

RES Support Mechanisms

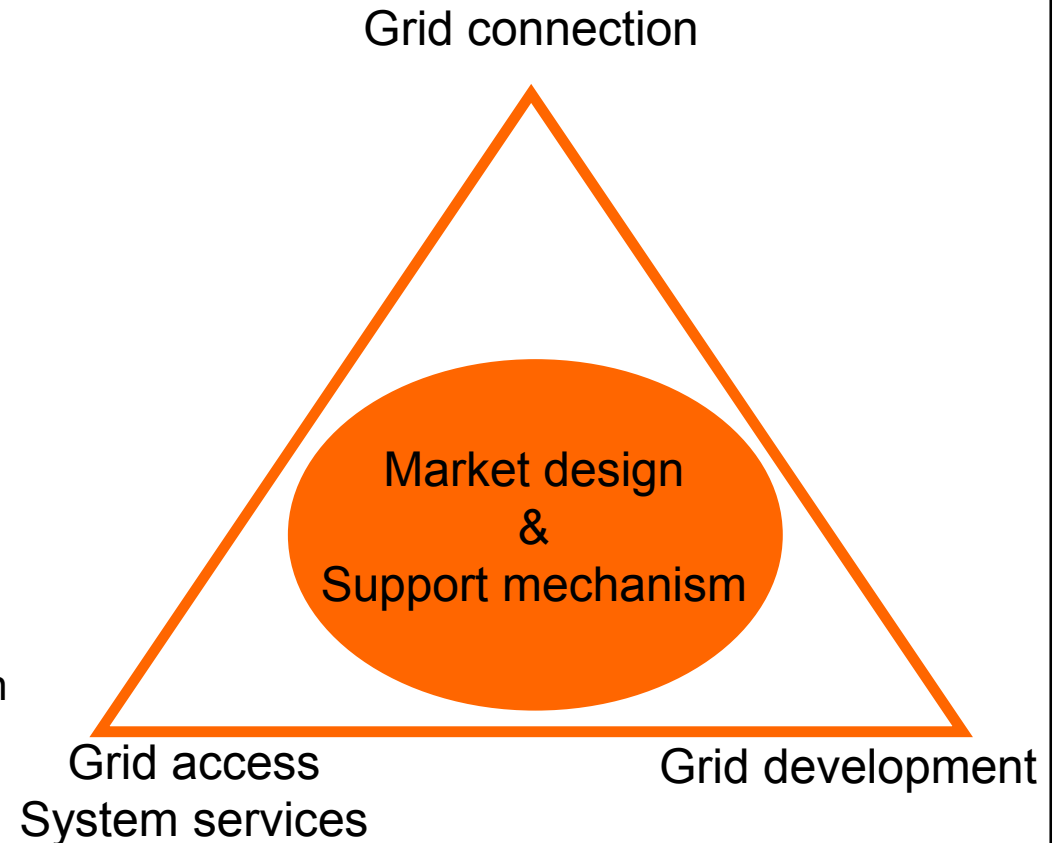
Design options for Offshore wind

13/06/2012



RES support mechanism design criteria: TSO perspective

- Elia takes no position on need, type nor level of support. We only feed the debate with possible design options.
- Design of support mechanism does influence operational practices:
 - Network planning (capacity/location)
 - System imbalances (cost of ancillary services)
 - Minimal price certificates obligation
 - ...
- ➔ Impact on grid development, system management, market functioning, ...



RES support mechanism design criteria: TSO perspective



- **Full market integration**
 - Support mechanisms should integrate RES in the market and not create a distinct class of generators outside the market. Hence, exposure to price signals should be preserved, in order to integrate RES into the energy markets
- **Incentives to balance**
 - All market participants should have incentives to manage their energy output in order to reduce the volume (and associated cost) of system balancing
 - Create strong incentives to innovate to avoid imbalance exposure (e.g. through forecasting tools)
- **Enhance liquidity of energy markets, in all timeframes**
 - All markets, meaning energy but also balancing markets, should be as liquid as possible
 - Support mechanisms should not impede but enhance the development of liquid markets in all timeframes (e.g. Intraday market development)
- **Optimal flexibility in system balancing**
 - Support mechanisms should not constrain the ability of the TSO to act in the best interest of the system and guard the Security of Supply

Challenge of RES for Elia

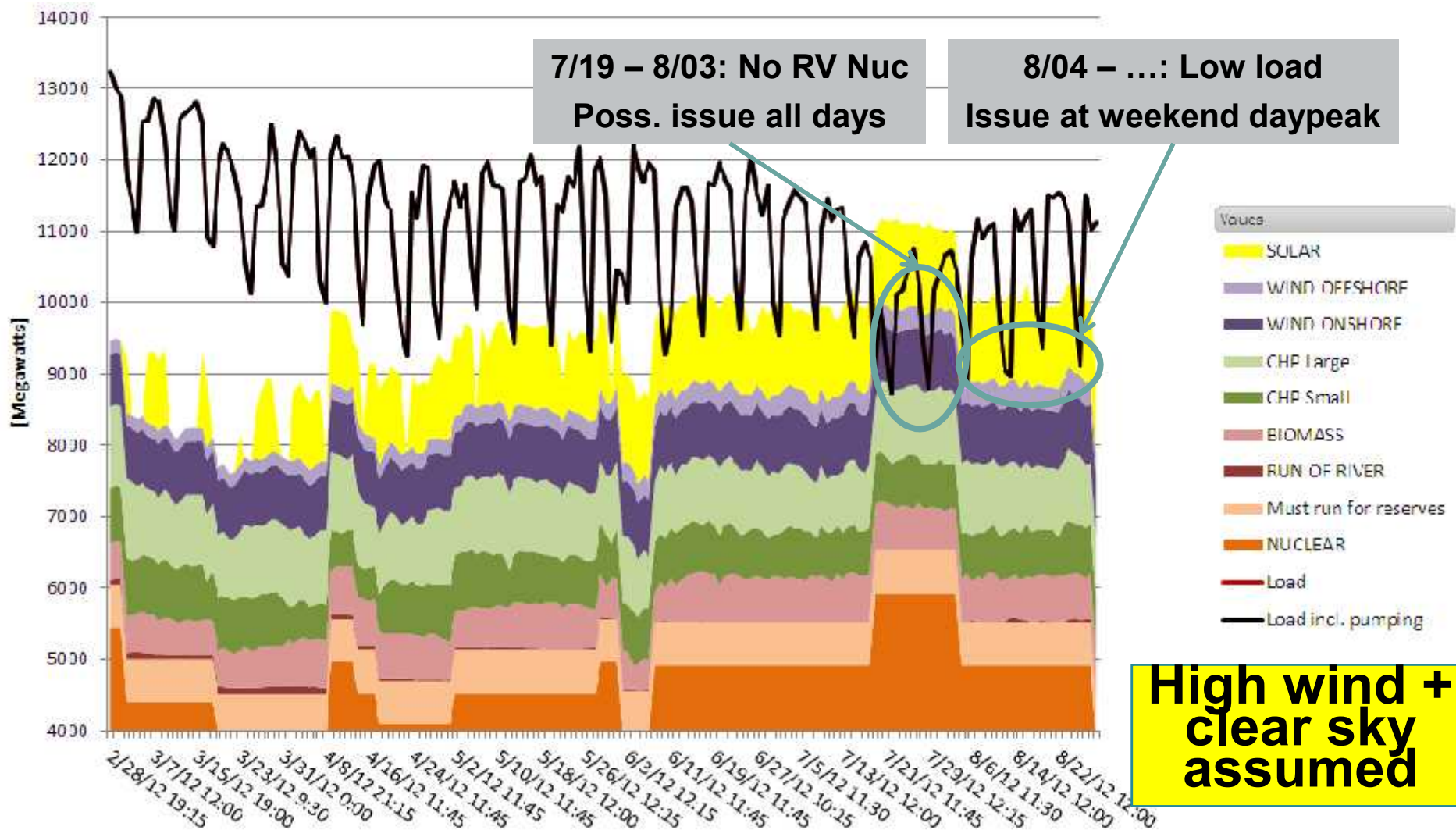
Risk assessment of issue of incompressibility due to:

- Decreasing energy offtake
- Increasing integration of renewables
- Increasing portion of non-flexible generation

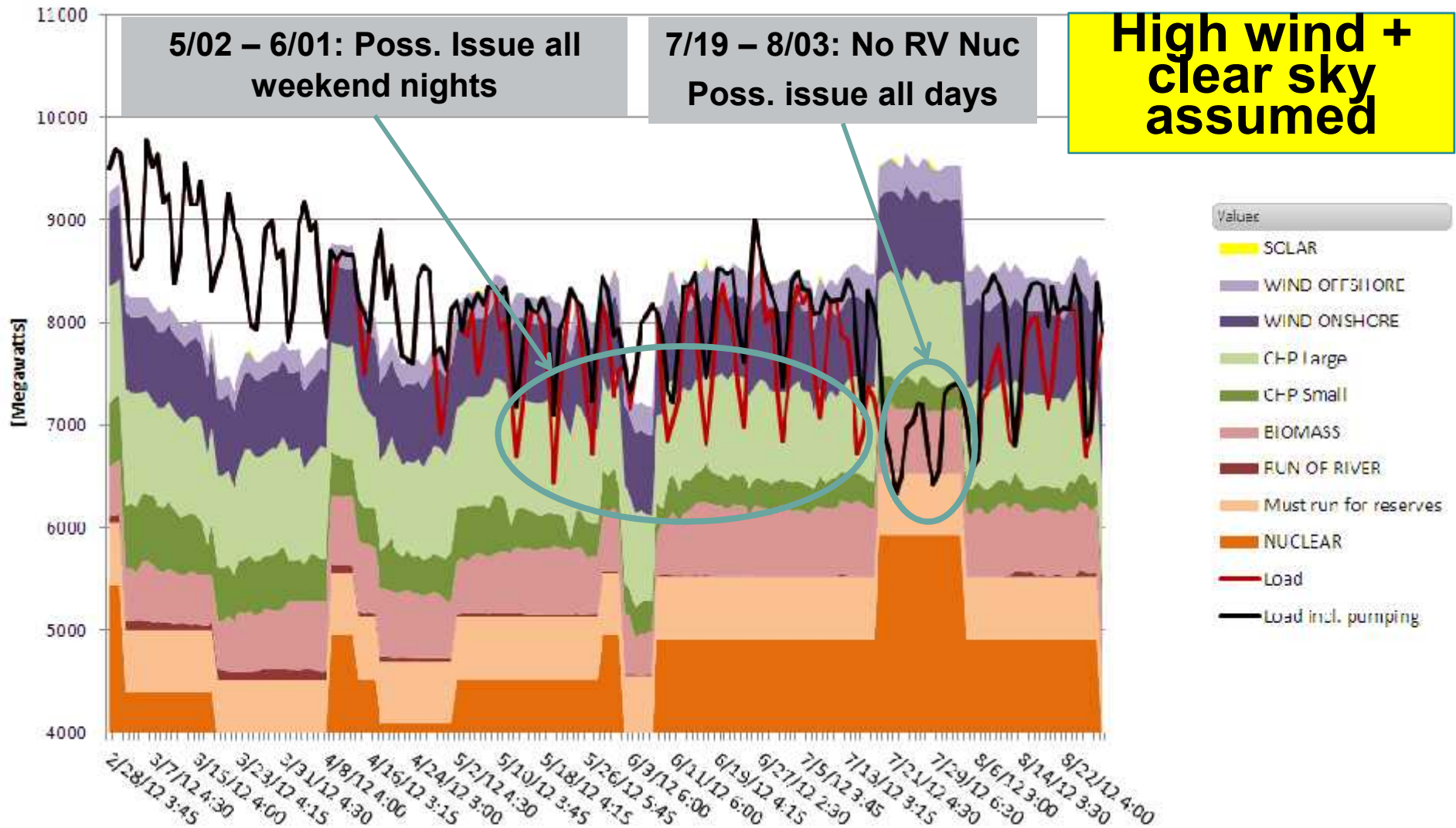
For this anticipated system state of incompressible generation urgent measures are necessary to avoid a severe impact on the operation of the electricity grid

E.g. Spring & Summer Outlook 2012

Incompressibility at Day Maximum

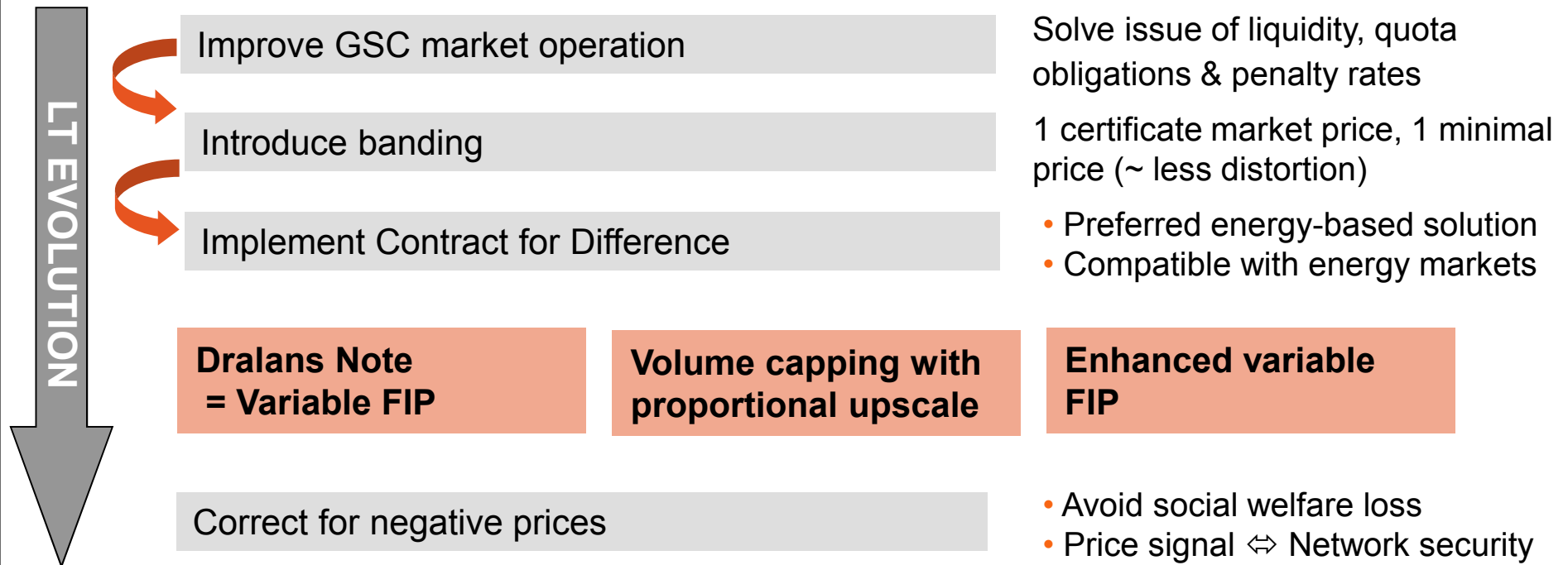


Incompressibility at Night Minimum



Possible Belgian evolution pathways

Energy-based support mechanism evolutions



Capacity-based support mechanism

- No interference of support mechanisms on energy-only markets
- Perfect integration of RES possible
- Introduces more flexibility towards RES producers in the system

Design options for offshore wind support mechanisms



Alternative design options:

1. Based on a fixed support level, comparable to the current support, with volume capping
[as presented previously in the ad hoc RES platform, not further discussed today]
2. Volume-capping with proportional upscale and variable premium
3. Enhanced Variable FIP with strong incentives for active participation in the balancing market

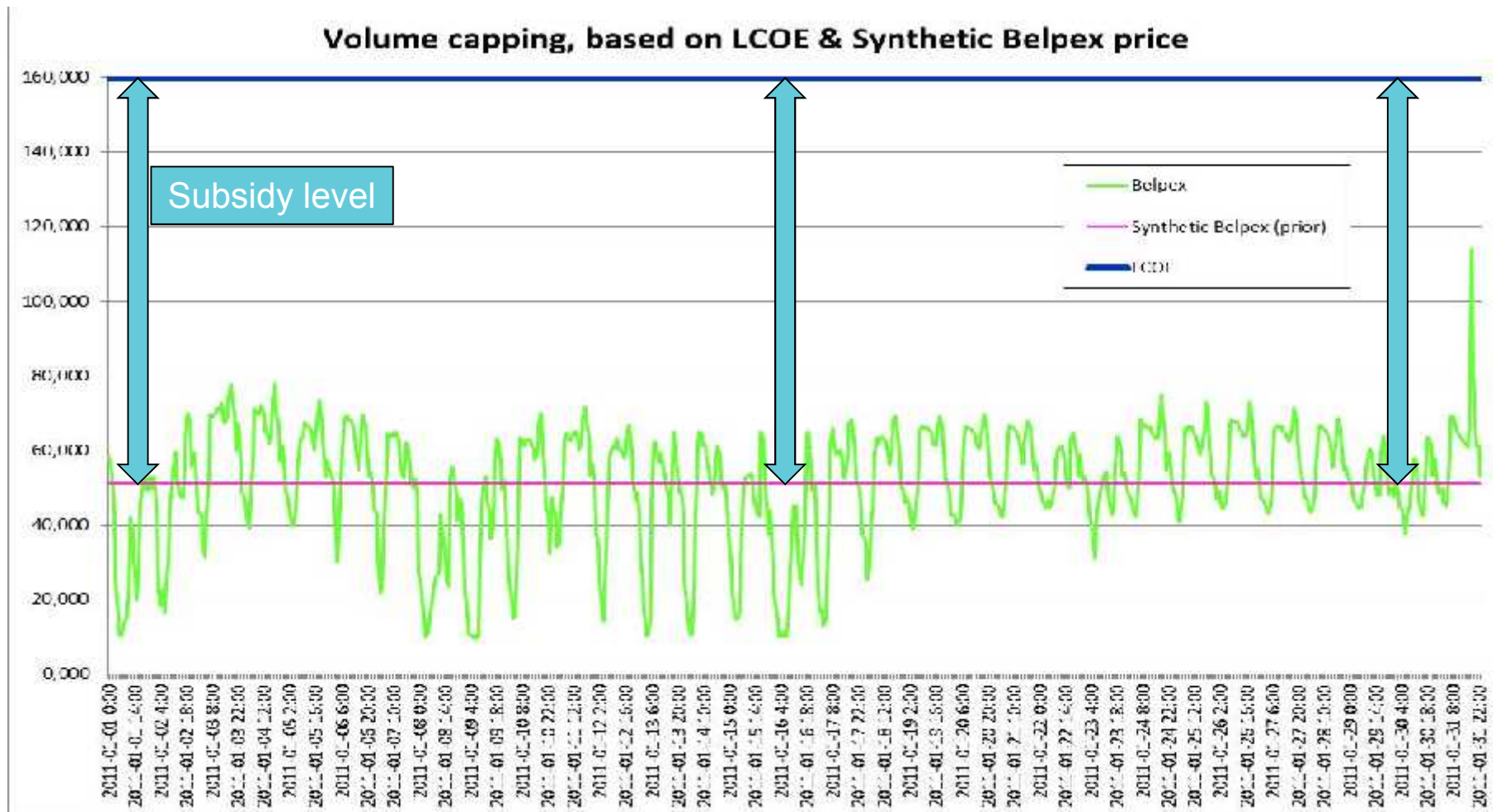
Volume capping with proportional upscale and variable premium



For each project:

1. Determination of LCOE (~ “onrendabele top”) for duration of project
2. Upscaling of LCOE, so that full subsidy revenue should be reached on 80% of the full load hours instead of 100%
3. Determination of synthetic Belpex average price, each year (ex ante)
4. Determination of subsidy = LCOE – Synthetic Belpex
 - Fixed FIP, determined yearly
5. Producer receives (yearly fixed) subsidy + Belpex price
 - Realises upside when offering its production as D-bids on the balancing market, during the 20% of full load hours where no subsidy is allocated
 - Only subsidy when producing => Incentive to be available!
 - Ex post correction for difference between synthetic and real wind production weighted Belpex price

Volume capping with proportional upscale and variable premium



Enhanced Variable FIP



Stronger Incentives for active participation in balancing market

In line with Group Dralans proposal, extended with incentives to participate in the balancing market

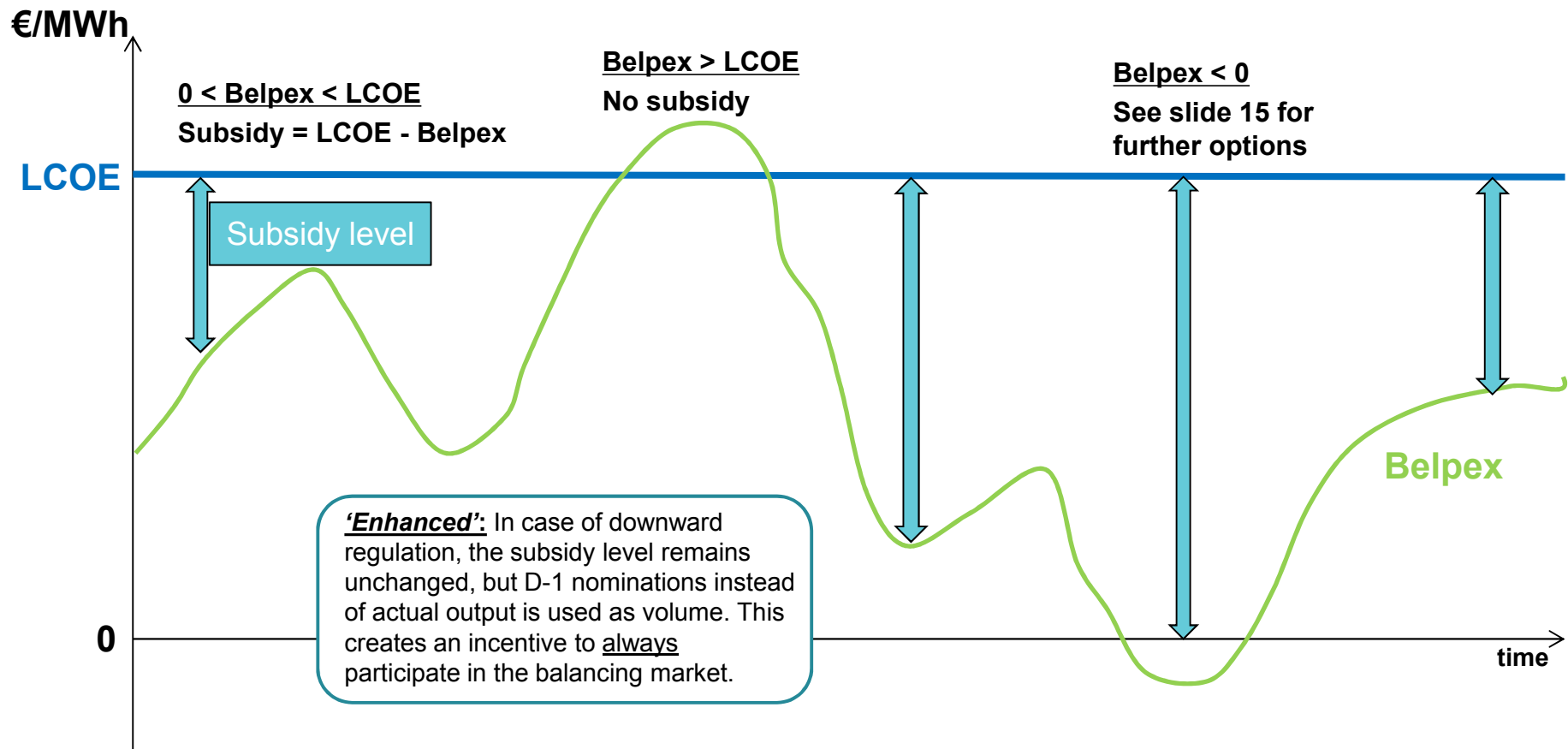
- Standard situation: Subsidy/GSC based on actual output
- When activated in balancing market (Downwards regulation - DBID): Subsidy/GSC based on day-ahead nomination

Advantages:

- Gives stronger incentive to participate in balancing market
 - As the support is not lowered when activated in the balancing market, there is always an incentive to gain an upside by participating in this market
 - This incentive exists from day 1 and does not start after the total support has been secured (as in the case of proportional upscale)
 - Due to the decoupling of support and output in case of downward regulation, there remains no incentive to bid at highly negative prices (e.g. $-LCOE$). Wind producer will offer downward regulating power at negative prices, but close to zero €/MWh, i.e. in line with its economic marginal cost
- Avoids the complexity of up scaling and yearly corrections (cfr. previous option 'volume-capping with prop. upscale and variable premium')
- Compatible with creation of a possible GSC market

Enhanced Variable FIP

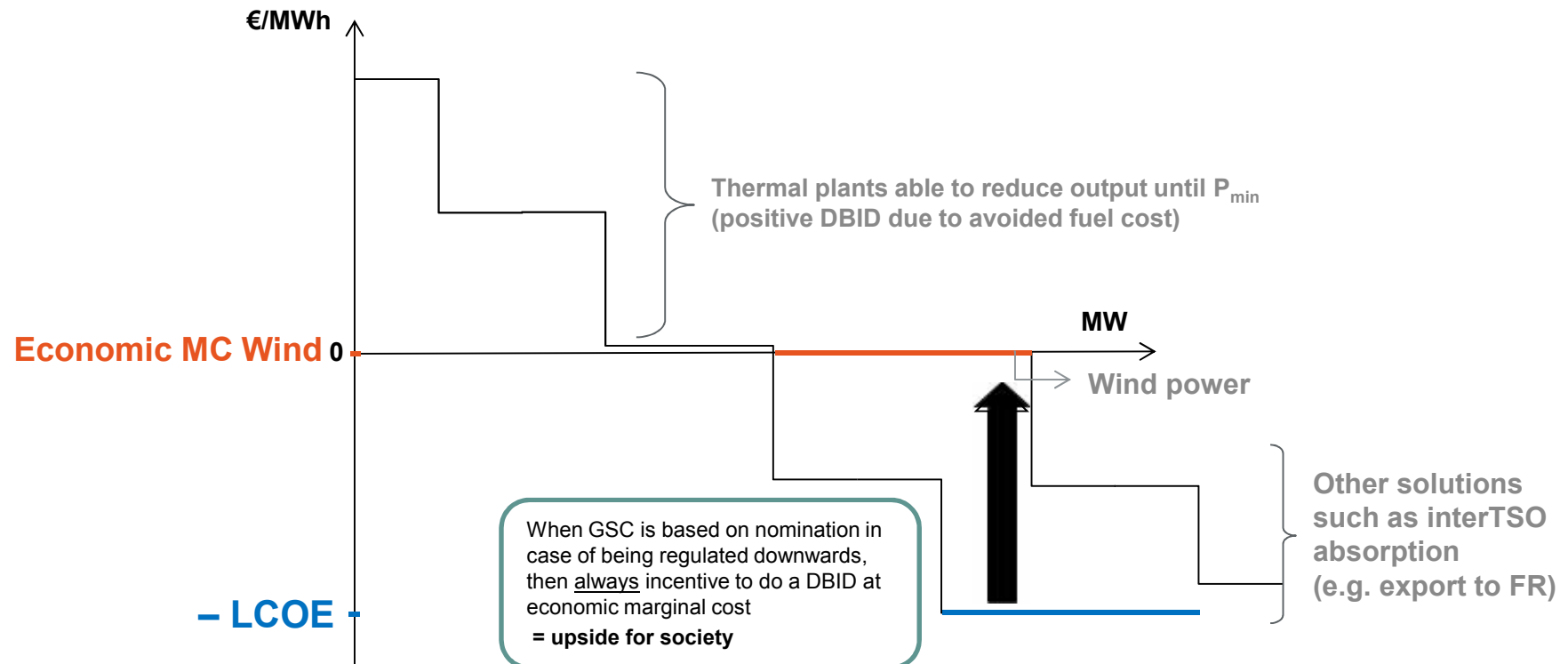
Stronger Incentives for active participation in balancing market



Enhanced Variable FIP

Stronger Incentives for active participation in balancing market

DBID merit order



Enhanced Variable FIP



Stronger Incentives for active participation in balancing market

Further explanation of underlying principles:

- This mechanism implies that subsidy/GSCs are awarded at moments without actual production. However, this only happens at moments when required by the system and when the wind producer was actually available.
- Although subsidy/GSCs are awarded for non-produced energy, such mechanism still fits the rationale of having a RES support mechanism. The wind producer is rewarded for providing the ability to provide renewable energy, but was prevented by system conditions. The individual wind producer, helping in meeting RES goals, cannot be blamed for the system conditions.
- Due to the imbalance mechanism, the wind producer has an incentive to provide the best possible nominations, rendering nominations a good proxy for the amount of curtailed energy (at least on average). This avoids any discussion on how much energy is not produced following downward regulation.

Alternative options for negative prices

RES support mechanism can influence bidding behaviour and, hence, increase of occurrence and depth of negative prices

e.g. if subsidy/GSC is given for each MW produced independent of the price level, then incentive to bid at minus subsidy level and willing to produce even with negative prices

→ A solution for avoiding negative prices should impact on the bidding behaviour

Solution: No subsidy/GSC when prices are negative

(as applied for the Danish wind farm Anholt)

→ No rationale anymore to bid at negative prices

→ Wind is not running and thereby a tight situation is avoided in an economic way and not by balancing or other out-of-market interventions.

Compensation possible for hours with negative prices and available wind power by increasing LCOE

Alternative options for negative prices

