

# Where is the world's best power market design?

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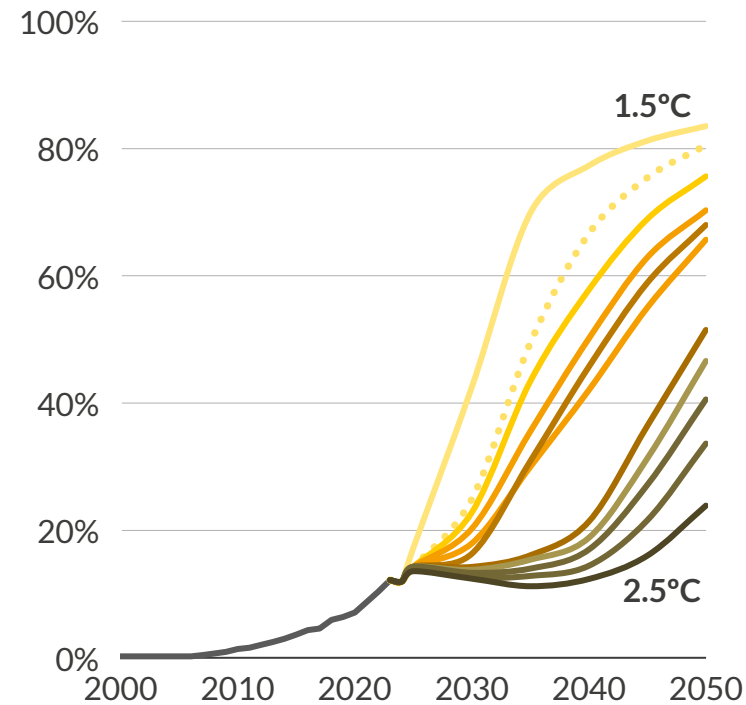
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# Current global plan A for hitting ~2 degrees of warming sees the electricity sector playing an enormous role

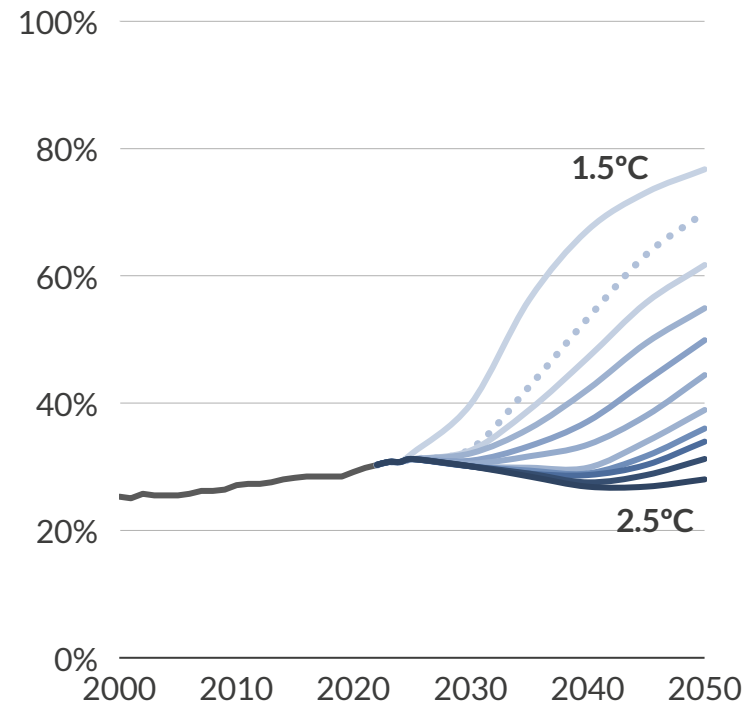
Renewables penetration grows 500% in 25 years...

Solar + wind share of generation



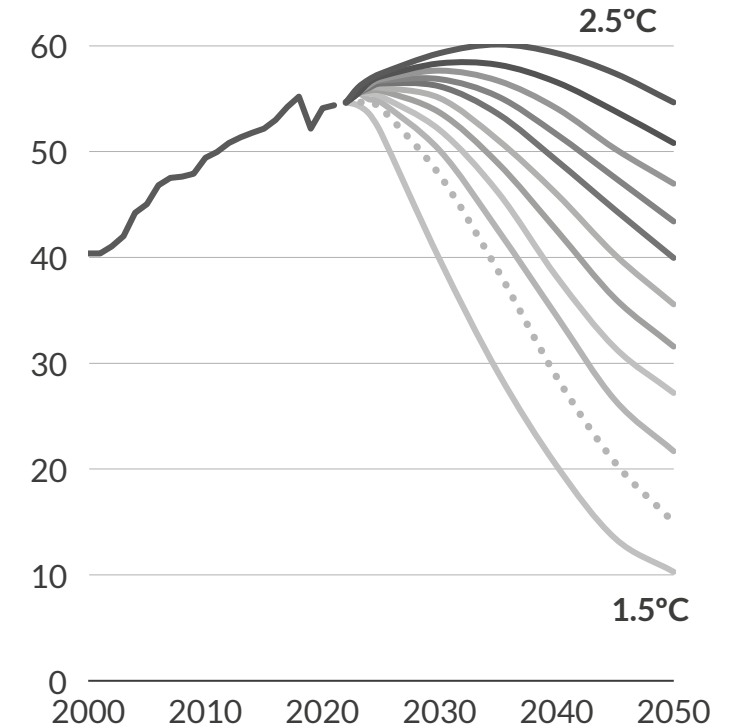
...at the same time as power demand booms...

Electricity share of useful energy



... for emissions to deliver ~2degrees of warming

GtCO<sub>2</sub>e



- I. No optimal regulatory model exists for power markets. History, geography and politics ensure this**
- II. Policies that reinforce the underlying economics of power generation and transmission are more sustainable in the long run**

# Historical decisions impact the optimal regulatory model

## Historical variables

## Global examples

## Regulatory model implications

### Market structure

Zonal pricing



Strong “outside market” regulatory influence on locational decisions (LTESA, constrained REZs)

Costly and complex to switch to LMP

Locational marginal pricing (LMP)



Energy markets do more work in driving investment and power flows;

Little debate on reform to change market price signals

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#### Existing assets

Nuclear dominance



State generation ownership (e.g. EDF, BPA, Norske Hydro) to drive economies of scale and appropriately allocate risk

Hydro dominance



Major asset-specific intervention (e.g. MRE – mecanismo de realocação de energia)

# Political context impacts the optimal regulatory model

## Political variables

## Global examples

## Regulatory model implications

Carbon pricing

Politically challenging



Texas



Non-market payments drive decarbonisation: “Direct Pay”; LRET; Rooftop solar FiTs; hydrogen subsidies; ARENA; CEFC

Broad support



Northeast



Market-driven low carbon investment; PPAs for renewables rather than government contracts; need for credible long-term carbon policy

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### Capacity Mechanisms

Politically challenging



Texas



Strong scarcity pricing; strategic reserves; direct Government support (e.g. Vic Gov’t’s lignite support )

Broad support



Northeast












Less scarcity pricing; state role in defining “scarcity events”

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Political variables	Global examples	Regulatory model implications
Carbon pricing	Politically challenging   Texas	Non-market payments drive decarbonisation: “Direct Pay”; LRET; Rooftop solar FiTs; hydrogen subsidies; ARENA; CEFC
	Broad support   Northeast	Market-driven low carbon investment; PPAs for renewables rather than government contracts; need for credible long-term carbon policy
Capacity Mechanisms	Politically challenging   Texas	Strong scarcity pricing; strategic reserves; direct Government support (e.g. Vic Gov’t’s lignite support )
	Broad support   Northeast	Less scarcity pricing; state role in defining “scarcity events”
Nuclear	Politically challenging 	Short term increase in emissions; one less low carbon option in the mix



# Geography impacts the optimal regulatory model

## Geographic variable

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## Population density

Low density



Existing grid topology strongly influences future investments  
Early need to adoption of location price signals (e.g. MLFs) within a zonal framework

High density



Northeast



Early offshore wind investment (onshore too difficult politically);  
Transmission network build very difficult; policies to support other forms of congestion management desirable (batteries; long duration storage, etc.)

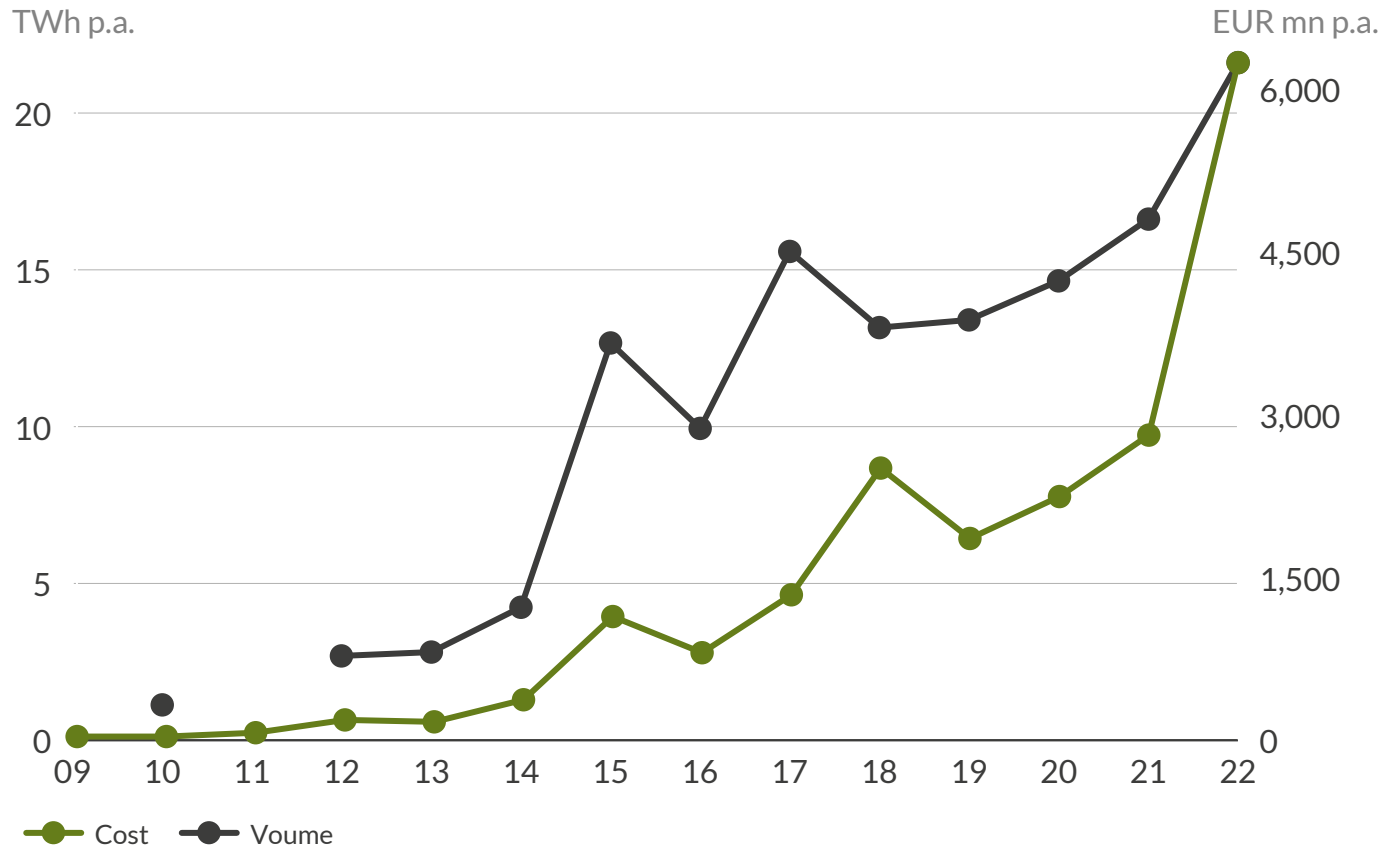
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# Germany: absence of any locational pricing and largely-state-driven renewables build created an unsustainable policy situation

Socialised costs of managing congestion have exploded...

... and the obvious political solution is too expensive

Congestion management in Germany



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