

A Work Project, presented as part of the requirements for the Award of a Master's degree in
International Finance from the Nova School of Business and Economics.

**CASE STUDY ON THE ACQUISITION OF BG GROUP BY ROYAL DUTCH SHELL
GAS GAMBLE: DID SHELL BET ON THE WRONG FUTURE?**

RAFAELA ALEXANDRA DA PIEDADE PALÁCIO

Work project carried out under the supervision of:

Professor Pranav Desai

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Abstract

A landmark \$70 billion acquisition in the energy sector shaken by falling oil prices and increasing pressure for energy transition: Royal Dutch Shell's acquisition of BG Group in 2016. The acquisition allows for analysis of industry-specific dynamics, the strategic and financial rationale behind the deal, the challenges of valuation amidst market volatility, and alternatives to this deal, such as renewable and nuclear energy projects, assessing implications for the energy transition. Engaging with this deal is to gain insight into corporate decision-making and the broader implications of strategic M&A in the energy sector and prepare the next generation of corporate leaders.

Keywords

Mergers and Acquisitions, Oil & Gas, Strategy, Energy Transition, BG Group, Royal Dutch Shell, Policy, Oil Price Downturn

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PART A: Case Study

Royal Dutch Shell announced on the 8th of April 2015 that it had reached an agreement for the acquisition of BG Group for around \$70 billion. On the day of the announcement, this meant that a hefty 52% premium over the market value of BG Group was to be paid by Shell through a mixed consideration of both cash and shares, by shareholders' election. The deal, envisaged to be completed by early 2016, had to overcome regulatory approvals from many jurisdictions, especially in Australia and Brazil, where BG had most of its ongoing projects, and required approval from a majority of shareholders from both firms. Shell viewed the acquisition as an important strategic move, not only in terms of expanding its market share, as it would become the world's second-largest public oil and gas company by market value, but especially in terms of strengthening the firm's position in deep water and liquefied natural gas (LNG). These were two of Shell's growth priorities, given the long-term growth in demand for less carbon intensive fuels. In the prior six months of the announcement date, the oil price had fallen by about 50%, putting the Oil & Gas industry under pressure. At the time, many analysts and some shareholders were concerned that Shell might have been overpaying on its offer for the British firm. In this context, you are put in the shoes of a major Shell shareholder to take what you see as the best course of action for Shell.

PART I: The Intriguing 2015 Energy Deal Announcement

Shell

Royal Dutch Shell plc, based in The Hague, Netherlands and referred to as "Shell", is one of the world's largest independent petroleum companies, carrying out exploration, production, refining and marketing processes of crude oil and natural gas in more than 70 countries globally (Figure 1). Shell explores oil and gas, both from conventional resources and from unconventional reservoirs, such as tight rock, shale, and coal formation. It develops new oil and gas supplies from major fields, and its reporting segments are organized in Upstream,

Downstream and Corporate. Upstream includes all the exploration, extraction, manufacturing and transportation processes of crude oil and gas. All these operations are heavily dependent on crude oil and natural gas prices and quantities produced, and projects are capital intensive and generate revenues in a long-term horizon. Downstream focuses on turning crude oil into a range of refined products, which are then marketed around the world and traded. It also markets gas and power and explores Shell's interests in alternative energy (excluding wind) and CO₂ management. Downstream businesses in Oil Products and Chemicals are highly cash-generative with high returns. Corporate refers to the support functions, comprising Shell's holdings and treasury organization (central functions and headquarters) (Shell Global 2024).

Shell's Background

The Royal Dutch Shell Group was created in February 1907 through the amalgamation (combining two or more companies into an entirely new entity) of two rival companies: Royal Dutch Petroleum Company and the "Shell" Transport and Trading Company Ltd, of the United Kingdom. The main motivation for the amalgamation was to compete globally with Standard Oil, an American industrial empire, controlling almost all oil production, processing, marketing, and transportation in the US (The Editors of Encyclopaedia Britannica 2024). In 2005, it came to light that the Group had overstated its oil and gas reserves, leading to a reduction in its stock value, followed by a demand from shareholders to have a more responsive corporate structure in place. The two parent companies transformed the Group into a single capital structure and delisted from their respective exchanges, creating a new parent company named "Royal Dutch Shell plc". The new entity would be primary listed on the London Stock Exchange, secondarily listed on Amsterdam Stock Exchange, headquartered and with fiscal residency in The Hague (Netherlands), but with its registered office in London, United Kingdom. Right after, an ambitious investment program in exploration and production in order

to rebuild its oil and gas reserves was reported (Chcom 2013). Ten years later, the BG announcement acquisition became one of its main maneuvers.

Shell's Strategy

As any other enterprise wishing to grow and succeed, Shell had been attentive to market developments and has put in place at the beginning of 2014 an improvement programme in which it would refocus its efforts and investment on only selected growth investments, including the exit and divestment of some projects that had been underperforming according to expectations. Shareholders, and Shell's iconic competitive dividend, had always been at its core. It seemed then to be the moment to implement a balance sheet restructuring, to balance risk, drive profitability and guarantee a strong financial performance by enhancing capital efficiency to ensure that strong project delivery would be enjoyed by shareholders. As an example, Shell had, earlier in 2015, exited the Bab sour gas project in Abu Dhabi and has ceased further exploration activity offshore Alaska for the upcoming future. One of the "selective" investments includes developments in new LNG capacity and deepwater positions, in which Shell already had some presence and experience (Figures 2 – 4). These two industry segments are not only exciting because of their growth potential, but also because Shell aims to lead by example in the energy transition panorama: a long-term trend in demand growth for lower-carbon energy is becoming evident. Shell wants to be ahead of these long-term growth demand for cleaner-burning fuel. "We intend to make investments in large-scale lower-carbon technology such as in natural gas, carbon capture and storage, biofuels, wind and solar energy. We have evolved over the last few decades from a company focused almost entirely on oil to one of the world's leading suppliers of gas, the cleanest-burning hydrocarbon. We want to continue to research and develop technologies that increase efficiency and reduce emissions from liquids and natural gas production, helping to meet global energy demand in a responsible way. Switching from coal to gas for power generation is one way to reduce emissions of CO₂"

(Shell Annual Report 2015, n.d.). The strategic objective was clear: creating a simpler and more focused company, in line with global energy demand and environmental pressures.

BG Group

BG Group is a British multinational Oil & Gas company that resulted from the 1997 demerger of British Gas into BG Group and Centrica. It is headquartered in Reading, UK, and it is composed of two segments: Upstream & LNG shipping and Marketing. It currently holds operations in more than 20 countries on 5 continents (Figures 5a and 5b) and it is the largest LNG supplier to the United States. In terms of business expansions, BG Group has acquired other companies in order to enter new geographic markets, as is the case of the acquisition of Queensland Curtis LNG for \$3.4 billion in 2008, to operate in Asia's LNG market; BG Group has also been partnering with other companies, like Cheniere Energy, in 2011, to export LNG from the United States. Currently, BG Group is focused on maximizing its assets in high-growth (and high-margin) areas such as LNG and deepwater ventures. Regarding LNG, BG Group is focused on solidifying its position as a leading player in this market, with a strong portfolio of extensive production and export operations, especially in Australia and the US. As demand for LNG particularly in Asia is rising, this allows for an interesting level of price flexibility, constituting a lucrative business vertical. As for deepwater exploration, it occurs mainly in Brazil, however, projects in East Africa and Australia have also been developed. From the operational standpoint, BG Group has streamlined its operations and maintained a focus on its core assets, allowing it to allocate capital to higher-return projects. As a reflection of its policies and strategy, it has maintained a strong balance sheet, which is essential when operating in volatile industries such as energy (gas).

Market Context

Both Shell and BG operate in the energy market, an industry which at the time of the announcement was experiencing some complications. Oil and gas prices had started to abruptly

fall since mid-2014 (Exhibit A) due to demand factors and supply shocks. Oil prices were central as global disruptions occurred, and Shell's performance heavily depended on them. These are mainly tracked with the WTI¹ and Brent Crude benchmarks and are mostly affected by a rapid supply increase from major oil producers, which was not in line with the demand's behavior (Figure 6).

The resilience of the shale oil industry to lower oil prices and Saudi Arabia's response

The US was experiencing great efficiency gains with their advancements in the fracking technology for shale oil extraction. Production costs fell so considerably (approximately 25%) that even with a selling price of \$30/bbl economic viability would still be maintained (Smith and Lee 2017). However, the boom in shale oil production by the US was not the sole friction that the market was observing. Saudi Arabia, which is the largest producer member of the OPEC², deviated from its forecasted behavior and did not step back. It kept injecting oil supply into the market to secure its market share against the US, a non-OPEC producer. This decision was totally the opposite to what they had previously made in the early 1980s, when attempting to protect and stabilize oil prices. But as prices were not rising, Saudi ended up losing output share, which translated into lower revenue, falling by more than 80% from January 1981 (Mănescu and Nuño 2015). OPEC decisions have a major impact on oil prices, and the Saudi Arabia decision in November 2014 to abandon price controls, only amplified the market sentiment of a supply surplus (Stocker et al. 2018).

The disappointing demand for oil growth and other factors

In addition, demand for oil, especially from China and Europe, was not matching IEA³ expectations due to an economic slowdown after the 2008 financial crisis. The disappointing global growth was felt particularly from mid-2015 to early 2016. Moreover, Iran sanctions were

¹ West Texas Intermediate

² Organization of Petroleum Exporting Countries

³ International Energy Agency

being lifted, and the US currency was appreciating against other currencies, translating into lower geopolitical risks and even lower oil prices. This is because producers tend to make up for this foreign currency exchange gain with lower quoted prices, instead of passing the entire price increase to foreign buyers (once oil is mostly quoted in US dollars). From June 2014 to January 2015, the dollar's value rose 14.3% compared to an average of currencies from major US trading partners (Stiger and Mead 2015).

The transition to an energy-efficient world

The world was praising less energy-intensive activities and investing in efficiency schemes, whether applied to households or industrial production. Not only did the fuel used begin to be more efficiently consumed, but also alternative fuels such as natural gas started to gain popularity. The world was turning to less polluting energy sources and something was brewing at a worldwide level, resulting in the Geneva negotiating text published in February 2015, a draft document for an international agreement to limit GHG⁴ emissions worldwide. This was showing a clear intention for the achievement of a deep regulatory landscape situation with impact on all industries. However, with a special space in the limelight reserved for the energy (both production and consumption) industry – what will happen to the energy industry if the emission of an unavoidable by-product of their operations is capped? In addition, all eyes are on the 2015 UN⁵ climate conference to happen in Paris at the end of the same year (Lee 2015).

Deal Consideration

These signals appeared to be the beginning of another historical oil price collapse and Shell's shareholders were facing an unavoidable question: whether they should vote for Shell to move forward with the deal in a world where oil and gas prices could remain lower for some time, just as the CEO Ben Van Beurden had expressed in December 2015 in a public announcement

⁴ Greenhouse Gas

⁵ United Nations

(Farrell 2015). The BG deal was agreed and predicated on the assumption that oil prices would strongly recover to \$90 a barrel by 2020. As of 8th of April 2015, WTI and Brent benchmarks were quoting \$50.4 and \$56.4 per barrel, respectively. Then, they seemed in fact to be recovering (Exhibit A), but they have since slipped back, augmenting expectations that they will remain lower for longer than expected. However, Shell's CEO still stated that the acquisition still offered a "strategic transformation" (Crooks 2015). Moreover, although the industry was experiencing one of its worst downturns in decades, the ISS⁶ mentioned in a report "the current low oil price may be of very little value in assessing the strategic opportunity of a transaction whose benefits will be realized over decades" (Bouso 2016).

The Deal Motives

Shell aimed to solidify its LNG and deepwater oil production, which were key growth markets. BG had built a strong foothold and substantial LNG portfolio in Australia and deepwater assets in offshore fields in Brazil, and, with the acquisition, Shell would become the world's second-largest public oil and gas company by market value, only behind Exxon Mobil Corp. In addition, it would make the firm the world's largest LNG firm and would also potentially surpass Exxon as the largest publicly traded oil and gas producer by 2020, according to Simmons and Company analysts (Bouso 2016). From 2014 to 2015, Shell had decreased its proved developed and undeveloped oil and gas reserves by around 10% ("Shell's Oil and Gas Reserves" n.d.). But more importantly, in 2015, the company achieved its worst performance since the accounting scandal in 2004: Shell had depleted its reserves much faster than replaced them, achieving an RRR⁷ of -20%. BG reached a RRR of 61% on the same year (Blas 2016). Despite many uncertainties around the deal, Shell's "iconic" dividend was something that had always been a "core value proposition" and hence, something that Shell had seen as a

⁶ Institutional Shareholders Services

⁷ Reserve Replacement Ratio. The amount added to reserves divided by amount extracted

commitment to be met. While some analysts, such as Matthew Beesley (head of global equities at Henderson), were defending that the acquisition was to “potentially strain on the dividend”, others, like Credit Suisse and ISS analysts, defended that the acquisition would protect it (Shubber 2015). What was certain was Shell’s investors regarding its impact in the first year or two. In addition, while BG shareholders were expecting to receive only \$0.14 in 2015 (BBC News 2015), Shell confirmed its commitment to pay existing shareholders \$1.88 per share, and again at least the same amount for 2016. Moreover, with the acquisition, BG shareholders would also receive Shell’s “iconic dividend”. Shell estimated about \$2.5 billion in synergies annually by 2018, stemming from cost reductions, operational overlaps, and asset optimizations (Table 1). The company also intended to divest \$30 billion in assets from both Shell and BG between 2016 and 2018 to streamline operations and enhance financial flexibility. For BG, the acquisition came at a time of vulnerability. The company had been hit hard by the fall in oil prices, which had dropped from over \$100 per barrel in mid-2014 to below \$40 by the time the deal closed in 2016 (Exhibit A). BG’s share price had suffered a significant decline, and the company was also dealing with asset write-downs and operational challenges. If these operational challenges persisted, they could leave BG in “deep water”. In addition, according to the new BG’s chief executive Helge Lund, “BG had struggled to shake off the perception that in developing Brazil and Australia it bit off more than it could chew” (Shubber 2015). And Shell has been recognized for a long time for its financial strength, whose debt was rated AA by Moody’s (Eley 2015). However, not all reactions were positive to the deal announcement. Some analysts and Shell shareholders expressed concerns about the timing of the acquisition, tense about the possible not recovery of oil prices to around \$90 per barrel by 2020. Critics argued that the high premium Shell paid was predicated on an optimistic view of future oil prices and that Shell might have overpaid given the risks involved in the volatile oil market.

PART II: Should Shell Shareholders Vote for BG Acquisition On 27th of January 2016?

With the acquisition, BG would become a wholly owned subsidiary of Shell. Shell structured the deal as a cash-and-shares offer, where BG shareholders would receive a value of £13.50 per share held, reflecting a premium of approximately 52% over BG's share price the day before the announcement, considering both cash and stock. While Beurden stated that it was not "outlandish" in the energy sector, many analysts pointed out that it could be too high (Shubber 2015). However, it is important to recall that the deal was also to be paid in shares, which could make the "real premium" paid to decrease. The initial blend consisted of £3.83 in cash and the remaining amount in Shell shares (preferably B shares but could also be A shares at the request of the shareholder), with BG shareholders also having the option of using a "Mix & Match" facility to adjust the proportion of cash and shares they received, to a limited extent (Shell. "Recommended Cash and Share Offer for BG Group Plc by Royal Dutch Shell Plc," 2015).

Beurden had also expressed that there was a "modest risk" that the deal could fail to fulfill all the key regulatory approvals (Crooks 2015). Given all the deal motives, together with the approximately 50% offered premium, questions arose whether this deal announcement had been a good move for Shell: "For Shell shareholders, we are less convinced of the merits. The deal is predicated on a strong recovery in oil prices" said Neill Morton, an analyst at Investec Bank. All Pre-Conditions were accepted as of 14th of December 2015. The show must go on.

PART III: Should Shell have acquired LNG at all? A 2024 perspective

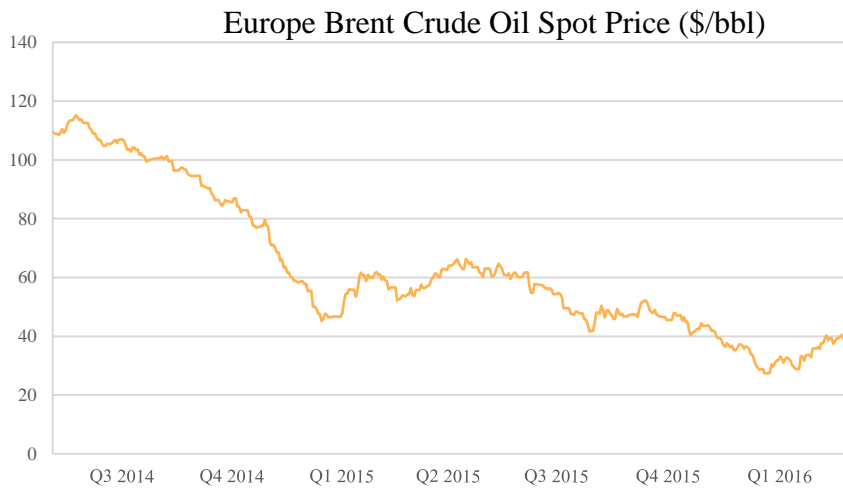
On Bloomberg Original's YouTube channel video "Shell CEO: BG Group Looked Too Good to Pass On" from 8th of April 2015, the acquisition is described precisely as a "big bet on gas", with the interviewer asking Beurden "How do you see natural gas rolling in the next 20-25 years in the global energy mix?". This is a very important question that, in case of a negative answer, leads to an even more crucial one: Did Shell bet on the wrong future? In 2024, almost 10 years from the deal date have passed, which allows for a different perspective and perhaps for a fair attempt at answering the above question. Starting by the LNG market as of 2024, natural gas represents around 25% of energy consumed in Europe (similar value to 2015), and LNG imports to Europe made up 43% of total gas imports in 2023, having increased from 20% in 2020 (European Commission 2024). The LNG and natural gas market has remained stable, being characterized by tight supply and affordable prices, from 2015 up to now, except for one event that caused a price shock in 2022. This event made prices triple for about 1 year (counting from the stable low point until it stabilized again) and led, together with other factors such as the increase in green energy output and two consecutive mild winters, to the reduction of consumption of natural gas. The US LNG export price is currently around the \$6/Mcf⁸ mark, being expensive compared to the big supply of other natural gas options, being double the average price for all-natural gas. As for future LNG demand, a CAGR of 3.6% is expected for the years 2023-2040 (Shell plc 2024). Despite the growth forecast, Europe has likely already passed its LNG demand peak, with the European Union's LNG terminal's average utilization rate falling below 50% in the first half of 2024, and the overall European demand for the fuel falling 20% YoY in the first half of 2024 (The Institute for Energy Economics and Financial Analysis 2024b). The growth forecasted is highly driven by China's demand increase, however, Reuters tells us not to count on that and that China, like Europe, might have outgrown natural

⁸ One thousand cubic feet (Mcf) of natural gas equals 1.038 MMBtu, or 10.38 therms, as per <https://www.eia.gov/tools/faqs/faq.php?id=45&t=8>

gas. Other important data is that of new LNG infrastructure construction. Projects for LNG terminals and infrastructure are being planned, from the US and Europe to African nations (Shell Global 2024). However, multiple projects in Europe are being shelved, Australia and Canada are suffering from high costs of construction, Russia is weakened by their geopolitics situation, Africa is geopolitical unreliable and suffering delays in LNG deliveries ranging from 6 months to 2 years, USA is reevaluating LNG industry's effects in natural gas prices as well as on the climate and the local communities, and lastly, Qatar is embarking on a massive LNG capacity expansion (Blas 2024). However, most of this future capacity (part to arrive already in 2025) is still uncontracted. Furthermore, LNG infrastructure has been deemed irreversible and impossible to adapt to green energy (Fakhry 2023). Regarding the environmental impact of LNG, energy research has found new facts. For example, a 2014 study was updated in 2019 (Roman-White et al. 2019) and, although still optimistic, it has reviewed its expectations regarding GHG emissions of both natural gas and specifically of LNG, providing a more pessimistic scenario (GHG emissions of 2019 version closer to coal emissions than 2014 version). Some studies indicate that LNG emits less GHG than gas, however, the breakeven point of gas leakage is very low, with evidence that normal operations surpass this level. Recently, a study (Howarth 2024) has been published that is causing turmoil in the energy world: "The greenhouse gas footprint of liquefied natural gas (LNG) exported from the United States" by Robert W. Howarth, a Cornell University researcher. In this study, one of the most comprehensive ever done in this area, Howarth found that the GHG footprint of LNG as a fuel source is 33% greater than the one of coal when considering a 20-year time horizon, and still greater when looking at a 100-year horizon. Since 2015, the investment in environmental, social, and governance (ESG) has only grown, with special attention paid to the period 2017-2022. Within ESG investing, climate risk has been a great focus, driven by regulatory support from Europe and parts of Asia (N. Iyer 2024). Both consumers and investors increasingly

demand more transparency and accountability regarding environmental impact and actions from corporations (Cooper 2021). At the same time, ESG investing has been proven to have the possibility of having higher returns than non-ESG investing. Due to these pressures (including environmental ones), the development of non-fossil alternatives, namely renewables and nuclear, has started to speed up (Rodríguez 2020) - the low-carbon journey is here to stay (Beck et al. 2021). The Geneva negotiating text published in February 2015 led to the now-famous Paris Agreement (2015/16). After 2015, several energy policies were made with this agreement in mind, and energy sources like LNG have now been deemed incompatible with the goals of the Paris Agreement for the temperature limit of 1.5°C and 2°C (Yang, Hastings-Simon, and Ravikumar 2022). Moreover, 60% of actual fossil fuel reserves would have to remain unexplored for us to remain on track for the 1.5°C limit (Cunningham 2024). There have been increasing concerns in gas exploitation regions, like Arlington (Texas, US) (Leibovici, Abdelilah, and Destal 2023), that the operations inherent to this activity cause very serious health conditions (School of Public Health of University of Pittsburgh 2023), leaving the surrounding population helpless and with no solution for their health problems. Since the signing of the agreement, the number of lawsuits against fossil fuel companies (responsible for almost 75% of the world's GHG emissions) has nearly tripled, with the main reasons for filing being "Integrating climate considerations cases", "Climate-washing cases", and "Government framework cases". Narrowing down to cases against fossil fuel-producing companies, in the number of cases, Shell is only dethroned by ExxonMobil, and the main reasons for filing are "Climate damages", "Misleading Advertisement", and "Environmental impacts & permitting" (Setzer and Higham 2024).

Exhibit A. Graph of the evolution of Brent crude oil prices between Q3 2014 and Q1 2016



Source: U.S. Energy Information Administration (EIA) 2024

Part B: Teaching Note

SYNOPSIS

On the 8th of April 2015, Royal Dutch Shell plc (Acquirer), one of the largest independent petroleum companies, announced that it had agreed to buy the oil and gas exploration firm BG Group (Target). “This is a compelling offer”, Shell’s CEO had said several times, due to the clear strategic and balance sheet fit between the two companies. The deal value was around \$70 billion (or £47 billion), yielding a total of \$3.5 bn of pre-tax synergies, and transacted in the form of cash and stock, with an associated high premium of approximately 52%. A Mix & Match facility was offered, in which BG shareholders could choose how much they could receive in cash and new Shell shares to be issued. The most remarkable aspect of the deal is that it came at a time of uncertainty for the oil and gas industry. In the prior six months of the announcement date, the oil price had fallen by about 50% (BBC News 2015), reaching its minimum in January 2016 at \$29.4 per barrel (Trading Economics 2024), the lowest level in a little over a decade. Both Shell and BG were highly reliant on oil and gas prices. Meanwhile, analysts warned that investment in North Sea oil exploration had all but dried up, threatening the entire industry (BBC News 2015). The deal (as well as the valuation) was predicated on an oil price recovery of \$90 per barrel by 2020. Despite the unfavorable pressures for the industry, and acknowledging “there was a modest risk”, Shell’s CEO Ben van Beurden, however, had always demonstrated confidence and great optimism that the deal would go through. The sole doubt Beurden manifested was getting all the several anti-trust clearances from the many jurisdictions in which Shell had an important presence, and the increased higher presence that the new combination would have. The deal represented the 14th largest M&A transaction in history at the time, and Shell became the second-largest energy company by market capitalization, surpassing Chevron Corp. The strategic fit behind the deal rationale seemed

clear, but, from the financial point of view, there was some opacity due to the development of oil prices and the justification of the apparent high premium offered.

PEDAGOGICAL POSITIONING

This case study was designed for students pursuing a master's degree either in Management or Finance, ideally to be taught in a Strategy or Mergers & Acquisitions course. Prior to the reading and analysis of the case, students should have a solid general understanding of M&A and Corporate Finance topics, such as deal terms and structure, corporate governance, some law terms, capital structure, and valuation methods, namely the Discount Cash Flow (DCF) analysis and the Comparable Companies' analysis. If needed, the chapter "Value and Capital Budgeting" of the academic book Corporate Finance (3rd edition) by David Hiller provides solid guidance for the valuation. To facilitate an easy discussion among students, the specific technical terms will have information that helps to define them, however, due to the specificity of the industry in which the deal takes place, it is considered valuable for the student to already hold a cultivated general understanding of the uniqueness of the energy market and prices. The purpose of this case study is to challenge students to think outside of the typical flow of M&A cases, presenting them with structures and topics they might not fully know before. To help the instructor guide the students, this teaching note serves as a basis for discussion, providing already some possible questions to be posed to students.

LEARNING OBJECTIVES

This case aims to increase and improve students' sensitivity to several topics, which should be presented, explained, and challenged by the instructor. These are:

- The formulation of a sound recommendation based on the given data. Students will be asked to deduce the strategic and financial deal rationale, both for the acquirer and the target. It is expected that students will cultivate a greater understanding of corporate decision-making.

- The understanding of synergy sources, which is one of the principal motives in M&A deals. Students will understand the implications of considering a deal that achieves synergies by revenue increase and/or cost savings.
- The understanding of the movements in share prices during the timeline, by gaining a perception of how market expectations react to public announcements and public data, as expectations highly influence valuations.
- Getting familiarized with the M&A practice and concepts applied to a real-world example, with the aim of incentivizing future paper and news readings in an effortless manner.
- Getting first contact with certain aspects of the legal landscape of the deal, by exploring the complexity of a real-life merger deal. Students will gain an awareness and understanding of the antitrust regulatory implications of a big deal.
- Gain knowledge on several components of M&A, from the classic strategic and financial fit to more dynamic concepts such as market trends and government policy changes, and how factors like these can condition the future success of the deal.

SUBSTANTIVE ANALYSIS AND TEACHING PROCESS

The case is expected to be taught in three separate classes (Sessions) of two hours each, and ideally with at least one day in between (and up to one week), for valuation purposes. The case is divided into three parts: Part I, Part II, and Part III. The class dedicated to Part I is intended to provide students with the most possible facts about the deal, from the pre-case questions to one of the most important parts of the case, the deal structure. It is recommended that students form groups of 3 to 4 people, to come up with their financial valuation. While Part I should be dedicated to getting students acquainted with the deal and for the teacher to explain pertinent topics in connection with it, Part II will mostly be dedicated to discussions from the strategic and financial points of view. Students are also expected to present their valuation results. Lastly, Part III will be dedicated to the post-deal and epilogue, approaching the strong and less strong

points of Shell's acquisition strategy, what could have been done differently, and the final sentiment about the case and the knowledge acquired.

◇ Session 1 ◇

Pre-case distribution questions

Before distributing Part I of the case, it is recommended to pose some pre-case questions about the industry and the companies involved, to capture students' initial attention, and so that the instructor can assess their pre-case knowledge. The instructor could divide the classroom into two groups, and the one with the most accurate answers would gain some reward at the end, acting as an incentive. The instructor is free to modify and come up with more questions as preferred. Examples can be found below:

- Explore the knowledge and awareness of some terminology, such as the Reserve- Replacement Ratio (RRR)⁹.
- Highlight the energy market specificities, namely its importance and relevance in global markets, its inherent price volatility, its competition, and regulation. For example, Shell is an independent petroleum company. This might lead to questions on the differences between dependent and independent energy producer companies and their implications. The instructor could ask the difference between the West Texas Intermediate (WTI) and Brent Crude indexes, mentioned in Part I.
- Instructors should also induce students to think about aspects that can affect income and expenses, such as the quoted oil prices, R&D, refining, drilling, and exploration costs.
- The possible integration challenges of M&A energy deals. For instance, the risk of overpayment due to the inherent energy price volatility, the potential lack of regulation with

⁹Amount added to reserves divided by amount extracted. The definition can be consulted at <https://www.investopedia.com/terms/r/reserve-replacement-ratio.asp>

the abrupt rise of renewables, and the possible different infrastructures and technology used in the parties' operations.

- The different existent energy sources in the market, their uses, and some characteristics that differentiate one from another. For example, what do we use oil for and what do we use gas for? What is the difference between “natural gas” and “liquefied natural gas” (LNG)?
- The current shifts in the energy mix of countries and long-term strategy changes, such as the 2022 Inflation Reduction Act in the US, or the 2020 European Green Deal.
- The role of the oil industry and how it has evolved over the past century, its historical context, economic importance, and the challenges to oil industry dominance.

Guide for The Case – Post-Case Part I Distribution

Now that Part I of the case has been distributed and students have had time to do a first reading session, the actual analysis will take place, starting with the deal pressures.

i. Pre-existent Industry pressures

It is relevant to identify pre-existent pressures both in terms of time horizon (short and long-term) and industry-level factors vs. firm-specific factors. With the help of a whiteboard, the instructor should start by collecting students' first insights and recording them visually on a matrix, with the short-term and long-term horizons acting as columns, and the industry and firms on the left acting as rows (Figure 7). The firm-specific pressures will be further discussed in section “*ii.*”. It is also important to mention that this section presents points both for and against a merger in this sector. The goal is to discuss the topics presented below. The instructor should then start with the industry ones, by asking:

- Based on the information available in the case study, what could be the short-term pressures acting on the industry around the time of the deal announcement? And long-term ones?

- If you were a US shale oil producer, would you step back to “protect” oil prices, or would continue to produce?

Students are expected to come up with the following (or similar) answers:

Short-Term Industry Pressures

- *Volatile Oil and Gas Prices:* At this time, oil prices were at a severe low. The industry was experiencing a historical oil price downturn (Figure 8). The fact that it was happening when the deal was being considered (from the announcement date until the date that the deal was closed) represented an important pressure for companies to consolidate and stabilize revenue streams. M&A deals are key in these situations as companies that do not hold strong financial positions tend to struggle to survive, eventually being acquired as a last resort.
- *Shale Boom Competition:* The rise of U.S. shale production largely caused by efficiency gains in shale technology, threatened the traditional dominance of big oil companies in global energy markets, increasing even more the competition between them. The big supply surplus made oil prices fall abruptly.
- *Demand-Supply Dynamics:* Immediate market oversupply causing lower prices to force companies to seek efficiency through mergers and cost synergies.

To go slightly beyond, the instructor can also ask students about the relationship between geopolitical tensions and deal activity, as political instability in oil-producing regions heightens the need for energy companies to diversify geographically.

Long-Term Industry Pressures

- *Energy Transition:* There was a growing global momentum toward decarbonization, and renewable energy sources were arising to challenge the traditional oil & gas business model.
- *Market Saturation:* Increasing competition from oil companies led to long-term consolidation trends.

Other relevant industry pressures that students can mention are:

- *LNG Demand Growth*: Growth in LNG demand increased pressure to build stronger LNG portfolios. Being LNG obtained by a liquefaction process that converts natural gas into a liquid state, its volume is reduced by about 600 times compared to natural gas, facilitating its storage and transportation.
- *Climate Change Regulations*: International agreements like the 2015 Paris Accord pushed for innovation and cleaner energy investments.
- *Technology Disruption (and the consequent rise of renewables)*: The advances in renewable energy and energy storage posed a long-term existential challenge to fossil fuel reliance.

ii. Deal motives

This section allows for a wide range of topic discussions. Hence, it is expected that the instructor will allocate more time to this section. Some questions to be asked could be:

- Recalling and considering the previously mentioned industry pressures, what were the key motivations behind Shell's acquisition of BG Group?

The instructor could let students originate their first ideas on their minds while, at the same time, direct them by asking additional questions such as:

- How did this acquisition position Shell in the natural gas market compared to its competitors?
- Based on the case information and by looking at the maps (Figures 2-5), what were Shell and BG strong in? Do they have similar operations and geographic presence?

After these initial questions, the instructor should come back to the matrix initiated on the whiteboard and complete it as students' suggestions and ideas arise. After brainstorming, the instructor should develop these motives from both parties' perspectives and fill in the firm-specific pressures into the matrix. The main motives are closely interconnected as they are rooted in both strategic and financial factors. These are developed as follows:

From Shell's perspective: Increase diversification, conquer the market, and synergies

For Shell, the deal was a long-term strategic move to solidify its leadership in LNG and deepwater oil production—promising areas seen as crucial for Shell in its long-term transition to less carbon-intensive fuels. BG's substantial portfolio in both areas, especially its deepwater assets in offshore fields in Brazil and its LNG projects in Australia, were key in attracting Shell, as it would become the world's second-largest public oil and gas company by market value, only behind Exxon Mobil Corp and potentially also surpassing it by 2020 as well, according to Simmons and Company analysts (Bouso 2016). Also, by integrating BG's operations, Shell would become the world's largest LNG firm, as would gain access to key growth markets such as Brazil, where BG had a strong foothold and reserves (Shubber 2015). Students may be assisted in arriving at such conclusions by looking at Figures 2 - 5, if presented by the instructor. Shell's future hydrocarbon production and, consequently, earnings and cash flows, depended largely on its ability to replace proved reserves. The acquisition of a new company also implies the acquisition of all its assets, meaning that Shell would gain access to BG's reserves, something especially important, with Shell's recent poor performance of reserves replacement, measured by the RRR. The replacement of new reserves can either be done by finding new ones or acquiring existing ones, the latter being considerably much easier.

Regarding the dividend, there were different views from analysts. On the one hand, the acquisition could put a strain on Shell's financials as they were to redirect cash flows to pay down debt. On the other hand, the argument was that it would reduce Shell's risk and make it more efficient, providing protection (Shubber 2015). The instructor could take advantage here to ask students what view from analysts they would support and what their line of thinking was. Lastly, Shell estimated synergies stemming from cost reductions, operational overlaps, and asset optimizations (Table 1). Hence, the instructor is expected to provide the above

information, and at the end, specifically indicate that these main motives from Shell's perspective are the following:

1) Diversification, which is one of the main reasons why mergers occur. By definition, a firm is diversified if it operates multiple divisions with imperfectly correlated cash flows. As already understood, BG was strong in LNG, while Shell was in oil extraction. The instructor, if perceived that students are into the energy sector, can also ask students about the relationship between crude oil and natural gas prices and what factors can affect them. Evidence suggests that Natural Gas prices and oil prices are linked in a long-run relationship and equilibrium, due to competition and substitution forces and that they have moved in tandem until 2008 (McHich 2018). Nevertheless, this relationship has been decoupled since 2008 due to several factors such as the shale revolution, innovation in technology, and investment in infrastructure. The more this linkage is dissociated, the more diversification effects a producer could get, as prices of natural gas and crude oil are less connected. In addition, it is relevant to know that while Natural Gas prices are affected by short-run shocks such as weather conditions, natural disasters (hurricanes), and storage dynamics, crude oil prices respond more to geopolitical events.

2) Market presence increase. Just as the Royal Dutch Petroleum Company and the "Shell" Transport and Trading Company Ltd, merged back in 1907 to compete against the American giant of Standard Oil and from Royal Dutch Shell plc ("Shell"), Shell decided to acquire a company with an important presence in the market to face competition.

3) Synergies realization. Synergies are also one of the main reasons why mergers occur. By definition, they are the additional value as a result of a transaction, when the combined value of the new entity is greater than the sum of its individual parts. These can come from several sources: cost savings and revenue growth (referred to as "operational synergies"), and capital structure improvement (referred to as "financial synergies"). When explaining the concept of

synergies, the instructor can also sketch on the whiteboard, showing other synergies sources with other examples. In the case of Shell, the instructor can pose the open question of whether students think that the identified and quantified cost synergies were “real synergies” or not. Real synergies are the ones that can only be obtained by way of a merger. Students could also point out that there could also be other synergies that were real ones, but that they have not been quantified. For example, the fact that Shell would share with BG its capabilities to extract their rich reserves (which is a much easier process than finding new ones) and give BG access to projects that could not have been possible by the British company otherwise. Cost synergies are the easiest to quantify, communicate, and convince the market, as they do not depend on uncontrollable external factors as they occur in the case of revenue synergies. Leaving this point open for discussion regarding whether the identified and non-identified synergies of this deal are “real” or not, can be an interesting exercise to be made in the classroom.

From BG Group’s perspective: Shell as a savior and leverage for operations

For BG Group, the acquisition came at a time of vulnerability. The company had been hit hard by the fall in oil prices, which had dropped from over \$100 per barrel in mid-2014 to below \$40 by the time the deal closed in 2016 (Exhibit A). BG’s share price had suffered a significant decline, and the company was also dealing with \$9 billion asset write-downs and operational challenges. The acquisition by Shell was seen as a lifeline, providing BG shareholders with a substantial premium and a chance to exit amid challenging market conditions. The deal also ensured that BG’s significant LNG and deepwater assets would be developed by a company with “deeper pockets” and a stronger financial position. And Shell has been recognized for a long time for its financial strength, whose debt was excellently rated by Moody’s (AA), which is better than many sovereign countries (Shubber 2015). The fact that BG shareholders would, certainly, start to receive the “iconic dividend” from Shell, was another big plus from the

transaction in favor of the BG Group. Once again, the instructor, after the delivery of the suggested insights, should write the specific motives on the matrix, which are:

1) BG's survival, as the company had a share price down 30% over the past year and facing operational challenges in a shaky market environment at the time, being acquired could have probably been its last resort versus shutting operations (Shubber 2015).

2) The acquisition by a strong financial player in the market. BG had struggled to show that it could develop its operations in Brazil and Australia, and with Shell acquiring it, this perception would come to an end, considering Shell's experience and dimension.

3) Better dividend compensation, as Shell was surely to pay \$1.88 on the 2016 financial year and at least maintain it for the next one (BBC News 2015).

4) Synergies once again, as they are enjoyed by all shareholders of the new combination.

Following the presentation of the motives, this section also allows the instructor to introduce several M&A concepts and link them with the case. To do that, several questions can be posed:

- Could you think of any effect, derived from the attempt at diversification, that could impact negatively the merger, and how could we perceive it? **(a)**
- Is this a vertical or horizontal merger? Discuss its purpose and benefits. **(b)**
- The estimated pre-tax synergies of this case were considerable. However, generally speaking, can a deal still make sense even though there are no synergies? Why? **(c)**

a. The downside: conglomerate discount

With the acquisition of BG, Shell was attempting to diversify its balance sheet and hence its operations and this was one of the main valuable motives for Shell to acquire BG, according to analysts. For diversification to add economic value, benefits that shareholders cannot obtain on

their own must exist, recalling that by definition, a firm is diversified if it operates multiple divisions with imperfectly correlated cash flows. It is important to remember that Shell had been struggling with replacing its reserves, and it was much easier to acquire new reserves (from BG) than to find new ones. However, some sort of “conglomerate discount” could have occurred, in the sense that the market could have thought that Shell did not have the means and capacity to manage BG’s assets and operations, hence, resulting in a lower value for the new combination, worthing less than the sum of the stand-alone value of the companies. The conglomerate discount effect is an economic concept in which the market values a diversified group of businesses and assets at less than the sum of its parts. Typically, it results in a 10% to 15% discount in valuation for the conglomerate (“Conglomerate Discount” n.d.). Nevertheless, there is a lot of debate about whether diversification causes this phenomenon, becoming unclear if the market punishes conglomerates through discounts.

b. Vertical vs. Horizontal Merger

Students are expected to identify that this is a case of a horizontal merger since it was an acquisition of a competing company in the same industry (often at the same stage of production or service delivery in which they expanded operations), but that did not engage in different operational processes. By contrast, a merger that is said “vertical”, occurs when the merger refers to companies operating at different stages of the production process within the same industry, allowing them to maximize joint profits and increase output. The instructor can also mention that the type of merger also has implications on antitrust matters. While vertical mergers involve the integration of complements (not reducing competition *a priori*), horizontal mergers involve the combination of businesses that are either actual or potential competitors (resulting in at least some loss of rivalry) (Wong-Ervin 2018).

c. Synergies: a plus or a must?

Although synergies are one of the main motives and driving forces of why mergers occur, which appear reflected in the premium paid, they are not a requisite. A deal can be valued with zero synergies and still provide benefits for the merger to happen. This can happen when the company that is merged does not share common operations with the buyer and runs its operations independently from it after the deal, not getting consequently any synergy potential as a result of the merger. Obtaining a synergy means a situation in which both parties benefit as a result of the share of their forces and fragilities, and whose benefits could not have been obtained on their own. The deal between Heinz (target) and 3G Capital and Berkshire Hathaway (buyers) initiated in 2013, is an example of a deal with zero synergies.

iii. *A Merger also depends on mathematics: the valuation*

After the qualitative aspects of the deal are explored, it is time to introduce the part that moves the world around, mathematics. Some questions on this subject:

- What valuation methods do you think are appropriate for analyzing this deal? **(a)**
- What are the potential synergies that Shell anticipates from the deal? (Qualitatively) **(b)**

a. Valuation Methods

For reasons of in-class time constraints, preference was given to simplicity and substance over complicated and overly complex assumptions, in valuing the deal. It is useful to briefly review the choice for the discounted cash flow analysis (DCF analysis) and the comparable peers' analysis. The DCF analysis discounts future cash flow streams at the weighted average cost of capital (WACC) and is "especially useful when applied to a multi-business company" (Koller, Goedhart, Wessels 2015, p.139). "WACC-based valuation models work best when a company maintains a relatively stable debt-to-value ratio" (Koller, Goedhart, Wessels 2015, p.137), which was the case of BG Group (D/EV ranged between 27% and 38% between 2010 and

2014). Besides, despite its less diversified operations comparatively to Shell, BG Group operated in different business segments within the oil and gas industry, with a special focus on Upstream and LNG Shipping and Marketing (BG Group 2015).

The DCF analysis is a form of intrinsic valuation, which means it “is independent of the market, so the current trading price should be neglected and not impact the ending valuation”. Despite the flaws in market pricing, it is important to also take an opposite perspective to the self-sufficient DCF approach, to grasp some of the market sentiment at the time and to create a more holistic view of a firm’s true value. Therefore, the employment of a form of relative valuation was made useful, and the market approach was also considered, through comparable peers’ analysis. This comparable analysis was done with 16 industry peers, and based on commonly used metrics in relative valuations, namely Enterprise Value/EBITDA (EV/EBITDA), Price/Earnings (P/E), and Price/Book Value (Price/Book).

Discounted cash flow (DCF) analysis

Valuing BG Group

The DCF analysis (Table 2) was divided into two steps. The first step was the valuation of BG Group by itself, not yet considering the predicted effects (synergies) from the combination with Shell. The necessary assumptions for this valuation were based on market research and data from previous annual reports of both firms and from Shell’s specific documents concerning the deal. The firm’s financial statements are attached in the Appendix (Tables 3 – 8). The assumptions made were the following:

1. As expenses as a percentage of revenues are relatively constant for the five precedent years (never more than five percentage points), we applied the growth rate directly to the EBIT for simplification purposes;

2. The assumed growth rate for the EBIT was 3%, deduced from the average of 2-4% annual growth, in line with the average GDP growth rate, considering 2-3% inflation; (Vipond 2023) (Royal Dutch Shell plc 2014);
3. As aforementioned, the DCF is a WACC-based valuation model that works “best when a company maintains a relatively stable debt-to-value ratio” (Koller, Goedhart, Wessels, 2015, p.137) (Tables 9-12). Since there is not much variance in the levels of the debt-to-value ratio for the five precedent years, the capital structure was kept constant at the average value of the ratio from 2010 to 2014;
4. The cost of debt was calculated as: $rd = Rate + Spread$, with *Rate* as the 10-year US market interest rate, represented by USD Swap 10-years as of April 2015 (Financial Times 2024), and *Spread*, as a measure of the risk of BG Group’s credit financing based on the CDS US 10-years (credit default swap) for ConocoPhillips, which had the same credit rating of BG Group at the time (Urmal 2017);
5. The cost of equity was obtained using the CAPM formula: $re = rf + \beta L(E(rm) + rf)$, in which: *rf* is the 10-year US Treasury yield as of April 2015 (St. Louis FRED 2024), *rm* is the market risk premium, based on the total equity risk premium for the UK (since BG is a British company) as of July 2015 (Damodaran 2014), and βL is the levered Beta, obtained as the raw beta for a 5-year linear regression analysis with monthly data (Bloomberg 2024).
6. The taxes from 2015 onward were assumed to be the average of the effective tax rate of BG Group from 2011 to 2014; (S&P Capital IQ Pro 2024).
7. Capital Expenditures (CAPEX) were taken directly from the cash flow statement. For valuation purposes, we have assumed a reduction of CAPEX between 2015 to 2020. A reduction of 30% in capital expenditures in 2015, in relation to 2014, was assumed, and this reduction would progressively decrease each year. The reasons for that were two: first, the high levels of capital expenditure at the time, mainly due to projects acquired in Brazil and

Australia, were unsustainable; secondly, these same projects, namely the Queensland Curtis Liquefied Natural Gas (QCLNG) facility, would be completed, further reducing capital expenditure (“BG Group expects capital expenditure on a cash basis in 2015 to be significantly lower than 2014, as projects complete and the Group reacts to a lower oil price environment by setting a higher hurdle rate for investment”) (BG Group 2014).

8. The change in Net Working Capital (NWC) was deduced from the difference between the change in current assets and the change in current liabilities from the balance sheet.
9. For forecasting current assets and current liabilities, the forecasted revenues for 2015 onwards were multiplied by the average ratio of current assets/current liabilities to revenues from 2011 to 2014.
10. Total assets from 2015 onward were assumed to be the average ratio of total assets to revenue from 2011 to 2014 multiplied by the forecasted revenue.
11. Depreciation from 2015 onward was assumed to be the average ratio of depreciation to total assets from 2011 to 2014 multiplied by the forecasted value of total assets.
12. To determine the terminal value, a perpetuity was assumed after 2020, with the aforementioned growth rate of 3%.

Given these assumptions, BG's Enterprise Value (the minimum offer price) is obtained in this first step. The second step is the quantification of the synergies resulting from the acquisition.

b. Valuing Synergies

Shell initially estimated “pre-tax synergies to reach \$2.5 billion per annum in 2018, comprising \$1 billion of operating cost savings and a \$1.5 billion reduction in exploration expenditure” (Royal Dutch Shell plc 2015a). “The implementation of the operating cost savings would also give rise to one-off costs of approximately \$980 million incurred in the first three years post-completion to the end of 2018, of which approximately 65% would be incurred in 2016 and 30% in 2017.” (Royal Dutch Shell plc 2015a) However, “Shell was also confident of realizing

additional synergies that could not be quantified for reporting under the City Code” (Royal Dutch Shell plc 2015a) at the time. Thus, by the end of 2015, Shell was able to increase its earlier estimates for pre-tax synergies by 40%, from \$2.5 billion to \$3.5 billion in 2018. According to the Dutch firm, “this increase was attributable to a doubling of expected operating cost savings from \$1 billion to \$2 billion and underscored the attractiveness of the recommended combination for both sets of shareholders” (Royal Dutch Shell plc 2015b). Therefore, the revised expected level of pre-tax synergies comprised \$2 billion of operating cost savings and a \$1.5 billion reduction in exploration expenditure by 2018. Shell directors expected these synergies to be delivered progressively, with 50% achieved by the end of 2016, 80% by the end of 2017, and the full amount in 2018. Additionally, the one-off costs as a result of the implementation of the operating cost savings would be “approximately \$1,230 million, to be incurred in the first two years post completion to the end of 2017, of which approximately 70% would be incurred in 2016 and 30% in 2017” (Royal Dutch Shell plc 2015b).

The basis of belief for Shell’s estimates of synergies can be broken down into three components for further understanding of the concept of synergies (Table 1):

“Corporate, administrative, organizational and IT operational efficiencies: \$1,400 million from the de-duplication of overlapping back office and business support functions, the elimination of overlapping support costs, office consolidation, the migration of BG onto Shell IT systems, and removal of duplicative corporate costs.

Efficiencies in procurement spend (\$520 million), and marketing and shipping costs (\$50 million): \$570 million from economies of scale, specification, standardization, and operating efficiencies across operating, capital, and raw material cost areas and optimization of shipping and marketing.

Reduction in exploration expenditure: \$1.5 billion from the reduction in exploration expenditure enabled by high-grading and optimization of the combined exploration portfolio”. (Royal Dutch

Shell plc 2015b). Thus, the value of synergies is obtained by subtracting taxes (tax rate equal to the weighted average of the tax rates of each firm based on their market caps) from the pre-tax cash flows from the synergies and the one-off costs and then discounting these values by the weighted average of the unlevered cost of equity based on the firms' market caps. Finally, by adding the values obtained by the first and second steps, EV and synergies, respectively, the maximum price for an offer to acquire BG Group is obtained. With the value obtained, the maximum premium to be paid would be 89.03%, substantially larger than the 52% paid to BG.

Comparable peers' analysis

With the comparable peers' analysis (much simpler than the DCF analysis), it is also interesting to identify possible mismatches between market perception and firm fundamentals. The analysis was performed for three financial ratios, namely EV/EBITDA, P/E, and P/Book. Based on EV/EBITDA and P/Book, BG Group was overvalued, even if slightly, based both on the median and the average of peers' values. The opposite is true when P/E is taken as the basis of comparison. By adjusting to size and narrowing our comparison to the four peers with the closest EVs/Market caps, the results of such analysis better match the results from the DCF. Notably, now both P/E and P/Book show BG Group as undervalued, while EV/EBITDA still shows the firm as slightly overvalued. To conclude, the valuation section of the class instructors may question students over why BG Group may have had a relatively high EV/EBITDA and a relatively low P/E. The answer to that question is that the amount of debt may cause this disconnection between the two ratios, since more long-term debt increases EV, while it may also decrease the price of shares, if deemed to be unsustainable by analysts, thus reflecting a heightened risk of investing in the company.

End of Part I

Students should now form groups of 3 to 4 people and perform their valuation of the deal with the information obtained in the case, along with the topics discussed in Part I.

Valuation is to be performed in between sessions.

◊ Session 2 ◊

Session 2 begins with a discussion of the valuation and fair acquisition price obtained by students between sessions 1 and 2. The instructor should resort to the above section “*iii.*” to discuss specific points of tension/disagreement/errors in the students’ presented valuation that they have observed. The discussion should be followed by a first impression discussion on their thoughts on whether to acquire the BG Group. The instructor should ask students the question of whether to vote “Yes” or “No” in a non-binding manner at this stage.

Guide for The Case – Post-Case Part II Distribution

Now, Part II of the case works in detail through the final conditions of the deal presented to the Shareholders of both companies for approval. This is the stage at which they will have to decide to cast their final vote for or against, now in a binding manner. However, there was a major setback shortly before the Shell shareholder’s meeting: oil prices have been falling since mid-2014, with the Brent barrel of oil trading at less than \$35 on January 2016. The strategic rationale of the business was challenged by a few analysts, but the further fall in the oil price raised shareholders’ concerns over Shell’s debt burden, considering the premium being offered.

Deal structure: Final Offer Terms

First, it is important that the instructor dives deep into the deal structure and its implications, explaining them in greater detail than in the case study. Some appropriate questions would be:

- How was the deal structured (cash vs. stock)? **(a)**
- What does the premium reflect? Was the premium paid for BG Group justified, given the market conditions at the time? If not, would you think of any reason for such premium? **(b)**

a. **Compensation Structure**

The acquisition of BG Group by Royal Dutch Shell was structured as a cash-and-stock (or cash-and-share) deal, where the payment to BG Group Shareholders would come as a combination of cash and Shell B shares. More specifically, shareholders would receive 3.83 pounds in cash and 0.4454 Shell B shares for each BG share held. Based on the 90-trading day volume weighted average price of Shell B shares and BG shares, the deal would be valued at around \$70 billion on the announcement day, 7th of April 2015, which implied a significant premium, of approximately 52%. As a multinational firm, incorporated in England and Wales and tax-resident in the Netherlands, Shell segmented its stock for tax purposes. And, as an alternative to receiving the equity component of the offer in the form of Shell B Shares, BG Shareholders would be able to instead opt to receive Shell A Shares at the same exchange ratio. Through A shares, dividends paid had a Dutch source for tax purposes and were subject to Dutch withholding tax, while for B shares, dividends paid were treated as UK-sourced for tax purposes.

b. **Premium**

The high premium of the deal, of approximately 52%, was meant to encourage shareholders of the target company to approve the sale, compensating them for the opportunity cost of holding their shares versus selling. For reference, in a Bloomberg interview with Shell's CEO, on the 8th of April 2015, the average premium of the industry for deals over \$10 billion was 40% (Bloomberg Originals 2015). The premium reflected Shell's strong commitment to acquiring BG's valuable LNG assets and deepwater oil capabilities. Though this level of premium was substantial, it wasn't entirely uncommon for major deals where strategic alignment and asset complementarity were strong (Vignaroli 2023). Moreover, high premiums are often justified by synergies expected from the merger—cost savings, operational efficiencies, or growth

potential—which Shell expected through expanded LNG capabilities and greater access to high-quality resources.

The persistent oil price downturn

Once their results are presented, the instructor should now position students further in time, at the time of the General Meeting of Shell shareholders, which took place on the 27th of January 2016. The instructor could project on the whiteboard the graph showing the price of crude oil at the time (Exhibit A). The reasonable question to be asked now to students should be:

- Would you support the assumption of a recovery in oil prices to 90\$/bbl by 2020 as a probable statement?

End of Part II

<> Session 3 <>.

Guide for The Case - Post-Part III Distribution

The knowledge cutoff date is 9th of December 2024

Regularly, the level of applicability of case studies to the present and future is insufficient. This usually happens due to the lack of analysis in the post-decision period. Being Shell's acquisition of BG Group a deal that (according to Shell's CEO) was for the long-term, it is important to perform an analysis of the prospectives of the deal almost 10 years past its completion along with an analysis of Shell's strategy in hindsight, with the argument that a true long-term deal would withstand the test of a mere decade.

This chapter explores whether the acquisition was a forward-thinking move or a misstep in the rapidly changing energy landscape. It evaluates whether Shell's decision to focus on natural gas was prudent, particularly given increasing environmental concerns, subsequent regulations and agreements, the rise of renewables, the criticism of fossil fuel, and, lastly, when considering

alternatives for the types of investment that Shell could have pursued. The following sections are planned to be taught on a mixture of expository lesson and in-class discussion, to provide more information to the students on the particularities of the energy sector and its future, and ultimately, to conduct the session as an exercise of reflection regarding the acquisition decision. After students have read Part III of the case study, some questions can be asked, such as:

- Regarding the event that triggered a price shock in gas in 2022: Does anyone know what that event was? Why did it trigger the gas price shock? What influence did that event have on Europe's energy direction? **(a)**
- Regarding the canceled/postponed LNG new projects, the information given about several regions' standpoints on LNG, and the difficulty in adapting LNG infrastructure to green energy projects, what conclusions can be drawn? **(b)**
- Based on the scientific evidence provided by the case study, what is your idea of LNG being an applicant to the role of bridge fuel for the energy transition? Is LNG a suitable candidate? **(c)**
- Referring to ESG investment growth, what could be the origin of this growth? **(d)**
- Considering the increase in court cases against fossil fuel companies since the signing of the Paris Agreement, do you see any new risk for future deals in this space? Do you see that risk diminishing any time soon? What might these reasons for filing point to? **(e)**
- Considering a decline in LNG demand, what scenarios can we build for the decline of the LNG industry? Which of those scenarios is most probable to happen? **(f)**
- Taking into consideration all we have explored in this case study, elaborate a summary of the points in favor and against Shell's action of acquiring BG Group. **(g)**
- Exploring other options that are not the acquisition of fossil fuel projects, explore the viability and the strategic fit of a renewable and a nuclear project. Compare it with the results of an LNG project. At the same time, questions like the following can be asked: does

anyone have a hypothesis on why the WACCs are so different? What can we do to compare different-sized energy projects and bring them all to the same level for comparison? What is expected to happen to CapEx, OpEx, and WACC as the industry matures and we gain more experience in this type of project? (h)

a. Gas Price Shock: an unavoidable problem

The Russia-Ukraine conflict was the cause of a gas price shock in 2022 due to the cut of natural gas supply from Russia to Europe, which made both natural gas prices in general and LNG prices triple for about one year, counting from the stable low point until it stabilized again (Figures 9 and 10). This conflict has forced Europe to diversify its natural gas sources and to lower its dependence on Russian gas from 41% in 2021 to 8% in 2023 (European Commission 2024). This forced diversification allied to two mild winters and (every year) more electric generation from renewable sources has led to a reduction in the consumption of natural gas as observed in Figure 11, and subsequently, to one of the highest rates of gas storage at the end of the winter (Figure 12) (Zaretskaya 2024).

b. Canceled projects and infrastructure inadaptability

Adding to the apparent fragility of the market in terms of future demand, there are projects for LNG terminals and infrastructure being planned, from the US and Europe to African nations (Shell plc 2024) that are being canceled or indefinitely postponed. Here is some information on LNG projects around the world (The Institute for Energy Economics and Financial Analysis 2024a):

- Europe: new projects (if completed) by 2030, 75% of LNG import infrastructure will be underutilized (The Institute for Energy Economics and Financial Analysis 2024b). This apparent miscalculation on demand is already being reflected in the project's alterations in the years 2023 and 2024 (Jaller-Makarewicz 2024) (Table 14).
- Australia: suffering from high exploration costs, it is tightening gas market output.

- Russia: is feeling the strain due to sanctions, weakening their gas export market.
- Canada: like Australia, but earlier on in the process as high costs hinder new plants.
- Africa: delays ranging from 6 months to 2 years in the shipment of LNG and the zone political risks make Africa a non-reliable option for LNG.
- United States: planned projects are rolling, however, the U.S. Department of Energy paused new authorizations for LNG exports to non-free trade agreement nations in January 2024 to reevaluate the LNG industry's effects on natural gas prices as well as on the climate and the local communities.
- Qatar: embarking on a massive LNG capacity expansion (Blas 2024), however, most of this future capacity (part to arrive already in 2025) is still uncontracted, pointing to a possibly oversupplied market.

Following on the then-scarce information in 2015, now in 2024 we consider that enough evidence has been presented to claim that: no, LNG is not THE fuel of the next 20-25 years as of 2015 (of the next 10-15 years as of now), much less a destination fuel. If much, it would only be a destination fuel under the angle of it hindering the development and deployment of clean energy sources, especially if we think about the irreversibility and impossibility of adapting LNG infrastructure to green energy (Fakhry 2023).

c. LNG as a “bridge fuel”

For LNG to act as a proper bridge fuel, two conditions have to be met: it needs to facilitate the transition from fossil fuels to cleaner sources of energy and it needs to be in demand (to fulfill its main function). Regarding the environmental part of easing the transition to green energy sources, multiple studies have put LNG with minimal (if any) advantage over coal, presented in Figure 13, a summary of those studies. At the same time, recall Howarth's study and the lack of flexibility to adapt LNG infrastructure to green projects.

As per the question of the demand and future trends, for lower-middle-income countries, due to coal being substantially cheaper than gas and that legislation in those countries is usually less focused on environmental aspects than in higher-income countries, it should not be likely that they will have in some years curves similar to the high-income countries' coal and gas curves available in Figures 14a and 14b where the gas curve overtakes coal's as coal demand decreases. As for high-income countries, we could maybe expect a gradual overtake of clean energy over gas, an overtake that could have happened directly with coal. This hypothesis is based on the high potential for green sources of energy, countries' increasing desire for energy independence, and the huge technological development since the 2010s. We conclude that LNG is a fossil fuel trying to appear green, without helping the transition for true green energy sources.

d. ESG in demand

Since 2015, the investment in ESG has only grown, with special attention for the period 2017-2022. This growth has been supported by greater returns than in traditional funds, a phenomenon that extends itself across fixed-income and equity funds (in 2023, 12.6% vs 8.6%). As for trends within ESG investing, climate risk has been a great focus, driven by regulatory support from Europe and part of Asia (N. Iyer 2024). Both consumers and investors are increasingly demanding more transparency and accountability regarding environmental impact and actions from corporations (Cooper 2021).

e. The rise of a new risk for the fossil fuels industry

The greater climate consciousness developed in the last 10 years has been pushing nations to phase out the use of fossil fuels and to attain their decarbonization goals. To reach those goals and still maintain an interesting level of diversification regarding energy sources (we learned the importance of that with the energy crisis of the 1970s), the development of non-fossil alternatives, namely renewables and nuclear, has started to speed up, with an increasing effort

made to solve the main issues in these energy sources: energy storage (renewables), and the up-front costs and bad reputation (nuclear) (Rodríguez 2020). With the aggravation of the climate crisis, oil and gas companies are now poised with a chance to embark on a low-carbon journey (Beck et al. 2021) or remain at their margin.

The mentioned aggravation of the climate crisis has made nations and international organizations discuss both the regulatory and the more actionable sides of pressuring private companies to act on this crisis. The Geneva negotiating text published in February 2015 led to the now-famous Paris Agreement that came into force in 2016. After 2015, several energy policies were made having this agreement in mind, however, it seems that at the same time, not enough were made having the agreement in mind: we are now at serious risk of not fulfilling the temperature warming limit of the agreement. In addition, energy sources like LNG have now been deemed incompatible with the goals of the Paris Agreement for the temperature limit of 1.5°C and 2°C, which highlights the need for alternative energy sources to fossil fuels (Yang, Hastings-Simon, and Ravikumar 2022).

The signing of the Paris Agreement has validated the public and climate activists' claims against excessive emission of GHG, which has led to an interesting phenomenon: the increase in litigation risk (and to several court cases against oil, coal, and gas companies). Since 2015, the lawsuits against fossil fuel companies (responsible for almost 75% of the world's GHG emissions) have nearly tripled, with no perspective of slowing down, especially when considering that 60% of actual fossil fuel reserves would have to remain unexplored for us to stay on track for the 1.5°C limit of the Paris Agreement (Cunningham 2024). Moreover, there have been increasing concerns in gas explorations regions, like Arlington (Texas, US) (Leibovici, Abdelilah, and Destal 2023), that the operations inherent to this activity cause serious health conditions (School of Public Health of University of Pittsburgh 2023), leaving

the surrounding population helpless and with no solution for their health problems. With this, there is a risk that a major (possibly criminal) lawsuit might happen in the not-so-distant future. Back to the immediate lawsuit question, Figure 15 displays the number of climate litigation cases within and outside the US between 1986 and 2023, where around 70% of the cases were filed post-2015, and in 2023, 233 cases were filed (129 in the US). Figure 16 shows the geographical distribution of filed cases, with countries such as the US, the UK, Brazil, Australia, Canada, and Germany leading the ranking. Regarding climate-aligned cases (80% of the climate-related litigations), the fossil fuel exploration, production, and transportation industry is a heavy target of these lawsuits, as displayed in Figure 17. Also important is the reason for filing these cases (and a general description), available in Table 15, with the categories “Integrating climate considerations cases”, “Climate-washing cases”, and “Government framework cases” leading the rankings, not only maintaining attention in the climate crisis but also trying to implement changes next to policymakers (Setzer and Higham 2024).

If we narrow down our search to cases solely filed against fossil fuel-producing companies (excluding other industries and companies involved in processing, distributing, and use of oil, gas, and coal), the trend of the surge of cases after 2015 remains (Figure 18), with 50% of the cases being filed in the US. More interesting are the companies in the defendants' position for the period 2005 – 2024, with Shell only being dethroned by ExxonMobil, and the primary reason for cases during the same period was “Climate damages”, “Misleading Advertisement”, and “Environmental impacts & permitting”. Lastly, if Shell were to be held responsible for 33% of the damage caused by their total emissions, it would represent \$1100 billion that would have to be paid out. In 2024, we are reaching a point where being an investor in an oil, gas, or coal company starts to represent a risk, especially if governments and nations (due to consumer pressure and an increase in lawsuits) start holding these companies accountable for climate damage (Oil Change International & Zero Carbon Analytics 2024).

f. Scenario considerations on LNG decline

While environmental pressures and market dynamics suggest an eventual decline of the oil and LNG sectors, their adaptability and the slower pace of renewable scalability in emerging markets indicate they will not be fully replaced in the near term. Instead, the industry may transition to a hybrid model, with fossil fuels coexisting alongside renewables for a longer period than anticipated as technological advancements and regulatory frameworks evolve.

Given the facts stated above, one thing is for sure to happen: an LNG decline. What remains unknown is the speed at which that decline will happen/might have been happening. Table 16 explores some scenarios, providing options for answers students might give. In addition, Figure 19 shows results presented on a McKinsey & Company study (Beck et al. 2021) with some of the options oil and gas companies have to participate in the new low-carbon energy dynamics with the infrastructure and industry contacts they have. The probability of any scenario happening can quickly change, with policy being one of the main motivators of that change, with the Paris Agreement, litigation trends, and a pull on the support previously given at a European and American level for the construction of new LNG projects being signs of that change of policy that was once beneficial for LNG development. In the future, policies will play a major role in shifting market dynamics by making certain practices (like coal or LNG reliance) economically or legally unviable and incentivizing innovation in renewables through subsidies, grants, or carbon pricing, fostering a transition from fossil fuels to green energies.

g. The Good and the Bad in Shell's Strategy

In this question, students are expected to do a general summary of positive and negative points on Shell's strategy regarding the deal, with some of the acceptable answers being presented below.

The Good: in support of Shell's Strategy

Natural Gas as a "Bridge Fuel": Shell's acquisition bolstered its position in natural gas markets, aligning with the (fossil fuel) industry view of natural gas as a transitional energy source towards a low-carbon future. This acquisition made Shell a leader in LNG.

Financial and Operational Synergies: The acquisition resulted in operational efficiencies, access to BG Group's preexisting infrastructure, and the potential for economies of scale in LNG production and distribution. Shell benefited from the integration of BG's lucrative assets in Brazil and Australia, which strengthened its portfolio in high-growth regions.

Company Finances: Despite initial skepticism, the deal provided Shell with enhanced cash flow potential and robust long-term profitability, boosting investor confidence.

Access to Resources and Geographical Diversification: As intended, BG Group's expertise and assets in deepwater drilling complemented Shell's capabilities, ensuring resource availability for years to come. The deal also expanded Shell's presence in emerging markets and high-growth areas, particularly in South America.

The Bad: downsides of Shell's Strategy

Misalignment with Global Trends: The acquisition tied Shell more deeply to fossil fuels at a time when the global focus was increasingly shifting towards renewable energy (International Renewable Energy Agency 2017). This reliance on natural gas, while transitional, might have delayed Shell's investment in sustainable energy projects.

Missed Opportunities: Shell allocated significant capital to this acquisition, potentially passing on early leadership opportunities in renewables, nuclear, or alternative energy solutions. The financial focus on the BG Group deal may have deferred Shell's ability to innovate in renewable energy markets, leaving room for competitors to dominate.

Greenwashing Allegations: Critics argued that the acquisition was part of Shell's strategy to portray gas as a sustainable energy source, potentially downplaying its environmental impact.

Allegations of greenwashing could damage Shell's reputation and weaken trust among stakeholders and the public.

Debt Burden: The acquisition came with significant financial strain, increasing Shell's debt during a period of volatile oil and gas prices.

Regulatory/Litigation Risks: Acquiring such a large company introduced antitrust and geopolitical challenges, particularly in sensitive markets like Brazil, and can complicate matters on a regulatory level for further acquisitions. At the same time, the fossil fuel industry has been under fire in court cases, an upward trend that can bring relevant reputational and financial damage to the companies.

h. Finally, the Alternative

The importance of this next section lies in the exploration of alternatives. This case might be an M&A case for its majority, however, there is more than (traditional) M&A in strategy. When preparing the next generation of corporate leaders that will sit in some years' time in strategy departments of some of the biggest companies of the world, the authors considered it relevant to present students with some of the other existing options, namely direct investment in other projects/companies and joint ventures.

Direct investment in green projects

This part is a good opportunity for the instructor to discuss in class with students on a high level the possible advantages and disadvantages of each one of the three projects under consideration (LNG, renewables, and nuclear) for Shell's strategy.

The investment in green energy would align with the trends observed at that time (2015) of increased investment in renewable energy project finance and within these, the dominance of solar and wind projects (Figure 20). Both renewables and nuclear projects are extremely low-

carbon and low-GHG. They also allow us to bypass one of the biggest downsides of LNG: extreme volatility and high sensitivity to events, for example, geopolitics.

The choice of going for renewables would allow Shell to diversify their portfolio sooner than most companies in the area, having a first-mover advantage for its development and commercialization - and would only do well for their brand and overall reputation. Moreover, they could have had some regulatory benefits that would lower the cost of this venture into renewables, especially relevant when considering the potential for scalability of these projects to meet energy demand.

Regarding nuclear energy, it provides extreme energy security that could have acted as an efficient way of reducing reliance on energy imports. Nuclear energy also aligns with governments' decarbonization goals and is now part of their strategy to attain those goals. An early investment could have positioned Shell as a preferred partner for these initiatives, even more so when we take into consideration that nuclear facilities are key to a growing hydrogen economy (one of the fuels of the future) (Constantin 2023), providing relevant synergies in future deals with hydrogen plants. This type of energy is great for ensuring reliability in a mixed energy grid as it provides consistent base-load power.

With this, by choosing LNG, Shell might have missed the chance to build a dominant position in renewables and shape the industry's future; secure long-term, stable energy revenues insulated from fossil fuel volatility; preemptively adapt to regulatory and societal shifts favoring green energy solutions; avoid sunk costs in fossil fuel infrastructure that may face obsolescence amid stricter climate policies. Shell gained immediate (worldwide) control of liquified natural gas, a source that, reputationally, is a little less stained than other fossil fuels. Although we are arguing against a strategic fit (of the future) of LNG in the energy revolution, we still live in a world highly driven by profit. Given this, it is relevant to go into project finance and quickly evaluate LNG, renewable, and nuclear projects. Due to the obvious complexity of

these projects and the difficulty in finding publicly available information on them, the DCFs performed in this section are purely a toy model to prove on a first line the profitability or not of these projects and public policies that might be implemented to motivate the development of green projects (Cordina 2024). The valuations were developed for the case of electricity plants, and despite existing other uses for LNG (that also have alternative fuels), electricity is the sector where gas is and will be at least until 2040 in more demand (Shell plc 2024). If we were to analyze all those alternative uses and alternative fuels for those uses, the case would be too exhaustive and extensive.

As the students already performed one exhaustive DCF valuation, this time, it is suggested that the instructor share in class the Excel template¹⁰ together with the data in Exhibit B, and all class work together and play with the numbers to evaluate the impact mainly of energy price and of the public policies on the DCF value¹¹. Alternatively, the Instructor might share the Excel with the solutions already implemented¹² and deepen the discussion on the particularities of each project. Students are encouraged to come up with their policies and see the impact they have on their values. Exhibit B presents the data used for the calculations, while the following subsections will dive deeper into some interesting characteristics of those projects that should be discussed by the instructor with the students.

Exhibit B. Data for the DCF (LNG, Renewables, Nuclear)

| | LNG ¹³ | Renewables ¹⁴ | Nuclear ¹⁵ |
|---|-------------------|--------------------------|-----------------------|
| Capacity (MW; MPTA for LNG) | 5.5 | 100 | 3,300 |
| Average capacity factor for energy production (%) | 60 | 43 | 93 |
| Project lifecycle (years) | 30 | 30 | 65 |
| Time until the project is online (years) | 5 | 3 | 7 |
| Ramp-up period (as % of full average capacity) | | | |
| <i>Year 1</i> | 30 | 70 | 30 |
| <i>Year 2</i> | 60 | | 45 |
| <i>Year 3</i> | 90 | | 80 |
| <i>Year 4</i> | | | 95 |
| Initial CapEx (\$M/MW or \$M/MPTA for LNG) | 1,250 | 1.8 | 5.8 ¹⁶ |

¹⁰ Excel file “PART III_DCF Projects_Students”

¹¹ Instructions on the model itself and the pre-made tables are available on the Instructor’s Excel.

¹² Excel file “PART III_DCF Projects_Instructor”

¹³ (Zhang et al. 2024)

¹⁴ (CATAPULT 2024)

¹⁵ (Kozeracki et al. 2023)

¹⁶ (National Renewable Energy Laboratory 2019)

| | | | |
|---|--------------------------|-------|---------------------|
| Sustaining CapEx (% of Initial CapEx) annually | 2 | 0.1 | 1.5 |
| Refueling Capex (\$M) every 2 years ¹⁷ | 0 | 0 | 40 |
| Operating costs (\$/MWh) | 37 ¹⁸ | 24.79 | 24.05 ¹⁹ |
| <i>Fuel (\$/MWh)</i> | 0 | 0 | 5.37 |
| <i>Operations (\$/MWh)</i> | 37 | 24.79 | 18.69 |
| Decommissioning costs (% of initial CapEx) | 2 | 0 | 3 |
| WACC, discount rate (%) | 8 | 4 | 6.5 |
| CO ₂ produced (t/MWh) | 440 | 0 | 0 |
| Cost 1 tCO ₂ – Carbon Credits (\$) | 90 | 0 | 0 |
| Market wholesale prices (\$/MWh) [Scenario 1] | 41 | 41 | 41 |
| Market wholesale prices (\$/MWh) [Scenario 2] | 41 | 60 | 60 |
| Market wholesale prices (\$/MWh) [Scenario 3] | 41 | 38 | 60 |
| Income Tax rate (%) | 30 | | |
| Green Policy A – Tax Benefit (\$/MWh) for green projects | 0 | 0.3 | |
| Green Policy B – Subsidize % initial CapEx for green projects | 0 | 15 | 10 |
| Green Policy C – Carbon Tax on non-green projects | CO ₂ emission | 0 | 0 |

The choice of capacity was made having in mind existing projects and/or what would be possible for each type of project. Apart from project-specific details like the fact that nuclear plants need to be refueled every 2 years and that they have severe decommissioning costs, or that both LNG and nuclear projects have bigger ramp-up periods than renewables, every information is straightforward except for the WACC. For the WACC, consideration was given with greater emphasis to the macroeconomics of the geographical area the projects were to be implemented (US and Europe), to the technology risk, and the maturity of the industry in focus for the projects. The WACC chosen for the LNG project is in line with the WACC used for the DCF performed in the standalone valuation of BG Group while the renewables project WACC was chosen in line with solar projects' WACC available in Figure 21 (Montague, Raiser, and Lee 2024), and nuclear project WACC was chosen within the range for European and American nuclear projects. China due to industry and technology maturity factors has a WACC for nuclear projects of 5.5% (Sousa 2023).

Note that the values chosen for input reflect the maturity of each project, as LNG is well developed, and renewables are on their way to being mature, while for nuclear, at a European and American level, the industry is still at the development of the 1980s. An advance in maturity

¹⁷ (Martinez and Desmarais 2011)

¹⁸ (Sauquet 2017)

¹⁹ (Nuclear Energy Institute Inc. 2023)

would allow for a reduction in the WACC, as well as in CapEx and OpEx, and possibly an increase in the average capacity factor for energy production, changes naturally occurring when risk lowers and efficiency increases.

Different scenarios should be planned to vary one of the most impacting factors of the DCF, the revenue: the same energy price (for energy sold) was used, corresponding to the actual spot price for LNG (**Scenario 1**). However, consumers are (at least in developed countries) available to pay more for green energy (**Scenario 2**). But we also know that renewables' characteristics have led to their price being lower than other sources (**Scenario 3**).

Then, three public policy measures can be applied, together or not:

- Green Policy A – Green projects earn a tax benefit equivalent to 0.3\$/MWh of energy produced.
- Green Policy B – Nuclear and Renewable projects have, respectively, a subsidy in the value of 10% or 15% of initial CapEx for the deployment of the projects, once in most cases the high initial costs impede the project. With time, initial CapEx costs will be reduced as technology advances and the industry matures.
- Green Policy C – Non-green projects will be subjected to a Carbon Tax on their CO₂ emissions in the value of an average European carbon tax (around 90\$ for the future years) (Ampudia et al. 2021).

Results from all possible combinations of the pricing and public policy implementation scenarios are available in Tables 17, 18, and 19. It is possible to observe that LNG is always profitable under the scenarios studied and, if public policy is to be used to disincentivize the use of LNG, it needs to be harsher. There is a margin to do that by implementing, for example, methane emission taxes on top of the carbon dioxide emission tax. However, the point of this exercise is not to label LNG unprofitable but to make the case that other (greener) technologies can also be valuable. Tables 20, 21, and 22 present those values divided by the total energy

(GWh) produced by each solution during its lifetime, allowing for a level-field comparison. Renewable energy allows for the greatest ratio (more value created per unit of energy produced), where, considering scenario 3 (most realistic pricing from the options presented), the combination of policies A+B or A+B+C produces the best result. Regarding nuclear in scenario 3, the combination of policies A+B or A+B+C allows for the greatest creation of value, superior to the value created by the LNG project. As a general commentary, the implementation of policy B contributes more to the increase in value creation for renewables and nuclear projects, which aligns with the results expected, as these projects demand a great initial capital expenditure and policy B mitigates that expenditure by subsidizing part of that initial expense. In parallel to our conclusions, Figure 22 shows the results of another study of the economic viability of multiple energy projects as energy return on investment relative to the breakeven value of 1, which might help find the right energy mix for our and the planet's needs. For a greater perception of the actual energy mix situation, the instructor can show students "Energy Maps"²⁰ that show the energy mix for each country and their carbon dioxide emissions.

Joint Ventures and Partnerships

New energy markets are inherently very capital-intensive areas, and, even with government subsidies and other public policies, it is difficult even for mature companies to be available to disburse all that necessary capital for initial infrastructure investments, research, and development. This characteristic of capital intensiveness makes it hard for companies to justify the investment in the short term, considering they still have to manage their normal daily operations and remain competitive (Khan et al. 2023). One way of mitigating this issue is through Joint Ventures (JVs) and partnerships. This deal type allows companies to pool capital, infrastructure, and human capital that will help reduce the initial capital needed, as there is combined access to resources and knowledge, leading to greater innovation, all while also

²⁰ One option of interactive map can be found at <https://app.electricitymaps.com/map/all>

sharing the risk. This model allows companies to more easily satisfy regulatory requirements, and to strengthen bids in very competitive markets (Renewable Energy World 2024). The option of pursuing a JV has been on an upward trend since 2014 when they made up less than 20% of energy deals to 2021 (more than 30%) (Khan et al. 2023). As such, a JV would have had chances to be a suitable alternative to the acquisition of BG Group and an opportunity to foster innovation in the energy sector, for example, through the development of renewables or nuclear projects.

End of Part III

EPILOGUE

On 15th of February 2016, Shell completed its acquisition of BG Group (deal timeline available on Figure 23), cementing its position as a global leader in LNG and deepwater oil exploration. However, the time passed has shown that volatile oil prices and growing momentum for green energy added complexity to the strategic fit of the deal. The merger brought significant synergies but also highlighted the challenges of strategic decision-making in a rapidly changing industry. While Shell achieved short-term financial gains and operational efficiencies, critics argued that the high premium and continued reliance on fossil fuels delayed its transition to a more sustainable energy portfolio. This is a story on corporate resilience, the risks of overconfidence in volatile industries, and the long-term impact of M&A on strategic positioning in a dynamic global market.

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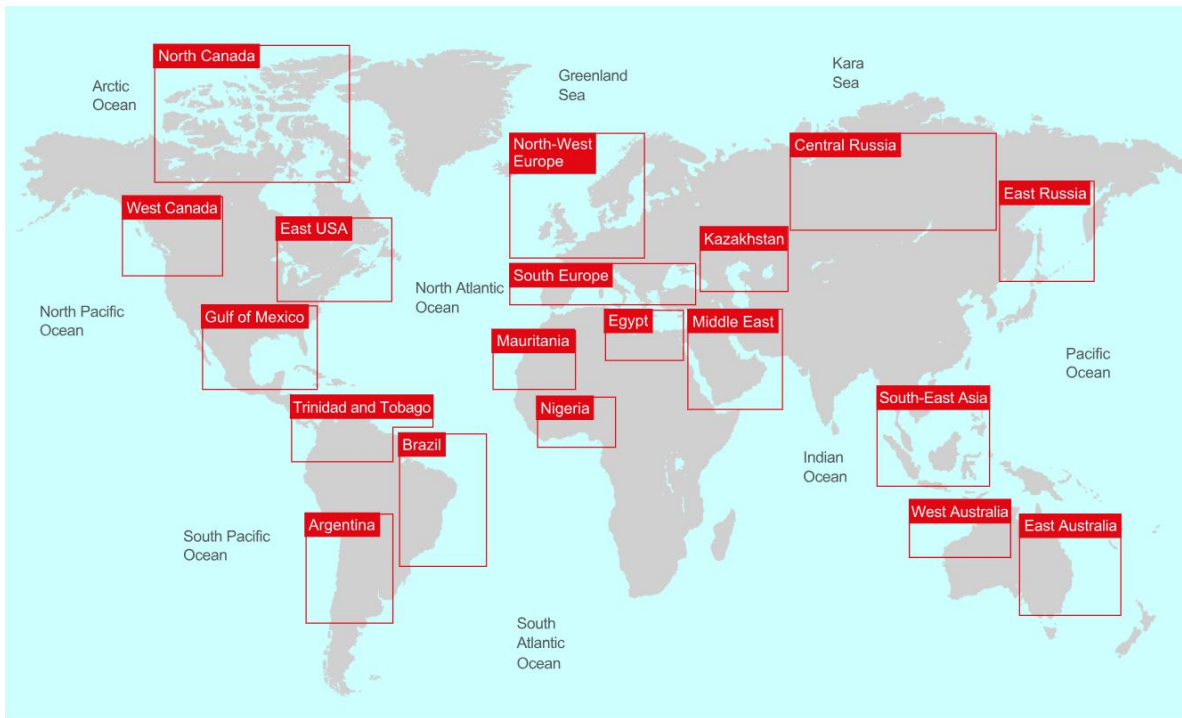
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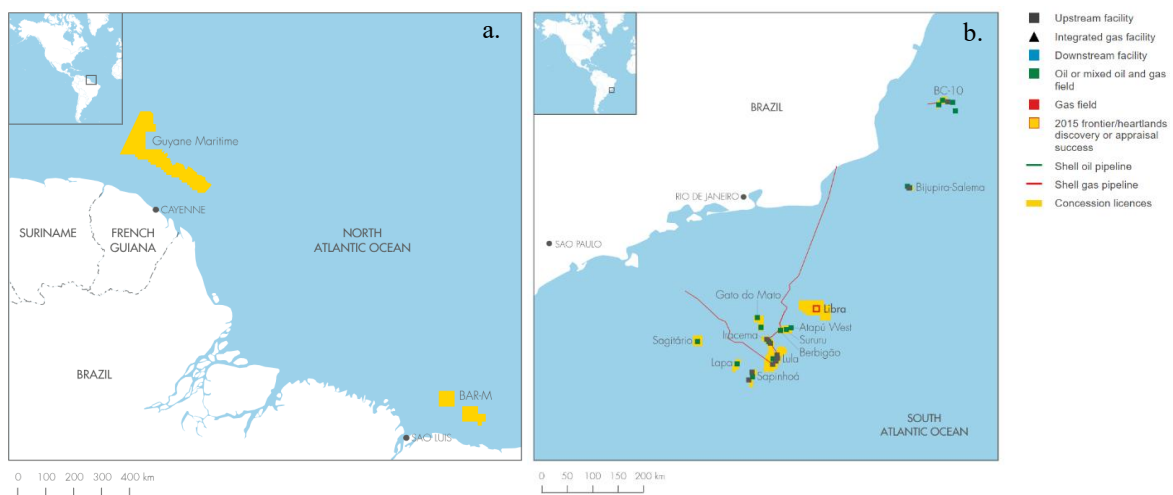
APPENDIX

Figure 1. Shell's presence and activities globally



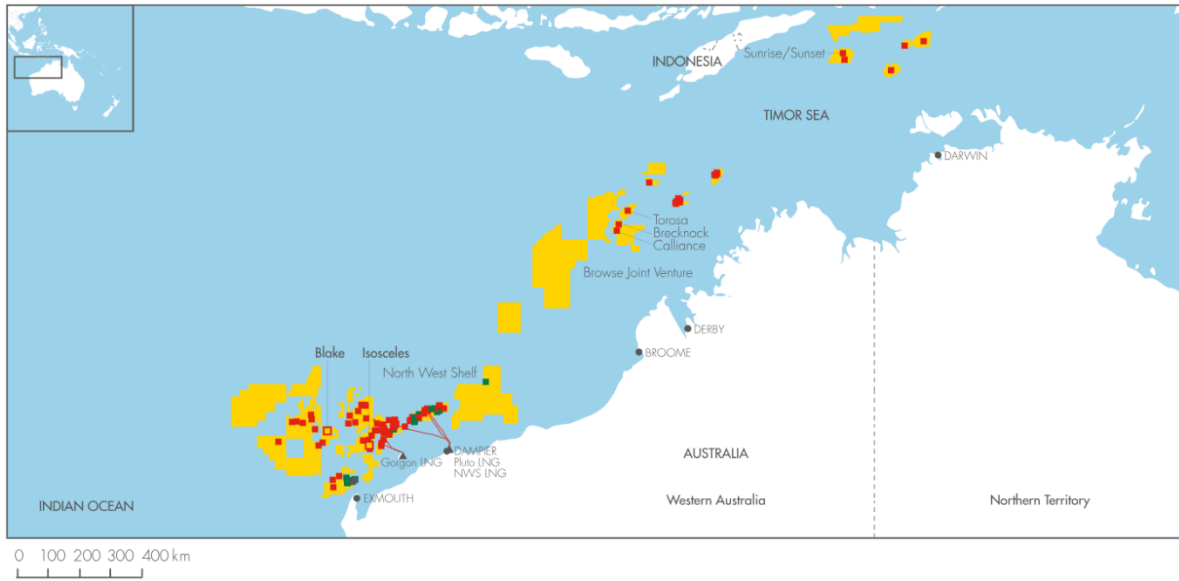
Source: Maps Shell Investor's Handbook 2015-2019

Figure 2a and 2b. Shell's presence and activities in Brazil (zoomed-in)



Source: Maps Shell Investor's Handbook 2015-2019

Figure 3. Shell's presence and activities in West Australia (zoomed-in)

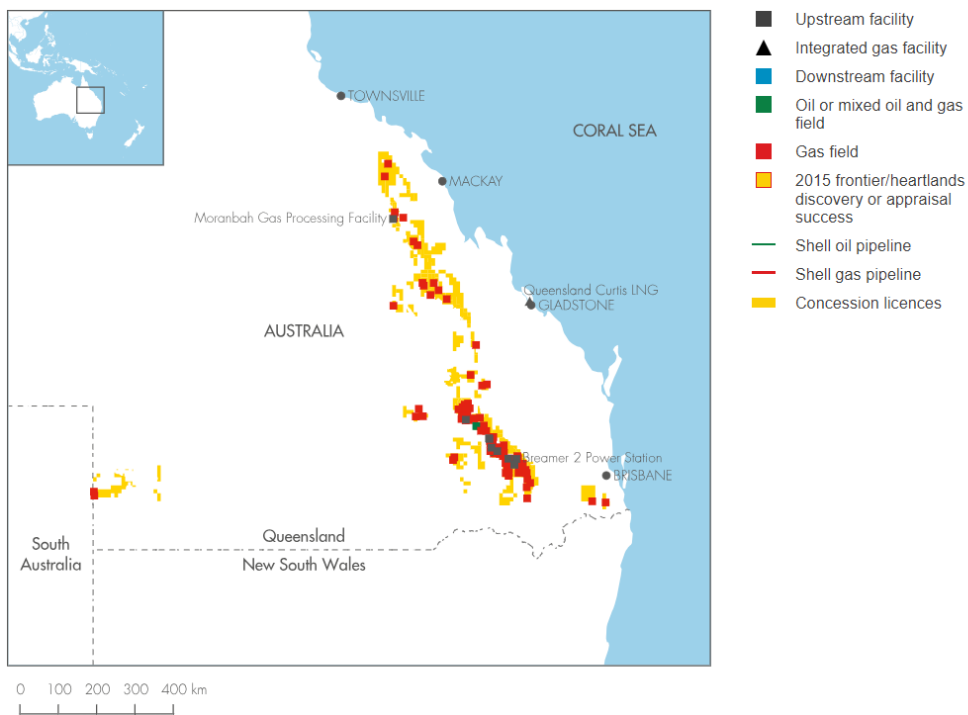


[View on the interactive world map](#)

- | | | |
|-------------------------|---|---------------------|
| Upstream facility | Oil or mixed oil and gas field | Shell oil pipeline |
| Integrated gas facility | Gas field | Shell gas pipeline |
| Downstream facility | 2015 frontier/heartlands discovery or appraisal success | Concession licences |

Source: Maps Shell Investor's Handbook 2015-2019

Figure 4. Shell's presence and activities in East Australia (zoomed-in)



Source: Maps Shell Investor's Handbook 2015-2019

Figure 5a and 5b. BG Group's global production by business segment in 2014, in thousand barrels of oil equivalent (kboed)

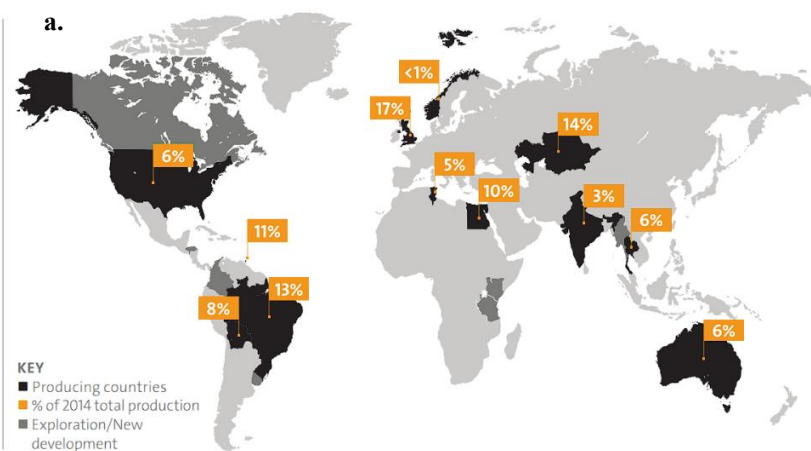
UPSTREAM

PRODUCTION BY COUNTRY (kboed)

| | 2013 | 2014 |
|---------------------|------|------|
| UK | 100 | 105 |
| Kazakhstan | 92 | 85 |
| Brazil | 39 | 78 |
| Trinidad and Tobago | 70 | 65 |
| Egypt | 112 | 62 |
| Bolivia | 36 | 48 |
| USA | 58 | 39 |
| Thailand | 41 | 39 |
| Australia | 25 | 34 |
| Tunisia | 38 | 32 |
| India | 20 | 18 |
| Norway | 2 | 1 |

EXPLORATION AND NEW DEVELOPMENT LOCATIONS

Aruba, Canada, Colombia, Honduras, Kenya, Myanmar, Tanzania and Uruguay.

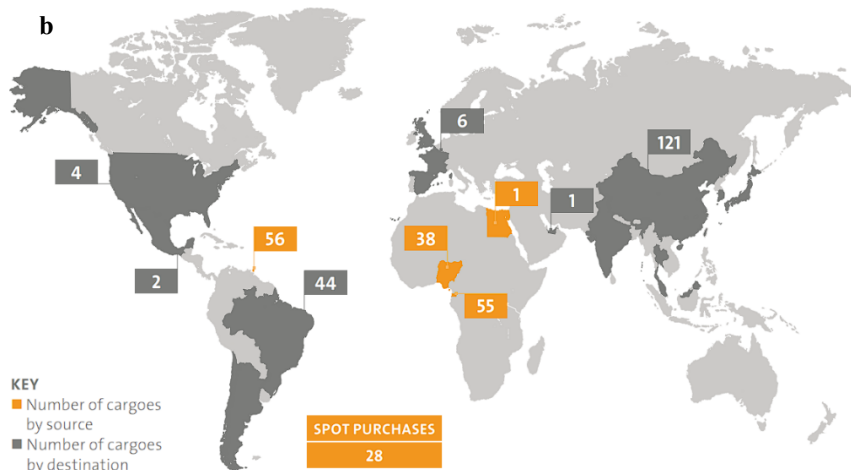


Source: BG Group | Annual Report and Accounts 2014

LNG SUPPLY SOURCES AND DESTINATIONS 2014

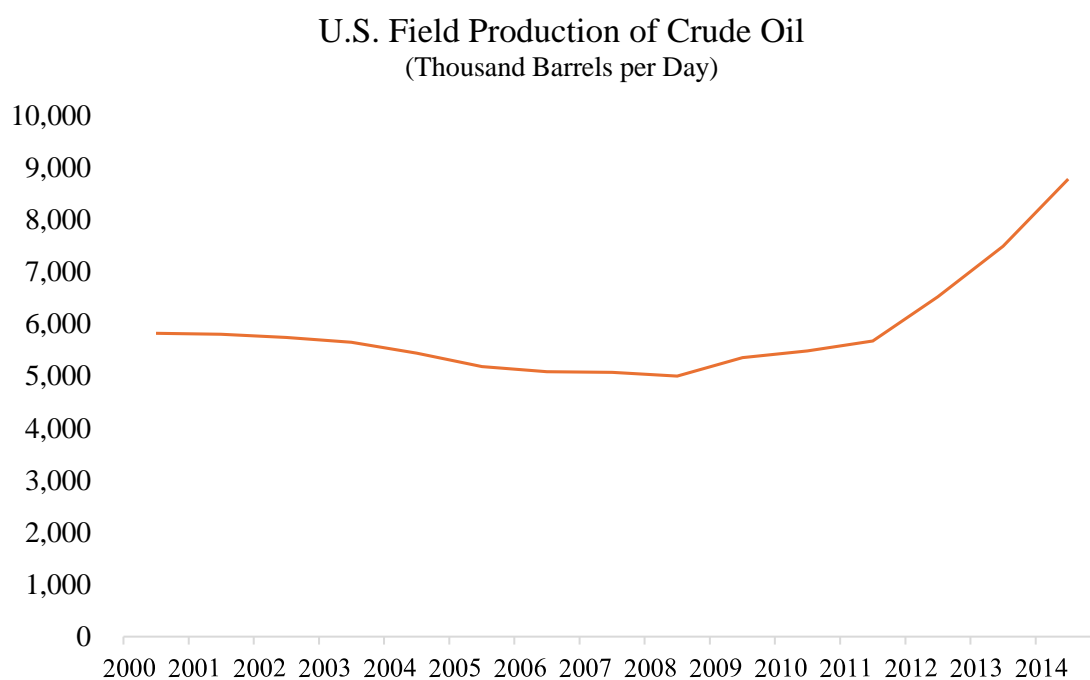
| SOURCE | 2013 | 2014 |
|---------------------|------------|------------|
| Trinidad and Tobago | 56 | 56 |
| Egypt | 25 | 1 |
| Nigeria | 30 | 38 |
| Equatorial Guinea | 58 | 55 |
| Spot purchases | 9 | 28 |
| Total | 178 | 178 |

| DESTINATION | 2013 | 2014 |
|-----------------|------------|------------|
| Asia | 127 | 121 |
| Europe | 2 | 6 |
| Central America | 1 | 2 |
| North America | 6 | 4 |
| South America | 41 | 44 |
| Middle East | 1 | 1 |
| Total | 178 | 178 |



Source: BG Group | Annual Report and Accounts 2014

Figure 6. Production of U.S Field Production



Source: Eia.gov

Table 1. Deal Synergies breakdown and one-off costs

| | 2016 FY | 2017 FY | 2018 FY | 2019 FY | 2020 FY |
|---|---------|---------|---------|---------|---------|
| Corporate, administrative, organisational and IT operational efficiencies | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| Efficiencies in procurement spend | 520 | 520 | 520 | 520 | 520 |
| Marketing and shipping costs | 50 | 50 | 50 | 50 | 50 |
| Reduction in exploration expenditure | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| One-off costs | -861 | -369 | | | |
| Pre-tax synergies | 874 | 2,407 | 3,470 | 3,470 | 3,470 |
| Taxes | 78 | 214 | 308 | 308 | 308 |
| After-tax synergies | 796 | 2,193 | 3,162 | 3,162 | 3,162 |

Source: 8 Apr 2015 - Recommended Cash and Share Offer Announcement

Figure 7. Short-Term and Long-Term Firm and Industry specific pressures

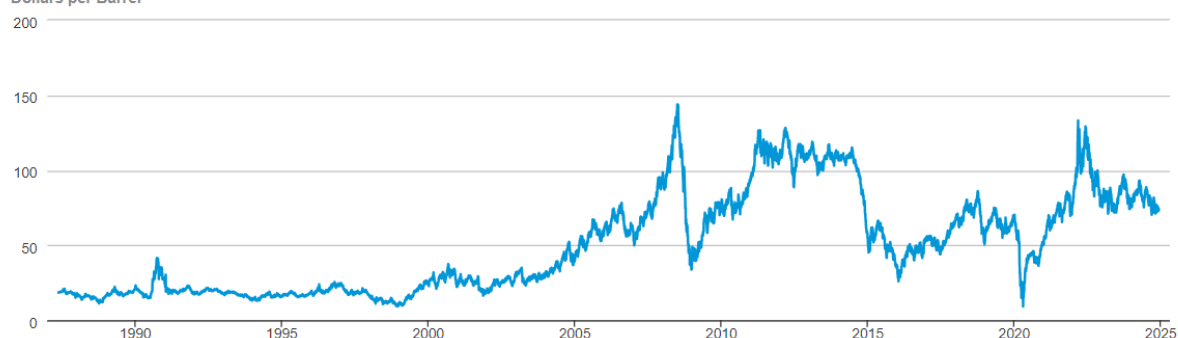
| | Short-Term | Long-Term |
|-------------------------|---|---|
| Firm specific for Shell | <ul style="list-style-type: none"> - Synergies' achievement - Market share increase achievement | <ul style="list-style-type: none"> - LNG exposure increase - Business focus and simplicity |
| Firm specific for BG | <ul style="list-style-type: none"> - Synergies' achievement - Higher dividend payment achievement | <ul style="list-style-type: none"> - Company survival - Being acquired by a strong financial player - Improved reserves exploitation |
| Industry specific | <ul style="list-style-type: none"> - Volatile Oil and Gas Prices (necessity to stabilize revenues) - Boom in Shale oil from the U.S. (supply surplus) | <ul style="list-style-type: none"> - Energy transition demands - Market saturation - LNG demand growth - Climate change and new regulations (2015 Paris Agreement) - Technology disruption |

Source: own elaboration

Figure 8. Historical evolution of Brent crude oil prices

Europe Brent Spot Price FOB

Dollars per Barrel



Source: U.S. Energy Information Administration (EIA) 2024

Table 2. DCF Valuation

| (\$000) | 2011 | 2012 | 2013 | 2014 | 1 2015E | 2 2016E | 3 2017E | 4 2018E | 5 2019E | 6 2020E |
|-------------------------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| WACC | 6.85% | 6.94% | 6.74% | 6.43% | 6.86% | 6.86% | 6.86% | 6.86% | 6.86% | 6.86% |
| Terminal Growth Rate | 3% | | | | | | | | | |
| EBIT | 7,035 | 7,760 | 6,939 | 5,872 | 6,048 | 6,230 | 6,416 | 6,609 | 6,807 | 7,011 |
| Taxes (t*EBIT) | 3,025 | 3,725 | 2,984 | 3,230 | 2,858 | 2,943 | 3,032 | 3,123 | 3,216 | 3,313 |
| NOPLAT | 4,010 | 4,035 | 3,955 | 2,642 | 3,190 | 3,286 | 3,385 | 3,486 | 3,591 | 3,699 |
| Depreciation and amortisation | 2,115 | 2,510 | 2,954 | 2,799 | 2,745 | 2,827 | 2,912 | 2,999 | 3,089 | 3,182 |
| OCF | 6,125 | 6,545 | 6,909 | 5,441 | 5,935 | 6,113 | 6,297 | 6,486 | 6,680 | 6,881 |
| CAPEX | (10,300) | (9,974) | (10,605) | (8,510) | (5,957) | (4,766) | (4,051) | (3,646) | (3,463) | (3,377) |
| Δ Current Assets | 2,269 | (326) | 1,995 | (125) | (55) | 418 | 431 | 444 | 457 | 471 |
| Δ Current Liabilities | 194 | (861) | (89) | (277) | 1,119 | 272 | 280 | 289 | 298 | 306 |
| Δ NWC | 2,075 | 535 | 2,084 | 152 | (1,174) | 146 | 151 | 155 | 160 | 165 |
| ICF | (12,375) | (10,509) | (12,689) | (8,662) | (4,783) | (4,912) | (4,201) | (3,801) | (3,623) | (3,541) |
| FCF | (6,250) | (3,964) | (5,780) | (3,221) | 1,152 | 1,202 | 2,095 | 2,685 | 3,057 | 3,339 |
| Discounted FCF (WACC) | | | | | 1,078 | 1,052 | 1,717 | 2,059 | 2,194 | 2,242 |
| Sum of DFCF | 7,022 | | | | | | | | | |
| Terminal Value | 59,803 | | | | | | | | | |
| Enterprise Value | 66,825 | | | | | | | | | |

Source: own elaboration

Table 3. Shell Income Statement

| <i>Shell plc Income Statement</i> | <i>2011 FY</i> | <i>2012 FY</i> | <i>2013 FY</i> | <i>2014 FY</i> |
|---|----------------|----------------|----------------|----------------|
| (\$000) | | | | |
| Revenue | | | | |
| Upstream | 42,260 | 43,431 | 47,357 | 45,240 |
| Downstream | 427,864 | 423,638 | 403,725 | 375,752 |
| Corporate | 47 | 84 | 153 | 113 |
| Total Revenue | 470,171 | 467,153 | 451,235 | 421,105 |
| Cost Of Goods Sold | 396,597 | 395,940 | 381,585 | 357,316 |
| Gross Profit | 73,574 | 71,213 | 69,650 | 63,789 |
| Selling General & Admin Expenses | 14,359 | 14,465 | 14,675 | 13,965 |
| Exploration/Drilling Expenses | 2,266 | 3,104 | 5,278 | 2,343 |
| R&D Expenses | 1,123 | 1,307 | 1,318 | 1,222 |
| Depreciation & Amortization | 11,745 | 13,518 | 16,099 | 17,867 |
| Impairments of Oil, Gas & Mineral Prop. | 317 | 940 | 4,511 | 5,366 |
| Total Other Operating Expenses | 29,810 | 33,334 | 41,881 | 40,763 |
| EBIT | 43,764 | 37,879 | 27,769 | 23,026 |
| Interest Expense | (1,373) | (1,757) | (1,642) | (1,804) |
| Interest and Investment Income | 1,039 | 1,013 | 809 | 1,094 |
| Net Interest Expenses | (334) | (744) | (833) | (710) |
| Income from Affiliates | 8,737 | 8,948 | 7,275 | 6,116 |
| Currency Exchange Gains (Losses) | 63 | 194 | (184) | (195) |
| Other Non-Operating Income | (6) | 164 | 82 | 12 |
| EBT Excluding Unusual Items | 52,224 | 46,441 | 34,109 | 28,249 |
| Gain (Loss) On Sale Of Assets | 4,485 | 4,228 | 382 | 3,212 |
| Asset Writedown | (1,166) | (157) | (899) | (3,147) |
| EBT Including Unusual Items | 55,543 | 50,512 | 33,592 | 28,314 |
| Effective Tax Rate (%) | 44 | 47 | 51 | 48 |
| Income Tax Expense | 24,450 | 23,552 | 17,066 | 13,584 |
| Net Income to Company | 31,093 | 26,960 | 16,526 | 14,730 |
| Minority Interests in Earnings | (267) | (248) | (155) | 144 |
| Net Income | 31,093 | 26,960 | 16,526 | 14,730 |

Source: S&P Capital IQ - Standard 2024

Table 4. Shell Balance Sheet

| Shell plc Balance Sheet | 2010 FY | 2011 FY | 2012 FY | 2013 FY | 2014 FY |
|---|---------|---------|---------|---------|----------|
| (\$000) | | | | | |
| Current Assets | | | | | |
| Cash and Cash Equivalents | 13,444 | 11,292 | 18,550 | 9,696 | 21,607 |
| Trade and Other Receivables | 70,102 | 79,509 | 65,403 | 63,638 | 58,470 |
| Inventories | 29,348 | 28,976 | 30,781 | 30,009 | 19,701 |
| Total Current Assets | 112,894 | 119,777 | 114,734 | 103,343 | 99,778 |
| Noncurrent Assets | | | | | |
| Property, Plant and Equipment | 142,705 | 152,081 | 172,293 | 191,897 | 192,472 |
| Joint Venture Associates | NA | 37,990 | 38,350 | 34,613 | 31,558 |
| Investment in Securities | 3,809 | 5,492 | 4,867 | 4,715 | 4,115 |
| Equity Accounted Investments | 33,414 | NA | NA | NA | NA |
| Deferred Taxation | 5,361 | 4,943 | 4,288 | 5,785 | 8,131 |
| Intangible Assets | 5,039 | 4,521 | 4,470 | 4,394 | 7,076 |
| Trade and Other Receivables | 8,970 | 9,256 | 8,991 | 9,191 | 8,304 |
| Retirement Benefits | 10,368 | 3,414 | 2,301 | 3,574 | 1,682 |
| Total Assets | 322,560 | 337,474 | 350,294 | 357,512 | 353,116 |
| Current Liabilities | | | | | |
| Trade and Other Payables | 76,550 | 81,846 | 72,839 | 70,112 | 64,864 |
| Retirement Benefit Obligations | 377 | 387 | 402 | 382 | 377 |
| Debts | 9,951 | 6,712 | 7,833 | 8,344 | 7,208 |
| Income Taxes Payable | 10,306 | 10,606 | 12,684 | 11,173 | 9,797 |
| Decommissioning and Other Provisions | 3,368 | 3,108 | 3,221 | 3,247 | 3,966 |
| Total Current Liabilities | 100,552 | 102,659 | 96,979 | 93,258 | 86,212 |
| Noncurrent Liabilities | | | | | |
| Long-term Debt | 34,381 | 30,463 | 29,921 | 36,218 | 38,332 |
| Retirement Benefit Obligations | 5,924 | 13,738 | 15,290 | 11,182 | 16,318 |
| Deferred Taxation | 13,388 | 10,096 | 10,312 | 11,943 | 12,052 |
| Minority Interest | 1,767 | 1,486 | 1,433 | 1,101 | 820 |
| Trade and Other Payables | 4,250 | 4,921 | 4,175 | 4,065 | 3,582 |
| Decommissioning and Other Provisions | 14,285 | 15,631 | 17,435 | 19,698 | 23,834 |
| Shareholders' Equity | | | | | |
| Common Stock - Par Value | 529 | 536 | 542 | 542 | 540 |
| Retained Earnings | 140,179 | 162,895 | 180,246 | 183,474 | 186,981 |
| Other Reserves | 10,094 | (1,961) | (3,752) | (2,037) | (14,365) |
| Shares Held in Trust | (2,789) | (2,990) | (2,287) | (1,932) | (1,190) |
| Total Shareholders Equity | 148,013 | 158,480 | 174,749 | 180,047 | 171,966 |
| Total Liabilities & Shareholders Equity | 322,560 | 337,474 | 350,294 | 357,512 | 353,116 |

Source: S&P Capital IQ – Standard 2024

Table 5. Shell Cash Flow Statement

| <i>Shell plc Cash Flow Statement</i> | <i>2010 FY</i> | <i>2011 FY</i> | <i>2012 FY</i> | <i>2013 FY</i> | <i>2014 FY</i> |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|
| (\$000) | | | | | |
| Operating Activities | | | | | |
| Net Income - CF | 20,127 | 30,826 | 26,712 | 16,371 | 14,874 |
| Depreciation & Amort. | 12,688 | 11,713 | 13,518 | 16,099 | 17,867 |
| Impair. of Oil, Gas & Mineral Prop. | 1,580 | 317 | 940 | 4,511 | 3,485 |
| Depreciation & Amort., Total | 14,268 | 12,030 | 14,458 | 20,610 | 21,352 |
| (Gain) Loss From Sale Of Assets | (3,276) | (4,485) | (4,228) | (382) | (3,212) |
| Asset Writedown & Restructuring Costs | 1,327 | 1,198 | 157 | 899 | 3,147 |
| Loss on Equity Investment | (5,953) | (8,737) | (8,948) | (7,275) | (6,116) |
| Other Operating Activities | 6,786 | 12,410 | 14,598 | 7,229 | 8,594 |
| Change in Acc. Receivable | (11,931) | (10,109) | 14,145 | 5,648 | (1,541) |
| Change In Inventories | (2,888) | (1,930) | (1,746) | 608 | 7,958 |
| Change in Acc. Payable | 8,890 | 5,568 | (9,008) | (3,268) | (12) |
| Cash from Ops. | 27,350 | 36,771 | 46,140 | 40,440 | 45,044 |
| Investing Activity | | | | | |
| Capital Expenditure | (26,940) | (26,301) | (32,576) | (39,975) | (31,676) |
| Sale of Property, Plant and Equipment | 3,325 | 6,990 | 6,346 | 1,212 | 9,873 |
| Invest. in Marketable & Equity Secur. | 1,507 | (1,328) | (2,416) | (1,000) | 2,737 |
| Other Investing Activities | 136 | 196 | 193 | (383) | (591) |
| Cash from Investing | (21,972) | (20,443) | (28,453) | (40,146) | (19,657) |
| Financing Activity | | | | | |
| Short Term Debt Issued | 4,647 | NA | NA | 3,126 | NA |
| Long-Term Debt Issued | 7,849 | 1,249 | 5,108 | 9,146 | 7,778 |
| Total Debt Issued | 12,496 | 1,249 | 5,108 | 12,272 | 7,778 |
| Short Term Debt Repaid | NA | (3,724) | (165) | NA | (3,332) |
| Long-Term Debt Repaid | (3,240) | (4,649) | (4,960) | (6,877) | (4,089) |
| Total Debt Repaid | (3,240) | (8,373) | (5,125) | (6,877) | (7,421) |
| Issuance of Common Stock | 187 | NA | NA | NA | 232 |
| Repurchase of Common Stock | NA | (2,035) | (1,526) | (5,565) | (3,328) |
| Common Dividends Paid | (9,584) | (6,877) | (7,390) | (7,198) | (9,444) |
| Total Dividends Paid | (9,584) | (6,877) | (7,390) | (7,198) | (9,444) |
| Other Financing Activities | (1,326) | (2,095) | (1,697) | (1,610) | (607) |
| Cash from Financing | (1,467) | (18,131) | (10,630) | (8,978) | (12,790) |
| Other Cash Flow | | | | | |
| Foreign Exchange Rate Adj. | (186) | (349) | 201 | (170) | (686) |
| Net Change in Cash | 3,725 | (2,152) | 7,258 | (8,854) | 11,911 |

Source: S&P Capital IQ – Standard 2024

Table 6. BG Group Income Statement

| | 2011 FY | 2012 FY | 2013 FY | 2014 FY |
|---|---------------|---------------|---------------|----------------|
| (\$000) | | | | |
| Revenue | | | | |
| Upstream | 10,125 | 11,161 | 11,455 | 11,161 |
| LNG Shipping & Marketing | 7,523 | 7,760 | 7,730 | 8,121 |
| Other activities | 19 | 12 | 7 | 7 |
| Total Revenue | 17,667 | 18,933 | 19,192 | 19,289 |
| Cost Of Goods Sold | 3,700 | 3,479 | 3,062 | 3,608 |
| Gross Profit | 13,967 | 15,454 | 16,130 | 15,681 |
| Selling General & Admin Expenses | 1,128 | 1,467 | 1,447 | 1,571 |
| Exploration/Drilling Expenses | 647 | 365 | 711 | 751 |
| R&D Expenses | 38 | 52 | 76 | 90 |
| Depreciation & Amortization | 2,115 | 2,510 | 2,954 | 2,799 |
| Impairments of Oil, Gas & Mineral Prop. | 293 | 319 | 394 | 237 |
| Other Operating Expenses | 2,711 | 2,981 | 3,609 | 4,361 |
| Total Other Operating Expenses | 6,932 | 7,694 | 9,191 | 9,809 |
| EBIT | 7,035 | 7,760 | 6,939 | 5,872 |
| Interest Expense | (108) | (97) | (119) | (108) |
| Interest and Investment Income | 76 | 125 | 104 | 104 |
| Net Interest Expenses | (32) | 28 | (15) | (4) |
| Income from Affiliates | 269 | 289 | 336 | 166 |
| Currency Exchange Gains (Losses) | 111 | 41 | (13) | (323) |
| Other Non-Operating Income | (25) | (122) | 65 | (264) |
| EBT Excluding Unusual Items | 7,358 | 7,996 | 7,312 | 5,447 |
| Gain (Loss) On Sale Of Assets | (414) | (1,651) | 242 | 836 |
| Asset Writedown | (312) | (2,161) | (4,059) | (8,956) |
| Other Unusual Items | NA | NA | NA | 106 |
| EBT Including Unusual Items | 6,632 | 4,184 | 3,495 | (2,673) |
| Effective Tax Rate (%) | 43 | 48 | 43 | 55 |
| Earnings from Discontinued Operations | 219 | 1,324 | 245 | 7 |
| Net Income to Company | 5,525 | 4,671 | 3,041 | (2,131) |
| Minority Interests in Earnings | (81) | (94) | (9) | NA |
| Net Income | 5,525 | 4,671 | 3,041 | (2,131) |

Source: S&P Capital IQ – Standard 2024

Table 7. BG Group Balance Sheet

| | 2010 FY | 2011 FY | 2012 FY | 2013 FY | 2014 FY |
|--|---------------|---------------|---------------|---------------|---------------|
| (\$000) | | | | | |
| Current Assets | | | | | |
| Cash and Cash Equivalents | 2,533 | 3,601 | 4,434 | 6,208 | 5,295 |
| Trade and Other Receivables | 5,994 | 7,375 | 6,369 | 6,900 | 5,042 |
| Current Tax Receivable | 233 | 141 | 25 | 77 | 151 |
| Inventories | 655 | 768 | 792 | 838 | 1,194 |
| Commodity Contracts and Other Derivative Financial Instruments | 550 | 331 | 129 | 107 | 235 |
| Assets Classified as Held for Sale | 227 | 245 | 386 | NA | 2,088 |
| Total Current Assets | 10,192 | 12,461 | 12,135 | 14,130 | 14,005 |
| Noncurrent Assets | | | | | |
| Tangible Assets, Net | 28,263 | 37,316 | 43,925 | 42,225 | 35,855 |
| Investments | 2,824 | 3,044 | 2,488 | 2,933 | 3,547 |
| Deferred Tax Assets | 518 | 647 | 821 | 1,397 | 3,949 |
| Commodity Contracts and Other Derivative Financial Instruments | 283 | 366 | 532 | 623 | 287 |
| Goodwill | 820 | 752 | 24 | 25 | NA |
| Other Intangible Assets | 7,193 | 6,159 | 4,469 | 3,864 | 3,135 |
| Intangible Assets | NA | NA | NA | NA | NA |
| Trade and Other Receivables | 206 | 695 | 896 | 777 | 1,068 |
| Retirement Benefit Surplus | NA | NA | NA | NA | NA |
| Total Assets | 50,299 | 61,440 | 65,290 | 65,974 | 61,846 |
| Current Liabilities | | | | | |
| Trade and Other Payables | 4,388 | 5,342 | 5,301 | 5,631 | 4,768 |
| Borrowings | 1,258 | 1,160 | 1,064 | 475 | 1,586 |
| Current Tax Liabilities | 1,814 | 1,238 | 1,377 | 1,831 | 1,412 |
| Liabilities Associated With Assets Classified as Held for Sale | 104 | 99 | 158 | NA | 63 |
| Commodity Contracts and Other Derivative Financial Instruments | 1,426 | 1,345 | 423 | 297 | 128 |
| Total Current Liabilities | 8,990 | 9,184 | 8,323 | 8,234 | 7,957 |
| Noncurrent Liabilities | | | | | |
| Borrowings | 8,446 | 13,977 | 14,443 | 17,054 | 15,921 |
| Retirement Benefit Liability | 260 | 436 | 288 | 168 | 258 |
| Deferred Income Tax Liabilities | 3,134 | 3,961 | 4,636 | 4,120 | 2,946 |
| Minority Interest | 356 | 291 | 57 | 0 | 0 |
| Trade and Other Payables | 72 | 72 | 123 | 150 | 136 |
| Provisions for Other Liabilities and Charges | 1,812 | 3,603 | 4,182 | 4,115 | 5,235 |
| Commodity Contracts and Other Derivative Financial Instruments | 901 | 696 | 347 | 173 | 253 |
| Shareholders' Equity | | | | | |
| Common Stock - Par Value | 576 | 577 | 578 | 579 | 579 |
| Retained Earnings | 20,085 | 23,482 | 27,248 | 28,772 | 26,634 |
| Other Reserves | 2,710 | 2,710 | 2,710 | 2,710 | 2,710 |
| Total Shareholders Equity | 26,328 | 29,220 | 32,891 | 31,960 | 29,140 |
| Total Liabilities & Shareholders Equity | 50,299 | 61,440 | 65,290 | 65,974 | 61,846 |

Source: S&P Capital IQ – Standard 2024

Table 8. BG Group Cash Flow Statement

| | 2010 FY | 2011 FY | 2012 FY | 2013 FY | 2014 FY |
|---|----------------|-----------------|----------------|----------------|----------------|
| (\$000) | | | | | |
| Operating Activities | | | | | |
| Net Income - CF | 3,351 | 4,234 | 4,523 | 2,441 | (1,044) |
| Depreciation & Amort. | 1,996 | 2,108 | 2,505 | 2,945 | 2,788 |
| Amort. of Goodwill and Intangibles | 129 | 7 | 5 | 9 | 11 |
| Impair. of Oil, Gas & Mineral Prop. | 382 | 293 | 339 | 394 | 237 |
| Depreciation & Amort., Total | 2,507 | 2,408 | 2,849 | 3,348 | 3,036 |
| (Gain) Loss From Sale Of Assets | 336 | 414 | (510) | (242) | (836) |
| Asset Writedown & Restructuring Costs | NA | NA | 2,161 | 4,059 | 8,956 |
| Loss on Equity Investment | (313) | (289) | (311) | (335) | (166) |
| Stock-Based Compensation | 60 | 72 | 73 | 74 | 62 |
| Net Cash From Discontinued Ops. | 208 | 244 | (1,069) | 18 | 9 |
| Other Operating Activities | 1,009 | 473 | 455 | (1,133) | (3,597) |
| Change in Acc. Receivable | (837) | (1,435) | (60) | (618) | 993 |
| Change In Inventories | 25 | (53) | (38) | (29) | (272) |
| Change in Acc. Payable | 40 | 914 | (78) | 234 | 258 |
| Change in Other Net Operating Assets | NA | NA | NA | NA | NA |
| Cash from Ops. | 6,386 | 6,982 | 7,995 | 7,817 | 7,399 |
| Investing Activity | | | | | |
| Capital Expenditure | (8,397) | (10,300) | (9,974) | (10,605) | (8,510) |
| Sale of Property, Plant and Equipment | 897 | 116 | 754 | 3,827 | 2 |
| Cash Acquisitions | (529) | (246) | (429) | (610) | (892) |
| Divestitures | NA | 84 | (25) | 103 | 800 |
| Invest. in Marketable & Equity Secur. | 166 | 94 | 878 | 485 | 41 |
| Net (Inc.) Dec. in Loans Orig/Sold: Investing | NA | NA | (280) | 112 | 111 |
| Other Investing Activities | 592 | 59 | 2,181 | 406 | 232 |
| Cash from Investing | (7,271) | (10,193) | (6,895) | (6,282) | (8,216) |
| Financing Activity | | | | | |
| Long-Term Debt Issued | 3,559 | 6,392 | 2,925 | 2,713 | 2,086 |
| Total Debt Issued | 3,559 | 6,392 | 2,925 | 2,713 | 2,086 |
| Long-Term Debt Repaid | (348) | (940) | (1,736) | (1,093) | (625) |
| Total Debt Repaid | (348) | (940) | (1,736) | (1,093) | (625) |
| Issuance of Common Stock | 95 | 48 | 36 | 45 | 28 |
| Repurchase of Common Stock | (2) | (23) | (16) | (13) | NA |
| Common Dividends Paid | (680) | (772) | (859) | (923) | (1,024) |
| Total Dividends Paid | (680) | (772) | (859) | (923) | (1,024) |
| Other Financing Activities | (337) | (383) | (559) | (560) | (556) |
| Cash from Financing | 2,287 | 4,322 | (209) | 169 | (91) |
| Other Cash Flow | | | | | |
| Foreign Exchange Rate Adj. | 30 | (61) | 28 | (16) | (5) |
| Net Change in Cash | 1,432 | 1,050 | 919 | 1,688 | (913) |

Source: S&P Capital IQ – Standard 2024

Table 9. Betas, Cost of Equity and Cost of Debt for Shell

| | |
|---------------------|--------|
| Rate | 2.00% |
| Spread | 1.22% |
| Cost of Debt | 3.22% |
| Risk Free Rate | 1.92% |
| Market Risk Premium | 5.81% |
| Beta (Levered) | 1.08 |
| Cost of Equity | 8.18% |
| Beta (Unlevered) | 0.975 |
| Re (Unlevered) | 7.584% |

Source: own elaboration

Table 10. WACC for Shell

| | 2010 FY | 2011 FY | 2012 FY | 2013 FY | 2014 FY | 2015 FY | 2016 FY | 2017 FY | 2018 FY | 2019 FY | 2020 FY |
|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Capital Structure Data (\$000) | | | | | | | | | | | |
| Total Debt | (2,789) | (2,990) | (2,287) | (1,932) | (1,190) | - | - | - | - | - | - |
| Total Shareholders Equity | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | - |
| Total Minority Interest | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | - |
| Total Capital | (2,789) | (2,990) | (2,287) | (1,932) | (1,190) | - | - | - | - | - | - |
| D/(D+E) | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% |
| E/(D+E) | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% |
| Tax(\$000) | | | | | | | | | | | |
| Diluted EPS Incl. Extra Items | | 5 | 4 | 3 | 2 | 0.00 | 0 | 0 | 0 | 0 | 0 |
| Diluted EPS Excl. Extra Items | | 5 | 4 | 3 | 2 | - | - | - | - | - | - |
| WACC | 5.70% | 5.62% | 5.63% | 5.65% | 5.67% | 5.70% | 5.70% | 5.70% | 5.70% | 5.70% | 5.70% |

Source: own elaboration

Table 11. Betas, Cost of Equity and Cost of Debt for BG Group

| | |
|---------------------|--------|
| Rate | 2.00% |
| Spread | 1.43% |
| Cost of Debt (Rd) | 3.43% |
| Risk Free Rate | 1.92% |
| Market Risk Premium | 5.81% |
| Beta (Levered) | 1.28 |
| Cost of Equity (Re) | 9.36% |
| Beta (Unlevered) | 1.016 |
| Re (Unlevered) | 7.822% |

Source: own elaboration

Table 12. WACC for BG Group

| | 2010 FY | 2011 FY | 2012 FY | 2013 FY | 2014 FY | 2015 FY | 2016 FY | 2017 FY | 2018 FY | 2019 FY | 2020 FY |
|-------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Capital Structure Data (\$M) | | | | | | | | | | | |
| Total Debt | 9,704 | 15,137 | 15,507 | 17,529 | 17,507 | - | - | - | - | - | - |
| Total Shareholders Equity | 26,328 | 29,220 | 32,891 | 31,960 | 29,140 | - | - | - | - | - | - |
| Total Minority Interest | 356 | 291 | 57 | 0 | 0 | - | - | - | - | - | - |
| Total Capital | 26,684 | 29,511 | 32,948 | 31,960 | 29,140 | - | - | - | - | - | - |
| D/(D+E) | 27% | 34% | 32% | 35% | 38% | 33% | 33% | 33% | 33% | 33% | 33% |
| E/(D+E) | 73% | 66% | 68% | 65% | 62% | 67% | 67% | 67% | 67% | 67% | 67% |
| Tax | | | | | | | | | | | |
| Effective Tax Rate (%) | | 43 | 48 | 43 | 55 | 47.25 | 47.25 | 47.25 | 47.25 | 47.25 | 47.25 |
| Income Tax Expense | | 1326.4 | 836.8 | 699 | -534.6 | - | - | - | - | - | - |
| WACC | 7.78% | 6.85% | 6.94% | 6.74% | 6.43% | 6.86% | 6.86% | 6.86% | 6.86% | 6.86% | 6.86% |

Source: own elaboration

Table 13. Industry Peers' comparables

| Peers | EV | EV/EBITDA | P/E | P/Book | Market Cap |
|---|---------|-----------|------|--------|------------|
| Exxon Mobil Corporation (NYSE:XOM) | 390,865 | 6.0 | 12.6 | 2.1 | 359,695 |
| Chevron Corporation (NYSE:CVX) | 219,841 | 5.0 | 12.0 | 1.3 | 204,075 |
| BP p.l.c. (LSE:BP.) | 124,450 | 4.8 | 29.2 | 1.2 | 105,151 |
| ConocoPhillips (NYSE:COP) | 98,979 | 4.8 | 11.6 | 1.6 | 81,114 |
| Eni S.p.A. (BIT:ENI) | 80,948 | 4.0 | 10.3 | 1.0 | 63,680 |
| Occidental Petroleum Corporation (NYSE:OXY) | 62,167 | 4.0 | 19.6 | 1.7 | 59,118 |
| Anadarko Petroleum Corporation (NYSE:APC) | 55,575 | 6.1 | 30.1 | 2.2 | 44,042 |
| EOG Resources, Inc. (NYSE:EOG) | 55,527 | 5.9 | 18.4 | 2.9 | 51,704 |
| Devon Energy Corporation (NYSE:DVN) | 40,639 | 4.5 | 8.4 | 1.2 | 26,035 |
| APA Corporation (NASDAQGS:APA) | 37,335 | 3.7 | 9.7 | 0.9 | 24,659 |
| Repsol, S.A. (BME:REP) | 32,279 | 11.9 | 28.2 | 0.9 | 26,142 |
| Hess Corporation (NYSE:HES) | 24,243 | 4.2 | 23.0 | 0.9 | 20,585 |
| Marathon Oil Corporation (NYSE:MRO) | 23,006 | 4.6 | 21.2 | 0.9 | 19,013 |
| Woodside Energy Group Ltd (ASX:WDS) | 18,490 | 4.2 | 11.0 | 1.5 | 18,471 |
| PAO NOVATEK (MISX:NVTK) | 16,396 | 14.4 | 45.6 | 3.7 | 14,211 |
| Tullow Oil plc (LSE:TLW) | 5,953 | 4.7 | NM | 1.1 | 3,464 |
| Minimum | 5,953 | 3.7 | 8.4 | 0.9 | 3,464 |
| Median | 48,083 | 4.7 | 18.4 | 1.3 | 44,042 |
| Average | 80,418 | 5.8 | 19.4 | 1.6 | 75,972 |
| Maximum | 390,865 | 14.4 | 45.6 | 3.7 | 359,695 |
| Shell Plc | 190,053 | 4.6 | 11.6 | 1.2 | 170,373 |
| BG Group Limited (LSE:BG.) | 49,212 | 6.5 | 13.6 | 1.7 | 39,398 |

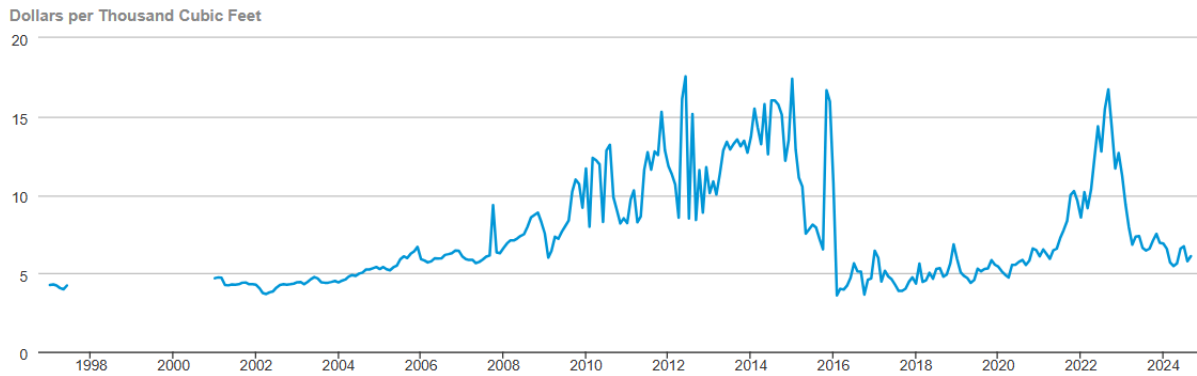
Source: S&P Capital IQ – Standard 2024

Figure 9. U.S. natural gas futures



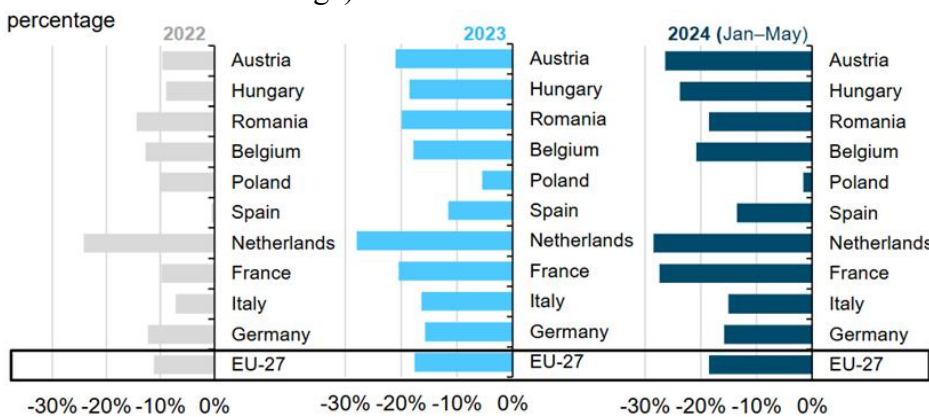
Source: Trading Economics

Figure 10. Price of Liquefied U.S. Natural Gas Exports



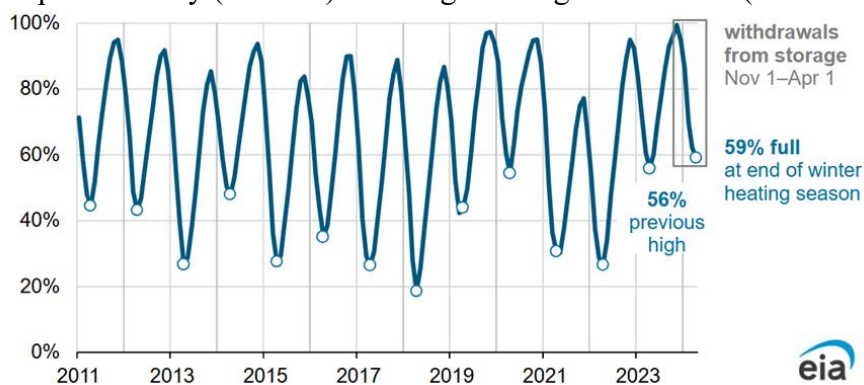
Source: EIA

Figure 11. Change (%) in consumption in EU-27's top 10 natural gas-consuming countries (2022-2024 vs. 2017-2021 average)



Source: EIA

Figure 12. Europe’s monthly (% filled) natural gas storage inventories (Jan 2011 – Apr 2014)



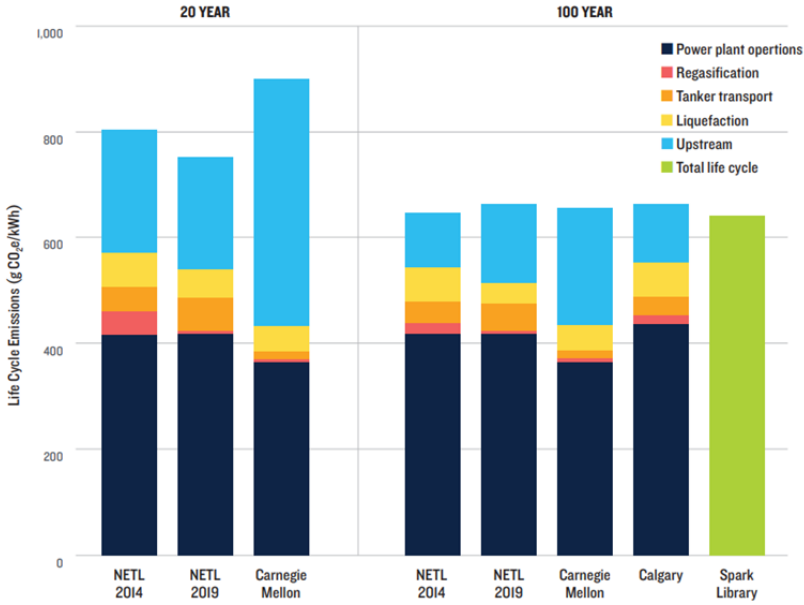
Source: EIA

Table 14. LNG projects alterations in the years 2023 and 2024

| Country | Project Name | Status |
|---------|---|--|
| Greece | Alexandroupolis FSRU + 3 other import terminals | delayed |
| Greece | Dioriga Gas terminal | shelved |
| Cyprus | Vasiliko terminal expansion | suspended |
| Latvia | Skalte terminal | lost support from the country’s government due to redundancy |
| Poland | 2 nd FSRU at Gdańsk terminal | shelved due to lack of interest |
| Ireland | Shannon terminal | shelved |
| Albania | Vlora terminal | shelved |
| Germany | Stade terminal (operations) | delayed for 2027 |

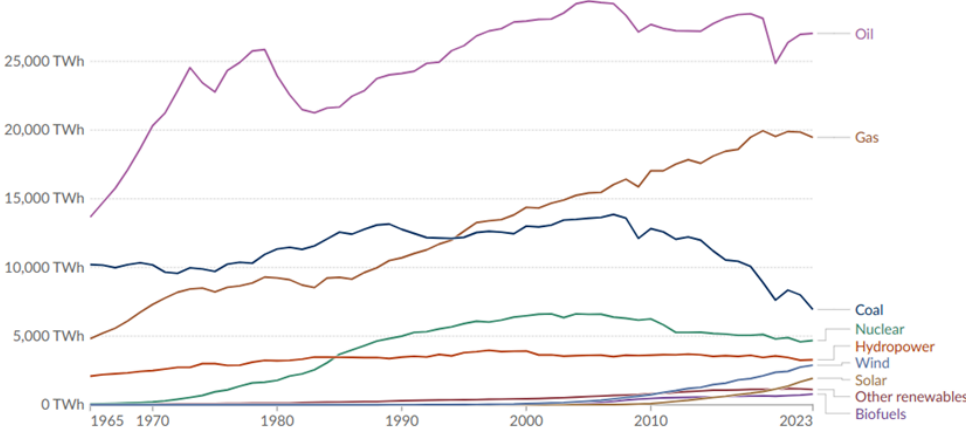
Source: Jaller-Makarewicz 2024

Figure 13. Average life-cycle greenhouse gas emissions from north American-produced liquefied natural gas exported to Europe and Asia

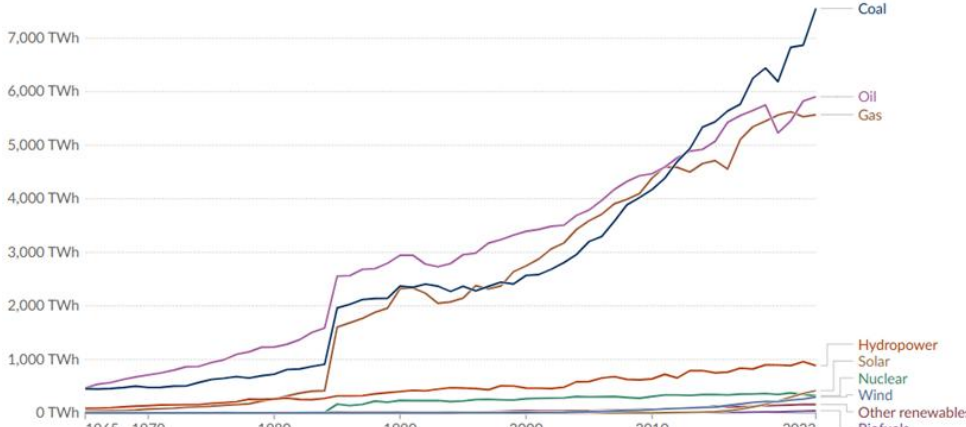


Source: NRDC

Figures 14a and 14b. Primary energy consumption (TWh) by source for high-income and lower-middle-income countries, respectively



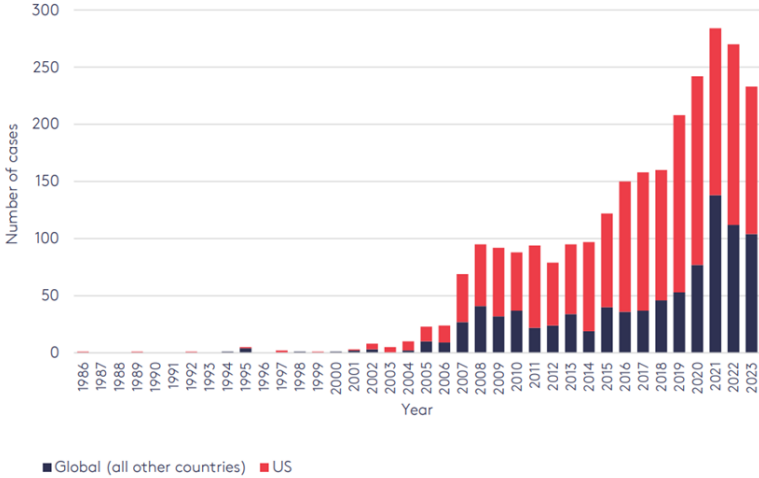
14a. Primary energy consumption (TWh) by source for high-income countries.



14b. Primary energy consumption (TWh) by source for lower-middle-income countries.

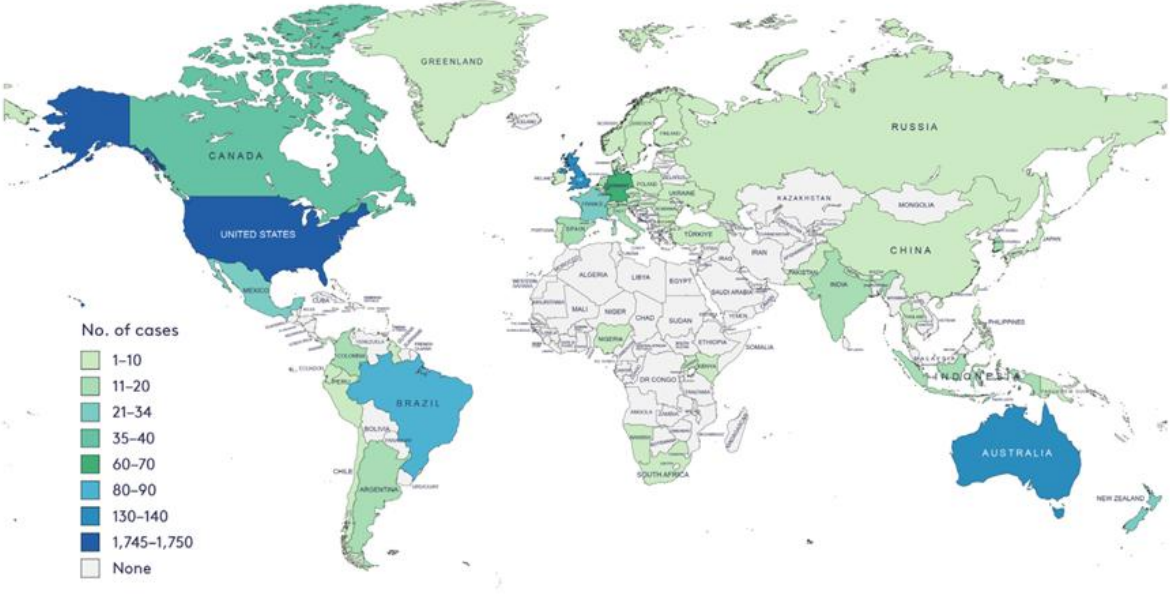
Source: Our World in Data

Figure 15. Number of climate litigation cases within and outside the US (1986–2023)



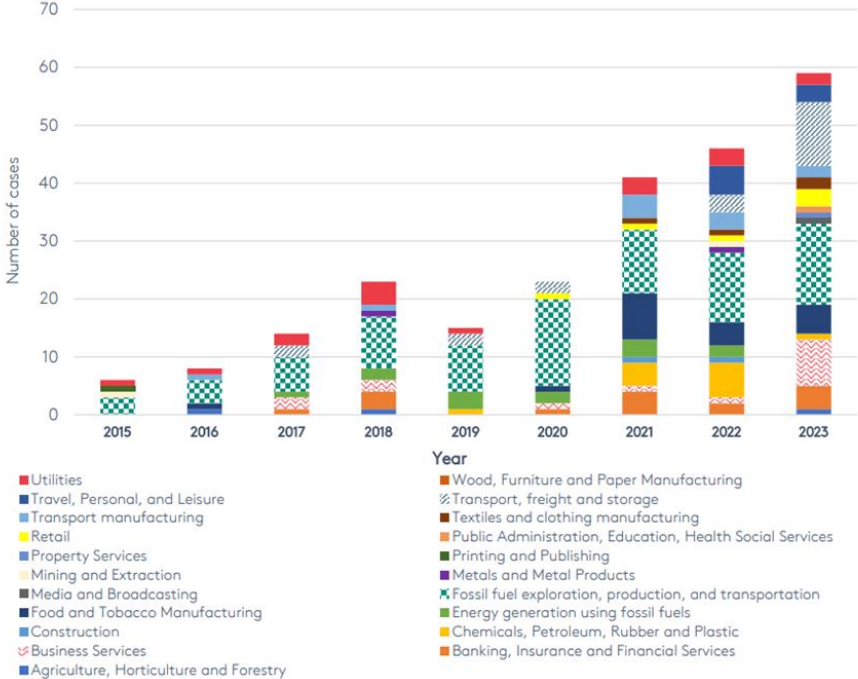
Source: LSE

Figure 16. Number of cases in countries globally (as of June 2024)



Source: LSE

Figure 17. Number of companies targeted in strategic climate-aligned cases by sector (2015–2023)



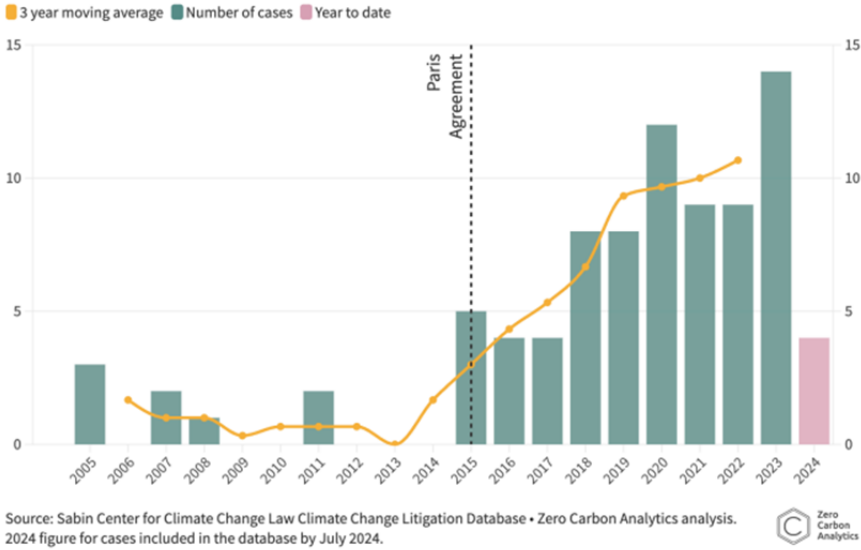
Source: LSE

Table 15. Types of climate-aligned case strategies and number of cases employing each strategy (2023)

| Strategy and definition | Case numbers | Examples of cases illustrating recent developments |
|--|---|---|
| Government framework cases: cases that challenge the ambition or implementation of climate targets and policies affecting the whole of a country's economy and society. | 15 new cases filed in 2023 <i>110 such cases have been filed around the world since 2015, and these are among the highest profile of all cases.</i> | <i>VZW Klimaatzaak v. Kingdom of Belgium and Others</i> <i>Comunidad aborigen de Santuario de Tres Pozos et al v. Jujuy Province</i> <i>KlimaSeniorinnen v. Switzerland (ECtHR)</i> |
| Integrating climate considerations cases: cases that seek to integrate climate considerations, standards, or principles into a given decision or sectoral policy, with the dual goal of stopping specific harmful policies and projects, and mainstreaming climate concerns in policymaking. | 97 new cases filed in 2023 <i>By far the largest category of cases to date, cases employing this strategy are often overlooked in the literature on climate litigation.¹</i> | <i>Healthy Gulf v. Haland</i> <i>IDLADS v. MINAM (Enforcement Action for Guarantee Fund)</i> |
| Polluter pays cases: cases seeking monetary damages from defendants based on an alleged contribution to harmful impacts of climate change. | 5 new cases filed in 2023 <i>34 cases have been filed since 2015, most of them in the US.</i> | <i>Falys v. Total</i> <i>People v. Exxon Mobil Corp (California case)</i> |
| Corporate framework cases: cases that seek to disincentivise companies from continuing with high-emitting activities by requiring changes in group-level policies, corporate governance and decision-making extending through the companies' operations. | 3 new cases filed in 2023 <i>22 such cases have been recorded to date, all of them outside the US.</i> | <i>Smith v. Fonterra</i> <i>Falys v. Total</i> |
| Strategy and definition | Case numbers | Examples of cases illustrating recent developments |
| Failure to adapt cases: cases that challenge a government or company for failure to take climate risk into account. | 8 new cases filed in 2023 <i>64 such cases have been recorded since 2015.</i> | <i>Healthy Gulf v. Secretary, Louisiana Department of Natural Resources</i> <i>Comité Dialogo Ambiental v. Federal Emergency Management Agency</i> |
| Transition risk cases: cases that concern the (mis)management of transition risk by directors, officers and others tasked with ensuring the success of a business. ² | 1 new case filed in 2023 <i>Just 17 such cases have been recorded since 2015, but considerable growth is anticipated in this area, including growth in cases that are only semi-strategic or non-strategic in nature.</i> | <i>ClientEarth v. Shell Board of Directors</i> <i>Métamorphose v. TotalEnergies</i> |
| Climate-washing cases: cases that challenge inaccurate government or corporate narratives regarding contributions to the transition to a low-carbon future. | 47 new cases filed in 2023 <i>More than 140 such cases have been filed to date, with numbers growing significantly in the last few years.</i> | <i>FossilVrij NL v. KLM</i> <i>ASA complaint on cruise operators by Opportunity Green</i> |
| Turning off the taps cases: cases that challenge the flow of finance to projects and activities that are not aligned with climate action. | 6 new cases filed in 2023 <i>33 such cases filed since 2015 have been recorded to date.</i> | <i>Communications to Saudi Arabia, Japan, France, USA and the UK, and 13 financial institutions</i> <i>Jubilee v. EFA and NAIF</i> |

Source: LSE

Figure 18. Number of cases by year filed (2005–2024)



Source: Zero Carbon Analytics

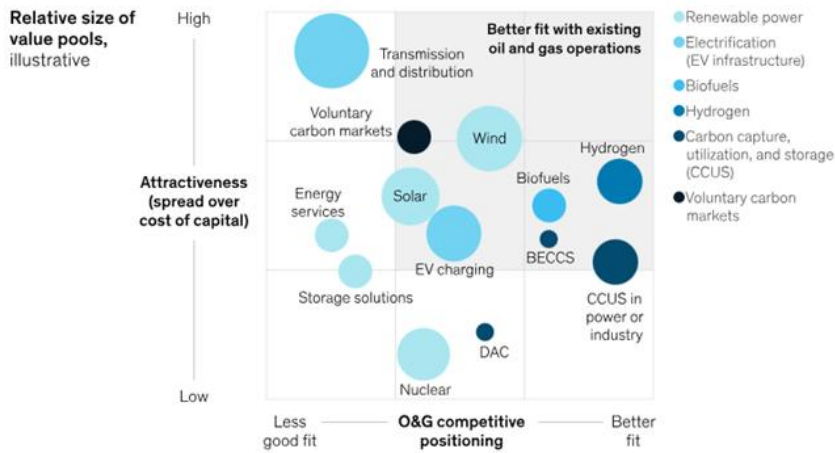
Table 16. Scenarios on the Decline of LNG

| Scenario | Description | Evidence | Likelihood | Justification |
|------------------------|---|---|---------------------|---|
| Gradual Decline | Decrease in oil/LNG demand as renewables scale, while certain niches (e.g., aviation, petrochemicals) maintain relevance. | Actual LNG oversupply (Group of Experts on Gas, Economic Commission for Europe 2015) and halted projects. European demand may have peaked, and renewables are gaining ground. | Moderately probable | While LNG's bridge-fuel image is challenged, the still slow adoption of renewables/other energy sources could sustain its role in specific sectors. |
| Rapid Collapse | Scenario dependent on aggressive regulation, societal rejection, and breakthroughs in alternatives. | Increasing litigation, societal demand for corporate accountability, and renewables' technological growth. However, there is some objection to departing from fossils. | Less probable | While pressures are significant, a collapse would require near-unanimous global regulatory action and faster technological breakthroughs than currently observed. |
| Transformation | Oil/LNG companies pivoting to become diversified energy companies by acquiring/ developing alternatives. | The strategic shift toward renewable and sustainable practices is a potential survival strategy. Companies like Shell are pressured to adapt. | Most probable | Companies face reputational and economic imperatives to align with ESG principles and decarbonization goals. |

Source: own elaboration

Figure 19. How Oil and Gas can take part of the low-carbon energy system

Oil and gas companies have an abundance of capabilities that may be valuable for parts of a new low-carbon energy system.

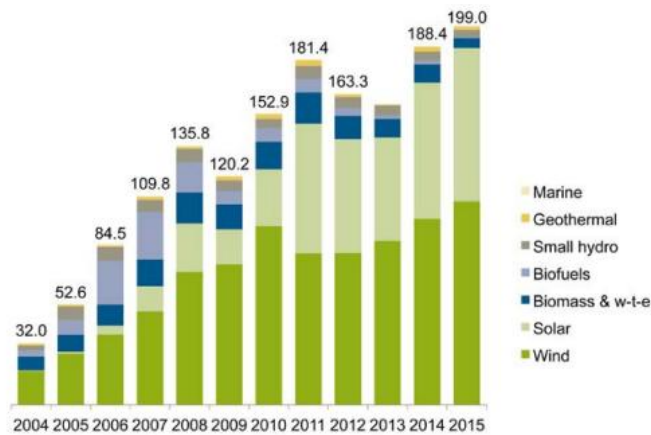


Sources of advantage for oil and gas companies

- Renewable power**
 - Familiarity with operating environments
 - Capital project delivery
 - Supply-chain scale and relationships
- Electrification (EV infrastructure)**
 - Balance sheets and alliances for innovation
 - Access to B2B customers
 - Adaptable refueling networks
- Biofuels**
 - Adaptable process assets
 - Liquid fuel and chemical engineering expertise
 - Access to B2B customers
- Hydrogen**
 - Access to CH₄ and CCUS to scale blue H₂
 - Refueling and logistics networks
 - Operational familiarity and safety processes
- Carbon capture, utilization, and storage (CCUS)**
 - Physical assets (depleted fields)
 - Deep subsurface knowledge
 - Proximity to industrial clusters with end users
 - For BECCS, all the advantages for biofuels
 - For DAC, adaptable process assets and access to low-cost power
- Voluntary carbon markets**
 - Large-scale marketing and commodities trading
 - Synergies with CCUS investment

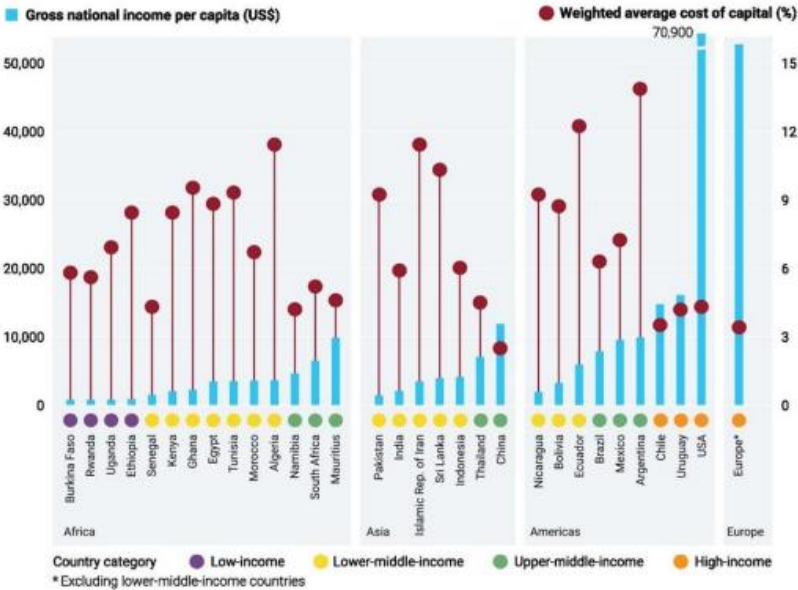
Source: McKinsey & Company

Figure 20. Asset Finance Investment in Renewable Energy by sector in \$Bn (2004–2015)



Source: Bloomberg New Energy Finance

Figure 21. WACC for solar PV projects against per capita gross national income for selected countries (2021)



Source: OECD

Table 17. Results of DCF - LNG

| LNG - DCF Results | Scenario 1 | Scenario 2 | Scenario 3 |
|-------------------|------------|------------|------------|
| GP* None | 795 | 795 | 795 |
| GPA | 795 | 795 | 795 |
| GP B | 795 | 795 | 795 |
| GP C | 782 | 782 | 782 |
| GPA+B | 795 | 795 | 795 |
| GPA+C | 782 | 782 | 782 |
| GP B+C | 782 | 782 | 782 |
| GPA+B+C | 782 | 782 | 782 |

* GP stands for Green Policy, used interchangeably with Public Policy
 Source: own elaboration

Table 18. Results of DCF - Renewables

| Renewables - DCF Results | Scenario 1 | Scenario 2 | Scenario 3 |
|---------------------------------|-------------------|-------------------|-------------------|
| GP None | 41 | 170 | 21 |
| GPA | 43 | 172 | 22 |
| GP B | 66 | 195 | 45 |
| GP C | 41 | 170 | 21 |
| GPA+B | 68 | 197 | 47 |
| GPA+C | 43 | 172 | 22 |
| GP B+C | 66 | 195 | 45 |
| GPA+B+C | 68 | 197 | 47 |

Source: own elaboration

Table 19. Results of DCF - Nuclear

| Nuclear - DCF Results | Scenario 1 | Scenario 2 | Scenario 3 |
|------------------------------|-------------------|-------------------|-------------------|
| GP None | -6,043 | 935 | 935 |
| GPA | -5,971 | 1,007 | 1,007 |
| GP B | -4,543 | 2,435 | 2,435 |
| GP C | -6,043 | 935 | 935 |
| GPA+B | -4,472 | 2,506 | 2,506 |
| GPA+C | -5,971 | 1,007 | 1,007 |
| GP B+C | -4,543 | 2,435 | 2,435 |
| GPA+B+C | -4,472 | 2,506 | 2,506 |

Source: own elaboration

Table 20. Results of DCF/GWh produced - LNG

| LNG - DCF Results/GWh produced | Scenario 1 | Scenario 2 | Scenario 3 |
|---------------------------------------|-------------------|-------------------|-------------------|
| GP None | 0.59 | 0.59 | 0.59 |
| GP A | 0.59 | 0.59 | 0.59 |
| GP B | 0.59 | 0.59 | 0.59 |
| GP C | 0.58 | 0.58 | 0.58 |
| GP A+B | 0.59 | 0.59 | 0.59 |
| GP A+C | 0.58 | 0.58 | 0.58 |
| GP B+C | 0.58 | 0.58 | 0.58 |
| GP A+B+C | 0.58 | 0.58 | 0.58 |

Source: own elaboration

Table 21. Results of DCF/GWh produced - Renewables

| Renewables - DCF Results/GWh produced | Scenario 1 | Scenario 2 | Scenario 3 |
|--|-------------------|-------------------|-------------------|
| GP None | 3.50 | 14.56 | 1.76 |
| GP A | 3.65 | 14.71 | 1.91 |
| GP B | 5.64 | 16.70 | 3.90 |
| GP C | 3.50 | 14.56 | 1.76 |
| GP A+B | 5.79 | 16.85 | 4.04 |
| GP A+C | 3.65 | 14.71 | 1.91 |
| GP B+C | 5.64 | 16.70 | 3.90 |
| GP A+B+C | 5.79 | 16.85 | 4.04 |

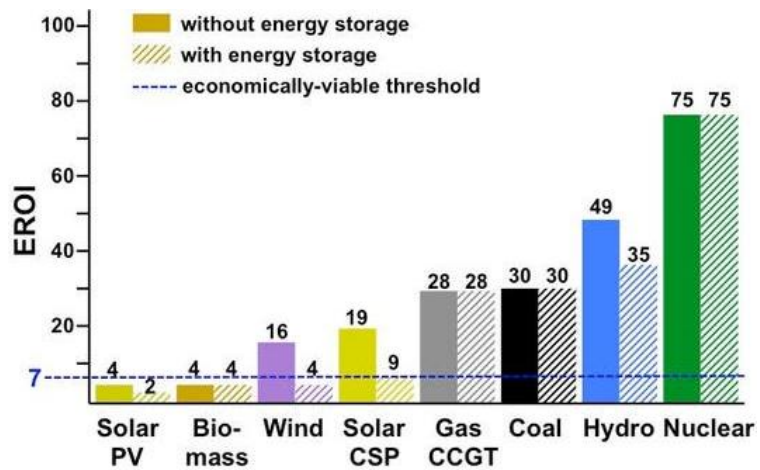
Source: own elaboration

Table 22. Results of DCF/GWh produced - Nuclear

| Nuclear - DCF Results/GWh produced | Scenario 1 | Scenario 2 | Scenario 3 |
|------------------------------------|------------|------------|------------|
| GP None | -3.54 | 0.55 | 0.55 |
| GP A | -3.50 | 0.59 | 0.59 |
| GP B | -2.66 | 1.43 | 1.43 |
| GP C | -3.54 | 0.55 | 0.55 |
| GP A+B | -2.62 | 1.47 | 1.47 |
| GP A+C | -3.50 | 0.59 | 0.59 |
| GP B+C | -2.66 | 1.43 | 1.43 |
| GP A+B+C | -2.62 | 1.47 | 1.47 |

Source: own elaboration

Figure 22. Energy Returned on investment relative to the breakeven value of 1



Source: Forbes

Figure 23. Deal Timeline

8/4/2015 Royal-Dutch multinational Shell plc and BG Group plc. Officially declared that Shell director board will acquire BG group and will pay shareholders around £1350 per share, which was around 50% premium on BG Group's share price.

11/4/2015 Both Royal-Dutch multinational Shell plc and BG Group plc. held a meeting to state the transaction call and set up the clause. They also decide the expected date for fulfilling the regulation process and completely acquire the targeted company in 2015 of last quarter.

16/06/2015 BG Group stated it had received anti-trust regulatory clearance from the U.S. Federal Trade Commission for Royal Dutch Shell's proposed \$70 billion acquisition.

8/7/2015 Brazil's competition regulator, CADE, gave preliminary approval "without restrictions" for the deal.

11/6/2015-19/11/2015

Review of the Merger Process Guidelines under the Australian Competition and Consumer Commission (ACCC) commenced.

The Former acquisition on 3rd of September 2015, was delayed by ACCC to analyze the whole structure and regulation.

Finally, on 19th of November 2015 ACCC announced they will not be opposed to the acquisition.

27/1/2016 Shell won shareholder approval for the takeover deal, with 83% of Shell shareholders voting for the acquisition.

28/1/2016 BG Group shareholders overwhelmingly approved Royal Dutch Shell's takeover, with 99.53% of BG shareholders voting in favor of the merger.

15/2/2016 Royal Dutch Shell PLC completed its \$53 billion acquisition of BG Group PLC, to become the world's second largest energy company by market capitalization behind only Exxon Mobil.