What could be saved?

Savings of up to 33% in a building's total electrical energy use – often for little capital outlay.

Annual energy savings around 9% - 15% on average.

Projected annual electrical energy savings across the EU Member States are 0.3 to 5% of its total annual primary energy use.

Projected annual electrical cost savings between €1,400M - €60,000M, based on achieved savings in operational buildings.

Time – staff resources, time spent investing in the wrong areas, quicker reduction of unnecessary resource use.

"Project Overview"

at www.iservcmb.info/results for more detail.

Have these savings been checked?

The project concurrently measured Indoor Air Quality in a sample of 62 systems across **Europe and Physically Inspected 64 iSERVcmb HVAC** systems.

These tests showed that individual system findings from the iSERVcmb process generally reflected the observations from the Inspections, and the IAQ measurements did not reveal problems concerning Indoor Air Quality being achieved, based on currently accepted IAQ standards.

"Indoor Air Quality" and "Physical Inspections" at www.iservcmb.info/results for more detail.

What do the **Professional Associations say?**

The iSERV data entry spreadsheet is an invaluable tool for gaining an overall understanding of the HVAC system described and for collating information essential for Inspections."

Hywel Davies, CIBSE

SERVcmb will change the quidelines on achieving energy efficiency in HVAC systems."

Olli Seppänen, REHVA

he reports produced within the iSERVcmb will be a useful information regarding real energy use of HVAC&R products."

Sylvain Courtey, Eurovent Certita Certification

Where can I find out more?

Cardiff University Ian Knight – Co-ordinator knight@cf.ac.uk

Intelligent Energy - Europe (IEE) SAVE Project IEE/10/272 May 7th 2011 to May 6th 2014

Project results:

http://www.iservcmb.info/results

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HOW ENERGY EFFICIENT ARE YOU REALLY?



PROJEC1

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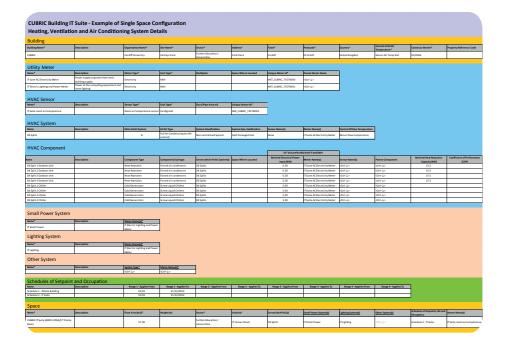




INSPECTION OF HVAC SYSTEMS THROUGH CONTINUOUS MONITORING AND BENCHMARKING

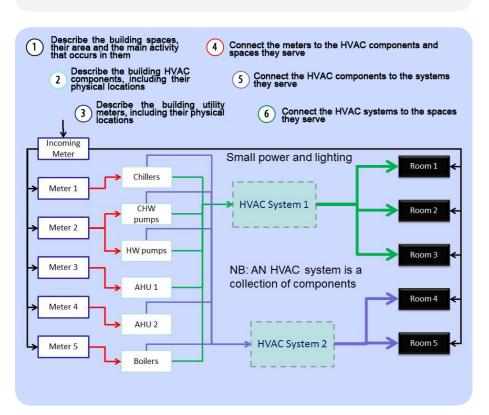
How should you describe a building to **reduce** its **energy use?**

Common format to allow comparison between buildings and systems throughout Europe



Physical asset descriptions allow actions to be focussed

Understand what connects to what



"iSERVcmb Spreadsheet"
at www.iservcmb.info/results for more detail

The industry's view

iSERVcmb is the independent evidence which can sort out the wheat from the chaff."

John Woollett, Swegon AB

The iSERVcmb database provides a good first step on the road to help ensure healthy sustainable buildings for the next generations of people working in our city based economies."

Peter Dyment, Camfil Farr Ltd

How much **energy** and **power** should my building services systems use?

Measured figures for operational energy use and power demands from EU buildings and systems

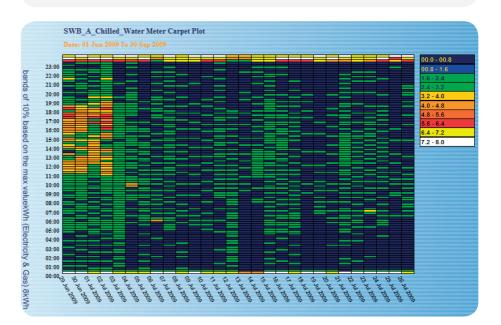
Activity Name		Sample Size			All in One Systems				Dehumidification	Heat Generators		Heat Pump		Heat Recovery		Heat Rejection		Pumps		Terminal Units	
			AVG	SD	AVG	SD	AVG	SD	AVG SD	AVG	SD	AVG	SD	AVG	SD	AVG	SD	AVG	SD	AVG W/m2	50
ssembly areas / halls	Electricity	23	2.37	3.55			0.43	0.46		0.00	0.00	3.23		0.04	0.00	0.01	0.00	1.92	3.74		
athroom	Electricity	- 6	0.55	0.38	_		3.92			_		_		_						_	
edroom	Electricity	24	6.79	0.83			7.53	6.31		_				_		_					
atering: Bars	Electricity	11	3.75	1.03			9.63			1.71	0.33							3.66			١,
atering: Eating/drinking area	Electricity	102	4.21 13.54	6.42 22.14	9.10	110	5.45	7.80 40.76		0.11	0.42	3.36	0.91	0.16	0.00	3.03	7.39	0.53		0.71	H
atering: Full Kitchen Preparing Hot Meals	Electricity				9.10	1.19									0.00		0.00				
atering: Kitchenette (small appliances, fridge and sink) atering: Limited Hot Food Preparation Area	Electricity Electricity	38	18.47 7.81	47.76 7.72	10.62	2 70	1.07 5.64	2.72 5.13		0.25 2.93	0.51 10.91	3.23		0.16		0.01	0.00	0.44	0.55	0.06	-
atering: Limited Not Food Preparation Area atering: Snack Bar with Chilled Cabinets	Electricity	39	6.13	5.88	10.62	2.79	1.48	1.00		0.20	0.27	3.75	1.58	_		0.02	0.00	0.79		0.08	
atering: Snack Bar with Chilled Cabinets atering: Vending Machines	Electricity	39 15	2.36	2 79	10.62	2.78	1.48	1.00		0.20	0.27	3.75	1.58	_		0.02	0.00	0.45		0.23	
atering: Vending Machines ellular Office Area	Electricity	297	2.36 1.55	3.27			4.64	1.49 4.78	0.01	0.00	0.61	8.58	33.96	0.16	0.00	0.02	0.00	0.75		29.53	16
ellular Office Area - multiple occupation	Electricity	119	5.79	8.07	9.10	1.19	2.40	2.34	0.01	0.29	0.81	1.07	0.53	0.16	0.00	5.61	7.04	0.26		0.31	
irculation area (corridors and stainways)	Flantricity	453	1.60	4.01	0.76	1.19	3.45	5.51	0.01	0.06	0.27	2.81	1.23	0.16	0.00	1.00	2.60	0.51		0.31	
onsultine/treatment room	Electricity	403	2.06	157	0.76	-	4.97	4.69	0.01	0.03	0.15	0.95	1.23	0.16	0.00	1.41	2.80	0.56		1.82	Н
ept Store Sales area - chilled	Electricity	43	6.58	5.56			13.50	9.51		0.03	0.03	0.95		_		141	2.80	0.56	0.00	1.62	
ept Store Sales area - critied ept Store Sales area - general	Electricity	199	4.34	4.76	9.16	6.18	4.36	3.32		_		1.40	1.72	_		0.83	0.98	1.44	0.99	0.52	
ept score sales area - general Saznostic Imaging	Electricity	21	13.06	14.55	9.10	0.18	4.30	3.32		0.06		5.65	1.72	_		0.63	0.96	3.44		2 37	
shibition rooms, museum	Electricity	20	8.59	2.34	-		1.44	1.26		0.00		243	_	-		0.05		0.19		2.37	\vdash
shibition rooms, museum	Electricity	37	0.32	2.34 0.66			6.56	1.26 8.01		1.91		1.17	0.91			0.05			0.16		
eneric Checkin areas	Electricity	37	16 10	26.23			8.85	9.28		6.90	174	2.17	0.91			0.03		0.07	u.07		
eneric Ward leavy Plant Room	Electricity	5	0.17	26.23	-		0.02	9.28		6.90	1.74	-		_		_		_	-		\vdash
eavy Plant Room dustrial process area	Electricity	17	0.17	0.13			0.02	0.00		-											
dustrial process area : High Density IT Suite	Electricity	39	5.78	3.65	17.55		16.74	13.38		0.07	0.16	4.21		0.16		0.05	0.09	0.43	12.09	1.65	
: High Density IT Suite	Electricity	39 41	3.78	5.85	4.65		100.84	196 37		0.07	0.16	4.21	-	0.16		0.05	0.09			2.85	
: LAN Rooms : Server Room	Electricity	112	5.44	9.37	53.66	49.38	175.82	196.37 221.49		0.06	0.15	0.50	0.20	0.16		4.11	12.10		41.39	6.01	
: Server Room aboratory	Electricity	112 87	33.50	9.37 33.20	53.86	49.38	21 54	221.49 34.04		0.07	0.13	6.78	10.20	_		0.11	12.10	23.94		29.39	
boratory boratory - Sterile	Electricity	2	5.83	33.20	-		21.54	34.04		0.13	0.21	0.78	10.76	_		0.11		1.10	1./1	29.39	- 20
	Electricity		37.05	27.92						_				_							
boratory with fume cupboards	Electricity	16 22	16.76	27.92 15.85	_		7.66	1.32		0.01		1.15		_		0.13	0.03	0.71	0.62	_	
aundry acture theatre		56	17.58	15.85	-		2.88	5.17		0.01	0.38	_		_		0.08	0.13	12.18		3.80	⊢
	Electricity			19.99						0.25						0.08		0.42		3.80	
brary - open stacks	Electricity Electricity	19 20	0.97	3.63	_		0.20	0.24 7.15		0.12	0.22	6.64	4.75 5.47	0.16		0.02	0.00	0.42		_	
brary - reading room brary - starks and storeroom		12	5.05	14.08	-		0.24	7.15	0.01 0		0.26	6.13	5.47	0.16		0.06	0.07	0.27		_	
	Electricity								0.01 0.			_									
fts sht Plant Room	Electricity Electricity	46 128	0.79	0.50	_		0.42	0.31		0.10	0.20	_		0.16	0.00	0.00	0.00	0.81		_	
					_									0.26	0.00		0.00				
ounges Section Boom	Electricity Electricity	52 95	4.67 5.74	6.61 7.40	18 98	12 92	8.11	13.52		0.00	0.00	3.23	2 90	0.16		0.01	2.23	0.69		1.54 7.64	
feeting Room fulti-storey car parks (office and private use)	Electricity	95	0.01	7.40	18.98	12.92	6.76	13.04		0.27	0.54	3.19	2.90	0.16		0.89	2.23	0.79	1.34	7.64	-3
					-					_		_		_							
lursery	Electricity	25	1.67	1.88			12.67			_		_		_					0.30	3.14	
pen Plan Office Area	Electricity	298	4.90	12.41	7.95	1.58	5.81	7.72		0.03	0.08	6.02	5.67	0.04	0.00	2.79	3.91	0.71	0.95	0.95	
operating Theatre	Electricity	29	20.48	9.69	_		7.57	0.10		_		_		_					_	_	
hysiotherapy Studio	Electricity	- 4	2.99				13.73	0.17		_		_		_							
ost Mortem Facility	Electricity	3			_		7.57	0.10		_		_		_							
leception	Electricity	95	0.80	1.49	0.53	-	1.87	2.13		0.11	0.21	1.86	1.70	_		0.51	1.29	0.44		1.66	
ecreational : Changing facilities with showers	Electricity	69	11.61	18.93	_					0.02	0.02	PARKET		_				0.37		0.64	
tecreational : Fitness Studio	Electricity	3	2.48	1.43	28.06		2.30	1.39		0.00				_		0.01	-	0.09			
ecreational : Fitness Suite/Oym	Electricity		8.24	13.69	28.06		1.73	1.59		0.00	0.00	_		0.04	0.00	0.01	0.00	0.21	0.32		
lecreational : Recreational Pool	Electricity	1	_		_					39.28		_		_							
ecreational : Sports ground changing rooms	Electricity	10	11.85	12.35	39.32					0.01	0.02			_				0.49		1.88	
etail Warehouse Sales area - chilled	Electricity	21	4.30	11.32	_		3.35	0.44						_				2.17	2.24	0.76	
etail Warehouse Sales area - electrical	Electricity	9	1.49	2.03	_					_		_		_					_		
etail Warehouse Sales area - general	Electricity	82	1.37	2.49	11.40	15.55	2.10	2.29		0.04	0.05	0.54				0.31	0.13	3.50		0.76	
mall Shop Unit Sales area - chilled	Electricity	14	0.81	0.63			0.89	0.89						_		0.13		0.51	0.52	2.17	
mall Shop Unit Sales area - electrical	Electricity	2	4.40				6.52														
mall Shop Unit Sales area - general	Electricity	84	1.95	1.37	9.95	2.21	8.38	8.55				6.65	10.04			0.92			1.41	9.67	
sectator area (theatres and event buildings)	Electricity	3	5.84				2.74	1.19		1								1.20		6.74	
tage (theatres and event buildings)	Electricity	14	2.23	0.91			9.16	12.70								0.02		0.71			
orage Area/Cupboard	Electricity	236	2.99	6.38			0.87	1.21		0.11	0.28	2.11	1.79	0.16	0.00	0.18	0.44	1.41		3.16	1 2
eaching Areas	Electricity	85	3.58	4.24			0.97	0.95		0.09	0.18			0.16				0.52			
pilet	Electricity	340	2.19	5.87	7.61	1.93	0.79	1.11		0.10	0.22	1.51	0.96	0.16	0.00	0.02	0.03	0.38		10.39	
noccupied space	Electricity	24	0.40	0.54			0.68	0.33		0.01								0.39			
Faiting Rooms	Electricity	14	2.39	1.93			2.81	6.23		0.01	0.00					0.01		0.31	0.43		
Varehouse storage	Electricity	94	1.06	1.05			1.21	1.23								1.57	2.17			0.31	
forkshop	Electricity	40	44.09	39.92			5.07			0.13	0.21	195						0.02		1.18	

"Power and Energy Benchmarks"
at www.iservcmb.info/results for more detail

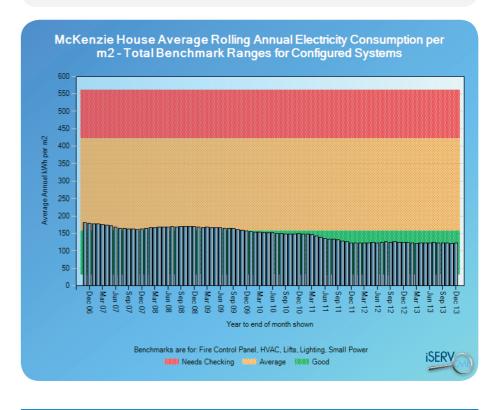
What happens when you understand where the energy goes?

Confidence to invest

Better control



Sustainable energy savings



"iSERVcmb Case Studies"
at www.iservcmb.info/results for more detail