

**CONSULTATION REPORT**

# **Report on the public consultation regarding System Imbalance forecast and its publication to stakeholders**

**December 2021**



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## 1. Introduction

Elia organized a public consultation from *31 august 2021* to *30 September 2021* regarding *System Imbalance forecast and its publication to stakeholders*. The consultation consisted of 10 questions spanning four different topics:

- The selection of the linear regression model
- The publication horizon and format
- The relevance of the publication
- The implementation of the SI forecast

During the public consultation Elia requested feedback on the potential dependencies and the relevance of publishing a System Imbalance (SI) forecast. The feedback from the consultation has been considered when developing a proposal for an implementation plan which was presented during the WG Balancing on 28 October 2021. Market parties were able to express their views on the proposed implementation plan until 15 November 2021.

The purpose of this report is to consolidate the feedback received from the public consultation and after the presentation of the implementation plan, while at the same time reflecting Elia's position on these reactions.

## 2. Feedback received

In response to the public consultation, Elia received the following non-confidential replies from the following parties:

- Belgian Offshore Platform (BOP)
- FEBEG
- Febeliec

In addition, one response was received that was designated as confidential:

No responses from market parties were received after the presentation of the implementation plan. One comment was made by the CREG on the publication timing.

All non-confidential responses received have been appended to this report. These reactions, together with this consultation report, will be made available on Elia's website.

## 3. Instructions for reading this document

This consultation report is structured as follows:

- Section 1 contains the introductory context,
- Section 2 gives a brief overview of the responses received,
- Section 3 contains instructions for reading this document,

- Section 4 discusses the various comments received during the public consultation and Elia’s position on them,
- Section 5 contains the annexes of the consultation report.

This consultation report is not a ‘stand-alone’ document, but should be read together with the proposal submitted for consultation, the reactions received from the market participants (annexed to this document) and final proposal.

Section 4 of the document is structured as follows with additional information on the content per column below.

Subject/Article/Title	Stakeholder	Comment	Justification
A	B	C	D

1. Subject matter covered by the various responses received.
2. It is indicated who made the comment. In general, the comments are listed alphabetically in the name of the parties concerned.
3. This document contains an overview of the main, but also specific comments on the document submitted for consultation.
  - a. In doing so, an attempt was made to list/consolidate all comments received and to argue whether or not they should be taken into account.
  - b. In order to maintain authenticity, the comments have been copied as much as possible in this document. However, the comments have sometimes been shortened and term have been uniformed to make them easier to read.
  - c. For clarification purposes, it is recommended to always include the original comment of the stakeholder concerned, as included in the appendix to this report.
4. This column contains Elia’s arguments as to why a comment was or was not included in the final proposal. However, this column does not contain the final text. For this purpose, the final proposal must be consulted.

## 4. Comments received during the public consultation

### 4.1 General comments received during the public consultation

This section provides an overview of the general reactions and concerns of market players that Elia received to the document submitted for consultation.

SUBJECT	STAKEHOLDER	FEEDBACK RECEIVED	ELIA'S VIEW
General	BOP	BOP welcomes the proposal for publication of a System Imbalance forecast as it might provide additional transparency for market players and might attract additional flexibility at the right instances.	<i>Elia acknowledges the response from the BOP and confirms that this is indeed one of the main drivers for the project.</i>
General	BOP	As the number of indicators forecasted by Elia is growing, we would like to suggest to develop a schematic to better understand how all the forecasted indicators are interacting and influencing each other. For instance the Elia (offshore) wind forecast is used to trigger the storm alerts and related storm procedure. The mitigating actions as performed by the BRPs in the frame of the storm procedure are to have an effect on the system imbalance. In order to avoid conflicting forecasts, we suggest to introduce a sanity check to ensure consistency of the forecasts, especially under exceptional circumstances.	<i>Elia notes the suggestion from BOP, however it is considered outside of the scope of this project.</i>

### 4.2 Specific comments received during the public consultation

SUBJECT	STAKEHOLDER	FEEDBACK RECEIVED	ELIA'S VIEW
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<p>Q1: The analysis resulted in the selection of the linear regression model. Can you support this choice?</p>	<p>Anonymous</p>	<p><i>As a baseline model this seems a good start. You might want to test other linear models like <b>lasso and ridge regression</b>. If the model aims to improve the activation of balancing reserves. This should be taken into account in the evaluation of the model.</i></p>	<p><i>Elia welcomes the support for the regression model that has been included in the report.</i></p> <p><i>Elia notes the proposal for using lasso and ridge regression. These two variants of linear regression apply a different cost function in order to simplify the model (or perform feature selection). In the model research conducted by Elia, feature selection methods have been tested, such as Recursive Feature Elimination and pure feature combinatorial testing. Elia recognizes the interest of lasso and ridge regression and might include them when trying to improve the performance the initial linear regression models during the first phase of the implementation.</i></p> <p><i>Elia wants to clarify that the models assessment included in the consultation document included an evaluation of the performance under high changes of SI from 1 quarter hour to the next. This evaluation showed a relatively good performance of the model.</i></p> <p><i>The Proof Of Concept ran in the context of this incentive showed that the current performance of the model is not sufficient to support the operational decision making process. Hence, Elia will focus on further improving the model during the first phase of the implementation.</i></p>
	<p>FEBEG</p>	<p><i>Yes. The linear regression model appears (i) to provide the best results, (ii) has the advantage to be simple and (iii) can be easily reproduced by stakeholders (at the condition that the data is available). Indeed, simplicity and transparency are very important overall principles for FEBEG, we plead for Elia to adhere to these principles as much as possible, not only on this topic, but in all instances as the energy market is already very complex.</i></p> <p><i>What we would have welcomed in the model assessment, is a test on some experienced erratic SI movements. Movement that could not be explained by any grid or generation outages (or storms event ...).</i></p>	
<p>Q2: Do you see other elements which could in-</p>	<p>Anonymous</p>	<p><i>You might test features as:</i></p> <ul style="list-style-type: none"> <li><i>• Fundamental data</i> <ul style="list-style-type: none"> <li><i>○ Hour versus quarter shape in demand/wind/solar</i></li> <li><i>○ Residual load</i></li> </ul> </li> <li><i>• Dummy variables for the weekday/hour/mtu</i></li> </ul>	<p><i>Elia would like to point out the current models do not see a statistical significant deterioration of quality during storm event or outages due to the low frequency of occurrence of these events.</i></p>

<p>crease the performance of the model?</p>		<ul style="list-style-type: none"> <li>• <i>Market data</i> <ul style="list-style-type: none"> <li>○ <i>Ramp in belpex prices</i></li> <li>○ <i>Settlement price of 15min auction</i></li> <li>○ <i>Continuous 15min trade data</i></li> <li>○ <i>Border capacity/flows</i></li> <li>○ <i>Spark spread</i></li> </ul> </li> <li>• <i>Balancing data</i> <ul style="list-style-type: none"> <li>○ <i>Amount of IGCC</i></li> </ul> </li> </ul>	<p><i>Elia acknowledges that further data might improve the performance of the model. As indicated in the consultation report, Elia believes that the inclusion of forward looking data (such as cross border nominations) has the highest potential to improve the quality of the models.</i></p>
	<p>BOP</p>	<p><i>It is our understanding that the SI forecast model will only provide a forecast for the next 2 quarter-hours, and that the variables used in the model are only real-time or historic values. If our understanding is correct, this implies that forward-looking data (e.g. a storm alert, forecasted wind production, nominations for the next quarter-hours, etc.) does not influence the SI forecast. What was the reason for leaving out forward-looking data?</i></p>	<p><i>Elia would like to confirm that we will consider the inputs provided by the consultation responses to further improve the forecasting quality <u>during the first phase of the implementation.</u></i></p>
	<p>Febeliec</p>	<p><i>An outage or cross-border related issue can extend in time if it has already occurred (and thus it might be possible to forecast its duration) but the proposed models will not help predict the occurrence of such (non-intermittent generation related) events; even for storm events, the forecast tools apparently handle them “comparatively well”, but whether that would be sufficient to have a real impact on system management remains an open question to Febeliec.</i></p>	
	<p>FEBEG</p>	<p><i>It seems that the most important (read the most correlated to the SI) variables have been identified. Therefore, we don't see other variables that would improve in a significant way the performance of the model. However, this does not mean that further investigations should not be performed (notably the nomination as proposed in the consultation document). Indeed, the changing market situation will probably have a non-negligible impact on the performance of the model and it will therefore be important that the model follows an evolutive process (incl. the variables).</i></p> <p><i>Particularly in the context of MARI and PICASSO, it might be relevant to investigate the correlation of non-BE related variables with the Belgian SI.</i></p>	



		<i>If not yet taken into account it could be helpful to recalibrate the model very frequently in order to help it adjust to a changing environment.</i>	
Q3: Do you agree with the proposed publication horizon and publication format?	BOP	<i>Elia intends to publish the forecast on Qh+0 for Qh+0, Qh+1 and Qh+2. With what frequency will the forecasts be updated? As 1-minute data is used in the model, the model would yield an update every minute; will this be provided to the market, or will the forecast only be updated at the start of every quarter-hour? And at what frequency will the model calibration/training be updated in order to grasp the evolutions in the energy system and changes in responses to the system imbalance and the published forecasts?</i>	<i>Following the feedback from the consultation, Elia proposes to update the publication of the SI forecast every minute (with a model trained for that minute of the quarter hour). Elia does see this as an extension of the initial scope of the incentive which was a single publication every 15' with a forecast performed at minute 8.</i>
	FEPEG	<i>Yes. Will there be an update more frequently than every 15'? More generally, what will the update rate of the forecast be?</i>	<i>Elia intends to monitor model performance regularly and eventually assess the benefit for a model re-training every month.</i>
Q4: Would you prefer the publication of the exact forecasted value or categorical predictions for Qh+1 and Qh+2?	Anonymous	<i>Categorical predictions including probabilities</i>	<i>Following the feedback from the consultation, Elia will make available both the exact forecast as the categorical predictions including probabilities.</i>
	BOP	<i>We therefore support the choice to add quality indicators (confidence intervals &amp; ranges) and only publish forecasts when the predictions are sufficiently reliable.</i>	

	FEBEG	<i>It seems to us that more info can be taken from a publication in the form of a range and a confidence level, compared to a single value. It leaves more interpretation open also to the market parties, which is a positive effect.</i>	
Q5: Do you believe the publication of the SI forecast is relevant?	Anonymous	<i>If the SI forecast will be part of the balancing protocol it is relevant that there is transparency about the SI forecast and how this is used in the balancing protocol. It might also help small players who can not afford to make their own SI forecast to balance positions.</i>	<i>Elia takes note of the feedback on the relevance of the SI forecast publication, and of remarks that the current quality of the model is not sufficient to perform pro-active balancing. Hence, Elia proposes to further study improvements of the model with the goal of reaching an RMSE below 100 MW for each forecasting horizon before publishing any data.</i>
	FEBEG	<i>The consultation document has shown that the Qh+0 forecast has a relatively good quality compared to those for Qh+1 and Qh+2. However, given the short notice linked to the Qh+0 forecast, BRPs will, in practice, not have the time to act upon it (e.g. update of BAL energy bids or even “proactive reactive” balancing).  Moreover, the forecast quality of Qh+1 and Qh+2 does not seem sufficient to us for acting upon it without taking a considerable risk as BRP.  In conclusion, we think that the publication could provide some interesting information, but it is not a silver bullet.</i>	
Q6: Should Elia withhold the publication if a certain quality level cannot be reached? What do you believe is the right threshold (e.g. RMSE < 100 MW)?	Anonymous	<i>The forecast should only be published if the usecase can be proven</i>	<i>Elia takes note on the feedback provided.</i>
	FEBEG	<i>We have no strong opinion if sufficient information is disclosed concerning the confidence level of the forecast.</i>	

<p>Q7: Elia sees no strong concerns for the publication of the SI forecast, do you agree with this evaluation?</p>	<p>FEBEG</p>	<p><i>We neither have reservation on the publication of such forecast.</i></p>	<p><i>The analysis published in the consultation document showed that there is only a weak correlation between the System Imbalance and the intermittent production (both actual production as forecast).</i></p>
	<p>Febeliec</p>	<p><i>[...] Febeliec nevertheless wonders to what extent this work on SI forecasting will provide added value to the system and the consumers. Febeliec remains in doubt towards the ultimate goal of these forecasts: if the purpose is to make better predictions regarding intermittent production, Febeliec is not convinced that this is the best way forward, as results from the (recent) past are not necessarily the best predictor for the (near) future. Rather weather conditions and some other parameters might provide a better bottom-up approach towards that end, as is currently already being done, as the major other elements impacting the system imbalance (in particular forced outages or cross-border related issues) are random with regard to forecasting (when using as input recent historical data from the recent timeframe). [...]</i></p> <p><i>In any case, as Febeliec considers the additional benefits for the system operation to be questionable, Febeliec believes that the only value for consumers of a better forecast of the SI as proposed by Elia would lie in the fact that less balancing capacity would have to be reserved (and paid for by consumers), yet based on the above Febeliec wonders whether such objective would be achieved.</i></p> <p><i>Moreover, the publication of the Elia SI forecast could even lead to adverse effects in case all market parties start using potentially erroneous data as input for their models, in the worst case thus even potentially introducing a new systemic risk component in the system.</i></p>	<p><i>The publication of the SI forecast and the work on this topic serve two goals.</i></p> <ol style="list-style-type: none"> <li><i>1. <u>A better understanding of the drivers of the System Imbalance.</u> The analysis in the consultation report has shown that there is no single driver for the System Imbalance and that intermittent production is – on average – not the single most important contributor to System Imbalance.</i></li> <li><i>2. The development of implicit reaction and provide the necessary operational information for the activation of balancing reserves. Elia believes that this objective can only be reached if the published SI forecast is sufficiently accurate</i></li> </ol> <p><i>To mitigate a potential negative impact on stakeholders Elia proposes to try to improve the model ahead of the publication and by imposing minimum quality limits.</i></p>

Q8: Would you see an impact on the market as result of the publication, and which one?	Anonymous	<i>The impact might be limited as market parties have developed already tooling themselves to balance their portfolio. All input data in the (linear) model is already published by Elia. On the other hand for small parties it could be a quick win.</i>	<i>Elia notes the feedback on the impact of the publication. In order to capture the impact of the publication on the market, Elia proposes to introduce an evaluation period after 6 months of publication.</i>
	FEBEG	<i>As explained, the use of the Qh+0 forecast is uncertain and will probably depend on the lead time for acting on it. Therefore, the impact on the market will also be limited. Regarding the Qh+1 and Qh+2 forecasts, the issue is the lower confidence level. BRPs, if they do, will anyway be very prudent with these forecasts. There could be a risk that there would be an “over reliance” on the forecast publications. The market will also learn with time how to take this information into account without such “over reliance”. The information may also prove to be of interest to the TSO in the decision making process on the activation of NRV means.</i>	
Q9: Do you recognize the dependency between the publication of the SI forecast and other changes to the balancing timeframe? Do you see others?	FEBEG	<i>Yes. We also want to emphasize that the model used past data. Those data should be used when the balancing ecosystem is stable. Any change (such as the accession to MARI or PICASSO, the removal of DA obligation), that has a significant impact on the variables chosen to train the model should be duly considered.</i>	<i>Elia notes the feedback on FEBEG and proposes to start the publication of the SI forecast (if quality criteria are met) directly after the implementation. However the evaluation period would only start once the balancing market is considered stable for the SI forecast. This is especially relevant for the go-live of iCaros phase 1 given the design changes it introduces (mFRR local design and explicit bidding).</i>

Q10: Elia believes the start of the publication should not overlap with other major changes, do you agree?	Anonymous	<i>The training set is 8 weeks. So if you retrain the model daily it should be able to pick up changes quite fast.</i>	
	FEBEG	<i>The Go-live of the publication of SI forecast should be linked to the relative stability of the BAL ecosystem. If not, the quality of the forecast will probably not be sufficient, and the evaluation of the impact of the introduction will be impossible if other changes happen in parallel.</i>	

## 5. Next steps

On the basis of the reactions received from market players and its views, as set out in this consultation report, Elia will finalise its note on *System Imbalance forecast and its publication to stakeholders*.

## 6. Attachments

The reactions Elia received to the document submitted for consultation:

- Belgian Offshore Platform (BOP)
- FEBEG
- Febeliec

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