Iberdrola's Roadmap to Successful Energy Transition

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Abstract

Iberdrola, the Spanish electric utility's successful energy transition over the past two decades, is a veritable tour de force. Its roadmap to success can serve as a founding stone for global energy utilities currently undertaking the transition. Thus, a practitioner-oriented approach was undertaken to comprehend the factors behind the successful transition by investigating three decades of company history through publicly available records. Moreover, overall sectoral reforms and competitor analysis of Iberdrola's two closest competitors have also been highlighted. The managerial implications showcase the importance of strong leadership, strategic acquisitions and sales, investment in R&D, strong stakeholder relations, and political economy.

Introduction

"Action is needed now. Iberdrola's energy transition started 20 years ago."
- Ignacio Galán[1]

In the 21st century, the world faces the daunting dilemma of balancing the ever-growing energy demands with the urgency of safeguarding humanity from the dangers of climate change. Despite transforming and empowering economies, fossil fuels have contributed 73% to GHG emissions and have

engendered a transition to renewable sources aligning with the Paris Agreement.[2] Furthermore, this radical change has sent ripples across the energy utility businesses due to its heavy dependence on fossil fuels, as it contributes 64% to the global electricity supply.[3] A successful transition would entail a substantial capital relocation, but the multidimensional shift's outcome at the intersection of technology, society, and institutions is difficult to predict. With the industry in flux, many electric utility businesses are still grappling with the complexities of energy transitions. However, a handful of firms, such as Iberdrola, have endured and prospered. The firm has successfully embraced energy transition over the past two decades and attained a 73% emission reduction compared to 2000 levels,[4] and even dethroned competitors to claim the world leader in wind power production with a market capitalization of $71.29B in 2022.[5,6] Thus, while Iberdrola's energy transition remains unmatched, the competition has floundered, which begs the question, how has Iberdrola accomplished this feat? In addition, what aspects of Iberdrola's success can serve as a template for other global electric utility firms on the brink of their transition?

Reflecting upon the above questions, we examine the electric utility sector in depth based on the three-horizon framework and Iberdrola's energy transition journey. Furthermore, Iberdrola's business model and competitor analysis of its two closest competitors were analyzed in detail. The complete case analysis was based on publicly available records, including articles, company records, executive statements, and interviews. Finally, the critical managerial insights and lessons are underlined further.

Electric Utility Industry

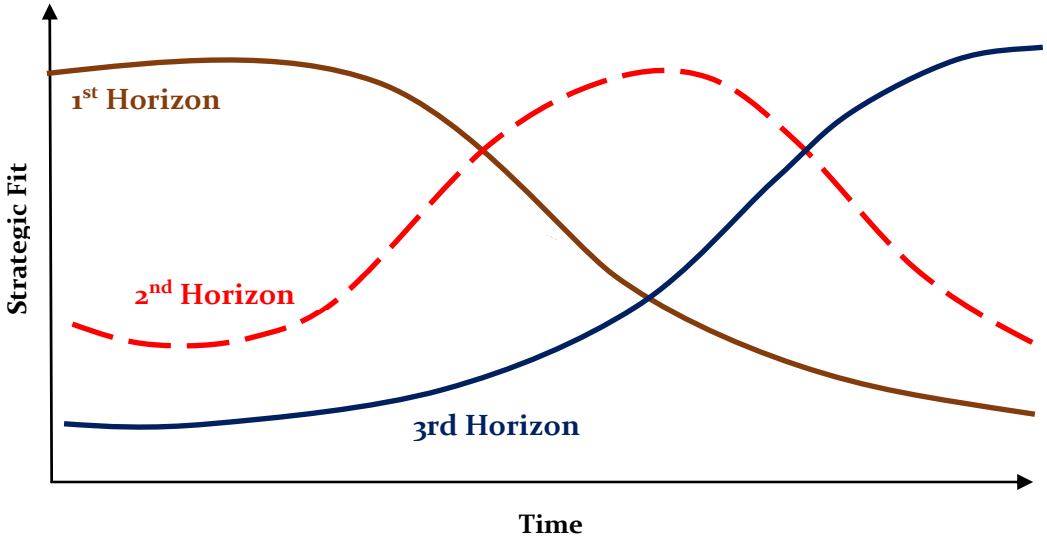
The electric utility industry is a critical cornerstone of global economies, fueling essential economic activities and supporting overall economic growth. The sector is tasked with generating and transmitting electricity and commands a market share of $1.8T in 2022, with a forecasted CAGR of 8.04% from 2023-2032.[7] This high growth can be attributed to higher economic growth and better quality of life in developing economies. However, the overall sector has also endured tough years of price volatility due to demand swings caused by the pandemic, followed by the Russia-Ukraine war.[8]

Three Horizon Framework – Energy Transition

The electric utility sector is undergoing expeditious transformations, but these changes are coupled with complexities and the future of the unknown. So, where is the industry overall heading? One of the main forces driving the shift from non-renewables to renewables sustainable technologies is path-breaking innovations with climate change.[9] The three-horizon framework details the undergoing transformative changes. The x-axis depicts the time,

whereas the y-axis measures the strategic fit in terms of external circumstances or firm. [10]

Figure 1. Three-Horizon Framework of the electric utility sector



Source: Adapted from "Seeing in Multiple Horizons: Connecting Futures to Strategy" [10]

Horizon 1: This horizon focuses on extending or defending the core business and represents the past global electric utility sector operations which were heavily coal-dependent. The growing coal demand and legislative policies further strengthen its usage contributing to the utility's profitability and market share.[11] However, the fuel's adverse environmental impact was gradually challenged, resulting in global investors cutting the funding for coal-fired thermal plants.[12] Further research brought the economic viability of established plants under scrutiny and the possibility of stranded assets.[13] Thus, stricter environmental regulations and ongoing plant closures by utility companies worldwide indicate that coal-produced energy is becoming less viable and losing its 'fit' over time.

Horizon 2: This horizon focuses on building emerging businesses. It is the current global electric utility sector, which can be described as an intermediate phase of transformation characterized by inherent messiness and non-linearity. The global utility brands now focus on transition fuels such as natural gas or other upcoming technologies. These have a significantly lower ecological footprint than coal and are supported by the European Union legislature.[14] However, despite its criticality, the phase is expected to be brief as natural gas still contributes to GHGs. Furthermore, the plummeting cost of renewables and the high price of natural gas have

already posed challenges in terms of economic feasibility for upcoming utilities' natural gas infrastructure.[15]

Horizon 3: This horizon focuses on building feasible alternatives for the future of the global electric utility sector, which offers limitless possibilities. The industry has witnessed the emergence of decentralized energy systems, which may completely transform towards a prosumer-centric model, leading to a significant shift in roles and business strategies of electric utility giants.[16] Additionally, the future could be entirely supported by sustainable energy sources, including renewables, nuclear-fission, or hydrogen-based energy, providing numerous opportunities for companies to thrive.[17]

Iberdrola's journey of embracing energy transition

Iberdrola, headquartered in Bilbao, Spain, under Mr. Ignacio Galán's leadership, has expanded significantly with subsidiaries and operations concentrated in the USA, Spain, United Kingdom, Canada, Brazil, and Mexico.[18] Though officially formed with the merger of Hidroeléctrica Española and Iberduero in 1992, the organization traces its root to the early pioneers of Spanish industrialization during the early 20th century.[19]

Since its inception, Iberdrola's generation capacity was at 38% of the domestic sector and generation portfolio inclined towards nuclear, followed by hydroelectric and thermal generation with 43.6%, 34.3%, and 22.1%, respectively. This starkly contrasted with the European Economic Community's (EEC) heavy reliance on thermal generation, which accounted for 60% of its energy mix.[20] Furthermore, Spain's accession to EC triggered a wave of outward investments by Spanish giants like Telefónica, Santander Central Hispano, and Repsol YPF, consistent with mid-1990s Spanish internationalization. The impetus behind the process was driven mainly due to greater competition resulting from the deepening of European internal markets and the creation of the Economic and Monetary Union. Additionally, the 1980s and 1990s debt crisis compelled the Latin American countries to implement structural reforms in need of financial needs, which presented a liberalized market for the firms.[21] Thus, with a stronghold on the domestic market, Iberdrola quickly followed suit and expanded to international markets with a series of acquisitions.

The firm followed a diversification strategy and acquired the Argentinian thermal power plant in 1992 and the Bolivian power distribution centers in 1995. It acquired the Chilean electricity generation utilities in 1996 and won the contract for a Mexican combined-cycle facility in 1999.[22] It broadened its reach further by acquiring hydroelectric and distribution plants in Brazil. During this phase, the firm purchased diverse assets such as Chilean sanitation, Brazilian telecommunications,[23] and gas distribution in Brazil,

Argentina, and Colombia, broadening the firm's offerings to become a multi-service operator.

However, in 2001, under Mr. Ignacio Galán, the firm charted a different course of action, diverging from the industry practices. Through the implementation of the 5-year strategic plans, the firm focused on the need for clean energy, growth in domestic and international markets via renewables, and overall financial strength.[20,24] The firm strengthened its commitment by revamping its brand image via brand renewal, making it the best valued in the Spanish electricity sector. The redesigned tri-element logo depicted its energy sources, with orange symbolizing fire and gas and blue representing water and air. The green, a merger of the first two, represented the firm's respect for the environment.[20,25]

The firm planned a modern-combined gas cycle and renewable power plants for the Spanish domestic market, aligning with the Spanish Government's 2002-2011 investment plan.[20]Additionally, as a part of the Spanish ministry's Star Project, which required replacing all the residential and industrial below 15kW analog meters, the firm turned the obligation into an opportunity. It transformed the conventional analog medium voltage (mv) distribution network into a digital, automatic network. This facilitated the smart meter installation and proved incremental for active management and future integration of electric vehicle charging.[26]

Simultaneously, the firm pursued international expansion by acquiring Great Britain's ScottishPower and United States's Energy East in 2006 and 2008, respectively.[27] Thus, these acquisitions marked a significant turning point for Iberdrola as it emerged as a globally diversified and the world's largest wind energy producer, with 62,613 MW of installed power capacity in 20 geographies.[28] In 2015, the firm also acquired UIL Holdings Corporation, which led to the formation of Avangrid and solidified its US portfolio. Additionally, the same year, Mr. Galán expressed his support for the historic Paris Climate Agreement and stated, "*Iberdrola welcomes the Paris agreement. Efforts now must be focussed on the implementation of the agreements and creating the instruments needed to mobilise the important resources and investments required.*"[29]

In 2017, putting words into action, the firm expanded its commitment to the Task Force on Climate-related Financial Disclosures (TCFD) initiative by disclosing financial information regarding the impact of climate change.[30] The following year, the company also integrated its contribution to United Nations' Sustainable Development Goals (SDG) into its annual statements, mainly focusing on SDGs 7 and 13.[31]

Despite stiff competition, Iberdrola has maintained its leading position as the foremost electricity utility giant in the Spanish domestic market,

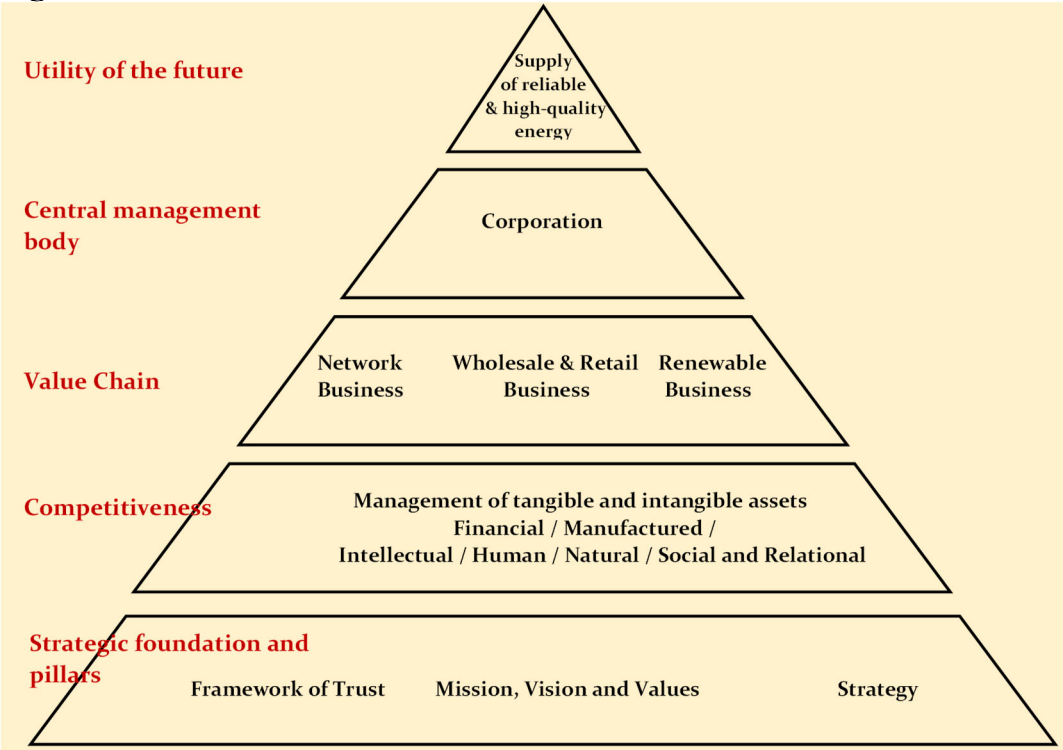
determined through installed electric capacity and generation in 2021.[32] The firm commanded 34% of the domestic market share alongside Endesa (based on the number of clients) respectively, placing itself at the forefront of the market.[33] In addition, the firm generated 57% and 18% of its annual electricity through renewables and nuclear energy, respectively.[34] Its long commitment and transition to renewable energy sources have positioned Iberdrola better than its competitors during the Russia-Ukraine invasion due to relatively limited exposure to non-renewable sources (approximately 25% combined cycle and cogeneration). This is further reflected when the firm shielded its residential and industrial customers from the price hike by freezing gas and electricity below the current market price.[35] Its latest significant investments in 2022 venture into new sustainable technologies such as green hydrogen and methane.[36]

As a part of its long-term decarbonization strategy, Iberdrola has divested non-core assets in domestic and foreign markets, including the sale of Ondagua and Pridesa.[20] Petroceltic, and Medgaz, Sagunto, Petroceltic, and BBG regasification plants and Euskaltel Telecom.[37,38] Additionally, 8500MW thermal capacity was eliminated through the closure of 17 global coal fuel-fired thermal power stations, bringing the firm a step closure to its commitment towards European Green Deal.[39] Surprisingly, the firm faced multiple challenges with government stakeholders over plant closures but was able to negotiate successfully. Iberdrola has been a prime supporter of just transition for its workforce, impacted by plant closures through the Scottish Partnership Action for Continuing Employment (PACE) and Innovation Citizen Platform.[4] These programs have worked with local communities for job guarantees and employee support, including training and retirement options.

Iberdrola's business model

Since the early 2000s, Iberdrola's business strategy and goals have been aligned with the Kyoto Protocol, which allowed the company to focus on decarbonization and rapidly adopt renewable technologies via investments.[40] Iberdrola's business model is presented in a five step-pyramid diagram and is outlined in Figure 2.

Figure 2. Iberdrola's business model



Source: Adopted from Company's Integrated Reports

Strategic foundation and Pillars: Iberdrola's business model is characterized by three key factors, which differentiate the company from its competition and the industry overall. Firstly, it has a framework of trust to ensure sustainability, built upon an advanced corporate governance model, corporate ethics, and an advanced risk control system that balances opportunities and mitigates risks.[30] Second, its mission, vision, and twelve values are guiding frameworks. Third, in strategy, the business treats climate change as a dual-natured factor representing risk and opportunity for organic growth, further prioritizing balanced growth, financial strength, and sustainable dividend.

Competitiveness (Management of tangible and intangible assets): The assets in this section are classified into two categories, i.e., tangible and intangible, with further subcategories. Tangible assets comprise financial and manufactured capital, which are used to finance infrastructure as the sector is known to carry heavy debt for financing.[41] The financial capital is further focused on achieving balanced growth through renewable assets or long-term contracts, operational excellence, sustainable results, and shareholder dividends. The manufactured capital includes power generation, transmission, and distribution through wind and solar farms, hydroelectric

and nuclear plants, substations, and gas pipeline assets.[42] Intangible assets include intellectual capital related to knowledge-based assets such as Research and Development (R&D), achieved through an open innovation approach.[43] Through PERSEO, which invest in startups in disruptive and ground-breaking technologies and business model, the firm further strengthened its support for innovation.[44] The group is further supported by 40,000 global employees, who form the core of its human capital. Regarding natural capital, the firm seeks to protect the ecosystems and biodiversity, prevent pollution and ensure sustainable modes of production and consumption. Lastly, the company puts stakeholders at the center of its decisions through its global stakeholder relations management model and Iberdrola stakeholders' hub, part of its Social and Relationship capital.[42]

Value Chain: Iberdrola's business and value chain activities are divided into three global businesses, i.e., network, whole and retail, and renewables. For different verticals, the company promotes a brand culture based upon global and local perspectives, referred to as "Glocal." It further engages with local supplier strategy in its value chain for diverse purchases or contacts, which accounted for 87.10% in 2022.[45] The firm utilizes a global supplier management model (TSMS) and supplier onboarding related to work and services. The model assists in a comprehensive tracking system, speeding up the process, reducing costs, and improving time management. Additionally, it utilizes a supplier evaluation model that accesses suppliers on 43 factors to calculate their respective ESG scores.[46] Suppliers further undergo varying levels of registration (elementary, basic, and 360°) and are classified as critical and non-critical based on diverse factors.[47]

Central management body (CMB): Iberdrola has been built around the corporation Iberdrola S.A. as its central management body. The senior leadership, including the board of directors and CEO, oversees and executes necessary strategic decisions across all its subsidiaries.[48] The corporation handles various intra-group commercial relationships, including corporate services, intangibles, and financial transactions. Corporate services comprise low-value support services, while intangibles align with the BEPS action plan and reflect each member's contribution. Lastly, financial transactions such as loans, cash pooling, and hedging are re-examined based on transfer pricing policies.[49] This has been a critical differentiator compared to competitors, as it allows the firm to adhere to a unified strategic trajectory across subsidiaries.

Utility of the future (raison d'être or Business Purpose): The company's business purpose, i.e., 'supply of reliable, high-quality and environmentally-friendly energy', has been the core ideology of its business operations. This purpose has resulted in electricity supply to nearly 100

million people, backed by 80% emission-free utilities, 40,000 workforces, and $150+ billion assets.

Iberdrola's two closest competitors

Enel

Enel was established in 1962 as Italy's national entity responsible for producing, distributing, and selling domestic electricity by consolidating 1270 local energy entities.[50] The 1976 oil crisis prompted the company to diversify its portfolio into diverse energy sources, including nuclear and renewables.[51] In 1999, the liberalization of the Italian market led to Enel's partial privatization and stock market debut. In 2001, the group invested significantly in digital technologies and was listed on the Dow Jones Sustainability Index.[52] The group also pursued international expansion through Endesa in Spain and established its significant presence in Latin and North America, directly competing with Iberdrola.[53]

In 2008, due to the economic crisis, Enel underwent a large-scale restructuring and downsizing. The reduced demand, and increased competition, bundled with stricter environmental regulations, led to the closure of its obsolete plants. Thus, the company reduced its overcapacity by decommissioning thermoelectric power plants.[54]

Enel's focus on innovation and sustainability was further reinforced in 2008 with the establishment of Enel Green Power, a spinoff that consolidated the firm's global renewable business under a single entity.[55] Under the open power strategy, the firm prioritized developing new technologies through collaboration with external stakeholders. In 2017, Enel X was created to offer digitalized products and value-added services to simplify global product lines such as e-industries, e-home, e-city, and e-mobility.[56] Adding further to the group's overall sustainable strategy and performance, it launched a sustainability-lined bond (SLB) aligning with its UN SDG goals.[50] The above plans enabled Enel to prioritize innovation, energy transition, and sustainability across its different business verticals, resulting in its commitment to energy transition with a complete exit from coal by 2027 and thermal power by 2040.[57]

However, despite the positives, the firm, under multiple leaderships, is yet to achieve a complete energy transition, and market capitalization further declined by 47.28% in 2022 to $54.53B from $103.45B in 2020.[58] Moreover, due to the Russia-Ukraine war, it has withdrawn from the Russian markets and underwent a billion-dollar loss during its subsidiary sale.[59] Additionally, it has further engaged in the process of divesting its assets in Romania and plans a complete exit from Argentina and Peru to reduce its overall debt. The organization also intends to divest from its gas portfolio in Chile and Spain,

limiting its transition to cleaner fuels to just six main markets in Europe and America.[8]

Electricité de France (EDF)

EDF, a French utility conglomerate headquarters in Paris with a global presence across five continents, commanded a market capitalization of $49.77B in 2022.[60] The company was established in 1946, after 1700 local energy producers, distributors, and transporters were nationalized to rebuild the war-torn French transmission grid. EDF focused on a variety of energy sources to power the country. However, the 1973 oil crisis tilted the French government's inclination towards civil nuclear energy.[61]

In 1992, EDF expanded its domestic dominance into international markets with investments in South America, Europe, and the UK.[62,63] In 2004, France's integration into the Common European Market (CEM) turned the state-owned into a limited-liability corporation. It further raised €6.7bn via its IPO on the Paris stock market exchange.[64] EDF further solidified its position by acquiring multiple companies in Germany, Belgium, Netherlands, Poland, and the USA.[62,65]

EDF's raison d'être aligns with its climate transition plans, and the group has been implementing energy transition plans for the past two decades. The firm adopted a 'climate hazard' plan in 2004, followed by a 'climate adaption' strategy in 2010. In terms of financing, EDF has issued green bonds for approx. $9.33B since 2013, with $9.59B in credit lines.[66,67] The company has also simultaneously concentrated on decarbonization by closing 48 coal and fuel oil plants. The firm has also extended its nuclear power plant's overall life and replaced fuel oil with liquid biogas and gas in its thermal plants as a part of its Multi-Year Energy Programme.[67,68] Its French R&D 99% expenses are further dedicated to energy transition and decarbonization-related projects such as renewable energies and carbon-free hydrogen.[69]

However, despite significant advantages due to its nuclear-dominated portfolio, EDF's energy transition is still incomplete as coal-fired plants contribute to its energy mix, unlike Iberdrola. Furthermore, the energy disruption in Europe caused by the Russia-Ukraine war resulted in unprecedented energy prices, which has benefited most European energy utilities but has emerged as a setback for EDF. Half of its nuclear plants under repair, coupled with an energy price cap, the firm recorded a loss of $19B, leading its overall debt to $68.57B.[70] Moreover, the firm is undergoing a change of leadership and nationalization.[71] As a result, the firm has launched 'Project Hercules' to tackle the issues and emerge stronger.[61]

Thus, the critical success factors, followed by financials and key parameters for Iberdrola, Enel, and EDF, are highlighted in Table 1 and Table 2.

Table 1. Critical success factors for Iberdrola

Critical Success Factors	Description
Strong Leadership with a clear and strategic vision	✓ Strong leadership steered Iberdrola's operations towards a futuristic vision, part of the firm's strategic pillars ✓ A strategic plan under senior leadership's direction sets clear deliverables for subsidiaries.
Strategic sales and acquisitions	✓ Acquisitions aligned with its long-term vision and strategy over short-term gains ✓ Sale of non-core assets to manage financials and pursue future capital investments into focused domains ✓ Pursued coal plants closure with replacement of renewable assets
Investment in R&D	✓ Open Innovation decentralized approach allowed faster innovation adoption across its business and workforce. ✓ Iberdrola, via PERSEO, invested in market trend identification and access to disruptive business models.
Strong stakeholder relations (Internal and external)	✓ Clear communication with internal and external stakeholders with logo transformation ✓ Training and plans for employees impacted by decommissioning of assets
Political Economy	✓ Turning obligations into future opportunities ✓ Implementing projects in line with government policies ✓ Proper negotiations with government stakeholders

Table 2. Financials and critical parameters of Iberdrola, Enel, and EDF

Parameters	Iberdrola SA	Enel	EDF
General			
Headquarters	Bilbao (Spain)	Rome (Italy)	Paris (France)
Entity Type	Public	Public	Public
Employees	40,721	67,381	167,157
Financial (Billions)			
Revenue	56.89	114.23	151.31
COGS	35.59	77.60	127.62
Gross Profit	21.30	36.63	23.69
Net Income	4.57	3.77	-18.92
EBITDA	14.22	19.59	-10.93
EBITDA Margin (%)	24.99	17.15	-7.22
Total Assets	165.86	234.30	416.23
Total Liabilities	103.54	186.36	366.51
Long Term Debt	51.25	77.41	71.50

Energy Mix (source) (%)			
Combined Cycle	36.50	23.20	-
Wind	28.10	17.00	-
Hydroelectric	15.20	25.60	8.80
Nuclear	14.10	11.50	78.20
Cogeneration	4.40	-	-
Renewables (Solar, Geothermal, etc.)	1.70	6.30	4.00
Fuel oil and gas	-	10.20	8.30
Coal-fired	-	6.20	0.70
Key Parameters			
Plants decommissioned	17	Not disclosed	48
Technology Investment	Smart Grids, Green Hydrogen	Digitization, Electric Mobility	Energy storage, Nuward - Small Modular Reactor
UN SDG Focus	7, 9	7, 9, 11, 13	7, 9, 12, 13

Note: The above data is the consolidated group data of the firms.
For Iberdrola and EDF - EUR to USD – 1.05, For Enel - EURO to USD – 1.18
Source: The above information is compiled from diverse sources such as the firm's website, annual and sustainability reports, library records, and databases and reviews.

Discussion

The present case underscores the ongoing energy and climate transition within the global electric utility industry through the three-horizon framework. We comprehensively analyze Iberdrola's expansion and energy transition journey from inception until 2023, with its business model, to gain further insights. The competitor analysis further examines Iberdrola's closest competitors, Enel and EDF.

Managerial Implications and Lessons

Based on the above analysis, the five critical takeaways for the winning formula for Iberdrola's successful energy transition are summarized below.

First, Mr. Ignacio Galán, Iberdrola's CEO, provided strong leadership for the company by demonstrating a clear and strategic vision. Prior to his appointment, the company, despite being an energy utility, pursued a multi-service operator strategy with acquisitions in non-core sectors such as sanitation and telecommunications. However, Mr. Galán's arrival brought a clear focus and vision, transforming the firm into a renewable utility giant. As an integral part of CMB, he set the course for the firm with 5-year strategic plans that provided all subsidiaries with specific deliverables.

Secondly, Iberdrola pursued strategic acquisitions in the renewable energy generation sector in the early 2010s, when renewables were neither mainstream nor cost-effective, unlike today.[72] The enterprise focused on the long-term strategy aligned with its strategic pillars, prioritizing renewable

energy over short-term gains from non-renewable sources. Additionally, the group further strategically divested from non-core sectors, which helped to maintain its debt and keep financials strong. It further decommissioned its thermal-fired plants, replacing them with renewable energy assets with further investments.[73]

Thirdly, Iberdrola adopted an open innovation, decentralized model that enabled the pursuit of multiple technologies, including supplier innovation programs, smart grids, and specialized training for its workforce.[74] Furthermore, Iberdrola's PERSEO project further provides support and investment for startups that promote disruptive technologies.

Fourth, Iberdrola prioritizes transparent communication with both internal and external stakeholders. During the initial phases of the energy transition, it launched a comprehensive rebranding effort, which included a change in its legacy logo to the tri-element logo that communicated the firm's vision and future direction. Iberdrola also established the *Campus for Innovation and Training* institute to upskill its workforce and senior executives for energy transition and green economy.[75] Moreover, it initiated several programs, including the Scottish Partnership Action for Continuing Employment (PACE) and Innovation Citizen Platform, to ensure a just transition for its workforce, impacted by the closure of its coal plants.

Finally, given the heavily regulated nature of the sector, the political economy and regulatory relations play an essential role. Iberdrola effectively turned obligations into future opportunities during the STAR Project. The group also pursued its business activities in line with government policies such as Paris Climate Agreement 2015, European Green Deal, and Task Force on Climate-related Financial Disclosures. Moreover, despite the government's intervention during coal plant closures, the firm negotiated and eventually proceeded with its plant closures.

Closing Remarks

Overall, the case underscores a multitude of diverse and critical managerial perspectives for successful energy transition execution in the electric utility industry. It is of immense value for academic deliberations in business classrooms and for electric utilities on the precipice of undertaking energy transition initiatives. A selection of the discussion questions is presented below for consideration.

Discussion Questions

1. *Utilizing the three-horizon framework, elaborate on the transformations occurring in the global utility industry, drawing insights from the current article.*

2. *What is your opinion on the concept of the energy transition?*
3. *From the current article, which global utility enterprise has accomplished the energy transition? What are the critical factors of success?*
4. *Please explain Iberdrola's business model and further illustrate its transformation over the past two decades.*
5. *What do you understand by the concept of just transition? Is it necessary?*
6. *From your perspective, what future challenges are perceived for Enel and EDF?*

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Endnotes

1. Iberdrola. (2021). *Integrated Report March 2022*.
2. Center for Sustainable Systems. (2021). *Greenhouse Gases Factsheet*. University of Michigan.
3. Gross, S. (2020, June). Why are fossil fuels so hard to quit? *Brookings.*
4. Iberdrola's climate story: innovating to create the energy system of the future. (2022, August 18). *We Mean Business Coalition.*
5. Iberdrola - Market capitalization (IBE.MC). (2023). *CompaniesMarketCap*.
6. Iberdrola. (2019, January 22). *Iberdrola, named as one of the world's 100 most sustainable companies* [Press release].
7. Power Generation Market (By Type: Hydroelectricity, Fossil Fuel Electricity, Nuclear Electricity, Solar Electricity, Wind Electricity, Geothermal Electricity, Biomass Electricity, Other Electricity; By End-User: Industrial, Commercial, Residential, Transportation; By Source: Conventional/Non-Renewable Source, Renewable Source; By Grid: Off Grid, On Grid) - Global Industry Analysis, Size, Share, Growth, Trends, Regional Outlook, and Forecast 2023-2032. (2023, February). *Precedence Research.*
8. Landini, F., & Weir, K. (2022, November 22). Tackling debt, Enel to sell assets and focus on six markets. *Reuters.*
9. Paul4innovating. (2022, June 15). Phasing the energy transition by technology and horizon management. *Paul4innovating Innovation Views.*
10. Curry, A., & Hodgson, A. (2008). Seeing in multiple horizons: connecting futures to strategy. *Journal of Futures Studies, 13*(1), 1-20.
11. Weiss, D. (2010, September 17). Efforts to save coal could end up destroying it. *Center for American Progress.*
12. Yukhananov, A., & Volcovici, V. (2013, July 17). World Bank to limit financing of coal-fired plants. *Reuters.*
13. Roberts, D. (2020, September 16). 4 reasons why coal is expensive and solar and wind are cheap. *Vox.*
14. Rankin, J. (2022, February 2). EU includes gas and nuclear in guidebook for 'green' investments. *The Guardian.*
15. Harvey, F. (2022, May 10). Avoid using gas as 'transition' fuel in move to clean energy, study urges. *The Guardian.*
16. Mclelland, J. (2021, June 23). The utilities industry is at the center of a massive global shift. *Forbes.*
17. Curry, A., & Hodgson, A. (2008). Seeing in multiple horizons: Connecting futures to strategy. *Journal of Futures Studies*, *13*(1), 1–20.
18. About us: Where we are [Organization website]. (n.d.). *Iberdrola.*

19. About us: Our company: Our history [Organization website]. (n.d.). *Iberdrola.*
20. Anes, G. (2006). *Un siglo de luz: historia empresarial de Iberdrola*. Iberdrola.
21. Díez, A. S., Reca, P. G., & De La Cruz, J. M. G. (2016). Mergers and acquisitions carried out by Spanish firms in Latin America: A network analysis study. *Cepal Review*, *120*, 51–69.
22. About us: Executive chairman: Ignacio S. Galán [Organization website]. (n.d.). *Iberdrola.*
23. Piragibe, C. (2001). *Competition and globalization Brazilian telecommunications policy at crossroads.* Paper Presented at 29th The Research Conference on Communications, Information and Internet Policy (TPRC) Conference, Alexandria, VA.
24. Galán, I. S. (2020, November). The CEO of Iberdrola on Committing to Clean Energy. *Harvard Business Review.*
25. About us: Our company: Our brand [Organization website]. (n.d.). *Iberdrola.*
26. ZIV plays a key role in Iberdrola´s STAR project. (2018, May 31). *Ziv Automation.*
27. Natural Gas Intelligence Reporters. (2007, June 2). Iberdrola to Acquire Energy East for $4.5B. *Natural Gas Intelligence*.
28. Kolk, A., Lindeque, J., & van den Buuse, D. (2013). Regionalization strategies of EU electric utilities. *British Journal of Management*, *25*(S1), S77-S99.
29. Ethical Board Room. (2016, February 16). *Iberdrola: Powered by ethics, values and culture | Ethical Boardroom*.
30. Iberdrola. (2018). *Integrated Report 2018: Business Model and Strategy*.
31. Mattera, M., Gonzalez, F. S., Ruiz-Morales, C., & Gava, L. (2021). Facing a global crisis - how sustainable business models helped firms overcome COVID. *Corporate Governance*, *21*(6), 1100–1116.
32. Electricity in Spain. (2023). *Statista*.
33. Electricity providers market share Spain 2020, based on number of clients. (2023, January 13). *Statista.*
34. Iberdrola. (2022). *Integrated Report March 2022.*
35. Iberdrola freezes prices to shield customers from Ukraine invasion-induced hike. (2022, March 22). *Reuters*.
36. Iberdrola to invest more than €1.1B to build a green hydrogen and methanol plant in Australia; Bell Bay Powerfuels. (2022, December 20). *Green Car Congress.*
37. Chazan, G. (2012, December 12). Iberdrola offloads French wind farms. *Financial Times.*
38. Chakraborty, A. (2021, December 6). Iberdrola divests its natural gas storage business in Canada. *Offshore Technology.*
39. Iberdrola. (2017, November 10). *Iberdrola announces the complete closure of its coal-fired power capacity* [Press release].
40. Iberdrola. (2020). *Integrated Report 2020: Business Model and Strategy*.
41. Maverick, J. (2022, October 2). Debt-To-Equity (D/E) ratios for the utilities sector. *Investopedia.*
42. Iberdrola. (2018). *Integrated Report 2018: Our Assets.*
43. Alvarez-Meaza, I., Pikatza-Gorrotxategi, N., & Río-Belver, R. (2020). Sustainable business model based on open innovation: Case study of Iberdrola. *Sustainability*.
44. Iberdrola. (2022). *Innovation Report 2020 – 2022*.
45. Iberdrola. (2023). *Integrated Report February 2023*.
46. Iberdrola. (2023). *Sustainable Value Chain*.
47. Iberdrola. (2023). *Procurement and Supplier Management activity report: Contribution to Iberdrola Group's Sustainability 2021-2022*.
48. Iberdrola. (2022). *Report on Tax Transparency of the Iberdrola Group*.
49. Ibid.

50. Schenker, J. L. (2021, March 12). *How Enel is powering change*. *Medium.*
51. Mio, C., & Fasan, M. (2013). The case of Enel. In C. Busco, M. Frigo, A. Riccaboni, & P. Quattrone (Eds.), *Integrated reporting: Concepts and cases that redefine corporate accountability* (pp. 225-236). New York: Springer.
52. About us: Our story [Organization website]. (n.d.). *Enel*.
53. Ibid.
54. Rugiero, S. (2019) Decarbonisation in the Italian energy sector: The role of social dialogue in achieving a just transition – The case of Enel. In B. Galgóczi (Ed.), *Towards a just transition: Coal, cars and the world of work* (pp. 109-133). Brussels: ETUI.
55. Ibid.
56. One year later: The 5 most valuable lessons learned. (2018, August 2). *Enel X.*
57. Stark, M., Cataudella, F., & Mayer, J. (2022, March 16). A cleaner future for coal power plants and coal-reliant communities. *World Economic Forum.*
58. Market capitalization of Enel (ENEL.MI). (n.d.). *CompaniesMarketCap.*
59. Marketwire. (2022, June 17). Enel takes billion-euro loss from Russia exit. *EnergyWatch.*
60. Market capitalization of EDF (Electricité de France) (EDF.PA). (n.d.). *CompaniesMarketCap.*
61. EDF, set for full-state control, warns again of big losses. (2022, October 27). *Reuters.*
62. The EDF group: EDF at a glance: History [Organization website]. (n.d.). *EDF*.
63. EDF Energy company history and facts. (2015, May 7). *Energy Company Numbers.*
64. Perryer, S. (2019, February 27). Top 5 European IPOs of all time. *European CEO.*
65. About: Our history [Organization website]. (n.d.). *EDF Trading.*
66. EUR to USD exchange rate: 1.07.
67. EDF. (2022). *The Edf Group Climate Transition Plan*. EDF.
68. About: Sustainability: Leading decarbonization [Organization website]. (2018). *EDF Energy.*
69. EDF. (2021). *Universal Registration Document 2021*.
70. Mallet, B. (2023, February 17). EDF boss vows to put company back on track after record $19 billion loss. *Reuters*.
71. Chrisafis, A. (2022, July 6). New French PM vows to nationalise EDF and tackle cost of living crisis. *The Guardian*.
72. Ro, C. (2022, September 14). Renewable energy costs have dropped much faster than expected, but there's a catch. *Forbes.*
73. Frangoul, A. (2019, December 2). Major European utility Iberdrola plans to replace coal-fired plants with solar, wind. *CNBC*.
74. Innovation: Open Innovation and Partnerships [Organization website]. (n.d.). *Iberdrola.*
75. Careers: Life at Iberdrola: Innovation and Training Campus [Organization website]. (n.d.). *Iberdrola*.