International and Austrian Smart Grid Activities and Projects

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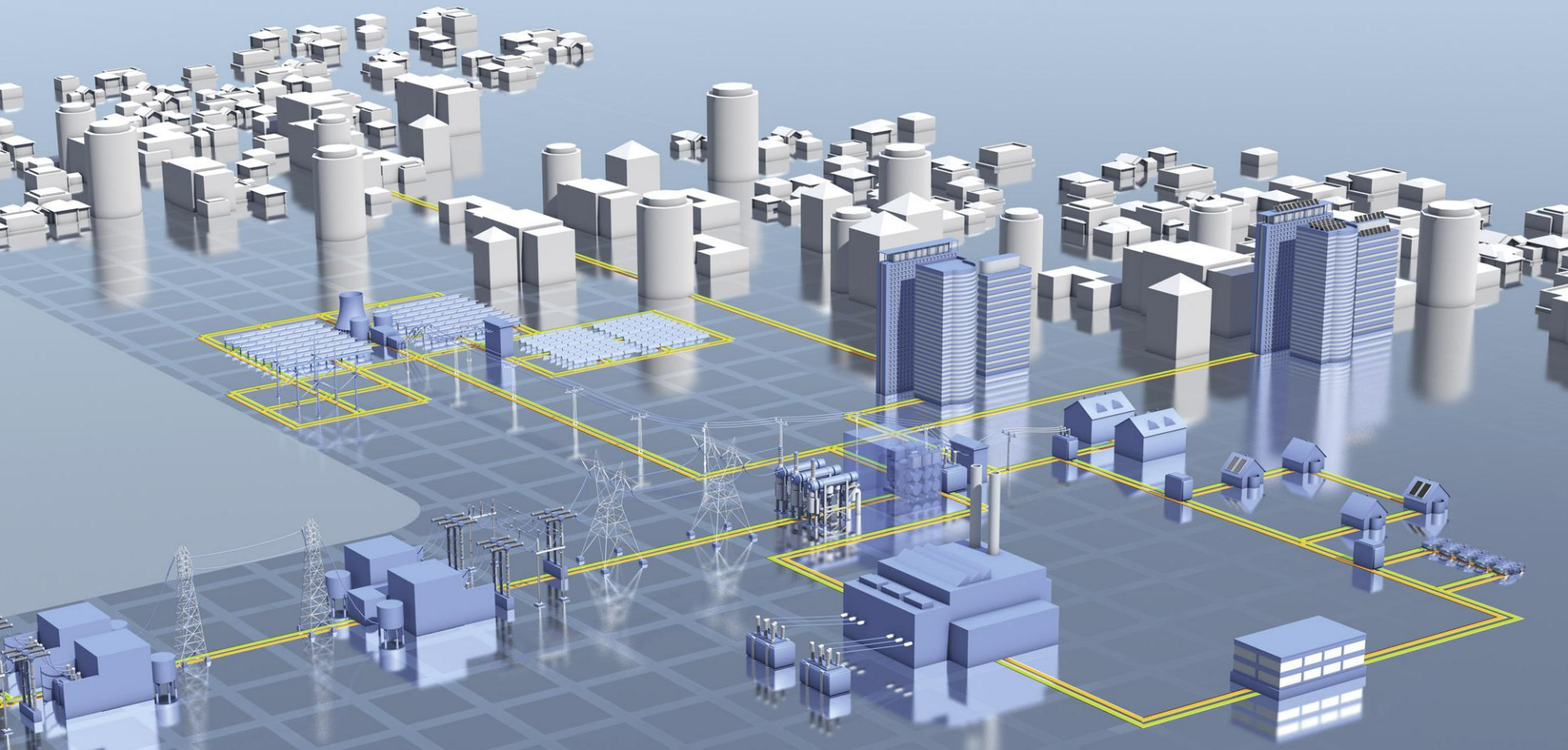

The electrical grid structure will shift towards a Smart Grid

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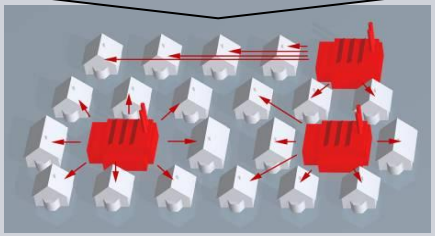
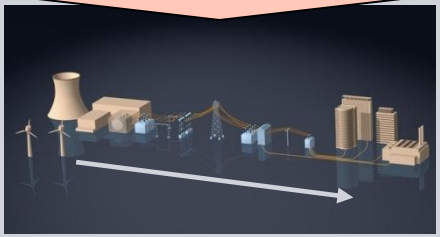
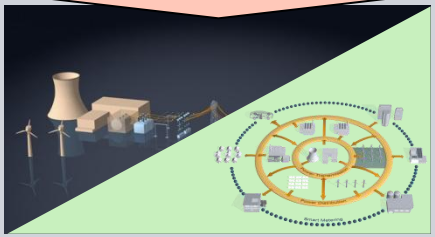
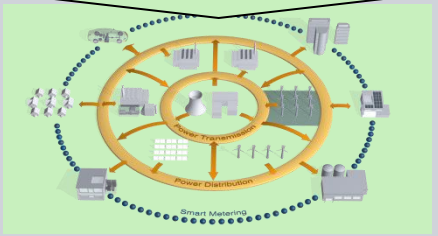
19th Century	20th Century	Early 21st Century	End of 21st Century
Electrification of society "Age of Coal" **Unsustainable energy system**	**Extensive generation of electrical energy** "Age of fossil fuels" **Unsustainable energy system**	**Shift towards SMART GRIDS** Challenges require rethinking: 1.) Demographic change 2.) Scarce resources 3.) Climate change	**The SMART GRID** Electricity will be ***the*** energy source for most applications in daily life. ➔Integrated energy system with power grid as backbone **Sustainable energy system**
			
"Generation and load closely coordinated" Supply island with stochastic load	**"Generation follows load"** Integrated network, central generation, load stochastically predictable, unidirectional energy flow	**"Energy system shifting"** Increasingly decentralized, fluctuating generation "consumer" becoming "prosumer"	**"Load follows generation"** Central + decentralized generation, intelligence with ICT [1], bi-directional energy flow
Fossil energy source, hydro	**Fossil energy sources, hydro, nuclear**	**Fossil energy sources, hydro, nuclear, biomass, wind, solar**	**Renewable energy sources** **(solar, wind, hydro, biomass),** **"clean" coal, gas, nuclear**

No environmental concerns ► ► ► ► ► ► ► **Environmental awareness**

1) ICT = Information and Communication Technologies

Siemens takes the lead in integrating Smart Grid solutions

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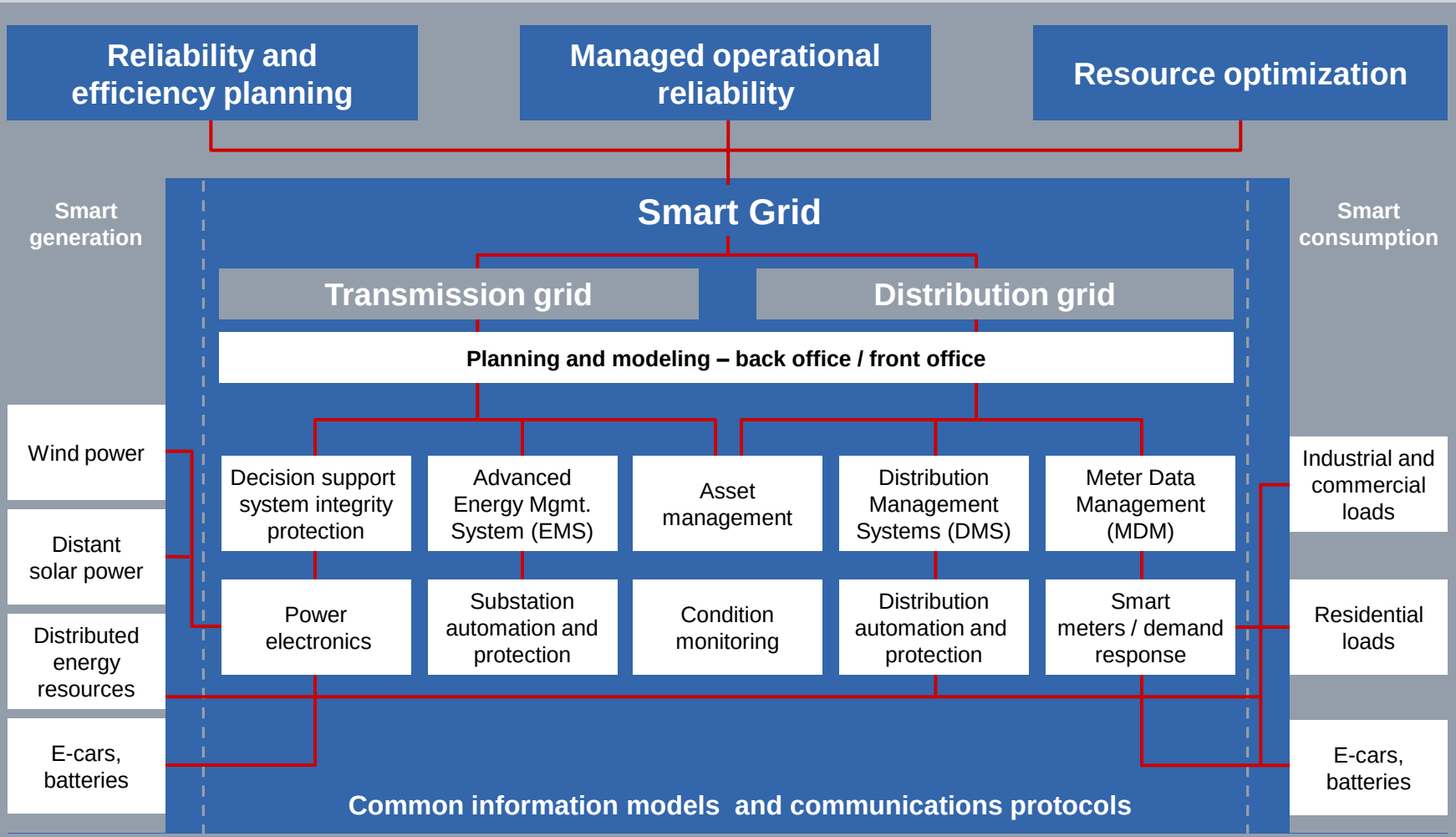

Smart Grid around the world: DSO initiative Smart Grid Europe

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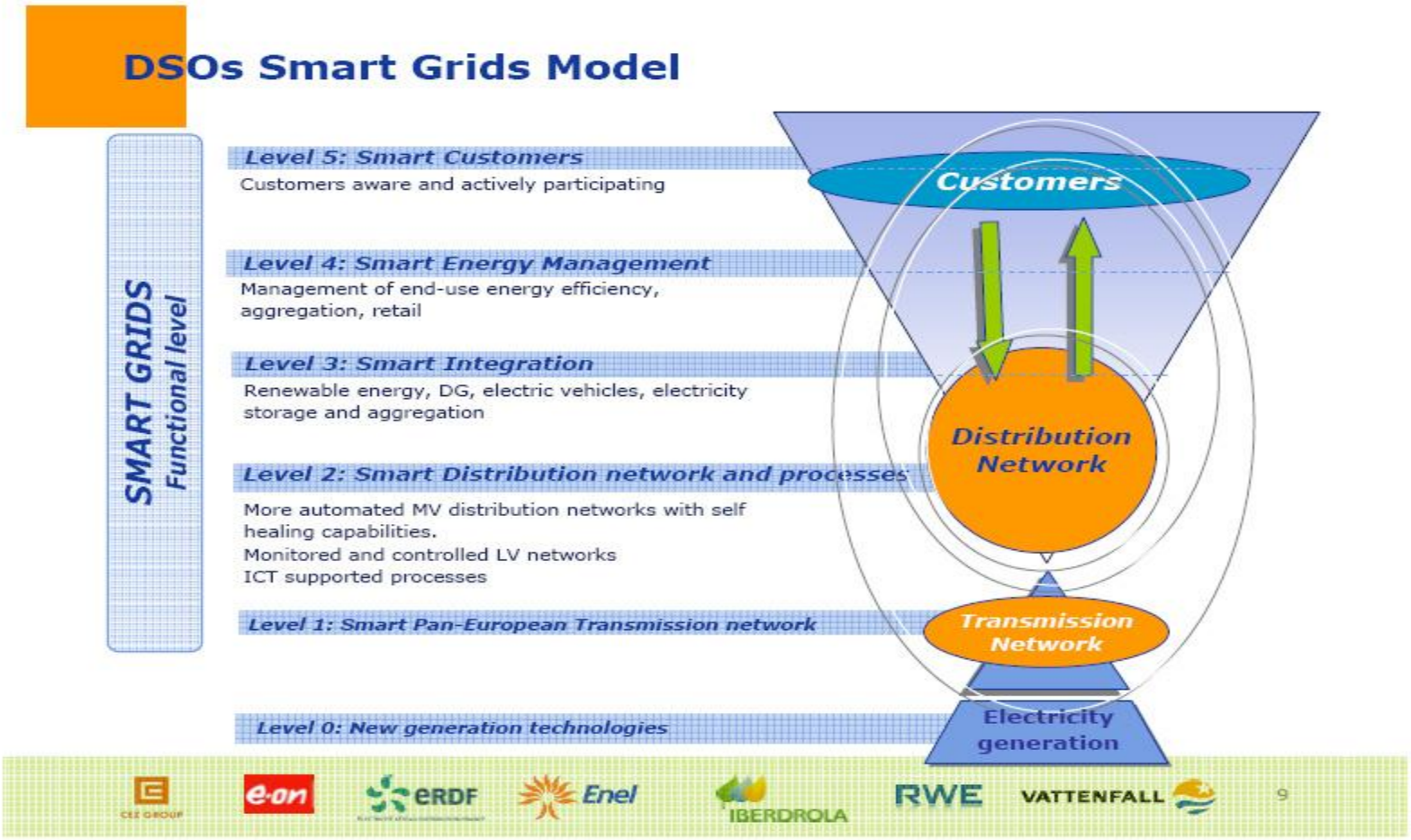
DSOs Smart Grids Model



Smart Grid around the world: DSO initiative Europe - Projects

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List of local implementation projects

1. Smart urban network
2. Smart rural network
3. Smart solar district
4. Web based information portal
5. Smart Grids for rural areas
6. Smart substation monitoring
7. Utilization of HVDC light 4 high penetration of RES
8. LV network monitoring and control
9. Grid integration of RES
10. E-mobility concept validation
11. AMI uses and Smart Homes
12. Active Informed Customers
13. Renewables & storage
14. Meshed Infrastructure Network
15. PHEV recharging infrastructure
16. IP Communication Infrastructure
17. Urban area Smart Grids with DSM + PHEV
18. Large scale integration of PV
19. Design of a self healing MV grid

- 1,5 Mln customers involved
- 50.000 km of power lines
- 20.000 substations

CEZ GROUP e·on ERDF Enel IBERDROLA RWE VATTENFALL 14

Masdar project is a comprehensive Smart Grid reference opportunity

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Masdar Smart Grid / Smart Building project

Masdar Project

Back-ground:

- Vision: "To become global 'no. 1' in clean technologies by leading Smart Grid / Smart Buildings vision, research, development, and implementation“
- Masdar plans to become first carbon neutral city

Scope:

DMS, EMS, Energy Automation + MV Power Network + Building Manage-ment + Smart Meters + Water Manage-ment + IT + Solar Power Generation

Next steps:

Oct , 2009 — Detail preparation — Jan 2010 — Implementation

Singapore could be the Smart Grid lighthouse project for Asia

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Singapore Project

Back-ground:

- Client is Energy Market Authority

Scope: (not defined yet, estimated)

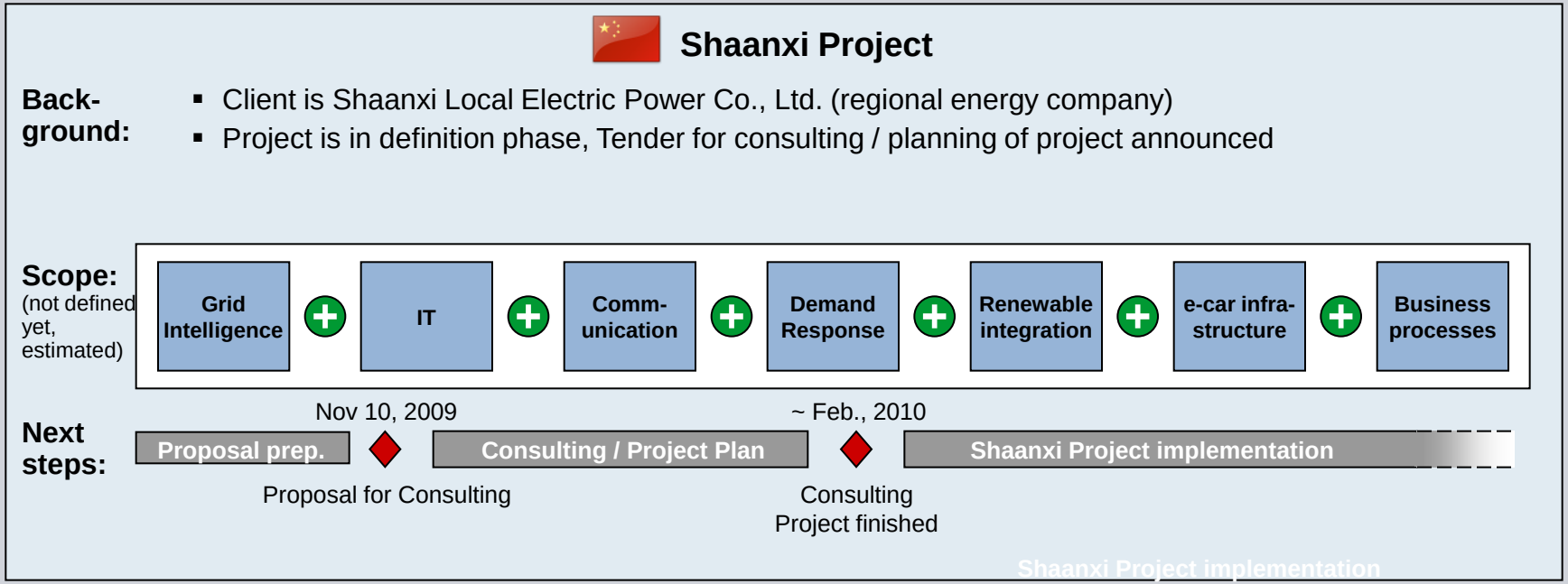
Distribu-tion auto-mation + Smart metering + Demand response systems + IT + Consulting + Building Manage-ment + Outage Manage-ment + e-car infra-structure

Next steps:

Nov 19, 2009		Dec 19, 2009		Jun 10, 2010
◆	Prequalification	◆	Evaluation and clarification of Proposal	◆
Tender announcement at Energy Week Singapore		Hand-in of prequalification document		Award of contract

Shaanxi Smart Grid project in China

Shaanxi Smart Grid project



Smart Grid Platform Austria

Industrie

ECO ENERGEN – A WHOLE NEW WORLD

Fronius

Infineon technologies

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SCHRACK TECHNIK

ubitronix system solutions gmbh

Netzbetreiber, Energiewirtschaft

VEO

ENERGIE AG Netz

LINZ AG STROM

Salzburg Netz

WIEN ENERGIE STROMNETZ

VKW Netz – VKW-Netz AG

ENERGIE STEIERMARK STROMNETZ

TIWAG Netz

EVN

Forschungseinrichtung

arsenal research – Ein Unternehmen der Austrian Research Centers

FACHHOCHSCHULE TECHNIKUM WIEN

Institut für Elektrische Anlagen – TUG

ifz

TU WIEN – Vienna University of Technology – Institute of Computer Technology

Energy Economics Group

Konsumenten, Nutzer

HG ENGINEERING

SMARTGRIDS AUSTRIA

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Smart Grids
Model Region Salzburg

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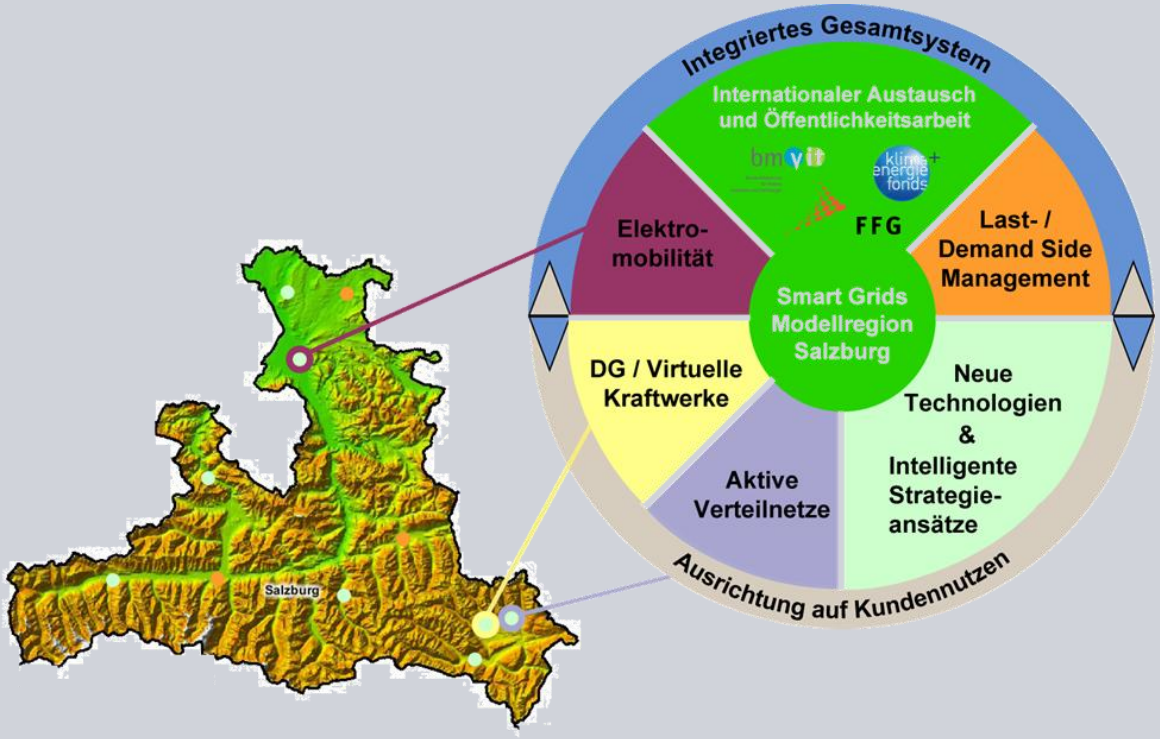
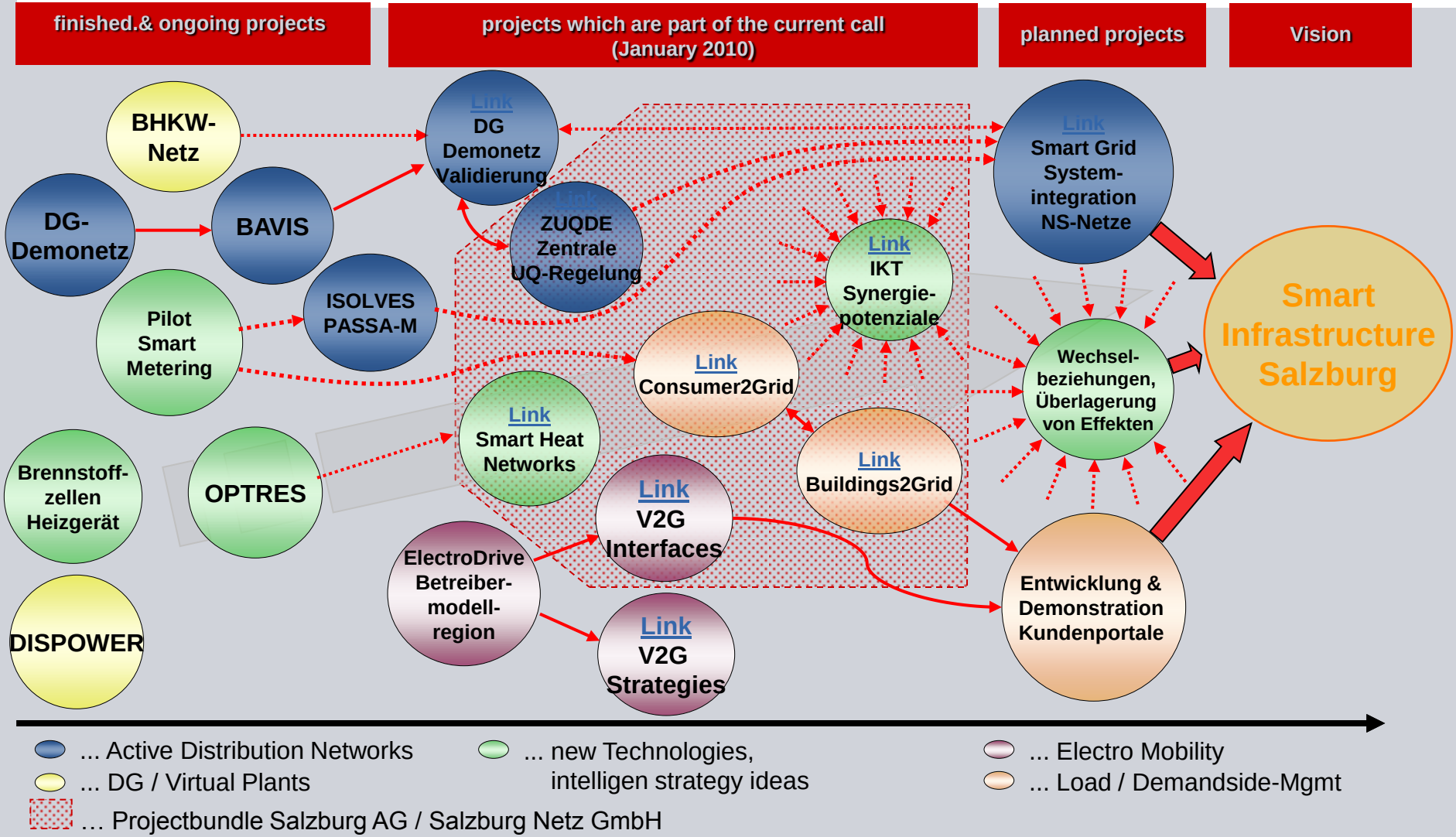
- **Combination** of the questions out of the sub projects **in a Model Region**
  - Using Synergies
  - Dependencies and Interactions
  - Integration horizontal and vertikal Approaches
  - Consequent Integration of Customer Needs



- **Realisation** of the integrated overall system **in Real Networks** with actual problems and **Customer Needs**
- **Realisation of Lighthouse Projects**, where they get visible as overall project

Structure
Subprojects Smart Grids Model Region Salzburg



... Active Distribution Networks
... DG / Virtual Plants
... new Technologies, intelligen strategy ideas
... Electro Mobility
... Load / Demandside-Mgmt
… Projectbundle Salzburg AG / Salzburg Netz GmbH

S&R Smart Grid environment
Currently activities driven by US, IEC picking up speed

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Strategy

Guides

Standards

U.S.

EISA Mandate 2007

NIST

Smart Grid Interim Roadmap

EPRI Project Lead

IEEE

IEEE P2030
(Guide for Smart Grid)

IEEE
NEMA 75 years of excellence
ANSI

IEEE-SA-SCC21
NEMA SG Advisory Panel
ANSI VTAG
etc.

World

IEC **SMB** **S**tandardization **M**anagement **B**oard

IEC **SG 3** **Smart Grid** **S**trategic **G**roup

IEC Smart Grid Standardization Roadmap

IEC

TC57 WG 19
(Taskforce Smart Grid)

IEC
TC 8 system aspects
TC 57 energy automation
TC 64 LV installations
TC 65 industry automation
TC 82 solar
TC 88 wind
Etc.

Cenelec TC205
CEN TC247

ISO
TC 205
building automation
Etc.

China

STANDARDIZATION ADMINISTRATION OF THE PEOPLE' S REPUBLIC OF CHINA
SAC *

Currently no activities known
Probably CEPRI activities ongoing

CEEIA TC 82
(mirror to IEC TC 57)

STANDARDIZATION ADMINISTRATION OF THE PEOPLE' S REPUBLIC OF CHINA
SAC TC 426
(mirror to ISO TC 205 WG 3)

* Activities not yet started
lot of influence through NEMA (US)

Turning the entire energy conversion chain into a smart infrastructure

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