PowerMatchingCity-II

New use cases

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- **New Use cases**
  - Wholesale processes
  - Billing
  - EV propositions
  - Network asset optimization and management
Hoogkerk living lab environment

- Established in the Integral-project
  - EU-FP7: [http://www.integral-eu.com](http://www.integral-eu.com)
- VPP established
  - 25 households with heating system + heat storage connected
    - 50% Stirling micro-CHP
    - 50% Hybrid Air-to-air heatpump/Gas fired boiler
- PV
- Wind
- 2 EV’s
- Operated in 7 use case applications
- Coordinated via PowerMatcher-technology
Setting

In-Home Optimization
Cost Effective use of Energy

Commercial Optimization
Virtual Power Plants

Integration of Renewable Energy
Valorization and imbalance Reduction

Capacity Management
Reduce Peak Loads
Types of agents

› Device agents: represent consuming and generating devices
› Concentrator agents:
   › Sum bid-curves of connected devices
   › Can apply transform on aggregated bidcurve
     › Coupled to home level
     › Coupled to a physical component of the grid
› Objective agents
   › Strive optimisation goal
   › Coupled to use cases: e.g. TDOA Trade Dispatch Objective Agent
› Auctioneer agents
Demand response potential: Heating buffer
TDOA: Pre-emptive charging of heat buffers – Hybrid approach: Optimization on forecast and real-time adjustment

[Graph showing forecasted power with labels: Blok Price, Forecasted Power, Heat Pumps fill the buffers before the price rises, μCHPs fill the buffers as long as the price is high.]
Continuation PMC-II

› PowerMatcherCity II (IPIN-project; Dutch SmartGrid program)
› More heterogeneous cluster with more device types (scheduling dishwasher/washing machine)
› Requirements for a ‘Distribution-Agent’ in a residential area
› Coupling of agent transactions to wholesale processes
› Coupling of agent transactions to billing processes
› Agents on mainstream ICT platform -> embedded systems
› Improved agent price models (marginal prices)
› Capacity management EV charging in buildings
  › According to emerging standards
  › As a time-dependent capacity proposition
  › Safe fast-charging
  › Billing and grid transaction communication
Continuation PMC-II

- User portal
  - Community formation and marketplace for communities; new role of retailer as mediator between communities
  - One app on SmartPhone for energy management