The debate on market design in the EU energy policy

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Agenda

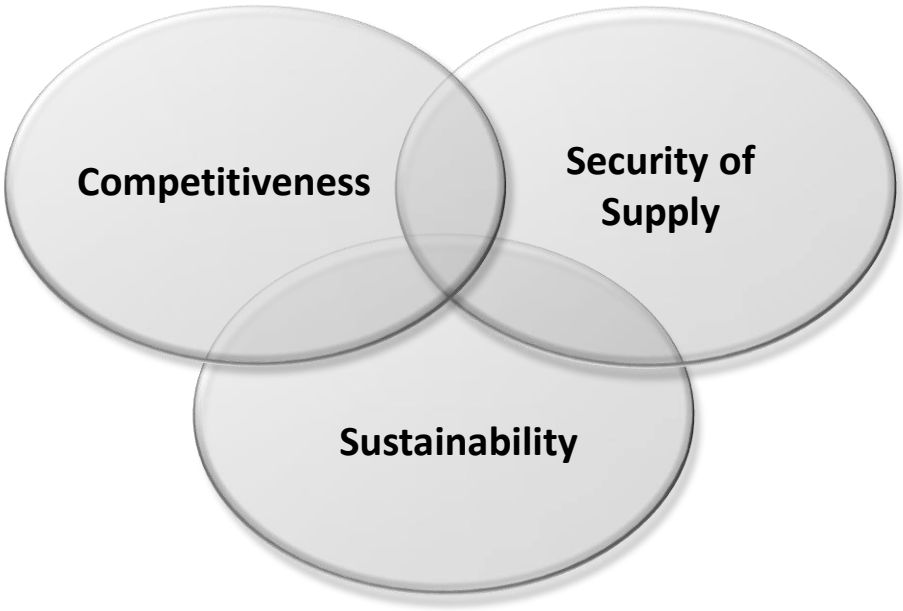
Context

Wholesale electricity market design

Retail electricity market design

Conclusions

EU Energy Policy is based on 3 key pillars that materialized into 3 specific targets for 2020 (20/20/20 package) and 2030…

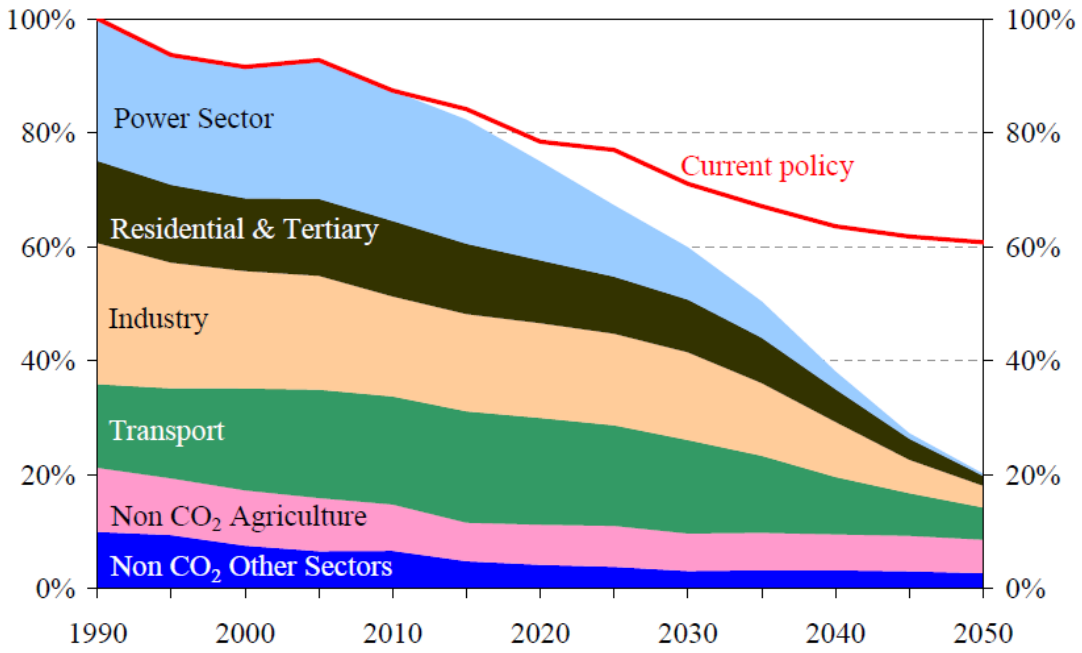


	2020	2030
Emissions	-20%	-40%
Renewables	20%	27%
Energy efficiency	20%	27%

… as a bridge to meeting its longer term economy-wide decarbonization goals

EU GHG emissions by sector

100%=1990



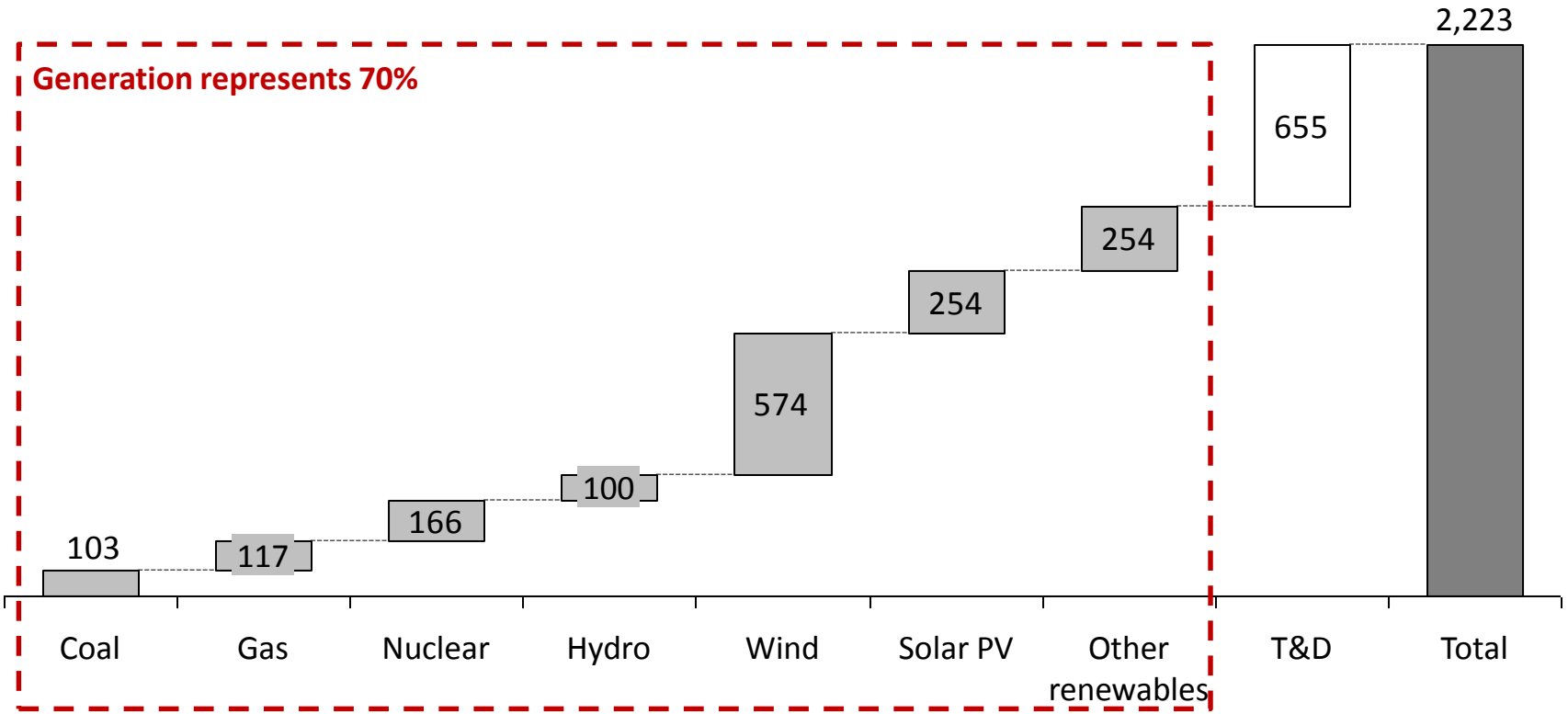
- Target: -80/95% CO_2 emissions vs. 1990
- Strong push for energy **efficiency**
- Strong **electrification** of energy demand
- Full **decarbonization** of power sector

Source: EC, "A Roadmap for moving to a competitive low carbon economy in 2050", 2011

The EU needs to invest $2.2 trillions in the power sector up to 2035 to renew the infrastructure and meet the decarbonization goals

Needed investments in the European power sector in the period 2014-2035

billions of USD

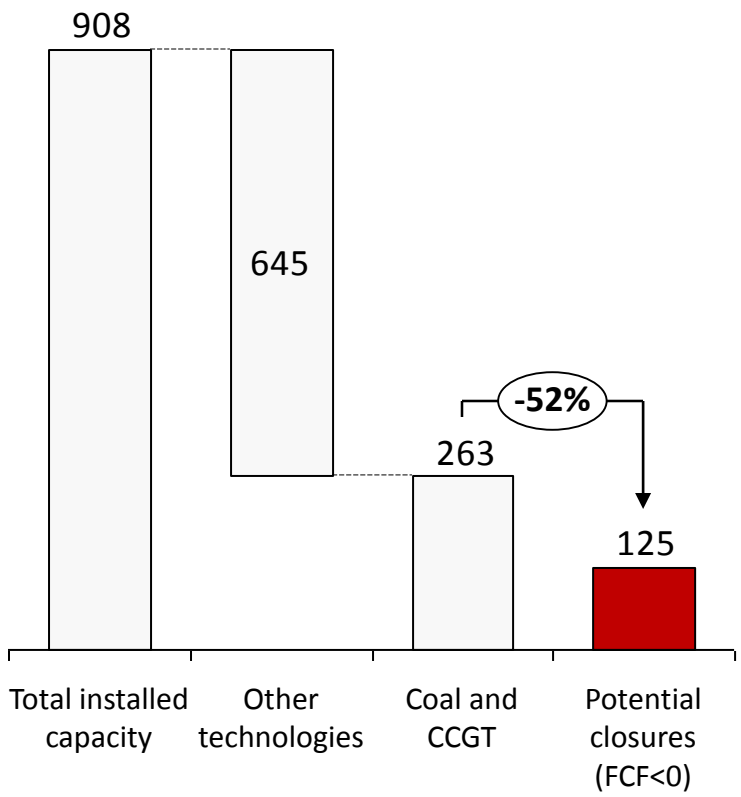


Source: IEA, "World Energy Investment Outlook 2014"

However, in the short term, half of the EU's thermal fleet is unprofitable, which could potentially lead to closures and blackouts

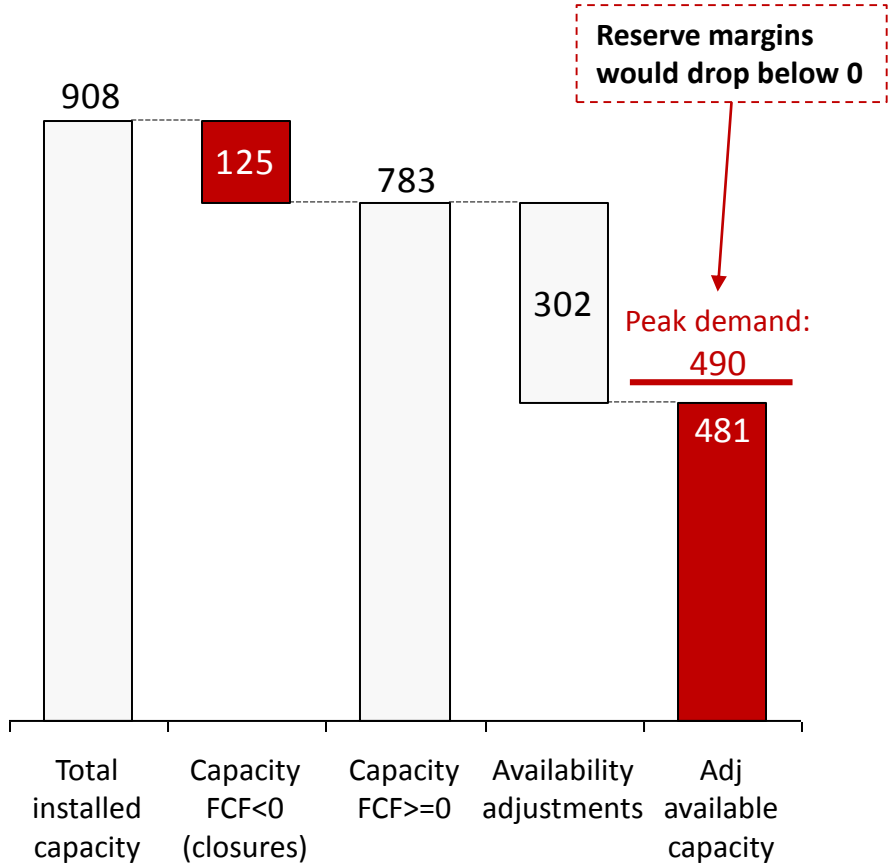
EU installed capacity and unprofitable capacity

GW



Adj available capacity after potential closures

GW



Source: UBS, "Pan European Utilities", April 2015

Is the current market design fit for purpose to meet both the short and medium/long term challenges?

- Can we rely on the **energy-only market** prices to signal the **right closures in the ST** (without compromising security of supply) and attract capital for **investments in the LT**?

- ST challenge is being addressed through a patch of **capacity mechanisms**. Is this enough? Is this adequate to foster low-C technologies?

- Is this market arrangement suitable to promote both **centralized investments** and the contribution of **distributed resources** (distributed generation, storage, energy efficiency, DSR, etc.)?

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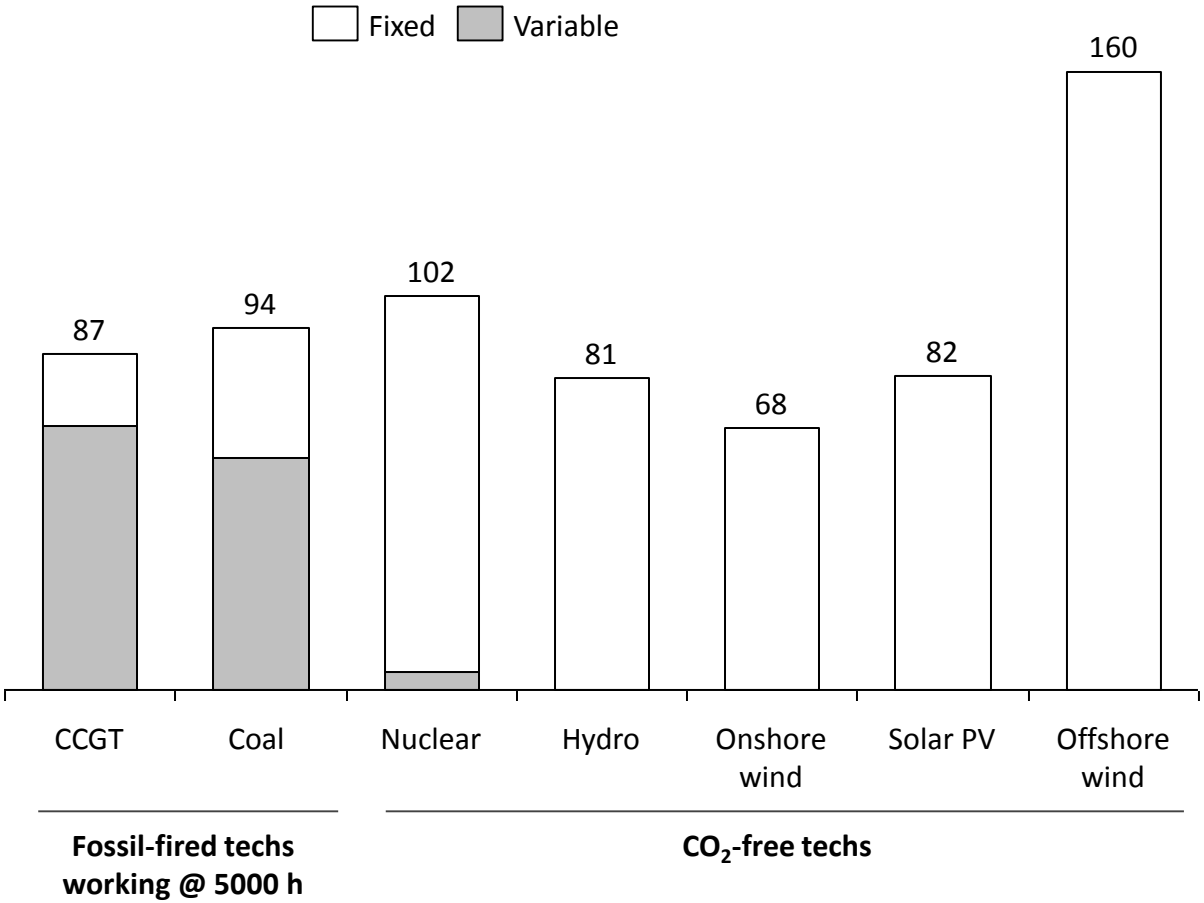
Low-C technologies are amongst the most competitive ones, but their cost structure is mainly fixed (the same applies to thermal backup)

- **Low-C techs** (nuclear and renewabes) have a cost structure mostly determined by the **upfront capital cost**
- An increased share of renewables gives thermal capacity a new role as **backup** and strengthens the need for **storage** and **networks**, which are again technologies based on **fixed costs**

Levelized cost of electricity generation for different technologies

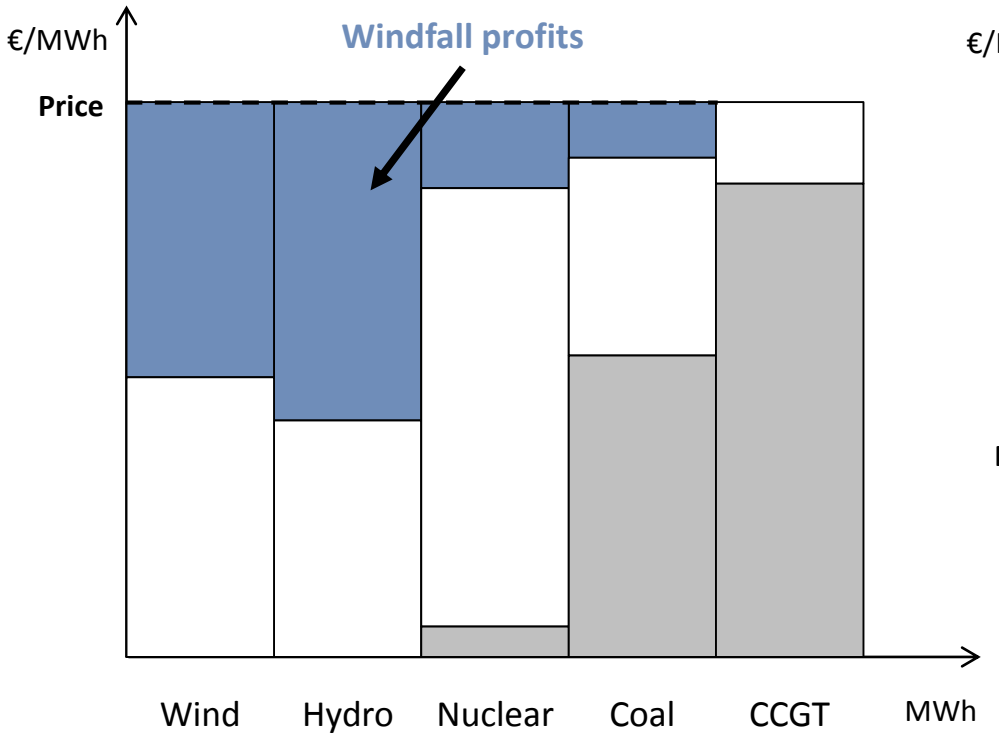
€$_{2014}$/MWh



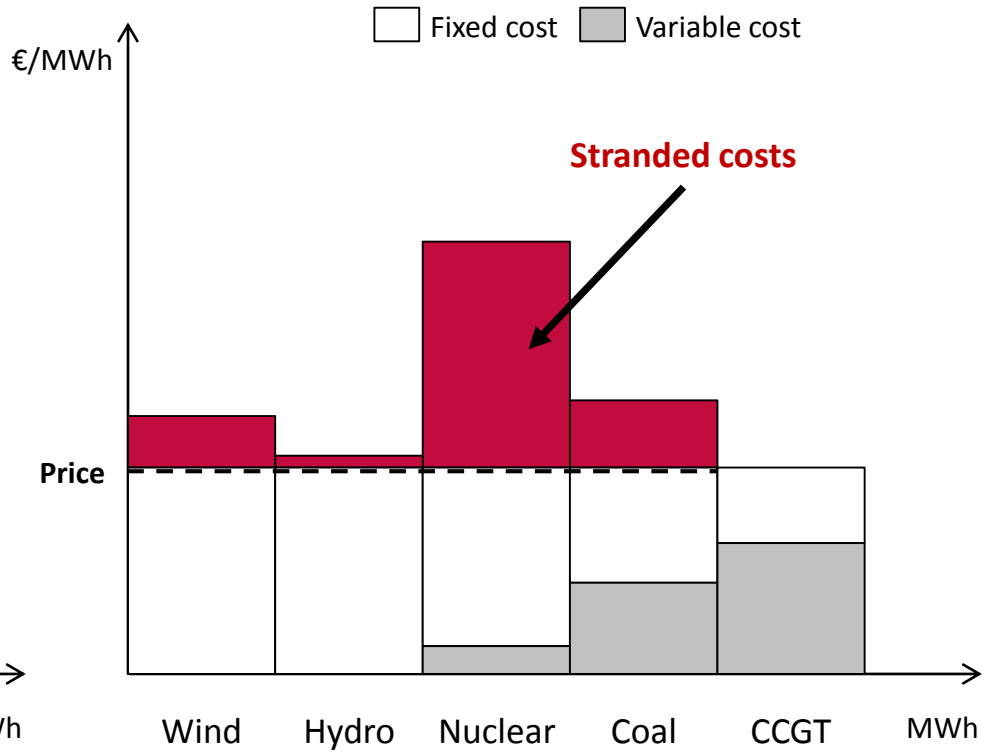
Source: EDP analysis

Marginal pricing model either over- or under-compensates inframarginal techs, exposing them all to risks that low-C techs cannot manage

High commodity price case



Low commodity price case



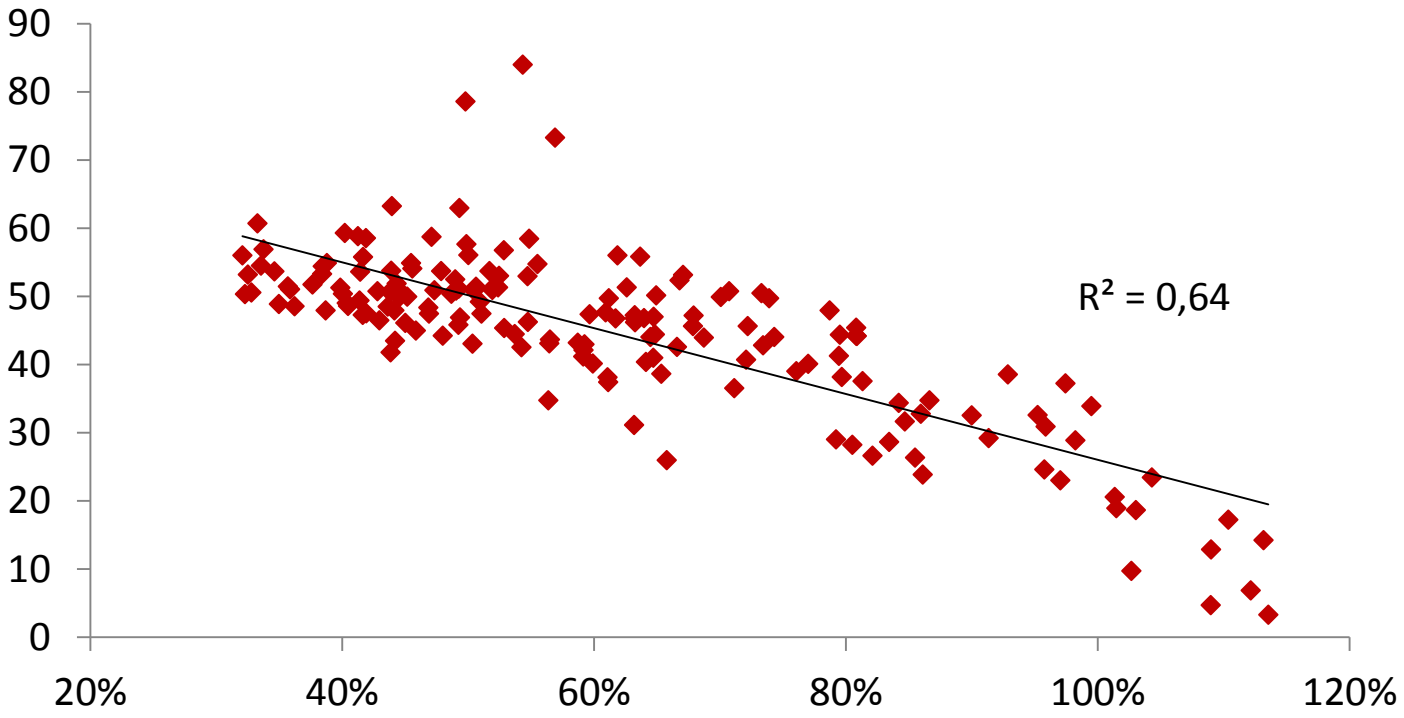
The result is an inefficient outcome, both for investors and society in general

- **Marginal pricing exposes ALL technologies to commodity price risk, increasing risk premia, hence the cost of capital**
  - Particularly penalizing capital-intensive technologies (e.g., renewables, nuclear)
  - Increased capital costs are ultimately passed on to consumers through increased electricity prices
- **Low commodity price scenario paved the way for the power sector's liberalisation in the 90's in Europe, but the context has changed and investors today are not willing to underwrite LT price risk**
  - Stranded costs were compensated before, but not under current liberalized framework
- **When commodity prices are high, marginal pricing's "invisible hand" should signal the best technologies to invest in, until a new equilibrium is reached, BUT:**
  - Technology choice for new investments (e.g., new nuclear, hydro) is never left purely to the market, as public acceptance, environmental issues and industrial policy often mute economic signals
  - Windfall profits accruing to existing capacity are typically seen as unfair and taxed by Governments
  - Investor are thus left with an asymmetric risk profile skewed to the downside

In addition, as the share of renewables increases, the wholesale price drops, making it structurally insufficient to remunerate any technology

Portuguese pool prices vs. share of renewables in national electricity consumption

€/MWh vs. %, weekly data, Jan 2012-Feb 2015



Source: Reuters, REN, OMEL, EDP analysis

To be able to attract capital and address the LT investment challenge, a sound market design must be based upon a correct risk allocation

- Closing the financing gap will require a rethink of Europe's regulatory framework to **reduce risks for investors**
- Given the current weakness of European utilities' balance sheets, **new sources of capital will be needed**
- Funds that have been typical of the utilities sector in Europe will also want a very secure risk profile, which means that the **key sources of risk will have to be mitigated and/or transferred** into other parties

	Private (investor)	Public (Gov't & customers)
Technical	• Project design • Construction • Operation	
Financial & credit	• Interest rate • Foreign exchange • Credit and liquidity	
Regulatory & Policy	• Climate-energy targets • CO_2 policies and regulation • Fiscal policy	• Predictability and credibility of energy policies
Market	• Commodity prices • Volume risk • Macro-economic cycle	• LT contracts

Investors are bearing all the risks in the current market design, making investment unattractive. Risk transfer mechanisms are needed to correctly allocate them.

The European wholesale market design (energy-only market) needs to change and adapt to the new reality

Short to medium term actions towards an adequate market design

Renewables

> Introduce **ex-ante competition** for **long-term contracting** (e.g., auctions of contracts for differences, preferably EU-wide) to lower risk premium

Thermal backup

> Implement competitive **capacity remuneration mechanisms** to adequately value firm backup

Spot market

> Keep spot price for **short-term optimization** and **dispatch signal**

> Improve market rules, allowing for a correct valorization of **flexibility** and the **integration of renewables**

EU-ETS

> **Strengthen the CO_2 price signal** by rebalancing the EU-ETS

Inter-connections

> Strengthen the needed interconnections for and efficient implementation of the **internal market**

Regulatory stability is key and retroactive changes are not acceptable and should be condemned

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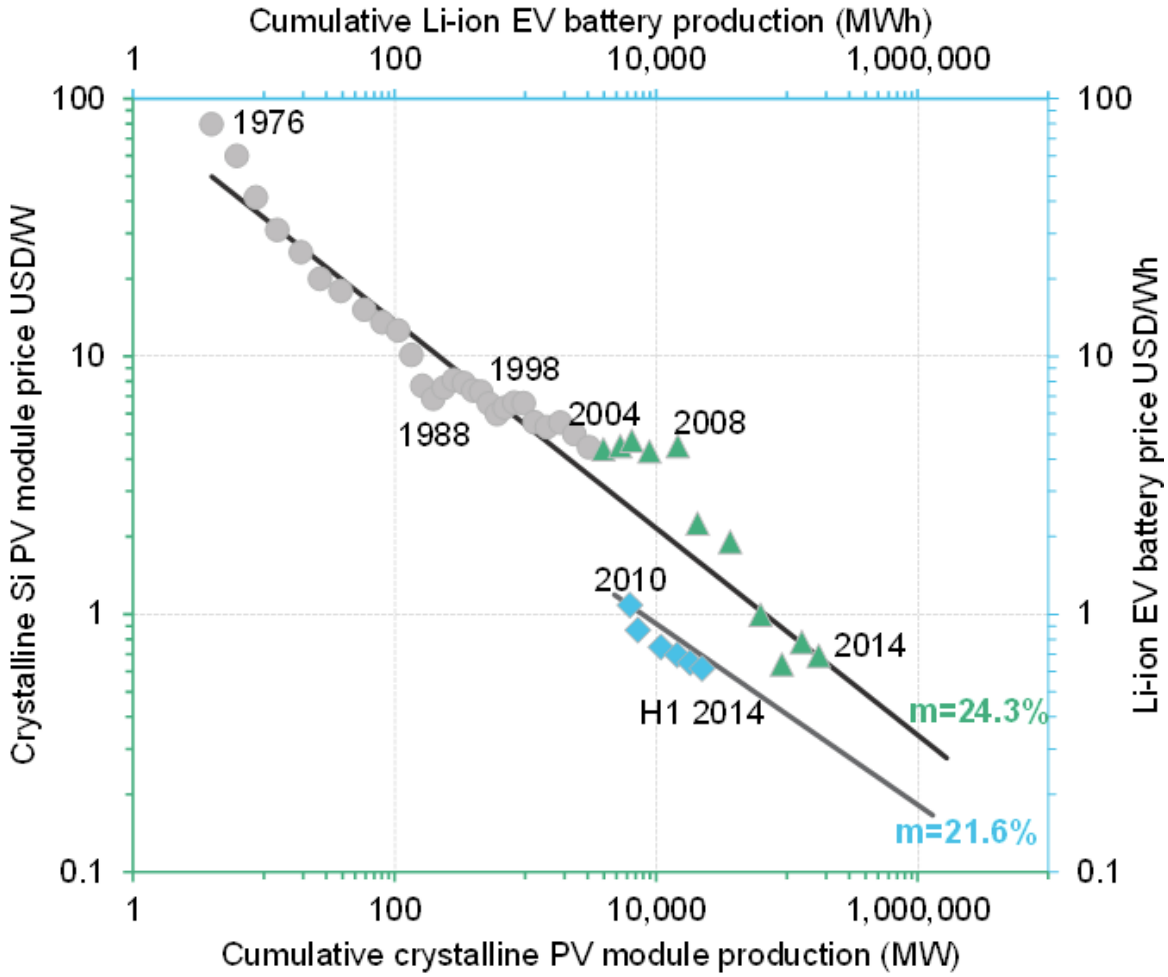
Solar PV systems have demonstrated a remarkable price decline (learning rate of 24.3%) and Li-ion batteries appear to be on the same path



Grid parity?

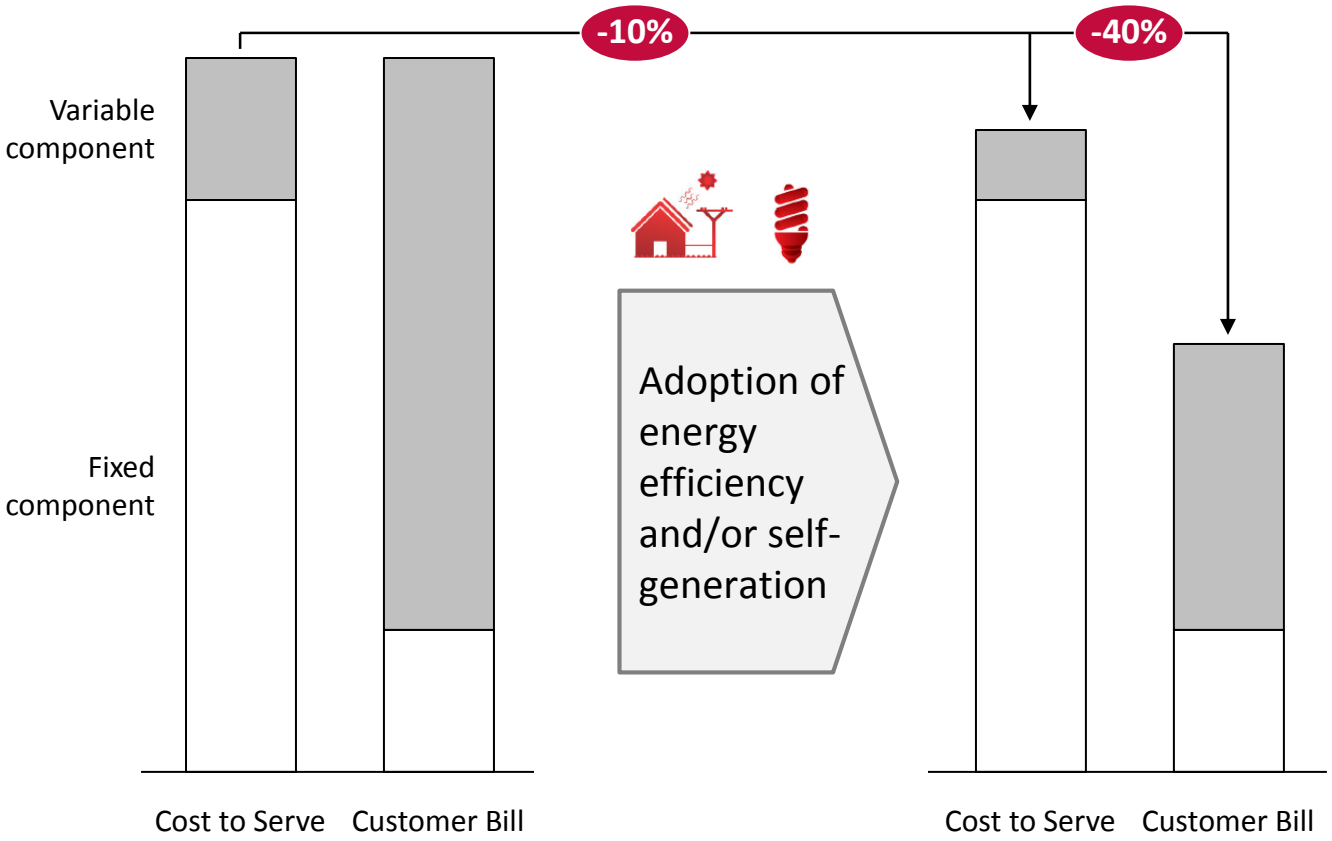
Load/grid defection?

Source: BNEF, April 2015

The adoption of these technologies has to be induced by correct price signals to avoid placing the sustainability of the system at risk

Illustration of the imbalance between the cost to serve and the customer bill caused by a 50% reduction on energy consumption

€/year



For the costs to be recovered there is a shift to other customers on the grid in the form of higher rates (**cross-subsidies**)

Retail pricing structures need to be revisited to reconcile the economic sound effects of EE and DG with the need to pay the costs of the system

- **In the short-term, DG should pay backup fees and the costs related with energy policy**
  - By translating all costs into volumetric charges, if customers don't consume energy they don't pay, although (i) they are using the grid essentially as a big battery and (ii) they are taking advantage of all energy policy related measures in place
  - DG customers are currently getting services for free and on the expense of other costumers

- **Longer term, the tariff structure has to evolve towards increased fixed charges either through regulation or innovative retail offers**
  - Dual offers, bundle packages with services, etc.

- **Incentives for energy efficiency can come from increasing block rate structures**
  - The concept of efficiency must evolve to capacity requirements
  - Prices can increase in tiers of contracted power

Other industries, namely telecoms, developed through time flat pricing structures (bundling of services) that can be an inspiration to the power sector

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Main messages

The power sector is going through a profound transformation and the context has changed, posing many challenges to this industry

- ✓ Massive investments needed to decarbonize
- ✓ Large scale integration of distributed resources
- ✓ Ensure security of supply at competitive prices

"It's not a problem. It's a task."

Current instruments are not fit for the decarbonization purpose and need to be revised

- ✓ EoM inadequate for an increasingly fixed cost structure
- ✓ Volumetric retail tariffs give the wrong signals to DG/EE
- ✓ LT contracting on the wholesale and flat tariffs on the retail could be the way forward

Don't kill the goals, adapt the means!