

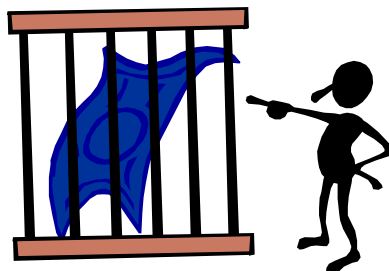
# Introduction

- **The following slides explain why a standard financial forward does not influence a player's behaviour at the physical market for electricity.**
- **For example, this means standard financial contracts may be used to subsidise renewables, when they need support**
  - ❑ **An advantage of the standard financial contracts is precisely that they do not affect players' behaviour at the physical market.**
- **Concerning the documents referred to in this presentation:**
  - ❑ **You can download the documents at <https://houmollerconsulting.dk/facts-findings/>**
- **This PowerPoint presentation is animated**
  - ❑ **It's strongly recommended to run the animation when viewing the presentation.**
- **On most computers, you can start the animation by pressing F5.**
  - ❑ **Now the presentation moves one step forward, when you press Page Down. It moves one step backward, when you press Page Up.**



# The Financial Electricity Market – 1

- You cannot buy or sell a single kWh at this market.
- The financial market is a market for price hedging and risk management.
- On the financial market “delivery” means that the financial contract is finally settled
  - ❑ It is delivery of money!
  - ❑ Not delivery of electrical energy.
- For a description of how a standard financial contract works:
  - ❑ See the first slides of the PowerPoint presentation *Volume risk and profile risk for financial contracts*.
  - ❑ Or see the chapters on financial contracts in the PDF document *The Liberalized Electricity Market*.



- The contracts used at the financial electricity market are examples of the so-called **derivatives**.
  - ❑ In general, a commodity derivative is a **contract** whose value is dependent upon the price of the commodity in question
    - ✓ In our case, the commodity is electrical energy.
    - ✓ The spot price is used as the price of the commodity.
  - ❑ There are many types of derivatives
    - ✓ For example futures, forwards and options.
- In this presentation, we look at a producer, who has entered into a standard financial forward
  - ✓ **Standard** means the financial forward works as described in the documents mentioned at the previous slide.
  - ✓ Such a contract works the same way as a so-called “two-way CfD” (two-way Contract for Difference).
- In the example, we consider a 2 MW power station
  - ❑ To simplify the discussion we assume the power station can run every hour next year.

# A producer's usage of a financial contract – 1

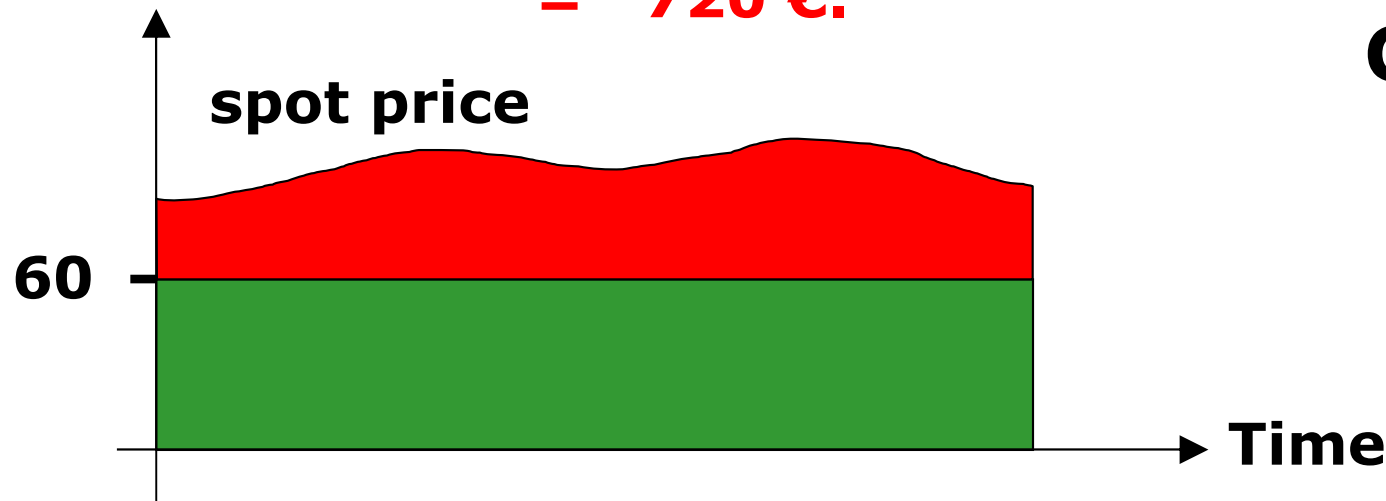
Example for one day. 2 MW power station.

Marginal production costs 60 €/MWh

- Financial contract for next year with **hedging price 80 €/MWh**. The contract's volume is 2 MW.
- Example 1: the spot price is higher than 60 €/MWh the whole day. The average spot price is 75 €/MWh.
- Proceeds from the financial contract:
  - $(80 - 75) \text{ €/MWh} * 2 \text{ MW} * 24 \text{ h} = 240 \text{ €}.$

**For this day – profit from running the station:**  
 $(75 - 60) \text{ €/MWh} * 2 \text{ MW} * 24 \text{ h}$   
 $= 720 \text{ €}.$

€/MWh



**Conclusion: station should run!**

**Total earnings are €**  
 $240 + 720 = 960$

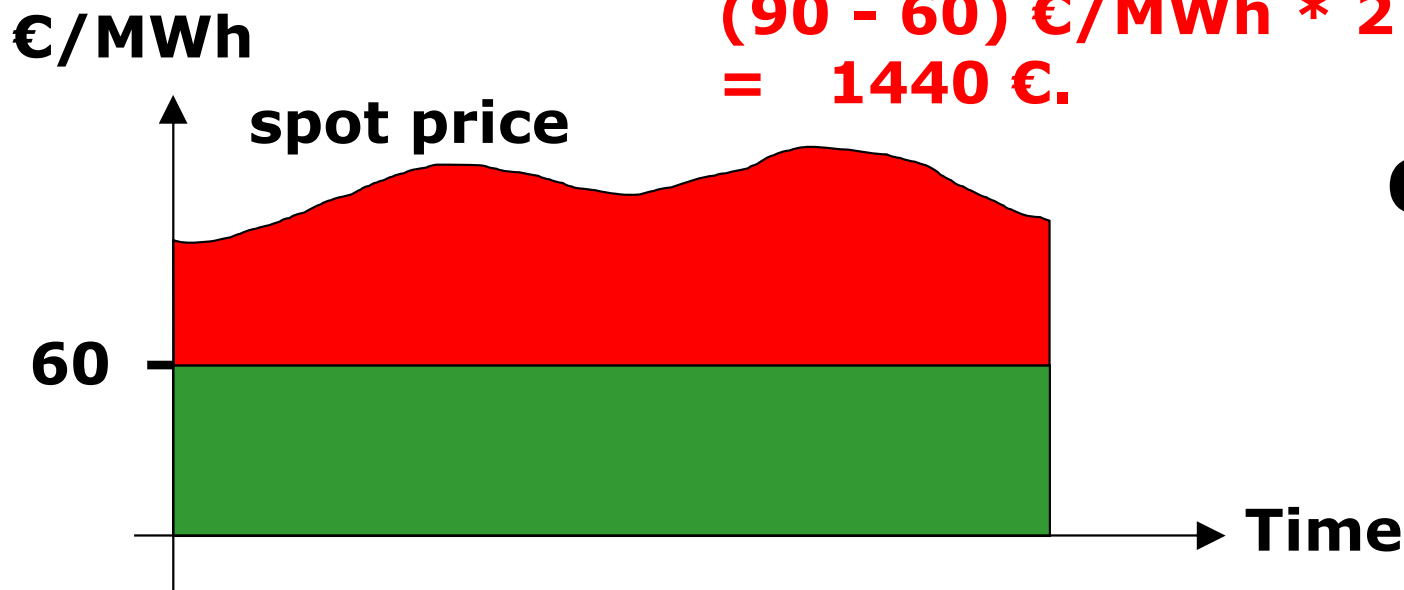
# A producer's usage of a financial contract – 2

Example for one day. 2 MW power station.

Marginal production costs 60 €/MWh

- Financial contract for next year with **hedging price 80 €/MWh**. The contract's volume is 2 MW.
- Example 2: the spot price is higher than 60 €/MWh the whole day. The average spot price is 90 €/MWh.
- Expense due to the financial contract:
  - $(80 - 90) \text{ €/MWh} * 2 \text{ MW} * 24 \text{ h} = -480 \text{ €}.$

**For this day – profit from running the station:  
 $(90 - 60) \text{ €/MWh} * 2 \text{ MW} * 24 \text{ h}$   
 $= 1440 \text{ €}.$**



**Conclusion: station should run!**

***Total earnings are €  
1440 - 480 = 960***

# A producer's usage of a financial contract – 3

Example for one day. 2 MW power station.

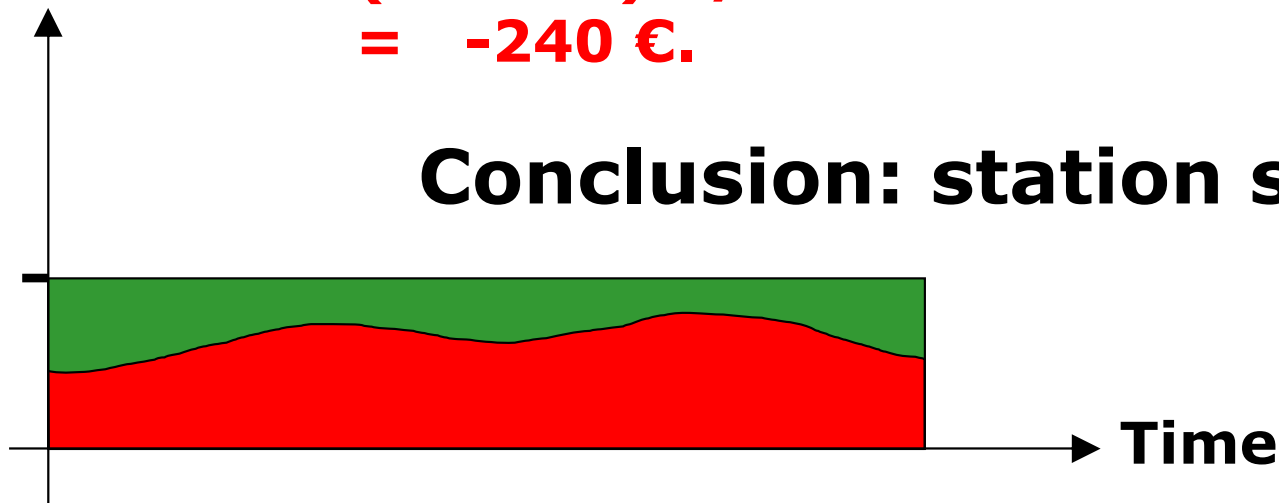
Marginal production costs 60 €/MWh

- Financial contract for next year with **hedging price 80 €/MWh**. The contract's volume is 2 MW.
- Example 3: the spot price is lower than 60 €/MWh the whole day. The average spot price is 55 €/MWh.
- Proceeds from the financial contract:
  - $(80 - 55) \text{ €/MWh} * 2 \text{ MW} * 24 \text{ h} = 1200 \text{ €}$ .

**If the station was running:**  
 $(55 - 60) \text{ €/MWh} * 2 \text{ MW} * 24 \text{ h}$   
 $= -240 \text{ €}$ .

**Conclusion: station should not run!**

€/MWh



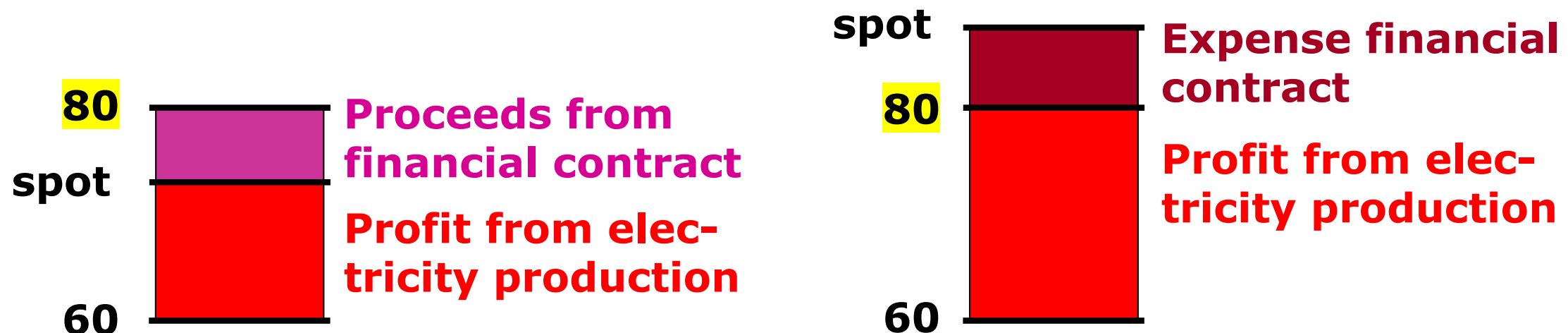
*Total earnings are €  
1200*

# A producer's usage of a financial contract – 4

Example for one day. 2 MW power station.  
Marginal production costs 60 €/MWh

## Conclusions:

- 1) The financial contract does not affect the station's operation.
- 2) If the spot price is higher than 60 €/MWh, the total earnings are always  
 $(80 - 60) \text{ €/MWh} * 2 \text{ MW} * 24 \text{ h} = 960 \text{ €}.$



# A producer's usage of a financial contract – 5

Example for one day. 2 MW power station.

Marginal production costs 60 €/MWh

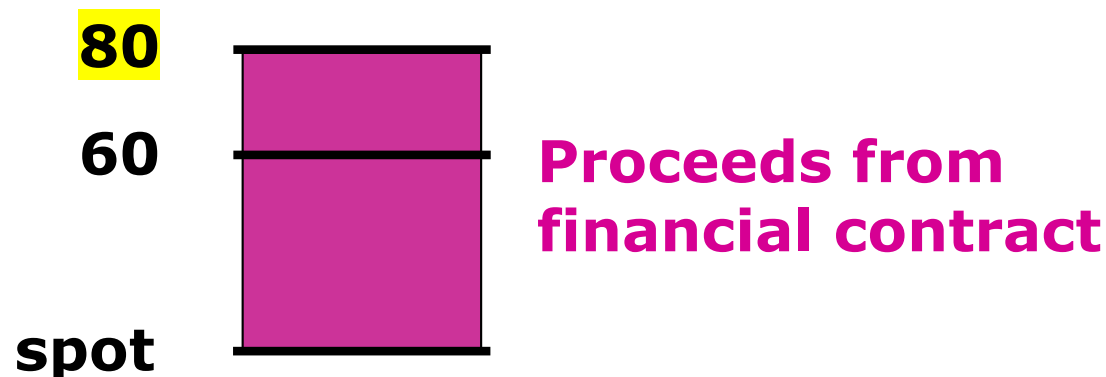
Hedging price financial contract: **80 €/MWh**

Only the financial contract contributes to the total earnings, if the spot price is lower than 60 €/MWh:

**(80 - spot price) €/MWh \* 2 MW \* 24 h**

Note: the total earnings are higher than

**(80 - 60) €/MWh \* 2 MW \* 24 h = 960 €**





# A producer's usage of a financial contract – 5

Example for one day. 2 MW power station.

Marginal production costs 60 €/MWh.

Hedging price financial contract: **80 €/MWh**

**Question 1: what is the advantage of the financial contract?**

**Answer 1: the daily total proceeds are at least  
(**80** - 60) €/MWh \* 2 MW \* 24 h = 960 €.**

**Therefore, a minimum for the total proceeds are ensured.  
In a low-price scenario the daily total proceeds can  
exceed 960 €.**

**Question 2: what is the drawback of the financial contract?**

**Answer 2: the producer renounces the high-proceeds  
prospect offered by a high-price scenario.**

# More information

- **See the PowerPoint presentations**
  - ❑ ***German forward prices for electricity.***
  - ❑ ***Nordic financial prices and spot prices – annual contracts 2002-2017.***
  - ❑ ***Nordic financial prices and spot prices – quarter contracts 2006-2017.***
- **These presentations give you historical experiences from the German and Nordic markets for power derivatives.**



# **Thank you for your attention!**

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