



S M A R T G R I D S

ETP SmartGrids

Active integrated grids accommodating
seamlessly energy efficient buildings

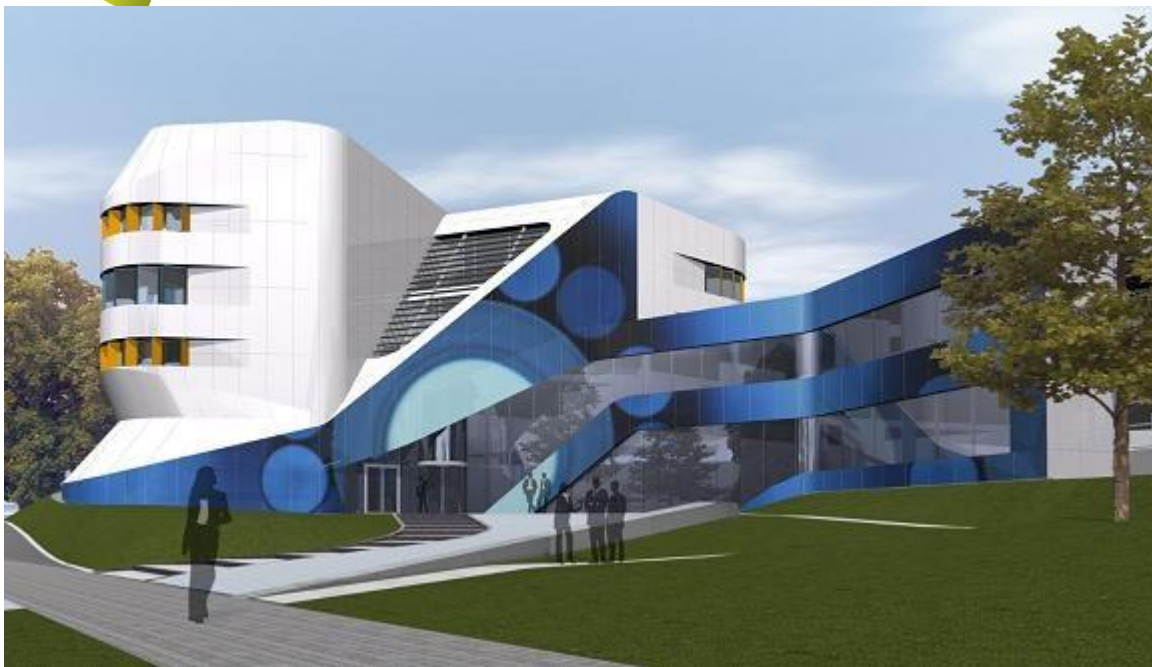
[Dr Venizelos Efthymiou](#)

www.smartgrids.eu



Technology is really changing the scene ...

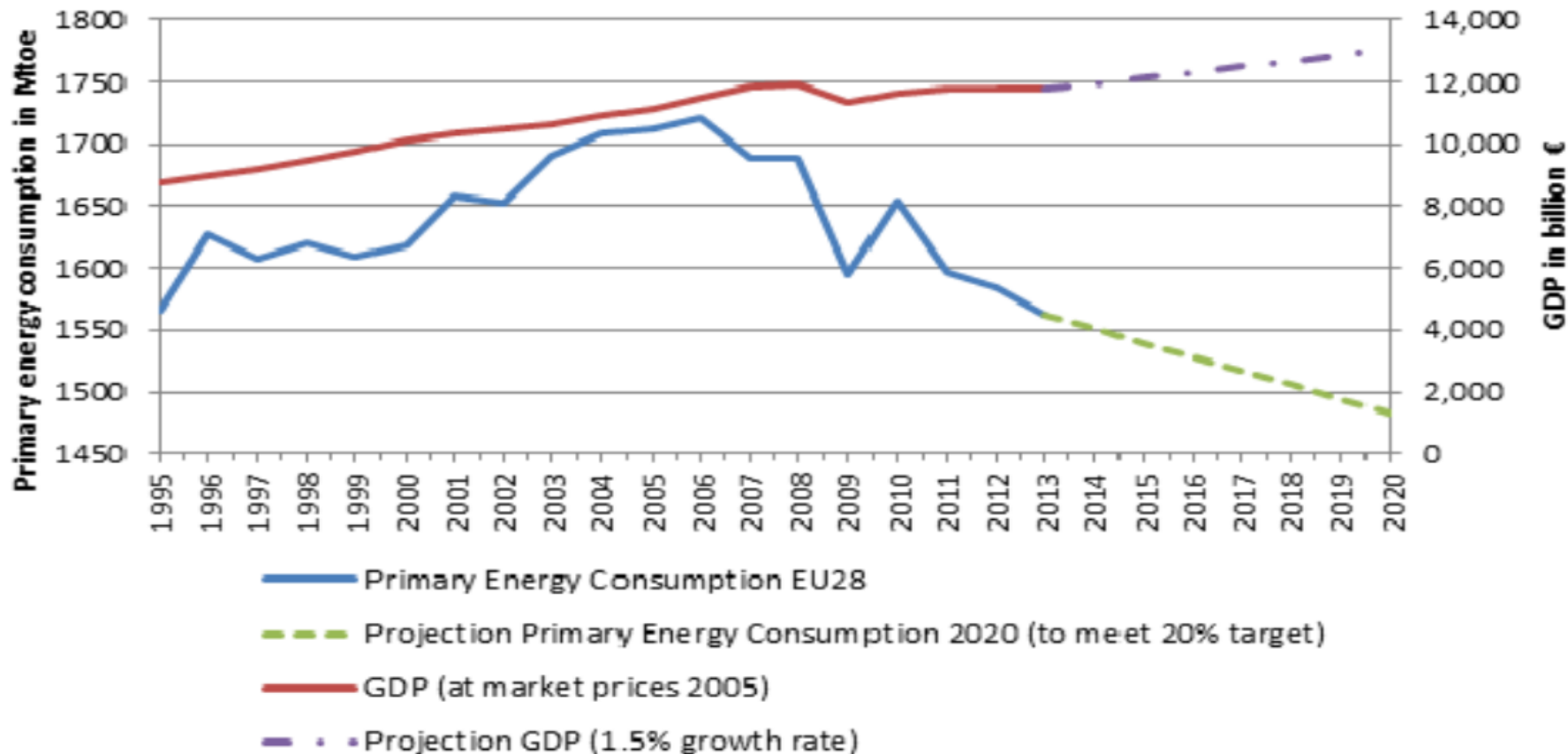
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The efficiency challenge ...

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Source: Commission services based on EUROSTAT data

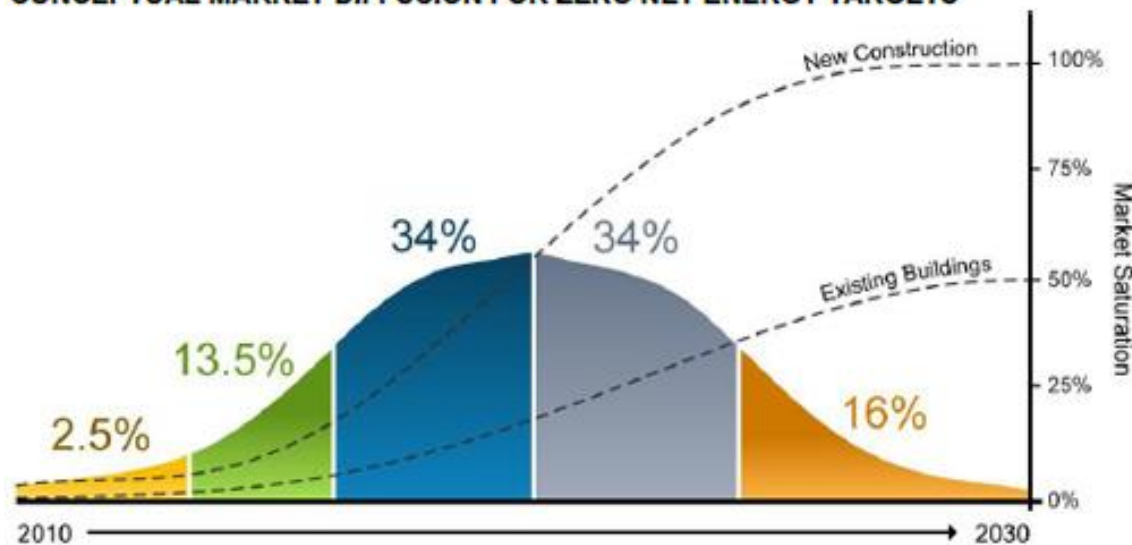


The Zero Energy Building challenge ...

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KEY TARGETS

CONCEPTUAL MARKET DIFFUSION FOR ZERO NET ENERGY TARGETS



Innovators

1-4/1-5: Innovative Finance Tools & Incentives

Early Adopters

1-3: Path to Zero/ZNE Pilots
1-6: Integrated Design
2-6: Existing Building Finance Tools
2-8: Plug Loads

Early Majority

2-1: Lead by Example
2-4: Benchmarking
2-5: Business case
2-7: Integrated Energy Management

Late Majority

2-2: Codes for Existing Buildings

Laggards

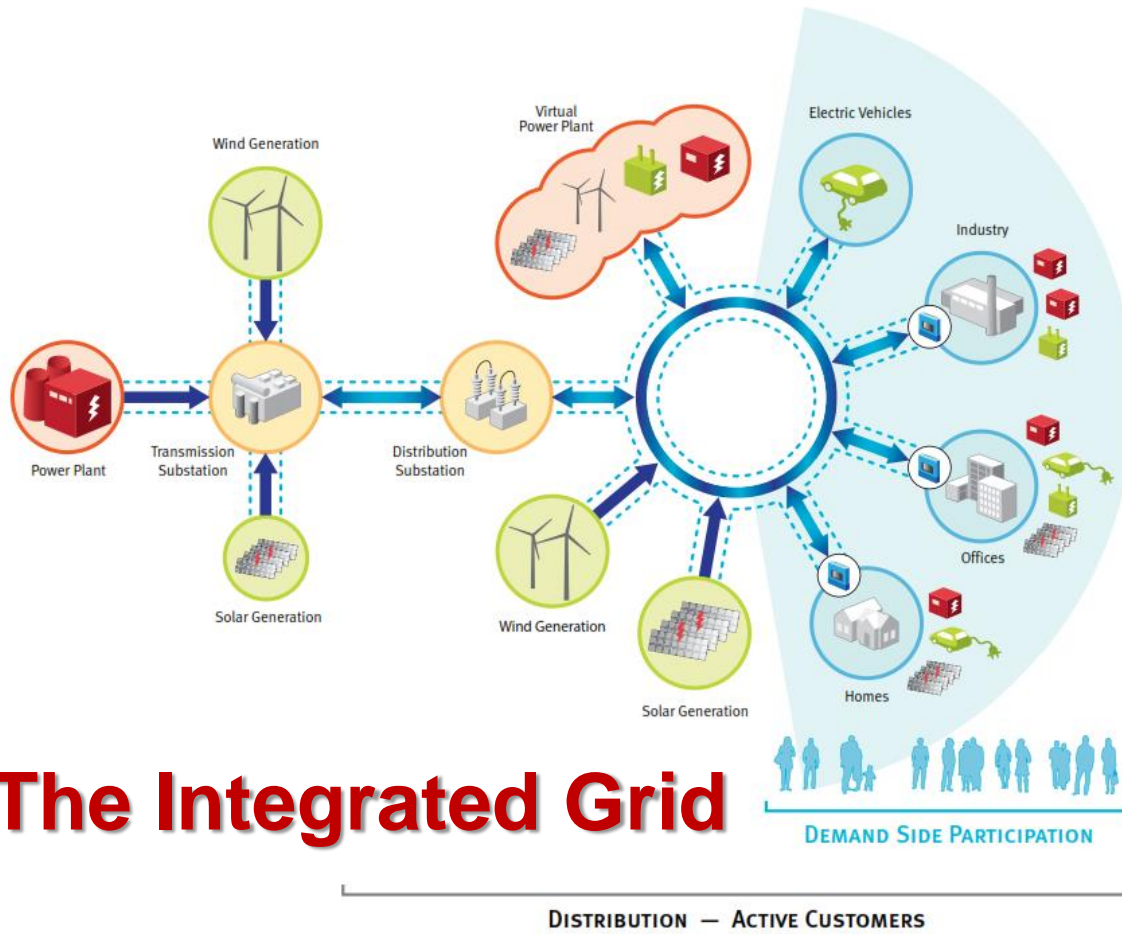
1-1: ZNE Codes
1-2: T24 and T20
2-3: Code Compliance

- We know it is possible but it is easier to say than to implement!
- Each Member Country has to go through a detailed plan to identify its own realistic road map in line with the targets set.
- The grid requires the smartness and flexibility to optimally respond to this paradigm change.
- Investments are sustainable but they need challenging remuneration and responsive policy pull.



The flexibility challenge ...

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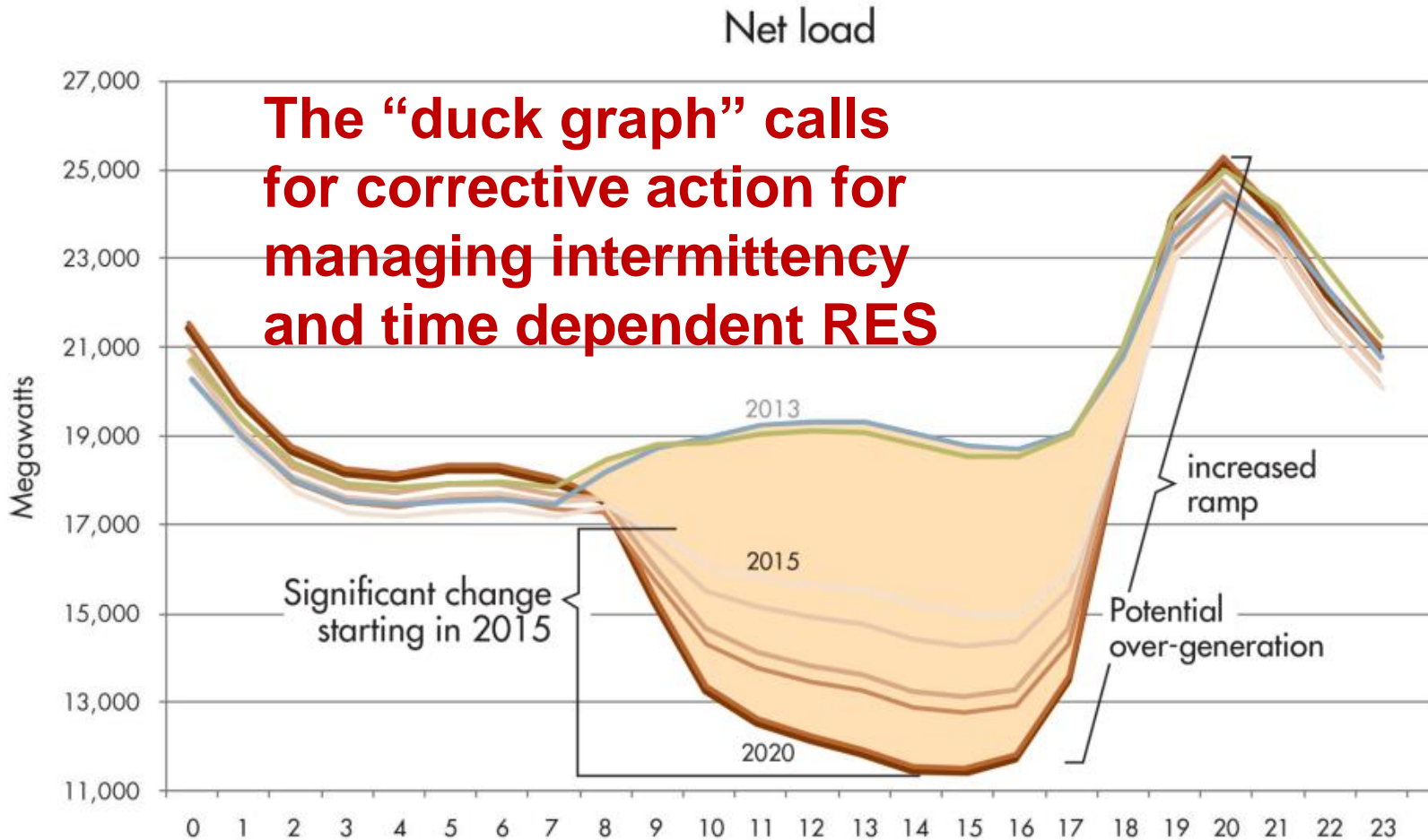
Requiring the evolution of Smart Grids to facilitate:

- Optimal synthesis of all active elements connected to the grid,
- Observability to all involved stakeholders to optimally maximise their role,
- Effective Demand Side Management for active citizens,
- Smart distributed control allowing self correction where needed.

The Integrated Grid



Growing need for flexibility

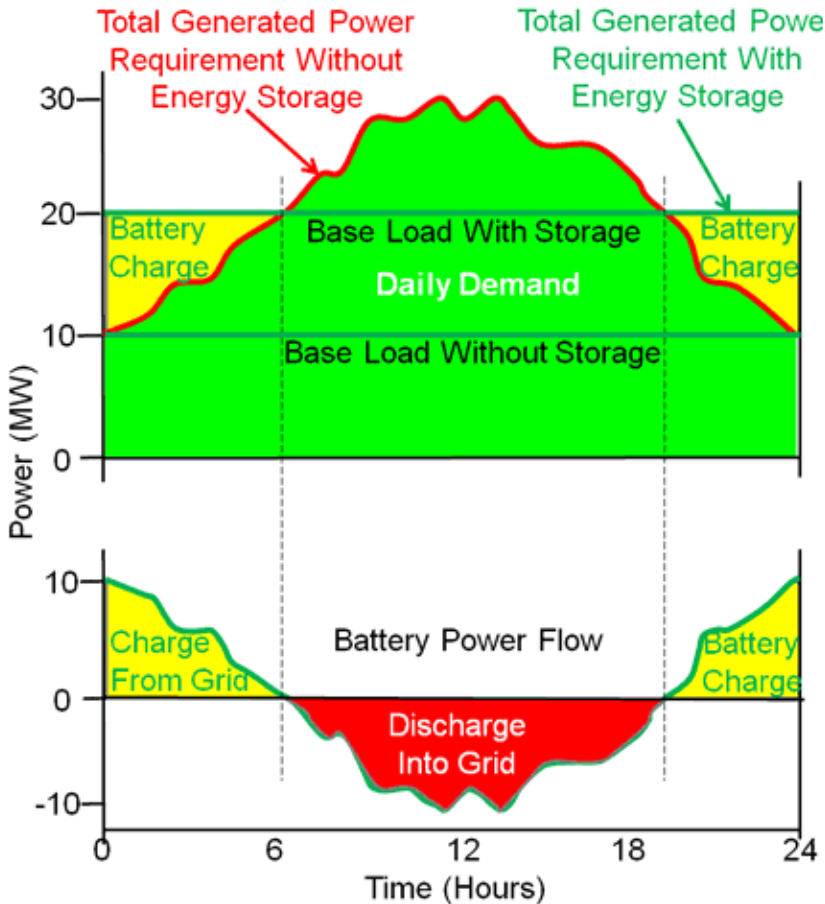




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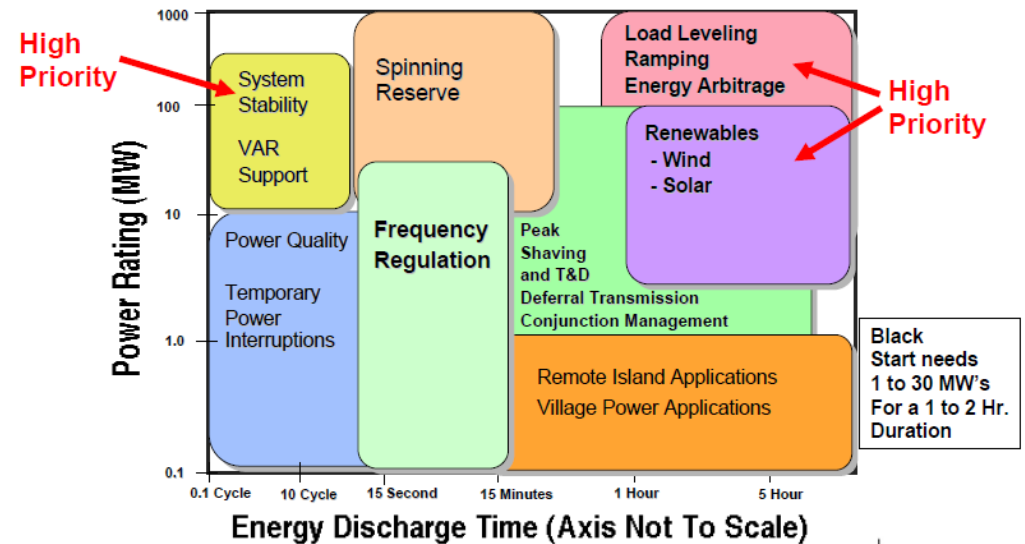
The bi-directional nature of storage offers a wealth of flexibility ...

Load Levelling With Energy Storage



Electric Energy Storage Applications

(All Boundary Regions Displayed Are Approximate)



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Complex to regulate due to its multi-use capability – But offers much needed flexibility !



All the required technologies for seamless integration of DG is already being tried out ...

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EU - GRID4EU Project



NICE GRID
A SMART SOLAR DISTRICT

Wilfried Elmenreich

Smart Microgrid as Smart House

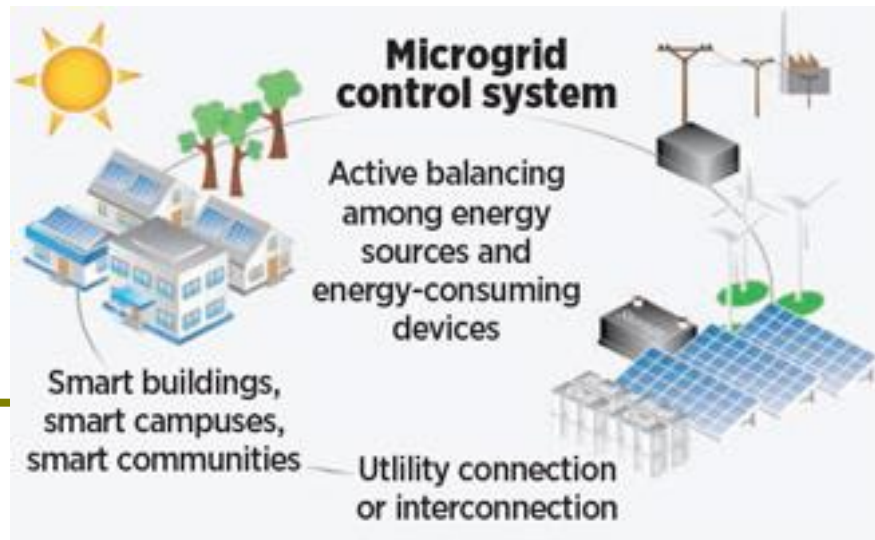
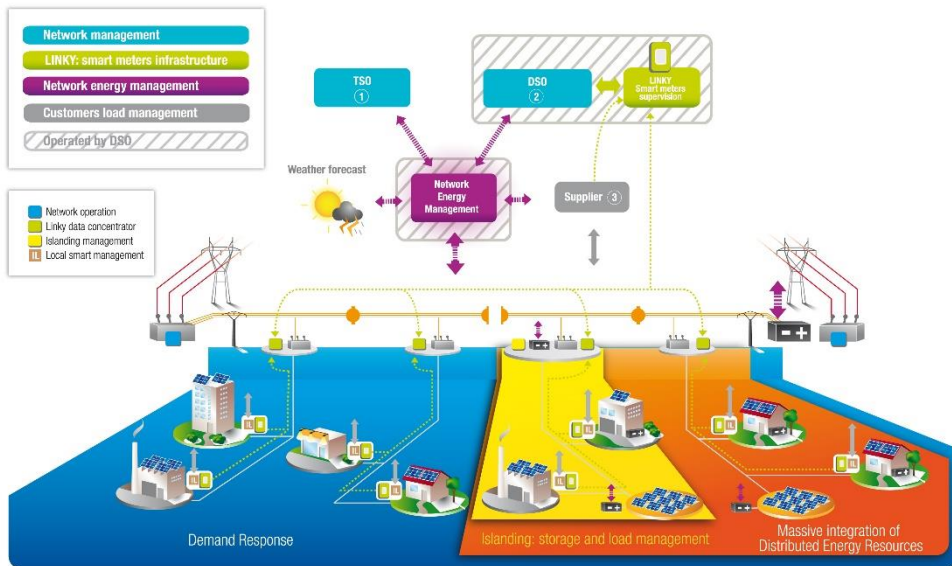
ALPEN-ADRIA
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Credit: Xcel Energy

Anita Sobe, Wilfried Elmenreich, "Smart Microgrids: Overview and Outlook", ITG INFORMATIK 2012, Workshop on Smart Grids, September, 2012

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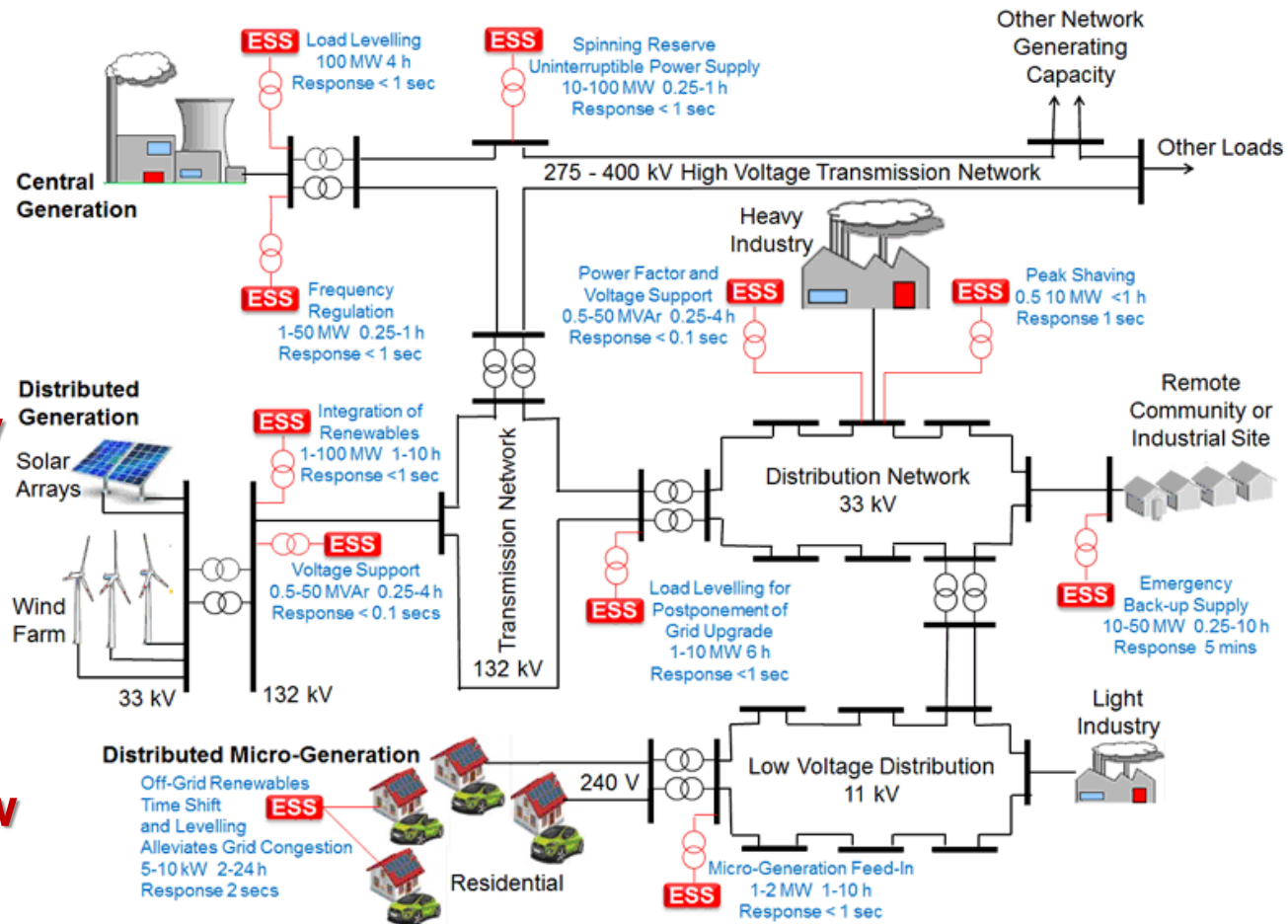


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The emerging active integrated grid goes hand in hand with the ZEB

The required grid functionalities are up and running on real systems merging the future with the well proven infrastructure that has served the economy so effectively up until today. The evolution into the SG realm is steadily growing, maturing into the new norm that can optimally serve the new mix of technologies !!!

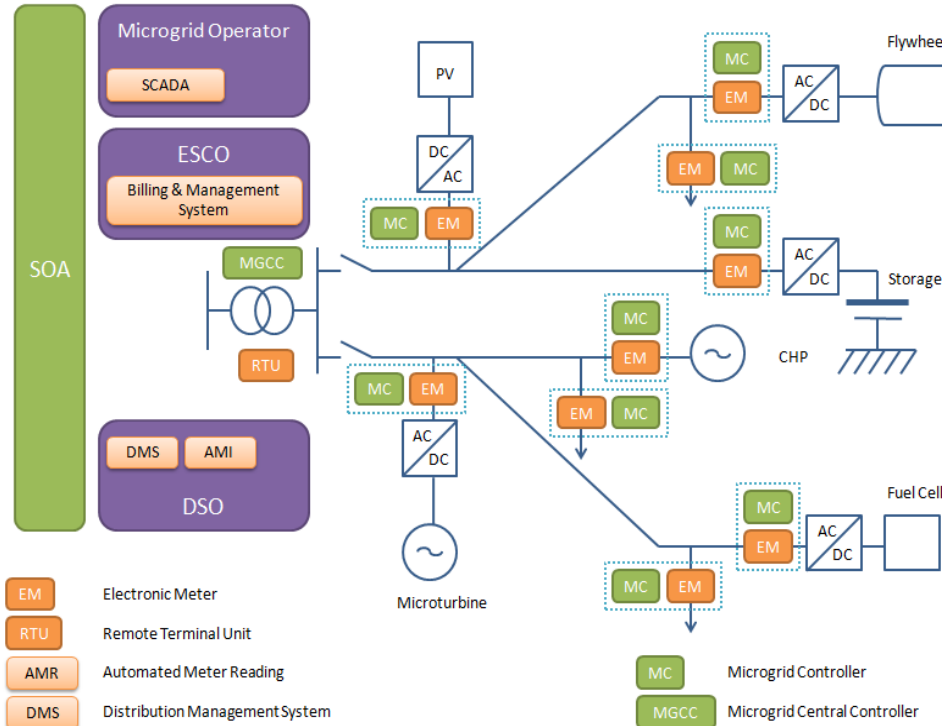
Grid Energy Storage Systems (ESS) and Applications





Need for smart incentivized Regulation ...

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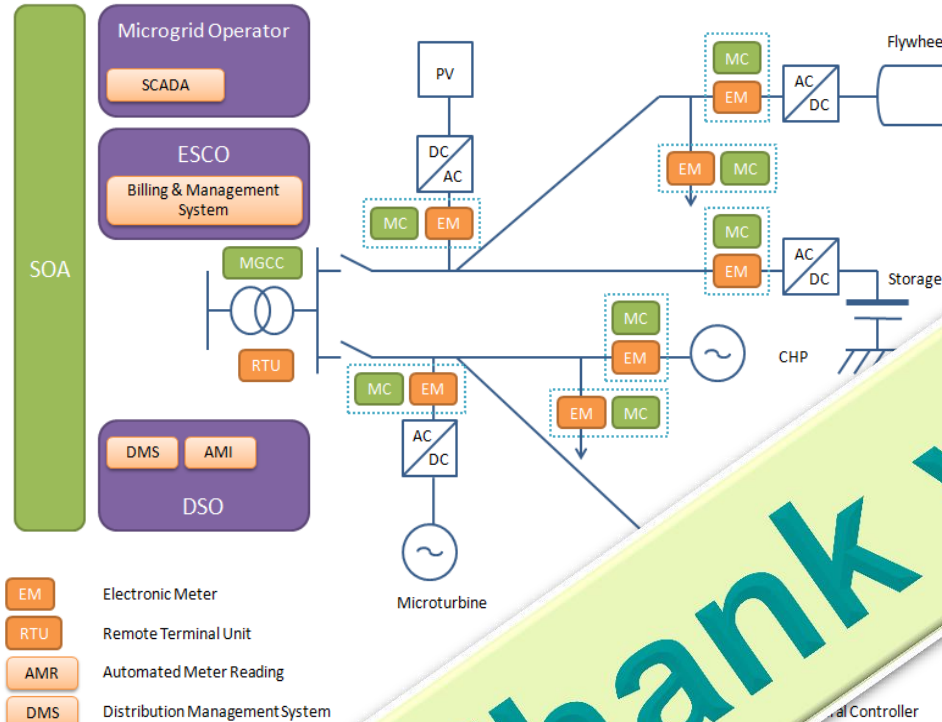
- **Distributed control architecture will prevail seamlessly linking all active elements of the integrated grid**
- **Embedded systems with microgrid capabilities or “web of cell” connectivity will offer quality inclusion of energy efficient buildings**

➤ **Policy and Regulatory shortcomings need to be addressed for smart investments to prevail and maximize benefits to all active stakeholders !!!**



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Need for smart incentivized Regulation ...



Distributed control architectures will prevail
searching for all active
integrated

Thank you !!!

distributed systems with
microgrid capabilities or
“web of cell” connectivity
will offer quality inclusion of
energy efficient buildings

Policy ... **shortcomings need to be addressed**
for smart ... **to prevail and maximize benefits to**
all active stakeholders !!!