EnergieKoplopers (Energy Frontrunners)

Lessons learned from a flexibility market for households with fuel cells

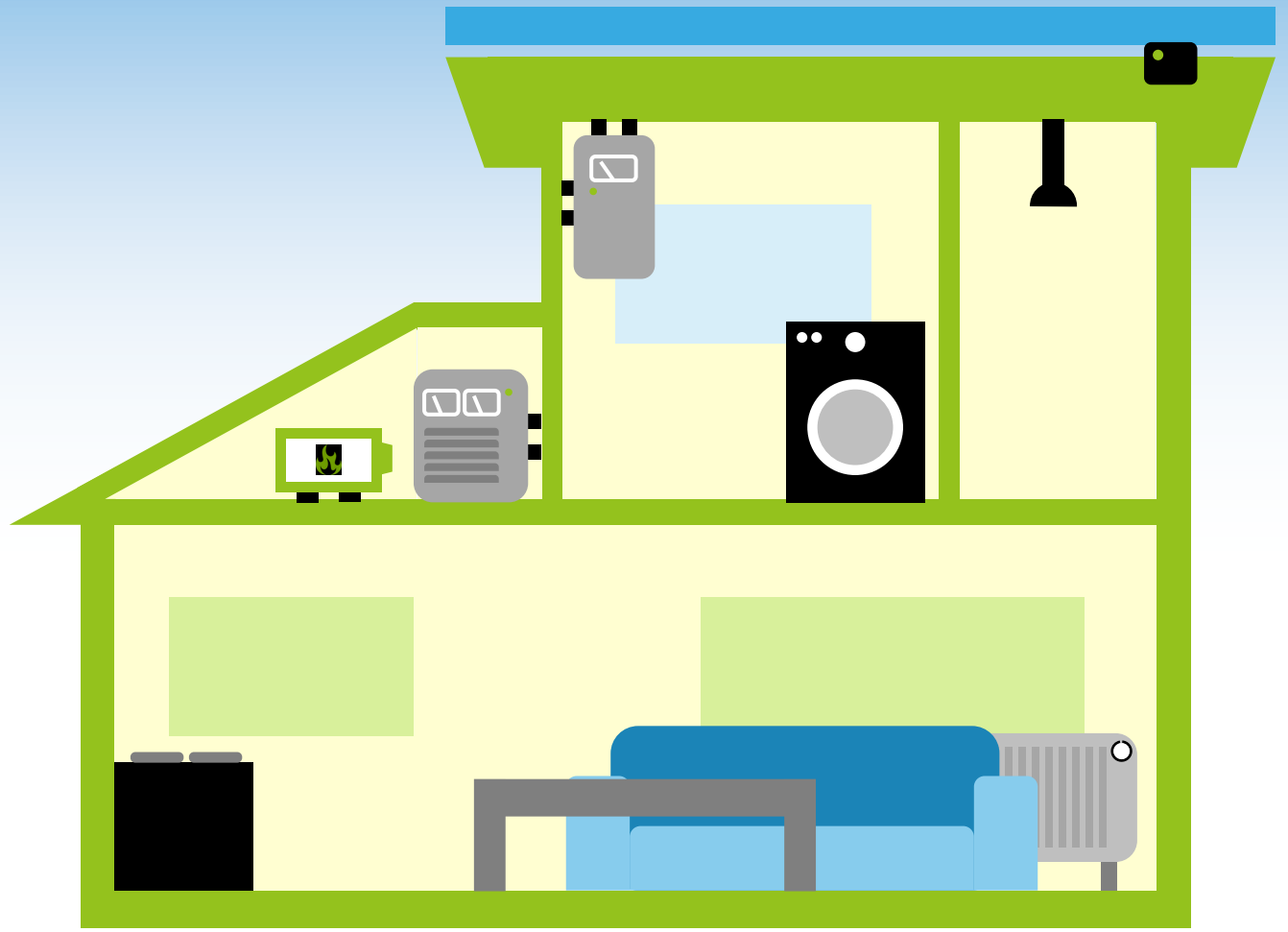
Increase in renewable energy

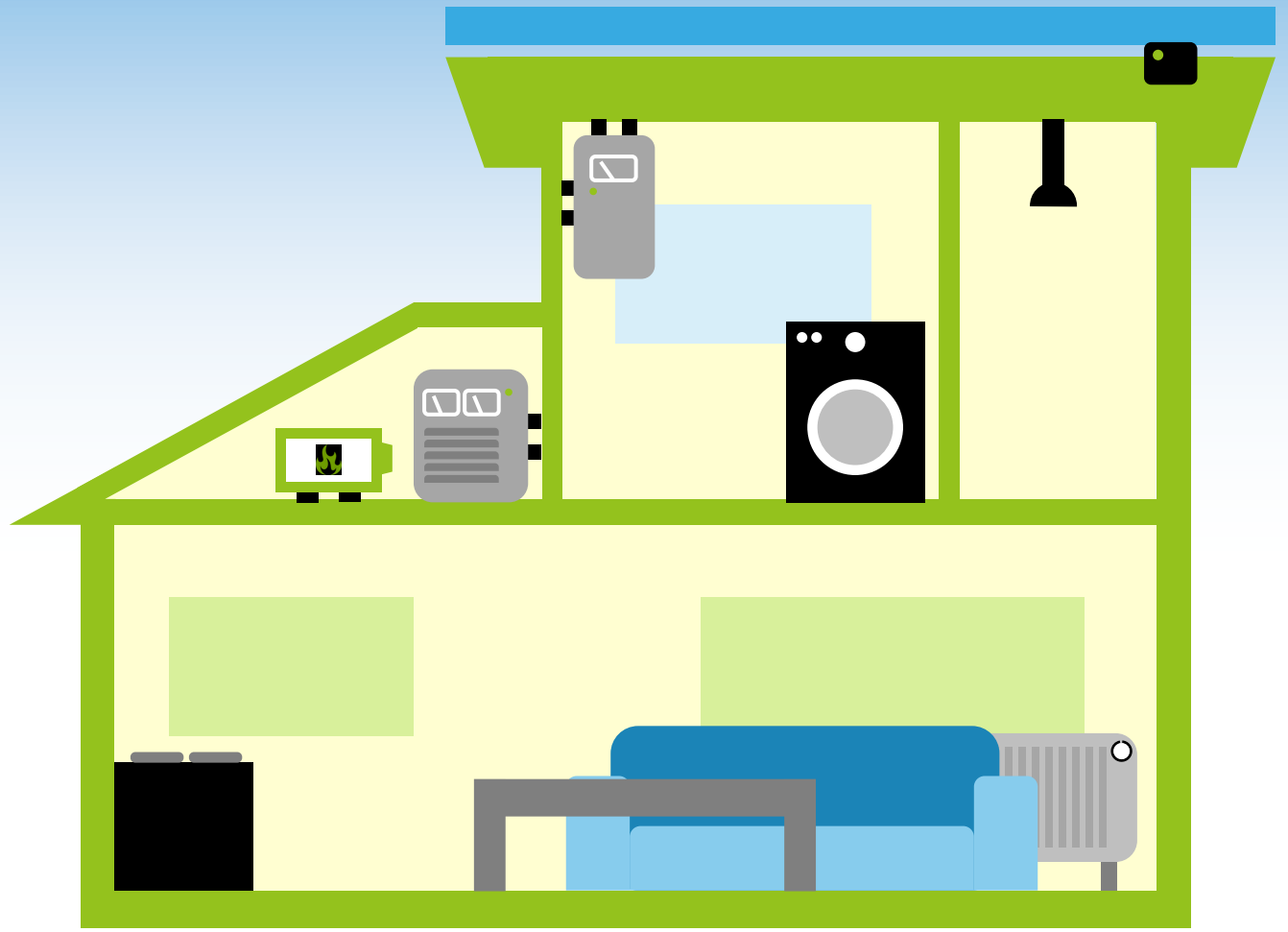
Intermittency of renewable energy increases costs for the energy system

Intermittency can cause high costs for the energy system

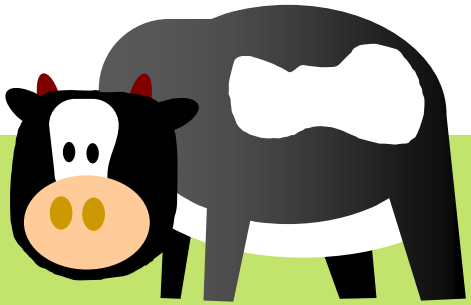
- Firstly, peaks in the grid can occur that the local grid is unable to cope with. For example, the electrification of our heating can cause significant peak demand in the evening. And vice versa, local generation through solar panels can result in considerable feed-in peaks at noon. The traditional method to solve this is grid reinforcement, but this is expensive.
- Secondly, supply for and demand of electricity is becoming more difficult to predict because of the fluctuating character of solar and wind power. This can sometimes result in moments of energy shortage, and sometimes in moments of energy surplus. To cope with these two problems, the electricity system needs to become more flexible

Flexibility in electricity consumption offers a solution

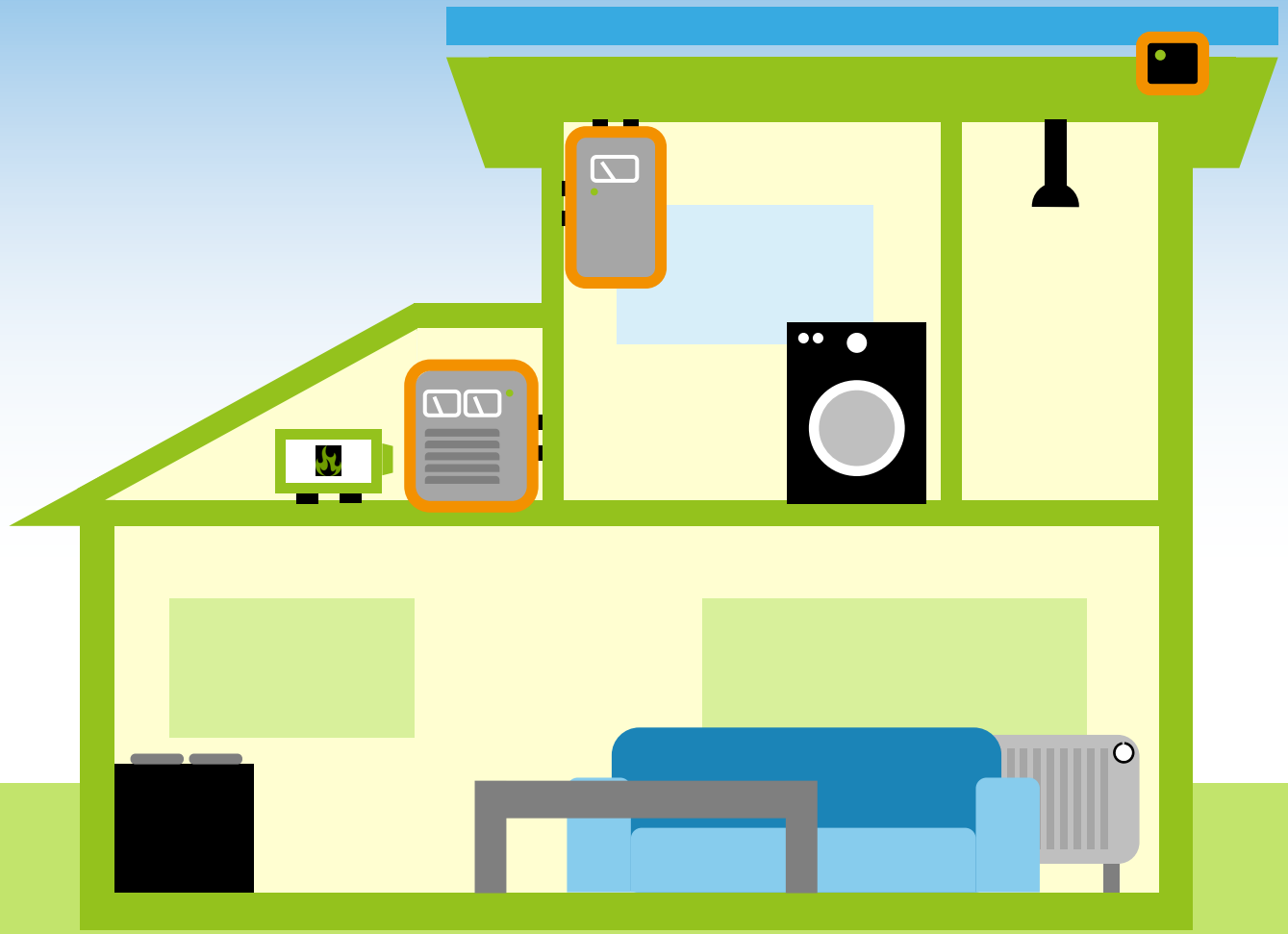




EnergieKoplopers: a testing ground ..

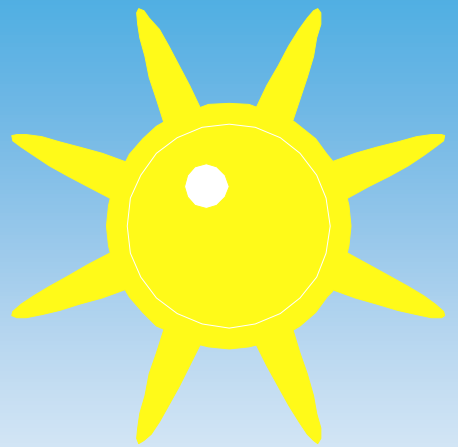


EnergieKoplopers: a testing ground ..



200

Smart devices



45 electric boilers

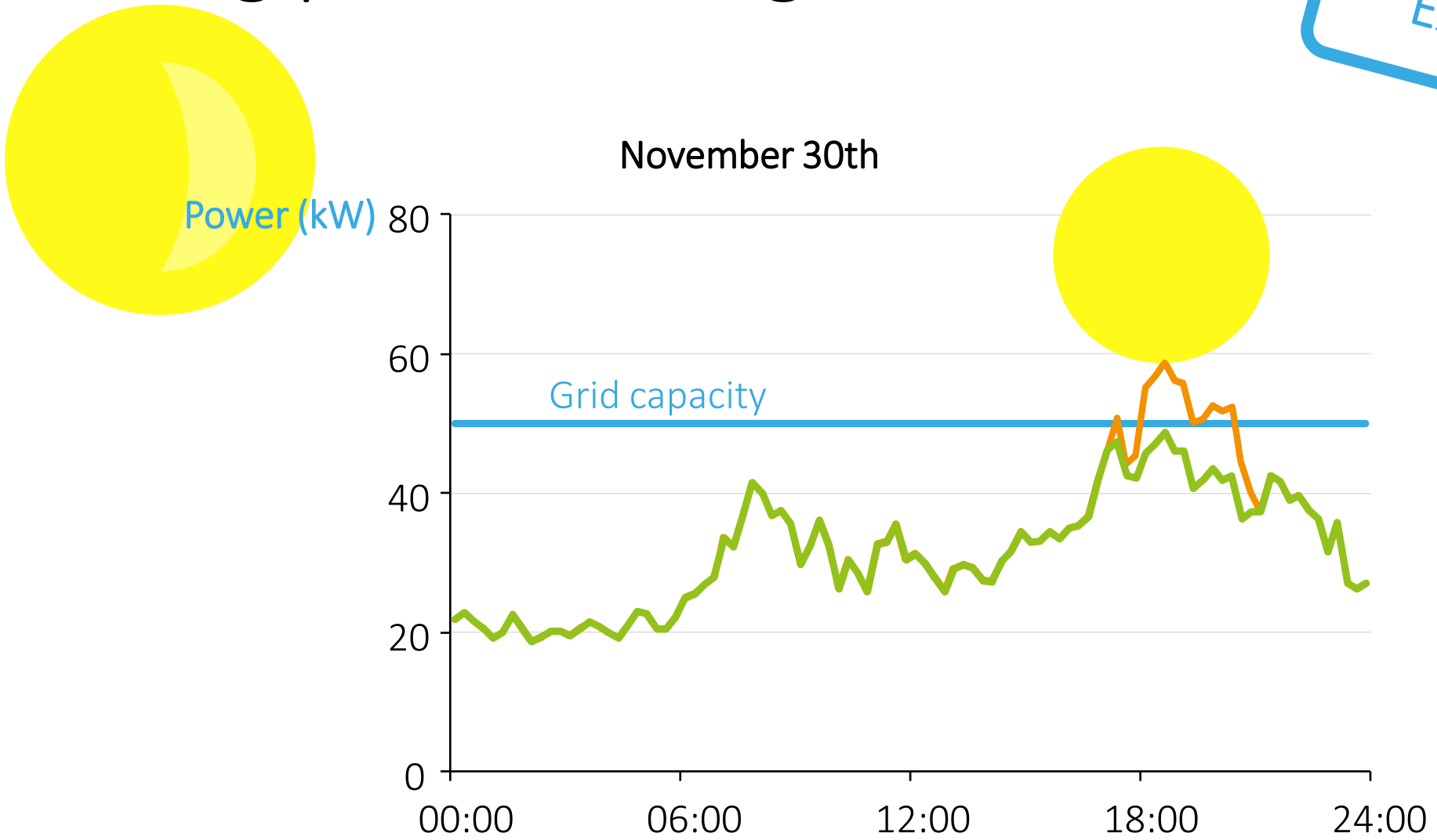
49 heat pumps

95 solar switches

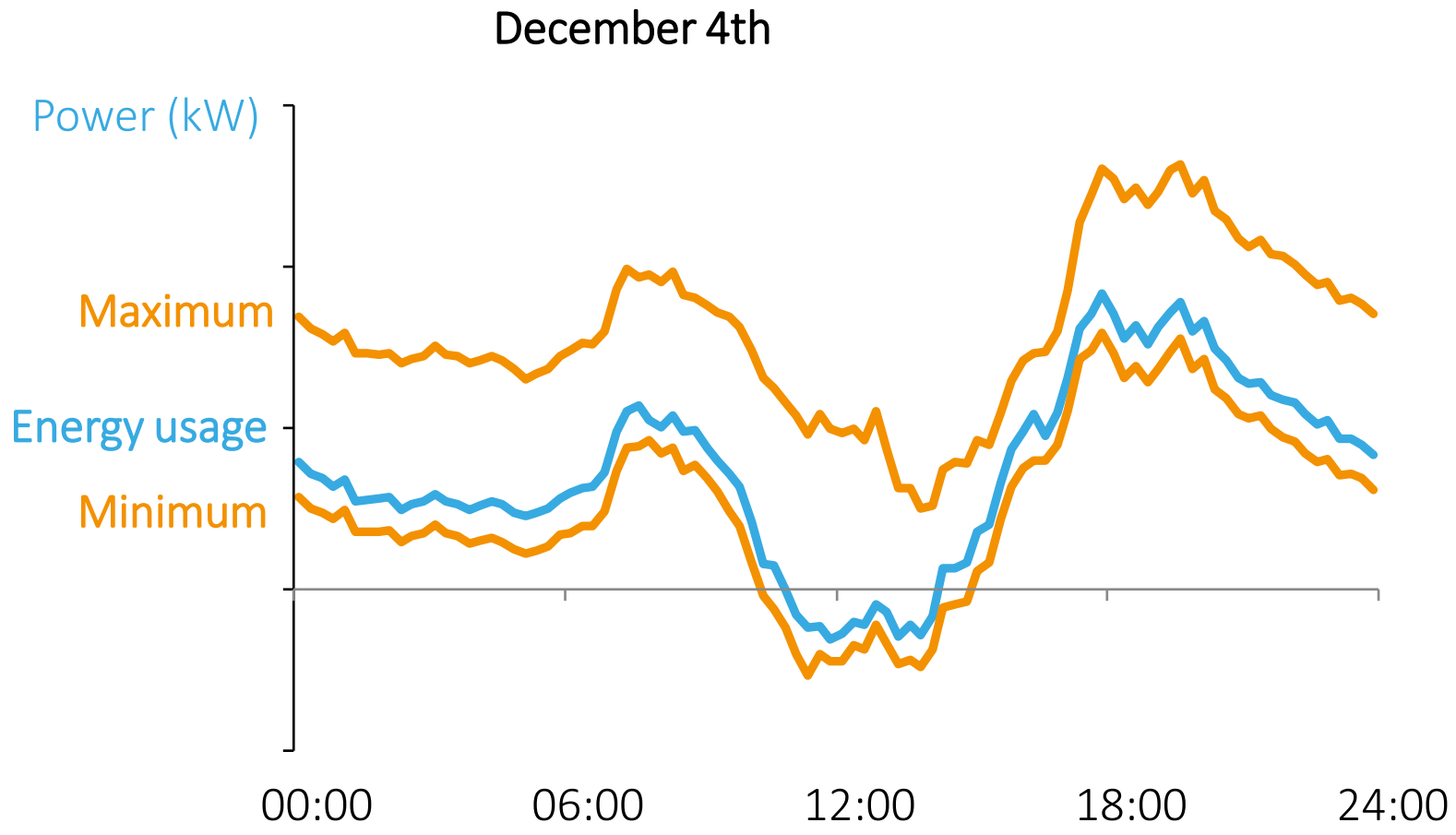
5 fuel cells (+9 virtual)

Reducing peaks in the grid

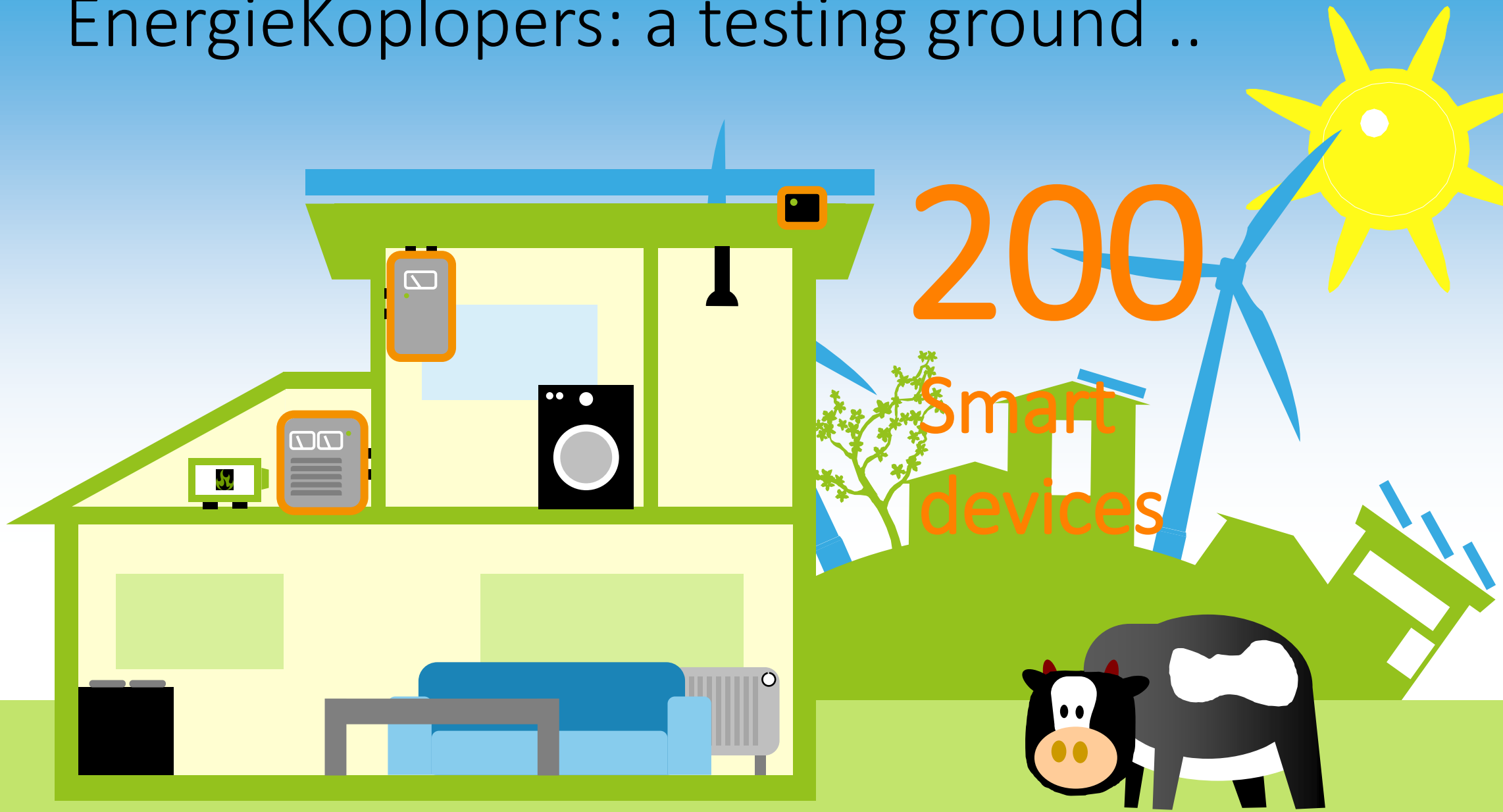
Example



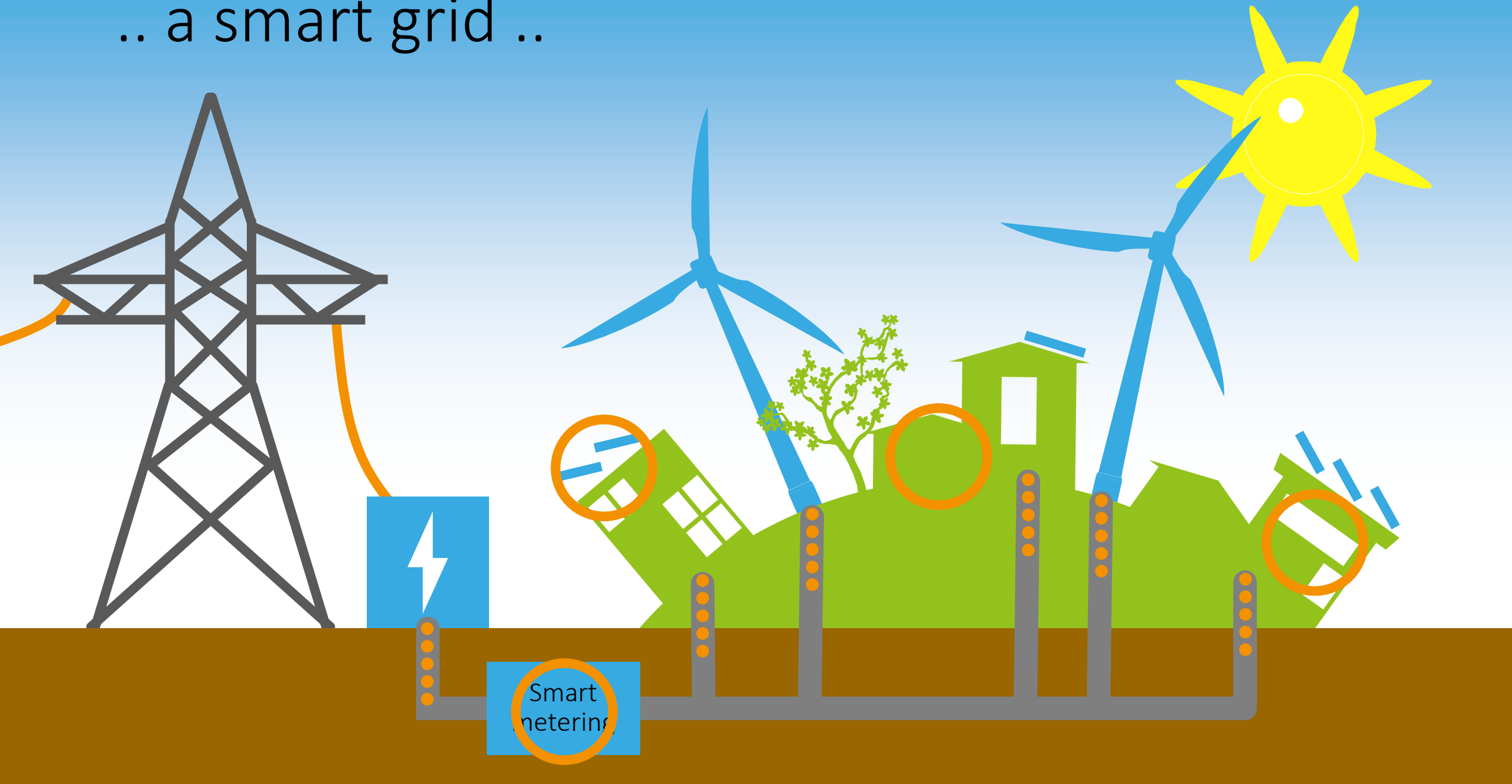
Bandwith of flexibility



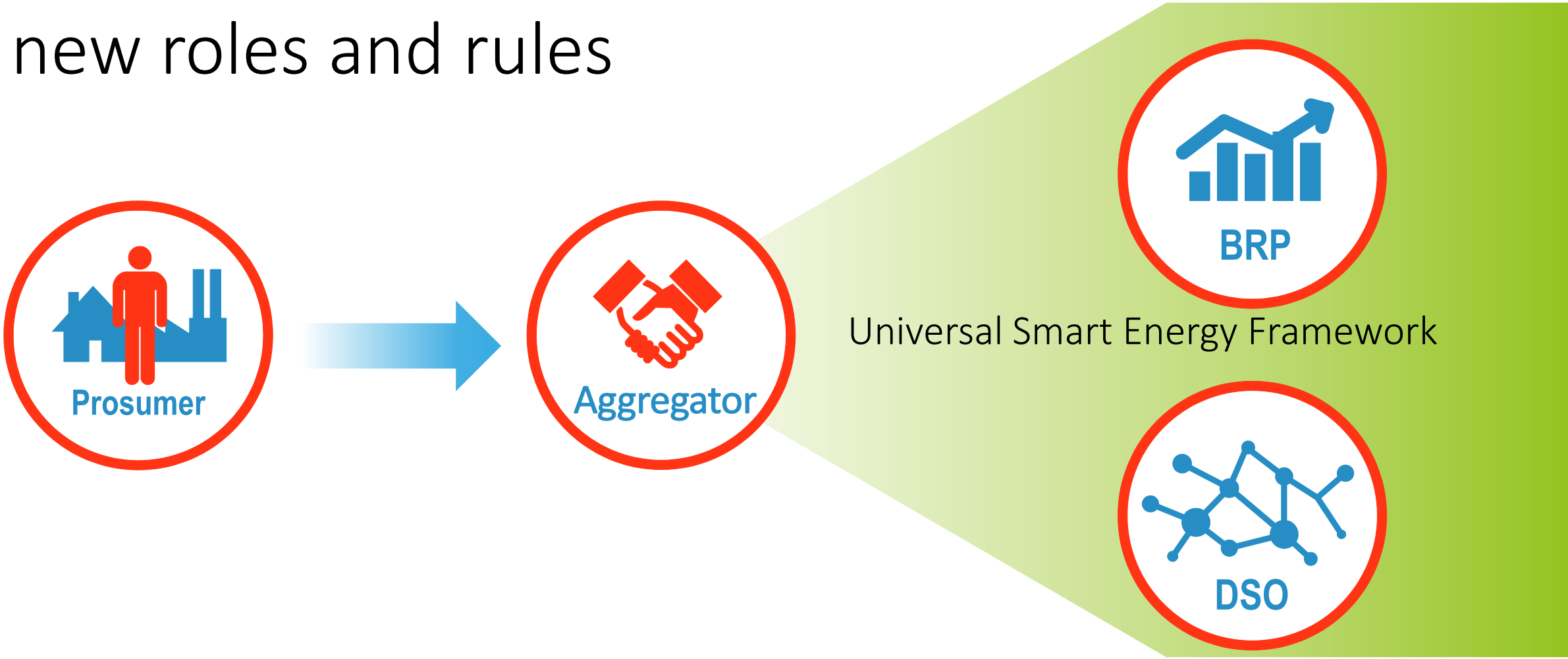
EnergieKoplopers: a testing ground ..



.. a smart grid ..



.. and a market with new roles and rules

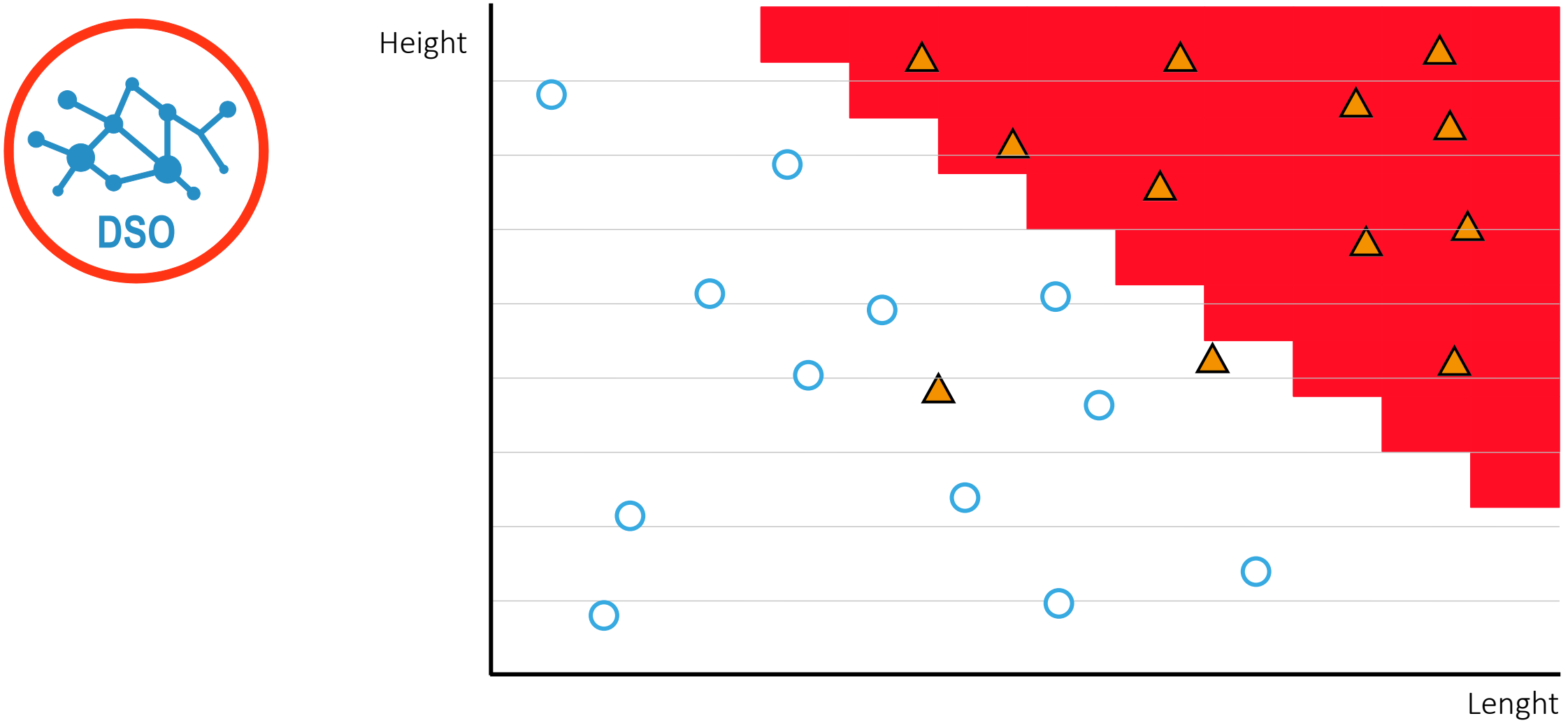


Flexibility creates possibilities for all parties involved

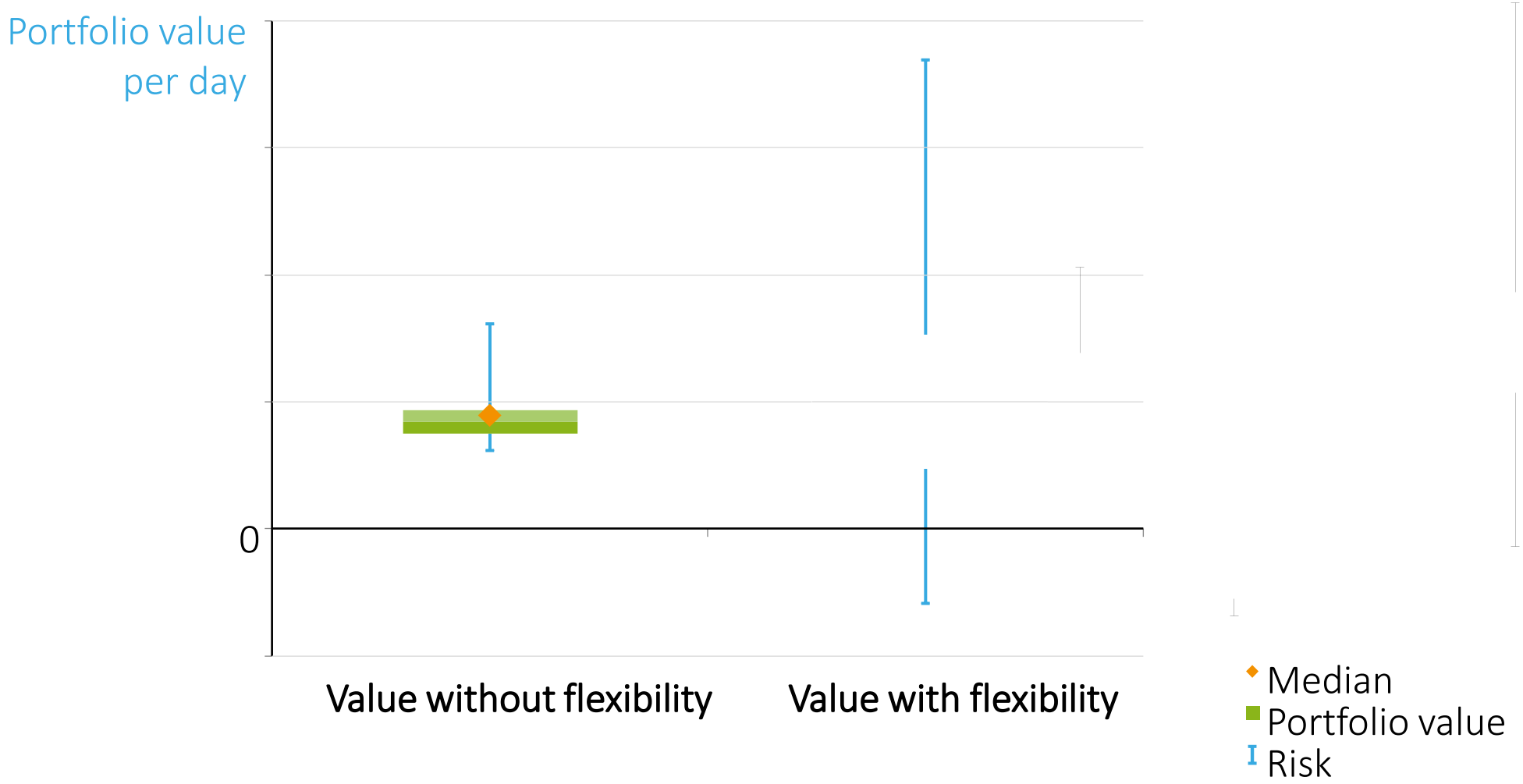
Prosumer wants to contribute, even without making profit

- Compelling story
- Easy to implement
- Financial security
- Reliable company

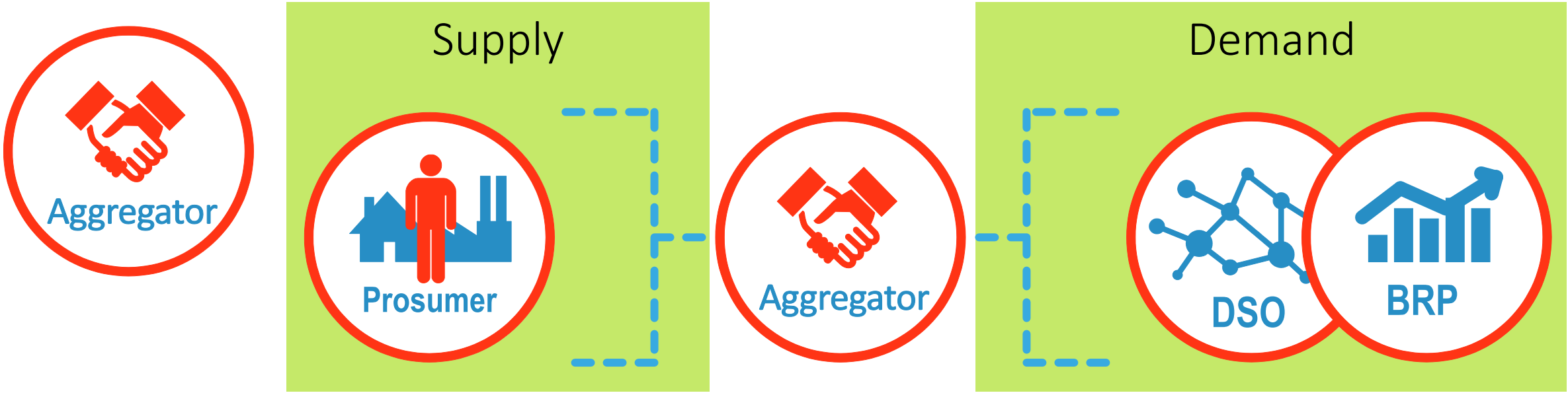
Flexibility market can prevent serious congestion for a grid operator



The portfolio of the BRP is optimized but this is not without risks

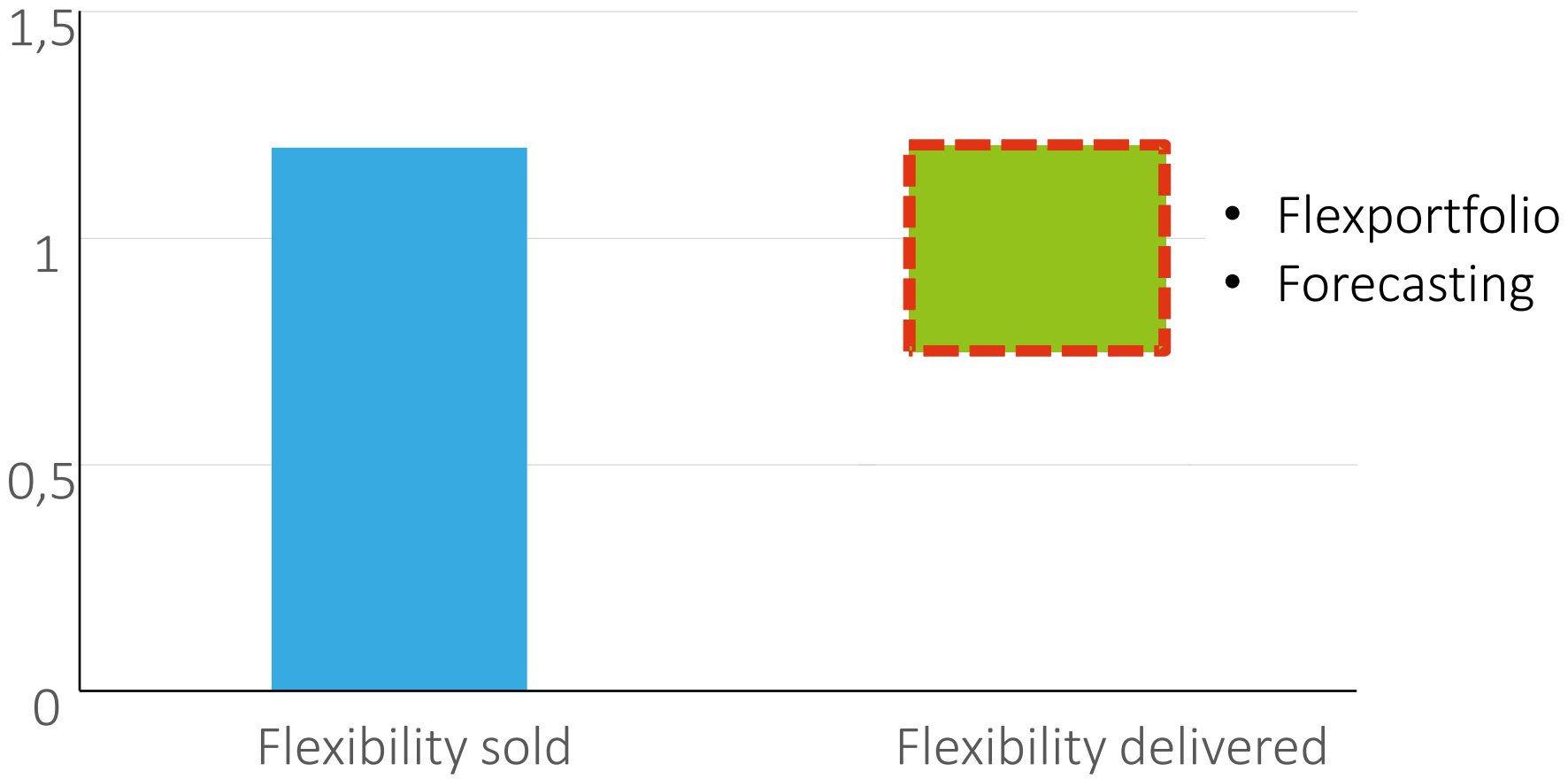


Aggregator plays an essential role in the flexibility market ..

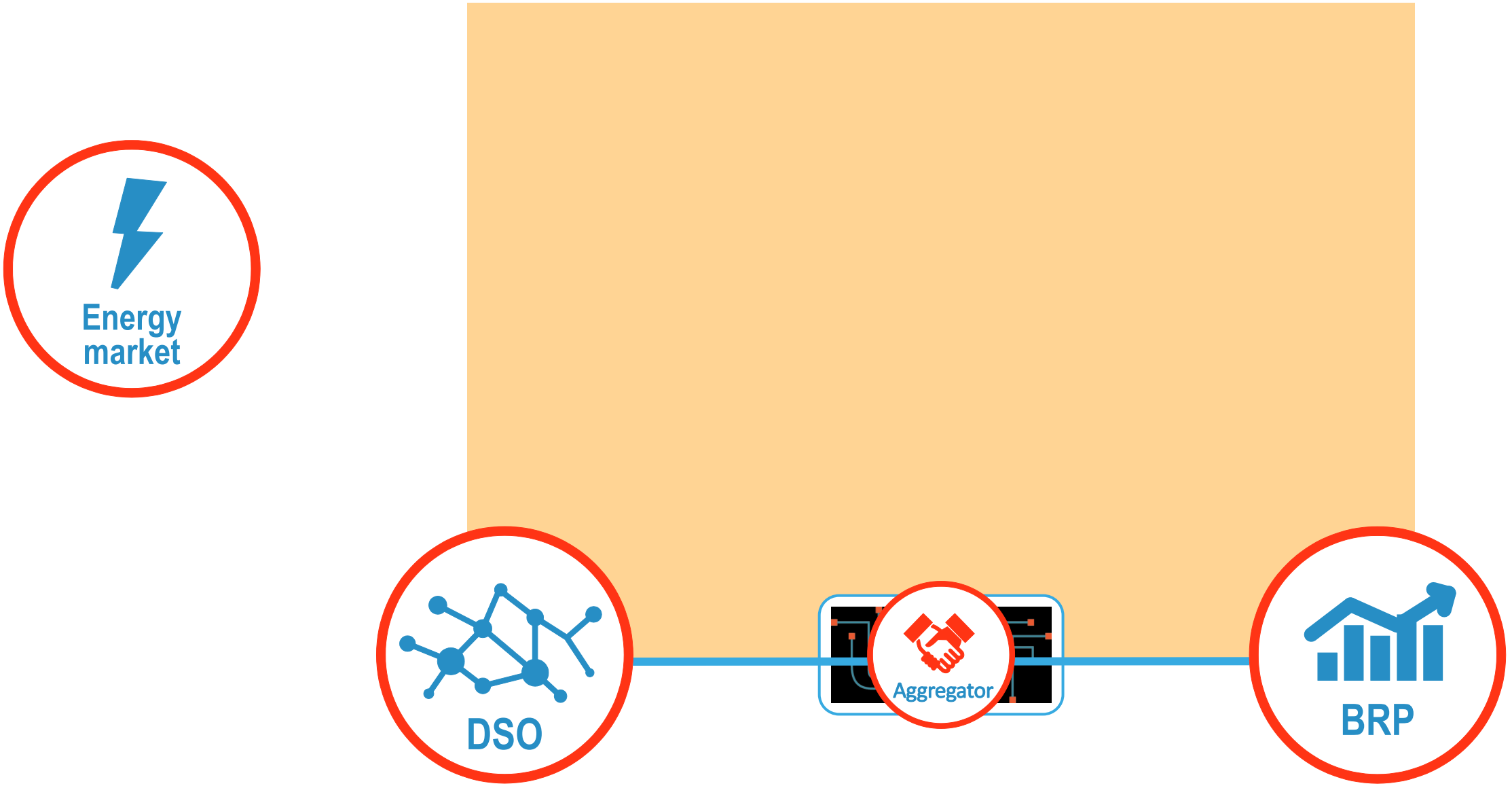


.. but does need to deliver

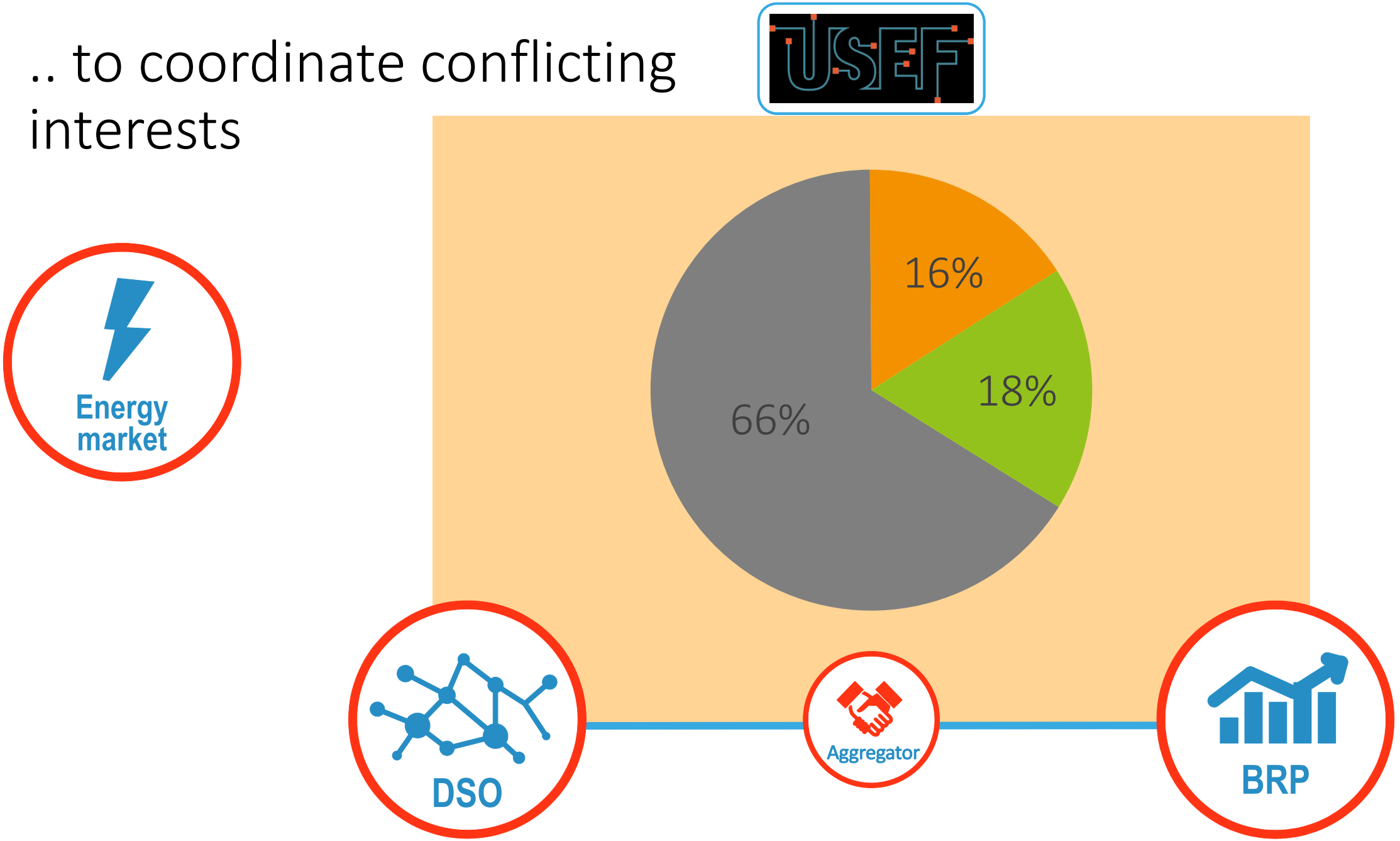
Aggregator



A market model is needed ..



.. to coordinate conflicting interests



Conditions for successful flexibility market

- Needs coordination / a market model like USEF
- Need trust, standardization (“Flex Ready”-badge) & convenience
  - Special control software / driver via technology provider / manufacturer
  - Open standard (EFI) successfully implemented
- More research for price dynamics
- Risk distribution
- Continuous development market model (USEF)
- Aggregator needs more detailed insight to optimize portfolio
- Need for installers with more IT-related knowledge
- Need for more market parties to test market dynamics

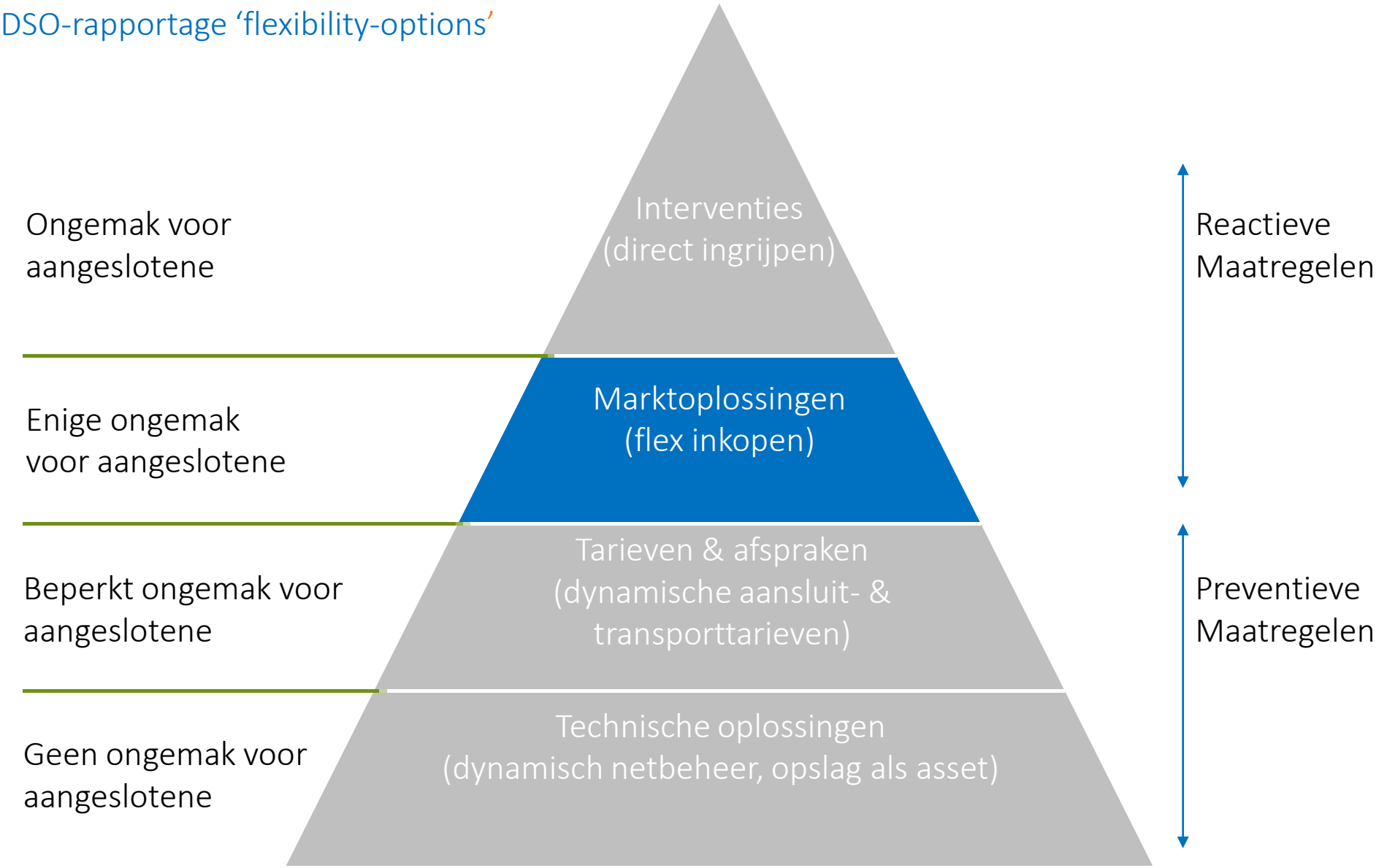
Fuel cells can be used for flexibility under certain conditions

- Very stable
- Using capacity of existing natural gas grid
  - For production electricity
  - For heat demand
- Flex up/down from FC’s or batteries, no other domestic appliances offers on demand production..

Fuel cells not yet practical for Dutch homeowners

- Big in size and production
  - BlueGEN 1500W too big for 1 Dutch household (13.000 kWh production vs 3500 kWh demand)
  - Fuel cell inside neighborhood E-box?
- Expensive (unit price and installation)
- Comfort loss in summer (heat and noise)
- Comfort increase in winter

Flexopties netbeheerder afgeleid uit EDSO-rapportage ‘flexibility-options’



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