Distributed generation, demand response and storage: Does this result in more energy use, more energy efficiency or only additional costs for the network operator?

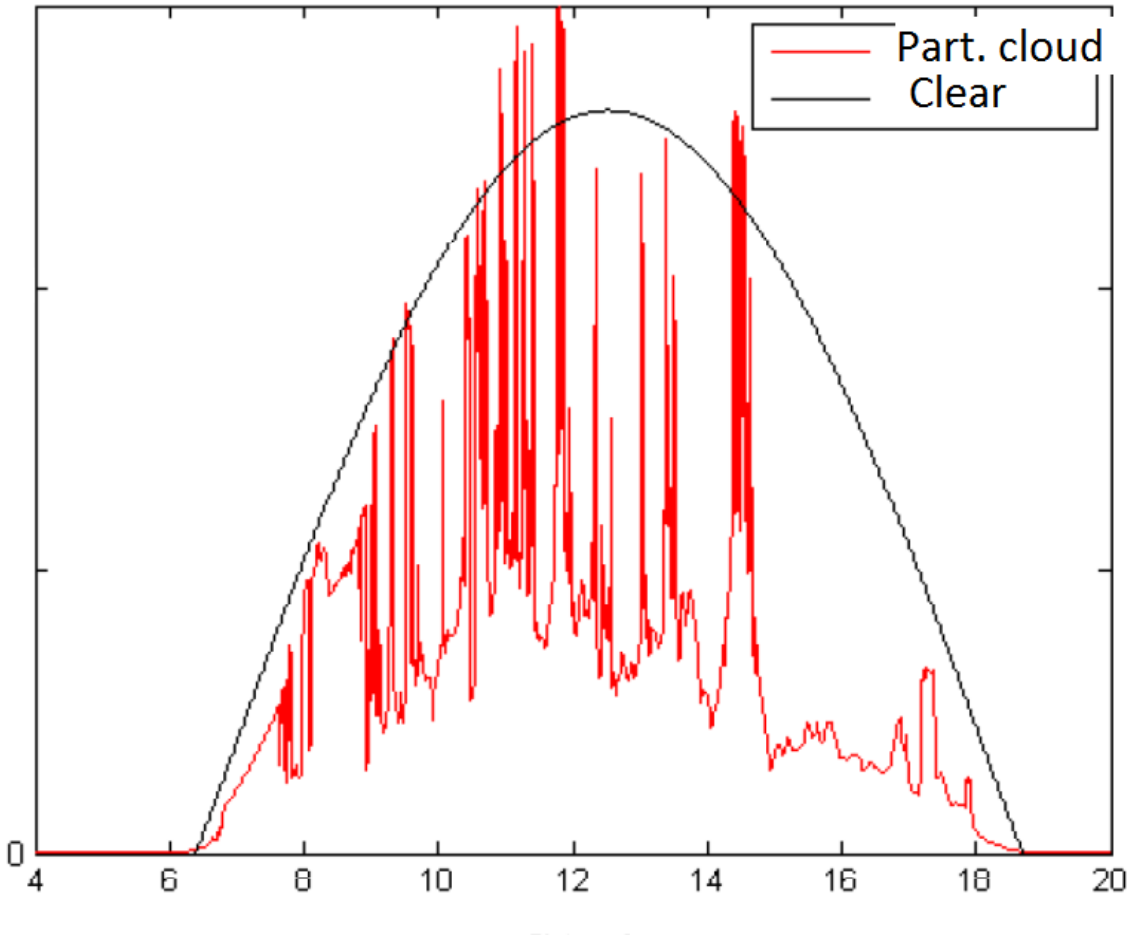
Utrecht, 24 april 2013

René Kamphuis TNO and TU/e, Matthias Stifter AIT

Task XVII: Demand Side management, Distributed Generation

Distributed Generation

Task-XVII Phase I (2006-2009); Building on task XVIII Demand Response Resources




Task: Demand Side management, Distributed Generation and Storage

Task-XVII
Phase II
(2009-2012)

- 5: Assessment of technologies and their penetration in participating countries
  - PV
  - Smart meters
  - Heat pumps
  - Micro CHP (Stirling/ fuel cell)
  - Electric vehicles charging infrastructure
- 6: Pilots and case studies
- 7: Stakeholders involved in the penetration and effects on the stakeholders
  - Stakeholder roles
  - Business models
- 8: Assessment of the quantitative effects on the power systems and stakeholders
- 9: Conclusions and recommendations of phase 2

IEA (Internationaal Energy Agency) Participants phase II

- Austria
- Netherlands
- Finland
- Spain
- France

Dutch stakeholders

- DSO
  - Alliander
  - Stedin
  - Enexis
- TSO: TenneT
- Trade/retail
  - Essent
  - Eneco

Stakeholders

- Economic value / consumer value of Smart Grids
- Environmental/ CO_2 i

"A transformer with Buttons"

There's a standing joke in the utility industry about smart grid, namely that if you ask ten people what the term "smart grid" means you'll get twelve different answers.
- ABB

: mark

intellig

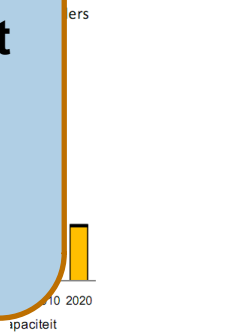
e of control and

Conflict operato

TSO/DSO

ystems: Flexwor

of the TSO in st



Project database: Ecogrid Bornholm

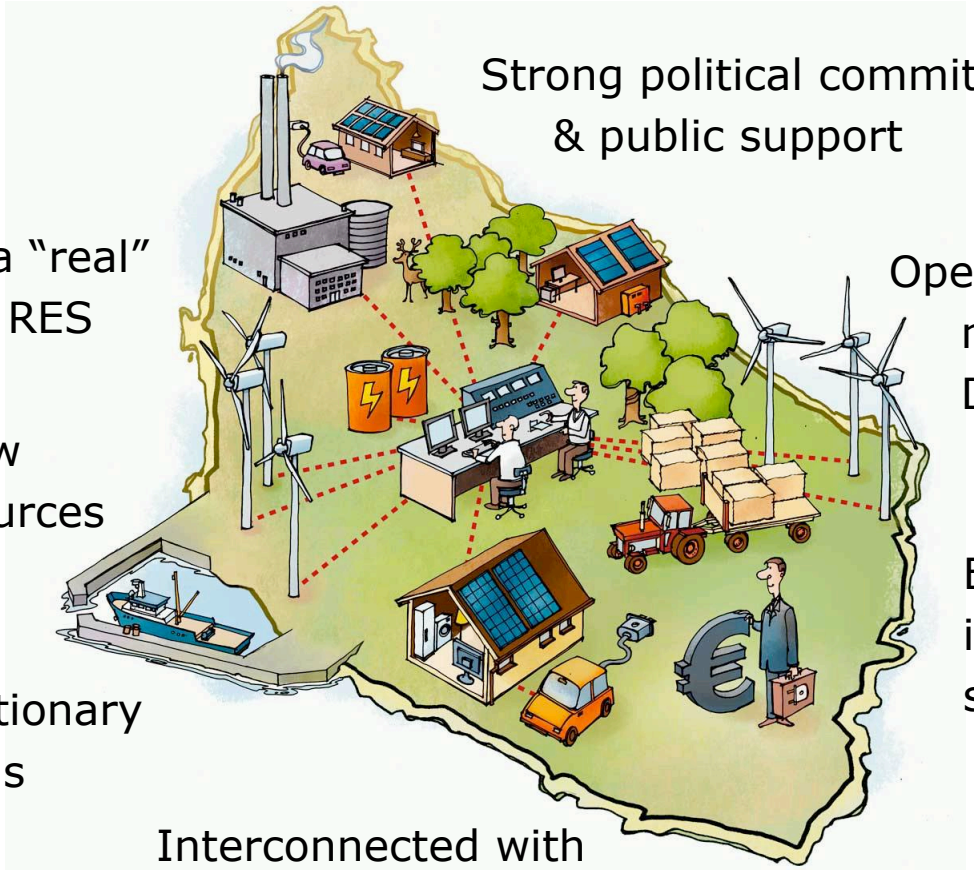
BRIGHT GREEN ISLAND
BORNHOLM

Strong political commitment & public support

Demonstration in a "real" system with 50 % RES

Operated by the local municipal owned DSO, Østkraft

High variety of low carbon energy sources

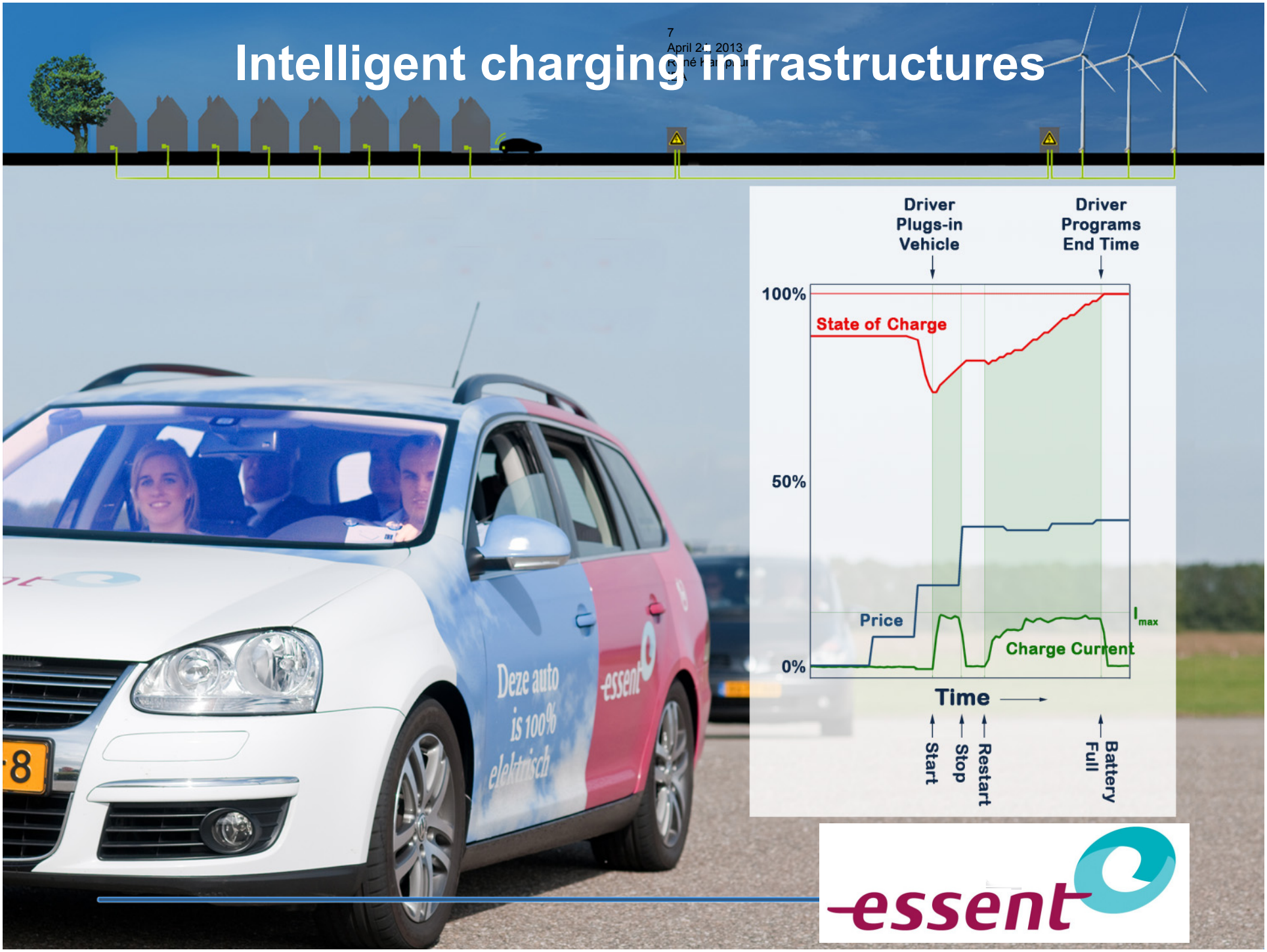


Eligible RD&D infrastructure & full scale test laboratory

Several active demand & stationary storage options

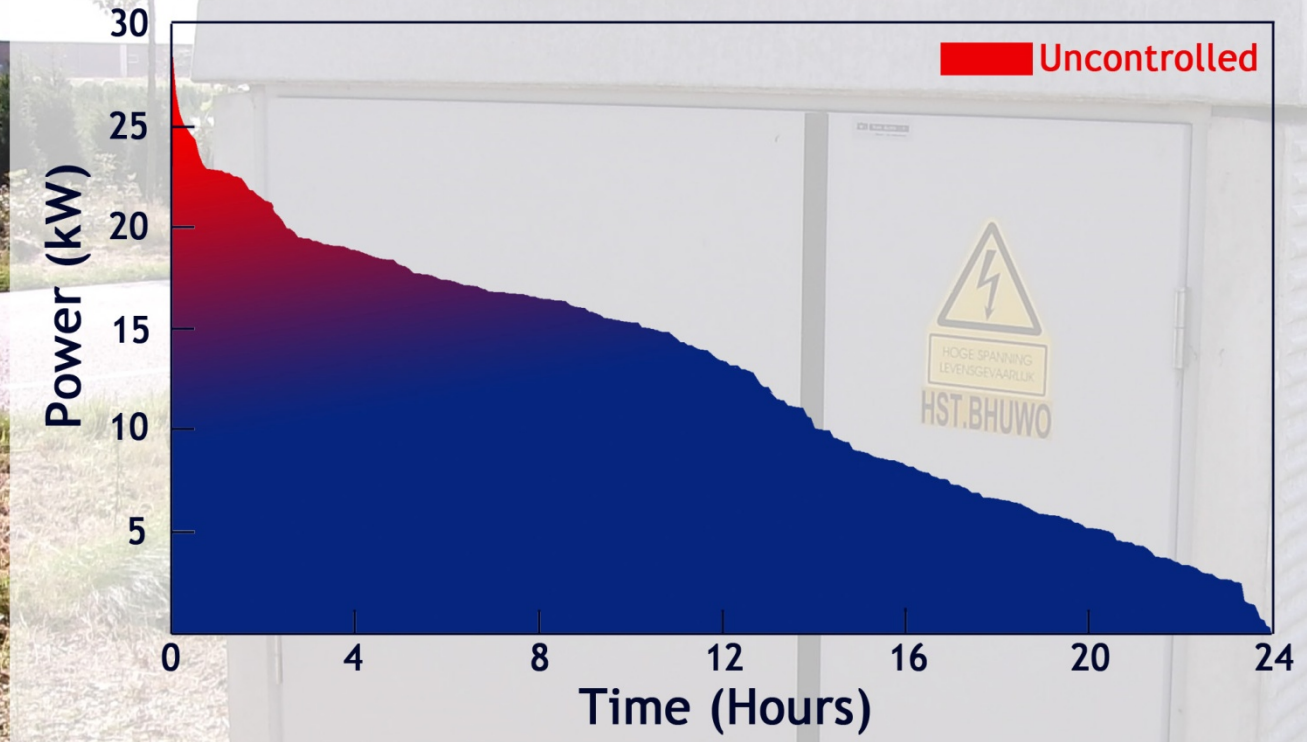
Interconnected with the Nordic power Market

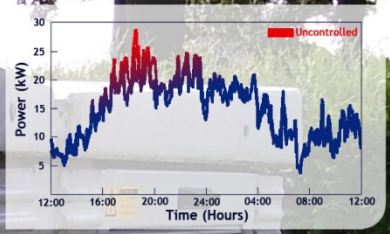
Intelligent charging infrastructures



Flattening of Load Duration, Enexis

on a Distribution Station





ENEXIS

Stakeholder setting SmartGrids living lab Hoogkerk

In-Home Optimization

Cost Effective use of Energy

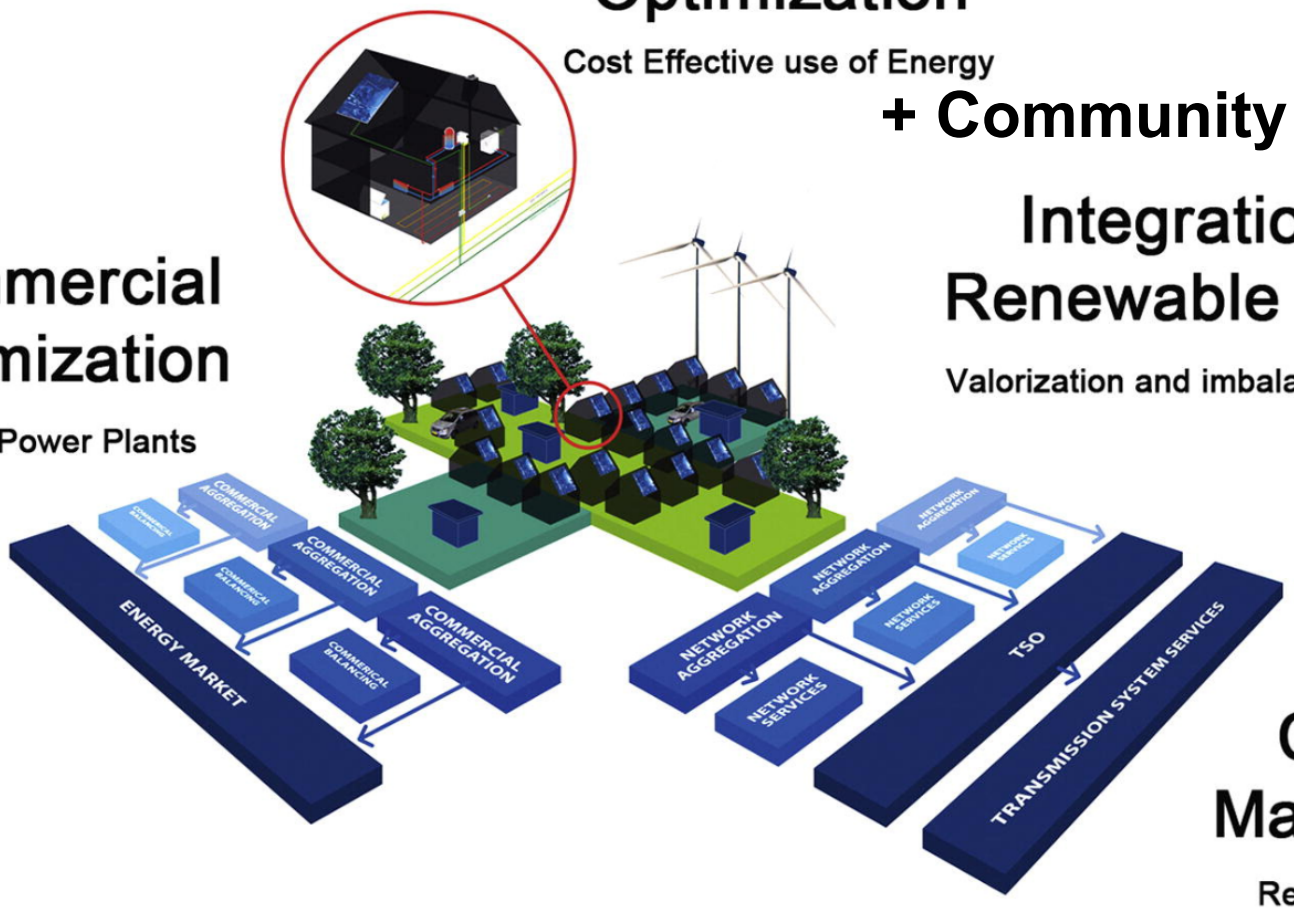
+ Community propositions

Commercial Optimization

Virtual Power Plants

Integration of Renewable Energy

Valorization and imbalance Reduction



Capacity Management

Reduce Peak Loads


Phase III: Look at grids from system view

Task-XVII
Phase III
(2013+)

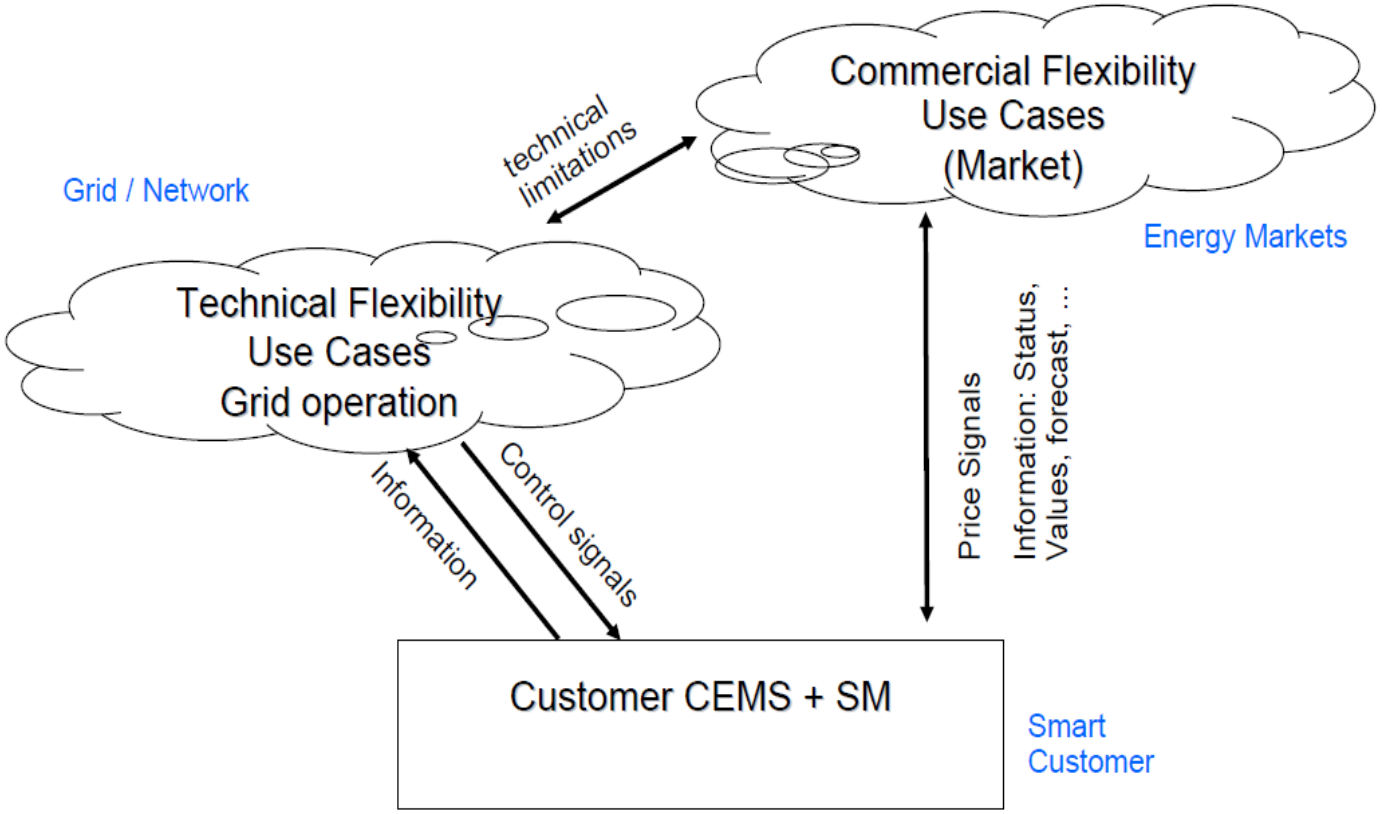
10: Role and potentials of flexible households and buildings
- Requirements
- Energy balancing potentials
- Smart meters (SM and Customer Energy MS)

11: Changes and impact on the grid and market operation
- Grid operation and customer benefits
- Optimization potential
- Regulatory and legislative requirements
- Comparison costs vs. delayed investments

12: Sharing experiences and finding best practices
- Lessons learned from existing pilots (e-Energy etc.)
- Country specifics
- Assessment and methodology development
- Extrapolation

13: Conclusions and recommendations

Dual stakeholder view on flexibility



Phase III planning:

IEA-DSM TASK XVII - Phase 3	Q1 13	Q2 13	Q3 13	Q4 13	Q1 14	Q2 14	Q3 14	Q4 14
Subtasks								
Subtask 10 - Role and potentials of flexible consumers								
Subtask 11 - Changes and impact on the grid and market operation								
Subtask 12 - Sharing experiences and finding best practices								
Subtaks 13 - Conclusion and recommendations								
Expert meetings								
Biannual country expert meeting								
Workshops								
Workshops with stakeholders and experts								
Reports								
Subtasks reports								
Final report								

Questions ??

rene.kamphuis@tno.nl

Matthias.Stifter@ait.ac.at