



Smart Grid

Challenges in Science and Beyond:

A systemic approach

serec Meeting Electromagnetics in Renewables

Zurich, 09. 11. 2012 – Dr. Severin Waldis, Leiter Innovationsmanagement Netze

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Outline: The big picture...

Innovation in Energy

DSM

Smart Grid

Thinking along the value chain

"Eigen-consumption"

Energiewende

Dye-based PV Cells

More Market

Total Cost of the Energy System

Longterm Invests

Could we build nature?

System Breakdown of the Energy System

Cost

Cheap is good enough

Big Data

Systemic Thinking

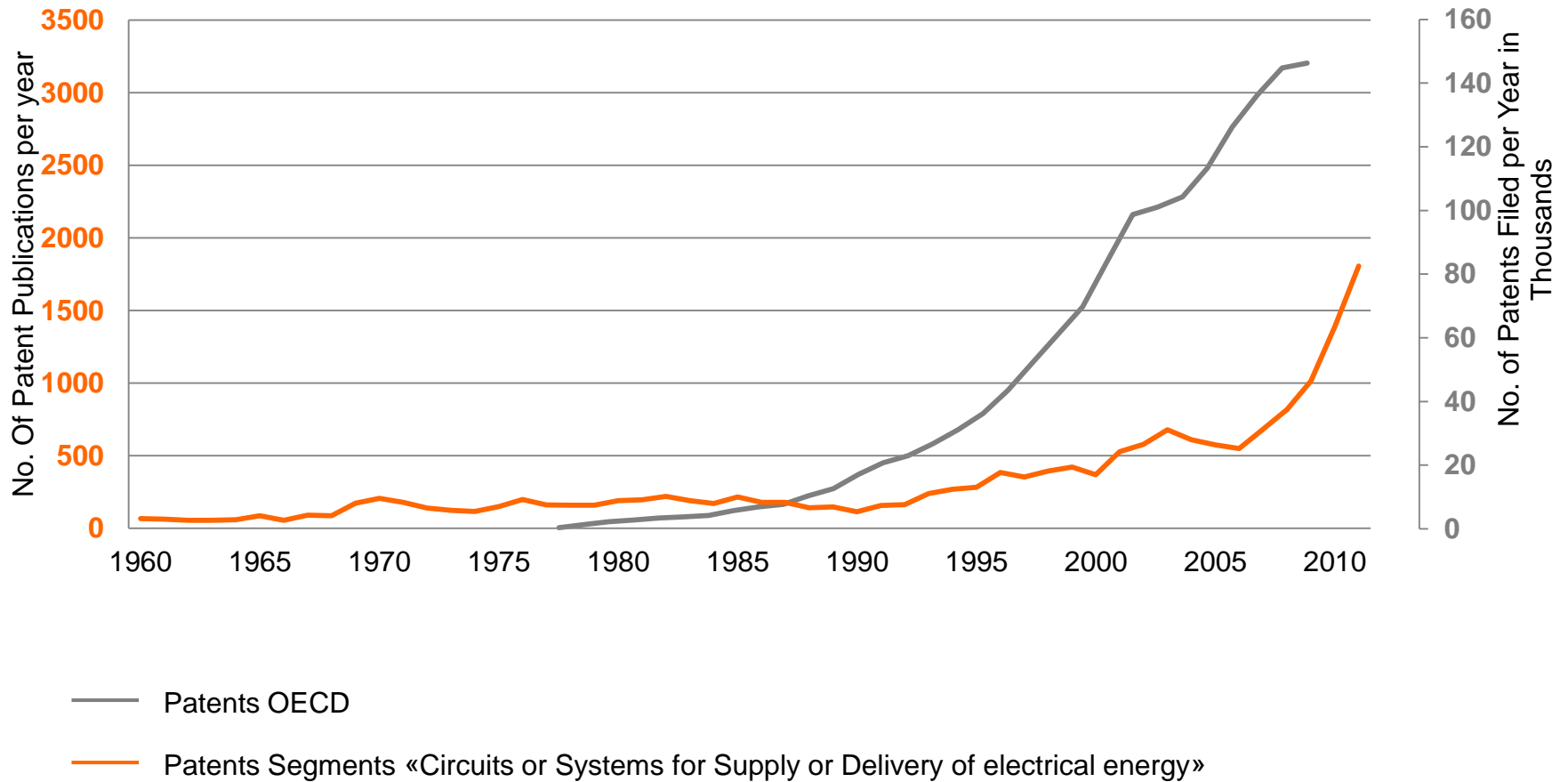
Reliability

System Engineering

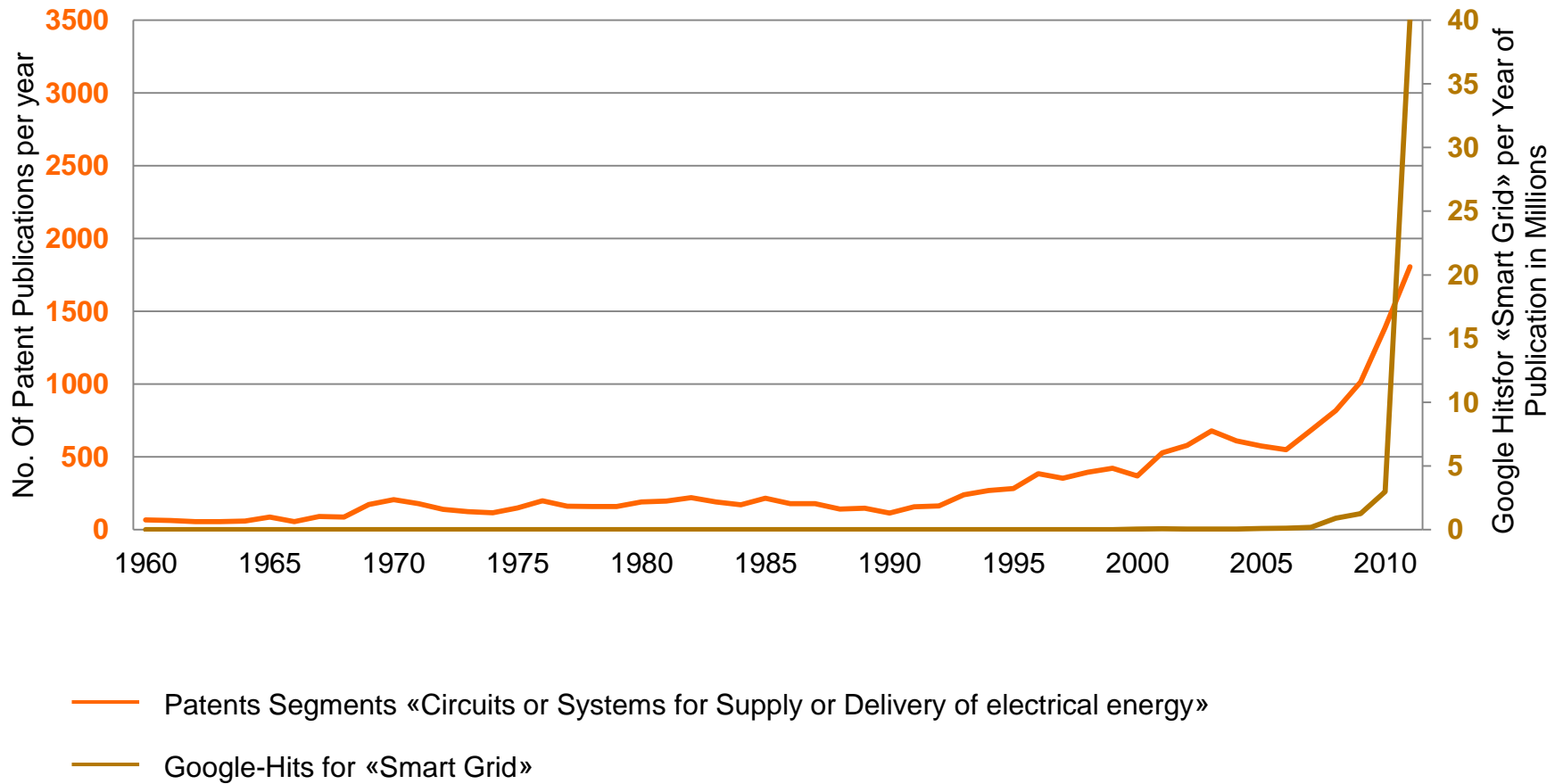
Requirements

The Challenge

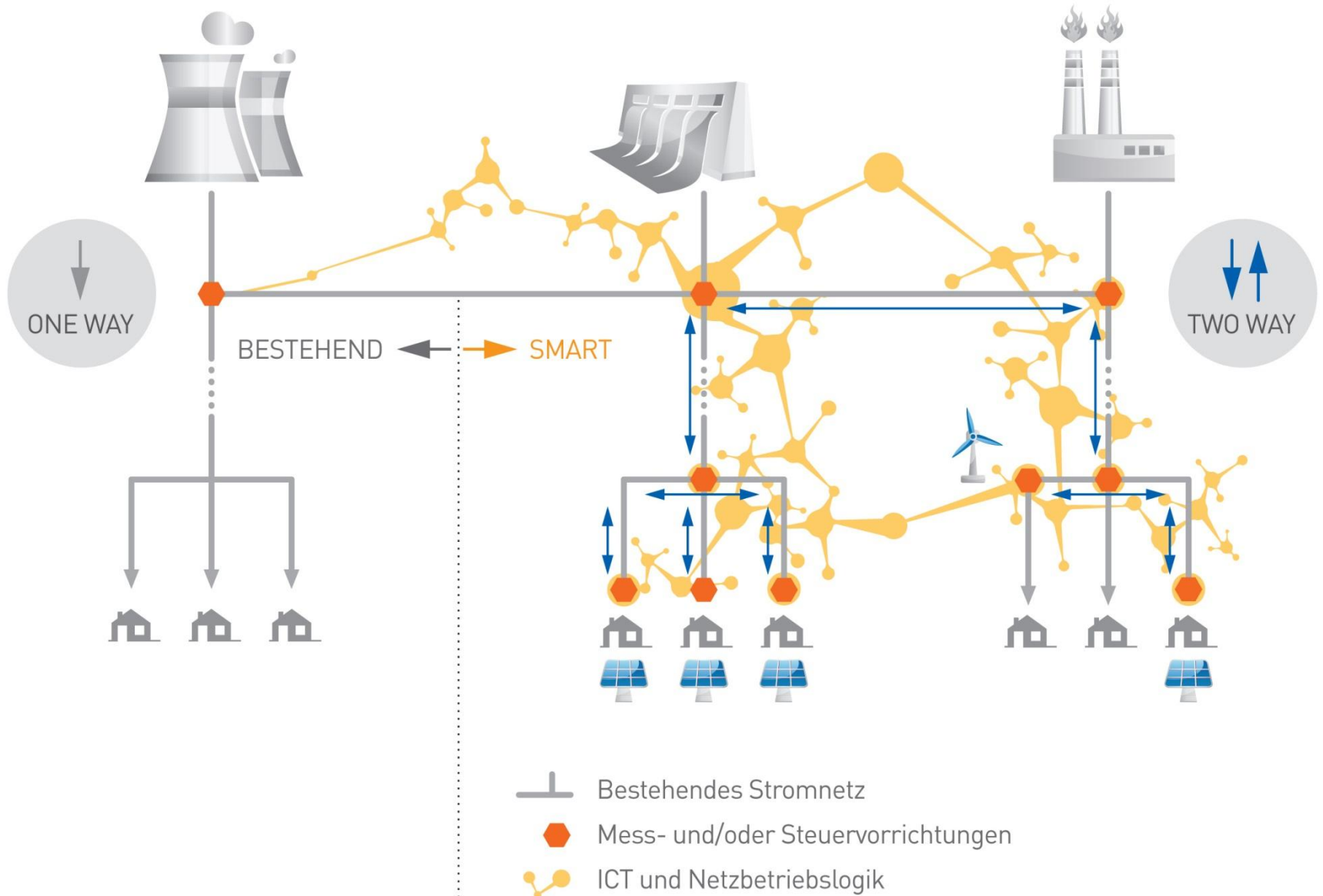
Patents in the Electrical Power Sector



Google Hits "Smart Grid" – driver "Energiewende"

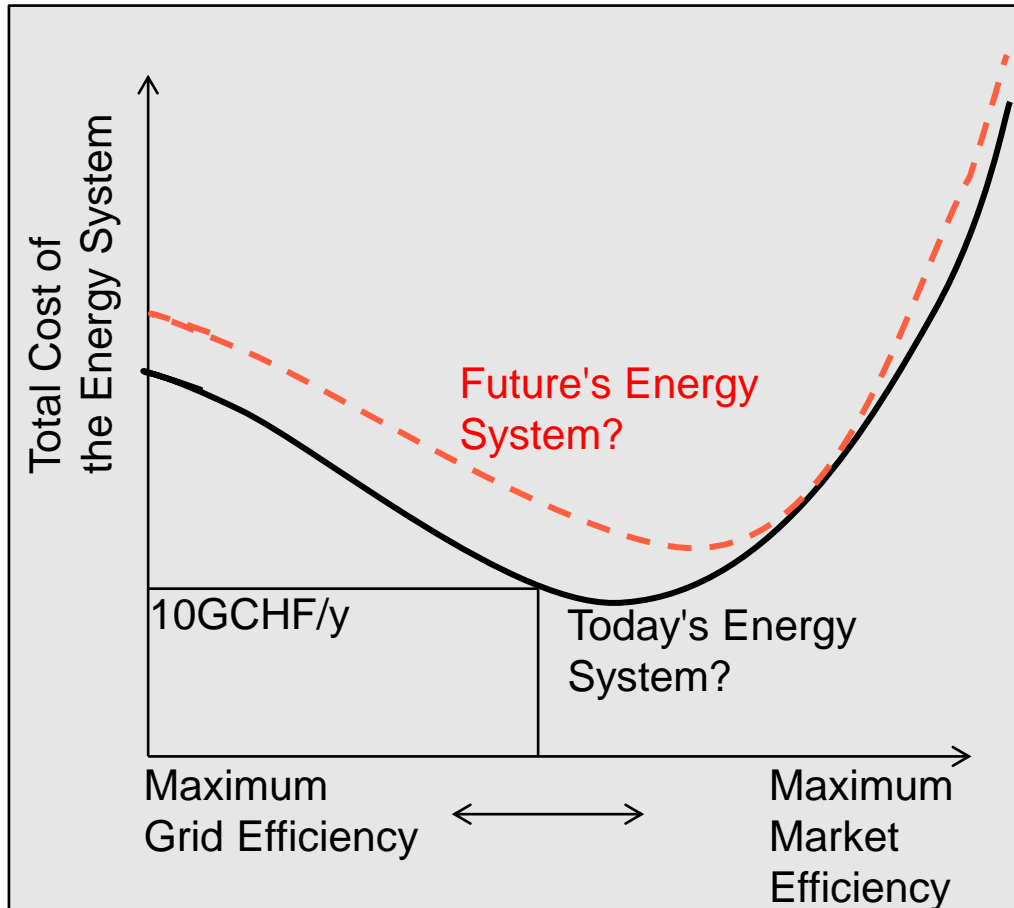


Smart Grid

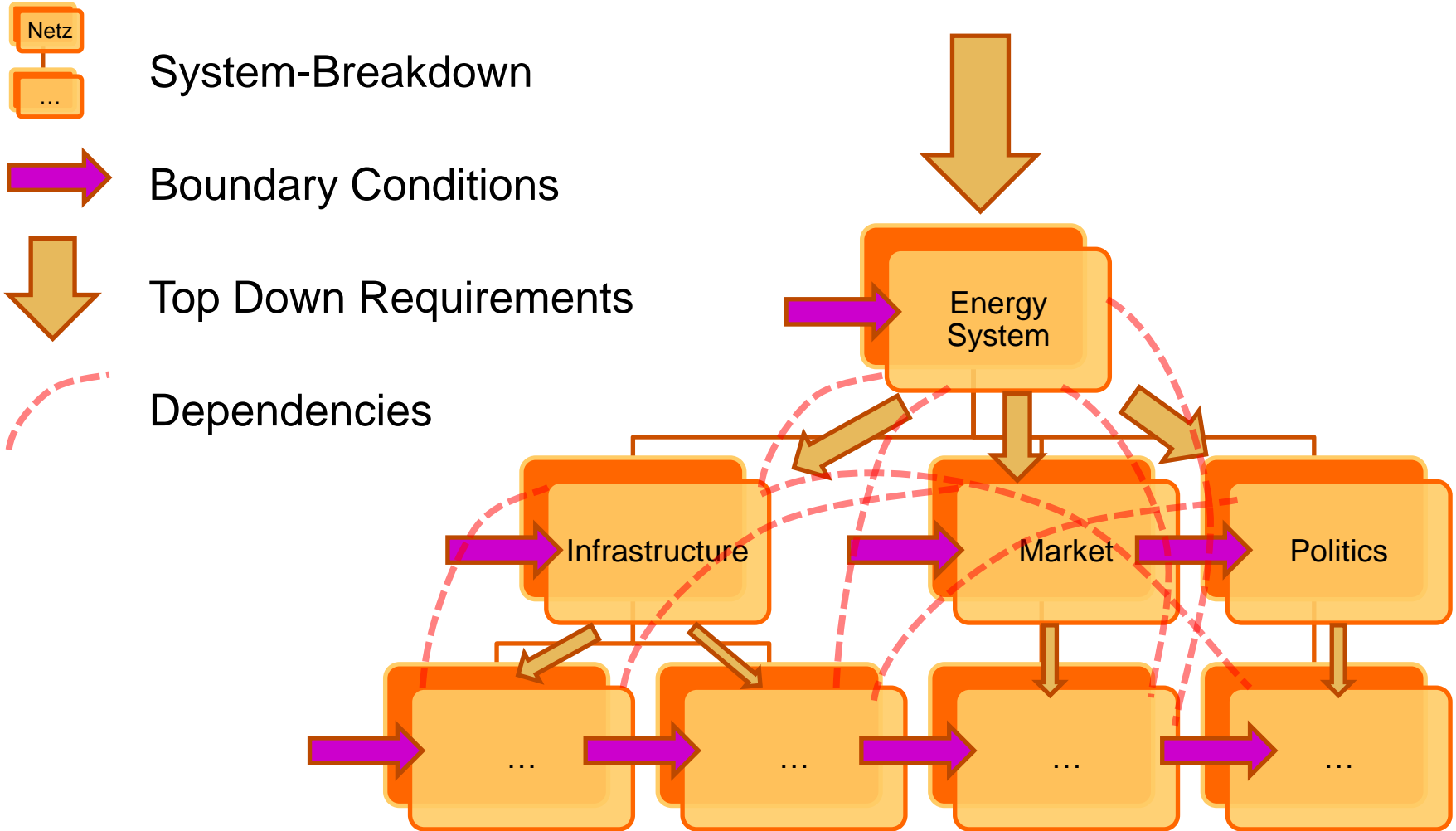


Total cost of the energy system

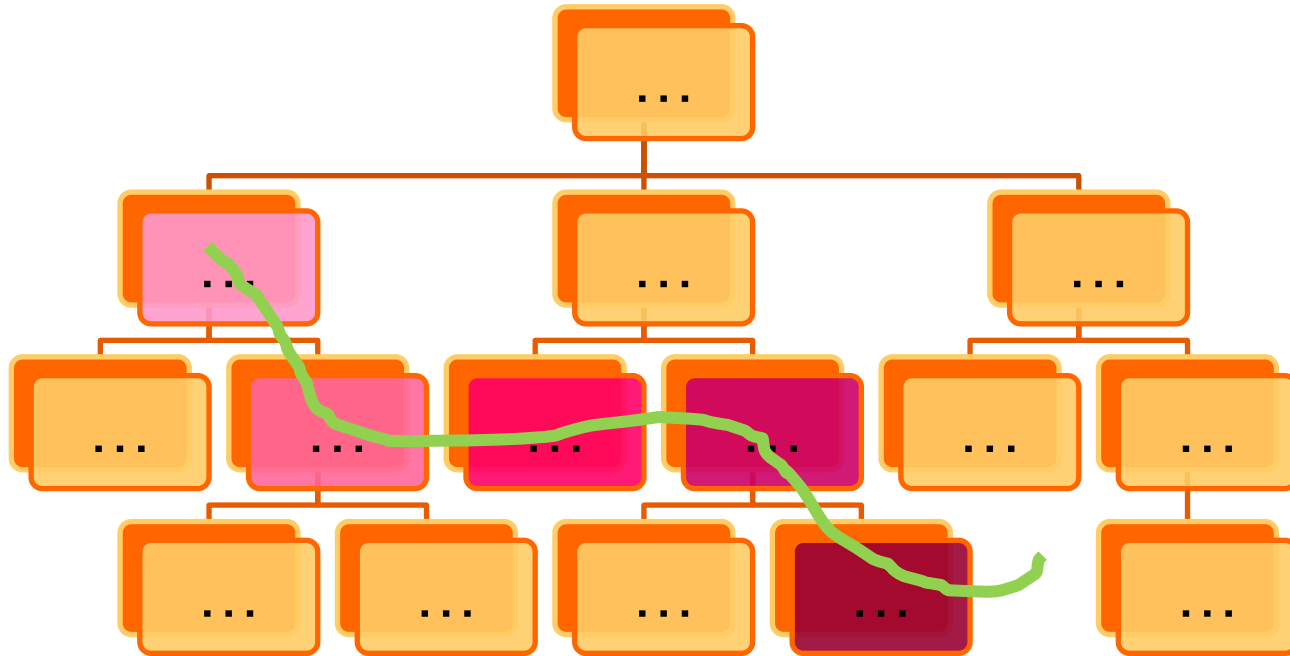
Efficient Infrastructure vs efficient market



System Breakdown of the Energy System?

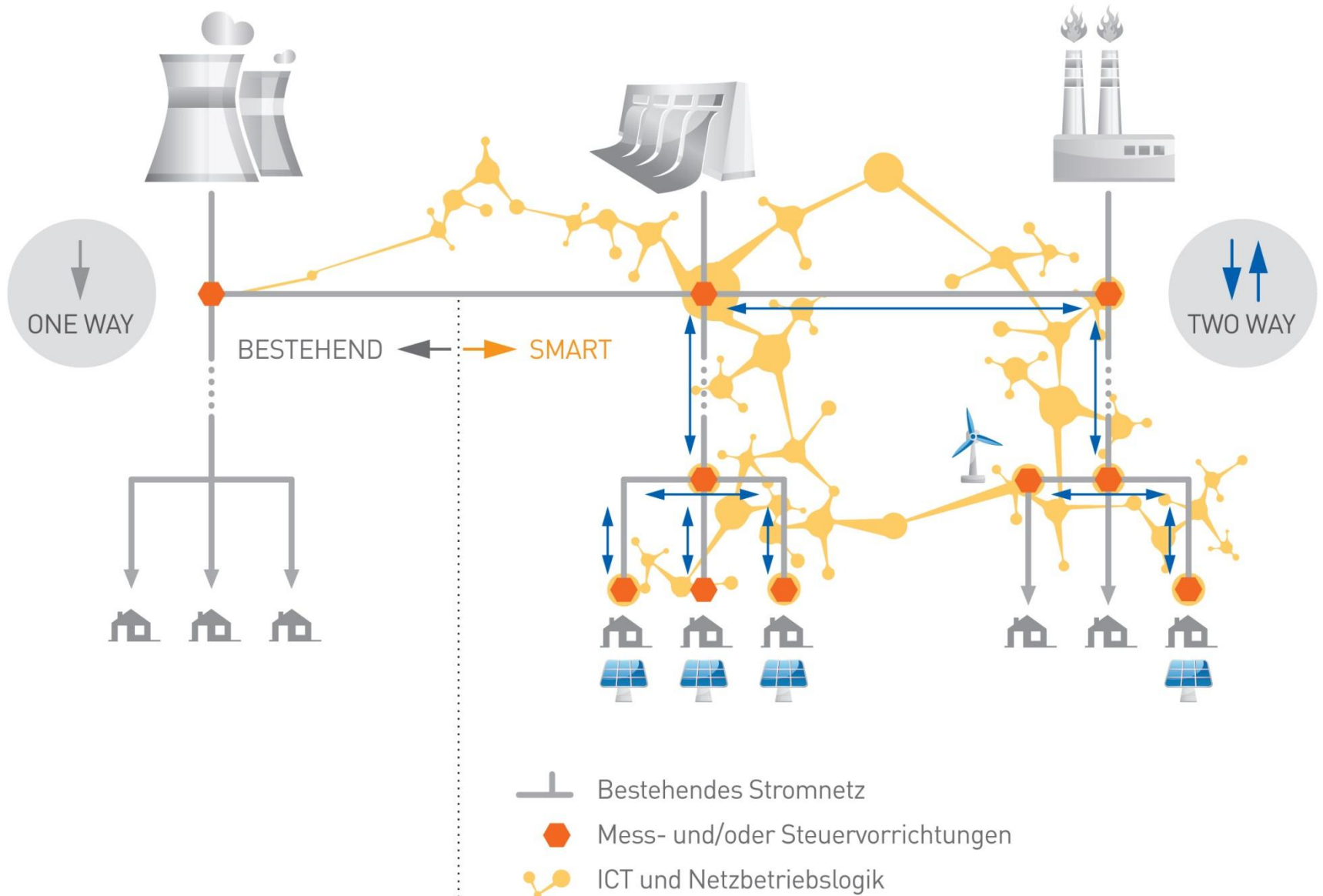


Systemic approach

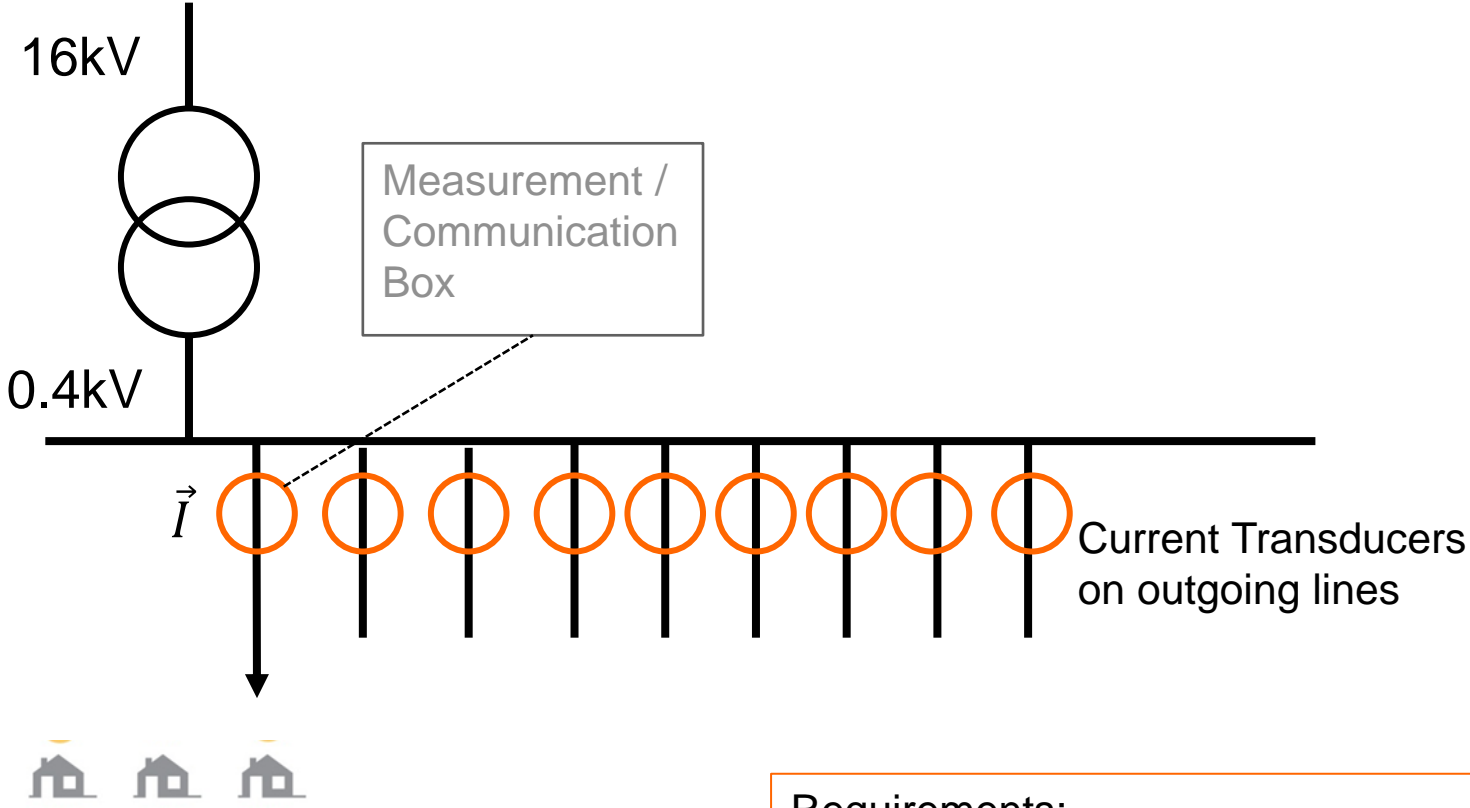


1. Place yourself within the system – look from the inside
2. Be concerned about relations / functions not about structures
3. Walk along the main lines and be holistic without looking from the outside

Smart Grid – Big Data



Current transducers in local transformer stations

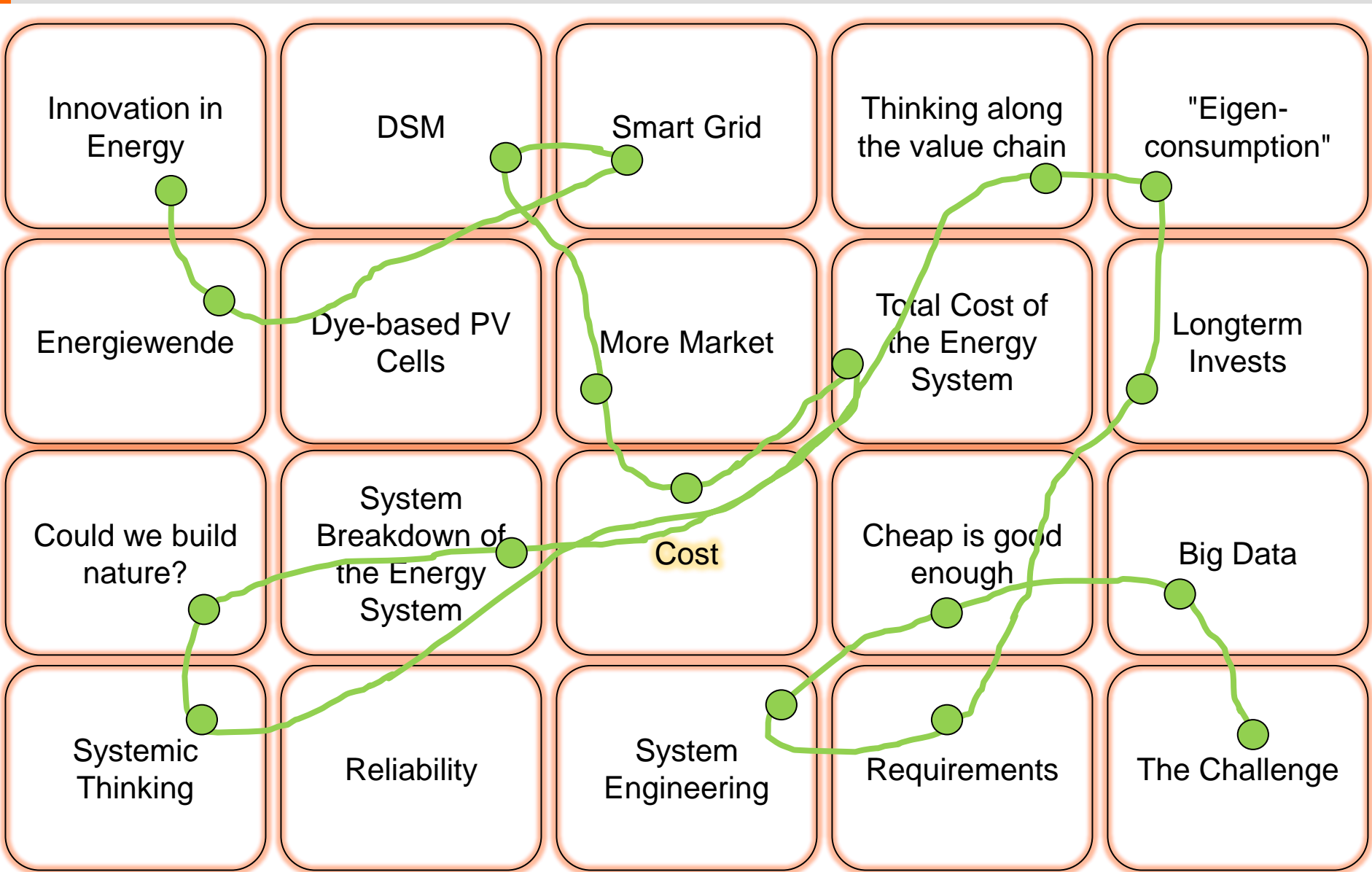


Requirements:
<10CHF per transducer
10s installation time per transducer

Conclusion – what we need to be the Smart Grid (and the Energiewende) a success story

1. Systemic thinking / holistic approaches
 - Place yourself within the system – look from the inside
 - Be concerned about relations / functions not about structures
 - Walk along the main lines and be holistic without looking from the outside
 2. Proper System Engineering:
 - Cost-per-Function – put a price tag to functionality
 - Specification management – put requirements into questions
- Simple ("cheap") solutions that positively impact the whole value chain
- Serve the purpose at minimum system cost

The big picture...we walked through it



Thank you!

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