

Introduction

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- ⇒ **This PowerPoint presentation presents FTR (Financial Transmission Rights).**
- ⇒ **You'll find more on FTR in the PowerPoint presentations '*Hedging with CfDs and FTRs Financial Transmissions Rights*' and '*PTRs Physical Transmission Rights and cross-border CfDs*' from Houmoller Consulting.**
- ⇒ **In the appendix, you'll find a list of the terms and acronyms used in this PowerPoint presentation.**
- ⇒ **This PowerPoint presentation is animated**
 - ✓ **It's 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.**

FTR – Financial Transmission Rights

Agenda for this presentation

- ⇒ **What is FTR?**
- ⇒ **FTR as hedging instruments.**
- ⇒ **The need for short-term hedging in markets with high penetration of renewable energy.**
- ⇒ **A suggestion for new cross-border financial contracts at the exchanges.**
- ⇒ **The TSOs as liquidity providers for such new, financial contracts.**

FTR Financial Transmission Right

How does it work? Border with market coupling/splitting

Example (north-south border):

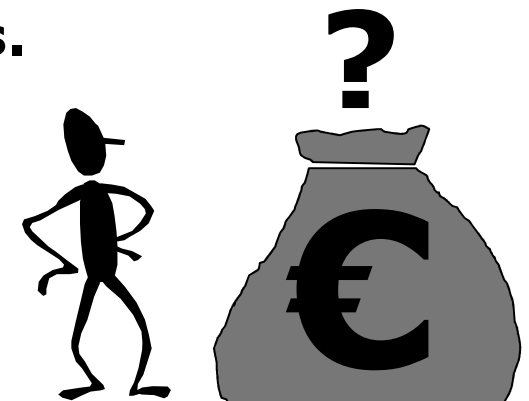
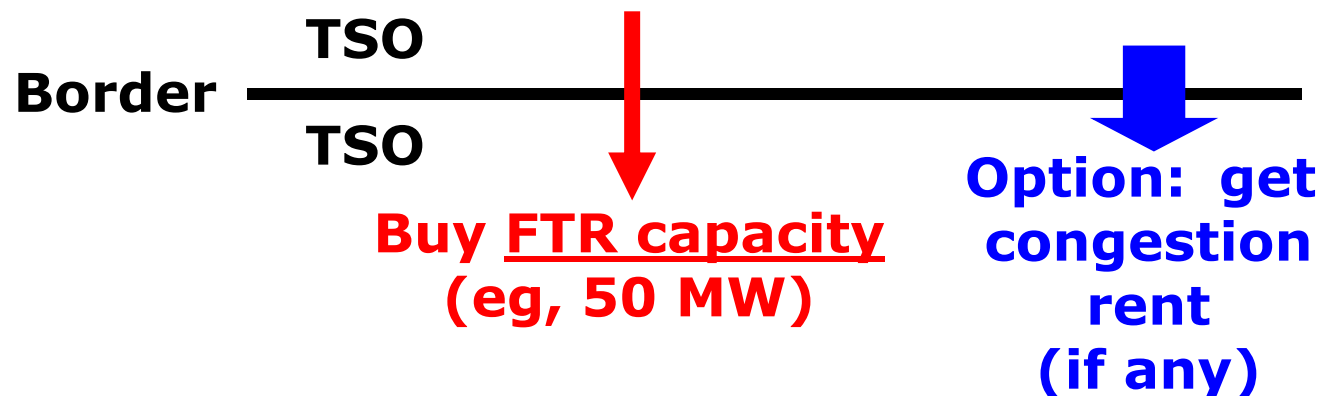
At the TSOs' FTR auction, a player buys 50 MW FTR capacity in direction south.

With a FTR auction system, the player is obliged to give the capacity to the market coupling/splitting.

In return, the player gets the congestion rent for the capacity (if any).

Conclusion: actually, at the FTR auction, the player did not buy the capacity. Instead, the player bought the unknown, future congestion rent of the 50 MW.

Therefore the name financial transmission rights.



FTR Financial Transmission Right – hedging

Example for one hour. Border with market coupling/splitting

Example: a retailer is buying 50 MWh on the southern side.

At the FTR auction, the retailer has bought 50 MW FTR capacity in direction south.

Assume the spot price on the southern side spikes.

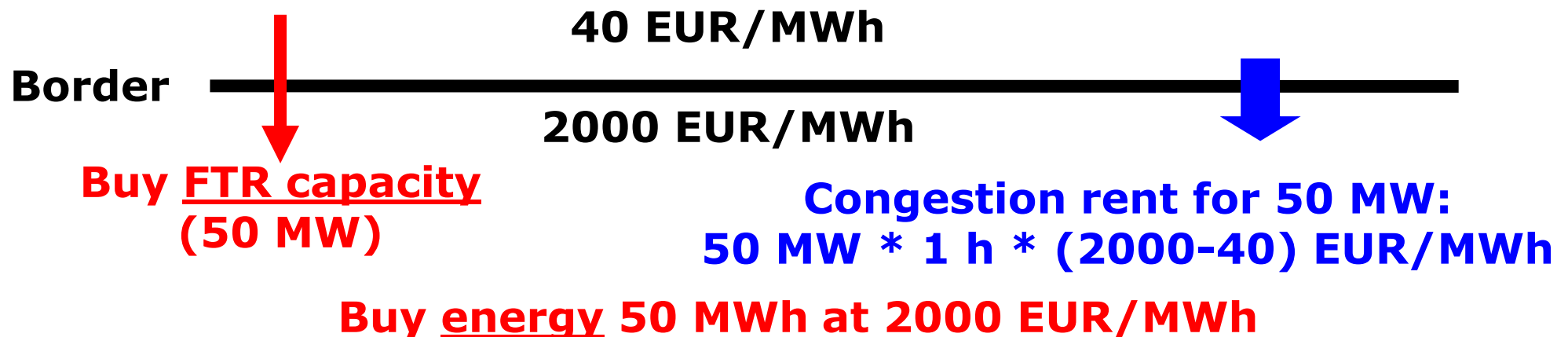
The FTR compensates the retailer:

On the southern side: for the 50 MWh, pay

$$50 \text{ MWh} * 2000 \text{ EUR/MWh.}$$

$$\text{FTR: receive } 50 \text{ MWh} * (2000-40) \text{ EUR/MWh.}$$

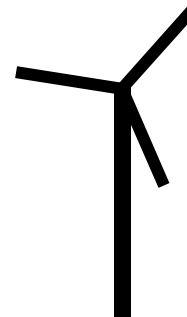
Net expenditure: 50 MWh * 40 EUR/MWh.



The current Nordic financial contracts

Compared with short-term FTRs

- ⇒ The current Nordic financial contracts are System Price contracts and Contracts for Difference (CfD).
- ⇒ They hedge against area prices during a given time period
 - ✓ Currently, in the Nordic countries, the minimum time period for an area hedge is a month.
- ⇒ The current financial contracts do not hedge against cross-border price differences
 - ✓ And you can not use these financial contracts to hedge against single-hour price spikes.
 - ✓ However, spells of cold weather typically give price spikes.
 - ✓ Further, with ever more wind energy entering the market, more price spikes during a few hours are inevitable!



Hedging with short-term FTR

- ⇒ **Assume you are a player with a lot of wind energy in your portfolio**
 - ✓ **Or you may simply be a seller in an area with much wind energy.**
- ⇒ **For the Nordic area, the CfD are notoriously illiquid and have low correlation to the spot prices.**
- ⇒ **However, with short-term FTR you need not resort to this primitive price hedging.**
- ⇒ **On a short-term basis, you can evaluate whether you need hedging**
 - ✓ **Using short-term FTR as the tool.**
- ⇒ **With FTR, you can use the price on the other side of the border as the anchor**
 - ✓ **A FTR is a hedge, if your area price spikes, and the price in the neighbouring area does not.**

Northern Europe: Where can we start having FTR?

Answer: Sweden – Western Denmark

Sweden: spot prices spike upwards during spells of cold weather.

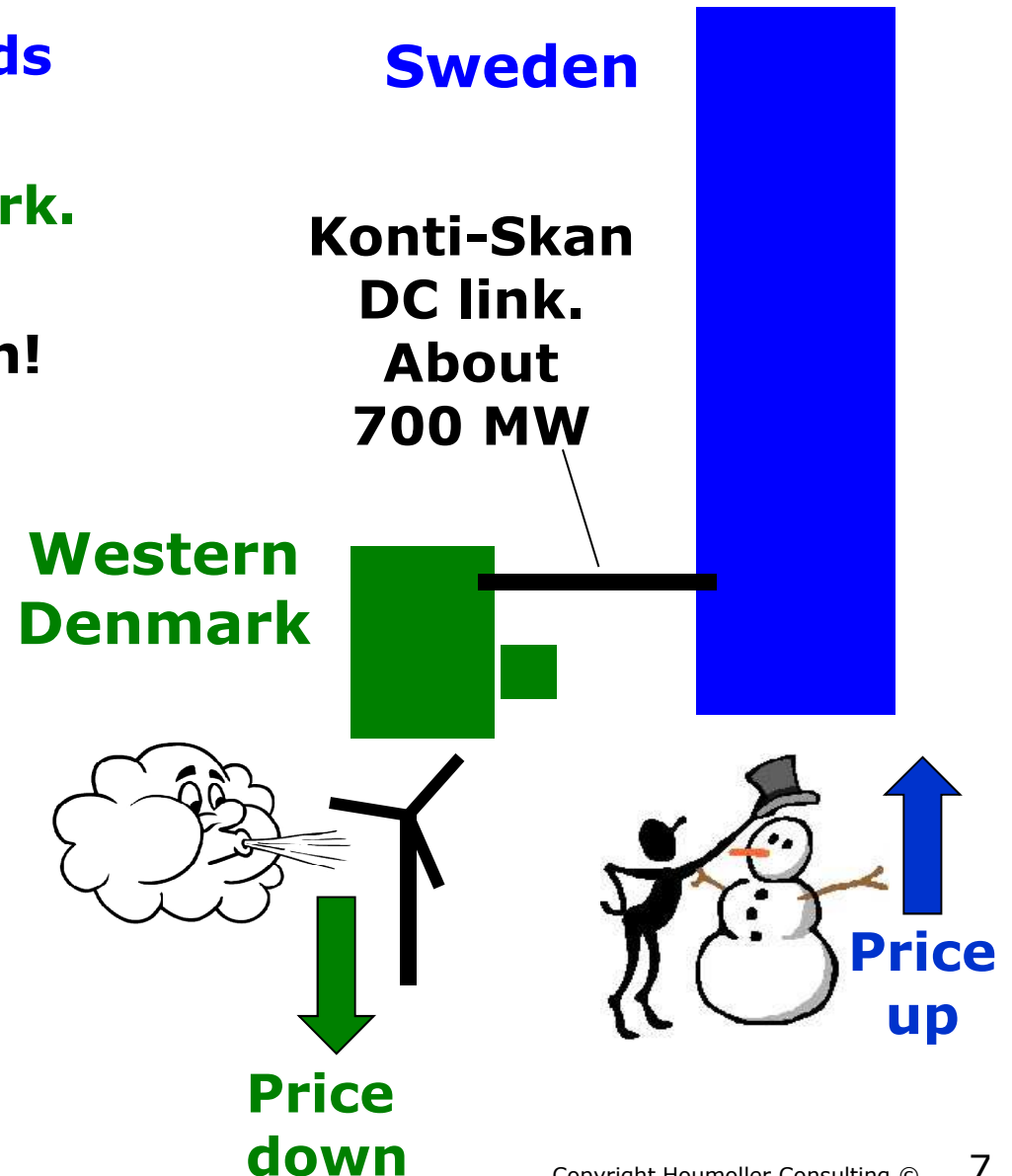
No such effect in Western Denmark.

Result: a FTR on Konti-Skan is a good hedge for a buyer in Sweden!

Western Denmark: due to lot of wind turbines, prices spike downwards during periods with high winds.

No such effect in Sweden.

Result: a FTR on Konti-Skan is a good hedge for a seller in Western Denmark!



Northern Europe: Where can we start having FTR?

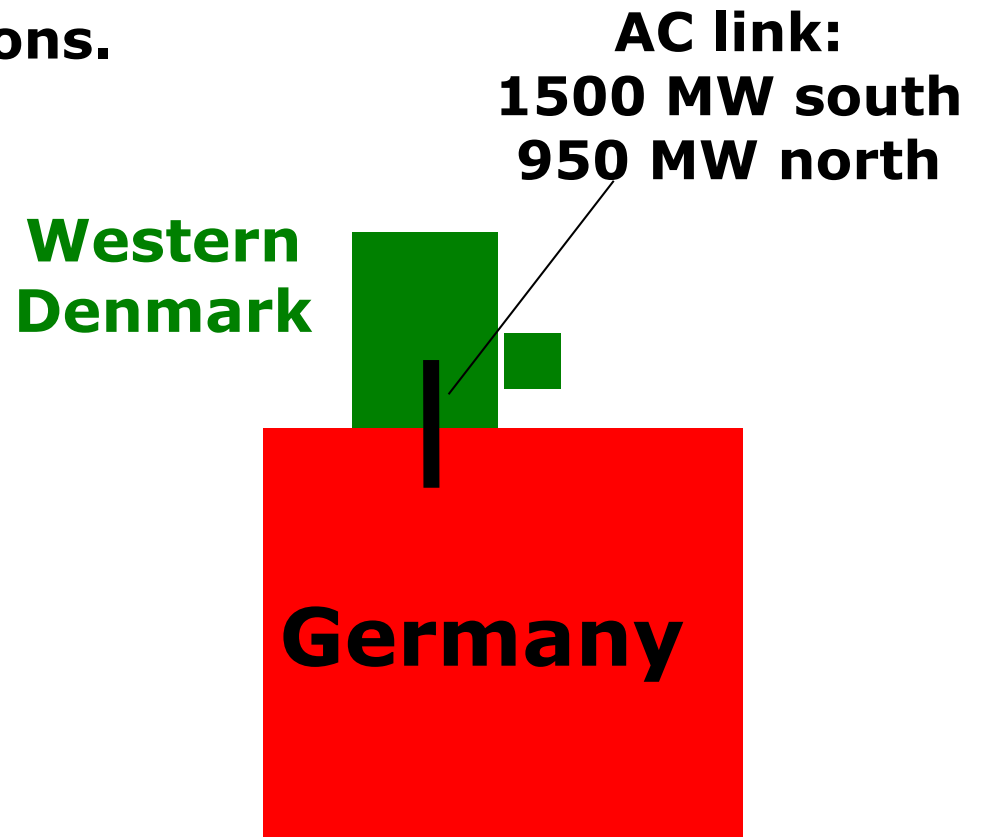
Answer: Germany – Western Denmark

This was the first European border, where we had explicit auctions of PTR (Physical Transmission Rights).

Therefore, at this border, the players are used to participating at cross-border auctions.

Also, Western Denmark has suffered a loss of liquidity after the introduction of market coupling Germany-Denmark.

Result: at this border, we must expect interest in (and therefore liquidity at) FTR auctions!



Shortcomings of secondary trade with PTR

(Physical Transmission Rights) Case: two players A and B

⇒ **In order for A to sell PTR to B the following conditions must be met:**

- ✓ **On both sides of the border, A and B must be registered as balance responsible market players.**
- ✓ **Both A and B must be registered at the TSOs' PTR auction system.**

⇒ **This reduces the number of players who can trade PTR**

- ✓ **Thereby reducing the liquidity at the secondary market for PTR.**

⇒ **Further, the TSOs may have rules requiring the transfer of PTR between commercial players must take place several working days before the day of operation**

- ✓ **In this case, at the secondary market, it's not possible to trade PTR during the morning the day before the day of operation.**

Financial Transmission Rights (FTR) do not have these flaws. With **FTR we are exchanging money – not electricity!**

Cross-border Contracts for Difference (CCfD)

Further enhancement of the liquidity

- ⇒ **In order to create better liquidity – and thereby better price transparency – the financial electricity exchanges can introduce new financial contracts: CCfD.**
- ⇒ **For each of the CCfD, the underlying reference will be the difference between two area prices.**
- ⇒ **For financial contracts, it's relatively easy to establish clearing and exchange trading**
 - ✓ **This further improves the liquidity.**

More on Cross-border Contracts for Difference (CCfD)

- ⇒ Naturally, trading with CCfD can take place between two players, also if neither of the two has bought PTR (Physical Transmission Rights) or FTR (Financial Transmission Rights) at the TSOs' auctions.
- ⇒ Question: why have the FTR auctions at all, when CCfD can do the job?
- ⇒ Answer: The prices at the FTR auctions will provide a starting point for prices of the CCfD
 - ✓ For a given border:
 - If all the unknown, future congestion rent is sold at FTR auctions, this will provide a good starting point for the prices of the CCfD.

Thereby, by auctioning off the whole unknown, future congestion rent, in effect the TSOs are acting as initial market makers for the CCfD

The TSOs as liquidity providers

- ⇒ **By establishing market coupling, the TSOs have taken a big step towards securing energy flows in the right direction.**
- ⇒ **However, as also explained in the previous presentation, market coupling has drained liquidity from the market**
 - ✓ **As market coupling was established without simultaneous launching of FTR auctions.**
- ⇒ **This draining of liquidity has clearly happened in Denmark**
 - ✓ **Probably, it will happen (has happened?) in other "market coupling countries" also, unless the right steps are taken.**
- ⇒ **The TSOs are the natural providers of liquidity in this case**
 - ✓ **As they at the outset have the congestion rent.**
 - **Which can be used as "liquidity oil" for the market.**

Note: the Nordic CfD have stayed illiquid for more than 10 years! So they are not going to be liquid...

For the new hedging options we'll not have this problem, when the TSOs have recurring FTR auctions!

Hedging in the Nordic area

- ⇒ **In the Nordic area, the countries are too small to sustain liquid, national, financial power markets.**
- ⇒ **Therefore, we have the Nordic System Price.**
- ⇒ **The Nordic System Price is a theoretical price:**
 - ✓ **It's the common Nordic price, we would have if there were no grid bottlenecks in the Nordic area.**
- ⇒ **Hence, if you are two Nordic players operating in different countries, you can use the System Price as the reference for your financial contracts**
 - ✓ **For example, a Norwegian producer and a Finnish retailer can enter into a financial contract using the System Price as the reference.**
- ⇒ **The CfD was the attempt to expand this to area price hedging**
 - ✓ **However, as mentioned previously: the CfD are illiquid and have low correlation to the spot prices.**

A vision for the future hedging in Central Europe

- ⇒ **In Central Europe, we have many countries who are too small to sustain national, liquid financial power markets.**
- ⇒ **Question: in the future – how may you hedge in Central Europe?**
- ⇒ **Answer: get a financial contract using the German spot price as the reference**
 - ✓ **And supplement the German, financial contract with a Financial Transmission Right (FTR)**
 - **Or supplement with a Cross-border Contract for Difference (CCfD).**
- ⇒ **In total, the two contracts give a hedge against the local price in your country:**
 - ✓ **(hedge Germany) + (hedge difference)**
 - ✓ **CCfD: actually, your country needs not even have a interconnector to Germany!**
- ⇒ **For countries with links to Germany: via FTR auctions, TSOs will be initial market makers for CCfD.**

Hedging in Central Europe and Nordic hedging

- ⇒ **Question: why do you have the Nordic System Price?**
- ⇒ **Answer: because there is not a “Germany” in the Nordic area**
 - ✓ **No Nordic country is big enough to be used as the starting point for the hedging.**
- ⇒ **However, in Central Europe, you can use Germany as the starting point for the hedging**
 - ✓ **And supplement with FTR or CCfD.**
 - ✓ **By auctioning off at lot of the capacity at day-ahead FTR auctions, the TSOs will daily feed liquidity to these area hedging options**
 - **Both in Central Europe and the Nordic area.**
 - **Note: the electrical energy is increasingly traded day-ahead**
 - **And the prices at this day-ahead trading is used as the basis for long-term contracts.**
- ⇒ **For the new hedging options, day-ahead FTR auctions can play the same role.**

Appendix

Terms and acronyms

Terminology and acronyms – 1

As used in this presentation

- ⇒ **Area** is used as the short version of bidding area.
- ⇒ **Bidding area** means a geographical area, within which the players can trade electrical energy without considering grid bottlenecks.
- ⇒ **Border** means a border between two bidding areas
 - ✓ Hence, it need not be a border between two countries. It may be a border between two bidding areas inside a country.
- ⇒ **Congestion rent** The arbitrage revenue earned by implicit auction. In implicit auction, for each interconnector, some body must buy energy at the spot exchange on the interconnector's low-price side and sell the energy at the spot exchange on the high-price side. Normally, this body is appointed by the interconnector's capacity owners; and the arbitrage revenue is collected by the capacity owners (most often TSOs). The amount of energy traded cross-border is calculated by means of market splitting or market coupling.

Terminology and acronyms – 2

As used in this presentation

- ⇒ ***Double auction*** A calculation method whereby an exchange's price is set by calculating the intersection between the exchange's supply curve and the exchange's demand curve.
- ⇒ ***Implicit auction*** The common term for market coupling and market splitting.
- ⇒ ***Market coupling*** A day-ahead congestion management system, you can have on a border, where two spot exchanges meet. The day-ahead plans for the cross-border energy flows are calculated using the two exchanges' bids and information on the day-ahead cross-border trading capacity.
- ⇒ ***Market splitting*** A day-ahead congestion management system, you can have on a border, where you have the same spot exchange on both sides of the border. The day-ahead plans for the cross-border energy flows are calculated using the exchange's bids and information on the day-ahead cross-border trading capacity.

Terminology and acronyms – 3

As used in this presentation

- ⇒ ***Nordic and Nordic area*** refer to the countries Denmark, Finland, Norway and Sweden.
- ⇒ ***Spot exchange*** In this document, a spot exchange is an exchange where
 - ✓ **Electrical energy is traded day-ahead.**
 - ✓ **The day-ahead prices are calculated by means of double auction.**
- ⇒ ***Spot price*** A price calculated by a spot exchange. Either by a calculation performed by the spot exchange itself, or by a calculation performed by a body, to which the calculation has been outsourced.
- ⇒ ***TSO*** Transmission System Operator.

Thank you for your attention!

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