Belgium Energy Profile: Strategic Insights for UK Energy Trading Professionals

Executive Summary

Belgium's energy landscape is undergoing a profound transformation, driven by ambitious decarbonization targets, evolving generation capabilities, and a dynamic interplay with regional European markets. In 2024, the nation witnessed a record surge in renewable electricity, primarily solar, while gas-fired generation reached an all-time low and nuclear output continued its decline. A pivotal policy reversal in May 2025, however, saw the repeal of the long-standing nuclear phase-out law, signaling a renewed commitment to atomic energy with plans to extend existing reactors and build new ones. This strategic shift, alongside significant investments in offshore wind and grid infrastructure like the Princess Elisabeth Energy Island, will reshape Belgium's energy mix and its role in the interconnected European system.

For UK energy trading professionals, these developments present a complex yet opportunity-rich environment. Belgium's increasing reliance on intermittent

renewables will amplify price volatility, creating frequent arbitrage opportunities on the Nemo Link interconnector. The re-evaluation of nuclear power is expected to temper long-term baseload gas demand, influencing Zeebrugge Trading Point (ZTP) prices and Interconnector flows, though gas retains its critical role as a flexibility and backup fuel. Understanding Belgium's evolving generation stack, its deep market coupling with continental Europe, the impact of carbon pricing, and the progression of key infrastructure projects will be paramount for optimizing trading strategies, managing risk, and identifying new avenues for value creation in the highly integrated UK-Belgium energy corridor.

1. Belgium's Energy Landscape: Current State (2024-2025)

1.1. Electricity Generation Mix and Trends

Belgium's electricity generation mix in 2024 underwent notable shifts, reflecting a concerted effort towards decarbonization alongside evolving operational realities. Renewable generation achieved a new record, contributing 29.8% to the national electricity mix, an increase from 28.2% in 2023. This growth was significantly propelled by solar power, which saw a 23% increase in installed capacity and a 15.7% year-on-year rise in generation, reaching 8.3 TWh and accounting for 11.9% of the total mix. Offshore wind contributed 10% (7 TWh) and onshore wind 7.9% (5.5 TWh) in 2024. Despite these gains, the absolute volume of renewable generation in 2024 (20.8 TWh) was slightly less than in 2023 (21.5 TWh), primarily due to exceptional wind conditions in the earlier year.[1]

Conversely, gas-fired generation in 2024 hit an all-time low, making up only 17.6% (12.3 TWh) of the generation mix, a significant reduction from 25.2% in

2023 and 26.9% in 2022. Nuclear power, historically a cornerstone of Belgium's energy supply, continued its decline for the fourth consecutive year, contributing 29.5 TWh (42.4%) in 2024, down from 31.4 TWh (41.3%) in 2023. Overall electricity consumption in Belgium showed a modest recovery, surpassing 80.5 TWh in 2024, an increase from 78.9 TWh in 2023. International electricity exchanges reached unprecedented levels in 2024, with over 44.5 TWh traded. Notably, net imports from France amounted to 12.6 TWh. This marked a shift in Belgium's trade balance, as the country transitioned from being a net exporter in 2022 (6.4 TWh) to a net importer in 2023 (2.8 TWh), a change largely attributed to the recovery of the French nuclear fleet.[1]

The increasing penetration of variable renewable energy (VRE) sources like solar and wind, coupled with the reduction in dispatchable gas and nuclear generation, means the Belgian grid is becoming increasingly reliant on weather-dependent inputs. This structural shift, while beneficial for decarbonization, inherently introduces greater intermittency and variability into the system. The grid operator, Elia, explicitly advised market participants to exercise vigilance during the summer of 2024 due to the substantial increase in solar generation capacity, highlighting the operational challenges associated with managing these fluctuating inputs.[2] For UK energy trading professionals, this heightened intermittency in Belgium's generation mix suggests that short-term supply-demand balances will be more dynamic, leading to increased price volatility on the Belgian power market.[5] During periods of high Belgian renewable output, wholesale prices may fall significantly, potentially even turning negative, creating opportunities to import cheap power into the UK.[5] Conversely, during periods of low Belgian renewable generation, prices could spike, presenting profitable export opportunities from the UK.

Belgium's deep integration into the broader European electricity market is underscored by the record international electricity exchanges in 2024 and the notable shift to net importer status influenced by the performance of the French nuclear fleet.[1] This signifies that Belgium's energy balance is not solely determined by its domestic generation but is highly sensitive to the generation profiles and market dynamics of its neighbours, particularly France's nuclear output and Germany's renewable generation. The phenomenon of "loop flows" from German renewables distorting Belgian prices and causing price peaks

further illustrates this interconnectedness.[8] To effectively trade with Belgium, UK professionals must adopt a regional perspective, continuously monitoring not just Belgian domestic generation but also key factors across the Central Western European (CWE) region. Price signals on the Nemo Link interconnector will often reflect these broader regional supply/demand imbalances rather than solely Belgian domestic conditions, necessitating a holistic view of the interconnected European market for strategic trading decisions.

The table below provides a quantitative overview of Belgium's electricity generation mix in 2024:

Fuel Type	Generation (TWh)	Share of Mix (%)
Nuclear	29.5	42.4%
Gas-fired	12.3	17.6%
Solar	8.3	11.9%
Offshore Wind	7.0	10.0%
Onshore Wind	5.5	7.9%
Other Renewables (Biofuels, Waste, Hydro)	~7.7	~10.2%
Total Renewables	**20.8**	**29.8%**
Total Electricity Consumption	**80.5**	**N/A**
International Exchanges (Traded)	**44.5**	**N/A**
Net Imports from France	**12.6**	**N/A**
Note: "Other Renewables" is a calculated figure based on total renewables		

and specific wind/solar data from the provided sources. [1]		

1.2. Renewable Energy Penetration and Growth Drivers

Belgium's renewable energy sector is characterized by robust growth, particularly in solar photovoltaic (PV) installations. In 2024, installed solar capacity saw a substantial 23% increase, leading to new generation records. Total solar energy generation reached 8.3 TWh, marking a 15.7% rise compared to 2023. By the close of 2024, Belgium's cumulative solar capacity stood at approximately 12 GW, contributing to 13% of the country's electricity consumption in the past year. Onshore wind capacity also expanded, with a 4% increase in 2024. However, offshore wind generation experienced a decline, producing 6.987 TWh in 2024, down from a record 8.011 TWh in 2023. This decrease was attributed to less favorable wind conditions and an incident involving the Rentel cable, which affected generation from early January to late May. No new offshore wind generation capacity is projected before 2028.[1]

Despite the variability in wind output, the combined generation from solar and wind achieved a new quarter-hourly record of 9931 MW on August 22, 2024, which corresponded to an impressive 93% of total consumption for that specific quarter-hour. This milestone indicates that it is becoming increasingly common for more than half of Belgium's electricity consumption to be met by renewable sources. The grid operator, Elia, recognized the operational implications of this significant increase in solar generation capacity and specifically advised market players to exercise vigilance during the summer of 2024.[2]

The rapid expansion of solar and wind capacity, alongside their ability to cover a very high percentage of instantaneous demand, signifies a growing penetration of variable renewable energy (VRE). This high VRE penetration, coupled with the inherent intermittency of these sources, creates periods of significant oversupply, as evidenced by Elia's call for vigilance during high solar

generation.[2] Such conditions often lead to depressed or negative wholesale electricity prices.[5] For UK traders, the increasing frequency and magnitude of periods with high renewable output in Belgium create distinct arbitrage opportunities. These periods can drive Belgian wholesale electricity prices very low, or even into negative territory, allowing UK traders with flexible portfolios to import cheap Belgian power. Conversely, the variability of renewables means that periods of low generation will lead to higher prices, creating export opportunities from the UK. The incident with the Rentel cable also highlights the vulnerability of renewable infrastructure to outages, which can cause sudden supply shortfalls and price spikes, offering additional trading signals.[2]

Elia's projections for substantial increases in PV capacity, reaching 22.5 GW by the end of 2030 and 33.6 GW by the end of 2035, alongside wind capacity growth to 7.6 GW by 2035, indicate a continued strong commitment to renewable energy expansion.[10] This long-term trajectory suggests that the trends of high VRE penetration and associated price volatility will not only persist but intensify. Managing this influx of intermittent power will necessitate enhanced grid flexibility, including demand-side response, energy storage solutions, and robust cross-border capacities.[5] The anticipated growth in Belgian renewable capacity implies that arbitrage opportunities linked to VRE output will likely become more frequent and potentially more pronounced in the coming years. UK traders should proactively integrate detailed renewable generation forecasts for Belgium into their models and closely monitor Belgian grid reinforcement plans and the development of flexibility markets, as these will directly influence the ability to absorb and manage high renewable penetration, thereby shaping future price dynamics and interconnector flows.

1.3. Role of Nuclear and Gas in the Generation Portfolio

In 2024, nuclear power remained a significant component of Belgium's electricity mix, accounting for 29.5 TWh, or 42.4% of the total. This contribution, however, marked the fourth consecutive year of decline for nuclear generation. Belgium currently operates four nuclear reactors with a combined capacity of 3,463 MWe.[3] Gas-fired generation, on the other hand, reached a record low of

17.6% (12.3 TWh) in 2024.[3]

A pivotal policy reversal occurred in May 2025 when Belgium's parliament formally repealed the 2003 nuclear phase-out law.[11] This decision followed an earlier move in March 2022 to delay the closure of the two newest reactors, Doel 4 and Tihange 3, until 2035, a measure prompted by energy security concerns amidst the Russia-Ukraine conflict.[14] The government now intends to extend the operating licenses of Doel 4 and Tihange 3 even further, to 2045, and is actively considering the construction of new reactors, including Small Modular Reactors (SMRs). The ambitious goal is to boost overall nuclear capacity from the current 4 GW to 8 GW by 2035.[11] This renewed commitment to nuclear energy is further solidified by a July 2025 agreement with France to strengthen bilateral nuclear cooperation.[20] While new gas-fired power plants were authorized for construction, expected to be operational by 2025, to compensate for the initial nuclear phase-out, the extended lifespan of nuclear units is already reducing the immediate capacity gap for 2025-2026 by 1700 MW.[4]

The decision to repeal the nuclear phase-out law and extend the operation of Doel 4 and Tihange 3 to 2045, with plans for new nuclear builds to reach 8 GW by 2035, represents a fundamental and long-term shift in Belgium's energy strategy.[11] This U-turn is primarily driven by energy security and climate objectives, aiming to reduce dependence on fossil fuels.[15] This renewed commitment to nuclear power will significantly reduce Belgium's long-term reliance on gas-fired generation for baseload power and security of supply, which was the original intent for gas plants.[16] The immediate impact is already evident in the reduced capacity gap for 2025-2026.[4] The long-term implications of this nuclear revival are substantial for gas markets: a sustained increase in Belgian nuclear output will likely dampen future baseload gas demand, potentially leading to lower gas prices at the Zeebrugge Trading Point (ZTP) hub and reducing the need for UK gas exports via the Interconnector.[24] While new gas plants were initially planned, their dispatch patterns may shift more towards peak load or balancing services rather than continuous operation. Traders should closely monitor the actual pace of nuclear life extensions and new SMR builds, as any delays or technical issues could revert Belgium to higher gas dependency, creating short-to-medium term trading

opportunities for gas.

Despite the significant pivot towards nuclear, gas-fired generation still constituted 17.6% of Belgium's electricity mix in 2024, and new gas plants continue to be authorized.[3] This indicates that gas will continue to play a crucial, albeit evolving, role in Belgium's energy transition. With the increasing penetration of variable renewables, firm and flexible capacity is essential for grid stability.[1] Gas-fired power plants are well-suited to provide this flexibility, ramping up and down quickly to balance intermittent renewable output and provide backup during periods of low nuclear availability or high demand. Even with nuclear extensions, gas will remain critical for balancing the Belgian grid, especially as renewable penetration increases.[5] This means gas power plants will likely operate more frequently in a mid-merit or peaking role, rather than baseload, driven by real-time renewable output and interconnector flows. This operational shift could lead to higher volatility in Belgian gas demand and, consequently, gas prices, creating distinct trading opportunities for gas traders who can react swiftly to market signals. The ongoing conversion of Belgium's L-gas network to H-gas will also streamline gas flows and enhance regional supply flexibility.[22]

1.4. Electricity Consumption and Demand Patterns

Belgium's electricity consumption experienced a slow but steady rise in 2024, reaching over 80.5 TWh, an increase from 78.9 TWh in 2023.[1] Historically, per capita electricity usage in 2024 stood at 7,182 kWh, representing a notable decrease from the peak of 9,079 kWh per person recorded in 2006. Similarly, low-carbon electricity generation per capita has also seen a decline since 2021.[9] Looking further ahead, Belgium anticipates a substantial increase in overall electricity demand. Projections indicate that electricity use could more than double from approximately 80 TWh in 2025 to between 155-170 TWh by 2050. This significant projected growth is primarily driven by the widespread electrification of various end-user demands, including the adoption of heat pumps in buildings, the transition to electric vehicles in road transport, and increasing electrification within the industrial sector, particularly from 2030

onwards.[28]

The historical decline in per capita electricity consumption since 2006 suggests successful energy efficiency measures and/or a structural shift in the Belgian economy towards less energy-intensive sectors.[9] However, this trend is poised for a dramatic reversal with the country's ambitious future electrification plans.[28] The projected doubling of electricity demand by 2050 due to the electrification of heating, transport, and industry represents a fundamental transformation of Belgium's energy system. For UK traders, this anticipated long-term surge in Belgian electricity demand will necessitate substantial new generation capacity and significant grid reinforcements. This implies a growing structural demand for electricity imports into Belgium over the long term, which will increase the strategic value and utilization of the Nemo Link interconnector.[29] This sustained demand growth could lead to higher average base prices in Belgium, influencing UK export strategies and creating consistent trading opportunities. Traders should integrate these long-term demand fundamentals into their strategic planning.

The widespread electrification of end-uses, particularly the adoption of heat pumps and electric vehicles, naturally creates a significant potential for demand-side management (DSM).[28] Elia's analysis explicitly highlights that flexible consumption is crucial for addressing both scarcity and surplus situations, and can yield substantial annual savings for the Belgian electricity system.[5] The fact that demand-side management was contracted in recent Capacity Remuneration Mechanism (CRM) auctions further confirms its growing recognition and integration into market mechanisms.[31] The increasing role of demand-side flexibility means that Belgian electricity demand will become more dynamic and responsive to price signals. This enhanced flexibility can help mitigate extreme price fluctuations by shifting consumption away from peak periods or towards times of abundant renewable generation. UK traders must therefore integrate the potential impact of Belgian demand response into their short-term price forecasting models. Understanding the triggers and mechanisms for Belgian DSM will be crucial for accurately predicting intraday and day-ahead price movements, and for optimizing interconnector flows and arbitrage strategies.

2. Energy Market Structure and Regulatory Framework

2.1. Electricity Market: Players, Mechanisms, and Exchanges (Elia, EPEX SPOT)

Elia serves as the Transmission System Operator (TSO) for Belgium's national high-voltage grid (70 kV and higher), holding critical responsibilities for balancing supply and demand, frequency control, managing interconnections, and ensuring the security of supply. The Elia Group is recognized as one of Europe's top five TSOs.[33] The broader Belgian electricity market ecosystem comprises various participants, including electricity producers, regional Distribution Grid Operators (DSOs), energy suppliers, Balance Responsible Parties (BRPs) who manage energy portfolios, and metering companies.[33]

Electricity trading in Belgium occurs across multiple timeframes. These include forward and futures markets, often conducted over-the-counter (OTC), the Day-ahead market operated by EPEX SPOT, and the Intraday market, also managed by EPEX SPOT.[33] The former Belgian Power Exchange (Belpex) merged with EPEX SPOT in 2015, with EPEX SPOT now facilitating power trading across the North-West Europe region, including the UK and Scandinavia.[33] EPEX SPOT is instrumental in operating the organized wholesale market for power trading across 13 European countries, running daily Day-Ahead auctions and continuous Intraday trading.[36]

Belgium is deeply integrated into European market coupling initiatives, specifically the Single Day-Ahead Coupling (SDAC) and Single Intraday Coupling (SIDC). These mechanisms are designed to optimize the allocation of cross-border capacities, aiming to reduce price differences between connected market areas.[37] The Price Coupling of Regions (PCR) initiative, of

which Belgium is a part, provides a common algorithm for Europe-wide price calculation, while SIDC establishes a single EU cross-zonal intraday electricity market for continuous trading.[37] Regulatory oversight is provided by CREG (Commission for Electricity and Gas Regulation) at the federal level, with regional regulators such as VREG for the Flemish Region, CWaPE for the Walloon Region, and BRUGEL for the Brussels-Capital Region.[35]

The evolution of the Belgian electricity market from Belpex to its current deep integration with EPEX SPOT and broader European market coupling initiatives highlights a sustained commitment to liberalization and cross-border efficiency.[33] This integration, facilitated by SDAC and SIDC, aims to enhance overall trading efficiency by promoting effective competition, increasing liquidity, and optimizing the utilization of generation resources across Europe. For UK traders, this means direct access to the Belgian market via EPEX SPOT, where price signals reflect coupled European market dynamics. Opportunities for cross-border arbitrage are directly facilitated by this efficient market coupling, allowing traders to capitalize on price differentials that emerge across the interconnected regions.

The Capacity Remuneration Mechanism (CRM) is a key component of Belgium's energy strategy, designed to ensure long-term security of supply by incentivizing investment in firm and flexible capacity.[33] Elia, as the TSO, plays a central role in organizing and managing the CRM auctions.[33] The Y-1 auction for the 2025-2026 delivery year successfully secured 14,627 MW of capacity, exceeding the assumed need of 14,155 MW, with foreign capacity (including from the UK implicitly) contributing significantly.[31] This auction demonstrated high liquidity and competitive pricing, with a weighted average price well below the price cap.[31] Similarly, the Y-4 auction for 2028-2029 contracted 1,926 MW of capacity, including new gas-fired plants and batteries, at a lower weighted average price than the previous year.[31] The recent decision to extend the lifespan of nuclear units Doel 4 and Tihange 3 to 2045 is expected to further reduce the capacity gap, notably by 1700 MW for 2025-2026.[4] The CRM ensures adequacy, reducing the likelihood of extreme scarcity events. The participation of foreign capacity, including implicitly from the UK, in these auctions means that UK traders are an integral part of Belgium's supply security framework. The auction results provide valuable forward price signals

for capacity, influencing long-term trading strategies and asset valuation for market participants.

2.2. Gas Market: Players, Infrastructure, and Trading Hubs (Fluxys, CREG, ZTP)

Fluxys is the independent operator of Belgium's natural gas transmission infrastructure, with core activities spanning gas transmission, storage, and liquefied natural gas (LNG) terminalling.[41] Fluxys is also the majority owner of Interconnector Limited, which operates the crucial gas pipeline connecting the UK with Belgium.[24] Belgium's gas network is highly interconnected, serving as a vital hub for gas flows between France, Germany, Luxembourg, the Netherlands, and the United Kingdom.[22] The Zeebrugge LNG terminal, operated by Fluxys, is a significant facility with a capacity of 9 billion cubic meters per year (bcm/yr), establishing it as a key LNG supply center for North-West Europe. The country is also in the process of converting its L-gas (low-calorific gas) network to H-gas (high-calorific gas), a project expected to be completed by 2024, which will further streamline gas flows. Additionally, Fluxys is investing in increasing LNG regasification capacity at Zeebrugge, with commissioning steps expected in early 2024 and early 2026.[22]

The Zeebrugge Trading Point (ZTP) is the primary gas trading hub for the integrated Belux market. On October 1, 2023, Fluxys Belgium merged its two existing gas trading services, "ZTP notional" and "ZTP physical," into a single ZTP index to simplify and increase liquidity.[47] ZTP pricing is closely interdependent with other major European hubs, such as the Dutch Title Transfer Facility (TTF) and the German Trading Hub Europe (THE), reflecting the highly interconnected nature of European energy markets and cross-border trade flows.[26]

The extensive interconnection of Belgium's gas network and the substantial capacity of the Zeebrugge LNG terminal solidify Belgium's position as a crucial gas hub for Northwest Europe.[22] The ongoing conversion of the L-gas network to H-gas further streamlines operations and enhances regional supply

flexibility. This central position allows Belgium to diversify its gas supply, which has become particularly important given the broader European shift away from Russian pipeline gas towards increased LNG imports.[22] For UK traders, Zeebrugge's role as a liquid trading point and a gateway for LNG into Europe means that ZTP prices will heavily influence, and be influenced by, broader European gas market dynamics, including global LNG spot prices. Monitoring ZTP activity and its correlation with TTF will be essential for identifying arbitrage opportunities and managing price risk in the interconnected UK-Belgium gas market.[26]

The Interconnector pipeline, majority-owned by Fluxys Group, is a vital bi-directional link between the UK and Belgian/European gas markets.[24] It offers substantial capacity: 20 bcm/yr for UK export and 25.5 bcm/yr for UK import. When operating at full import capacity, it is capable of meeting over 25% of annual Great Britain (GB) gas demand.[24] This pipeline is a strategic asset for cross-border trade and security of supply, promoting liquidity and competition across the region.[24] For UK energy trading professionals, the Interconnector provides direct avenues for gas arbitrage. High UK gas prices relative to the continent (e.g., NBP vs. ZTP) can incentivize imports, while low UK prices can drive exports. The bi-directional nature and high capacity mean that flow direction and volume will be highly responsive to price differentials and supply/demand imbalances on either side of the link. Monitoring maintenance schedules and operational information for the Interconnector will be critical for predicting short-term capacity availability and price movements.[50] Furthermore, the active engagement of Interconnector and Fluxys Group in exploring CO2 and hydrogen transportation and storage signifies a forward-looking strategy that aligns with broader European decarbonization goals.[24] This indicates a future where the pipeline infrastructure may evolve beyond natural gas to accommodate carbon-neutral molecules, supporting the transition to a net-zero energy system.

2.3. Regulatory Bodies and Policy Direction (CREG, EU Influence)

The Belgian electricity and gas markets are overseen by a multi-layered

regulatory framework. At the federal level, CREG (Commission for Electricity and Gas Regulation) plays a central role in issuing opinions, approving grid management documents such as tariffs and development plans, and generally supervising market functioning.[35] Complementing CREG are regional regulators: VREG for the Flemish Region, CWaPE for the Walloon Region, and BRUGEL for the Brussels-Capital Region, which handle aspects like issuing supply licenses and accrediting renewable energy generation units.[35]

Belgium's energy policy is significantly shaped by broader European Union (EU) directives and targets. The country is committed to achieving climate neutrality by 2050 and aims for a 55% greenhouse gas (GHG) emissions reduction by 2030, aligning with the EU's Effort-sharing Regulation targets.[15] The European Commission has consistently recommended that Belgium phase out fossil fuel subsidies, shift taxation from electricity to fossil fuels, and accelerate investments in green transition, climate change adaptation, and energy efficiency.[15] The REPowerEU chapter within Belgium's national recovery and resilience plan (NRRP) further emphasizes clean hydrogen production and energy system integration as key investment areas.[15]

Recent policy shifts underscore Belgium's evolving energy strategy. The May 2025 repeal of the 2003 nuclear phase-out law, alongside the intention to extend the operating licenses of Doel 4 and Tihange 3 until 2045 and pursue new nuclear builds, marks a significant departure from previous policy. This U-turn is primarily driven by concerns over energy security and climate objectives.[11] The new government agreement for 2025-2029 also includes measures to strengthen fiscal incentives for energy renovations, apply a reduced VAT rate to heat pumps, and gradually phase out fiscal incentives for fossil fuels.[53]

The multi-layered regulatory framework in Belgium, encompassing federal and regional bodies, aims to ensure a stable and competitive energy market. This framework is designed to protect consumer interests while facilitating the energy transition.[35] CREG's oversight of the Capacity Remuneration Mechanism (CRM) is crucial for guaranteeing long-term security of supply by incentivizing necessary capacity investments.[33] The European Commission's approval of state aid for nuclear life extension further highlights the regulatory support for strategic energy assets.[54] For UK traders, understanding this regulatory

landscape is vital for assessing market risks and opportunities. Regulatory decisions on tariffs, capacity mechanisms, and market design directly influence profitability and trading strategies. The stability provided by mechanisms like the CRM reduces the risk of extreme supply shortfalls, contributing to more predictable market conditions, although significant policy shifts, such as the nuclear U-turn, can introduce new uncertainties.

Belgium's commitment to climate neutrality by 2050 and its ambitious 2030 emissions reduction targets, coupled with broader EU-wide green transition efforts, will continue to drive significant changes in its energy mix and market dynamics.[15] The focus on expanding renewables, extending nuclear operations, and promoting energy efficiency, along with the gradual phasing out of fossil fuel subsidies, indicates a clear long-term direction towards a low-carbon energy system.[15] For UK traders, this sustained push for decarbonization implies a continuous shift in the merit order, with renewables and nuclear increasingly displacing fossil fuels.[7] This will likely lead to lower marginal costs of electricity during periods of high clean energy availability, but also increased reliance on flexible resources during intermittency. The introduction of the EU's Emissions Trading System 2 (ETS2) from 2027, targeting transport and domestic heating, will further internalize carbon costs, potentially impacting overall energy prices and influencing fuel switching decisions.[56]

3. Interconnections with the UK and Trading Opportunities

3.1. Electricity Interconnection: Nemo Link

The Nemo Link is a 1,000 MW High Voltage Direct Current (HVDC) submarine power cable that directly connects Richborough Energy Park in Kent, United Kingdom, with Zeebrugge, Belgium. This interconnector has been fully

operational since January 31, 2019, and possesses an annual transmission capacity of 8.76 TWh. Over its first five years of operation, Nemo Link facilitated the transfer of 29 TWh of electricity, with a significant majority (24.75 TWh) flowing to the UK and 4.25 TWh to Belgium. The interconnector has maintained an impressive operational availability exceeding 99%.[29]

Electricity trading on Nemo Link occurs through explicit auctions conducted on the eCAT Platform, which is managed by the Joint Allocation Office (JAO). Capacity can be procured across various timeframes: Long Term (Annual, Quarterly, and Monthly auctions), Daily (D-1 auctions held between 09:00 and 09:30 CE(S)T), and Intraday (four auctions per day). Information regarding all unplanned and planned outages on Nemo Link is made publicly available on the REMIT page of BMREPORTs website and Elia's Inside Information Platform.[30]

Nemo Link represents the first direct electrical interconnector between the UK and Belgium. Its establishment contributes significantly to increased interconnectivity between the two countries, aiming to reduce price differences between their respective bidding zones.[29] This integration allows for more efficient optimization and sharing of renewable generation and other energy resources, thereby enhancing the security of supply for both regions.[38] For UK traders, Nemo Link provides a direct conduit for cross-border arbitrage, allowing them to capitalize on price differentials between the GB and Belgian markets. The high availability of the link means consistent access to these opportunities. Continuous monitoring of real-time price signals on both sides of the interconnector, as well as forecasts for renewable generation and nuclear availability in Belgium, is crucial for optimizing trades and maximizing profits.

As Belgium increases its reliance on intermittent renewable sources like solar and wind, and navigates the complexities of its evolving nuclear policy, the demand for balancing services and cross-border flexibility will grow.[1] This dynamic energy landscape in Belgium will directly influence the direction and volume of flows across Nemo Link. For example, periods of high Belgian solar output may lead to exports of cheaper electricity to the UK, while low renewable generation or nuclear outages could necessitate imports from the UK to cover deficits.[1] UK traders should anticipate increased volatility in Nemo Link flows and prices, driven by Belgian supply-demand fundamentals. The ability to accurately forecast Belgian renewable generation, nuclear operational

status, and overall system adequacy will provide a significant competitive advantage in optimizing interconnector capacity bids and executing profitable trades.

3.2. Gas Interconnection: Interconnector UK-Belgium Pipeline

Interconnector Limited owns and operates a bi-directional natural gas pipeline that serves as a critical link between the UK and Belgium, extending to wider European gas markets. This pipeline boasts a substantial UK export capacity of 20 billion cubic meters per year (bcm/yr) and a UK import capacity of 25.5 bcm/yr. When operating at its full import capacity, the Interconnector pipeline is capable of meeting over 25% of the annual Great Britain (GB) gas demand. The pipeline is majority-owned by Fluxys Group and has demonstrated impressive reliability, meeting 99.8% of nominations over a 20-year period.[24]

Gas transportation services on the Interconnector are offered under the Interconnector Access Agreement (IAA), which enables shippers to procure both long-term and short-term capacity. Unsold technical capacity is typically offered in regular auctions held on the European joint booking platform, PRISMA, and via Implicit Allocation. Additionally, Interconnector may offer unsold or unutilized capacity through Overnomination on an interruptible basis.[46] Interconnector, as part of the broader Fluxys Group, is actively exploring opportunities for cross-border transportation and storage of CO2 and hydrogen, positioning itself to play a role in a future hybrid energy system.[24]

The Interconnector is a critical strategic energy link for both UK and European gas security of supply, facilitating cross-border trade and enhancing market liquidity.[24] Its bi-directional capability allows gas to flow to where it is most needed, effectively balancing regional supply and demand imbalances. This has been particularly important in response to geopolitical shifts and changes in supply routes, such as the replacement of Russian pipeline gas with increased LNG imports into Europe.[22] For UK traders, the Interconnector is a primary tool for managing gas supply and demand imbalances between the UK and

continental Europe. Price differentials between the National Balancing Point (NBP) in the UK and the Zeebrugge Trading Point (ZTP) in Belgium will dictate the profitability of flows across the pipeline. Monitoring real-time gas flows, storage levels across Europe, and LNG imports into Zeebrugge will be crucial for anticipating price movements and optimizing pipeline capacity bookings.

The active engagement of Interconnector and Fluxys Group in exploring CO2 and hydrogen transportation and storage signifies a forward-looking strategy that aligns with broader European decarbonization goals.[24] This indicates a future where the pipeline infrastructure may evolve beyond natural gas to accommodate carbon-neutral molecules, supporting the transition to a net-zero energy system.[24] UK traders should recognize the long-term potential for this infrastructure to transition into a "hybrid energy future" for carbon-neutral molecules. While immediate trading opportunities remain in natural gas, strategic planning should consider the developing market for hydrogen and CO2 transportation, which could open new trading avenues and influence the long-term value proposition of the Interconnector.

4. Market Pricing and Volatility Analysis

4.1. Electricity Price Trends and Drivers

In 2024, average electricity prices in Belgium experienced a 28% decrease compared to 2023. Despite this reduction, prices remained higher than levels observed prior to the gas crisis.[1] For context, the average price on the Belgian Day-ahead market throughout 2022 was €244.5/MWh, a period marked by sharp price peaks. During 2022, price convergence with neighboring bidding zones also fell significantly.[48]

The price of electricity in Belgium, as elsewhere in the EU, is influenced by a range of interconnected supply and demand conditions. These include the

geopolitical situation, the national energy mix, import diversification, network costs, environmental protection costs, severe weather conditions, and levels of excise and taxation.[61] The large-scale integration of solar photovoltaic generation has a notable impact, tending to significantly reduce prices during hours when their output is highest. This phenomenon contributed to 222 hours of negative prices observed in 2023, predominantly during midday hours.[6] Furthermore, external factors such as "loop flows" originating from German renewables, exacerbated by poor interconnection between North and South Germany, can distort Belgian electricity prices severely, leading to price peaks that have reached up to €500/MWh.[8]

The increasing share of intermittent renewable energy sources, particularly solar, directly contributes to greater price volatility in the Belgian electricity market. During periods of high solar generation, prices can be significantly depressed or even turn negative, as evidenced by the numerous hours of negative prices in 2023.[6] Conversely, lower renewable output due to less favorable weather conditions can lead to sharp price increases.[62] For UK traders, this volatility presents clear short-term arbitrage opportunities. Real-time monitoring of Belgian renewable forecasts and actual generation will be crucial for predicting price dips and spikes, enabling profitable import/export decisions via Nemo Link.

Belgium's deep integration into the European electricity market means its prices are heavily influenced by cross-border flows and the supply-demand dynamics of neighboring countries. The occurrence of "loop flows" from German renewables, for instance, can significantly distort Belgian prices and create extreme peaks.[8] While market coupling mechanisms like the Single Day-Ahead Coupling (SDAC) and Single Intraday Coupling (SIDC) are designed to optimize cross-border capacity allocation and reduce price differences, they cannot eliminate all volatility.[37] UK traders must consider the broader European context when analyzing Belgian electricity prices. Understanding the interplay between Belgian domestic generation, interconnector flows (Nemo Link), and the dynamics of the wider Central Western European (CWE) region is essential for comprehensive price forecasting and effective risk management.

4.2. Gas Price Trends and Drivers

Natural gas consumption in Belgium saw a significant decrease of 15.2% in 2022 compared to 2021, a reduction largely attributed to sharp price increases and milder temperatures.[48] Average gas prices on the Belgian Zeebrugge Trading Point (ZTP) platform more than doubled in 2022, rising from an average of €46.9/MWh in 2021 to €101.9/MWh.[48] In 2024, ZTP prices exhibited fluctuations, ranging from a low of €25.83/MWh in February to a high of €44.90/MWh in December. Early 2025 prices have also shown variability, with January at €48.29/MWh and July at €33.25/MWh.[27]

Global natural gas markets have experienced unprecedented volatility since 2022, primarily driven by geopolitical tensions, notably Russia's full-scale invasion of Ukraine, and the subsequent steep decline in piped gas deliveries to the European Union. This supply shock necessitated a significant reconfiguration of global liquefied natural gas (LNG) flows, with LNG becoming a new baseload source for Europe.[63] Price volatility in gas markets is influenced by multiple factors, including algorithmic trading, ongoing geopolitical complexities, increasing weather sensitivity (due to the rising share of variable renewables in the electricity mix), and growing regional interconnectivity facilitated by flexible LNG trade.[63] ZTP pricing is intrinsically linked and interdependent with other major European hubs, such as the Dutch TTF and German THE, reflecting the integrated nature of the European gas market.[26]

Belgium's gas prices, particularly at the ZTP hub, are highly sensitive to global LNG market dynamics and geopolitical events. The shift from Russian pipeline gas to LNG as a baseload supply source has fundamentally reconfigured global flows and increased overall price volatility.[48] ZTP's role as an LNG gateway amplifies its exposure to these global factors.[43] For UK traders, this means that Belgian gas prices will continue to be influenced by global supply-demand balances for LNG, as well as by the broader European gas market's response to geopolitical developments. Monitoring LNG cargo arrivals at Zeebrugge and other European terminals, along with global gas market news, is critical for anticipating ZTP price movements and managing risk on the Interconnector.

The increasing share of weather-dependent electricity sources in Europe's

electricity mix means that higher gas generation is often needed to offset lower power supply during periods of low wind or solar output.[63] This creates a strong operational and price link between electricity market dynamics and gas demand. Furthermore, carbon pricing mechanisms, such as the EU Emissions Trading System (ETS), directly impact the marginal cost of gas-fired power generation, influencing dispatch decisions and, consequently, gas demand and prices.[7] The upcoming ETS2, set to be enforced from 2027, will extend carbon pricing to other sectors like transport and domestic heating, further influencing overall energy demand and potentially impacting fuel switching decisions.[56] UK traders should analyze the interplay between Belgian electricity prices, renewable generation forecasts, and carbon allowance prices to predict gas demand from the power sector. This integrated approach allows for a more nuanced understanding of ZTP price drivers and potential arbitrage opportunities between gas and power markets.

5. Emerging Trends and Future Outlook

5.1. Long-Term Energy Strategy and Targets (2030, 2050)

Belgium is committed to achieving climate neutrality by 2050, with an interim target of 55% greenhouse gas (GHG) emissions reduction by 2030 (relative to 1990 levels for Wallonia and 2005 for Brussels).[15] However, projections from the Federal Planning Bureau indicate that Belgium will likely fall short of its 2030 emissions reduction targets, achieving only a 32% reduction compared to the planned 47%. Furthermore, the country may not reach net-zero emissions by 2050 under current policies, partly due to the continued reliance on fossil fuels in industrial and electricity production sectors.[68]

Regarding renewable energy, Belgium's draft updated National Energy and Climate Plan (NECP) projects a 21.7% renewable energy source (RES) share in final consumption by 2030. This figure is below Belgium's expected

contribution to the revised EU-wide 2030 target of 42.5%.[15] Despite this, regional targets are more ambitious, with Flanders aiming for 2.8 GW of wind and 10 GW of solar by 2030. Overall, Belgium intends to significantly expand solar capacity to 22.5 GW by 2030 and 33.6 GW by 2035, and wind capacity to 7.6 GW by 2035.[10]

A significant development in Belgium's long-term strategy is the recent repeal of the nuclear phase-out law in May 2025. The government now intends to extend the operating licenses of Doel 4 and Tihange 3 until 2045 and is actively planning for new nuclear builds, including Small Modular Reactors (SMRs), with a goal to reach an overall nuclear capacity of 8 GW by 2035.[11] While gas is expected to remain a part of the rebalanced energy mix, its role is primarily envisioned for flexibility and backup purposes.[68]

Key infrastructure developments are underway to support these targets. The Princess Elisabeth Energy Island, an artificial energy island in the North Sea, is expected to be finalized by 2025, with its electrical infrastructure becoming operational between 2026 and 2030. This island will serve as a central hub for bundling offshore wind farm cables and as an intermediate landing point for interconnectors, including the Nautilus link with the UK and the Triton link with Denmark.[15] Additionally, Fluxys continues to invest in gas transmission and LNG infrastructure to ensure supply security and flexibility.[22]

While Belgium has ambitious climate targets aligned with the EU, a recognized gap exists between current policies and the necessary pace of emissions reduction, particularly in industrial and electricity sectors that still rely on fossil fuels.[68] This implies that more stringent carbon pricing or incentive-based policies will be needed to accelerate the transition. The long-term energy strategy heavily relies on nuclear extensions and significant renewable build-out, but these face their own challenges, such as cost sensitivities for SMRs and structural challenges for offshore wind development.[18] For UK traders, this suggests that Belgium's energy transition path may not be smooth or linear. Potential shortfalls in renewable deployment or delays in nuclear projects could lead to continued or increased reliance on gas-fired generation in the medium term, creating demand signals. Conversely, successful rapid deployment of clean energy could accelerate the displacement of fossil fuels,

impacting long-term price trends.

Major infrastructure projects like the Princess Elisabeth Energy Island are designed not merely as domestic generation assets but as central hubs for regional energy integration and cross-border trade.[72] These projects will significantly enhance Belgium's role as an energy nexus in Northwest Europe, facilitating greater renewable energy exchange and potentially new forms of energy trade, such as green hydrogen.[71] UK energy trading professionals should closely monitor the development and commissioning of these large-scale infrastructure projects. The Princess Elisabeth Island, with its planned interconnections to the UK (Nautilus link), represents a future expansion of cross-border capacity, offering new and expanded avenues for electricity arbitrage and potentially for trading emerging energy carriers like hydrogen. This necessitates a forward-looking approach to market analysis and strategy development.

5.2. Carbon Pricing and its Market Impact (ETS, ETS2)

In 2023, a substantial portion of Belgium's greenhouse gas (GHG) emissions, specifically 75.7%, were subject to a positive Net Effective Carbon Rate (ECR). Explicit carbon prices, predominantly stemming from the EU Emissions Trading System (ETS), covered 32.9% of total GHG emissions in CO2 equivalent. Fuel excise taxes, an implicit form of carbon pricing, accounted for 46.3% of emissions, with an average ECR of €72.74 per tonne of CO2 equivalent.[57] The existing EU ETS primarily covers direct emissions from large industrial installations, power plants, and aviation.[65]

Looking ahead, the European Union's new carbon tax, Emissions Trading System 2 (ETS2), is slated for enforcement from 2027. This new system will specifically target emissions from petrol, diesel, and domestic heating, obligating users to pay more for the carbon emissions associated with these fuels. The Belgian Federal Planning Bureau forecasts that the ETS2 carbon price will be around €60 per tonne of CO2, and these costs are expected to be fully passed through to consumers. This pass-through is projected to increase

the cost of fuel oil by 21%, natural gas by 16%, and petrol and diesel by 10-11%.[56]

Carbon prices under the EU ETS directly influence the marginal costs of fossil fuel-based power generation, particularly for gas and coal-fired plants, although coal is now a marginal contributor in Belgium's mix.[7] Higher carbon prices incentivize the dispatch of lower-emission sources, such as renewables and nuclear power, and can reduce the profitability of carbon-intensive plants. This directly impacts investment decisions and reshapes the merit order of electricity generation.[7] For UK traders, tracking EU ETS allowance prices is crucial, as these will directly affect the competitiveness of Belgian thermal generation and thus the overall electricity price. A rising carbon price will likely increase the cost of gas-fired power, potentially making imports from the UK (if less carbon-intensive or with different carbon costs) more attractive, or increasing the value of Belgian renewable exports.

The introduction of ETS2 will extend carbon pricing to a wider range of sectors, including transport and buildings, directly impacting household and business energy costs.[56] This will create strong financial incentives for energy efficiency measures, such as the adoption of heat pumps and building retrofits, and encourage a broader shift away from fossil fuels in these sectors.[51] While higher-income households may face greater absolute cost increases, lower-income households are projected to experience a proportionally greater burden without compensatory measures.[56] UK energy trading professionals should consider these broader economic impacts. Increased energy costs due to ETS2 could dampen overall energy demand or accelerate the electrification of heat and transport, influencing the long-term electricity demand profile. This could create new demand-side flexibility opportunities and reinforce the trend towards a more electrified Belgian energy system, which will affect interconnector flows and trading strategies.

6. Conclusions and Recommendations for UK Energy Trading Professionals

Belgium's energy profile is characterized by dynamic shifts, presenting both challenges and strategic opportunities for UK energy trading professionals. The nation is rapidly increasing its renewable energy penetration, particularly solar, while simultaneously reversing its nuclear phase-out policy to extend existing reactors and plan for new builds. This dual strategy aims to enhance energy security and accelerate decarbonization, but it also introduces complexities in grid management and market dynamics. Gas-fired generation, though at a record low, will retain a crucial role for flexibility and backup, especially as intermittency from renewables grows. The deep integration of Belgium's electricity and gas markets with continental Europe, coupled with the critical interconnections to the UK (Nemo Link and the Interconnector pipeline), means that Belgian energy developments have direct and immediate implications for UK trading strategies.

Based on this analysis, the following recommendations are provided for UK energy trading professionals:

- **Optimize Electricity Arbitrage through Enhanced Forecasting:** The increasing frequency and magnitude of price volatility in the Belgian electricity market, driven by high penetration of variable renewables and the evolving nuclear landscape, create significant arbitrage opportunities via Nemo Link. It is recommended that trading desks invest in sophisticated forecasting models that accurately predict Belgian solar and wind output, nuclear availability, and overall system adequacy. This granular understanding will enable precise timing for both importing cheap power from Belgium during periods of high renewable generation and exporting from the UK during Belgian supply shortfalls or price spikes.
- **Adapt Gas Trading Strategies to Evolving Demand:** The long-term revival of nuclear power in Belgium is expected to dampen baseload gas demand, potentially influencing ZTP prices and reducing the need for consistent UK gas exports via the Interconnector. However, gas will remain indispensable for providing flexibility and backup to a renewable-heavy grid. Traders should monitor ZTP prices in relation to TTF and global LNG markets, while also tracking Belgian gas plant dispatch signals, particularly

those related to Capacity Remuneration Mechanism (CRM) contracts and real-time balancing needs. Opportunities may shift towards shorter-term, more volatile gas trades driven by renewable intermittency.

- **Maintain Vigilance on Policy and Regulatory Shifts:** Belgium's energy policy, heavily influenced by EU targets and national priorities, is subject to significant shifts, as demonstrated by the nuclear U-turn. Regulatory decisions on capacity mechanisms, market design, and environmental policies (e.g., ETS2 implementation) will directly impact market fundamentals and profitability. Continuous monitoring of Belgian and EU energy policy developments is essential to anticipate structural changes, assess regulatory risks, and identify new market signals.
- **Monitor Strategic Infrastructure Development:** Key projects like the Princess Elisabeth Energy Island and Fluxys's initiatives in hydrogen and CO2 transportation represent future trading avenues and structural changes to cross-border energy flows. Close observation of their development and commissioning timelines is advised. The Princess Elisabeth Island, with its planned interconnections to the UK, signifies future expanded cross-border electricity capacity, while Fluxys's work indicates potential for new trading markets in decarbonized gases.
- **Adopt a Holistic, Regional Market View:** Given Belgium's deep integration into the European energy system, a comprehensive understanding of its energy profile necessitates a broader, regional perspective. UK traders should integrate analysis of French nuclear fleet performance, German renewable output, and overall Central Western European (CWE) market coupling dynamics into their trading models. This holistic approach allows for a more accurate anticipation of price movements across interconnected markets and enables robust risk management in a highly interdependent energy landscape.

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