasing capital for other activities, such as expanding renewable energies.

Energy self-sufficiency can be found on different scales. There is the energy self-sufficient farm, the energy self-sufficient town or village, or the energy self-sufficient county, to mention but a few. Even the possibility of entire countries that are energy self-sufficient is conceivable. In this context, the question arises as to what the most suitable size of unit is for achieving the goal of self-sufficiency. It is important to “find a workable compromise between the necessary geographical proximity to the local people and the level of professional resources needed to be effective.” (Tischer et al. 2009: 51). This would point to the region as the optimal spatial unit.

It also defines the scope of the energy balance. This produces a dilemma: strictly speaking, energy self-sufficiency needs a closed system, whereas regions are open systems. Consequently, a region would have to be seen as an “island” – which is what happens in many initiatives. “Island solutions” - i.e. standalone systems - are sought. However, that seems positively anachronistic, if we consider how each region is interconnected with its surroundings in many varied ways, in other words does not in any sense live an “insular existence.”

We have nothing against the broad range of titles that regions give themselves as they work towards self-sufficiency, sometimes for marketing reasons. However, as our remarks above show, the imprecise use of complex terms throws up questions. In a number of initiatives, it is not clear what is precisely behind the terms they use – other than the general thrust. More sharply defined and clearly delineated terms would be welcome to establish a sound basis for formulating goals and measures.

3.2

LONG-TERM VISIONS FOR THE SHIFT TO SELF-SUFFICIENCY

Energy self-sufficient regions take a long-term view to planning for the future. The underlying concepts are innovative and promising, but still in their infancy. In other words: there are scarcely any empirical values and no generally applicable approaches to refer back to. It is often a case of trial and error, bearing in mind that the transition to energy self-sufficiency is a process. The “100 %-Erneuerbare-Energie-Regionen” project for example distinguishes between three levels: the status level, which describes developments to date, a target level describing the vision for the future and an operational level covering past and proposed activities. The ideal state is described as follows:

“An ideal 100 % renewable energy region meets its own energy demand entirely from renewable sources, is extremely energy efficient and uses its regional potentials in a way that is both sustainable and accepted by the general public. This means that the energy supply is environmentally sound, sustainable, secure and contributes to the regional added value. All regional stakeholders have been involved and there is high public acceptance for this type of energy generation. Key regional actors have worked with end users, energy producers and those responsible for implementation to create the process that has led to a comprehensive energy supply from renewable energies. To reduce costs and safeguard supply security, it operates in a network with other ideal regions. It sees energy efficiency, sustainable energy production and regional activities to promote energy conscious behaviour as givens.” (Projekt 100 %-Erneuerbare-Energie-Regionen 2009: 12).

Apart from financing, this description lists all the key factors. It also makes it quite clear that switching to renewable energies is not the end of the story. Energy saving and energy efficiency are equally important. But energy self-sufficiency also means sustainable agriculture, energy-efficient building, climate-friendly transport and much more besides (cf. compacts on construction and refurbishment, spatial planning and transport). It is important to capitalize on the resources of regions and boost their circular flow of income. That involves nothing short of converting entire regions to sustainability. Such an all-encompassing structural and social change needs a workable consensus among all stakeholders.



Figures 2+3:

Key regional actors are shaping the development process in cooperation with users, producers and implementers.

A DECLARATION OF INDEPENDENCE WITH OPPORTUNITIES AND CHALLENGES

There are many good reasons for a region to develop towards energy self-sufficiency. Below is a summary and critical appraisal of the most important arguments.

4.1 PROTECTING THE CLIMATE AND THE ENVIRONMENT

The production and consumption of fossil energy sources cause serious environmental pollution. Burning fossil fuels is also responsible for the majority of greenhouse gas emissions and therefore for climate change. Using energy more economically and efficiently and switching to renewable energy sources help to protect the environment and the climate. All national climate protection targets assume that the renewables share in energy protection has to be massively increased. Since the potentials for generating renewable energy is not equally distributed across a country, a national target of 30 % for renewable energy means that some regions have to go way beyond that level, in other words have to work towards the target of a 100 % renewable energy supply.

4.2 STABLE PRICES, GUARANTEED SUPPLY

Numerous publications, including the World Energy Outlook, point to the problems of our existing energy supply. How long the fossil raw materials needed to meet the steep rise in global demand will last is a moot question. What is, however, clear is that prices will continue to rise. Tapping the last reserves will require significant levels of investment. In addition to that, many of these reserves are in regions in political crisis. The existing supply uncertainties and political dependencies they engender are therefore likely to become even worse in the future. If we are to guarantee a secure supply and stable prices in the future, there is no alternative to reducing energy consumption and switching to renewable sources.



Figure 4:

Greater use of regional raw materials offers advantages in the fields of agriculture and forestry. Here: Vision Rheintal.

4.3

ATTRACTIVE LOCATIONS, NEW JOBS

Establishing an energy self-sufficient region has a positive effect on the regional labour market: agriculture and forestry can benefit from increased use of regional raw materials (biomass). Existing companies working in energy technology, heat insulation and construction will find new fields of activity. And additional jobs will be created in the energy production industry itself. Renewable energies are seen as future technologies with promising growth prospects. Connected with this is the hope for regions that innovative companies will locate there. And furthermore: a supply of energy from renewable sources at attractive prices promising long-term stability could add to the attractiveness of the entire region for businesses, making it interesting for companies working in a broad range of fields.

4.4

INCREASE IN REGIONAL VALUE ADDED

Most energy systems are based on centralised supply. The energy is generated from fossil and nuclear sources; there is an outflow of capital for energy imports, control is beyond the sphere of influence of the regional actors, and regions become dependent on urban centres. More efficient use of energy and a decentralised supply based on renewable sources could eliminate these disadvantages: money and decision-making power remain in the region. Furthermore, this would trigger economic multiplier effects and endogenous development processes. These developments and the value chains associated with them would strengthen rural areas. In a best case scenario, energy policy can become the core of economic stimulus and a driver of economic and social development.

4.5

SUSTAINABLE DEVELOPMENTS

Tischer et al. (2009: 36) view renewable energies as a “stroke of good fortune” for sustainable regional development. The effects on jobs, income and climate protection mentioned above are cited as reasons for this view. Furthermore, materials cycles and value chains can be regionally linked in a sustainable way. The expansion of renewable energies increases the chances of rural areas being able to participate in technological and economic developments. Their relative significance increases and it is anticipated that rural areas and urban centres will be able to interact as equals. In brief: energy self-sufficiency is conducive to sustainable regional development.

4.6

STRONGER IDENTITY

The establishment of an energy self-sufficient region can only take place if there is a broad consensus of opinion. All stakeholders (households, businesses, towns and villages etc.) must agree on a common vision and approach. Commitment to a common cause has a bonding effect and strengthens social networks. Furthermore, a region can present itself as progressive and environmentally conscious and possibly even take on the function of a pioneer or role model. A positive internal view and an image as an innovative location promote both regional cohesion and people’s identification with the region.

The increase in regional value added is a central argument for establishing an energy self-sufficient region. The prospect of positive economic development attracts a great deal of support for the idea from the general public and politicians alike.

However, there are very few verifiable details in the literature about the potential of energy regions to add value. Often their effects on the labour market and on value creation are framed in a simplified and exaggerated way. It is important to specify the conditions needed for the economic effects hoped for to actually happen (cf. Hoppenbrock & Albrecht 2010).

The high expectations will only be fulfilled if the potential of renewable energies is actually fully exploited, i.e. through full-scale expansion. A further requirement is that the renewable energy a region produces itself must be cheaper than imported fossil energy; this is definitely conceivable in the medium term. Furthermore, regional funding must be found to which regional investors, community joint venture enterprises and the commitment of regional banks contribute. And finally, it is important to move value chains into the region. Here three levels of intensity can be distinguished:

- pure application of the technology, e.g. installation of solar cells
- exploitation of potentials such as above-average solar irradiation, and
- industrial production, e.g. development, production and sales/export of solar cells.

Whereas applications and exploitation of potentials are relatively simple, the step forward into production presents a major challenge. It is easier, for example, in the field of sustainable and energy-efficient construction and refurbishment, where use of regional building materials and heat sources can constitute a very significant share of the value added in the region.

To sum up this assessment of the conditions needed: a certain degree of caution in assessing the effects on the labour market is appropriate. In many areas, such as agriculture and forestry, but also the electrical trade and the building industry, it is primarily a question of safeguarding existing jobs. People may be given new job descriptions (e.g. a farmer may produce energy rather than agricultural goods), but new jobs will not necessarily be created.

There will be new jobs in the renewable energy production industry but operation and maintenance of most facilities are not labour intensive. What would be of real interest would be if new companies and research facilities located to the region, but flagship examples such as the Güssing model are not so easy to copy or replicate.



Figures 5 + 6:

The use of regional construction and heating materials increases the share of regional value-added.

If production of renewable energy is expanded, it is crucial that nature and the landscape do not fall by the wayside. As CIPRA's compacts on energy, agriculture and nature protection explain, the following areas are particular fraught with conflict:

- the construction of large standalone installations, such as solar and wind power stations,
- further expansion of hydropower, which clashes with the wish to protect the last remaining natural bodies of flowing water,
- a possible competition for land between the production of energy crops and food
- the overuse of forestry resources in non-sustainable management practices and when “wood for energy” is grown in monocultures.

The problems can to some extent be defused by focusing very clearly on energy efficiency and energy saving. Then every kilowatt hour that is not consumed does not need to be produced and consequently does not cause conflicts of aims around its production. Furthermore, biomass-fuelled combined heat and power stations, for example, must be designed in a way that avoids unnecessary haulage and ensures that capacities can be fully utilised using local and regional resources. In this connection, we must mention the spatial planning level and system boundaries once more. Choosing too small a scale with small units can mean that inefficient measures are promoted and implemented and that installations such as wind farms are built, which could be operated more economically elsewhere. All this speaks in favour of concentrating on the most suitable locations, of cooperation between different regions and reconciling the interests of energy and environmental protection goals.



Figure 7:

The switch from fossil fuels to renewable energy sources must be encouraged, but not to the detriment of the natural environment. The production of biomass and the construction of wind power and hydro power plants in the Alps are a potential source of conflict.

MILESTONES AND SUCCESS FACTORS

There are many regions that are on the way to becoming energy self-sufficient. Some are just in the starting blocks and others can already see the finishing line ahead of them. A great deal can be learnt from the experiences of these pioneers, especially in those regions that are still in the initial phase. These regions would therefore be well advised to consult any available information. Below, we explain in more detail some of the individual building blocks and milestones that regions have encountered along the way towards energy self-sufficiency.

5.1

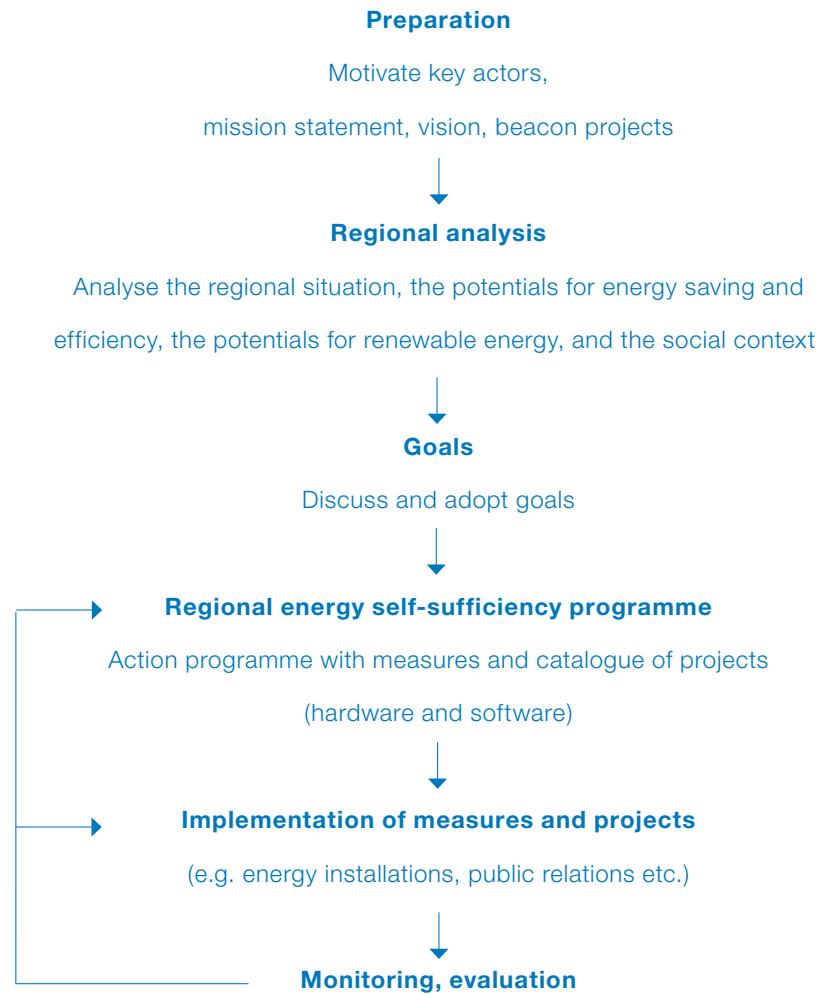
POINTERS TOWARDS SELF-SUFFICIENCY

In recent years a number of guidance documents and manuals have been written on the subject. These publications are useful for regions, helping them to get started and giving pointers about possible directions they might take. They illustrate how the process can be structured at local authority or regional level, pointing out what to consider and what to avoid. Below are a number of examples (in German):

- 10 Schritte in die Energieautarkie – Wie Österreichs Gemeinden unabhängig von fossilen Energien werden (www.klimaaktiv.at)
- Wege zum Bioenergiedorf – Leitfaden für eine eigenständige Wärme- und Stromversorgung auf Basis von Biomasse im ländlichen Raum (Ruppert et al. 2008)
- Energieregionen der Zukunft – erfolgreich vernetzen und entwickeln (Neges & Schauer 2007)
- Sozio-technisches Betreuungsmodell für Energieregionen der Zukunft (Schauer & Bärnthaler 2008)
- Auf dem Weg zur 100 % Region – Handbuch für eine nachhaltige Energieversorgung von Regionen (Tischer et al. 2009)

Creating an energy self-sufficient region is a complex process. It can be divided into different phases, as shown in Figure 8. It is important to note that, depending on the starting situation and the objective, the priority areas may vary in the individual phases. Often the phases will overlap. That means that steps that we have depicted here as happening in a linear way may often take place simultaneously or as part of a cycle. Monitoring and evaluation impact on the action programme and implementation, so that feedback effects also have to be taken into consideration.

Figure 8:
The regional energy
self-sufficiency process.



Source : after Tischer et al. 2009 : 44

5.2 NETWORKS AND STRUCTURES

The creation of an energy self-sufficient region involves pursuing broad-based and long-term goals. These goals, which are closely connected with the economic, ecological and social development of a region, can only be achieved by broad consensus. According to Tischer et al. (2009: 103), it is essential to create structures that:

- unite the diverging social forces behind the goal of the initiative;
- sustain the activities in the long term; and
- take both economic aspects and the public interest side of the development into account.

“To ensure the long-term survival of an initiative ... economically sustainable structures are also necessary. To create them, it is essential to recruit the support of business in the region. However, during the implementation of the process, tasks emerge that are in the public interest, i.e. the wellbeing of the entire region is in the foreground, both its natural features and also its socio-cultural character. Thus, it is a question of also involving

and coordinating any ideals-driven people.” (Tischer et al. 2009: 104). The authors therefore propose a dual structure:

- a heterogeneous network to provide moral support to the initiative. Often an association is set up to represent all the individuals and institutions interested in self-sufficient energy supply; and
- economically focused structures. Here anything is conceivable: from a loose form of cooperation among existing companies or the formation of energy clusters, through to the creation of an energy self-sufficiency holding company.

This structure is complemented by two more elements: an operational unit, such as a coordinating office, and the “forward thinkers,” who have primarily representative and strategic responsibilities.

5.3

TASKS AND DIVISION OF TASKS

In the course of the energy self-sufficiency process, countless tasks need to be performed: information acquisition, data analysis, development of measures, communications planning, to mention but a few. In other words, downright hard work that calls for staying power and the appropriate know-how. Here, too, it is important to build on existing knowledge and benefit from past experience. Let us cite an example to illustrate this:

Estimating the potential for renewable energies is hugely important. Many countries have carried out location analyses and published the results in map form. An example of this is the Bayerische Geothermieatlas (www.stmwvt.bayern.de). Austria has gathered the most comprehensive information: here an assessment of short- and medium-term potential was carried out (2012/2020) at district level. The results of this interesting research project can be directly incorporated into the planning process; however, the analyses also show how much the level of resources and therefore the potentials of individual regions differ (cf. www.regioenergy.at).

Furthermore, the know-how of the various energy agencies, research institutes, interest groups and associations can be drawn upon.

It may also be useful to participate in existing energy and climate protection programmes; those which come to mind include the European Energy Award, the Austrian e5 Programme for Energy-Efficient Communities, the Swiss energy city programme (Energienstadt) and the Austrian Climate Alliance (Klimabündnis). They are a good way of getting started, since they are well established and can provide advice; they have knowledge and appropriate tools and cover important areas that play a key role in achieving energy goals.

As well as technical assistance, financial support is also available at EU, national and regional level. It may take the form of indirect funding through programmes to promote increases in energy efficiency, for example, and expand renewable energies, or direct funding, as is the case in Germany and Austria:



Figures 9 + 10:

A broad-based consensus and sustainable structures are essential if the initiatives are to be successful in the long term.



Figure 11:

Innovative ideas for a Bioenergy Region: Bioenergy Region competition launched by the German Federal Ministry.

- The bioenergy regions competition organised by the German Ministry of Food, Agriculture and Consumer Protection (www.bioenergie-regionen.de) aims to increase regional value added and create jobs. It promotes networks with innovative concepts that use the development opportunities inherent in bioenergy to their advantage. 25 regions were selected, receiving a maximum of 400,000 euros. Starting in 2009 and running for three years.
- The Klima- und Energiefonds' (Austrian Climate and Energy Fund) programme of grants for model climate and energy regions (www.klimafonds.gv.at/modellregionen). The aim of this programme is to support new model regions during their inception and start-up phase. Funding is given for the development of a regional implementation concept and for the activities of the model region manager. Budget: 4 million euros, a maximum of 100,000 euros per model region, co-financing at least 40 %. Second call for applications is currently running (as at August 2010).

5.4 TASKS AND RESPONSIBILITIES

The question of division of tasks also arises. In a structure such as that described in 5.2, tasks can be divided up as follows:

- Network for non-material support: strategy presentation, setting up broad-based alliances and general public relations and awareness raising activities.
- Economic structures: here the focus is on the economic success of the participating companies. Advisory services, marketing, planning, funding and the operation of renewable energy installations come under this category.
- Coordination offices: the volume of work involved in creating an energy self-sufficient region quickly reaches a level that can no longer be dealt with on a voluntary basis. The day-to-day business is therefore managed by a central coordination office.
- "Forward thinkers:" in many energy initiatives there is a small group of people whose dedication to the cause is above and beyond the norm. They are the people who have a decisive influence on the development. They come up with the ideas and are the driving force behind the initiative. They take care of the initiative's strategic development and act as ambassadors for its ideas.

The division of tasks outlined above is based on an ideal structure. In reality the groups of actors and areas of responsibility will overlap. What is important is that the role of the different actors is clear and their areas of responsibility are well defined. The broader based the ownership structure, the easier it is for the responsibilities to be shared. However, often there will not be sufficient internal capacity to deal with all the tasks that arise. In this case, governmental, semi-governmental and private institutions can help out. That includes research institutes, energy agencies and advisory offices.

Preparing a regional energy concept is an integral part of the process. This concept should consider the following minimum requirements:

- **Current status:** latest data on regional energy consumption and regional energy production;
- **Target status:** estimation of the demand trend and the potentials for energy saving and efficiency and for the production and use of renewable energies
- **Context:** political, social and economic environment; relevant actors and interest groups; how key people see the issue of energy self-sufficiency, their interests and opinions.

On the basis of the concept, practical implementation recommendations and a raft of measures are developed. At the same time, an initial assessment of the positive effects anticipated can be made, based on energy and CO₂ saving, regional value added etc. It is important to remember to include costs and the question of funding. Furthermore, responsibilities must be defined, a timetable drawn up, and milestones set out.

These concepts may be very detailed. However, in practice they may be less comprehensive and compromises may have to be made – either because what people would ideally like is not feasible or because there is insufficient data or insufficient time and money for a detailed analysis.

Below is a brief outline of the energy balance for Kötschach-Mauthen (Austria). This example is typical for Alpine regions in that, in the case of electricity, a surplus is already being produced – using hydropower. On the other hand, all vehicle fuel has to be imported. For fuel to produce heat or electricity, the town is highly self-sufficient by comparison with many other Alpine regions.

Table 1 :
Energy balance for
Kötschach-Mauthen 2007.

	Regional final energy demand by type of energy	Regional total energy production by type of energy
Vehicle fuel	40 GWh/a	0 GWh/a
Fuel to generate electricity and heat	48 GWh/a	26 GWh/a
Electricity	14 GWh/a	50 GWh/a
Total	102 GWh/a	76 GWh/a

Source : Könighofer et al. 2009.

Table 2 :
Predicted energy balance for
Kötschach-Mauthen in 2020.

	Regional final energy demand by type of energy	Regional total energy production by type of energy
Vehicle fuel	31 GWh/a	5 GWh/a
Fuel to generate electricity and heat	46 GWh/a	54 GWh/a
Electricity	12 GWh/a	57 GWh/a
Total	89 GWh/a	116 GWh/a

Source : Könighofer et al. 2009.

The detailed analysis of the current situation (Table 1 is merely a short extract) is used as a basis for developing measures. Measures must be developed on both the consumer and producer side. In Kötschach-Mauthen it would be possible to save approximately 13 GWh/a through heat insulation (2 GWh/a), electricity savings (2 GWh/a) and changes to transport behaviour (9 GWh/a). This would reduce the regional final energy demand to 89 GWh/a by 2020. At the same time, regional energy production could be increased by about 40 GWh/a to 116 GWh/a by use of additional biomass (32 GWh/a), solar (2 GWh/a), hydro and wind power (6 GWh/a).

According to the calculations of Könighofer et al. (2009), the degree of self-sufficiency, defined as regional energy production relative to regional energy consumption, could rise from 75 % (2007) to 130 % (2020). At the same time, greenhouse gas emissions could be reduced by about 60 %. In pure mathematical terms, energy self-sufficiency would therefore be achieved by 2020 – although the majority of fossil vehicle fuels would still have to be imported. This could, however, be offset by the surpluses in the areas of electricity and fuel for generating electricity and heat. Some thought was given to the possibilities that would arise from increased use of electric vehicles, but they are not really reflected in the above calculations.

5.6 REMOVE OBSTACLES

Throughout the energy self-sufficiency process there will be a need to overcome doubts and opposition. Knowing where potential dangers may lurk makes it easier to deal with them (cf. Neges & Schauer 2007: 32ff.):

- **Time and money:** the amount of time and money that will need to be invested in successfully creating an energy self-sufficient region is high and should not be underestimated. Furthermore, people's commitment will need to be sustained over a long period of time if the goals set are to be achieved.
- **Enabling environment:** the lengthy decision-making processes in political bodies and the often unresolved question of long-term funding must not be forgotten.

- **Opposition:** any change, no matter how convincing, will always trigger opposition. It might come from individual municipalities wanting to opt out because they fear additional costs or from energy utility companies wanting to hold onto their current business model of selling as much fossil energy as possible.
- **Competitiveness:** when economic self interest or party political wrangling take centre stage, the view of the bigger picture is obscured. The ensuing conflicts hamper or delay both planning and implementation.

What can be done to prevent these dangers? Put in place a broad-based, independent ownership structure, a broad-based and long-term financing model, a clear division of the different tasks and responsibility, a pragmatic and goal-oriented approach, a systematic information campaign to win hearts and minds – and add in a great deal of staying power and persistence.

5.7

SUCCESS FACTORS

Recently, a number of factors have emerged as being conducive to the development of energy self-sufficient regions (cf. also Neges & Schauer 2007: 22ff., Kompetenznetzwerk Dezentrale Energietechnologien 2010 and the examples of good practice). The following factors are essential:

- A **convincing vision** that has broad public appeal and can unite people around it. The initiative must be well grounded and help to strengthen a sense of regional identity.
- A **clear implementation concept** with realistic goals. Building castles in the air is of no use; instead it is important to divide the process into manageable stages and from the very outset work towards quickly visible and quantifiable results.
- **Committed individuals** who support the process and drive it forward. In most cases, it has also proved helpful to incorporate the work of local politics (e.g. local council resolutions).
- **Good teams** that perform their duties responsibly. Trust is important and must constantly be reaffirmed by the actions of all concerned.
- **Secure long-term financing.** A boost from government funds is very helpful. However, in the medium term, care should be taken to mobilise as much capital as possible in the region itself.
- Sound **structures that can cope with the diverse tasks.** It is also important that they are adaptable and able to evolve, in other words that they are conducive to a “learning region.”



Figure 12:

Convincing visions that appeal to the local people and promote a feeling of belonging are among the keys to success for energy-independent regions.

CONCLUSIONS

It is impressive how much the pioneers in the field of energy self-sufficiency have achieved to date, whether in the much cited town of Güssing, the bioenergy village of Jühnde, the Danish island of Samsø or many regions in the Alps. The successes are based on the great perseverance with which the many different actors pursue a common vision, and on a will to achieve an across-the-board conversion of the energy supply. They prove that energy self-sufficient regions are not just a pipe dream, but a worthwhile alternative.

The strategy of responding to climate change by designing a proactive and target group oriented resource and energy policy at regional level is extremely welcome. Firstly, because it is an example of people accepting responsibility for the climate. Secondly, because creating an energy self-sufficient region can provide an important stimulus for the regional economy. That is particularly true in rural and structurally weak areas where resources lie idle and there is a lack of economic alternatives.

Regional development, energy policy and climate protection make up a convincing combination of motives for taking action and encourage the desired transformation. The regional value added argument can be used to draw together the interests of all stakeholders. It is not just a question of using renewable energy, but also of energy saving and efficiency programmes. Energy self-sufficiency also involves sustainable agriculture, energy-efficient building, climate-friendly transport and much more besides. Ultimately it is nothing short of a wholesale structural change: conversion of an entire region to sustainability.

Achieving this task needs a convincing vision. It also needs clearly defined concepts. In many regions the concepts are based on the principle of the “journey is the goal.” What initially may be perfectly adequate as a broadly defined goal must be made more precise and specific as the energy self-sufficiency process progresses. This is the only way to formulate effective goals and communicate realistic expectations.

A great deal of economic potential lies untapped in the energy self-sufficient regions. It is crucial that this potential be fully exploited. But a concept in itself is no guarantee for development and prosperity. The potential effects on the regional economy must be analysed. Simplistic assumptions and over-optimistic projections are inadvisable. Ultimately, you should be looking to communicate justified hopes, not exaggerated expectations.

The stated motivation of most energy self-sufficiency initiatives is sustainability. However, when it comes to the concrete implementation – as is always the case in politics and business – it is economic considerations that prevail, with ecological aspects often tending to be relegated to second place. This problem becomes particularly obvious when specific energy projects are about to be implemented and – as happens quite frequently – conflicts of aims between energy policy and nature protection emerge. But an energy self-sufficient region can only be classed as genuinely sustainable if it also integrates the interests of nature and landscape conservation.

Often priority is given to the technical aspects of the energy self-sufficiency process. But equally, if not more, important are the social changes that go with energy self-sufficiency. Ultimately, it is people who are decisive for the success or failure of a project. This statement, which may on first glance seem rather banal, is of particular significance here, because we are talking about a radical structural and social change that can only be achieved with not against the key stakeholders. This gives huge importance to the social aspects – from an analysis of stakeholders, to the design of the processes of change through to consciousness raising and communication.

There is now a whole series of Alpine regions that are on the way to becoming energy self-sufficient. The basic thrust of their endeavours is comparable, but there are key differences with regard to their objectives, organisational forms, and level of resourcing. Having said that, it is important to take the different scales of the enterprises into account: it makes a difference whether it is a single municipality seeking to move towards energy self-sufficiency, or a cooperative venture between town and state or a large regional association. The uneven distribution across the arc of the Alps is also striking. In the German-speaking region, the concept of regional energy self-sufficiency is relatively well known.

This is also where the most successful and advanced examples can be found. In the other regions, an increase in interest can be observed, but to date there is only a handful of practical examples that have progressed beyond the initial stage. We can only speculate about the reasons for this uneven distribution. On the one hand, it may be due to the different starting points and speed of progress in terms of energy and climate policy and, on the other hand, to the different national funding practices. The right enabling environment can trigger a very dynamic development, as the example of Austria illustrates.

EXAMPLES OF GOOD PRACTICE

7.1 ENERGY VISION MURAU (STEIERMARK/AUSTRIA)

INTERVIEW WITH JOSEF BÄRNTHALER, PROJECT EXECUTIVE AND MANAGER OF ENERGY VISION MURAU

When was energy vision Murau born?

At the beginning of 2003

What goals is energy vision Murau pursuing?

We want the entire district to become self-sufficient in terms of heat and electricity provision. Transport is not included in that goal. The timescale goes up to 2015. The important thing is to get individual stakeholders to work together to create a common process.

What sort of ownership structure do you have?

A group of stakeholders, consisting of the Obersteiermark energy agency as the executing body, a core group of six people from the municipalities, energy utility companies and businesses, an extended group of interested people and a number of theme-specific working groups.

How do you finance your initiatives?

Financing is organised on an individual project basis. We also receive support from the central and state governments.

What have you achieved so far? What are the three key milestones?

1. We have succeeded in setting in motion a process with goals that are supported by the community.
2. The theme-specific working groups that are responsible for the actual implementation are doing an outstanding job.
3. The Stolzalpe hospital (LKH), the region's largest energy consumer, has managed to replace over a million litres of heating oil with biomass.

What are the major challenges?

1. Persuasion: you have to be able to get the sceptics on board too.
2. Staying power: you have to be able to keep the process running over a long period of time.

Figure 13:

Good teams and committed individuals to drive the process forward are further success factors.





Figure 14:

A vision becomes reality:
Energy Vision Murau..

3. Tenacity: the project management team have to constantly keep their eye on the ball, otherwise there is a danger that the processes that have already been set in motion will peter out after a short time.

How do you create a successful energy region?

1. You need a foundation of trust. The project management team must be impartial and independent; communication must be open and honest. How the working groups are moderated is very important: actors who are normally in competition with each other, such as tradespeople in the energy sector, have to unite around a common philosophy.
2. You need motivated people, who take a proactive approach to implementing ideas, are active in working groups and have their own business models. Examples include operators of biomass-fuelled combined heat and power plants, or mayors who refurbish local authority buildings in an exemplary way.
3. You need beacon projects. Abstract concepts are very difficult to sell, whereas a new energy facility or a well-executed refurbishment project demonstrates both the vision and the fact that it can be translated into reality.

What advice would you give to a region embarking on the path to becoming an energy region?

First of all, you must clarify the potentials for energy saving and for using renewable energy. Then you should think about which individuals might be a possibility for implementing the vision. We developed an implementation manual entitled "Sozio-technisches Betreuungsmodell für Energieregionen der Zukunft." I am sure that – in terms of process - it would be transferable to other regions.

www.energievision.at (de)

7.2

ACHENTAL BIOENERGY REGION (BAVARIA/GERMANY)

INTERVIEW WITH WOLFGANG WIMMER, PROJECT MANAGER FOR ACHENTAL BIOENERGY REGION

When was the Achental bioenergy region born?

June 2009 – and it will run until May 2012.

What goals are you pursuing?

We distinguish between our short-term and long-term goals. During the term of the project, we are seeking to drive forward the use of bioenergy and get what we call pinnacle projects up and running as demonstration projects. Our long-term goal is energy self-sufficiency: we intend to switch our entire energy supply – heat, electricity and vehicle fuels – to renewable sources by 2020.

What sort of ownership structure do you have?

The project is owned by the Biomassehof Achental GmbH & Co.KG, a subsidiary of Ökomodell Achental e.V.



Figure 15:

Committed individuals put the vision in the public eye.

How do you finance your initiatives?

We receive a maximum of 400,000 euros from the bioenergy regions competition organised by the German Ministry of Food, Agriculture and Consumer Protection (BMELV). We have about 50,000 euros in self-funding. By the end of the project term, the Achantal bioenergy region must be self-financing.

What have you achieved so far? What are the three key milestones?

1. Constructed a combined heat and power plant for district heating in Grassau.
2. Run a focused public relations campaign.
3. Exploited the tourism value of the measures, offering, for example, visitor packages and environmental education tailored to selected target groups.

What are the major challenges?

1. Motivating the key decision-makers, especially local councillors.
2. To implement a broad-based initiative, you need broad-based support. It is not always easy to find competent people to join the campaign and people who are good at turning words into action.
3. Good ideas are one thing, but you have to be able to find the financing for them. In other words, funding has a positive impact on decision-making.

How do you create a successful energy region?

1. You need the acceptance of decision-makers, especially local councillors.
2. The idea has to be firmly grounded and enjoy a high level of public acceptance.
3. You need a broad-based and persuasive public relations campaign.

What advice would you give to a region embarking on the path to becoming an energy region?

You need a vision. You have to be able to show people where you are headed, make it clear what goals you want to achieve. You should not spend too long on talking and developing concepts. It is important to produce visible results fairly promptly. Success creates acceptance. And you have to work towards getting it well established, particularly with decision-makers.

www.achental.com (de/it/fr/sl/en)

INTERVIEW WITH ROGER WALTHER,
INITIATOR OF GOMS ENERGY REGION

When was Goms energy region born?
in August 2007

What goals are you pursuing?

We want the Goms region to become autonomous and independent in meeting its heat, electricity and vehicle fuel demand from renewable energy by 2030 – that is our vision.

What sort of ownership structure do you have?

It is owned by an association; its members include all the political communes in Goms. Local businesses can also join. We also receive financial support from the federal and canton governments. We work on a voluntary basis and concentrate on fundraising for specific projects. We have almost no overheads.

What have you achieved so far? What are the three key milestones?

1. Drafting a regional energy concept as the central basis for decision-making.
2. Getting our first beacon project up and running – a large, very visible photovoltaic system.
3. Launching “Alpmobil” (www.alpmobil.ch). Electric vehicles are an integral part of our regional tourism portfolio.

And what are the major challenges?

1. Time: creating an energy region requires a huge time investment. It needs a great deal of commitment, perseverance, powers of persuasion and leadership.
2. Empathy: it is not easy to recognise the processes of change the numerous actors have to go through and to provide supervision and focused leadership.
3. Financing: securing financing for the association is a complex problem that needs a very creative approach. It is easier to access funding for the individual projects.

Figure 16:

Creativity is also called for in the development of an energy-independent region.

How do you create a successful energy region?

1. You need people who want to change things. People with genuine



passion, people who are movers and shakers. It is also important that the project is firmly grounded in the local population and that there is good networking – both in the region and beyond the cantons.

2. You need a vision on the one hand. But, on the other hand, you have to get projects up and running quickly. It is important to have tangible projects that demonstrate visible results.

3. Good and intensive media relations.

What advice would you give to a region embarking on the path to becoming an energy region?

You need a convincing vision. Independence and self-sufficiency are good arguments. They go down well and are easy to understand. You should not get too weighed down with theory, but start on implementing ideas straight away. Fast results build trust; they show that things are moving forward and that the vision can become reality.

www.energieregiongoms.ch (de)

7.4

CLIMATE-NEUTRAL BOLZANO (SOUTH TYROL/ITALY)

Bolzano, Alpine Town of the Year in 2009, intends to be climate-neutral by 2030. A climate plan to this effect was unanimously adopted by the town council. That is a great success for the initiator of the idea Helmuth Moroder. Moroder, who will become Bolzano's chief executive in January 2011, sees the town as a source of energy– a source, it should be noted, that is by no means exhausted. A great deal of energy is wasted. There is still huge potential for energy saving. The existing natural resources such as the sun and wind have not been used properly to date. Areas of work include:

- carrying out energy-efficiency improvements to existing buildings and tightening regulations for new builds;
- transport: increase pedestrian and bicycle traffic and use of public transport;
- renewable energies: photovoltaic and other solar power facilities and new run-of-the-river hydroelectric power stations.

A study has been carried out to assess the potential of these measures. Sparber et al. (2010) came to the conclusion that energy consumption could be reduced by about 1650 GWh/year; savings in the transport sector would be 680, thermal energy 600 and electrical energy 380 GWh/year. The authors do not mention the investment costs that would be required, but do give an estimate of the reduction in overall annual energy costs: about 160 million euros, of which 61 million in the transport sector, 42 million in thermal energy and 57 million in electrical energy .

The overall scenario also indicates that the emission target called for of two tonnes of CO₂ per inhabitant per year is within the realm of the possible. It presupposes that the broad-based and far-reaching measures are systematically put in place. Moroder believes that this is completely feasible, not least because the energy and CO₂ savings also make economic sense. www.cipra.org/de/alpmedia/news/4050 (de/it)



Figure 17:

Golden Cube for the winners: the Climate House Award is for buildings, projects and persons.

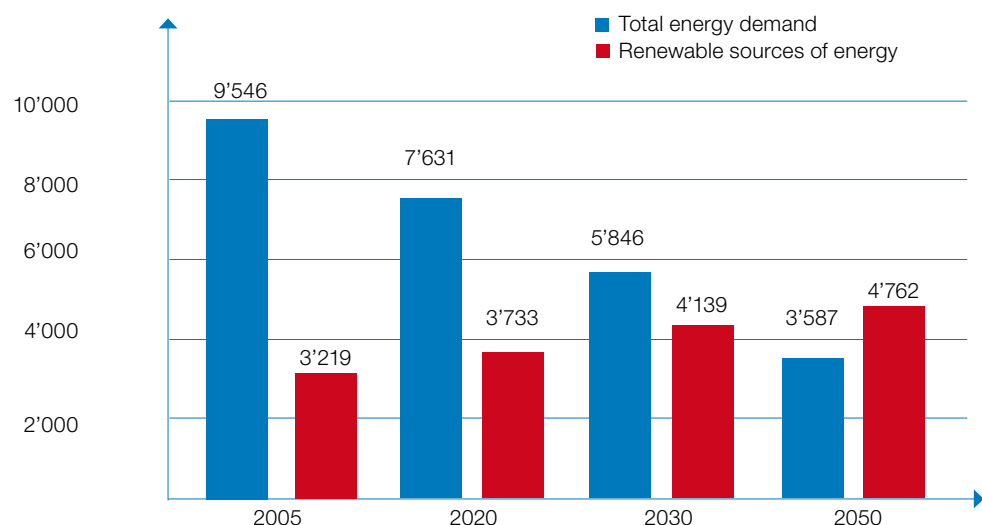
In 2007, the Energiezukunft Vorarlberg programme was born. The Vorarlberg state parliament unanimously adopted the goal of achieving energy self-sufficiency by 2050. For Adi Gross, chief executive of the Energieinstitut and project manager of Energiezukunft Vorarlberg, this goal is both a vision and a commitment: “It is about breaking our dependence on energy imports in the medium term – in all sectors, from households and transport through to industry. At the same time, we must make use of the opportunities this presents for society and the economy. Supporting green technologies and social change towards sustainability today means ensuring prosperity for tomorrow. Energy autonomy facilitates an equitable way of life and is ultimately the only intelligent way forward on the energy question and climate protection.” As initial calculations show, energy autonomy is definitely achievable. However, it does presuppose a massive reduction in energy consumption. At the same time, the potential of renewable energies must be exhausted wherever this is ecologically acceptable (Figure 2).

In the next stage, the guidelines and recommendations for action that have been developed in theme-specific working groups will be translated into a ten-year programme including specific measures. It is important that these measures can be financed and thus implemented; they must be visible, quantifiable and comprehensible, and contribute to achieving the idea behind the slogan “step by step towards energy autonomy.” To make this happen, the public must be involved in the process. On this point, Adi Gross writes that the process of social change “can only be carried out if people understand it and take part in it. A change in lifestyle must have the support of society. An ambition like this cannot happen by decree; it has to be fulfilled through a participatory process.”

www.vorarlberg.at/energiezukunft (de)

Figure 18:

Scenarios for energy demand and supply from renewable energy sources in Vorarlberg (in GWh).



Source : Office of the Vorarlberg state government 2010: 19

BACKGROUND INFORMATION

- **A current listing of links, further examples, and compacts on other topics available on www.cipra.org/cc.alps (de/en/fr/it/sl)**

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Links

- Energieallianz Glarus: www.energieallianz-glarus.ch (de)
- Bioenergie-Region Achantal: www.achental.com (de)
- Bioenergie-Regionen: www.bioenergie-regionen.de (de)
- energie:autark Kötschach-Mauthen: www.energie-autark.at (de)
- energieregionGOMS: www.energieregiongoms.ch (de)
- Energieregion Weiz-Gleisdorf: www.energieregion.at (de)
- Energietal Toggenburg: www.energietal-toggenburg.ch (de)
- Energievision Murau: www.energievision.at (de)
- Energiewende Oberland: www.energiewende-oberland.de (de)
- Energiezukunft Vorarlberg: www.vorarlberg.at/energiezukunft (de)
- Europäisches Zentrum für Erneuerbare Energie Güssing: www.eee-info.net (de/en)
- klima:aktiv: www.klimaaktiv.at (Energiesparen – Energieautark werden) (de)
- Klima- und Energiefonds: www.klimafonds.gv.at (de)
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- REGIO Energy: www.regioenergy.at (de)
- 100 %-Erneuerbare-Energie-Regionen: www.100-ee.de (de)