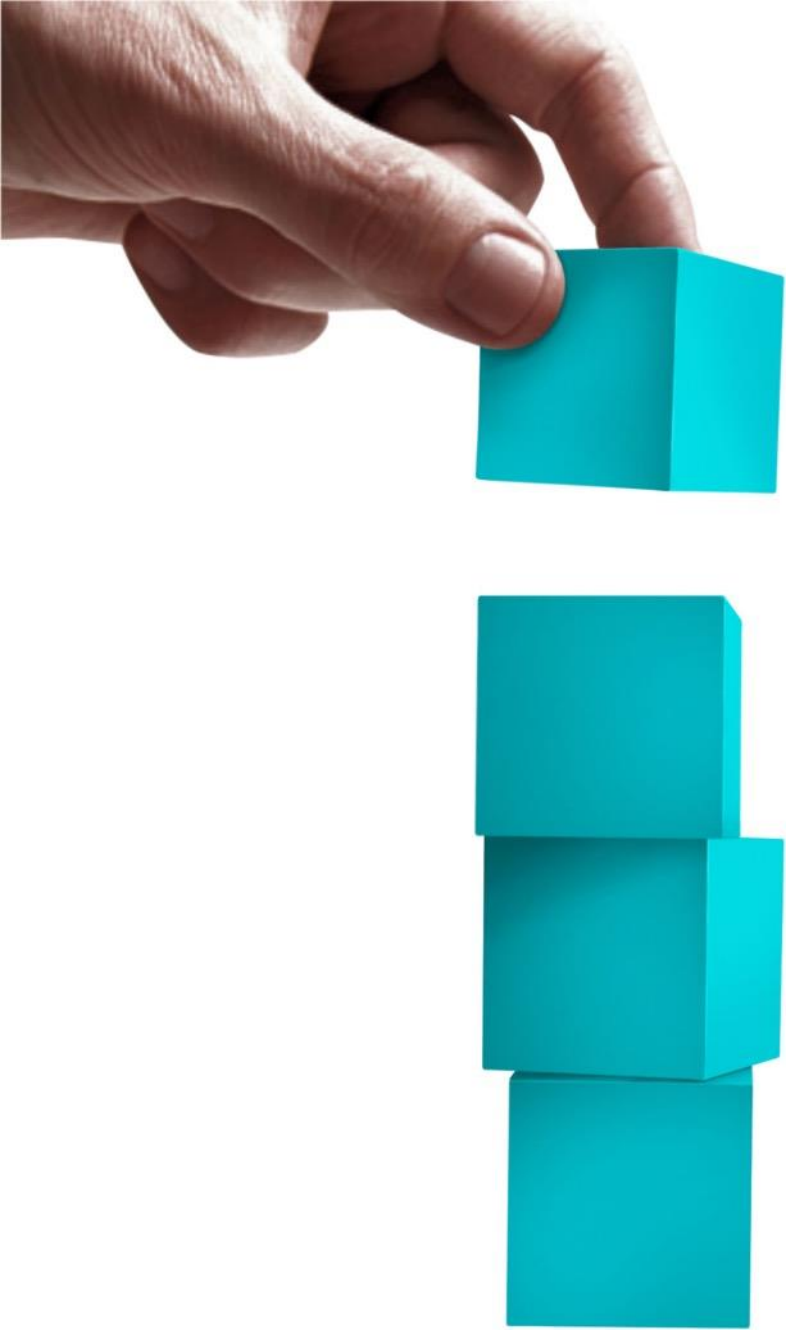


Layered Energy System Pilots solving distribution grid issues

CIGRE C0 session June 2021

Michiel Dorresteijn
Consultant Energy Markets

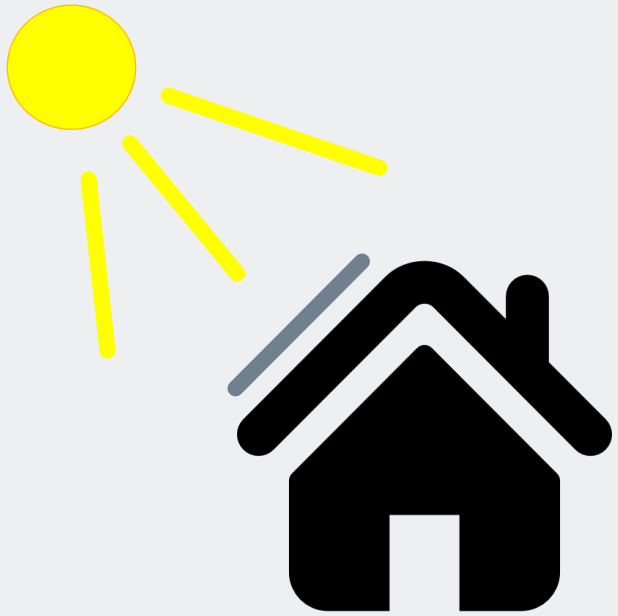

How should we prepare for the storm?
Shall we build huge shelters? Large infrastructures that can withstand the wind and water?
Or shall we give the residents the tools and materials to prepare themselves?

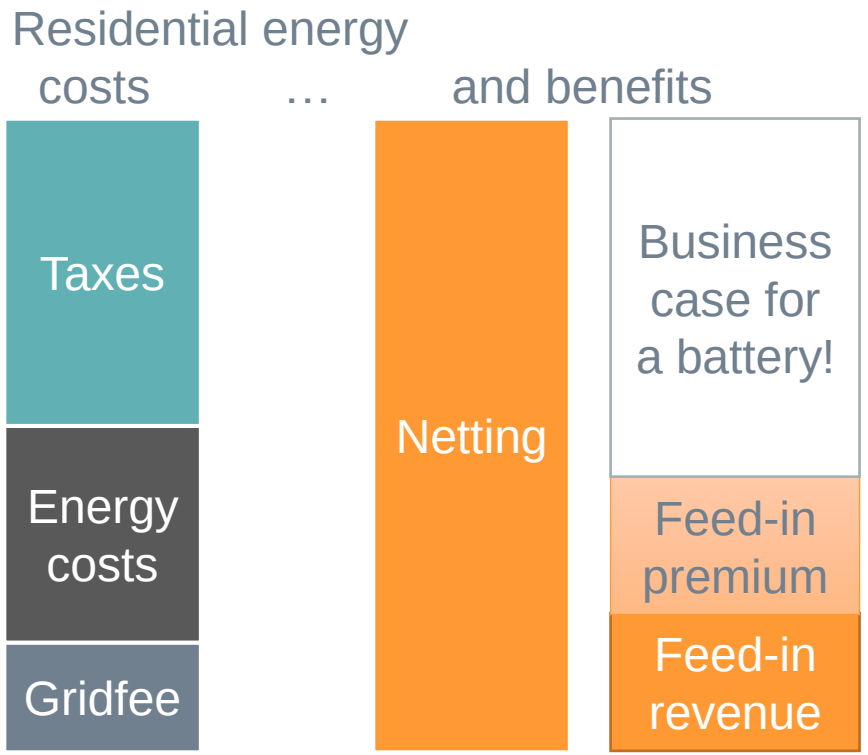
The energy system is in transition

- Stakeholders are facing serious impact
- Regional grid operators are in the middle of it

- More distributed in-feed
- Local congestion and power quality issues
- Electrification of heat and transport
- Societal obligation to facilitate the energy transition at lowest cost
- More local energy initiatives are asking for help

Access to flexibility at residential prosumers?

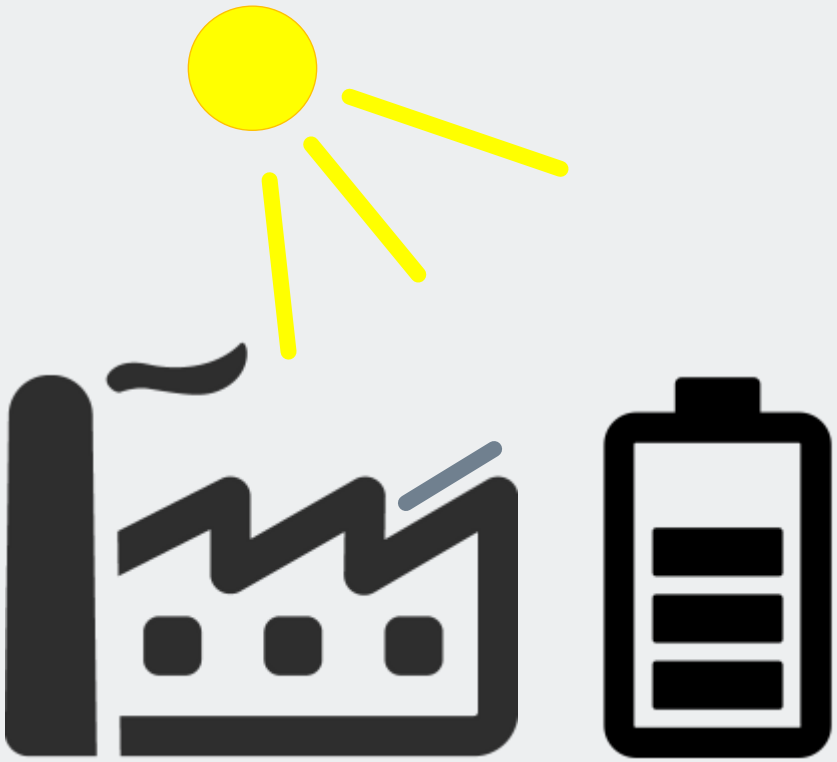




So is a residential customer willing to share flexibility for the good of the system?

Probably not…

Access to flexibility at SME prosumers?



When the system would like the battery to charge fast…

… kW-max will induce high costs for 12 months afterwards

… while using the battery for minimizing the connection will save costs

So is a SME customer willing to share flexibility for the good of the system?

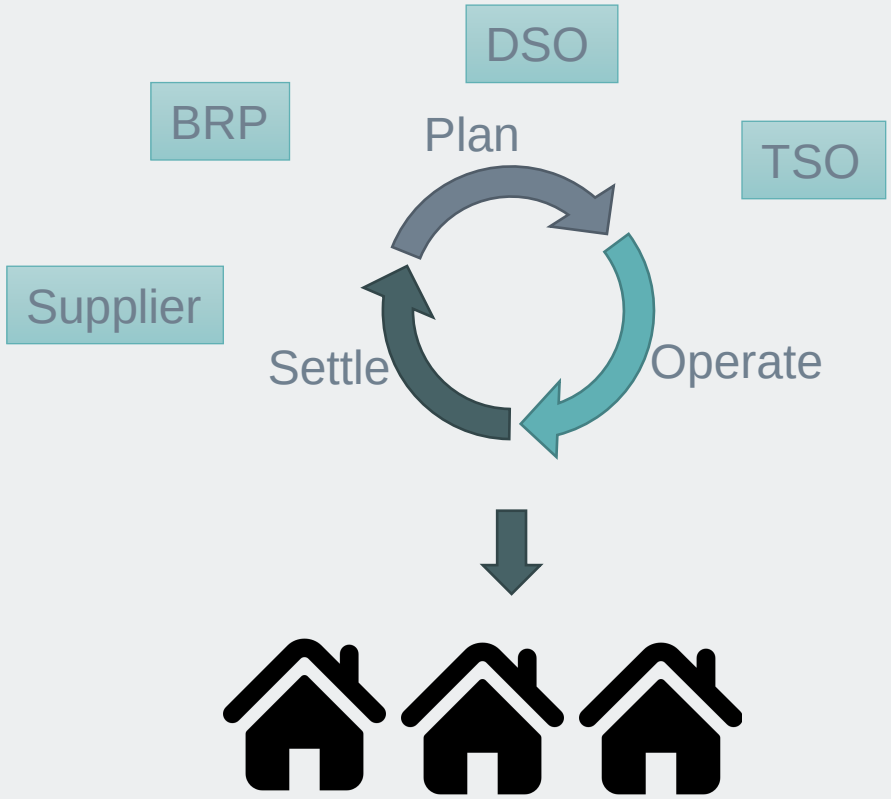
Probably not…

The Layered Energy System (LES) principles

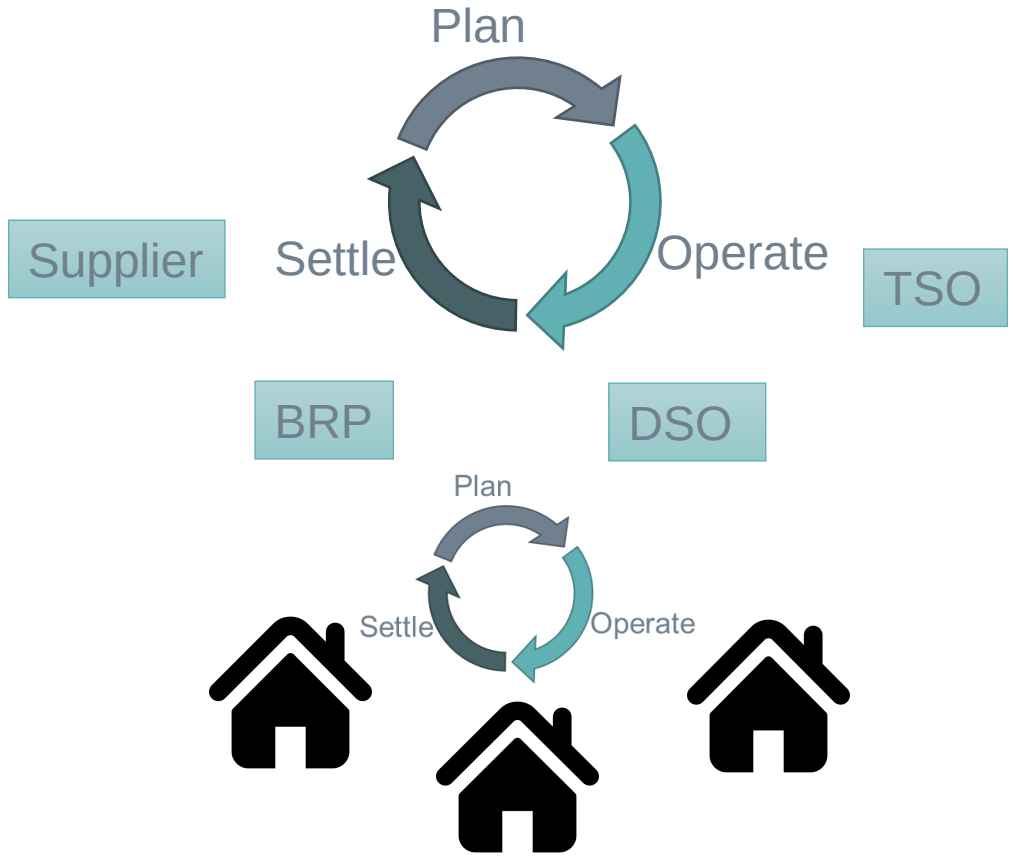
1. Lower system costs
2. Customer empowerment
   - Freedom of choice
   - No lock-ins
3. Stimulating transition
   - incentive to invest in where needed
   - prevent energy poverty
4. Scalable
   - Fitting in the current market model
   - Replicable and modular

The Layered Energy System (LES)

Current situation



Layered Energy System



- All orange functionality and interaction should be open source (Hello World package).
- Yellow and grey can be propriety IP but should be interfacing according to the open source API, smart-contract, etc.
- The overall logic should be clearly documented
- Standardization of blue is desirable

The Layered Energy System (LES) – Live pilot projects

Hoogdalem

- Residential setting
- Focus on energy
- Local energy has an advantage over external energy
- Local market (merit order) for energy

Greenparc Bleiswijk

- SME setting
- Focus on capacity
- Dynamic (ToU) grid fee plus contractual bandwidth
- Local market (OTC) for capacity

Results so far

- Technically no obstacles
- Process model seems robust and scalable
- Regulation prohibits large scale roll-out
- Lower system costs
- Automated prosumer forecasting etc. is important

- LES keeps local flexability accessable for DSO (and TSO)
- The social urge to do something locally is an important factor
- LES solves the discussion about balance responsibility of energy communities

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Thank you

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