



8 MAY
2025
COTSEN HALL
ATHENS

**INNOVATION
IN ENERGY
CONFERENCE**



INNOVATIONS IN ENERGY & THE BUILT ENVIRONMENT

Constantinos A. Balaras, PhD

Mechanical Engineer, Research Director IERSD-NOA

costas@noa.gr

Group Energy Conservation (GREC)

<https://groupenergyconservation.com>

Institute for Environmental Research & Sustainable Development (IERSD)

National Observatory of Athens (NOA)

www.iersd.noa.gr



MASSIVE



A

✓ New

N

○ Existing

D

A

Building



Neighborhood



City



T

O

R

Y



Energy
Efficiency
FIRST!

Design ♦ Envelope
Installations ♦ Equipment

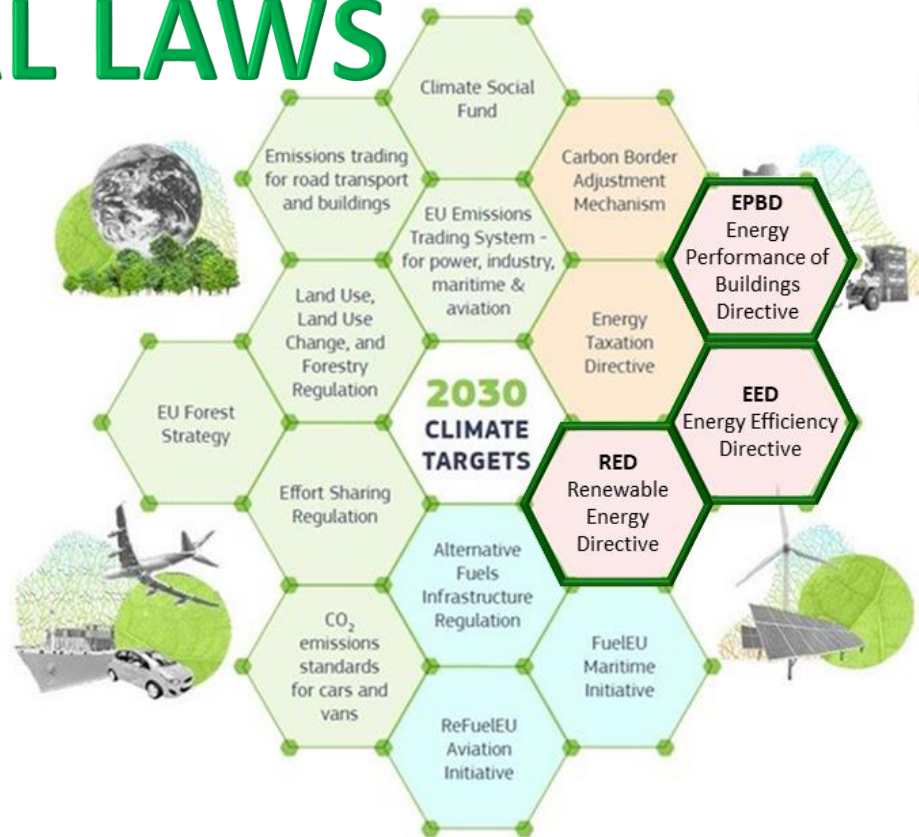




EU REGULATIONS – DIRECTIVES & NATIONAL LAWS



Tools



Select most appropriate

Plethora of SOLUTIONS & TECHNOLOGIES are available
ENFORCE Legislation – IMPLEMENT knowledge & tech solutions
– PROVIDE Supporting Actions & Financing €



SMART Buildings-Cities-Grids/Networks

Industry advances-flexibilities; Market (people) demand – services, comfort

 **EPBD** (2018/844/EU) <http://data.europa.eu/eli/dir/2018/844/oj>

SMART READINESS INDICATOR



-  Optimise energy use as a function of (local) production
-  Optimise local (green) energy storage
-  Automatic diagnosis and maintenance prediction
-  Improved comfort for residents via automation

Changing Indoor & Outdoor Conditions

- Sense
- Interpret
- Communicate
- Actively respond

https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/smart-readiness-indicator_en



Optimise energy efficiency and overall in-use performance



Adapt their operation to the needs of the occupant



Adapt to signals from the grid (energy flexibility)



Energy efficiency



Maintenance and fault prediction



Comfort



Convenience



Health, well-being and accessibility



Information to occupants



Energy flexibility and storage

Bilateral Flow of Electricity & Communication between Electricity Providers & Consumers



EFFICIENT

Persistent low energy use minimizes demand on grid resources and infrastructure



CONNECTED

Two-way communication with flexible technologies, the grid, and occupants



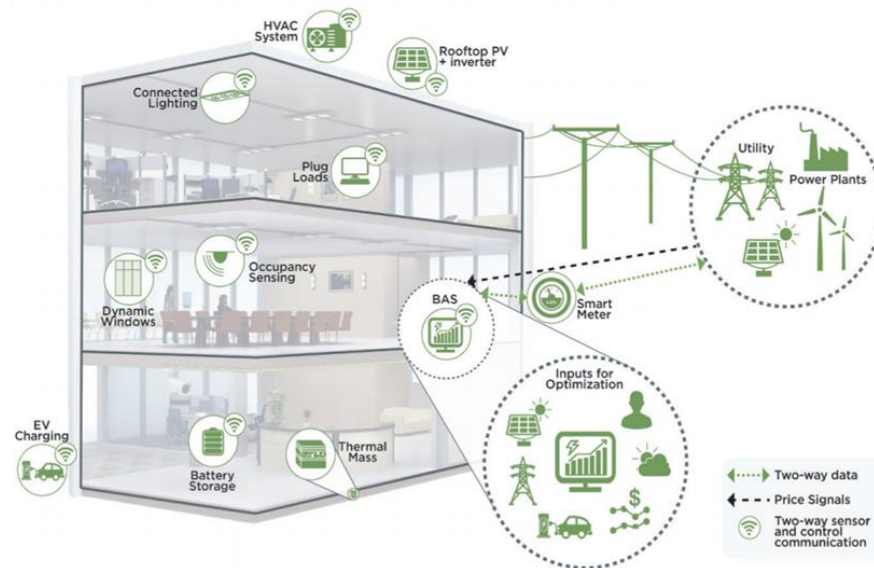
SMART

Analytics supported by sensors and controls co-optimize efficiency, flexibility, and occupant preferences



FLEXIBLE

Flexible loads and distributed generation/storage can be used to reduce, shift, or modulate energy use



<https://www.energy.gov/eere/buildings/grid-interactive-efficient-buildings>

Networks & services become more efficient using digital solutions to better serve residents & businesses

- ✓ Smart & efficient buildings
- ✓ Reduced resource use
- ✓ Lower emissions
- ✓ Smart urban transport networks
- ✓ Upgraded water supply & waste disposal
- ✓ More interactive local government
- ✓ Safer public spaces
- ✓ etc.







8 MAY
2025
COTSEN HALL
ATHENS

**INNOVATION
IN ENERGY
CONFERENCE**



INNOVATIONS IN ENERGY & THE BUILT ENVIRONMENT

Constantinos A. Balaras, PhD

Mechanical Engineer, Research Director, Group Energy Conservation, IERSD-NOA

costas@noa.gr

Thank you for your attention ...



Think Globally
Act Locally





www.noa.gr

More Information

GRoup Energy Conservation (GREC)

Institute for Environmental Research & Sustainable Development (IERSD)

National Observatory of Athens (NOA)



www.iersd.noa.gr



<https://groupenergyconservation.com>



www.facebook.com/GROUPEnergyConservation



<https://www.linkedin.com/in/costasbalaras>



https://www.researchgate.net/profile/Constantinos_Balaras

