Smart Grid
Objective 6.1 in WP2013

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Smart Cities and Sustainability
Communication Networks, Content and Technology
European Commission

OUTLINE

European policy on Smart Grids

RTD on ICT for Smart Grids

Smart Grid: A digitally planned and operated Grid

Information Technology:

- Embedded systems and power electronics
- Monitoring and control systems
- Decision support – Analytics

Communication Technology:

- A telecoms network for the energy network
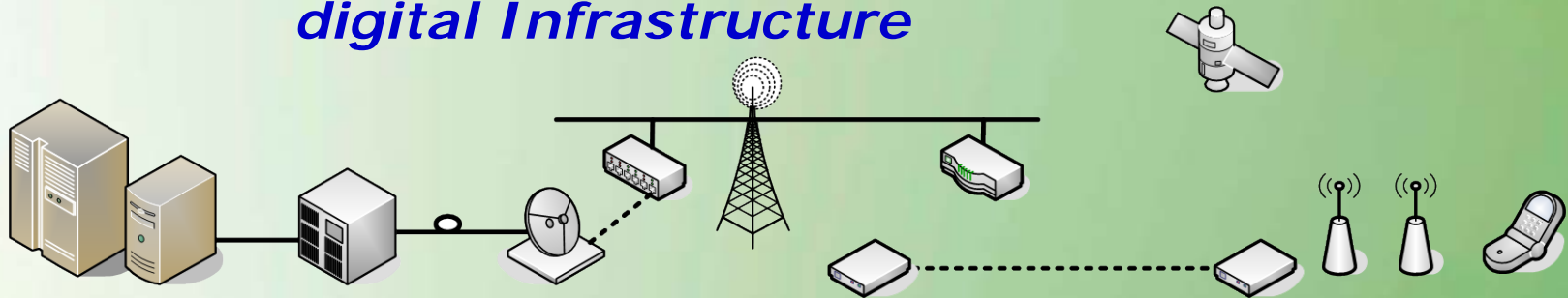- Internet services
- Costumer management

Smart Grid: the Grid + a network of computers to collect, transmit and store data to manage supply and demand
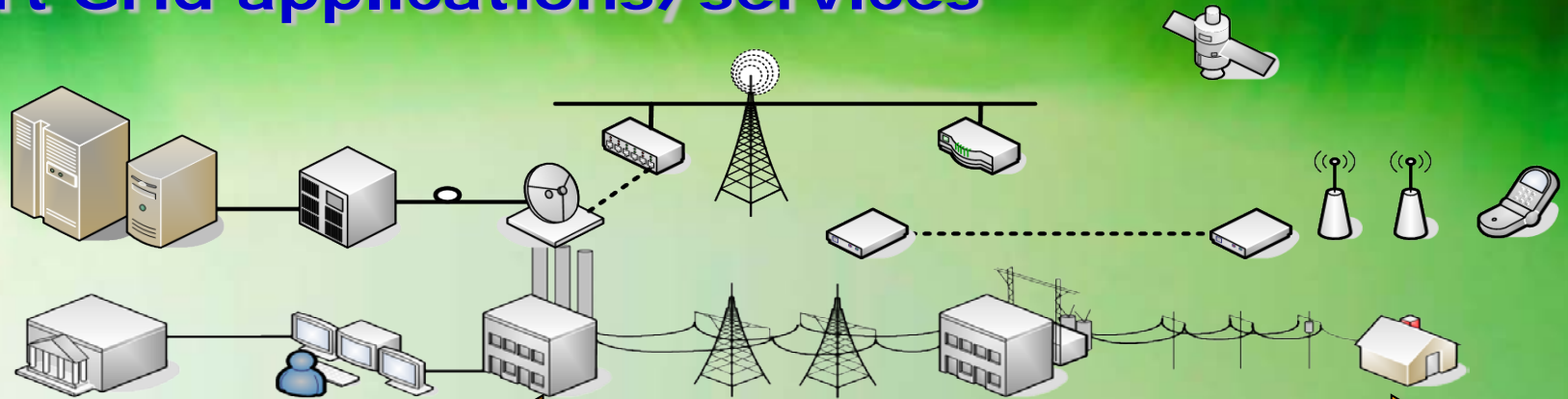

Electrical Infrastructure

digital Infrastructure

Source: Rochester Institute of Technology

Smart Grid applications/services

Demand Response and Dynamic Pricing

Distributed Generation and Alternate Energy Sources

Self-Healing Wide-Area Protection and Islanding

Asset Management and On-Line Equipment Monitoring

Real-time Simulation and Contingency Analysis

Participation in Energy Markets

Shared Information – Continuously Optimizing – Intelligent Responses!

Source: Rochester Institute of Technology

Huge investment in ICT

- 56 billion in the EU by 2020 for Smart Grids (Pike Research, 2011)

However:

- Rapid growth of electricity used by ICT: today responsible for the 8% of electricity consumed in the EU and expected to double by 2020

- Parallel telecommunication network infra-exploited

Reducing ICT footprint – Towards a Common Methodology

An agreed measurements framework to define environmental KPIs for ICT's impact is a precondition for any further meaningful work.

The Issue
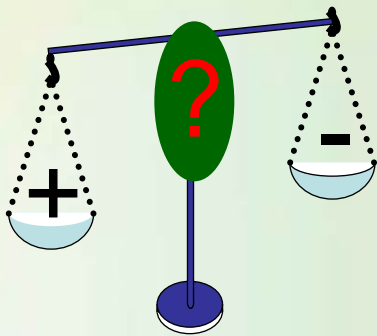
+ ICT as enabler to contribute to energy, resource efficiency targets

− Negative impact of ICT on the environment

How to measure the overall impact of ICT?

EC Approach

➢ Working with international standardisation bodies (ITU, ETSI, IEC, …)

➢ Working with industry stakeholders

Completing and expanding efforts to a common framework to capture ICT's overall impact across environmental dimensions

Application to Energy

➢ Energy infrastructures
➢ Energy Services

To be able to compare and learn the energy sector require a framework to measure ICT's impact

Synergy Energy – Telecom: Policy

- By 2020 all Europeans will have broadband access at least at 30 Mbps and 50% or more European will have it at 100 Mbps.

  - It could cost more than 200 B€

  - However, up to 80% of total investment cost are civil engineering works.

- Public Consultation on an EU Initiative to Reduce the Cost of Rolling Out High Speed Communication Infrastructure in Europe.
  - From 27th April to 20 July 2012

  - From information sharing to mandating access to infrastructures of other utilities (e.g. ducts)

- Crowdsourcing ideas to reduce the costs of broadband rollout

http://ec.europa.eu/information_society/policy/ecomm/library/public_consult/cost_reduction_hsi/index_en.htm

Synergy Energy – Telecom: Regulation

- Co-chairing EG#3 of the Smart Grid Task Force (DG CONECT, DG ENER)
  Issues:
  - exploring synergies and opportunities to put in place broadband infrastructures for the rollout of smart grids,
  - opening up the energy digital infrastructure for telecom services,
  - Energy service provision combined with other consumer services such as telephone, TV or Internet
  - BEREC and CEER both involved

  http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm

- The German regulator Bundesnetzagentur is responsible for telecoms and energy.
  On 27 August 2012 published the guidelines on optical fibre cable installation with the aim of installing power lines and telecommunication infrastructures simultaneously

  http://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/EN/2012/12 0827GridExpansionGuidellinesOpticalFibre.html?nn=48242

- The Netherlands competition authority
  "Energy and transport will merge with telecoms and consumer
  on January 1, 2013"

Synergy Energy – Telecom: Infrastructure

EC proposal: Connecting Europe Facility Proposed budget 50B€

- Energy – € 9.1bn
- Transport – € 21.7bn (+ €10bn)
- ICT/Digital – € 9.2bn

The ICT has two parts:

Infrastructure: exploiting the synergies between the roll-out of broadband networks and smart grids.

The provision of Smart Energy Services:

to manage energy demand, energy resources and storage capacity with the aim of improving efficiency.

http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/1200

Co-chairing EG#4 of the Smart Grid Task Force (DG CONNECT, DG ENER)

http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm

Synergy Energy – Telecom: Research

Draft WP 2013

- Objective 6.1 <u>Smart Energy Grids</u>
  - Intelligent systems built over existing and future telecommunication networks and services for the management of the electricity distribution grid.
  - Proposals should include appropriate validation phase
  - Opening: 18/09/2012 Closing: 16/4/2013 Budget 18M€

- Objective 6.5 <u>Optimising Energy Systems in Smart Cities</u>
  - Decision support and management and control systems for energy-efficient neighbourhoods
  - Validation phase in real-live environments in at least two cities
  - Call opening: 16/07/2012 closing 27/11/2012, Budget 40M€

Objective ICT-2013.6.1 Smart Energy Grids

This objective explores the potential of bringing together stakeholders from both the energy utilities and the telecom sector to develop common approaches for future digital networks and smart energy services infrastructure for electricity distribution.

The focus is on data management including the exchange of information with transmission network operators and with end users.

Special attention is given to exploring new business models for DSOs (Distribution System Operators).

Target Outcome:

Intelligent management systems for DSOs

Key research challenges:

a) Sharing backbone infrastructure and last mile connectivity Considering both technology and business models to deliver significant costs and investment savings

b) Improving existing telecoms infrastructure in order to cope with mission critical grid services. Explore the possibility of deploying dedicated services on shared telecoms infrastructure

c) Services e.g. demand response, load balancing and forecasting

d) Data management issues (ownership, access, security, confidentiality, business models)

Special conditions:

- Proposals should focus on one or a combination of the previous points

- Consortia must be compact with partners each making substantial contributions and with expertise in both telecoms and energy

- Proposals shall include in all cases an appropriate validation phase to draw conclusions for further deployment

Expected Impact:

- Reduction of the percentage of energy lost during energy distribution;

- Reduction of the gap between energy produced and energy consumed;

- Increase of renewable energy sources and Combined Heat and Power - CHP connected to the distribution grid;

- Reduction and shifting of peak loads;

- Number of publications jointly authored by researchers from ICT and energy.

Administrative details:

Funding Scheme: STREPs

Indicative budget: 18M€

Call FP7-ICT-2013-11:
18th September 2012 to 16th April2013

Thank you for your attention!

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