Deliverable 6.1

User stories and priorisation

Prepared by Anders Michael Odgaard & Jørgen Lindgaard Olesen, PlanEnergi
Reviewed by Brian Vad Mathiesen, AAU

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PROJECT INFORMATION

Project name	Hotmaps – Heating and Cooling Open Source Tool for Mapping and Planning of Energy Systems
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Project coordinator	Lukas Kranzl TU Wien Energy Economics Group – EEG Gusshausstrasse 25-29/370-3 A-1040 Wien / Vienna, Austria Phone: +43 1 58801 370351 E-Mail: kranzl@eeg.tuwien.ac.at

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The Hotmaps project

The EU-funded project Hotmaps aims at designing a toolbox to support public authorities, energy agencies and urban planners in strategic heating and cooling planning on local, regional and national levels, and in line with EU policies.

In addition to guidelines and handbooks on how to carry out strategic heating and cooling (H&C) planning, Hotmaps will provide the first H&C planning software that is

- **User-driven**: developed in close collaboration with 7 European pilot areas
- **Open source**: the developed tool and all related modules will run without requiring any other commercial tool or software. Use of and access to Source Code is subject to Open Source License.
- **EU-28 compatible**: the tool will be applicable for cities in all 28 EU Member States

The consortium behind

Scientific partners

TU WIEN – Technische Universität Wien, Vienna | Austria
Aalborg Universitet
e.e.m.
energycities – Where action & vision meet
Hes·so – Haute Ecole Spécialisée de Suisse occidentale, Fachhochschule Westschweiz, University of Applied Sciences and Arts Western Switzerland
EURAC research
Fraunhofer ISI
e-think Energy Research
PlanEnergi
e· energy center

Pilot areas for developing and testing the tool

Aalborg Kommune
Ville de Genève
Bistrita Municipality
Stadt Frankfurt am Main – Energiereferat > Die kommunale Klimaschutzagentur
Milton Keynes Council
Kerry County Council
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1. Summary

Before starting the development of the Hotmaps toolbox, the tool needs have been investigated form a user perspective. Each of the seven pilot areas have given their input regarding local challenges and needs in relation to local heating and cooling planning.

Furthermore, inputs have been gathered through interviews with energy planning experts in pilot areas, follower areas, and other experts to prioritise and elaborate further on user needs.

After a final discussion, the Hotmaps consortium agreed that the following user needs should have high priority in the software development phase of the Hotmaps project:

- Overview of the existing heating and cooling infrastructure
- Mapping possibilities for new district heating and cooling areas
- Mapping location of heat demand
- Mapping potential of utilising industrial excess heat for domestic heating and cooling
- Mapping potential of using local heat sources for large scale heat pumps for heating and cooling
- Cost of individual heating and cooling (natural gas, heating oil, heat pumps, wood pellets, etc.).
- Cost of district heating and cooling from new or existing plant
- Mapping local renewable energy resources (biomass, solar, etc.)
- Increase in renewable energy in future scenarios
- Compare relevant future heating and cooling scenarios to a reference scenario
- CO_2-reduction potential in future scenarios
- Share of local fuels in future scenarios

2. Introduction

Project objectives

The overarching goal of Hotmaps is the development of an open source heating / cooling mapping and planning toolbox and to provide default data for EU28 at national and local level.

The data and toolbox will allow public authorities to identify, analyse, model and map resources and solutions to supply energy needs within their territory of responsibility in a resource and cost efficient way. Those results will help authorities to develop heating and cooling strategies on local, regional and national scale, which are in line with RES and CO_2-emission targets on national and EU level.

This leads to three main project objectives:

1. Develop an open source toolbox (Hotmaps toolbox) that will effectively and comprehensively support local, regional and national heating and cooling planning processes.
2. Provide a default open data set to lower the initial barrier in applying the tool for regions across EU-28 member states and include the ability that the users can adapt and provide more accurate, large and complex data for a specific area.
3. Provide a tested and user-friendly open source software tool, which is based on user needs. Guarantee wide usability, flexible adjustability and concrete application of the tool within and beyond the project duration.

Requirements of the Deliverable

Firstly a stakeholder analysis on the structure and exact roles of different stakeholders in the strategy development process for heating and cooling in the pilot and follower areas is made. This will be combined with experiences within the consortium and a literature review on the roles of stakeholders in different countries (see also Task 5.1) in order to select experts for interviews. Via 10-15 expert interviews the user needs will be further specified, based on the structures already developed within the proposal phase.

This will allow to clearly explain the possibilities that can be expected by the Hotmaps database and toolbox and it will result in a prioritisation of the functions of the tool. For these expert interviews, representatives of the target group a) internal to the project and b) external to the project (Energy Cities network) will be integrated. The result will be detailed “User Stories” covering typical user types in EU28.

The detailed user stories and their prioritisation resulting from this Task will be utilized in an early stage in WP 2-4 for the further development of database and toolbox.

The purpose of this deliverable is to identify and prioritise user needs related to the Hotmaps toolbox before moving into the software development phase.

Procedure of identifying user needs

The seven pilot areas play a key role in identifying the user needs for the Hotmaps toolbox. They cover different European contexts for heating and cooling planning and represent user needs at different stages in the heating and cooling planning process.

The identification of user needs has been carried out in four steps:

1. Identifying pilot area expectations for the outcome of the Hotmaps demonstration phase;
2. Identifying pilot area needs for the Hotmaps toolbox;
3. Interviewing energy planning experts in pilot areas, follower areas and other experts to prioritise and elaborate further on user needs;
4. Final prioritisation of user needs at the 2nd project meeting in Bolzano

3. Expectations for the Hotmaps process in pilot areas

Target group

All the pilot areas indicate that the primary target group for the Hotmaps tool from their perspective is the Local Authorities/Municipalities. Moreover, additional target groups are also regional and national public authorities, energy agencies, planners, consultants and potential future developers of the tool.

The pilot areas in Hotmaps (Bistrita, Frankfurt am Main, Geneva, Kerry County, Milton Keynes, San Sebastian, and Aalborg) have been asked which expectations they have for the output of the Hotmaps process in relation to their future needs.

Primary overall focus

Interviews and workshops with pilot areas show that their wishes for the Hotmaps tool are very much depending on the forthcoming tasks in their local energy planning processes.

- **San Sebastian** wants to get an overview of local potentials and opportunities before deciding whether to make a local heating and cooling plan.
- **Geneva and Bistrita** want to make a Municipal Masterplan for future heating and cooling.
- **Kerry County and Milton Keynes** want to analyse the feasibility of specific local projects.
- **Aalborg and Frankfurt** have already gone far in their planning process and want to evaluate their existing planning efforts.

Most mentioned expectations

The table below shows the pilot areas' most mentioned expectations to the Hotmaps process:

	Bistrita	Frankfurt am Main	Genève	Kerry	Milton Keynes	San Sebastian	Aalborg
A heating and cooling action plan showing individual heating and cooling and areas with possibility for future district energy	■	■	■	■	■	■	
Scenario calculations showing variations up to 100 % renewable district heating and cooling systems in 2030 and 2050	■	■	■	■	■	■	■
Scenarios showing reduction in CO_2-emissions based on direct emissions or LCA approach	■	■	■	■		■	■
Scenarios including refurbishment of x-% of buildings	■	■		■		■	■
Calculations of extension of present district heating or cooling	■	■		■	■	■	■
Calculations of new district heating in villages compared to individual heating	■	■		■	■	■	■
Calculations of scenarios without use of biomass or fossil fuels for district heating		■		■	■	■	■
Calculations of new district cooling in cities compared to individual cooling	■			■	■	■	
Calculations of scenarios with heat pumps for district cooling	■	■		■	■		■

The table above shows that the pilot areas expect the Hotmaps process can help them make:

- A heating and cooling action plan showing individual heating and cooling and areas with possibility for future district energy;
- Scenario calculations showing variations of 100 % renewable district heating and cooling systems in 2030 and 2050.

Other expectations

Beside the most mentioned expectations, the pilot areas have also listed other expectations as inputs to the Hotmaps process.

Bistrita

Bistrita expects to get a basic strategic overview of the present situation, local potentials and opportunities.

Furthermore they want to make a heating and cooling action plan showing individual heating and cooling and areas with possibility for future district energy bearing in mind different energy sources (heat pumps and renewable energies and taking into consideration the Romanian Energy Strategy 2016-2030, with the perspective of 2050)

Frankfurt

Most important for Frankfurt am Main, is to find out in which direction the energy demand and energy supply should go to fulfil the target of a 100% renewable energy supply for Frankfurt in 2050.

Frankfurt needs to know the total costs of the process (refurbishing building stock to a certain energy demand and the costs for covering the remaining heat demand).

The solutions will differ from the local circumstances in the area. Therefore, there is a need for different scenarios and sensitivity analysis to make a decision whether to refurbish to “zero” energy demand or a moderate energy refurbishment, because renewable energy is available at a low price (e.g. excess heat at a high temperature level). They need a risk analysis whether the excess heat will be available in 2050 too and alternatives for covering the energy demand.

Frankfurt states that they need to know where expanding exiting district heating system is economically reasonable, where smaller district heating solutions should be established, and where there is a demand for single-building solutions.

Finally they need to know how they can cover the energy demand for Offices, Industries and Residential areas every hour of the year with renewable energy sources from Frankfurt and the region.

Geneva

Geneva states that the energy planning done in Hotmaps must be linked with the update process of their Municipal Master Plan. This process will begin in 2017 and must be closed in the end of 2018. Geneva has tried to elaborate on how this process could take place, and what the needed outcomes for their planning would be:

Geneva states that in their point of view, the process will have at least four stages:

1. First stage would be to make an comprehensive inventory, and should be available in the middle of 2017;
2. Second stage would be to work out a strategic analysis (pros and cons or opportunities for using the identified resources, for the deployment of energy infrastructures, for the rules of all the stakeholders etc.), and should be available at the end of 2017;
3. Third stage would be to specify the different scenarios, in 2030 and 2050, and should be available in the first third of 2018;
4. Fourth stage would work out some recommendations for the scenarios implementation according with the Municipal Master Plan's vision, and should be available in the second third of 2018.

Geneva states that they in fact, for their planning need:

- A decision-making tool for the politic and strategic levels;
- A map to view an energy inventory;
- A way to compare different scenarios;
- Choose between available resources;
- Energy policy monitoring and supervision (with suitable indicators);
- Results shown as:
  - A strategy to implement their vision (according with energy goals and urban planning policy);
  - An action plan with an economic evaluation:
    - Final cost of heating/cooling (€/kWh);
    - Investment plan (new or existing plant);
- If this should have a value, the level of detail in the Hotmaps should be on the building level or at least on a 100x100m scale.

Kerry

Kerry County states that they would like the process to start in the 3rd quarter of 2017. They have elaborated on which focus the heating and cooling action plan should have, and they would like it to focus on the two largest urban centres of the Kerry County, which are Tralee and Killarney. This could largely been done on top of the work for Tralee in the EU-project SmartReFlex, which could be developed in a similar manner for the town of Killarney.

Kerry states that for their planning process they could use:

- Full calculations of the heat losses in district heating pipelines:
  - This in order to allow the removal of the current Irish building regulations, which penalise district heating for losses in the network through the primary energy factor, regardless of if the production technology is renewable or not,
- Full calculation of life cycle cost benefit analysis suitable for use in Energy Performance Contracts,
- A way to incorporate planning zoning policies when choosing the location for the district heating centre,
- A tool to assist in the identification of zones suitable for future district heating development,
- Calculation of pipe sizes and storage tanks for potential installation in advance (or anticipation) of the complete system in the instance where a road may be in the process of being dug up or new roads and housing being developed.

Milton Keynes

Milton Keynes states that they are partially already in a planning process, which is outside the Hotmaps process. Therefore, the Hotmaps process could shadow the existing Heat Network evaluation report, which is due for completion within the next few months. Milton Keynes therefore thinks that it would be useful to consider the effectiveness of that process, including the time it have already taken to provide answers, which is over a year.

Milton Keynes would value a reappraisal of their existing heat resource appraisal in the Hotmaps process. This especially in the light of a new large-scale waste-to-energy plant and the Milton Keynes Council's adoption of the ambition to be carbon neutral by 2050. This ambition would include a transition from a carbon (natural gas) based heat network to a decarbonised one.

San Sebastian

San Sebastian want a clearer idea how conduct a heating planning process and local possibilities regarding future heating and cooling.
They are not ready to involve external stakeholders at this stage, but wants to evaluate the need for a heating plan.

Aalborg

Aalborg state that they have been working with heat planning in the Municipality of Aalborg since the late 1980s and have a detailed knowledge of the area – planning process, data collecting, working with politicians etc. Through the years, Aalborg have made several heat plans for the municipality. Due to this and the fact that Aalborg have a recent energy vision, energy strategy, and heat plan, they state that they do not expect to make a new heat plan in the Hotmaps process, but expects to be able to test the outcome of the Hotmaps process and tool and compare it to their existing results and planning.

In addition, Aalborg expects to learn from the others pilot areas and partners in Hotmaps. Since it is always rewarding to hear how things are done in other places and which positive and negative experiences they have. Even if the other pilot areas maybe does not have the same experience as they have. Likewise, Aalborg intend to include and share their knowledge and experience to the Hotmaps process and to the other pilot areas.

4. Tool needs in pilot areas

The pilot areas in Hotmaps project have been interviewed regarding their needs for the Hotmaps toolbox.

The pilot areas have given their tool needs input in two overall categories:

1. Mapping tool needs: Overall planning needs aiming at overview of local potentials and opportunities
2. Planning tool needs: Tool needs when wanting to identify potential business cases and initiate concrete project oriented dialogue with local stakeholders and decision makers

Mapping tool needs

The pilot areas have been asked which needs they have regarding the mapping part of the Hotmaps toolbox.

Most mentioned needs

The table below shows the pilot areas' most mentioned needs regarding the mapping tool:

	Bistrita	Frankfurt am Main	Genève	Kerry	Milton Keynes	San Sebastian	Aalborg
Location of heat demand							
Potentials and possibilities for new district heating and -cooling areas							
Overview of the existing heating and cooling infrastructure							
Overview of of relevant future energy infrastructure scenarios							
Location of potential excess heat							

As shown in the table above pilot areas have especially needs for a mapping tool that can help assess:

- Location of heat demand;
- Potentials and possibilities for new heating or cooling districts;
- Overview of the existing heating and cooling infrastructure;
- Overview of relevant future energy infrastructure scenarios.

Other needs mentioned

Geneva

Geneva also states that they would like the mapping tool to be able to show the location and potential of all local resources (level of temperature, power, continuity, availability, etc.). In addition, Geneva would like the screening tool to be able to show the area of potential exploitation of the identified resources with economic, technologic, and energetic hypothesis (E.g. use the drinking water pumping for heat pump, or use the wastewater collector).

The location of the stakeholders (consumers, buildings owners, industry, etc.), is also a need that Geneva has for the mapping tool. The screening tool should also be able to have a statistical inventory of the state of the building. Furthermore, Geneva states that the mapping tool should have the possibility to show an inventory of non-energy infrastructures that can have an energy use (multi-functionality).

Kerry

Kerry County also states that they would like the mapping tool to be able to show local renewable energy sources (sea, wind, sun, anaerobic digestion, biomass, water, etc.)

Aalborg

Similar Aalborg would like the mapping tool to be able to show the location of sources for excess heat and cooling. In an attempt to face the challenge of planning outside the district heating areas, they would like the mapping tool to be able to show energy density in these areas.

Planning tool needs

The pilot areas have been asked which needs they have for a planning tool, which can be used for local business case discussions with local stakeholders and decision makers.

Most mentioned needs

The table below shows pilot areas' most mentioned needs regarding planning tool:

	Bistrita	Frankfurt am Main	Genève	Kerry	Milton Keynes	San Sebastian	Aalborg
Make accurate economic supply calculations, which are useful in local decision-making process							
Cost of individual heating (€/MWh)							
Cost of district heating from new or existing plant (€/MWh)							
Consequences of specific local actions (total cost, CO_2-emissions, share of renewables)							
Excess heat temperature levels							

As shown in the table above the pilot areas especially needs a planning tool where:

- Precision and accuracy of model calculations must be as high as possible.

In addition, also a tool that can help assess:

- Cost of individual heating (€/MWh),
- Cost of district heating from new or existing plant,
- Consequences of specific local actions.

Other needs mentioned

Geneva

Comparison between several scenarios (technology, heat plants, deployment, etc.) with a basic scenario (that the user can define themselves) is a need that Geneva states for the planning tool.

Kerry

Kerry County would like the planning tool to be able to make comparisons of different heat plant technologies i.e. heating-only or CHP or heating and cooling etc. The tool should also be able to make a comparative cost effectiveness of the different local energy resources (sea, wind, sun, anaerobic digestion, biomass, water, wind).

If the planning tool should be able to be used Kerry states, that the tool should remove the local planning requirement and make the planning able to be assessed national by the National Planning Board. E.g. tool should make it possible to see if there is a grid connection, if the resources are available, if an EIS (Environmental Impact Statement) if required or if the zoning is suitable.

Kerry states that the planning tool should be able to assess the local sustainable jobs created by using locally sourced fuel and for the running of the plant as opposed to heating from imported fuels. In addition, the planning tool should be able to make a calculation of the financial benefit to the local economy and the funds remaining in the local economy, and be able to calculate the amount of imported fuel and CO_2 emissions displaced. Kerry also states that a need could be that the decision tool could show a comparison between different financial resource models e.g. ESCO's, EPC, ECB bank loan, Co-op model, private company, state owned etc.

Aalborg

Aalborg states that in relation to the challenge of planning outside the district heating areas they would like the planning tool to be able to calculate investments in pipes etc. and to get some key figures on profitability for areas with high heating or cooling density outside the existing district heating areas.

Aalborg also states that they would like to be able to visualize some of their existing planning in order to make it more accessible to other stakeholders than planners. Furthermore, Aalborg would like the planning tool to help them integrate heat pumps into the system and make concrete plans on cooling.

5. Expert interviews

The pilot areas of Bistrita, Frankfurt, Geneva, Kerry County, Milton Keynes, San Sebastian, and Aalborg have identified some potential needs for the Hotmaps toolbox.

In order to prioritise between relevant user needs and to get external input for the development phase 20 interviews have been conducted with experts in the pilot areas, follower areas, and other relevant research institutions.

The interviews covered:

- 7 Pilot area experts
  - Electricity Distribution Company, Bistrita
  - Gunter Ingenieure TA, Frankfurt
  - Mainova AG, expert 1, Frankfurt
  - Mainova AG, expert 2, Frankfurt
  - XD Sustainable Energy Consulting Ltd, Kerry County
  - City Hall, San Sebastian
  - Aalborg Energikoncern

- 9 Follower area experts
  - City of Niš, Serbia
  - Climate Alliance Italy
  - Dobrich Municipality, Bulgaria
  - Frederikshavn Municipality, Denmark
  - Odense Municipality, Denmark
  - ABMEE Brasov, Romania
  - Pamplona City Council, Spain
  - Provincial Environmental Protection Agency of Bozen, Italy
  - Land Tirol, Austria/Italy

- 4 Other experts
  - Catalonia Institute for Energy Research (IREC), Spain
  - Politecnico di Milano, Italy
  - Solites - Steinbeis Research Institute for Solar and Sustainable, Germany
  - Aalborg University, Denmark

The expert inputs are gathered in two annexes:

- *Annex 1: Expert priority of identified user needs*
- *Annex 2: Expert comments user needs*

Overall tool needs

Expert priority

The experts were asked to give their priority among three overall user needs for the Hotmaps tool.

Their indicated priority of different topics was:

Priority	Topic	Score
1	Overview of the existing heating and cooling infrastructure	177
2	Make accurate economic supply calculations, which are useful in local decision-making process	166
3	Make existing analysis and data accessible to others than heat planning experts	146

Expert comments and Hotmaps priority

According to the experts, there is a need for a heating and cooling planning toolbox that can fill out the gap between overall analysis of new district heating potentials at the national level and then the very case specific local calculations.

Regarding economic calculations experts seem to agree on a level of detail that is good enough to initiate a serious dialog with local stakeholders about relevant local actions and further analysis. However, it is not a realistic ambition to create a toolbox that can deliver all relevant information for a local investment decision. Furthermore, there is a variety of tools already available aiming at detailed local business case calculations.

It is considered more important to develop a relevant tool that is editable for local heating and cooling planning experts rather than making a tool accessible to non-energy planners. Experts expect non-energy planners will not be using the tool.

Heating and cooling demand

Expert priority

The experts were asked to give their priority among five overall user needs for the Hotmaps toolbox.

Their priority was:

Priority	Topic	Score
1	Mapping possibilities for new district heating and cooling areas	187
2	Mapping location of heat demand	184
3	Mapping refurbishment potentials	168
4	Mapping location of cooling demands	155
5	Mapping of end-use in different sectors (residential, tertiary etc.)	154

Expert comments and Hotmaps priority

The experts agree that mapping the location of heat demand and possibilities for new district energy areas is very import.

All experts agree that detailed and reliable mapping of heating demand should be given high priority, since every other part of the Hotmaps toolbox becomes irrelevant if the basic mapping is not precise enough. Mapping should focus on collecting data at the building level, which can be aggregated to heating and cooling districts for further analysis of relevant future supply options.

Some experts give mapping of refurbishment potentials a lower priority and some underline that focusing on refurbishment potentials might make analysis of district heating potentials unnecessary complicated. When making new district heating in cities the main challenge is getting a sufficient amount of buildings (heat demand) connected to the district heating network. Future energy savings are uncertain and play a less import role in the business case decisions. On the other hand, refurbishment potentials are very relevant when making future scenario calculations with a more strategic focus.

Several experts give mapping of heat potentials on sectors low priority since this mapping is in general not necessary to perform analysis of feasible district heating potentials. Existing district heating systems show that the systems load curves for regions with similar climate are very similar.

Excess heat and heat pump potentials

Expert priority

The experts were asked to give their priority between two user needs for the Hotmaps toolbox.

Their priority was:

Priority	Topic	Score
1	Mapping potential of utilising industrial excess heat for domestic heating and cooling	175
2	Mapping potential of using local heat sources for large scale heat pumps for heating and cooling	175

Expert comments and Hotmaps priority

Mapping of excess heat is very relevant and should be performed as detailed as possible. A minimum mapping should include; potential, location, and temperature level. Temperature level is equally important or more important than the heat potential. Load curve, cost of distribution and heat storage should also be considered.

Temperature level analysis should, as a minimum identify excess heat feasible for direct district heating and indirect district heating.

Moreover, it is very different how easy it is to recover excess heat form industrial processes depending on the specific factory setup. Therefore, it is relevant to give industrial excess heat potentials priority according to branch specific conditions for utilising excess heat.

Cost calculations

Expert priority

The experts where asked to give their priority between two user needs for the Hotmaps toolbox.

Their priority was:

Priority	Topic	Score
1	Cost of individual heating and cooling (natural gas, heating oil, heat pumps, wood pellets, etc.).	178
2	Cost of district heating and cooling from new or existing plant	175

Expert comments and Hotmaps priority

For each local case, it is necessary to make cost calculations of both district energy and the most price competitive individual heating and cooling options.

There is a variety of analysis available trying to identify key figures for heating and cooling costs at the EU-level. This is no easy task and no matter how much effort is put into this, reliable economic calculations have to be based on country specific data.

The Hotmaps project should focus on making it possible to insert country specific cost and should only put little effort in default data for EU28, since default economic calculations will probably give results very far away from local business economic realities. Moreover, local tax systems, subsidies and legislation are very different from one country to another.

Future heating and cooling scenarios

Expert priority

The experts where asked to give their priority among nine user needs for the Hotmaps toolbox.

Their priority was:

Priority	Topic	Score
1	Mapping local renewable energy resources (biomass, solar, wind etc.)	178
2	Increase in renewable energy in future scenarios	175
3	Compare relevant future heating and cooling scenarios to a reference scenario	174
4	CO_2-reduction potential in future scenarios	173
5	Share of local fuels in future scenarios	171
6	Overall costs of future scenarios	168
7	Analysing large scale integration of heat pumps in the local electricity and district heating market	167
8	Local economy impact of future scenarios	164
9	Local job creation in future scenarios	162

Expert comments and Hotmaps priority

Experts give mapping of local renewable energy resource potentials high priority. Mapping of potentials should focus on resources with relevant connections to future heating and cooling systems.

Scenarios should have a predefined timeline. For instance 2030, 2040 and/or 2050 and for each year future heating and cooling scenarios should be compared to a reference scenario. Key indicators in the scenario calculations could be narrowed down to increase in renewable energy, CO_2-reduction and share of local fuels.

Future costs are given low priority in the scenario part of the Hotmaps toolbox, since the number of uncertainties is greatly rising when moving into distant future scenarios. Uncertainties related to e.g. future energy prices and technology data. When using the Hotmaps toolbox in local action plan processes it makes good sense to focus on making reliable economic calculations of the present opportunities, less on more uncertain future scenarios.

Experts give macro analysis on integrations of heat pumps in the electricity and district heating market relatively low priority. Given that several energy systems tools have been developed with this sort of system analysis focus in mind detailed analysis in this field and in particular the feedback on the electricity price should not be included in the Hotmaps toolbox.

Local economy and local job creation is given lower priority by expert. Share of local fuels/energy in future scenarios is another way of identifying this effect and therefore local economy and job creation should not be included in the Hotmaps toolbox.

6. Conclusions

Input from pilot areas and interviews with energy planning experts from the pilot areas, follower areas, and other experts where gathered before the 2nd project meeting in Bolzano in March 2017.

At the Bolzano meeting, the consortium made a prioritised list of user needs wrapping up the process of specification and prioritisation of user needs.

User needs with high priority:

- Overview of the existing heating and cooling infrastructure
- Mapping possibilities for new district heating and cooling areas
- Mapping location of heat demand
- Mapping potential of utilising industrial excess heat for domestic heating and cooling
- Mapping potential of using local heat sources for large scale heat pumps for heating and cooling
- Cost of individual heating and cooling (natural gas, heating oil, heat pumps, wood pellets, etc.).
- Cost of district heating and cooling from new or existing plant
- Mapping local renewable energy resources (biomass, solar, etc.)
- Increase in renewable energy in future scenarios
- Compare relevant future heating and cooling scenarios to a reference scenario
- CO_2-reduction potential in future scenarios
- Share of local fuels in future scenarios

User needs with medium priority:

- Make accurate economic supply calculations, which are useful in local decision-making process
- Mapping refurbishment potentials
- Mapping location of cooling demands
- Overall costs of future scenarios

User needs with low priority:

- Make existing analysis and data accessible to others than heat planning experts
- Mapping of end-use in different sectors (residential, tertiary etc.)
- Analysing large scale integration of heat pumps in the local electricity and district heating market and the feedback on the electricity sector and the electricity price
- Local economy impact of future scenarios
- Local job creation in future scenarios

7. Annexes

Annex 1: Expert priority of identified user needs, (editor: PlanEnergi), Excel table with expert priority of identified user need and a list of other relevant heating and planning tools

Annex 2: Expert comments user needs, (editor: PlanEnergi), Expert comments sorted by category

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