IEA DSM Task 17 – Phase 3:
Integration of DSM, DG, RES and ES

Task Status Report, ExCo Meeting, Wellington, NZ

Matthias Stifter (AIT Energy Department, Austria)
René Kamphuis (TNO, The Netherlands)

IEA DSM Task 17 Phase 3

Agenda

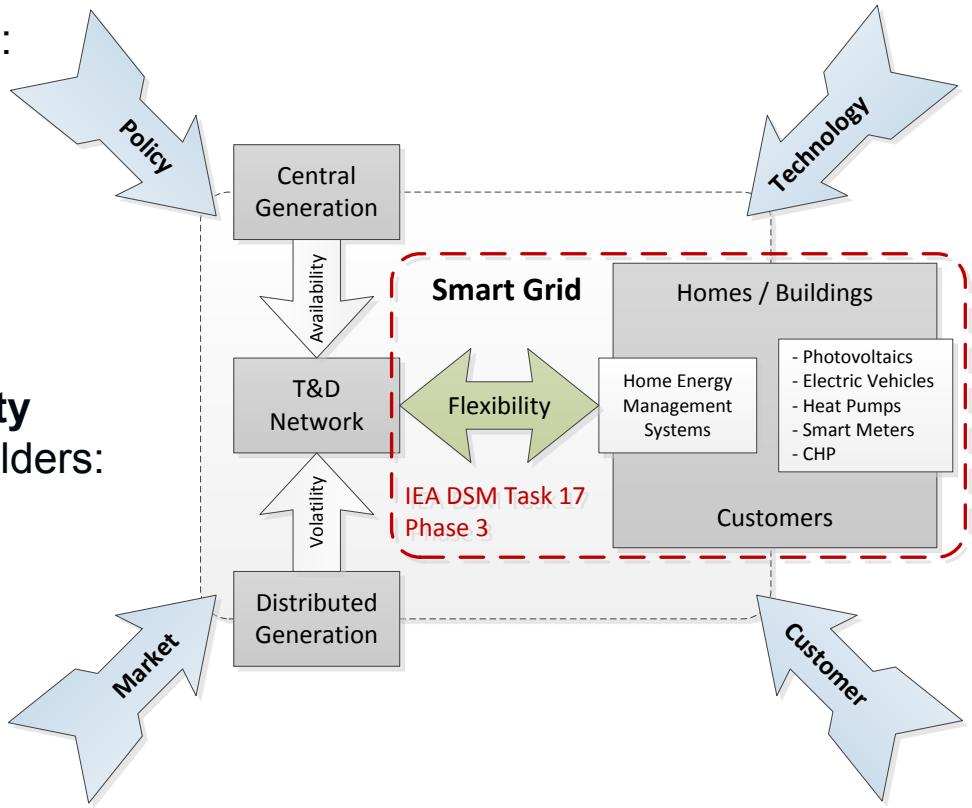
- Introduction
- Participating countries
- Synergies with new task proposal (Australia)
- Collaborations
- Next Steps
  - Kickoff Meeting and Workshop

Subtask of Phase 3 - Introduction

Systems view on enabling flexibility in the smart grid

- **Different views** on the Smart Grid:
  - Technology
  - Customer
  - Policy
  - Market

- Focus on the **enabling of flexibility** and the impact of it on the stakeholders:
  - What are the requirements?
  - How do we manage it?
  - How will it effect operation?
  - What are the benefits?



Participating Countries

IEA-DSM Task 17 – Phase 3

- **Committed:**
  - Austria
  - Switzerland
  - Netherlands
  - Copper Alliance
- **Consideration**
  - Sweden (Experts nominated, Swedish Energy Agency decides in April)
  - India (Experts nominated, ExCo needs to commit)
  - US (Experts nominated, Funding is sorted out)
- **Collaborations**
  - Australia to join IA and task 17
- **Observers**:
  - Finland has strong interest, but no founding

Participating Countries

IEA-DSM Task 17 – Phase 3

- **Overview**

Participant	Yes	Interested	No	Observer
Austria	x			
Belgium		?		
Finland				x
India		x		
Italy		x	x	
Republic of Korea			x	
Netherlands	x			
New Zealand			x	
Norway		?		
Spain		?		
Sweden		x		
Switzerland	x			
United Kingdom			x	
United States		x		
RAP (sponsor)			x	
ECI (sponsor)	x			
Australia		x		
Germany		?		
Schneider Electric		?		

Synergies with new task proposal

Task proposal from Australia

- **Content:**
  - comprehensive analysis of various economic incentives and fiscal measures, including pricing systems, tariffs and levies that stimulate/influence DSM
  - → Task 17 subtask 11: Changes and impact on grid and market operation

- **Collaboration scenarios**
  - *Include in Task 17*: Australia joins as an expert and member country and puts focus on SM tariffing

    → no separate subtask (no additional costs)
  - *Extend Task 17*: Australia joins and budget is increased for task 17. Depends if other countries are interested and willing to join

    → separate subtask (same budget / additional costs)

    → budget has to be increase on this topic which must be provided by increased number of participants or by the participating countries.
  - *Different tasks*: Collaborate on level of shared workshop and exchange of information

Kick-off and joint Workshop

Start of IEA-DSM Task 17 – Phase 3

- **When:** 19th / 20th May 2014
- **Where:** Graz, Austria –
  during the Smart Grids Week (congress)

- **Kick-off**
  - Half day / Monday afternoon
  - Open to observers

- **Workshop on DSM (public)**
  - Joint Workshop with EcoGrid EU.
    - DSM potentials of buildings
    - DSM for distribution networks
    - DSM and market operation
    - DSM and electric vehicles

Next Steps

IEA-DSM Task 17 – Phase 3

- **Kickoff and Workshop**
  - Planning and preparation
- **Administrative**
  - Call for participation
  - Offers and Contracts
  - Notice of Participation
- **Task Workplan**
  - Active involvement of participants
  - Austria: coordinate ongoing work on DSM, DR, HEMS.
- **Collaborations**
  - ISGAN Annex 2 use cases
  - IEEE IC-CSHBA

AIT Austrian Institute of Technology	TNO Netherlands organization for science and technology
Matthias Stifter	René Kamphuis
Energy Department Complex Energy Systems Giefinggasse 2 1210 Vienna Austria T +43(0) 50550-6673 M +43(0) 664 81 57 944 F +43(0) 50550-6613 matthias.stifter@ait.ac.at http:// www.ait.ac.at	Energy efficiency program Service enabling and management Eemsgolaan 3, 9727 DW Groningen T +31 (0) 621134424 PO Box 1416 9701 BK Groningen The Netherlands rene.kamphuis@tno.nl www.tno.nl

IEA DSM Task 17

Overview and Presentation

Subtask of Phase 3 - Introduction

Differences to on-going initiatives and working groups

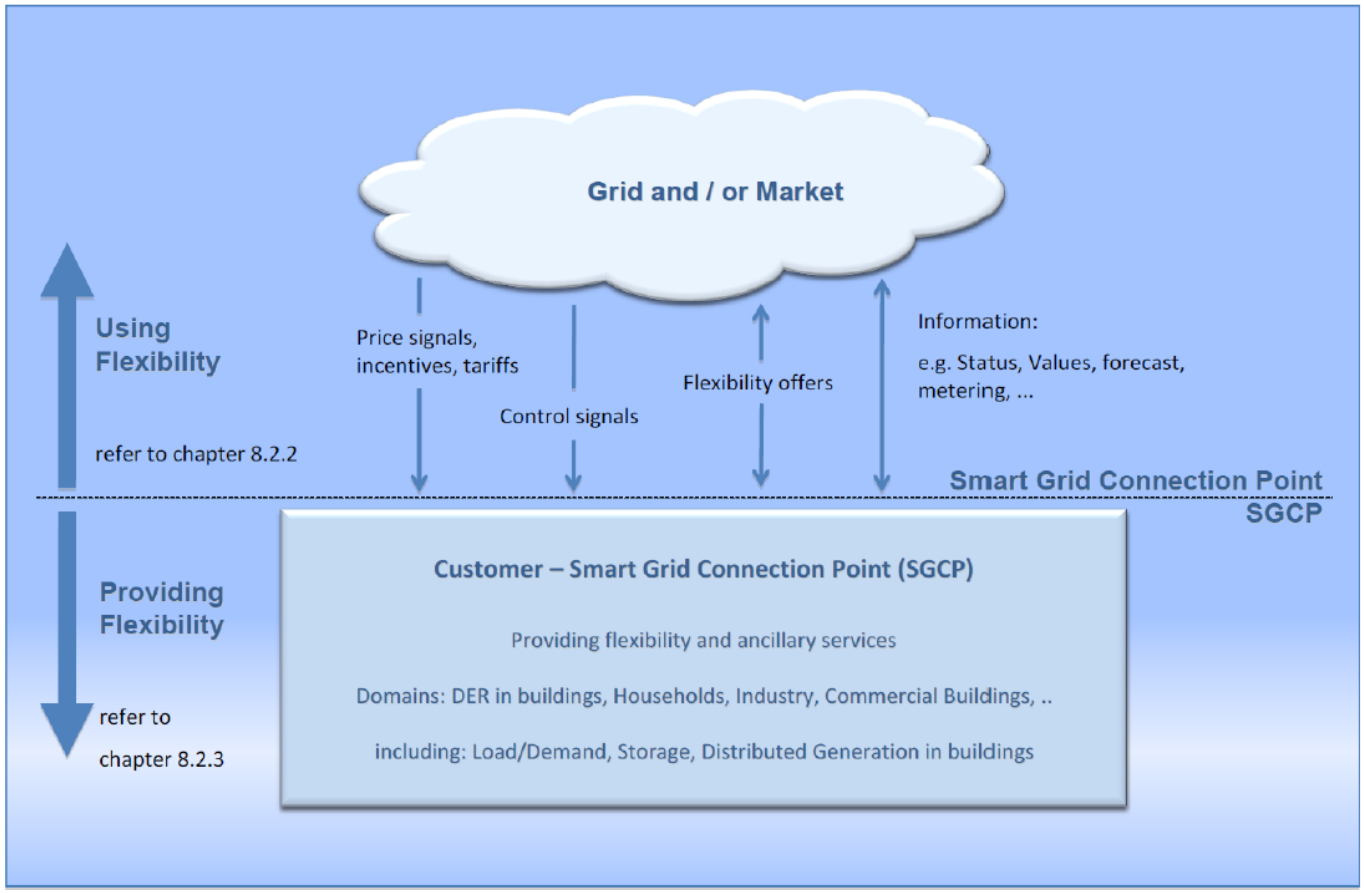
- Phase 3 is **not about**:
  - Standardisation
  - SG Reference Architecture
  - Interoperability – protocols and formats
  - Business models
  - Use case repository
  - Cyber security

- Phase 3 is **about** analysing:
  - Existing implementations, prototypes, pilot projects
  - Gap between theory and practice
  - Applicability to different countries, regions and regulatory frameworks

Subtask of Phase 3 - Introduction

Systems view on enabling flexibility in the smart grid

- **Technical Interfaces** CEN-CENELEC-ETSI Smart Grid Coordination Group



Subtask of Phase 3 – Overview of the Subtasks

Systems view on enabling flexibility in the smart grid

- **Subtask 10:** Role, and potentials of flexible prosumers (households, SMEs, buildings)
- **Subtask 11:** Changes and impact on stakeholders operations
- **Subtask 12:** Sharing experiences and finding best/worst practices
- **Subtaks 13:** Conclusions and recommendations

Subtask of Phase 3 – Subtask 10

Role, and potentials of flexible prosumers (households, SMEs, buildings)

- Controllability requirements (generation and consumption)
- Opportunities, challenges and barriers for flexibility services (providers and technologies)
- Energy and power balancing potentials
- Smart technologies (SM and Customer Energy MS)
  - VPPs
  - EV charging
  - DG-RES integration and storage
  - Integrating heat pumps and thermal storages

Subtask of Phase 3 – Subtask 11

Changes and impact on stakeholders operations

- Methodology development for assessing/quantifying impact
- Grid, market and customers (prosumer/consumer)
- Sharing common benefits/losses
- Optimization potential (eg. DR building audits and customer requirements)
- Regulatory and legislative requirements
- Comparison costs vs. delayed investments

Subtask of Phase 3 – Subtask 12

Sharing experiences and finding best/worst practices

- Collection of data
  - Workshops
- Lessons learned from existing pilots
  - EcoGrid-EU Bornholm, PowerMatchingCity I and II, Linear, Greenlys, Building2Grid, SmartCityGrid: CoOpt, eEnergy, …
- Country specifics
  - differences in the implementation
  - applicability
- Extrapolation of the results from previously collected projects on applicability

Subtask of Phase 3 – Subtask 13

Conclusions and recommendations

- Based on the experts' opinion

- Will provide a ranking based on
  - Impacts
  - Costs
  - Future penetration of the technologies

Background

Background and Motivation for Task 17 Phase 3

- **„Empower Demand** - *The potential of smart meter enabled programs to increase energy and systems efficiency: a mass pilot comparison“* vaasaeet for ESMIG, 2011
- „**Shift, not Drift:** *Towards Active Demand Response and Beyond“* – Think, June 2013
- IEC/TR 62746-2 (DRAFT), *Systems interface between customer energy management system and the power management system* – Part 2: **Use cases and requirements,** June 2013
- CEN-CENELEC-ETSI Smart Grid Coordination Group – **Use Case Management Process** – implementation in a standardized way, Nov. 2012

Empower Demand

Results

- About 100 pilots studied – structured into 22 variables
  - IHD can save between 3-19%
  - Good informative billing can save more even IHD is more effective in average
- Five factors which decide success
  - Socio-economic factors (surrounding variables)
  - Participant consumption patterns
  - Program content/structure
  - Supportive technology
  - Household load sources
- What makes a pilot a success or failure?
  - Meet the consumer needs with the program
  - Technology is the enabler
  - „more is more“: segmentation, feedback, pricing, multiple information
  - Meet regional market realities
  - Layered programs

Shift, not Drift

Results

- Consumer centered approach – through contract between consumers and intermediaries
- Comments from project advisors, industry and public consultation
- Recommendations:
  - Guidelines in form of good practice codes and regulations for customer empowerment and protection
  - Transparency rules for pricing, contracts, etc.
  - Pilot projects on contracts – engage consumers
  - Database of pilot studies for dissemination and extrapolation of results
  - Market entry for new players / market access
  - access to data
  - EU wide real time market

CEMS and Power Management System interfaces

IEC 62746 Technical Report Objective

Use cases and requirements for the interface between the power management system of the electrical grid and customer energy management systems for residential and commercial buildings and industry.

- User stories → use cases → data model → information content & structure

- Examples:
  - The user wants to get the laundry done / EV charged by 8:00pm
  - Grid recognize stability issues
  - CEM feeds own battery pack energy into own network or into the grid
  - Heat pump and Photovoltaic Operation with Real-Time Tariff

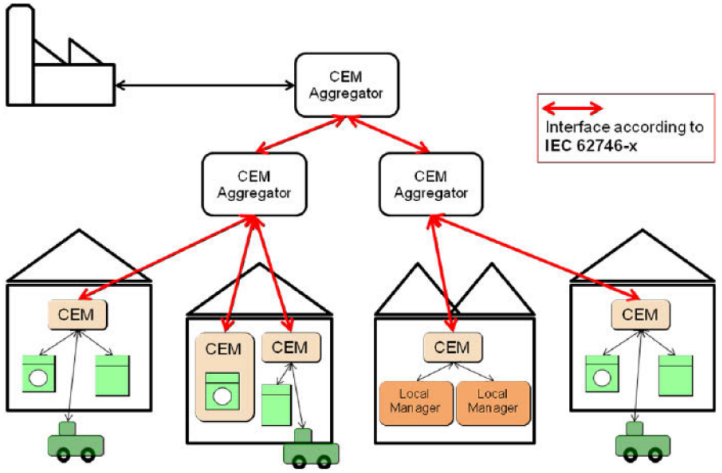


Figure 6: Cascaded CEM architecture

Smart Grid Coordination Group – Sustainable Processes

CEN, CENELEC and ETSI - M/490

The "Smart Grid Use Case Management Process" essentially describes the implementation of use cases in the standardization environment.

- Flexibility concept, understand demand response, Smart Grid & EV
- → Flexibility functional architecure
- → Use Case collection

- Examples:
  - Customer Energy Manager (CEM)
  - Market roles and interaction
  - Assessing impact of flexible resources on the grid (traffic light)
  - Flexibility operator