SmartReFlex
RENEWABLE DISTRICT HEATING & COOLING

Program for Workshop 1

Workshop 1“Design and planning”

2 Days duration

Expected participants:

Technical staff and city planners from municipalities and regional authorities, DHC utilities and designers.

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Co-funded by the Intelligent Energy Europe Programme of the European Union

Program for Workshop

The main objective of workshop 1 "Design and planning" was to train local authorities staff in design and planning issues on renewable district heating and cooling.

Main addressed topics:

- *Urban heat planning, DHC vs. individual heat supply, cooperative ownership (~workshop 3), real examples of project development*
- *Case-studies*
- *Concepts how to stepwise reach 100 % RES, e.g. utilization of excess heat from industry*
- *How to come from case studies to municipal and regional plans, addressing the necessary framework for development of DHC (cf. risk analysis)*

Day one

1. **Welcome** (30 minutes)
    a. The regional task force: Presentation of regional status, strategy recommendations for 100 % RES DHC and implementation of EU Directive for Energy Efficiency (ART.14) (from WP2) and goal and program for the workshop.
    b. PlanEnergi: The steps in heat planning (mapping of consumption and resources, prediction of future consumption, district heating & cooling or individual heating and cooling, calculation of economical and environmental consequences). Introduction by PlanEnergi.

The following steps 1, 2 and 3 focus on consumption, resources and competitiveness of DH, respectively.

2. **Step one** (45 minutes)**.** Mapping of present and future heat and cooling demand.
    a. Presentation of methods, including how to estimate heat demand based on m^2 of buildings, standard consumption and applied heating technology. Estimation of future heat and cooling demand.
    b. Example from Denmark (Horsens) including key data for specific consumption (kWh/m^2)
    c. Example from the region provided by local participants. If possible use of GIS based on local data. Local consultants find local data and methodology. This takes place before the workshop if possible
    d. Discussion of alternative methodologies – how to get a fair estimate of the demand without getting lost hunting data

3. **Step two.** Mapping of resources (45 minutes)
    a. Excess heat from industries, waste incineration and power production. Solar thermal, biomass, resources for biogas, heat resources for heat pumps.
    b. Example from Denmark showing data for biogas, surplus straw and surplus wood. Presentation of Danish sources of information (covering Denmark).
        i. Demonstration of tool (spreadsheet)
        ii. Reports on excess heat and organic waste (types)
        iii. Data from waste incineration plants
        iv. Solar radiation from the Danish Meteorological Institute
        v. Biomass and biogas from spreadsheet from Aarhus University
        vi. Heat sources for large scale heat pumps
        vii. 4DH, mapping of resources (www.4dh.dk, to be investigated)
    c. Local consultants find local data. Example from the local region.

4. **Step three.** Costs and competiveness (45 minutes)
    a. Map of competitiveness (visualization), input data and results (including local data if possible), methodology from 4DH.
        i. District heating & cooling or individual heating and cooling?
        ii. Calculation of production prices for individual heating and cooling
        iii. Calculation of production prices for district heating & cooling.
    b. PlanEnergi calculates with Danish investment cost. Examples including data for costs for district heating and individual heating (calculation of heat production costs for different individual sources) for heating and cooling
    c. Local consultants find local fuel cost and if possible local investment cost. Local example (prepared before the workshop)

5. **Brain storm.** Barriers and advantages for district heating and cooling in the region (20 minutes)
    a. The purpose is to produce a list of advantages and barriers, thereby get an overview and create a basis for discussion of possible solutions

6. **Example of how to integrate district heating in regional and municipal planning in DK** (45 minutes)
    a. Region Midtjylland and 19 municipalities
    b. Local examples by local consultants

7. **Group Work 1.** What should municipal and regional heat plans include? (30 minutes group work, + 30 minutes presentations)
    a. Discussion of elements in a rough heating (and cooling) plan for the region
    b. Discussion of barriers and how to overcome them

Day two

8. **Design of case studies, general methodologies and cases** (60 minutes)
    a. Presentation of tools (software programs and spreadsheets)
    b. Presentation of cases (applications of tools and results)
9. **Case study from the Region**.(30 minutes)
    a. Calculation of business economy (heat production price), local economy, consumer economy and environmental consequences for a district heating (and cooling) plant. PlanEnergi calculates with Danish investment costs.
    b. Local consultants find example, local fuel costs and if possible local investment costs. This is prepared before the workshop by the local consultants, coordinated with PlanEnergi.
10. **Other case studies** (30 minutes)
    a. Presentation of local case studies and ideas.
11. **Group work 2** (60 minutes)
    a. Where could district heating and cooling be the best solution in the region.
12. **Presentation** of group work
13. **Conclusion** by the regional task force
    a. Announcing the next workshops and how the design and planning workshop will be followed up.