iSERV Workshop – Continuous Monitoring and Benchmarking of Heating, Ventilating and Air-Conditioning systems

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Hotel Timisoara, Room: LONDRA ROOM

Friday, April 20th, 13:30 -15:00

Aims of Workshop

The objective of the workshop is to explore the benefits and implementation of the continuous energy monitoring and benchmarking of HVAC systems as a means of achieving robust improvements in in-use energy efficiency, and as an alternative route to compliance with EPBD requirements for the Inspection of HVAC systems.

A fully web-based database solution has recently been implemented by the iSERV project to help answer this question. The workshop aims to involve HVAC system owner/operators/specifiers; HVAC system/component manufacturers; HVAC system designers/consultants; and monitoring system providers in looking at progress to date and assessing how to overcome current and future barriers to the implementation of such an approach.

The workshop is based on the European Intelligent Energy Europe (IEE) iSERV Project, www.iservcmb.info, which started in May 2011 and finishes in May 2014.

Equipment	Electrical consumption as % of total EU use in 2007
Air conditioning units and chillers	0.75
Fans in ventilation systems	3.34
Pumps	1.81
Space and Hot Water Heating	5.23

Joint Research Centre, Institute for Energy, 2009

Background

According to the EC's Joint Research Centre (2009), Heating, Ventilation and AC (HVAC) systems in the 27 European Union Member States were estimated to account for approximately 313 TWh of electricity use in 2007, about 11% of the total 2,800 TWh of electricity consumed in Europe that year.

HVAC systems must therefore be a key contributor towards energy savings if the EU is to reach its target of reducing energy use by 20% by 2020.

The iSERV project is based on two of the major findings from the 3-year duration IEE HARMONAC project which concluded in late 2010. These findings were:

- That the current EPBD Inspection requirements were likely to miss over 60% of the potential energy savings available in operational AC systems, and that long-term detailed measurements obtained by HARMONAC from operating AC systems were shown to be

capable of identifying many additional control and other issues which short-term Inspections could not hope to find.

- The second major finding was that potential energy use reductions achievable in the systems investigated ranged up to 60% in individual systems, with savings over 15%+ being common.

The findings from HARMONAC led to the addition of a new option in the recast EPBD which allowed the use of automatic monitoring systems as an alternative to the Inspection of HVAC systems.

The use of detailed in-use energy consumption measurements are the basis of iSERV, along with a web-based database system which relates them to the HVAC components and the activities served by these components.

The project is looking to recruit around HVAC 1600 systems from around Europe to participate in the project, and the REHVA Timisoara Conference will be one of the launch events for the database and this recruitment.

Both REHVA and CIBSE are full Partners in the project, and will be using the data arising from this project to help provide professional guidance in the form of benchmark ranges of expected energy use by HVAC components servicing specified end use activities.

A further major focus to the project is that it acknowledges that best practice and innovative behaviour/designs in energy efficient HVAC systems are not the preserve of any one sector or organisation, but can be found across Europe. The project database provides a rapid and independent means of finding and highlighting these approaches so that they can play a part in reducing Europe's overall HVAC energy use.

iSERV therefore offers an important European-wide opportunity to all stakeholders involved in managing the energy use of HVAC systems to understand how they are performing against yet to be produced benchmarks and/or demonstrate the in-use energy efficiency achievable by various HVAC system approaches.

Workshop Objectives

The overall objective of the workshop is to obtain delegates feedback and thoughts on the initial outputs from the project, and to participate in suggestions as to how this approach might be made to work for all stakeholders.

One of the potential aims is for the iSERV approach to act as a means of rewarding proactive behaviour by stakeholders in reducing their HVAC systems energy use. This might be through easing the regulatory burden where good practice/behaviour/energy efficiency can be demonstrated or through other approaches yet to be proposed.

This approach can therefore act as a means of improving the overall energy efficiency of HVAC systems in Europe, as well as allowing the best practice approaches of individual organisations to become visible and celebrated.

It is important to note that the workshop aims to find practical solutions to implementing such an approach and the topics shown below are intended to facilitate this. The workshop topics to be covered will not be fixed until the workshop itself, so that they can be made relevant to the attendees interests, but they are likely to be organised around the following areas:

Topic 1: Acceptable levels of data requirements to enable participation

- How much data is it reasonable to provide to such a scheme?
- Evaluation of iSERV Excel data input sheet

Topic 2: Barriers to participation

- What incentives/rewards would be required to trigger participation in such a scheme as opposed to a Business As Usual approach? For example, ability to avoid mandatory Inspections? Assistance in initial setup?
- What are the main barriers to adopting such a scheme as opposed to undertaking intermittent physical inspections?

Topic 3: Data collection systems

- What are the options for data collection systems that would be acceptable to owners/operators and HVAC component manufacturers?
- Can existing systems, such as BMS, be used?
- What performance related data parameters would you like to see recorded?

Topic 4: Information produced by the iSERV system to stakeholders to drive systematic improvements in HVAC system energy efficiency

- Discussion of the existing outputs from the iSERV system to enable HVAC system energy improvements to take place. What do stakeholders want to see?
- What form should this information take (frequency, delivery, audience, etc)?

The workshop will be organised along topic lines. The exact details will depend on the delegates attending and the topics of interest to them. A workshop sign-up form will be distributed prior to this workshop allowing further topics to be proposed if desired.

Who should attend?

The workshop is intended for anyone with an interest in the design, operation and energy efficiency of HVAC systems in buildings.

Workshop Outputs and Impacts

Impact on legislation

The iSERV project has an important profile in Europe, both as the largest single project ever funded by EACI and because the potential for monitoring to reduce regulatory burdens in many areas is one that is being actively explored. The project has already been presented to the EU Member States regulators responsible for transposing the recast EPBD into National Legislation and they are keenly awaiting further information on the impact of the approach to see if it can help their Member State become more competitive.

It is anticipated that there will be important points made by the workshop participants and some of these will find their way to the EU MS legislators in the form of suggestions and observations.

Participation in iSERV

It is expected that a number of delegates attending the workshop will wish to become involved in trialling the iSERV approach over the remainder of the project through providing suitable HVAC systems. Other delegates might wish to explore how system components might be designed or amended to allow more immediate use in the approach proposed e.g. through altering software or hardware to allow capture and transmission of the required data to the internet.

Improvement of iSERV database and process

The results of the workshop will be used to improve the iSERV project as well as to potentially alter its interaction with existing and proposed Inspection Methodologies.

The results will also be used to develop REHVA activities in the area of A/C Inspection – possibly resulting in a joint ASHRAE/REHVA publication in this area.

Publications and guidelines

It is anticipated that an output from the workshop could be guidelines on an agreed set of parameters to be monitored to enable an HVAC component or system to participate in this approach. The parameters would be those needed to demonstrate that a system is performing well enough to meet yet-to-be-defined standards/benchmarks. Other publications may arise as a result of insights and requests made at the workshop.

Tentative programme

Chair: Ian Knight, Cardiff University, UK

Co-chairs: Alex Vanden Borre, REHVA,

Zoltan Magyar, Pecs University, HU

Time	Topic	Involved	Organisation
13:30	Introduction to iSERV	Ian Knight	Cardiff University, UK
13:50	Small group discussions	All delegates	
14:30	Presentation and discussion of main findings by topic groups or sector. 5 minutes per presentation	Nominated presenters	
14:55	Conclusions and future actions	Ian Knight Alex Vanden Borre Zoltan Magyar	Cardiff University, UK REHVA, BE Pecs University, HU