SEPEMO-Build

SEasonal PErformance factor and MOnitoring for heat pump systems in the building sector

Duration: 06/2009 – 06/2012
Contract N°: IEE/08/776/SI2.529222

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SP Technical Research Institute of Sweden

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SEPEMO-Build  Objectives

The project aims at
- Overcoming market barriers to a wider application of HPs, namely the lack of robust data on the conditions “in real installations” influencing reliability and seasonal efficiency, i.e. the SPF of HP systems in Europe.

- Developing a common methodology for field measurement of HP systems SPF. This requires respective a *systems perspective* including the efficiency of the HP unit and also the regional building standards and climate conditions.

- Improve the **understanding of key parameters influencing the reliability and efficiency of HP systems** in residential buildings, by improved quality assurance for HP systems in the building sector.

The project focuses on **all types of HPs** (air, water and ground) in **residential buildings**.

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The key objective is broader acceptance of heat pump systems and improved quality assurance for heat pump systems in the building sector.
SEPEMO-Build  What we do / Main goals

• Collection and evaluation of already running field measurements on heat pump systems.
• Evaluation of existing methods for
  • field measurement and
  • calculation of heat pump systems’ SPF.

• Development of a methodology to monitor heat pump systems SPF in a standardised way.
• Setting up new field measurements on heat pump systems using a common methodology.
• Improve and extend existing guidelines, to include all types of heat pumps, for installation of energy efficient and reliable heat pump systems taking into account regional constraints as well as the building standards.

• Information dissemination.
What we expect to achieve

• **A definition of systems boundaries** that includes the devices (pumps, controls, heat pump unit)

• **Field measurements** in which the energy demand will be measured **according to the definition**.

• Improve the understanding of **key parameters** influencing the reliability and efficiency of heat pump systems in residential buildings.

• **Contribute to overall goal of realising the potential** of heat pumps towards energy savings and emissions reduction.
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Expected Results

The results from the SEPEMO project will:

• Be a valuable input to estimating SPF for the Annex VII in the RES directive, and for EUROSTAT statistics.

• Lead to better insight in concepts and the differences in performance.

• Support the RES-directive in development of guidelines for system quality. Also it supports the possibility for certification of installers based upon system quality.

• Serve as benchmark for the EuP (ErP) Directive, both for the methodology planned in the directive to calculate the primary energy efficiency of heat pumps, and for the setting of class boundaries.
Supporting the RES-directive (Directive 2009/28/EC)

ANNEX IV

Certification of installers

2. Biomass, heat pump, shallow geothermal ... installers shall be certified by an accredited training programme or training provider.

Annex VII

\[ E_{RES} = Q_{usable} \times (1 - 1/SPF) \]

\[ SPF > 1.15 \times \frac{1}{\eta} \]

By 1 January 2013, the Commission shall establish guidelines on how Member States are to estimate the values of \( Q_{usable} \) and \( SPF \).

SEPEMO supports both these actions!
Proposed model

\[ Q_{\text{usable}} = \text{amount of sales (kW)} \times Q_{\text{usable factor}} \]

\[ E_{\text{RES}} = Q_{\text{usable}} \times (1 - 1/\text{average SPF}) \]

SPF is here the average seasonal performance factors per technology split by energy source. It should be regularly updated, with data from field studies and surveys.
SEPEMO contribution

• Systems boundaries

• Measuring methodology

• Field measurements
Systems boundaries, needed for a common view
Systems boundaries, needed for a common view
Example

$$SPF_{H2} = \frac{Q_{H\_hp} + Q_{W\_hp}}{E_{S\_fan/pump} + E_{HW\_hp}}$$
Measuring methodology

• Common description of minimum measurement requirements (not equipment, but measurement resolution, calibration, stability, accuracy, …)

• Tradeoff between cost and quality of final result

→ SEPEMO aims at +- 5-10% accuracy on SPF (work in progress)
Field measurements

46 new field measurements

In 5 European countries
# SEPEMO-Build

## Partners & Contact

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

| SenterNovem  
[www.senternovem.nl](http://www.senternovem.nl)  
Armines  
[www.armines.net](http://www.armines.net)  
European Heat Pump Association  
[www.ehpa.org](http://www.ehpa.org)  
Arsenal research  
[www.arsenal.ac.at](http://www.arsenal.ac.at)  
Fraunhofer ISE  
[www.ise.fraunhofer.de](http://www.ise.fraunhofer.de) | Electricité de France R&D  
[www.edf.com](http://www.edf.com)  
Fachinformationszentrum Karlsruhe  
[www.fiz-karlsruhe.de](http://www.fiz-karlsruhe.de)  
Centre Scientifique et Technique du Bâtiment  
[www.cstb.fr](http://www.cstb.fr)  
Centre for Renewable Energy Sources  
[www.cres.gr](http://www.cres.gr) |