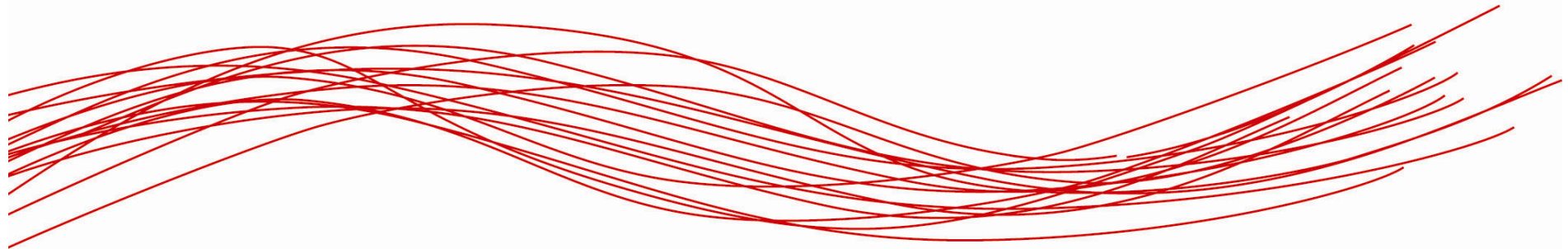


**EeB.NMP.2012-3**

# Development and validation of new 'processes and business models' for the next generation of performance based energy- efficient buildings integrating new services



**European Commission**  
**DG Research and Innovation**  
**Industrial Technologies**  
**Patrice Millet**

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Note that this presentation is not legally binding  
and does not represent any commitment  
on behalf of the European Commission





# Technical Content / Scope

- **New business models** which are triggered by new emerging technologies and processes **need to be developed to reach the energy efficiency targets** in the vast majority of construction SMEs.
- **Organisational and financial models** which include **Energy Service Companies (ESCOs)**, should address **the marketing and the demonstration of energy saving measures and energy generation within buildings** (regional flagship projects like schools or residential homes could be addressed, with the involvement of local authorities or property developers)
- **Need for Common energy tool sets for simulation and analysis** at the EU level, taking into account country or regional specific issues: energy supply and demand, best available technologies, structured information on typology, etc **of the existing building stock.**



# Technical Content / Scope

- **Need for Performance based contracts and the shift towards life-cycle-performance based business, including risk/value distribution across the value chain.**
- **Need for Business models using collaborative value chain approach, life-cycle costing and/or total cost of ownership at building or even at district level.**
- **Synergies with on-going initiatives should be established, by mapping the relationship between relevant programmes and actions at national and regional level.**
- **SMEs should have the decision making power in the project management; and the output should be for the benefit of the participating SMEs and the targeted SME dominated industrial communities.**



## Funding scheme:

- **SME-targeted collaborative projects.**

## Expected Impact:

- **The projects should enable economic, organisational and social innovation solutions** which will boost the transformation towards low carbon cities.
- **New business performance-based models** should clearly support **market adoption of new energy-efficient solutions** by increasing their market share by 10% per year measured on the basis of each technology.
- The **business models** should incentivise uptake of these energy-efficient solutions by **increasing profitability and reducing risk.**



# Thank you for your attention!

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**EeB.NMP.2012-6**

# **Methodologies for Knowledge transfer within the value chain and particularly to SMEs**

**European Commission  
DG Research and Innovation  
Industrial Technologies  
Patrice Millet**

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# Technical Content / Scope

- In order to successfully transform the energy efficiency market, SMEs have a key role to play.
- To facilitate their critical involvement there is a need to **develop viable business models that SMEs can use to reduce risk and provide clear growth areas** for their businesses.
- To encourage the transfer of **good practices, technologies and methodologies**, including cross-sectoral cooperation, the set up of a communication infrastructure and the organisation of a number of coaching events are also needed.
- **New tools** which are **cost effective, fast and easy to use** have to be developed to **overcome present barriers** (e.g. cultural, linguistic, financial, etc).

# Technical Content / Scope

- **To achieve coordination** between the EU and national/regional levels activities need to be developed and implemented, such **as spreading the information**, in particular with regard to public procurement, standardisation and regulation, outreach programmes, energy innovation platform, training and providing an infrastructure of experimental buildings that incorporate new technologies in the field of Energy Efficiency.
- **Methodologies and tools to strengthen the involvement of SMEs**, including in particular the role of contractors, architects, engineers and designers, within the value chain **should allow later to develop and use these advanced technologies** in an integrated way to enable energy saving solutions **to be largely disseminated into the market.**





## Funding scheme:

- **Coordination and Support Action (supporting actions)**

## Expected Impact:

- **Energy-efficient solutions and market uptake measures including easy-to-apply reliable business practice guidelines for SMEs will be provided for one homogenous climatic area.**
- **Evidence-based recommendations in support of policy-making on public procurement rules, regulations and standards, to provide SMEs with a lean and coherent framework of definitions and of assessment, certification and verification procedures for buildings.**
- **Validated methodologies and tools that demonstrate cost and comfort benefits and reduce risk will boost effective exchange of knowledge and best practices among SMEs.** Such tools could include mechanisms to develop multi-skilled partnerships of SME businesses.

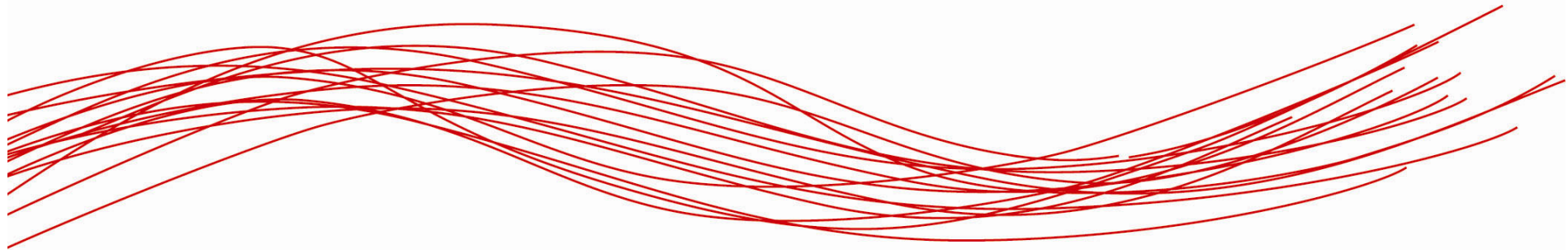


# Thank you for your attention!

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# Energy Efficient Buildings NMP Topics



**Alexandre d'Angelo**  
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**Info day, Brussels, 11 July 2011**

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# TOPIC

- **EeB.NMP.2012-1 « Interaction and integration between buildings, grids, heating and cooling networks, and energy storage and generation systems »**



## EeB.NMP.2012-1

### **(1/2) Technical content / Scope :**

- ✓ Innovative solutions → for higher energy efficiency and improved connection between storage systems, smart grids, buildings and vehicles/mobility systems,
- ✓ methodologies → for interconnectivity between smart grids and other networks, in line with the SET Plan.
- ✓ New methods for real-time management of energy demand and supply
- ✓ New technologies and approaches → effective Building-to-Building and Building-to-Grid interactions.
- ✓ Energy-efficiency interoperability of buildings with other urban domains (transportation, energy grids, etc).
- ✓ Methodologies and tools for reduction of CO<sub>2</sub> emissions and improved energy efficiency → a low carbon economy.



## EeB.NMP.2012-1

### **(2/2) Technical content / Scope :**

- ✓ **This integrated approach → considering simultaneously storage of energy of different types.**
- ✓ **Specific solutions → allowing the best solution to be selected to store renewable thermal or electrical energy at district level or at another scale.**
- ✓ **Storage capabilities → combined with systems and equipment for energy production and distribution at building and district level.**
- ✓ **Achieving the highest coverage of built environment energy demand by renewable (heat, cool and electrical) energy production at building and district level.**
- ✓ **New methods of predicting well in advance the renewable energy production and use → accordingly the best storage and usage strategy.**



## EeB.NMP.2012-1

### **Deliverables :**

- ✓ **Regarding systems and equipment for energy use at building and district level**
  - **energy-conversion hub/router concepts.**
  - **maximum renewable energy usage from decentralised (electrical, thermal) production.**
- ✓ **Thermal and/or electrical system optimisation at building or district level.**
- ✓ **Technological demonstration and testing which will validate advanced energy-efficient infrastructure and strategies.**
- ✓ **Solutions and technologies → to be easily replicable throughout all countries and variety of European climatic areas.**
- ✓ **Appropriate industrial standards and new business models.**





## EeB.NMP.2012-1

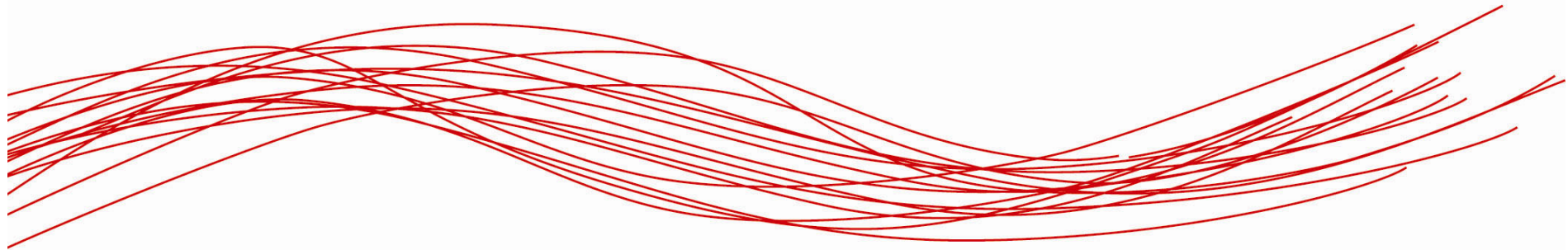
### **Expected impacts :**

- **Involvement of the construction industry and all relevant industrial research and public stakeholders → validate advanced energy-efficient infrastructure and strategies at district level.**
- **For thermal systems, → demonstrate 20% reduction in annual primary energy demand,**
- **For electrical systems → a nearly zero energy annual balance for a community of buildings (compared to their expected energy performance summed on an individual building basis).**
- **Projects → a reduction in peak load after retrofit without forgetting a 20% reduction of CO<sub>2</sub> emissions.**
- **Clear evidence of the cost benefit / solutions should be replicable in at least two EU countries with clearly different climate conditions.**





# Energy Efficient Buildings NMP Topics



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# Energy Efficient Buildings PPP Vision

## European energy efficient buildings initiative (EeB)

Deliver, implement and optimise concepts for

**buildings and districts**

that have the technical, economic and societal potential to drastically

**decrease the energy consumption** and the  
**carbon dioxide emissions**

from existing and new buildings throughout the European Union.



## TOPIC

- **EeB.NMP.2012-2**

Systemic Approach for retrofitting existing buildings, including envelope upgrading, high performance lighting systems, energy-efficient HVAC systems and renewable energy generation systems



## **Technical Content/scope:**

**Existing residential building stock is the main target**

**Reduce primary energy demand**

### **Objectives :**

- ✓ **Upgrading the envelope (insulation systems + multifunctional systems)**
- ✓ **Integrated solutions including HVAC, electricity and heat network, lighting technologies and ICT**
- ✓ **Cost effective solutions suitable for Retrofitting**
- ✓ **To be applied widely within buildings or districts**
- ✓ **Holistic approach (heating, ventilation, lighting, comfort...)**
- ✓ **Active participation of industry (SMEs) is expected**
- ✓ **Demonstrate the in-use success of the package developed**



## **Deliverables :**

- ✓ **Development, Integration, demonstration and validation of reliable systems for a better comfort and reduced primary energy use**
- ✓ **new holistic solutions easy to install with low maintenance and simplifying logistics.**
- ✓ **Appropriate measurement and analysis tools to validate the energy performance**
- ✓ **Solutions should be compatible with the district dimension**



## Funding Scheme :

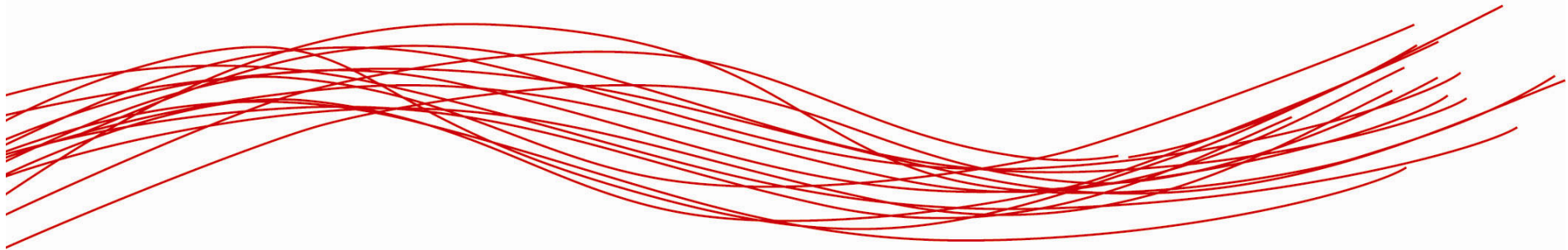
**Large Collaborative projects**

## Impacts :

- ✓ **The overall efficiency of new solutions should be  $\geq 40\%$  and reduced CO2 emissions  $\geq 20\%$  compared to actual situation**
- ✓ **Retrofitting target: 50kWh/m<sup>2</sup>/year for energy consumption**
- ✓ **New lighting energy savings  $\geq 50\%$**
- ✓ **Pay-back max 7 years**
- ✓ **End users acceptance**
- ✓ **Long term continued efficient operation**



# Energy Efficient Buildings NMP Topics



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# TOPIC

- **EeB.NMP.2012-4 Nanotechnology based approaches to increase the performance of HVAC systems**





## Technical Content/scope

### Rationale:

- Heating, Ventilation, and Air Conditioning (HVAC) systems represent 39% of energy use in residential buildings and 32% in commercial facilities.
- Cooling trends are increasing.
- Effect of climate change and heat releasing equipment
- Air quality crucial for health
- Nanotechnology may offer innovative solutions

### Objectives:

- ✓ Focus on reduction of overall energy demand
- ✓ To improve HVAC systems or building components
- ✓ To introduce nanomaterials or nanostructures
- ✓ Holistic approach (ventilation, humidity...)
- ✓ Active participation of industry is expected



## Expected impact

### Deliverables :

- ✓ **Nanotechnology solutions demonstrated at industrial level.**
- ✓ **Key advantages in:**
  - ✓ **Performance**
  - ✓ **Benefits in terms of service-life costs**
  - ✓ **Quality of indoor environment**
- ✓ **Energy consumption reduced by 50% compared to conventional systems**
- ✓ **Shift to non-fluorocarbon refrigerants**
- ✓ **Safety issues adequately addressed**

### Funding scheme:

Small or medium-size collaborative projects



**EeB.NMP.2012-5**

# **Novel Materials for Smart Windows conceived as Affordable Multifunctional Systems offering enhanced Energy Control**

**Info Day PPP  
11th July 2011**

**European Commission  
DG Research & Innovation  
Unit G3 Materials  
Dr Monique Lévy**

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# Novel Materials for Smart Windows

- **New **Materials**** for new window concepts
- **Better understanding and improvement of **material combinations and synergies****
- **Affordable** multifunctional systems
- **Offering enhanced **energy control****
  
- **Going well beyond State of the Art**

# Novel Materials for Smart Windows: Technical Characteristics

- **Bringing energy saving and/or energy harvesting**
- **Reduced embodied energy**
- **Improved durability**
- **Lighter weight**
  
- **Possibility to consider application of OLED, adjustable infrared radiation transmission, sensor technologies, material analysis & modelling**



# Novel Materials for Smart Windows: Functionality

- **Adequate luminosity**
- **Adequate light transmittance**
- **Glare control**
- **Increased thermal comfort**
- **Noise reduction**

# Novel Materials for Smart Windows: Environmental Aspects

- **Respect sustainability principles for each developed solution: life cycle assessment studies**
- **Recycling and re-use of materials may be addressed**



# Novel Materials for Smart Windows: Applications

- **New Built and Renovation**
- **Hot and Cold Climates**
- **Easy to install**
- **Realistic solutions at reasonable price**

# Expected Improvements

Compared to presently available State of the Art **Smart Windows:**

- Reduction of U-value down to 0.3 W/(m<sup>2</sup>.K)
- Weight reduction of at least 50%
- Cost reduction of at least 15%
- Improved energy efficiency in buildings
- Greenhouse gases reduction deriving from buildings in Europe

# Novel Materials for Smart Windows

- **Proof of concept: supply at least one Prototype proving scalability towards industrial needs**
- **Active participation of industrial Partners, including SMEs**
- **Participation of Public Authorities may be an asset**
- **Standardisation aspects may be considered**
- **Small or medium-scale focused research project**

**Many THANKS for your attention!**

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