

Institute for Energy Engineering (IIE-UPV) & Universidad Politécnica de Cartagena



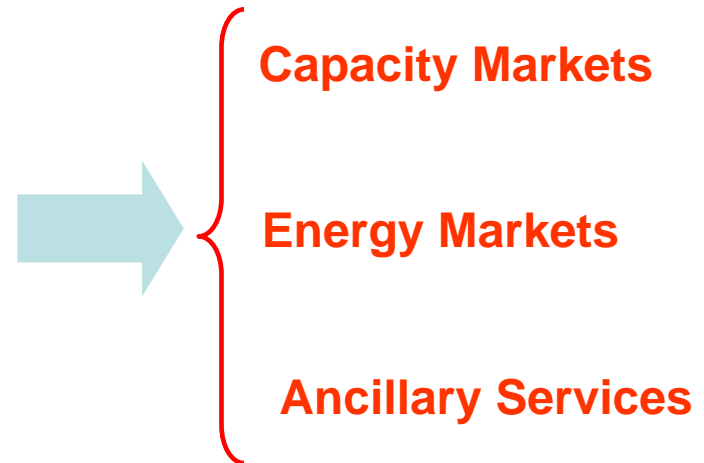
Aggregation (WG3)

Brussels, June 2014



● **Aggregation means:**

- Classify, identify and forecast the demand of the customers
- Manage information from and to the aggregated group
- Assess the potential of the group and its ability to understand and to react face to internal or external signals
- Maintain and develop technical and economic expertise
- Put in the place of their customers with respect to third parties
- Where?



● State of the art in Europe vs. USA

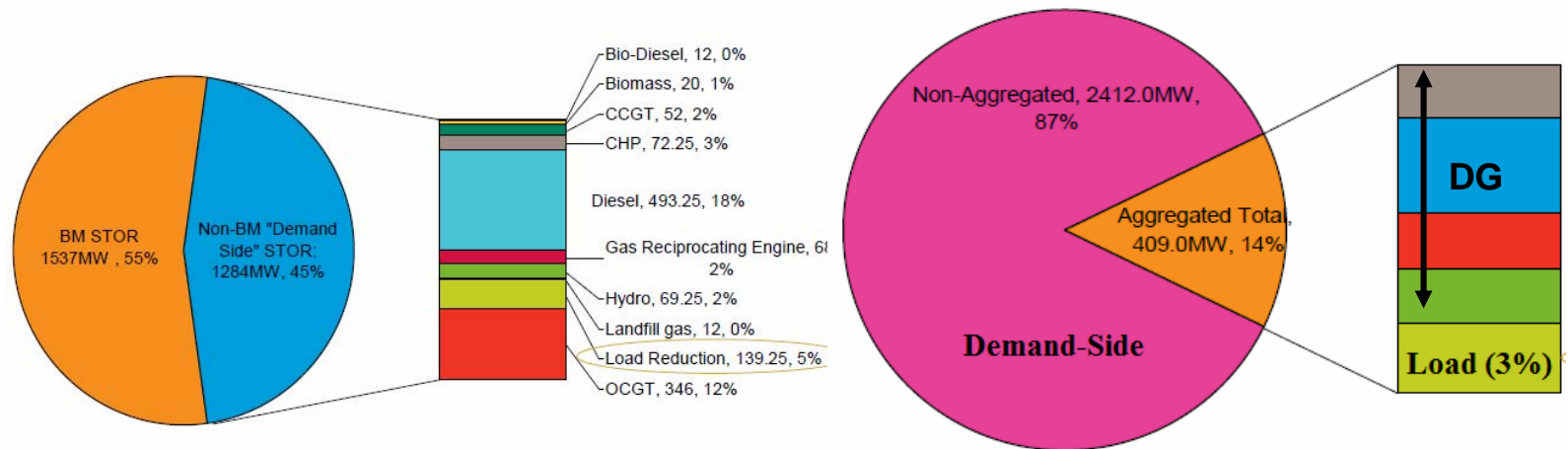
- USA: up to 10% of peak demand (66GW) can be clipped
 - Growing activity of aggregators (for ex. 80 in PJM)
 - CSP list <http://www.pjm.com/markets-and-operations/demand-response/csps.aspx> Some examples: Siemens, SUEZ, EDF, Enernoc,....(USA?)
 - FERC 745&755
 - Removing legislative barriers: ex. CalCAN, SB594 (CA)
- USA: DR is theoretically open to all electricity markets
 - Ancillary Services & Capacity Markets in the last decade
- Europe: positive trends, but there are barriers to be removed yet
 - 5% at maximum, 3% in average (source: UCTE, 2010)
 - Aggregation should be implemented NOW taking the opportunity offered by a period of changes and developments in markets

ISO/ RTO	Min Size (MW)	Rules of Regulation Services			Rules of Spinning Reserves	
		Aggregation	Symmetric Bid?	Energy period	Aggregation	Energy Period
CAISO	0.5	No	No	60 min	No	30 min
ERCOT	0.1	No	No	NA	No	NA
MISO	1	No	Yes	60 min	Yes	60 min
PJM	0.1	Yes	Yes	NA	Yes	NA
NYISO	1	No	Yes	NA	No	60 min
ISO-NE	NA	NA	NA	NA	Yes	NA



● An example in the EU: The Short Term Operating Reserve (STOR) in UK

- UK is traditionally very active and open to DR
- Aggregation providers have been experiencing a growing trend (16 in 2013).
 - Remember: more than 80 CSP play in PJM, 34 in NYISO (USA).
- The problems:
 - Supply-Side wins in balancing markets
 - In the Demand-Side, the main resource is generation
 - Figure source: J. Torriti (Florence School of Regulation, 2013)
- Conclusion: the potential of aggregation need to be explored



● New “winds” for Demand Response (reasons)

- The rising share of RES by 2050: ► uncertainty in Supply
- Small-size resources (37%) ► they need aggregation and opportunities (i.e. SME could reduce their costs)
- Economic concerns ► €44 billions of benefits can be lost (the potential of enabling technologies deployed in EU)

● The EU actors interested to enhance DR (I)

- Public authorities (European Commission)
 - Energy Efficiency Directive 2012/27/EU
 - Includes aggregation in a nondiscriminatory way (art 15.8)
 - New markets and possibilities: AS markets (art 15.8)
 - Commission Staff Working Document on DR (2013)
 - Make DR-side participation fairly respect to Supply-Side
 - Remove, if any, discriminatory treatment in markets
 - Energy Efficiency Plan 2011
 - Are ESCOs (and aggregators) developing its full potential? There is a lack of expertise in complex DR products!



● The actors interested in new resources (II)

● Energy regulators

- ACER (Agency for the Cooperation of Energy Regulators) in “Framework Guidelines on Electricity Balance (2012)”
 - Balancing allowed for load entities (through aggregators or not)
- CEER (Council for European Energy Regulators) in “Regulatory and Market Aspects for DS Flexibility”
 - Issue: NRA (National Regulation Authorities) address a clear role for aggregators in the near future.
 - Consider the possibility of aggregation in the offer for balancing

● The Electricity Industry: Eurelectrics (see, for example, “Flexibility and Aggregation. Requirements for their aggregation in the markets (2014)”

- “... aggregation offers the opportunity to exploit DR flexibility potential...”
- “... better access of the customers to the markets”
- Market rules will need to be adapted to enable aggregators to participate in energy, balancing and constraint management



● Smart metering and aggregation

- Smart meters are a key for the energy policy in EU
- Measurement and verification are of the highest interest for DR:
 - Demonstrate its full potential
 - Assure a correct distribution of benefits (opposite to fixed revenues strategy: ex. Water Heaters in Christchurch, NZ)
- The measurement in aggregated loads is complex
- Aggregated load \neq large generators
 - Measurement requirements must be different
- Monitoring: some questions...
 - Is it necessary to have real time monitoring? Cost (M&V)/incomes and dynamics of demand vs. generators, number of “units”...
 - Is it possible an statistical monitoring? I.e. to measure or request feedback from some loads only.
- Conclusion: it is necessary to revisit requirements and propose a new equilibrium specifications/functionalities (AMI) vs flexibility (DR resource)

