Renewable energy in district heating & cooling: Litoměřice (Czech Republic)

Best practices, success factors and recommendations on actions and policies

Prepared by:
Edith Holländer, Annette Roser - IREES

Reviewed by:
Marcus Hummel – EEG TUW

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The progRESsHEAT project

The progRESsHEAT project aims at assisting policy makers at the local, regional, national and EU-level in developing integrated, effective and efficient policy strategies to achieve a rapid and widespread penetration of renewable and efficient heating and cooling systems. Together with 6 local authorities in 6 target countries across Europe (AT, DE, CZ, DK, PT, RO), heating and cooling strategies will be developed by a detailed analysis of (1) heating and cooling demands and future developments, (2) long-term potentials of renewable energies and waste heat in the regions, (3) barriers & drivers and (4) a model-based assessment of policy intervention in scenarios up to 2050. progRESsHEAT will assist national policy makers to implement the right policies based on a model-based quantitative impact assessment of local, regional and national policies up to 2050.

Policy makers and other stakeholders will be strongly involved in the process, learn from experiences in other regions and gain a deeper understanding of the impact of policy instruments and their specific design. They are involved in the project through policy group meetings, workshops, interviews and webinars targeted to the fields of assistance in policy development, capacity building and dissemination.

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1. Success factors and best practices

Based on the above review of existing policies of task 3.1, and the analysis of barriers and drivers in task 3.2, success factors for the promotion of RES-H/C technologies are identified. The approach considers the following questions:

- Are the policies and activities on the different levels harmonised and consistent? Do they complement one another, or do they mitigate their impact by not being congruent? Do they interfere with each other?
- Are the policies and activities appropriate in order to reach CO_2 targets and shares of renewable energies or do we need others?
- Do the policies and activities identified in task 3.1 address the barriers so that these can be minimised or abolished? What are the reasons for whether or not they are working well?
- Which framing conditions, policies, and actions are real drivers? Are they transferable to other communities, other regions, or other countries? Which adaptation processes are needed?
- Which package of measures, at the different levels (national, regional and local), promises to be the most successful (best practices)?

1.1 Evaluation of policy measures

The different measures in the Czech Republic presented in Report 3.1 include specific incentives for several different technologies. Measures range from funding for the industry and research for the introduction of innovative technologies in the area of RES at the national level, to funding for modernisation projects. At the local level the planned geothermal plant is the focus of energy policy. In addition, the installation of solar systems for the replacement of coal boilers and energy saving measures in the residential and public sector are funded. All in all, the most common energy policy measure appropriate in Litoměřice is direct investment support (“carrot”). Command-and-control instruments (“sticks”) as well as knowledge building instruments (“tambourines”) cannot be found, other than a communication strategy regarding geothermal energy. Detailed information can be found in Report 3.1.

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Are the policies and activities on the different levels harmonised and consistent?

Policy programmes at both national and local level have very similar target groups and funding issues.

- Operational Programme Environment (OPE, 2014-2020), Priority axis 5 & Municipal Energy Saving Fund for public institutions
    - National Fund: The Operational Programme Environment (OPE) aims to protect and ensure the quality of the Czech population's living environment by promoting the efficient use of resources, eliminating negative impacts of human activities on the environment, and mitigate climate change. The Priority axis 5 (Energy savings) focuses on reducing final energy consumption and the consumption of non-renewable, primary energy by using local renewable sources in public buildings. Several measures are supported.
    - Municipal Fund: The Municipal Energy Saving Fund (ESF) was established in 2014 as a revolving fund with the aim of re-investing money from energy savings i.e. the approved net energy savings back into new energy saving measures, and thereby multiplying savings effects in the city and region.
    - Consistency: Both programmes partly fund the same measures. As the municipal fund has multiple benefits for public institutions, this should be the initial choice at the local level.
- Integrated Regional Operational Programme (2014-2020), Priority axis 2 & Green Investment Scheme & Municipal fund for solar systems
    - National Fund: The priority of the Integrated Regional Operational Programme (IROP) is to facilitate balanced territorial development, improve the infrastructure, improve public services and public administration and ensure sustainable development in villages, towns and regions. In the Priority axis 2 it is specifically designed to improve energy performance in the housing sector.
    - National Green Investment Scheme: The Green Savings programme focuses on support for heating installations using renewable energy sources, but also investing in energy savings within reconstructions and new buildings. The objective of the programme is to improve the environment by reducing greenhouse gas emissions through the improved energy efficiency of buildings, the support of residential development with very low energy performance, and the efficient use of energy sources.
    - Municipal Fund: In the year 2000, the municipal government introduced a subsidy scheme for solar water heaters (SWH) in an administratively simple programme. The city offered a small, yet quickly available local subsidy to home owners willing to replace coal boilers with solar water heaters. These subsidies could be combined with additional funding, for instance available from various state grants.
    - Consistency: A combination of the funds is taken into account at local level.

Are the policies and activities appropriate in order to reach CO_2 targets and the required share of renewable energies?

There is only one CO_2 emissions target at national level: CO_2 emissions in non-ETS companies are required to be not more than 9 % above those in the reference year of 2005 by 2020. All policy measures described in report 3.1 address this target. There is no CO_2 target at the local level.

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The national target, to meet 14 % of the heat demand through renewable energy (RES) by 2020, is supported by the plan of Litoměřice to build a geothermal plant. There is, however, no RES target at a regional or local level.

Targets to decrease energy demand (national target: 15 % of 1990 levels by 2020, local target: 20 % of 2012 levels by 2030) can be met through the national programme "Operational Programme Environment" and the local programme Municipal Energy Saving Fund for public institutions.

Do the policies and activities identified in task 3.1 address the barriers?

Within Report 3.2, policy measures as well as overall conditions regarding energy issues in Litoměřice, have been evaluated by several experts and 99 participants of a household survey. The main barriers to the use of renewable energy for heating and cooling, identified by empirical analysis are:

- **Lack of awareness of renewable energies**: The first step to get people thinking about renewable energy is to raise awareness concerning their options. In the interviews, experts, for example, postulated running an awareness raising campaign to promote the district heating system as an alternative heating option. The second step would be to provide information about it.
- **Lack of information about renewable energies**: Providing information follows the raising of awareness of a technology. As the survey shows, just 55 % of the participants reported to be very well or well informed about renewable energy and 47 % of all participants wanted to have more information.
- **Need of best practice examples regarding energy refurbishment**: 50 % of the survey participants agreed that "*best practice examples regarding energy refurbishment would be helpful to perform comprehensive renovations"*.
- **High investment costs**: Initial investment is especially high and named as a significant barrier by the experts interviewed.

The policy measures were evaluated according to the degree to which they address the above named barriers. Four levels of impacts are defined:

-	impact not observed (no indicator)
+	intention is recognised in the programme description but not confirmed by empirical results
+/-	it is a focus of the programme *and* contradicts empirical results regarding impact
++	impact is confirmed by empirical results

The evaluation of policy measures in Litoměřice is based on several documents (see bibliography), expert interviews and a survey among private households.

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Tab 1: Evaluation of policy measures in Czech Republic and Litoměřice

	Operational Programme Environment (OP E) Priority axis 5	Operational Programme Enterprise and Innovations for Competitiveness (OP EIC) Priority axis 3	Integrated Regional Operational Programme (IROP) Priority axis 2	Green Investment Scheme	Municipal fund for the solar systems	Municipal Energy Saving Fund	Communication Strategy Geothermal Plant
Description							
Level	national	national	national	national	local	local	local
Target Group	public institutions	companies	home owners	building owners	building owners	public institutions	citizens
Policy approach[1]	Direct investment support (carrot)	Direct investment support (carrot)	Direct investment support (carrot)	Direct investment support (carrot)	Direct investment support (carrot)	Fiscal incentives (carrot)	information campaign (tambourine)
Overall Target							
increasing of the share of RES	+	+	+	++	++	+	+
energy saving	+	+	+	++	-	++	-
Impact of measures addressing barriers							
raising awareness of RES	-	-	-	-	-	-	++
increasing knowledge about RES	-	-	-	-	-	+	++
Facilitating Best Practice Examples	+	+	-	-	+	+	+
reducing high upfront investment of RES	+/-	+	+	++	++	++	-
directly enhancing energy supply	+	+	+	+	+	+	+
publicity	+/-	+	no data	+	++	++	+/-

[1] policy approaches are described in Report 3.1: Command-and-control instruments ("sticks"), Incentive regulation instruments ("carrots"), Knowledge building instruments ("tambourines")

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1.2 Success factors

In Litoměřice the main driver for resource efficiency policies is currently the policy development within the EU. In the following, a summary of frame conditions, policies, and actions that are real drivers in Litoměřice are shown as identified in the interviews and the surveys.

Status quo favourable, in order to (further) promote renewable energy:

- Energy independency is a big topic for the municipality and private households.
- The city is very active regarding sustainable energy supply and use.
- The award winning funding campaign for photovoltaic cells could be a best practice example (The town's motto: 'Who gives quickly gives twice').
- A communication process within the geothermal project since the start of the project.
- Other exemplary campaigns include the installation of solar systems into common municipal property, e.g. solar bench[1].
- There is a round table which regularly discusses energy topics (Project READY21) and a forum for enterprises.
- There is close cooperation with neighbouring municipalities.
- Since 2008 the city of Litoměřice has been providing incentives for individual solar thermal collectors on the rooftops of buildings, or on building envelope.
- District heating is well accepted in Litoměřice and should be extended to the city centre.
- In 2014 a municipal energy manager association was set up in four Czech cities.

Planned policy measures in order to (further) promote renewable energy:

- Financing a geothermal plant
- Awareness raising and information campaign (ENGAGE) with posters of important people standing up for the environment. ENGAGE is a participative communications campaign implemented by European local authorities. They use this initiative as a communication tool to share the Covenant of Mayors objectives locally.[2]

1.3 Best practices

Energy Saving Fund (ESF)

The Municipal Energy Saving Fund (ESF) was established in 2014 as a revolving fund with the aim of re-investing money from energy savings back into new energy saving measures, thereby multiplying savings effects in the city and region. In the beginning, measures such as energy audits, Engineering, Procurement, Construction (EPC) project preparation and analysis were financed by the Energy Saving Fund. The money saved from measures within the fund, i.e. the approved net energy savings (energy savings less energy cost) were distributed to different causes. For 2015, they were divided into 4 categories: 35 % allocation to the municipal budget, 30 % allocation to the Energy Saving Fund, 30 % allocation to the municipal organization, 5 % allocation to the Commission Fund. The fund is very visible and successful. In this way, since 2014, the money saved has triggered investments, decreased operational costs, stayed in the region and will, in the end, increase each citizen´s quality of life (Pidoux 2015).

[1] http://www.energy-cities.eu/Sit-and-connect-First-solar-bench
[2] http://www.energy-cities.eu/ENGAGE

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Subsidy scheme for solar water heaters (SWH):

The award winning funding campaign for solar energy, introduced in 2000, is another best practice example. The town's motto in this campaign is 'Who gives quickly gives twice'. The city offered a small, but quickly available (within 14 days after approval of request) local subsidy to home owners willing to replace coal boilers with solar water heaters, enabling them to combine it with state grants. The council has supported the development of small hydro power plants (8.7 MW) and has installed solar thermal as well as photovoltaic systems on public buildings (1,216 MW). Only home owners who have installed at least 3 m^2 of collector area and use ecological heating, rather than coal, are entitled to a contribution of up to 40,000 CZK (about 1,500 Euro). Involvement of the relevant building authority and the Heritage Institute has proved to be crucial in order to avoid conflicts (as the centre of the town is a listed area).

Litoměřice's SWH subsidy programme has earned the city nationwide attention. Litoměřice won several awards in the Czech Solar league and the European RES Champions League (2010). In 2014, around 5% of households had installed SWHs (1750 m^2 in total). As the solar installations can be seen from afar they serve as a demonstration project and are exemplary. This is why neighbouring mayors are considering introducing a similar municipal funding model in their villages and towns.

2. Policy recommendations

It is neccessary to have a mix of policies and measures for the successfull implementation of renewable energy for heating and cooling. In Litoměřice, with the focus on financial incentives, such a mix is missing but highly recommended:

Establish specific targets regarding the share of renewable energy at a local level in Litoměřice. This should be in a binding document in order to motivate stakeholders and to be able to measure success. In addition, a plan on how to reach these targets with relevant measures and specific responsibilities, clearly has to be defined.

Increase local government procurement of renewable energy. Installations of renewable technologies in public buildings can serve as demonstration examples. This has several advantages, such as increasing awareness, reducing perceived risk, and imparting knowledge to potential investors.

Raise awarenes of all citizens in Litoměřice with regard to renewable energies and inefficient gas or coal boilers. This can be done by encouraging private, commercial and public owners of buildings to integrate renewable energy in project planning and decision making. People don't see their responsibility to increase their own use of renewable energy. This point of view could be changed.

Impart knowledge of renewable technologies to all citizens of Litoměřice regarding alternatives to conventional technologies. Appropriate instruments for information campaigns are 1) online information website 2) information leaflet or letter through the post 3) advertisements on TV, radio or in the newspapers.

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Support energy suppliers who are all stakeholders related to renewable energy. A first measure is to invest in the geothermal plant. A next step would be to invest in the district heating system in order to avoid losses. Sufficient skills of the planner, designer, and installers etc. are particularly crucial for the successful implementation of renewable heating and cooling technologies. This can be be ensured by training these stakeholders.

These findings and recommendations are derived from the specific situation and empirical results in Litoměřice but they will also apply to other environments. The first two recommentations apply solely at the local level, while the last three can also apply at the regional and national level. It has to be stressed that these are the five most important reccommendations and can be complemented by others.

3. (Inter-)National transferability of the Litoměřice case

The barriers identified in Litoměřice are quite comparable to those of other countries. Despite that, in the case of specific renewable sources (geothermal and hydro energy), the situation of Litoměřice is not nationally or internationally transferrable as geothermal power does not provide a significant share of renewable energy sources for heating in the Czech Republic or other countries. Furthermore, in most other European countries there is greater policy support of renewable energy.

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