

Austrian Institute of Technology

IEA Workshop, Technological Vision for the Heat Pump Industry
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AIT - Austrian Institute of Technology

- **Ownership structure**
 - 50.46% **Republic of Austria**
(through the Federal Ministry for Transport, Innovation and Technology)
 - 49.54% **Federation of Austrian Industries**
- **Employees: 901 plus 168 freelance workers**
- **Total revenues: 119,4 mill. euros, of which**
 - Contract research revenues (incl. grants): 60.7 mill. euros
 - Financial support of partners: 40 mill. euros
 - Other revenues: 18.7 mill. euros

Structure – AIT Austrian Institute of Technology



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Energy Department – Facts & Figures

- Total number of scientific staff: 104 (planned growth for 2013 : ~ 125)
- Interdisciplinary: Architecture, civil engineering, building technology, physics, mathematics, engineering, electrical engineering
- Total revenues 2009: ~ 10 mill. Euros
- Research areas:
 - Electric Energy Infrastructure
 - Energy for the Built Environment

Research Area 1: Electric Energy Infrastructure

- **Smart Grids (Intelligent Transmission & Distribution Networks)**
 - Development of network management concepts
 - Interaction between system and components
 - Power system components: method development for design, validation and diagnosis

- **Photovoltaics (Electric Energy Conversion)**
 - Advanced experimental investigation, characterisation and modelling of thin film photovoltaic modules and new PV technologies (concentrator PV)
 - Simulation of system output and life-cycle testing, integration of PV into other infrastructure (buildings, automotive, etc.)
 - PV thin-film cell technology

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Research Area 2: Energy for the Built Environment

- **Energy related concepts for urban planning**
 - Development of energy planning and management concepts for urban areas
 - Interaction between energy performance characteristics (urban morphology, end use mixes, building energy performance characteristics) and thermal and electric grids
 - Development of community energy management concepts (load management, energy storage concepts...)

- **Sustainable building concepts**
 - Development of new design concepts (form, envelope characteristics, thermal mass storage..)
 - Integration of energy efficient and renewable energy supply systems (compression and absorption heat pumps, solar thermal systems, solar cooling,...)
 - Energy management and control strategies (weather, energy prices, load management with real time simulation, ...)

- **Thermal components and subcomponents for building applications**
 - Heat and mass transfer devices (new heat and mass exchanger concepts for absorption and compression heat pumps – microchannel flows, icing on air heat exchangers)
 - Solar thermal components (collector physics for modeling and virtual prototyping, mid-temperature collectors)

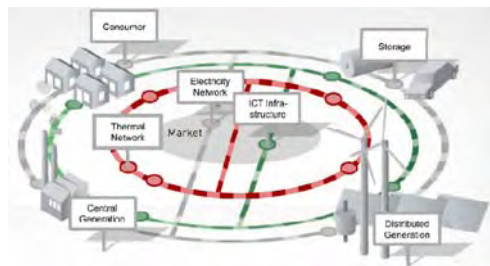
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„Smart Cities“ A European Initiative

„Smart Cities“ – the vision

In the Smart Cities Initiative of the European Union's SET-Plan (SEC(2009) 1295), the European Commission proposes

- “to progress by 2020 towards a 40 % reduction of greenhouse gas emissions through sustainable use and production of energy”, requiring
- “systemic approaches and organisational innovation, encompassing energy efficiency, low carbon technologies and the smart management of supply and demand.”



Need for innovative supply technologies



- Development of new supply technologies (generations 1-3)
- On-site renewables
- Polygeneration and use of waste heat

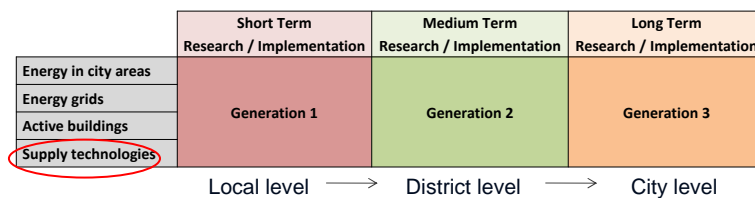
Involving research in the field of:

Optimised HVAC systems

Cascade use of resources

Energy storage in buildings

Full integration of supply systems into energy network → system approach



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your ingenious partner

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