EU SUSTAINABLE ENERGY WEEK
24-28 JUNE 2013

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Overview Vito’s interactive buildings EU projects

1. Introduction

2. EU FP7 projects

3. Conclusions
Introduction to Vito

• VITO - Flemish Institute for Technological Research - is a leading independent European research and consulting centre developing sustainable technologies in the area of energy, environment, materials and remote sensing.

• 700 VTE – 5 sites - total budget M€ 90-100

• Topics:
  – Industrial Innovation (new processes, materials)
  – Quality of Environment (measuring, modeling, observation)
  – Energy (transition and energy technology) => smart energy cities/smart grids
VITO sites

Greenbridge
» FCA
» West-Flanders

Ghent
» KMO
» East-Flanders

Berchem
» MIP2
» VBBV
» VBAV

Mol
» Head office
» Sustainable chemistry, material management, health, land use
» SME’s Limburg, Antwerp, Flemish-Brabant

EnergyVille
» Sustainable energy
FP7 Interactive buildings projects

www.e-hub.org  www.resilient-project.eu  www.fc-district.eu

Safety Testing Approaches for Large Lithium-Ion Battery Systems

MERITS
A RECHARGEABLE HEAT BATTERY

address®
interactive energy

SUSTAINABLE ENERGY
WEEK 24 - 28 JUNE 2013
EU FP7 E-hub project

- FP7 project EeB.NMP.2010-2 NMP – 2010 - 2014
- Energy-Hub for residential and commercial districts
  - Cover up to 100% of the energy demand on district level with renewable energy
  - Match supply and demand - conversion and storage of energy and load shifting
  - All types of energy flow - heating and cooling, electricity
  - Thermal energy storage, energy management systems, business models
  - Connects households but also EV, commercial buildings or industry
- Demonstration
E-hub partners

- Acciona (Es)
- Solintel (Es)
- Ertzberg (Be)
- Mostostal (Po)
- D’Appolonia (It)
- HSW (Ge)
- ICAX (UK)
- Cestec (It)
- EDF (Fr)
- ISPE (Be)
- ECN (NI)
- **TNO (NI) - coordinator**
- VITO (Be)
- Fraunhofer (Ge)
- VTT (Fi)
- University of Genova (It)
The key concepts

- Energy storage
- Energy management
- Business models
Outcomes of the project

- E-hub develops and field-tests
  - Missing energy technologies
    - Open/closed thermochemical
    - Distributed energy storage
  - Energy management systems
  - Business models smart energy districts

- Field-testing research solutions in the region Tweewaters, Leuven, Belgium
Tweewaters (Leuven, Belgium)

- New/renovated district 170,000 m²
- Residential + commercial/public buildings
- Energy vision: local production + consumption of energy
- Energy concept: District heating, cogeneration, centralized and decentralized heat storage, smart control of appliances, user awareness/acceptance
Technical outlay

- Smart Apartments
  - Power - Price
  - Time (h)
  - Price tariff
  - Smart Appliances
  - Uncontrollable load

- Other Apartments
  - Power - Price
  - Time (h)
  - Price tariff
  - Whitegoods
  - Uncontrollable load

- Application
  - Application Server
  - Web Server
  - Data Server
  - Logging Database
  - Data Center Kortrijk
  - Balk van Beel (Leuven)
  - Realtime Database
  - Webservices
  - CHP SIMULATION

- Technical outlay
EU FP7 FC District

- FP7 project EeB.NMP – 2010 - 2014
- New µCHP network technologies for energy-efficient and sustainable districts
- Optimization and implementation of an innovative energy production and distribution concept for sustainable and energy efficient refurbished or new "energy autonomous" districts, exploiting decentralized co-generation coupled with optimized building and district heat storage and distribution network
Outcomes of the project

- **FC District develops and field-tests**
  - A high temperature Solid Oxide Fuel Cell
  - Advanced, durable and cost effective insulation materials for building and district piping thermal response
  - Implement an “Intelligent Heat Network”
  - Development and demonstration of new district management business models and service models for the consumer

- **Demonstrations**
Control/optimisation of district heating networks

- Heat network vs. electricity network
- Low temperature heating networks
- Combination with thermal energy storage

=> Investigate the flexibility of district heating and thermal energy storage in smart grid
EU FP7 Resilient project

- FP7 project EeB.NMP.2012-1 – 4 years - 2012 - 2016
- Coupling Renewable, Storage and ICTs, for Low carbon Intelligent Energy management at district level
  - Integration and interaction between VPP, Microgrids and Energy Hubs
  - Integration of renewable energy, cogeneration, storage units embedded into an ICT framework/ICT algorithms
  - The concept is simulated, installed, monitored and evaluated in three pilot projects
  - Demonstrators in 3 countries (Italy, Belgium, UK)
  - Vito = technical coordinator (DAPP = coordinator)
EU FP7 Resilient partners
Conclusions

• These projects outlines the importance of combining energy systems with ICT at building and district level
  – Balancing supply/demand energy
  – Higher share of RE in buildings and districts
  – Thermal and electrical energy storage
  – Development of “missing” technologies
  – Identifying business cases for flexibility
• Concepts tested in pilot cases (building/district level)
• Don’t forget the user (User behaviour)
Questions?

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- EnergyVille – Applied research centre on smart energy districts - *co-operation between VITO, KU Leuven, IMEC*