The European Technology and Innovation Platform on Renewable Heating and Cooling (RHC-ETIP)

Rainer Janssen
WIP Renewable Energies

Webinar: Heating & Cooling Research: Envisioning Tomorrow
Concept of the European Technology Platforms

- **Initiated** by the European Commission
- **Objective**: Accelerate technological development in promising sectors
- **Governing rules** for the platforms:
  - Representation from all sectors: Research, Industry, public sector
  - Transparent and open structure:
    - Everybody can participate
    - Election of governing bodies
    - Documents and positions

- **Activities**
  - Joint development of a vision, strategy and roadmap, ...

- **Expected results**
  - Harmonized research activities of industry and research sector
  - More efficient use of R&D funding
European Technology AND INNOVATION Platforms (ETIPs)

- RHC-Platform became an ETIP in 2016

- The ETIPs are foreseen to be a continuation of (ETPs) and European Industrial Initiatives (EIIs) in a single platform with the freedom to organise themselves as they see fit.

- New working arrangements will be established. The new element would also foresee arrangements for involvement of representatives of the interested MS/AC's. In addition, developing working relationships with the relevant national/regional platforms addressing public and/or industrial priorities will become essential to ensure synergies between EU and national/regional activities.
Facts and figures

- Solar thermal platform founded in 2005
- 2008 enlarged to RHC-platform
- Officially endorsed by European Commission
- More than 800 members from almost all European countries, some from abroad:
  - ca. 40% industry
  - ca. 35% research & academia
  - ca. 5% government, public agencies
  - ca. 20% NGO, others
- Became an ETIP in January 2016
**RHC-Platform: Work and Publications**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td></td>
<td>Strategic Research &amp; Innovation Agenda</td>
<td>Common Implementation Roadmap</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Since 2015, the activities of the RHC-ETIP have been supported by the European Union under contract No PP-2041/2014. Under this scope, the RHC-ETIP has delivered the initial set of expected documents, which are the “First report on the status of the implementation of the five Roadmaps”, the “Intermediate analysis of the heating and cooling industry” and the “Intermediate report on the analysis of the heating and cooling consumers”. All the documents are available on the members only area of the RHC-ETIP website.
The vision of the RHC-platform: Renewable energy sources (RES) will deliver 100% of the European heating and cooling demand by 2040

Share of RES on heating and cooling demand in Europe in 2014: 17.7%

Source: EHC-platform, Common vision for the RHC-sector, 2011
RDP-Scenario = Full Research, development and policy scenario
Solar Thermal Market and Research Topics

MARKET 2014 (EU-28 + Switzerland)
- Newly Installed: 2.9 Mio m² / 2.0 GW_th
- Total installed: 45 Mio m² / 32 GW_th
- Growth rate: -7.1%

Roadmap: MAIN RESEARCH TOPICS

SCOHYS: Solar Compact Hybrid Systems

SAH: Solar-Active-Houses
Solar fraction above 50%
Nearly zero-energy building

SHIP: Solar Heat for Industrial Processes
- Low temperature < 100°C
  Mid temperature < 250°C

CHALLENGES
- Cost reduction
- Simplification and compactness
- High solar fraction per building
- Solutions for industrial processes
**Biomass Market and Research Topics**

**MARKET 2014 (EU-28): Solid biomass**

Heat production from solid biomass
- Total: 69,859 Mtoe
- Of which district heating: 13%

**CHALLENGES**
- Extend sustainable biomass fuel supply
- Reduction of real-life emissions
- Increases of real-life efficiency
- Improved fuel-flexibility of biomass
- Increased load flexibility at industrial plants
- Increased electrical efficiency of large CHP plants through increased steam parameters

**Roadmap: MAIN RESEARCH TOPICS**

- **Whole value-chain approach**
- **Advanced Fuels** replacing coal, fossil oil and natural gas in heat and combined heat and power (CHP) generation
- **Micro/Small-Scale CHP**
- **High efficient large-scale industrial steam CHP**
- **System integration**
Geothermal Market and Research Topics

MARKET 2014 (EU-28)
- Direct use of geothermal heat (excl. Heat pumps): 0.8 Mtoe
- 8 new geothermal heat networks commissioned: 76.2 MW\textsubscript{th}

CHALLENGES
- Improvements of exploration and underground reconnaissance / reduction of investment risk of drilling
- Increase of efficiency / cost reduction
- Deployment of enhanced geothermal systems (EGS)

Roadmap: MAIN RESEARCH TOPICS

Deploy EGS technology and make the technology competitive

Cost reduction of geothermal CHP plants by optimizing efficiency in installation & operation

Reducing EGS cost of exploration, drilling and installation and improving longevity of material
Cross Cutting Technologies

TECHNOLOGIES
- District heating and cooling (DHC)
- Thermal energy storage
- Hybrid systems and heat pumps

APPLICATIONS
District heating & cooling (DHC)
With seasonal storage

Thermal Storage
Water, PCM, Thermochemical, underground storage (UTES)

Hybrid systems and heat pumps
Small scale
Smart integration
Advanced heat pumps

CHALLENGES
- Develop smart solutions including ICT for complex systems
- Increase degree of prefabrication and standardisation
- Increase efficiency and COP, leading to reduced costs on kWh base

COP = Coefficient of performance, PCM = Phase change material, GT = Geothermal, UTES = Underground Thermal Energy Storage
Characteristic H&C markets and technologies

- **High heterogeneity, high complexity**: on owner, operator, technologies, equipment and system sizes, type and size of applications (room, district and process heating,...)

- **Strong dependency on international fossil fuel prices** (with uncertain forecasts)

- Growing interdependency of the heating & cooling with the electrical sector (heat pumps, combined heat and power, other power to heat technologies)
  ➔ System solutions are necessary for the electric-heating-cooling system

- **Future heating & cooling demand is difficult to forecast, because it is strongly dependent on efficiency and comfort requirements** (building insulation, efficient technology and distribution,...)

- **Renewable energy sources (RES) are able to deliver 100% of the H&C demand, but**
  - demand must be is limited = high efficient system,
  - energy system must be optimized (right mix of local resources) and
  - the entire electrical-heating-cooling system must be optimized

- **Development of technologies and markets in heating & cooling is necessary**
  - there is huge market potential and huge potential on technological innovations
Thanks for your attention!

More information on RHC-ETIP at: www.rhc-platform.org

Contact

Rainer Janssen
WIP Renewable Energies
Sylvensteinstrasse 2
81369 Munich, Germany
www.wip-munich.de

Rainer.janssen@wip-munich.de