



Integration of RES & RUE measures into historic buildings
Lessons learned from the Renewable Energy House in Brussels
and technical guidelines for building designers

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The Renewable Energy House

- ⦿ Headquarters for the European RE sector
- ⦿ 2800 m² office building
 - 3 large townhouse
 - 100 pers. / 15 associations
- ⦿ Showcase for EE and RE
 - Listed building
 - Urban environment
- ⦿ Central point for RE issues
- ⦿ Visites guidées
 - More 15.000 visitors



Inauguration on 22nd March 2006

Historic buildings from the 19th century

Built 1866-1868
Listed 1996

Renovation Phase I 2005-2006
Renovation Phase II 2007-2008



INTERNAL FEATURES

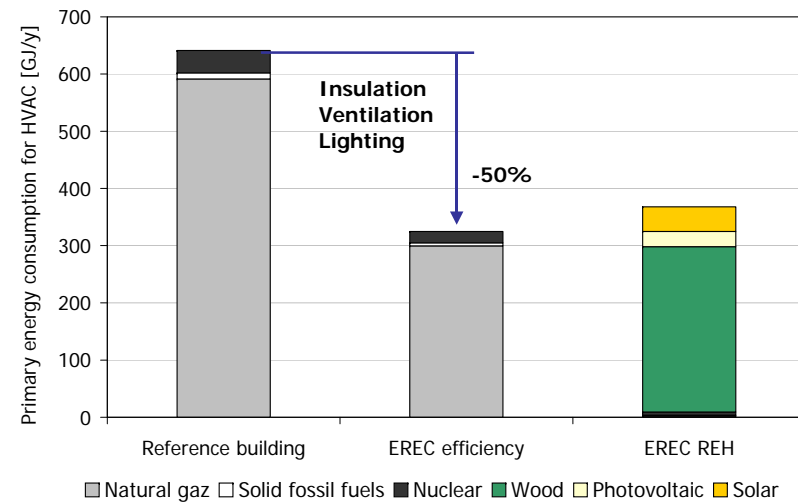


Energy Concept - EE & RE

Approach

- Limit thermal exchanges
- Heat recovery
- Performant equipments
- Renewable energy sources

Energy Consumption

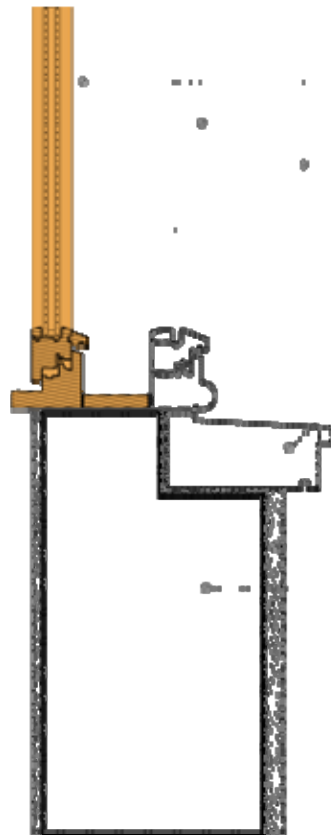


BUILDING ENVELOPE: THERMAL INSULATION OF THE FACADES



FRONT FACADE

Doublage du châssis existant $U=1,1 \text{ w/m}^2 \text{ K}$ $g=0,6$



- Nouveau châssis + double vitrage
- Châssis existant simple vitrage
- Encadrement de baie en pierre bleue existant

Banc en pierre existant

Enchâssage de la façade existante (élément) / - 3 cm
 Matériau existant



CONTRAINTES: - FACADE CLASSEES
 - DECORATION INTERIEURE

INTERNAL GAINS

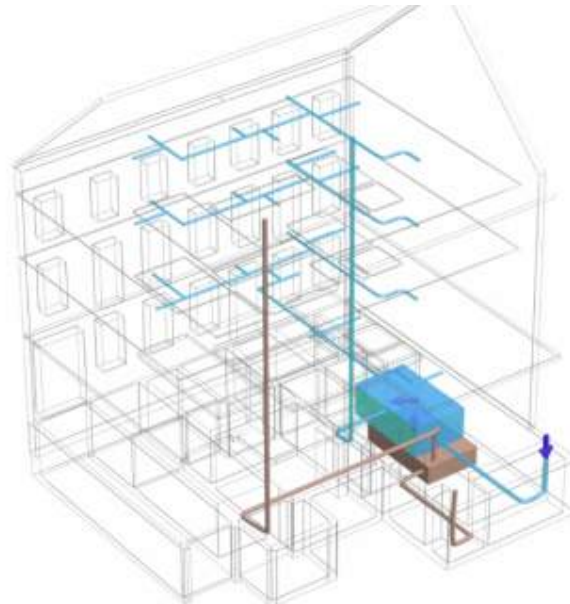


LIGHTING < 8W/m²
OFFICE EQUIPMENTS
USERS BEHAVIOUR

HEAT RECOVERY

DOUBLE FLOW WITH HEAT RECOVERY

- Heat recovery wheel 85%
- Indirect adiabatic cooling
- Occupancy based system
 - IR + CO2+ thermal sensors in each office and meeting room



CONSTRAINTS:

- Integration of new ducts
- Integration of air handling units

100% Renewable Energy for Heating

Biomass



Solar Thermal

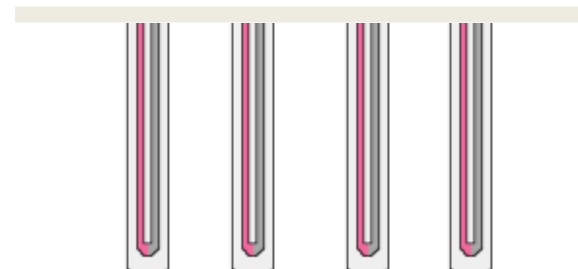


Geothermal



100% Renewable Energy for Cooling

- Solar thermal collectors
 - 70 m²
- Biomass back-up
 - 15kW (+80 kW)
- Hot water storage tank
 - 2 X 2000 l
- Absorbtion chiller
- Geothermal boreholes
- Cold water storage tank
 - 1000 l
- Ventilation circuit



100% Renewable Energy for Electricity

Green electricity supplier

- Wind 62.96%
- Biomass 35.58%
- Bio-CHP 1.38%
- Small Hydro 0.07%

REH installation

- PV : 3kWc



- *PV : extension*
- *Micro-CHP: in project*



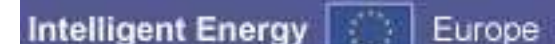
From the example to its replication

New4old Network of Renewable Energy Houses

Focal points for policy issues on sustainable energy
Basis for further stimulation of the market

New4old Technical guidelines

Integration of Energy Efficiency and Renewable Energy
into historic buildings





Why technical guidelines

- Building sector: 33% of CO₂-emissions worldwide
- The building sector has the highest economical mitigation potential (IPCC 2007)
- New buildings ↔ existing buildings
- The existing building stock is huge and renovation rates are low
- Renovation is often a matter of structural, functional or esthetical improvements only



Why technical guidelines /2

- Historic buildings are rarely renovated with regard to their energy performance
 - Additional costs
 - Conservation of historical elements
 - Protection by law (listed building)
 - Technical feasibility
 - Lack of knowledge



Technical guidelines for RUE and RES in historical buildings



Situation and scope

TRIAS ENERGETICA

- 1. Reduce energy demand (RUE)**
Insulation, solar protection, heat recovery, etc...
- 2. Maximise the use of renewable energy (RES)**
Active and passive solar gains, photovoltaics, biomass, etc...
- 3. Most efficient use of fossil fuels**
Condensing boilers, cogeneration, inverter technology, etc...

Focus: RUE and RES



Target audience

All parties involved in historic building (portfolio) management and renovation

- Architects
- Engineers
- Constructors
- Public authorities
- Private historic building owners



Overview of the chapters

Structure

- Introduction
- PART I: The outside of the building
- PART II: The inside of the building
- PART III: Regulation and control



Overview of the chapters

PART I: The outside of the building

- General principles of the building envelope
- Penetrations and additions
- Exterior insulation
- Windows
- Integration of solar thermal collectors
- Integration of photovoltaic panels
- Integration of wind turbines



Overview of the chapters

PART II: The inside of the building

- Indoor user comfort
- Thermal mass
- Interior insulation
- Interior shading devices
- Renewable heat and cold production
- Technical rooms
- Integrating ventilation systems
- Integrating heating and cooling emission systems
- Integrating lighting



Overview of the chapters

PART III: Regulation and control

- Control strategies
- User behaviour
- Monitoring and follow-up



Where can you find it?

Different formats

- Introductory brochure, 12p, pdf
→ *website, CD-ROM, hard-copy*
- Full guidelines, 117p, pdf
→ *website, CD-ROM*
- Full guidelines, html format
→ *website*

See also brochures desk and poster

Website : www.new4old.eu



Partners

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