



Karl Elfstadius, ABB Smart Grid

InnoEnergy – an innovation driver for the Smart Grid

A sustainable energy system - with Smart Grid as the enabler

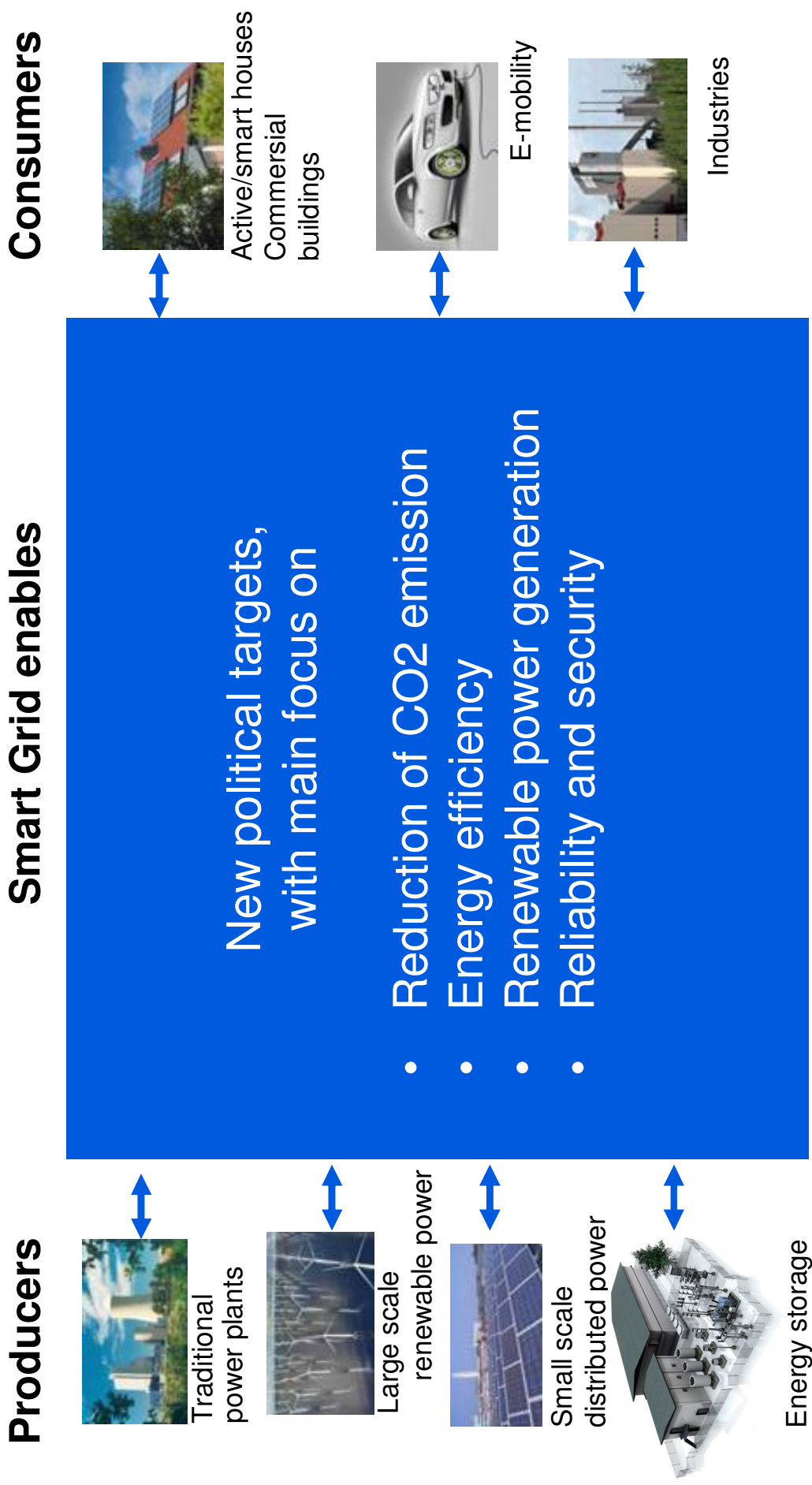


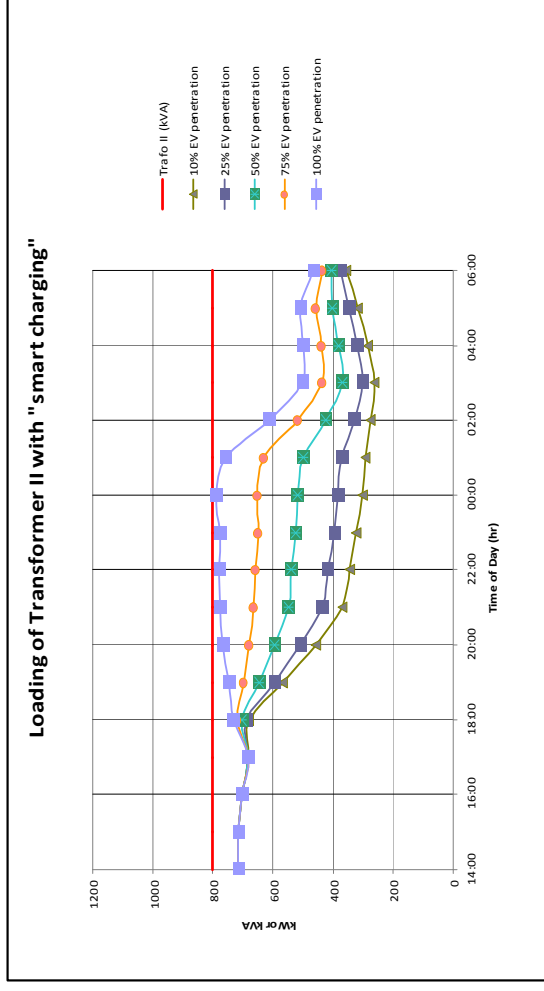
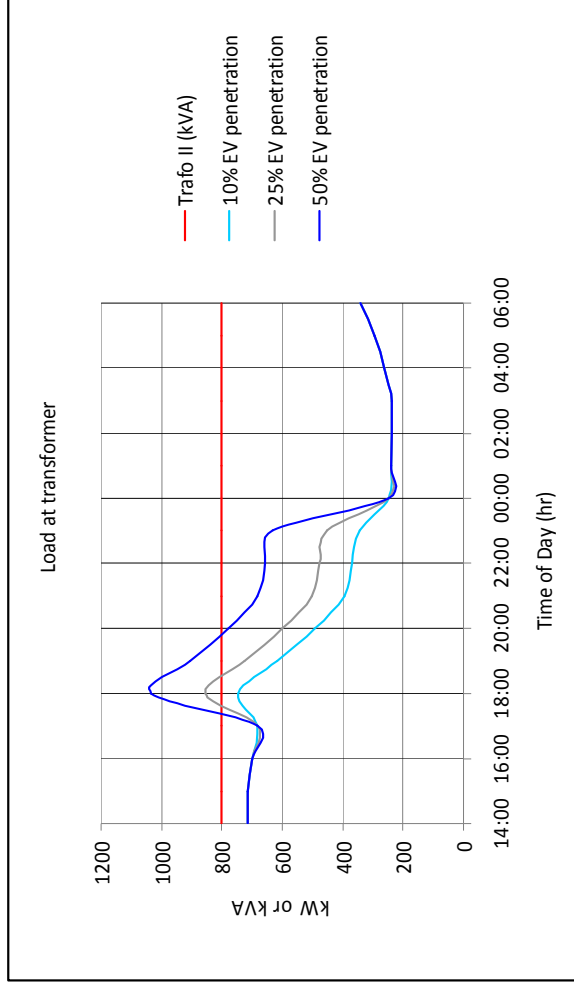
ABB – Power and Automation With Smart Grid as the Core Business

				
Power Products	Power Systems	Discrete Automation and Motion	Low Voltage Products	Process Automation
\$11.2 billion 33,500 employees	\$6.5 billion 16,000 employees	\$5.4 billion 18,000 employees	\$4.1 billion 19,000 employees	\$7.8 billion 28,000 employees

2009 revenues (US\$; pro-forma figures for automation divisions)

- Key components in ABB's Smart Grid portfolio:
 - Grid integration wind/solar
 - Grid interconnections by HVDC
 - Increased transmission capacity by FACTS
 - Electrical storage
 - Grid automation
 - Network management
 - IT for trading/market
 - Charging infrastructure Electric Vehicles
 - Active house concept

Charging infrastructure for e-mobility Challenge: Peakload



- Blackout prevention by charging scheduling even with 100% EV penetration
- Charging management system can be included into demand response systems
- Most cost efficient solution for charging infrastructure

Intelligent charging management prevents grid overstrain

Smart Grid components: Charging infrastructure Electric Vehicles

Billing system

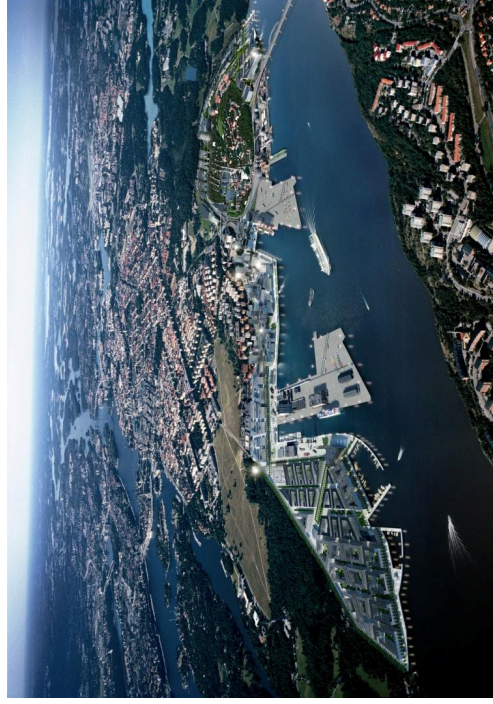


Benefits

- CO2 reduction
- Allows for the possibility to dispose energy when excess production is available.
- Peak load shaving

Charging method	Description	Installation
Slow charging	<ul style="list-style-type: none"> ▪ Individual poles at home or parking lots ▪ Charging time ~6 hours 	<ul style="list-style-type: none"> ▪ ~2kW, AC converters
Fast charging	<ul style="list-style-type: none"> ▪ Special charging stations or with equipment at home ▪ Charging time ~1 hour 	<ul style="list-style-type: none"> ▪ ~20kW, AC converters
Ultra-fast charging	<ul style="list-style-type: none"> ▪ Concept for special charging stations ▪ Charging time ~6 min 	<ul style="list-style-type: none"> ▪ >300kW, DC converters

Need of Smart Grid R&D Arenas Development of technology, business models & regulatory framework

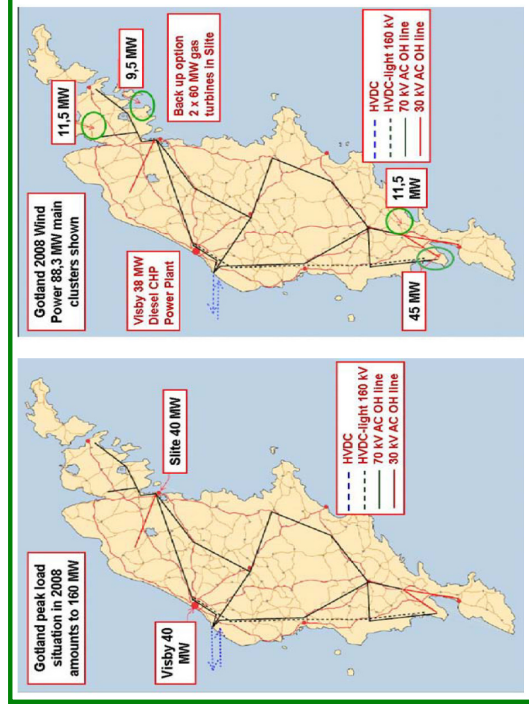


Stockholm Royal Seaport

- A full scope Urban Smart Grid for a sustainable city and harbor environment
- Focus on active consumers (residential and harbor) and peak load reduction
- Main partners - Fortum and ABB and KTH

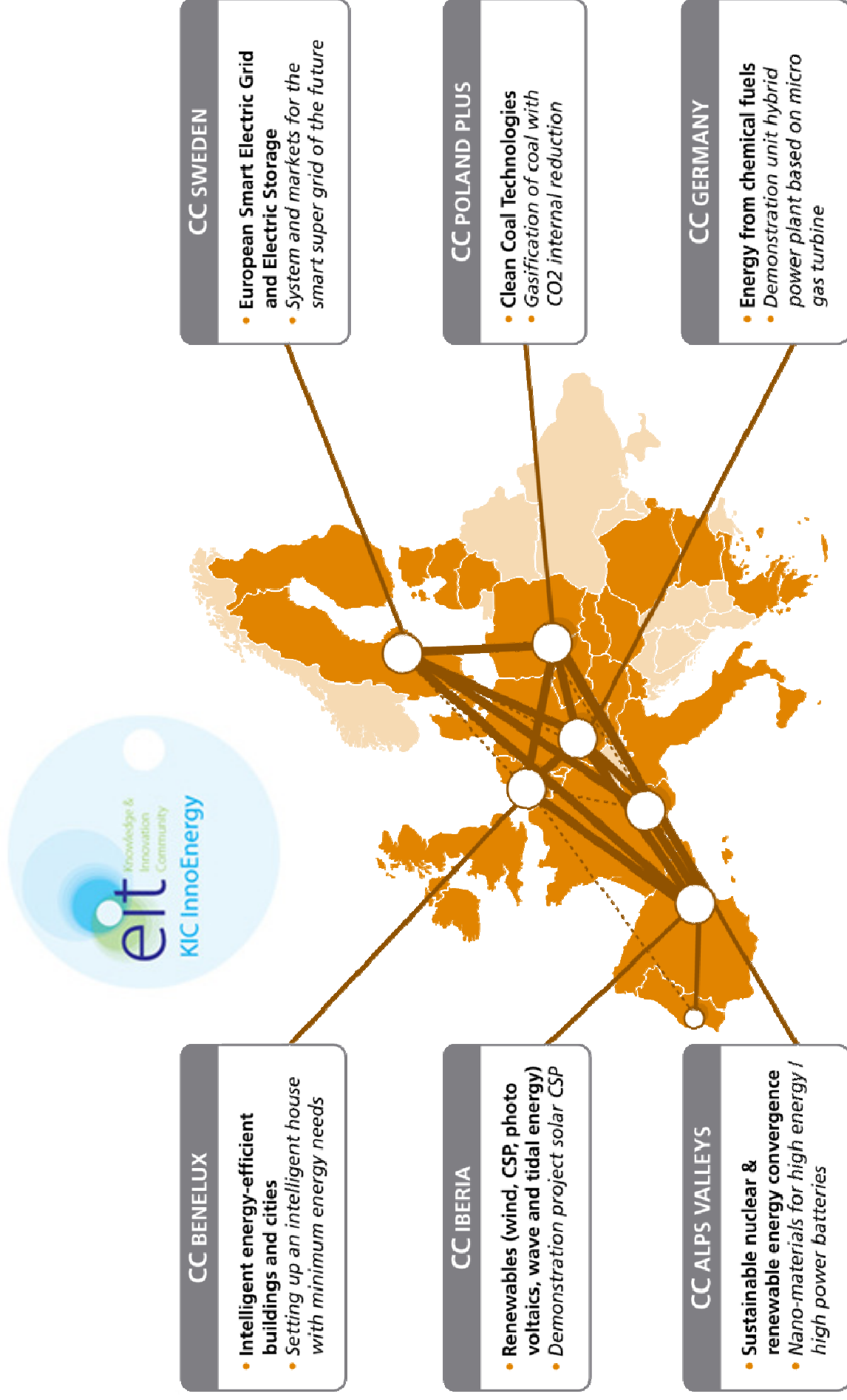
Smart Grid Gotland

- A full scope Rural Smart Grid
- Focus on wind integration and related stability and reliability issues
- With 30% intermittent renewable production Gotland represents the challenge many regions and countries will face in the future.
- Main partners – Vattenfall and ABB and KTH



EIT - KIC InnoEnergy.

Six co-locations centers (CC) and thematic areas in line with SET Plan



KIC InnoEnergy – A world class alliance of top European players with a proven track record

The diagram shows a map of Europe with callouts to various KIC InnoEnergy clusters. Each cluster is represented by a circular icon with city names and a list of partner logos in a rectangular box.

- CC BENELUX:** eandis, vito, TU/e, LEUVEN
- CC SWEDEN:** Uppsala, STOCKHOLM, VATTENFALL, ABB
- CC POLAND PLUS:** Katowice, KRAKÓW, ZAK, AGH
- CC GERMANY:** SAP, EnBW, Universität Stuttgart, KIT
- CC ALPS VALLEYS:** Grenoble, Lyon, Cadarache, Marseille, AREVA, INSA, cea, CIPS, Schneider Electric, PHENIX
- CC IBERIA:** Barcelona, Madrid, gasNatural, ESADA, IREC, Ciemat, IBERDROLA
- KIC LEVEL:** TOTAL, EDF

- 13 companies, 10 research institutes, 13 universities
- ~50% industry partners (incl. associated partners)
- >50% of key research players in Europe
- Covering the whole energy mix
- Knowledge triangle balanced along all dimensions
- Strong connection with VCs and local governments

**Power and productivity
for a better world™**

