

The slide features a header with the 'intense energy efficiency' logo on the left, the title 'Energy carriers and RES' in the center, and a small image of solar panels and wind turbines on the right. The main content area is white with the title 'Energy carriers and renewable energy sources ("RES")' centered. The footer contains the author 'Joerg Faltin, AURAPLAN Jan. 2011', the document title 'Electronical handbook', and the 'INTELLIGENT ENERGY EUROPE' logo with a small European Union flag icon. A small number '1' is visible in the bottom right corner of the slide frame.

This module shows two aspects of the energy supply of buildings:

On the one hand it explains the current situation of available and most used energy carriers and its perspectives for changes.

On the other hand this module shows what could be available and appropriate solutions for the use of the RES.

(„RES“ is the short form to “renewable energy sources“)

Besides this fact that we are learning more and more globally and that we can have all these masses of information we have to respect the local situations, which are individually very different. Also for real projects there have to be done local decisions, which are all different.

This individuality could not be covered totally by this module. So it is the aim to give ideas and an overview about the ongoing developments and types of technical solutions and to show principles, which help to find out these locally reasonable solutions.

Where we find basic differences for planners and for the implementation of ideas and plans, there we give special planning information and for the realizing companies and craftsmen.

Connection to other themes

settlement planning, systems engineering: heating and cooling

links

www.unendlich-viel-energie.de/en

www.postcarbon.org

intense energy efficiency

Energy carriers and RES

Fossil fuels, Renewable Energy Sources, Energy efficiency and Saving Potentials

FOSSIL
-fuel oil
-natural gas
-coal
-uran

“RES” – renewable energy sources
-solarelectricity
-solarthermal
-geothermal
-wind
-waterpower
-biomass/biogas

Meeresenergie 2-mal
Erdwärme 5-mal
Biomasse 20-mal
Wind 200-mal

AND
-increasing the energy efficiency
-energy saving instruments

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Jan.2011

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Overview over **ALL options of energy supply**

Multiple options for using – and not using energy carriers.

Energy carriers can be fossils, renewables – and also savings and efficient use by efficient appliances.

This module leads to

- 1.) information and importance of saving potentials
- 2.) information and importance of energy efficient appliances
- 3.) Applying appropriately sized energy systems from fossil to renewable energies
- 4.) Special view to planning and implementation aspects

Additional information is given to the regional creation of value by choosing the energy system.

Note: technology develops fast so we need basic principles for taking sustainable decisions today and tomorrow.

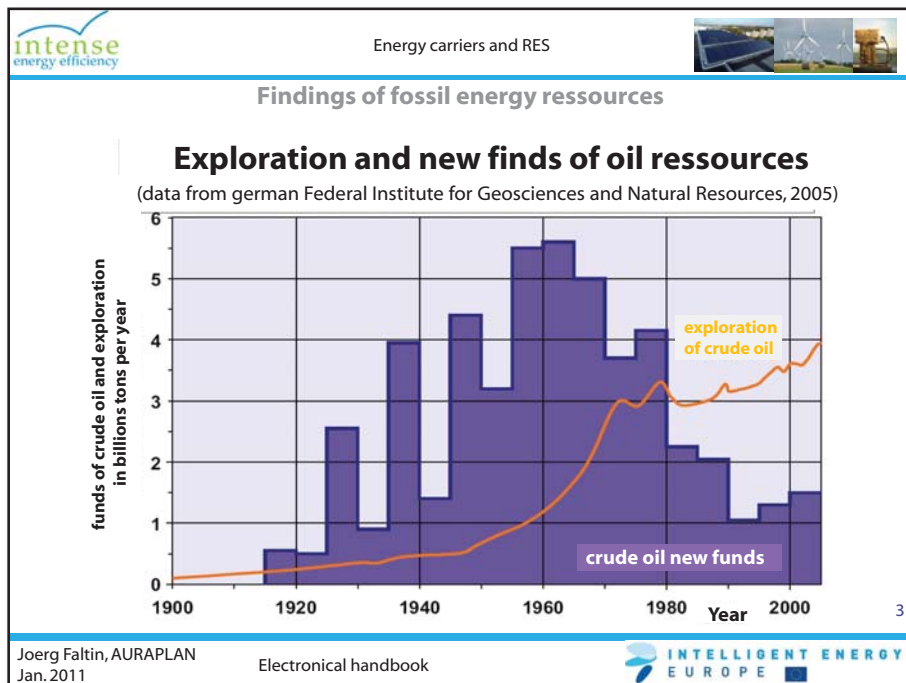
Background

Statistical data from your region or country

Book: Energy Autonomy – The Economic, Social and Technological Case for Renewable Energy, Earthscan/James&James

links

www.wcre.org



Background

Fossil energy sources become more and more expensive. Also irregular and unpredictable variations in their price is obvious. It is obvious that the easy and cheap exploration of e.g. crude oil is more or less over, we are living in the time of the "peak oil day", which means that this day with the absolute biggest exploration is probably already history.

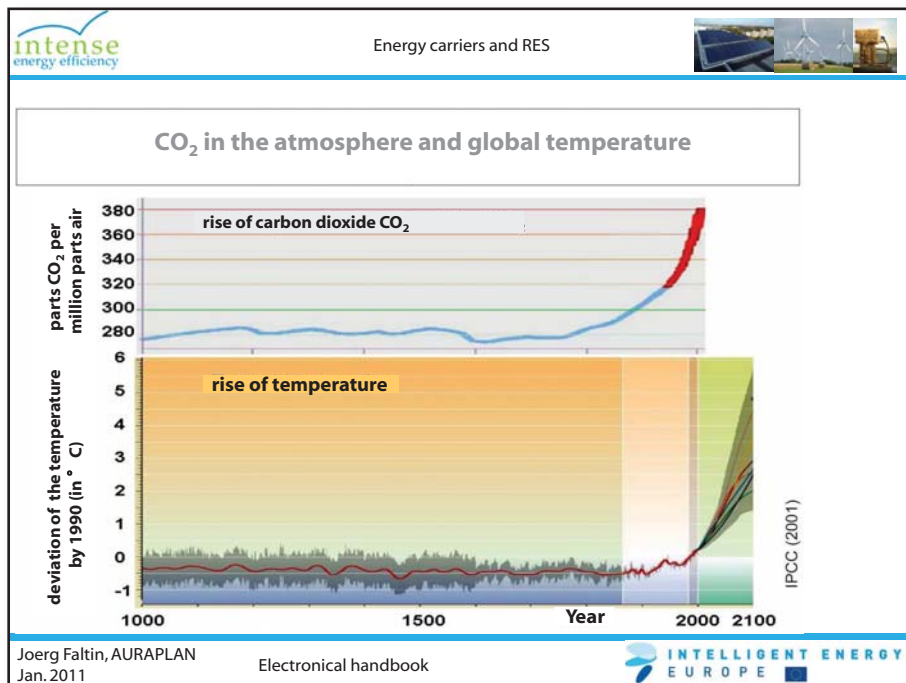
One consequence is the search for new oil sources, for example in Canada, where are found oil sands. But this is problematic for the reason of a higher price and because of environmental damages.

links

www.wolfatthedoor.org.uk
www.energywatchgroup.org

Suggestions for presentation

show other graphs and statistics with the last decades of availability of energy resources.



Connection to other themes:

legislation

costs of CO₂, prices of emission rights you find here: www.eex.com

Background

global warming; climate change


Suggestions for presentation

Show own or public graphs and facts.

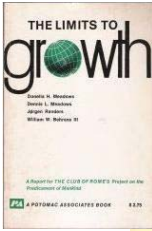
Show what is already realized to lower climate impact in your region, what is planned to do.

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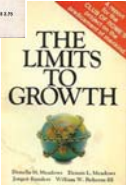
Energy carriers and RES

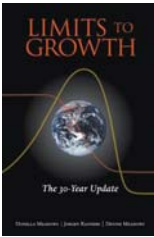


Awareness of scientists and politicians

 **1972** recognition of **scientists** of the of unlimited growth and and warning of the resulting problems for the living environment

1974 1st update


 **2004** update after 30y



politicians act globally:
1992 Rio Conference
1997 Kyoto protocol
2009 Copenhagen Conference

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Connection to other themes:

legislation

Background

1972 + 1974 "The limits to growth" by Donella and Dennis Meadows, Jorgen Randers, William Behrens

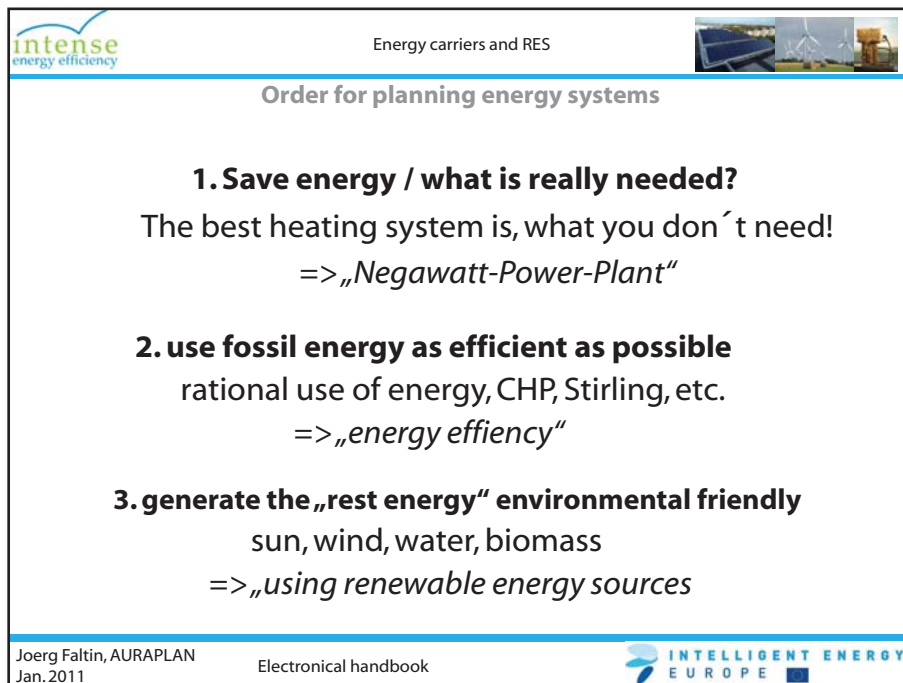
Watch a video (english): www.chelseagreen.com/bookstore/item/limits_to_growth:paperback/video_growth_vs_development

links

www.worldfuturecouncil.org
<http://energywatchgroup.org>

Suggestions for presentation

- show publications and position of scientists and politicians of your country
- discuss or present the publications of scientists and the decisions of politicians, which have influence to your local situation
- discuss or present the options of each single houseowner
- discuss or present the safety of energy supply in awareness of political decisions
- discuss or present for the stability of prices in awareness of political decisions



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Energy carriers and RES

Order for planning energy systems

1. Save energy / what is really needed?
The best heating system is, what you don't need!
=> „Negawatt-Power-Plant“

2. use fossil energy as efficient as possible
rational use of energy, CHP, Stirling, etc.
=> „energy efficiency“

3. generate the „rest energy“ environmental friendly
sun, wind, water, biomass
=> „using renewable energy sources“

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Connection to other themes:

- quality control:
- proper design and planning should realize all good ideas, concepts and details of building design, also site design (solar-energetical optimization). Saves energy by not using it because basic principles of energy optimized designing of a house / settlement were respected.
- efficiency of energy systems could also be reached by proper planning, tendering and installing of high efficient systems.
- one step more energy efficient: external control of the designed and planned system can afford the most up to date efficient measures and technologies
- systems engineering, -tendering / green public procurement for energy efficiency

Background - see also next slides


Not using saving potentials often leads to inefficient and expensive technical solutions! Installing of just a technical system could appear as an easy and attractive solution but experience has shown that in reality all is connected and depends on each other. So it is not a good solution to improve one single aspect to very good and leave others in old and not so good condition. So this planning order is economic.

Energy saving by optimizing procurement processes: <http://deep.iclei-europe.org>


Improving energy efficiency for low income families: www.oe2.de/index.php?id=40

Suggestions for presentation

Discuss pro and con's if only one step would be realized and the others not!



Energy carriers and RES




Savings and Efficiency - 1


energy savings

energy efficiency

car sharing, public traffic concept/mobility strategies, tv, stand by




use efficient applications, efficient controlling ...



result:
„negawatt-power-plant(s)“

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It is not a task mainly for technical planning. But planners in a wider range of this profession, if they like structuring and organizing processes with people, and like to work with people, they can realize savings in the size of real power-plants!

There is a high potential for saving energy, if private households get general and individual consultancy for these issues.

Connection to other themes

see other INTENSE activities like awareness raising strategies, communication strategies, at: www.intense-energy.eu/english/you-need/communication-to-citizens

Background: development to higher energy efficiency is realized by not only technical solutions but also communication and organizational activities help to save energy.

Suggestions for presentation: Present results/statistics of energy actions for citizens as energy consumers. A lot of projects have been realized with awareness rising and informing of end users, keeping the same level of comfort.

Present realized „Negawatt-Power-Plants“. Negawatt is an artificial new word from Non and Mega, which means, that No Megawatt is required – if saved by organisational work.

Sometimes it has been realized as school projects that big amounts of not spent energy could be as big as a new powerplant or heating system.


Often it is less expensive to „organize“ a Negawatt-Power-Plants than installing a real one.

For example see IEE-project documentation “buildings” from November 2009: www.odyssee-indicators.org/publications/PDF/brochures/buildings.pdf “Household energy efficiency for EU-27 has improved by 8-10% since 1997”, Page 20, Box 2-3 “Overview of household saving technologies”: “The most common saving measures are..., Advanced saving measures ..., Renewable options ...”

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Savings and Efficiency – 2 (more)



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links

www.energieverbraucher.de/de/Umwelt-Politik/Politik/Brennstoff-Armut/Caritas-Stromcheck__2588

www.bmu-klimaschutzinitiative.de/en/for_consumers www.dereinsparshop.de/strom-sparen.html

www.en.wikipedia.org/wiki/European_Union_energy_label

www.utopia.de/negawatt/64kw/index.html (german and english version)

www.duesseldorf-astrhein.de/fakten.htm (german, but interesting to show the dimension, here promoted for a big power-plant for the state capital of NRW - northrhein-westfalia, a region for 16 million people)

www.negawatt.org

www.heise.de/tp/r4/artikel/19/19056/1.html

Here is mentioned the "Staudinger Gesamtschule", with it's Negawatt Project. Also other links to e.g. english and french sites are there.

online translation of also complete websites e.g. here: <http://de.babelfish.yahoo.com>

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Energy carriers and RES

Ranking of primary energy efficiency of supply systems

Supply systems, running on:

- fossil
- fossil + efficient
- fossil + efficient + small renewable application (10-20%)
- fossil + efficient + bigger renewable application (20-50%)
- renewable 100%
- renewable 100% + zero emission on site

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Planning knowledge necessary:

- small systems: general knowledge, no special.
- medium systems: basic planning knowledge and experience
- big systems: basic and special knowledge; experience, and new information from market, about products are strongly recommended

Helpful in every cases are: study visits, project documentation neutral and additional from producers, planning advice written or personal from neutral institutes/experts and additional from producers.

Connection to other themes:

Settlement planning, systems engineering, HVAC

Background

- evaluation of different heating systems
- dissemination of for example cogeneration as efficient energy supply system, see:

www.cogeneurope.eu/category/about-cogen/what-is-cogeneration



www.cogeneurope.eu/wp-content/uploads//2009/02/share-of-CHP-in-EU.bmp

Suggestions for presentation







Discussion themes:


- what examples are known locally for these different supply situations?
- what other efficient energy supply systems are common at your country or region?

Add to this slide efficiency parameters and local information of percentages of dissemination.


Energy carriers


Using the renewables – sun energy

 SOLAR	thermal	small medium	<u>decentral - on site</u> (central) – small or big systems, supply district heating - up to 100%	  
	electrical	small medium big	<u>decentral - on site</u> (central) – grid connected „super“ central – in the desert?	

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Pictures on 1st row

Unknown one family house; decentralised collectors for heating warmwater of a multistorey residential building; Solarthermal field on flat roof in Kirghizia for district heating; 18.000sqm solarthermal for district heating in Denmark since 1996

Pictures on 2nd row

Unknown one family house with roof applied photovoltaik system.

Connection to other themes:

- systems engineering
- settlement planning
- legislation

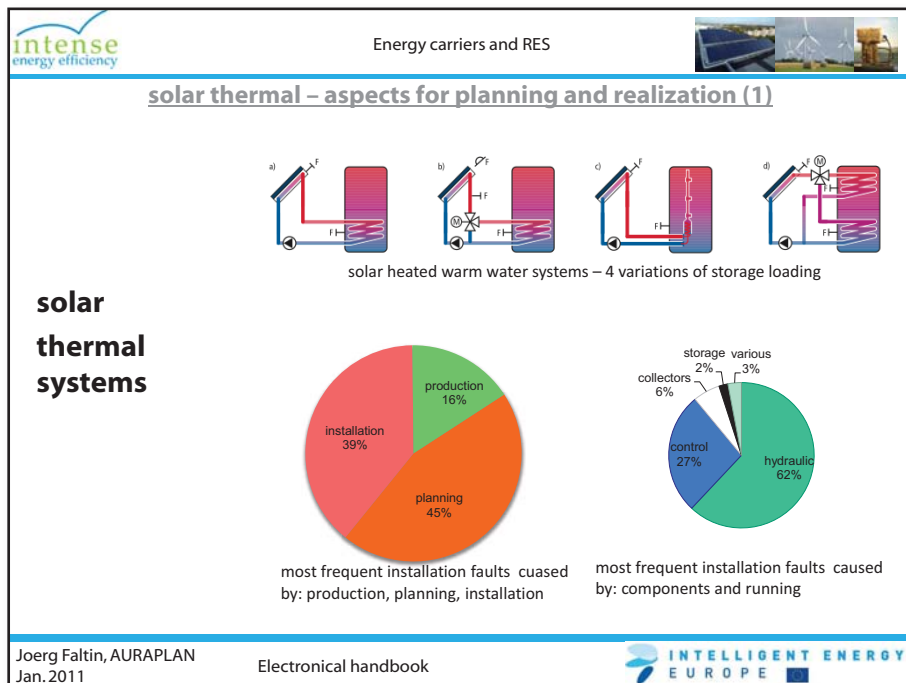
Background

www.estif.org/st_energy/technology/introduction
www.ises.org/ises.nsf

Suggestions for presentation

Discussion of:

- what is known in your country as good real examples
- how can district heating systems with big solar thermal supply work technically?
- Temperature levels
- Solar fraction



Planning: Ever -and with planning of ST systems this is more important than with using a simple gas boiler- it is first to ask after the purpose and the aim(s).

This exists of a technical optimum AND an economical optimum (which usually can not be reached both together). This simple procedure could lead in different regions with different circumstances to complete different results!

One basic and very important planning information is the level of the needed temperature. With this the possible (economically) fraction of solar rate is determined.

With the additional also basic information of needed amount the size of the system can be calculated.

For medium and bigger solar thermal systems it is very important to have a balanced hydraulic field of collectors – otherwise it will work only partly and earnings will be bad.

Realization: It is an comfortable established principle to have a pressure about 5bar in the solar circle. Than it is possible to leave out the automatic air separators, which in practice (statistic proved) often leads to faults and stagnation of the collector. This is uncomfortable to repair and can so easily be avoided.

Strongly recommended: drawing of hydraulic scheme, additional with drawing of el. wiring (see example) of control and sensors.

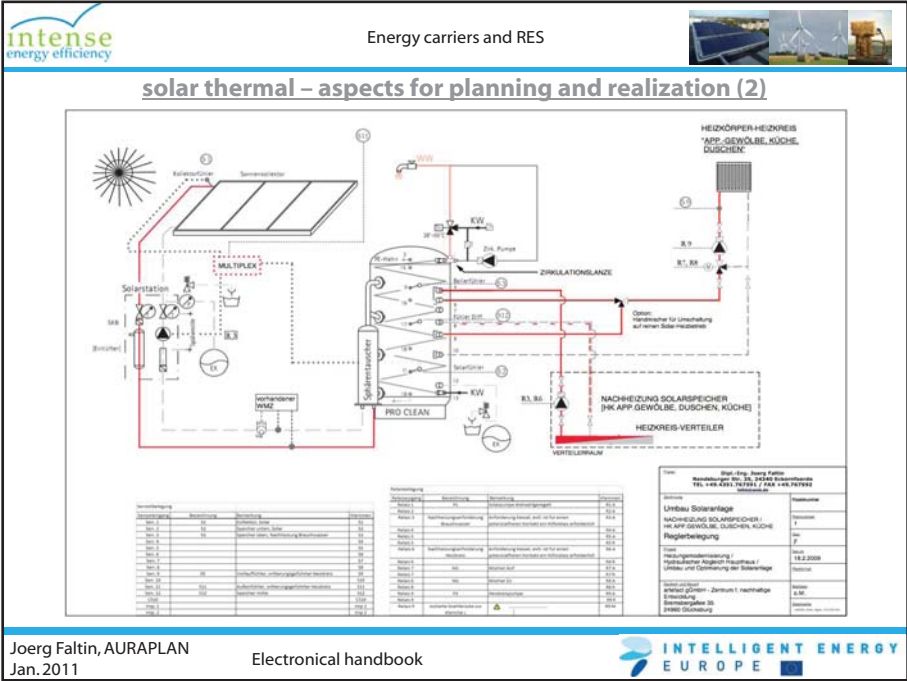
Connection to other themes:

system engineering

Suggestions for presentation

Discussion of:

- who has already installed solar thermal systems?
- which size
- what is supplied with
- how is maintenance organized



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links

- www.estif.org/st_energy/technology/introduction/ Information to different ST systems
- www.estif.org/on_going_projects/ongoing_projects/ Other EU-Projects with ST
- http://austriasolar.at/ (only german, but very much and good sorted information!)
- www.tisun.com good supplier with lots of technical information for good working solar systems, small and medium. Realizes also big systems.

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using the renewables - wind energy

WIND

on shore **small** decentral - on site?
medium central „wind parks“

off shore **big** central - grid connected over nations

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Connection to other themes

cost benefit; settlement planning

Background

Energy Mix of our upcoming energy supply

Suggestions for presentation

Discussion of:

- how we see our future: big wind parks – pro and cons, or small wind turbines for everyone?

Therefore keep in mind the EU directive, where is foreseen zero emission buildings and Great Britain as first EU country has already decided this as standard for new buildings erected by 2016.

links:


www.kleinwindanlagen.de

www.energysavingtrust.org.uk/



online translation of also complete websites e.g. here: <http://de.babelfish.yahoo.com/>

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Energy carriers and RES




dimensions of supply systems and money

small	single buildings 	money stays in the region
medium	group of houses, organisational units as settlements, villages, companies, regions 	

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Connection to other themes:

Settlement planning, legislation, system engineering, local policies, cost benefit

Background

The spending capacity of people could be used more in the region so the money does not go only to the globally acting companies.

Therefore it is attractive to use regionally available energy sources and also supply systems which locally have a positive effect on jobs.

Some regions have developed this and plan to be 100% neutral to climate in the next years. Few regions already have reached this with different concepts and mix of methods and energy carriers.

links

www.global-change-2009.com/weblog/

Suggestions for presentation

- how much money is going abroad by spending money for energy (citizens, municipalities)?
- show the structure of local energy consumption

for discussion:

- how much money could be useful to invest to attract people to use local energy resources?
- develop concept for CO₂ free region