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NEWSLETTER – 3 – SEPTEMBER 2012

Inspection of HVAC Systems through continuous monitoring and benchmarking



welcome – welcome – welcome – welcome – welcome – welcome – welcome



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Welcome to the third iSERVcmb Newsletter,

The project is nearing its halfway stage and has made good progress over the last 17 months. We have just assembled our first set of HVAC component benchmarks, and are now able to produce a first indication of bespoke in-use energy consumption benchmark ranges for specific HVAC systems. This means the iSERV database can also now go 'live' and it is undergoing its final tests before being released for end users to access.

This issue of the newsletter focusses on the contributions of the Project's Industry Steering Group and other organisations who have signed up to the iSERVcmb concept and will be trialling the database. The organisations cover the full range of stakeholders in the energy use of HVAC systems from end-users through to HVAC component manufacturers.

The newsletter also provides hyperlink access to parts of the project website that will allow access to the various resources gradually being assembled – in particular registration to the project and how to participate in the project for anyone looking to understand more about the 'in-use' benchmarking of HVAC systems. This builds on the introduction to the website and database in Newsletter 2 but reflects the release of the 'live' database.

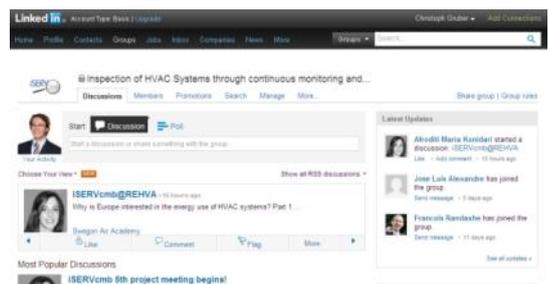
I look forward to welcoming further interested parties into the project over the second half of the project, whether just to understand what is being produced or to participate by providing information which can be used to refine the many 'in-use' energy benchmarks by activity starting to emerge from the project.

Ian Knight



Join us on

Stay up to date and get involved in discussing topics surrounding project iSERV - join the iSERV group on LinkedIn!





iSERV Steering Group – iSERV Steering Group – iSERV Steering –

The iSERV Steering Group members act as a reality check for the project as a whole, as well as providing invaluable practical advice and guidance. They perform a crucial role in the overall project.

The members of the Group, which represent manufacturers within the field of HVAC, currently come from Skanska, Swegon, and Camfil Farr.

To date, the Steering Group has specifically helped with providing potential building contacts to the project as well as completing a risk assessment of the database indicating where further work might be required to make the approach acceptable to industry. The next part of this Newsletter introduces the representatives of the Steering Group.

Peter Dymant
Technical Manager
Camfil UK Ltd.



What is the role of your company in the HVAC sector?

Camfil Farr is the world leading manufacturer of air filtration products and provider of associated services. The company's annual turnover is 435 million pounds with 24 plants and many laboratories with a main technology research centre in Trosa, Sweden. Camfil has a truly international capacity to support all air filtration projects.

The largest sector of business is HVAC air filtration which is typically 35% of the national market by value. Camfil has designed Low Energy Air Filters to give optimum clean Indoor Air Quality for buildings with minimum use of energy.

Why did you get involved in iSERV?

Camfil recognises the need to use energy efficiently and thereby reduce CO₂ emissions.

iSERV encourages and informs HVAC Plant managers to take action to use minimal energy.

What do you think will be the most important outcome from the iSERV project?

To enable delivery of significant building HVAC plant energy savings by means of ECO's and benchmarking. Camfil itself has made a 40% energy related total cost reduction over the last two years.

The iSERV Steering Group is our reality check – and it provides invaluable practical input.

John Woollett

Project Manager

Swegon AB

Petra Vladykova

Project Manager

Swegon Air Academy



What is the role of your company in the HVAC sector?

Swegon AB manufactures and sells products and solutions for ventilation and indoor climate systems. Our mission is to provide good indoor air in buildings to make people feel better.

Why did you get involved in iSERV?

We believe that this project will not only contribute to improving European legislation related to buildings but it will also reveal the actual energy consumption in various HVAC systems and buildings.

What do you think will be the most important outcome from the iSERV project?

The most important to me is the actual and long-term energy monitoring of buildings which I believe should be mandatory for the majority of buildings. This will allow us to understand and control the building's systems along with the HVAC performance.

Per Kempe

Technical Manager

Skanska Installation AB



What is the role of your company in the HVAC sector?

Skanska is active in the fields of construction and project development, including commercial properties, homes and Public Private Partnerships. Skanska Installation is a part of Skanska that installs HVAC equipment, provides maintenance, energy analysis and operation optimization.

Why did you get involved in iSERV?

In our commercial projects that have high energy performance, we record many data streams (temperatures, flows, control signals, energy meters, etc.) in the control system, for energy analysis and operation optimization. It's very important to work with energy analysis and operation optimization to achieve high energy performance in practice. Furthermore,

it's important to develop better tools to make analysis and optimizations more time efficient.

What do you think will be the most important outcome from the iSERV project?

ECOs. iSERV helps end users identifying Energy Conservation Opportunities and provides them with practical recommendations to lower electricity consumption.



iSERV End Users – iSERV End Users – iSERV End Users – iSERV End Users

The following organisations are involved in iSERV somewhere in Europe and have given permission to be identified. At the time of writing this newsletter there are over 80 organisations using the iSERV project in some form or committed to providing data, with hundreds more to come.





iSERV public workshops – iSERV public workshops – iSERV publi

Three times a year, we invite the public to become better informed about our project at an iSERV workshop. Both the attendees and iSERV benefit strongly from these interactions.

3rd Public Workshop
Liège, Belgium
May 10, 2012



Our Belgian project partner, the University of Liège invited people interested in iSERV to Liège in May 2012. Participants from consultancies, manufacturers, science, and other companies discussed the benefits of involvement in iSERV and how to accurately provide system and building data with the help of the spreadsheet.

Some of the main drivers for participating identified by the participants present were:

- Identification of potential energy conservation opportunities and cost reductions for their specific HVAC systems
- Involvement in the definition process of European Benchmarks, influencing legislative actions
- Reducing costs on energy audits and inspections
- Free-of-charge use of the iSERV database, thus reducing financial barriers to participation



Dr. Ian Knight (left) and Francois Randaxhe (middle) during the public workshop in Liège

4th Public Workshop Athens, Greece September 13, 2012



National and Kapodistrian
UNIVERSITY OF ATHENS

The Athens Workshop took place on September 13, 2012. It was organised by iSERV project Partner the National and Kapodistrian University of Athens (NKUA). The focus of the workshop was primarily on issues surrounding Indoor Air Quality (IAQ) and how the iSERV project would account for this in deriving its benchmarks.

A main target for iSERV is to reduce the in-use energy consumption of HVAC systems in practice. Nevertheless, there is the possibility of a trade-off between indoor air quality and energy use. It would be easy to save electricity by switching off the air conditioning or reducing the ventilation provided by the HVAC system, but people working or living in the building would not be happy about the working conditions this would produce.

The topic is addressed by conducting indoor air quality tests in a sample of iSERV systems with the help of IAQ-kits produced to a specification suitable for use within iSERV (see picture below). The intention is to ensure that energy efficiency is not being obtained at the expense of comfort and air quality, as well as helping to differentiate required electricity consumption from unnecessary consumption.

Around 80 IAQ-tests will be carried out in selected systems by monitoring the concentration of CO₂, relative humidity, temperature, and volatile organic compound (VOC) levels in spaces served by HVAC systems participating in iSERV. During the workshop, which was attended by around 30 representatives from HVAC companies, universities, Greek Ministries, and real estate firms, Margarita Assimakopoulos explained how this will be done (see picture on the right) and discussed the first measurements being undertaken with a Greek HVAC company.



Margarita Assimakopoulos (NKUA) demonstrating a kit for monitoring indoor air quality

“I would like to express our excitement at participating in the iSERV project. The project provides much awaited indication that energy conservation through operational efficiency in buildings is finally beginning to draw the attention it deserves in Europe.”

Thanos Daskalopoulos
Business Development Director, Delphis Building Services



REHVA conference – REHVA conference – REHVA conference – REHV



REHVA Annual Conference 2012
Timisoara, Romania
April 17 - 20, 2012



Dr. Ian Knight during the workshop on iSERV at REHVA's Annual Conference in Timisoara, Romania

REHVA is a European organization which represents the interests of the professional building services organisations within Europe. It is dedicated to the improvement of health, comfort and energy efficiency in buildings and is one of the 12 partners participating in iSERV. The REHVA Annual Meeting and Conference took place in Timisoara, Romania and had been organised in cooperation with the Romanian Installation Engineers Association (AIIR), the Romanian General Association for Refrigeration (AGFR) and the "Politehnica" University of Timisoara. The conference focus was "HVAC Technology in Energy Retrofitting".

The conference brought together an international group of researchers, professionals and practitioners who routinely improve energy efficiency, operating costs, and environmental impacts of buildings. Speakers at the conference were top experts in their fields representing the European Commission and other important organizations and member states of the European Union.

On Friday, April 20th, a workshop on iSERV took place. The aim of the workshop was to explore the benefits of continuous energy monitoring and benchmarking of HVAC systems in helping to achieve robust improvements in terms of energy efficiency. Delegates discussed the iSERV approach and provided feedback on the initial outputs of the project. The session was organised by the iSERV Co-ordinator Ian Knight, REHVA representative Alex Vanden Borre and Zoltan Magyar from Pecs University in Hungary. Dr. Knight's presentation is available on the iSERV website.

"iSERV will change the guidelines on achieving energy efficiency in HVAC systems."

Olli Seppänen
REHVA General Secretary 2011

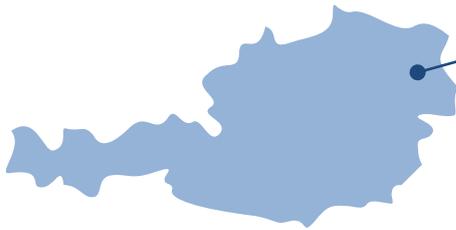


Download the iSERV presentation from REHVA's Annual Conference



announcements – announcements – announcements – announce

Next Public iSERV Workshop



Vienna, Austria

January 24, 2013

More information on specific dates and the location will be available soon on iservcmb.info

Further workshops will be organised in Slovenia (May 2013), Portugal (September 2013), Belgium (January 2014) and the UK (April 2014). The exact dates will be announced on www.iservcmb.info/events. Please register on the iSERV website to receive further information on exact dates and locations.

Other iSERV events

The iSERV Co-ordinator presented iSERV:

- To an invited professional audience on-board HMS Belfast in London on 18th June,
- At the UK's Association of University Engineers Conference in Keele University, Stoke-on-Trent on 6th September,

More presentations have already been scheduled: Dr. Ian Knight will present iSERVcmb in the Polish cities of Warsaw, Wroclaw, Poznan and Krakow on October 4, 5, 16, and 17 at Swegon Air Academy events. One more Swegon Air Academy seminar before Christmas 2012 is scheduled in Tallinn, Estonia, on November 22, 2012.

Other HVAC events

- ❄ **Chillventa 2012** - International Trade Fair for Refrigeration, AC, Ventilation and Heat Pumps
9 – 11 October, 2012 in Nuremberg, Germany
- ❄ **CIBSE Conference – Building Services 2012**
10 – 11 October, 2012 in London, UK
- ❄ **AIVC and TightVent Conference**
10 – 11 October, 2012 in Copenhagen, Denmark
- ❄ **AiCARR National Conference Italy**
19 October, 2012 in Bologna, Italy
- ❄ **EMES - 1st World Meeting on Energy Efficiency in Buildings**
21 – 23 November 2012 in Madrid, Spain



iSERV application – iSERV application – iSERV application – iSERV appl

This section of the newsletter is devoted to explaining how to participate in the project. Any HVAC system located in the EU that has some independent sub-hourly metering of its HVAC components can participate.



Watch the iSERV introductory video on You Tube!

One of the key elements of the iSERV project is the **online application**. This is fed with monitoring data from participating buildings, systems, and operators and provides a user interface for uploading, processing, analysing, benchmarking and reporting of this data. This is how each participant can access and benefit from this multi-functional tool:



1 Register online

www.iservcmb.info



Register your interest in participating in iSERV now!

To communicate your interest in participating in iSERVcmb you must first register in the iSERVcmb official website. Once complete, the iSERV Partner responsible for your Member States will contact you.

2 Provide system and building data

To provide you with meaningful analyses, we need to know some details about your HVAC systems and buildings. These should be provided using the bespoke Excel-based spreadsheet designed by the iSERV Partners which can be downloaded from the iSERV website following registration. This spreadsheet is currently available in English, Greek, Italian, Portuguese, Slovenian, Dutch, French, Spanish, Hungarian and German. More information on this spreadsheet is available in Newsletter 2. It allows the building owner to enter the following data:

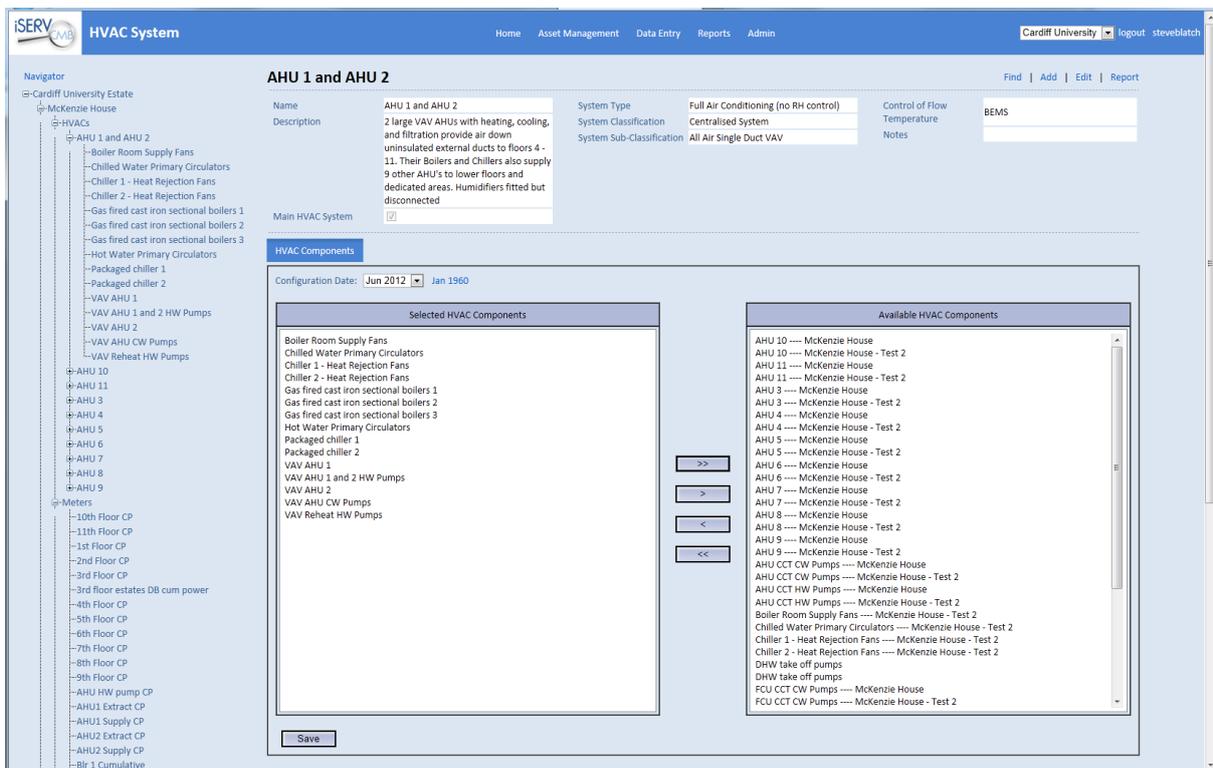
- Building description and the organisation it belongs to
- The spaces in the building showing the areas (m²) and activities served by the HVAC system(s)
- The HVAC system, its components and the meters
- The schedules for building occupation and HVAC operation

- The configuration of the building showing how (1) spaces are attached to HVAC systems and meters, (2) HVAC components are connected to HVAC systems, (3) meters are attached to components

Once this information has been entered for each HVAC system the participant wants to enrol, the participant emails the spreadsheet as an attachment to a designated email address which your local iSERV Partner will arrange to be sent to you. After doing so, you will receive your login data for the iSERV online application.

Once the building and system data is loaded into the iSERV database the user can log on to the iSERV application using a normal web browser to check that the building's spaces, meters, HVAC systems and components have been entered and configured correctly. At present the site is not optimised for mobile browsers.

If there are errors in the building data entered, or the system, spaces, meters, etc change in any way, then the user can use the online iSERV database to amend any of the details, including connections. Changes can be applied from a particular month to reflect normal Estate evolution without losing the original configurations. The image below shows the online HVAC System Add/Edit/Modify/Report screen.



Modify your HVAC components or building data online

On the left hand side of the screen is a tree navigation control. This control shows that the HVAC System: 'AHU 1 and AHU 2' belongs to Cardiff University's McKenzie House. The 'AHU 1 and AHU 2' node has been expanded to show the Components that make up the HVAC system. The fields below 'AHU 1 and AHU 2' give a summary of the HVAC systems characteristics. Below the summary details there are two configurable lists. The left hand list shows the selected Components. The right hand list shows available Components that, at present, are not included in the AHU 1 and AHU 2 HVAC system. The Find, Add, Edit and Report buttons on the top right-hand side of the screen allows the user to: add a HVAC system, alter the setup of the current HVAC system, and navigate to a different HVAC system or Report on the current system.

3 Upload your metering data

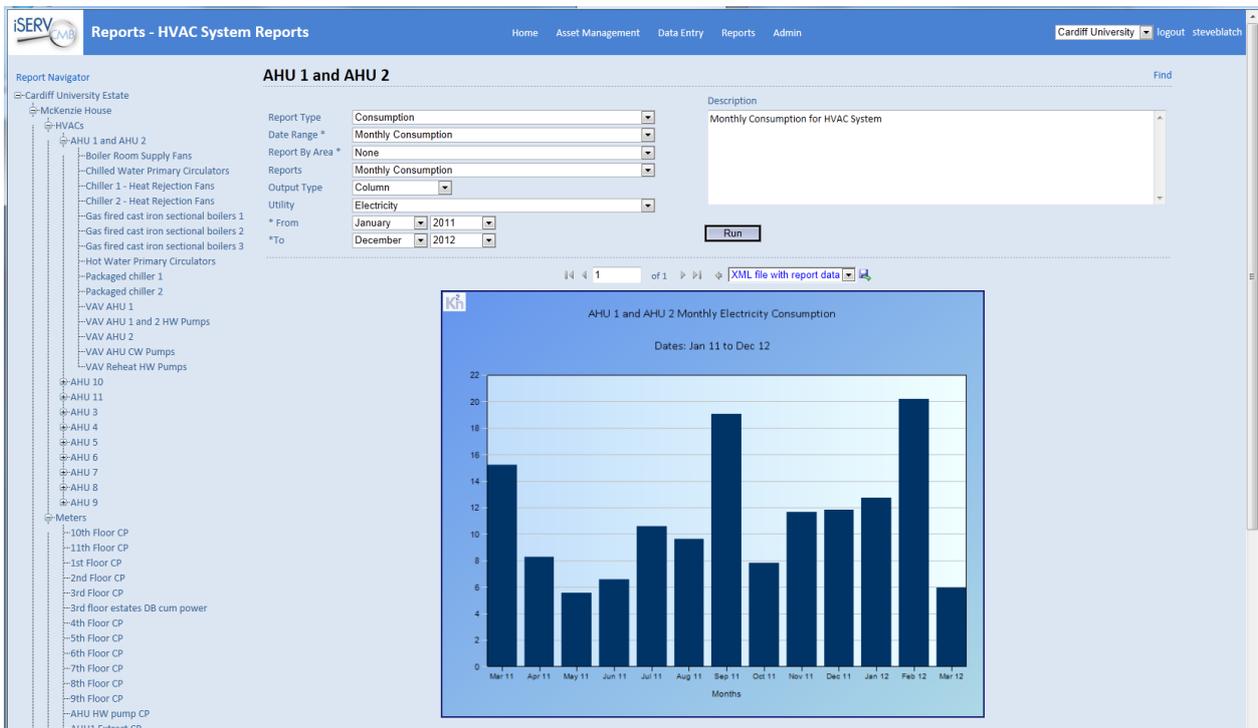
After registering your building with the online database, you should send your monitored data for all the meters you have connected. Usually this should include the electricity consumption of at least the Cold Generator (Chiller), but ideally for all the HVAC components in your system if you have suitable metering.

The time intervals between energy consumption data collection should preferably be less than one hour (ideally 15 minutes) and ideally in the form of meter readings not just consumption in a time period.

To provide you with useful and timely analyses, this data should be sent at least once a month. You can send your data through (1) automatic built-in web server transmission, (2) e-mail or (3) via direct manual data entry on your account.s

4 Get your analyses and benchmarks

You are now ready to produce reports on your system’s performance. The image below shows an example online report screen at the level of a HVAC System. There are many other reports available and more will be added during the project as further insights become available.



Get the energy performance of your HVAC system analysed online and sent to your inbox

The dropdown control above the graph allows the report to be exported in the following formats: Excel, Word, PDF, XML and HTML. During the project period, iSERV will produce key reports which will run automatically at monthly intervals each time a certain level of consumption data is uploaded. This will include exception reports which run only where there are issues to highlight, including Energy Conservation Opportunities (ECO’s). These

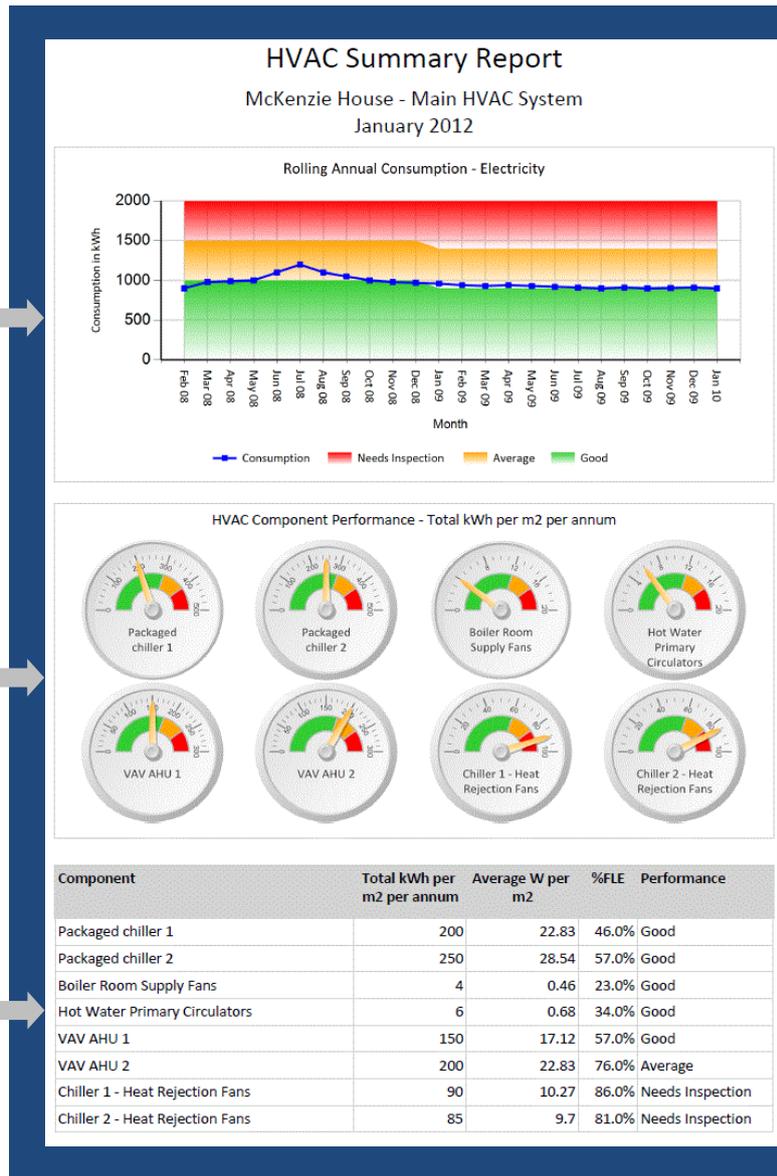
reports will reflect the findings of the iSERV project on what needs to be known to reduce the energy consumption of HVAC systems in-use.

An example of this is the following high-level summary report. This report provides an easy to read dashboard for the main HVAC system. In short, the tool will be able to provide you with quantified suggestions on how to lower electricity consumption and operating costs in regard to your specific HVAC system serving the specific activities noted.

The first graph shows the rolling annual consumption for the HVAC systems electricity usage. The blue line denotes the rolling annual consumption per m² against the automatically generated benchmarks for this HVAC system and its components. The red shaded area shows a level at which the HVAC system is performing poorly and should be inspected. The amber shaded area shows average performance, whilst green shows good performance. This graph therefore shows that the system as a whole is operating between good and average.

The second report shows the same type of benchmark and consumption information as above but represented as dials for the individual Components that make up the HVAC system. The graphical layout lets us quickly identify that the Chiller 1 - Heat Rejection Fans and Chiller 2 - Heat Rejection Fans have a problem and need to be inspected.

The third report again shows the same information as text.



As the iSERV project progresses we expect to be able to present this information in cost terms as well by allowing the end user to enter electricity cost information to produce estimates of financial savings to be made.

The HVAC system benchmarks are also expected to evolve quite significantly in the early period as more information becomes available, this is why it is important that we receive information from as wide a range of sources as possible to provide the statistically robust basis needed for the benchmarks to become useful guides to what it is possible to achieve in HVAC systems 'in-use'.



project partners – project partners – project partners – project partners

Welsh School of Architecture, Cardiff University UK (Project co-ordinator)		K2n Ltd UK	
MacWhirter Ltd UK		National and Kapodistrian University of Athens Greece	
University of Porto Portugal		Politecnico di Torino Italy	
Université de Liège Belgium		Univerza v Ljubljani Slovenia	
University of Pecs Hungary		Austrian Energy Agency Austria	
REHVA EU		CIBSE UK	

iSERV Steering Group Members:

SWEGON AB		Camfil Farr		SKANSKA	
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