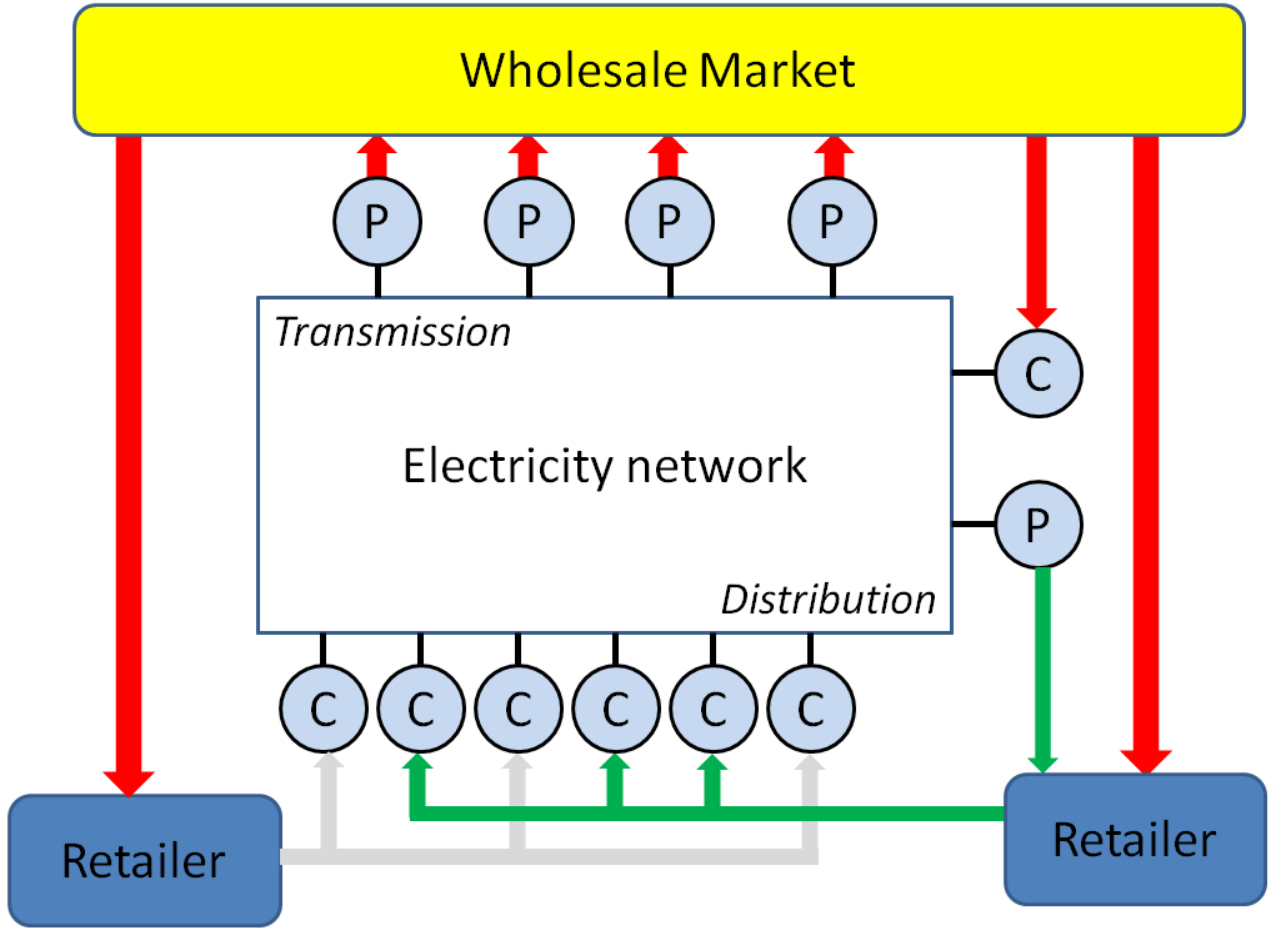
Microgrids and the Utility a European perspective

Math Bollen

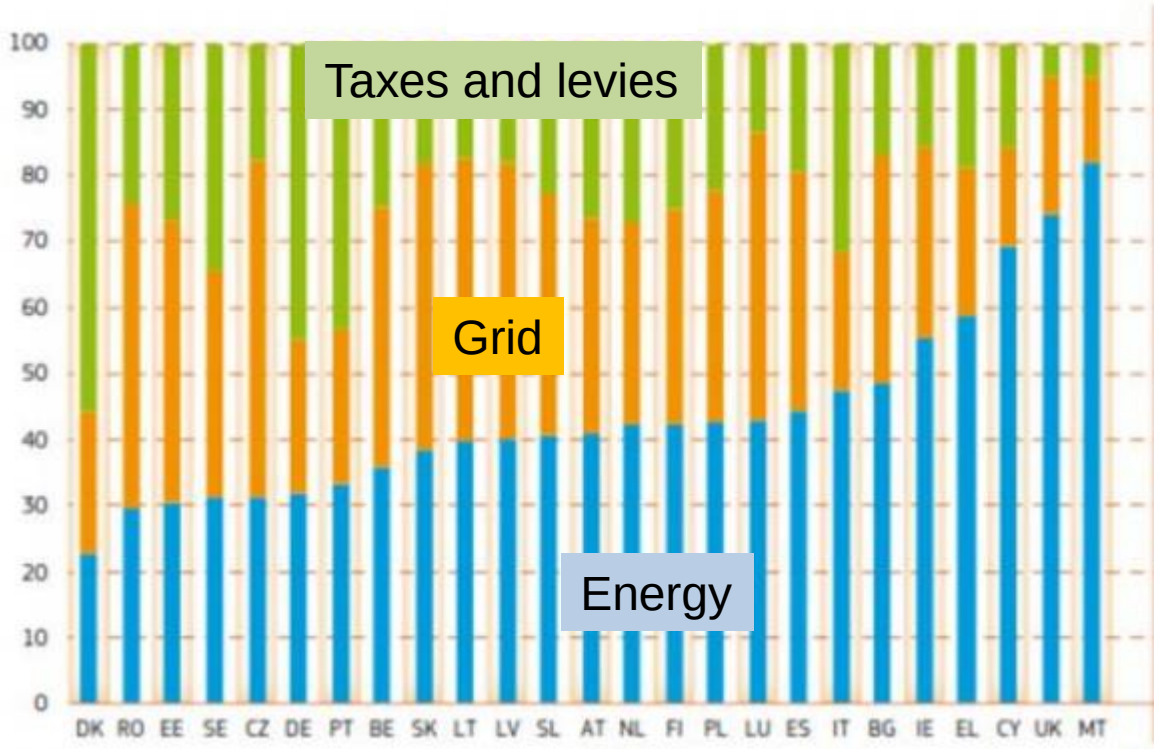
Luleå University of Technology, Sweden

The European Electricity Market



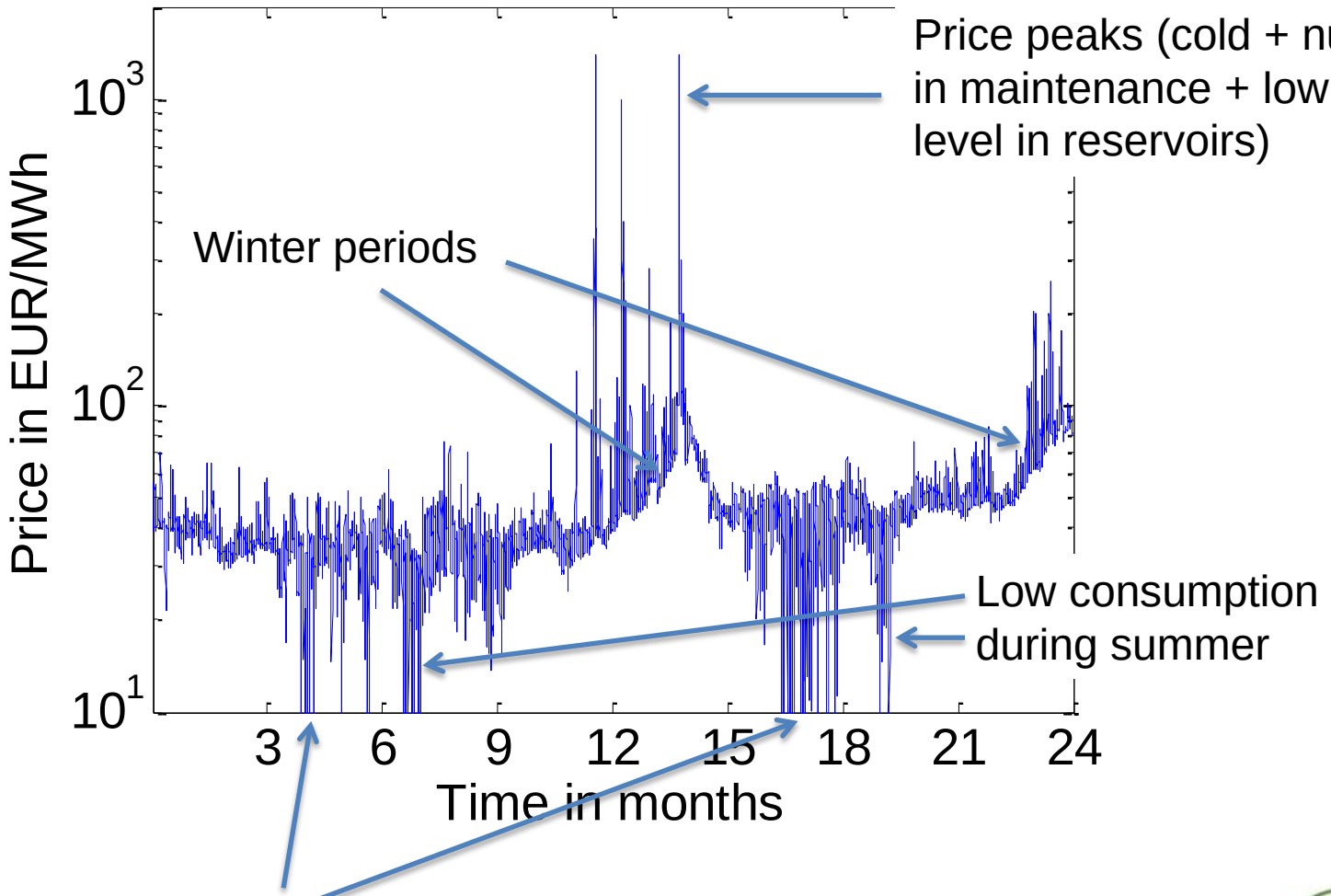
Costs of electricity for households

Source: Eurelectric, 2013



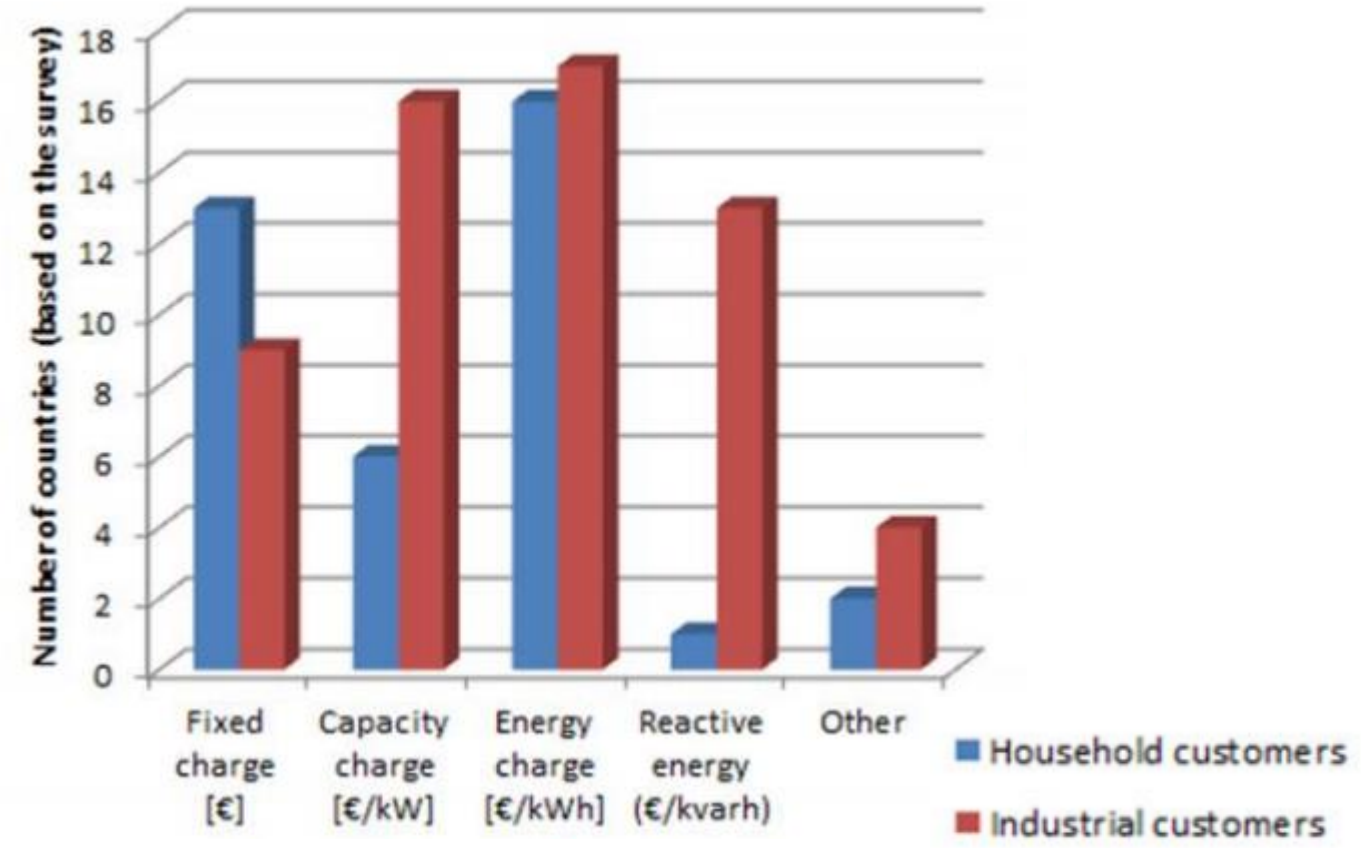
Different European countries

Price variations



Network tariff structure

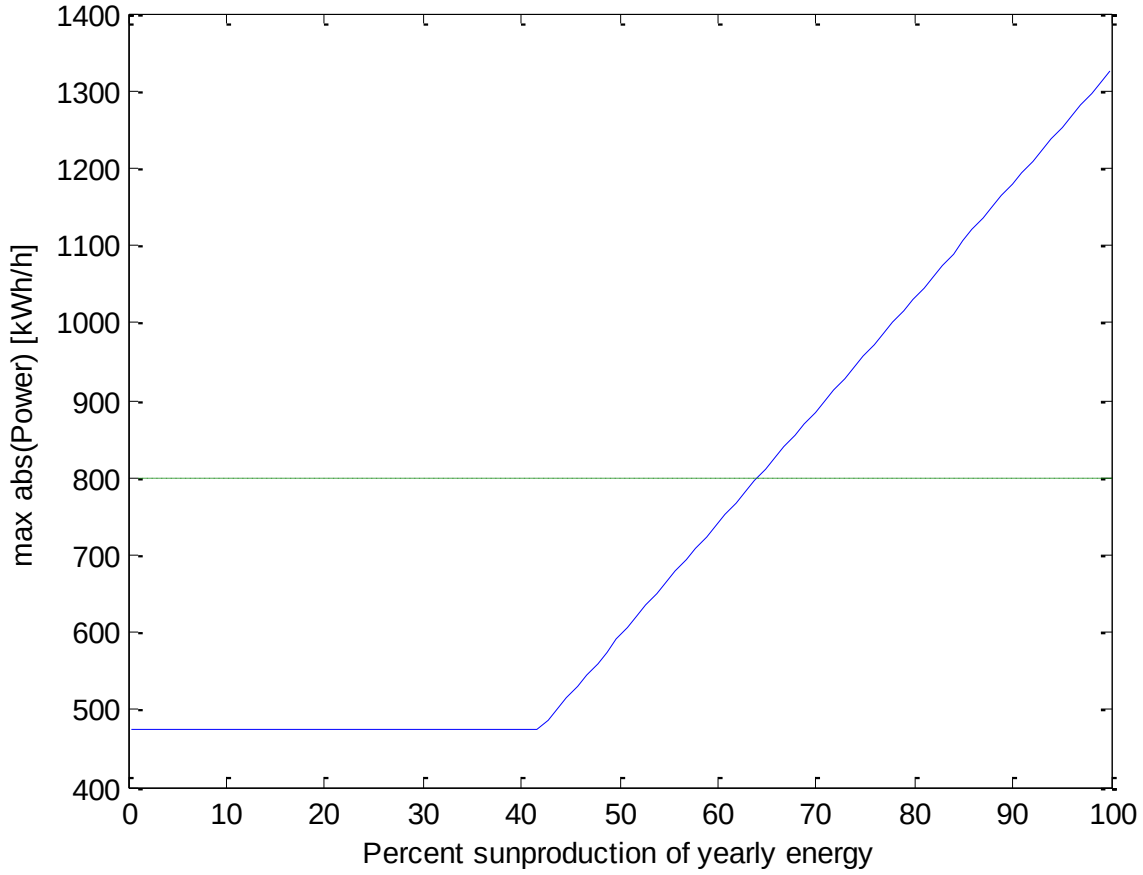
Source: Eurelectric, 2013



Network tariffs

- European directive: income of network operator shall not be dependent on consumption
- Shift towards capacity charge based on highest hourly consumption during a month
- Shift away from energy-based tariffs

Zero energy – three times power



STRI

galvin center for electricity innovation at ILLINOIS INSTITUTE OF TECHNOLOGY

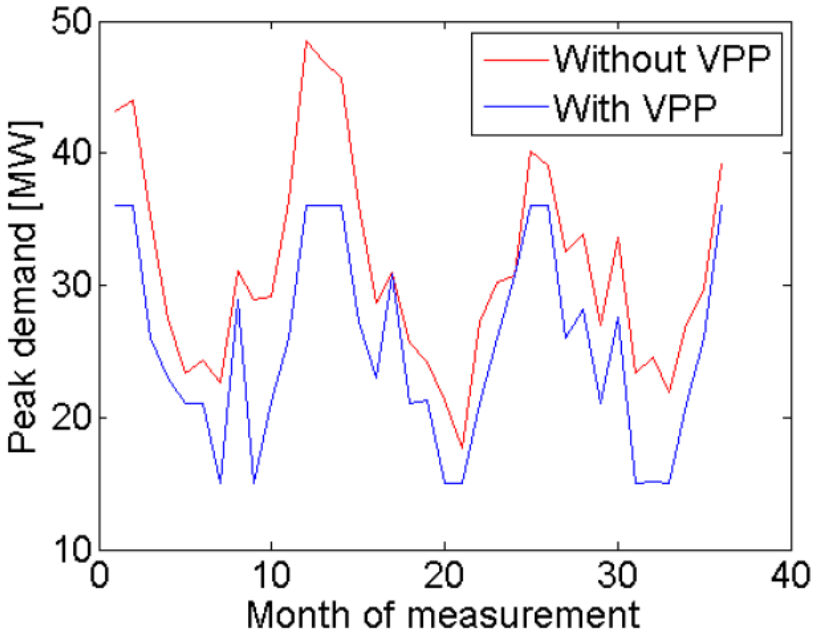
IEEE PES Power & Energy Society®

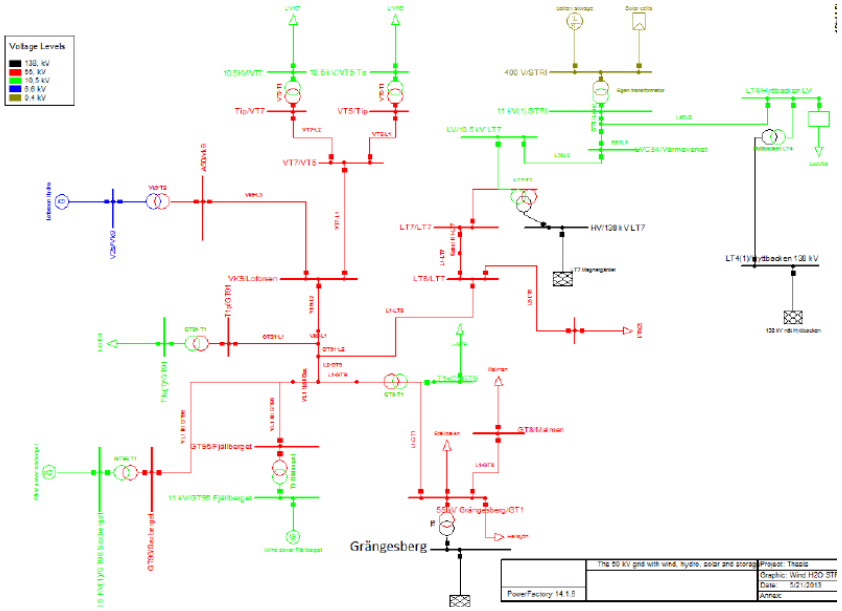
Driving forces

Microgrids and virtual power plants

- Strong fluctuations in electricity prices
  - Even bigger on the balancing market
- Reduction of costs for use of network
  - Reduction in connection charge
  - Reduction in subscribed power
  - Reduction in peak-load
- Further services to the network operator

Reducing peak load of local DSO

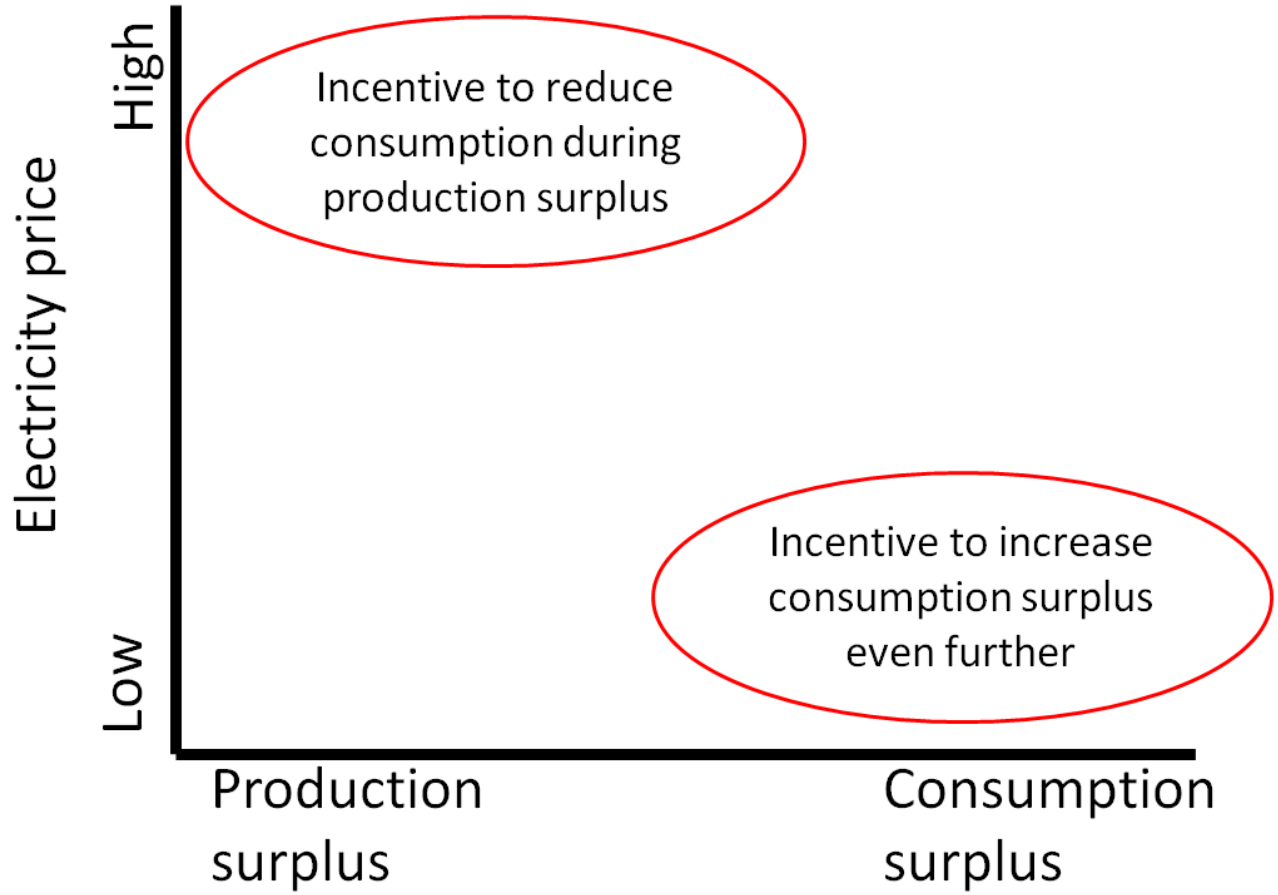




Actual hourly consumption data over 2 years
Actual network data (130 and 50 kV)
Actual production data
Modelled storage and hydro power

STRI

Risk of local overload



How about the network operator?

- Microgrids are out of the control of the network operator
- Could result in new and unexpected flows
- Improve in reliability for the customer
  - Who will get the credit?
  - responsible for interruptions during islanding?
- Source of ancillary service to support the grid