Feedback in response to the public consultation on the Federal Development Plan for the Belgian transmission system (110kV to 380kV) over the period 2024-2034

In this reaction, Belgian Offshore Platform responds to the public consultation on the draft Federal Development Plan for the Belgian transmission system (110kV to 380kV) over the period 2024-2034 – "On the road to a carbon neutral society by 2050" and the accompanying environmental impact report as launched by Elia on 2nd of November 2022.

Summary

Massive integration of renewable energy is a prerequisite for the energy transition in Belgium. Maximum effort is to be made on the integration of offshore energy, primarily in the Belgian part of the North Sea, but also from further abroad. Several recent studies support these statements, a.o. the Paths 2050 study of Energyville[1].

Several political initiatives and announcements made by all member states around the North Sea demonstrate the willingness and readiness to accelerate the developments in offshore wind energy and to transform the North Sea into the powerhouse of green energy for Europe. In the Esjberg declaration of May 2021, four countries around the North Sea target for at least 65GW of offshore wind by 2030 and at least 150GW by 2050. And the Belgian federal government announced in March 2021 to aim for 8GW of offshore energy in the Belgian part of the North Sea.

These massive investments in offshore generation capacity require adequate and timely investments in the offshore and onshore grid.

Unfortunately, the project portfolio presented in the FDP lacks ambition to enable timely realization of the vision regarding offshore integration. The current plan will not allow for a fast realisation of the energy transition and risks to further postpone the decarbonization of our country. A delay that can no longer be afforded given the urgency of the climate crisis.

A more proactive approach with anticipatory investments is necessary to keep up with the offshore development plans. At least 8GW from within the Belgian waters will need to be connected to shore. On top of that up to 16GW additional capacity will be required from the larger North Sea. In the FDP, currently a mere 3.5GW of additional capacity is planned for.

Integration of the Princess Elisabeth Zone

The proposed grid design for integrating offshore wind energy in the PE zone into the Belgian grid is a hybrid solution, meaning that the grid capacity of 3.5GW offshore wind capacity is to be shared with cross-zonal flows up to 1.4GW over the Nautilus interconnector with the UK. The hybrid solution contains only 3.5GW of transmission capacity from the Princess Elisabeth island towards the Belgian coast. This grid design proposal is clearly not future proof as it is not in line with the high offshore ambitions.

[1] https://perspective2050.energyville.be/

The proposed hybrid grid design is not a result of an optimization study, but merely based on a conservative bottom-up approach from selected projects. In the section on identification of system needs, a summary of the results of the KARI study is presented, a project that tried to identify optimal grid capacities. Unfortunately, only the overall benefits from a European perspective are shown and the resulting capacity needs from the North Sea towards Belgium are omitted. This study however clearly shows that faster developments of offshore wind deliver far higher added value for society compared to grid optimisations.

Furthermore, the advantages of the proposed hybrid grid design for the PE zone developments and the Belgian society in general are not sufficiently demonstrated. As the grid capacity is to be shared between offshore wind parks in the PEZ and imports from the UK, and offshore wind production in UK and Belgium are strongly correlated (over 77% correlation coefficient), the hybrid grid design will have a negative impact on the offshore wind developments and the decarbonization of our industry. The hybrid design, which is based on transmission under-capacity, leads to less green electrons reaching the Belgian industry and consumers. In the context of the energy transition and the (by Elia) forecasted increase in green electricity demand, such under-capacity at such an early stage in the offshore grid development, is incomprehensible.

The proposed hybrid design creates an additional financial risk which might disincentive offshore wind development due to several side-effects. Besides loss of income, the wind assets will not be optimally used due to avoidable curtailments and their lifetimes will be shortened due to avoidable standstills, which are detrimental to the turbines.

BOP demands a guaranteed access to the Belgian grid and fixed connection capacities to be able to fully use the valuable wind assets in the PEZ and to produce green offshore wind power at the lowest cost for society. The proposed grid design falls short in transmission capacity from the PE island towards inland Belgium to achieve this and will put further pressure on the timely achievement of the Belgium's renewable energy target.

1. Introduction

BOP welcomes the specific attention in this Federal Development Plan (FDP) on integration of offshore energy into the Belgian electricity system, from within the Belgian waters as well from the broader North Sea basin, as for instance put forward as "Principle 1: Maximum integration of domestic renewable energy potential in the electricity system[2]" and "Pillar 1: development and integration of the offshore network.[3]

BOP shares the vision on the need for electrification to make Europe more energy independent, resilient and sustainable. Therefore, renewable energy, and especially offshore energy is to be integrated more quickly and on a very large scale. This will require large scale investments in infrastructure and in grid infrastructure in particular. The next decade will be crucial, and in this respect, this major update of the FDP arrives not a day too soon.

BOP support the statements:

- *"If we do not anticipate what is to come, the electricity grid will be a bottleneck for the large-scale integration of renewable energy and will delay the energy transition. This would go against the wished and interests of our society[4]"*

- *"Principle 4: Maximum integration within the EU electricity market: the domestic high-voltage grid must not restrict the international cooperation and must be prepared proactively."*

However, observations from the past and the present learn that grid development is lagging and delaying offshore wind developments in Belgium, in the entire EU and even worldwide. The latest offshore wind farms in the existing Eastern zone in Belgium could only be connected after commissioning of the Stevin-link, which experienced several years of delay. A similar scenario is now repeated for the developments in the Princess Elisabeth zone, which are already postponed due to difficulties in the permitting procedures for the Ventilus and Boucle du Hainaut projects.

On top of this, ambitions in offshore wind developments as already pronounced by all countries around the North Sea basin, have increased and accelerated drastically. A further misalignment between offshore wind developments and grid infrastructure is to be anticipated.

The current development plan misses the opportunity to really achieve a 'leading grid' instead of 'lagging grid' and risks to introduce, once more, bottlenecks in terms of timing and transmission capacity, to fully and timely integrate the strongly needed offshore wind developments into the Belgian electricity system.

Only a more ambitious and proactive approach, with anticipative investments can eliminate the gap between offshore wind developments and grid developments (both offshore and onshore).

[2] Executive Summary, page 7
[3] Executive Summary, page 18
[4] Executive Summary, page 4 – orange box

2. Long term vision of introducing offshore energy from the North Sea towards Belgium

Offshore wind installed capacities in Belgium

The current installed capacity of offshore wind in Belgium accounts 2262 MW in the existing Eastern zone and was commissioned in a record pace and on time at the end of 2020, despite the COVID-19 crisis and very short realization times as a consequence of delays in the available grid connection capacity.

The goal for 2030 is set at 5.8GW in Belgium, by timely developing the Princess Elisabeth offshore energy zone. In the decision of the ministerial council of 18th of March 2022, it was decided to raise the ambition for offshore wind in Belgium to 8GW (without a targeted timing). Figure 1 shows the assumption in the FDP on installed offshore wind developments.

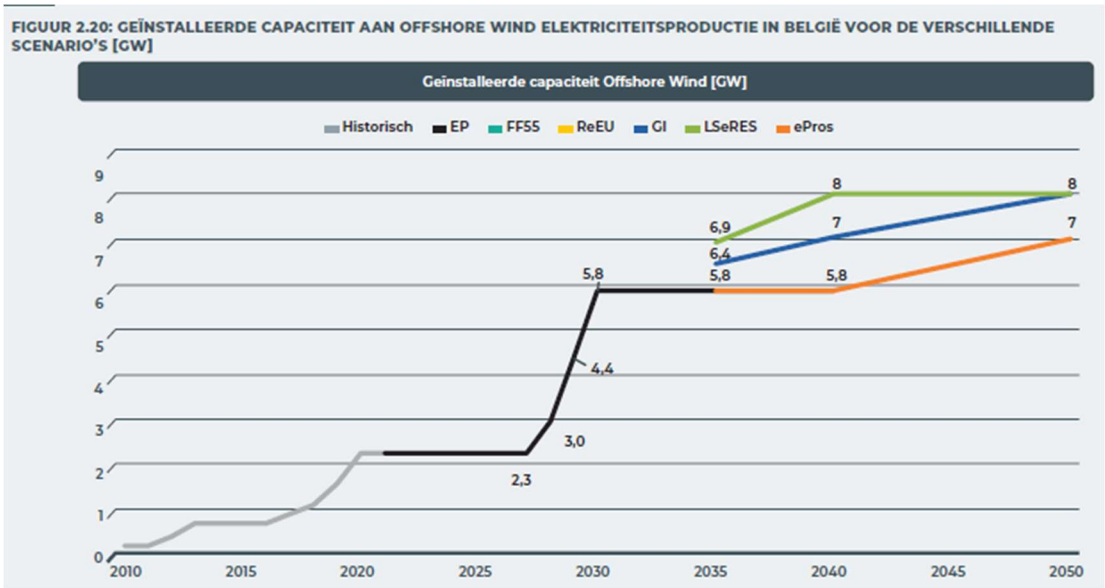


Figure 1 – Assumptions on installed offshore wind capacity (FDP - §2.1.6 - page 119)

BOP regrets that Elia takes the assumption that 8GW of offshore wind in Belgium is, in the most optimal scenario, only achieved by 2040. Although the federal government did not yet decide on a target date for the 8GW ambition, this assumption clearly lacks ambition by accounting for 18 years of development time to add 2.2GW of offshore wind. Elia only takes 'repowering' of the existing wind parks into account its assumptions.

However, it has also been decided into the decision of the ministerial council of 18th of March 2022, to investigate the acceleration of offshore wind and explore the possibilities for a third offshore wind zone within the Belgian Exclusive Economic zone. The decision on a third offshore wind zone is to be taken in the process of the marine spatial plan, which is due for an update at the latest by 2026. This means that an optimal scenario for installed offshore wind capacity in Belgium, the 8GW target can be set in the period 2030-2035.

Elia makes the assumption that additional growth in offshore wind in Belgium, beyond the 5.8GW already planned, will only occur as of 2035; conveniently outside of the scope of this FDP. BOP is of the opinion that this additional growth can, and should, occur sooner, and that Elia must thus, already now, plan for the necessary grid investments. If not, we will see that for the third time in history, the grid development will be the delaying factor in offshore developments, instead of the enabling factor.

Excess renewable energy available from the North Sea

BOP acknowledges the need for structural import of renewable energy from the North Sea towards Belgium, as illustrated in Figure 2. Belgium is and will be in need for renewable energy and there will be an excess of energy available in the North Sea basin.

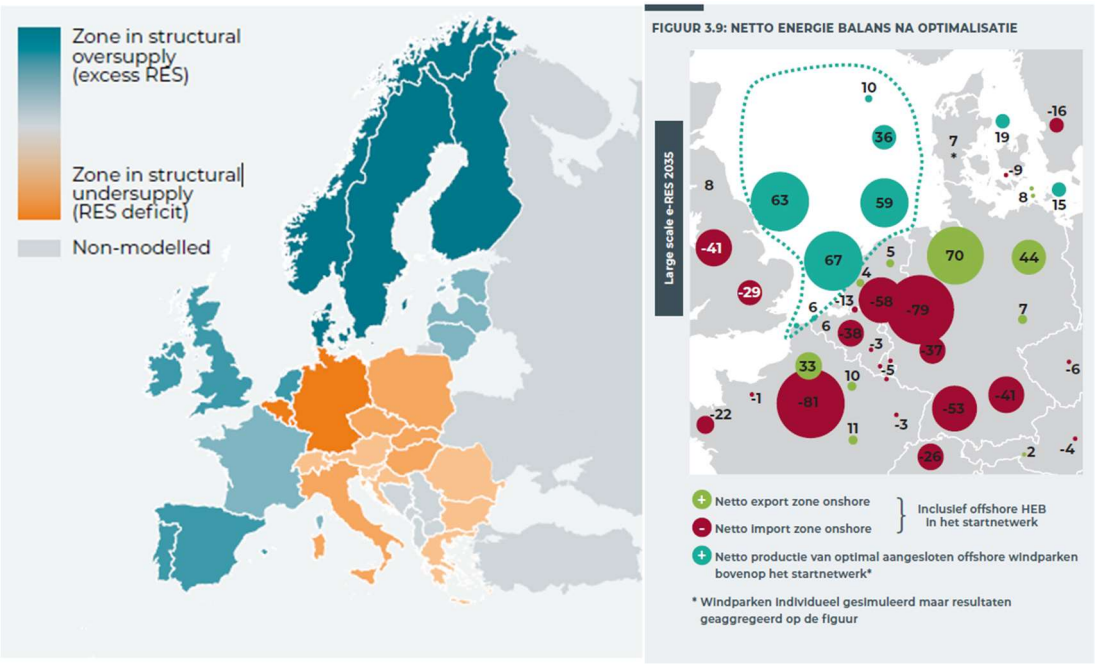


Figure 2 – (left) Belgium in structural undersupply of renewable energy sources[5]- (right) Excess energy (in TWh) to be directed inland by 2035[6]

BOP supports the view that offshore energy from the North Sea will need to be evacuated towards the load centres, which are located inland. This is further supported by the recent Elia Group study[7] on "Powering industry towards net zero", which identified the need for accelerating the build-out of the grid as an enabler for the industrial transition, as the electricity needs of the industry will increase by 50% by 2030, and almost triple by 2050. Also according to Elia (FDP page 116), the total energy demand will increase from ~90TWh in 2018 to 115-116TWh by 2050.

The FDP (page 24) mentions that "By 2050 – 15 tot 66TWh of non-Belgian renewable energy will need to be imported or connected to the Belgian grid". With an offshore wind capacity factor of ~50%, this corresponds to 3.5-15GW extra transport capabilities required.

In the FDP, Elia highlights, rightfully so, the needs of additional transmission capacity from the North Sea towards the load centers located inland. However, BOP does not see this ambitious general statement translated in actual grid development projects. On the contrary, the FDP is consciously under-dimensioning the grid capacity in comparison to the already announced offshore energy developments; let alone that the FDP provides room for further offshore growth.

[5] FDP Exec Summary – page 23
[6] FDP §3.2.4.1 on page 184
[7] https://issuu.com/eliagroup/docs/powering_industry_towards_net_zero?fr=sNThlMjU0MTU1OTg

Energy hub off the Belgian coast

As explained during the Task Force MOG2 on the 10 of October 2022 (cf. Figure 3), Elia's vision on integrating the offshore energy into the Belgian electricity system, is to concentrate all import streams in an energy hub, implemented on the Princess Elisabeth island. This energy hub will also be the connection point for the offshore wind production from the Princess Elisabeth zone. The transmission capacity is to be shared between interconnectors and Belgian offshore wind production.

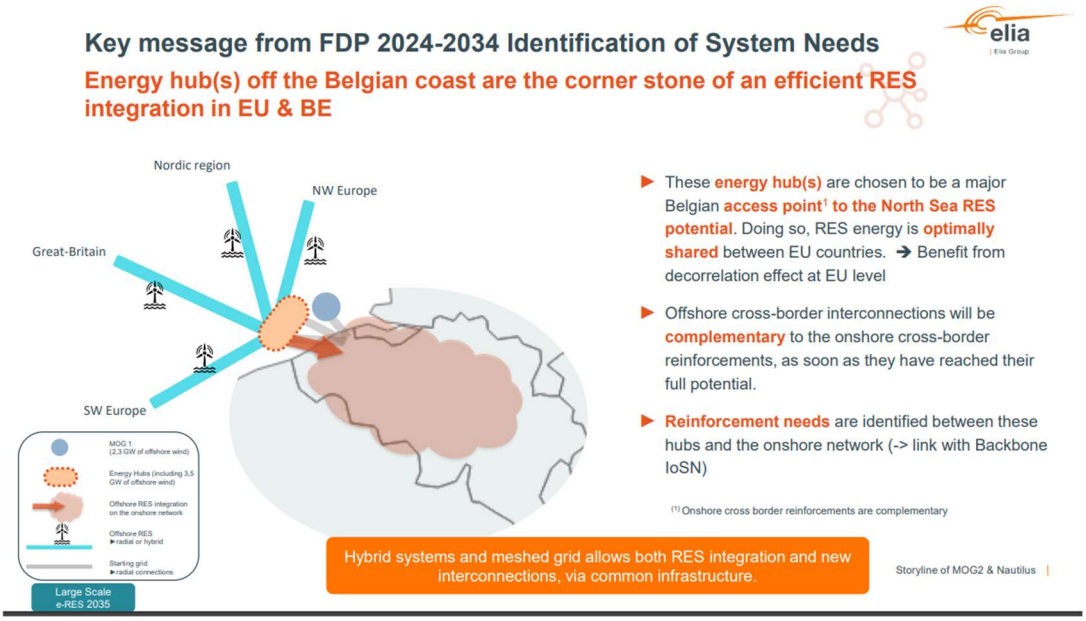


Figure 3 – Energy hubs as cornerstones of RES integration (Elia TF MOG2 – 10 Oct 2022)

BOP can support the concept of an energy hub, as, when properly designed, it can create redundancy in transmission capacity from the hub to shore. However, here again BOP sees a strong mismatch between the generic statements and future vision of Elia, and the actual grid projects elaborated upon in the FDP.

In this Elia vision, the offshore energy (from the PE zone and from abroad) will be concentrated on the PE island. At the moment, 4.9GW of energy projects are already foreseen to be concentrated on the island (1.4GW Nautilus + 3.5GW PEZ offshore wind). The connection capacity from the island to the shore, however, is only foreseen to have a capacity of 3.5GW, i.e. an under-dimensioning of almost 30%. At the same time, Elia proposed to concentrate even more energy projects (production capacity or interconnectors) on the island, without any concrete proposal to expand the connection capacity to shore. Also, no alternatives are foreseen, even not analysed, such as batteries on or near the island, electrolysis on the island and a pipeline instead of power connection to shore. Such solutions would ensure no renewable electrons are lost as a consequence of curtailment and can be an economically viable alternative on the short terms, if physical constraints prevent the immediate build out of more grid connection capacity.

To maximally integrate this offshore renewable energy into the Belgian electricity system, sufficient capacity is to be created to transport all the energy from the island towards inland Belgium.

The implementation of this vision in the draft FDP is lagging the offshore ambition and has not quantitatively optimized the capacity from the PE island towards inland Belgium.

3. Identification of system needs (§3.2)

§3.2.3 KARI study

In §3.2.3 Elia presents the **Kari-study** that investigated an optimal integration of offshore renewable energy towards 2035. BOP regrets that the offshore wind industry was not involved nor consulted in this study.

The study tried to minimise the total costs for developing both grid and offshore wind developments. It uses a TOTEX definition which includes operational production cost (fuel, CO_2 emissions, O&M of thermal park), investments costs in grid and societal value of CO_2. This TOTEX definition[8] does not account any effect on the offshore wind park (investment costs or O&M costs). BOP is wondering if this is correct.

Less optimal use of wind assets due to grid constraints leads to more expensive offshore wind production (in terms of LCOE, as the same investment costs need to be recovered on a lower volume), but more importantly to less CO_2-neutral electricity, which in turn will slow the pace of electrification. BOP's understanding is that the "CO_2 emissions" that are part of TOTEX only take into account the CO_2 emissions of the electricity generation source, but not the supplementary CO_2 gains that stem for faster electrification through the economy.

Not fully accounting for these effects artificially increases the social welfare gains and skews the results in favour of lower needs in grid infrastructure.

Also, it is not clear what bidding zone assumptions are taken in the KARI study. Please clarify whether offshore bidding zones were introduced in the study, or how the offshore developments were split in the different home markets?

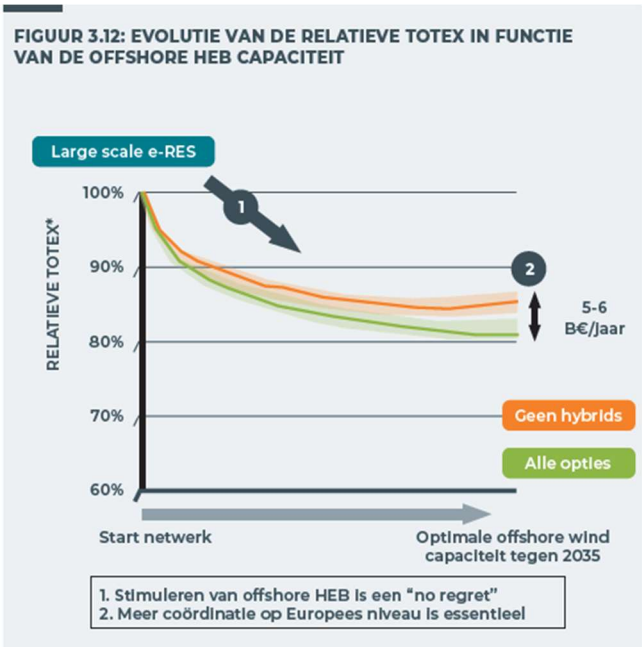


Figure 4 - Overall optimization results of the KARI study

[8] FDP page 179 – ***Totex = operationele productiekost van het systeem (brandstof + CO2 emissies + O&M thermisch park exclusief netverliezen) + investeringskost in het systeem (netuitbreiding).

Figure 4 shows that stimulating offshore energy is a "no regret": regardless of grid optimization offshore wind developments result in tens of billions of costs reductions, due to a.o. fuel savings and societal benefits related to CO_2 emission reductions. **The gains in optimizing the grid via hybrid projects is much smaller than the gains of the offshore wind developments themselves. The priority should be at realizing and connecting the wind developments as fast as possible, hence justifying a proactive approach in grid investments.**

Moreover, the results presented from KARI study do not answer some crucial questions which are relevant to this Federal Development Plan, i.e.:

- What is the need in grid capacity needed between the entire North Sea and Belgium (by 2035, 2040,…)?
- What is the optimal grid design (by 2035, 2040,…) to integrate the offshore developments and to enhance cross-zonal trade? And how does the optimal grid design compare to the start grid in the study and the grid proposal in this FDP24-34?
- What is the optimal grid capacity between the Belgian hub and inland Belgium?
- What is the societal value created for Belgium by the (locally) optimizing the grid towards Belgium?
- What is the missed value from the (suboptimal) grid proposal in the FDP24-34?

The same questions are to be asked related to the need for reinforcing the onshore grid. Only overall optimal results are presented (cf. Figure 5) and no details are shared related to specific effects for the Belgian onshore grid.

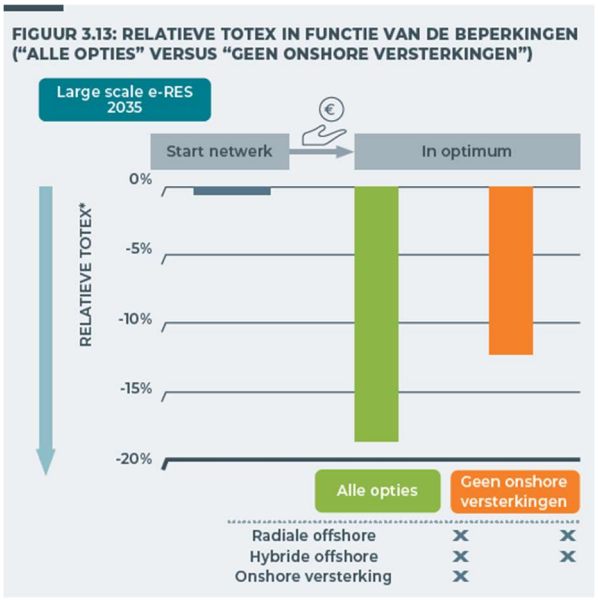


Figure 5 – Optimization of the grid with onshore reinforcements

From the results presented from the KARI study one cannot conclude that the hybrid grid design proposed by Elia for MOG 2 and Nautilus between the North Sea and Belgium is the optimal grid design (by 2035) from a societal perspective. It only partially shows the potential of hybrid projects in the development of a larger offshore grid.

BOP asks more transparency on the assumptions and results coming out of the KARI-study specifically related to integrating offshore renewable energy towards Belgium. In particular, the optimal grid design resulting from this study is to be published.

§3.3 Needs identification for the internal backbone 380kV

Situation in 2030

In the reference grid of 2030, high loads are observed in West-Flanders, without the inclusion of Nautilus (cf. Figure 6). The Nautilus interconnector is planned for commissioning in 2030. Why is this cable excluded and what would be the effect on the internal backbone? Is the integration of the offshore wind projects in the PEZ secured, without curtailments/redispatch, for the first years following 2030, prior to the finalization of the planned reinforcements on the internal backbone?

Furthermore, the grid connection capacity to shore from Nautilus and MOG 2 is constrained to 3.5GW in the offshore grid design proposed by Elia. What would be the loads on the internal backbone if the grid capacity to shore is increased to allow for the import of the full 4.9GW from the PEZ and the Nautilus interconnector into the Belgian onshore grid?

The analysis clearly confirms the need for further reinforcement of the internal backbone to be able to integrate the renewable energy from the North Sea.

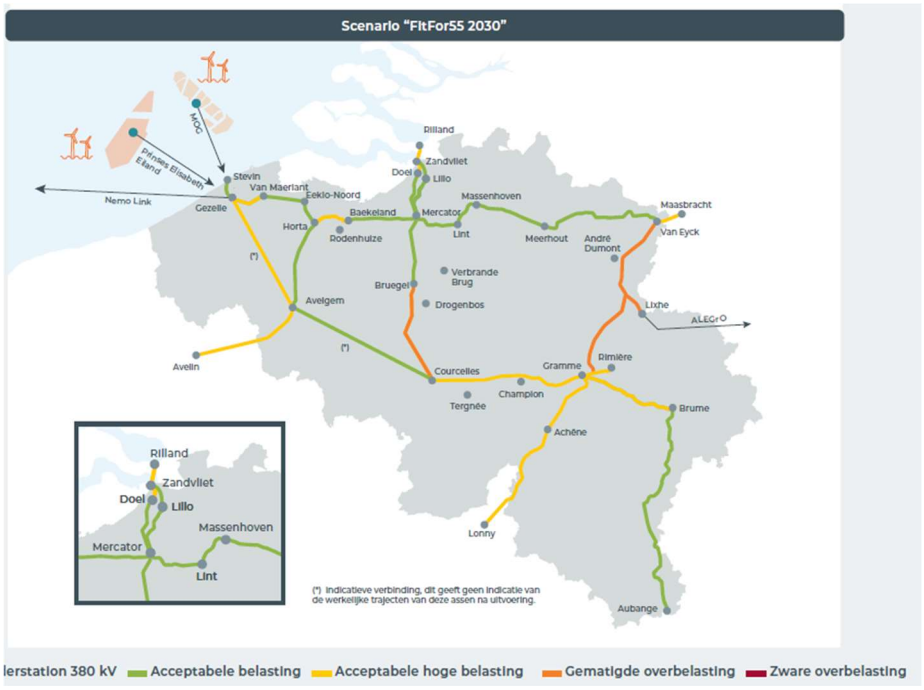


Figure 6 – Loads on the internal backbone (FitFor55 2030 scenario)

Situation in 2035

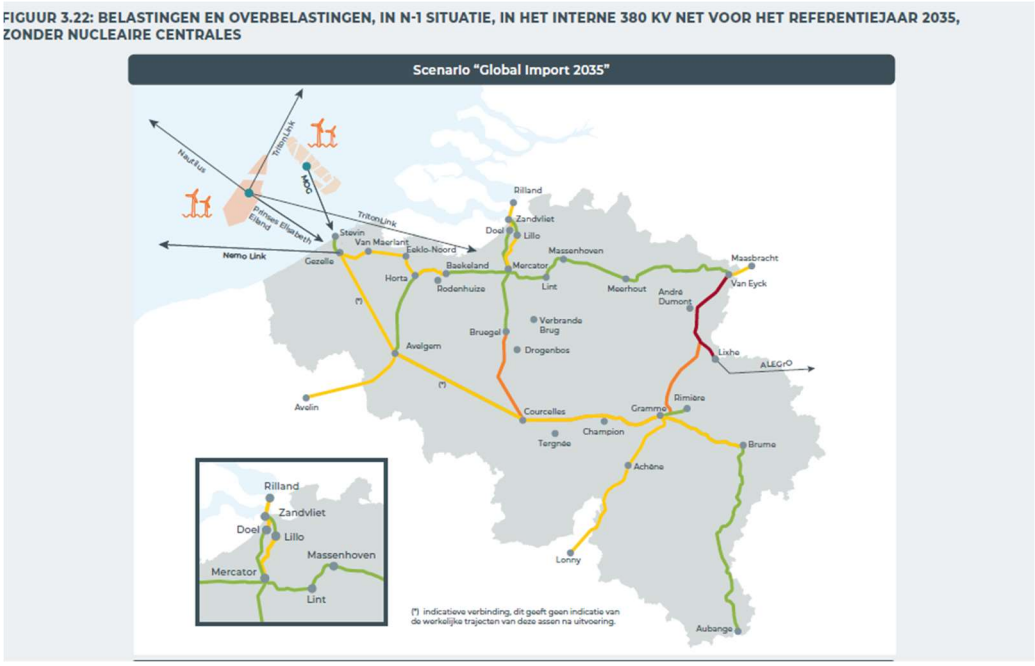


Figure 7 - Loads on the internal backbone (Global Import 2035 scenario)

The analysis, based on a rather limited ambition in offshore wind developments by 2035 (5.8GW + 600MW), shows a clear need for further onshore grid reinforcements (after realization of Ventilus and Boucle du Hainaut) to allow integrating both offshore and onshore wind developments. **The reinforcements are required regardless of nuclear extension discussions and are even more pressing with a higher offshore wind ambition of 8GW prior to 2035.**

4. Transmission capacity for offshore wind developments in Belgium

High-level evolution of the 380kV grid in Belgium

Elia proposes the high-level evolution of the offshore grid and related onshore reinforcements, as shown in Figure 8.

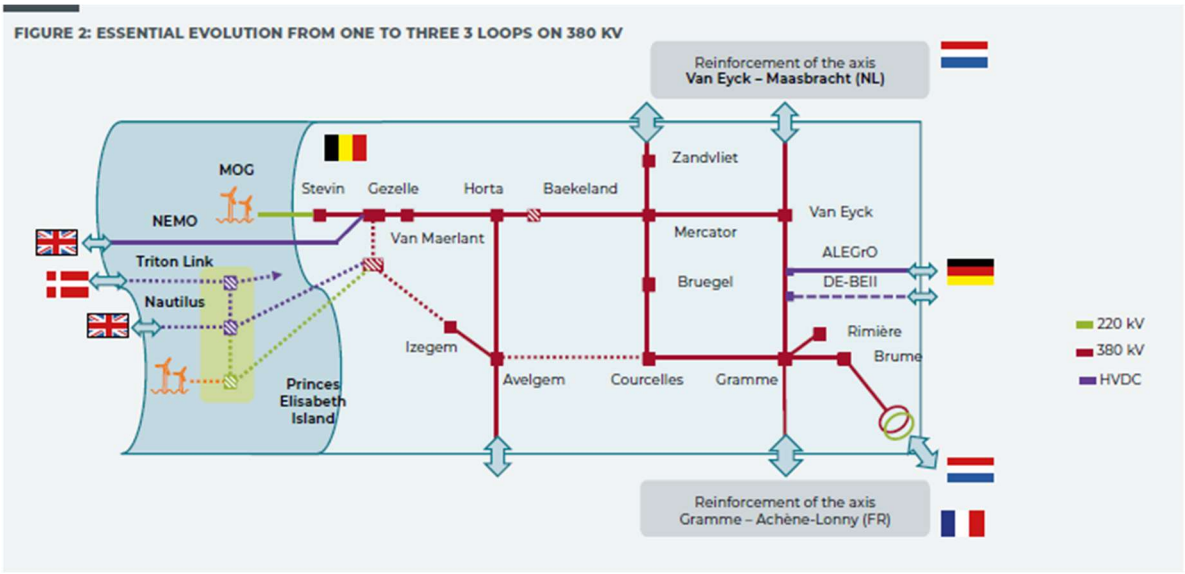


Figure 8 – High-level evolution of the 380kV grid in Belgium

BOP supports the fast reinforcement of the 380kV backbone by closing the loops via the Ventilus and Boucle-du-Hainaut projects, but regrets that Elia does not take a proactive approach to implement its vision of accelerating the integration of offshore renewables from the North Sea.

Additional onshore reinforcements, on top of Ventilus, Boucle du Hainaut and TritonLink are required to host the future offshore developments. The needs and benefits are clearly identified, but not translated into concrete projects. Without these additional projects, once again, the grid developments will hamper the speed of the energy transition, the consolidation of Belgium's pioneering position in the offshore wind sector and the export possibilities of this valuable expertise abroad.

It is also primordial to prepare the public opinion that extra onshore grid developments will be needed to attain the climate goals. BOP is of the opinion that by not being specific enough about these developments, Elia missed an opportunity to lift the public debate beyond the Ventilus and Boucle du Hainaut projects.

§4.2 Expansion and integration of the offshore grid

Elia proposes a hybrid solution to integrate the offshore wind development of the Princess Elisabeth zone (PEZ) with the Nautilus (and the TritonLink interconnectors). As justification Elia relies on the high-level results of the KARI-study which tried to identify potential benefits of hybrid projects. As explained above, the KARI-study did not show the benefit of a hybrid solution for the specific situation of the PEZ. Furthermore, in this FDP24-34, Elia does not show the advantage of the proposed hybrid solution over alternative grid designs. Also, the FDP does not compare the proposed MOG2 grid design and related onshore reinforcements with the optimal configurations resulting from the optimization in the KARI study.

Elia fails to show the proposed hybrid solution for integration of the offshore renewables from the PEZ is the optimal grid design from a societal perspective. A comparison with alternative solutions is missing. **BOP asks for more transparency and requests to investigate and include solutions with a higher capacity between the Princess Elisabeth island and the Belgian load centres, especially given the fact that the distance to shore is a mere 40 kilometers.**

§4.2.1 Energy-island and MOG2

The draft FDP mentions (page 247) that a variant analyses for the PEZ and the PE island was presented to the minister and the ministerial council approved the draft ministerial decree on 23rd of December 2021.

- Why was this analysis not published, discussed and/or consulted with the stakeholders prior to the decision? BOP regrets the lack of transparency in the decision-making process.
- Why is this variant analysis is not included in the FDP to support the proposed solution? **BOP requests Elia to publish this analysis.**

Regarding the grid design:

- Why is the additional capacity of 1400MW between the island and the coast not considered in AC cables? What is the added value of building this link in DC?
- Why is a 1.4GW DC link proposed and not a 2GW DC link considering this is becoming the standard for 525kV offshore HVDC connections and the need for additional capacity from the North Sea towards Belgium?
- What is the anticipated grid design in case of an increase off the installed offshore capacity to 8 GW and how would/could this influence the choices to be made today?

It is mentioned (page 248) that: *"Na een uitgebreid onderzoek van verschillende varianten, werd beslist om een mix van wisselstroom en gelijkstroom op een kunstmatig eiland te installeren"*:

- Why is this investigation not included in the FDP? **BOP requests Elia to publish this analysis.**
- What is the advantage of mixing AC and DC on the energy island?

The argument of reducing the environmental impact is rather minimal considering the number of infield-cables that need to arrive at the island (>50) and their increased length, compared to saving 3 AC export cables.

The argument of higher integration potential for building an offshore DC network is to be nuanced, as integration of a DC network is not deemed feasible prior to 2035, and a higher capacity in AC for the PEZ is not preventing the addition of DC cables (as the TritonLink) in a later phase.

BOP requests to be fully transparent and publish the variant analyses that have been performed.

BOP regrets the decision-making process that has led to the current proposal of connecting the offshore wind developments in the PEZ. A more active involvement of the stakeholders is to be implemented.

Voltage level of inter-array cables (66kV vs 132kV)

In the MOG extension project, a voltage level of 66kV is proposed by Elia for the connection of the inter-array cables of the offshore wind parks, although a voltage level of 132kV has significant advantages.

At 132kV, fewer inter-array cables are needed to connect the expected generation capacity compared to 66kV. Besides an advantage in cost, this reduces the (environmental) impact on the seabed as well as electrical cable losses. However, the reduction in the number of cables also gives advantages in

finding the most efficient cable routes within the conditions of concessions (cf. locations and possible constraints regarding gravel beds that still have to be determined) and also limits the difficulties with the installation and possible later repair of cables at the landfall on the energy island, where dozens of cables from various parties will arrive. Past experience has shown that the consequences in terms of liabilities and insurance should not be underestimated.

Regarding the timing of availability of this 132kV technology, according to our information from the market, it is very likely that the offshore turbines at 132kV will be available from all (European) players towards the end of the decade. This already makes the 132kV a preferable option for the 2x1400MW wind farms to be developed in phase 2 of the Princess Elisabeth zone.

For the first wind farm in planning, it seems too early today to guarantee that the technology at turbine level will be available, but given its advantages as well as current uncertainty in the overall planning, this option cannot be ruled out either. On the other hand, we do not understand why Elia needs project development times this long, that require to fix the voltage level already today.

We therefore ask to keep the option of connecting to 132kV open for all wind farms in the PEZ, by taking this into account in the (preliminary) designs for connection, and without this option introducing delays in the timelines towards connection.

§4.2.2 Nautilus

The cost-benefit analysis assumed an offshore bidding zone for the coupled wind developments in the PEZ, although a procedure for altering the bidding zone configuration has not yet been started.

BOP emphasizes that approval of the Federal Development Plan cannot imply a decision on the bidding zone configuration, and the official procedures as per EU Regulation are to be followed.

A choice for a hybrid grid design for the Nautilus-MOG2 combination, implies that the Nautilus interconnector is being underutilized during offshore production in the PEZ, i.e. over 40% of the time (when the capacity factor of the offshore production is over 60% or more than 2.1GW). What would be the impact on the CBA when a larger transmission capacity is provided between the energy-island and Belgium, over only 40 kilometers? Intuitively, by adding the 40 kilometer cable, the much longer Nautilus cable will have a higher load factor compared to the hybrid set-up, increasing societal value by more than the investment in an extra cable of 40 km between the island and Belgium. Without objective information from Elia, BOP cannot properly assess that this alternative solution, or others as proposed later in this document, are less valuable to society than the set-up currently proposed by Elia.

This triggers the question, whether a more optimal grid design could be achieved, by optimizing the grid capacity between the energy island and the inland Belgium. A proper CBA should compare with the right counterfactuals, and not only compare a “with the project” and “without the project” situation. Furthermore, as explained in the feedback on the KARI-study, the impact on the offshore wind parks is to be taken into account (f.i. impact of unter-utilizing the wind assets, impact on the different scenarios of the PEZ tender design (full CfD, hybrid system with a carve out to tailor for PPA’s or zero bid) when one tries to make conclusion on a societal level. Otherwise, costs are only being transferred from one party to another, without any effect on the society/consumer.

Furthermore, as acknowledged by Elia[9], the theoretical benefits of the proposed hybrid grid design with Nautilus may not be realized due to various technical and market limitations:

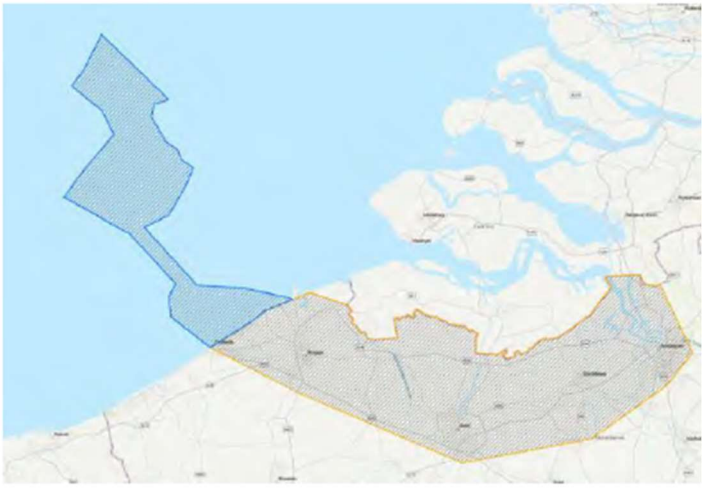
[9] Task Force MOG 2, 10/01/2023

- The coupling between the AC connected wind farms (PEZ lot 1 and 2) with the Nautilus interconnector and PEZ lot 3 may not be feasible due to a significant risk for the stability of the grid. As a result, the timing (if at all feasible), the additional grid design costs, the residual stability risks, and the impact on the PEZ tender are of great concern.
- Since the Brexit, the UK is no longer part of the European implicit price coupling market. The capacity of the Nautilus interconnector must therefore be made available to market participants in an explicit way based on price forecasts. This prevents an efficient use of the available (constrained) grid capacity to shore.

BOP urges Elia to prove the value of the proposed hybrid set-up by comparing the proposed hybrid grid design, with proper counterfactuals which include higher capacities between the Princess Elisabeth island and inland Belgium.

§4.2.3 TritonLink

The TritonLink is to bring offshore renewable energy from Denmark to Belgium via a subsea and underground HVDC cable. The part from the coast to inland Belgium (area Gent-Antwerpen) is planned for overland. Elia asks for a conditional approval of the project with planned realization date in 2031-2032.



Figuur 6-3 Zoekzones voor de kabels voor de nieuwe hybride HVDC interconnectie België-Denemarken

BOP requests to pro-actively investigate options to bring offshore energy from the North Sea to inland Belgium, in line with the Elia vision and the identified onshore needs. Additional capacity can be realized in the same timeframe (by 2031-2032) and synergies can be found with the overland part of the TritonLink project.

§4.2.5 Further development of offshore renewable energy in the Belgian North Sea

As the 8 GW ambition of the Federal government is clear and strives to be implemented asap, we urge Elia to proactively develop the necessary grid developments for a third zone for offshore wind developments in the Belgian part of the North Sea, as well as making the necessary preparation for repowering of the existing Eastern zone an providing sufficient hosting capacity for new offshore technologies as floating PV projects.

§4.5.2.1 and §4.5.2.2 Ventilus and Boucle du Hainaut

Both projects are crucial to timely provide the required connection capacity for the offshore wind developments in the Princess Elisabeth zone.

In the further detailing of the projects and trajectories, it will be essential to safeguard the full hosting capacity of the new corridors and to avoid introductions of local bottlenecks (f.i. by undergrounding part of the trajectories with a limited cable capacity), as is the case for the Gezelle-Van Maerlant section of the Stevin corridor.

§4.5.2.3 Reinforcement of the Gezelle – Van Maerlant section

Considering the need for capacity from the North Sea to inland Belgium, it is incomprehensible that this project is only aimed for by 2035 and linked to the additional need when repowering in the existing Eastern offshore wind zone.

Additional hosting capacity is useful to evacuate offshore energy from the PE zone as well as the offshore interconnectors starting from 2030. Also additional capacity for a third offshore wind zone and offshore PV projects is to be anticipated for. The maritime spatial plan is to be renewed by 2026, meaning that offshore developments in a third zone can be installed by 2030. The grid is to be ready.

Also additional hosting capacity could be provided without the need for additional cabling, by optimally using the existing infrastructure, as the excellent thermal conductivity in the underground in West-Flanders might allow for dynamic cable rating well above the nominal cable rating. This means that the actual operational capacity of the corridor could be much higher than 3GW (N-1). BOP asks further transparency on the operational limits of the corridor (dynamic cable ratings), to further optimize the transmission potential for offshore wind energy.

BOP urges to speed up the investigations of removing the current bottleneck in this section of the Stevin corridor, in order to enhance the offshore hosting capacity as soon as possible. In this respect, the planned realization date is to be accelerate to the period 2030-2032 at the latest (and conditional to the results of the studies).

§4.6.1 North Sea offshore grid

The need for a North-South corridor makes sense in the broader view of developments. But sufficient attention is to be put on how to bring the offshore energy inland.

A third hybrid offshore system by 2035-2040 will be too slow to follow the developments in offshore wind production.

The North Sea Offshore Grid study is important and is to be executed without any delay. BOP proposes to put a timing on delivering the study, f.i. by 2024 at the latest, to fully translate the results into project proposals by the next iteration of the FDP.

§4.6.3 Further development of the backbone

The further reinforcement of the backbone is at least as important as bringing offshore energy from the North Sea to the energy island or to the coastal area. The Ventilus and Boucle du Hainaut projects prove that additional onshore corridors have extremely long timelines and are the real bottlenecks in realizing offshore ambitions and the energy transition in general.

BOP regrets that Elia is not taking a more pro-active approach in investigating the further developments of the backbone and proposed to put a strict deadline on delivering the study to be able to fully translate the results into project proposals by the next iteration of the FDP.

5. Alternative grid designs and proposals

BOP would like to propose some additional grid design options compared to or on top of the proposed projects in the FDP:

1. Develop Nautilus inland in parallel with TritonLink

The landing point of the Nautilus interconnector can be redirected further inland (Antwerp of Brussels area). Large synergies, in permitting in particular, can be looked for with the TritonLink project via similar trajectories for a large fraction of the cable, especially on land. As the TritonLink project is aimed for the period 2030-2032, this new onshore trajectory is feasible in the same timeframe, with a minimal impact on the commissioning of the Nautilus cable (which is not bounded by any legally binding deadline). When largely similar trajectories are used, the additional environmental impact is minimal while creating the transmission capacity that is required anyhow to meet the offshore ambitions.

The planned grid design for MOG2 (2.1GW AC + 1.4GW DC) can at first instance be fully utilized for the 3.5GW offshore wind capacity in the PEZ. In a later stage, the Nautilus connector can be integrated in the energy hub on the Princess Elisabeth island (similar as planned for with the TritonLink).

2. 2GW DC cable from PE island to BE

The FDP plans for a 1.4GW DC cable from the Princess Elisabeth island towards the Ventilus corridor. HVDC cable technology is however developing fast and 2GW HVDC cables and substations are becoming the new standard.

Increasing the HVDC cable capacity from 1.4GW to 2GW between the PEZ and the Ventilus corridor is to be fully investigated as it will support to maximize the integration of renewable energy from both the PEZ and the UK (via the Nautilus interconnector), with minimal impact on cost and environment (similar number of convertors and kms of cable).

3. Extra 220kV AC capacity from PE island to BE

Additional capacity from the PE island to the Ventilus corridor could also be planned for in AC technology. The impact of two to four additional 220kV AC cables is to be fully investigated, in order to find the optimal capacity for integrating the 3.5GW offshore wind capacity in combination with 1.4GW import from the UK (as the optimal transmission capacity in terms of costs and benefits is not demonstrated in the FDP and will be higher than 3.5GW).
Also the maximum export capacity of the already proposed 220kV AC cables should be investigated. By maximising the cross section of the cables and by utilising dynamic cable rating to make full use of the cables' transport capacity, the proposed 350MW rating per cable could be increased significantly.

4. Faster elimination of the Gezelle-Van Maerlant bottleneck

Additional capacity offshore between the PE island and the coastal area might require additional onshore transmission capacity. The elimination of the Gezelle-Van Maerlant bottleneck is currently planned for by 2035 or later (§4.5.2.3) and is to be accelerated to match with the pace of the offshore developments.

5. Additional DC project from PE island to BE

An additional DC cable project from the PE island to inland Belgium should be fully investigated on top of the current projects in the FDP (i.e. on top of Nautilus and TritonLink cables) in order to follow the pace of offshore wind developments in the North Sea and to avoid a constant structural under-dimensioning of the grid capacity from the energy hub on the PE island and Belgium. This project will

bring additional benefits towards Belgium by more timely introducing low-cost green electricity from the North Sea and a faster decarbonization of the Belgian industry. As shown in Figure 4, timely introducing offshore wind developments brings greater value to society than saving on grid infrastructure.

General remarks

1. Stakeholder involvement during drafting of the Federal Development Plan

As also cited by CREG in its opinion on the draft development plan 2024-2034[10], BOP regrets that the participation of market players in the drafting of the development plan is limited to the scenario drafting process.

BOP explicitly requests to be actively involved in the drafting of the next federal development plan in order to optimally align and synchronize the necessary grid infrastructure investments with offshore wind developments in the North Sea. This could be for instance achieved by adding key stakeholders to the collaboration committee.

2. Frequency of updating the Federal Development Plan

Considering the fast evolutions of the energy landscape in Belgium, the EU and worldwide, and considering that grid developments have extremely long lead times towards realization, a more flexible approach is required for the process and delivery of the Federal Development Plan. BOP therefore proposes to increase the frequency of updating the FDP to every two years, especially for the chapters and projects related to the integration of offshore wind and developments of the offshore grid.

3. CBA methodology and alternative grid topologies

BOP regrets that the draft FDP does not provide details on the alternative grid designs and solutions and only describes the desired solution of Elia.

BOP urges Elia to be more transparent on the high-level grid alternatives and its pros and cons, as it will help consensus building on the optimal proposal. It will also help public acceptance of additional infrastructure works and as such can contribute to faster realization times.

BOP asks the authorities to change the legislation to mandatorily include an evaluation of grid alternatives in the next update of the FDP.

[10] CREG (A)2445 – Advies over het ontwerp van ontwikkelingsplan 2024-2034 van de NV ELIA Transmission Belgium – 15 september 2022