



# Impact of Advances on Regulatory Paradigm

Hafez El-Salmawy

MedReg President

Managing Director, *EgyptERA* (Egypt)



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# Background on *MedReg*

- *MedReg* gathers 24 energy regulators from 21 Mediterranean countries with the aims to promote transparent, stable and harmonized regulatory framework in the region and foster market integration, infrastructure investments, consumer protection and overall energy cooperation.



# MedReg Strategy 2020-2030

- Achieve Mediterranean Energy Community Through the Following Measures:
  1. A sound institutional regulatory framework.
  2. Optimal conditions for infrastructure investments.
  3. Functioning, competitive and transparent electricity and gas markets.
  4. Efficient consumers protection taking into account the particular situation of vulnerable Consumers.
  5. Intensified regional cooperation and setting up of pilot projects



# Impact of changes in political context on Regulatory framework

- Drivers for the changes in Political context can be attributed to:
  - Changes in policy which may include: environmental policy (e.g. ,more renewable, EE), privatization, market opening, taxes....etc.
  - Crises such as; challenges to the security of supply, financial market failure,....etc
- This impact can have an influence on two domains, which include:
  - Functional aspects of the national regulatory agency (NRA)
  - National energy market development



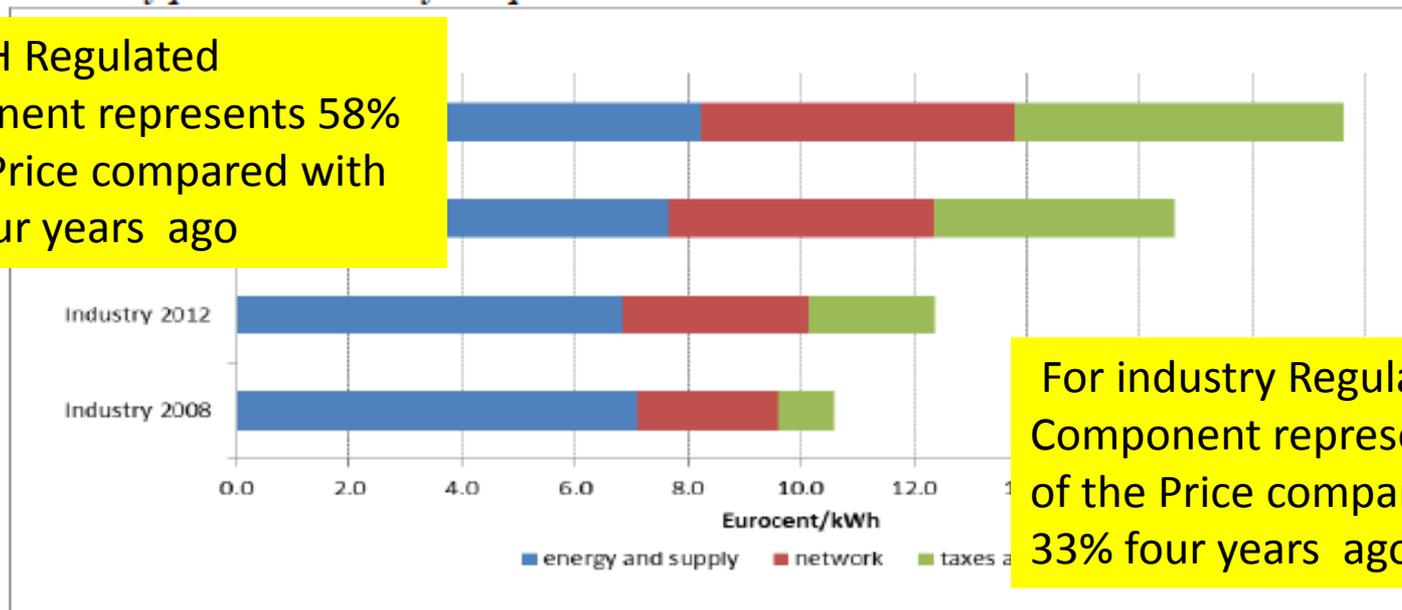
# Change in Law

- Political changes may leads to change in laws (either primary or secondary)
- The law specifies the regulatory framework, which include\*:
  - legal status.
  - independence.
  - competencies
  - procedures for core regulation
  - transparency.
  - Enforcement.
  - Accountability
- These changes can be positive or negative depending on how this will address the above mentioned criteria

MedReg report on:: Minimum requirements considered as necessary to ensure independent regulatory authorities in the Mediterranean Area

# Impact of the political Changes on Retail Energy Prices

For H.H Regulated Component represents 58% of the Price compared with 53% four years ago



For industry Regulated Component represents 45% of the Price compared with 33% four years ago

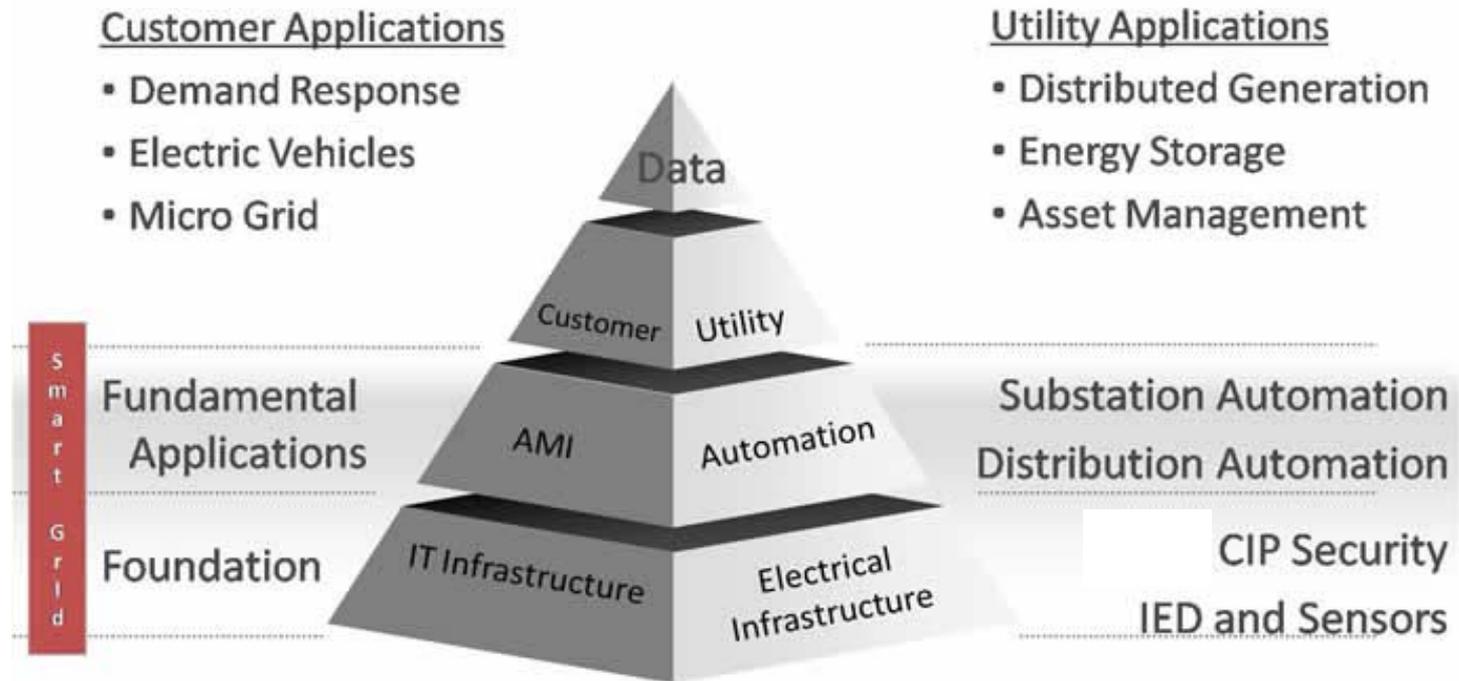
- The relative share of the energy element in the retail price of electricity has gradually diminished, over time due to the increase in the tax / levy component. This led to more dominance of the regulated component against the competitive one



# Advances in Technology and Innovations

- Smart Grid:
  - A SG is an electricity network that can intelligently integrate the actions of all users connected to it - generators, consumers and those that do both – in order to efficiently deliver sustainable, economic, and secure electricity supplies.
  - This represents a paradigm shift from our today grid which was designed to have unidirectional power flow from generation to customers with a capacity to meet the absolute peak demand.

# Smart Grid Vision



Advanced Metering Infrastructure (*AMI*)

Intelligent Electronic Devices (*IEDs*)

CIP (Critical Infrastructure Protection) cyber security protection

**Source:** <http://www.asatsolutions.com/smart-grid.htm>



# Needs for Regulations development to Support SG

- Some of the existing regulations are barriers to SG
  - a. Current rate designs do not provide an incentive for consumers to become actively involved – *advanced tariff structure*.
  - b. Many of the grid assets are not compatible with SG technologies and must be replaced even though they are not at the end of their functional lives – *more favourable depreciation rules are needed*.
  - c. Utility revenues are based on sales of kWh. SG may result in a reduction of kWh sales to utilities – *Regulations are needed to give utilities incentives to invest in grid modernization*.
  - d. Uncertain cost recovery for investment in SG is preventing a deeper deployment of new technologies – *cost benefit analysis are needed to assess externalities( impacts on social and welfare)*



# Needs for More Developed Cyber Protection Regulations and Practices

- Utility Industrial Control System “ICS” environments are designed to operate over relatively open IP protocols as well as prior generation dial-up systems.
- As these environments become more connected, the risks of unauthorized access and control greatly increases



# Requirements and Constraints for Cyber Protection

## Requirements

- Performance/Usability
- Upgradability/ Adaptability
- Effectiveness/ Efficiency
- Confidentiality
- Integrity
- Availability
- Compliance
- Reliability

## Constraint

- Computational/ Networking
- Storage/ Personnel/ Financial
- Temporal/ Technology
- Availability/ Maturity
- Integration / Interoperability
- Lifecycle
- Interconnectedness of  
infrastructure / Infrastructure

## Regulatory requirements

Scope / sphere of influence

Acceptance vs. transference (i.e., is the regulatory requirement directly related to the utility or the customer?)



# Privacy

- Security objectives of the smart grid infrastructure encompass environment countermeasures that are necessary to protect privacy.
- Utility personnel will need significant education to learn not only their own roles in a utility with smart grid, but also the issues of security and privacy that will become far more critical with the widespread scope of AMI.
- Codes of conducts as well as of ethics need to be improved and enforced.



# Integration of RES (1/2)

- Some renewable energy sources, such as wind and solar, are variable. This means that their output changes according to a changing natural resource such as wind speed or direct sunlight.
- With more renewable energy connected, the challenge of balancing the electricity grid will be greater expensive as well as costly environmentally.
- The availability of smart appliances as well as low-cost microcontrollers make it possible for these appliances to sense the power imbalances on the electricity grid and automatically alter their demand.
- From regulatory prospective, there is as yet no incentive mechanism to reward dynamic demand service providers for enabling system benefits and carbon savings, changes in market rules may be needed for the valuation of frequency response\*.



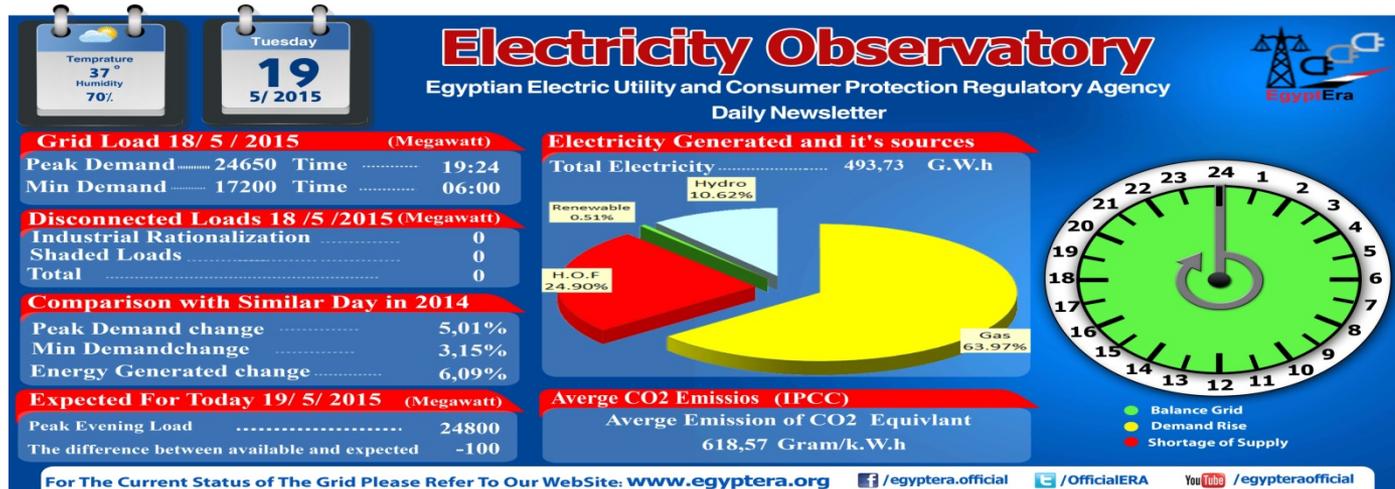
## Integration of RES (2/2)

- Advanced types of renewable contract scheme may be needed to rewards capacity credit of the RES in a form of a premium.



# Impact of 3G and 4G Telecom Networks on the QoS and transparency

- The developments in the Telecom networks have enabled energy service providers with a wide range of smart services, which can improve the quality of service to the consumers
- This can cover a wide range using mobile applications for meter reading, billing and collection, timely network events notification, complaints notification and follow up, consumers surveys, ...etc.





# Electro-Mobility

- Several countries around the world have ambitious plans regards the use of electric as well as hybrid cars.
- This offers the electric utility a wide ranges of chances as well as challenges
- Several regulations are needed including; pricing methodologies for supply and recovery from storage batteries
- Incentive mechanisms based on cost benefit analysis taking into consideration impact on emissions reduction and energy efficiency.



# Conclusions

- Political changes has a direct or indirect impact on the regulatory framework.
- Recent technological advances and innovations are leading to a change in the way the utilities are operating. This needs development of suitable regulations which leverage the benefits as well as mitigate any adverse effects.



# Thank You

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