SEPEMO Build

Lessons learned – inputs to EUCERT
# SEPEMO-Build Partners & Contact

<table>
<thead>
<tr>
<th>Project lead partner</th>
<th>Project Coordinator</th>
</tr>
</thead>
</table>
| SP Technical Research Institute of Sweden  
Box 857, 501 15 Borås, Sweden  
www.sp.se | Roger Nordman  
Tel.: + 46- 10- 5165544  
roger.nordman@sp.se |

<table>
<thead>
<tr>
<th>AgentshapNL</th>
<th>Electricité de France R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.senternovem.nl">www.senternovem.nl</a></td>
<td><a href="http://www.edf.com">www.edf.com</a></td>
</tr>
<tr>
<td>Armines</td>
<td>Fachinformationszentrum</td>
</tr>
<tr>
<td><a href="http://www.armines.net">www.armines.net</a></td>
<td>Karlsruhe</td>
</tr>
<tr>
<td>European Heat Pump Association</td>
<td><a href="http://www.fiz-karlsruhe.de">www.fiz-karlsruhe.de</a></td>
</tr>
<tr>
<td><a href="http://www.ehpa.org">www.ehpa.org</a></td>
<td>Centre Scientifique et</td>
</tr>
<tr>
<td>Austrian Institute of Technology</td>
<td>Technique du Bâtiment</td>
</tr>
<tr>
<td><a href="http://www.ait.ac.at">www.ait.ac.at</a></td>
<td><a href="http://www.cstb.fr">www.cstb.fr</a></td>
</tr>
<tr>
<td>Fraunhofer ISE</td>
<td>Centre for Renewable</td>
</tr>
<tr>
<td><a href="http://www.ise.fraunhofer.de">www.ise.fraunhofer.de</a></td>
<td>Energy Sources and saving</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.cres.gr">www.cres.gr</a></td>
</tr>
</tbody>
</table>
SEPEMO-Build  *Main steps*

- **Main body of work:**
  - Collection and evaluation of past and present field measurements on HP systems.
  - Evaluation of existing methods for field measurement and calculation of HP systems SPF.
  - Development of a common methodology for field measurement of HP systems and calculation of SPF.
  - New field measurements on HP systems using a common methodology.
  - Improve and extend existing guidelines to include all types of HPs, for installation of HP systems, taking into account regional constraints as well as the building standard.
  - Information dissemination.
Some results from the project $\rightarrow$ EUCERT?

- System boundary concept $\rightarrow$ for comparison with other heating systems
- Monitoring of HP’s for proof of performance (SPF) $\rightarrow$ NREAP
- Monitoring concepts and quality of monitoring (GSHP, ASHP, A2A)
- Benchmarking other HP key numbers for better understanding
- Environmental aspects (TEWI, PE, CO2-eq)
- Experience of performance connected to quality of installation and user behaviour
System boundary concept → for comparison with other heating systems

- Visualise parasitic losses
- Visualise which components could be discarded for a fair analysis
Monitoring of HP’s for proof of performance (SPF)

Concept of REMBO
(following proposal of SEPEMO project)
Monitoring concepts and quality of monitoring (GSHP, ASHP, A2A)
Benchmarking other HP key numbers for better understanding


- Compressor
- Source pump/Fan
- Back-up heater


- Space heating
- Domestic hot water
- Cooling

Seasonal Performance Factor (SPF)

4.40
Carnot efficiency

- $\text{SPF}_{H1} + \text{Carnot Efficiency}$ give the possibility to check if the
  - heat pump unit is working properly
  - Operating conditions are fine

⇒ Without showing operating temperatures!!!

⇒ Calculation with average temperatures measured during operation of the unit

e.g.: high SPF + average $\eta_{\text{Carnot}}$ => system is fine
      low SPF + average $\eta_{\text{Carnot}}$ => bad operating conditions for the hp
Environmental aspects (TEWI, PE, CO2-eq)
Experience of performance connected to quality of installation and user behaviour
Maintaining the system...
Needs from EUCERT

• Content?

• Quality of presentation?

• Technical detail?