Energy Efficiency with:
Building Automation Control Systems (BACS)
eu.bac Vision statement

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

40% of the world energy consumption*

- Mobility 28%
- Buildings 41%
- Industry 31%

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

80% = Operational Costs over the use of the Building.

(40% of this value is Energy)

15 – 20 years 10% = Deconstruction Capital Cost

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

Save Energy with regular eu.bac audits

The eu.bac 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**

  - Start: 2002/91/EG
  - Current version: 2010 recast

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

  - Start: 2007
  - Current version: 2012

**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

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**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) CO₂ by 2035

* The scope for energy and CO2 savings in the EU through the use of building automation technology, European Copper Institute, 2014
Energy-efficient and sustainable operation

- **Non BEMS System**
- **Non-maintained BACS not audited**
- **Audited and Serviced Control System**
- **EN15232- Class C**
- **EN15232- Class B**
- **EN15232- Class A**

*For illustration purposes only, energy savings will vary from site to site.*
EN 15232 Weighting of BACS functionality

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**

*Example*
## POINTS AND CLASS SUMMARY

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Importance</th>
<th>Actual Imp.</th>
<th>Norm. Score</th>
<th>Result</th>
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<tbody>
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<td>1</td>
<td>Heating control</td>
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<td>10.00</td>
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<td>2</td>
<td>Domestic hot water supply control</td>
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<td>38.10</td>
<td>7</td>
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<tr>
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<td>Lighting control</td>
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<td>6</td>
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</table>

**NORMALIZED TOTAL (0-100)**

50.93

10 points improvement means 5% energy savings!
Building lifecycle: eu.bac System entry at any phase

- **Specification**: Drives specifications for BACS class B and higher.
- **Commissioning / Handover**: Ensures quality and implementation as specified.
- **Audit & Reaudit**: Reports a roadmap for improvement measures to increase energy efficiency.
- **Continuous improvement**: Enables ongoing optimization through BACS improvement measures.
- **Monitoring**: Enables continuous KPI visibility and cost-effective re-audit.
Ongoing monitoring of performance with eu.bac System KPIs

Example: KPIR.d will identify inefficient implementation of the cooling control function.
eu.bac System Partners across Europe support the local rollout activities including localized Auditor trainings.
The current status with over 50% of systems being rated below class C indicates high potential for improvement towards higher energy efficiency.

284168 m² audited to date
NuOffice is an office complex with a total area of 33,000 m² 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.
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.
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
For information on auditor training, contact training@eubac.org.
To learn more, contact info@eubac.org.

thank you!