POSITION

Subject: FEBEG comments on ELIA's public consultation on the Scenario Report
Date: 10 December 2021

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FEBEG thanks ELIA for having the opportunity to react ELIA's Public consultation on the Scenario Report[1].
We welcome the workshops and the opportunity to share our views and comments on the scenarios and storylines for the future energy mix in Belgium. This topic is very important and we are more than happy to contribute to ambitious and realistic scenarios to enable Belgium to strive towards a carbon neutral energy mix by 2050.
The inputs and suggestions of FEBEG are not confidential.

General Remarks

The consultation document refers to the discussions that took place in 2 roundtables that were organized by Elia, and in which FEBEG participated actively with some of its members.

First, we simply wish to very briefly repeat the main messages and elements of feedback provided during these meetings:

- FEBEG agrees that the scenarios should aim for a carbon neutral energy mix in 2050
- However FEBEG has underlined the following risks and hurdles to reach this common objective:
    - The technical potential of PV & wind in Belgium should be taken into account
    - The social acceptance should be considered (NIMBY)
    - A mix of many/various/complementary technologies will be needed
    - Scenarios should be adapted/fine-tuned in time considering the most recent evolutions
- Regarding Flexibility, FEBEG wishes to underline that counting too much on decentralized flexibility to tackle big risks such as offshore balancing or outage of an HVCD line, is very risky, we ask Elia to consider scenario's where B2C flexibility is not so easily tapped into.

In addition to this, we are also concerned that a very high level scenario/approach is replacing very specific scenarios and specific issues. We would like to maintain specific efforts, collaborations, scenarios discussions for certain important "short term" issues such as balancing, adequacy, CRM auctions, availability of import and interconnections.

[1] https://www.elia.be/en/public-consultation/20211115_public-consultation-on-the-scenario-report

Specific comments to the Elia questions

#Q1 – The link with the European framework

The final storylines proposed, by using the TYNDP storylines as starting point, aim to provide a relevant set of scenarios for the evolution of the energy system with focus on Belgium. Do you know any relevant report or data we should consider for other European countries (besides the TYNDP scenarios), and if yes could you share it with us?

Most analysis and storylines are, unfortunately, made on a national level. It is not easy to identify EU wide studies and scenarios which would provide useful input to the current debate. One document which is highly relevant are the scenarios of the European Commission[2] used for the impact assessments behind the new proposals.

However, we would like to add that some conflict could exist between EU level scenarios and national scenarios, the latter being more reliable for specific adequacy issues occurring in the Member States. Most notably, there is a risk of a "gap" when comparing high level and more specific scenario.
We invite Elia to take a look at the following studies in the EU:

- France: "Futurs énergétiques 2050" – RTE: https://www.rte-france.com/analyses-tendances-et-prospectives/bilan-previsionnel-2050-futurs-energetiques
- The Netherlands: "Klimaatneutrale energiescenario's 2050" – Berenschot voor EZK: https://www.berenschot.nl/media/hl4dygfq/rapport_klimaatneutrale_energiescenario_s_2050_2.pdf
- UK: "Future Energy Scenarios" – National Grid: https://www.nationalgrideso.com/future-energy/future-energy-scenarios/fes-2021
- Germany: "Netzenetwicklungspplans Strom 2035": https://www.netzentwicklungsplan.de/de

#Q2 – Proposed storylines

The proposed storylines, by using the TYNDP storylines as a starting point, aim to provide a relevant set of scenarios for the evolution of the energy system with focus on Belgium. These proposed storylines take into account also the feedback received by stakeholders during the 'TF Scenarios' workshops.

– Do you consider the methodology followed to define and further refine the proposed storylines robust enough? Why / Why not?
Would you like to propose any additional dimension, driver, assumption, which according to you is missing and is needed to complete the definition of any of the storylines proposed?

– Please provide detailed arguments on any input you might provide in this respect.

[2] resource.html (europa.eu)

As a very general comment, FEBEG considers that it is not an ideal situation that Scenarios are being developed "by TSOs for TSOs" while the scope and impact is obviously large and considers all stakeholders, not only in the electricity sector, but in the society at large (mobility, industry, consumer behavior…). TSO's are obviously important stakeholders, but there is a risk of over-attention to issues which impact the TSO while other elements (social impact for example) are less considered.

There is a clear trend and consensus that the evolution of the energy system means that sector integration should be taken into account – how can an exercise driven by Elia ensure that the role of gases (natural gas and then renewable and low-carbon gases) is adequately taken into account ? One would expect that integrated exercises with all energy vectors (power, gases incl. H2…) will become the norm – this seems not sufficiently worked out in the overall approach of Elia. In addition, it is also not clear how the proposal does fit with the EU "Energy Efficiency First Principle".

FEBEG wishes to underline the overall appreciation of "risk factors" in the storylines of Elia. For example: the price of fossil fuels/CO2, cost of renewables, NIMBY, new technologies,… As mentioned in the overall comments, sensitivities/scenarios should also be considered to address "what ifs" in a more pessimistic future, such a "low FLEX" scenario or "high NIMBY" scenario (maybe this could be done as sensitivity on the BAU scenario). Such scenarios would have an added value to raise awareness on what would happen when little advancements are – unfortunately – made in relation to these important challenges. The importance and adverse impact of NIMBY is currently painfully clear on issues such as interconnections, onshore wind, thermal assets, infrastructure works…

Regarding the scenarios mentioned in *Figure 2.3.3 High-level description of scenarios,* we wonder why is there no "decentral – low import" scenario. The approach of Elia seems to indirectly assume that a decentral scenario would *by definition* result in a very high share of import, while we do not agree with such an assumption. Indeed, many decentral technologies can be envisaged that would not result in high import dependence (offshore technologies, low carbon molecule based technologies, new innovative solutions based on renewable technologies…).

Specifically on the Large Scale Res scenario, if it is an "intermediate" scenario, this does not add to our opinion a lot to the debate.

#Q3 – Storylines to scenarios

The methodology to transform the proposed storylines into quantified scenarios is presented in this section. These together with the trajectories presented below in Section 2.5, constitute the building blocks for the creation of the scenarios.
– Do you consider the methodology proposed to quantify scenarios from the storylines suitable? Why/Why not?
Would you like to propose any additional steps which according to you are missing from the presented methodology and could be needed for a satisfactory quantification of the scenarios?
– Please provide detailed arguments on any input you might provide in this respect.

Regarding the Flexibility related topics, FEBEG is convinced of the uptake of electric mobility and, overall, the electrification of many parts of the economy. However, we would like to alert Elia to not consider that all these loads will be, *by definition*, used in a flexible manner (to help the grid). This will depend to a large extent on the attitudes of the consumers and the evolution of the market (development of new roles, finding positive business cases, …). On top of this, there is a cannibalization effect, the more flexibility is part of the system, the lower the business case for new flexibility to be added to the system. It is hard to estimate, at this point in time, how this will develop in the coming 20-30 years. This being said, we do think that some of these loads will be used in a smart and flexible way, albeit, not all of them . We should be careful not to make scenarios only on wat we would like see, but also what is likely to happen. Referring bask to the “risk factors” mentioned above, the price/cost of technologies will have a major impact on this (cost of EVs, cost of small vs large scale batteries, …).

#Q4 - Photovoltaic

Trajectories for the evolution of PV are presented based on recent sources and estimates. These trajectories serve as a guidance of the possible range that PV technology can present in the different scenarios.

- Do you consider the range provided by these trajectories reasonable, too optimistic or too pessimistic? Why?

Notice the actual values of PV for each of the scenarios will be defined through the modelling exercise upon checking e.g. that the level of e-demand covered by RES is in accordance with each storyline set of assumptions.

- Do you think that the maximum or minimum ranges provided by the presented trajectories should be used to define a ‘maximum’ and/or ‘minimum’ bound for PV development in each scenario? Why?

FEBEG is of the opinion that the potential of PV in Belgium is relatively high, and that a lot more of PV will definitely be installed in the coming years. However, we consider that for the very long term the lower bound scenario (20-30 GW by 2040 and 2050) is more realistic. Indeed one should also take into account that total peak demand in summer is less than 10 GW, therefore, the business case to install 2-3 times more than the total demand seems challenging, in particular if neighboring countries would have similar very ambitious scenarios for PV.

#Q5 - Onshore and Offshore Wind

Trajectories for the evolution of Onshore and Offshore Wind are presented based on recent sources and estimates. These trajectories serve as a guidance of the possible range that Onshore and Offshore Wind technology can present in the different scenarios.

- Do you consider the range provided by these trajectories reasonable, too optimistic or too pessimistic? Why?

For onshore, we would like to refer to the comments in the introduction. FEBEG is very much in favor of developing as much onshore wind as possible in Belgium, however, the NIMBY issues are huge and we fear that if no measures are put in place to tackle this issue, the ambition levels will, unfortunately, turn out to be too optimistic. We consider that in Belgium for 2030 the capacity would likely be about 5 GW (close to the lower-end scenario), unfortunately, due to the issues mentioned above, a higher installed capacity is unlikely considering the current investment climate.

We believe that for offshore the scenario is realistic, indeed the offshore capacity for Belgium by 2050 is probably situated in between 5.8 GW and 8 GW. The 5,8 GW is an ambition put forward by the government for 2030, while the 8 GW could be reached by replacement/upgrade of the existing parcs.

A small additional comment raised here is how and if Elia takes into account “new” offshore technologies like floating PV? Or other innovative energy technologies (tidal energy, wave energy…)

Notice the actual values of Onshore and Offshore Wind for each of the scenarios will be defined through the modelling exercise upon checking e.g. that the level of e-demand covered by RES is in accordance with each storyline set of assumptions.

- Do you think that the maximum or minimum ranges provides by the presented trajectories should be used to define a ‘maximum’ and/or ‘minimum’ bound for Onshore and Offshore Wind development in each scenario? Why?

Yes, we consider that for offshore wind the technical limit in Belgium is 8 GW, due to the limited space in the North Sea.

For onshore, we consider that NIMBY is the most important barrier for more ambitious scenarios.

#Q6 - Underlying assumptions of electricity demand

Trajectories for the evolution of the electricity demand are presented based on its different underlying drivers, namely i) demographic aspects, ii) macro-economic aspects, iii) energy efficiency and circularity, iv) behavioral changes of the end-costumers and v) fuel switching behaviors. These trajectories serve as a guidance of the possible range that electricity demand which can be present in the different scenarios.

- Do you consider the range provided by these trajectories reasonable, too optimistic or too pessimistic? Why?

We consider that the ranges presented seem reasonable.

We do have two comments:

- For heat pumps development in 2050, the range is very wide. While the very high range is quite optimistic, the lower range (only 35%) seems a bit too pessimistic considering ‘gas phase out’ announcements.

- The higher range for electric heavy trucks in 2050 (90%) seems too optimistic: considering stock inertia, 100% of heavy truck in sales should be electric in 2035-2040.

Notice the actual values of electricity demand for each of the scenarios will be defined through the modelling exercise in accordance with each storyline set of assumptions.

- Do you think that the maximum or minimum ranges provides by the presented trajectories should be used to define a 'maximum' and/or 'minimum' bound for electricity demand development in each scenario? Why?

We consider the lower and higher bound (110 and 170TWh in 2050) large enough to encompass all different possible pathways.

#Q7 – Demand Side Response

Trajectories for the evolution of Demand Side Response are presented based on recent sources and estimates. These trajectories serve as a guidance of the possible range that Demand Side Response can present in the different scenarios.

- Do you consider the range provided by these trajectories reasonable, too optimistic or too pessimistic? Why?

Notice the actual values of Demand Side Response for each of the scenarios will be defined through the modelling exercise in accordance with each storyline set of assumptions.

- Do you think that the maximum or minimum ranges provides by the presented trajectories should be used to define a 'maximum' and/or 'minimum' bound for Demand Side Response development in each scenario? Why?

Overall, we consider the flexibility from DSM shedding and shifting (both heating and cooling and industry & appliances) is pretty high and the figures are very rough assumptions (only some percentages on total demand proposed). We like to point out that shifting/shedding demand has a certain cost and that the business case might not always be positive. We ask Elia to have a more in depth look at the economic viability of these assumptions, as we feel this has not been considered. The numbers for industry and large scale seems to be picked in a very arbitrary fashion "25-30-35%" is this based on input from the industry? Examples? Benchmarks? Techno/Economic insights?

For heating and cooling, we note that Elia assumes the following *"For the scenarios 'Global import', 'Large-scale e-RES', 'e-Prosumers' and 'Flex+', it is proposed that respectively 35%, 50%, 65% and 80% of the consumption from heating and cooling can be shifted intra-daily."* Especially the latter scenarios seem more like a "wish list" instead of an objective analysis of future scenarios. It seems very unlikely that 65-80% of total demand would "move" in the future. As households or SMEs will only move demand when faced with significantly interesting economic incentives, it seems highly unlikely that the incentives would be so extreme that almost all (heating/cooling) demand would become flexible.

For V1G we are more optimistic and think that the potential is indeed significant, as we move towards installation of more and more “home energy management” systems at the household level and, at least in Flanders, the DSO capacity tariffs will promote EV charging to be slow and evened out over the night for example or when the sun is shining. So here, if all goes well, maybe the Elia scenario of 50% by 2030 would be possible, however, to reach 100% by 2050 seems overly optimistic, 70-80% would be a more realistic scenario, indeed “fast charging” will in all cases be a relevant part of the market.

#Q8 - Storage

Storage encompasses (pumped-storage capacity, batteries and vehicle-to-grid. Trajectories for the evolution of these different sources of Storage capabilities are provided based on recent sources and estimates. These trajectories serve as a guidance of the possible range that Storage that can present in the different scenarios.

- Do you consider the ranges provided (for pumped-storage capacity, batteries (large and small) and vehicle-to-grid, respectively) by these trajectories reasonable, too optimistic or too pessimistic? Why?

Notice the actual values of Storage for each of the scenarios will be defined through the modelling exercise in accordance with each storyline set of assumptions.

- Do you think that the maximum or minimum ranges provides by the presented trajectories should be used to define a ‘maximum’ and/or ‘minimum’ bound for Storage development in each scenario? Why?

- Do you expect any such storage category not to have any maximum bound? Why?

- Do you expect any such storage category to be near its maximum development potential already? Why?

Regarding the use of batteries, there are many uncertainties to take into account: first the cost evolution of batteries, which has been very impressive in recent times (in €/kW), Second the technological evolutions, where a break-through is realistic in the coming 20 years. Lastly, the impact of the cannibalization effect on the business cases is a more negative driver of the potential of batteries. For example, a new and cheap large scale storage system (2nd hand car batteries, flow batteries, compressed air…) could kill the business case for small storage systems. Also when smart charging will be common practice, maybe the additional (economic) benefits of batteries at DSO level will be negligible. Given all these uncertainties, we think it is too optimistic to assume that 15-30 GW of capacity would be installed by 2040/2050.

Concerning V2G, we have following comments: the volume available for V2G not only highly depends on the number of electric vehicles in Belgium but also on the roll-out of the available technology to make them active market participants in the electricity market (smart meters roll-out but also compatibility of cars to being smartly charged). FEBEG has strong doubts that this latter will be generally available any time soon. Currently very few models are ‘2VG ready’ and we expect a very slow uptake of this technology (currently less than 1 MW) only from 2022/2023 onwards when Volkswagen will start to work with this type of technology. Additionally it should be noted that V2G charging infrastructure is also more expensive than normal "smart" charging infrastructure and must be deployed. Next to the availability/compatibility issue, it should be underlined that the (financial) added value for the consumer remains very marginal and will probably not be impacting enough to drive a behavioral change in the short run. Next to the currently non-availability of the technology in the market, we would like to stress the need for a clear and stable regulatory framework and a positive business case, which are both completely absent at the moment.

#Q9 – Electrolyzers

Electrolyzers will play a role in the production of green-molecules and hydrogen from renewable electricity production. This will be relevant to decarbonize the hydrogen current consumption itself as well as to decarbonize sectors which cannot be easily electrified and/or which use hydrogen to produce feedstock. Trajectories for the evolution of electrolyzers are provided based on recent sources and estimates. These trajectories serve as a guidance of the possible range that Electrolyzers can present in the different scenarios.

- *Do you consider the ranges provided by these trajectories reasonable, too optimistic or too pessimistic? Why?*

Notice the actual values of Electrolyzer capacity for each of the scenarios will be defined through the modelling exercise in accordance with each storyline set of assumptions.

- *Do you think that the maximum or minimum ranges provides by the presented trajectories should be used to define a 'maximum' and/or 'minimum' bound for Electrolyzer development in each scenario? Why?*

We have no major issues or comments regarding the ranges provided by Ela in the study, however we wish to provide some additional feedback. According to a study[3] released last year by the "Fuel Cells and Hydrogen Joint Undertaking", the estimated hydrogen demand would require an amount of 0.4-2.3 GW of electrolyzers. In addition, the study of FCH is based on the current NECP targets, which are not in line yet with the Fit for 55 package. Therefore the need for electrolyzers could be even higher than estimated in this study. After 2030, demand for green hydrogen will probably grow markedly.

In addition, we would like to refer to the Fluxys consultation Request for Information which provides some very interesting insights on for example the development of H2 projects.

#Q10 – Dispatchable Generation

Dispatchable generation will be based on the TYNDP scenarios and then subjected to a dispatchable economic viability assessment. This assessment will ensure that countries are between predefined reliability standard levels. From 2030 onwards, it is proposed that

[3] https://www.fch.europa.eu/sites/default/files/file_attach/Brochure%20FCH%20Belgium%20%28ID%209473032%29.pdf

added dispatchable generation will consist only of carbon-free generation in the form of hydrogen turbines.

- Do you think adding only carbon-free dispatchable generation from 2030 onwards is a good assumption for the dispatchable economic viability assessment? Why?

No, in 2030 there could still be economically viable investments in e.g. CCGT on natural gas which later can be converted.

- Do you think using hydrogen turbines as the reference technology for carbon-free dispatchable generation from 2030 onwards is a good assumption? Why?

No, we suggest to also add natural gas + carbon capture and storage as an option, if socially accepted and the scenario storyline allows for it. This technology could have a lower LCOE than hydrogen-based turbines. Also biomass/gas technologies will still be relevant in our view.

The impact of the need to import cheap "low carbon" molecules in such scenarios should not underestimated. It remains to be seen if this will become a reality already by 2030.

Other remarks

FEBEG would like to restate the messages already shared with Elia regarding the TYNPD scenarios.

TYNDP does not fully meet the criterion of consistency. The assumption of a more centralized (GA) or decentralized (DE) is not really well supported. In particular, it is not well explained which assumptions are underlying this differentiation. The reasons for a more centralized (offshore) and decentralized (onshore/PV) development remain rather unclear.

In particular, it is unclear whether GA and DE scenarios reflect well the main risk factors which, in our view, are related in the long term to technological aspects (including energy efficiency) and to policy choices in the shorter term.

In our opinion, technology (including energy efficiency) is probably the main differentiating factor in the long term. Scenario analysis should reflect this uncertainty. In the TYNDP, energy efficiency improvements by 2050 are significant and fairly similar across scenarios. Also, investment cost assumptions (centred around assumptions of the ASSET report) differ between GA and DE to enable the storyline of the scenario. Scenarios therefore do not fully reflect technology uncertainty (it is not clear why technology development would differ between centralized/large scale and decentralized/smaller scale technologies).

Also, the question will be how the system will develop in practice, according to market mechanisms or in a more centralized command and control manner. The TYNDP report should at least point to gaps with respect to the current target model in addressing future challenges. For instance, the electricity transmission grid is modelled with a network of about 100 zones by 2040. Today’s electricity markets usually rely on one zone per member state (with exception of the Nordics and Italy).

The power system is rather well modelled while the gas network representation seems to be underdeveloped. This is, however, essential linking between gas and electricity via hydrogen.