International Energy Agency

INTERNATIONAL LOW-CARBON ENERGY TECHNOLOGY PLATFORM

"Accelerating the deployment of smart grids around the world."

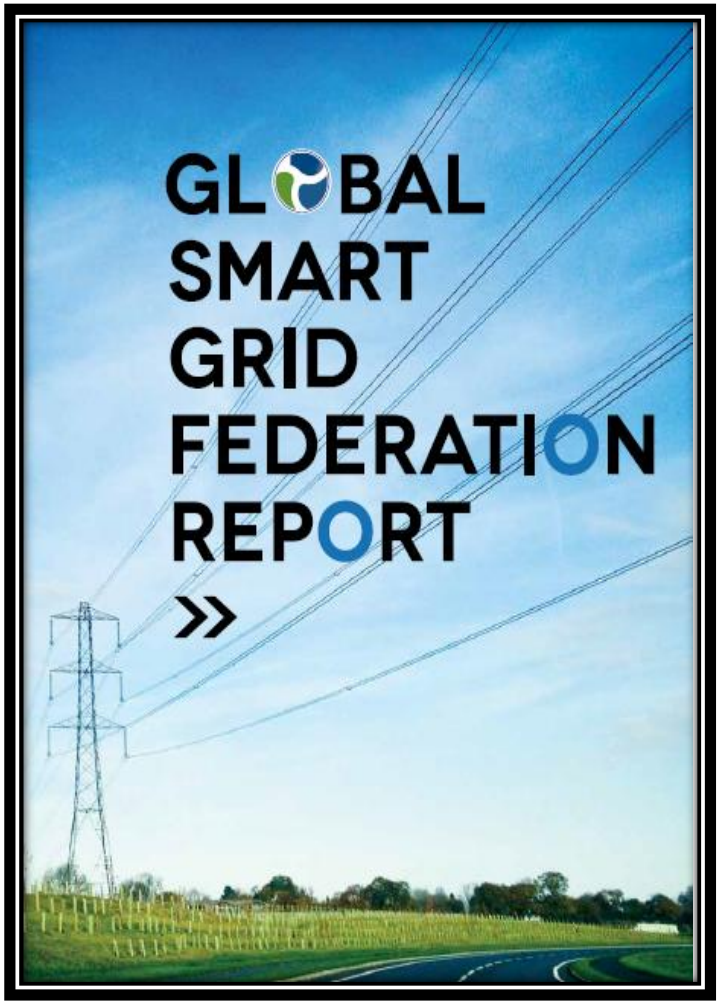
Global Smart Grid Federation

The Global Smart Grid Federation directly links international smart grid associations thereby facilitating the sharing of best practices on resolutions around barriers to deployment; consumer engagement; innovation and capacity building.

GSGF Members

Smart Grid Australia	**Smart Grid Canada**	**Danish Intelligent Energy Alliance**
Smart Grid Great Britain	**India Smart Grid Forum**	**Smart Grid Ireland**
Japan Smart Community Alliance	**European Distribution System Operators**	**GridWise Alliance**
Israel Smart Energy Association	**Korea Smart Grid Association**	

GSGF Smart Grid Report



Report provides insight and analysis member countries deploying smart grid. The report identifies challenges which must be addressed collaboratively:

1) Speed of Technology versus Regulation

2) Developing Interoperability Standards

3) Gaining Consumer Interest and Support

4) Protecting Intellectual Property Rights

5) Defining Stakeholder Needs

GSGF Report Findings

At the Global Level; smart grids have become

- *a powerful agent of environmental policy by enabling reliable integration efficiency and cleaner sources of power*
- *a part the economic growth and jobs agenda for many countries looking for domestic employment and new export opportunities*

The Business Case for smart grids is positive when factoring societal benefits

such as environmental, energy security, and economic development factors

The ratepayer is taking on the role previosly held by the taxpayer in paying

for environmental and energy security policy

There is a role for government and industry to convince consumers of the

environmental, security and economic benefits - a role that many utilities have not traditionally been asked to perform

Highlighted Projects

Country	Project	Cost
Australia	**Smart Grid Smart City** Cross-cutting project focused on demand response and household energy management along with improvements to grid to integrate renewables, storage and EVs.	$ 243M
Canada	**Ontario Smart Metering Initiative** Installation of 4.5M smart meters nearing completion with mass deployment of time-of-use rates – the first in the world.	$ 1,000M
Europe	**GREEN eMOTION** Integration of regional electric mobility projects complete with billing and bi-directional charging.	$ 30M
Great Britain	**Low Carbon London** Four-year demonstration project integrating a number of low carbon technologies.	$ 46M
Ireland	**ECAR Ireland** Ambitious program to install charging infrastructure in all towns with more the 1500 people as well as every 60km on inter-urban routes.	$ 28M
Japan	**Hachinohe Microgram** Demand-supply control system managing impact of renewable energy with real end user in electrical island.	$ 42M
Korea	**Consumer Smart Place** Outfit houses and buildings with integrated energy management services.	$ 30 M
USA	**Houston Smart Grid** DoE support large scale smart grid deployment improving reliability in the hurricane prone Gulf of Mexico.	$ 640 M

GSGF Collaboration

- Major Economies Forum on Energy and Climate (MEF)
- Clean Energy Ministerial (CEM)
- International Smart Grid Action Network (ISGAN)
- International Energy Agency (IEA)
- Global Green Growth Forum (3GF)
- New collaborative engagements pending

SGI Strategic Themes

The Three Pillars for successful Smart Grid Transformation

Policy and Regulation	Deploying Technology	Sector Collaboration
Interoperability Standards	Smart Meters	Vendors and Utilities
Cyber Security	Data Analytics	Device Manufacturers
Data Privacy	System Integration	Research Universities
Smart Grid Statutes	Renewables Integration	Electric and Gas Utilities
Regulatory Frameworks	Distribution Automation	Public and Private Sector

Europe and Smart Grid: the "third industrial revolution"

"The transition to the Third Industrial Revolution will necessitate a wholesale reconfiguration of the economic infrastructure of the European Union, creating millions of jobs and countless new business opportunities…" *Jeremy Rifkin*

JOBS AND GROWTH

A recent Smart Grid Great Britain report indicated sustained investment results in an annual average of 9,000 jobs per year in manufacturing and installation of smart grid technologies.

ENVIRONMENT

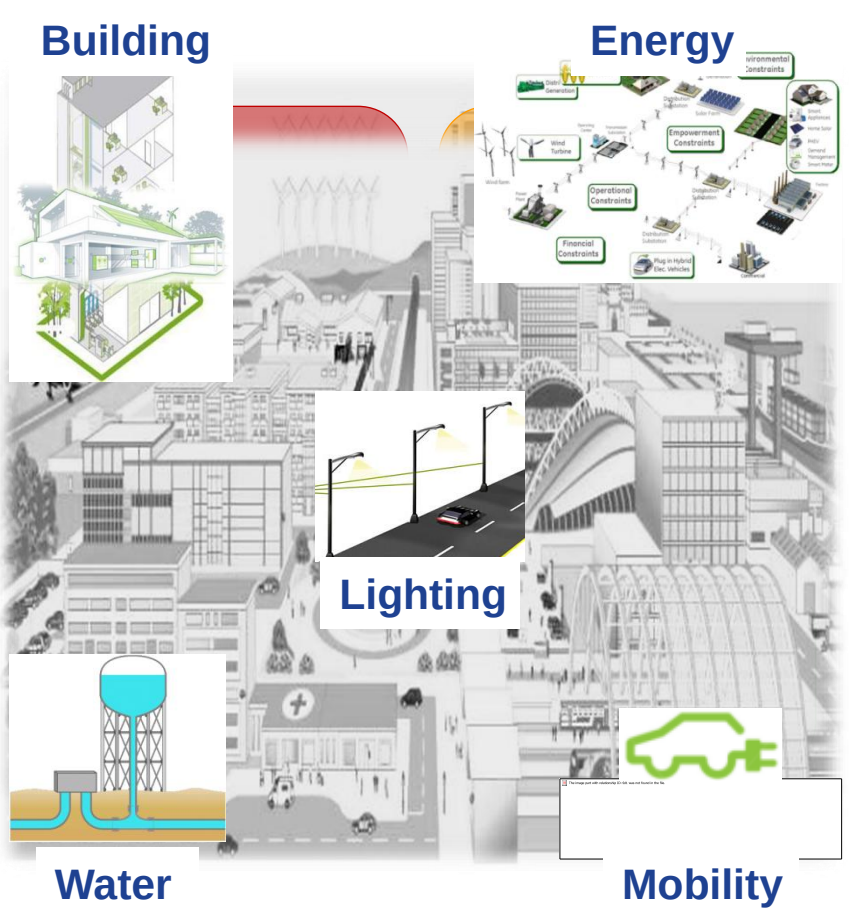
A strong link exist between carbon and smart grid including;

Quicker connections of renewables, connection of distributed generation, managing fluctuating supply and demand over large footprint

EU INTEGRATION

A fully integrated EU power market will allow member countries to efficiently trade renewable and conventional power and build a much more resilient system. This can only be realized through and intelligent network.

GE Smart City approach



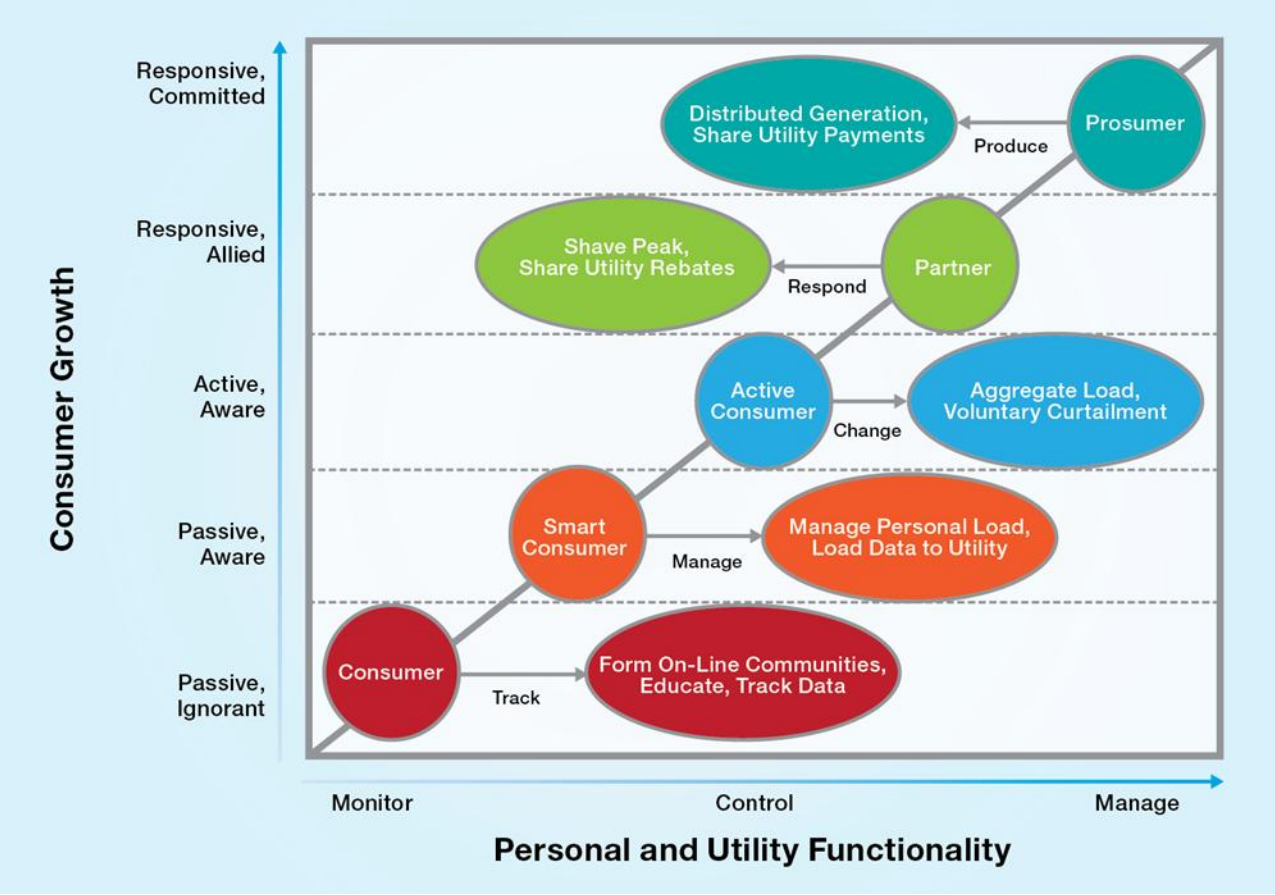
10 Value Propositions

1. **Optimize Network Assets**
   Maintenance… extension… optimum… economy
2. **Improve Network Efficiency**
   Productivity… yield… saving… value
3. **Improve Service Reliability**
   Sustainability… regulations… control… safety
4. **Manage Constraints**
   Bottleneck… monitoring… outage… recovery
5. **Actively Manage Networks**
   Real time… dynamic… anticipate… control
6. **Improve Environmental Footprint**
   Green… renewables… recycling… citizenship
7. **Enable New Economy & Technologies**
   Innovation… integration… communication… implementation
8. **Ensure Stakeholder Active Engagement**
   Ownership… involvement… information... drive
9. **Enable Knowledge Management**
   Information… involvement… connect… communication
10. **Increase City Attractiveness**
    Image… advantage… future… value

Sources: GE DE Smart City Study Collaterals Q2 2011

A profound change for citizens

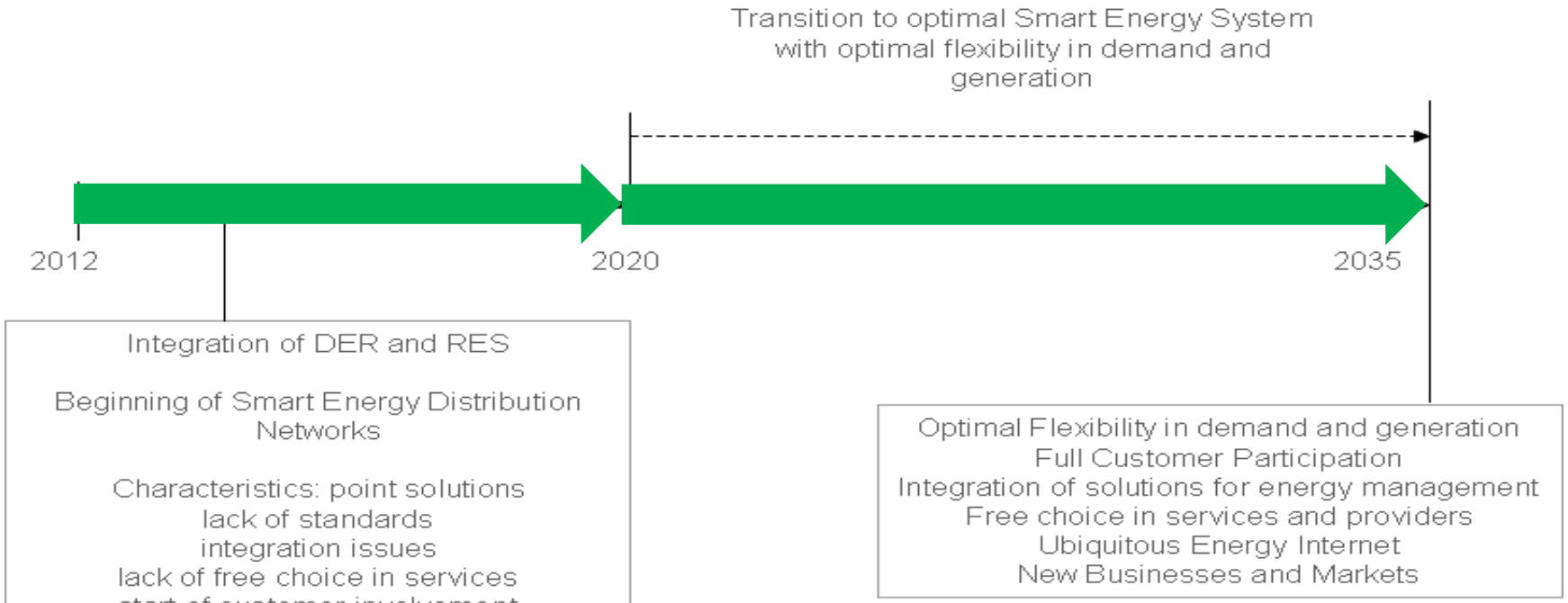
Taking energy as an example…



…and multiple across every Network, Service & Amenity

Source: Chapter 7, *The Advanced Smart Grid*

What are the expected fundamental changes between 2020 and 2035 for SmartGrids?



Leen.vandezande@esat.kuleuven.be – SG ETP
EERA JP Smart Grids Workshop, 27 June 2012

To summarize

- Year 2020 ≠ 2035: SRA 2035 describes research for SmartGrids challenges after 2020 towards 2035+
  - EEGI (European Electricity Grid Initiative) will demonstrate solutions to SmartGrids challenges of the year 2020; and then?
  - SRA 2035 assumes strong changes after 2020
    - More renewables, more flexible consumption, more retail and consumer markets, more Electric Vehicles, more HVDC grids, more SmartGrids legislation & regulation
- SRA 2035: Urgent need of new research going beyond previous SRA (of 2007) and beyond EEGI
  - New SmartGrids technology area IS: Integrated Systems of Systems
  - New SmartGrids technology area RC: Retail and Consumer Systems
- SG ETP remains a Technology Platform, but ..
  - Many open Socio-economic and Ecosystem SmartGrids questions

Thank you!

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