

Data-driven Non linear Prediction Model for Price Signals in Demand Response Programs

G. De Zotti* H. Binder** A. B. Hansen**
H. Madsen* R. Relan*

* Technical University of Denmark

** Energinet

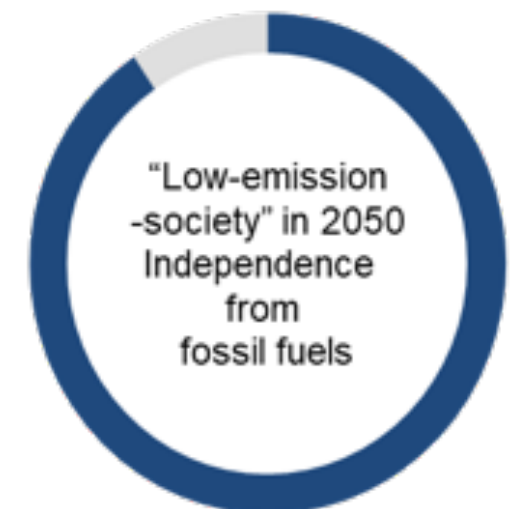
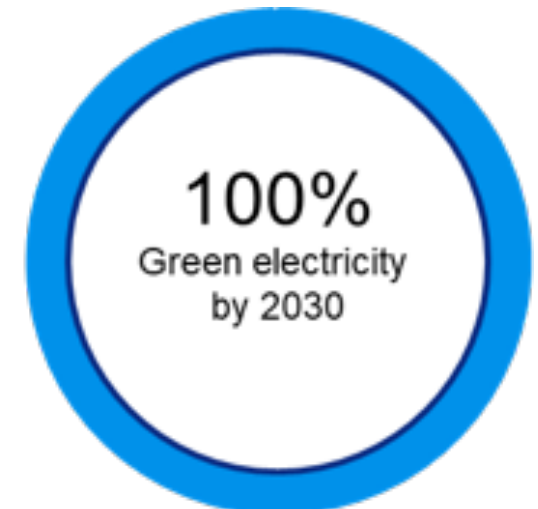
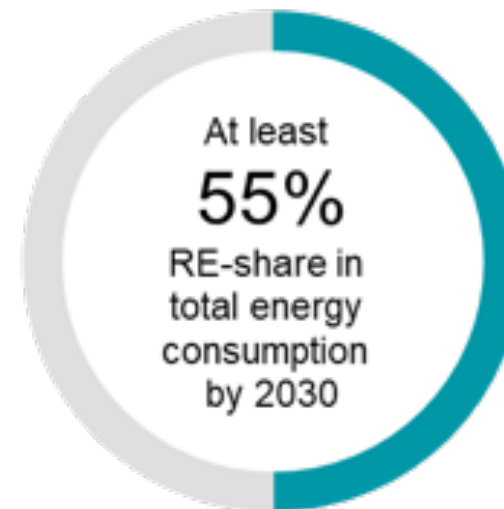


ENERGINET

Outline

- Motivations
- Engaging the flexible resources
- Role of demand response
- Neural network
- Results
- Conclusions

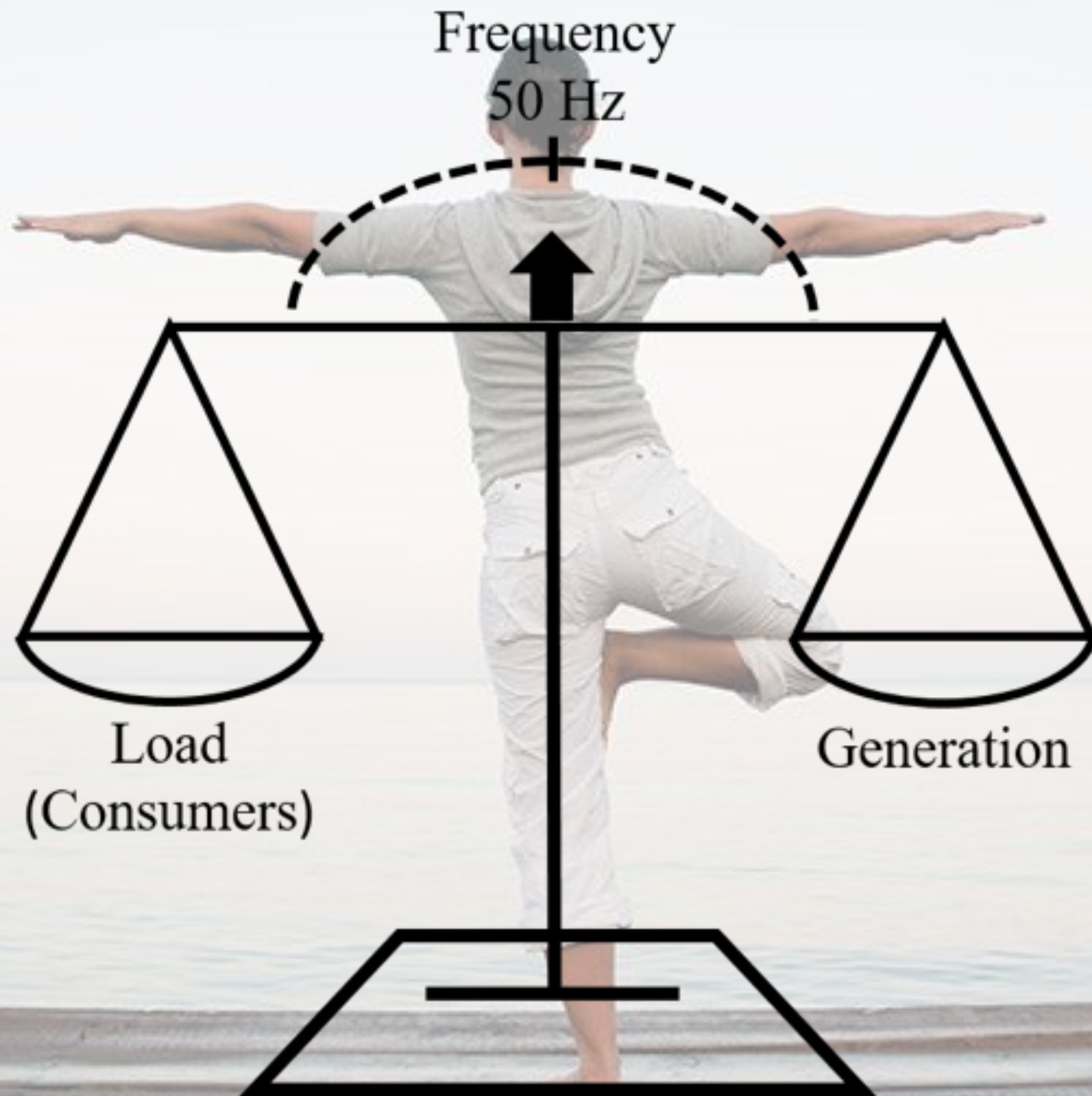
Denmark's ambitious climate target



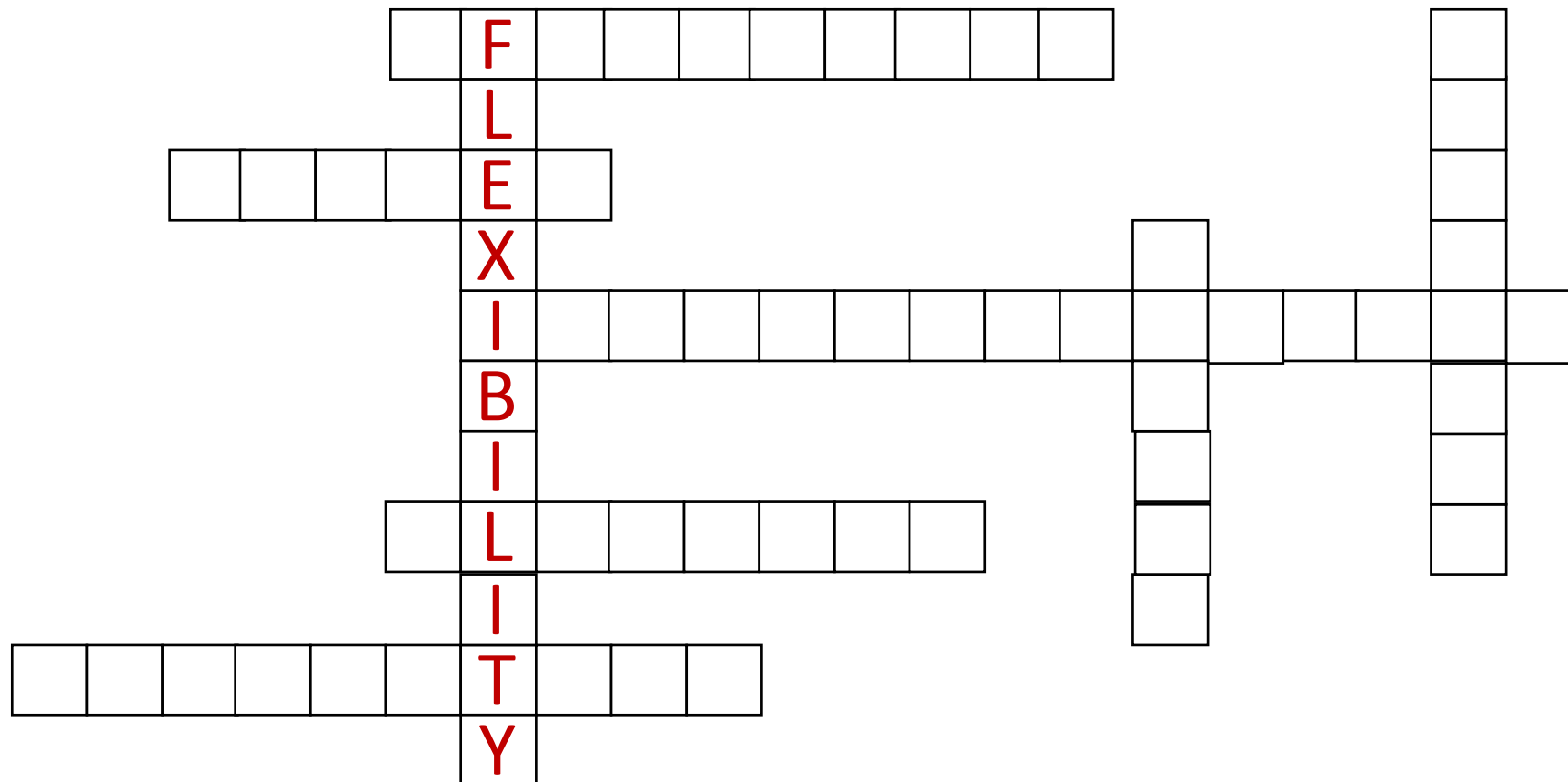
Balance in power systems



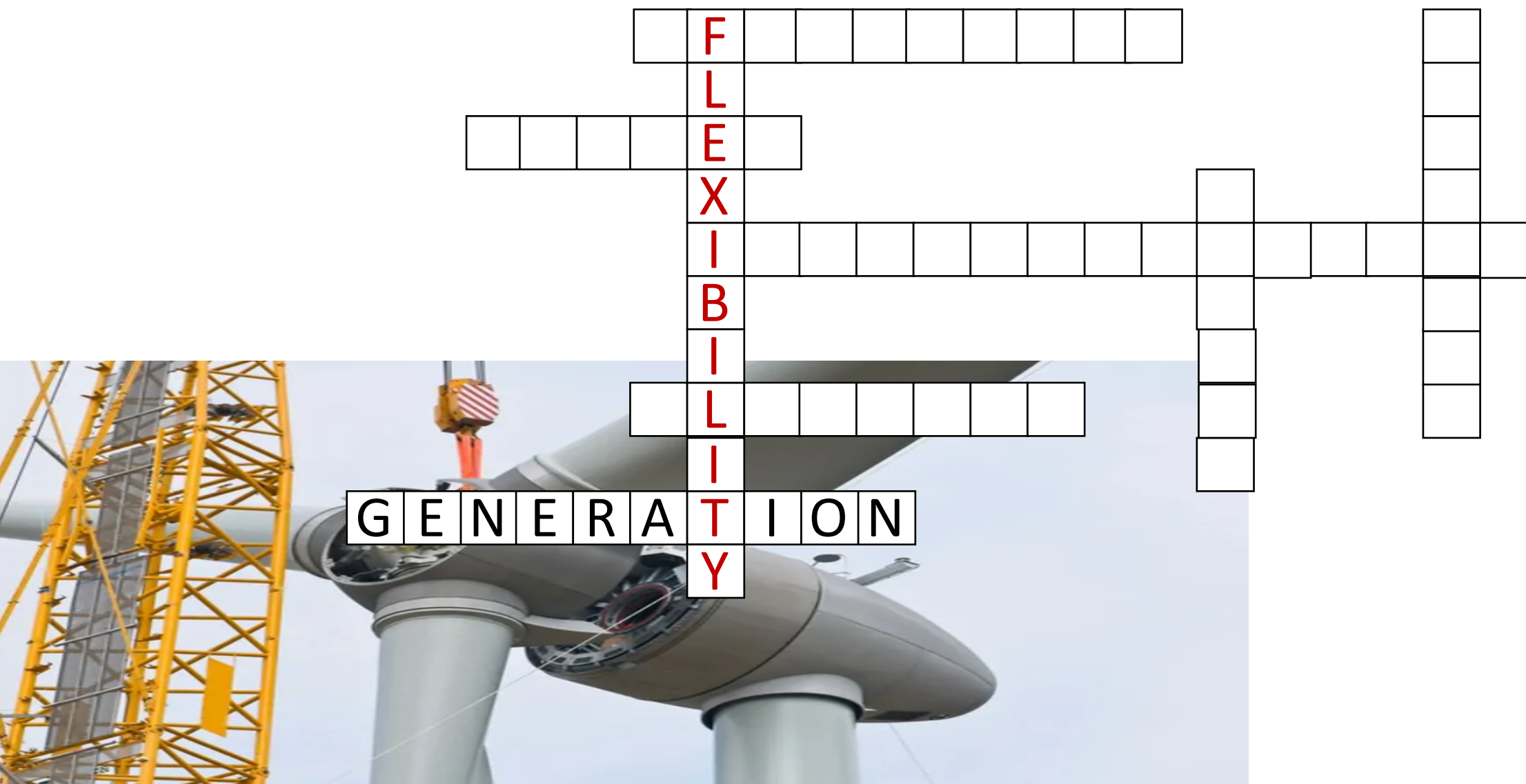
Balance in power systems



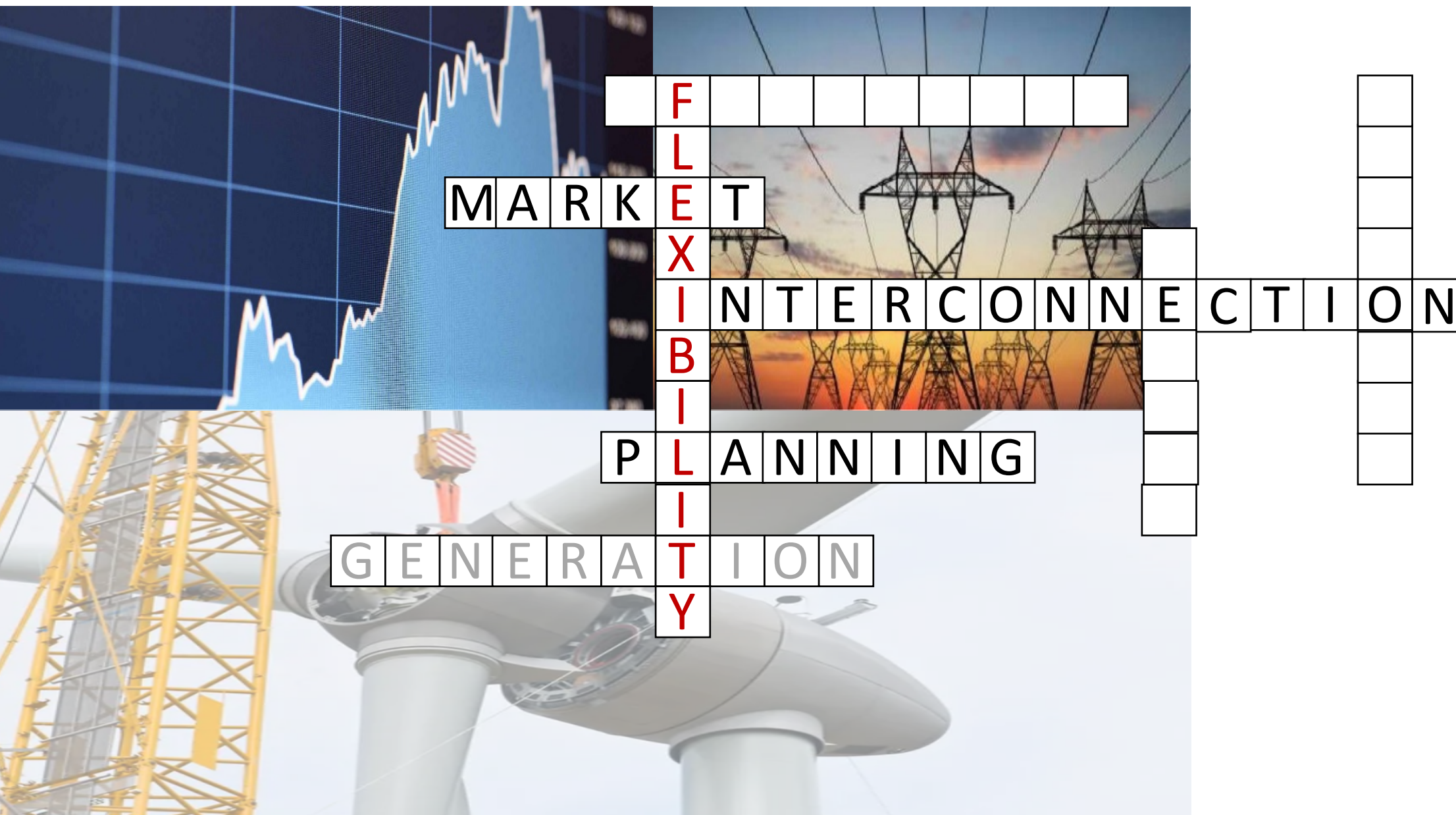
Engaging the flexible resources



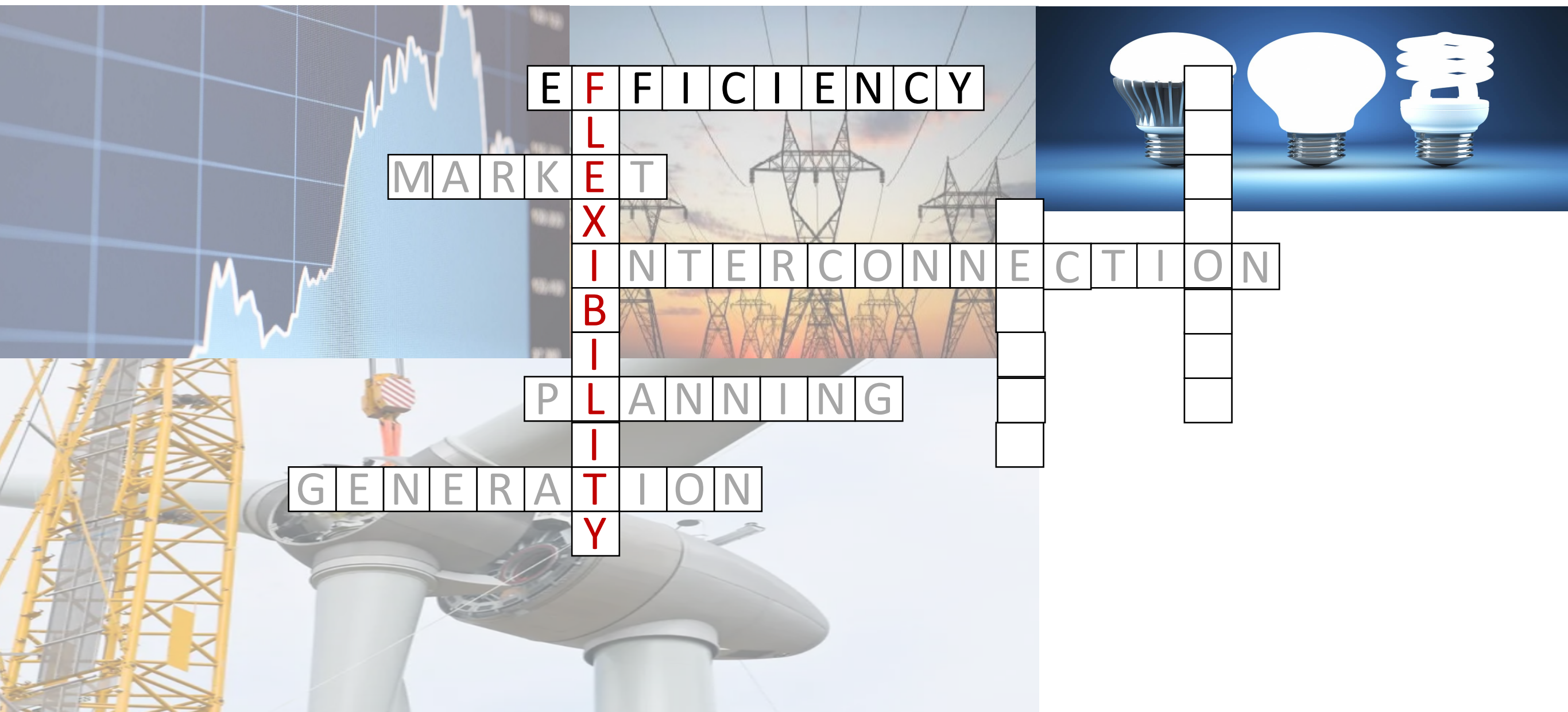
Engaging the flexible resources



Engaging the flexible resources



Engaging the flexible resources

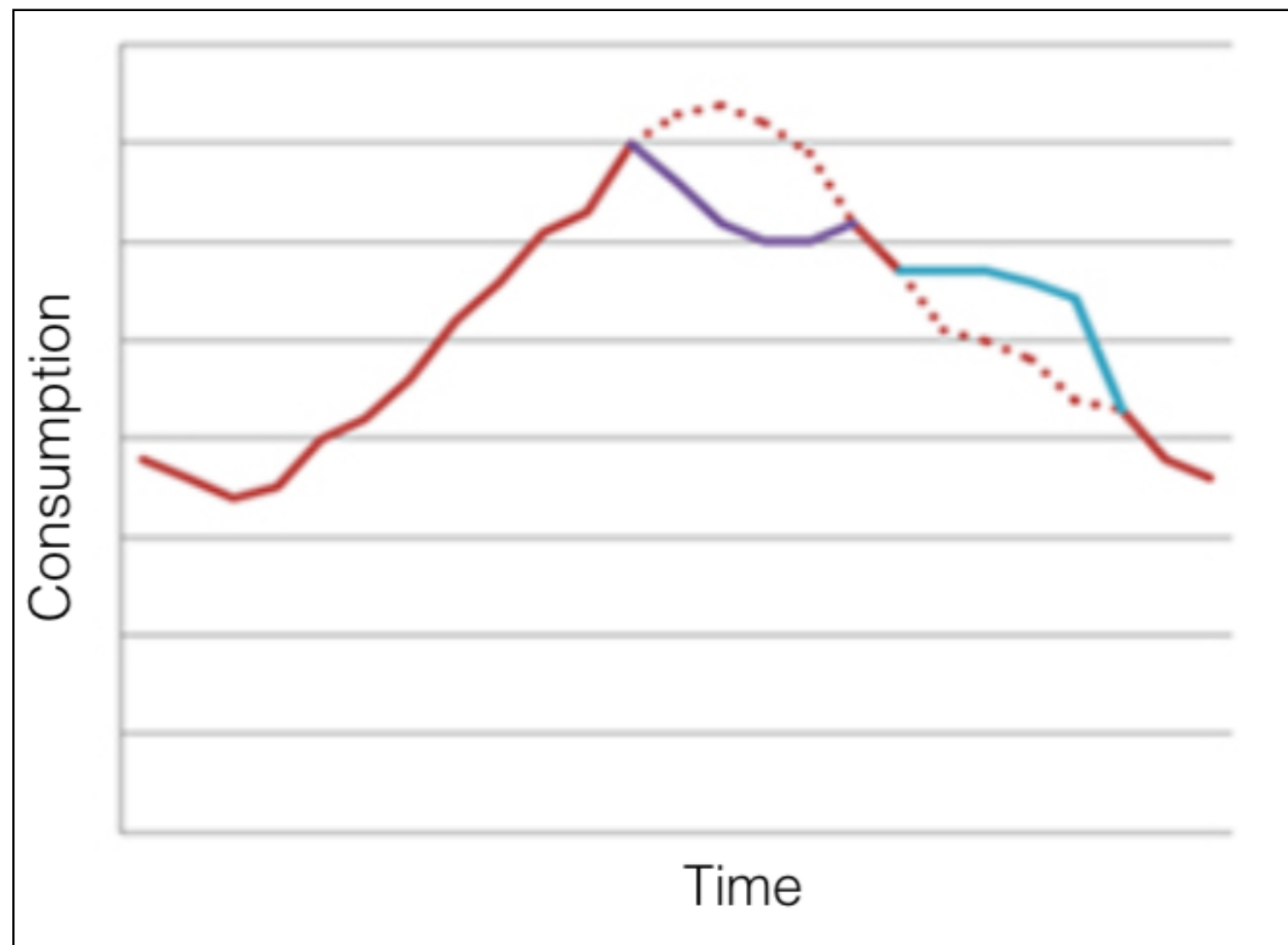


Engaging the flexible resources

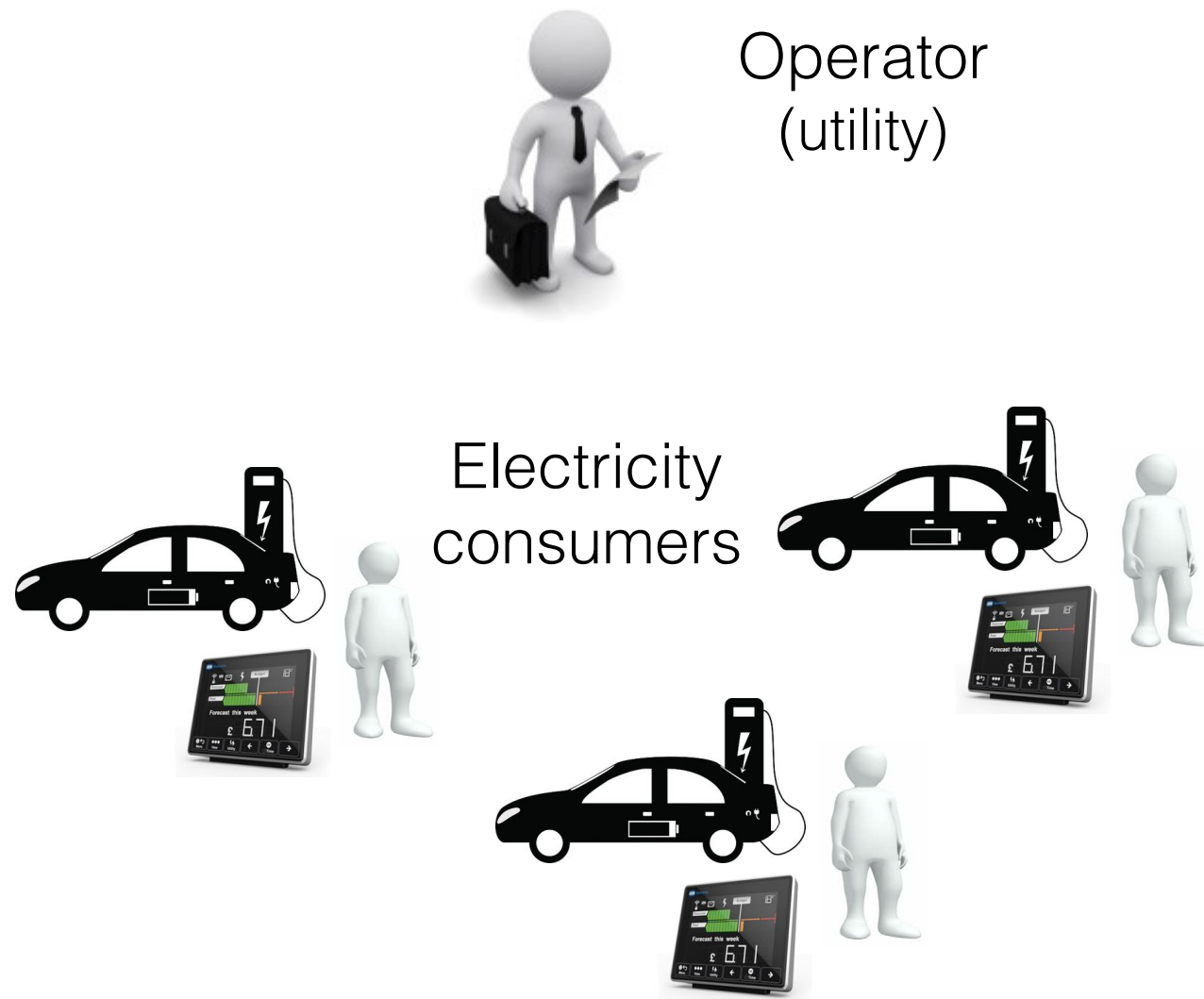


Leveraging demand response

It consists of **changes in consumers' electricity demand** that provide services to the grid.

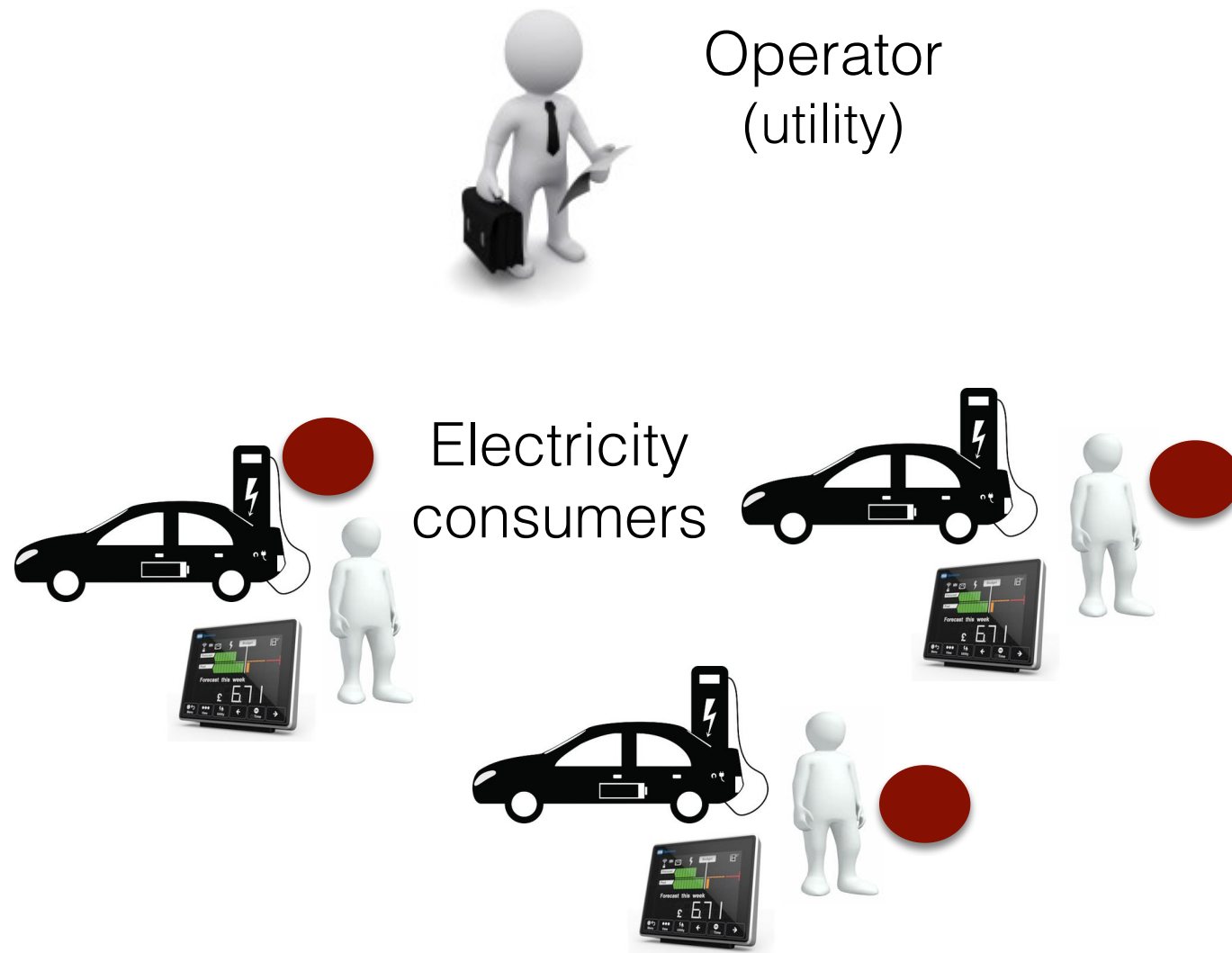


Indirect control approach



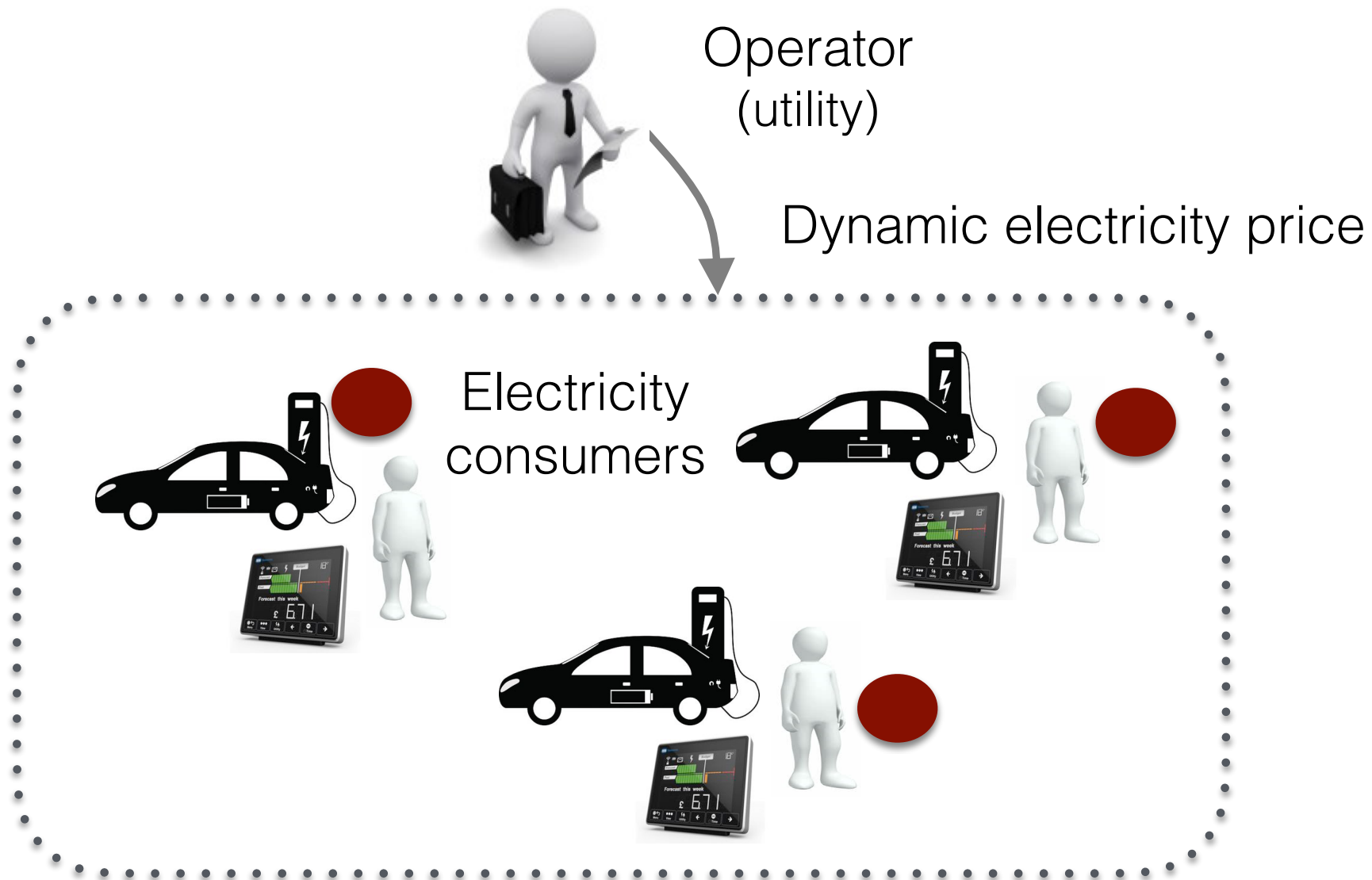
Indirect control approach

● Control logic



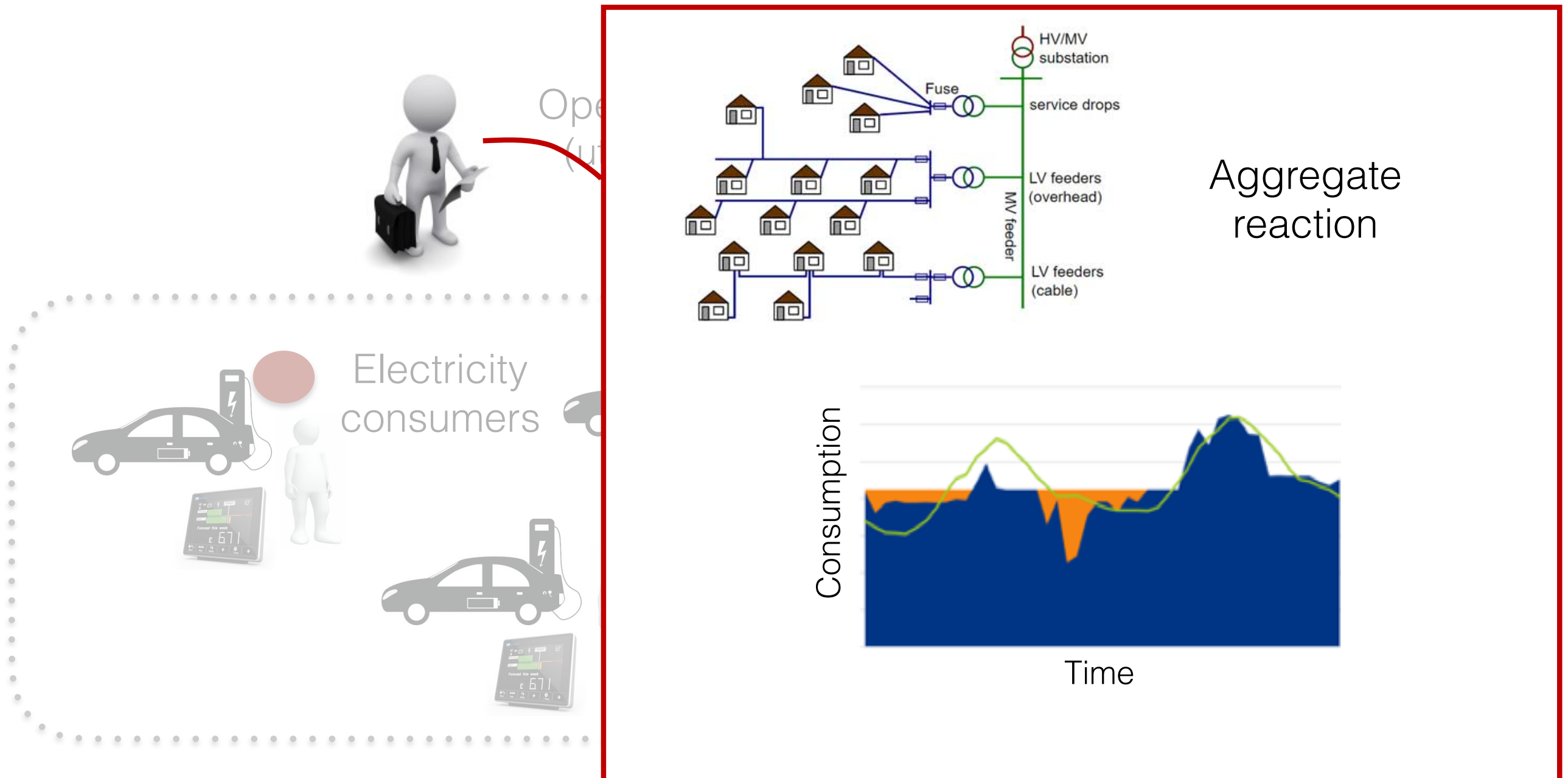
Indirect control approach

● Control logic



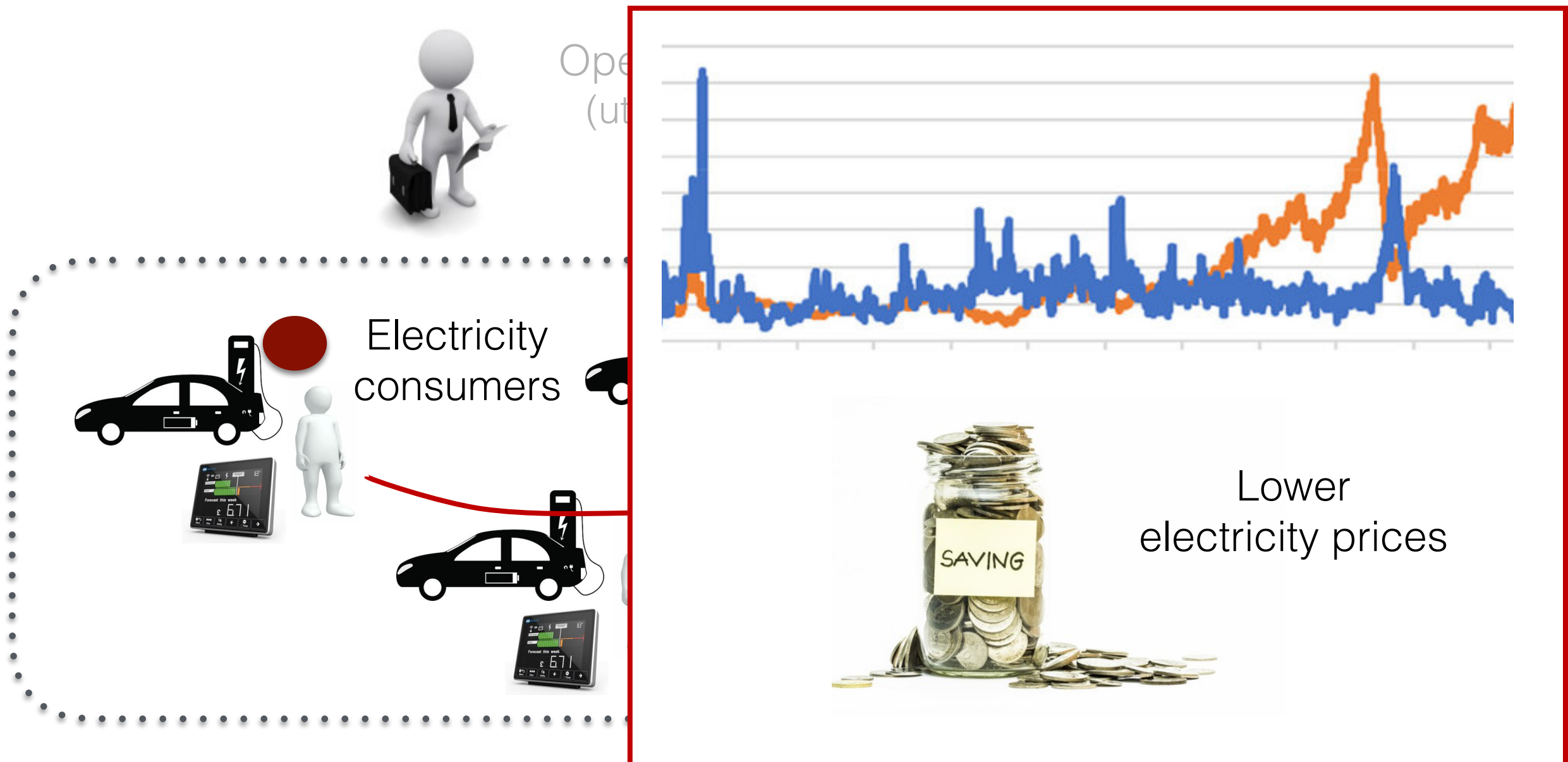
Indirect control approach

● Control logic

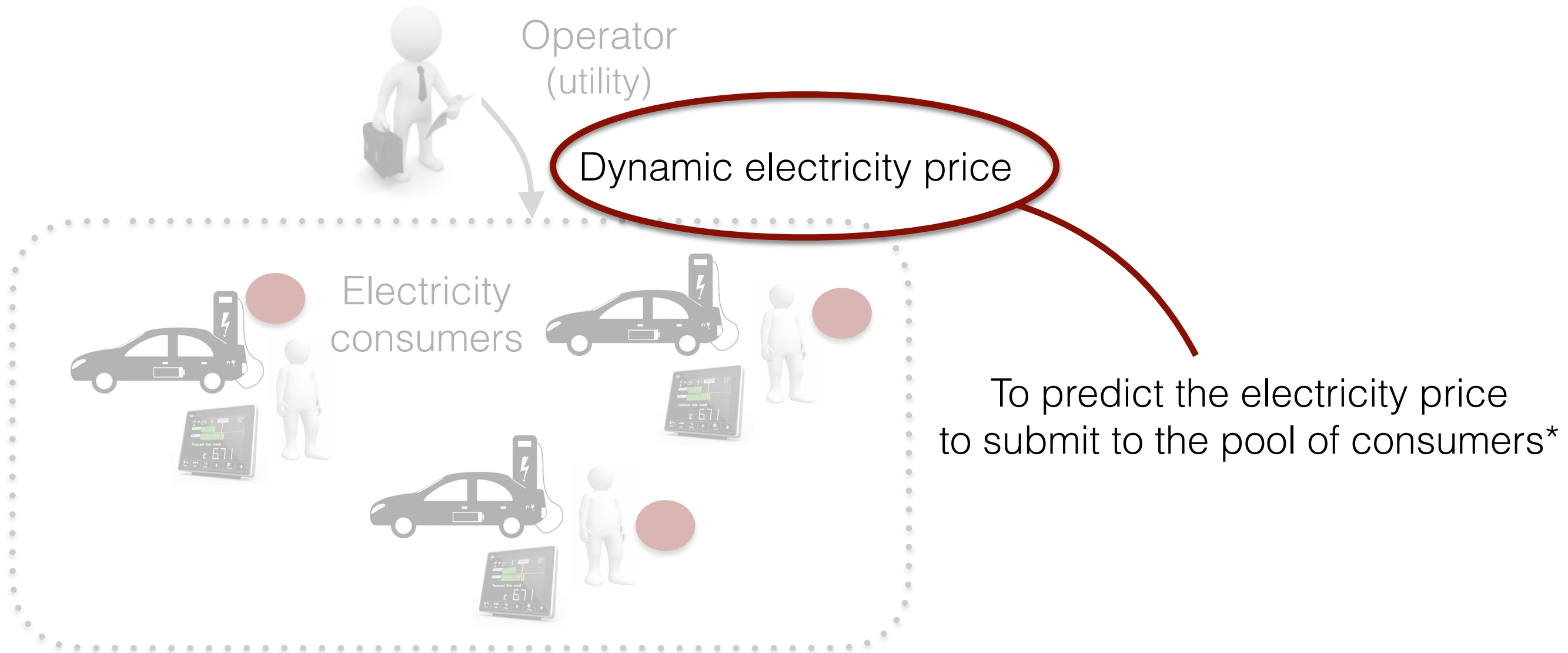


Indirect control approach

● Control logic



Formulating the dynamic electricity price

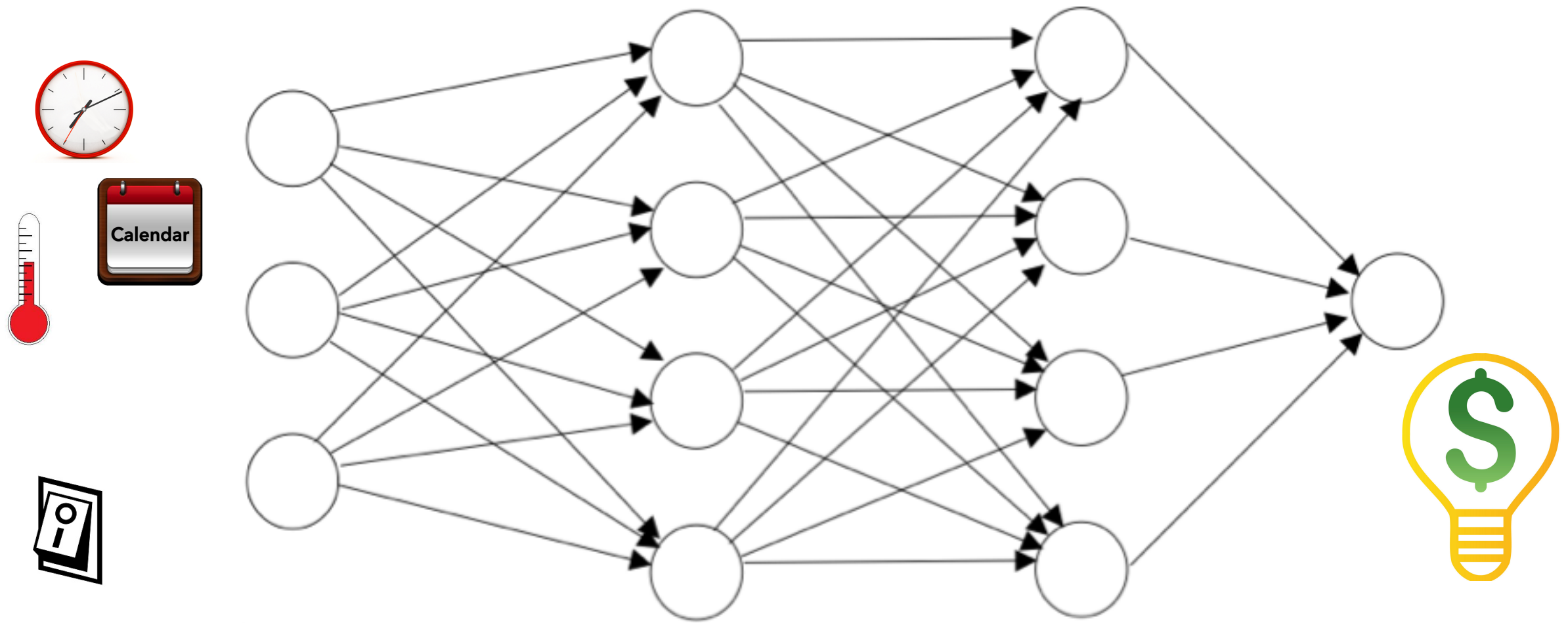


* having certain information about the pool of consumers

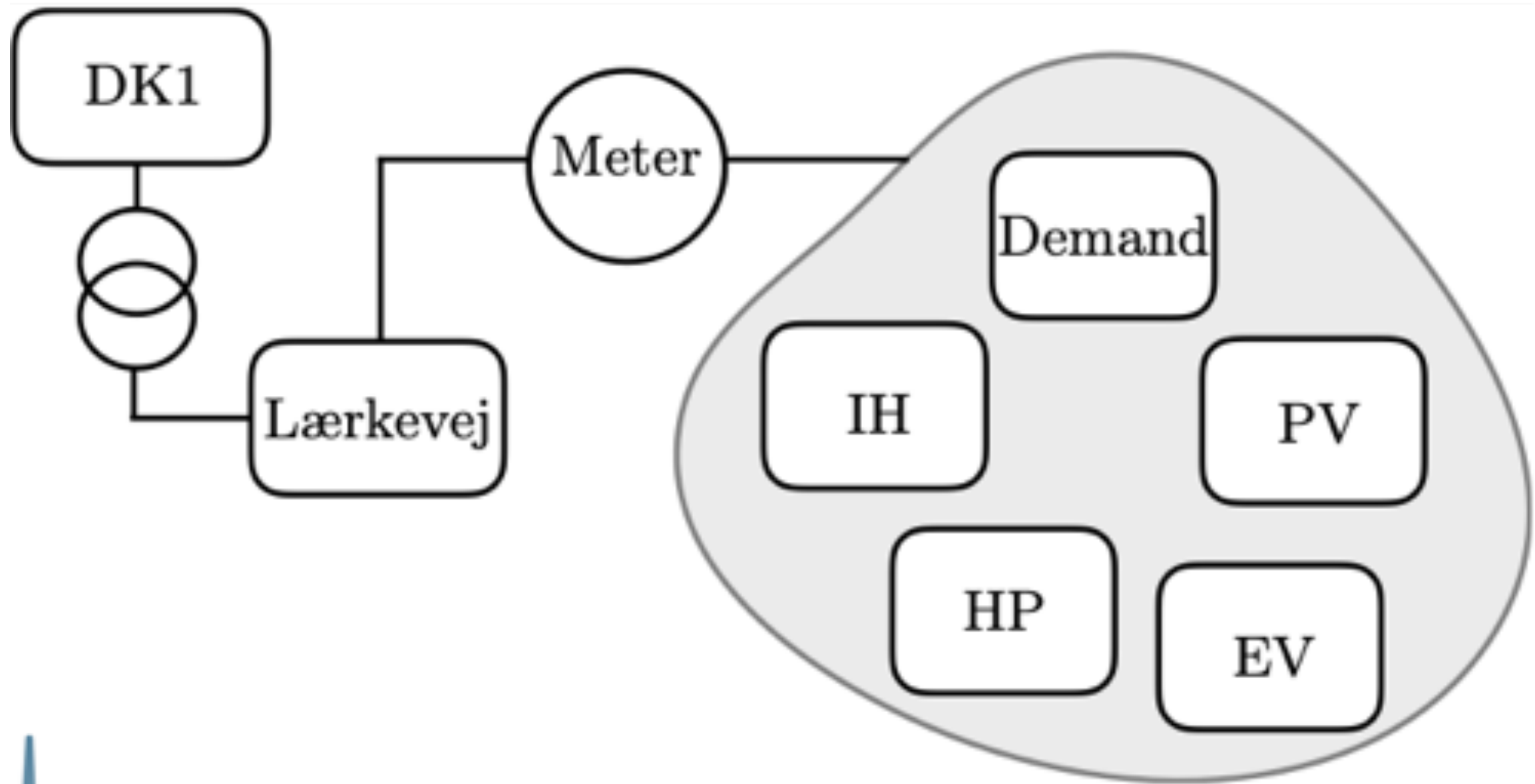
Neural network

Input

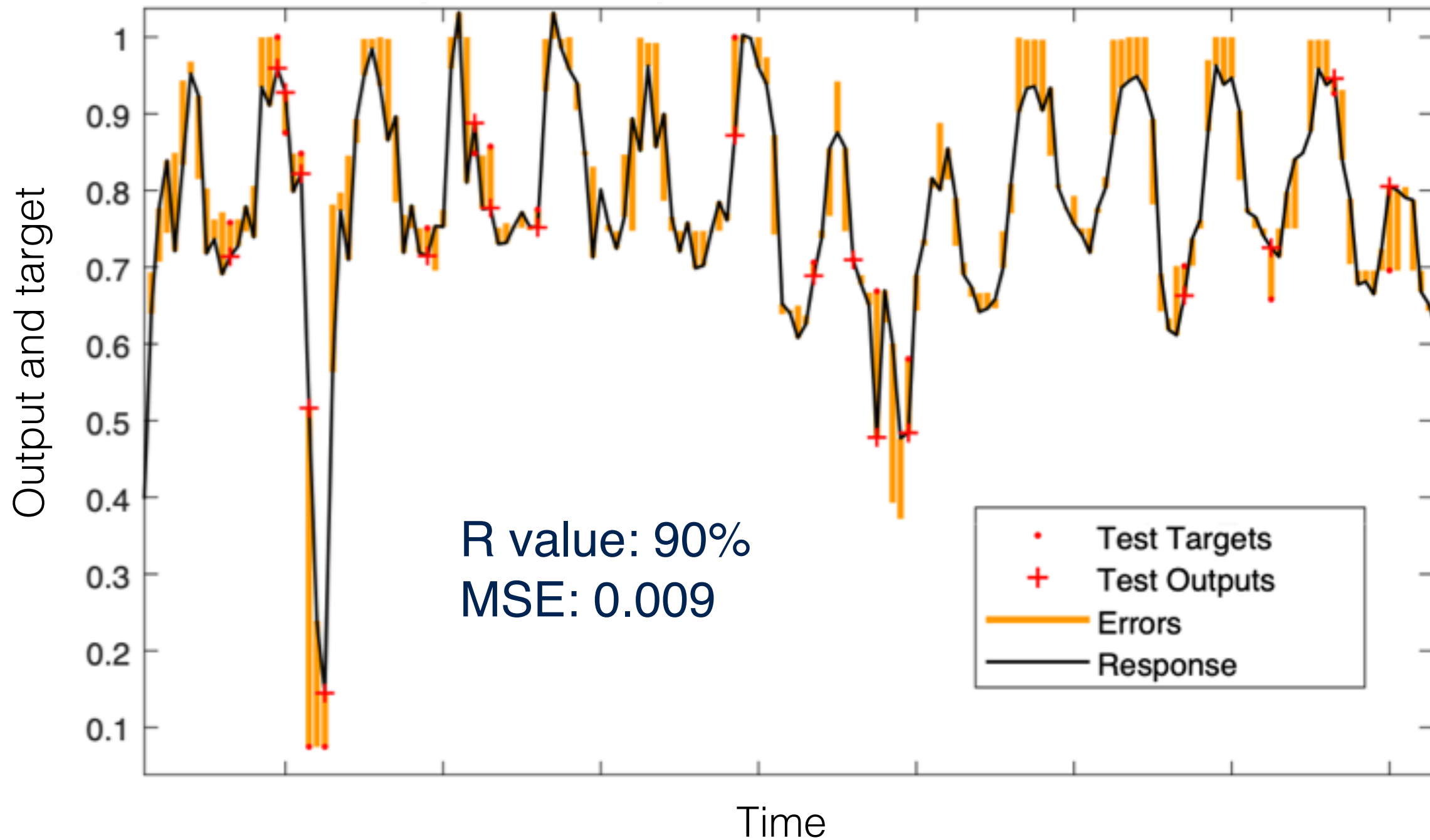
Output



Case study of Lærkevej



Results



Conclusions

Demand response can unlock flexibility to support the Danish ambitious climate targets.

Dynamic electricity prices can be used in demand response programs.

Neural network can help to formulate dynamic electricity prices to achieve aggregate change in consumption.



Contacts

- Giulia De Zotti gizo@dtu.dk
- Hanne Binder hbr@energinet.dk
- Anders Bavnhøj Hansen abh@energinet.dk
- Henrik Madsen hmad@dtu.dk
- Rishi Relan risre@dtu.dk

