The EU power sector needs long-term price signals

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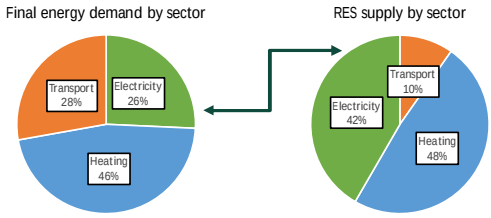
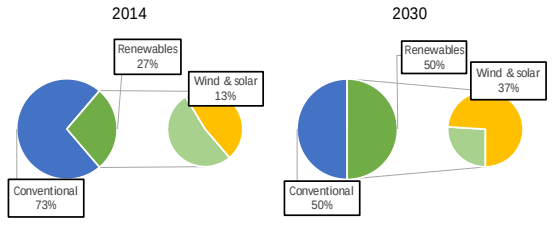
Where we are (EU-28, 2014)



- Power sector is contributing over-proportionally to decarbonisation
- Transformation is more quick than in heating or transport
- Change is profound and will continue

Where the power sector is going to



- Renewables covered 27%
- Intermittent sources: ~50% of that

- Renewables will cover 50%
- Intermittent sources: ~75% of that

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Implications

Renewables	▪ Growing market share ⇔ significant capacity additions needed
Conventional power	▪ Decreasing market share & intermittency of renewables ⇔ reduction of running hours (less utilisation) ▪ Relegation to "back-up" tasks ▪ In 2030, half of the capacity could be on stand-by 80% of the time

- **High importance of cost of capital**
  - Renewables: high up-front costs & close-to-zero operating costs
  - Back-up power: low utilisation ⇔ low utilisation
- **Different from the technology choices envisaged by the Third Package**
- Uncertainty of recouping fixed & investment costs will be reflected in:
  - Cost of capital, ergo: investment decisions
  - Capacity retirement choices

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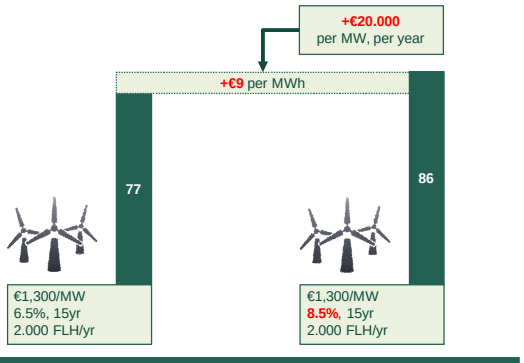

- Additional wind capacity until 2030: +150 GW
- +2% cost of capital ≈ +€3 billion / year
- Long-term arrangements are beneficial to keep cost of capital under control

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Long-term price signals in the current market framework

Bilateral contracts
- Contract between a buyer and a seller
- Counterparty risk difficult to hedge, resulting into high cost of guarantee
- Potentially to be approved (antitrust)

Forward markets
- Central marketplace for trading electricity ahead of delivery
- "Tradable bilateral contracts"

Contracts with regulated counterparty
- Already used in most renewable support schemes
- Regulated counterparty: TSO,…

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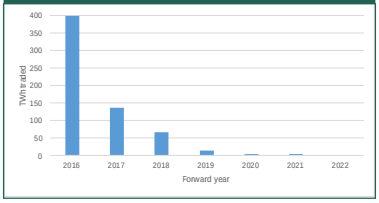
Forward markets today

Volumes traded in 2015, Germany (*PHELIX-Base-Year-Future*)



Uncontested
- There is price visibility for 2-3 years
- There is no significant price visibility for later years
- Base futures are not compatible to intermittent renewables

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LT contract with regulated counterparty

Example: evolution of renewable support schemes

Feed-In Tariff
- Fixed tariff (€/MWh) set administratively
- Power is commercialised by 3rd party (TSO)
- Long-term contract (10+ yrs)

Contract for Difference (CfD)
- Fixed remuneration level (€/MWh), set administratively
- Direct commercialisation
- Balancing responsibility
- Long-term contract

Auctions
- Fixed remuneration level (€/MWh), set by competitive bidding process
- Direct commercialisation
- Balancing responsibility
- Long-term contract

All steps so far: long-term contracts (…but fragmentation across EU)

Conclusions & policy options

Facilitate bilateral LT contracts

- High cost of guarantee
  - Policy option: socialise cost of guarantee
- Uncertain approval times
  - Policy option: provide guidance regarding antitrust matters

Define framework for LT contracts with regulated counterparty

- Fragmented approach so far (type of contract, price discovery, cross-border participation)
  - Policy option: include contracts with regulated counterparty in target model

Thank you for your attention

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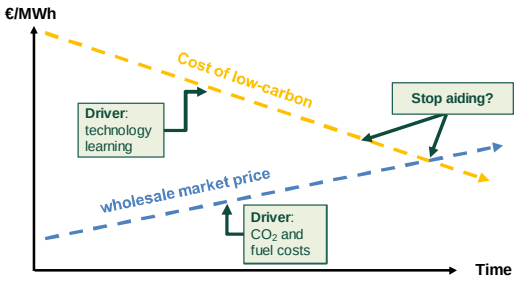
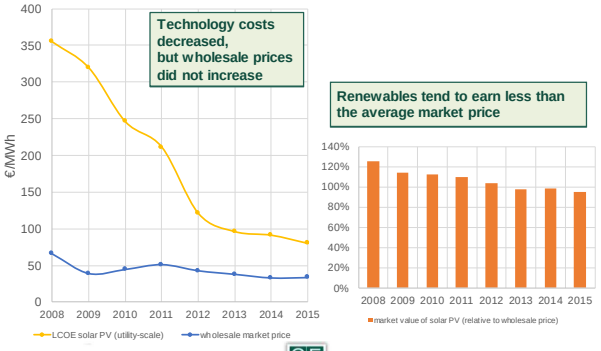
Expectations in 2007/08



Reality (German market)



Compared to other commodities, churn rates of power markets are low

Churn rate

- Ratio of traded volume to actual physical throughput
- Commodity market deemed to have reached maturity when the churn rate is above 10
- Financial players unlikely to participate in markets with low churn rates

Churn rates of EU gas hubs*	2012	2013	2014
NBP (GB)	21.4	18.7	26.2
TTF (NL)	18.2	19.3	36.0

Churn rate of *PHELIX-Base-Year-Futures* traded in 2015: *~1.0*

Power is less commoditised than gas

- Lower churn rates
- Price visibility for future years not robust
- New products needed for intermittent generation

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* source: OIES (2015)