



ECONOMIC
CONSULTING
ASSOCIATES



Energy crisis and regulatory considerations for the future market model

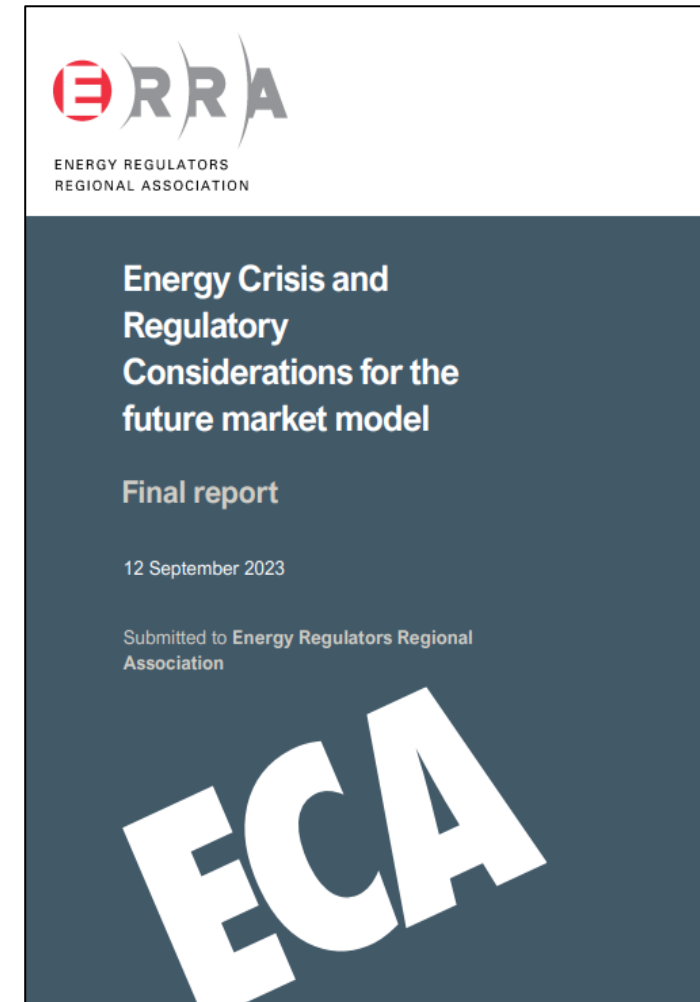
Nick Haralambopoulos
Economic Consulting Associates



ERRA EMER Committee Meeting
January 23, 2024 | Online meeting

Study purpose and presentation contents

- Study objective
 - Highlight experiences from the recent energy crisis
 - Identify lessons and measures that might serve as a guide for responses to future crises
- Study approach
 - Desk-based research
 - ERRA secretariat interviews with ten member regulatory agencies
- Today's presentation
 - Overview of the energy crisis
 - Responses to the crisis
 - Retail market and consumer support interventions
 - Wholesale market interventions
 - Lessons regarding both short and long term interventions and measures

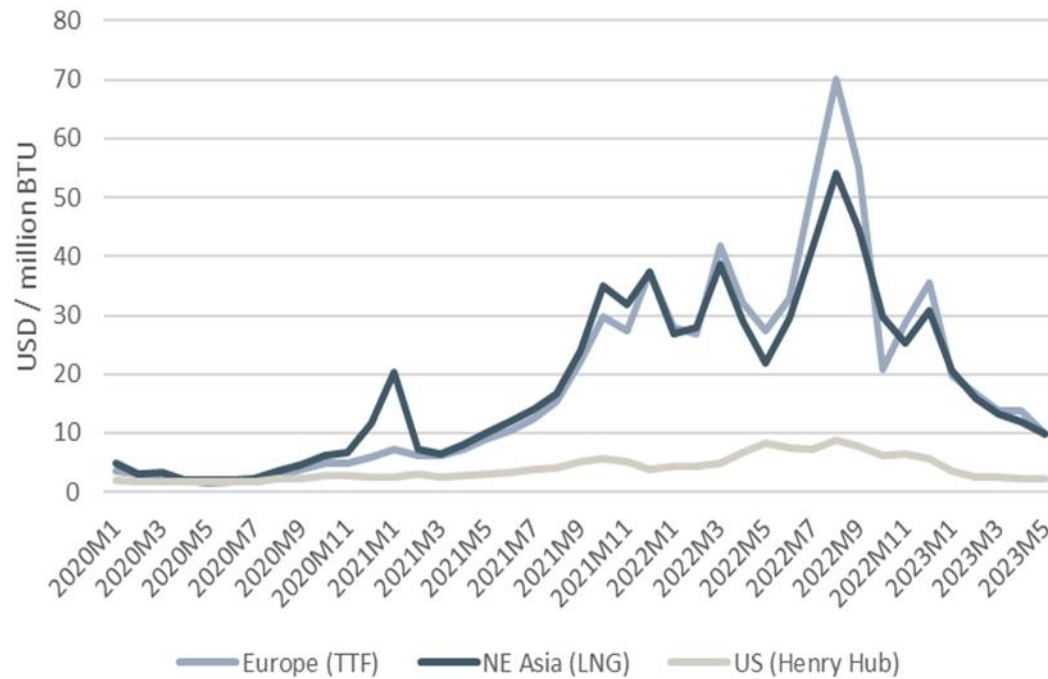


The energy crisis generated unprecedented increases in gas and electricity prices in many countries ...

- The energy crisis started developing in 2021, as the easing of COVID-19 restrictions released **pent-up demand** against a backdrop of **supply side constraints**
- Russia's invasion of Ukraine in February 2022 then resulted in severe **energy supply disruptions** and significant **uncertainty**
- Coupled with other factors (including **extreme weather events**), this pushed global energy markets deeper into crisis
- Europe's **dependency on Russian energy** placed it at the centre of the crisis, but the effects were global
- Gas prices reached unprecedented levels in many markets, which, in turn, drove exceptional increases in wholesale electricity prices
- Governments (and regulators) in many countries were faced with the urgent issue of how to respond – in particular, to maintain **consumers' access to energy at affordable prices**
- In jurisdictions with electricity wholesale markets, questions were also raised as to **whether the market designs remained fit for purpose**

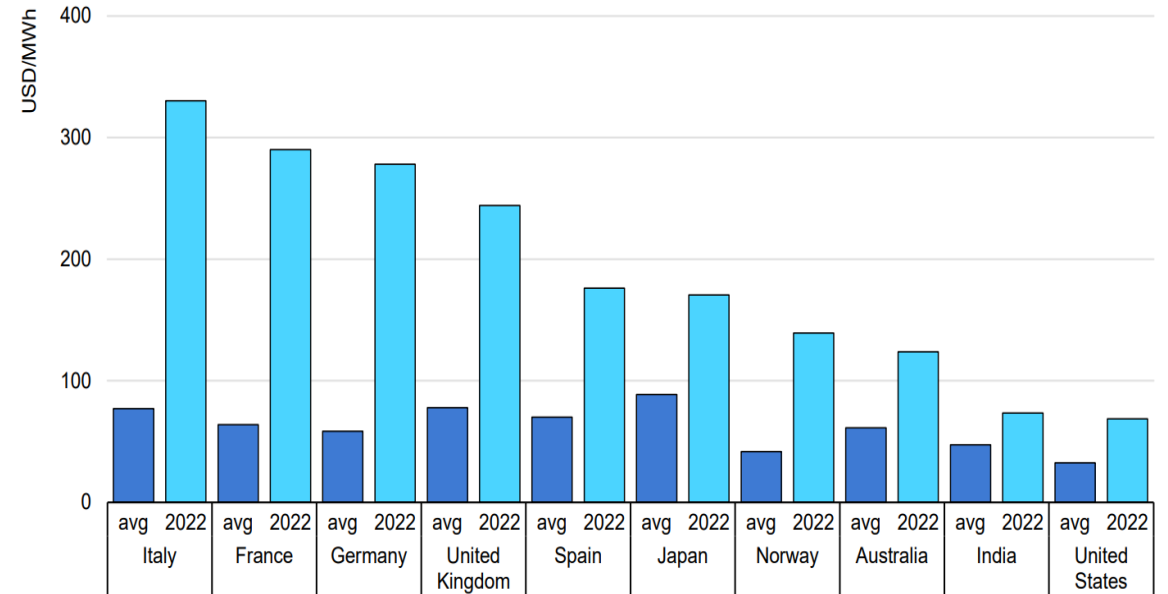


Monthly average gas prices from 2020 to 2023



Electricity wholesale prices in 2022 vs 2017-2021 average

Source: IEA (2023) Electricity Market Report



... compelling government (and regulators) to intervene with a range of measures, primarily to support affordability

- Many types of measures were adopted, often as a matter of **urgency**, in response to the crisis
- The details of **interventions varied**, not least depending on the stage of development of competition in wholesale and retail markets
- The costs of the interventions were material – with estimates ranging between **\$500bn and \$760bn**
- The nature of the interventions and the sizeable fiscal implications **required government to (typically) lead the response**
- The **role for regulators was important** but, inevitably, more limited (particularly in the short term), including
 - Acting as an expert advisory body to governments
 - Implementing (and monitoring the effect of) measures
 - Streamlining and ensuring the efficacy of processes for transfer of customers (supplier of last resort)

Taxonomy of some of the key measures

Examples of short term measures (mainly to address affordability)

Direct financial support

Retail price caps

Reduced tax on retail bills

Demand reduction

Cap fuel price for fossil fuel generators

Cap on electricity price of
inframarginal producers

Cap on all wholesale electricity prices

Other measures

Windfall taxes

Energy supplier measures

Wholesale market design issues

Export restrictions

Gas storage and supply diversification

Additional generation capacity

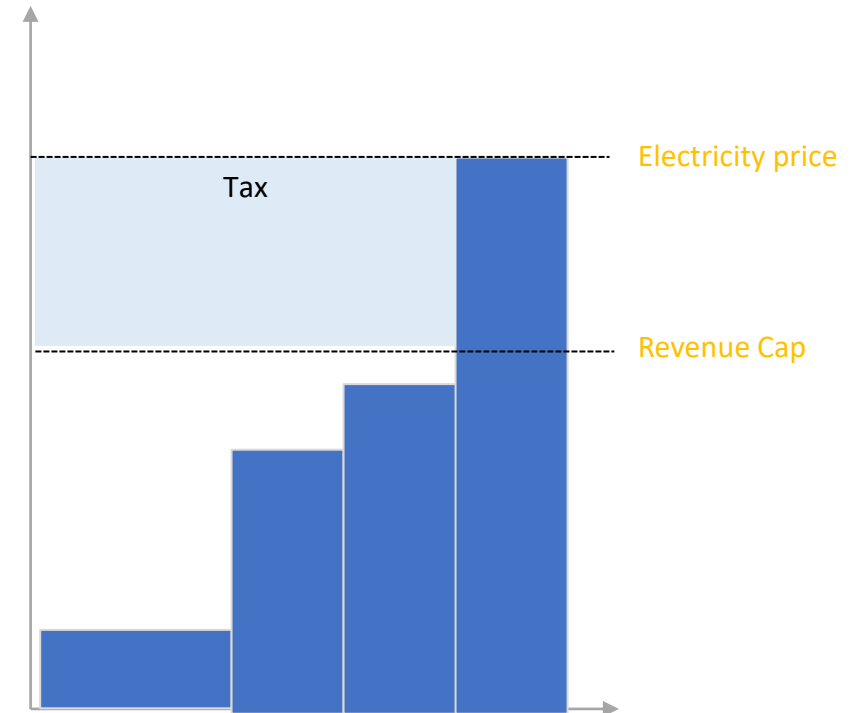
Elaboration of some of the measures instituted to support consumers and affordability

Direct financial support to some or all consumers	This measure is relatively easy to implement and leaves markets to operate largely unchanged, with price signals unaffected. Strong incentives for consumers to reduce demand are retained. Such support can be targeted (eg to low income households)
Retail price caps	Revenue shortfalls between the cap and supplier costs would need to be 'made good' by government. Depending on detailed implementation, retail competition may be distorted and incentives to reduce demand weakened
Reduced taxation on electricity charges	A relatively distortion-free approach to providing support that is also relatively easy to implement. However, it is not (typically) a very targeted measure, applying to all (or most) consumers
Demand reduction	A largely distortion-free approach to improving affordability. Encouraging short term behaviour change (eg through communication campaigns) can be challenging
Energy supplier measures	Not directly related to affordability but measures to protect consumers through, for example, requiring suppliers to hedge (and offer fixed prices), protection against disconnection, and efficient supplier of last resort procedures

Wholesale market interventions – example 1

Revenue cap on inframarginal electricity generators

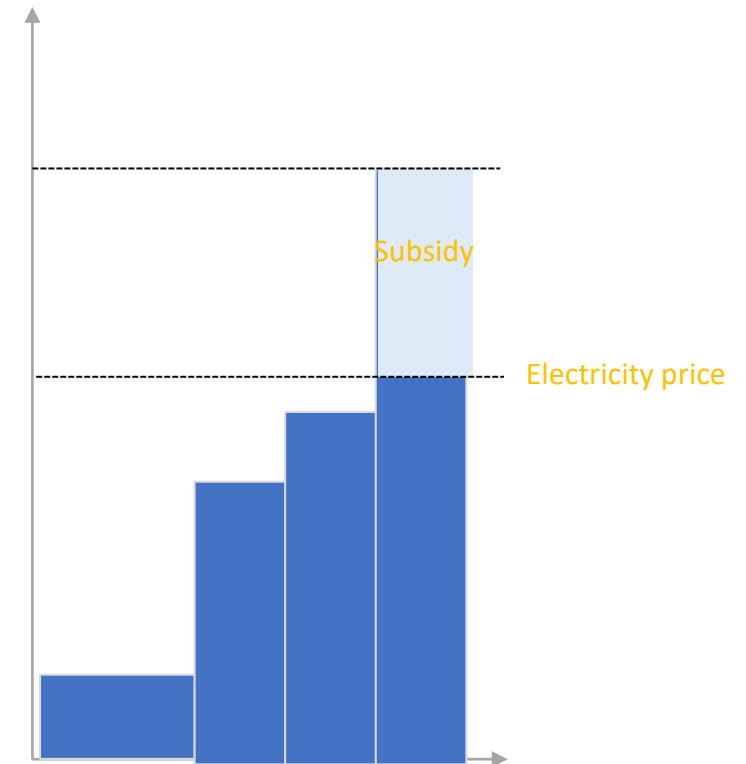
- Returns to inframarginal generators, such as renewables and nuclear, increased during the crisis, even though their operating costs were largely unaffected
- Capping the revenue of inframarginal generators transfers rents from them to government (who can choose to use the additional revenue to support consumers)
- Price formation and functioning of the wholesale market are largely unchanged (retaining dispatch by merit order)
- Setting the cap at an appropriate level is a challenge and it is difficult to implement for bilateral contract trades (PPAs)
- The European Commission adopted this as a temporary measure in response to the crisis (with a subsequent recommendation to not extend its application, given potential adverse impacts on PPAs)



Wholesale market interventions – example 2

Gas price cap for electricity generators

- Spain and Portugal established a cap on the cost of gas for power generation
- Generators are compensated for the difference between the level of the cap and the wholesale gas price they face
- Introduced in June 2022 for a year to ensure gas generators submit lower bids into the power market
- Cap was set at €40/MWh for six months, with a gradual increase until reaching maximum value of €70/MWh
- Electricity price rises were contained, but there were negative externalities, with more exports to France (ie Spanish taxpayers subsidising French consumers), and greater dependence on gas-fired generation

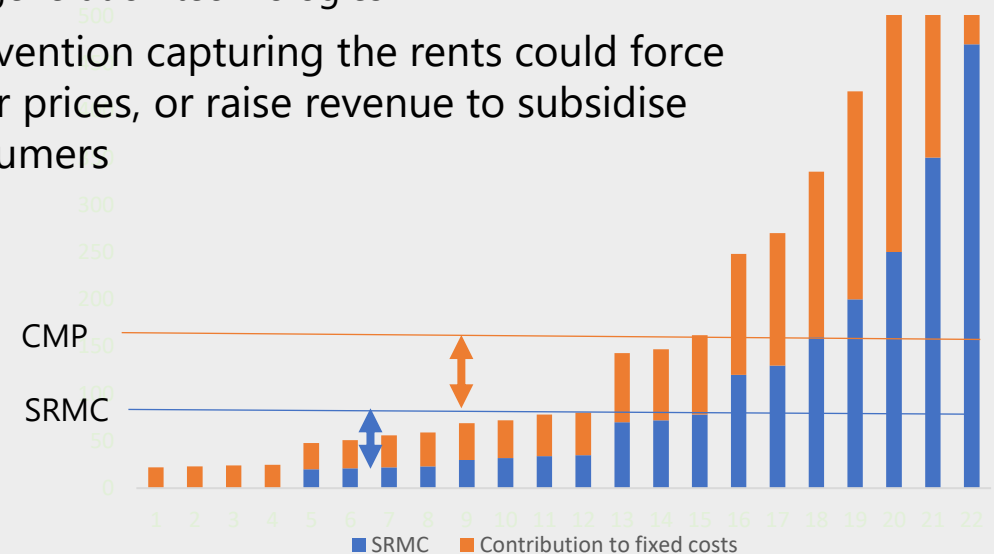


Thoughts on the economics of intervention

- Markets are meant to reflect supply and demand fundamentals
 - Marginal prices signal scarcity and encourage investment in scarce capacity
 - Short term price signals also signal long term shortage so remain valid signals
- But marginal prices give rise to inframarginal rents
 - At what stage are these windfall profits?
- Interventions to capture inframarginal rents will blunt price signals
 - It is a trade-off
 - There is a regulatory risk for investors – does this raise long term costs for consumers?

- ▶ A 'normal' market offers acceptable inframarginal rents
- ▶ A price shock (gas price rise) raises the rent for those with unaffected variable costs
 - Excess inframarginal rent is signal to invest in different generation technologies

- ▶ Intervention capturing the rents could force lower prices, or raise revenue to subsidise consumers



- ⬆️ Inframarginal rent against short run marginal cost (SRMC)
- ⬆️ Inframarginal rent against commercial market clearing price (CMP)

Short term interventions were often introduced (necessarily) in haste and there are lessons to learn

1. Secondary effects of measures need to be considered, especially where competition is in place, to minimise interference with price signals and unintended outcomes
 - a) Demand reduction, direct financial support to consumers and reduced taxation are all measures that have minimal distortionary effects on competition
 - b) Retail price caps may affect retail competition (if it exists) but may leave wholesale markets largely unaffected
 - c) Interventions in wholesale markets run the greatest risk of undesirable and/or unintended outcomes
2. Short term interventions should be targeted
 - a) First, in the case of supporting affordability, to where it is most needed (eg the energy vulnerable) to minimise intervention costs
 - b) Second, to the extent possible, at the root cause of the problem, rather than at symptoms
3. Emergency interventions should be time limited (not open-ended) to support control of costs, minimise negative consequences and provide an opportunity for re-evaluation

Longer term measures may help to mitigate the effects of any future crisis

- Longer term measures and policy that are primarily the domain of governments include
 - Introducing greater diversity in generation to increase the resilience of electricity markets to shocks
 - Additional flexibility (ideally from non-fossil fuel sources, such as storage and demand response) to accommodate more renewable generation (which contributes to diversity and decarbonisation goals)
- Longer term measures that regulators can consider in preparing for and mitigating effects of future shocks include
 - **Development of markets** and market design – eg a greater role for longer term markets, creating a buffer between short term wholesale price changes and consumers' bills
 - Establishing regulatory processes that allow for the **accelerated transmission network** development needed to accommodate the connection of new renewable generation
 - **Protection against market failures** or problems observed during the crisis – eg requirements for holding strategic gas reserves, conditions on financial robustness of suppliers, and supplier of last resort provisions



**THANK YOU
FOR YOUR ATTENTION!**

Nick Haralambopoulos
nick@eca-uk.com