REGIONAL PLANS FOR THE DEVELOPMENT OF RENEWABLE THERMAL ENERGY
Experiences from the RES H/C SPREAD Project
The challenge

The potential of renewable energies for heating and cooling is still largely unexploited in the EU and plays a crucial role in the transition to an efficient and decarbonised energy system and in the achievement of energy security in the long term. The challenge is thus to mitigate heating and cooling demand by increasing the efficiency of plants and buildings, maximizing the use of renewable energy and reducing heating and cooling costs to levels accessible to all. The European Commission is seriously committed to promoting the use of these energy sources and technologies, as demonstrated by the Renewable Energy Directive (Binding National Targets, National Renewable Energy Action Plans) and the Energy Efficiency Directive (Art. 14, the need to exploit RES H/C potential and develop heating markets at the local and regional levels).

The RES H/C SPREAD project

In this framework, given that the production and management of energy produced from renewables is closely linked to the territory and, in general, is independent of national operators, regional and local public administrators require targeted support to improve their planning and governance capabilities. The RES H/C SPREAD (RES Heating and Cooling - Strategic Actions Development) project, recognizing the central role of local authorities, aims to provide them with support in terms of knowledge and best practices in order to strengthen their capacity for planning in a sustainable development framework.

To this end, in collaboration with the European pilot regions participating in the project, 6 regional plans for heating and cooling from RES have been developed. Based on that experience, the project has produced and tested methodological guidelines and tools that are and will continue to be made available to local energy agencies and regional administrations who wish to use and benefit from them.

The methodology followed for the development of the plans can be described in five basic steps, but before analysing these, it is important to understand what is meant by the "planning process."

What do we mean by the “planning process”? The planning process is “a basic management function involving formulation of one or more detailed plans to achieve optimum balance of needs or demands with the available resources.”

The strategies have to be feasible from a technical and economic point of view and have to produce measures that bring benefits to the community.

What are the “ingredients” for a RES H/C planning exercise at the regional level? The regional planning process developed by the project is made up of five basic steps: strategic vision and goal setting; collection and organization of data; development of territorial maps and relative analysis of heating and cooling demand as well as supply potential from renewable sources; cost-benefit analysis; and identification of intervention strategies and their implementation policies (according to the strategic objectives set at the beginning).

These “ingredients” constitute a cyclical and iterative process where each step is fed by the previous one and provides inputs to the next. The following figure shows...
the process schematically: the first phase on the definition of strategies and targets overlaps the last one, where the policies to achieve these objectives are identified.

Specifically, an initial strategy and targets are set out to determine what data are needed in order to start the data collection procedure for the creation of RES H/C's supply and demand maps. Next, the cost-benefit analysis process evaluates the cost-effectiveness of the interventions to be carried out and helps refine targets and strategies.

Key points within this scheme are the mapping procedure and the evaluation of the demand and supply potential, to be considered basic prerequisites for the development of a Regional RES H/C Plan. These are generally complicated tasks because of the widely varying and often limited availability of timely and accurate data and because of the diverse organizational and administrative structures of the various European countries.

The Country Governance Committees

This whole process is carried out in close collaboration with the "Country Governance Committees" (CGCs) in order to ensure, right from the first phase of work, the active involvement of the major stakeholders of the region (regional and community leaders, entrepreneurs, managers and energy distributors, consultants, researchers, etc.). These regional governmental committees are an integral part of the plan’s development process, as proven in all six pilot regions of the project. The CGCs have in fact substantially increased the awareness of both the private sector, especially as regards the potential for investment in renewable thermal energy and policies to be implemented to overcome economic and regulatory barriers, and the public, so as to allow the insertion of the project’s plans within the wider regional planning policies.

The mapping process

Besides the important experience gained from the participation of the stakeholders of the pilot regions in the development of the plans, the project promoted the development of geo-referenced thematic maps on demand and supply potential from renewable thermal energy sources.
In particular, in some of the pilot regions, which did not have these territorial analysis instruments yet (as in the case of Bulgaria, Greece, Italy and Latvia), this meant a major step forward in terms of the development of analytical methods for the estimation and geolocalisation of potential energy demand and supply from renewable energy sources as well as for the collection, sorting and capitalization of a considerable amount of data.

The images below show some examples of maps developed by the RES H/C SPREAD regions. All the other maps are available on the project [website](#).

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The **mapping process** consists of collecting data on energy demand (heating and cooling uses) and on thermal energy supply, in our case, mainly from renewable energy and excess heat sources. These data are then **accurately geo-referenced in order to build real maps necessary to identify and localize the energy supply and demand potential of each region.** The aim is to identify the most favorable areas characterized by high demand density that can be conveniently satisfied by available and reasonably exploitable energy supply.

*Figure 1: Annual energy heating demand in Rhodope Region (Bulgaria)*
Figure 2: Cooling energy demand of Western Macedonia Region (Greece)

Figure 3: Excess heat map of Salzburg Region (Austria)
Figure 4: Biomass potential in Riga Planning Region (Latvia)

Figure 5: Constraints map of Emilia Romagna Region (Italy)

**Data analysis and collection**

These maps are the results of intensive work that partners have carried out throughout the duration of the project in order to collect all the data necessary to effectively “build” these maps.

It must be said that although, in theory, this work seems to be simple and straightforward, the lack of high quality, publicly available data presents a number of challenges. Specifically, the data are often aggregated at the regional
level and are not differentiated by sector or sub-sector nor broken down by sub classes of activity (as often happens in the case of the tertiary sector) or structure (as in the case of buildings) or specific energy end uses (e.g., electricity uses).

Moreover, useful detailed data, where available, are often neither public nor easily accessible (as in the case of electricity consumption or of non-aggregated energy demand from the industry or service sector), or are not designed for aggregated statistical analysis, as for the cadastral data. Therefore, sectoral interviews are needed or estimates must be performed in order to reach the level of details required to reproduce a realistic description of the territory from the energy point of view.

In the report “Draft guidelines to set the baselines for the RES HC development and the monitoring procedures”, available at www.res-hc-spread.eu, the main data set available at the EU level is provided and the principal data estimation methodologies are illustrated in depth.

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<th>Why do a cost-benefit analysis?</th>
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<td>The cost-benefit analyses (CBA) move from this visual analysis (demand and supply maps) to the identification of potential feasible interventions, specifically by validating their technical and economic feasibility and therefore the affordability of the heating and cooling technologies that can be implemented in a region. In others words, the purpose of the CBA is to analyse an energy system and to assess some alternative scenarios for improving the energy performance of a region in terms of renewable energy, CO2 reduction and fuel consumption. In this regard, another important tool used in the project is the EnergyPlan application, developed by Alborg University (Denmark). Most of the project partners used this to perform cost-benefit analyses of the potential RES and energy efficiency interventions that each region would carry out in the plan. More information on this argument can be found in the “Handbook on Cost Benefit Analysis” developed by the Comitato Termotecnico Italiano, (partner of the project) and available at: <a href="http://www.res-hc-spread.eu/wp-content/uploads/2015/08/D4-1.pdf">http://www.res-hc-spread.eu/wp-content/uploads/2015/08/D4-1.pdf</a></td>
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<th>The project’s success stories</th>
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<td>All in all, the RES H/C SPREAD project has been a successful project because it has allowed the local stakeholders and public administrators of the participating regions to become aware of the potential represented by the diffusion and implementation of RES H/C technologies and to take advantage of the data and tools developed within the project to reinforce their planning capacity and skills. The success of the overall project is clearly the result of the individual success stories of each participating region that, given the logic and the structure of the project itself, are more or less all very similar. In practically all cases, to different extents and with different outcomes, the RES H/C plans prepared by the regions either have become an integral part of their energy plans or have been adopted as the official plan for the development of these technologies. As stated previously, the key ingredient for success in reaching the project’s goals was the organization of the Country Governance Committees. These committees, through the proactive participation of regional stakeholders, have made it possible to take into account the needs and requirements of the local</td>
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operators and public administrators as well as to receive input and suggestions from them.

The following are four examples of success stories achieved in Spain, Bulgaria, Greece and Italy.

### Making RES H/C a success in Castilla y León, Spain

In Castilla y León the organization of these governance groups has made this Spanish region a real success story. Here, stakeholder participation has been instrumental for the development of the regional plan as once the involved stakeholders and public administrators realized the importance for their region of the topics proposed by the RES H/C SPREAD project, they strongly encouraged the Castilla y León Region to officially entrust EREN with the development of a detailed regional plan. Following this official request, EREN has, for the first time, developed a very detailed model for the assessment of regional heating demand at the municipal level and analysed the corresponding renewable energy supply potential. Based on this evidence, EREN then formulated, in agreement with the governance group, the strategies and policies for the development of sustainable technologies in this field.

### Making RES H/C a success in Rhodope Region, Bulgaria

In Bulgaria, the CGCs played a key role in the plan’s success. The communication of all the important stakeholders allowed for a better understanding of regional needs, sharing best practices, and agreement with the objectives and planned policies. CGC members helped in the data collection, dissemination, and engagement of authorities in the implementation of the plan.

It is moreover important to add that all Bulgarian municipalities have to regularly develop RES programs and reports on their implementation and, in this framework, five Rhodope municipalities are currently developing their SEAPs. These planning efforts, however, are hindered by a lack of information and the capacity of the local administrations. The regional plan of the Bulgarian Rhodope Region is thus of great value for local planning, by providing comprehensive information about heating demand and RES potential as well as cost benefit analyses of a number of heating options in the residential and public sectors. Regional priorities for heating technologies and policies to implement them have been agreed on with local stakeholders and municipalities. Finally, both the Rhodope municipalities and districts within the region have approved the plan and are committed to implementing it, inter alia, by harmonizing their policies with those proposed by the plan.

### Making RES H/C a success in Western Macedonia, Greece

As in the other participating countries, in the Greek region of Western Macedonia the role of the CGC was essential for the development of the regional RES H/C plan, as all the members of the CGC contributed to the identification of needs and priorities, to the evaluation of the RES technologies, to the improvement of the implemented methodology and to the selection of the most effective policy measures. The constitution of the CGC was well balanced and took into consideration the peculiarities of the region. The majority of the initially identified stakeholders participated in the planned meetings, while additional stakeholders were invited to participate by covering specialized issues during the development of the plan. All the CGC meetings held were evaluated very
positively, and all the members of the CGC declared their willingness to participate in the committee after the project’s completion.

All the specified needs and priorities of the participating stakeholders were taken into consideration during the development of the regional plan, leading to the selection of the most efficient policy measures. Specifically, four policy measures will contribute to maintain district heating as the main supply technology for the residential sector by combining lignite with biomass and by leading to a more efficient exploitation of the biomass for heating purposes.

It is finally worth noting that the regional plan will be utilized as an effective tool by the regional authority in the framework of the “Regional Operational Program” in order to formulate effective policies for the programming periods until 2030. With regard to this, the Regional Authority of Western Macedonia expressed its willingness to integrate the developed H/C plan into the regional energy plan until 2030 with a signed endorsement letter.

The participative process in the Emilia Romagna region involved almost 100 stakeholders and municipal administrators. These participants developed a comprehensive strategy for the development of the RES heating technologies composed of several policy measures. The role of the CGC was essential for the development of the regional H/C plan as all of its members contributed to the identification of needs and priorities, to the evaluation of the RES technologies and to the selection of the most effective policy measures. The CGC balanced the public and private sectors, taking into account the peculiarities of the Emilia-Romagna Region. All the CGC meetings held were evaluated very positively and all the members of the CGC declared their willingness to participate in the committee after the project’s completion.

The project allowed ARPAE to broaden and reinforce its already robust set of data by providing a harmonized set of georeferenced maps on heating demand and supply potential for the first time. This set of GIS data was appreciated by the main municipalities of the region as it will be very useful for the improvement of their planning capacity. To this end, ARPAE has created an open data team to manage, update and share the collected data.

The combined efforts of the working team and the stakeholders participating in the CGC was moreover welcomed by the regional authorities, who have decided to include the RES H/C plan in the third regional plan, officially issued at the end of May 2016.
Main hurdles in RES H/C planning

As shown in the success stories outlined here, the constitution of ad hoc focus groups from the beginning of the planning activity proved to be a winning factor. However, there are other factors, aside from stakeholder participation that play a key role in the plan’s development, factors that, if not adequately analysed in a timely manner, could seriously impede the success of these plans. Looking at the lessons learned from the work carried out by the project partners, the main hurdles to overcome are:

- Data availability and diversity of users. Missing, unsuitable or confidential data will result in time-consuming data collection procedures. Data availability should be analysed at the beginning of every planning project.
- Inadequate tools (e.g. for cost-benefit analysis, spatial resolution of heat demand etc.). Regional planners need to really understand the tools and methodologies that are suggested to use.
- Uncertainties regarding future developments such as energy carrier shifts or changing political circumstances are also a significant hurdle for RES H/C planning.
- Plan updating and monitoring. A process to continually improve the plans needs to be implemented in order to ensure the plan’s success. Therefore, responsibilities and monitoring processes have to be defined so that the regional plan is continuously reassessed and updated.
- Facilitating interaction between local/regional/national stakeholders is a precondition for successful RES heating and cooling planning and is necessary for the endorsement of the work carried out. Relevant public authorities should draft a memorandum of understanding for the plans’ implementation well in advance.

Some key recommendations from the lessons learned from the project

- It is essential to identify, analyse and define the most important (key) stakeholders for a regional RES heating and cooling planning process beforehand. This will facilitate the design of efficient policies and their smooth implementation.
- Feedback from key stakeholders has to be incorporated, in order to make clear that the stakeholders’ involvement influences the decisions made. Therefore, exactly what input is needed from the stakeholders and how this input might/will be used should be explained.
- Generally, an increase in the share of RES for heating and cooling is not only seen as positive for energy and environmental (i.e. decarbonization) commitments, but also generates added value in the regions. It is important to disseminate these beneficial effects outside of a RES heating and cooling planning project as well.
- Cost benefit analyses are an appropriate way to promote cost-efficient RES technologies and can be used to convince responsible public authorities of their efficacy.
RES H/C SPREAD project

Duration: March 2014 – October 2016
Coordinator: ISINNOVA, Italy
Consortium: 11 partners from Austria, Bulgaria, Greece, Italy, Latvia, Spain
Budget: 1.24 M EUR

www.res-hc-spread.eu