ENERGY-EFFICIENCY-PLAN

for the region „Tullnerfeld West“

Part of the VIS NOVA-project

3.5.4 Energy Efficiency Plan

Quelle: ec.europa.eu/energy/efficiency/action_plan/action_plan_de.htm

Authors:
Bernhard Hölblinger (im-plan-tat Raumplanungs-GmbH&CoKG)
Birgit Weiß (Energy Changes Projektentwicklung GmbH)
Franz Figl (ConPlusUltra GmbH)

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CONTENT

1 ABSTRACT

The Energy-Efficiency-Plan (short: EEP) with its objectives aims to a long-term improvement of the energy situation in municipalities and a sustainable implementation, which is carried out by the involved stakeholders. The EEP should serve the decision-makers in the municipalities as a guidebook and a valueable basis for actions. The report at hand states the procedure of establishing the Energy-Efficiency-Plan for the municipalities by means of “energy accounting”. Based on the results of this “energy accounting” a road map, which includes concrete measures to increase energy efficiency in the public buildings, was created in order to realise identified savings potentials. Figure 1 illustrates the major steps and effects of the Energy-Efficiency-Plan.

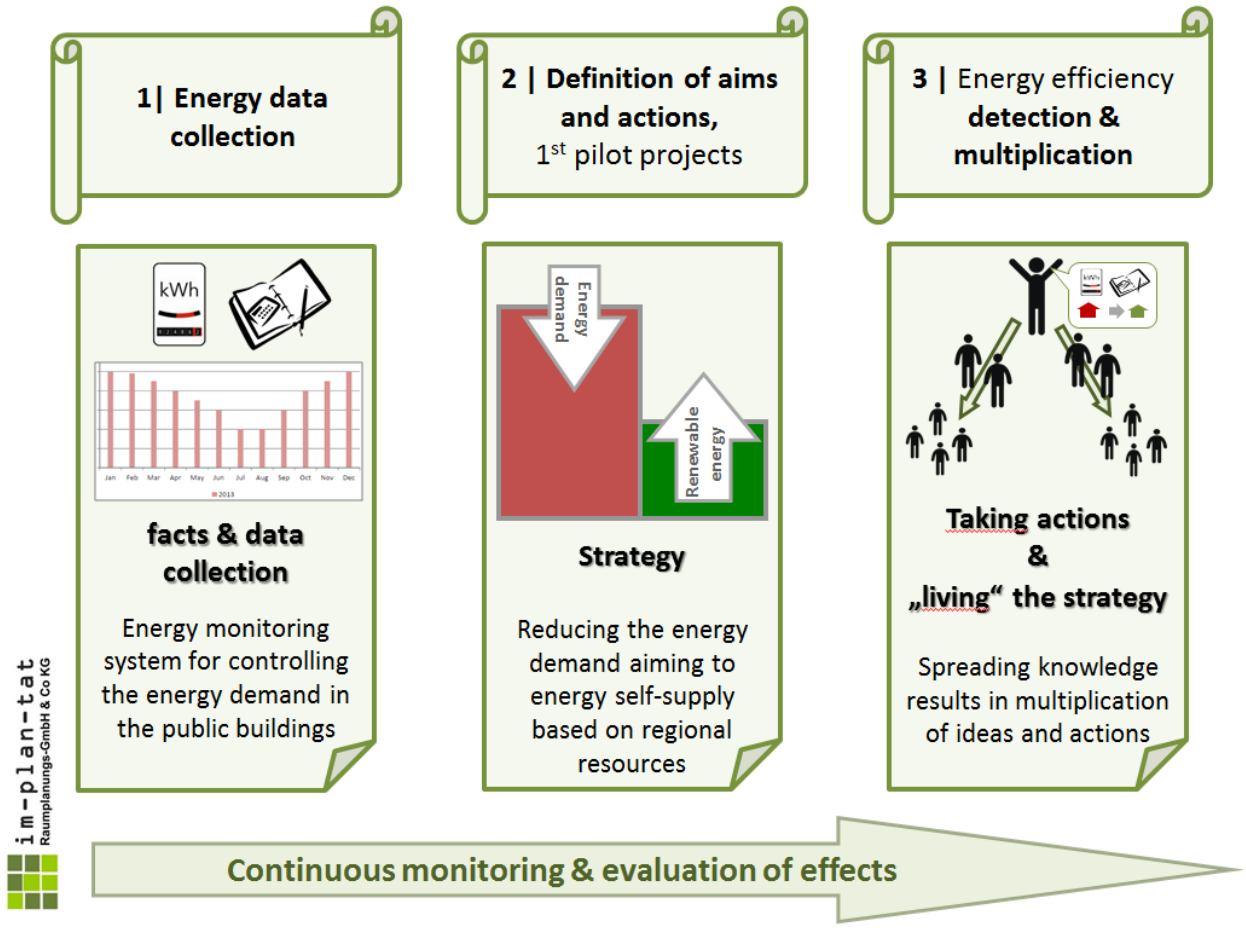


Figure 1: Energy-Efficiency-Plan – major steps and effects (source: im-plan-tat)

Furthermore, the report at hand presents best practice examples in the region "Tullnerfeld West", which should serve as inspiration and motivation. These best practice projects show clearly, how and to which extent efficiency potentials can be realised in different buildings in practice.

The collected data for the „energy accounting" are constantly being extended and updated. Therefore the Energy-Efficiency-Plan is not an unflexible and closed product, but rather an instruction on how the process of data collection and the identification and realisation of potentials can be carried out in municipalities and regions.

Defined objectives are essential, but a constant re-evaluation is equally nessacary and advisable. Sticking to the drawn up measures when the circumstances may have changed in the meantime, is usually counterproductive and not constructive.

2 INITIAL SITUATION

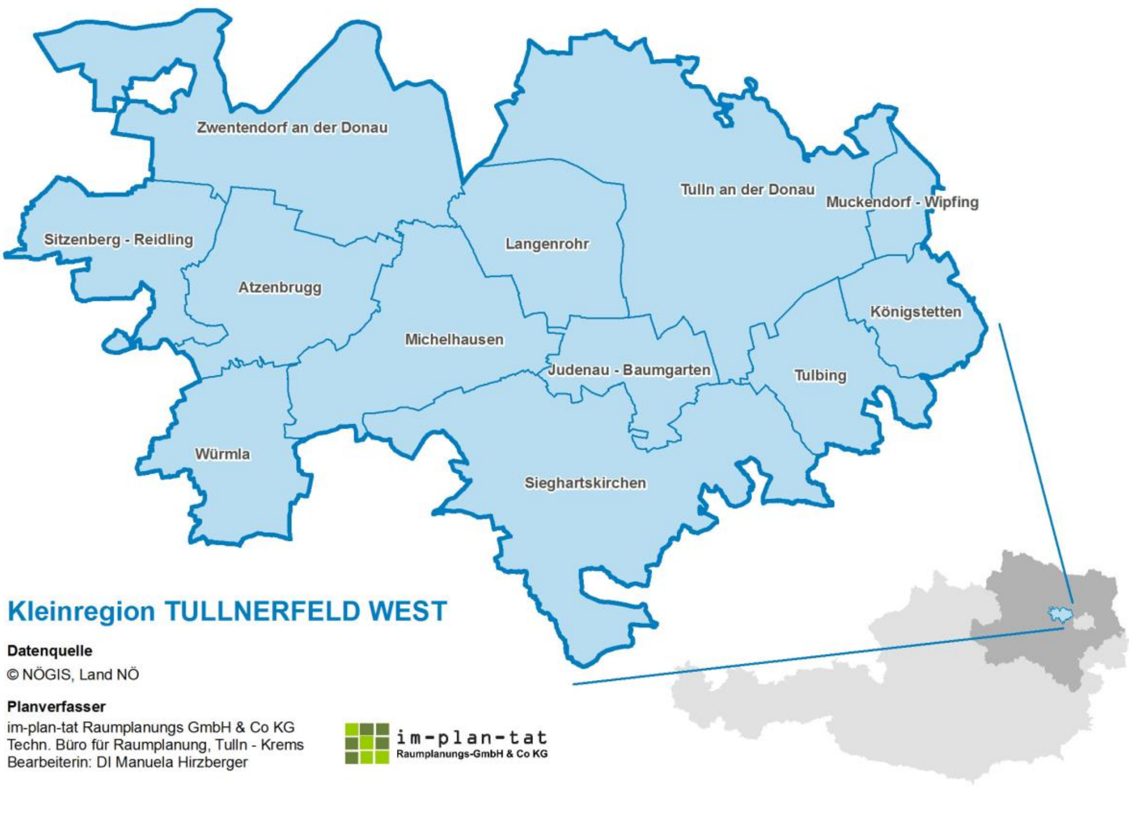


Figure 2: Dimension and situation of the region „Tullnerfeld West" (source: im-plan-tat)

The region “Tullnerfeld West” is situated in Lower Austria and consists of the following 12 municipalities: Atzenbrugg, Judenau-Baumgarten, Königstetten, Langenrohr, Michelhausen, Muckendorf-Wipfing, Sieghartskirchen, Sitzenberg-Reidling, Tulbing, Tulln, Würmla und Zwentendorf

Those municipalities are jointly involved in the “Central Europe”-Project VIS NOVA, which aims to push energy efficiency measures and sustainability in the rural area.

2.1 PRELIMINARY WORK AND FURTHER ENERGY PROJECTS

All 12 municipalities have already been working in the field of energy efficieny in the past. They are all part of the LEADER region “Donauland-Traisental-Tullnerfeld”, which was established in 2007 and consists of a total number of 21 municipalities. The LEADER region developed a “regional energy concept” in the years 2010/2011.

Furthermore, 5 of the 12 municipalities (Zwentendorf, Sitzenberg-Reidling, Atzenbrugg, Michelhausen and Langenrohr) form the so called „Climate and energy model region Alternatives Zwentendorf – Tullnerfeld West”. Energy efficiency is one of the main focuses of this model region. For this reason, special attention was laid on those municipalities while developing the Energy-Efficiency-Plan, in order to generate synergy effects and additional value from this common focus.

2.2 ENERGY POTENTIALS IN THE REGION

In order to include existing knowledge and to benefit from synergy effects between LEADER, the “Climate and energy modell region” and VIS NOVA, the “regional energy concept” of the LEADER region was used to portray the regional energy and efficiency potentials (see Figure 3). The diagram shows the already used and the still useable potential (= total potential) in the region. The blue bars demonstrate the potentials for energy supply from renewable regional resources (left to right: energy wood from the forests, miscanthus/short rotation forestry, straw & corncobs, solar heat, geothermal heat, hydropower, windpower, photovoltaics, biogas, bio fuels, electric mobility) and the green bars (left to right: thermal renovation, efficient electric devices, reduction of motorised traffic) illustrate the energy efficiency potentials in the private households in the region.

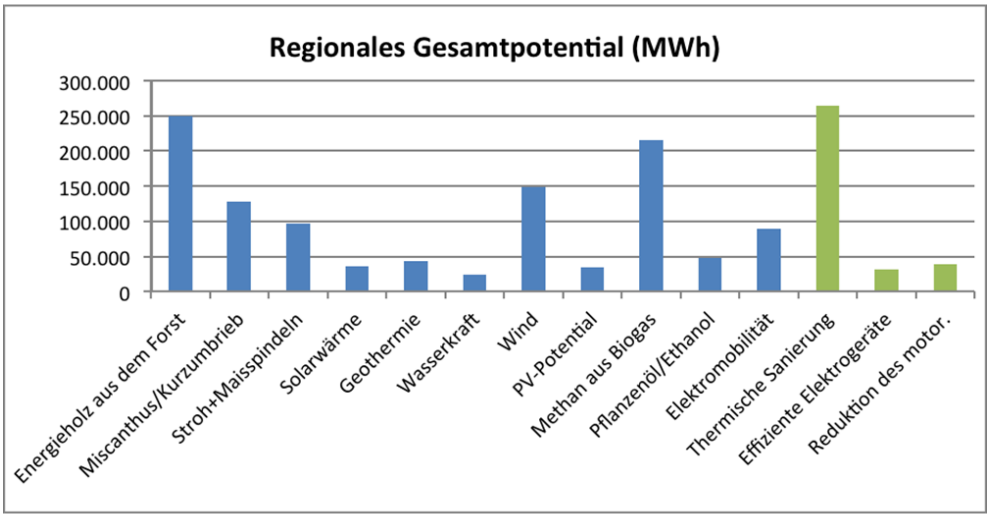


Figure 3: Diagram showing the total amount of the regional potentials (MWh) in the fields of energy supply and energy efficiency (source: regional energy concept of the LEADER region Donauland-Traisental-Tullnerfeld, 2011)

Figure 4 shows the still useable regional potential. The total amount of the still useable potential for thermal energy supply from regional renewable resources (first 5 blue bars left to right: energy wood from the forests, miscanthus/short rotation forestry, straw & corncobs, solar heat, geothermal heat) is 347,000 MWh. The savings potential that can be realised through thermal renovations (frist green bar from left) amounts to 260,000 MWh. This comparison shows clearly, that the first priority needs to be on energy saving measures and subsequently on providing the needed amount of energy from regional renewable resources.

This approach – 1st step energy saving, 2nd step energy supply – was used in the best practice examples as well as for the developing of the EEP's road map.

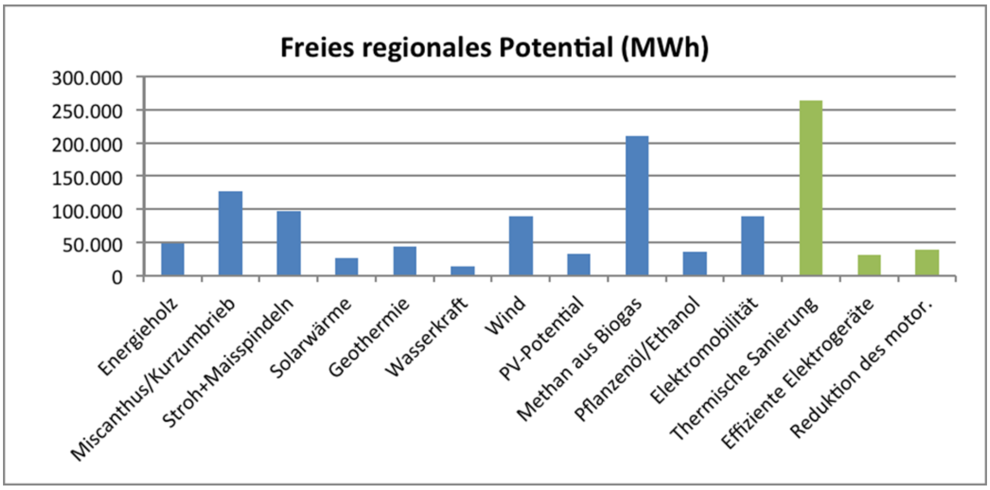


Figure 4: Diagram showing the still useable potentials (MWh) in the fields of energy supply and energy efficiency (source: regional energy concept of the LEADER region Donauland-Traisental-Tullnerfeld, 2011)

3 OBJECTIVE AND PROCEDURE

The main objective is an optimal cost-benefit ratio between the acquisition, the analysis and the usability of the energy data. High costs for a regular monthly data acquisition and an eventual low potential for improvements in a building are not advisable. In such buildings it is more reasonable to acquire the annual amounts of the energy demand and include those in the “energy accounting” system. The annual energy data are in such cases sufficient in order to deduce potentials for improvements.

Before concrete measures to improve energy efficiency are carried out, they need to be checked according to cost effectiveness. In this context governmental subsidies can play an important role to improve the cost effectiveness of measures to increase energy efficiency and save energy, which can make their realisation considerably more likely.

3.1 PROCEDURE - OVERVIEW

3.1.1 First information for the municipalities

The first step was to inform the municipalities about the “energy accounting” and the intended procedure. Therefore, a checklist containing information on all relevant data to be gathered was sent to the municipalities in preparation of the subsequent personal meetings with the responsible persons. The checklist included the following bullets:

1. List of buildings, that shall be included in the "energy accounting"
2. Data to each selected building
   (use of the building, address, number of floors, year of construction,…)
3. Floor plan of each building (and plans of restorations)
4. Records of energy demand / energy costs for the past 4 years
   (electricity bills, bills for fuel oil, …)
5. Energy report of the power company (if available)
6. Energy performance certificate for buildings (if available)
7. Information on the municipality's vehicle fleet
   (type of vehicle, kilometres travelled)
8. Name and contact information from the responsible person in the municipality

3.1.2 Personal meeting with the responsible persons an on-site inspections

The next step was a personal meeting with the relevant stakeholders in each municipality in order to equalise objectives, ideas and expectations. Especially when drawing up the roadmap for the EEP, existing objectives must be considered.

For each selected building to be included in the "energy accounting", a data sheet (see appendix) needed to be filled out together with the responsible persons during the meeting. Therefore on-site inspections were carried out as well. This data sheet included the following information:

- Contact person (Name, phone number, e-mail)
- General data of the building (owner, type of building, address of the building)
- Specific data of the building (such as energy efficiency index (kWh/m²a), year of construction, year of restoration, number of floors, gross floor area (heated),

ventilating system (Y/N), in cases of school or kindergarten buildings: number of classes / groups, etc.)

- Data regarding the energy supply of the building (such as energy resource used for the heating system, year of construction of the boiler, boiler capacity, means of hot water production (e.g. combined with the heating system, solar heat,…), number of supply areas concerning electricity, connection power (kW), photovoltaic,…).

The meeting was closed with information on the next steps. Good information is the key to a high acceptance and willingness to contribute for all relevant stakeholders, especially the ones who are responsible for collecting the data. Only if the data are collected carefully and regularly (optimal would be monthly) on all meters (electric, heat, water), good results can be expected from the "energy accounting".

3.1.3 Data processing and analysis

After all the necessary data was gathered and all the buildings and the counting devices were inspected, the data was added in the online "energy accounting" tool (EMC - Energy Monitoring & Controlling Solution of the company Siemens). The following list illustrates the required steps to process the data and get good quality results from the EMC in order to identify concrete measures to save energy and increase energy efficiency:

- Creating databases for all buildings in the EMC
- Including the meters from all buildings and connect them to the particular buildings (virtually)
- Inserting all meter readings from the previous years
- Municipalities deliver the meter readings regularly (optimal: monthly)
- Continuously inserting the meter reading data in the EMC for all buildings
- Evaluating and processing the data in the EMC
- Interpretation of the results and developing suggestions for improvements

- Creating an annual energy report for the municipalities including diagrams showing the development of the energy demand in the buildings and identified measures in order to save energy
- Integrating the results of the energy report in the Energy-Efficiency-Plan

4 ESTABLISHING THE ENERGY-EFFICIENCY-PLAN

Figure 5 schematically illustrates the purpose of a continuous energy data monitoring as an essential basis for establishing the Energy-Efficiency-Plan.

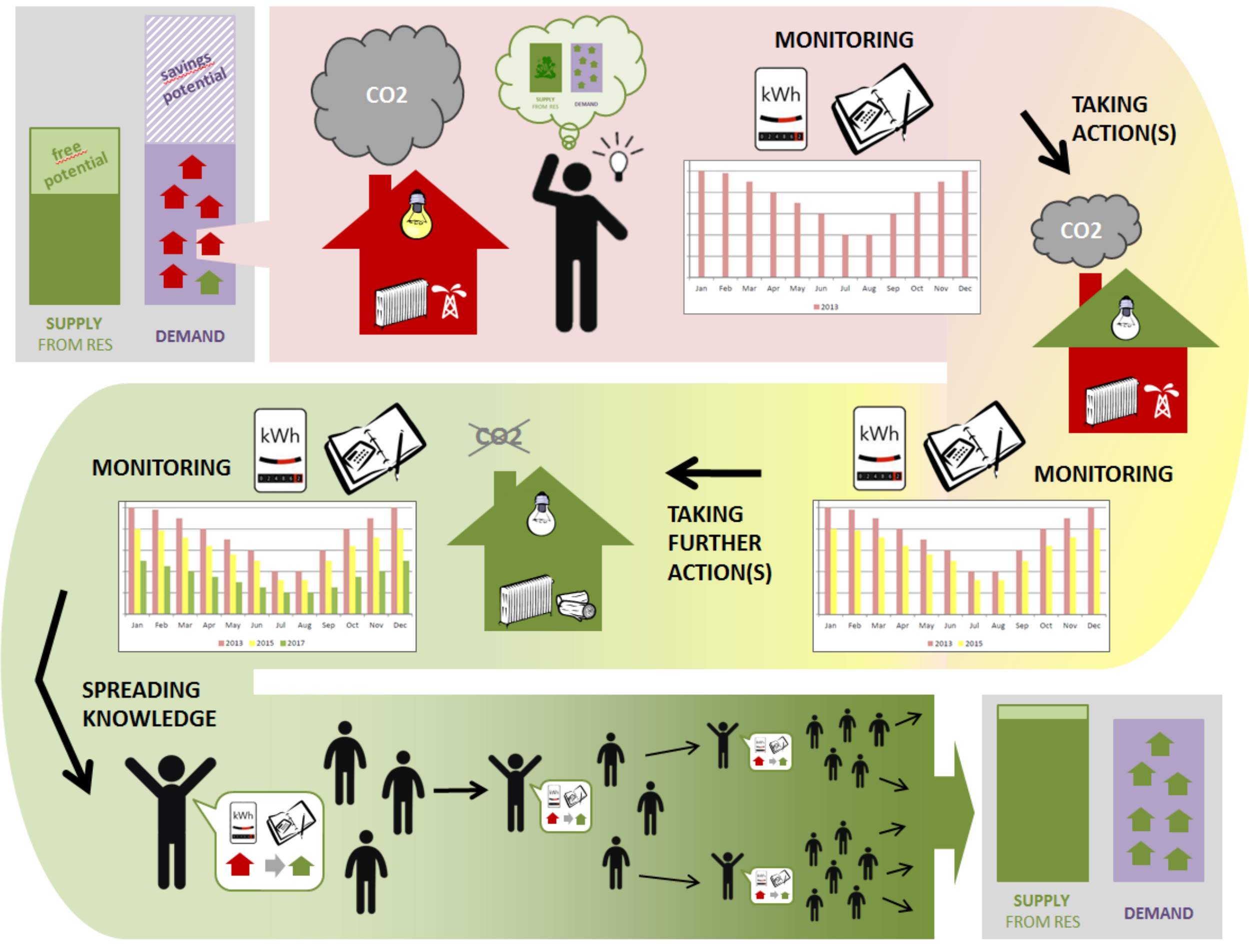


Figure 5: „Energy accounting“ as an essential contribution to reach a sustainable energy supply (source: im-plan-tat)

Based on the analysis of the regional potentials (both savings and supply), the tool of "energy accounting" contributes to further refine those data in order to being able to identify concrete measures for improvements on the level of buildings. Raising awareness and spreading knowledge in this field is equally important to - step by step – reach a sustainable energy supply in the future. The constant monitoring and collection of the energy data of the buildings plays an important role not only for the identification of suitable measures for improvements, but also for evaluating the effects of implemented measures.

4.1 ENERGY-EFFICIENCY-LAW (LOWER AUSTRIA)

The energy-efficiency-law of the federal state of Lower Austria serves as the basis for establishing the Energy-Efficiency-Plan (EEP) for the 12 municipalities participating in the VIS NOVA project. This law came into effect in January 2013 and directs the municipalities to keep an "energy accounting" for all the publicly owned buildings, where all data regarding the energy demand of the buildings must be recorded. Furthermore, the municipalities must appoint a so-called "energy representative", who is responsible for carrying out the "energy accounting", the continuous monitoring of the energy demand and for informing the responsible stakeholders in the municipality about observed shortcomings regarding energy efficiency.

Based on this legal frame, the municipalities of the region "Tullnerfeld West" appointed one "regional energy representative", who carries out the "energy accounting" for all the 12 municipalities. This "regional energy representative" inserted all the energy data (electricity, heat, water) of the selected publicly owned buildings (e.g. primary school, kindergarten, municipal office,…) in an online "energy accounting" tool.

4.2 SELECTION OF THE BUILDINGS

The number of buildings, that were included in the "energy accounting", was chosen via an allocation formula based on the number of inhabitants of the municipalities. Therefore, different numbers of buildings (between 3 and 32) were selected in the individual municipalities. The municipalities decided themselves, which buildings they wanted to include in the "energy accounting". Priority was thereby laid on older buildings in need of restoration or buildings with a high energy demand.

4.3 "ENERGY ACCOUNTING"

The data of 86 buildings with more than 230 meters (electricity, heat, water) and more than 3,300 meter readings were collected. For processing the data an online "energy accounting" tool (EMC – Energy Monitoring & Controlling Solution of the company Siemens) was used.

4.3.1 Energy Monitoring & Controlling Solution (EMC)

The EMC is an online tool, which the federal state of Lower Austria provides for the municipalities. This tool enables the municipalities to enter and administrate the energy data of the buildings and objects themselves. The aim is to enter and administrate the energy data of all publicly owned buildings in all municipalities in Lower Austria. These buildings and objects are mainly schools, kindergartens, municipal offices, fire stations, sewage plants, pump stations, street lighting systems, etc.

Figure 6 illustrates the structure of the "energy accounting" tool EMC, which is designed in a tree structure. On the first level (1) the municipalities are entered. On the second level (2) all the publicly owned buildings and objects in each municipality are added and for each building the according meters (3) are added as well. In the best of cases electricity meters, heat meters and water meters are added for each building.

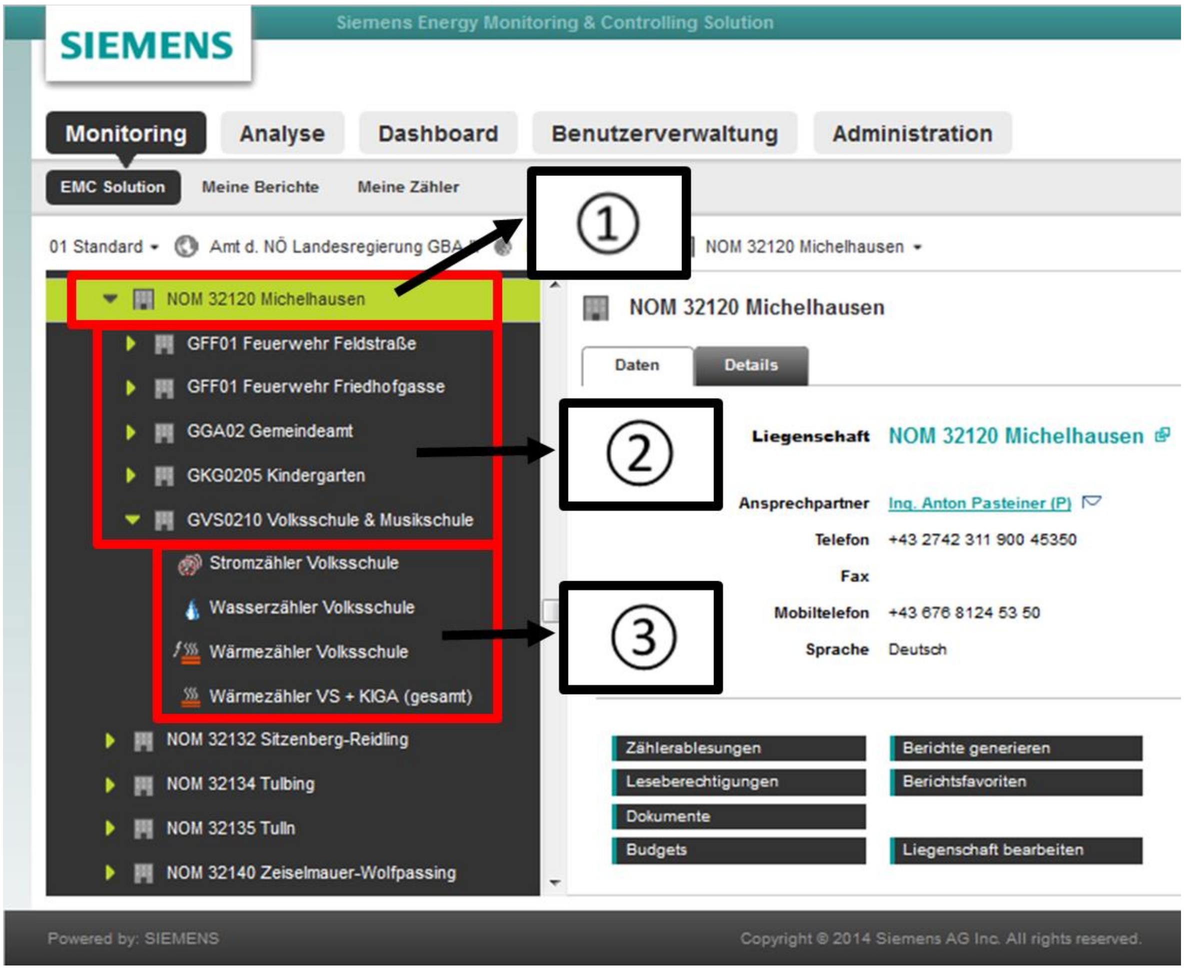


Figure 6: Structure of the "energy accounting" tool EMC (source: EMC-tool | Siemens)

4.3.2 Data collection from the meters

In order to obtain a wide range of comparative values, the energy data of the previous years (beginning in 2009) was gathered and entered in the EMC. That enabled the "regional energy representative" to compare energy demand data from the years 2009 to 2014 and draw according conclusions. The data from the previous years were mainly annual values, but partly also monthly values. Monthly values are however better when it comes to interpreting the data, because abnormal energy demand (e.g. due to inefficient heating regulations, unnecessary running electric devices or lighting, etc.) can be better and faster identified and corrected. When in general an increased demand is observed, it can be allocated to specific months and does not "vanish" in an annual sum.

All the collected meter readings and energy demand data were an essential basis for establishing the Energy-Efficiency-Plan for the region “Tullnerfeld West” in the course of the VIS NOVA project.

4.3.3 Analysis

The main aim of collecting all these data is to use them constructively and purposeful and not to create graveyard data.

The “energy accounting” tool provides functions to generate reports for individual buildings/objects as well as for whole municipalities. The energy demand data can be displayed monthly or annually and compared to each other. With such reports the energy demand can be presented clearly and potentials for improvement can be identified. It is thereby certainly essential, that the data are properly comprehended and interpreted correctly.

In the EMC, reports in the form of tables and diagrams can be generated, so that the results of the “energy accounting” can be presented to the members of the municipal council in a graphic and easily understandable way.

The collection of energy demand data in the EMC helps to recognise potentials for improvements on the one hand and is on the other hand also a valuable tool to identify errors. Due to the continuous recording and analysis of the data, errors can be faster identified and their cause eliminated in order to improve the energy efficiency of the building/object and in total of the whole municipality.

4.3.4 Benchmark

The appointment of a “regional energy representative” brings a noteworthy advantage: Due to the fact that he attends to all the municipalities of the region, he knows the energy demand data of distinctly more buildings and can use that knowledge for the interpretation of the data. So he can not only compare the energy demand data from different years and different types of buildings, but also the data from the same type of buildings, that are located in different municipalities. Of course, this information is communicated anonymously. The "regional energy representative" does let the municipalities know, how efficient respectively inefficient their buildings are in comparison to other similar buildings in other municipalities, but not in which municipality exactly the buildings are better or worse. For instance the fire station in municipality A can be compared to the fire station in municipality B, if they are of similar size and similarly used. With that knowledge, potentials for improvements in the buildings can be easier recognised.

WÄRME							
Bauwerkszuordnung	Untergrenze der Klassen (kWh/m²a)						
	A	B	C	D	E	F	G
Bürogebäude	0	84	104	123	145	171	217

63,23 kWh/m²a

STROM							
Bauwerkszuordnung	Untergrenze der Klassen (kWh Strom/m²a)						
	A	B	C	D	E	F	G
Bürogebäude	0	8	11	14	17	22	30

57,44 kWh/m²a

Figure 7: Benchmarking in the EMC-tool for an office building (above: benchmarking for heat demand, below: benchmarking for electricity demand) (source: EMS-tool | Siemens)

The EMC tool offers a benchmarking-function, but this function only allows a comparison in a superficial way. Figure 7 exemplarily shows the benchmarking from the EMC for an office building. The efficiency classes A to G help to rank the buildings. The illustration above ("WÄRME") shows the boundary values in kWh/m²a for the heat demand of all the office buildings, which are covered in the EMC. The average of all the office buildings in the EMC tool lies in category D. Our exemplary office building has a heat demand of 63 kWh/m²a, which means that it is a "category A" building and better than the average. Regarding the classification of the exemplary office building's electricity demand (see illustration below – "STROM"), the building is not that efficient. The average electricity demand lies around 14 kWh/m²a (category D), our exemplary building has a significantly higher electricity demand (57 kWh/m²a) and therefore only ranks in the inefficient category G.

These average values have only guiding character and shall help to quickly and roughly recognise how efficient a particular building is. Deviations can often be explained easily by closer analysis of the data.

An example for the comparison of the current energy demand with values of the previous years is illustrated in Figure 8. The values of each month can be compared to the values in the particular month in the previous years and significant deviances can be easily detected.

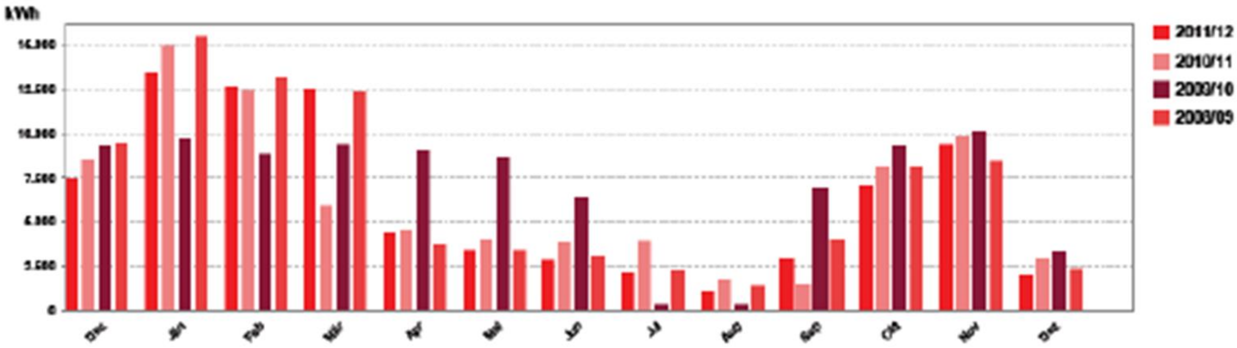


Figure 8: Comparison of the energy demand data from different years in the EMC-tool (source: EMS-tool | Siemens)

4.3.4.1 Detection of increased demand and errors

A fundamental purpose of the "energy accounting" is the detection of errors. Figure 9 illustrates an according example. Thanks to the monthly data collection the energy demand in each month is known and can be shown in the diagram. In our example, a significantly increased demand is apparent when comparing the demand in January 2012 and January 2013. Comparing the following months shows equally higher demand in comparison to the previous year. Especially in the summer month in 2013 the difference is particularly visible. In order to find the cause for this increased demand, the building was inspected and the cause was detected: The roof gutter heating, which prevents the generation of icicles above entrance areas in winter, was running accidentally nonstop over the whole year. Normally the roof gutter heating is regulated by an outdoor temperature detector and should only be activated in winter. In this case the temperature detector had accidently been bypassed. The problem was solved by installing an additional control lamp and a lock for the control system.

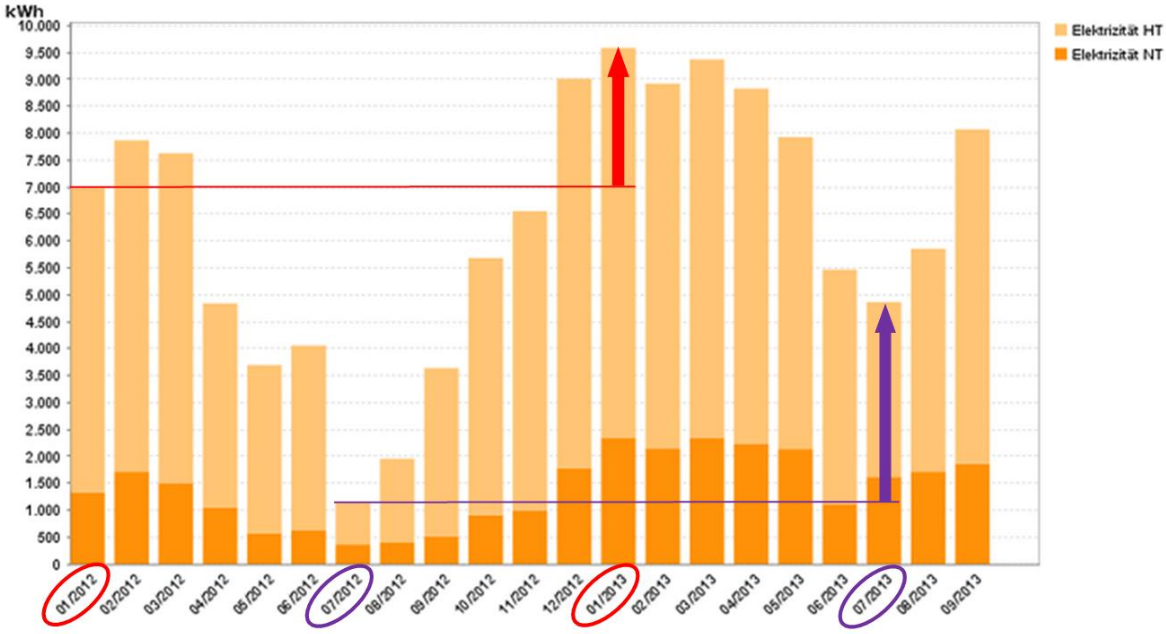
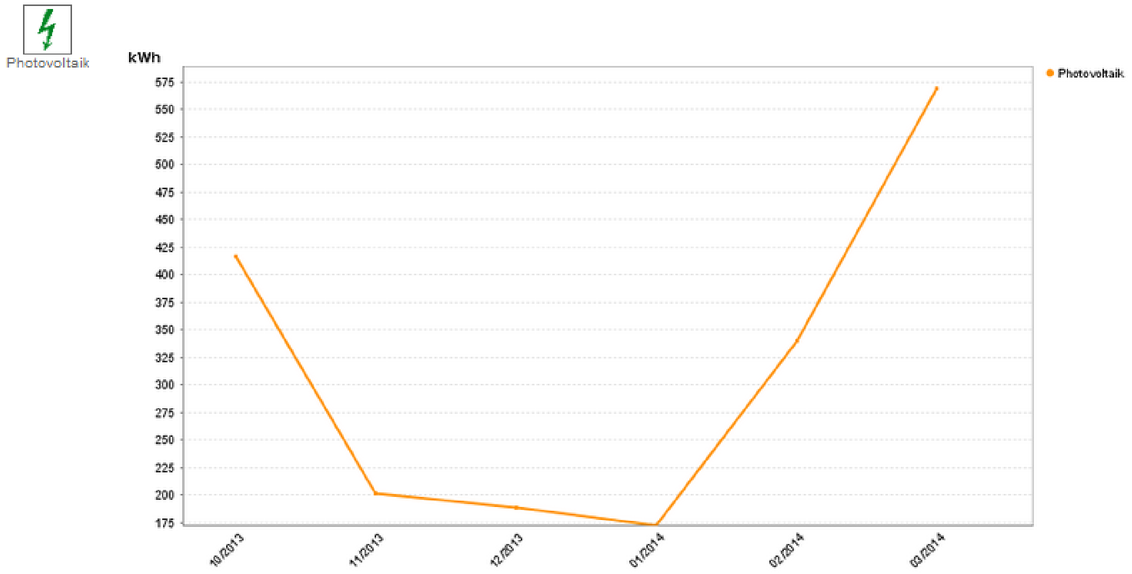


Figure 9: Identification of errors through the comparison of the monthly data from different years in the EMC-tool (source: EMS-tool | Siemens)

4.3.4.2 Evaluation of implemented measures

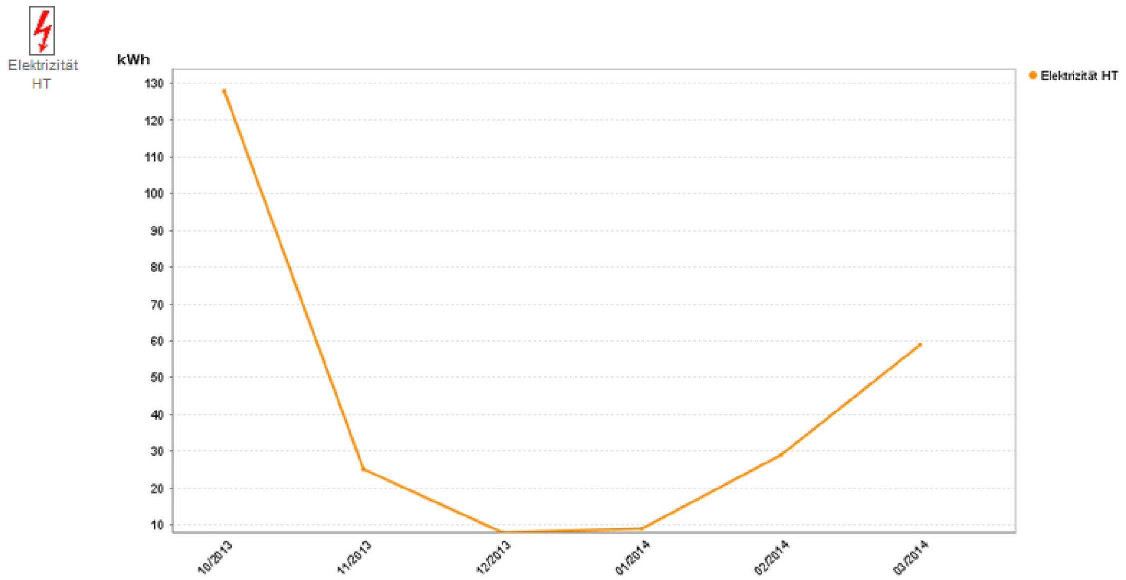
Figure 10 illustrates another example for the use of the results of the "energy monitoring": Validating a photovoltaic plant regarding its correct dimensioning. The example shows the electricity production of a 5 kWp photovoltaic plant, which is installed on the roof the building of a primary school. The graph shows the monthly produced amount of electricity between September 2013 and April 2014.



	Datum	Photovoltaik kWh
1	10/2013	417,00
2	11/2013	202,00
3	12/2013	189,00
4	01/2014	173,00
5	02/2014	340,00
6	03/2014	569,00

Figure 10: Electricity generation from the photovoltaic plant (source: EMS-tool | Siemens)

In comparison, Figure 11 shows the amount of electricity, which was feed-in to the public grid during the same space of time. Table 1 combines these data and calculates the degree of electricity self-supply in percent. Depending on the concrete month, the degree of electricity self-supply lies between 69 and 95 %, which states an optimal degree of utilisation and that this photovoltaic plant operates efficiently and economically.



	Datum	Elektrizität HT kWh
1	10/2013	128,00
2	11/2013	25,00
3	12/2013	8,00
4	01/2014	9,00
5	02/2014	29,00
6	03/2014	59,00

Figure 11: Feed-in of the overproduction from the photovoltaic plant (source: EMS-tool | Siemens)

	Photovoltaikstrom		
	Erzeugung	Überschuss	Eigenverbrauch des PV-Stroms
Datum	kWh	kWh	%
10/2013	417	128	69
11/2013	202	25	87
12/2013	189	8	95
01/2014	173	9	95
02/2014	340	29	91
03/2014	569	59	90
04/2014	584	98	83

Table 1: Calculation of the degree of self-supply from the photovoltaic plant (source: EMS-tool | Siemens)

5 INVOLVED ACTORS

In order to successfully establish an extensive Energy-Efficiency-Plan for the municipalities, it is essential to involve different persons and stakeholders in the process.

5.1 FEDERAL STATE OF LOWER AUSTRIA

The federal state of Lower Austria released an energy-efficiency-law, which instructs the municipalities to carry out an "energy accounting" for the publicly owned buildings. For this purpose the federal state offers the municipalities an online "energy accounting" tool (EMC), that they can use free of charge. On the one hand the federal state obligates the municipalities to record the energy demand data from the buildings, but on the other hand the federal state does support the municipalities in providing this useful tool for the purpose.

5.2 MUNICIPALITIES

The municipalities of the region "Tullnerfeld West" appointed a "regional energy representative", who is responsible for the data entry and analysis. Nevertheless, the collection of the data as well as taking actions according to the results of the "energy accounting" must be carried out by the municipalities themselves. Therefore the municipalities were involved in the whole process right from the beginning and the "regional energy representative" visited all municipalities, held conversations with the majors and chief officers and inspected all buildings that were included in the "energy accounting".

5.2.1 Political representatives

In order to work efficiently both on the "energy accounting" and on establishing the Energy-Efficiency-Plan it is essential to have high acceptance among the political representatives of the municipalities. Conversations about the purpose of the "energy accounting", the further steps and the needed contribution of the municipalities were held with the majors and chief officers. In some municipalities the municipal council was informed and involved as well.

5.2.2 Municipal administration

In addition to the meetings with the political representatives meetings with responsible staff members of the municipal administration (chief officers and staff from the building department) were held as well.

The “regional energy representative” visited all the buildings together with the responsible staff members to ensure, that the meter readings and the energy demand is collected and forwarded properly in the future. Especially the in each building responsible person for the data collection (e.g. janitor, sewage plant operator,…) was instructed how to read the meters correctly. Furthermore the basic data from the buildings (year of construction, energy efficiency index, type and age of the heating system, gross floor area, etc.) was also collected with the help of these persons.

All these data are essential to analyse the energy demand of the buildings and assess them regarding energy-efficiency.

5.3 EXTERNAL COUNSELLING

Furthermore, technical offices and construction companies were involved in the project. They supported the “regional energy representative” in several fields, e.g. the analysis and assessment of the building structure or the existing heating system. This expertise combined with the data of the “energy accounting” was used for the evaluation of the building’s energy efficiency status and the conclusion of effective measures for the improvements.

6 ENERGY REPORTS

As already stated in chapter 4.3.3, it is not intended to gather graveyard data, but to actively work with the collected data. In order to assure this, the “regional energy representative” generates annual energy reports for the municipalities. This report includes – among other parts – an overview of the covered buildings/objects in the municipality with the according energy demand data (electricity, heat, water), both current and previous ones. Those data need to be interpreted by a qualified person, such as the “regional energy representative”, in order to draw the right conclusions and give effective recommendations for increasing energy efficiency and saving energy. This annual reports serve – in addition to the Energy-Efficiency-Plan – as an essential basis for concrete actions to improve energy efficiency. The report stresses in particular abnormal or significantly increased energy demand and detected shortcomings. Furthermore, already implemented measures for improvements can be evaluated with the “energy accounting” and these results are of course also part of the energy reports.

7 BEST PRACTICE EXAMPLES IN THE REGION – AWARENESS RAISING

To sensitise regional stakeholders best practice examples in the field of public thermal rehabilitation, public renewable energy and energy efficieny projects on basis of the motto – curtain call for projects – were identified and presented at a regional stakeholder meeting on 18 March 2014. The presenation of best practice examples supports awareness raising for the population and relevant stakeholders.

7.1 MUNICIPAL OFFICE ATZENBRUGG

Municipal office Atzenbrugg	
	
Project management:	Municipality Atzenbrugg
Type of building:	Public building, municipal office
Year of construction	1888, renovation 1991

Project duration:	2008-2009 (11 months construction period)
Measures:	• thermal rehabilitation • unchanged historical appearance (facade and windows) • heat recovery: waste heat used for heating in winter and cooling in summer • renovated to passive-house standard
Energy savings:	approx. 90 % energy savings with mentioned measures
Construction costs:	approx. EUR 950.000,--

An abstract of the Siemens counter report of the municipal office Atzenbrugg shows the development of the heating consumption since October 2009. Since April 2009 there is a regular service in the renovated municipal office. During an opening ceremony the population could be convinced of the successful best practice rehabilitation.

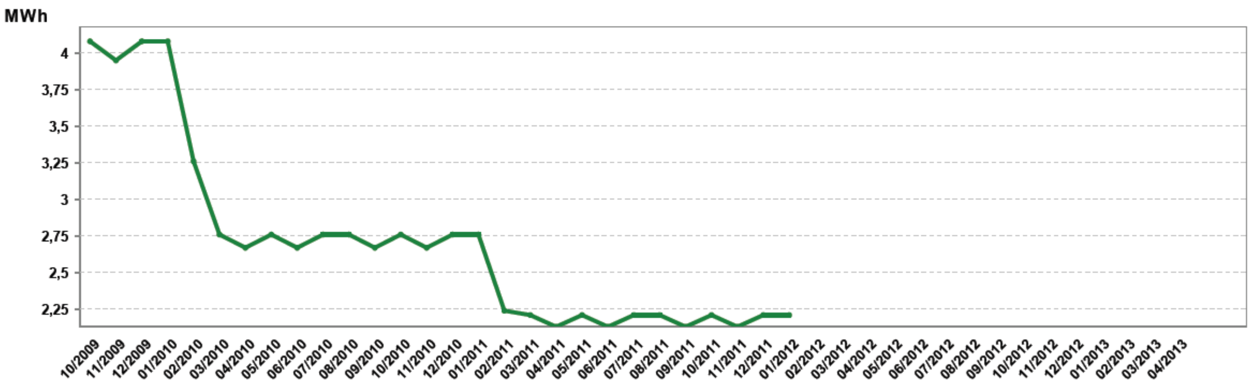


Figure 12: Heating consumption municipal office Atzenbrugg, (source: Siemens counter report, energy accounting system)

7.2 PRIMARY SCHOOL WÜRMLA

Leopold Figl Primary school Würmla	
	
Project management:	Municipality Würmla
Type of building:	Public building, primary school
Year of construction	1963-1965
Project duration:	Summer holidays 2011
Project partner:	• Neulengbacher Kommunalservice GmbH • Ing. Franz Kickinger GmbH
Measures:	• extension of the school • full heat insulation • replacement of windwos • Heating adjustment to district heating (biomass) • awareness raising in the population • model effect for pupils, parents and teachers
Energy savings:	61.570 kWh/a
Construction costs:	EUR 700.000,--

The municipality Würmla ordered thermographic pictures of the primary school, which showed the importance of the necessary thermal rehabilitation, especially the replacement of the windows. According to this a rehabilitation concept was elaborated.

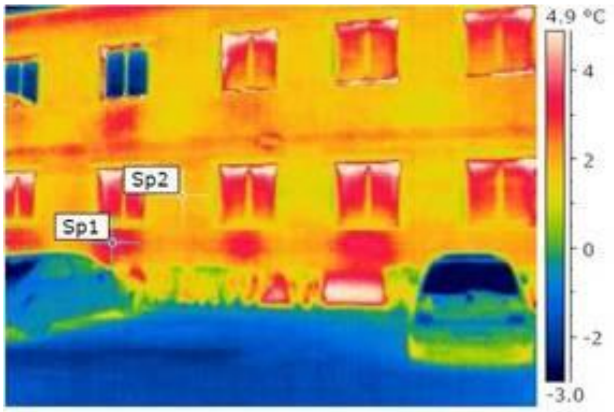


Figure 2: Thermografic picture of primary school Würmla (source: www.enerpro.at)

7.3 PRIMARY SCHOOL AND INDOOR SWIMMINGPOOL ZWENTENDORF

Primary school and indoor swimming pool Zwentendorf	
	
Project management:	Municipality Zwentendorf, A-3435
Type of building:	Public building, primary school
Year of construction	1973
Project duration:	2009-2011
Project partner:	• Atelier Langenlois • Ökoplan Energiedienstleistungen GmbH
Measures:	• The complex of buildings, constructed 1973, includes the primary school, nursery and indoor swimming pool of the municipality. The indoor swimming pool and the primary school are built with lightweight concrete and contain metal windows. The nursery consists of bricks and plastic windows. • Extension of the complex and thermal rehabilitation of primary school, nursery, indoor swimming pool including wellness area with approx. 4.370 m^2. • awareness raising for pupils, teachers

	and parents
Energy savings:	194.000 kWh/a, 47.040 kg CO_2-reduction per year
Construction costs:	n/a

7.4 INDOOR SWIMMING POOL TULLN

Indoor swimming family pool Tulln	
	
Project management:	Municipality Tulln/Donau, A-3430
Type of building:	Public building, indoor swimming pool
Year of construction	1974
Project duration:	2013 – ongoing
Project partner:	n/a
Measures:	• During a planned rehabilitation of the indoor swimming pool the best available technology should be installed. • New water treatment facilities • New heating, air- conditioning and plumbed installations. • Heating adjustment to district heating (current heating system: gas) • Installation of a photovoltaic plant to

	cover at least a third of the electricity demand.
Energy savings:	n/a
Construction costs:	EUR 5,9 million

7.5 CHARGING STATION SITZENBERG-REIDLING

Photovoltaic electricity charging station Sitzenberg-Reidling

Project management:	Municipality Sitzenberg-Reidling
Type of building:	electricity charging station at Leopold-Figl-Platz
Year of construction	n/a
Project duration:	2012-2013
Project partner:	• EVN
Measures:	• Photovoltaic electricity charging station at Leopold Figl Platz. • for one-lane and tow-lane electric vehicles (4 power outlets) • integrated parking lot for electric vehicle • for now free of charge

			• Electromobility in the region is supported!
		Energy savings:	n/a
		Construction costs:	EUR 19.000,--

8 ROADMAP "THE WAY IS THE AIM"

To achieve the energy objectives, it is necessary to create an activity plan for not to lose the actual sight of the goal. This line of approach is often referred to as ROADMAP.

The roadmap should be a help for the participating municipalities to define their objectives and accordingly shall also determine those selection criteria, subsequently, to make the necessary decisions for the selected measures.

For this it is necessary to be able to rely on data in order to define appropriate parameters. The data can be based either on our own measurements (heat meter, electric meter, water meter ...), or you can use statistical data (regional consumption and volume, age structures of the buildings,...); which is to give preference to your own measurements.

We obtain the energy consumption, energy production and possible potentials through the regional statistical data. These data help us to assess the region as a whole but on the other hand as well to present the individual municipalities to each other. About the statistical data, the differences in the individual fields of view are well represented, differences in the number of inhabitants, number of public buildings....

By analysis of the statistical data, also regional resources can be mapped very well. Local resources can be demonstrated... Local energy resources such as forests, fields and streams for small hydro power thus also contribute to ensuring a sustainable energy supply in the region. Free potentials can be shown and play a major role in future projects.

Through the collection of data and the comparison with other municipalities in the region, a list of measures / project ideas can be created. The measures are defined so that the objectives to be achieved are measurable.

This action plan can be ranked based on predefined priorities. The project ideas are individually valued. The assessment may be based on different criteria such as: savings or CO2 effects, investment costs and financing needs, creating value for the region....

To build specific indicators the calculated consumption and different building data were needed: index kWh/m^{2}a or kWh/m^{3}a;... electricity consumption kWh, kWh heating energy demand, consumption per pupil, consumption per employee (s)...

These ratios are then compared to the same building types from other municipalities or can also be evaluated on benchmarks in the respective subject areas. The additional data on the technical building equipment and all remediation measures since building of these public buildings are necessary to define the further procedure and decisions.

With so determined indicators a priority matrix can be created. In this matrix, the more possible measures should be registered with the implementation timeframe for each building. It is also possible to record reasons for exclusion and the corresponding investment costs of measures. This project matrix should be divided into Regional and municipal projects.

In the municipal specific project matrix, the focus will be on projects in the various municipalities, rehabilitation of public buildings, expansion of district heating, ...

In the region matrix inter-communal actions should be listed, existing synergies to be exploited and developed here, e.g. municipal sewage treatment plant, waste collection centre,... .

8.1 PRACTICAL EXAMPLE OF THE MUNICIPALITY OF SITZENBERG-REIDLING

In the concrete project example for the municipality Sitzenberg-Reidling this roadmap has the following dimension.

The energy targets are based on the environmental analysis of the “climate and energy model region Tullnerfeld West” and the energy concept of the LEADER region “Donauland-Traisental-Tullnerfeld”.

These objectives are defined as follows:

- 100% heat self-supply by 2020
- 100% electricity self-supply by 2020
- 50% fuel self-supply by 2020

The data collection in public buildings is based on actual measurements using electricity- and heat-meters and is shown in the energy accounting of the energy officer of the municipality.

8.2 DESCRIPTION OF THE PROJECT IDEA

8.2.1 Elementary school

- Built in 1864, general renovation 1999 (upgraded insulation and window replacement)
- Gross floor area: 3,465 m²
- Energy index expected: 48 kWh / m² a.
- Heating demand: 167,000 kWh, district heating since 2004
- Electricity demand: 27.400 kWh
- Photovoltaic system: 4,550 kWh yield (since 02/2013, Size 5.1 kWp system , overfeeding)
- Possible remedial measures:
    - Change the lighting to LED (gear, locker, Outbuildings, ..)
    - Controlled ventilation system
- Remarks:
    - Currently no action planed

8.2.2 Kindergarten

- Build 2010, new thermal standard
- Energy index: 50 kWh/m².a
- Gross floor area: 395 m²
- Heating demand: 22,000 kWh, electricity demand of the heat pump 8,072 kWh
- Electricity demand: 10,589 kWh (without heat pump)
- Controlled air ventilation and window ventilation
- Possible remedial measures:
  - Change the lighting to LED
  - Photovoltaic system for heat pump
- Remarks:
  - Currently no action planed

8.2.3 Municipal office

- Built in 1980, no thermal improvement
- Gross floor area: 700 m²
- Energy index expected: 138 kWh / m² a.
- Heating demand: 98,000 kWh, district heating since 2004
- Electricity demand: 5,100 kWh
- Photovoltaic system: 6,940 kWh yield (since 02/2013, plant size 7 kWp , overfeeding)
- Possible remedial measures:
  - Window replacement , exterior door replacement
  - Insulation measures : thermal insulation , top floor ceiling
  - Change the lighting to LED
  - Controlled ventilation system
- Remarks:
  - Windows and doors replacement and full thermal refurbishment and top floor ceiling in the upcoming 2-3 years

- Not being considered switching to LED

8.2.4 Projectmatrix

In the project matrix all project ideas with the respective implementation periods are noted. For a better overview of the project ideas, even those ideas are entered which are currently not planned.

Project matrix	May14	Jun.14	Jul.14	Aug.14	Sep.14	Q4/14	Q1/15	Q2/15	Q3/15	Q4/15	2016
Elementary school	Currently no action planned										
Kindergarten	Currently no action planned										
Municipal office											
Windows- and door replacement											
Thermal insulation											
Fire station											
Photovoltaic system											
Football field											
solar thermal system											

Table 1: Projectmatrix (Source: ConPlusUltra)

Using the project matrix is now very comfortable for the planning of the remaining measures to make and also to manage the financial resources. Also the planning for the implementation is well specified by the definition of timelines.

8.3 OTHER MEASURES

For the actual implementation of the project ideas, it is necessary to set up the financing accordingly. Subsidies are often very important and can have a significant reduction of the financial burden on part of the municipality.

Currently funding on behalf of the country government and the federal government are possible:

- Country government - specific action for municipalities: "Thermal refurbishment"
- Thermal renovation of buildings for municipalities as part of the promotion campaign " climate change in municipalities "
- Climate protection in municipalities: Municipal investments in energy saving and energy supply

9 APPENDIX

Data sheet for the buildings

GEBÄUDEDATENBLATT Energiebuchhaltung für Gemeinden

Hauptregion (Viertel)	MOSTVIERTEL
Gemeinde	MARKTGEMEINDE PYHRA
Datenblatt Nr.	4
Ansprechpartner/Energiebeauftragter	
Ansprechpartner in der Gemeinde	VB Matthias Hasenzagl
Tel. Nr.	02745 / 2208 - 17
Handy Nr.	
E- Mail	matthias.hasenzagl@pyhra.gv.at
Allgemeine Gebäudedaten	
Objekteigentümer	NÖ HYPOLEASING MOATUS GRUNDSTÜCKSVERMIETUNG
Gebäude	NÖ Landeskindergarten Pyhra
Straße / Haus Nr.	Wiedener Straße 11
Plz / Gemeinde	3143 Pyhra
Spezifische Gebäudedaten	
EKZ falls vorhanden	23 kWh/m²/a
Baujahr	2008 - 2010
Gebäude wurde saniert im Jahr	/
Anzahl der Geschoße	2 Keller- u. Erdgeschoß *
Beheizte Brutto - Fläche m²	1.119,57 m²
Beheiztes Brutto Volumen m³	5.247,57 m³
Nicht beheizte Brutto -Fläche m²	207,87 m²
Nicht beheiztes Brutto Volumen m³	855,48 m³
Objekt wird auch genutzt als:	
Wohnraumlüftung	☒ ja ☐ nein
Anzahl Kindergarten Gruppen	5
Anzahl Schulklassen	/

Anmerkungen:
siehe auch Energieausweis vom 15.11.2011
* Kellergeschoß nur teilweise ausgebaut

Bei Fragen wenden sie sich bitte an Energiebeauftragten bei ihrem zuständigen Gebietsbauamt.

Angaben zur Energieversorgung

Wärme				
Warmwasser mit Heizung	☒ ja ☐ nein			
Energieträger 1	Fernwärme (Biomasse)			
Brennstoff				
Baujahr				
Kessel oder Anschlussleistung	89 kW			
Energieträger 2				
Brennstoff				
Baujahr				
Kessel oder Anschlussleistung	kW			
Energieträger 3				
Brennstoff				
Baujahr				
Kessel oder Anschlussleistung	kW			
Warmwasser				
Energieträger	an Heizung gekoppelt			
Brennstoff				
Kessel oder Anschlussleistung	kW			
Solaranlage	m²			
Wasser				
Zähler 1	Nr. A 1566094	Standort: Technikraum		
Zähler 2	Nr.	Standort		
Elektrische Energie / Strom				
Anzahl der Versorgungsbereiche	1			
Versorgungsbereich 1				Netzebene
Anmeldeleistung	16 kW	Hochtarif HT (8.2)	☐	
Anmeldeleistung	kW	Niedertarif NT (8.1)	☐	
Versorgungsbereich 2				Netzebene
Anmeldeleistung	kW	Hochtarif HT (8.2)	☐	
Anmeldeleistung	kW	Niedertarif NT (8.1)	☐	
Versorgungs-Bereich 3				Netzebene
Anmeldeleistung	kW	Hochtarif HT (8.2)	☐	
Anmeldeleistung	kW	Niedertarif NT (8.1)	☐	
PV- Anlage	kWp			
27.2.2013 (Erstellt am)	Unterschrift: [signature]			