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Smart Grids in Cyprus
A DSO Perspective

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Decarbonisation & RES

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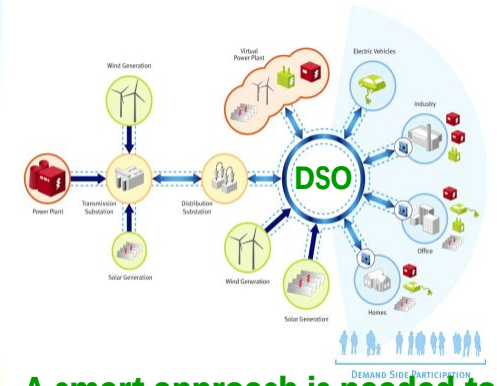
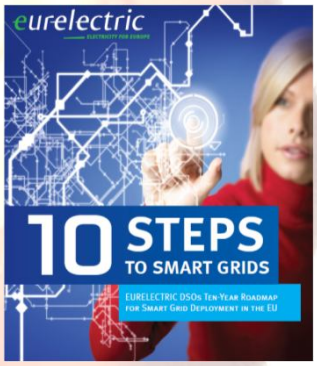
Distribution networks need to become 'smart' to cope with the power decarbonisation challenge & required RES penetration





A smart approach is needed to manage the shift from centralized to dispersed energy

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Why active involvement of DSOs on the decarbonisation pathway is necessary?

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- More dispersed generation will increasingly be connected to distribution networks
- Most of the demand side flexibility will be developed on distribution networks
- Quality expectations remain high
- Pressure on costs remains high
- Many innovative solutions to be integrated within distribution networks

DSOs are active players in designing the EU electricity system

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EURELECTRIC sees quite some challenges in infrastructure and smart grid development

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Investments need to be delivered

Appropriate regulatory incentives need to be in place for DSOs to invest in Smart Grids

'Smart' market models must be developed

Clear roles and responsibilities for DSOs, market players and third parties

Electrify the demand side: bring customers on board

Privacy and data confidentiality
Don't regulate the customers, don't restrict business models

Large scale deployment must be a priority

In all voltage levels

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Investments for SG might benefit several parties, but mostly are done by DSOs

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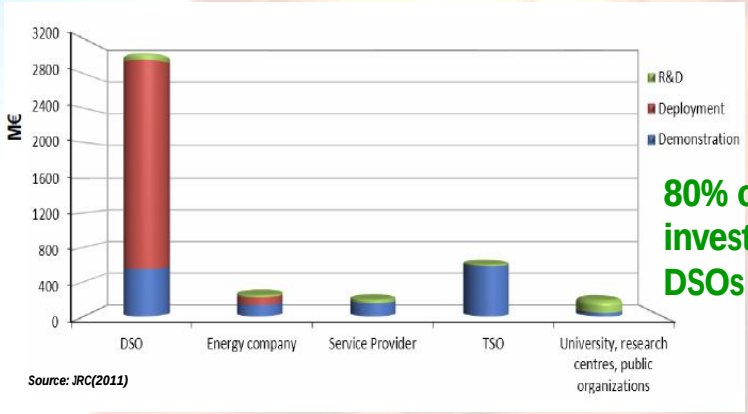

Source: JRC(2011)

80% of investments by DSOs

A smart infrastructure investment is the one which achieves the goal at the lowest cost (cost-efficient system approach!)

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A cost-benefit analysis of past and on-going projects is necessary to evaluate their impact

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Market forces must see real financial returns in achieving energy policy goals to incentivise the continued significant investments

- Quantification of costs,...
- ...benefits...
- ...and allocation to the appropriate beneficiaries

Necessary to mitigate business risks and encourage investors!

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A EURELECTRIC effort supports this difficult exercise – "The Smartness Barometer" report

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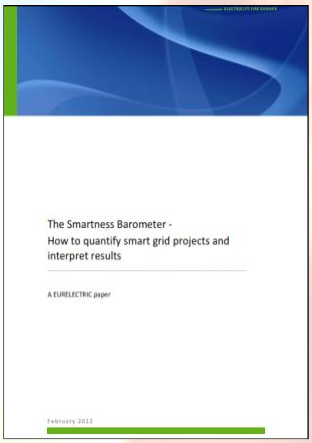
The Smartness Barometer -
How to quantify smart grid projects and interpret results

A EURELECTRIC paper

February 2012

A methodology that can support distribution companies in evaluating and comparing different types of 'smart' innovative investments, communicating their results and developing investment strategies which incorporate smart investment options

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A methodology with a 7-step approach

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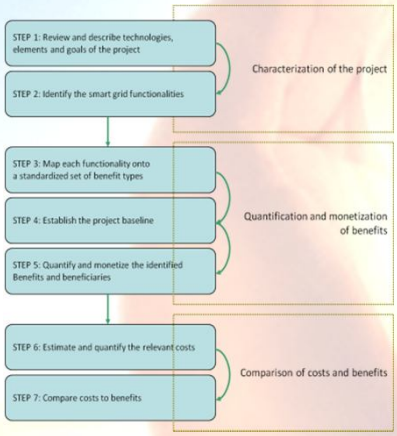

1. Help to show which technological solutions work

2. Universal meaningful comparisons between different type of projects installed in different network systems

3. Show the value of investment, compare costs to benefits and pinpoint who will benefit

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Why is this methodology and a CBA of smart grid projects is so important?

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... the communication of benefits is most universal and most practical when in monetary terms – an investor can see the return of his investment .

... it offers a unique value when one is looking to obtain project funding, indicating not only the benefits, but who benefits.

... it strengthens a business case, particularly as presented to the regulator whose primary concern is the benefits to society at large rather than the distribution company.

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Smart Grids in Cyprus

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- Process innovations that combine advanced metering and communications technologies (Advanced Metering Infrastructure or AMI) have the potential to dramatically improve economic efficiency and productivity of distribution and supply businesses.
- The case for introduction of AMI in Cyprus has attracted the interest of the sector's stakeholders and especially the Electricity Authority of Cyprus (EAC) who is responsible for the distribution of electricity supply in the country.

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The first phase implementation of Smart Grids: 3000 smart meters

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- Deployment of 3000 smart meters from 3 different suppliers which will be connected to a Meter Data Management System (MDMS) via different telecommunication paths.
- The MDMS, along with existing EAC Meter Collection Systems, will collect metering data from residential, commercial and industrial customers.
- The project will also include in full cooperation with the Water Board and affected Municipalities, water meters for recording the water consumption using the same infrastructure.
- The MDMS system will be interfaced with the existing billing and customer care application.

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Objectives of AMI system

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- To evaluate different communication technologies and to use this experience and knowledge to optimise the technical design of the Full Scale AMI System.
- To verify interoperability between equipment supplied by at least three different manufacturers, and to validate proper integration with the MDMS.
- To obtain knowledge and experience from planning, implementing and operating an AMI System in order to optimise and standardise the implementation of the FSS.
- To gain first-hand experience with respect to the integration of an AMI system into EAC's systems & business processes, to inform on the change management that will be required for the FSS.

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Smart Meter System Architecture

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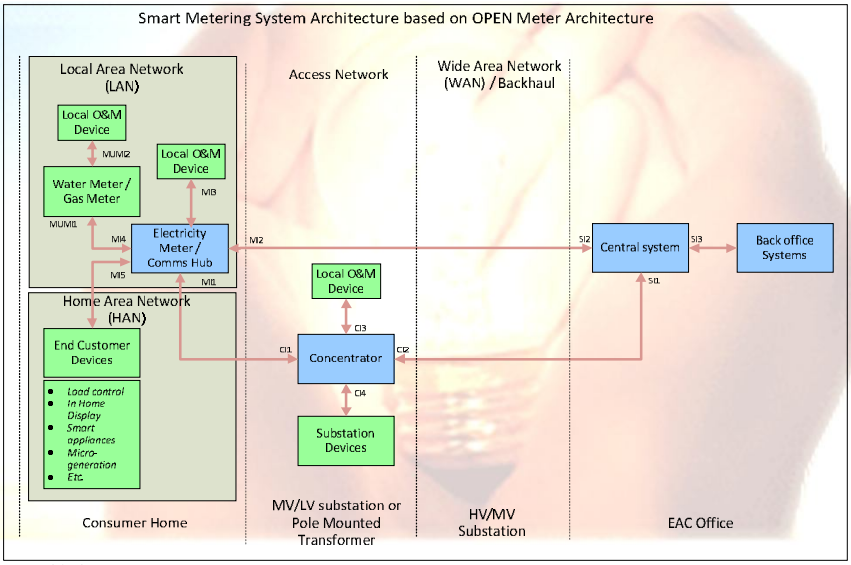

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Communication Architecture

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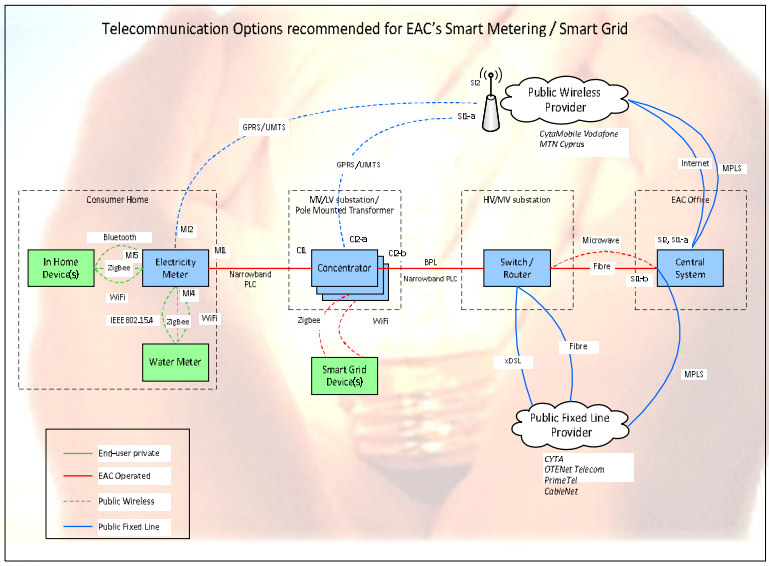

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System Architecture

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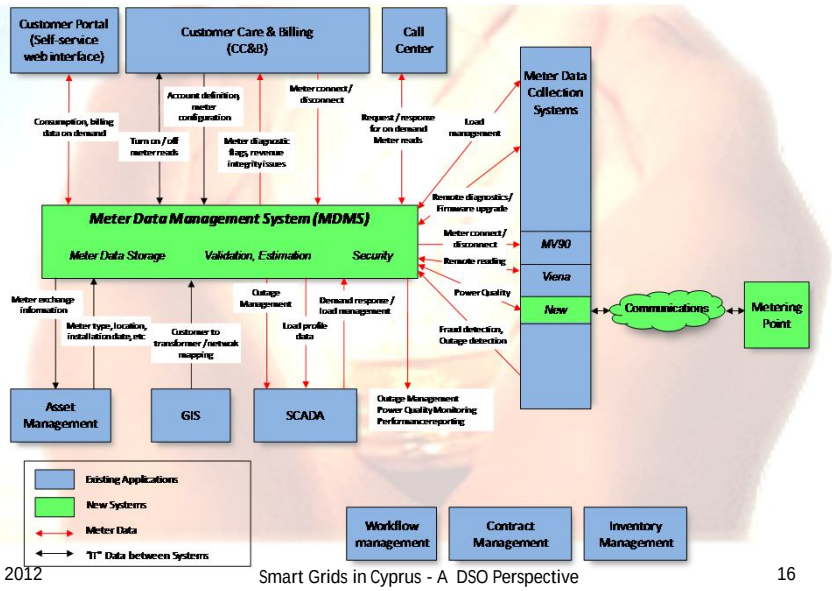

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Virtual Power Plant: First attempt in Cyprus

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- The power shortage that we are facing in Cyprus after the 11th of July 2011 has urged the Regulator to cooperate with the DSO / EAC for creating a VPP using a selection of privately owned generators.
  - ✓ 100 MW of "private generators" (≈150) will be conducted for participation
  - ✓ Use smart meters, controllers and the MDMS system of a provider to remotely control the generators
  - ✓ Use a special capacity payment tariff and other incentives to encourage the owners to participate

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Virtual Power Plant with private generators

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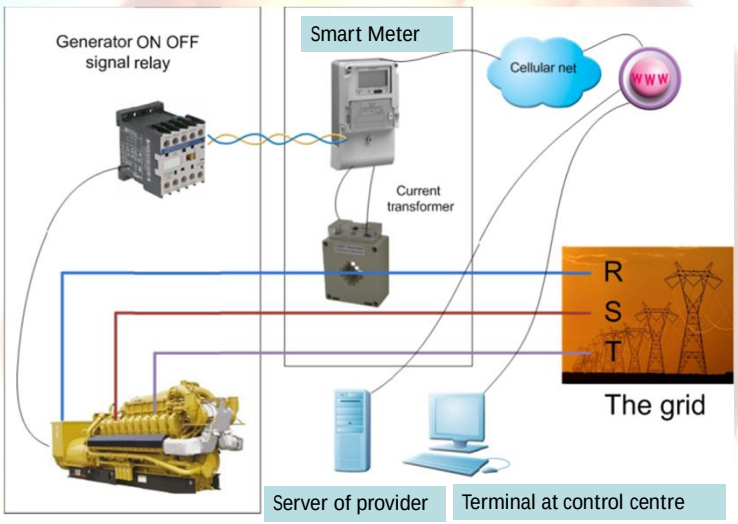

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What is the role for the DSOs?

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" In the future, the electrical industry should aim for a 'smart' market and assign to the DSO a more lean role"

"In the Smart Grids future, the relation between the customer and DSO will intensify"

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Emerging role of DSOs

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DSOs must identify how to act to meet the new challenges and adopt their business model. The current DSO views of EURELECTRIC are:

- ✓ Moving beyond traditional role of "building and connecting" towards "connecting and managing"
- ✓ Becoming facilitators for producers, service providers and customers to meet in an open efficient market
- ✓ Gaining better control over activities in the network using more ICT, sensors, demand side management etc.

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Smart Grids & market competition

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The interface between the tasks of smart grid and market with the related commercial players is changing:

- ✓DSOs are gaining importance as **independent information hubs.**
- ✓Large scale introduction of DER and EV will link further the functions of DSOs and their core responsibilities with the competitive side of the market.
- ✓**Synergies with telecom providers** are emerging and these need to be properly exploited for the benefit of the end customers.
- ✓Distributed control, efficient microgrid operation and VPP effectiveness will eventually dictate **local balancing as a DSO function.**

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DSOs will need flexibility to manage local network constraints…

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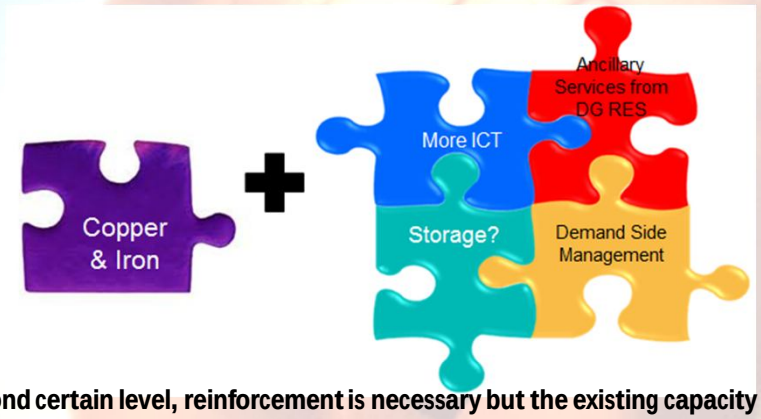
…to integrate DG RES & comply with their responsibilities



Beyond certain level, reinforcement is necessary but the existing capacity could be used more efficiently, investment deferred & the peak load required on the network reduced!

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Not a 'Revolution' but an 'Evolution' of Roles, Responsibilities & Interactions

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Thank You !!