Smart and Flexible 100 % Renewable District Heating and Cooling Systems for European Cities

Regional strategy of Baden-Württemberg (EN)

Deliverable

WP 2	Improving the regional framework
Task 2.1	Survey of regional RES DHC framework
Del. 2.1	Regional strategy

Solites (Input is based on the IEKK)
Baden-Württemberg, 27.02.2017

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1. Introduction

In the state of Baden-Württemberg 438 out of 1112 municipalities have a district heating system. These systems cover a net energy demand of about 27 PJ per year. More than 60 % of the district heat demand can be found in municipalities with 1.500 to 50.000 inhabitants (source: IER).

In this document the goals and measures regarding the realization of ‘Smart and Flexible 100 % Renewable District Heating and Cooling Systems’ in the state of Baden-Württemberg are described. As Baden-Württemberg is no direct project partner within the SmartReflex project, SFZ Solites describes the situation for Baden-Württemberg by using the ‘Integriertes Energie- und Klimaschutzkonzept Baden-Württemberg’ (IEKK) which was finally concluded in August 2014. After the presentation of the first draft of the IEKK in the end of the year 2012 it was further developed by hearings with associations and public participation in 29 sessions.

The IEKK of Baden-Württemberg is an energy and environmental protection plan that is part of the Climate Protection Law of Baden-Württemberg. It points out goals, strategies and possible measures to reach the climate protection targets of the state which are the reduction of greenhouse gas emissions by 25 % until 2020 and by 90 % until 2050. Which measures will be implemented by when is not defined in the IEKK. Furthermore some measures are already under realization. The IEKK addresses goals regarding security of supply, cost certainty, climate protection, regional added value and the obligation of citizens.

In chapter 3 the goals regarding renewable district heating systems are described more in detail.

2. Action Plan

This section describes the most important actions planned for the project period (and beyond). This table is updated by the regional partners every 6 months.

In the follow up of the task force meetings with external stakeholders in July 2015 (***see SmartReFlex_WP2_TaskForceBadenWürttemberg_20150729.docx***) a document was prepared by Solites that concludes the findings of these first task force meetings. This so-called 'Sachstandspapier' is the base for the action plan for Baden-Württemberg (***see SmartReFlex_WP2_TaskForceBadenWürttemberg_Sachstandspapier_02.07.2015.pdf***).

Solites prepared together with AGFW and HIR an action plan for Baden-Württemberg in German language that was approved by the Ministry of the Environment Baden-Württemberg. The action plan includes the following three main issues:

1. New RES DH systems
   (Communication and consultancy, capacity building, initiation of projects)
2. Existing DH systems
   (Use of industrial waste heat, structural change of DH, legal framework)
3. Heat planning

Therefore activities in three different areas will be done:

1. Continuing of the task force meetings/activities
2. Organisation of seminars and workshops for capacity building
3. Initiation/realisation of case studies in Baden-Württemberg

The detailed planning is described in German language in chapter 3 of the action plan (***see SmartReFlex_ArbeitsAktionsplanungBW_20151027.pdf***).

<table>
<tr><th colspan="3"></th><th colspan="2">Timeline</th></tr>
<tr><th>Required action</th><th>Stakeholders needed</th><th>Resources / instruments needed</th><th>Planned date</th><th>Real implementation</th></tr>
<tr><td rowspan="2">- Action:
Workshop: Areas for solar thermal systems

- Which stakeholders are needed?
Ministry of the Environment, DHC stakeholders and associations dealing with environmental protection issues

- Content:
Discussions on areas: Approval, ecology, environmental protection issues …
(What are the current requirements? Advantages of the unsealed surface; Realization of eco concepts; …)

- Note:
In cooperation with the regional project SolnetBW</td><td colspan="2" rowspan="2"></td><td>Spring 2016</td><td>11.04.2016</td></tr>
<tr><td colspan="2">Results:
The topic was brought on the agenda of the ministry and discussed with different relevant stakeholders.
A process has been started to improve, amongst others the planning and approval procedure, for solar thermal and other RES installations in urban areas.</td></tr>
</table>

- *Action:* Conference: Forum Solare Wärmenetze - *Which stakeholders are needed?* DHC and solar experts, local authorities, utilities, planners, city planners, cooperatives - *Content:* 1st day: Conference (presentations and workshops) 2nd day: 2 parallel visit tours to Crailsheim and Büsingen - *Note:* In cooperation with the regional project SolnetBW	11./12. 05.2016	11./12. 05.2016
	Results: More than 140 persons participated at the Forum and the small exhibition of suppliers and collector manufacturers! The state of the art of the technology and its application possibilities was presented. An exchange of knowledge and transfer of know-how to planners and utilities took place.	

- *Action:* Workshop on Solar DH as part of the congress: 'Energieregion Effiziente Wärmenetze' www.energieagentur-regio-freiburg.de - *Which stakeholders are needed?* Local stakeholders and citizens, local authorities and planners - *Content:* Information and dissemination of knowledge on renewable district heating systems - *Note:* The congress is organized by the energy agency Regio Freiburg together with further regional energy agencies	07.04.2017	…
	…	

- *Action:* Conference: 2. Forum Solare Wärmenetze www.solar-district-heating.eu - *Which stakeholders are needed?* DHC and solar experts, local authorities, utilities, planners, city planners, cooperatives - *Content:* One day conference program with presentations and workshops to allow an exchange of knowledge and transfer of know-how to planners and utilities - *Note:* Activity is part of the regional project SolnetBW II	30.05.2017	…
	…	

3. Regional strategy

The four goals and measures that are described in the following tables base on the descriptions of the IEKK Baden-Württemberg.

1. Goal **Develop a strategy for local district heating systems (IEKK, page 97-98)**		
S	**Describe the specific area for improvement for this goal**	- District heating systems provide a useful infrastructure for a sustainable energy supply structure based on renewable energies. - The feed-in of renewable energy sources such as solar thermal, industrial surplus heat or waste water heat can be done very efficiently when both the heating network and the serving structure are able to run on low-level temperatures.
M	**Quantify your goal:** **e.g. How much?** **e.g. How many?**	- Support local and regional heating concepts (M 61, page 98) - Create heating and cooling plans (M62, page 98) - Determine the realization of urban heat concepts (M63, page 98)
A	**Which stakeholders support/accept this goal?**	- Local authorities
R	**What results can realistically be achieved referring to the goal?**	- Heating networks provide a flexible distribution structure which is adaptable to future generation technologies. By changing the central heat producer a large number of users can be supplied in a simple way by a more efficient and/or environmental-friendly technology at short notice.
T	**When can the results be achieved?**	- n.a.
What external factors affect achieving the goal?		- n.a.

2. Goal Develop the use of solar thermal energy (IEKK, page 90 – 91)		
S	**Describe the specific area for improvement for this goal**	- Develop solar thermal district heating systems with seasonal heat storage (M54, page 91) - Support the application of large-scale solar thermal collectors and storage concepts connected to heating networks. In this framework also cooperative models are promoted.
M	**Quantify your goal: e.g. How much? e.g. How many?**	- The application of large-scale solar thermal collectors and storage concepts connected to heating networks will be supported by further pilot projects.
A	**Which stakeholders support/accept this goal?**	- n.a.
R	**What results can realistically be achieved referring to the goal?**	- n.a.
T	**When can the results be achieved?**	- Until the year 2020 the solar thermal collector area shall be tripled (including not only ST DH applications!).
What external factors affect achieving the goal?		- The development of heating networks requires also a rethinking of the citizens as there are emotional barriers to replace the individual heating system by an externally controlled network.

3. Goal Make use of environmental heat and geothermal energy (IEKK, page 92 – 94)		
S	**Describe the specific area for improvement for this goal**	- Develop the funding program for geothermal district heating systems (M58, page 94) - Develop investments in new heat supply projects basing on deep geothermal energy feeding into existing or new heating networks - Promote the use of geothermal energy in ‘cold DH systems’
M	**Quantify your goal: e.g. How much? e.g. How many?**	- Development of pilot projects
A	**Which stakeholders support/accept this goal?**	- n.a.
R	**What results can realistically be achieved referring to the goal?**	- With the development of deeper levels in the area of ‘Oberrhein’ and ‘Oberschwäbisches Molassebecken’ temperatures up to 160°C are possible. The thermal performance of such geothermal sources is between 30 and 50 MW.
T	**When can the results be achieved?**	- On the long term the geothermal energy offers a big opportunity for the heat supply in Baden-Württemberg.
What external factors affect achieving the goal?		- Various damages have disturbed the confidence in geothermal energy in the recent years. The goal is to establish again the trust through quality assurance measures.

4. Goal **Make use of industrial surplus heat (IEKK, page 94 – 97)**		
S	**Describe the specific area for improvement for this goal**	- Develop a market model for the feed-in of surplus heat in district heating systems (M60, page 97) - For the feed-in of industrial surplus heat in district heating systems of public utilities practical models have to be created to ensure a fair balance of interests between feed-in party and network operator.
M	**Quantify your goal:** **e.g. How much?** **e.g. How many?**	- Companies should follow a three step strategy: 1. Make processes more efficient (use less energy) 2. Use surplus heat internally in other processes 3. Feed-in surplus heat in district heating systems
A	**Which stakeholders support/accept this goal?**	- Energy costs for companies have increased steadily in recent years. This increases the internal pressure to open up efficiency potentials or make additional revenue from the sale of surplus heat.
R	**What results can realistically be achieved referring to the goal?**	- From technical perspective new developments of heating networks with low temperatures (Low-Ex-concepts) offer good possibilities to make use of the heat that arises usually at a low temperature level.
T	**When can the results be achieved?**	- Two investment cycles are expected for the transformation: 1. 2010 – 2030: from coal and oil to natural gas 2. 2030 – 2050: from natural gas to renewable energies
What external factors affect achieving the goal?		- A systematic analysis of the surplus potentials is missing.

4. Improving the framework

Technical, organizational and legal issues	
A detailed baseline with information on the framework was prepared by developing the IEKK Baden-Württemberg by the Ministry. Within that document also measures are described for reaching the different goals. For a comprehensive strategy some of the measures needed to be worked out more in detail. Therefore an action plan has been prepared (see chapter 2).	

5. SURVEY RESULTS

In Germany the Hamburg Institute prepared the survey document **'The Legal Framework for Renewable District Heating in Germany'** in German language.

Within this document the legal framework in Germany as well as in particular in Schleswig-Holstein and in Baden-Württemberg has been analyzed. The German version of the document has been prepared within the project SolnetBW (www.solnetbw.de) financed by the state of Baden-Württemberg. An English summary was added within the project SmartReFlex.

Further and more detailed information can be found in the following documents.

- Energy and environmental protection plan:
  Integriertes Energie- und Klimaschutzkonzept Baden-Württemberg (IEKK), 31. July 2014
- Climate protection law:
  Klimaschutzgesetz Baden-Württemberg (KSG BW), 23. July 2013
- Renewable heat law:
  Erneuerbare-Wärme-Gesetz (EWärmeG), last amended 01. July 2015