ISGAN
international smart grid action network

ANNEX 7
SMART GRID TRANSITION – ON INSTITUTIONAL CHANGE

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY

TRANSITION TOWARDS FUTURE MEDIUM AND LOW VOLTAGE GRIDS

Changing Cognitive Frames, Social Networks and Institutions

Is there a future for *Distribution Systems?*

IEA Workshop, 29.2.2016

Klaus Kubeczko, Austrian Institute of Technology (AIT), ISGAN Annex 7

Socio-technical transitions at different levels

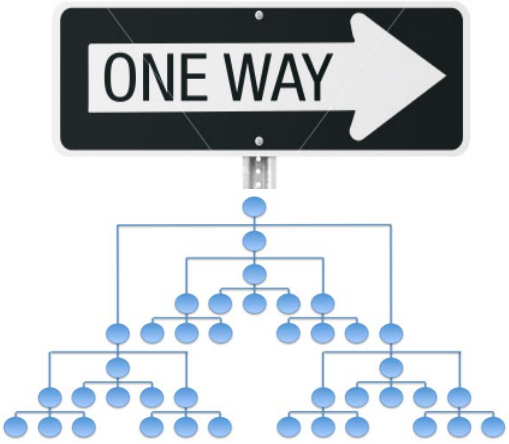
- Transforming specific local systems
  - **Infrastructure systems – from distribution grids to Local RES Smart Grids**
  - Local mobility and production-consumption systems

- Transforming large socio-technical systems
  - **Need to transform centralized energy systems -> decentralised low-carbon energy systems**
  - „Managed“ transformation process

- Transforming basic operation of our economies
  - **Low-Carbon Economy**
  - Transformed capitalism

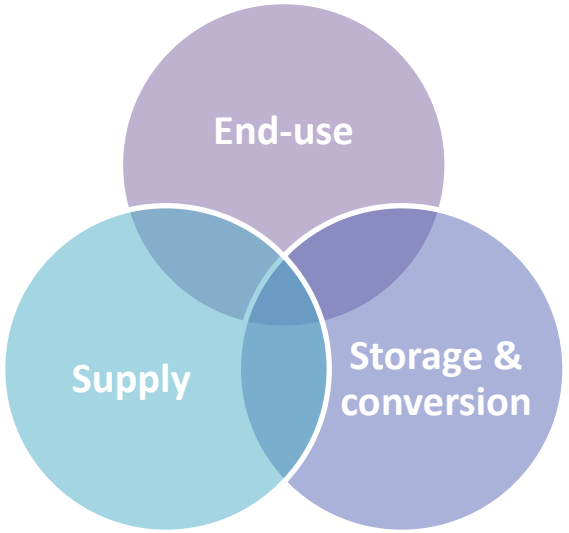
Transition to a decentralised – low-carbon electricity system

Centralized System:
external
energy supply



Simple distribution network

Decentralized System:
internal
energy supply



Complex local network / ecosystem

Power of cognitive frames

- What is in the **centre of** Smart Grid **representations**?
- What is **common to** all Smart Grid **representations**?

Power of cognitive frames

- What is in the **centre of** Smart Grid **representations**?
  - ICT
  - Smart meters in small households
  - Renewable energy sources
  - “the market”
  - Grid control
  - End-user and prosumer
  - Integrated system perspective

- What is **common to** all Smart Grid **representations**?
  - All consider **Storage/Conversion as a key component – system functions: flexibility & efficient use of RES**

Who are future actors?

- Incumbent actor groups
  - Core: Producers, consumers, TSOs, DSOs, …
  - Peripheral: Hardware providers, Software provider

- New actor groups
  - Is there an need for a new role regarding increased complexity? (e.g. storage)
  - Entrants from other sectors (e.g. ICT)

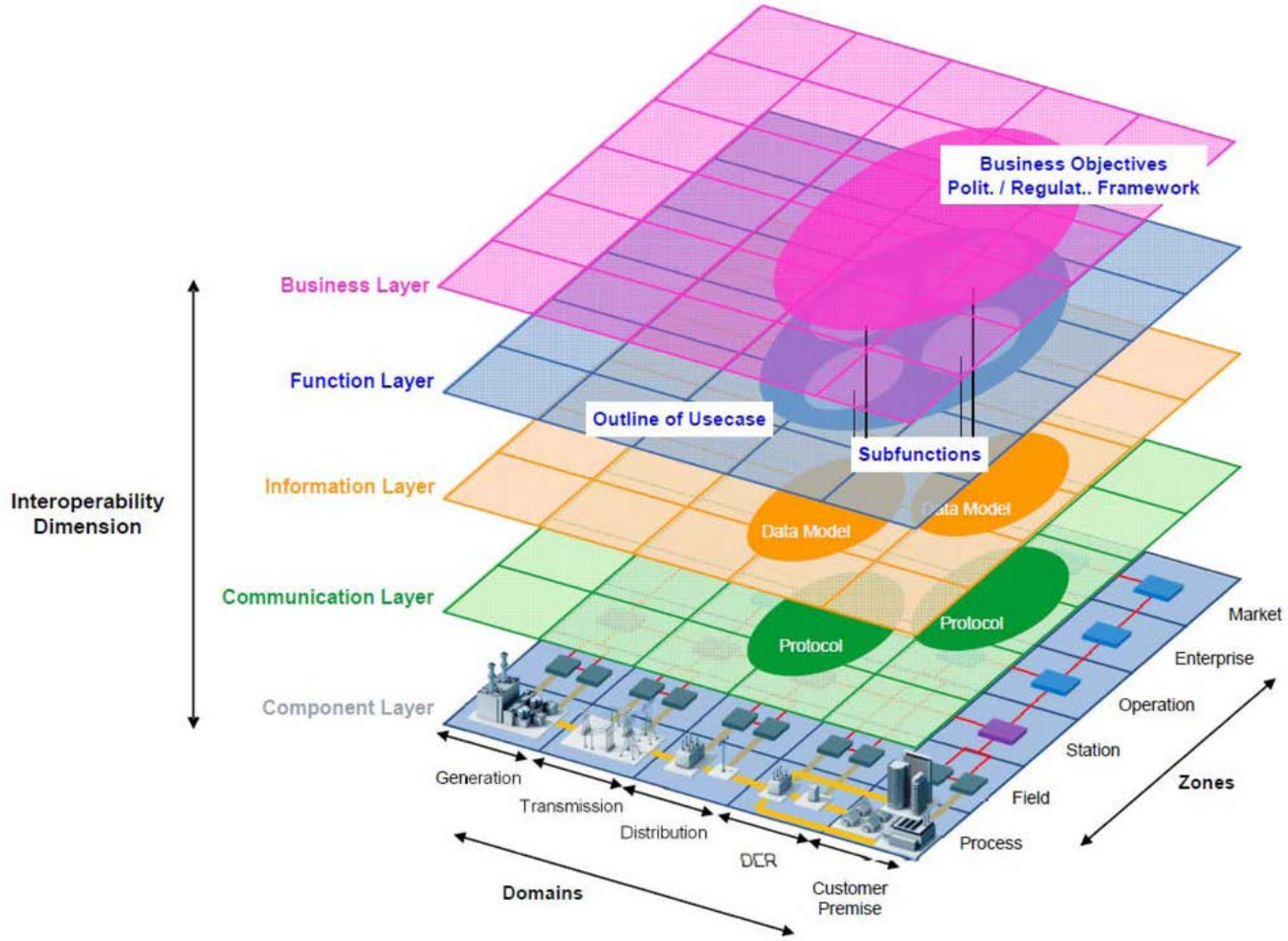
Institutions

- Evolution of Terms and Definitions
- Regulatory principle – US/Europe
- Institutionalization of RES-functions

Institutionalization of new systemic functions?

- How is the Storage-function positioned **in standardisation**?
  - **in SGAM** it is **"hidden" as part of DER**
- How is the Storage – function **institutionalized?**
  - **E.g. in EU Directive** 2009/72/EC **NOT mentioned – not defined ! (unlike on Gas-Regulation)**

Smart Grid Architecture Model (SGAM)

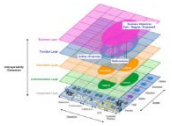


Dynamic Change of Social Systems

Institutions

Electricity grid Directive 2009/72/EC

SGAM



Networks

Incumbent actors and technology and service providers

Emerging new actors and technology providers

Establish collective power to shape institutions

Influence structure of social networks

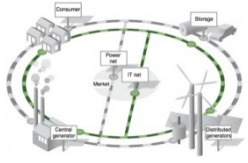
Provide legitimation and shape perception of institutions

Shape perception of network structures

Make values socially relevant

Shape and diffuse cognitive frames

SG visions of actor groups



Collective Cognitive Frames

Based on Beckert (2010)

Issues for shaping future LV/MV Grids

- *Words are Deeds* – Renaming Institutional Roles
  - Term “Distribution System” is outdated
  - Find the right term & define roles in LV/MV Grids

- Allowing for new actor groups
  - Clarifying the Institutional-Roles in local energy grids
  - Do we need a “Storage Operator” in local energy grids in order to guarantee system functions: flexibility & efficient use of RES?

- Develop collectively shared Transition Pathways for future LV/MV Grids
  - Broad participation
  - Adapt them over time

ISGAN international smart grid action network

ANNEX 7
SMART GRID TRANSITION – ON INSTITUTIONAL CHANGE

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY
TOMORROW TODAY

DR KLAUS KUBECZKO
Senior Expert Advisor
Research Coordinator - Transition Governance
Innovation Systems Department
Research, Technology and Innovation Policy

AIT Austrian Institute of Technology GmbH
Donau-City-Straße 1 | 1220 Vienna | Austria
T +43(0) 50550-4566 | F +43(0) 50550-4599
klaus.kubeczko@ait.ac.at | http://www.ait.ac.at