

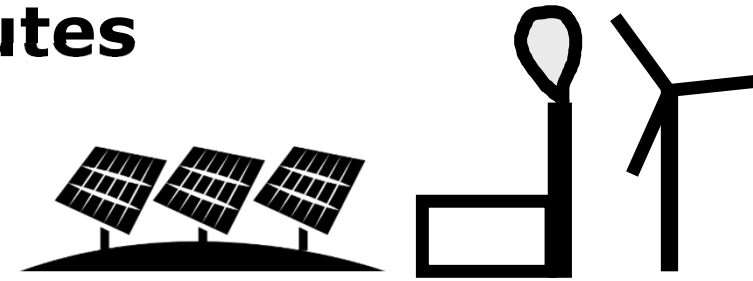
# Introduction

- **This presentation argues the TSOs should not impose a fine on those players, who have an imbalance**
  - ❑ **Instead, the imbalance prices should be derived directly from the prices for balancing energy.**
- **A fine for imbalances has a very unfortunate consequence:**
  - ❑ **It incentivise players to hold flexibility in-house**
    - ✓ **Instead of bidding the flexibility at the TSOs' markets for ancillary services.**
- **In this presentation, we ignore the profit a player may have from selling balancing capacity to the TSO**
  - ❑ **We only consider a player's trading of balancing energy.**
- **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.**

# Player with assets

## Which can regulate within 15 minutes

### Example for one hour of operation



Situation during  
Hour of Operation.  
4 combinations

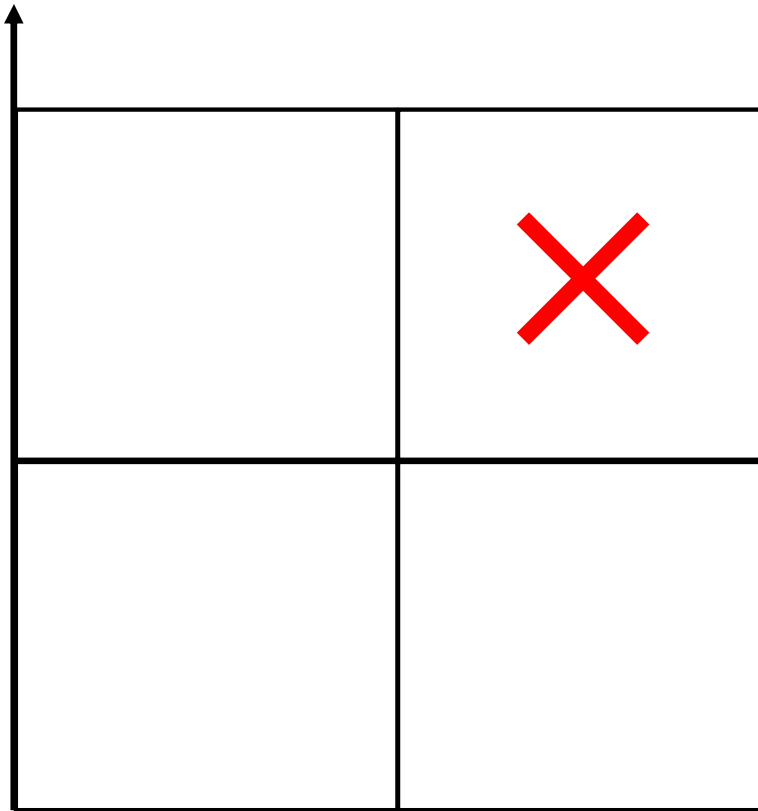
**Player  
needs**

**Player's assets**

*Up regulation  
(player's assets  
produce less  
than sold to market)*

*Down regulation  
(player's assets  
produce more  
than sold to market)*

**The next slides  
discus this  
situation**



*Down regulation  
(total production  
bigger than total  
consumption)*

*Up regulation  
(total production  
smaller than total  
consumption)*

**System  
needs**

# Sale of balancing energy – 1

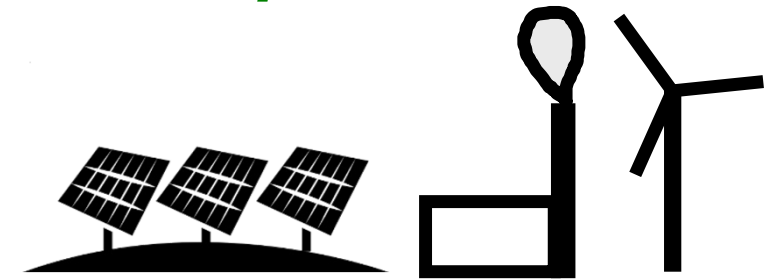
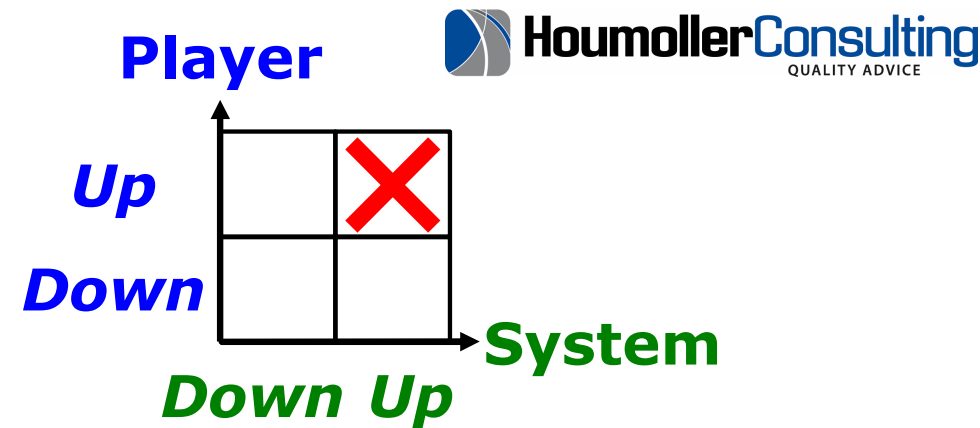
## And settlement of imbalances

Example for one hour of operation

No “fine” for imbalances

Player P produces 10 MWh  
less than sold to market.

Player P has up  
up regulating capacity.



Player P's assets

Up regulating price  
80 €/MWh.

Market price 70 €/MWh.

### First observation

If P's up regulating cost is higher than the imbalance price:

Then P should not self-regulate.

*However, this argument is not valid, if there is an imbalance fine.*

**Next: assume P's up regulation cost is lower than imbalance price.**

# Sale of balancing energy – 2

## And settlement of imbalances

Example for one hour of operation

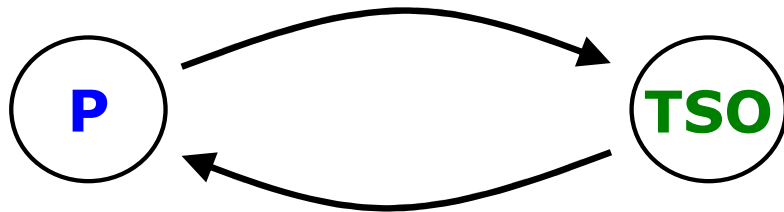
No "fine" for imbalances

Player P produces 10 MWh less than sold to market.

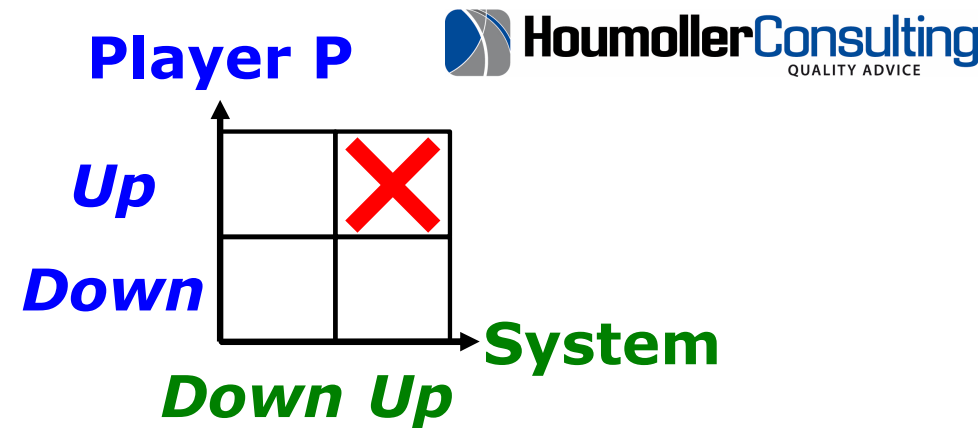
Player P has 15 MW up regulating capacity.

All 15 MW are used.

P's sale: sell 15 MWh at 80 €/MWh



P's imbalance: buy 10 MWh at 80 €/MWh



Up regulating price  
80 €/MWh.

P's up regulating cost  
75 €/MWh.

Market price 70 €/MWh.

If the following accounting, we ignore P's sale to the market

P's gross profit when not self-regulating:

$$15 \text{ MWh} * (80-75) \text{ €/MWh} - 10 \text{ MWh} * 80 \text{ €/MWh}$$

$$= 75 \text{ €} - 800 \text{ €} = -725 \text{ €}.$$

P's gross profit when *self-regulating*:

$$-75 \text{ €/MWh} * 10 \text{ MWh} = -750 \text{ €}$$

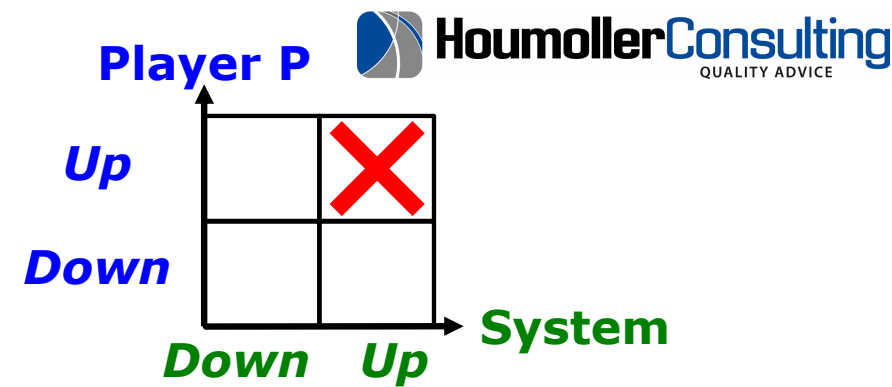
*The extra 5 MW are useless.*

*They have not been bid at the TSO's market.*

*They were kept in-house.* Copyright Houmoller Consulting ©

# Sale of balancing energy – 3

## And settlement of imbalances



- **Even in the up-up situation sketched out at the previous slides, there are many more combinations of volumes and prices**
  - ❑ **Only two combinations were discussed at the previous slides.**
- **It's left to the reader to go through the many combinations...**
- **However, for any given player, the conclusion is:**
  - ❑ **Without fines for imbalances and without fines for not being able to deliver balancing energy offered to the TSO:**
  - ❑ **The best strategy is to bid all flexibility to the TSO's market**
    - ✓ **In some scenarios, this strategy gives the same result as self-regulation.**
    - ✓ **In other scenarios, this gives a better result than self-regulation.**
    - ✓ **And it's difficult to foresee the Hour of Operation's scenario!**

# More information: the spot market

- Normally, the prices at the so-called *spot market* is the starting point for the prices at the TSOs' market for balancing energy
  - ❑ The prices at the intra-day markets can also be the starting point.
  - ❑ However, the liquidity at the intra-day market is low for the EU Member States (apart from Germany).
- For a discussion of the organization of the spot market, please see the PowerPoint presentations
  - ❑ *Single Market Coupling Operator.*
  - ❑ *Nodal and zonal pricing.*
- For a presentation on how the spot prices are calculated, please see the PowerPoint presentations
  - ❑ *Market coupling and spot price calculation.*
  - ❑ *Spot trading.*



# **Thank you for your attention!**

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