



THE **FICHTNER** GROUP

ENGINEERING -- CONSULTING

Apertura Mercato MSD e Produttori di Energia: Analisi delle Opportunità

Apertura MSD: aggiornamenti normativi e di mercato

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Fichtner - Engineering & Consulting advisory for Utility Sector



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•	Regulation and Terna's pilot projects	 Italian energy regulation key elements Pilot projects and results Opportunity from EU market integration
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Agenda

- Business model overview
- Regulation and Terna's pilot projects
- Market highlights

Aggregators concepts

Energy management by Aggregation create values from portfolio management of demand, supply or both



Context for aggregation services

The opportunities for aggregation services is linked to a several different factors, where regulation is the main driver



EU Regulation pushing for integration

- Clean Energy Package pushes for increasing the role of aggregators and active consumers
- TSO/DSO role
- New EU energy exchange platform (Xbid, Terre, etc.)

Technology new services opportunities

- Digitalization allow innovative services
- Technology cost reduction and innovation
- Smart grid and real time management

Energy markets context development

- Decentralized and distributed business, RES growth
- New balancing rules
- Ancillary services optimization

Energy management services by Aggregators

Optimization of load and/or generation profiles allows to exploit additional value from the market, both from energy as well as from services provision

Typical risk allocation



1. Market access

Provide route to market to:

- small-size units
- players with limited or no market competences

2. Profiling

Commercial function for value optimization:

- profile shaping
- price hedging
- cross-market energy trading
- imbalance optimization

3. Balancing

Aggregators provide ancillary and balancing services to the TSO:

- frequency response
- balancing reserve
- balancing energy

from remotely controlled demand and / or supply units

Aggregation business models and services

Demand Response is typically related to any optimization related to services post meters; Direct Marketing of RES and DG could be applicable to aggregation services also





Demand Response (DR) business model

Meter DR

Demand aggregator manages a portfolio of loads and generation in order to provide capacity, balancing and ancillary services to grid operators, retaining a fee on revenues



Range of services

- Capacity services (where applicable: UK, USA, etc)
- Ancillary services (Italian regulation is currently opening the balancing market to the participation of aggregated loads)
 - Shut down
 - frequency regulation (secondary reserve, etc.)

Value from market participation

- Revenue from market
 - Capacity fee (€/MW) for capacity made available for a defined time frame
 - Energy payment for the effective MWh of energy curtailed (€/MWh)
 - Ancillary service payment for availability and/or activation (€/MW and/or €/MWh)
- Demand Aggregator
 - it bears the market risk (mitigated by portfolio effect)
 - Profit sharing: customer receives a pre-negotiated split of the revenue that Aggregator earns from the grid operator; typical Aggregator fee is 30%



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Italian Regulation in development

Demand Response mechanism is in development with other regulation impacting generation

Demand Response - Resolution 300/2017/R/eel

- Definition of UVAC, UVAP, UVAM the role of aggregator BSP (Balance Service Provider) and BRP (Balance Responsible Party-"Utente del Dispacciamento")
- Regulation UVAC (30/05/207)
- Regulation UVAP (25/09/2017)
- Document for consultation UVAM (19/06-11/07/2018). Last week of September Terna published final documentation

Capacity market

- After EU approval of Feb 2018 CM mechanism is in the final stage
- On Sept 2018 MISE draw back approval from EU white paper on capacity: uncertainty on next decision and timing
- Access to the MC should be grated to domestic and foreign generation units, including non-programmable renewable sources, such as photovoltaic and wind power, as well as consumption units.
- Confirmation of RES as potential participant (this mechanism overlap with new RES auctions regulation in development and Demand Response)

RES Auctions

- MISE has published a draft of scheme for RES new auction incentives mechanism (March 2018)
- The incentives plan for the period between 2018-2020 (i.e. not suitable for ground PV) provides maximum amount of incentives equal to 5,8 billion €/year
- PV greater than 20 KW, not in agricultural areas, and without other incentive contracts in force (i.e. *Scambio sul posto, Ritiro Dedicato*), are allowed to participate, in competition with wind onshore. Below 1 MW are set "*Registri*"; above normal auctions

Four aggregation types

The three main types of UVA present some differentiations

		UVAP	
Minimum size	• 1 <mw<10< th=""><th>• 1<mw<10< th=""><th> 1<mw<10; also<="" li="" storage=""> </mw<10;></th></mw<10<></th></mw<10<>	• 1 <mw<10< th=""><th> 1<mw<10; also<="" li="" storage=""> </mw<10;></th></mw<10<>	 1<mw<10; also<="" li="" storage=""> </mw<10;>
Services	Tertiary reserve upwardBalancing upward	Tertiary reserveBalancingCongestion solutions	Tertiary reserveBalancingCongestion solutions
Execution time (from order received)	• 15 minutes	• 15 minutes	• 15 minutes
Minimum service time	• 3 hours	• 3 hours	• 4 hours

- Access to market and services
 UVA aggregated could participate only to MSD markets, not to MGP
- Geographical perimeter

Does not exceeds the market area; Terna defined a sub-set of Provinces aggregation for pilot

• Technical requirements

Terna requires compliance with UPDM (Unità Periferica di Monitoraggio) and verification, before the qualification

UVAC Pilots project (1/2)

First projects have been set up for demand units (UVAC), with a tender procedure ("contrattualizzazione a termine")



Source: doc TERNA 9 July 2018

UVAC Pilots project (2/2)

The last tender on UVAC was on assigned 30th August 2018; in total, since first tender June 2017, it has been contracted 543 MW capacity on 21 operators



Three operators account for 75% of total capacity assigned

UVAP Pilots project

Production units participate without a tender with €/MW capacity assignment: UVAP could bid directly on MSD market together with the other relevant units



Source: doc TERNA 9 July 2018 (data up to 7.07.2018)

UVAM regulation

UVAM will substitute both UVAC and UVAP and it also open to storage and veichle-togrid participation to MSD



- Max 40% of summed Maximum enabled power should be given by nonprogrammable sources
- Auction based on the reserve premium (to be fixed by Terna)
- BSP has to offer upward offers at a maximum price ("strike price") for substitution reserve
- BSP Needs to be able to modulate the negotiated capacity for at least 4 hours (14.00-20.00) mon-fri



Source: doc TERNA 9 July 2018

EU Energy market integration – balancing market

In the next years further opportunities could derive from the participation of Italy to the ongoing integration of energy market at EU level



17 Source: doc TERNA 18 June 2018

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Market highlights

Global operators are developing energy services - M&A

Last years M&A activities show a strong interest in the DR business, in particular with focus on operators on UK and US market



Fast growing market – energy Start ups (German case)

We have analyzed 100 start-ups operating in energy: majority are positioned in the production/storage phase of the value chain (27 operators) and most relevant category is energy services (43%)



The graph above does not include 26 start-ups which would have been classified within "Services" along the value chain. Activities range from: Smart home appliances, Energy monitoring, Software support, Energy storage

20 Source: Fichtner research

Balancing Services Provided in Germany - sample



Balancing Services Provided in UK - sample

	Product		Response time	Procurement Delivery period		Capacity fee	
Primary Reserve	Static FFR	Firm Frequency	10 - 30 secs	Monthly	1 or multiple months	Pay as bid	
	Dynamic FFR	response	Auto	tender			
	EFR	Enhanced Frequency Response	1 sec Auto	Trial tender	1 or multiple months	Pay as bid	
	FFR Bridging	FFR Bridging	10 - 30 secs Auto	Tender	12–24 months	Bilateral price	
	FCDM	Frequency Control by	2 secs Auto	Bilateral contracts	1–2 years	Contracted	
2 nd R	Fast Reserve	Demand Management	2 mins Manual	Monthly tender	1 – 24 months	Pay as bid	
Tertiary Reserve	STOR	Short term operating reserve mins) Manual		Competitive annual tender (three tender round in a year)	Until 2 years	Davi sa kid	
	STOR Runway				2 years	Pay as bid	
	Demand turn Up		10 mins Manual	Bilateral contracts	NA	Bilateral price	

Utility Demand Response Market – the business case in USA

Looking at most advanced market, is possible to understand the timing of different products



USA Utilities involvement in DR events

Out of some 18,3 GW of capacity contracts under DR services, primary use for the activation of the services is made by customer itself ("customer initiated" activities 7,2 GW)



National DR market (2017) - MW	AC Switch	Water Heater	Thermo stat	Behavior	Automat.	Custom. Iniated	\int	Total potential DR capacity available for dispatch
# utilities called during DR events 2017	52	24	47	20	36	44	/	
Avg. number of events called by utilities	8	61	8	7	26	9		Actual DD consoitu
Enrolled capacity (MW)	3.428	280	1.204	735	3.700	7.200		reduction dispatched
Dispatched capacity (MW)	1.821	180	1.081	711	1.800	3.400	,	during a DR event

Source: Navigant

Italian potential - MSD size and pricing

The MSD market volume and the spread from PUN and MSD price shows how relevant is the need for optimization



Italian potential - MSD available capacity and services

Provided services are mainly tertiary reserve with large contribution for maintaining spinning reserve on line (minimum).





Italian potential - Demand Response market volumes

Typically the reference market of the DR is about 5% of the peak demand. For Italy, it is equal to some 2,6 GW



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Contacts

