Module 2 – Electricity Spot Markets (e.g. day-ahead)

2.5 Impact of regulation and support schemes

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Why regulation and support schemes?

New energy generation technologies may need support in order to reach grid parity (i.e., when Levelized Cost of Energy - LCOE, becomes less than market price).

Regulation is then an instrument for policy makers to support their integration in the market.

Support schemes consist in financial support to make them competitive in the market.
Alternative support schemes

The 3 most common support schemes are:

- **feed-in-tariff (FIT)**
- **fixed feed-in premium (FIP)**
- **contract for difference (CfD, or sliding premium)**

These may have an impact on participant revenues, offering strategies and market outcomes.
Participant revenues

Let us consider the case of a renewable energy producer (wind or solar) participating in the Danish day-ahead electricity market, DK1 area (Western Denmark)

3 cases:
- FIT at 35 €/MWh
- FIP of 5 €/MWh
- CfD to guarantee 35 €/MWh

Revenues are:
- FIT case: $35 \times 3 = 105$ €
- FIP case: $(23+16+32) + 5 \times 3 = 96$ €
- CfD case: $(23+16+32) + (12+19+3) = 105$ €
Offering strategies under CfD support scheme

- Consider a wind or solar power producer under a *CfD support scheme*

![Graph showing offering strategies under CfD support scheme]

- **High price offer**
- **Low price offer**

- **Price [€/MWh]**
- **Quantity [MWh]**

- **CfD (35 €/MWh guaranteed)**
- **0 €/MWh**

**Legend:**
- \( \lambda^S \)
Offering strategies under CfD support scheme

- Consider a wind or solar power producer under a *CfD support scheme*

- The optimal offering strategy is to offer at minimum price, e.g., -500 €/MWh in Nord Pool
Offering strategies under FIP scheme

- Consider the same wind or solar power producer under a *FIP support scheme*

![Diagram showing high and low price offers with FIP value of 5 €/MWh and λ^S values.]
Offering strategies under FIP scheme

- Consider the same wind or solar power producer under a *FIP support scheme*

- The optimal offering strategy is to offer at minus the FIP value, e.g., -5 €/MWh in the present case
Effect on market outcomes

- Let us see the effect of having more or less market participants with different support schemes
  
  - Only a few of them
  
  - Quite many more

- As their share increase, clearing prices can become negative(!)
Impact of a change of regulation on the market

- The regulator states that if clearing prices are negative, market participants lose their support (CfD and FIP)
- For both support scheme, the optimal strategy is then to offer at 0 €/MWh
Impact of a change of regulation on the market

- The regulator states that if clearing prices are negative, market participants lose their support (CfD and FIP)
- For both support schemes, the optimal strategy is then to offer at 0 €/MWh
- Only a few of them

Clearing prices still decrease, but they never become negative

- Quite many more
Use the self-assessment quizz to check your understanding!