BUILDINGS OF THE FUTURE

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29th of June 2011
Outline

Buildings - evolution process
Trends and Challenges
New concepts
Buildings of the future?
Buildings of the Future June 2011

PAST

PRESENT

FUTURE

EVOLUTION PROCESS
Buildings - evolution process

Man adaptability…

From early stages, the man has shown great adaptability to different types of climate, from the polar to equatorial one, by means of simple efficient solutions corresponding to specific type of climate and other conditions.

Buildings can be designed in order to assure a comfortable environment for a wide range of climate conditions.
In Portugal, the tradicional architecture and design were often able to answer properly to comfort and sustainability demand.
TRENDS…

- URBAN CONCENTRATION
- GLOBALIZATION-FINANCIAL CRISIS
- GROWING ENERGY DEMANDS
- CLIMATE CHANGE
- INCREASING SCARCITY OF NATURAL RESOURCES
CHALLENGES

NEW MATERIALS
ADVANCED SYSTEMS AND TECHNOLOGIES
ENERGY EFFICIENCY

RES INTEGRATION AND UTILIZATION
ENERGY STORAGE TECHNOLOGIES

INTELLIGENT GRIDS

MARKET EFFICIENCY
REGULATION, INCENTIVES

DECISION MAKERS
legal mechanisms

CONCEPTS

CIENTIFIC COMMUNITY
technological innovation
Measures and strategic plans

European Strategic Energy Technology Plan

Green paper on security of supply

**legal mechanisms**

- **1990**
  - Calculation methodology
  - Minimum requirements
  - Energy certification

- **2002**
  - RCCTE
  - Dec-Lei Dec 40/90
  - RSECE

- **2006**
  - Desempenho Energético de Edifícios [2006/32/CE]
  - Nearly zero-energy buildings

- **2010**
  - EPBD recast [2010/31/EU]

- **2022**
  - Mandatory use of solar thermal collectors for DHW
1. Minimize the energy demands
   • Materials, advanced efficient systems and technologies integrated in building façade

2. Rational energy use
   • Efficient lighting, efficient heating and cooling systems
   • Energy storage

3. Utilization of renewables energies
   • Solar thermal collectors
   • Photovoltaic systems
   • Wind energy
   • ....
concepts

Autonomous building
1930-1950

*Dymaxion House*

Solar House
1930-1940

*House of tomorrow*

Modern history
Passive House 1990

Nearly-Zero Energy Building 2006
*SOLAR XXI*

Net-Zero Energy Building 2009
*Elithis Tower*

*Contemporary developments*
SOLAR XXI
1º edifício Towards NZEB in Portugal

- Building in accordance with actual building code + typical building related loads
- Improved standard + Typical building related loads
- Use of efficiency measures (passive techniques and strategies)
- Use of renewable energies
- Feed-in credit
- Feed-in credit (estimated in 2011)
Future developments?

- Plus Energy Building
- Heliotrope

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56 story air filter

One Bryant Park

Water Building Resort

medindoagua.blogspot.com
Buildings of the Future?

As Yoda always likes to say:
*Always in motion the future is*
Thank you