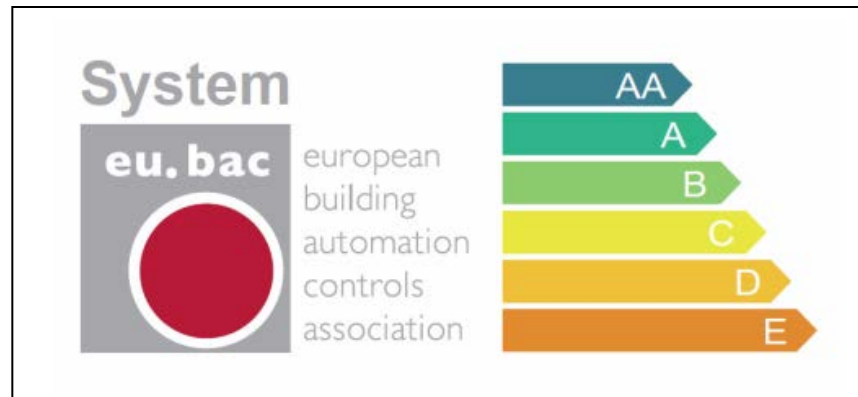




# eu.bac System

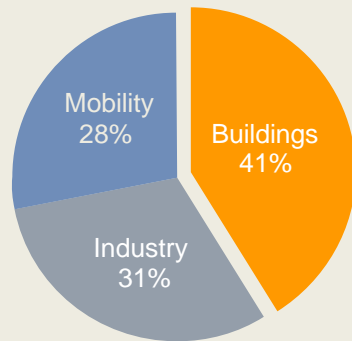


## Energy Efficiency with: **Building Automation Control Systems (BACS)**



# eu.bac Vision statement

40% of the world energy consumption\*



"A world where energy-efficiency and sustainability in every building is achieved through the optimal application of building controls, automation systems and services."

eu.bac is the European Building Automation and Controls Association. Founded in 2003 it represents the European manufacturers for Home and Building Automation and Energy Service Companies.



## Facts about Buildings 10-80-10

1-5 Yrs. **10%** = **Design & Build Capital Cost**

15-20 Years **80%** = **Operational Costs over the use of the Building.**  
**(40% of this value is Energy)**

**10%** **Deconstruction Capital Cost**

**Design Right with EN15232**

Operational cost must be considered over Capital Cost to ensure the life cycle efficiency of the building.

**Save Energy with regular eu.bac audits**

\*International Energy Association, auf weltweiter Basis, im Jahr 2002 / \*\* Dena Congress, Berlin, 2008 / \*\*\* „Global Mapping of Greenhouse Gas Abatement Opportunities up to 2030“



# The eu.bac System

## System



The eu.bac System Label assures the BACS has been assessed according to EN15232 and highlights the potential to control the building systems in the most energy-efficient way.

## Mission

- Promoting best practice of energy-efficient control applications
- Use of intelligent controls to support sustainable energy efficiency buildings
  - Testing – Evaluation – Labeling
  - Ensuring conformity to European directives and industry standards
  - Sustaining through re-certification
- Identifying improvement measures through BACS enhancement



# Proactive implementation of European directives



## Requirements for inspection schemes and building certification

European Energy Performance of Buildings Directive (**EPBD**)  
Start: 2002/91/EG  
Current version: 2010 recast



## Methods for evaluating the influence of building automation on the energy consumption of buildings

**EN 15232:** Energy Performance of Buildings – Impact of Building Automation, Controls and Building Management  
Start: 2007  
Current version: 2012

System



## Certification scheme for assessing the building automation functions with impact on energy efficiency in buildings

**eu.bac System** Audit and Label  
Start: 2013  
Current version: 2015

Legislation

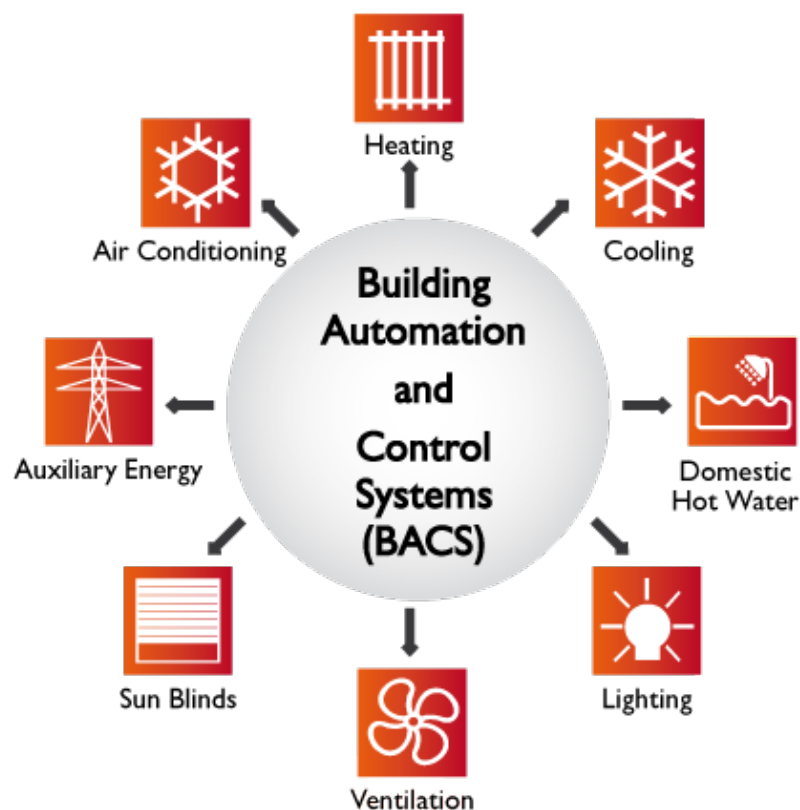
Standardization

Certification





# Intelligent integration of systems



**BACS binds all systems together through efficient controls strategies.**

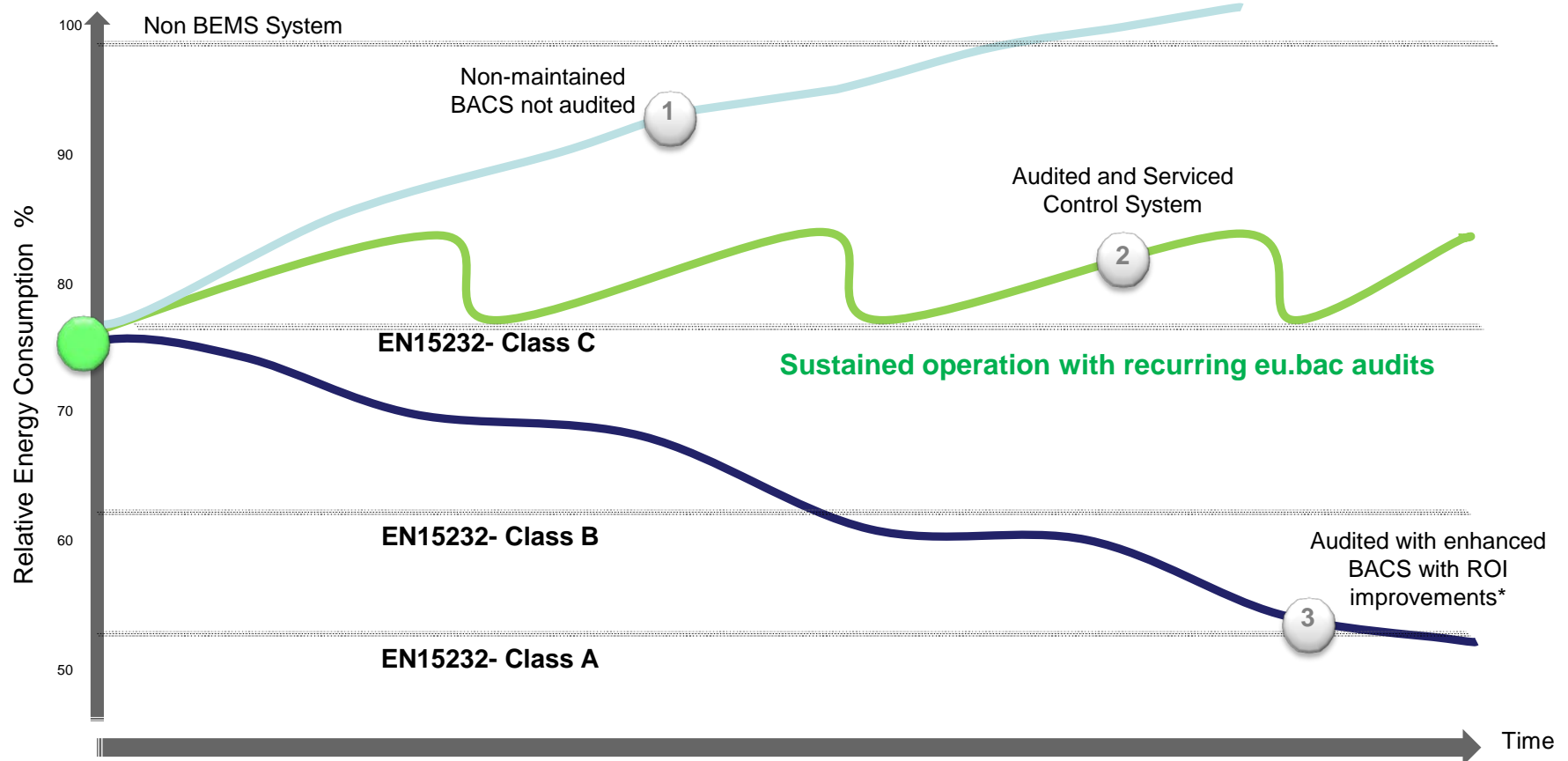
**Control systems are essential to save energy.**

**A recent study\* estimated potential savings of 3.4 GT (gigatonnes) CO<sub>2</sub> by 2035**

\* The scope for energy and CO<sub>2</sub> savings in the EU through the use of building automation technology, European Copper Institute, 2014



# Energy-efficient and sustainable operation



\*For illustration purposes only, energy savings will vary from site to site



# EN 15232 Weighting of BACS functionality

Class	Thermal energy				Electrical energy			
	D	C	B	A	D	C	B	A
Offices	1,51	1	0,80	0,70	1,10	1	0,93	0,87
Lecture hall	1,24	1	0,75	0,50	1,06	1	0,94	0,89
Education	1,20	1	0,88	0,80	1,07	1	0,93	0,86
Hospitals	1,31	1	0,91	0,86	1,05	1	0,98	0,96
Hotels	1,31	1	0,85	0,68	1,07	1	0,95	0,90
Restaurants	1,23	1	0,77	0,68	1,04	1	0,96	0,92
Wholesale & retail	1,56	1	0,73	0,60	1,08	1	0,95	0,91
Residential	1,10	1	0,88	0,81	1,08	1	0,93	0,92

**BACS Energy Performance Classes – EN 15232**

- High energy performance BACS and TBM **A**
- Advanced BACS and TBM BACS and TBM **B**
- Standard BACS **C: Reference**
- Non-energy-efficient BACS **D**

BACS Building Automation and Control System  
TBM Technical Building Management System

Factors may vary depending on usage and building parameters

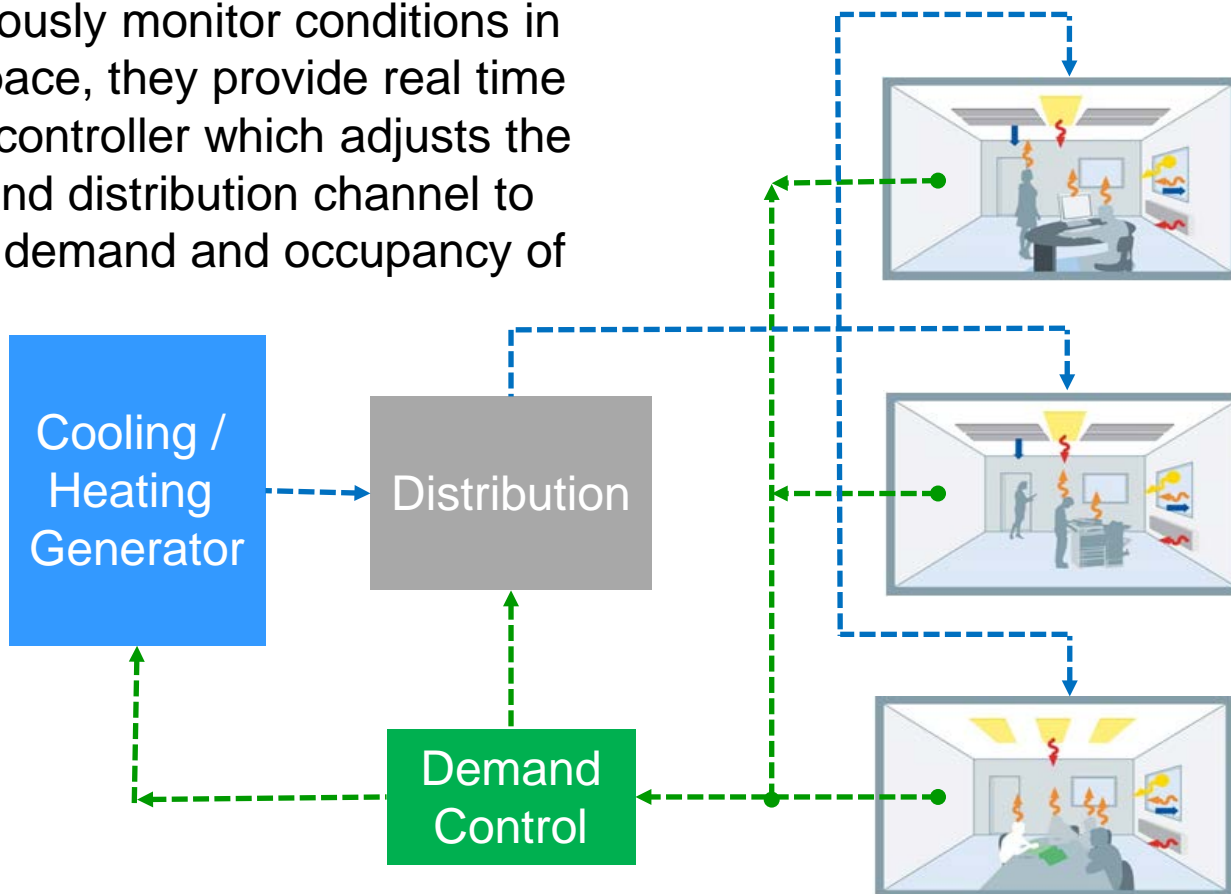
Level “C” for standard BACS is used as a reference level in EN 15232 calculations with “1” as energy consumption factor.





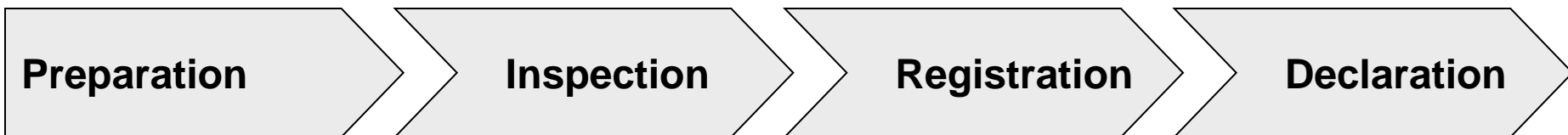
# Demand Driven Energy Use

Sensors continuously monitor conditions in the controlled space, they provide real time feedback to the controller which adjusts the generator load and distribution channel to match the exact demand and occupancy of the building.





# Audit of a BACS installation



## Preparation

- Overview on floor plans
- Understand flow of heating, cooling, ventilation
- Prepare Check-list based on BACS documentation

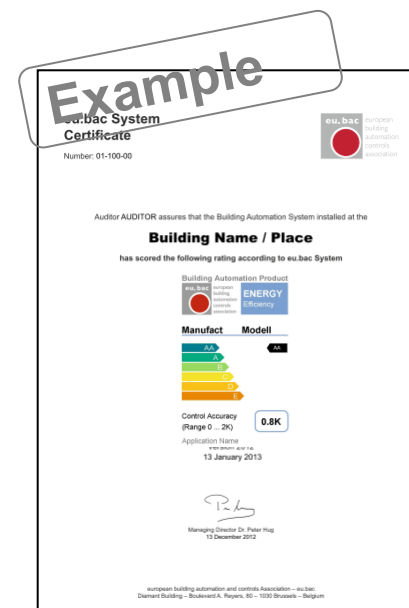
## Inspection

- Record building data in eu.bac System Check-list
- Do partial checks to verify functionality

## Registration

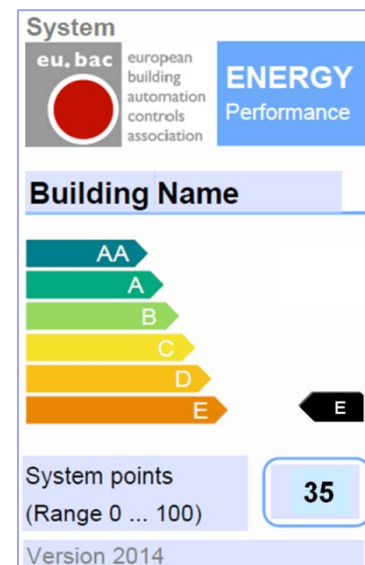
- Review inspection
- Clarify deviations
- Audit report
- Register BACS on eu.bac database

## Declaration



# Points system

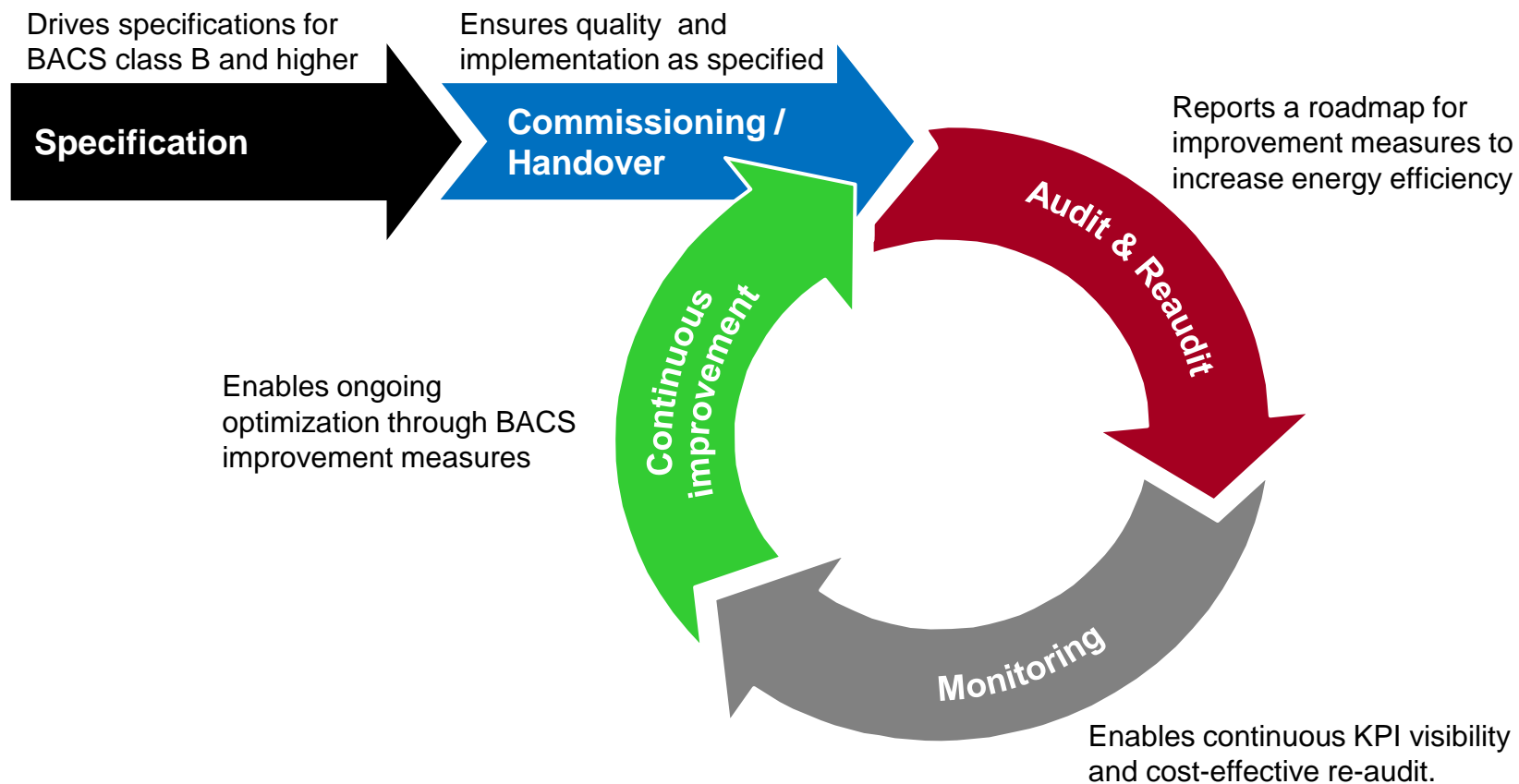
POINTS AND CLASS SUMMARY					POINTS	
Section	Description	Importance	Actual Imp.	Norm. Score	Result	<5%
1	Heating control	10	10.00	61.29	12	
2	Domestic hot water supply control	2	2.00	35.42	1	
3	Cooling control	10	10.00	35.14	7	
4	Ventilation and air conditioning control	10	10.00	38.10	7	
5	Lighting control	5	5.00	0.00	0	
6	Blind control	5%	2.55	0.00	0	
7	Technical building management	10	4.76	66.67	6	
8	eu.bac Key Performance Indicators	5%	2.55	0.00	0	
9	eu.bac Extended Functionality	5%	2.55	29.24	1	
10	eu.bac Certified Products	3%	1.53	0.00	0	
<b>NORMALIZED TOTAL (0-100)</b>			50.93		<b>35</b>	
<b>eu.bac System (F-A+):</b>					<b>E</b>	



**10 points improvement means 5% energy savings!**

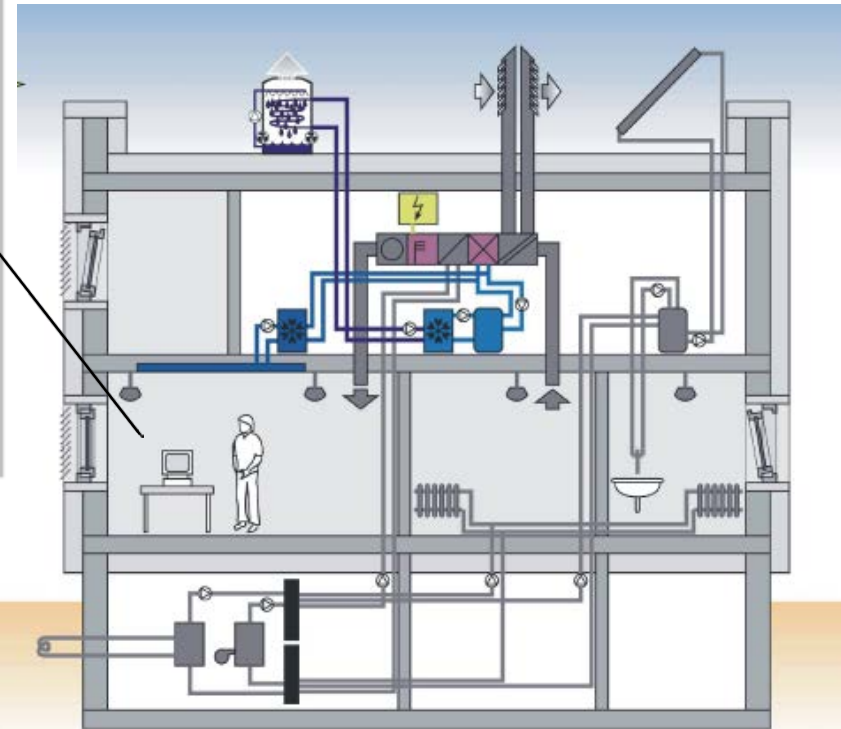
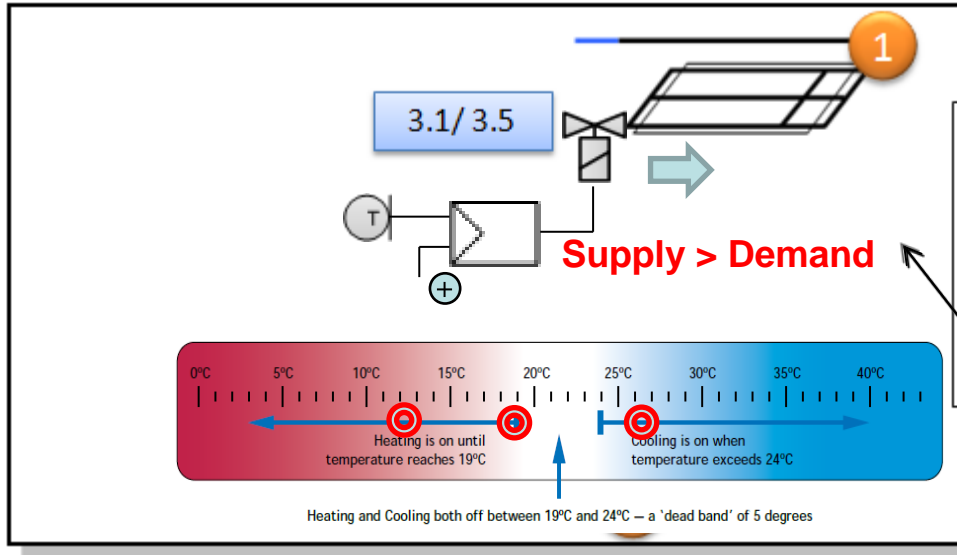


# Building lifecycle: eu.bac System entry at any phase

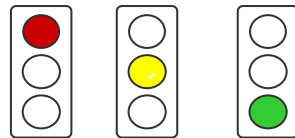




# Ongoing monitoring of performance with eu.bac System KPIs



Example: KPIR.d will identify inefficient implementation of the cooling control function.



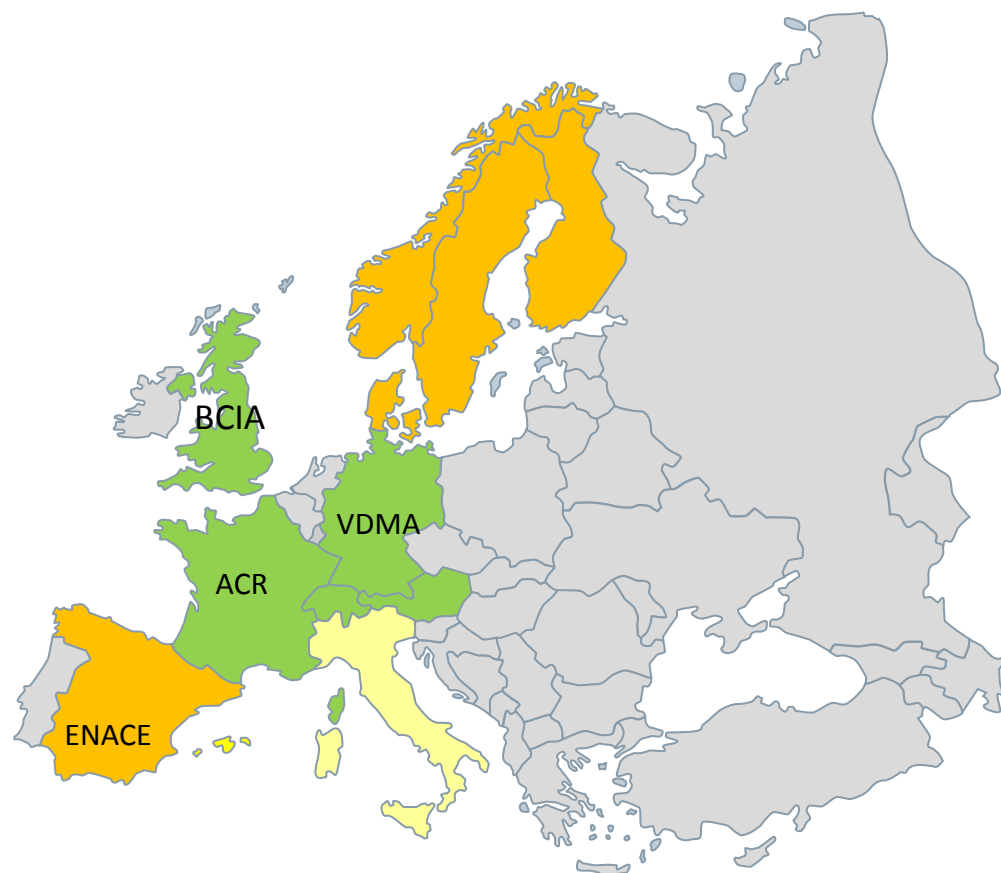




# eu.bac System presence and partners

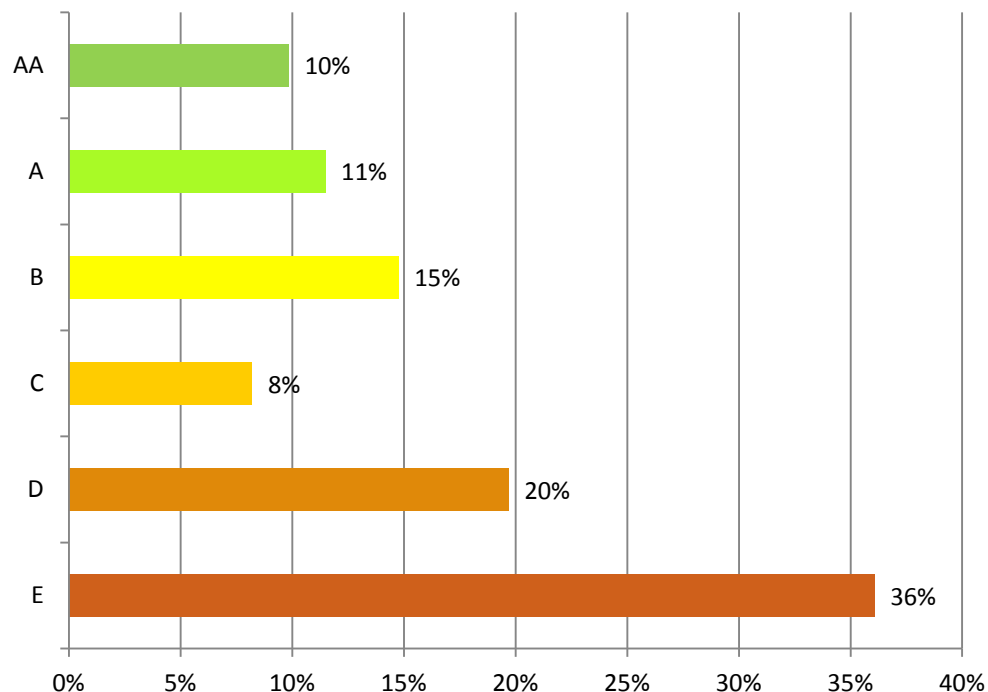
- established
- developing

eu.bac System Partners across Europe support the local rollout activities including localized Auditor trainings.





## eu.bac System – findings to date



**284168 m<sup>2</sup>  
audited to date**

The current status with over 50% of systems being rated below class C indicates high potential for improvement towards higher energy efficiency.



## Reference Case NuOffice project in Munich



NuOffice is an office complex with a total area of 33,000 m<sup>2</sup> which is currently being built in three phases in the north of Munich, and which will already exceed the German government's energy targets for 2050 to 2100.

The building is extensively equipped with heat, electricity and water sub-meters and with additional sensors for measuring room temperature, humidity and light levels.

The first of three buildings in the NuOffice project, completed in 2013, is a nearly-passive building which was awarded the LEED Platinum certificate as well as the class A eu.bac certificate.



## Reference Case LOYTEC headquarters in Vienna



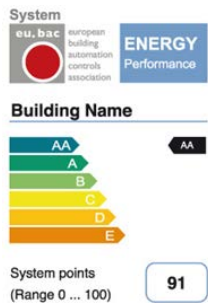
In the new LOYTEC headquarters, the room automation system controls heating/cooling, sunblinds, and lighting operating functions.

Thanks to the efficiency of the room automation system, LOYTEC received an eu.bac System Certification Mark of the highest class AA, with 87 out of 100 points for the new building at Blumengasse 37 in Vienna.





## eu.bac stakeholder benefits



### Building Owner - Operator

- new build with best practice energy efficient solutions
- save energy with ongoing re-certification and improvements
- high efficiency eu.bac energy performance increases building value
- maximize tenant retention and rental



### Engineering Consultants

- design best practice efficient control strategies with EN15232
- consulting services with eu.bac audits to validate BACS effectiveness
- formalize identification of improvement measures



### System Installers – Maintenance Providers

- transparency BACS is working effectively to EN15232
- service level agreement to regularly audit with eu.bac
- create “Greener” buildings with recommended improvements
- measure ongoing energy efficiency





Energy efficiency and comfort in buildings



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Members

Certification, Labelling, Audits

Product Certification + Labelling

System Audits

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Procedure and Partners

FAQ

Events and Trainings

System Documents Download

Links eu.bac systems

Meetings

Upcoming Events (eu.bac participation)

SYSTEM AUDITS

## Welcome to eu.bac system

Certified Building Automation for an energy-efficient and sustainable operation of Buildings

eu.bac Systems Auditors can find more information using the members Log-In

System



ENERGY Performance

Building Name




eu.bac System supports you in design, commissioning and operation of an energy efficient building automation system and, therefore, offers added value throughout the different phases of the life cycle.


System points (Range 0 ... 100)


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