Offshore integration

Design freeze – workshop with market parties 12/03/19
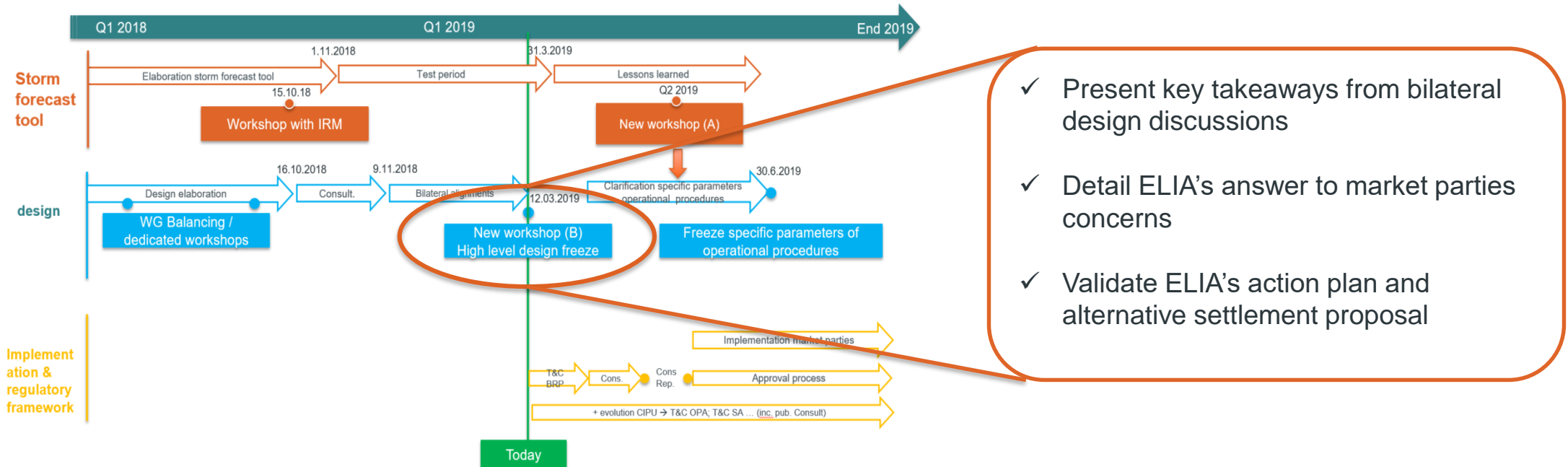
Offshore integration

Agenda of today's workshop

- Workshop objective

- What's next?

- **Analysis of storm event – 10/03/2019**

- Feedback from bilateral meetings

- ELIA's action plan

- Alternative settlement proposal

- Next steps

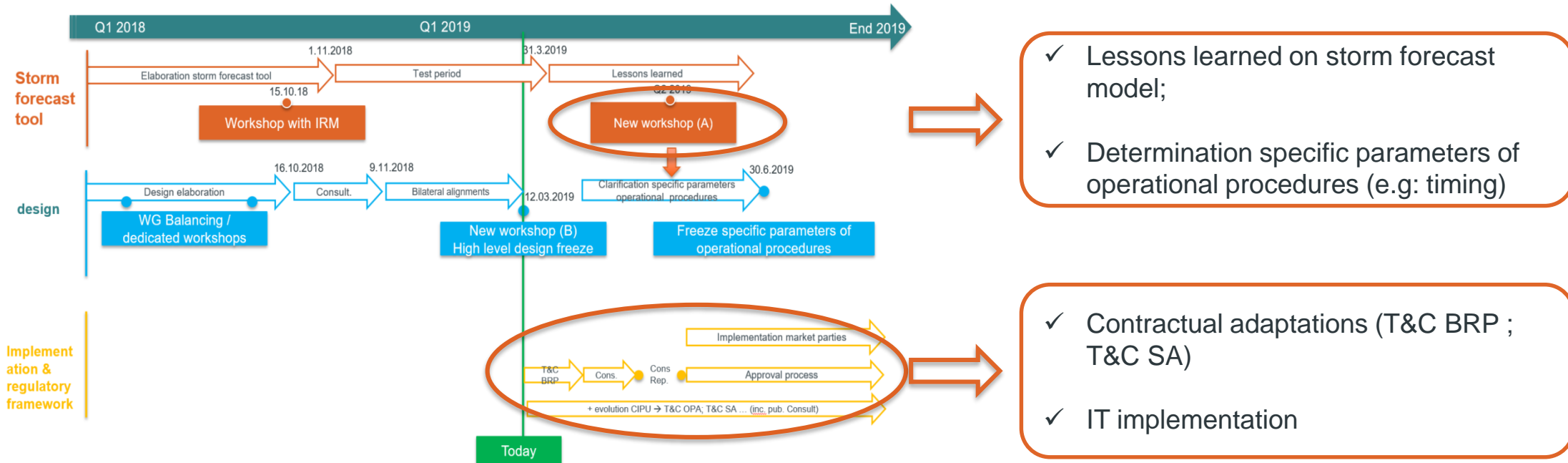# Offshore integration
Goal of 12/03 workshop

Objective of today's workshop

✓ Present key takeaways from bilateral design discussions

✓ Detail ELIA's answer to market parties concerns

✓ Validate ELIA's action plan and alternative settlement proposal

Disclaimer
The solution presented here is only valid for 2.3 GW offshore production and cannot be considered as a valid proposal with more offshore capacity (a.o: 4 GW).

Out of scope for today's workshop

Storm forecast tool
- Elaboration storm forecast tool
- 1.11.2018
- 15.10.18 — Workshop with IRM
- Test period
- 31.3.2019
- Lessons learned
- Q2 2019 — New workshop (A)

design
- Design elaboration
- 16.10.2018 — Consult.
- 9.11.2018 — Bilateral alignments
- 12.03.2019
- WG Balancing / dedicated workshops
- New workshop (B) High level design freeze
- Clarification specific parameters operational procedures
- 30.6.2019
- Freeze specific parameters of operational procedures

Implementation & regulatory framework
- T&C BRP
- Cons.
- Cons Rep.
- Implementation market parties
- Approval process
- + evolution CIPU → T&C OPA; T&C SA ... (inc. pub. Consult)

Today

Q1 2018 — Q1 2019 — End 2019

- ✓ Lessons learned on storm forecast model;
- ✓ Determination specific parameters of operational procedures (e.g: timing)

- ✓ Contractual adaptations (T&C BRP ; T&C SA)
- ✓ IT implementation

What's next?

Q1 — Adaptation of offshore integration design note and publication on ELIA's website (< 30/03)

April — Start adaptation of contractual framework (T&C)

Usual public consultation process
→ Market parties get the opportunity to react on ELIA's proposal

Q2 — Specific workshop to detail results of storm forecast test period and confirm improvement possibilities identified thanks to bilateral meetings with market parties
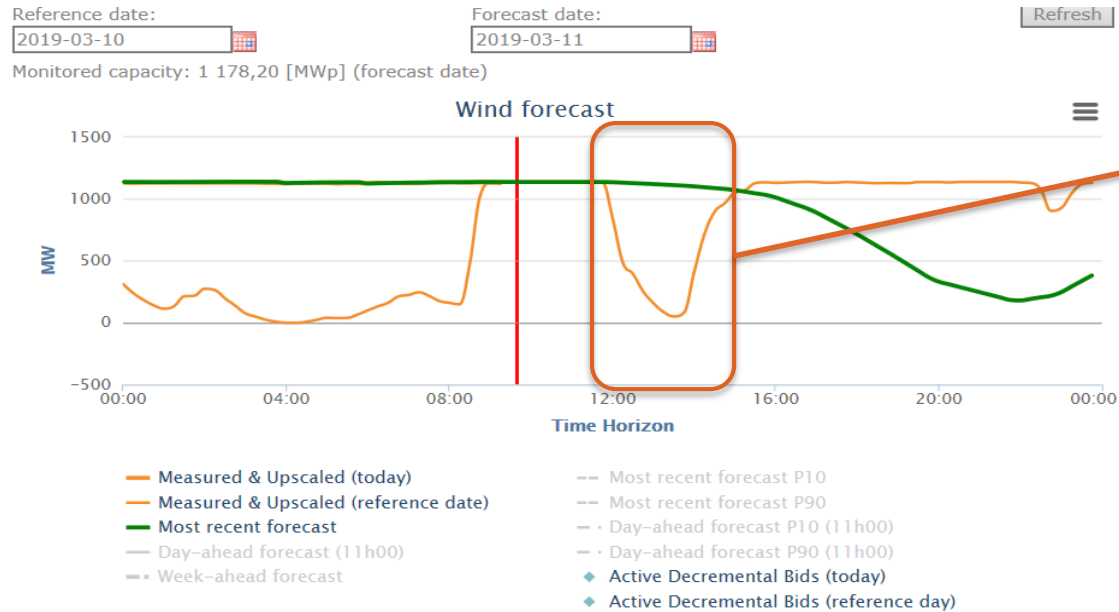
Q2 — Start implementation
Share IT specs (if any) to market parties

Offshore integration
Storm event – Example with 10/03/2019 case

Storm event – Sunday 10/03/2019

Reference date:
2019-03-10

Forecast date:
2019-03-11

Refresh

Monitored capacity: 1 178,20 [MWp] (forecast date)

Wind forecast

Time Horizon

— Measured & Upscaled (today)
— Measured & Upscaled (reference date)
— Most recent forecast
— Day–ahead forecast (11h00)
—· Week–ahead forecast

-- Most recent forecast P10
-- Most recent forecast P90
—· Day–ahead forecast P10 (11h00)
—· Day–ahead forecast P90 (11h00)
◆ Active Decremental Bids (today)
◆ Active Decremental Bids (reference day)

- Storm event from 11:45 to 13:30

- Loss of entire production (from 1132 MW to 49 MW) ; among which 645 MW in 30 min.

- Start of cut-in phase from 13:45

Was the storm event predicted by forecast tool?
Forecasts received on 10/03 at 00:00

Lessons learned for this event
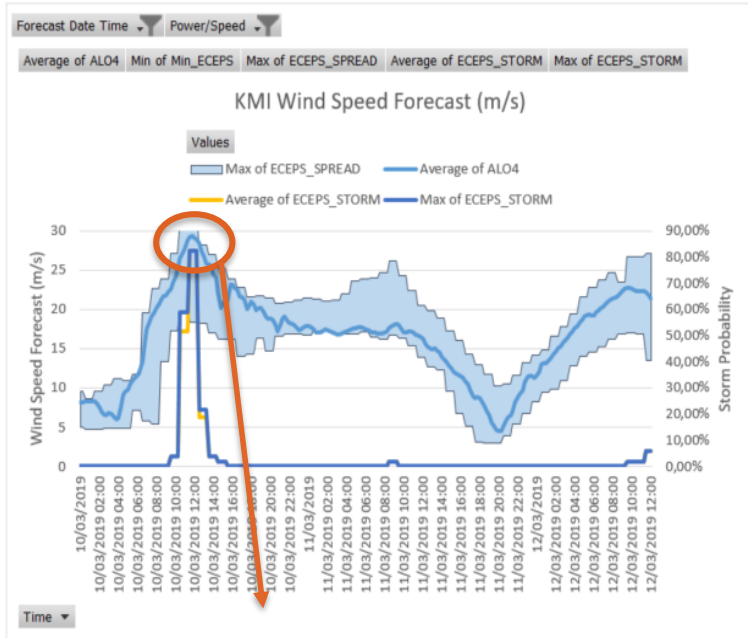
Forecasted windspeed of 29,1 m/s
(11:45, ALARO model)
Probability of higher windspeed for some ECEPS models
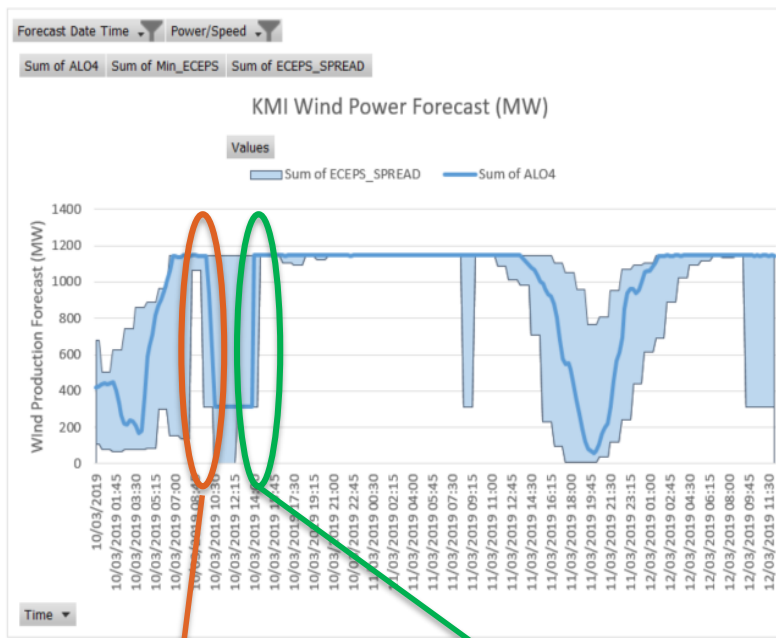
Forecasted impact between 800 MW
(parks with cut out > 30 m/s still expected to run) and 1180 MW

Forecasted cut-in from 13:45

✓ **Exact timing for cut out**

✓ **Exact timing for cut-in**

✓ Uncertainty around 30 m/s as windspeed forecast are close to cut-out of some turbines

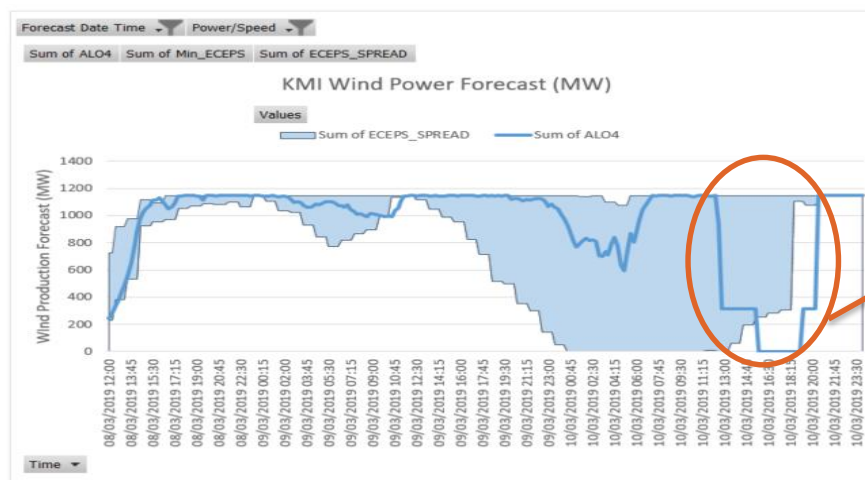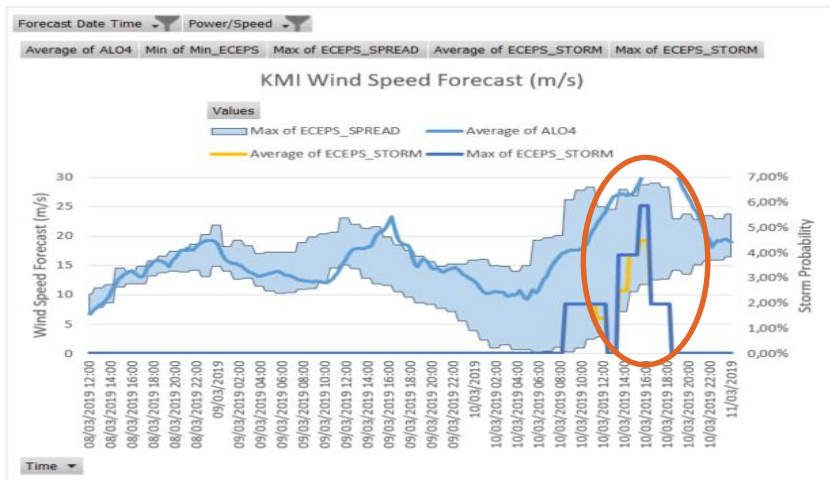   → Calibration based on historical windspeed measurement needed to further improve the model

Storm event of 10/03
What about DA and D-2 forecasts?
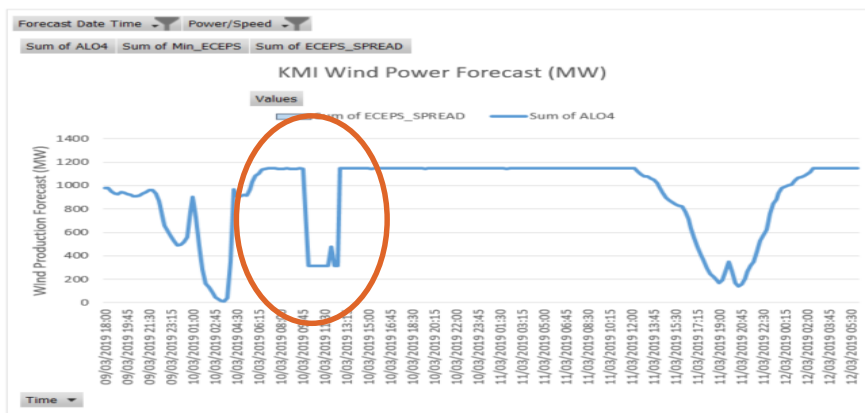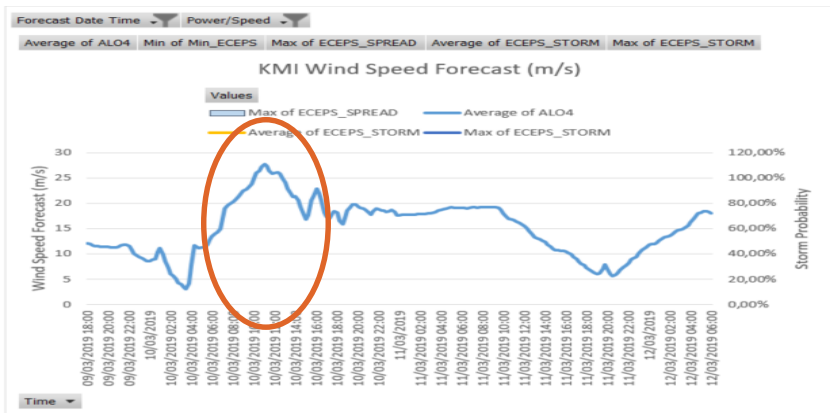
Forecasts D-1 (9/3 18:00)
Forecasted storm from
09:45 to 13:00

✓ Forecasted event

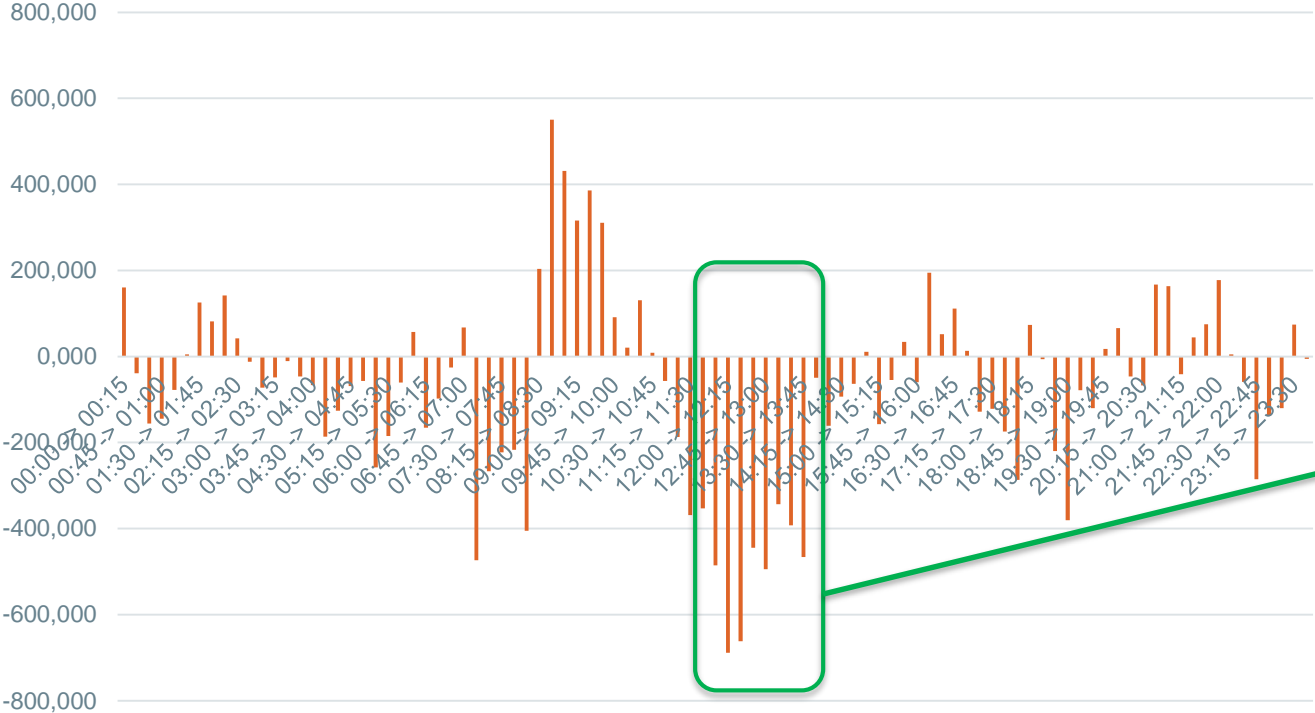✓ +- 2 hours delay (cut in)
✓ +- 1 hour delay (cut out)

Forecasts D-2 (8/3 12:00)
Forecasted storm from
12:15 to 16:00

✓ Forecasted event

✓ +- 30 min delay (cut in)
✓ +- 2 h delay (cut-out)

Did the forecasted storm event generate system imbalance?

System imbalance on 10/03/19

Storm event of 10/03

SI reached 688 MW (12:00-12:15)

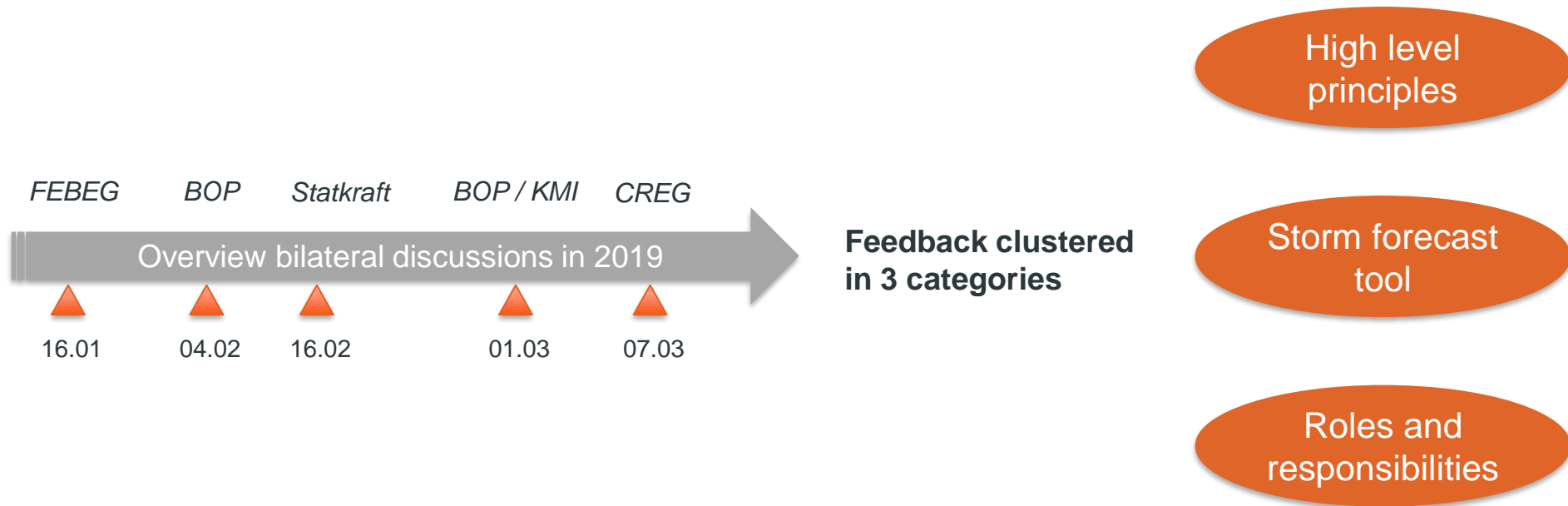No specific imbalance noticed at moment of cut-in phase

Key takeaways from 10/03/2019 storm case

- Significant storm observed (forecasted wind speed close to 30 m/s; wind speed measured higher (no data available yet))

    → These events are those for which ELIA elaborated the offshore procedure described in the design note;

- Good results of storm forecast tool (currently being tested and not final yet)

    → Exact QH forecasted for both cut-out and cut-in phase;
    → Good order of magnitude for the MW impact (improvement possibilities identified)

- Entire offshore production cutted-out

    → Even though some parks are already equipped with "high wind ride through" technologies (positive aspect is that it slowed the cut out by approx. 30 min, which is a significant improvement)
    → 3rd event (Nov. 16, Jan. 18 and march 19) of such amplitude in recent past
    → Impact of such event with 2.3 GW installed would be (as estimated in 2017) above 2 GW.

- Even with perfect timing forecasted (more than 12 h in advance), system imbalance observed at 12:00 close to 700 MW

    → Confirms the need for ELIA's offshore operational procedure and related incentive (imbalance mechanism)
    → More details available once BRP perimeter position are calculated (data not available yet) → On the agenda of Q2 technical worskhop along with other cases and re-run of historical data

Offshore integration
Feedback from bilateral meetings

Feedback bilateral meetings

FEBEG	BOP	Statkraft	BOP / KMI	CREG

Overview bilateral discussions in 2019

16.01   04.02   16.02   01.03   07.03

Feedback clustered in 3 categories

High level principles

Storm forecast tool

Roles and responsibilities

Feedback bilateral meetings
1. *On high level principles*

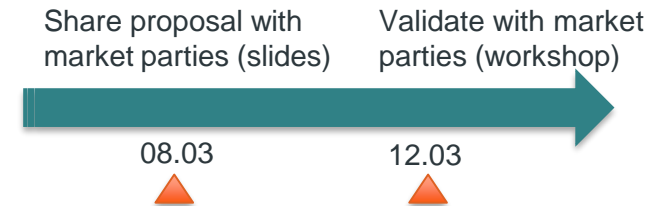High level principles

Storm forecast tool

Roles and responsibilities

✓ Market parties understand ELIA's need to better coordinate storm events
✓ Market parties agree with proposed operational process
✓ Market parties accept an ex-ante intervention if deemed necessary by ELIA (system security)

BUT do not accept ELIA's proposal for fall back mechanism. It is considered as:

1) An intervention into BRP's role (ELIA imposes a schedule before BGCT)
2) A change in the role of the BRP: Obligation of mean towards obligation of result
3) Additional financial risks for BRPs which will affect the contractual arrangements between offshore parks and BRPs
4) Additional complexity: multiple roles (SA, BRP, OPA) are simultaneously affected

Moreover market parties are challenging the definition of 'storm' which will be used as basis for the settlement.

ELIA has developed an alternative proposal considering the comments received and which still provide adequate incentives for BRPs in storm context

Share proposal with market parties (slides)

Validate with market parties (workshop)

08.03

12.03

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Feedback bilateral meetings
2. On storm forecast model

High level principles

Storm forecast tool

Roles and responsibilities

✓ Challenge scenarios put forward in 3E study as some do not consider new technologies (a.o: high wind ride through (Siemens))

✓ Question model accuracy in context of its use as part of the ex-post validation of effective storm event

✓ Request for an increased collaboration (storm forecast supplier – ELIA – interested market parties) for the elaboration of storm model (to go live end 2019)

✓ Question how is the model built (consideration of gusts, wake effect, …?) for existing and for new parks

✓ Question the roles and responsibilities for the storm forecast model

Feedback bilateral meetings
3. On roles and responsibilities

High level principles

Storm forecast tool

Roles and responsibilities

- ✓ Exact allocation of responsibilities between OPA – SA – BRP - ELIA – OWF not clear yet

- ✓ Information exchanges between these 5 market parties unclear

  - ▪ Publications on ELIA's website;

  - ▪ Information on BRP's proposed mitigation measures;

  - ▪ Information related to ex-post settlement

- ✓ Consequences of actions required by the operational procedure (adaptation of schedules; adaptation of outage planning, …) unclear

Offshore integration
ELIA's action plan consecutive to bilateral meetings

1. Settlement proposal
Reminder of key principles presented in design note

High level principles | Storm forecast tool | Roles and responsibilities

Set up of information exchange (ELIA – BRP – SA – OPA) in context of storm (as soon as storm is forecasted) to make sure its potential impact (cut-out) on balancing area is always lower than ELIA's available balancing means

Offshore BRPs are responsible to:
- Confirm / modify / deny the identified storm risk;
- Communicate if and how mitigation measures are foreseen to cover identified storm impact
- Decide which mitigation measure suits him the most
- Coordinate with OPA / SA (if different parties)

Monitor and run periodical risk assessment (based on storm forecast and info communicated by BRP)
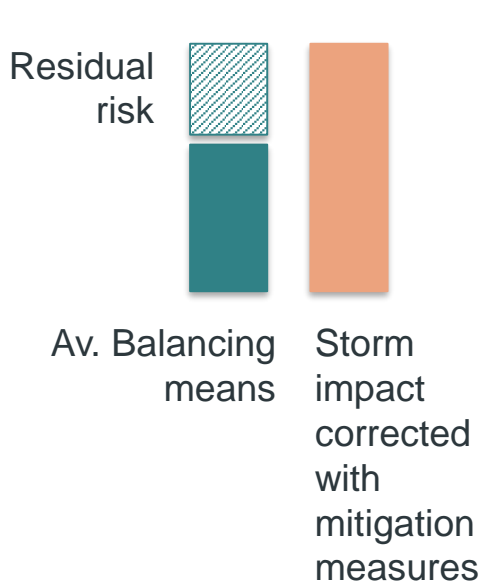Trigger – if needed – the fallback mechanism

1. Settlement proposal
Reminder of initial settlement proposal

Residual risk

Av. Balancing means

Storm impact corrected with mitigation measures

Focus only on the delta between 15 min balancing means (available) and estimated impact for which no solutions are proposed by the BRP's.

Incr. Focus on flexibility not accessible within 15 min (slow starts)

Decr. Compensation of incremental actions with decremental (pro-rata) ones on offshore parks

- ☐ Ex-ante (a few hours in advance) actions
- ☐ Ex-post settlement based on verification of storm occurrence
- ☐ Financial penalty (no remuneration of decremental bid + no BRP perimeter correction) in case of effective storm

1. Settlement proposal
Alternative settlement

1. **Whole operational process remains valid**

    → Keep focusing on residual risk
    → Keep using slow start unit (not accessible within 15 min)
    → Keep the logic that each incremental action needs to be compensated (decremental) to avoid generating imbalances

2. **Roles and responsibilities (BRP – SA – OPA – ELIA) remain valid**

3. **Costs of ex-ante activations are not considered in the set up of imbalance price**   compliant

In case insufficient reserves for expected storm impact, create additional flexibility via:
- Activation of slow starts until Pmin (to generate additional flex activable within 15 min) and;
- Activation of decremental bids **following the usual merit order (and not first on offshore parks)**   Both actions corrected (BRP perimeter) and paid

No impact on the imbalance price: ex-ante activations will be limited to the volume not covered via available reserves ; hence the most expensive means would be still activated in real time

Alternative solution however only acceptable in case alpha modification (200 €/MWh) is applicable
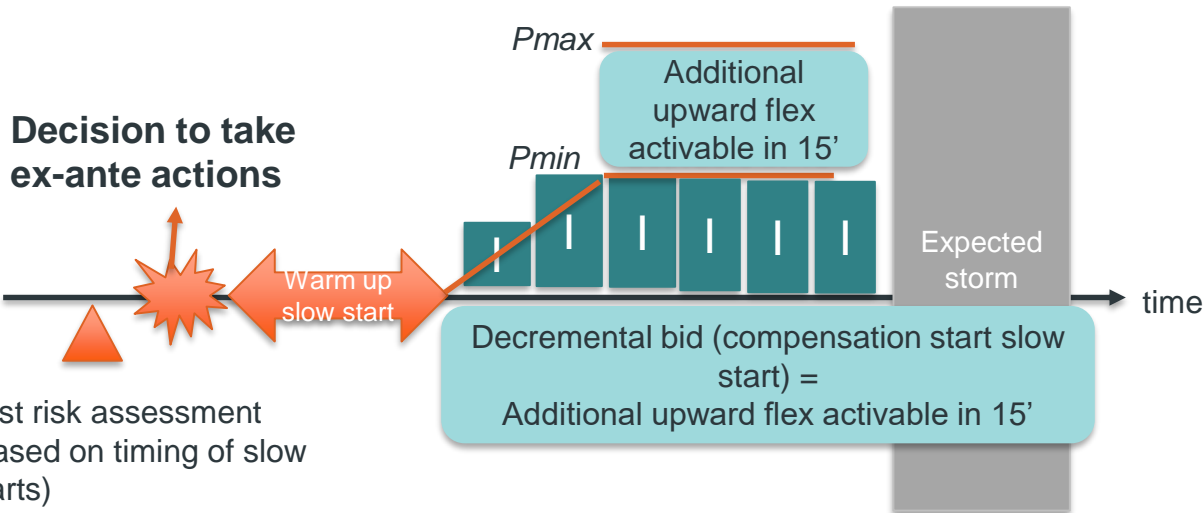
1. Settlement proposal
Alternative settlement

Incremental direction

Decision to take ex-ante actions

Last risk assessment (based on timing of slow starts)

Pmax

Pmin

Additional upward flex activable in 15'

Warm up slow start

Expected storm

time

Decremental bid (compensation start slow start) = Additional upward flex activable in 15'

Decremental direction

Rationale

➤ **Incentivize the BRP** as no decremental ex-ante actions on offshore parks and subject to high imbalances in RT (if storm effectively happens) thanks to the **usual MO activation and the review of alpha component**

➤ Elia respects the current operational procedures
  - Up: LFC BOA – ex. Reserve process
  - Down: current balancing process

➤ No need for ex post settlement (verification if storm happened y/n)

➤ No interference with BRP's role

➤ Fulfill ELIA's operational need to cover residual risk

➤ Simplify contractual implementation in T&C

➤ Minimize financial risk in case of forecast error

1. Settlement proposal
Alternative settlement – additional comments

High level principles | Storm forecast tool | Roles and responsibilities

- **Limit ex-ante actions on offshore parks** as this would give the wrong incentive to the BRP (reduction of its risk to deal with in real-time);

- **Newly created flexibility are not contracted**

  Need to adapt T&C SA to make sure start-up costs are reimbursed in case the newly created flexibility is used FOR OTHER PURPOSES between start up of slow start and start of storm event

  → Specific operational follow up each time this procedure is activated

- <u>**Only efficient solution**</u> **if the proposed adaptation of the alpha parameter is implemented** as the imbalance tariff becomes the unique incentive for BRP to take mitigation measures.
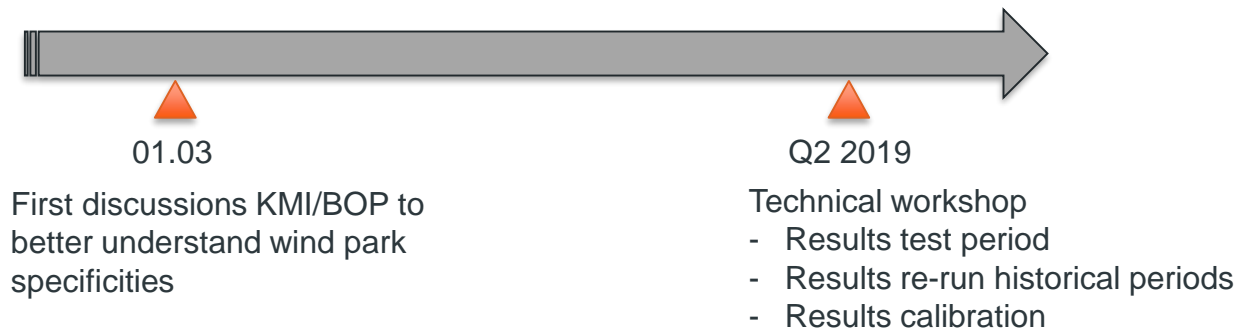
2. Storm forecast tools

✓ ELIA proposes to increase transparency and collaboration on the set-up of storm forecast tools with KMI. In this way, the following actions are identified:

01.03

First discussions KMI/BOP to better understand wind park specificities

Q2 2019

Technical workshop
- Results test period
- Results re-run historical periods
- Results calibration

use of historical wind speed measurement for model calibration

Development of storm model for new parks

Include other improvement identified during technical workshop

2. Storm forecast tools

Who is responsible for storm forecast tools? What happens in case of system failure? (e.g: ELIA's website)

For transparency reasons; ELIA will share storm related information on its website and use it as input for its operational procedure. ELIA is not responsible in case of system failure. BRP must anyway have their own forecasts as they remain responsible for the offshore parks.
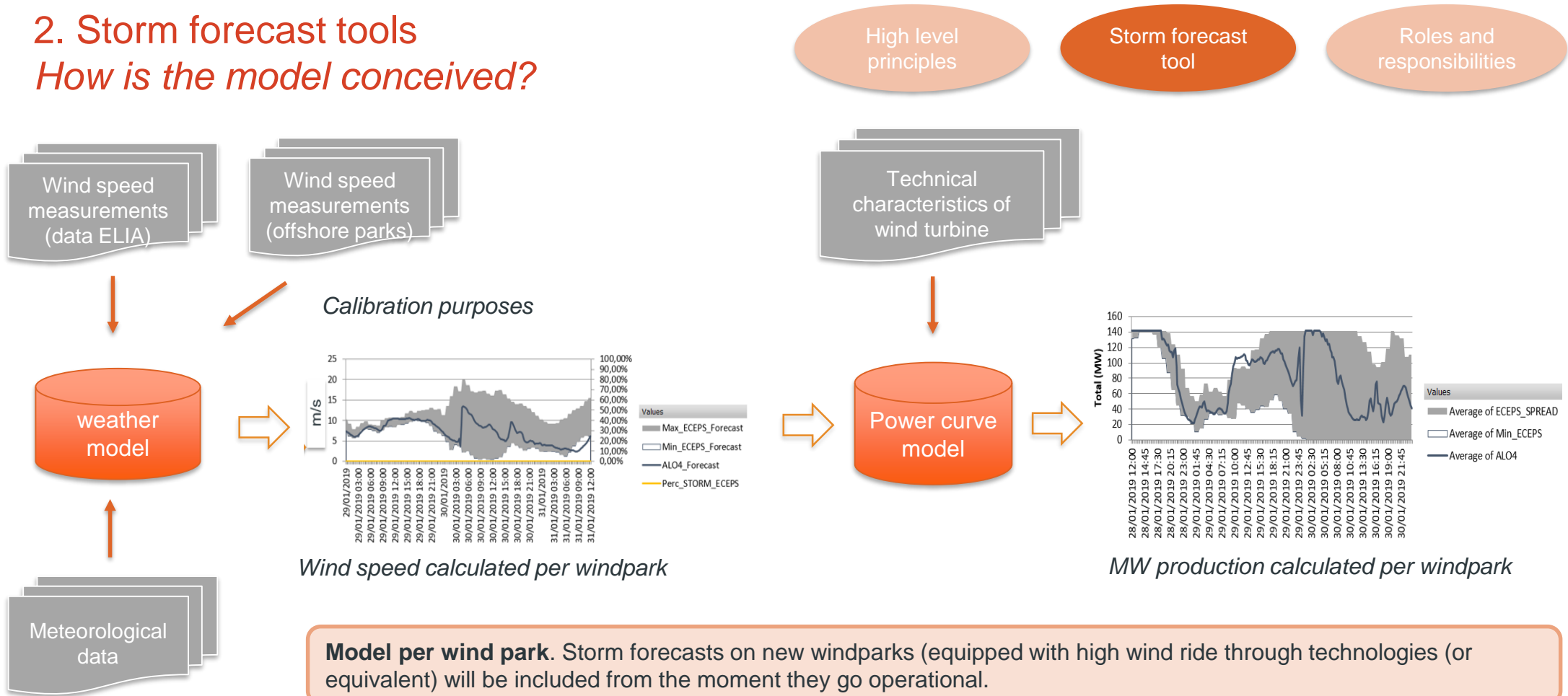
Update 3E study to consider the most recent information on cut-out wind speed on newcoming parks

Most probable storm event impact around 1.5 GW thanks to the confirmation that newest technologies (high wind ride through) will be installed on new parks.

Impact above 2 GW will only be reached in case of extreme events (with wind speed above 31 m/s)

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2. Storm forecast tools
How is the model conceived?

High level principles

Storm forecast tool

Roles and responsibilities

Wind speed measurements (data ELIA)

Wind speed measurements (offshore parks)

Technical characteristics of wind turbine

Calibration purposes

weather model

Power curve model

Values
- Max_ECEPS_Forecast
- Min_ECEPS_Forecast
- ALO4_Forecast
- Perc_STORM_ECEPS

Values
- Average of ECEPS_SPREAD
- Average of Min_ECEPS
- Average of ALO4

Meteorological data

Wind speed calculated per windpark

MW production calculated per windpark

Model per wind park. Storm forecasts on new windparks (equipped with high wind ride through technologies (or equivalent) will be included from the moment they go operational.

Model based on 15 min average wind speed forecasts. No consideration of specific effects (gusts; wake effects;…)

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3. Roles and responsibilities
Reminder of initial design

High level principles

Storm forecast tool

Roles and responsibilities
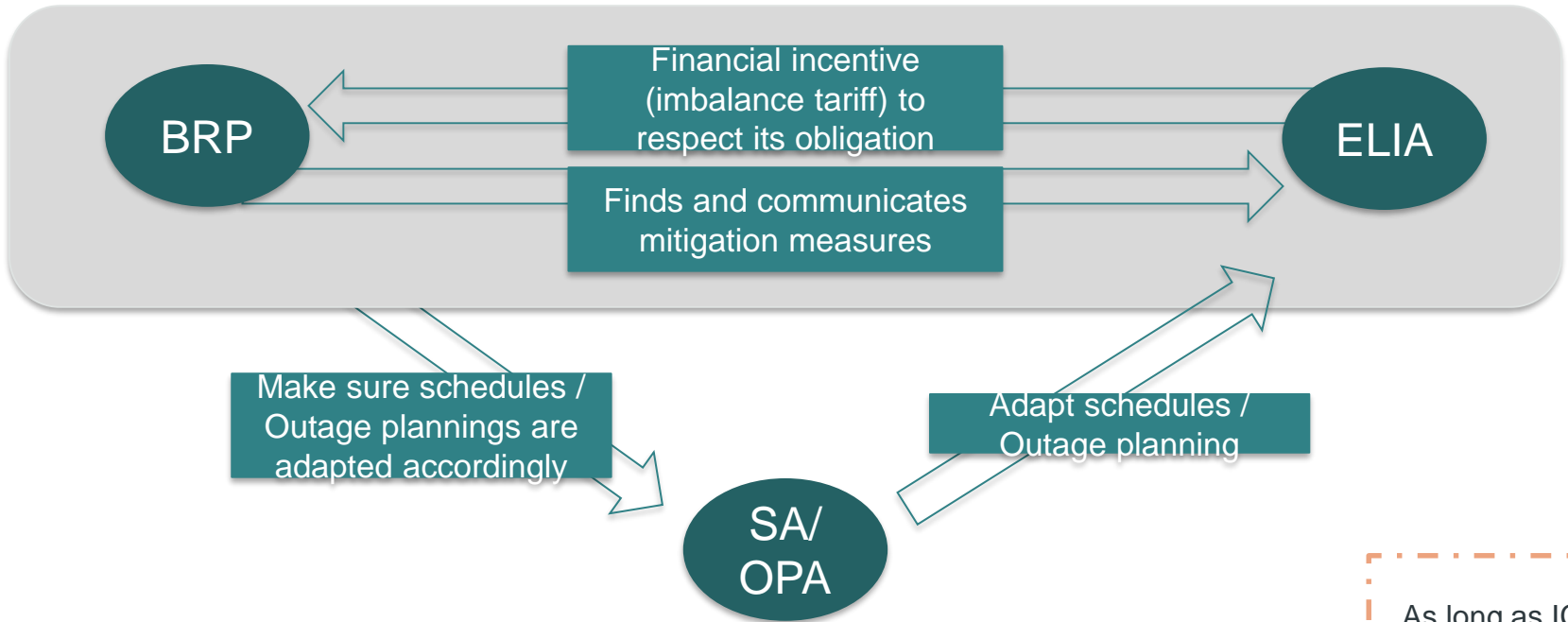
Contractual relation ELIA - BRP

No specific communication process foreseen ELIA / OWF

No additional obligation on OWF (except data exchange m/s)

BRP

ELIA

Financial incentive (imbalance tariff) to respect its obligation

Finds and communicates mitigation measures

Make sure schedules / Outage plannings are adapted accordingly

Adapt schedules / Outage planning

SA/ OPA

Reminder
As long as ICAROs is not implemented, BRP = SA = OPA

3. Roles and responsibilities

What are the consequences of adaptation of outage planning and schedules in storm conditions?

1 Mitigation measures are reflected in schedules. Adapted schedule must be respected. In case of forecast error or wish to come back to production after storm event, the usual procedure (IDPCR) must be respected

2 No specific compensation foreseen by ELIA (usual processes apply)

3 In case of partial cut out (e.g : with high wind ride through technology or similar) ; Outage planning is adapted (Pmax reduced) as well as schedules.

Reference schedule become the Pmax reduced

3. Roles and responsibilities

How are wind farms informed about their BRP's mitigation measures?

Data exchange between ELIA and BRP. No parallel information flow foreseen between ELIA and other market parties (apart website publications).

How are other market parties informed about ex-post settlement results?

Considering ELIA's alternative settlement proposal, no need for specific ex-post settlement anymore (use of existing processes)

Which information is shared by ELIA on its website?

Will be confirmed during specific workshop on procedure parameters (Q2). Focus will be on aggregated information (offshore area: MW impact, expected timing; …)

Offshore integration
conclusions

Conclusions

- Valuable input provided by market parties. It helped ELIA to propose an answer to every major concern raised.

- Incentive of alternative settlement proposal exclusively based on imbalance tariff:

    o The modification of alpha component is a required pre-requisite for this proposal to work

    o No changes to current market organization and roles and responsibilities of each concerned party

    o Current procedures (LFC BOA and balancing rules) are applicable in case of use of fallback mechanism

- Facilitate the integration of offshore procedure into the contractual framework