

Addressing the crisis with a resilient power market design and electricity prices in check

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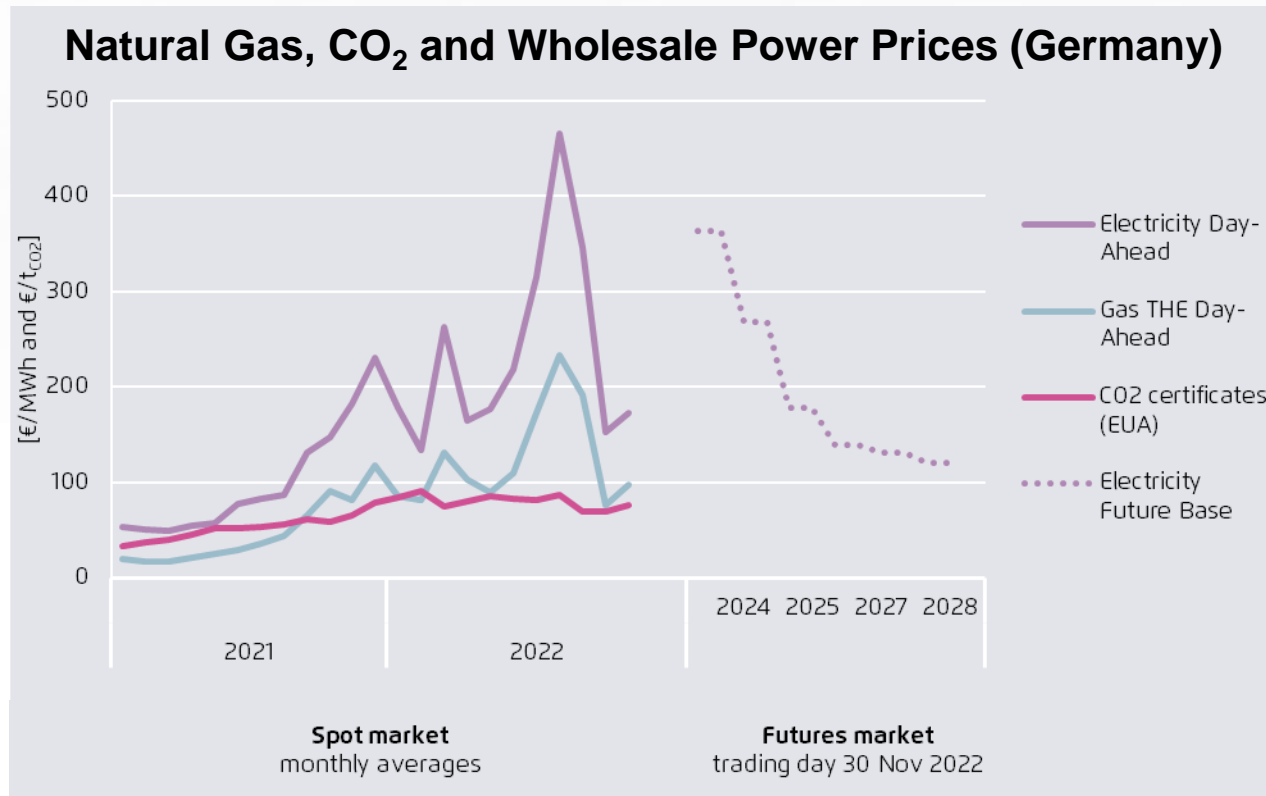
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Energy Prices



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High power prices resulting from gas shortages initiated discussions on power market design adjustments.



Agora Energiewende based on Bloomberg (2022)

- Increased gas prices and power prices are a **huge burden for customers**
- They also **increased producer rents** of renewables to very short amortization times for investments
- However, an immediate **investment boost is not triggered**

How could European electricity market design protect consumers in the gas crisis?

- Which **key requirements** does European market design need to fulfil?
- Which **market design parameters** are suitable for adjustment?
- Which **options** are on the table?
- What is the **recommended way forward**?

European power market design needs to be compatible with the requirements of the energy transition.

- Continue **competition** to stimulate innovation in generation and supply
- Foster EU **market integration**
- Support of **decentralised generation investment** and governance, enabled by digitalisation
- Ability to **deal with** fuel scarcities and fuel **price shocks**

Market design parameters are under review in the UK.

Wholesale Market (operation)	Location	Zonal pricing		Nodal pricing				
	Technology	Unified market		Split by characteristic				
	Price formation	Pay-as-clear		Pay-as-bid + average pricing				
	Dispatch	Self-dispatch		Central dispatch				
Investment	Mass low carbon power	Voluntary CfD	Mandatory CfD	Deemed generation CfD	Supplier obligation	Revenue cap and floor	Dutch subsidy	Equiv. firm power auction
	Flexibility	Optimised CM	CM with flex enhancements	Supplier obligation (inc. CPS)		Targeted tender	Strat. reserve	
	Capacity adequacy		Capacity payment	Centralised reliability option	Decentralised reliability option			
	Operability	BAU	BAU+	Local markets	Changes to CfD/CM design	Co-optimisation	Dedicated support scheme	

The most obvious parameter to adjust would be price formation.

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Pay-as-bid would not change bidding behaviour.

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Central dispatch has potential advantages...

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... but is a complex change with long implementation time.

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Market split (“Greek proposal”) is also in discussion...

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... but many fundamental problems.

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Intermediate summary

Change of price formation to pay-as-bid

- Theory and practice shows **no substantial change** of bidding behaviour

No realistic option

Market split into two segments

- Known as the “Greek proposal” to deal with the gas price crisis.
- Numerous **fundamental and implementation problems** emerged in the discussion of the past months

No realistic option

Transition to central dispatch

- Could potentially facilitate unit and cost-based bidding
- Has potential advantages in dispatch efficiency, operational security
- Should be considered in combination with nodal pricing at a later stage of market development

Possibly future relevance

Complementary measures

- PPA support and Contracts for Differences are interesting options for fast implementation

Closer examination

What remains are investment-related parameters.

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Three development options: PPA support, voluntary and mandatory CfD are further examined.

Option 1: PPA support*

- National barriers to the use of PPAs are removed
 - Revenues from Guarantees of Origin revenues can be realised
 - Other supportive measures (platform, pooling etc.) are implemented
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Option 2: Voluntary 2-sided Contracts for Differences (CfD)

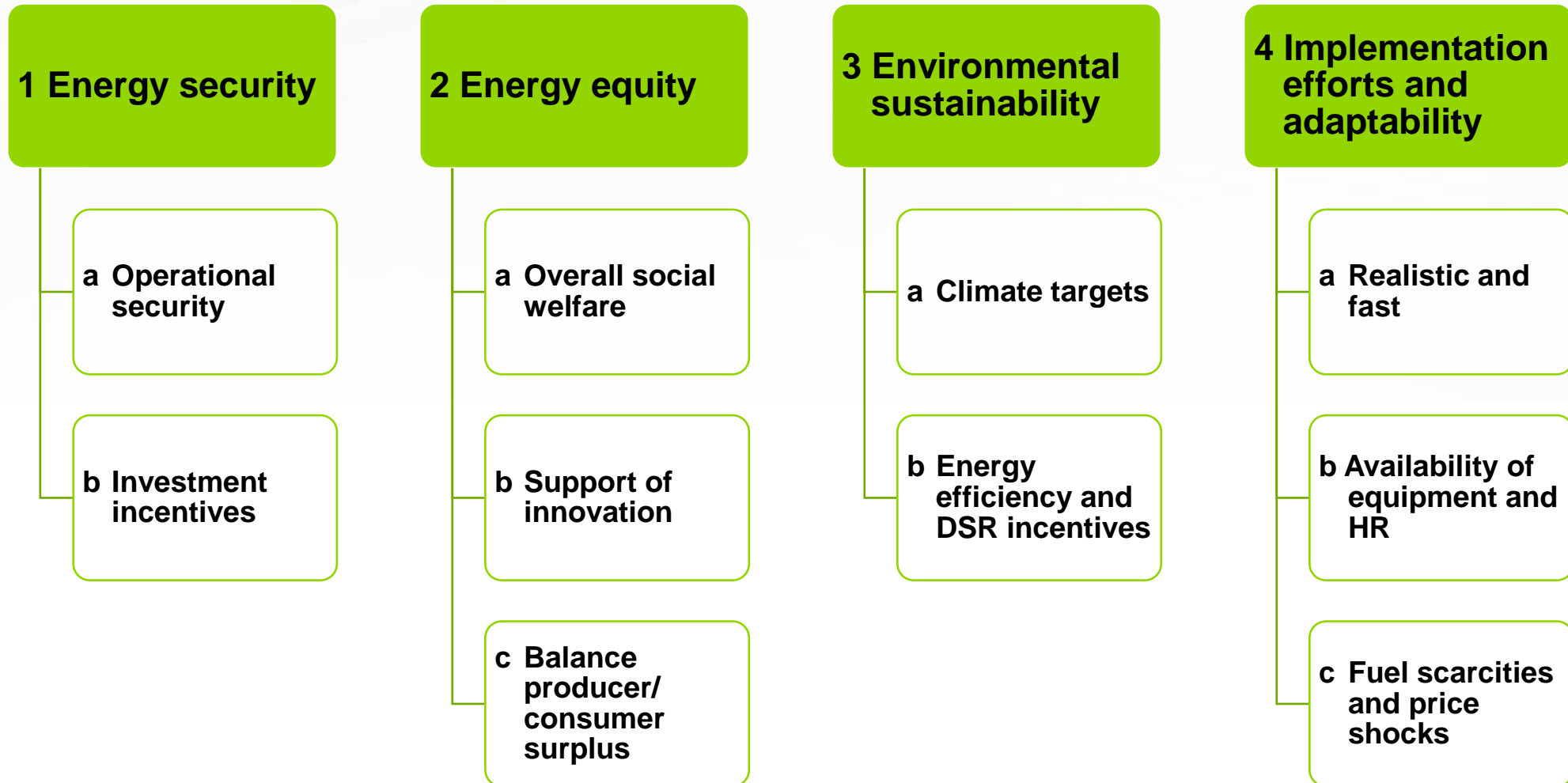
- Support for new low carbon technologies administered by the state in auction-based systems
 - System is open for entry by existing generators
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Option 3: Mandatory 2-sided CfD

- Requirement for new all low-carbon generators to join the scheme

* Key features outlined in the Commission staff working document SWD (2022) 149 final as of 18.5.2022

We defined 4 main and 10 sub-criteria for evaluation of the options.



We evaluated the options against the defined criteria and compared them to the status quo.

1 Energy security

2 Energy equity

3 Environmental sustainability

4 Implementation efforts and adaptability

Options	1a Operational security	1b Investment incentives	2a Max social welfare, efficiency, least cost	2b Balance consumer - producer surplus	2c Support of innovation	3a Climate targets, externalities	3b Incentives DSR, energy efficiency	4a Realistic, fast to implement (fit w/ stable cond's)	4b Fit w/ equipm. / HR scarcities	4c Fit w/ fuel price shocks
1 PPA support	○	○	○	○	●	○	○	●	○	○
2 Voluntary CfD	●	●	○	●	○	●	○	●	●	●
3 Mandatory CfD	●	○	●	●	●	●	●	●	●	○

Legend: ● Improvement ○ Balance of pros/cons ● Worsening

Voluntary CfD score best compared to status quo while problems of the mandatory approach exist.

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2 Voluntary CfD	●	●	○	●	○	●	○	●	●	●
3 Mandatory CfD	●	○	●	●	●	●	●	●	●	○

Option 1: **PPA support** does not change the picture, but **supports market forces and innovation**

Option 2: **Voluntary CfD** offer government-backed **security for investments** and hence **increases consumer surplus**

Option 3: **Mandatory CfD** could increase consumer surplus even more but would **impede innovative solutions**

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3 Mandatory CfD	●	○	●	●	●	●	●	●	●	○

Options 2&3: **Both CfD options** support climate targets by providing investment security.

Option 1: **PPA support** is easiest to implement,
 Option 3: **Mandatory CfDs** are the hardest to implement

Option 2: **Voluntary CfD** are a good option to deal with future price shocks

Summary and conclusions

- We looked at the history and particularities of EU electricity markets, main targets they must achieve, and current challenges.
- Of many detailed market design options, **we concentrated our analysis on those with low implementation barriers**. Some harder-to-implement options may become part of later, 5th Package discussions, especially if they support high RES shares, complete decarbonisation, flexibilities.
- We **evaluated PPAs and voluntary as well as mandatory CfDs** against the main targets and 10 sub-targets, especially consumer protection.
- **Voluntary CfDs show the most pros and very few cons. PPAs are easy to implement but with limited benefits. Mandatory CfDs have strong cons.**
- The **consumer protection effects grow over the years** with new investments; short-term relief depends on uptake by existing resources.
- **CfDs** smoothen, make less risky contributions to margin for investors, **help protect consumers** during high prices but **may cost them more during low prices**.
- **Lower Rate of Return risk premiums** and some investors' acceptance of lower windfall profits can **provide net price reductions over years**.