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Smart Grids and Energy Markets

# Ecosystem for Demand Response

**Erkki Viitala**

Emtele Oy

**Petri Trygg, Pertti Järventausta**

Department of Electrical Energy Engineering, Tampere University of Technology

**Dedehayir Ozgur, Seppänen Marko,**

Department of Industrial Management, Tampere University of Technology

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# Background of ecosystems

**Dedehayir, Ozgur; Seppänen Marko; Mäkinen, Saku**

Center for Innovation and Technology Research  
Department of Industrial Management  
Tampere University of Technology  
P.O. Box 541, FI-33101, Tampere, FINLAND

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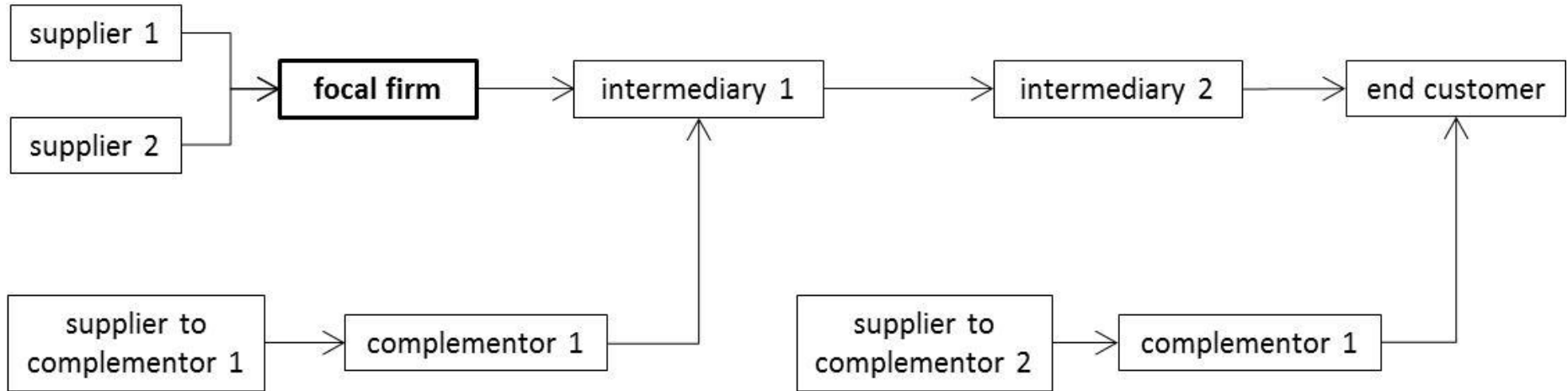


## Defining the business ecosystem

- The network of firms, which collectively produces a holistic, integrated technological system that creates value for customers.
- Each member contributes to the ecosystem's overall wellbeing, and is dependent on other members for its survival.
- The survival and success of each member is influenced by the ecosystem as a holistic entity that is in continuous evolution



# Value blueprint of the business ecosystems

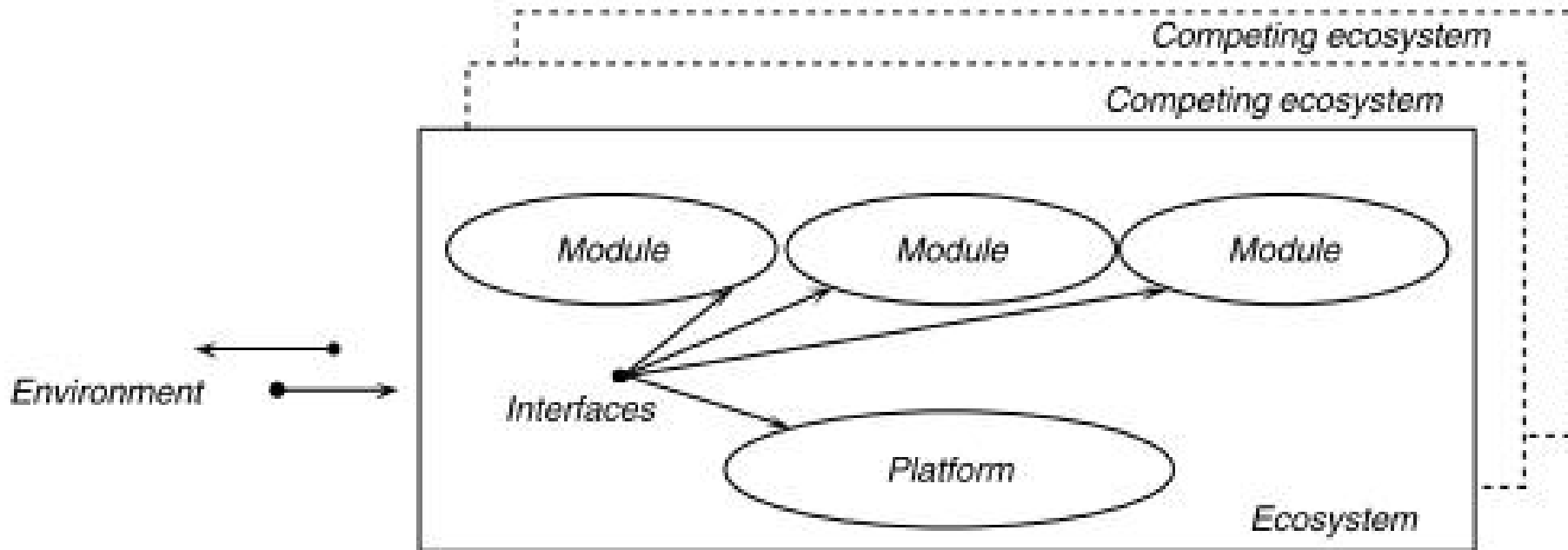


*Adner, 2012*



# Business ecosystems

## Platform-Centric Ecosystems





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# Ecosystems for DR

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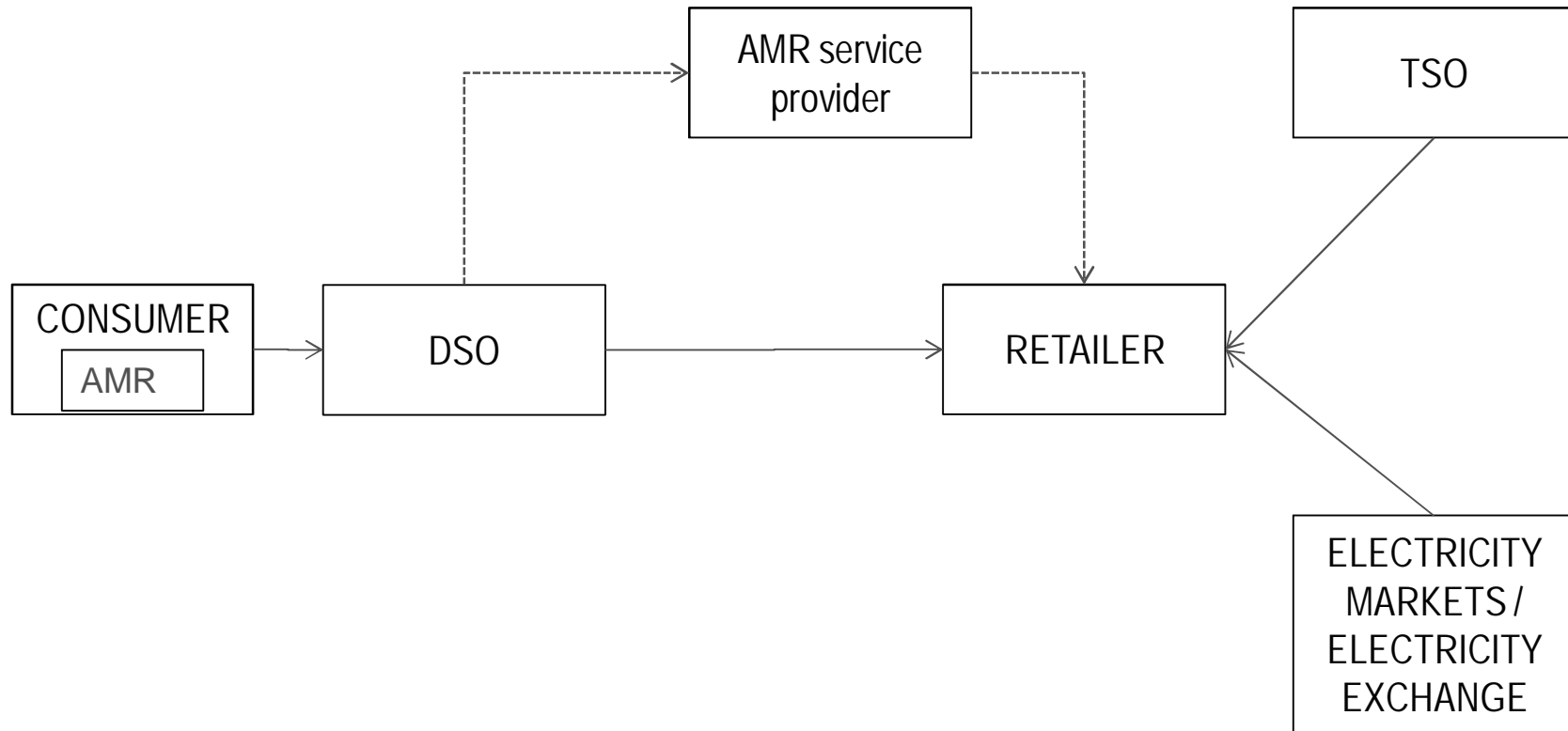
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# Retailer's balance settling model (AMR)





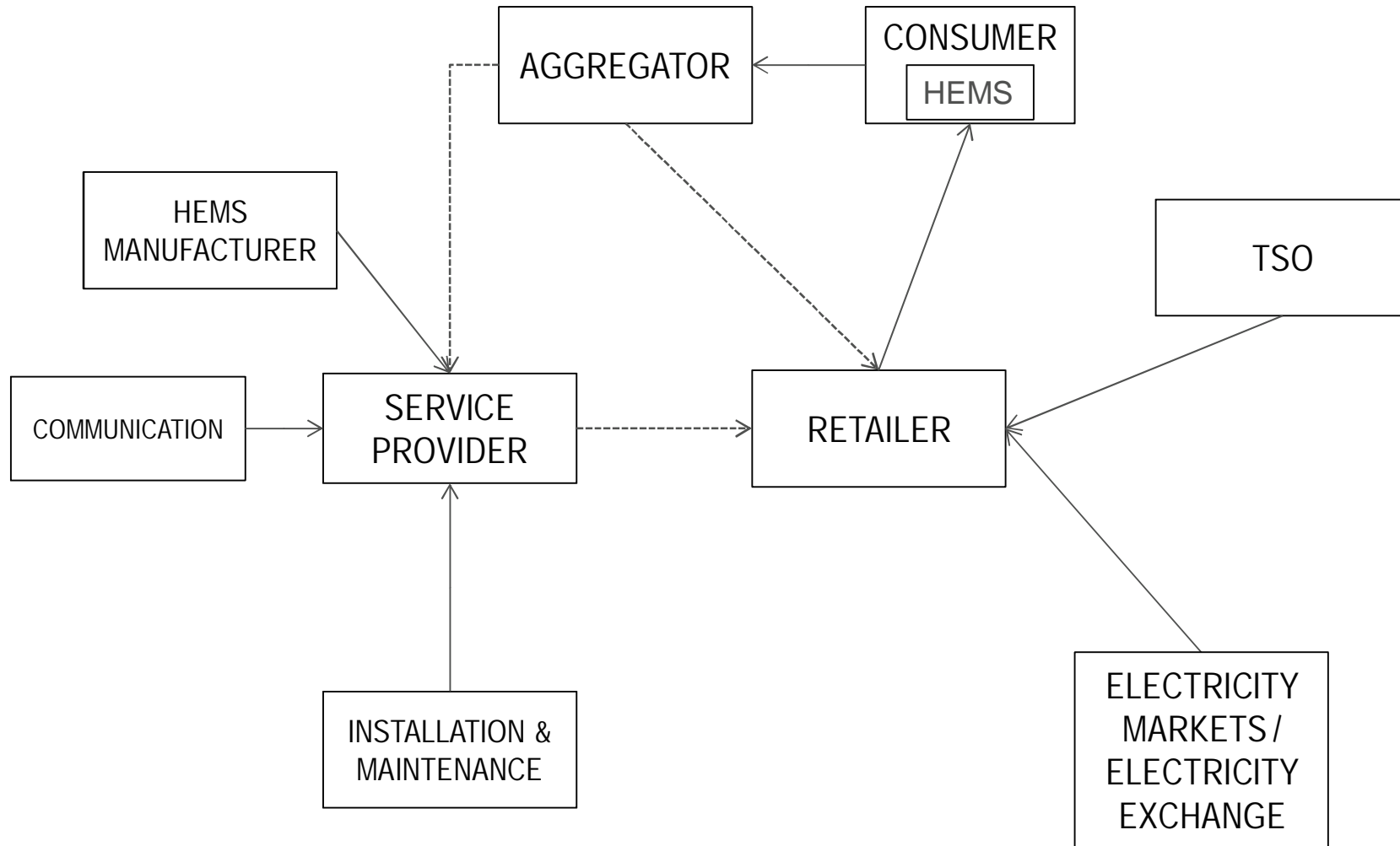
## Ecosystem functionality

- AMR for DSO´s customers is used for providing controllable resources for Demand Response (DR). This is done by own system or alternatively by AMR service provider. In this option it is possible to use several DSOs.
- Retailer can optimize it´s balance by AMR based resources instead of electricity exchange products or other electricity market products.





# Retailer's balance settling model (HEMS)



—— Providing value  
- - - - Alternative solution

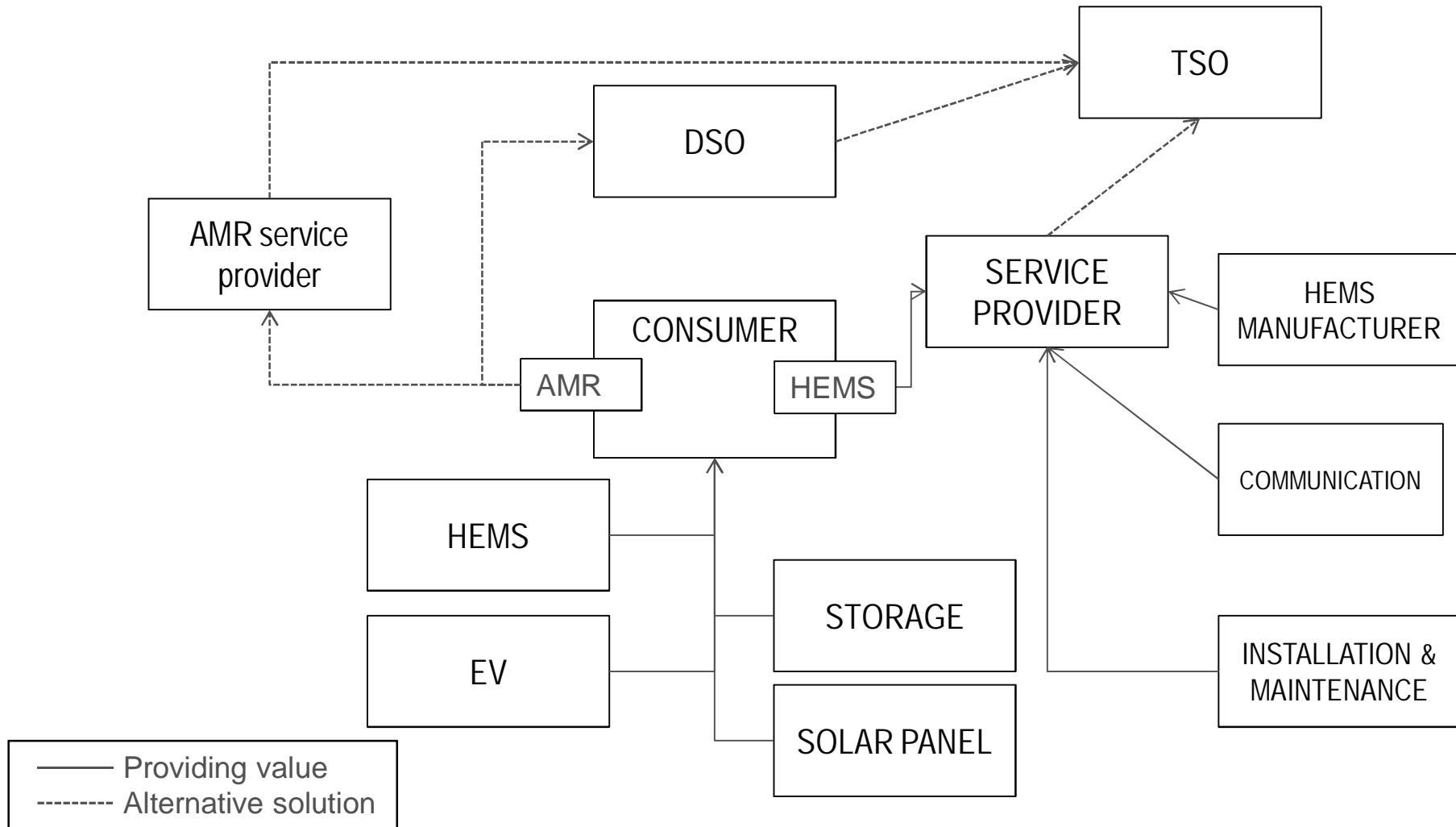


## Ecosystem functionality

- Retailer has agreed with HEMS customer that DR load can be purchased.
- DR load can be available to Retailer by aggregator that has other services such as security or telecommunication agreements with customers. Alternatively Service provider concentrating only to HEMS functions is providing load in addition to installation and maintenance.



# TSO disturbance reserve



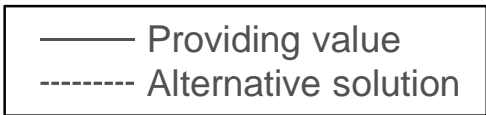
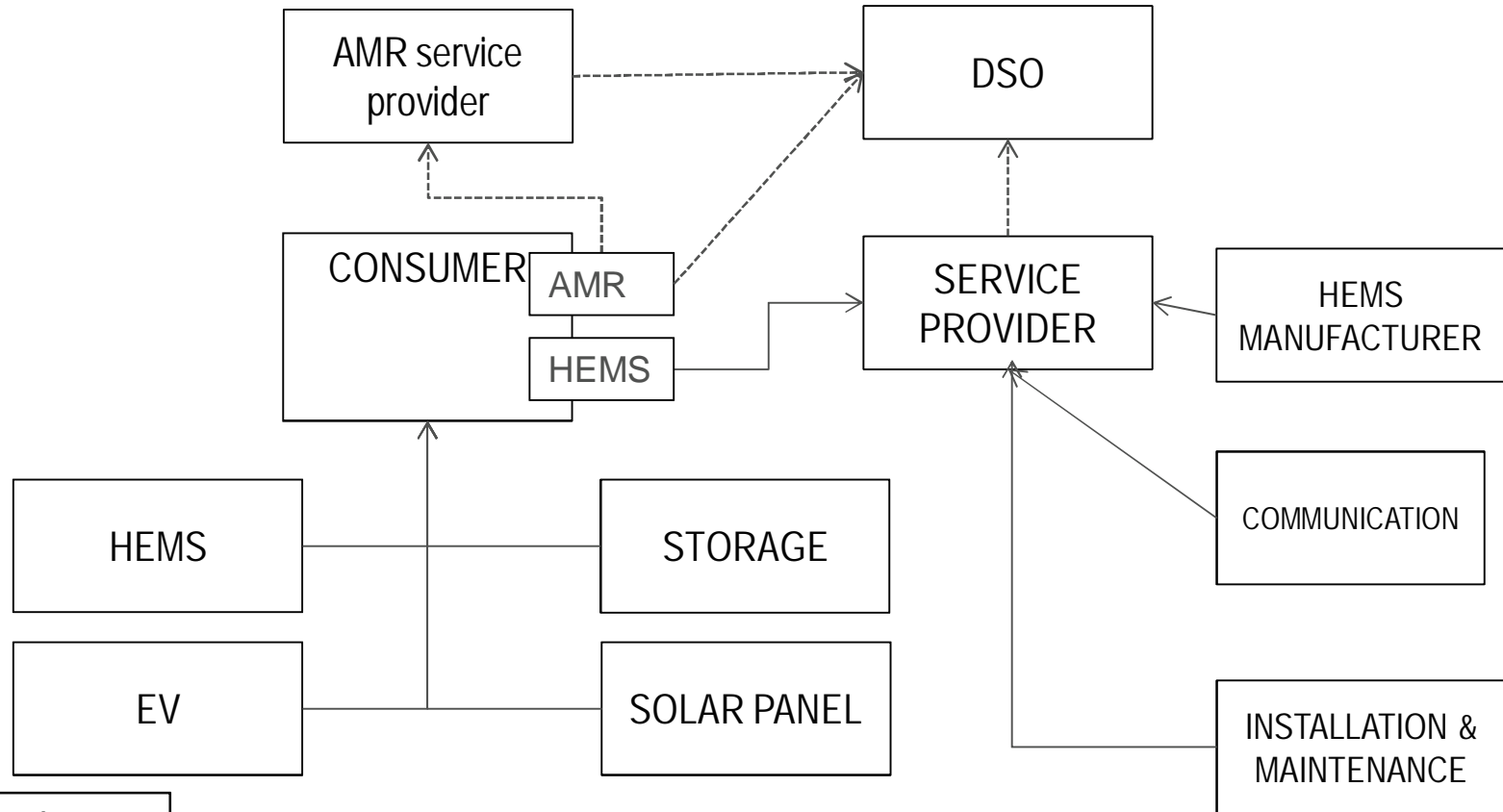


## Ecosystem functionality

- In case of losing network connections or production TSO traditionally starts fast gas turbines to maintain frequency. DR could be used as alternative or in addition with gas turbines. This could be done by AMR and alternatively by HEMS.
- DR resources could also include Electrical Vehicle, Energy Storage or Distributed generation such as Solar Panel. In this case HEMS also manages these.



# DSO capacity management





## Ecosystem functionality

- In case of outage in distribution network DR could be used for restoring electricity or limited power in case of bottleneck capacity for certain areas. This could be done by AMR and alternatively by HEMS.
- DR resources could also include Electrical Vehicle, Energy Storage or Distributed generation such as Solar Panel. In this case HEMS also manages these.



# SGEM participants for this ecosystem

- DSO
  - Helen Sähköverkko, Elenia, Fortum
- AMR Service Provider
  - Empower, TeliaSonera
- HEMS Manufacturer
  - There, ABB
- Communication
  - Elisa, TeliaSonera
  - Viola Systems
- Installation and Maintenance
  - Empower
- DR service provider
  - Empower, Emtele
- Retailer
  - Helen