NEWS - KEEP THE LIGHTS ON

January 20, 2023

#9 Public consultation Elia

Now is the time to join forces, use all the knowledge, talent and resources we realistically have at our disposal, in order to make evidence and science based policy decisions in the interest of Belgium and in solidarity with the EU.

Elia organised a public consultation from Friday 28 October until Monday 28 November 2022, on the methodology, the basis data and scenarios that will be used for the study regarding the adequacy and flexibility needs of the Belgian power system, which must be carried out every 2 years. Keep The Lights On (aka KTLO) welcomed the opportunity and posted a response on the Elia website (see annex, page 6-9).

Triggered by the Elia report and the currently increased media attention surrounding the prolongation, this post aims at updating the public on how we are reading the challenges that Belgium is facing today, 11 months after launching our initiative.

The whole of Europe, and in particular Belgium, runs a massive risk of not being able to supply their population and their industries with sufficient electricity. We indeed see an **accumulation of risks**:

- Insecure supply of and in any case historically highly priced natural gas;
- The current strategy remains based on increased import. Belgium is better interconnected than ever before. Nevertheless, we see a growing risk of not being served by our neighbouring countries when push comes to shove (cfr. Germany's solo slim to Qatar, tensions between France and Germany, or France's recent nuclear fleet difficulties);
- Netherlands worries on security of supply;
- Supply chain of materials under tension and limited resources, making 100% renewable strategy unrealistic;
- Construction time, also of renewable, electricity production is unclear (NIMBY, permit lead times, wind mill manufacturers in bad financial shape, …);

- Management of an electric grid not based anymore on synchronous machines but on power electronics with no guarantee it will work when used at large scale (one already detected these difficulties in daily life within streets with high concentration of solar panels);
- Cost of 100% renewables (assuming it is feasible which it is not) is demonstrated to be very high compared to a mix of renewables and nuclear. This is not a risk, it is a fact;
- Problem of several days of no wind and no sun, also known as Dunkelflaute, is not solved (even big batteries + H2 can never help for more than a few hours, no concept of large batteries for worldwide application ready), even with more interconnection, because of the homogeneity of wind in large sections of Europe; See December 2022 weather: several foggy days and no wind, while we needed heat and light;
- Betting on 4th generation SMRs is also a risk, as this technology is still under development, that means timing remains uncertain.

On a subject so critical for industry and human wellbeing, one *MUST* use the available technologies (i.e. off the shelf) in scenarios that can be modified step by step as some new technology challenge is unlocked, and it would be *UNWISE* to base scenarios on "possible" technologies. The decision to limit the diversification (i.e. reduce or suppress nuclear in the mix) while the current strategy should focus on maximising resilience remains a major concern and critique.

Figure 11 of the Elia consultation (see page 3 top) confirms our February 2022 criticism (cfr. KTLO website NL/FR) that the total projected annual electricity consumption in Belgium in Elia's previous Adequacy and Flexibility 2021 was largely underestimated: the gap is now confirmed to be approximately 16 TWh. For the sake of comparison, 1 GW nuclear represents on average around 7,5 TWh, so the gap approximates the equivalent of Doel 3 & Tihange 4 combined. Knowing that the previous report (see figure 5-67, page 3) mentioned an already tight situation (even excluding electrolyzers) and a strong reliance on natural gas (1/3rd) and import (1/3rd) in 2032, this gap is of greatest concern.

Figure 11 shows the trajectory as compared to the previous Adequacy and Flexibility 2021 study and other external studies which cover this time horizon.

Sources:

- EC-MIX scenario [8]
- TYNDP2024 & ERAA2023 data collection NT+ scenario guidance range
- EnergyVille-Febeliec – Paths 2050[9]
- Ember – Clean Power pathways [10]

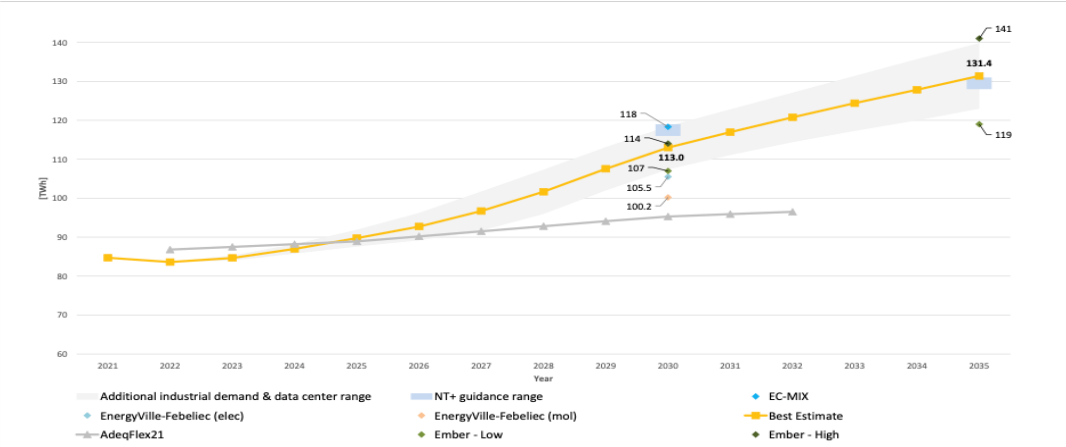
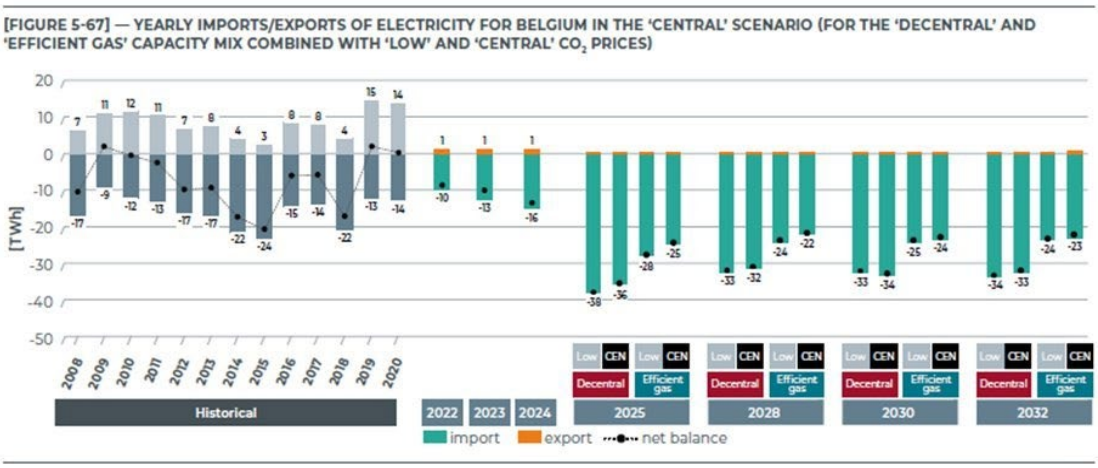


Figure 11 Total annual electricity consumption in Belgium compared to previous Adequacy and Flexibility 2021 and other studies (including grid losses[11], energy branch consumption and excluding electrolyzers)



We prefer to base ourselves on the EnergyVille Paths 2050 Electrification scenario estimates, as also shown in Figure 11, in order to calculate the need for an autonomous (based on a net annual balance) Belgian electricity generation. Furthermore, we recommend to benchmark the Elia and EnergyVille studies with those from the UK and France (RTE).

The events post mid February 2022, when we launched our initiative, have only reinforced the risks and fair questioning by KTLO in its 2 perspectives on security of supply (FR/NL) and socio-economic aspects (FR/NL), even with the currently hoped for nuclear phase out agenda as assumed in the Elia consultation:

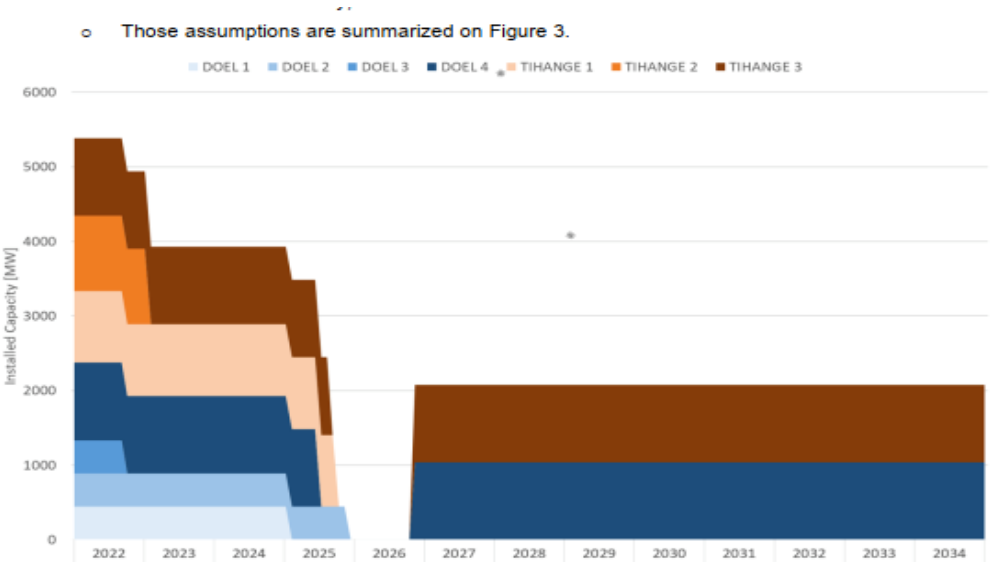


Figure 3: Unit-by-unit installed capacity of the nuclear fleet in MW

For all above reasons, we feel that Belgium *MUST* keep its autonomy (based on a net annual balance) in electricity generation. Only under that condition will Belgium be able to retain its value-added industries and be able to attract and generate new investments, both of which are a must for our future prosperity.

The real question to answer now (and quickly) is what is the optimum mix between wind/solar and nuclear within a long term electrification vision. The optimum should be based on maximising an objective function based on cost, security of supply, minimum need of gas (to drop CO2 emission to minimum) and the stability of the grid, also at subhourly intervals. Nobody today knows what is the best balance, which is certainly country dependent. What is known for sure is that 100% renewables is not the optimum (and as explained earlier, not possible) while 100% nuclear is not a good choice in terms of diversification. But is the right strategy 50%-50% ? 20%-80%, other? The analysis is urgently needed to decide soon about the nuclear capacity we need at the horizon 2035 and then horizon 2050 in terms of building new reactors (before SMRs gen IV are available).

Concretely, based on today's new reality and in the absence of a definitive optimum scenario available, **we plead**:

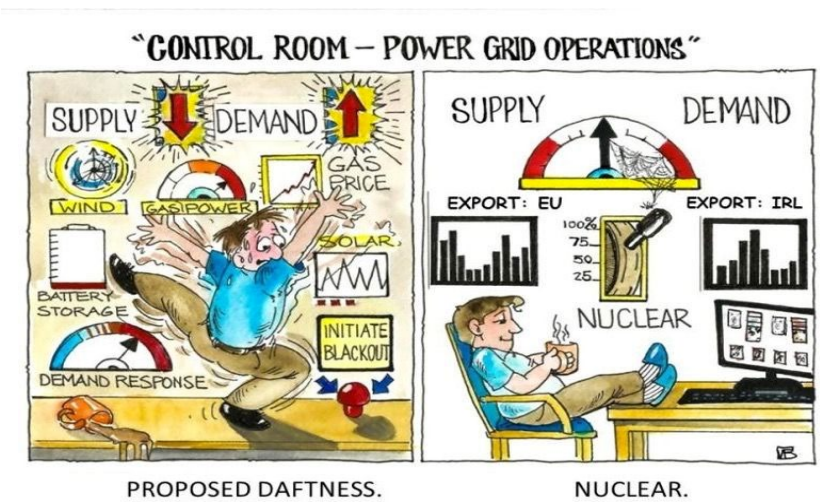
1. to now make a pragmatic non-ideological but determined move towards a coherent & holistic energy vision for BE in a EU context (evidence/science based and not a priori excluding any technology) and to focus on what all of us want to achieve in the end:
    - reducing our dependence on fossil fuels;
    - reducing our dependence on questionable regimes;
    - achieving a resilient and robust electricity system;
    - thus taking care of the wellbeing of our citizens and our economy.

    This common goal should help us to stop attacking one another about whether or not nuclear, or wind & solar, or any other electricity source for that matter, has a place in the energy mix. Now is the time to join forces, use all the knowledge, talent & resources we realistically have at our disposal, in order to make evidence & science based policy decisions in the interest of Belgium and in solidarity with the EU;

2. to extend at least **5** of our nuclear plants for at least another **20** years, and in preparation thereof, make sure that D3 and T2 are mothballed, so they can be onboarded again in the future;

3. to abolish the outdated 2003 law on the nuclear exit in order to create a legally secure framework within which industry can invest for the long term;

4. to launch a reflection about the construction of new nuclear power reactors similar to the decision taken during 2022 by many countries around the world (The Netherlands, France, UK, Poland, South Korea, Japan, …).



Credit to André Wakker

Annex

KTLO's answer to the public consultation on the scenario and methodology document of Elia dealing with the adequacy and flexibility study 2024-2034.

General:

KTLO welcomes the opportunity given by Elia with this public consultation.

The report highlights the fact that in the beginning of 2023 some major decision has to be taken by the government. Unfortunately, our general impression is that this study is far from complete. So we see only two solutions: postponing this public consultation or making enough scenarios to cover all possible decision-outcomes (ref p9 and others). Indeed, referring to Elia's statement in chapter 2 "given the uncertain context", this uncertain context is only increasing further, therefore we would expect Elia to take sufficient margins and provide recommendations about how to ensure the grid remains reliable and resilient within that uncertain context by presenting scenarios (e.g. concerning import risks, see further in our specific questions).

Prices used in the study are underestimating the real cost:

- certainly for wind/solar as the ghost capacity needed to cover the non-operational time (about 90% for solar and between 70% and 80 % for wind) are not considered in the price of this renewable energy. This is misleading and disinformation.
- The system cost of renewables (primarily wind and solar) is not considered adequately. Scholars claim that the integration cost may equal up to 3x the production cost.
- Gas prices are non-compliant with current levels and also the forecasts are not in line with what experts say the prices will be in the years to come.

One other major shortcoming is limiting its calculations to a time tick of one hour. All events of less than one hour will be completely missed. Integrating over one hour may mask severe blackouts without notice.

In some parts of the study it is as if the nuclear power plants are omitted. We would insist on taking them along as they might be the only reliable source for covering the base load, in the future as well as today.

Specific questions:

1. Can you please comment on how consistency between core region level assumptions is being verified? How do you ensure that each country takes compatible assumptions? For example, how do you ensure that two countries do not expect imports from their neighbours at the same time? Especially since the "climate year" statement that neighbouring countries are likely to have similar scarcity in wind/solar energy ("The meteorological data is also geographically correlated, as European countries are close enough to each other to be affected by the same meteorological effects").
   The import from France and Germany often referred to, seems non-existing as France became a net importer and Germany is struggling with its own supply and had to reopen pit and coal plants.

2. Assumptions about unit availability over the years are considered as inputs for scenarii. However, it would be of added value to see recommendations about postponing the phase out of some production units and about adding some margin for potential delays in delivering new capacities (especially in a context of crisis/geopolitical conflicts/inflation that could have an impact on those important industrial projects).

3. A considerable growth of wind/solar capacity is considered. Several questions related to this fact:
   - Especially for onshore wind, but in general for all new capacity planned: Have the potential new capacity volumes been compared to actual available projects/sites/permitting possibilities? Has NIMBY (not in my backyard) been considered?
   - Especially for Solar: Is this compatible with production capacity and material availability?
   - Seeing that most of the countries evaluated have important growing assumptions in renewable capacities, is this compatible with global market delivery capability (materials, factories, technical and operational talent, ...)?
   - The volatility introduced to feed the base load (today covered by mostly nuclear and gas) by using primarily wind and solar energy, comes with a major threat to continuity of supply. Compliant with basic system dynamic principles, volatile and non-addressable sources should be minimised in the energy mix, not maximised.
     This same volatility almost caused a breakdown of the Belgian electricity system on May 26th 2022, when suddenly and in a never before seen amplitude, all offshore wind was cut to zero in a few minutes time. The

reserves of Coo had to be used for keeping the lights on instead of being used for covering peak consumption. Luckily the nuclear power plants were still active and constituted a firm part of the base load. If the same base load would have been provided by offshore wind, a major blackout would have happened. In the light of the foregoing we would like to see a few “extreme” situations in the calculations where at some point, and inspired by some real events (as the one of beginning of July 2022) suddenly and within a very short time all off-shore capacity is switched off. We would like to see how the system would react to such a disruptive event.

- The capacity in Belgium should cover the needs in ALL circumstances (excluding major exceptional outages of one or more major power plants), for example and in particular also during a ‘Dunkelflaute’. Can this be guaranteed? If yes, under which assumptions?

4. Major cities in Germany started exercising blackouts in the range of a few minutes to several hours. It would be recommended to do the same in Belgium, asking how we will foresee enough capacity (and of which type) to cover blackouts ranging from less than a minute, to several hours.

5. 2.4.1 figure 10 mentions "excluding electrolyzers demand" - Why? Where are they considered then?

6. For each graph, we advise to add previously modelled data with actual data to give the reader an impression about the accuracy of previous projections and discuss the relevance of the current margins considered.

7. Figure 18: the 'high' curve could consider some additional capacity for projects not yet the object of a request.

8. Just above fig 18 : "It must be noted that a significant share of this additional electricity demand is focused on the electrification of heat (industrial heat pumps, electric steam boilers, electric ovens…) & other types of flexible devices. Therefore, not all of this demand will result in additional peak demand and will likely be able to deliver flexibility services." What portion of these users is considered "flexible"?

9. A few questions surrounding the adoption of EVs:
   - Figure 23: EV public charging points should not be considered as flexible as it could be anticipated that those points will be subject to limited time

(in order to make them available for several EVs per day). Therefore an EV parked in a public charging point should often be considered charging.
    - Figure 23: what would be the impact of an EV being used as a home battery (with a bidirectional charger)?
    - Figure 26: is it considered that EV charging (even with smart flexible solutions) would still charge directly to a minimum level before enabling flexibility (natural first until for example 50% charge then only flexible)?

10. We see major shortcomings and underestimations in the forecast of the energy demand:
    - Recent studies pointed out that only the electric lease cars in Belgium would require an extra power plant like Doel 4. So expanding electric vehicles to the full fleet of Belgium comes with an extra demand of several times the current total energy.
    - The energy needed for heat pumps is largely underestimated and does not consider the inefficiency of the system at lower temperatures.
    - The need to cover the rise in digitization of services is largely underestimated. It should not be limited to data-centers alone.

11. Figure 30 : CO2 prices - what are the sources? Given the increase over the last few years, the projected growth seems far too low. Especially as it was already too low in the previous adequacy study compared to the actual price observed recently (40€/t compared to 80 seen).

12. Figure 31: Does this include risk of delays (permitting or local actions for example)?

13. 2.9.3 Netherlands > how is the 1.4GW hydrogen produced?

14. We deplore that in the text (p37) the new generation power plants aren't considered. However, they might be the solution to maintain supply stability and keep the cost acceptable.

15. The figures on p43 (concerning Germany) do not comply with real figures.

16. It would be great to integrate and map this report to previously released studies such as:
    https://www.vlaio.be/nl/nieuws/naar-een-koolstofcirculaire-en-co2-arme-vlaamse-industrie

    https://perspective2050.energyville.be/