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REGULATORY AUTHORITY FOR ENERGY

Demand & Response in South-East Europe

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Demand & Response

Energy management means to optimize one of the most complex and important technical creations that we know: the energy system. While there is plenty of experience in optimizing energy generation and distribution, it is the demand side that receives increasing attention by research and industry. Demand Side Management (DSM) is a portfolio of measures to improve the energy system at the side of consumption.The smart grid is conceived of as an electric grid that can deliver electricity in a controlled, smart way from points of generation to active consumers. Demand response (DR), by promoting the interaction and responsiveness of the customers, may offer a broad range of potential benefits on system operation and expansion and on market efficiency. Moreover, by improving the reliability of the power system and, in the long term, lowering peak demand, DR reduces overall plant and capital cost investments and postpones the need for network upgrades.

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- The electric power industry considers demand response programs as an increasingly valuable resource option whose capabilities and potential impacts are expanded by **grid modernization efforts**. For example, sensors can perceive peak load problems and utilize automatic switching to divert or reduce power in strategic places, removing the chance of overload and the resulting power failure in the grid. Advanced metering infrastructure expands the range of time-based rate programs that can be offered to consumers. Smart customer systems such as in-home displays or home-area-networks can make it easier for consumers to changes their behavior and reduce peak period consumption from information on their power consumption and costs to generating power.

- In an electricity grid, electricity consumption and production must balance at all times; any significant imbalance could cause grid instability or severe voltage fluctuations, and cause failures (shortages) within the grid. Total generation capacity is therefore sized to correspond to total peak demand with some margin of error and allowance for contingencies (such as plants being off-line). Operators will generally plan to use the least expensive generating capacity (in terms of **marginal cost)** at any given period, and use additional capacity from more expensive plants, only as demand increases. **Demand response in most cases is targeted at reducing peak demand**. Consumers of electricity will also pay higher prices if generation capacity is used from a higher-cost source of power generation. Demand response may also be used to increase demand during periods of high supply and/or low demand. Some types of generating plant must be run at close to full capacity (such as nuclear), while other types may produce at negligible marginal cost (such as wind and solar). Since there is usually limited capacity to store energy, demand response may attempt to increase load during these periods to maintain overall grid stability.

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- Energy consumers need some incentive to respond to such a request from a **Demand Response Provider**. Demand Response incentives can be formal or informal. For example, the utility might create a tariff-based incentive by passing along short-term increases in the price of electricity. Or they might impose mandatory cutbacks during a heat wave for selected high-volume users, who are compensated for their participation. Other users may receive a rebate or other incentive based on firm commitments to reduce power during periods of high demand, sometimes referred to as *negawatts*.

- Commercial and industrial power users might impose load shedding on themselves, without a request from the utility. Some businesses generate their own power and wish to stay within their energy production capacity to avoid buying power from the (more expensive) grid.

- A number of provisions dealing with demand side participation are stipulated in various EU policy documents, specifically the **Electricity Directive (2009/72/EC) and the Energy Efficiency Directive (2012/27/EU).** In an effort to increase public engagement with demand response (current estimates suggest that only 1% of demand response potential is being tapped in Greece), the Energy Efficiency Directive is calling on Member States to remove incentives in transmission and distribution tariffs that might hamper demand response participation. Member States should also ensure that national energy regulatory authorities encourage the participation of demand side resources, such as demand response, alongside supply in wholesale and retail markets.

Furthermore, Member States should ensure that network operators are incentivized to improve efficiency in infrastructure design and operation and that tariffs are put in place that allow suppliers to improve consumer participation in demand response. There are, however, some barriers that need to be overcome before we can expect to see the wide-scale uptake of demand response solutions. Regulatory and market barriers seem to be the main obstacles to the development of commercially viable aggregation applications, e.g. establishing clear rules for the technical validation of flexible demand-response transactions. Another challenge to be overcome is gaining consumer trust and encouraging consumer participation, as consumer resistance to participating in projects is still significant. In this regard, demand response projects are benefiting from the deployment of **smart meters, which are key enablers for demand response initiatives.** Consequently, an increasing number of demand response projects are moving from research and development to consumer engagement tests in the Nordic and central European regions. Programs to lower energy consumption by providing feedback to customers on their consumption patterns are also paving the way for the wider uptake of demand response solutions across Europe.

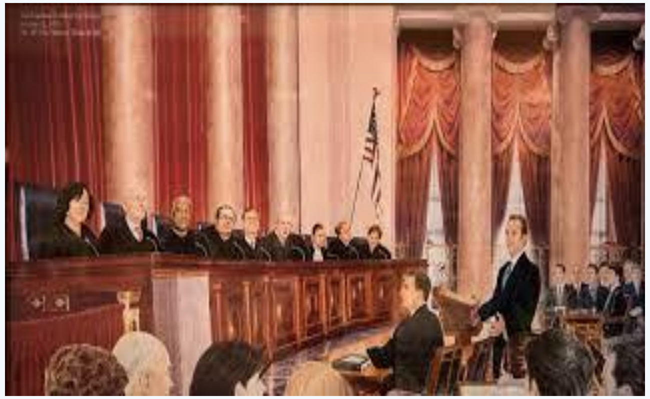
For example, in the US, commercial and industrial customers make up a small share of the number of demand-response customers (7% and less than 1%, respectively), but they provide larger shares of the energy savings and receive much larger incentives. Industrial customers delivered more than half of all actual peak demand savings from demand response in 2016. The average annual commercial customer incentive was almost $600, while the average industrial incentive was more than $9,000. California is the most active state in demand-response markets: the state contains 12% of the nation's population but has 20% of the total demand-response customers (industrial and household) and contributes 20% of the total peak demand savings.

Because demand-response actions often occur during times of peak electricity demand, demand response provides value to the electric system in several ways. Lower demand means that less efficient, and often more expensive, forms of electricity generation do not need to come online during times of high demand. Reducing the amount of demand often results in lower wholesale electricity prices. On January 25, 2016, the Supreme Court overturned a lower court's ruling concerning the way demand response could participate in wholesale markets (577 U. S. 2016: FEDERAL ENERGY REGULATORY COMMISSION v. ELECTRICITY POWER SUPPLY ASSOCIATION ET AL). In wholesale markets, grid administrators accept bids from electricity generators to continuously match supply with demand. Bids are ordered from lowest to highest, and they are accepted until the supply sufficiently meets demand. All bidders are then compensated at the rate of the highest-accepted bid, known as the Locational Marginal Price (LMP). Οριακή Τιμή του Συστήματος.

The Court's decision focused on Orders by the Federal Energy Regulatory Commission (FERC), which stated that demand-response providers could be compensated based on the Locational Marginal Price (LMP), as if they were power generators. A lower court had vacated such Orders, but the Supreme Court overturned the lower court's rulings **providing assurance that demand response will continue to play an active role in wholesale electricity markets. The ruling may increase the market for demand response in the near term, especially as more advanced electric meters and appliances and equipment that can be cycled by grid operators continue to be adopted across the Grid.**

- The Court affirmed that “FERC’s statutory authority extends to the Rule at issue here addressing wholesale demand response. **The Rule governs a practice directly affecting wholesale electricity rates. And although (inevitably) influencing the retail market too, the Rule does not intrude on the States’ power to regulate retail sales.** FERC set the terms of transactions occurring in the organized wholesale markets, so as to ensure the reasonableness of wholesale prices and the reliability of the interstate grid. And in choosing a compensation formula, the Commission met its duty of a reasoned judgment. FERC took full account of the alternative policies proposed, and adequately supported and explained its decision.”

The US Supreme Court



- **The Way Forward: Market Liberalization** as wholesale price caps will be removed, making prices reflect the real value of electricity in time and location (scarcity pricing) to drive investments towards the flexible assets most needed to the system, including demand-response and storage in the Greek islands.
- **Sustainability:** is also about moving towards the decarbonization of the energy mix of the European Union and, thus, the Energy Community Member – States.
- **Security of Supply:** electricity and gas transmission grids should be reviewed from a regional perspective in order to increase competition in the energy internal market and provide system stability.

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Energy Community in South-East Europe

Ms Afrodite Semkou will now conclude our presentation with her remarks from a consumer's perspective within the Greek market.

Ευχαριστώ για την προσοχή σας!

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