EXIST

The Energy Crisis and the New Electricity Market

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EXIST CEO

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Athens

Heatwave + Rapid Economic Recovery = Unexpected Demand Increase all over the world

Over usage of the stored gas + Price hike in the Asian LNG + Low Renewable + Drought

High carbon/ coal prices

Image Source: Alamy

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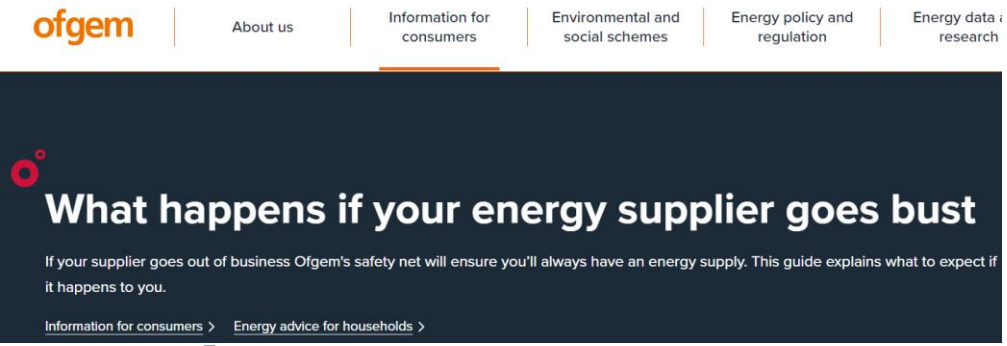
Crises is Everywhere

The New York Times

His Lights Stayed on During Texas' Storm. Now He Owes $16,752.

After a public outcry from people like Scott Willoughby, whose exorbitant electric bill is soon due, Gov. Greg Abbott said lawmakers should ensure Texans "do not get stuck with skyrocketing energy bills" caused by the storm.



Gas & Electricity Price Changes from in 2019 - 2021

	BG	DE	EL	FR	IT	SK	TR	EU
Wholesale Gas	592%	559%	11%	562%	406%	37%	116%	429%
Retail Gas	38%	5%	28%	25%	14%	-8%	37%	14%
Wholesale Electricity	306%	259%	121%	281%	210%	206%	33%	230%
Retail Electricity	21%	5%	19%	5%	-2%	9%	42%	7%

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Source: https://www.nytimes.com/2021/02/20/us/texas-storm-electric-bills.html
OFGEM, EU Commission – Latest Possible Values (2021 – First 10 Months)

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Electricity Market Design

The New York Times

Mr. Hogan, a professor of global energy policy at Harvard's Kennedy School, acknowledged that while many Texans have struggled this week without heat and electricity, the state's energy market has functioned as it was designed.

That design relies on basic economics: When electricity demand increases, so too does the price for power. The higher prices force consumers to reduce energy use to prevent cascading failures of power plants that could leave the entire state in the dark, while encouraging power plants to generate more electricity.

"It's not convenient," Professor Hogan said. "It's not nice. It's necessary."

The Harvard Crimson

After a winter storm in Texas earlier this month left the state's residents to contend with widespread power outages and skyrocketing electricity prices, William W. Hogan, the architect of the state's energy market system and a professor at the Harvard Kennedy School, said in an interview with The Crimson Wednesday that the state's electricity market had "worked as designed" given the conditions.

Hogan, an energy policy professor, has researched the structure of energy markets for several decades and advocated for a specific type of scarcity-based market model in an attempt to reduce prices for consumers. In 2013, Texas chose to adopt Hogan's model.

Per scarcity-based pricing models, when the power supply is scarce, as was the case during the recent storm, the price of energy increases.

Source: https://www.nytimes.com/2021/02/16/us/texas-winter-storm-power-outages.html

Source: https://www.thecrimson.com/article/2021/2/26/hogan-texas-energy-prices/

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Liberalization / Electricity Market Design

1980s First ideas for liberalization of the electricity sector, and introduction of electricity market concepts in Chile (the “Chicago boys”)

LARGE SYSTEMS

Power

Power systems ‘2000’: hierarchical control strategies

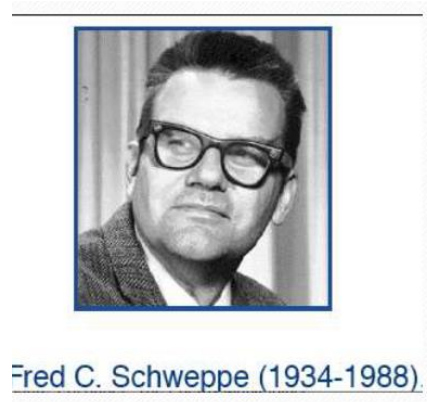
Multilevel controls and home minis will enable utilities to buy and sell power at ‘real time’ rates determined by supply and demand

Fred C. Schweppe
Massachusetts Institute of Technology

substations. Residential customers and small businesses will be able to choose from a wide spectrum of standardized microcomputer display systems, depending on their own needs and preferences. (By the year 2000, relative af-

0018-9235/78/0700-042$00.75©1978 IEEE

IEEE spectrum JULY 1978



Fred C. Schweppe (1934-1988)

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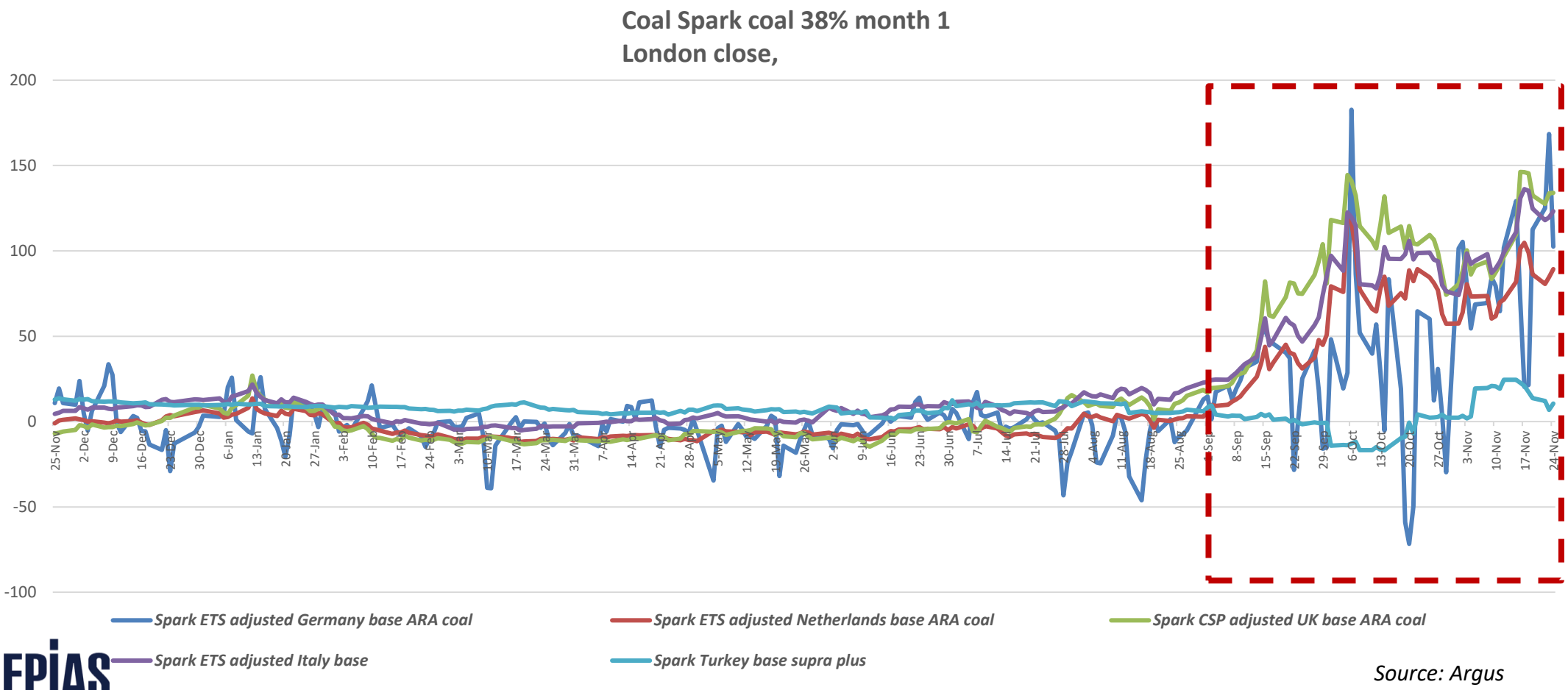
Coal Spark



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Source: Argus

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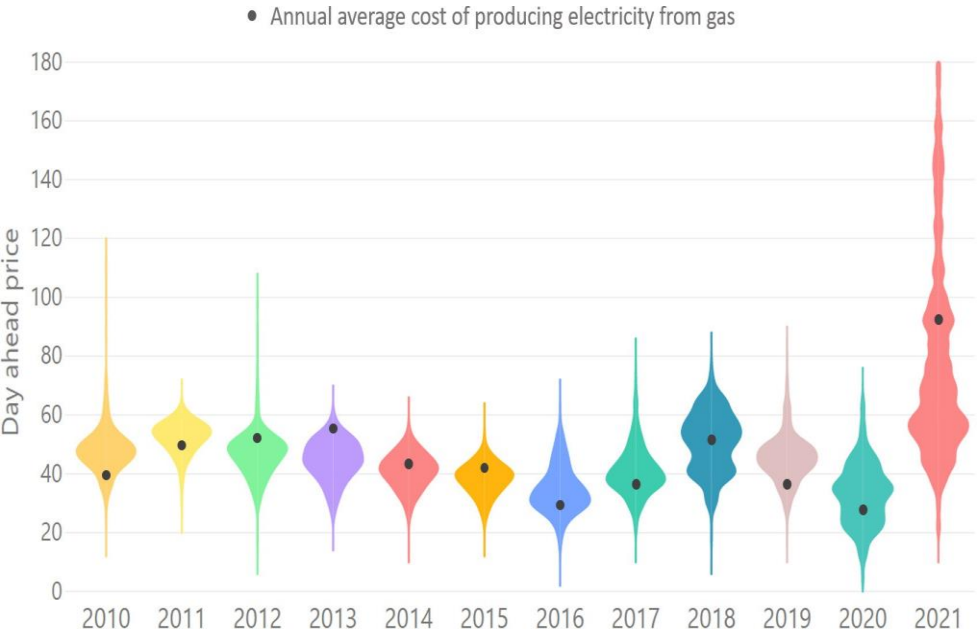
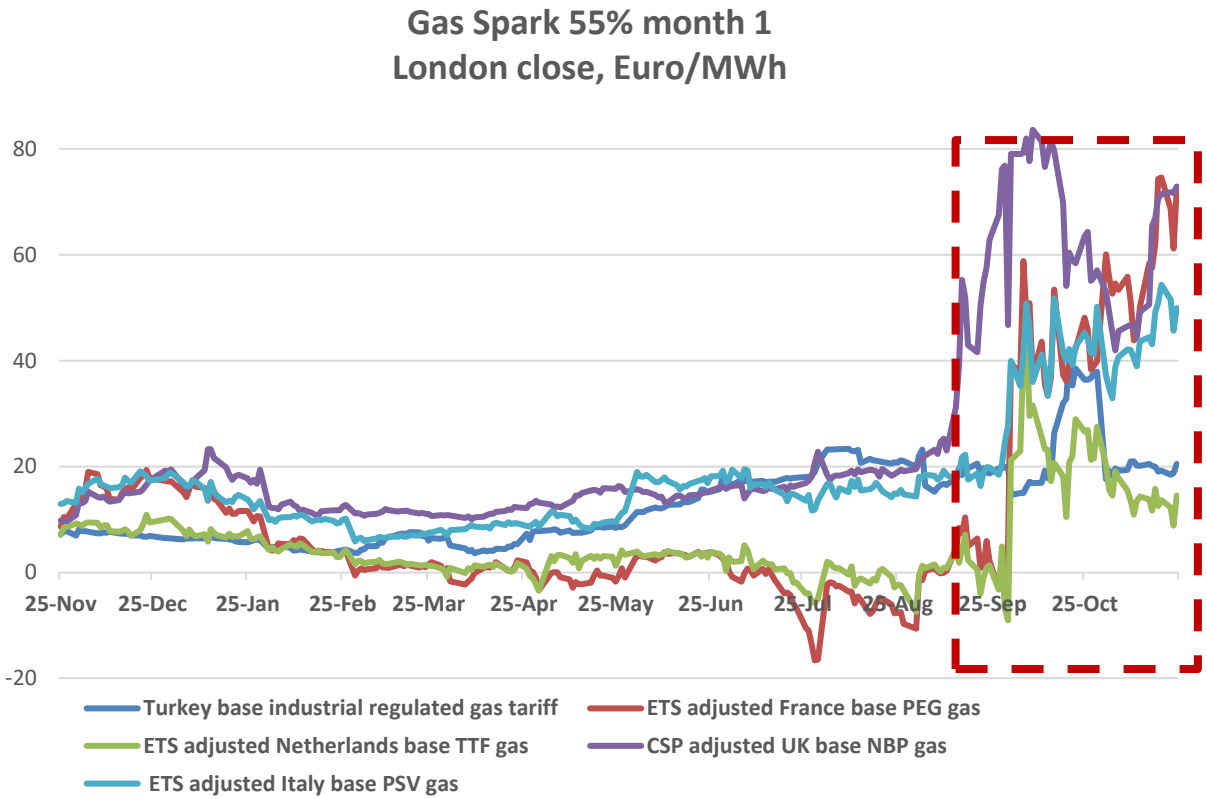
Electricity – Gas



Painted area show distribution of DAM Prices



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Source: ACER, Argus

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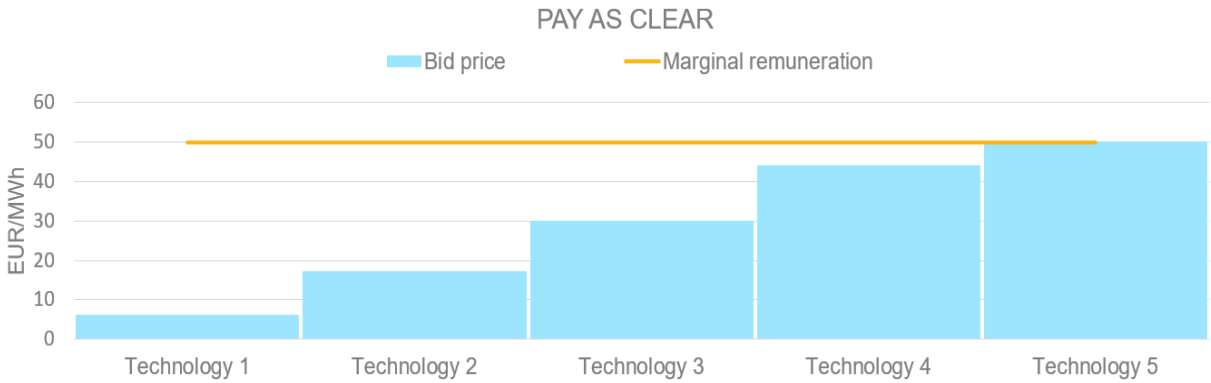
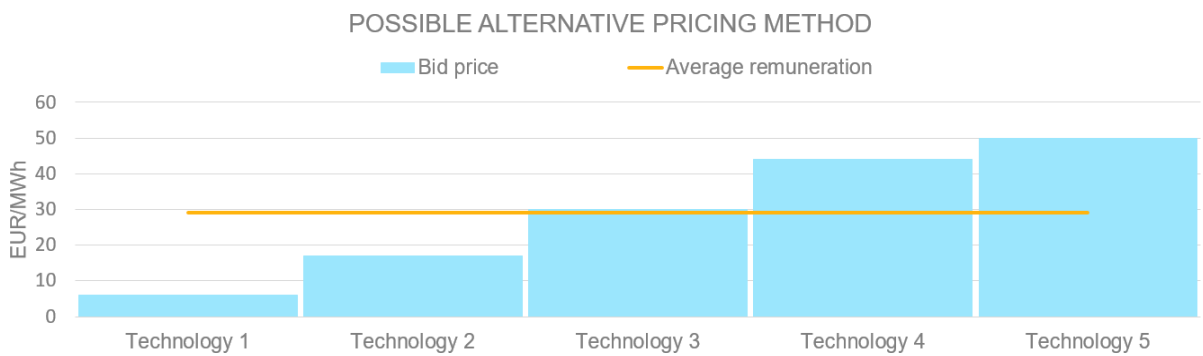
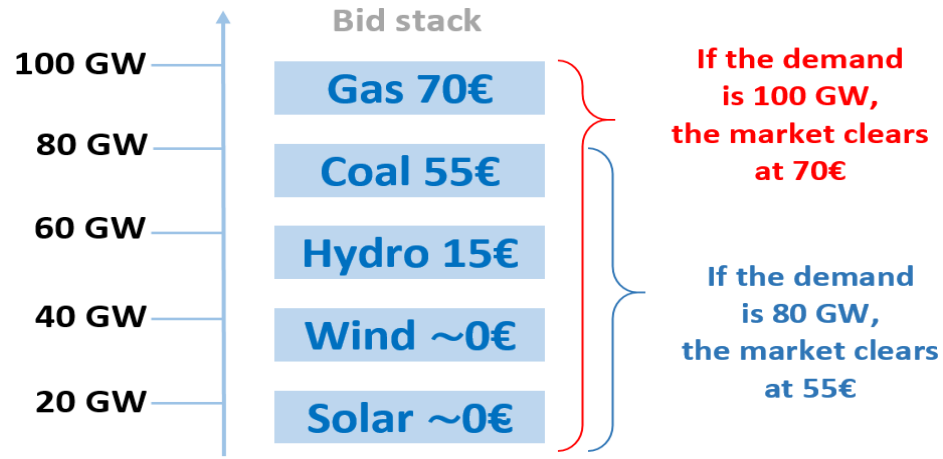
Illustration of the current electricity wholesale pricing method and a possible alternative







Producers bid true costs and get the market clearing price.

Source: ACER

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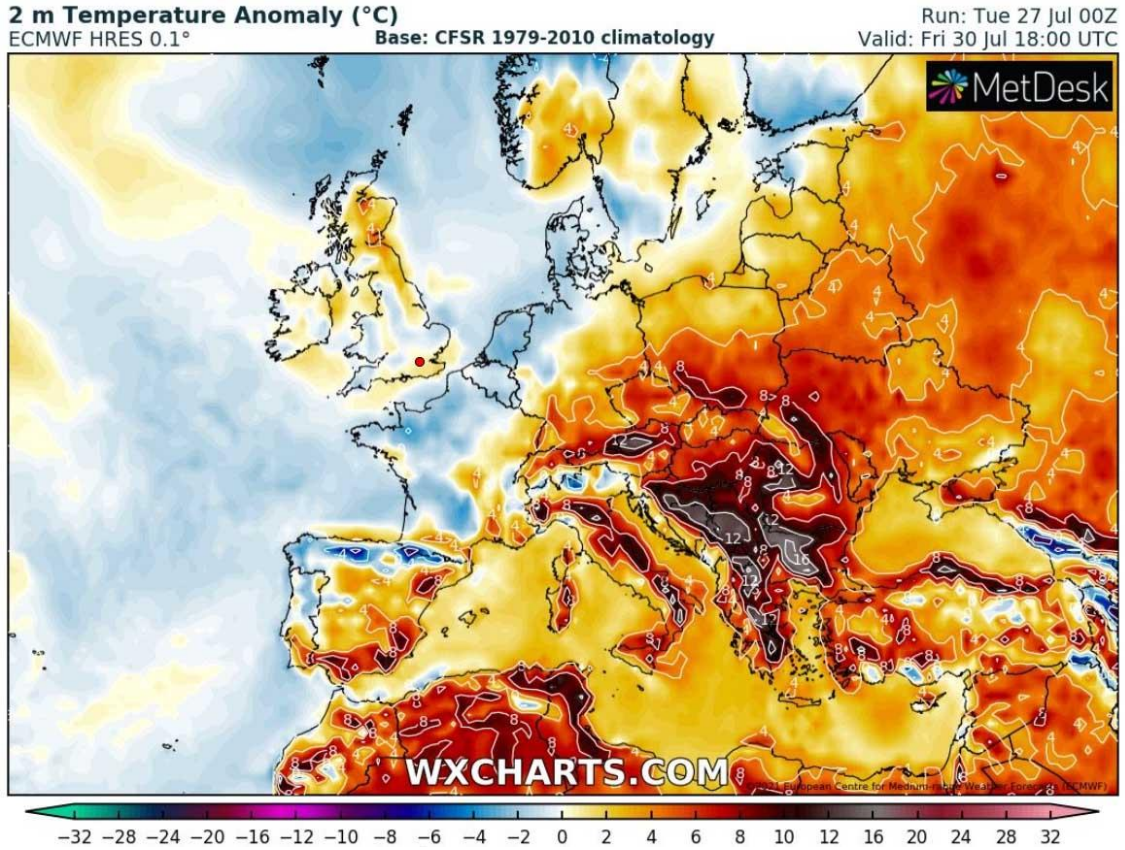
Climate Change – Heat & Cold Waves



- Change our understanding of installed capacity.
- Heat & Cold Waves will test our system capabilities
- Rapid increases in the peak load
- Better Optimization needs

Source: Metdesk

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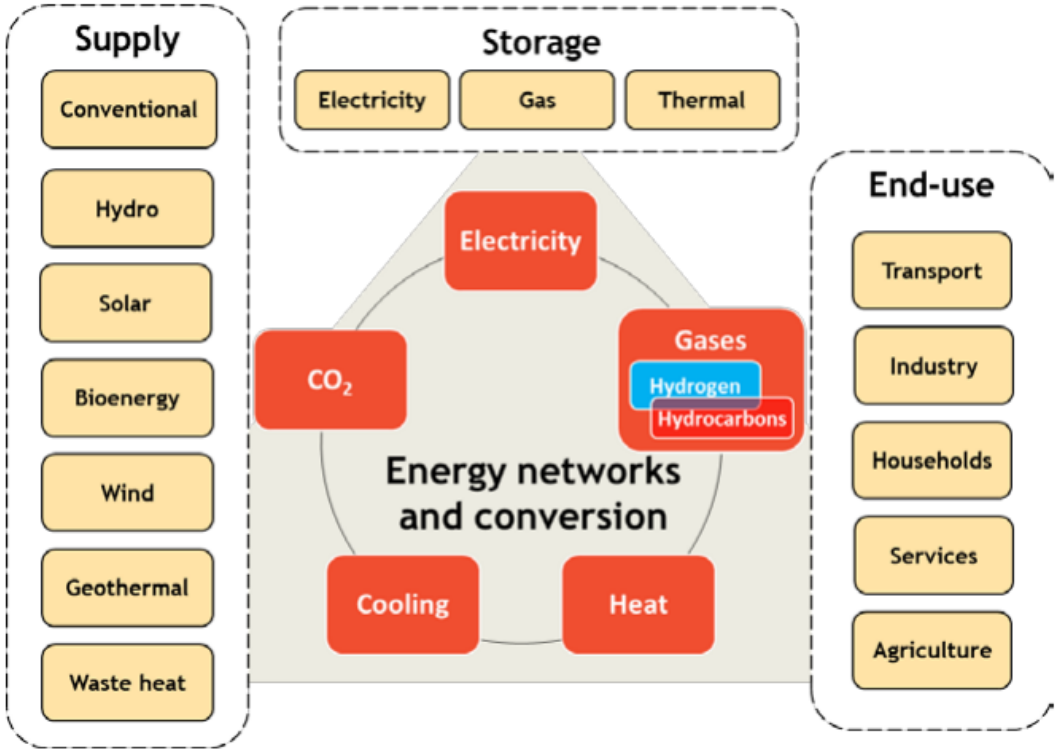
Coupling of the energy system sectors



- Zonal approach being questioned due to increased congestion levels and slow progress in grid extension
- Further electrification of many sectors (industry, transport, heating, etc.)
- Digitalisation, technological innovation, large-scale roll-outs (e.g. offshore wind/off-shore BZs), energy system integration
- Increased potential of demand-side flexibility, storage, etc.

https://www.europarl.europa.eu/RegData/etudes/STUD/2018/626091/IPOL_STU(2018)626091_EN.pdf

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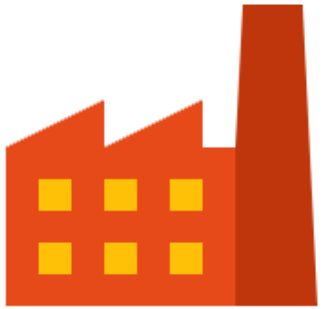
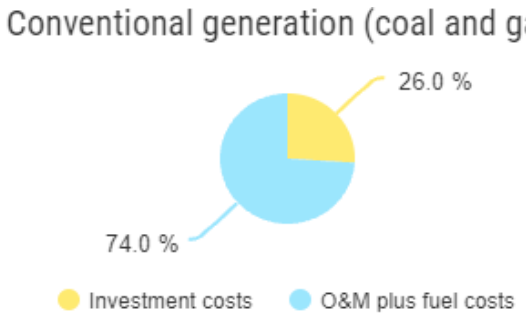
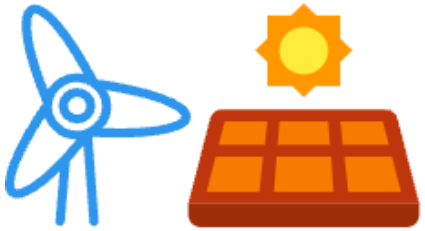
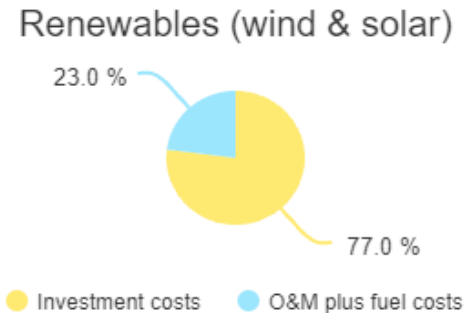
Role of wholesale markets in a high renewables system





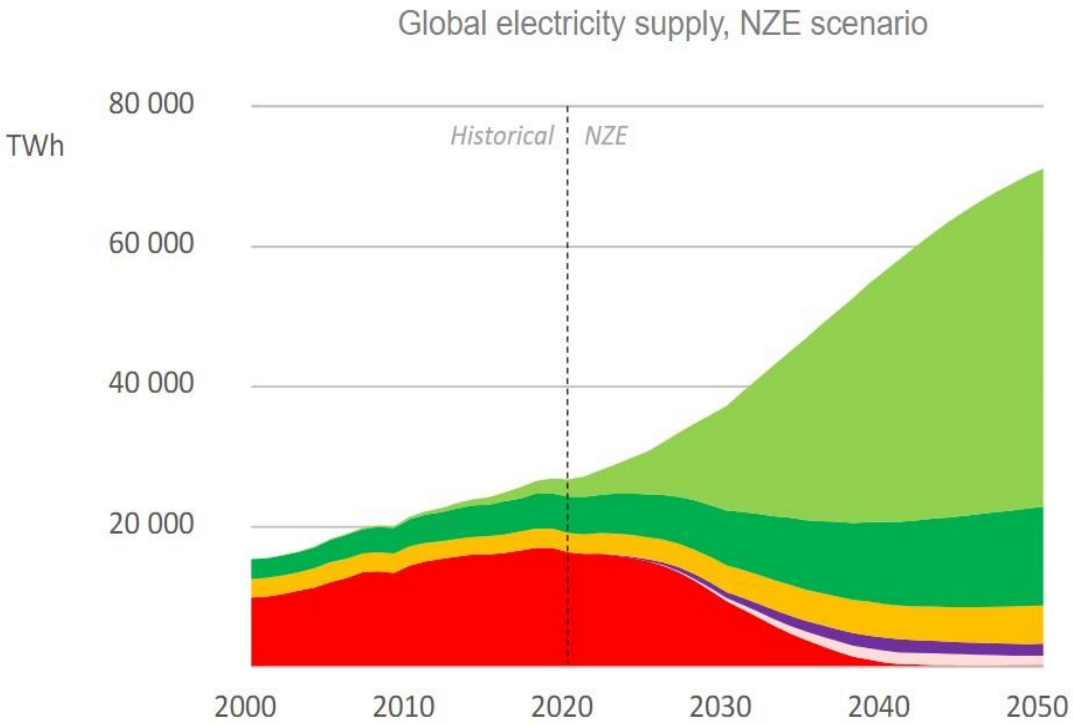


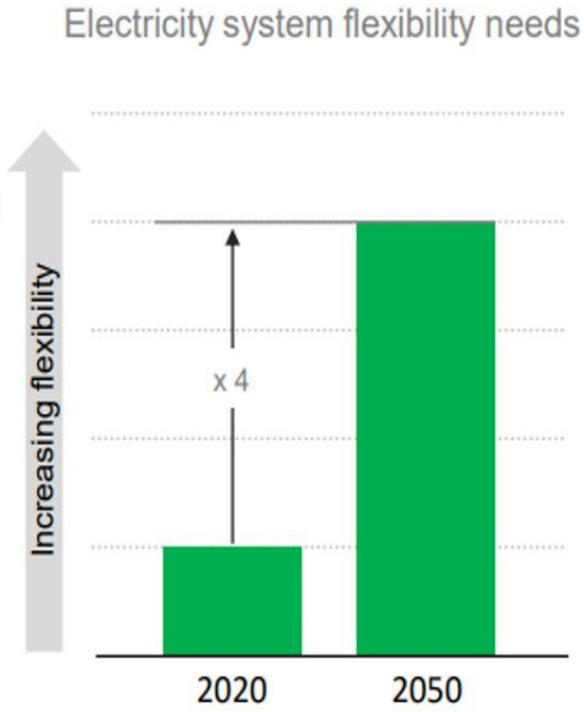


- Decarbonisation targets will require high shares of renewable energy.
- Renewable and low-carbon gases at large scale will require an evolution of the current market design.
- RES projects with high up-front capital costs but very low marginal running costs
- Subsidy schemes are widely used and distort the markets

Source: ACER based on the IEA

Outlook for global electricity generation and associated flexibility needs towards a 2050 net zero trajectory





Source: Net Zero by 2050: a Pathway for the Electricity Sector, IEA May 2021

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Responsibilities of the Market Operator in this Era

Transparency

As one of the most inevitable factors in building trust in the energy markets, transparency constitutes the foundation to perform the market operating acti- vities. This principle provides information open to and accessible by everybody as well as equality opportunity to all market participants in business sense.

Reliable

With its high technological infrastructure and advanced surveillance mechanisms, EPİAŞ is a market that imbue people with trust in the energy markets.

Liquidity

An important indicator of a successful market, the liquidity expresses high trading volumes and high market participation. EPİAŞ meet requirements to ensure formation of liquidity in the energy markets.

Equality

EPİAŞ guarantees energy trade with equal trading conditions for everybody. For this reason, it takes its position at an equal distance to all market participants and provides competitive market conditions and makes contribution to development of the energy markets.

Development

EPİAŞ believes that success is a result of a process of intensive work an conti- nuous improvement. Each step it takes consistently follows the previous one, contributing to development of the energy markets as a whole.

Cooperation

EPİAŞ develops the energy trade in a close cooperation with all interested market participants. Participatory approach is especially important for EPİAŞ. It sets up working groups to identify all market developments and requirements, holds discussion meetings or conducts surveys and emphasizes significance of cooperation with all stakeholders.

Simplicity

EPİAŞ designs the processes required by the energy markets as simple as pos- sible and establishes a facilitation market structure to promote the trade.

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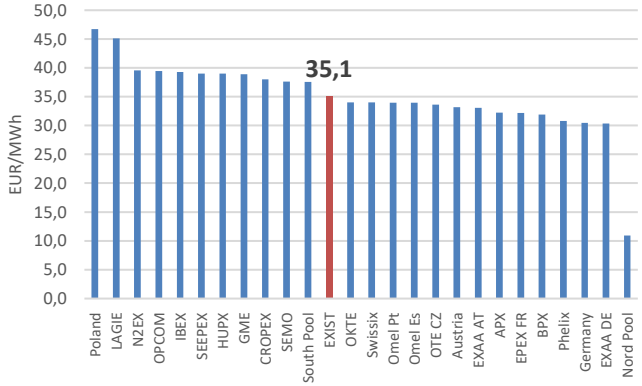
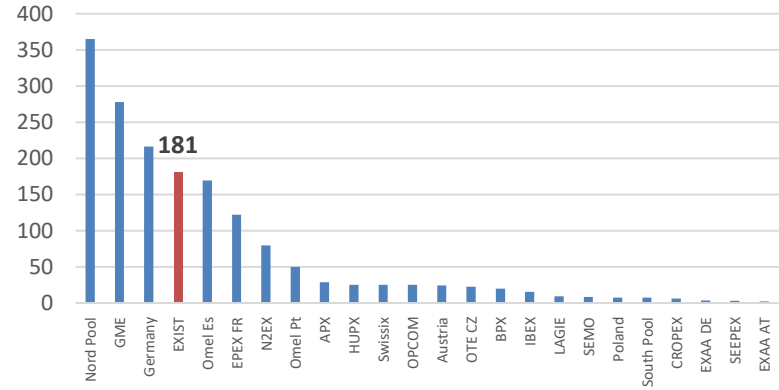
DAM

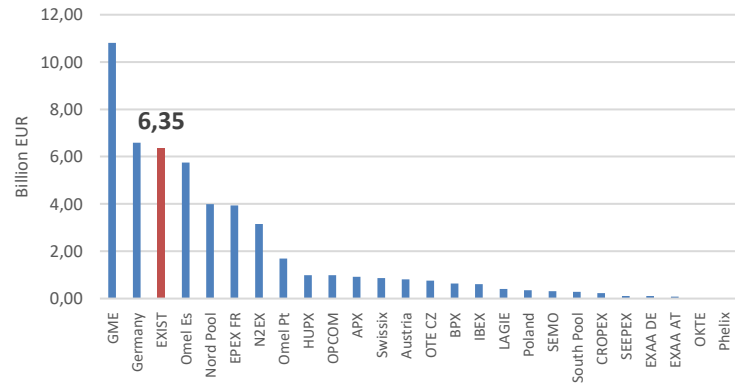
2020 DAM MCP



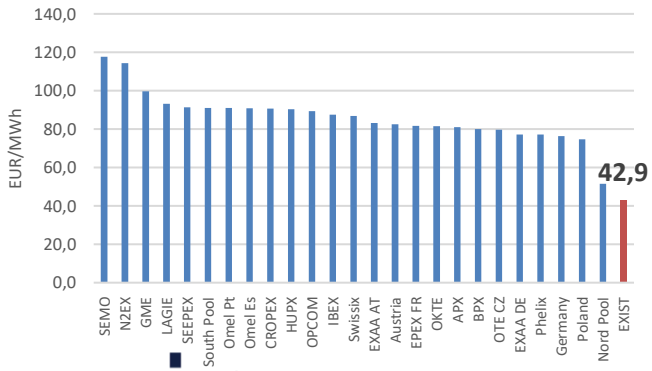
2020 DAM Volume



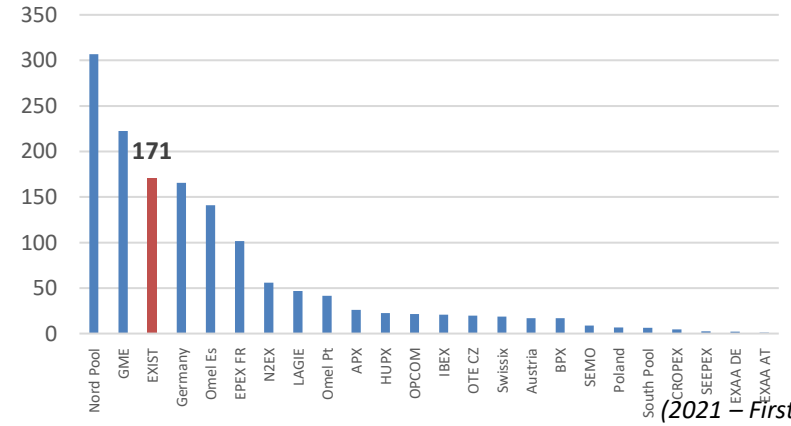
2020 Financial Volume



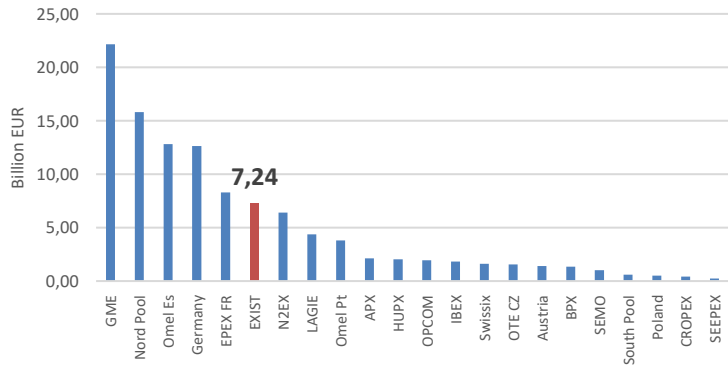
2021 DAM MCP



2021 DAM Volume



2021 Financial Volume



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(2021 – First 10 Months)

Source: Montel Eurospot – Some Values may have numeric differences and some volumes are missing with respect to lack of data

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Energy Exchange Istanbul

Electricity Day Ahead and Intraday Market Operations

Power Futures Market Operations

Organized Wholesale Natural Gas Spot Market Operations

Natural Gas Futures Market Operations

YEK-G System and Market Transactions with Blockchain

Settlement and Financial Transactions of Day-Ahead, Intraday, Balancing, Power Futures Market

Settlement and **Financial Transactions** of Organized Spot & Natural Gas Futures Market

Settlement of Ancillary Services Market,

Billing Transactions & **Eligible Customer** Transactions

RESS Operations

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THANK YOU

Ahmet Türkoğlu
EXIST CEO

December 1, 2021
Athens