

CROSS-BORDER CAPACITY RESERVATION

Rationale, options and challenges

BSG Meeting Brussels,
June 30th, 2016

AGENDA

1. Starting Point: The EB GL and the rational for XB Capacity reservation
2. The Methods: Description, Implementation & Challenges
3. What is Value: Comparing same with same (Including the Energy Component)
4. Conclusions



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Rationale for capacity reservation for balancing

- According to the EB GL, there should be *room for **improving competition** by means of **cross-border Balancing exchanges**,*
- ...instead of allocating all transmission capacity **only to other timeframes**, *to foster **greater and more efficient use of transmission capacity**.*
- To improve the competition for markets in all timeframes (trading + balancing) an effective transmission capacity allocation process is required, *to yield the largest benefit through market-based allocation.*
- **Reservation for balancing fosters competition in Balancing markets**, which in several countries today cannot be guaranteed on a national level, as markets may only consist of few BSPs.

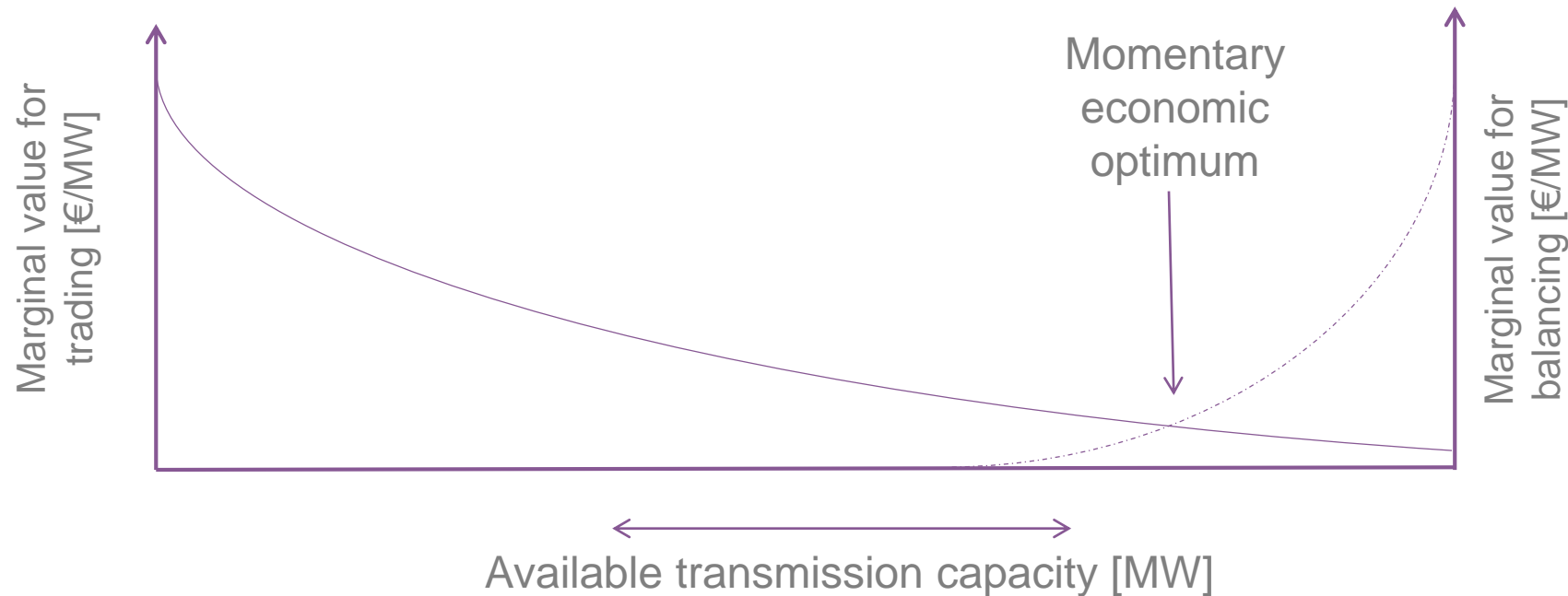
Maximising value of transmission capacity

Our common goal:

Maximisation of the value of transmission capacity to the benefit of the end-consumer

Allocation optimum

Reservation optimum between trading markets (BRPs) and balancing process (BRPs + BSPs) from an economic perspective:



Reservation of cross-zonal capacity

- Reservation can only be done on borders, where XB-capacity is calculated according to the rules of CACM and FCA.
- Reserved XB-capacity shall be considered as “previously allocated”.
- Necessity of reservation needs to be assessed regularly.
- 1 harmonized methodology per allocation timeframe as target model (4Y after EIF) (Co-Optimization or Market Based)
- When the harmonized methodology is implemented, no other methodologies are allowed for the timeframe.

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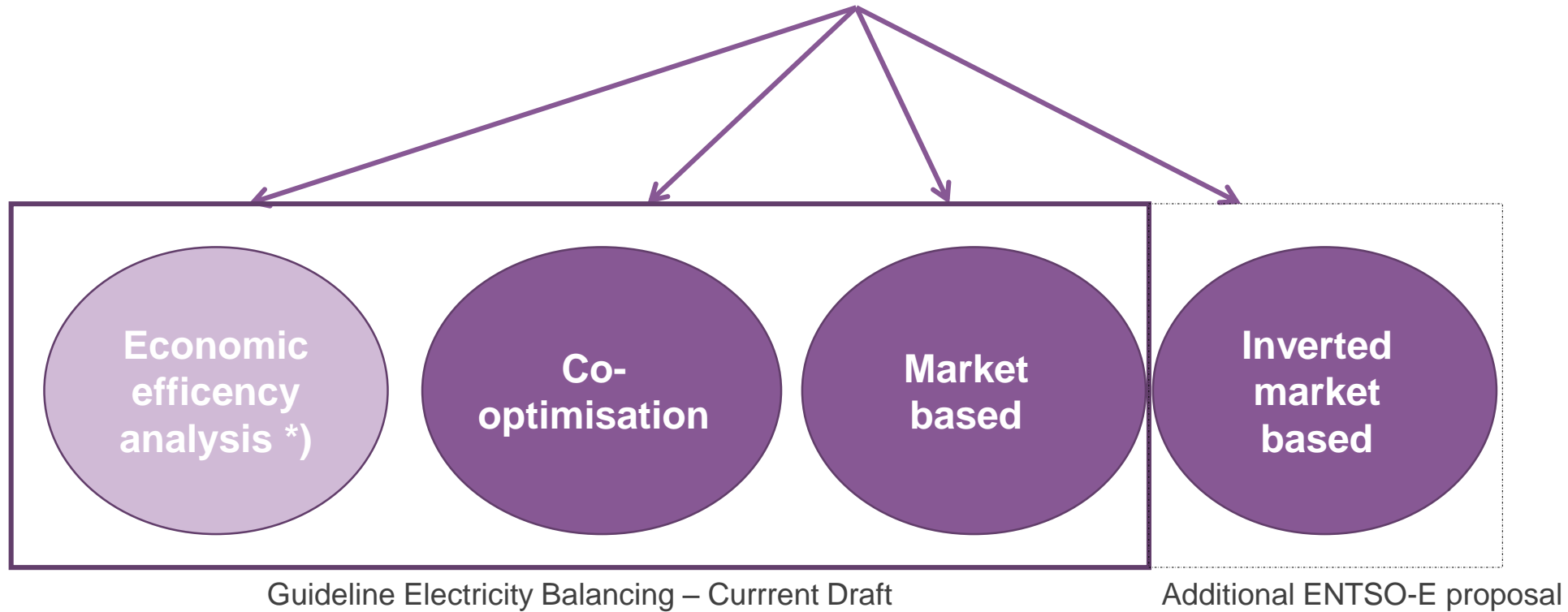
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Description & Implementation Options

Capacity allocation methodologies

Transmission capacity reservation methodologies



*) no longer allowed after Co-optimisation or Market Based are implemented (4 Y after EIF)

Descriptive comparison of methodologies

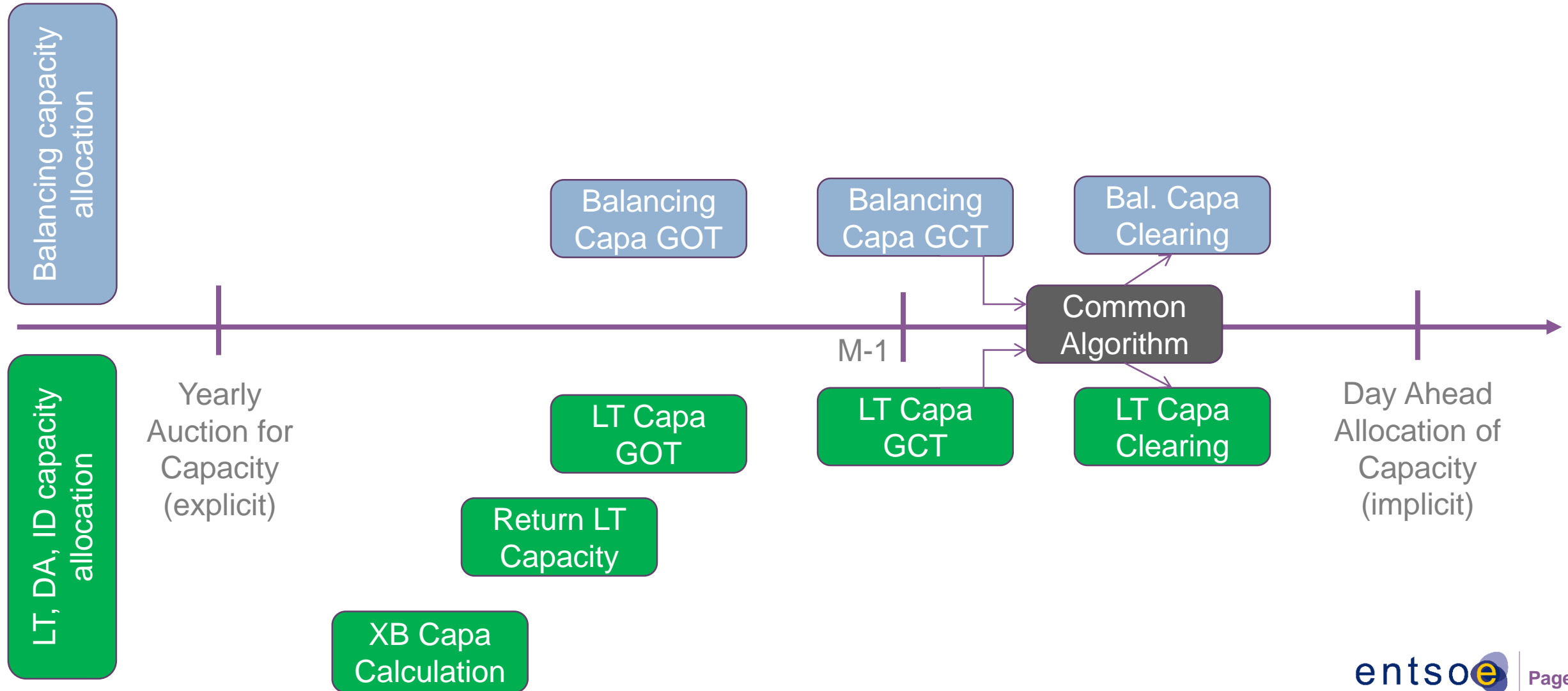
	Value from Balancing Market	Value from Energy Market	Value of the XB-Capacity	Possible Times for XB-Capacity reservation (for balancing)
Probabilistic Approach	-	-	Opportunity after intraday (currently =0)	not necessary
Co-Optimization	Actual Value (*)	Actual Value	Actual Market Value	Regular Capacity Allocation (implicit or explicit) & Balancing Reserve Procurement must run in parallel
Market Based Reservation	Actual Value (*)	Forecasted Value	Forecasted Market Value	During Balancing Reserve Procurement
Economic Efficiency Analysis	Forecasted Value (*)	Forecasted Value	Forecasted Market Value	At any point in time (long term oriented)
Inverted Market Based	Forecasted Value (*)	Actual Value	Forecasted Market Value	During Regular Capacity Allocation (implicit or explicit)

(*) Value for balancing should consider the best assessment of social welfare that can be derived from the data available at point of application of the methodology. → Definition open what this assessment should contain (see slides on “Energy Component”)

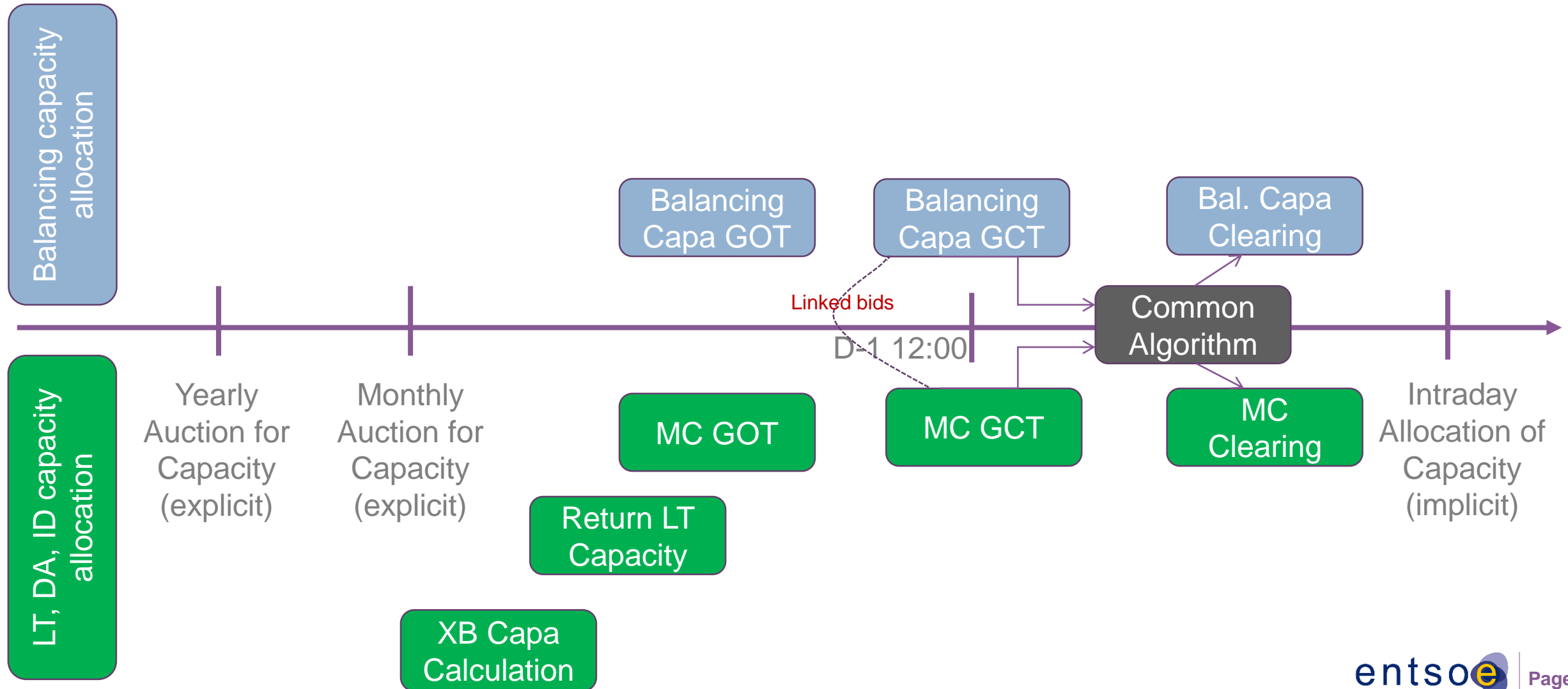
Co-Optimization Approach

- Single optimization process for allocation of cross-zonal capacity between energy market and balancing market (both implicit and explicit auctioning) accounting for different market structures and principles (linked balancing markets,...)
- TSOs shall bid the Market Value into the co-optimized allocation.
(= forwarding of balancing capacity bids of BSPs)
- Procurement of balancing reserves must take place in parallel to a existing XB-capacity allocation auction or DA market coupling.
- Co-optimization to account for impact on welfare for both market segments

Co-optimization: Timeline in Long Term Capacity allocation



Co-optimization: Timeline in Day ahead

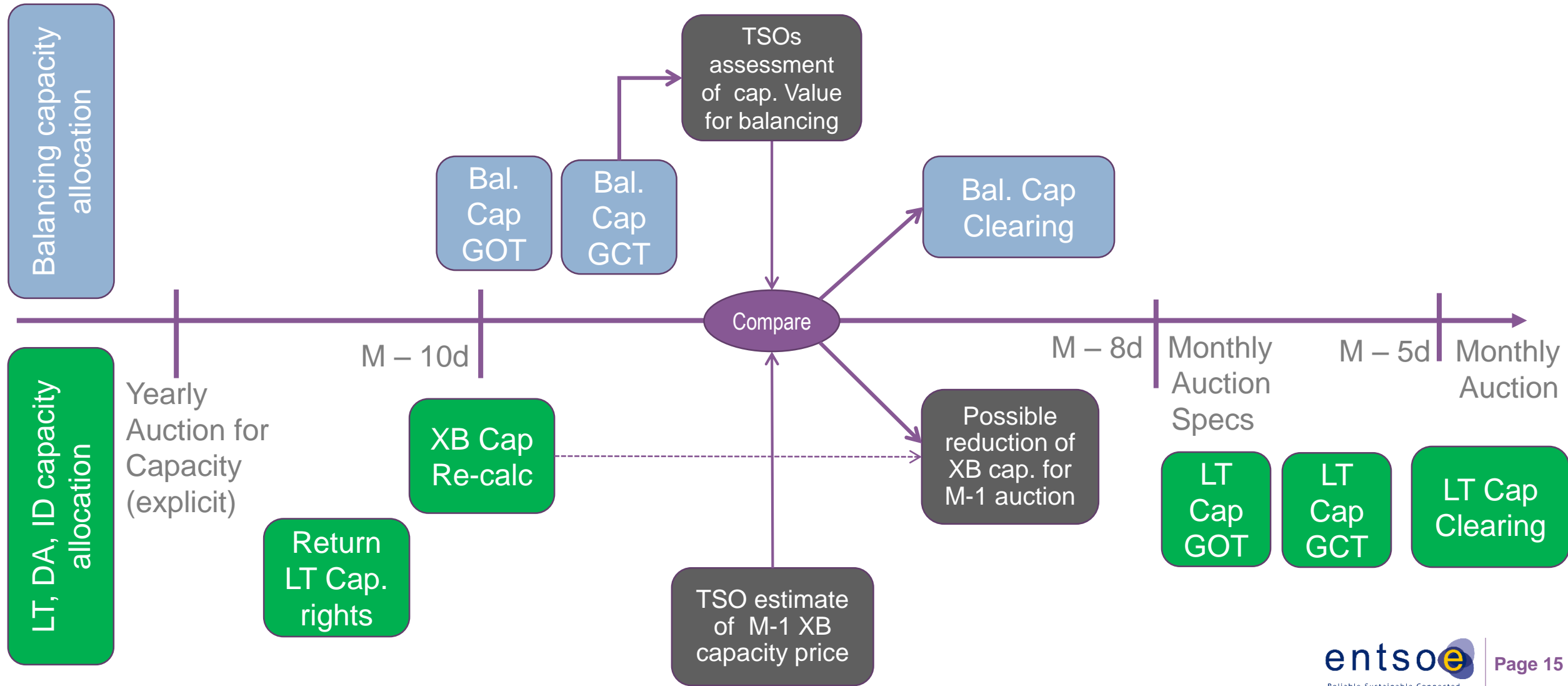


Market Based Reservation

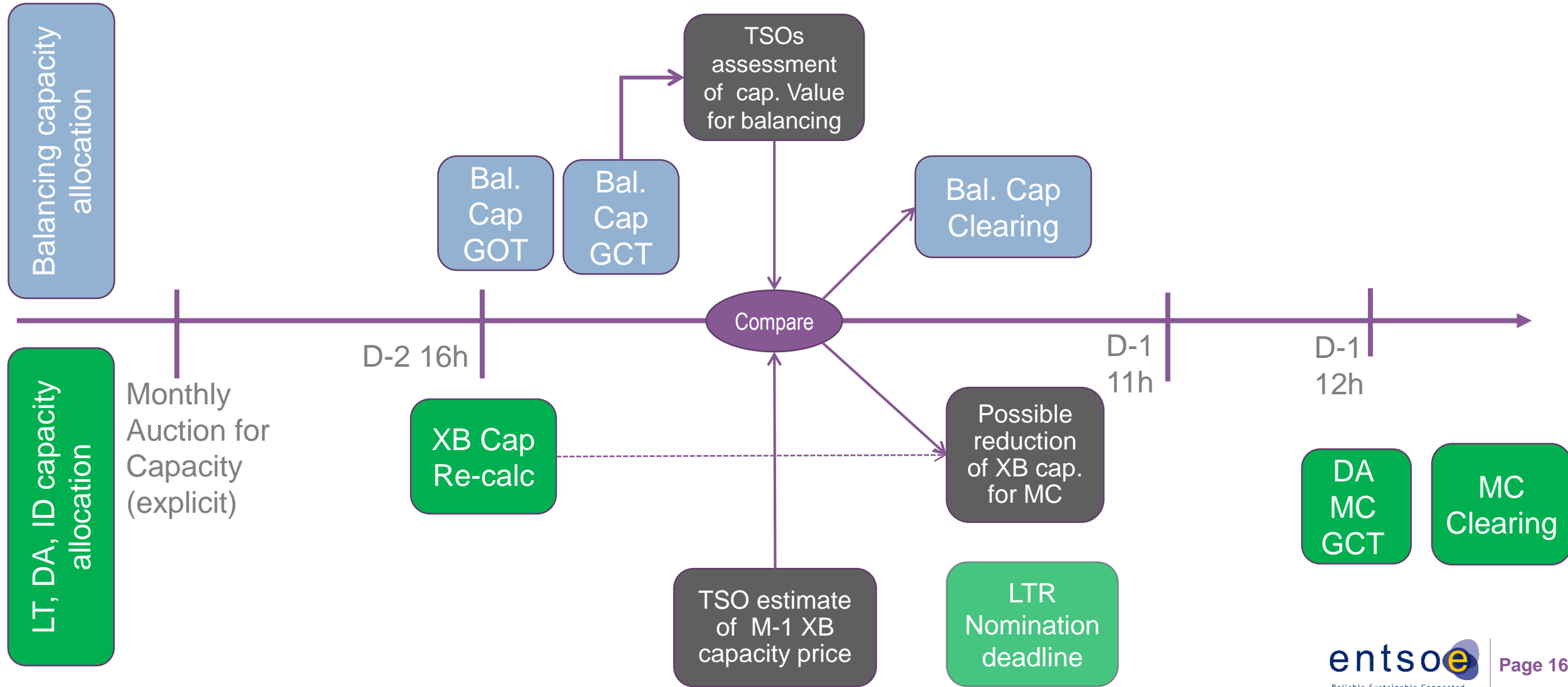
- Market Based Reservation shall compare the actual market value of XB-capacity for balancing with the forecast market value of XB-capacity for the energy market.
- Reservation could take place whenever* balancing reserves shall be procured → for instance weekly or in D-2 before the DA allocation

*provided coherence with capacity calculation and allocation processes is ensured

Market Based: Timeline in Long Term Capacity allocation



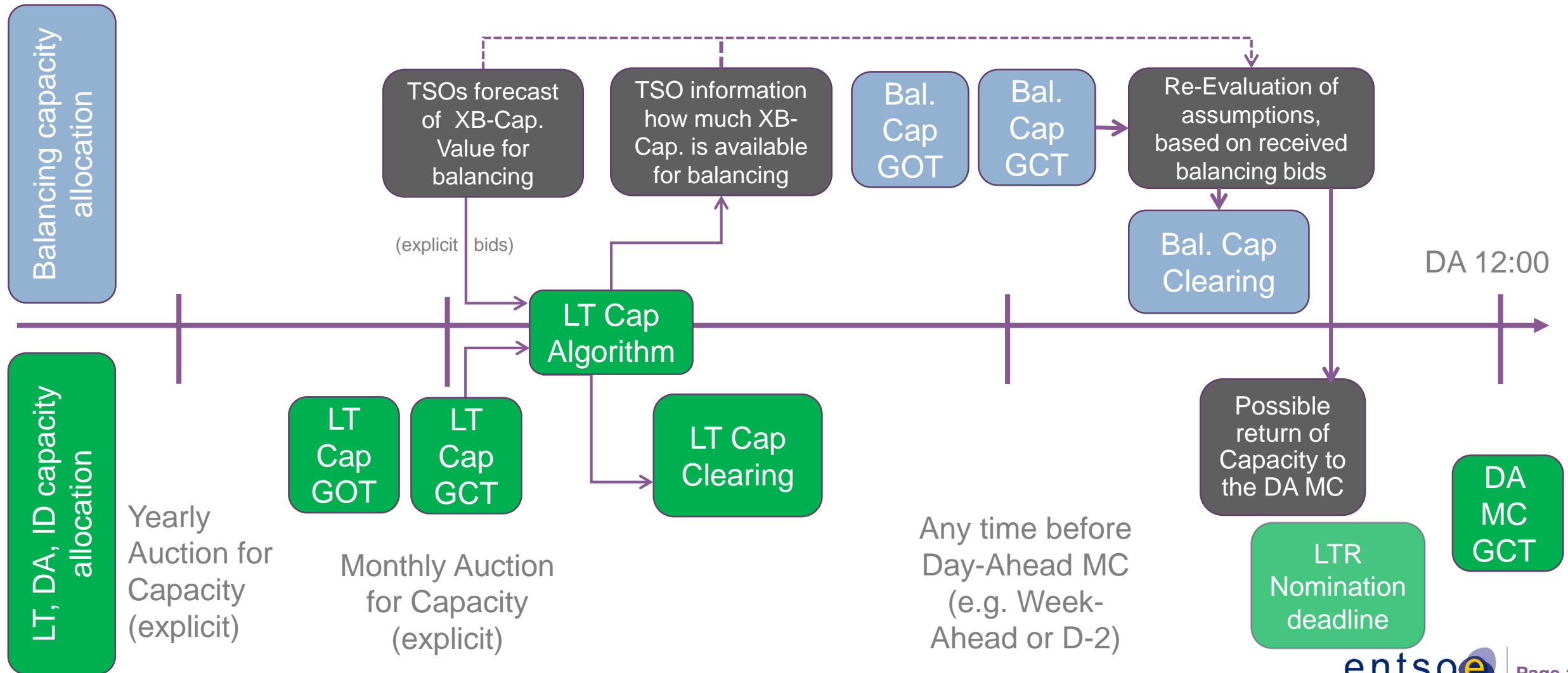
Market Based: Timeline in Day-Ahead (D-2)



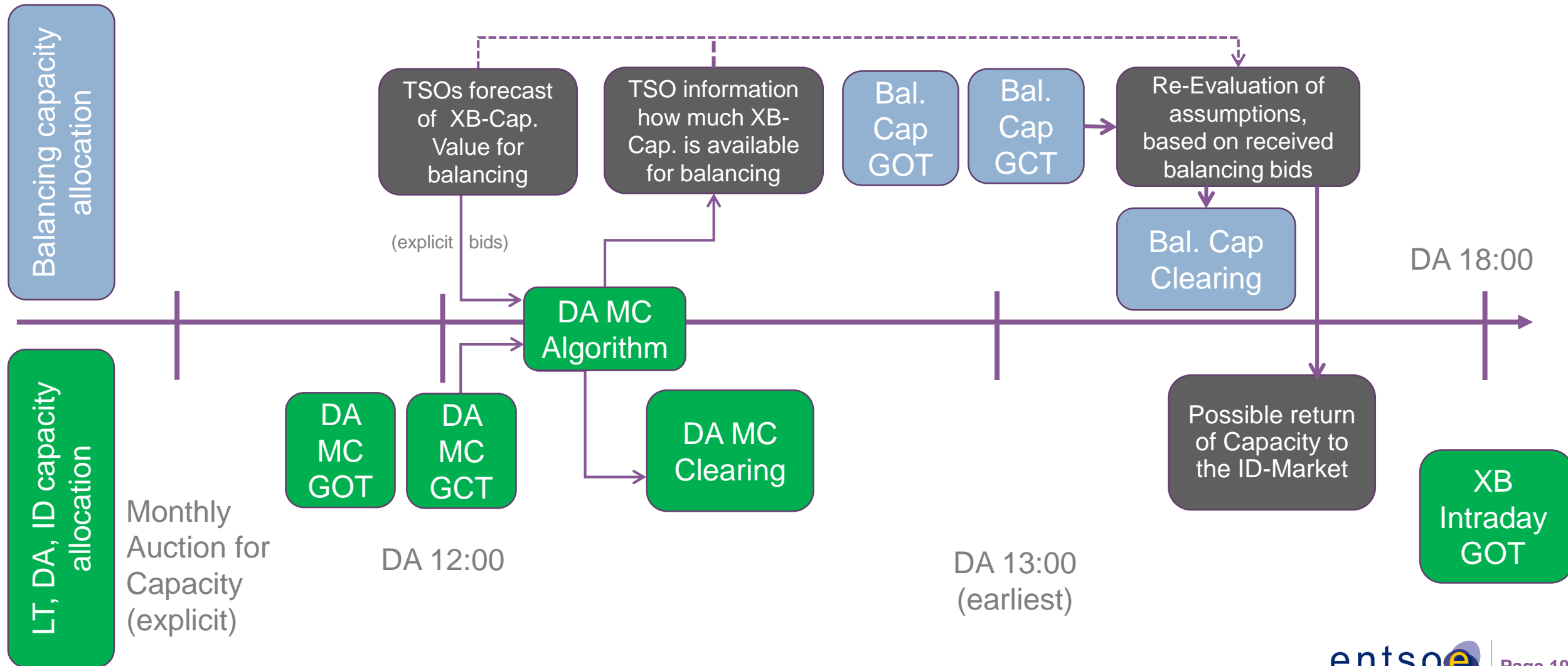
“Inverted Market Based”

- Not presently foreseen by draft NC EB
 - (Inverted Interpretation of the Market Based Approach)
- Reservation can take place in any given XB-capacity allocation auction before the procurement of balancing reserves.
- If applied in Long Term market ,TSOs bid for capacity in explicit auctions.
- If applied in the DA market, it creates additional capacity only product (like co-optimization)
 - XB-capacity bid by TSOs allocated by algorithm together with capacity and/or energy products.
- Capacity can be given back to the next subsequent market timeframe, if ex-ante assumptions are not confirmed by real balancing procurement auction

“Inverted Market Based”: Timeline in Long Term Capacity allocation



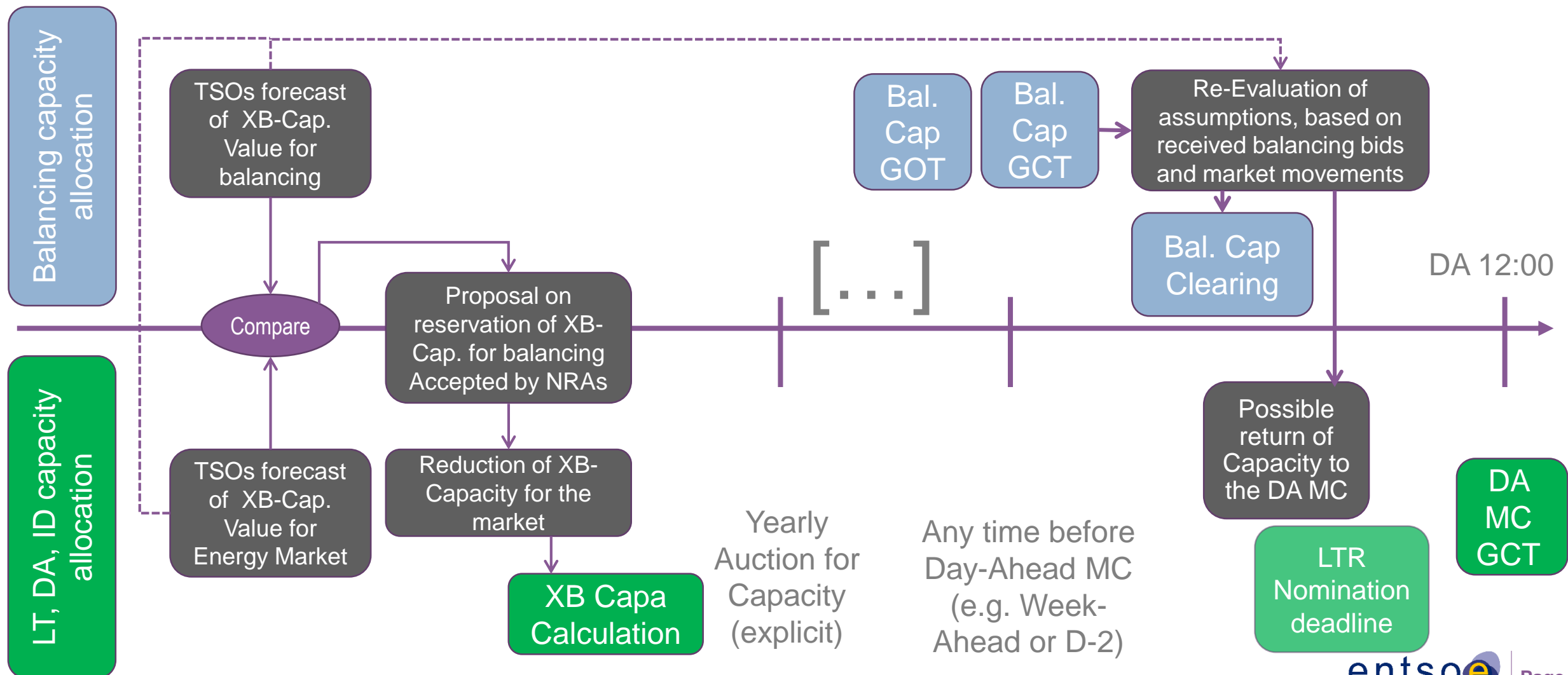
“Inverted Market Based”: Timeline Day-Ahead MC



Economic Efficiency Analysis

- The development of an EEA methodology is optional in the EB GL.
- Option for an ex-ante evaluation of the XB-Cap. value for the balancing market and the “regular” energy market, and according reservation of XB-Cap.
- Long-Term oriented methodology; every reservation proposal needs to be approved by the competent NRAs.
- Value of XB-Capacity has to be re-assessed within the balancing capacity procurement process, and XB-Cap. no longer beneficial needs to be returned to the market.
 - o (Same logic as proposed by ENTSO-E for the “Inverted Market Based” approach)

Economic Efficiency Analysis (generic for all timeframes)



Challenges

Co-optimisation

Pros:

- No estimation to be made by TSOs (no risk of inaccurate estimations of market prices for XB capacity), if welfare is based on capacity prices
- Accurate market information available (including XB capacity) at time of TSOs bidding for XB capacity
- Most transparent “market-oriented” method
- Could be used in Intraday with auctions (unlike inverted market based)

Cons:

- Complexity, especially with implicit auctions. In DAMC: Robustness of algorithm questionable and feasibility within process timings?
- Needs to account for complex nature of balancing capacity markets (interlinked bids, potentially across different products & timescales), when bidding by BSP needs to be done in parallel.
- Reduced efficiency as balancing bids have to be collected at the same time as energy bids as they are interdependent (if linked bids are prevented by the 2 step process). Non selected balancing bids can then not be sold to the market if procurement is close to real time.
- If no linked bids are possible, risk that market parties would bid in either balancing or energy markets, possibly leading to compliancy issues for TSOs and/or higher market prices
- Impossible to compute additional social welfare in value of capacity to be reserved for balancing as there is no time to derive it from anything else than reserve bids
- Constrains TSOs balancing procurement timeframe and product types (especially in LT auctions) as they need to be consistent with XB capacity auctions times/products
- Requires EU harmonisation of balancing auctions to align input to XB capacity auctions
- Impossible to be performed in CT environment (no real co-optimisation)

General comments/recommendations:

- More suitable for explicit/LT procurement because of high complexity in DA and ID timeframe (feasibility in question)

Market Based

Pros:

- Simple methodology, does not affect MC algorithm
- Quicker/easier implementation
- More flexibility to schedule balancing capacity auction times independently of XB capacity allocation
- Easier/more efficient for market parties to bid subsequently first for balancing reserves and then for the regular energy market
- Technically feasible with ID (especially with auctions)
- Estimating market prices may be easier than estimating balancing reserves prices (as in inverted market based)
- Could be run right before or after DAMC without having to enter in implicit auction

Cons:

- Risk of wrong market prices forecasts (but impact decreases moving closer to real time)
- inaccuracies could affect many parties and large volumes (esp. in DAMC)
- Timings could be tight if moved close to D-1. Need of XB capacity availability info to run balancing capacity auction (D-1 morning window too short?)
- No possibility to correct assumptions ex post by giving back unused capacity (like in IMB)

General comments/recommendations:

- More suitable for shorter timeframes (if compatible with CC and CA processes) to limit the risk of wrong estimations

Inverted Market Based

Pros:

- Possibility to validate assumptions on value of XB capacity for balancing AFTER XB capacity auction.
- May strengthen acceptability for stakeholders
- If assumptions were wrong, XB capacity can be given back to the next subsequent market timeframe.
- TSOs capacity bids are tested against the true market, rather than a estimate of the market: higher NRAs/stakeholder acceptability than for market based
- Less complex algorithm than co-optimisation
- In a proactive system the market is given more time to find a solution (in DA) that may avoid the need for balancing

Cons:

- Difficult estimation of balancing capacity value, could affect the market (robust methodology needed for TSOs credibility)
- Algorithm complexity if applied for implicit auctions (but less than for co-optimisation as there are no linked bids)
- TSO estimate of balancing capacity value could be used for gaming by market participants, if publicly available (esp. in non liquid markets).
- If performed Day-Ahead, could be unsuitable for some TSOs as they wouldn't have the necessary certainty of reserved volume sufficiently in time.

General comments/recommendations:

- Need of inclusion in EB GL as possible method (inverted interpretation of market based).

Economic Efficiency Analysis

Pros:

- Gives predictability for investors – both CZC and potential BSPs for new products if long term tender.
- Simple, does not rely on other processes.
- TSO estimates are re-assessed regularly and non-beneficial CZCs are given back to the market (as IMB)
- Every reservation has to be checked and approved by all relevant NRAs (high degree of credibility)

Cons:

- Calculation of economic efficiency just based on forecasts at time of reservation.
- Complex to incorporate dynamic market changes in conditions.
- May be challenging with transparency.

- Not allowed after Co-optimization or market based methodology are implemented

General comments/recommendations:

- Most pragmatic methodology for the start of XB-Cap. reservation for balancing
- Possible fall-back if other methods cannot prove feasibility?

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Defining the Value of XB-Capacity

- The socio-economic welfare effect is defined as:

Gained Consumer Welfare + Gained Producer Welfare

- For the energy only market the definition is rather straight forward as it can be derived from the supply and demand curve of only 1 product (energy).

(If XB-Cap. is reserved it can be used for the exchange of energy – full stop)

- For the balancing market this assessment is not so simple, as welfare (or economic efficiency) can be gained through several steps along the process:

- Exchange of Balancing Capacity (may include sharing – currently not foreseen by EB GL)
- Exchange of Balancing Energy
- Imbalance Netting

(If XB-Cap. Is reserved for the exchange of balancing capacity it will also be used for the exchange of the respective energy. If it is not used for that it is still available for subsequent balancing processes.)

Including the energy component

Exchange of Balancing Energy is an important driver of the value XB-Cap. has for the balancing market. Hence, its effect on the economic efficiency of potential XB-Cap. reservation for balancing needs to be taken into account.

IF NOT INCLUDED A COMPARISON WITH THE ENERGY ONLY MARKET WOULD ALWAYS BE BIASED!!

Further arguments to include the energy component:

- Some Balancing Areas have low procurement prices and high balancing energy prices, other Balancing Areas have the opposite
- The value of balancing energy is especially dominant compared to the value of balancing reserves for the rather lower margins of capacity reservation.
- The energy component (balancing energy) is always of direct benefit to BRPs (market parties)
- Important for areas with (low procurement prices and) high balancing energy prices
- Important for proactive balancing areas
- Important for CoBAs with relative larger potential of imbalance netting volumes
- Non-inclusion of energy component leads to biased assessments of capacity value

Including energy component

Pros:

- More objective assessment of reserved capacity value
- More efficient capacity allocation (increased value)
- Reduces the amount of unused transmission capacity
- Including the value of balancing energy is of direct benefit of market parties (as expenses of Balancing Reserves are for some countries socialised and are not of direct value to BRPs)

Cons:

- Need for forecasting, facing risk of mistakes

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Conclusions

- In general reservation methodologies applied in the LT timeframes have lower complexity and implementation challenges than if applied in DA. In particular, LT co-optimisation seems much more feasible than DA.
- The co-optimisation approach seems the most suitable overall for the LT timeframe.
- For reservation close to the DA timeframe (e.g. D-2) the Market Based approaches seems promising because of simplicity and reduced risks of wrong estimations
- The extent of the increased complexity through the co-optimisation and IMB for DA requires further analysis to assess feasibility.
- The IMB approach looks promising close to DA and less complex than the co-optimisation; Key question: how exactly shall XB-Cap. be given back to the market?
- Economic Efficiency Analysis looks like the most pragmatic solution and may hence be preferable, at least in a starting phase. It might prove necessary to keep the approach if none of the others prove feasible for the long-run.

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