

ACT LOCAL – in a European wide network – e5 and the European Energy Award® – a way to realise permanent and sustainable energy-efficiency projects in communities

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Abstract

Nowadays communities are increasingly faced with questions such as:

- What can be done within shrinking budgets for communities?
- How can politicians be inspired by energy-saving measures?
- How can sustainable and permanent projects be realised?

The Austrian e5 program for energy efficient communities as a part of the European Energy Award® (eea®) offers satisfactory answers to these questions. The program supports communities that want to contribute to a sustainable energy policy and urban development through the rational (efficient) use of energy and an increased use of renewable energies.

For a successful implementation, two factors are relevant: A guided civil participation process in the city or municipality. Local energy teams assist in managing the communication between citizens and relevant stakeholders in order to enforce local activities. Apart from this civil participation process, a clear political commitment on a local, regional and federal state level is crucial for the successful realisation of energy saving measures. The paving of this way, the coordination, the exchange of know-how and experience as well as the organisation of further

education come under the umbrella of e5- Austria and European Energy Award®.

Finally, the core of the matter is the certification and award for energy related achievements and the monitoring of success through regular audits. This gives all participating communities the chance of benchmarking in a European context and exchanging their experience. So, a European network of eea®-cities is spreading out and is leaving visible marks: Up to now, more than 300 municipalities and cities in ten European countries have taken part in the network.

Introduction

According to the Kyoto-Protocol, Austria has to reduce its CO₂-emissions by 13 % until 2010. In 2002 the Federal State of Austria has worked out a Climate Strategy together with the 9 Austrian provinces. The realisation of emission-reducing measures in the field of energy production, traffic, heating, industry, agriculture and waste should help to reduce the Austrian CO₂-emissions. The utilization and development of new energy technologies is also an essential part of the Austrian Climate Strategy. Nevertheless Austria is not approaching its Kyoto goal. Today CO₂-emissions increased by 19.2 % compared to 1990.¹

The Austrian impulse program “klima:aktiv” for an active environmental protection initiated by the Federal Ministry of Agriculture, Forestry, Environment and Water Management supports the measures of the Climate Strategy. “Klima:aktiv” includes 23 different programs in 4 different categories (mobil-

1. APA, Kyoto-Bericht: Österreich von Ziel weit entfernt, 27.02.2006

ity, renewable energy, energy efficiency & buildings and communities) coordinated by the Austrian Energy Agency – the “klima:aktiv” e5 program is one of them. The program supports municipalities in long-term practical climate protection measures in the areas of energy and mobility.

More precisely, e5 is a certification and quality management system for towns and cities that are making a significant contribution to improve energy efficiency and increase the utilization of renewable energies. The inefficient use of energy wastes money and natural resources while unnecessarily causing environmental pollution. The e5 program informs communities that by making a few simple changes in the way energy and natural resources are used, significant savings and a positive contribution towards a sustainable future can be reached.

Originally, the idea of the program was developed in Switzerland (www.energiestadt.ch) and in 1998 it was adopted and insignificantly modified by the three Austrian provinces Vorarlberg, Tirol and Salzburg. Because of the program's success an Austrian-wide coordination-office was implemented. The main tasks of this office are to implement the e5 program in other provinces, to motivate municipalities to take part, and to represent Austria on an European level.

e5 Within the European Energy Award®

In 2002 representatives from Austria (e5), Switzerland (Energiestadt) as well as project partners from Germany and Poland decided to implement a harmonised program called European Energy Award®, which corresponds to the previously implemented programs e5 and Energiestadt.

The European Energy Award® combines the expertise and tools developed by Austria and Switzerland with the ideas of Germany, Ireland, France, Lithuania and Italy who joined the program in 2003.

At the end of 2005 more than 300 communities (with more than 7 million citizens involved) participated in the program and 168 of them have already been awarded with the European Energy Award® (see table 1). 11 of the 168 awarded municipalities received the European Energy Award® Gold.

The Austrian and Swiss partners decided to keep their well accepted and established brands e5 and Energiestadt. But all three brands (e5, Energiestadt and European Energy Award®) use the same tools and the international umbrella organisation

of the European Energy Award® ensures uniformity of all programs.

Based on the required structures for national and regional implementation of the eea® program in the respective countries, the European Association (European Forum “European Energy Award”) and the European Program Office for this Forum have been established.

The Forum was founded on September 25th 2003. The European Program Office is acting on behalf of the FORUM in order to manage and administer this institution. The European Program Office coordinates all European Energy Award® Gold certification activities, ensures the mutual transfer of know-how, the training of the auditors as well as the benchmarking among the European municipalities.

Very early new participating countries are forced to get in contact with the relevant stakeholders and to think about an adequate eea® program structure in their countries. Figure 2 shows the organisational structure on a European level. It is very important to find politically accepted program trustees and to involve the relevant stakeholders on a regional/national level.

As the eea® is a protected trademark, rules how to deal with the instruments had to be defined. For this reason specifications for the work in licensed countries and regions were elaborated. These specifications include the definition of the assessment tool, the responsibility for the assessment tool, the procedures for the translation into other languages, the allowances for changes and amendments in the assessment tool, the rules for forwarding the tools to the advisors and communities, the intervals for the revision of the tools etc. All these rules have to be followed by the license contractors because it is an important part of quality assurance.

The eea® – A Program for Energy-Efficient Communities

With the eea® program communities can make the step from single energy efficiency projects to a long term program, which is target and action oriented.

The main elements of the eea® are:

- Total quality management system (TQM) for communal energy-related activities

Table 1. Participating communities in the project (end of 2005)

Country	Number of participating communities	Number of involved citizens	Number of awarded communities
Switzerland	220	1,200,200	126
Austria	50	250,000	20
Germany	40	4,600,000	18
Ireland	2	9,000	2
Lithuania	1	368,000	1
Italy	5	11,000	1
France	8	759,000	0
Total	326	7,197,200	168



Figure 1. Three brands – one system.

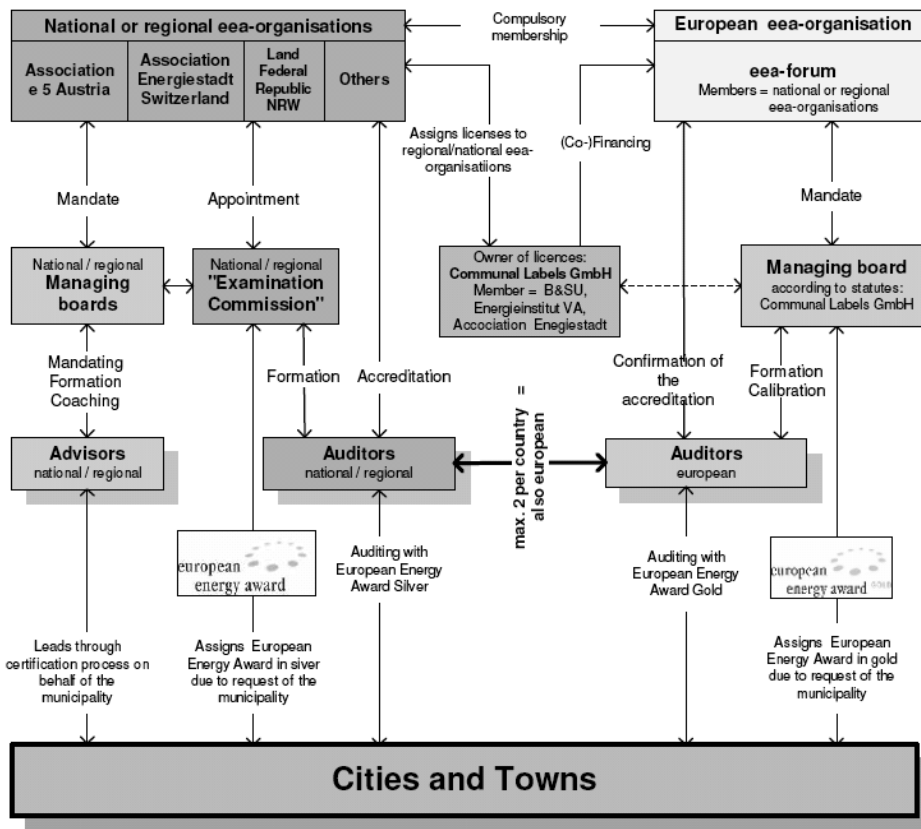


Figure 2. Organisational structure on European level.

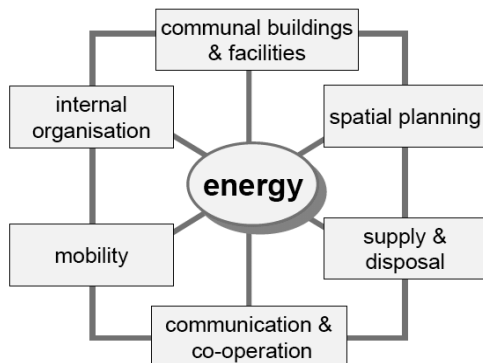


Figure 3. The eea@ Catalogue.

- Certification and award for energy-related achievements in two award categories and monitoring of the progress through regular audits
- Networking within the community and between communities through increased co-operation and communication

Based on a quality management system traditionally used in the business sector, the target of the eea® program is the identification of energy saving potentials within a community and the realisation, documentation and evaluation of the saving measures. Therefore a communal action program has to be developed and adapted annually. All energy-related fields of municipalities (development & planning, buildings & facili-

ties, transport, energy supply, internal organisation, communication & co-operation) are considered. Internal structures, suitable for steering the process including all relevant players in the community (politics, administration, citizens, enterprises etc.) are set up.

THE EEA® TOOLS

The following tools are used in the eea® program:

- eea®-catalog – audit/assessment tool
- Guide book
- Report of the audit
- Benchmarking with indicators
- Good practice catalogue

The most important tool is the standardized eea® catalogue (= assessment tool), which consists of 84 possible measures in six different fields (see figure 3).

The catalogue contains a general description of every single measure and dwells on the degree of realisation and the planned measures. Every measure has a maximum number of points and a number of possible points. The auditor uses the catalogue for the external audit. Further more the catalogue is also an important document for the communal energy team. The team can use the catalogue as a checklist for energy reviews. As the catalogue contains the documentation of each measure, the community can see what has been achieved. Further more the catalogue is a catalyst for the process, because as long as a community has not reached all its possible points it will try

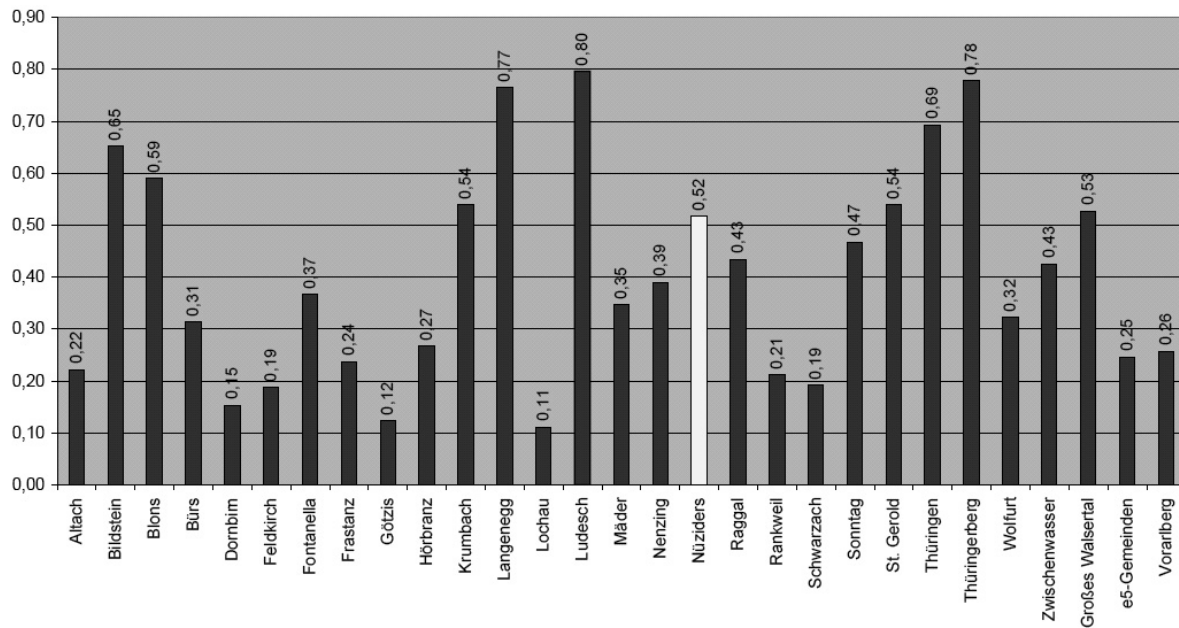


Figure 4. The solar collector surface in m² per capita

to improve its energy situation. Besides that the catalogue can support the community in planning future activities.

The Guide Book helps the auditor to assess the measures and to attribute the correct number of points. The results of the audit will be summarized in a report.

Another important tool is the benchmark with indicators. Each community has the possibility to compare its results with other communities. Such indicators can be for example the

- heat/electricity consumption of private households per inhabitant in MWh/a
- heat/electricity consumption of the industry per working place in MWh/a
- heat/electricity consumption in communal buildings in kWh/m² a
- energy consumption of street lighting per km of streets
- share of eco electricity in the total electricity demand of the city in %
- number of car sharing user
- low/passive energy houses in m²/inhabitant
- etc.

Figure 4 shows the benchmark of the installed solar collector surface per capita between all e5 communities in the province of Vorarlberg.

The good practice catalogue is a collection of successful examples of measures. On the one hand this catalogue shows municipalities what other municipalities have achieved and on the other hand they give them an idea about which measures are under which circumstances very effective.

THE EEA® PROCESS

Figure 5 illustrates a typical quality management process within the eea® program.

Start-Up Phase

During the start-up phase the municipality signs an agreement with a regional trustee, agreeing to the terms of the eea®. Then an energy team is formed within the community to carry out the necessary steps involved in the eea® program. The team consists of representatives from the community administration, politicians and committed citizens. They are responsible for executing the eea® program on behalf of the community. During the process, an eea® advisor provides expert guidance to enable the maximum benefits which are to be realised. The energy team works together with the accredited advisor to:

- carry out the energy support of the audit tool
- develop an energy work program
- develop and realise energy efficiency projects
- carry out the annual internal audit

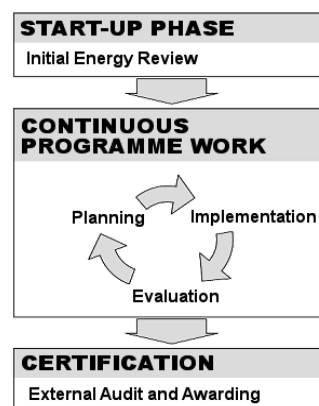


Figure 5. The eea® process, a typical quality management process.

The Continuous Program Work

The first action is the initial energy review, an analysis of the current status of the community assisted by eea® tools. The results of the energy review give the community a rough idea about their energy situation in their sphere of action and an overview about strengths and weaknesses. This will help to process a communal energy policy and action program.

The next step is that the community puts a short, medium and long term activity program into place which ensures the realisation of concrete measures for future improvements. Then the community implements its work plan. The energy team is responsible for steering the process: projects will be planned and decisions will be prepared and finally implemented. An energy review is carried out every year describing the work progress. If necessary the communal energy policy and action program has to be updated.

With the help of the provided eea® tools the community can assess and visualize its own strength-weaknesses profile and select among a broad variety of fields of action to set priorities and estimate their effectiveness.

The energy-political profile visualizes the percentage of realisation in each field of action (see figures 8 and 9)

External Audit and Certification

When the degree of implementation of energy measures is at the required level, the community can apply for certification through external audit. The certification is awarded in two categories:

- When a community attains 50 % of all possible points the European Energy Award® Silver is awarded by the regional trustee.
- When a community attains 75 % of all possible points the European Energy Award® Gold is awarded by the European eea® Office. This can be seen as the European Champion League of energy efficiency.

A monitoring of the progress through external audits (at least every three years) ensures that the communities continue their efforts.

A regularly international comparison between the results of the communities leads to some positive competition. Figure 6 shows that at the end of the year 2005 the Austrian community Mäder is leading the ranking with 84 % of all possible points, followed by Lausanne, Schaffhausen, Münster, Neuchatel with 80 %, Zürich, Langenegg, Ostbevern, Zwischenwasser with 78 % and Riehen and Cham with 77 %.

As figure 7 illustrates, within the Austrian e5 program the certification is awarded in 5 categories. For the first “e” 25 %, for “ee” 37 %, for “eee” (=European Energy Award®) 50 %, for “eeee” 62 % and for “eeeee” (eea® Gold) 75 % of all possible points have to be attained.

THE BENEFITS AND TASKS OF MEMBER-TOWNS

The benefits for towns participating in the eea® are:

- step by step enhancement of energy-efficiency in combination with cost-savings
- increasing and advancing the implementation of energy saving measures

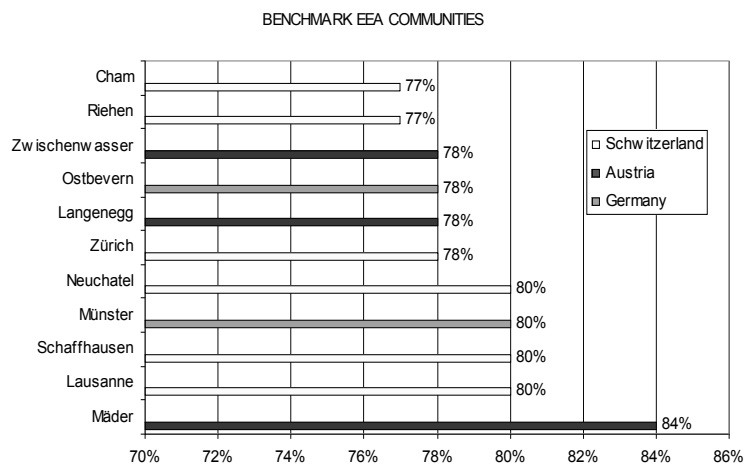


Figure 6. Benchmark of the eea® Gold communities.

- implementation of a sustainable energy-policy in combination with the performance of international contracts for climate protection
- corporate image benefits through a responsible energy and climate policy
- integrating the eea® into city marketing activities
- stimulation of investment especially on a local and regional level
- involvement of committed citizens and interest groups in energy policy planning and decision making process
- qualification of employees in municipal departments and support through the e5-network in planning and realising measures
- access to the know-how and experience of leading energy communities and municipalities throughout Europe
- enhancement of internal structures and processes of all energy-relevant categories in the community (planning – realisation – evaluation, systematic review, control of success)
- appropriate steering and controlling instrument for local energy policy
- benchmarking with other communities
- external, independent audit of achievements in the field of energy
- successful dissemination of “energy-activities” through a European assessment and an award
- To make use of the advantages of the program, communities have to agree on the following points:
 - to stand up for realisation of the program targets
 - to provide human and financial resources which ensures satisfying work of the energy-team
 - to pay an annual program-fee
 - participation in eea®-conferences and advanced trainings

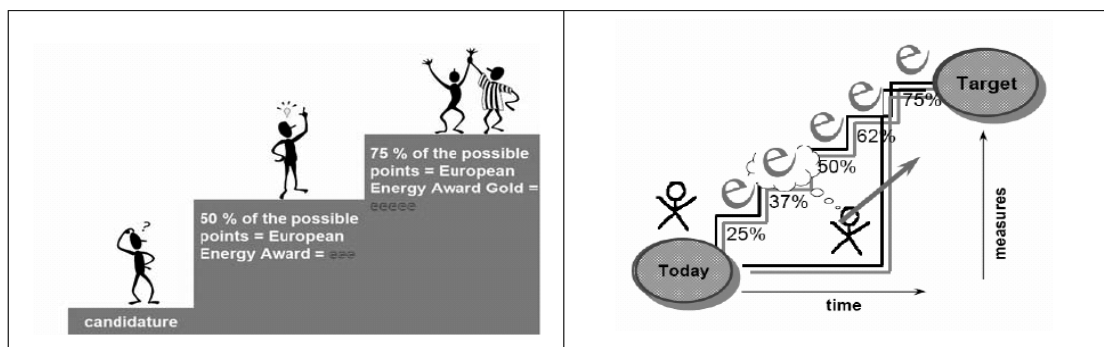


Figure 7. eea@ versus e5 certification.

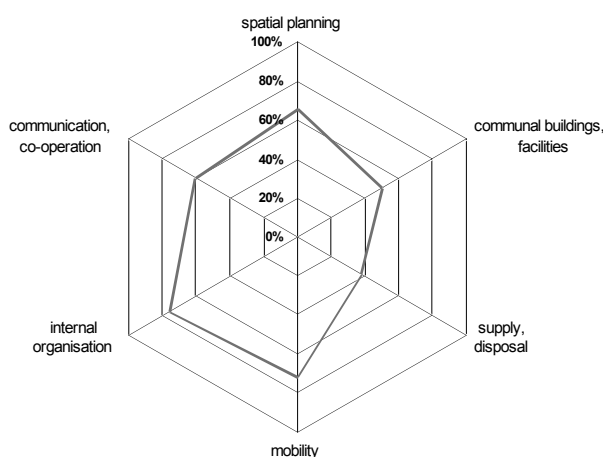


Figure 8. The energy profile of Dornbirn, 2003.

- to tell other interested eea® communities about their experience and know-how
- regularly participation in an external audit (at least every 3 years)

Status of the eea® in Austria

At the moment there are approximately 50 e5 communities in the provinces of Vorarlberg, Tirol, Salzburg, Carinthia and Styria. In 2004 the first European Energy Award® Gold was awarded to an Austrian municipality (Langenegg in Vorarlberg). Today 3 communities (Langenegg, Mäder and Zwischenwasser) have already reached “eeee”. 5 communities (Ludesch, Wolfurt, Kufstein, Virgen and St. Johann) have “eeee”. In total Austrian communities have collected 98 “e”s. During the last three years 600 active team-members were responsible for the realisation of 1,100 projects.

SUCCESSFUL AUSTRIAN EXAMPLES

Dornbirn

Dornbirn is a city in the province of Vorarlberg and has 43,700 inhabitants and 17,941 households.

Dornbirn joined the e5 program in the year 2000. In the year 2003 Dornbirn reached 238.7 points out of 410 possible points. That means an implementation degree of 58 %. Consequently the European Energy Award® Silver and “eee” were awarded to Dornbirn.

Dornbirn’s energy profile 2003 shows that the city has been very successful in the field of internal organisation, mobility and communication as well as co-operation (see figure 8).

For example Dornbirn has worked out a mobility plan: Dornbirn offers a good public traffic-net which includes 9 bus-lines and 285 stops and is used by 5 million people per year. Further, “soft mobility” measures have been implemented. In the year 2005 the mobility-plan of the city was updated and a mobility-management for the employees of the city hall was worked out (e.g. bikes for the employees, public repair-stations for bikes).

Examples for other important measures are:

- Dornbirn informs their citizens regularly about current traffic and energy-topics. An annual energy report is published.
- Energy accounting has been introduced for communal buildings.
- The street-lighting has been changed to energy-saving light.
- Private and public energy companies produce a high amount of electricity from renewable energy resources (e.g. from photovoltaic, biogas and small hydro power plants).
- etc.

St. Johann im Pongau

St. Johann is a city in the province of Salzburg and has 10,988 inhabitants and 4,450 households. In 2004 St. Johann reached 64 % of all possible points. That means “eeee” and the Silver European Energy Award®.

Some of the most effective energy policy measures of St. Johann are:

- the optimisation of street lighting, which reduces the energy consumption for street lighting by 20 %
- solar thermal and photovoltaic installations for communal buildings such as a senior residential building, schools, kindergarten, sport-sites. On average St. Johann has a solar

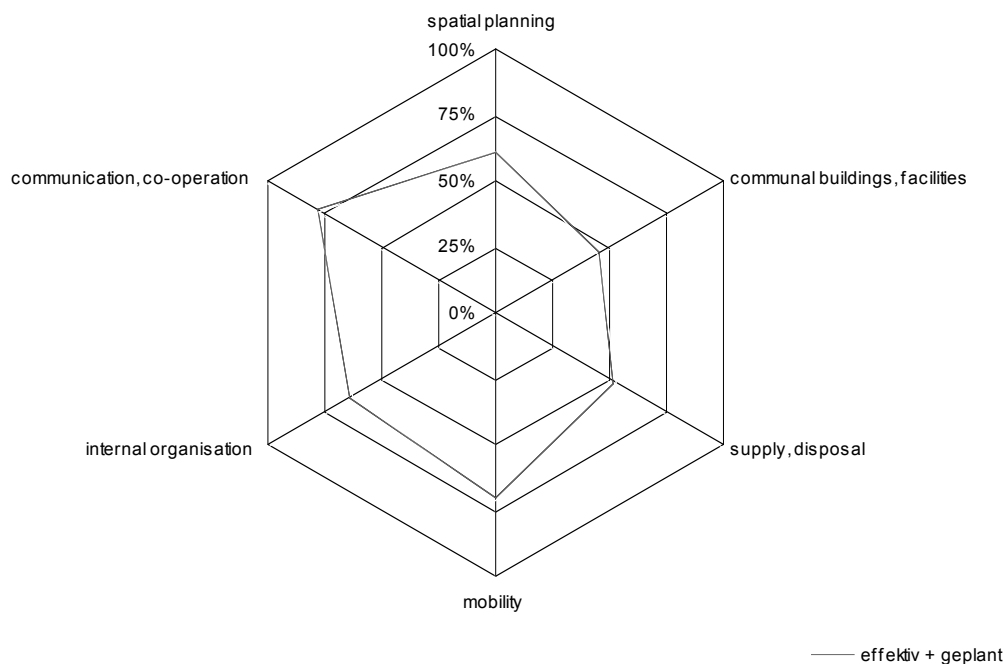


Figure 9. The energy profile of St. Johann, 2004.

collector surface of 450 m²/1,000 inhabitants. The CO₂-reduction of this measure is 940 tons per year.

- the installation of a biomass district heating system for 9 hotel buildings which saves 400,000 l of oil per year
- the development of a mobility-concept which includes 2 city bus-lines, parking management, deconstruction of major roads, walker-friendly design of roads and places
- fuel switch of local district heating systems from gas to biomass with biomass CHP and decentralized oil-boilers to biomass. Because of this measure the gas consumption decreased by one million m³ per year and the oil consumption decreased by 450,000 l per year. In total that means 5,000 tons of CO₂ less per year.

Further Developments and Aims

In the three well-established participating countries Switzerland, Austria and Germany the eea® program is spreading to new regions and new towns. Besides the growing number of communities certified with the European Energy Award®, the member communities are continuously improving their performance.

THE EUROPEAN PROJECT “BALANCE GLOBALLY, EVALUATE LOCALLY”

The project “Balance globally, evaluate locally” (BALANCE) is funded by the European Commission and consists of 8 partners. Germany, Austria, Ireland, Italy, Switzerland, Lithuania, Czech Republic and the Netherlands are working on further developments of the eea® program. The project started on January 1st 2006 and will be finished by the end of 2007.

One of the project’s objectives is to develop and test tools to evaluate the energy and CO₂ saving potentials at municipal

level in general (top-down) and of individual hard as well as soft measures in particular (bottom-up). These new tools lead to an improvement of knowledge for decision making and identify the most cost efficient measures. The elaborated tools will be tested in 20 municipalities and after revision widely implemented in about 100 municipalities. In addition, the eea® program will be introduced into two new countries (CZ and NL) and schemes for voluntary agreements and CO₂ town twinning projects should be elaborated.

Concerning energy and CO₂ balancing on a municipal level (top-down approach) the following results have been achieved so far:

- An overview on available European tools was elaborated.
- The project team decided against a single software solution but defines requirements for an energy and CO₂-balance on municipal level.
- Regional workshops with stakeholders and up-coming users took place in seven countries. Some of the main results have been:
 - The level of statistical information has widely spread.
 - The most detailed information has been available in Austria and Switzerland. In these two countries a harmonised tool for energy and CO₂ balancing has already been implemented.
 - In Germany around 10 to 20 % of the municipalities have balancing systems in place but there has been no common approach. A harmonised methodology or tool would be very welcome.
 - Only few municipalities in Italy have got an energy balance.

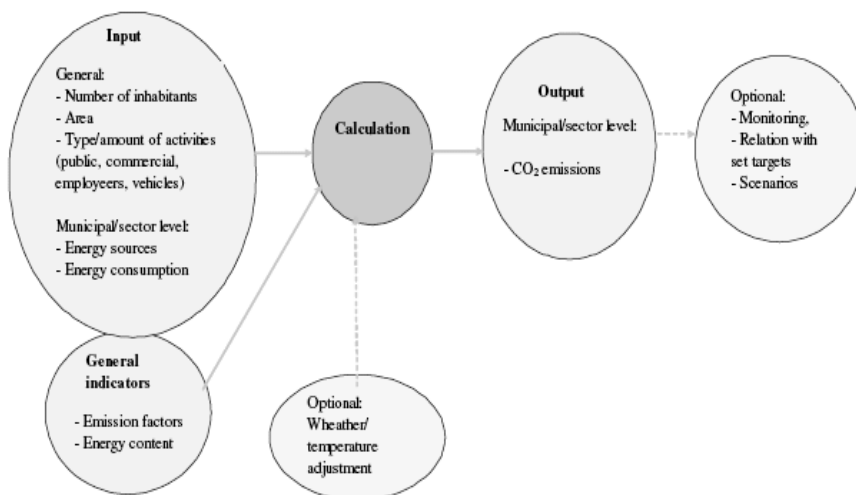


Figure 10. Main characteristics of a CO₂ balancing method

- The CO₂ emissions have been taken into account but there is no standardised method.
- The existing software tools available in Europe were checked with regard to their international transferability and costs.

An Energy and CO₂ Balancing Tool on Municipal Level

A closer inspection of the existing CO₂ balancing tools in the project partner's countries has shown that the tools are based on more or less the same method (see figure 10). The main differences are in the detail level (input and output data).²

The main requirements for a CO₂ balancing method useable within the eea[®] procedure relate to the following points:

1. **Top down and/or an bottom up methodology:** It is difficult to find an optimal balance regarding the availability of local data, the necessary workload and costs to collect the data and the required accuracy of a methodology. In principle there are three main approaches:
 - Top down approach, using international and national statistics to allocate emissions over municipalities.
 - Bottom up approach, using specific municipal data to determine emissions in the municipality.
 - Combination of top down with bottom up approach, using default values based on (inter)national statistics, unless better data at regional and/or local level are available.
1. **The system boundaries:** A CO₂ balancing method for a local authority is defined as a method which determines the CO₂-emissions caused by energy consumption within the border of the municipality. This implies that in general the territory principle is applied: the place where CO₂ is emitted through burning of fossil fuels is leading. The two exceptions are large national energy plants and transportation. In these cases the principle of cause needs to be taken into ac-

count. That means the emissions are accounted to the place where the energy is consumed. For example the emissions caused by electric or heat production which are attributed at the electricity consumers. Further, the definition of the emission factors for district heat and electricity depends on the selected system boundaries.

2. **International comparability:** An important characteristic of the eea[®] method is the comparability between various municipalities within the national and international context. Therefore it is important that only one tool is chosen per country, so that comparison of CO₂ balances at a national level is possible. For the international comparison, it needs to be clear
 - On which tool the balance is based
 - What the differences between the basics, such as system boundaries and emission factors, of the chosen tools are? And in addition, what the influences of these differences are?

Table 2 shows the requirements for a good CO₂ balancing tool so that it can be used within the eea[®]-procedure.

Estimating the Energy and CO₂ Savings of Individual Measures

Concerning the energy and CO₂ saving potentials of individual hard as well as soft measures the following results have been achieved so far:

- First of all the project team had to make a decision, whether an enlargement of the existing eea[®] tool or a development of a complementary tool was appropriate.
- A new tool with a similar structure to the assessment tool should be developed to keep the tools simple and user-friendly for the estimation and monitoring of the emission-reducing measures realised by municipalities.
- The aim is to develop a very simple tool which could be enlarged very easily if necessary.

2. Joosen S., Luttmer M., Cooking Book: CO₂-Balancing, in Framework of Balance Project, Ecofys, 2006.

Table 2. Requirements for a good CO₂ balancing tool suitable within the eea® procedure

Topic	Level	Requirements
Programmed in	Minimal	Electronical, software applicable for most used PCs (e.g. excel, access)
	Preferably	Web based
Used sources	Minimal	Known
	Preferably	Regular updated official sources
Used estimation	Minimal	Known
	Preferably	Based on official monitoring protocols
Method	Minimal	Bottom up
	Preferably	Combination bottom up, check with top down figures
Input	Minimal	Approximate level, default values, in case information is not available at municipal level
	Preferably	Two levels: approximately and detailed
Output	Minimal	Energy use and CO ₂ emission of the municipality, check with macro energy use figures
	Preferably	Energy use and CO ₂ emission of the municipality, total overview, but also zoom in per policy measure and sector
Detail level	Minimal	Municipality
	Preferably	Sector
Work load	Minimal	Not more than two weeks per year
	Preferably	Limited to few hours to a few days per year
Usability	Minimal	It takes half a day to a day work to understand the working
	Preferably	Web based and works intuitively
System boundaries	Minimal	Known
	Preferably	Based on official national and/or international agreements
Number of applications	Minimal	Applied in several municipalities (at least 5)
	Preferably	Applied in many municipalities in several European countries
Cost	Minimal	Limited cost (not above 100 Euro)
	Preferably	Limited cost (less than 100 Euro)
Flexibility	Minimal	Easy to update/adjust information, connect to monitoring programs
	Preferably	Interactive with other planning, budget programs, monitoring program, set target(s) and outlooks

Source: Joosen S., Luttmner M., *Cooking Book: CO₂-Balancing, in Framework of Balance Project*, Ecofys, 2006.

- For monitoring energy policy efforts the project team chose 23 macro and micro indicators in the six areas of the assessment tool. Further indicators can be added easily.
- The indicators are directly connected with a calculation of energy and CO₂ savings.

Implementing the eea® in New Countries

The Netherlands and the Czech Republic are currently working on the implementation of the eea®.

The Dutch project partner has established contact with the National Energy Agency and the Dutch government. It is possible that the eea® program will be the successor program of the Dutch BANS program. The success depends on political decisions and on the results of the eea® initial energy review in communities. At the moment the Dutch partner is in the contracting phase with 7 municipalities. If the Dutch government decides to implement the eea® program, a first awarding of model communities could be in April.

The Czech project-partner has addressed some municipalities with experience in energy projects. Two of them have a political decision and agreement with the Czech partner and will go for the award.

Schemes for Voluntary Agreements and CO₂ Town Twinning Projects

The general target of voluntary agreements and town twinning projects which should be initiated within the BALANCE project is to reduce energy consumption. Therefore model contracts for voluntary agreements which can be adapted to

the national situation should be worked out. These model contracts for voluntary agreements should attract the regional or national authorities to conclude such an agreement. Regarding this aim the experiences made in the field of enterprises have to be transferred to municipalities.

Until now only the Netherlands and Switzerland have experience with voluntary agreements in involved municipalities. Concerning the initiation of town twinning projects, the funding problem is not to be solved easily.

Expected Results of the BALANCE Project

By the end of the BALANCE project it can be expected that the number of participating municipalities will increase from about 320 to 420. This increase will be due to general public relation activities but also to the higher attractiveness through the newly developed tools.

The energy savings which will be achieved by the project are estimated to approximately 250,000 MWh. Under the condition of an energy price of about 20 Euro per MWh the cost savings will be approximately 5 million Euro. This estimation is based on the assumption that more than 10 million inhabitants are involved in the eea® program by the end of the project.

The implementation of the eea® will also encourage the municipalities to increase the share of renewable energies on a local and a regional level. Further, new workplaces for advisors and auditors will be created.

Conclusions

The success of the eea[®] program is shown by the increasing number of participating communities. At the end of 2005 more than 300 communities in 7 European countries (with more than 7 million citizens involved) participated in the program, 168 of them have already been awarded with the European Energy Award[®]. In the framework of the “Balance globally, evaluate locally”-project (funded by the European Commission), the eea[®] program will be introduced into two more countries: Czech Republic and the Netherlands.

The success of the Austrian e5 program is shown by

- more than 50 communities in the provinces of Vorarlberg, Tirol, Salzburg, Carinthia and Styria
- 3 “e5”-communities: Langenegg, Mäder, Zwischenwasser
- 5 “e5”-communities: Ludesch, Wolfurt, Kufstein, Virgen and St. Johann
- more than 600 active team-members
- about 1,100 projects realised during the last three years
- 50 guidelines and handbooks
- more than 60 exchange of experience-meetings of the teams

The most important advantages for the participating communities are:

- energy savings, which consequently lead to lower energy costs
- protection of human being, environment and climate
- positive economic effects for the region
- higher security of energy supply
- increasing plausibility of local politics (consequently the mayors gain sympathy)

The benefits for the citizens are:

- protection and improvement of the quality of life
- careful handling with energy sources and tax money
- possibility of active participation by working in the eea[®]-team

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