European Commission

Luxembourg, 20 October 2015

Concerted Action - Energy Efficiency Directive

Core Theme 3

Energy Efficiency in network design and regulation – Art 15 (2b)

- State of play in Art 15(2b) assessments-

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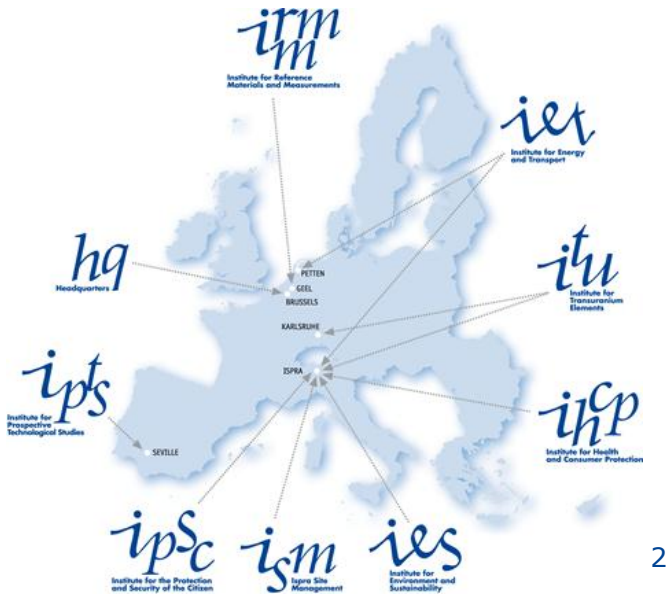

At this moment

Very few Assessments received by DG Energy – Due in June 2015

DG ENERGY has received 9 Member State Assessments (AT, BE, DK, FI, DE, HU, LT, NL, UK)

JRC is in the process of evaluating 4 of these (DK, FI, NL, UK, BE)

First Findings

Various types of detail and reporting on the assessment of the networks efficiency potentials and cost-efficient measures

The assessment of losses/shrinkage is the most direct, easy and cost-effective way to improve the efficiency of electricity and gas networks

Traditional measures like component replacement are seen as priority (or at least the easy way)

Smart grids are being considered but a long way to go still. Roll-out of smart meters seen as crucial for the optimization of grids processes

Overall structure of assessments

Responsability to perform the assessments is varied (Universities, Energy Regulators, Energy Agency)

Overview of the regulatory bodies in the Member State and legal frameworks of electricity and gas networks

Assessment of losses in Electricity and Gas Networks. More Focus on Distribution Networks

"Reducing shrinkage and losses is recognised as the most effective method of improving energy efficiency of networks. The potential for shrinkage and loss reduction is the focus of this assessment." UK Art.15 Assessment

Assessment of loss reduction potentials through:

- In existing and new networks through component replacement, optimization of power flow, network voltage regulation, management solutions, operational measures

Measures in Assessments

DK, FI, NL, UK

DK

Good Overview of already existing measures

Assessment of loss reduction potentials in Electricity **Transmission** Networks.

- EE improvements in existing networks (existing measures)
  - Automatic voltage control
  - **Inclusion of costs** for network losses in connection with the establishment of price equilibrium

- EE gains through the development of networks
  - **Loss optimization** taken into account in assessing new projects
  - DANPAC Project: **Restructuring of 132/150 kV network** through component replacement

DK

Assessment of loss reduction potentials in Electricity **Distribution** Networks.

- Opportunities identified to reduce technical energy losses through:
  - Replacement of components in the network
  - Optimization of the **flow of power** in the network (connection state)
    - Decentralized production
  - **Network Voltage regulation**

DK

Assessment of loss reduction potentials in **Gas** Networks.

- Potential EE gains in existing networks
  - Process consumptions at Metering/Regulation stations and compressors

- Potential for energy savings at gas storage facilities
  - Blow-off of gas following compressor shutdown
  - Heat recycling in compressor building
  - Heat recycling from air compressor
  - Controlled start-up of pre-heaters and dehydration plants
  - …

DK

Very low losses

	Network loss
Electricity transmission	1.8 %
Electricity distribution	4.8 %
Gas transmission and distribution	0.05 %
Gas storage	0 %

- Danish Legislation promotes **already cost-effective investments** in energy networks
- System operator of Electricity and Gas **includes efficiency** in new transmission networks investments
- **Distribution undertakings** are covered by the energy savings obligation scheme and focus energy savings at the end energy consumer stage
- DK states that cost-effective investments in energy efficiency **have already been implemented**

FI

- **Electricity Network Losses of 3%** in 2013 (2% Dist., 1% Trans.)

- Due to being a **bordering country** it is clearly referred the issue of **bottlenecks**, requesting for European level regulation and collaboration between transmission-network operators

- **Current measures being implemented:**

Energy Performance Contracts: Network companies enter a programme for energy services and commit themselves and costumers to reduce energy consumption. Covers more than 80% of the electricity transmitted and sold. (Impact of 13.5 GWh in 2014)

FI

- **Current measures being implemented:**
- Network data and usage support systems for the planning and operation of electricity distribution networks
- Replacement of distribution networks taking into account efficiency besides security of supply
- Remotely read meter capable of bidirectional data transfer installed in almost 100% of electricity consumers.

FI

Electricity networks proposed measures

- Regulation models should include energy losses as a cost to be controlled
- EE considered during network planning (as part of EPC)
- Promotion of Demand Response
- Opportunity for network companies to use Energy Reserves
- Power based tariffs
- Elimination of bottlenecks

Gas Networks proposed measures

- Optimum operation method of compressor stations
- Use surplus or deficit heat from surroundings in compressor and pressure-reduction stations
- Liquefied Natural Gas using tankers vs pipelines and to serve as buffer in consumption peaks
- Exploitation of Biogas

NL

- Non detailed assessment with short overview of measures already being implemented

- **2013 Energy Agreement:**
  - Energy efficiency as the basis for increasing competitiveness
  - Measures to improve use of residual heat and the necessary investments in gas and electricity infrastructure
  - Covenant between network operators, energy suppliers and independent service providers on the large-scale rollout of smart meters.
  - Information is exchanged to allow the energy suppliers and service providers to respond accordingly in their customer offers

- **The 'energy efficiency multiannual agreements':**
  - Between the government and businesses, institutions and municipalities
  - Promotion of sustainable energy and the reduction of GHG emissions.
  - Increasing use of cogeneration plants.

UK

Very extensive evaluation of Barriers, Enablers and Uncertainties

Electricity Distribution Network concrete measures

- Component replacement (transformers and cables)
- Voltage control
- Interoperability
- Non-technical losses

Electricity Distribution Network Potential measures

- Component replacement
- Network configuration
- Power quality (harmonics, phase balancing, power factor correction)
- Legacy network design rationalization
- Optimizing network design
- Active network management

UK

Electricity Distribution Network Potential measures

- **Operational** Measures to reduce losses
  - **Switching out** under utilized plants
  - **Distributed Generation**

- Measures to reduce **network reinforcement**
  - **Smart Meters**
  - **Demand Side** Management

UK

Electricity Transmission Network measures

- **Component replacement (transformers, cables, conductors)**
- **Transmission development and reinforcement**
  - Voltage level increase
  - New circuits
  - De-energizing or removing unnecessary equipment

- **Alternatives to network reinforcement**
  - Demand side management
  - Time of use tariffs
  - Energy storage

UK

Gas Network concrete measures

- **Shrinkage**
  - Shrinkage incentive
  - Environmental Emissions Incentive
- **Leakage**
  - Proactive maintenance of network parts (mains, joints)
  - Gas conditioning
  - Average system pressure control
  - Network reinforcement
- Shrinkage (excluding leakage)
  - Own Use Gas
  - Theft of Gas

UK

Gas Network potential measures

- Infrastructure
- Low and medium pressure distribution mains
- Distribution services
- Above ground installations
- Own Use Gas
- Mains replacement
- Further development of the shrinkage model
- Investigating the use of smart meter data

BE

Very well documented methodology to evaluate the effectiveness of potential energy efficiency measures

A. Qualitative description of the measure
B. What is the measure whose potential is being studied
C. How this measure increases efficiency
D. What are additional effects of the measure
    A. Techical-Economical implication in general
    B. What relationship is there with the other measures discussed in the context of Art 15.2
    C. Is the measure depending on third parties?
E. Quantitative study of the potential
F. Methodology for the determination of the efficiency potential according to available data

Final Considerations

- Assessments very heterogeneous – Only the first results. Never been done. Hard to evaluate
- Documentation of cost assessment could be more extensive
- Losses/shrinkage minimization seen as the main way to go
- "Smart grid measures" still in a shy state

Thank you!

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