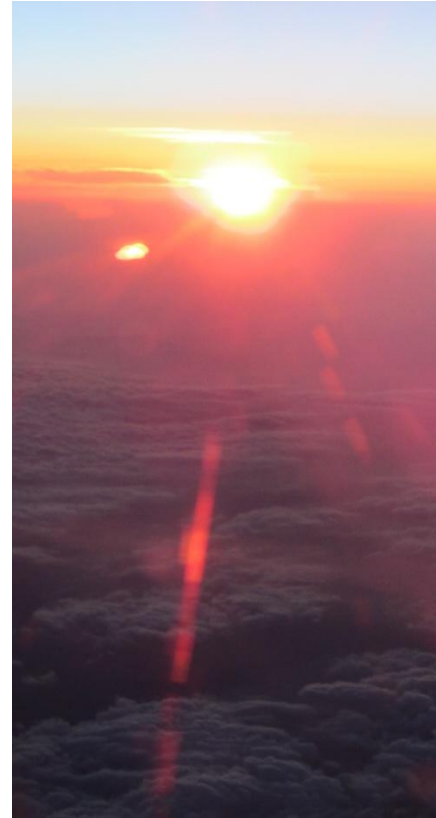


A vertical rectangular image on the left side of the slide showing a clear blue sky with scattered white clouds.

Simplifying Smart Grids

RE integration- simple, robust and
affordable

Joint workshop IEA-EPIA and PVPS: „Self consumption
business models“. Amsterdam, Sept. 22nd, 2014
Dr. Thomas Walter & Marie Berger



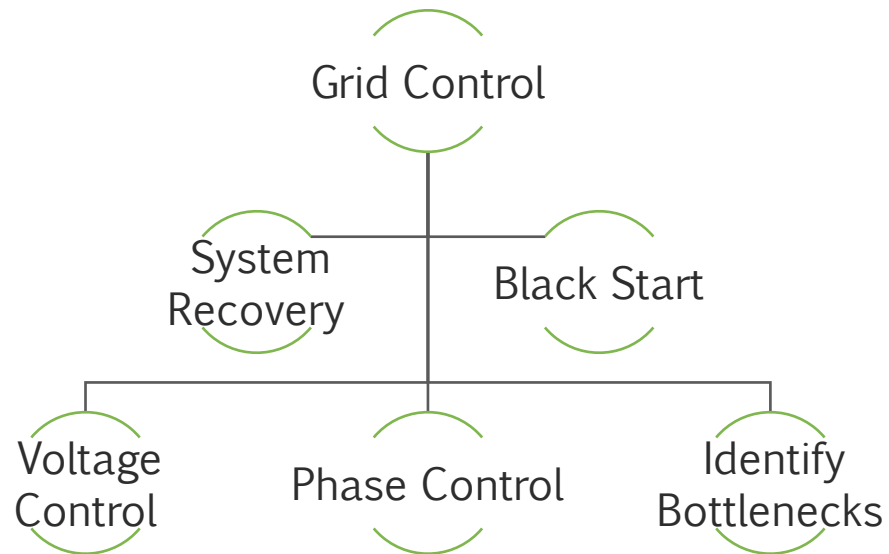
Agenda

1. How grids can benefit from „Smartness“
2. Smart evolution of established methods
3. Smart Grid key functionality – simple, robust, affordable
4. Business model and approach

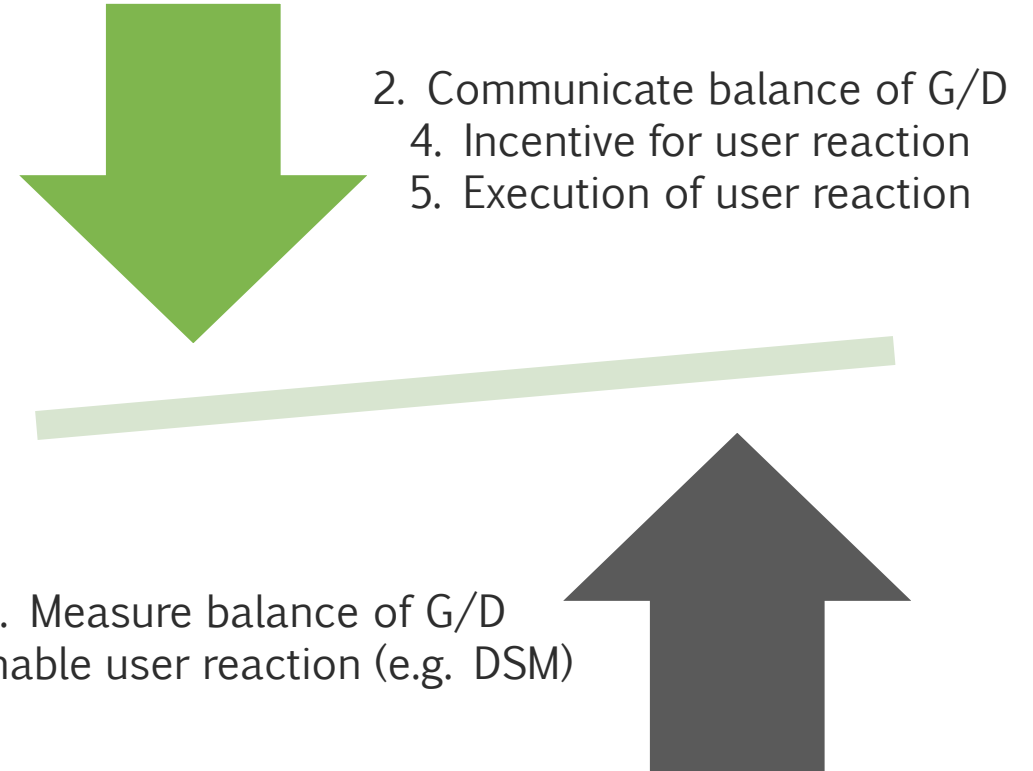


1. How grids can benefit from „smartness“:

Focus today: grid balance



Grid infrastructure:
lines and topology



Grid balance:
generation and demand



2. Smart evolution of established methods

Two (mostly) separate worlds

Control by frequency:

Control by price:

Owners	Engineering people	Owners	Commercial people
Time range	Milliseconds to hours	Time range	Quarter hour to days
Detection	Automatic (rotating mass)	Detection	Prediction, bidding, exchanges
Transmission	Automatic (grid frequency)	Transmission	ICT (computers and communication)
Reaction	Automatic/semi automatic (primary to tertiary control)	Reaction	Transferred into schedule, enforced by contract or penalty



2. Smart evolution of established methods

- combine the best from two worlds

Information processing and communication uses existing technical system.

- Low cost
- high speed
- data security.

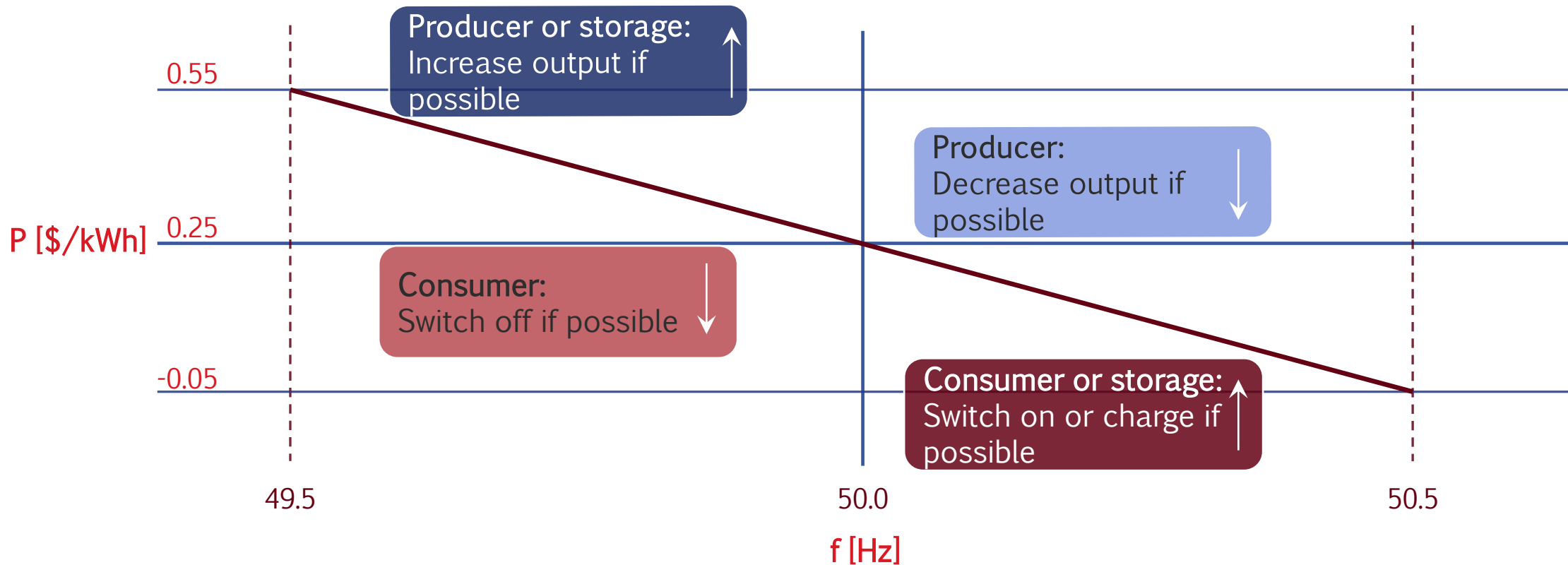
Price setting and incentives by money rather than central control with energy exchange approach.

- Decentral control
- market function
- variable prices.



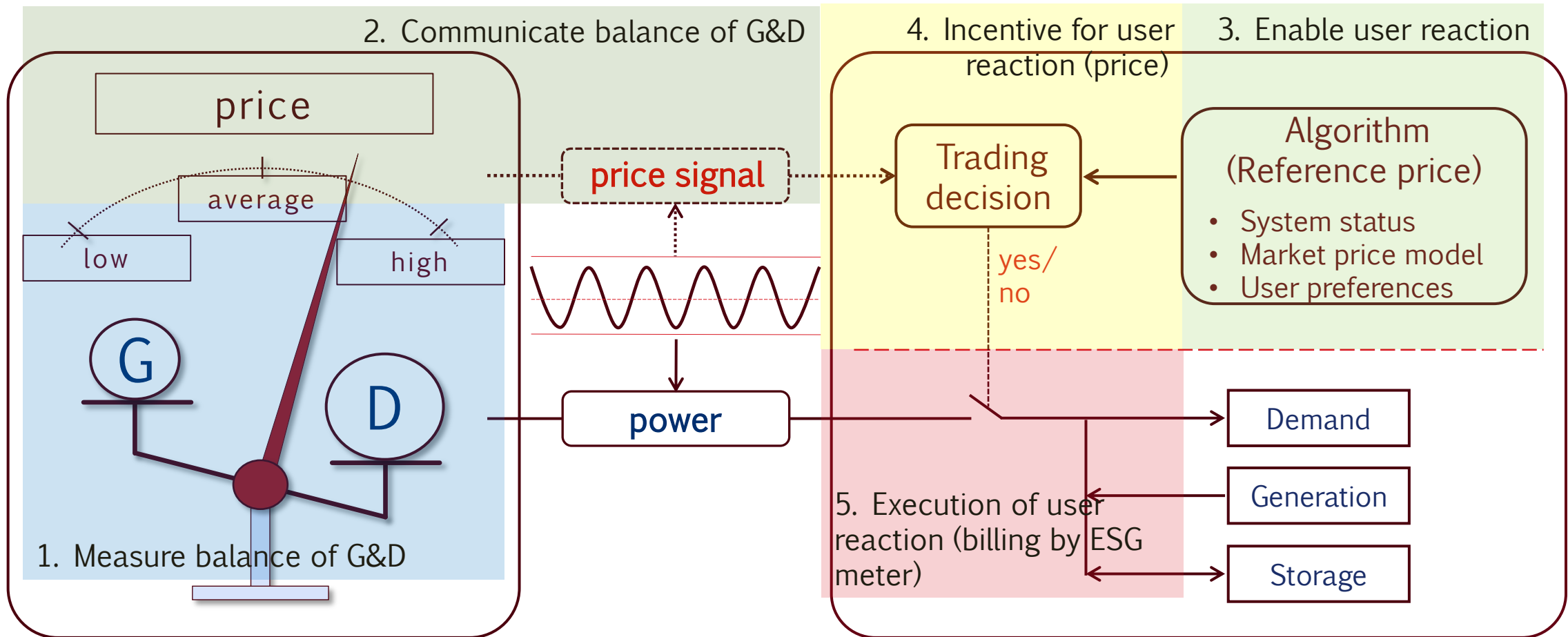
2. Smart evolution of established methods

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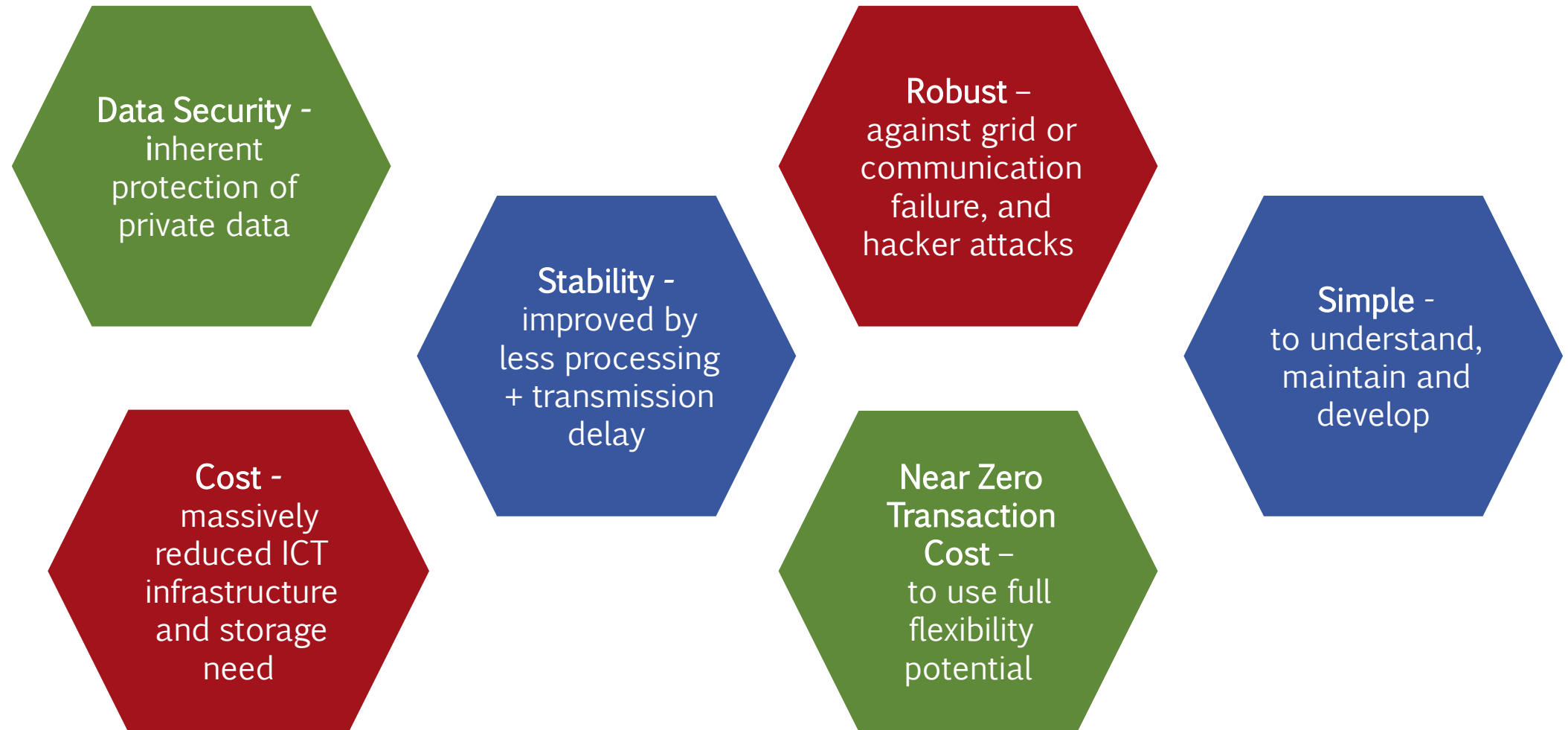


3. Smart Grid key functionality

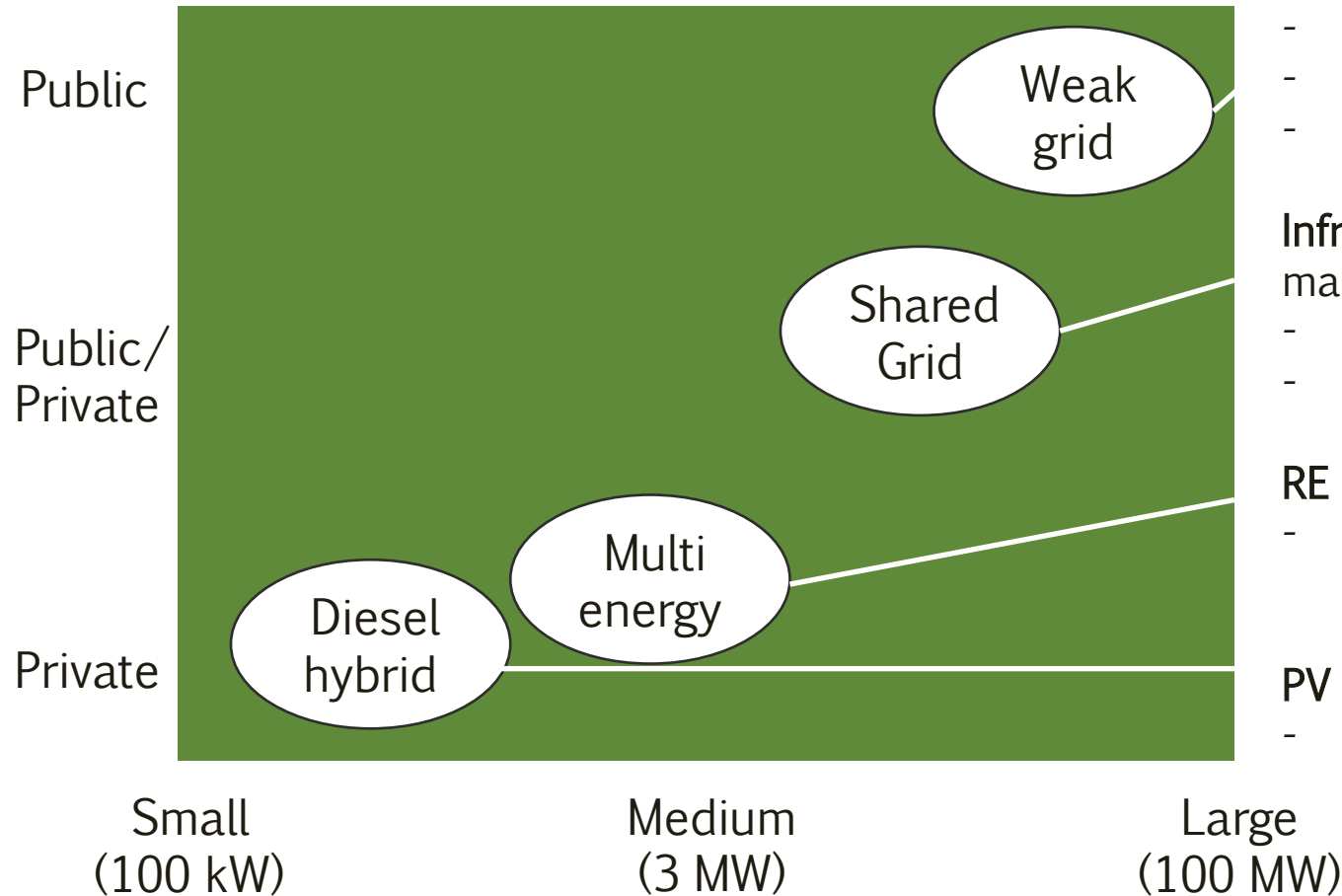
Five steps to balance generation and demand with near zero transaction cost



Benefits : simple, robust, affordable



4. Market segments that benefit from ESG



Grid Operators

- Protect assets and customer satisfaction
- Improve stability in weak grids
- Better use of limited capacity

Infrastructure Players (governments, facility managers) - fair electricity pricing in

- Green-/brownfield developments
- Clusters and anchor models, PPP

RE developers and industry

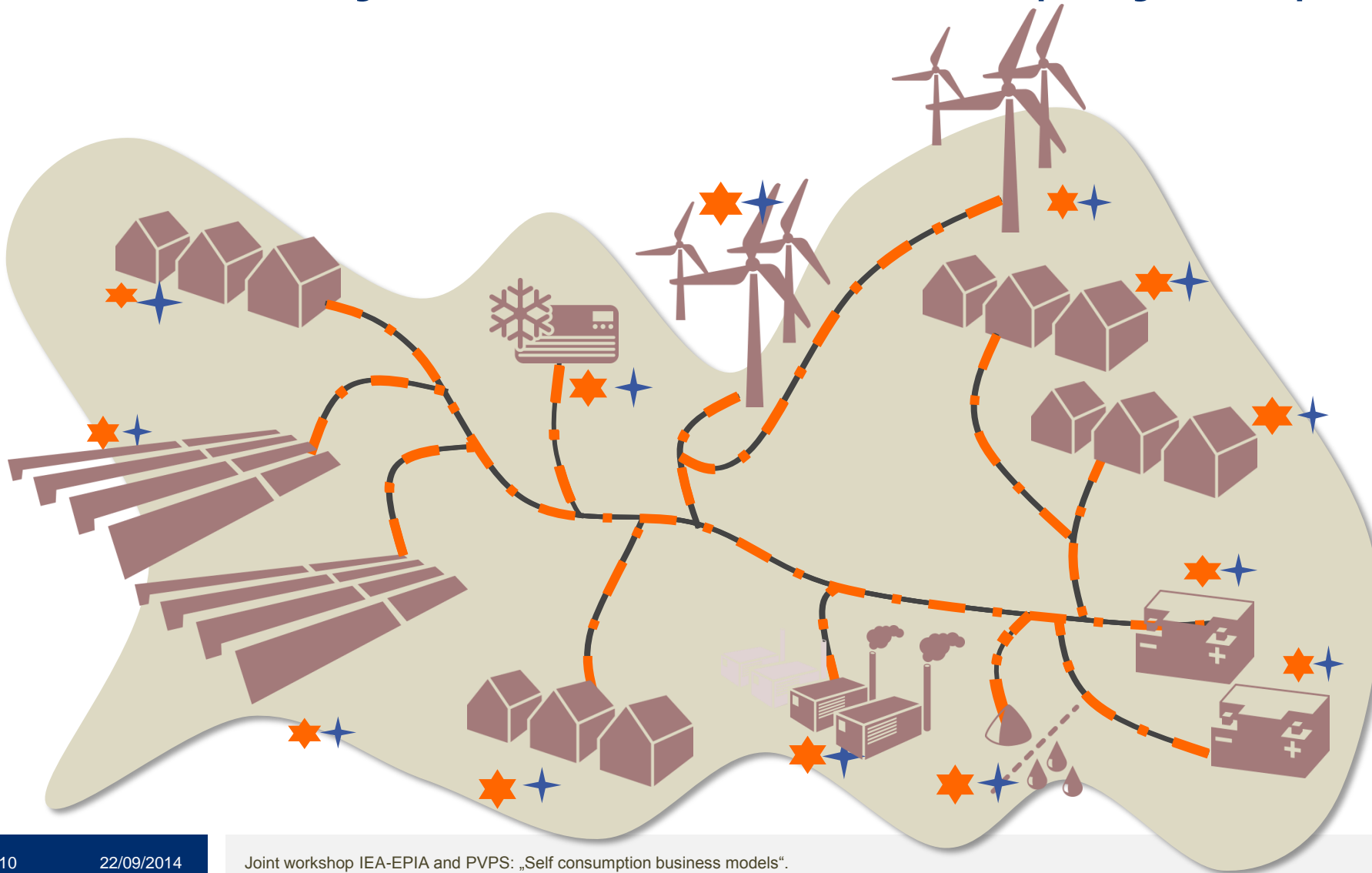
- Multi source integration (PV+Wind+Hydro+Biomass) -complementarity, fair pricing

PV developers and industry

- More PV in diesel+PV hybrids



Easy Smart Grid with step by step approach



- Step 1: Harvest low hanging fruit
- Step 2: Higher RE integration and storage
- Step 3: Full ESG implementation

★ SmaCo box
✦ ESG meters





Thank you for your
interest!

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