IEA DSM Task 17
Phase 4: Responsive Prosumer Networks
ExCo Meeting Bergen 17 April 2018

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Task 17: Integration of Demand Side Management, Energy Efficiency, Distributed Generation and Renewable Energy Sources (previous phases)

- Phase 1 (VTT: 2008-2010): Information collection on technologies and analysis
- Phase 2 (VTT: 2011-2013): Projects inventory, qualitative analysis and maturity assessment
- Phase 3 (AIT/TNO 2014-2016): Potentials, business models and quantitative analysis (US, Copper Alliance, S, CH, A, NL)

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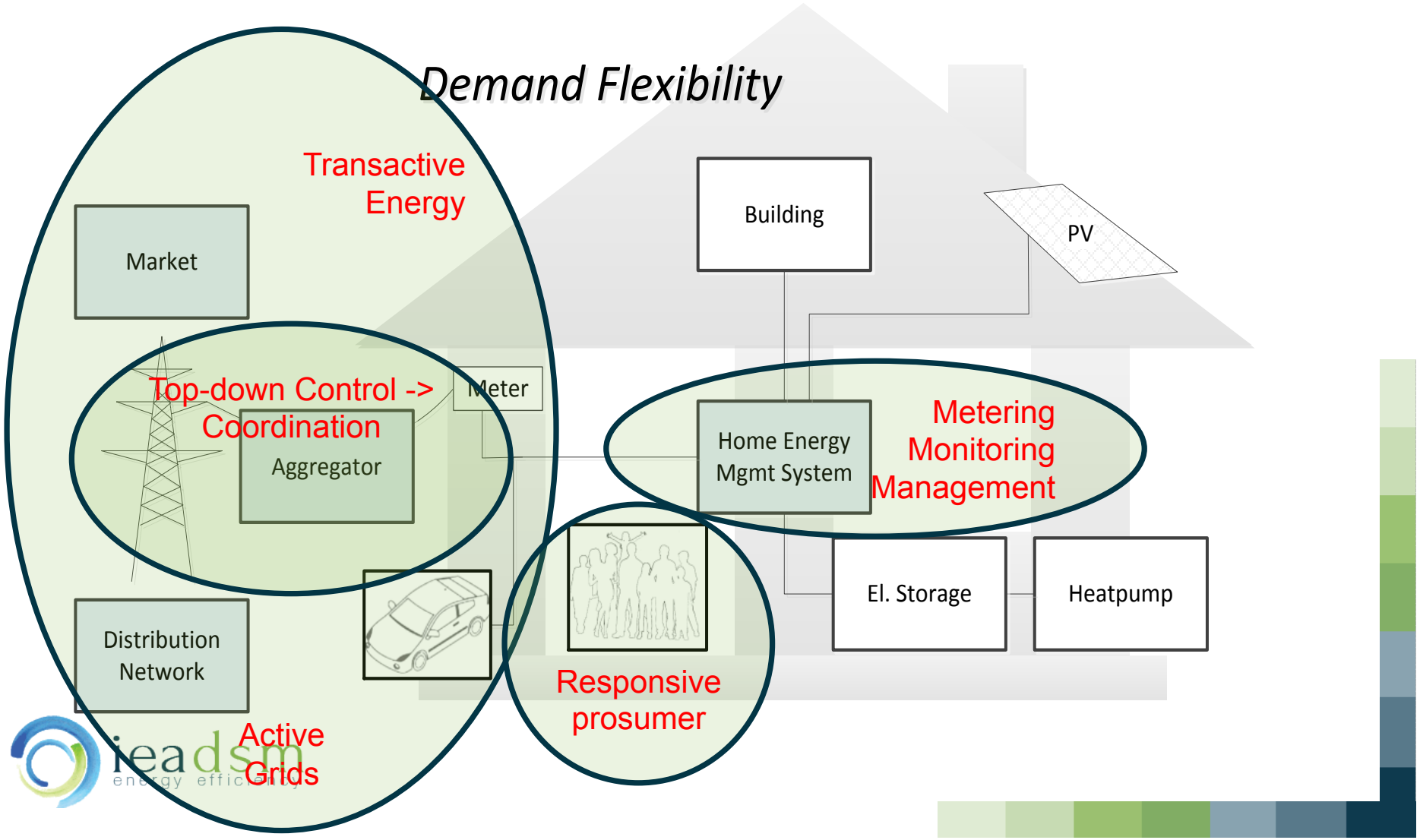
Overview: Deployment view : one step further



Phase 4; Demand Side Management → Integration

ENERGY TRANSITION

- Metering → Monitoring → Context awareness
- Control → Coordination → Participation
- Passive → Active grids → Pre-emptive grids
- Tariffed → Microtransactions → Transactive Energy, P2P

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Responsiveness via incentives

ENERGY TRANSITION

• Metering	→	Monitoring	→ Inform, analyse and verify
• Control	→	Coordination	→ Emergent behaviour
• Passive	→	Active	→ Larger flexibility potential
• Fixed Tariffs	→	Flexible tariffs	→ Incentive v punishment, smart P2P contracts

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Prosumer

ENERGY TRANSITION

• Passive	→	Active
• Monthly/yearly energy demand	→	Demand per hour/minute
• Manual control	→	Home automation and remote control
• Economical	→	Environmentally friendly
• On demand consumption	→	Sustainability and self-consumption
• HEMS Internal optimization	→	Smart Communities/ Smart Cities

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Networks

ENERGY TRANSITION

• Operation mode:	Top-down	→ More bottom-up
• Investments:	Asset driven (30+ y)	→ Risk driven (10-15 y)
• Tariffs	Capacity (max. kW/y)	→ Real time (kW(t))
• Monitoring	Primary substation	→ Secondary substation

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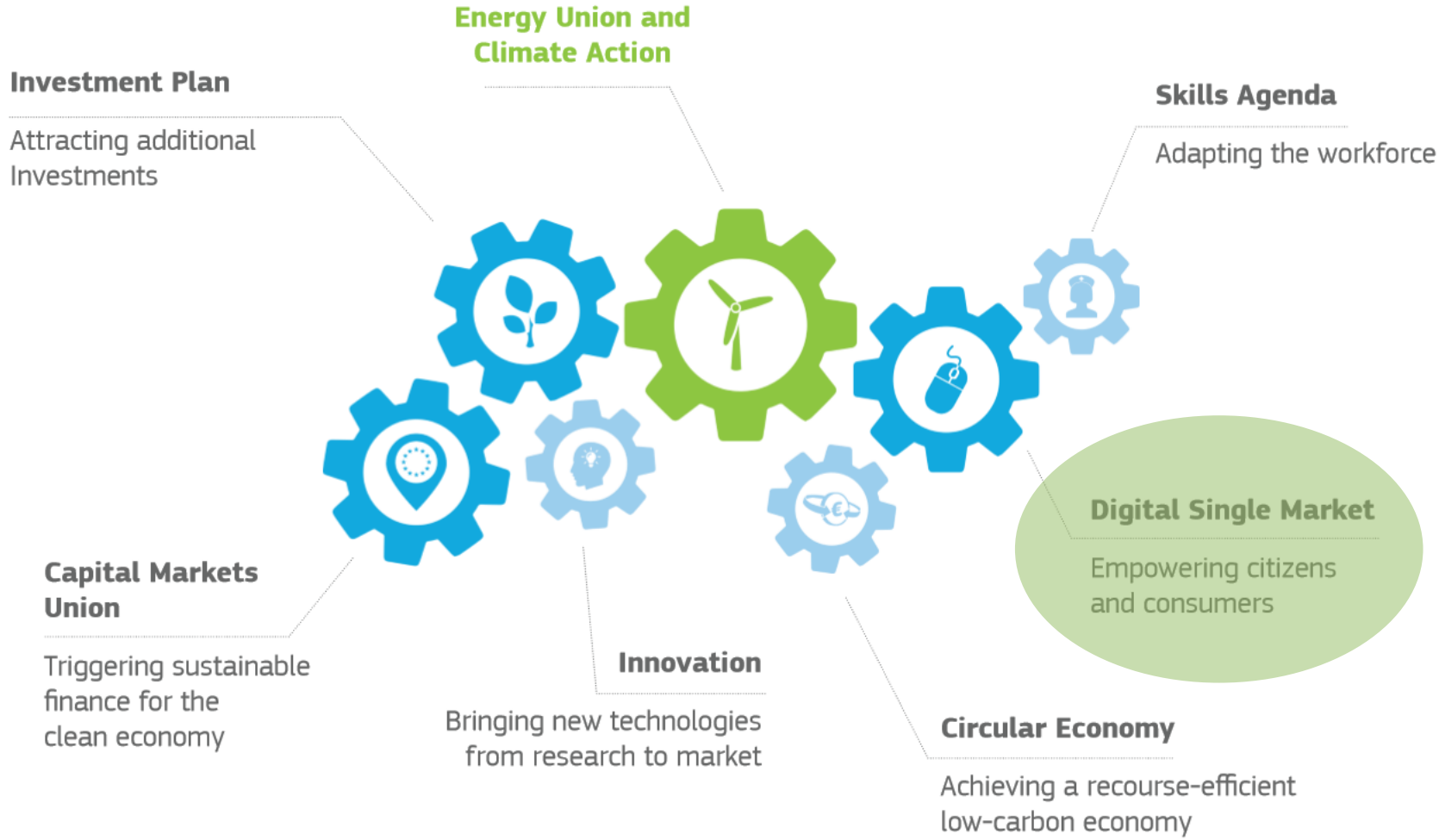
Subtask 14: Context EU winter package



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Subtask 14: Context EU winter package 2016

Some consumers – as individuals or in cooperatives – already generate renewable electricity, self-consuming

We want to **break those barriers** by making the whole system less burdensome, more flexible and more responsive to the way consumers produce and consume.

It is central that consumers can trust the energy policies and services. We want to increase transparency in the energy costs and prices. The current situation wherewholesale prices for electricity and gas are close

bill or deal with a problem. We want to change this. With our proposals **Europeans will have better access to smart meters and clear bills, and will be better able to switch energy provider**. We want Europeans to have better information, more possibilities to engage in the energy market and to be more in control of their energy costs.

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Subtasks

- Subtask 14:
  - Context analysis, use cases and Smart City pilots positioning
- Subtask 15:
  - Metering, monitoring and coordination methods required to increase prosumer responsiveness
- Subtask 16:
  - Coupling to innovative user feedback, billing and transactive(P2P) contract schemes
- Subtask 17:
  - Conclusions and Recommendations

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Subtask 14 : Context analysis, use cases and Smart City Pilots

- Energy transition
  - electricity: commodity, dissatisfier -> asset, gadget, part of life style
- Digitalization
  - Information available anywhere, anytime
  - Big data, liked data
  - Software or hardware cost no longer major issue
- Value creation
  - Mapping roles and responsibilities
  - Value flows
- Analyze the end-user behavioral characteristics and their relation to system operation. Classify and analyze behavioral changes that occur with customer energy transition, observed via metering and interviews.
- Analyze and refine the role and level of aggregator and aggregation in common use cases
- Critical success factors for smart city projects
- Bottlenecks in upscaling successful pilots
  - Increase technology readiness levels

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Subtask 15 : Metering, monitoring and coordination methods required to increase prosumer responsiveness

- Develop view on how to come to a better mapping of commercial **tariffs** on DR and DG customer behavior
- How do prosumer assets (including storage) become available for other actors (e.g. aggregators)
- Make inventory on current and future distribution grid asset management, operation modes and associated tariff scheme components
- Develop view on possible new **tax** and **subsidy** schemes
- Assess the relation to already existing and future automated **control schemes**

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Subtask 16 :Coupling to innovative user feedback, billing and transactive energy schemes

- Make an inventory of existing **feedback, reconciliation and billing systems** for electricity
- Assess a number of pilots, that have been implemented with alternative approaches:
  - Transactive energy
  - P2P
- Develop common view on **feedback** (50% kWh/50 flex) and **billing** innovation (e.g. Ethereum/smart contracts)
- Analyze the influence of instant feedback and microtransactions on user **behavior** and **responsiveness**

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Subtask 17 : Conclusions and Recommendations

- Lessons learned

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Collaborations

- IEEE, IEC and CENELEC standards committees
- ISGAN (SmartGrids)
  - Several annexes
- National stakeholder groups
  - NL/TKI Urban energy
- EERA/SmartGrids
- DERLabs HESI-facility
- IEA/TCP
  - ECES (Storage)
  - HPT (Heat pumps)
  - PVPS (photovoltaic)

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Organization

IEA-DSM TASK 17 - Phase 4	Q3 18	Q4 18	Q1 19	Q2 19	Q3 19	Q4 19	Q1 20	Q2 19
Subtasks								
Subtask 14 - Context								
Subtask 15 - Metering, monitoring and billing								
Subtask 16- Billing and transactive								
Subtaks 17 - Conclusion and recommendations								
Expert meetings								
Biannual country expert meeting								
Workshops								
Workshops with stakeholders and experts								
Reports								
Subtasks reports								
Final report								

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Deliverables

- IEA-DSM-17.4.14: “Context analysis, flexibility aggregation and Smart City initiatives”
- IEA-DSM-17.4.15: “Metering, monitoring and coordination methods required to increase prosumer responsiveness”
- IEA-DSM-17.4.16: “Innovative user feedback, billing and transaction schemes”
- IEA-DSM-17.4.17: “Conclusions and recommendations realizing responsive prosumer networks”

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Financial

- Dependent upon the number of participating countries (>4); 32-24k€
- In kind country expert contribution 200-300 hrs over 2 years

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Questions

TNO Netherlands organization for science and technology

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Energy efficiency program
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