



Securing Belgium's Nuclear Future



How Young Professionals Contribute to Long-Term Operation

Between July and October 2025, the Belgian nuclear reactors at **Tihange-3** and **Doel-4** restarted for **an additional decade of operations, securing affordable, low-carbon electricity to 2035.**

We spoke with **Etienne Hoarau**, a young nuclear professional at Tractebel and vice chair of BNS-YGN, about **what it takes to deliver LTO on a tight timeline** — from a technical, organisational, and personal point of view.

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In early July 2025, Belgium's nuclear regulator FANC (Federal Agency for Nuclear Control) cleared the restart and continued operation of Tihange-3 after a major LTO outage—an important step toward securing affordable, low-carbon electricity to 2035. Similarly, Doel-4 restarted early October, reaching full power on the 10th.

We spoke with **Etienne Hoarau**, a young nuclear professional at **Tractebel** and vice chair of **Belgian Nuclear Society - Young Generation Network**, about what it takes to deliver LTO on a tight timeline—technically, organizationally, and personally.

- *Etienne, for readers new to LTO: in simple terms, **what just happened with Tihange-3, and what's next for Doel-4?***

Tihange-3 and Doel-4 are the youngest nuclear power plants in operation in Belgium. They both started their operations over the summer of 1985, so this year they celebrate 40 years of electricity production, with a remarkable average capacity factor close to 85%[1]. Of course, **like all machines and power plants, nuclear ones also require maintenance, controls and ageing management** to ensure their efficient and safe long-term operation.

In this specific case, following the decision to keep these two plants operating, **intensive consultations, studies and verifications have been carried out over the last years**, and the final results have finally been submitted to the Belgian nuclear regulator (FANC). Concerning Tihange-3, FANC approved this massive revision project – which is the **LTO dossier “Plan d'Action Global”[2]** – and gave it greenlight to restart and operate the plant for the next decade. Similarly, the dedicated dossier has more recently been accepted for Doel NPP.

- ***Could you briefly explain why these milestones are so important for Belgium's energy system and for Europe more broadly (reliability, affordability, climate...)?***
How does LTO contribute to grid stability and price resilience in the coming winters (and beyond)?




























































Indeed, the toughness of **the winters in Belgium requires an extra amount of electricity during this period.** The storage capacity existing today does not allow for covering this extra need, so the country relies then on production means running constantly and steadily, called **“baseload capacities”**. The main baseload capacities are nuclear, hydropower, biomass, gas, coal, and oil.

Once these capacities are identified, a choice must be made depending on the technology itself. Hereunder is a simplified table to explain the main decision criteria:


ENS
Interview


Baseload Capacity


Main Decision Criteria

Technology	Pollution	Price	Sovereignty	Dispatchability
Nuclear 	  	 		
Hydropower 	  	 	  	
Biomass 		  	 	  
Gas 		  	 	  
Coal 	  	 		  
Oil 	  	 	 	  

Criteria Legend


Good



Average


Poor

Note: These estimations are just qualitative and do not come from calculations. The goal of the table is simply to illustrate.

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Authors- Mattia Baldoni, Etienne Hoarau



When a government is establishing its electricity roadmap - the strategy - it relies on analysis of this type and decides how the country will be powered in the coming years.

In the case of Belgium, **the context changed drastically at the beginning of the 2020's**, with, amongst others, the war in Ukraine. The country's strategy needed to be revised at the last minute and then the main criteria became "What is available for the winters 2025, 2026 and 2027".

The reasons why nuclear has been reconsidered and is today a key player in the electricity mix come from **its intrinsic advantages**:

- Land occupation is very limited compared to other production means
- CO2 emissions at the lowest level
- Highly qualified jobs and positions for local people

And in the case of LTO, **the main drawbacks**, which are initial investments and waste management, **are largely diminished**:

- **Waste management**: The LTO is a real opportunity to consolidate the funds dedicated to waste management projects for the future
- **Initial investment**: Limited because the plant is already built, people are already trained, and all the supply chain is already ready.

So, this urgent need for electricity supply during the upcoming winters will be covered by **existing plants**, which are operated in a manner that keeps them at a high level of safety. **The effort to reach the requested safety level for an LTO is therefore limited.**

I've recently participated in a panel session on LTO at the 51st Annual Meeting of the Spanish Nuclear Society, and I would like to quote Garry G. Young (Technical Executive, LTO and Ageing Management Strategy Nuclear at EPRI), on stage with me. As he said,

"The best you can do as a plant owner to prepare for LTO in the future is to ensure in your daily work the highest level of quality and continuous improvement, making the option of LTO easier to implement when the time comes."

Thanks to this operational excellence, **it has been possible to develop a Flex LTO** where the necessary modifications and upgrades allowing the plant to go 10 years forward will be made during the summer of the coming years while the plant safely produces energy for the country during the winters.

- ***Could you tell us about your role in these LTO projects?
What are you personally working on day-to-day?***

For the LTO, **I am part of the Programme Management Team**. This team has the role of gathering the information. Indeed, **an LTO programme consists of more than a hundred projects working in parallel to perform the different tasks** included in the global action list.

Our role is to:

- **Validate the completion of the actions** (contained in the famous 'Global Action List')
- **Gather global financial information and develop visions** on the LTO budget
- **Communicate** - Good communication is key in such large projects!
 - Communication of our progress to the directors of the plant but also to the authorities
 - Communication to the other projects, constantly working to make the LTO a reality
 - Communication between Bruxelles, Tihange and Doel to align visions and share progress.

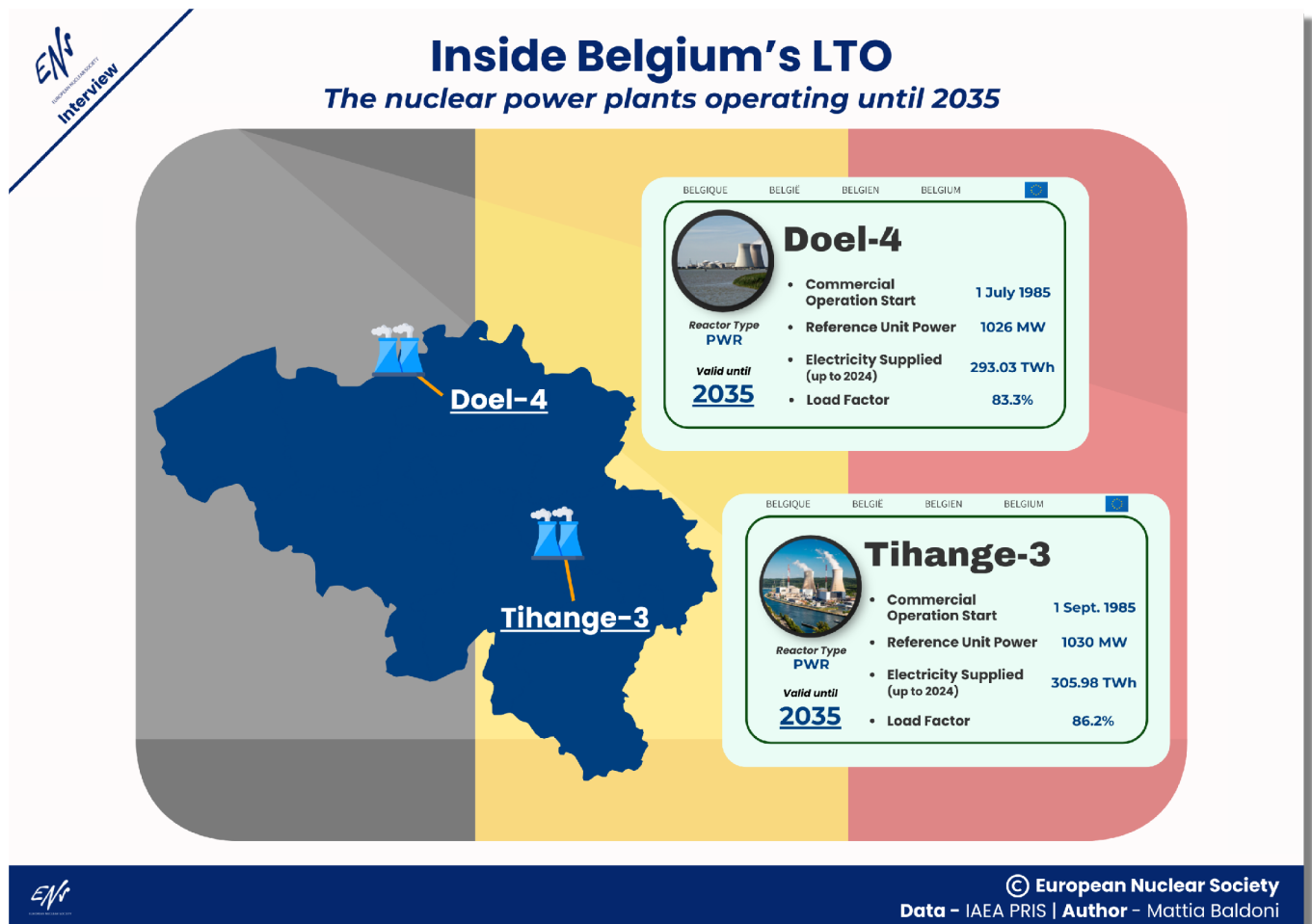
In my specific case, I oversee the committee's work to validate the completion of actions and prepare part of the communications supported by our fantastic administrative team.

This role gives me **the opportunity to develop an overview of all the activities that an LTO represents** and challenges me to find ways to make the data speak for itself without it being a burden to the work teams.

The day-to-day is evolving, depending on the actions to be taken to optimise the programme. There is a steady part with the management of the global action list and room for opportunities, challenges and new ideas that suit me perfectly.

The LTO Programme

Technical & organisational challenges, compressed timelines, extraordinary teamwork



- ***What does “preparing a reactor for long-term operation” involve from a technical and regulatory point of view?***

The development of a timeline for the LTO programme requires several steps:

1. **Expression of the need for nuclear in the electricity mix**

- It is really key to validate with the energy strategists the place foreseen for the nuclear before considering the start of such a project. “LTO production is efficient (the plant already exists), but you have to sell it in sufficient quantity at a reasonable price to have a financial viability of the project”.

2. **Agreement with the industrial companies**

- After having the required global strategy, the realisation will be made by industrial groups which have their own interest and vision. An alignment is necessary between the different parties to ensure the profitability of the project and affordable electricity prices.

3. **Start of the LTO Programme**

- The programme itself is mainly composed of two phases. The study phase is to define the work to be done, develop the licensing documents, including the safety studies and the implementation phase for the realisation of all the work defined in the study phase.

- **Study phase:**

As for any project, the scope-budget-planning trio will be essential to pilot and enable the good execution of the latter.

- **Definition of the scope**

- Ageing studies : Review of all components participating to the safety functions
 - Identification of design upgrades
 - Identification of regulations update
 - Identification of opportunities

- **Definition of the budget**

- **Definition of the timeline**

- **Train workers**

It is important to notice that nowadays the number of nuclear projects is growing tremendously. This implies stress for the workforce and a reinforced need for training

- **Implementation phase:**

In a nuclear power plant, certain zones are not reachable during operation (vary depending on the design); it is therefore required to programme consciously the works to be performed to optimise the availability of the plant on the grid.

- **Preparation** (procedures, order components ...)
 - **Realisation of the on-site work**
 - **Train workers**

4. Validation with Safety Authorities

- The LTO will only be considered finalised when the safety authorities agree on the fact that the level of safety reached after the programme is sufficient to guarantee a safe operation during the operating time considered (for instance, 10 years if the plant goes from 40 to 50 years of operation).

5. Operation

- The LTO programme is officially over, and the plant can resume operating, doing normal maintenance to ensure the continuous safe operation of the plant.

- *Your team have been praised for working under very tight schedules – what were the main schedule risks, and how were they managed?*

Generally speaking, **teamwork is crucial**, above all in this process. The LTO is not an adventure that the operator will face by itself. The industrial adventure can only be possible thanks to a network of interactions that could be represented as follows:

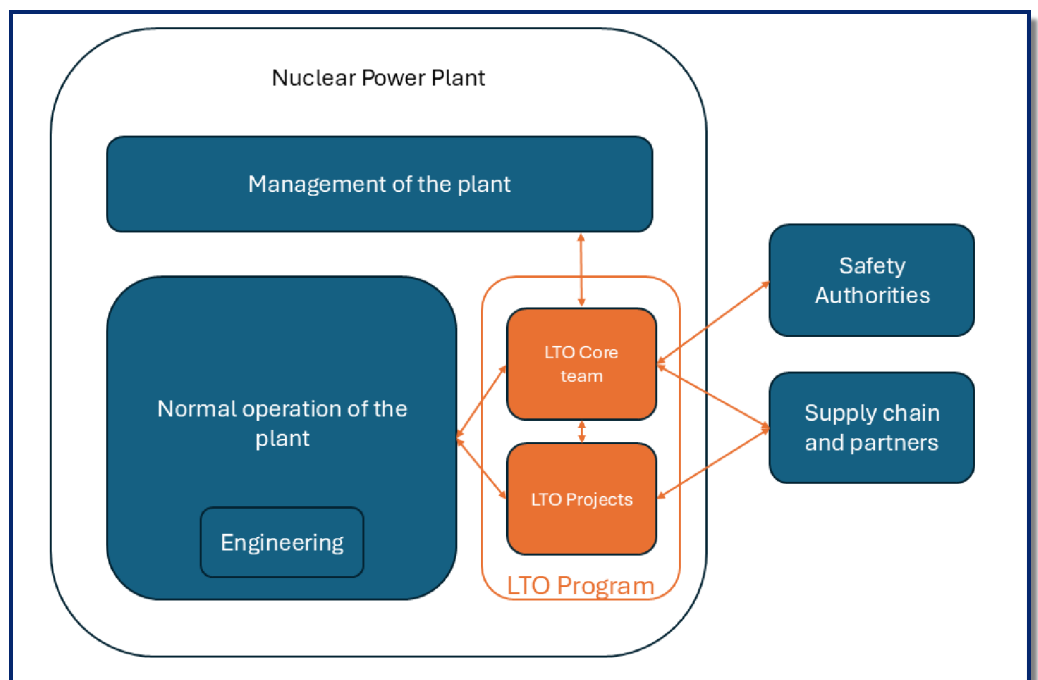
- **The LTO core team**

Which will be in charge of the management, the development of the overview and make the main decision to realise the programme.

- **The project teams**

Which will be in charge of the realisation of a part of the LTO scope. These teams are the “working ants” of the projects contributing to the success of the global programme.

The collaboration inside and between the teams is a key factor in the programme success. A good cooperation will also ensure clear communication to the different actors internally in the plant (management...) and externally (safety authorities...).



- **One engineering challenge you're proud your team solved, and why it mattered for the project.**

I am not anymore in a team solving engineering problems to be honest, but if I look more broadly at the different activities performed around me, **I am always fascinated by the qualification works undergone to demonstrate that the proposed solution is suitable** for the application it is dedicated for.

Indeed, the components to be installed on qualified systems are tested in extreme environments and conditions to prove their ability to withstand such conditions. We recently started some seismic tests for electrical components: the study is exciting, and all the partners involved are passionate, what a blast!

Faces of Nuclear

The people behind the projects

- **What motivated you to pursue a career in nuclear?
And what does work on LTO mean to you personally?**

I started my journey as a student in 2017, when nuclear was largely misunderstood. It has been a challenge to explain why I wanted to go there, but if you have a bit of time, **read about nuclear physics: this is simply amazing**. You can explore further as you like; it is always an immense satisfaction to understand a little more.

My genuine motivation comes from my passion for the domain and the conviction of its role in several fields, like energy and medicine.

Today, **nuclear energy is better understood, and its added value is clear** in the eyes of decision-makers. **The momentum is here; we must make it real**. I am more motivated than ever to use all my energy to support the development of the sector. Moreover, I am deeply involved in the BNS-YG because **I am convinced that the young generation has a brilliant future in this field**.

- **A piece of advice to students and young engineers considering nuclear for their future...**

I would say first, embrace the challenge! What we have in front of us is massive, but also beautiful. There is **an unlimited amount of career and development paths just at our door**.

Cultivate passion: your passion and that of others. There's nothing more incredible than talking to a passionate person and explaining something with "starry eyes". Whatever your ambitions and abilities, there's room for everyone and definitely something to be passionate about.

Enjoy it. Make it fun, surround yourself with people who create an atmosphere you'll never want to leave. Your development depends largely on keeping your mind free and relaxed, so you can focus and think outside the box at the same time.

- *Looking at 2035, **what are the big milestones and what would success look like from your desk?***

My dreams:

- By 2035, we need to **have 4 GW of nuclear on the grid.**
- I would like to see **a Young Generation united and committed**, proving itself capable of what we don't even expect from it.
- See Belgium strengthening its leading position in the global nuclear industry.

My tasks:

- Lead with all my energy and all my passion **the Young Generation of the Belgian Nuclear Society**
- **Become a great manager** of nuclear projects
- **Inspire**, by my passion and will to make my dreams real
- **Learn each day** a bit more about the beautiful field we have the chance to evolve in
- **Connect with current and future leaders** to prepare the nuclear of tomorrow

- *If you could explain LTO in one sentence to someone outside the nuclear field – **why it matters and why it's worth investing in – what would you say?***

I would like to conclude with a question:

"Have you ever considered demolishing your current car while it's still in perfect working order?"

Well, now replace the car with a nuclear fleet and think again...

Notes

1. <https://pris.iaea.org/PRIS/CountryStatistics/CountryDetails.aspx?current=BE>
2. <https://afcn.fgov.be/fr/system/files?file=2025-07-03-approbation-red%C3%A9marrage-lto-tihange3.pdf.pdf>

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