

A Work Project, presented as part of the requirements for the Award of a Master Degree in Economics / Finance / Management from the NOVA – School of Business and Economics.

EQUITY RESEARCH: ROYAL DUTCH SHELL
FROM GREAT POWER TO GREEN
RESPONSIBILITY

GONÇALO MANUEL PEREIRA PARREIRA
28983

A Project carried out on the Master in Finance Program, under the supervision of:

Professor: Rosário André

MAY 21ST, 2021

Abstract

The Future of the Oil and Gas industry will depend on society's demands and the way the industry's players will respond to them. Royal Dutch Shell will create a strategy to adapt its segments according to the different energetic needs from emerging and developed economies and follow its commitment to be a part of the transition towards a future with greener energy solutions.

Keywords (up to four)

Shell; Oil; Gas; Renewables

Table of Content

UPSTREAM SEGMENT	4
SEGMENT PRODUCTION	4
▪ <i>Historical Production</i>	4
▪ <i>Production Capacity</i>	5
TRANSITION SCENARIOS	5
▪ <i>Production</i>	5
INTEGRATED GAS SEGMENT	8
SEGMENT PRODUCTION	8
▪ <i>Historical Production</i>	8
▪ <i>Production Capacity</i>	9
TRANSITION SCENARIOS	10
▪ <i>Production</i>	10
DOWNSTREAM SEGMENT	12
OIL PRODUCTS	12
▪ <i>Historical statistics</i>	12
CHEMICALS	13
▪ <i>Historical Statistics</i>	13
TRANSITION IN THE PRODUCTION	14
COSTS & CAPEX	15
SEGMENT CORE VALUE & BETA ANALYSIS	16
VALUATION AND RECOMMENDATION	16
AGGREGATED VALUATION	17
MULTIPLES VALUATION	18

Upstream Segment

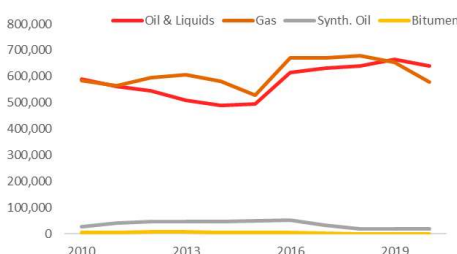


Figure 44 – Historical production by product (in K BOE per year). Source: Royal Dutch Shell.

The Upstream segment is the base of Shell's value chain, **accounting for over 90% of the production of liquid hydrocarbons – as input before refining – and 55% of the production of natural gas in 2020**, the rest being processed by the Integrated Gas segment. As such, it is naturally impacted by direct demand and supply forces on the market and transitions in the industry environment. The following years will reflect recovery from the COVID-19 pandemic, product demand adjustments and, more importantly, a large change in structure in order to fulfil the **2050 Carbon Neutrality Goal – reflecting net zero emissions of greenhouse effect gas**.

Segment Production

Upstream relies heavily on property, projects, and exploration prospects to obtain raw inputs, which it sells directly to other segments and third parties.

■ Historical Production

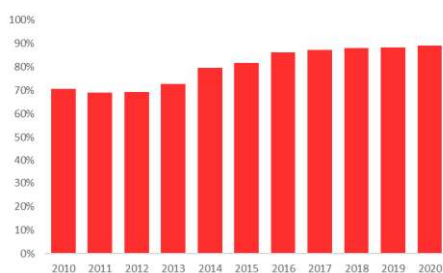


Figure 45 – Share of historical production (in %) obtained by Royal Dutch Shell's consolidated subsidiaries. Source: Royal Dutch Shell.

Upstream's production has been historically focused on oil and several liquid hydrocarbons, gas and synthetic oil and bitumen, the latter two being now part of Downstream's production. The share of production for each product has changed widely over time, for which gas has had, for the most part, the largest production share. Production of both oil and gas increased tremendously upon BG Group's acquisition in 2016, one of Shell's largest acquisitions historically, contributing mostly to increase its portfolio of gas supplies. **In 2016, production of gas increased roughly 41% and the production of oil increased about 27%.** In 2019, production of oil & other liquids surpassed the production of gas, in what

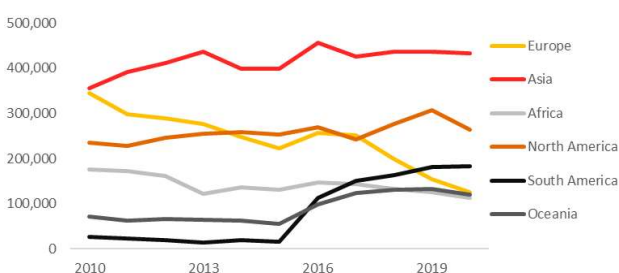


Figure 46 – Historical production by region (in K BOE per year). Source: Royal Dutch Shell.

has been stated by Shell as the peak year for oil production at roughly **665.5 million barrels of oil equivalent (BOE)**. In the same year, **gas achieved a production of roughly 653 million BOE**. In 2010, 30% of Shell's upstream production was achieved through Joint Ventures and other production-sharing agreements, an amount that was reduced to about 10% by 2020, reflecting the company's interest in producing more under its own consolidated subsidiaries.

Although upstream operates on a global scale, the distribution of production share across regions is far from being even. Europe, for instance, concentrated **in 2010 almost 30% of upstream's entire production**, with focus in the UK's North Sea and in the Netherlands' mainland and North Sea, being at level with Asia. **In 2020, Europe's share of production had dropped towards only 10%,**

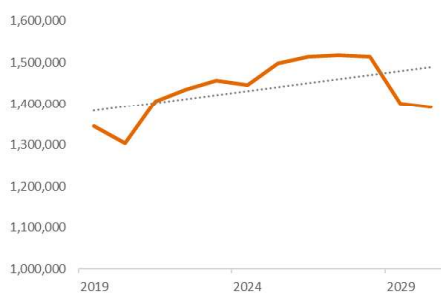


Figure 47 – Estimated total future upstream production capacity (in K BOE per year). Source: Analysts' Estimates.

whereas Asia would produce 35% of the total. Other major changes include increases in South America's and Oceania's production, mostly due to **deep-water oil and gas investments off-shore Brazil in the last 5 years and gas projects in Australia**. Production in North America and Africa remained relatively stable, with a small increase in the former and a small decrease in the latter.

These reflect part of Shell's future Upstream restructuring.

■ Production Capacity

A thorough analysis of Shell's most relevant present and future projects allows for an estimate of its upstream production capacity. This capacity is adjusted to current production to allow for future production estimates.

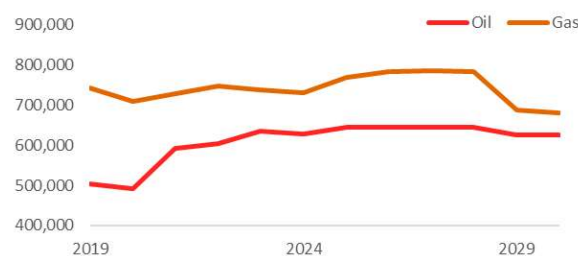


Figure 48 – Estimated oil and gas future upstream production capacity (in K BOE per year). Source: Analysts' Estimates.

After a visible drop in production capacity for 2020, in the following years a series of new upstream projects create an **upward trend until 2027, with an increase in capacity of about 8% from 2021 until 2027**, period until when there is plenty of project information. **This increase is caused by an increase of 9% in oil production capacity and 8% in gas production capacity.**

From 2020 to 2027 there are also slight changes in the relocation of upstream's production capacity, with **Oceania, South America and Africa all gaining margin while Europe, North America and Asia slightly decrease in capacity**. This is justified by Shell's restructuring plan for the segment, where it wishes **to focus 80% of its cash CAPEX and operating cash-flows in core producing regions, of which Brazil and Nigeria see a new inflow of projects**. Other core regions include UK, Kazakhstan, Oman, Malaysia, Brunei, and two locations in the USA. Europe continues seeing continuous divestment, with one of Shell's biggest gas fields, Groningen Gasveld, seeing government-imposed cuts in capacity and final shutdown in 2022.

Transition Scenarios

The future contribution of upstream towards Shell's profitability depends on how it is going to transition to attain the 2050 goal. Companies in the industry often study how the transition can occur: **Extreme emission reduction (attaining net-zero), moderate reduction, and slow reduction**. We too believe these scenarios may provide an useful picture of upstream's possible performance and base our views on numerous demand and supply outlooks for possible paths.

■ Production

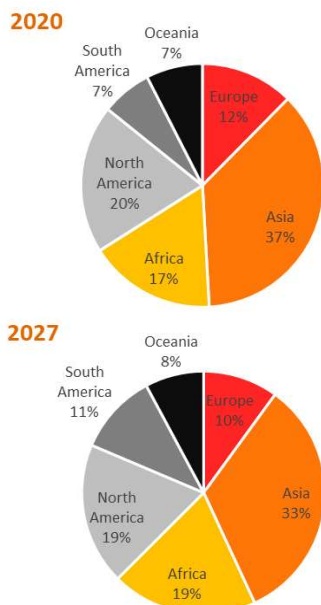


Figure 49 – Comparison of share (in %) of total future upstream production capacity by region (2020 & 2027). Source: Analysts' Estimates.

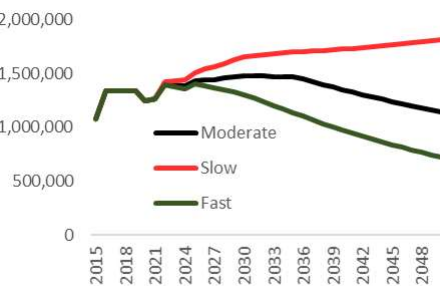


Figure 50 – Estimated future production by scenario (in K BOE per year, 2015-2050). Source: Analysts' Estimates.

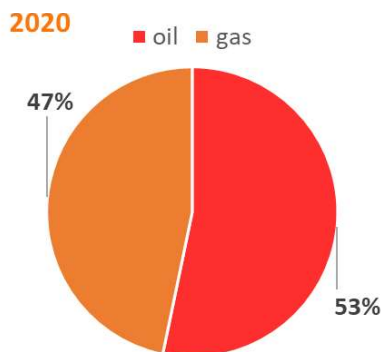


Figure 51 – Production share of oil and liquids versus natural gas (in %) as of 2020. Source: Royal Dutch Shell.

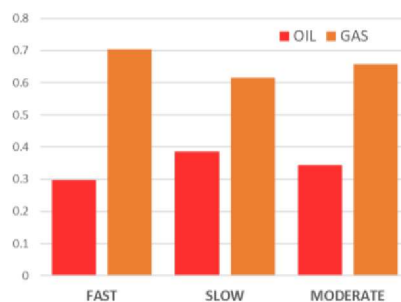


Figure 52 – Estimated production share of oil and liquids versus natural gas (in %) as of 2050, per scenario. Source: Analysts' Estimates.

We choose the moderate transition scenario as the basis for the analysis. This includes a decrease in production of oil **of about 1% per year until 2030, with gas production increasing – about 2-3% until 2035** - to compensate as a cleaner energy source. In the last ten to fifteen years, a larger drop is expected in both, accelerating the divestment in oil production, and decreasing the production of gas. Both Asia and Africa, having higher demand for more polluting energy sources – still very coal intensive – are assumed to **transition slower than the remaining regions**, while Europe is considered unable to increase gas production due to the closure of the Groningen Gasveld. All three scenarios calculate the value of oil and gas for the first following years through the capacity estimation stated above, both adjusted in 2021 for the recovery of the COVID19 crisis.

The slow scenario considers very little effort to reduce emissions, assuming **a growth of 17% for oil and liquids for the first 10 years, following a reduction of 21% over the next 20 years**. This is the only scenario considering an increase in oil production, which goes against Shell's planned strategy. Gas faces a similar acceleration as the one for the basis scenario until **2035, but continues to grow until 2050 at an average rate of 2%** unlike the other scenarios. Asia and Africa are considered as having a slower transition in the second half (after 2035).

The fast scenario is the one which more closely aligns with the net-zero goal, assuming decreases in both oil and gas over time and a **large change in structure, with the share of oil decreasing from 53% in 2020 to 30% in 2050**. Both oil and gas are assumed to decrease starting in 2021 and 2025 respectively, with the decreasing rate **almost doubling in the second half, with gas decreasing around 1-2% per year and oil with a much larger rate of 3-4% per year**. Asia and Africa again present a lag, transitioning slower.

• Operating Costs and CAPEX

In the basis scenario we align the costs with Shell's future strategy while being conservative. Exploration costs are expected to remain stable until 2025, when Shell intends to not have any new exploration projects. Instead, we assume **exploration costs to drop 80% only by 2027 and remain stable afterwards**. Regarding production expenses, fixed costs are expected to drop following the restructuring to the core zones. Following our capacity analysis, **Shell's core upstream areas produced, in 2020, roughly 55% of the total production**. As this restructuring is expected to occur until 2035, **fixed costs are expected to decrease accordingly 45% by 2035, becoming variable afterwards**. Variable costs are expected to attain 80% of their current value by 2030, on a

conservative analysis, despite Shell's ambitions by 2025. In the slow scenario we assume **these costs to be attainable only by 2035**, following a slower change into producing gas, which is cheaper. **Exploration costs to decrease 5% per year until 2035** as exploration for oil and gas is assumed to continue further. The restructuring and thus fixed costs are assumed to be the same. In the fast scenario, the variable costs are expected to **drop 80% by 2025 as envisioned by Shell**. Similar to the moderate scenario, **exploration costs drop 80% but in the planned year of 2025**. Purchases use historical average ratio – which is higher – for both moderate and slow scenarios.

We align capital expenditures to Shell's ambitions in our basis scenario.

Shell estimates dedicating between **\$11 and \$14 Billion per year until 2025 in**

Planned Upstream CAPEX	Moderate	Slow	Fast
Conventional Oil and Gas	4,000	5,000	3,500
Deep-Water	4,000	5,000	3,500
Shales	3,000	4,000	2,000
Total	11,000	14,000	9,000

CAPEX to Upstream, with moderate expectations. For the moderate scenario we conservatively assume **\$11 Billion**, whereas for the slow scenario we assume **\$14 Billion**, due to a larger continuous investment in oil and gas PP&E.

For the fast scenario, we limit the value to the planned **\$9 Billion in Cash CAPEX**, envisioned by Shell for the upstream transition. After 2025, CAPEX is estimated based on revenue, **being curved 5% upwards and downwards in the slow and fast scenarios**, respectively.

Figure 53 – Planned capital expenditure per year, in USD Million, from 2021 to 2025, split by type of upstream projects. Source: Royal Dutch Shell and Analysts' Estimates.

• Segment Core Value & Beta Analysis

Each scenario will impact the value of the segment and thus the evaluation of Shell's share price.

Scenario	Slow			Moderate (Basis)			Fast		
Beta	1	1.25	1.5	1	<u>1.25</u>	1.5	1	1.25	1.5
Scenario	78,975	59,828	47,588	55,370	<u>45,616</u>	38,753	76,992	67,786	60,867
Growth Rate (G)	-0.3%			-2.8%			-5.0%		

Figure 54 – Comparison between present values for estimated future upstream core free cash flows, depicting the segment's value, in USD Million, per scenario. These values are estimated as of the end of the year 2021. A beta analysis and perpetual growth rates are also displayed per scenario. Source: Analysts' Estimates.

The **basis scenario** yields the lowest present value of core free cash flows when compared to other with the same betas. An **average beta selected from comparable companies** to the upstream segment alone is used as the average beta. In the moderate scenario, a **market beta would increase the value of the segment by 21% and a higher beta, indicating higher risk, would decrease the value by 15%**. When using the average beta, the value of the company **in the slow scenario increases by 31% and in the fast scenario by 49%**, both being the result of doing business-as-usual in the former and lower costs in the latter. **The tax rate considered for the estimation is 50%**, resulting from an historical difference of around 25% when compared to the downstream

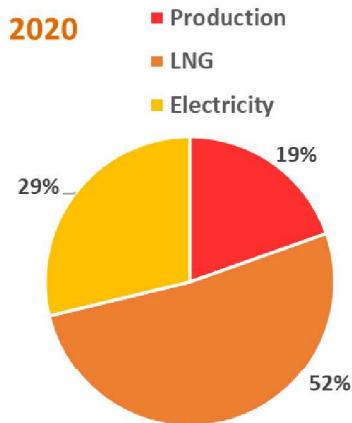


Figure 55 – Share (in %) of revenue originating from each main sales category from the integrated gas segment, in 2020. Source: Analysts' Estimates.

segment that follows an effective rate close to the statutory rate of 25%. Upstream is subject to higher taxation due to the nature of the business. **All scenarios stabilize at negative perpetual growth rates**, due to the industry transition into cleaner energies, with the **slow scenario having the highest growth rate** and the **fast scenario having the lowest growth rate**, and thus more harmful for the segment. **The basis scenario stabilizes in between both, at a growth rate of -2.8%.**

Integrated Gas Segment

Like the upstream segment, the integrated gas segment also sits at the top of the value chain, focusing mostly on **Shell's LNG portfolio**, and, like upstream, some part of the **oil and liquids and natural gas production**. Shell is also recently incorporating its new energies developments into this segment. For this reason, we analyse here Integrated Gas as a segment seeing a future transition between oil and gas products and renewable energies, in which Shell has been investing in order to attain the **2050 Carbon Neutrality Goal**. In 2020, we estimate that **52% of the segment's total revenue originates from LNG sales**, whereas **oil and liquids and natural gas only comprise 19% of the total**, with **electricity managed by shell returning 29% of total revenue**. LNG is thus estimated to be the most important IG business.

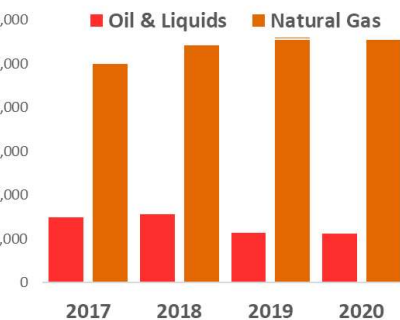


Figure 56 – Production (in K BOE per year) of oil and liquids and natural gas, from 2017 to 2020. Source: Analysts' Estimates.

Segment Production

Integrated gas relies heavily on property, projects, and exploration prospects to obtain raw inputs, which it sells directly to other segments and third parties. Furthermore, **it relies on investment on LNG terminals and transportation property**, and, more recently, on **solar and wind farms to produce renewable energy**.

■ Historical Production

Integrated gas's production of oil and liquids and natural gas is merged with upstream's production, sharing many projects. IG's share of upstream production has been estimated following analysis of historical production capacity, determining the projects corresponding to each segment and to both. Historically being a segment focusing more on **natural gas**, **its share of production was 77% in 2017, which grew to 83% just three years later**, due to both a decrease in oil production and an increase in the output of natural gas. **IG did not follow the oil production peak in 2019** as recorded by upstream. Like upstream, IG is also focusing its production on its consolidated subsidiaries, **which comprised 85% of the full oil and liquids and natural gas production in 2020**.

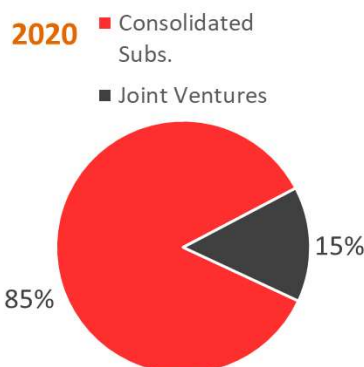
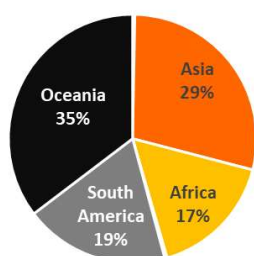


Figure 57 – Share (in %) of production of oil and liquids and gas by consolidated subsidiaries and joint ventures, as of 2020. Source: Analysts' Estimates.



Figure 58 – LNG liquefaction and sales volumes, in MTPA, from 2017 to 2020. Source: Royal Dutch Shell.

2020



2020

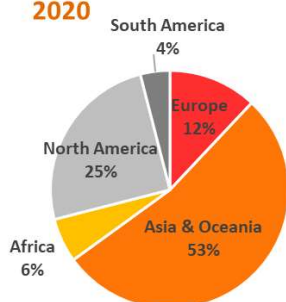


Figure 59 – Share (in %) of LNG liquefaction and share (in %) of LNG Exports, by region, in 2020. Source: Royal Dutch Shell and Analysts' Estimates.

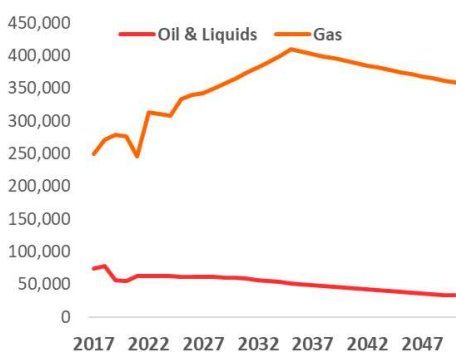


Figure 60 – Evolution of estimated oil and liquids and natural gas capacity, in K BOE per year. Source: Analysts' Estimates.

Integrated gas has recently also been developing its portfolio of LNG, with **LNG sales volumes growing almost 13% from 2017 to 2019**, with a natural reduction in 2020 due to the COVID19 pandemic. **Liquefaction volumes also increased almost 8% in the same period**. Liquefaction volumes are lower than sales volumes, **at around 50% per year**, due to Shell's current strategy of buying LNG to sell and producing about half of the amount sold. Projects which strongly develop Shell's LNG portfolio include agreements with **Qatar Gas**, the largest LNG producer in the world, **for an LNG train in which RDS has an interest of 30%**. Shell also detains many LNG projects in Australia, mostly due to the acquisition of BG Group, and several other large investments in **South America, Nigeria, Egypt, Oman and Russia**. We estimate that **53% of Shell's LNG sales are exported to Asia & Oceania**, with South America receiving the lowest share – **only 4%** - despite its higher liquefaction share (**19%**). In 2020, **Oceania is the region with the highest production share**, due to the large projects acquired in Australia. Royal Dutch Shell presents itself as the second largest company by LNG storage capacity, only slightly below Qatar Gas itself.

The electrical capacity managed and sold by Shell and reported in this segment is rather recent, including electricity both from renewable and non-renewable sources. Most electrical capacity is managed by **Shell Energy North America, managing a capacity of 10,000 MW** from several sources. Regarding renewable electricity sources, most projects are currently located in the Netherlands and in the USA. **In 2020, our capacity analysis estimates a total electrical production capacity of 96 TWh.**

■ Production Capacity

Production of oil and liquids and natural gas are assumed to follow upstream's capacity as new projects begin. For this estimation we always assume **upstream in the basis (moderate) scenario**, throughout the scenario analysis, as this production concerns the lowest share of revenue and we consider the basis scenario to be an adequate response for IG in the long run. By 2050, **the production capacity for oil and liquids is expected to decrease about 41% and for natural gas is expected to increase about 30%**, when compared to 2020.

Capacity of LNG liquefaction is expected to **increase in the next 5 years**, with North America and Oceania observing the largest growth in capacity. South America, Europe and Asia have no planned projects for capacity increase. From 2020 until 2026 **LNG liquefaction capacity is expected to grow 24%**.

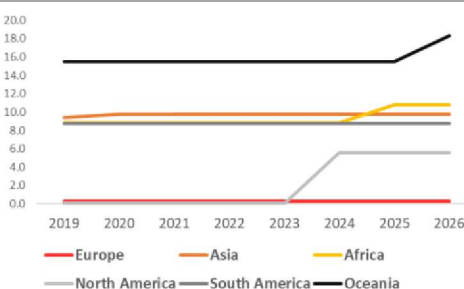


Figure 61 – Evolution of estimated LNG capacity, per region, in MTPA. Source: Analysts' Estimates.

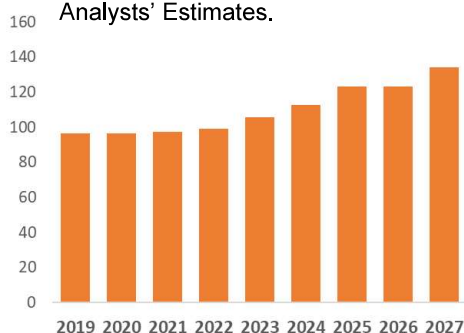


Figure 62 – Estimated electricity capacity, in TWh. Source: Analysts' Estimates.

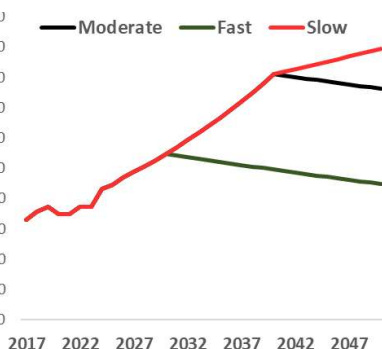
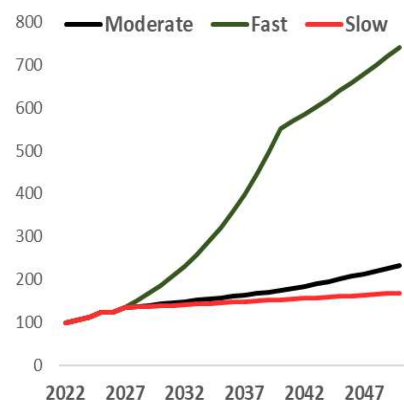


Figure 63 – Estimated electricity production (in TWh) and LNG sales (in MTPA), as per estimated scenario. Source: Analysts' Estimates.

Capacity of electricity production is also expected to increase with a series of new renewable energy products coming online. **From 2020 until 2027, capacity for electricity production is estimated to increase roughly 39%.**

Transition Scenarios

Like upstream, the production of integrated gas will depend on how the transition is made. More properly, it will depend on the demand for LNG, and consequentially for natural gas, and on the demand and ability to transition to renewable energies.

Production

The moderate scenario is chosen as the basis scenario for the scenario analysis. In this scenario electricity production is assumed to grow at **2% for the first 20 years** following demand outlooks for electricity, accelerating afterwards to **4%**. LNG sales are assumed to grow at **4% until 2040** following Shell's planning, for which we assume a slight decrease afterwards until 2050 in order to reduce carbon emissions closer to 2050. Asia and Africa are once again met with a lag in this decrease as happened for the upstream segment. Demand by continent is expected to change with Asia taking a share of **almost 60% by 2040**.

In the slow scenario, electricity managed is expected to grow slightly less than in the previous scenario, as Shell will still attempt to increase its share of renewable electricity, thus growing at a **CAGR of 1% for every region until 2050** following outlook analysis. Regarding LNG, sales are expected to grow as planned until 2040, like in the previous scenario, but now Shell is expected to keep increasing the production of LNG until 2050, albeit at a mediocre **rate of 1% for every region**.

For the fast scenario, the production of electricity is assumed to grow at a **CAGR of 11.5% from 2027 to 2040**. This scenario assumes that Shell is able to meet its goals of managing **about 560TWh of electricity**, although by 2040 since our capacity analysis does not indicate that such value could be likely attained by 2030 as ambitioned by Shell. LNG sales are still expected to grow at **4%** as planned by Shell, although we believe the company would begin transitioning into electricity sooner, and thus we assume said growth only until 2030, after which LNG sales are expected to **drop at a rate of -1%**.

Operating Costs and CAPEX

Costs also slightly differ per scenario. Exploration costs follow the same basis as described in the upstream scenarios, due to the need for exploration for

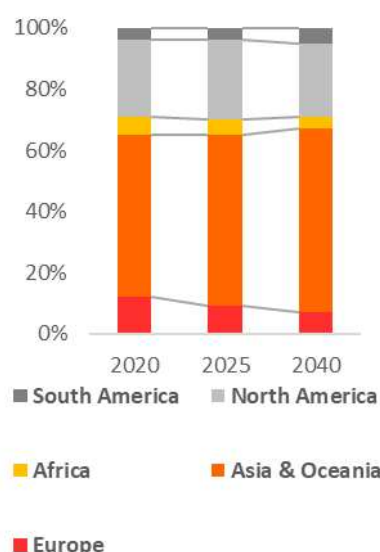


Figure 64 – Share (in %) of demand for LNG exports by region, as estimated by the indicated year. Source: Analysts' Estimates and LNG Outlooks.

Planned Upstream CAPEX	Moderate	Slow	Fast
Renewables	4,000	3,000	5,000
IG (Gas and LNG)	4,000	4,000	3,000
Total	8,000	7,000	8,000

Figure 65 – Estimated capital expenditure per year, in USD Million, from 2021 to 2025, split by type of integrated gas projects. Source: Royal Dutch Shell and Analysts' Estimates.

gas fields to produce LNG. Research & Development costs are increasing in every scenario due to the transition, with the moderate scenario seeing the **R&D expenses increase 5% each year**, while the fast scenario sees the same expenses growing **at 7% a year**, due to more investment in renewable electricity projects, and the slow scenario sees an **increase of 3%**. Fixed costs are assumed to grow at a **stable rate of 2%** in all scenarios due to the high investment to increase the number of LNG terminals, transportation vehicles and renewable energy farms, all requiring maintenance. The variable costs in the moderate scenario include a conservative reduction of **20% by 2025**, differently from Shell's ambitions to do so by 2022. This value mostly regards operating expenses for the production of LNG. As such, in the slow scenario, this value is **assumed to be instead attained at 2022** due to larger investment in LNG. In the fast scenario, this reduction is assumed to never be attained as the focus is directed towards renewable energy.

CAPEX is aligned with Shell's planning for the next years, dedicating **between 3 and 5 billion USD** to invest in renewables, in the slow and fast scenarios respectively. CAPEX for gas and LNG is expected to remain the same in both the slow and moderate scenarios, at **4 billion USD**, due to similar production structure up until 2040. Overall, total CAPEX for integrated gas is expected to stay **between 7 and 8 billion USD**. **After 2025, CAPEX grows 1% in the fast scenario and decreases 1% in the slow scenario.**

• Segment Core Value & Beta Analysis

Scenario	Slow			Moderate (Basis)			Fast		
Beta	0.78	1.034	1.28	0.78	1.034	1.28	0.78	1.034	1.28
Scenario	147,604	95,072	68,022	116,792	81,255	60,636	209,516	122,932	82,641
Growth Rate (G)	1.5%			0.3%			2.1%		

Figure 66 – Comparison between present values for estimated future integrated gas core free cash flows, depicting the segment's value, in USD Million, per scenario. These values are estimated as of the end of the year 2021. A beta analysis and perpetual growth rates are also displayed per scenario. Source: Analysts' Estimates.

The **basis scenario** yields again the **lowest present value of core free cash flows**. An average beta is selected between average betas of gas and LNG standalone companies and renewable companies, at **70% of gas companies and 30% of renewables**, based on IG's production shares. **The tax rate considered is 50%** and follows the same reasoning as for the upstream segment. Integrated gas is assumed to have the same tax rate for the WACC calculation as upstream, due to the nature of the business. **All scenarios stabilize at positive perpetual growth rates**, due to the industry transition into cleaner energies, with the **fast scenario having the highest growth rate** and the **moderate scenario having the lowest growth rate, at 0.3%**.

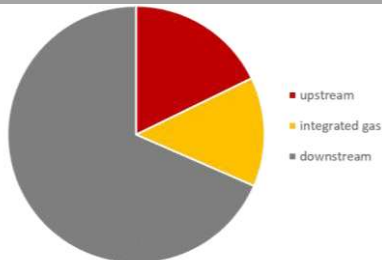


Figure 67 – Share of total Revenue by segment. Source: Analysts' Estimates.

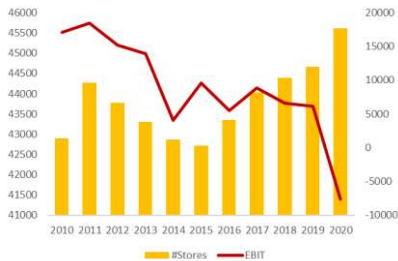


Figure 68 – Evolution in the number of stores VS EBIT in M\$. Source: Analysts' Estimates

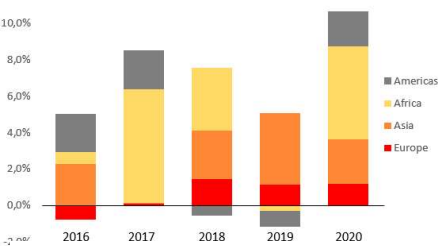


Figure 69 – Growth rate in the number of stores by region. Source: Analysts' Estimates.

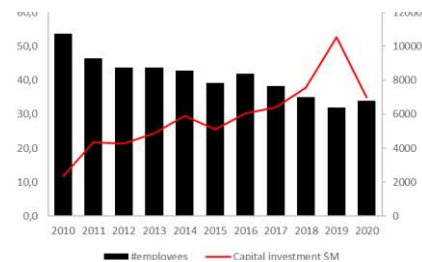


Figure 70 – Number of employees in thousands VS Capex in million \$. Source: Analysts' Estimates.

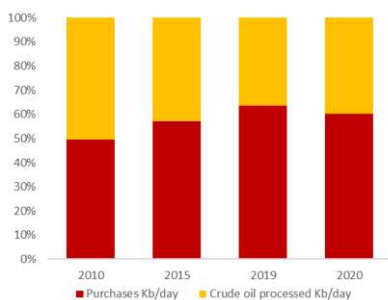


Figure 71 – Purchases evolution by year VS total crude oil processed in thousand barrels per day. Source: Analysts' Estimates.

Downstream Segment

The Downstream segment represents the branch of Shell's core activities directly related to serving the customer's needs concerning the end products of Shell's value chain. It manages more than **45 thousand retail stores across the globe** and 36 thousand employees working to fulfil the everyday energetic needs of private customers worldwide. Alongside with the B2C marketing elements of the segment, it manages 2 main branches of the integrated value chain.

Oil Products

This sub-segment corresponds to the processing and refining of crude oil and other types of feedstocks, to produce commercial end products such as gasoline, diesel, lubricants, fuel oil and other types of products constituting the vast portfolio of products Shell provides to its customers. This branch not only deals with the private customers directly but also performs trading and distribution to other businesses. As of 2020, oil products contributed to a share of **90% of the total Downstream's revenue** and close to **70% of Shell's overall consolidated revenue**.

Historical statistics

Over the last 10 years, the number of retail stores has presented slight changes, directly connected to fluctuation in the company's performance for this segment and also the demand affecting it. By analysing the geographical distribution of these stores, **Asia and Africa** have been the regions showing the **highest growth rate**, while Europe and Americas have been showing signs of stabilization. These results match the expectations for the future of the segment, where emerging economies are the ones still presenting growth in energetic needs, while developed economies show signs of stabilization and are looking for alternative solutions regarding climate change. At the same time, the number of employees has dropped at a constant rate, from levels around **54 thousand in 2010** to little over **30 thousand in 2020**. This does not seem aligned with the evolution of the number of retail stores, however the decline in employees can be associated with higher levels of investment, especially in better technological and service automatization solutions implemented in the company.

Considering the refining capacity of this branch, it has presented a **constant 2% to 3% decrease across the last 10 years**, explained by the divestment in refining plants together with a policy of increasing the **purchase ratio over production** in the same period. The utilization rate has kept relatively constant at around 90% in the last 10 years, except in 2020 due to lower overall demand for

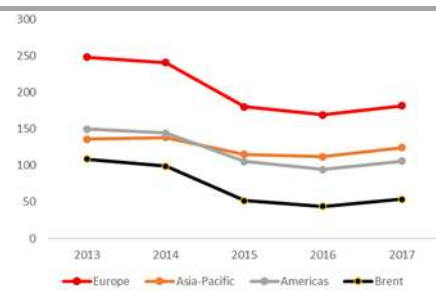


Figure 72 – Yearly evolution in the Price of Gasoline by region VS Brent's spot price. Source: Analysts' Estimates.

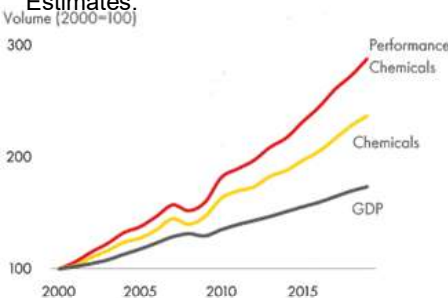


Figure 73 – Volume of Chemicals against evolution in GDP by Year. Source: Shell Presentations

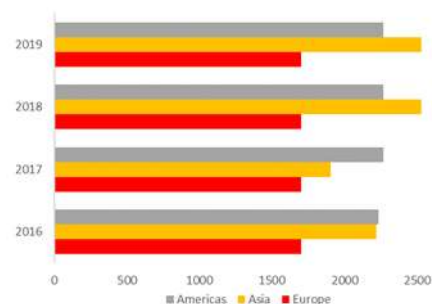


Figure 74 – Evolution in the capacity of Ethylene by Region (thousand of barrels per day). Source: Analysts' Estimates.

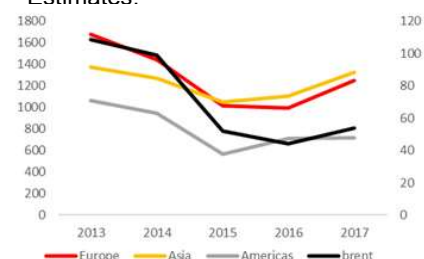


Figure 75 – Evolution in the price of Ethylene by Region VS Brent. Source: Analyst's Estimates.

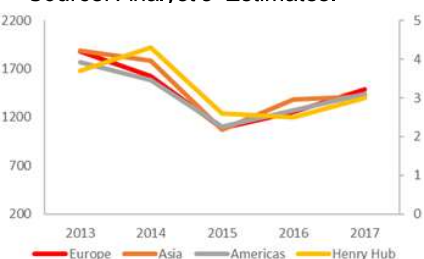


Figure 76 – Price of Styrene Monomer by Region VS Brent. Source: Analyst's Estimates.

oil products, especially fuels. The total amounts of purchases and production are distributed by the different products sold in this business unit. The main products considered were gasolines, kerosines (jet fuel), diesel, fuel oil and other products such as biofuels, the latter representing a market still to be further developed in the future.

In terms of **prices**, although they are not exactly similar to the price of oil and gas futures, associated with the premium from being a defined retail price, they still followed the **same pattern of movement as the main spots** for the oil and gas futures in the industry. To note that European prices are substantially higher for gasoline and diesel due to policy imposing higher taxation on these products.

Chemicals

The Chemicals unit focuses on the production and sale of base and intermediate petrochemicals essential for the production of everyday products like plastics and solvents. Thus, it is more connected with Downstream's B2B element, serving as a distribution point for the sale of chemical inputs to major retail manufacturers from a variety of industries. As of 2020. This sub-segment contributed to around **10% of total Downstream's revenue**, however the vast amount of end products dependent of these inputs create **future expectations of growth** within this area.

Historical Statistics

In terms of production and capacity, this subsegment has a different structure compared to Oil and Products. **Asia shows significant investment in this area**, confirmed by the **higher level of ethylene capacity achieved in 2018 when compared to Europe and Americas**. These are the only considered regions for Shell regarding this BU, since Africa does not have share of production nor of sales after 2016. Considering **capacity utilization**, this ratio has oscillated between **85% and 90%**, except for 2020 where it **dropped to 80%**. Regarding the revenue of this unit, it mostly derives from the production and sale of base and intermediate chemicals. For the valuation, the base chemicals share is represented by ethylene quantities, while intermediates & other share is represented by Styrene Monomer, Ethylene Glycol and High Olefins. The difference between the two is the level of processing, since ethylene is a simple hydrocarbon which has not been processed, while intermediates already have gone through one stage of processing and are expected to be used as inputs for a variety of final products.

The environment in prices also portrays a similar image to oil products, which is mainly related to the fact that the current production processes are

based on cracking methods to dismantle the complex organic molecules of crude oil and natural gas into simpler hydrocarbons such as these chemicals.

Transition in the production

As for the previous segments, three scenarios for the transition will be analysed. However, while Oil Products will be analysed with different implications for each scenario, the Chemicals unit is expected to evolve in parallel to the rest of Shell's activities. Although the link with energy spot prices is present, this assumption is justified by its lower share of revenue and because its operations serve more diversified industries, moving away from the basis of energetic demand. There are already some executive decisions taken by RDS regarding the **divestment in refinery plants**, one in **Europe** (Fredericia) and one in the **US** (Convent). Thus, the impact of these divestments will be replicated for the three scenarios, considering a **7% decrease in capacity** for the two regions by 2023, the expected date for the full closure of these refining plants.

Considering the **moderate scenario**, the capacity for oil products will follow a pattern consistent with their expected decrease in demand. For **Europe and Americas** after 2023 the **expected decrease** in capacity will be **1% per year until 2035**, while for the **emerging economies of Asia-Pacific and African** regions the **peak in demand presents a delay**, having increasing growth in capacities of **1% until 2026**, achieving the peak and stabilizing by 2030. Capacity utilization is expected to recover from the drop in 2020 reaching levels of past years, to later present a **0.5% decrease** each year for **Europe and Americas**, in the opposite direction to a **yearly increase of 1% in emerging economies**. The change in share of total production by regions follows the same path, with Asia absorbing a small but consistent share each year from both developed regions' share. Regarding the products themselves, **Europe and Americas** currently have a high share in **diesel and gasolines** respectively, hence we expect a **conversion shift** for these 2 products within both regions. Also, a shift for a higher share in **other fuels (biofuels)** was considered for this scenario. For the cases of Asia and Africa, there is small impact with a yearly increase in the share of gasoline assimilated from the share of diesel to balance these 2 sources, while after 2030 there is a slight increase in the share of other oil products.

The slow and fast scenarios differ from the moderate scenario in terms of capacity, its utilization ratio and the shifts in demand, being that these three variables are evaluated geographically. For the case of the **slow transition**, **capacity increases until 2030** where it peaks and starts to decrease at a small rate in Europe and Americas. Asia and Africa present a delay, **having stabilized by 2035**. The utilization ratio follows the same path with stable high levels of

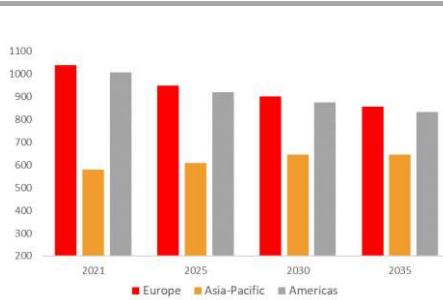


Figure 77 – Capacity change Moderate scenario in Kb/day.
Source: Analysts' Estimates.

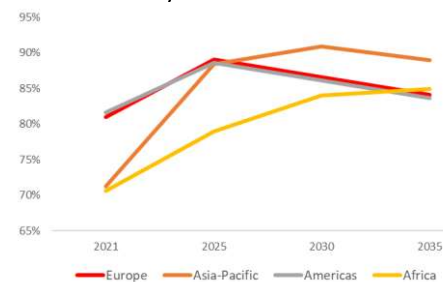


Figure 78 – Capacity utilization ratio by year. Source: Analysts' Estimates.

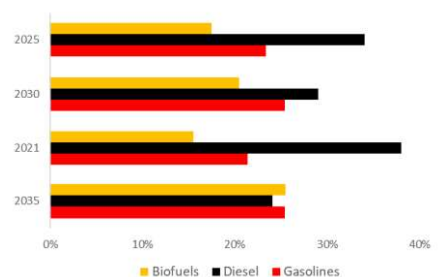


Figure 79 – Demand Shift for oil products in Europe – Moderate.
Source: Analysts' Estimates.

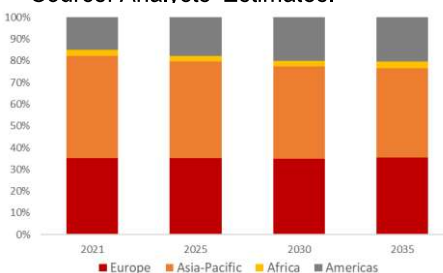


Figure 80 – Shift in share for biofuels in the Moderate Scenario.
Source: Analysts' Estimates.

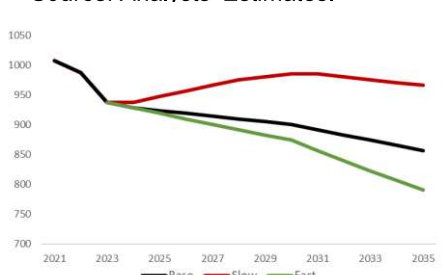


Figure 81 – Americas' effects by transition scenario on capacity (Kb/d). Source: Analysts' Estimates.

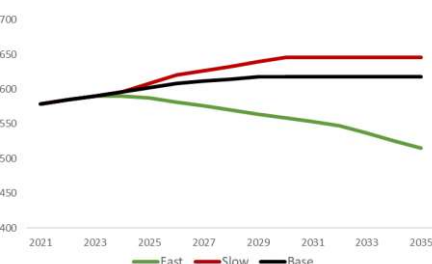


Figure 82 – Asia's' effects by transition scenario on capacity (Kb/d). Source: Analysts' Estimates.

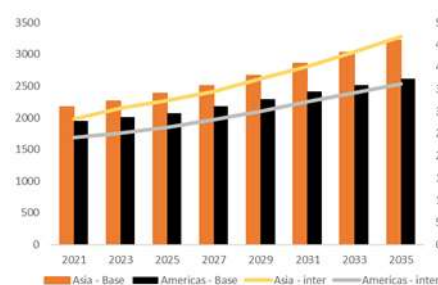


Figure 83 – Asia's production of base (bar) and intermediate (line) chemicals VS Americas. Source: Analyst's Estimates.

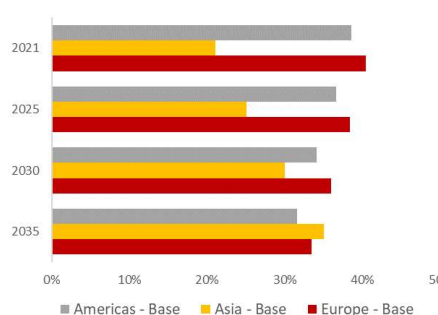


Figure 84 – Evolution of Base chemicals market share by region. Source: Analysts' Estimates.

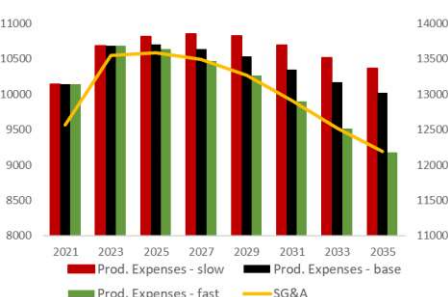


Figure 85 – SG&A and Production expenses by transition scenario. Source: Analysts' Estimates.

capacity for all regions and higher growth experienced in Asia and Africa. Regarding the shift in product demand, other fuels do not gain much share above its current level until 2030 when it starts to increase marginally by 0,5%, absorbing from gasoline and diesel's shares similarly across all regions. In the **fast transition** scenario, **capacity continues to decrease at 1% per year** after the full closure of the 2 refining plants, while **accelerating to 2% after 2030**. Simultaneously, capacity utilization drops around 8% for Europe and Americas and 3% for emerging economies from 2021 to 2035. Besides production itself, in this scenario **gasoline and diesel** have their share of sales **decrease** remarkably, contributing for the growth of biofuels across all regions, with rates of **2% per year for emerging economies** and **1.5% for Europe and Americas**.

Concerning the chemicals business unit, according to Shell's plans of investing towards the development of intermediate and performance chemicals, intermediates will have relatively higher growth acceleration compared to base chemicals. The overall capacity is expected to grow at an increasing pace, **1% for the first years** and finishing at **3% growth per year by 2035 in Europe and Americas**, while for **Asia this growth reaches 4%**. Following the higher investment in intermediate chemicals, the capacity utilization is expected to grow for both base and intermediates in all regions, however the maximum achieved in ethylene will be of 90% capacity while for intermediates it will rise until 92%. It is also expected that Asia absorbs significant share of the total sales by type of chemical, hence a **gradual 1% increase in the base chemicals share** was evaluated yearly, such that in 2035 it achieves the highest share among regions. For **Intermediates, Asia is already the leader with over 40% share** of the market, thus a yearly increase was evaluated but **capped at 45% until 2035**.

Costs & Capex

Downstream presents a cost structure significantly different from the other segments, since **selling and administrative expenses** account for a higher share of total operating costs, with a variable component associated with labour expenses. Variable costs were considered to represent around 70% of the total SG&A and are set as a percentage of total revenue that is expected to decrease until 2035 due to the historical trend of reduction in the number of employees. The fixed part is expected to remain constant throughout the period, following the historical trend in the number of retail stores. In the case of **production and manufacturing expenses**, they depend directly on the scenario for the transition, with **small growth for the first years after the divestments** and **small decline approaching 2030 in the slow transition**, while for the **moderate and fast transitions** these will demonstrate a **higher short term**

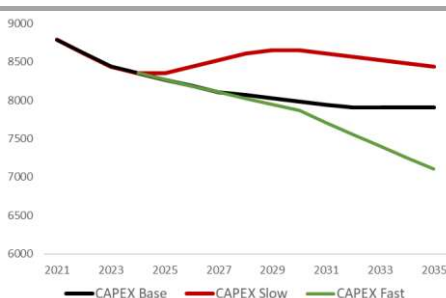


Figure 86 – CAPEX evolution by transition scenario (in million\$).
 Source: Analysts' Estimates.

decrease and long-term stabilization closer to the end of the considered period. CAPEX is calculated in line with revenue and adjusted with the three transition scenarios. **Until 2023 capex is reduced for the 3 scenarios** due to the confirmed divestments. After that year, in the **moderate** case it will **decrease at a gradually lower rate until it stabilizes in 2035**, while the **fast** transition is expected to translate a **decrease at an accelerating rate**, reaching **-2%** in 2030. The **slow** transition case has an **increase until the peak is reached by 2030**, when it starts to slightly decrease.

Segment Core Value & Beta Analysis

Scenario	Slow			Moderate (Basis)			Fast		
Beta	1	1.21	1.5	1	<u>1.21</u>	1.5	1	1.21	1.5
Total Value	88,060	67,823	50,492	59,253	<u>47,710</u>	37,138	39,595	32,962	26,606
Growth Rate (G)	1.8%			0.9%			0.2%		

Figure 87 – Comparison between present values for estimated future downstream core free cash flows, depicting the segment's value, in USD Million, per scenario. These values are estimated as of the end of the year 2021. A beta analysis and perpetual growth rates are also displayed per scenario. Source: Analysts' Estimates.

A Beta of 1.21 for the analysis of Downstream was retrieved with an average of Betas from listed companies presenting similar business models to the one of this segment, with both a refining unit for Oil Products and a Chemicals unit. This value was put to the test for the 3 transition scenarios, having we considered as well a Beta of 1 and of 1.5 for sensitivity purposes. In this case the basis scenario yields an intermediate level of Present Value of core FCF. This follows the changes in the growth rate manifested, which makes sense since the faster the transition the more the Oil Products branch of the segment will lose in performance, being that chemicals stay at their own level of growth for the three scenarios. The tax rate was set at 25%, confirmed by Shell's Contributions Reports data confirming the close level of effective rate against the Netherlands' statutory rate, while being around 25% lower compared to the one of Upstream and IG.

Figure 88 – Combination of present values for all segments in all scenarios and derivation of Shell's A Shares price, in euros. Source: Analysts' Estimates.

Valuation and Recommendation

Scenario	Slow			Moderate (Basis)			Fast		
Beta	LOW	AVG	HIGH	LOW	AVG	HIGH	LOW	AVG	HIGH
UPSTREAM	78,975	59,828	47,588	55,370	<u>45,708</u>	38,753	76,992	67,786	60,867
INTEGRATED GAS	148,557	95,982	68,889	116,723	<u>81,520</u>	61,065	209,516	122,932	82,641
DOWNSTREAM	88,060	67,823	50,492	59,253	<u>47,687</u>	37,138	39,595	32,962	26,606
TOTAL SHELL	315,592	223,633	166,969	231,346	<u>174,915</u>	136,956	326,103	223,680	170,114
SHARE PRICE (€)	51.18	32.65	21.23	34.20	<u>22.83</u>	15.18	53.30	32.66	21.86

All scenarios present gains to the investor except for the moderate scenario with higher beta and risk. Slow and fast scenarios present unlikely circumstances, hence presenting higher share prices. These are, however, likely to be met with higher risk, for which the valuation with higher betas presents as more suitable. **Our recommendation is based on the basis scenario and backed by the others, with average betas, for which we issue a BUY recommendation for Shell's A Shares, with a target price of 22.83€ as of December 31st, 2021, and with an expected capital gain of 41% until the end of 2021, a dividend yield of 2.6%, and a total expected return to the investor of 43.6% until the end of 2021, based on the current share price.**

Aggregated Valuation

We have also performed an aggregated valuation of Shell's A Shares, with the biggest difference lying on the fact that the **core FCF are being aggregated** instead of valuating each segment with their own beta from comparables and own tax rates. This valuation uses as such the beta derived from Shell's A Shares historical returns, regressed against the market. The market returns were estimated with historical prices data for the MSCI World index. **Royal Dutch Shell's beta is thus estimated at 0.955.** The aggregated valuation is also performed for the three scenarios depicted before, with the results being presented in the table below.

Scenario	Slow	Moderate (Basis)	Fast
Total Value	273,520	208,553	259,112
Growth Rate (G)	1.34%	0.25%	1.39%
SHARE PRICE (€)	42.70	29.61	39.80

Figure 89 – A Shares price, in euros, for the aggregated valuation by scenario. Source: Analysts' Estimates.

Again, the moderate scenario presents the lowest share price, as the other scenarios include less likely and risky decisions that the firm would take. It also provides a **smaller perpetual growth rate for the company, at 0.25%**. Based on the moderate scenario, **the total return to investors would be of 85%**, based on the current share price. This aggregate valuation assumes less risk due to the smaller beta, and hence displays higher values for the share price. **The results match and support our segmented valuation, with riskier beta assumptions, for which we reinforce our BUY recommendation for Royal Dutch Shell's A Shares.**

Multiples Valuation

We also evaluated RDS according to the multiples from its peers. **EV/EBITDA** was the metric chosen as **Enterprise Value multiple**, while **Price to Book** was chosen for the **Common Equity metric**. Within both we considered one multiple derived from the average of the peers, one from the median and one for the proxy with the lower end ratio (British Petroleum).

For the selection of comparable companies, we mainly focused on choosing the ones that present similar business models in comparison to RDS, while also having **significant size, geographical distribution of activities and no direct control or influence from governments**. For the latter reason we excluded China Petroleum and Saudi Arabian Oil Company from the list despite being aligned with the previous filters.

Shell presents an EV/EBITDA of 6, within its peers. Chevron presents an abnormal **EV/EBITDA** compared other peer firms, mostly due to a **low current 12-month EBITDA caused by high recent purchases and low revenue during 2020**. Regarding the **EV/EBITDA multiple**, the share price obtained for 2021 is significantly higher than our estimates for the average method, while the **median and the proxy provided similar results**. For the **Price to Book multiple**, all methods match our expectations, with the lower end proxy being more conservative on the level of return for the investor. Shell presents a **lower current price-to-book ratio of 0.94**, when compared to its peers, possibly pointing towards an undervaluation of Shell's share, supporting our recommendation.

Our estimations with both ratios point all towards an increase in the price of Shell's A Shares, with total returns for investors running from **26% to 117% for the EV/EBITDA ratio**, and from **16% to 41% for the price-to-book ratio**, with the latter one better matching our segmented and aggregated valuation above. For said information, **we reinforce our BUY recommendation for Shell's A Shares**. More detailed information about the returns for each ratio of the multiple valuation can be found in the tables below.

EV / EBITDA	
BP	5.56
Equinor	5.33
TOTAL	6.85
ENI	5.55
Chevron	16.17
Exxon	8.42
Average	7.98
Median	6.21
Proxy	5.56

Figure 90 – EV/EBITDA for comparable firms. Source: Bloomberg.

Price to Book	
BP	1.16
Equinor	1.92
TOTAL	1.12
ENI	0.92
Chevron	1.51
Exxon	1.59
Average	1.37
Median	1.34
Proxy	1.12

Figure 91 – Price-to-Book for comparable firms. Source: Bloomberg.

	EV / EBITDA	
	Share Price A	% return
Average	34.78	117,42%
Median	23.98	50,71%
Proxy	20.04	26,39%

	Price to Book	
	Share Price A	% return
Average	22.48	41,45%
Median	21.91	37,90%
Proxy	18.38	16,11%

Figure 92 – Multiple valuation results, by type of multiple. Source: Analysts' Estimates.

ROYAL DUTCH SHELL PLC

ENERGY

STUDENTS: GONALO PARREIRA, TIAGO POL3NIO

COMPANY REPORT

21 MAY 2021

28983@NOVASBE.PT 28966@NOVASBE.PT

Equity Research: Royal Dutch Shell

From Great Power to Green Responsibility

▪ We issue a **BUY** recommendation for Royal Dutch Shell's A Share, with a target price of 22.83€ as of FY21, with an expected capital gain of 41% until the end of the year, a dividend yield of 2.6%, and a total expected return to the investor of 43.6% until the end of the year, based on the current share price.

▪ Our basis production strategy scenario for Royal Dutch Shell predicts a moderate, steady transition into new energies to reduce emissions, with **LNG sales expected to grow 4% per year until 2040 and electricity 2% per year for the next 20 years. Oil production is expected to decrease 1% per year for the next decade. Production of oil products is expected to follow the same trend.** Our basis scenario predicts a firm **growth of 0.25%.**

▪ Shell is investing strongly in its portfolio of **LNG and electricity**, expecting to increase its electrical capacity up to **560 TWh by 2030, which we consider unlikely following analysis of the current projects of the firm.**

▪ We estimate revenue **CAGR's of -1.21%, -1.66% and 2.23%** for Downstream, Upstream and Integrated Gas segments, following price analysis.

▪ A **price-to-book of 0.94**, lower than most peer firms, supports our proposal, hinting at possible share **undervaluation.**

Company description

Royal Dutch Shell PLC is an Anglo-Dutch energy company. Founded in 1907 by fusion of two former international independent businesses, it is currently one of the Big Oil companies. Shell operates in all areas of the oil and gas industry, while currently also increasing its presence in renewable energies and electricity.

Recommendation: **BUY**

Vs Previous Recommendation N/A

Price Target FY21: **22.83 €**

Vs Previous Price Target N/A

Price (as of 21-May-21) **16.19 €**

Reuters: RDSa.AS, Bloomberg: RDSA:NA

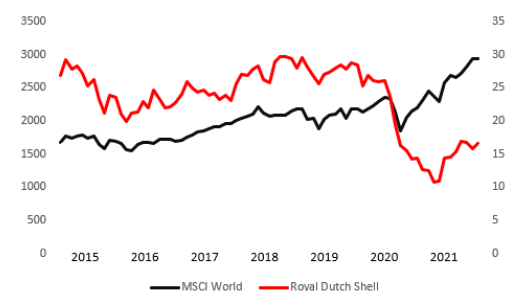
52-week range (€) 9.863 - 18.688

Market Cap (€m) 123,141

Outstanding Shares (m) 4,101

Public Float (% Outstanding Shares) 99.7%

Source: Bloomberg



Source:

(Values in \$ millions)	2020	2021	2022
Revenues	180,54	284,22	305,49
Gross Margin	20,9%	16,5%	16%
EBITDA	26,491	34,915	35,88
EBITDA Margin	15,4%	10,9%	10,5%
Net Profit	(21,53)	1,047	3,957
Core ROIC	-6,8%	1,9%	2,5%

Source: Royal Dutch Shell; Analysts' Estimates

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY GONALO PARREIRA AND TIAGO POL3NIO, MASTER IN FINANCE STUDENTS OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS. THE REPORT WAS SUPERVISED BY A NOVA SBE FACULTY MEMBER, ACTING IN A MERE ACADEMIC CAPACITY, WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL. (PLEASE REFER TO THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

Table of Content

COMPANY OVERVIEW.....	3
BUSINESS ACTIVITY	3
▪ <i>Business Segments</i>	3
▪ <i>Comparable Segments</i>	6
EQUITY AND OWNERSHIP	7
▪ <i>A and B Shares</i>	7
▪ <i>Dutch Withholding Tax and Dividends</i>	8
▪ <i>Ownership</i>	8
MARKET OVERVIEW.....	9
HISTORICAL PERFORMANCE	9
RATIO ANALYSIS.....	10
RDS & COMPETITORS.....	11
▪ <i>Future conditions of the market</i>	12
RISK FACTORS.....	12
▪ <i>ESG, Reputation & Regulation</i>	13
▪ <i>Demand Effect on Prices</i>	14
▪ <i>Supply Effect on Prices</i>	15
PRICE SCENARIOS	16
DOWNSTREAM SEGMENT	16
UPSTREAM SEGMENT	17
INTEGRATED GAS SEGMENT	17
UPSTREAM SEGMENT	18
SEGMENT PRODUCTION	18
▪ <i>Historical Production</i>	18
▪ <i>Production Capacity</i>	19
TRANSITION SCENARIOS	19
▪ <i>Production</i>	19
INTEGRATED GAS SEGMENT	22
SEGMENT PRODUCTION	22
▪ <i>Historical Production</i>	22
▪ <i>Production Capacity</i>	23
TRANSITION SCENARIOS	24
▪ <i>Production</i>	24
DOWNSTREAM SEGMENT	26
OIL PRODUCTS	26
▪ <i>Historical statistics</i>	26
CHEMICALS	27
▪ <i>Historical Statistics</i>	27
TRANSITION IN THE PRODUCTION	28
COSTS & CAPEX	29
SEGMENT CORE VALUE & BETA ANALYSIS	30
VALUATION AND RECOMMENDATION.....	30
AGGREGATED VALUATION.....	31
MULTIPLES VALUATION	32
APPENDIX.....	33
FINANCIAL STATEMENTS.....	33
REPORT RECOMMENDATIONS	35



Figure 1 – Royal Dutch Shell plc Logo.



Figure 2 – Royal Dutch Petroleum Company and Shell Transport and Trading Company.

Company Overview

Royal Dutch Shell plc is a large multinational company operating mostly in the oil and gas industry and constitutes one of the most important players in the energy sector. It is the parent company of the Royal Dutch Shell group constituting Shell's subsidiaries. While operating globally, RDS is originally an Anglo-Dutch company resulting from a merger between the Royal Dutch Petroleum Company (The Netherlands) and the Shell Transport and Trading Company (UK) in 2004, and is headquartered in The Hague, The Netherlands, and is incorporated with a registered office in London, United Kingdom.

Business Activity

Royal Dutch Shell operates vertically over the entire spectrum of the oil and gas industry, and in the overall energy and petrochemical sectors, in over 70 countries. Its several segments comprise the processes related to the extraction and exploration of natural gas, natural gas liquids, bitumen, and crude oil, as well as managing the infrastructure and equipment necessary for transport and respective exploration of the resources. It also encompasses the production and refining of both liquefied natural gas (LNG), gas-to-liquids (GTL) and oil products. On the lower end, the company covers the operations regarding marketing and selling of these products, both raw and finished, as well as supplying electricity. Shell, as are other players in the industry, is incorporating new energy sources into its operations, accommodating its structure accordingly.

Business Segments

Royal Dutch Shell's business activity can be separated into four business segments: Upstream, Integrated Gas, Downstream and Corporate, where the first three regard the operating core activity of the company and the last one regards non-operative activities. Upstream covers most of the company's exploration and extraction operations for development of oil and gas resources. Integrated Gas has minor exploration and extraction projects, although focusing mostly on gas resources, including Shell's entire LNG liquefaction and transportation portfolio. It also manages the electrical generation capacity of the company and is the segment responsible for incorporating the new and cleaner energy solutions into Shell's portfolio. Downstream uses the input products produced by the former two segments and is responsible for the largest share of sales to final consumers, as well as for the refining of these products into final consumer products such as fuels, lubricants and other petrochemical goods.

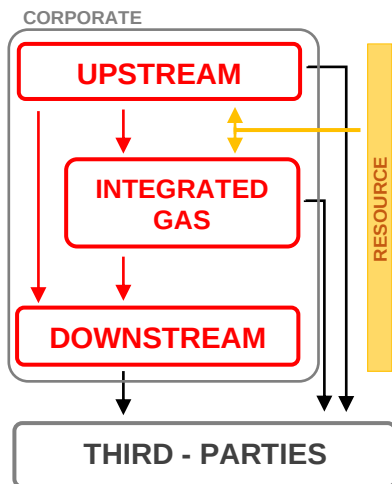


Figure 3 – Royal Dutch Shell segment structure, displaying flows of third-party sales, inter-segment sales, and resource extraction.

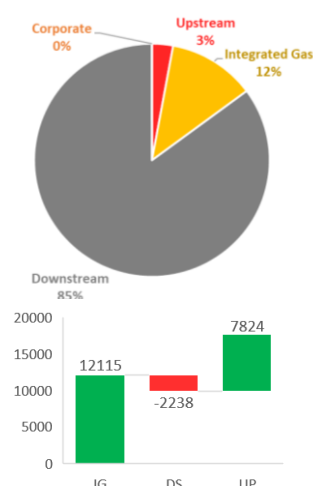


Figure 4 – Independent Revenue and FCF by segment (2019), \$M.
 Source: Royal Dutch Shell;
 Analysts' estimates.

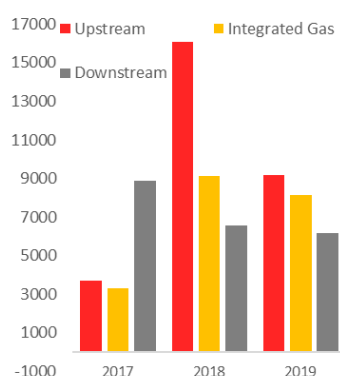


Figure 5 – Core EBIT per Segment (2017-2019), \$M.
 Source: Royal Dutch Shell.

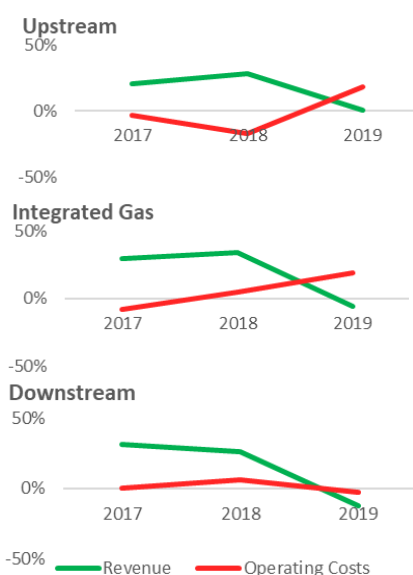


Figure 6 – Independent Revenue and Operating Costs growth rates (%).
 Source: Royal Dutch Shell.

Downstream is the largest segment regarding revenue and free cash flows. In **2019**, 85% of all third-party revenue concerns this segment, although generating free cash flows of -\$2 Billion, versus 12% of independent revenue from Integrated Gas and net free cash inflows of \$12 Billion, mostly due to LNG sales. Upstream only accounts for 3% of total revenue and has net free cash inflows of \$8 Billion, justifiable due to high investment in the segment. The three segments total a **net free cash inflow of about \$17 Billion** in 2019.

Over the past recent years, the average EBIT for core operations has remained around **\$24 Billion**, with a high-performance improvement visible for all segments except Downstream from 2017 to 2018. The EBIT for Upstream **increased approximately 332%**, being the largest gainer. Downstream faced a **26% decrease**, and Integrated Gas faced a **steep performance increase of 178%** in EBIT for 2018. Overall, the total **core EBIT faced an increase of 100%** for that same year. In 2019, however, all segments presented a decrease in performance, with Upstream having the largest **decrease of 43%** in EBIT. Both Downstream and Integrated Gas suffered a **decrease of 6% and 11% respectively**, adding to a total **core EBIT decrease of 26% for 2019**.

The improvement in performance for 2018 is attributable to different factors. Upstream gained largely due to **both an increase in independent revenue, of 28%, and a decrease in operating costs¹ of 17%**. The figure changes when observing the other two segments, which faced both **increases in independent revenue and operating costs**, although with much larger **increases in revenue in comparison to costs**. Integrated Gas faced an **increase of 34% in revenue and 5% in costs**, and Downstream met **values of 26% and 6%**, also for revenue and costs, respectively, albeit with a lower revenue growth rate when compared to 2017. Convexly, the performance in 2019 was impaired by opposite effects, with Upstream being the only segment keeping relatively stable revenues – **1% growth** – and both Integrated Gas and Downstream **faced decreases in revenue**, with decrease **values of about 6% and 12%**, respectively. The **operating costs strongly surged for both Upstream and Integrated Gas, by 18% and 19%, respectively**. While Downstream presented itself as much more resilient to cost increases, displaying an even **decreasing rate of 3% for operating costs**, its much higher decrease in revenue highly impaired its performance for the year, similar to what happened in the other two segments.

¹We include in as part of OC Shell's operating expenses of production, distribution, and R&D as well as Exploration, Depreciation and Amortization costs.

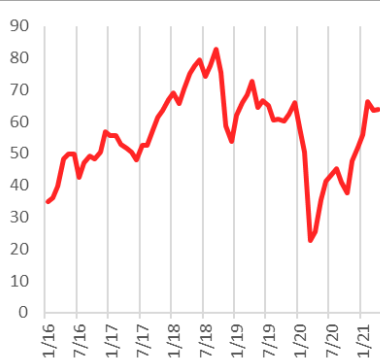


Figure 7 – Brent Oil Futures
(USD \$) (01/2016 – 04/2021).
Source: Investing.com

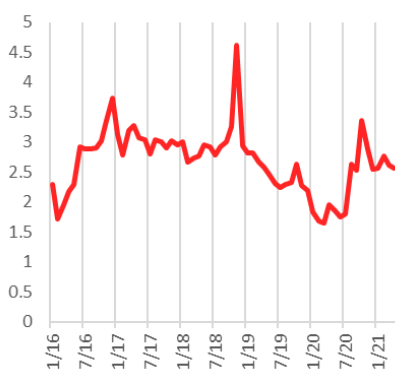


Figure 8 – Natural Gas Futures
(USD \$) (01/2016 – 04/2021).
Source: Investing.com

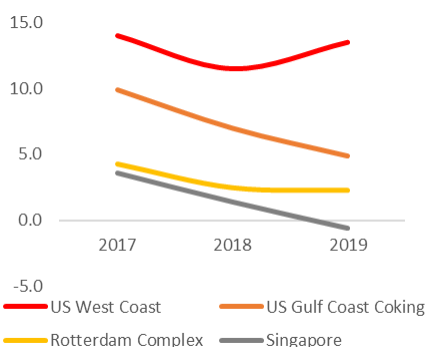


Figure 9 – Average Industry Refining Margins
(USD \$/barrel) (2017-2019). Source: Investing.com

The increase in revenue in 2018, which was even higher for Upstream and IG when compared to 2017, **coincides with a large increase in crude oil prices and stable natural gas prices for 2018** (though with a large spike in gas prices by the end of the year), which does not directly impact the sale of refined products, justifying the smaller growth rate for Downstream in 2018 when compared to 2017. Conversely, **in 2019, the prices for the same products dropped**, associated with the general decreases in revenue growth. Downstream is the most flexible segment, being able to adjust more quickly to decreasing sales, being the only segment which also able to decrease its costs as revenues go down. This can be partially supported by Downstream having approximately 50% of its operational expenses driven from selling, distribution, and administrative expenses, which are much more dependent on the sales, while both Upstream and Integrated Gas see around 90% of its operational expenses fully dependent on production costs, which, per se, are much less flexible giving the nature of the business. **Less flexibility in decreasing production and lower sales lead, as expected, to an increase of 14% in Royal Dutch Shell's inventories.**

Upstream and Integrated Gas are thus subject to demand shocks affecting the price of "raw" oil and gas products, while having relatively more fixed costs, thus risking bearing larger overall losses during crises and market volatility. These shocks could, naturally, have several different macroeconomic, political, or other causes. The costs are less predictable, depending on the ability of the company to reduce unit costs, while depending on the company's exploration and project investment strategy. Downstream, due to selling more specific products, can suffer shocks in more specific demands regarding various petrochemical and refined products, while having a relatively large share of variable costs which allow it to adjust. An interesting way to evaluate these several impacts is through observation of the industry refining margins, which define the difference in value between the final refined products and the initial raw products. Overall, except for the US West Coast, **all industry benchmarks for refining margins decreased between 2017 and 2019**, with Singapore suffering the largest decreases – **-61% in the first year followed by -143% in the second year**. The general decreasing tendency for margins explains reasonably well the decrease in revenue growth rates for downstream over the same period, which did not occur for the other segments.

Overall, the three segments are interconnected, and it is likely that even a demand shock for a specific Downstream product will affect the full value chain, from which Downstream obtains its raw inputs.

■ Comparable Segments

Comparable companies are subject to similar risks, as such, their equivalent segments² are expected to behave comparably to Shell's segments.

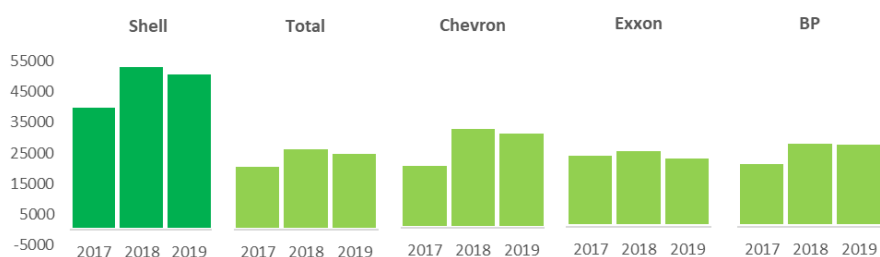


Figure 10 – Third-party revenue for Shell and comparable companies for exploration & production segments (Shell and Total with UP and IG aggregated), in \$ Million. Source: Companies' Annual Reports.

translated into a **large increase in revenue in 2018 (average growth of 30% across companies)** followed by a **decrease in 2019 (average decline of 5% across companies)**, growth values aligning with Royal Dutch Shell.

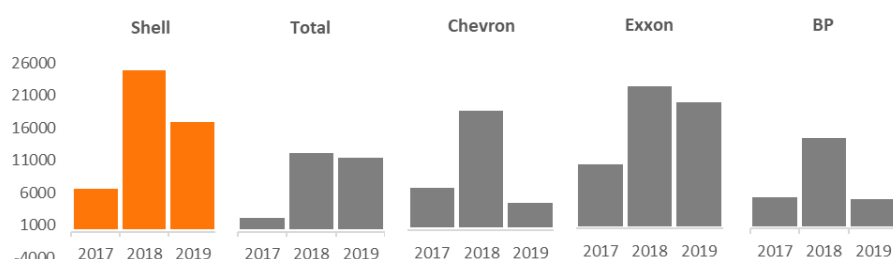


Figure 11 – EBIT for Shell and comparable companies for exploration & production segments (Shell and Total with UP and IG aggregated), in \$ Million. Source: Companies' Annual Reports.

expected behavior, with a **large increase in EBIT in 2018 (average growth of 215% across companies)** followed by a **decrease in 2019 (average decline of 40% across companies)**. Shell fared better both in 2018 and in 2019, with an increase of 260% in the first year and a decrease of 31% in the second year, hinting at more favourable and easily adjustable cost structure.

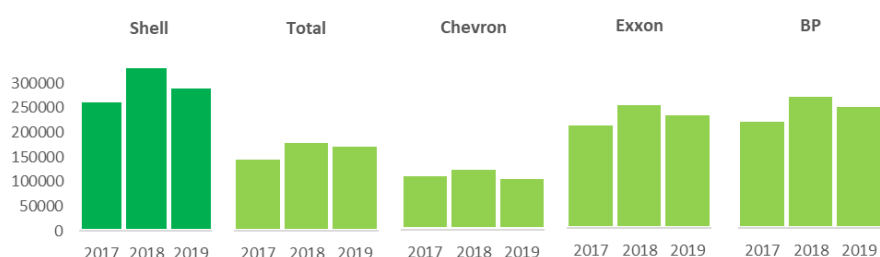


Figure 12 – Third-party revenue for Shell and comparable companies for refining and marketing segments (Downstream) in \$ Million. Source: Companies' Annual Reports.

a **large increase in revenue in 2018 (average growth of 19% across companies)** followed by a **decrease in 2019 (average decline of 8% across companies)**, growth values aligning with Royal Dutch Shell, which did slightly

Over the same period, the segments corresponding to the production and exploratory activities of Shell's comparable companies carried the same behavior as Shell's Upstream and Integrated Gas segments regarding 3rd party revenue. This was, as expected,

Coherently with the higher third-party revenue volumes, Shell also present higher EBIT than the selected companies, except for ExxonMobil which presents superior earnings in both 2018 and 2019. All companies observed, as expected, the same

Regarding Downstream and equivalent segments, Shell is once again the largest in third-party revenue when compared with the same companies, with only ExxonMobil and BP having a closer revenue volume. All peers follow the same trend as Royal Dutch Shell, with a

² Shell's competitors present segments which differ slightly in their operations, but which we consider nonetheless suitable and fit for comparison purposes.

better in 2018 as well as slightly worse in 2019, proving slightly more volatile, a probable consequence of its size.

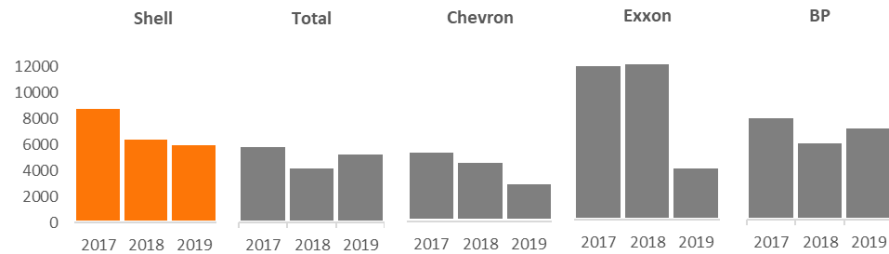


Figure 13 – EBIT for Shell and comparable companies for refining and marketing segments (Downstream), in \$ Million. Source: Companies' Annual Reports.

The Downstream EBIT shows a more mixed picture across companies, however with a general decreasing tendency over the three years. Despite having the largest Downstream revenue, Shell does not have the largest earnings, with the EBIT value for **2019 being**

lower than that of ExxonMobil and BP. This hints at a different cost structure or a possibility of Shell being less cost efficient than EM and BP. While for 2018 the overall tendency is a **decrease in EBIT (16% average across companies)**, in 2019 there was a **mixed tendency** with some companies growing and some losing, with **an overall decrease in EBIT of 15% across companies.** Shell performed worse in 2018, **losing more than 26%**, but remained **more stable than the average in 2019, with a loss of only 6%.**

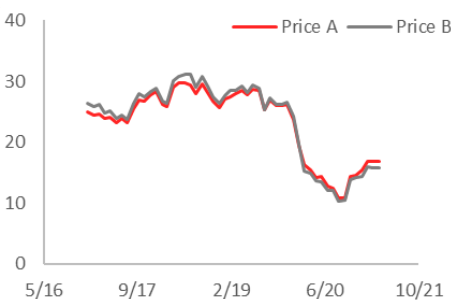


Figure 14 – Prices (Euro €) of A and B shares (01/2017 – 04/2021). Source: Investing.com

Equity and Ownership

Royal Dutch Shell has two different classes of ordinary shares, A and B shares. Both are listed at the Euronext Amsterdam, London Stock Exchange, and New York Stock Exchange. Our suggested strategy applies to the AMS: RDS.A, which represents the A Shares as traded at the Euronext Amsterdam Stock Exchange. Shell also has an American Depositary Share Facility, with each ADS being equivalent to 1 common A or B share.

▪ A and B Shares

The only difference between Shares A and B lies on the fact that class A shares are sourced in The Netherlands, for taxation, and B shares are sourced in the United Kingdom, influencing the dividend pay-out. Dutch law imposes a withholding tax on dividends of 15% (except for investment funds, which are subject to full reimbursement) whereas British law does not, and instead dividends are obtained through a dividend access mechanism. Therefore, holders of class A shares will, under general conditions, pay tax to the Dutch government whereas holders of class B shares will pay no tax.

The price of A Shares has been slightly below the price of B Shares over the past years, which is expected given that holders of A Shares are worse-off regarding dividend earnings. The situation has however inverted during the last year, since the beginning of the ongoing pandemic, with B shares having a lower

	A Shares	B Shares
Shares Outstanding	4,101,239,499	3,706,183,836
Average Volume (3Mo.)	15,263,363	191,073
Nominal Value (\$)	345,000,000	306,000,000

Figure 15 – Number of outstanding shares, average trading volume and total nominal value of A and B shares, as of April 1st. Source: Royal Dutch Shell and Investing.com

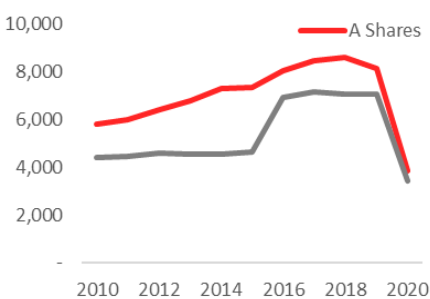


Figure 16 – Total dividend payment by share type (\$Million). Source: Royal Dutch Shell.

price than A shares likely caused by increased volatility and higher speculation of A shares. We expect the difference between B and A share prices to be positive once the effects of the pandemic soften.

▪ Dutch Withholding Tax and Dividends

Despite the withholding tax, A shares are by far much more liquid than B shares, while also having a larger total nominal value due to the number of outstanding shares being slightly higher.

The dividend payment per share is independent of the type of share. **In 2020, Shell paid per share a dividend value of \$0.957** for both Shares A and B, after recurring to dividend cuts during the pandemic. **In 2019 and 2018, this value was of \$1.88.**

Over the year 2020, investors of A Shares would have a **net after tax loss of 32.1%** – assuming a 15% withholding tax on dividends. Investors of B shares would have a **net after tax loss of 36.5%** – assuming no withholding tax on dividends. For 2019, investors of A Shares would have a **net after tax loss of 6.4%** – assuming a 15% withholding tax on dividends. Investors of B shares would have a **net after tax loss of 5.5%** – assuming no withholding tax on dividends. For 2018, investors of A Shares would have a **net after tax gain of 1.6%** – assuming a 15% withholding tax on dividends. Investors of B shares would have a **net after tax gain of 2.2%** – assuming no withholding tax on dividends. Using the data from the last three years it is possible to see that before the pandemic B shares presented as providing higher returns, but in turn investors of A shares did not lose as much as investors of B shares in 2020, coinciding with when the price for A shares became higher than for B shares. A shares would, however, become dominant in both scenarios regarding returns if not subjected to a dividend withholding tax. **If there were no tax, A shares would provide returns of -31.5%, -5.4% and 2.5%, in 2020, 2019 and 2018 respectively, having in all three years superior returns to those of share B, which for fund investors would prove beneficial.**

▪ Ownership

Shell's A and B shares both grant equal voting rights and thus equivalent ownership of Royal Dutch plc.

Royal Dutch Shell presents, as of 2020, four major direct shareholders, with each of those holding more than 3% of Shell's total shares. The largest shareholder (21% of total shares) corresponds to the central security depository of the Netherlands, holding mostly A shares. The other three shareholders hold

	Total	A Shares	B Shares
Nederlands Centraal Instituut Voor Giraal Effectenverkeer Bv	21.19%	39.95%	0.42%
Guaranty Nominees Limited	18.03%	18.93%	17.04%
State Street Nominees Limited	4.19%	3.71%	4.73%
Chase Nominees Limited	3.35%	0.96%	5.98%

Figure 17 – Holdings (in %), per share class, of the four major direct shareholders of Shell.
Source: Royal Dutch Shell.

	Total	A Shares	B Shares
BlackRock Inc	7.14%	7.32%	6.95%
The Capital Group	4.99%	0.54%	4.45%
e Vanguard Group	4.29%	4.75%	3.78%

Figure 18 – Holdings (in %), per share class, of the three major indirect shareholders of Shell.
Source: Royal Dutch Shell.

more mixed positions, corresponding to institutional investor holding companies, of which the second and the fourth are held by Chase Bank.

Through these and the remaining direct shareholders (which hold around 50% of the total shares) it is possible to invest directly as part of investment funds and other institutional investor programs. Shell recorded, as of 2020, three major indirect shareholders, each holding indirectly more than 3% of Shell's total shares, with all being large asset management companies.

Due to most shareholding being done by companies in the investment management sector, and with no substantially large influential shareholder for either share, we are confident that there is no significant influence being exercised by these companies on Shell's management. **We thus expect that the company's general strategy, outlook, sustainability development and future projects will not be compromised by or depend on its shareholders' expectations.**

Market Overview

Royal Dutch Shell has a leadership position among its peers in the industry, however, this current condition does not guarantee future profitability and growth in such an "erratic" sector. RDS and the remaining players in the energy sector are directly exposed to business defining macroeconomic risk factors, which have been constantly changing according to the adjustable flow of societies' demands. Therefore, the future of the Oil & Gas industry will depend on the constituent's ability to respond and take action according to the risk factors affecting their businesses, not only the ones that already defined performance in the past, but also new challenges emerging with society's evolution and needs.

Historical Performance

The oil and gas industry has achieved significant growth over the last decades, following the remarkable economic growth observable across the world's economy, as well as the accelerated development of emerging industries, such as tech and e-commerce. This sustained growth in the oil industry derives from the continuous increase in the demand for fuels, associated with higher energetic needs from the world's major economies as well as from emerging markets going through high levels of economic growth.

Nonetheless, although this industry has benefited from high demand towards their final products, price volatility has always been a significant factor affecting the performance of the industry's players. They are directly dependent of the global supply and demand for oil and gas, hence shocks in either side of this equation

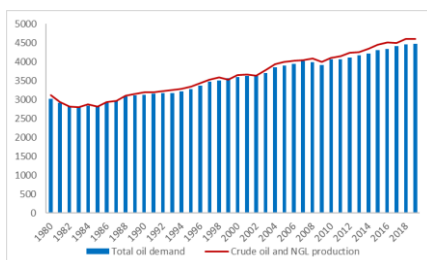


Figure 19 – Demand VS Supply oil
Source: IEA.org

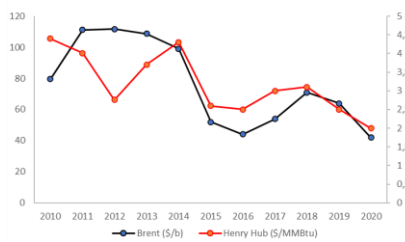


Figure 20 – Brent and Henry Hub Prices from 2010 to 2020
Source: Bloomberg

translate directly on the performance of the companies. From 2010 to 2014, oil prices were high and remained at this level along this period, experiencing low levels of volatility. This was related to stability in geopolitical decisions on the supply side, mainly composed by OPEC members, aligned with stable levels of growing demand for this product. At the same time, Henry Hub's spot for natural gas suffered a decrease in price of around 31% in 2012, due to an accumulation of natural gas inventories that can be explained by mild winter being experienced in the US and Canada in that year. This type of event demonstrates that this industry's prices can be directly affected by short-term events impacting demand.

On the same line, in **2015** the average oil prices fell by close to 50%, which was mainly caused by a significant increase in the supply of crude oil and oil products, causing subsequently an **accumulation of inventory** much higher than in the previous years. With this notable decrease in prices, the performance of RDS and other players in the industry was heavily affected, with a **decrease in total revenue** of around 37% showcased similarly among all company's with a business model comparable to the one of RDS.



Figure 21 – Revenue RDS and main competitors 2013-2016
Source: Annual Reports

By 2018, industry prices have recovered to levels similar to the ones before the decrease in 2015, helping the industry's players reach strong performance once again, now with more experience and structural measures to tackle the high volatility in prices and the uncertainty regarding geopolitical decisions. However, changes in demand specifications and needs are currently the new horizon for the oil and gas industry, with environmental concerns as a topic of interest for society, pushing towards the utilization of renewable energy with the aim of reducing the environmental footprint of the industry.

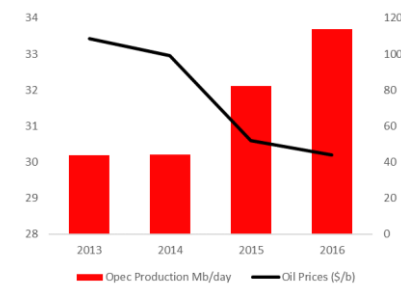


Figure 22 – Revenue RDS and main competitors 2013-2016
Source: OPEC monthly reports

Ratio Analysis

By analysing the activity ratios of RDS, it is noticeable that the cash conversion cycle has moved within the range of 10 to 20 days, which is enough to consider that RDS does not have much pressure on its short-term liquidity. Although for this industry the **average holding and collection period** tend **not** to be **the smallest**, this extra pressure on the company's liquidity is compensated by RDS's capacity to sustain a **high Average Payable** period in the last 10 years. This is likely related to RDS's **negotiating capacity against its suppliers** due to the leadership position it holds in the industry.

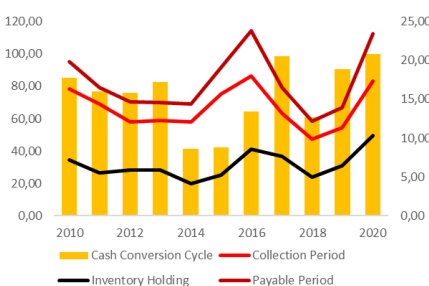


Figure 23 – Cash Conversion Cycle, Collection Period, Inventory Holding Period and Payable Period in days. Source: Annual Report

In what regards RDS's capacity to fulfil its short-term obligations, the **current ratio** is sustained **above 110%** for the last 10 years, while the **cash ratio** has been fluctuating from **13% in 2010 to 43% in 2020**, which provides significant security against short-term negative shocks on the company's performance. At the same time, it is noticeable that RDS has been **reactive**

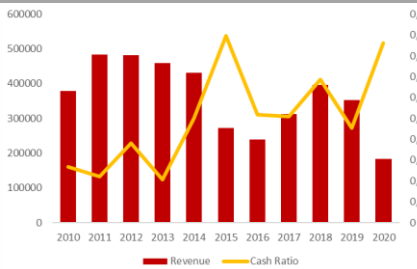


Figure 24 – Cash Ratio in % VS Revenue per year in million\$.
 Source: Annual Report

against negative shocks on performance, since the main increases in the cash ratio occurred in years where there were strong effects on the revenue of the company. From **2013 to 2015**, Shell **increased its cash ratio from 10.3% to close to 45%**, in response to the crash in industry's prices. With the recovery from that period, revenue levels increased and the cash ratio evolved in the opposite direction, decreasing again to **22.7% by 2019**. With the **COVID19** pandemic, this **ratio spiked** once again, reaching **43%** and creating more **short-term resilience** against the negative impacts of the current situation in the industry's environment.

Analysing now the company's capacity to fulfil long term debt obligations, RDS has kept its solvency at acceptable levels but showed a significant decrease in the last 2 years, from **103% to 72%**, meaning that it has now lower capacity to fulfil its obligations with internally generated capital. Regarding financial autonomy, RDS has maintained a solid level of Equity over total Assets, thus the company does not rely heavily from funding coming from creditors. At the same time, it guarantees more resilience in times where access to credit is more difficult to obtain.

In terms of efficiency in capital allocation, the core activities ROIC has remained positive, except in 2020 mostly due to the heavy decrease in prices influencing revenue. Nonetheless, when the industry's environment stable, the company is able to generate value from its investments at rates above 5%. Regarding financial margins, Shell achieves a solid position amongst the rest of the market, not having the highest margins of all peers in stable periods, but also having relatively more capacity to sustain performance against negative shocks, like in 2015 when even with the drastic decrease in prices Shell managed to keep a positive net margin in that year.

RDS & Competitors

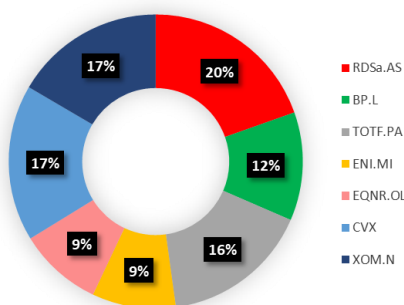


Figure 25 – Share of crude oil Production for the total peers production
 Source: Annual Reports

As already mentioned, RDS is a leader in the Oil and Gas industry, with superior levels of revenue and geographical distribution. Considering the current business conditions, the main drivers that solidify a player as a market leader are the shares each player has in the main products being sold. Considering the extraction and production of crude oil, RDS has a 20% relative market share against its main direct competitors and therefore is leading in the production for this source of energy. At the same time, this provides shell with a higher capability of crude oil processing for the production of oil products and derivatives, such as fuels, lubricants and chemicals, which also solidifies the company's strong position in these 3 branches of the Downstream business. The other current main source of energy for the Oil and Gas industry, as the name says is

natural gas. In this department, Shell is once again a leader with close to 20% of the share of total production amongst the main players in the market. With this consolidated position, Shell also benefits from a leading position in the LNG market, especially in exports.

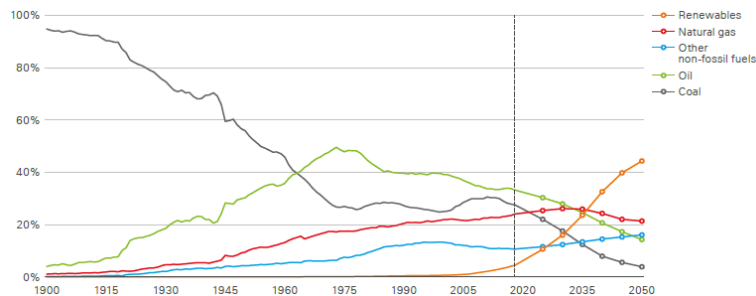
■ Future conditions of the market

The acquisition of BG by RDS turned the company into the leader in the production of this energy source, which can also be seen as a strategy to invest in the future of the industry, as Natural Gas emits around half the total GHG

when compared to coal, the world's main energy source just a few decades ago. However, it is important to notice that although coal is no longer the main source of energy as in the past, it still fulfills a significant share of the world's energetic needs. In fact, coal is still the main source of energy in most emerging economies, which can be explained by

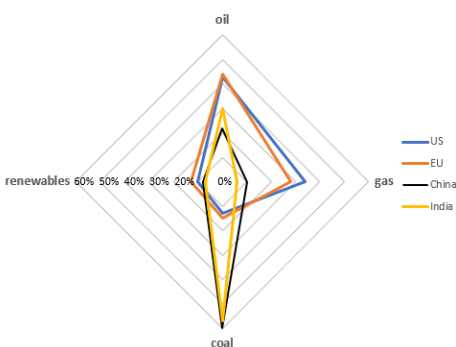
lower levels of economic strength but also by simply having easier access to this source of energy, instead of focusing on importing oil and gas from other producing countries. India and China serve as main example for this argument, having more than 50% of the total energetic share coming from coal, when at the same time regions like Europe and the US have lowered their share in this energy resource to values around 15%, compensating this decrease from previous years with higher share coming from oil and gas.

Figure 26 – Evolution of the shares of the energetic market by energy source.
Source: BP Outlook 2020



This brings to the discussion the new paradigm of tackling climate change, which is expected to change drastically the current demand for this industry and force a full business adaptation in the upcoming years. With this in mind, the peak in oil demand is suggested to be close to the present in the developed economies, having natural gas as a short-term future solution with lower carbon emissions, and in the longer term the investment in renewables should be the focus for the industry. However, emerging economies are expected to present a delay for this transition process, following a similar path to the one presented until the present. As such, emerging economies are expected to still be further away from the demand peak in polluting energy sources and should be behind in the transition to renewables, as the main objective for these economies is to fulfill the short-term energetic needs of their population.

Figure 27 – Share of each energy source by Region
Source: BP Outlook 2020



Risk Factors

The Oil & Gas industry presents permanent inherent business risks for its constituents. These risks include fluctuating energy prices, direct risks associated

with the company's core business and internal competition, among others which have been tackled since RDS's inception and entry in the industry. However, RDS must be prepared to adjust its activities for the changing near future environment of the industry, directly connected to the variable risks impacting its performance.

▪ ESG, Reputation & Regulation

Sustainability and addressing climate change are currently two fundamental subjects defining public policy and concentrating significant attention within the media and the public. This creates extra pressure in industries considered to be the sources of this problem, especially Oil & Gas, where the production process contributes directly to the emission of Greenhouse Gases (GHG), with the inherent risks related to the possibility of catastrophes, such as oil spills. At the same time, the output produced also builds up on this problem indirectly, since in this case the final consumer will be the one emitting GHG.

The establishment of objectives regarding climate change had its historical mark when the Paris Agreement was signed in December 12th 2015. This agreement was signed by 196 parties, committing themselves to design and implement policies in order to tackle climate change directly in the near future. With the growing importance of this subject, in order to maintain strong business reputation, RDS must incorporate it in its business decisions and commit to the role of leading the path to Energy Transition, to achieve the net zero goal for GHG emissions. The European Green Deal created in line with the Paris Agreement and following the results from the special report: "*Global Warming of 1.5°C*" published by the IPCC, establishes the path to improve the sustainability of natural resources and to cut the current levels of pollution, being the European Union the legal enforcer of this objective.

In what regards the main players in the Oil & Gas industry, RDS and the considered peers have the commitment to achieve Net-Zero emissions by 2050, working this proposition as the main banner for the Environmental, Social and Corporate Governance of these companies. It is only understandable that this is the strategy used by all these players, even the ones with headquarters outside the EU, since according to Bloomberg: Research & Analysis, **ESG assets** have been increasing significantly in the past years and are expected to hit **\$53 Trillion by 2025**.

The fact that investors' interest in ESG assets has been increasing also reflects the reputational impact that RDS's future business decisions could have. Besides the possible fines and legal action imposed by public institutions related to delays in what regards the achievement of the Energy Transition's stages, this

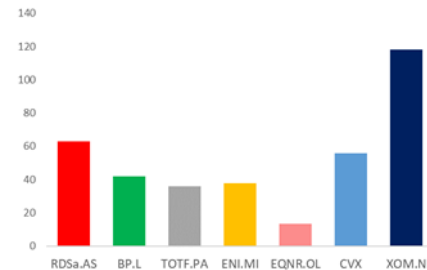


Figure 28 – GHG Emissions by each competitor in MtCO2e
 Source: Annual Reports

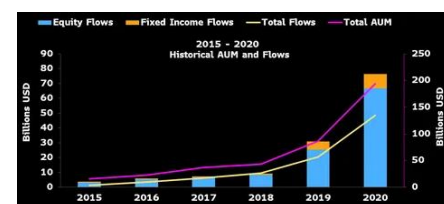


Figure 29 – Total Flow and Assets Under Management related to ESG investments.
 Source: Bloomberg Intelligence

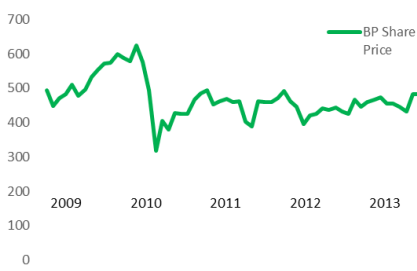


Figure 30 – BP Plc share price from 2009 to 2013 (monthly basis).

Source: Investing.com

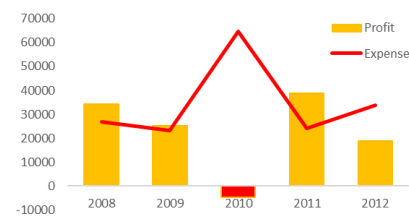


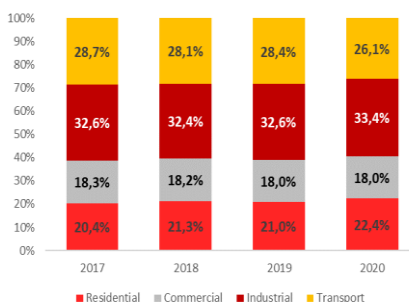
Figure 31 – BP's Profit level VS production expenses from 2008 to 2012. Source: Analysts' Estimates.

is a crucial period for competition within the industry. Reputational issues may cause shifts in demand for the main players in the market, being the ones in the leading role to achieve the Net-Zero commitment possibly capable of attracting more investment, hence gaining a competitive advantage against their peers. Although it is still early to confirm this will happen, the Deepwater Horizon oil spill in, which occurred in April 20th 2010 on one of BP's offshore drilling rigs, serves as a good example to recreate this possibility. On April 2016, BP signed a \$20 Billion settlement with the US Department of Justice, adding to the drastic increase in production costs in the year of the incident to more than double compared to the average from past years. These costs reflect direct impact on BP's performance, however these were followed by a significant 50% drop in the company's share price a few months after the event. For the following years, BP's share price did not re-establish its value to levels comparable to the one prior to the incident, which can be justified by an increase in the amount of risk aversion from investors regarding the possibility of such events occurring in the future. In this case, although a demand shift was not fully verified with the quick recovery in financial performance achieved by BP in the year following the incident, the attractiveness to investors suffered a significant blow from this negative impact on the company's reputation.

▪ Demand Effect on Prices

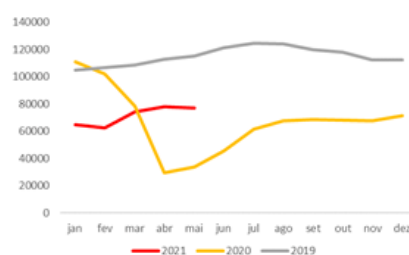
Sustaining good performance in the Oil & Gas industry relies directly on the equilibrium between supply and demand for these commodities. This is a risk factor that RDS has faced since its inception, however it must not be seen as a factor with constant effect on the company's performance, as these markets have high associated levels of volatility. This volatility depends on the demand side, related to the variable needs for Oil & Gas products, the supply of crude oil and natural gas to be processed, and external factors such as political disputes and government policy regarding the core activities of the players in the industry.

Figure 32 – Share of energy demand per sector in the US. Source: EIA Gov



In the case of demand shifts, lower demand will contribute for an environment of lower oil and gas prices. The COVID-19 pandemic has been a good example of how demand can suffer significant shifts, since sectors that constitute a significant share of Oil & Gas products demand were highly affected by the pandemic. Transportation, a sector that corresponds to a share of more than 25% of total energy demand, was one of the most affected with definitive prohibitions on business execution due to lockdown periods combined with the closure of national borders. Aviation was the branch suffering the biggest impact within this sector, having the average number of daily flights decreased by more than 70% worldwide when the pandemic struck in March 2020, with a following

Figure 33 – Number of flights per day (monthly average). Source: flightradar24.com



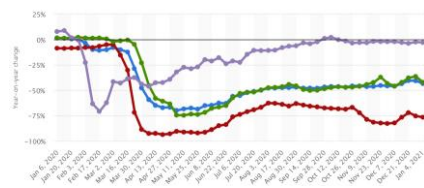


Figure 34 – Flights per region.
 Grey – China; Blue – Global; Red – Germany; Green – US
 Source: Statista

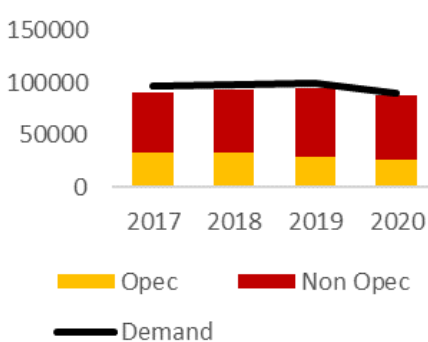


Figure 35 – Demand VS supply
 from Opec and Non Opec
 countries in total barrels per day.
 Source: Analysts' Estimates.

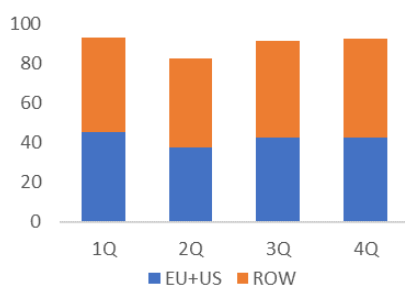


Figure 36 – Demand for Oil by
 quarter 2020 in thousand Barrels
 per day. Source: Analysts'
 Estimates.

recovery to levels close to 60% of 2019's average achieved in august of the same year. With this effect on the aviation sector, jet fuel demand decreased significantly by more than 40% most world's regions, except for China which managed to sustain its domestic flight network succeeding the reports of lower levels of new daily COVID-19 cases when compared to other regions.

▪ Supply Effect on Prices

Alongside the demand's effect on prices, these are only set against the supply that is being distributed by the producers in the market for Oil and Gas. Although RDS and the remaining players have their own share in oil and gas reserves, creating drastic changes in the production levels may cause significant price changes in the short term. Oversupply leads to decrease in prices, since without demand for the product the producers will have to store the quantities produced until more demand is created. An example of such event occurred in April 2020 when the Crude Oil WTI Futures fell to negative territory due to the crash in demand caused by the COVID19 pandemic, leading to producers losing their capacity to store their production, with the need to start storing them in offshore tanks.

Although this event can be seen as a disaster for producers, applying strategic modifications to production levels is not an uncommon practise in this industry. OPEC is estimated to possess around 79,4% of the world's proven oil reserves, hence the members of this organization have enough power to collude in a similar way to a cartel in order to sustain the monopoly they possess in the industry. For OPEC members to achieve their maximum level of profits, they must agree on a specific production target and sustain it in order to avoid internal political conflicts and influence the leveraged position of this organisation against the rest of the world. In fact, due to the agreements to sustain monopolistic quantities being produced, OPEC's production levels represent a much lower share of total world's production when compared to the capacity level possessed, only reaching 31% and 29% of total world's production of oil in 2019 and 2020 respectively.

It is important to notice that in 2020 there was a significant decrease in demand, especially in the beginning of the second quarter of the year, having OPEC decided to cut on the quantities being produced in order to recover from the environment of low oil prices caused by the pandemic's effect on the demand for these products. Hence, the decisions of this organisation are a main driver for the oil and gas prices environment, which creates significant risk for RDS and the remaining players in the market due to the possibility of political incidents.

Price Scenarios

In the current environment there are no certainties regarding the future of prices in the Oil and Gas Industry. Both supply and demand shocks have immediate influence in prices for this industry, hence it is important to analyse how the company's revenues will react to different scenarios. Revenues will be challenged against industry prices according to the basis scenario for capacity and production in the Valuation segment of the report. In line with that part will be the three scenarios for the evaluation of these prices, fundamentally linked with demand shifts arising from, slow, moderate and fast clean energy transition scenarios, as well as different reactions to these demand changes by region. The three scenarios will assimilate a trend of growing energetic needs across all regions of the world and will consider that **RDS takes a moderate approach for the transition** to clean energies. In this way, **RDS's capacity and production future levels will be the same for these 3 scenarios**, according to the Basis scenario for production analysed in the second part of this report.

The basis (moderate) scenario represents society's ambitions of reducing the current level of fossil fuel dependence, however the first concern continues to be fulfilling energetic needs. The slow scenario follows low ambitions to tackle climate change, with fossil fuels having their demand sustained, growing in the short term and declining only in the long-term. The fast scenario contemplates a much more accelerated demand for transition, with further decreases in the prices of fossil fuels and the increase in the price of alternatives such as biofuels.

Downstream Segment

Demand shifts will influence this segment the most since it deals directly with the sale of end products to private customers. The Chemicals business unit is expected to grow in parallel to the Oil Products unit due to the different market for their products, thus only Oil Products will be analysed. In the **moderate scenario, oil products** deriving from **fossil fuels have their prices peak in 2025 for developed economies and by 2030 in emerging economies**. In the opposite direction, the price of **biofuels** increases every year at an accelerating rate. For the **slow scenario**, the peak in oil products is **further delayed** for all regions, while **biofuels** only start to reflect a **slight increase in prices by 2025**. The fast transition scenario assumes that the peak for the demand in oil products was achieved in 2019, hence oil product's prices will **decrease at an accelerating rate from 2021**. On the other hand, biofuels demand is enhanced, and their prices will grow at an accelerating pace.

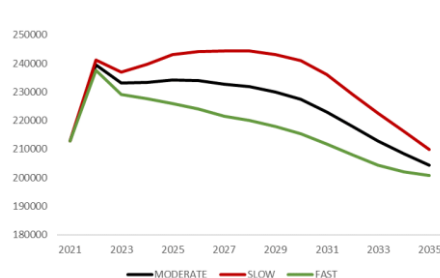


Figure 37 – Downstream revenue projections by scenario in million \$. Source: Analysts' Estimates.

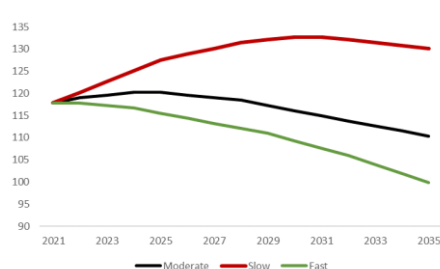


Figure 38 – Change in Price of Diesel by scenario for the Americas region. Source: Analysts' Estimates.

Price Scenarios		
Slow	Moderate	Fast
-1,07%	-1,21%	-1,28%

Figure 39 – Downstream revenue CAGR from 2021 to 2035. Source: Analysts' Estimates.

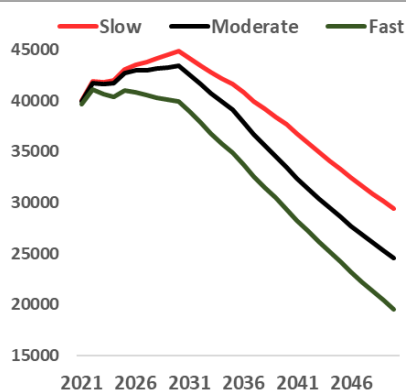


Figure 40 – Upstream revenue projections by scenario in million \$. Source: Analysts' Estimates.

As expected, in the short term the revenues are much higher in the slow scenario, however with RDS moderate level of adaptation affecting future production and with the shift to biofuels, the fast scenario shows a converging trend relatively to the others, as the moderate and slow transition will suffer from the effects of low prices and lower RDS capacity in Oil Products.

Upstream Segment

Assuming a moderate strategy for production for Royal Dutch Shell, revenues for upstream are naturally expected to fall as the company changes its portfolio to incorporate new, less carbon intensive energies. We assume that the three price scenarios create a revenue range likely for the segment in the future.

In the moderate scenario, we assume prices for oil in developed economies should begin falling in the mid 2020's. This effect is assumed to be lagged in emerging economies, with the oil prices only starting to decrease in about 10 years. The price of gas is assumed to continue growing worldwide for the next decade, with the prices growing sooner in developed economies than in emerging economies as the latter are expected to start depending more strongly on gas later, a transition which has already been occurring in developing economies. Gas prices are also expected to decrease in the long run.

In the slow scenario, the global demand is expected to be much more dependent on oil and gas than in the other scenarios, for which oil prices are expected to start dropping only in the 2030's, with emerging economies transitioning even later. **Gas prices are expected to grow firmly worldwide, with prices increasing less in the last decades until 2050.**

The fast scenario goes the other way around, assuming oil prices to decrease starting next years, assuming the peak for oil demand has already passed in 2019. Gas prices follow the same trend albeit later.

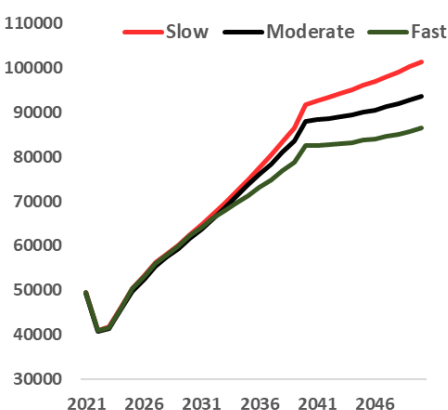


Figure 42 – Integrated gas revenue projections by scenario in million \$. Source: Analysts' Estimates.

Integrated Gas Segment

For the integrated gas segment, oil and gas produced will follow the same patterns described in upstream for each scenario, the same happening for LNG regarding the trend of gas for each scenario in both developing and emerging economies. Electricity prices are expected to grow conservatively in the slow scenario, accelerating more in the moderate scenario and even more in the fast scenario. LNG is expected to follow the same trend of gas although having its prices dropping in the last years due to introduction of new projects by big gas companies like Qatar Gas, the biggest LNG exporter worldwide.

Price Scenarios		
Slow	Moderate	Fast
2.51%	2.23%	1.95%

Figure 43 – Integrated gas revenue CAGR from 2021 to 2050. Source: Analysts' Estimates.

Upstream Segment

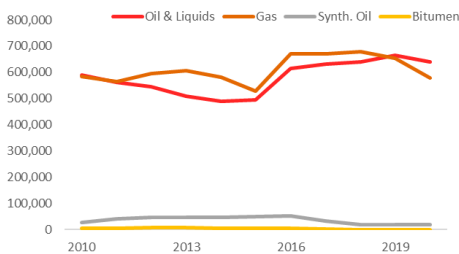


Figure 44 – Historical production by product (in K BOE per year).
Source: Royal Dutch Shell.

The Upstream segment is the base of Shell's value chain, **accounting for over 90% of the production of liquid hydrocarbons – as input before refining – and 55% of the production of natural gas in 2020**, the rest being processed by the Integrated Gas segment. As such, it is naturally impacted by direct demand and supply forces on the market and transitions in the industry environment. The following years will reflect recovery from the COVID-19 pandemic, product demand adjustments and, more importantly, a large change in structure in order to fulfil the **2050 Carbon Neutrality Goal – reflecting net zero emissions of greenhouse effect gas.**

Segment Production

Upstream relies heavily on property, projects, and exploration prospects to obtain raw inputs, which it sells directly to other segments and third parties.

Historical Production

Upstream's production has been historically focused on oil and several liquid hydrocarbons, gas and synthetic oil and bitumen, the latter two being now part of Downstream's production. The share of production for each product has changed widely over time, for which gas has had, for the most part, the largest production share. Production of both oil and gas increased tremendously upon BG Group's acquisition in 2016, one of Shell's largest acquisitions historically, contributing mostly to increase its portfolio of gas supplies. **In 2016, production of gas increased roughly 41% and the production of oil increased about 27%.** In 2019, production of oil & other liquids surpassed the production of gas, in what has been stated by Shell as the peak year for oil production at roughly **665.5**

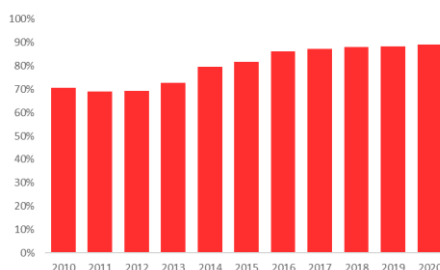


Figure 45 – Share of historical production (in %) obtained by Royal Dutch Shell's consolidated subsidiaries. Source: Royal Dutch Shell.

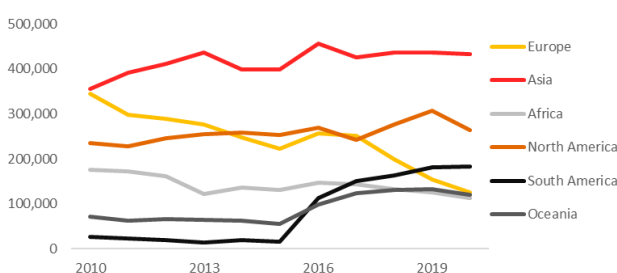


Figure 46 – Historical production by region (in K BOE per year).
Source: Royal Dutch Shell.

million barrels of oil equivalent (BOE). In the same year, **gas achieved a production of roughly 653 million BOE.** In 2010, 30% of Shell's upstream production was achieved through Joint Ventures and other production-sharing agreements, an amount that was reduced to about 10% by 2020, reflecting the company's interest in producing more under its own consolidated subsidiaries.

Although upstream operates on a global scale, the distribution of production share across regions is far from being even. Europe, for instance, concentrated **in 2010 almost 30% of upstream's entire production**, with focus in the UK's North Sea and in the Netherlands' mainland and North Sea, being at level with Asia. **In 2020, Europe's share of production had dropped towards only 10%,**

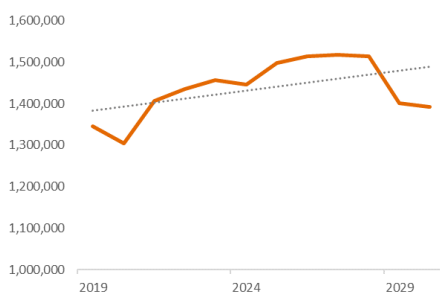


Figure 47 – Estimated total future upstream production capacity (in K BOE per year). Source: Analysts' Estimates.

whereas Asia would produce 35% of the total. Other major changes include increases in South America's and Oceania's production, mostly due to **deep-water oil and gas investments off-shore Brazil in the last 5 years and gas projects in Australia**. Production in North America and Africa remained relatively stable, with a small increase in the former and a small decrease in the latter.

These reflect part of Shell's future Upstream restructuring.

Production Capacity

A thorough analysis of Shell's most relevant present and future projects allows for an estimate of its upstream production capacity. This capacity is adjusted to current production to allow for future production estimates.

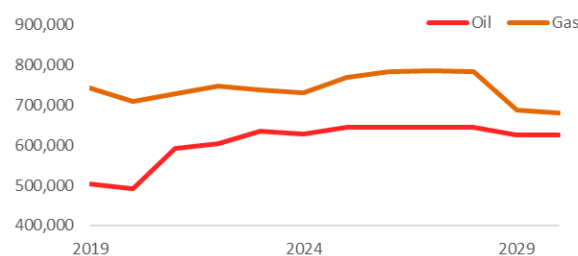


Figure 48 – Estimated oil and gas future upstream production capacity (in K BOE per year). Source: Analysts' Estimates.

After a visible drop in production capacity for 2020, in the following years a series of new upstream projects create an **upward trend until 2027, with an increase in capacity of about 8% from 2021 until 2027**, period until when there is plenty of project information. **This increase is caused by an increase of 9% in oil production capacity and 8% in gas production capacity.**

From 2020 to 2027 there are also slight changes in the relocation of upstream's production capacity, with **Oceania, South America and Africa all gaining margin while Europe, North America and Asia slightly decrease in capacity**. This is justified by Shell's restructuring plan for the segment, where it wishes **to focus 80% of its cash CAPEX and operating cash-flows in core producing regions, of which Brazil and Nigeria see a new inflow of projects**. Other core regions include UK, Kazakhstan, Oman, Malaysia, Brunei, and two locations in the USA. Europe continues seeing continuous divestment, with one of Shell's biggest gas fields, Groningen Gasveld, seeing government-imposed cuts in capacity and final shutdown in 2022.

Transition Scenarios

The future contribution of upstream towards Shell's profitability depends on how it is going to transition to attain the 2050 goal. Companies in the industry often study how the transition can occur: **Extreme emission reduction (attaining net-zero), moderate reduction, and slow reduction**. We too believe these scenarios may provide an useful picture of upstream's possible performance and base our views on numerous demand and supply outlooks for possible paths.

Production

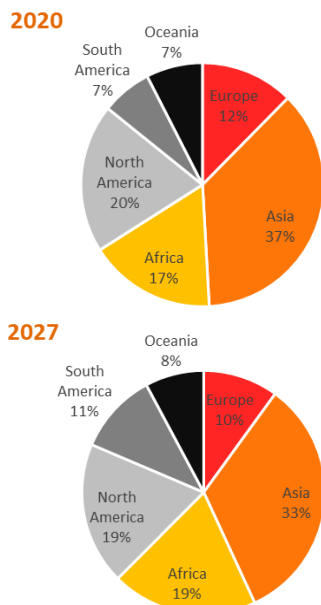


Figure 49 – Comparison of share (in %) of total future upstream production capacity by region (2020 & 2027). Source: Analysts' Estimates.

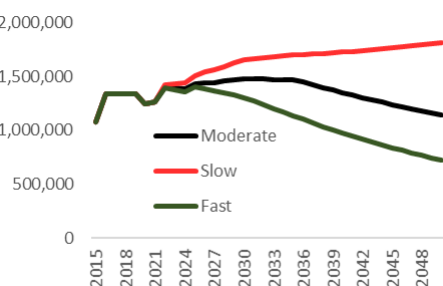


Figure 50 – Estimated future production by scenario (in K BOE per year, 2015-2050). Source: Analysts' Estimates.

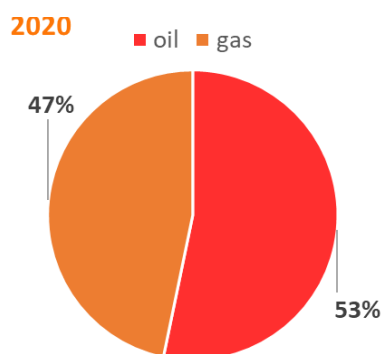


Figure 51 – Production share of oil and liquids versus natural gas (in %) as of 2020. Source: Royal Dutch Shell.

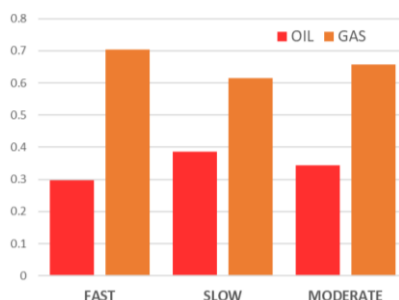


Figure 52 – Estimated production share of oil and liquids versus natural gas (in %) as of 2050, per scenario. Source: Analysts' Estimates.

We choose the moderate transition scenario as the basis for the analysis. This includes a decrease in production of oil **of about 1% per year until 2030, with gas production increasing – about 2-3% until 2035** - to compensate as a cleaner energy source. In the last ten to fifteen years, a larger drop is expected in both, accelerating the divestment in oil production, and decreasing the production of gas. Both Asia and Africa, having higher demand for more polluting energy sources – still very coal intensive – are assumed to **transition slower than the remaining regions**, while Europe is considered unable to increase gas production due to the closure of the Groningen Gasveld. All three scenarios calculate the value of oil and gas for the first following years through the capacity estimation stated above, both adjusted in 2021 for the recovery of the COVID19 crisis.

The slow scenario considers very little effort to reduce emissions, assuming **a growth of 17% for oil and liquids for the first 10 years, following a reduction of 21% over the next 20 years**. This is the only scenario considering an increase in oil production, which goes against Shell's planned strategy. Gas faces a similar acceleration as the one for the basis scenario until **2035, but continues to grow until 2050 at an average rate of 2%** unlike the other scenarios. Asia and Africa are considered as having a slower transition in the second half (after 2035).

The fast scenario is the one which more closely aligns with the net-zero goal, assuming decreases in both oil and gas over time and a **large change in structure, with the share of oil decreasing from 53% in 2020 to 30% in 2050**. Both oil and gas are assumed to decrease starting in 2021 and 2025 respectively, with the decreasing rate **almost doubling in the second half, with gas decreasing around 1-2% per year and oil with a much larger rate of 3-4% per year**. Asia and Africa again present a lag, transitioning slower.

• Operating Costs and CAPEX

In the basis scenario we align the costs with Shell's future strategy while being conservative. Exploration costs are expected to remain stable until 2025, when Shell intends to not have any new exploration projects. Instead, we assume **exploration costs to drop 80% only by 2027 and remain stable afterwards**. Regarding production expenses, fixed costs are expected to drop following the restructuring to the core zones. Following our capacity analysis, **Shell's core upstream areas produced, in 2020, roughly 55% of the total production**. As this restructuring is expected to occur until 2035, **fixed costs are expected to decrease accordingly 45% by 2035, becoming variable afterwards**. Variable costs are expected to attain 80% of their current value by 2030, on a

conservative analysis, despite Shell's ambitions by 2025. In the slow scenario we assume **these costs to be attainable only by 2035**, following a slower change into producing gas, which is cheaper. **Exploration costs to decrease 5% per year until 2035** as exploration for oil and gas is assumed to continue further. The restructuring and thus fixed costs are assumed to be the same. In the fast scenario, the variable costs are expected to **drop 80% by 2025 as envisioned by Shell**. Similar to the moderate scenario, **exploration costs drop 80% but in the planned year of 2025**. Purchases use historical average ratio – which is higher – for both moderate and slow scenarios.

We align capital expenditures to Shell's ambitions in our basis scenario.

Shell estimates dedicating between **\$11 and \$14 Billion per year until 2025 in**

Planned Upstream CAPEX	Moderate	Slow	Fast
Conventional Oil and Gas	4,000	5,000	3,500
Deep-Water	4,000	5,000	3,500
Shales	3,000	4,000	2,000
Total	11,000	14,000	9,000

CAPEX to Upstream, with moderate expectations. For the moderate scenario

we conservatively assume **\$11 Billion**, whereas for the slow scenario we

assume **\$14 Billion**, due to a larger continuous investment in oil and gas PP&E.

For the fast scenario, we limit the value to the planned **\$9 Billion in Cash**

CAPEX, envisioned by Shell for the upstream transition. After 2025, CAPEX is

estimated based on revenue, **being curved 5% upwards and downwards in**

the slow and fast scenarios, respectively.

Figure 53 – Planned capital expenditure per year, in USD Million, from 2021 to 2025, split by type of upstream projects. Source: Royal Dutch Shell and Analysts' Estimates.

• Segment Core Value & Beta Analysis

Each scenario will impact the value of the segment and thus the evaluation of Shell's share price.

Scenario	Slow			Moderate (Basis)			Fast		
Beta	1	1.25	1.5	1	<u>1.25</u>	1.5	1	1.25	1.5
Scenario	78,975	59,828	47,588	55,370	<u>45,616</u>	38,753	76,992	67,786	60,867
Growth Rate (G)	-0.3%			-2.8%			-5.0%		

Figure 54 – Comparison between present values for estimated future upstream core free cash flows, depicting the segment's value, in USD Million, per scenario. These values are estimated as of the end of the year 2021. A beta analysis and perpetual growth rates are also displayed per scenario. Source: Analysts' Estimates.

The **basis scenario** yields the lowest present value of core free cash flows when compared to other with the same betas. An **average beta selected from comparable companies** to the upstream segment alone is used as the average beta. In the moderate scenario, a **market beta would increase the value of the segment by 21% and a higher beta, indicating higher risk, would decrease the value by 15%**. When using the average beta, the value of the company **in the slow scenario increases by 31% and in the fast scenario by 49%**, both being the result of doing business-as-usual in the former and lower costs in the latter. **The tax rate considered for the estimation is 50%**, resulting from an historical difference of around 25% when compared to the downstream

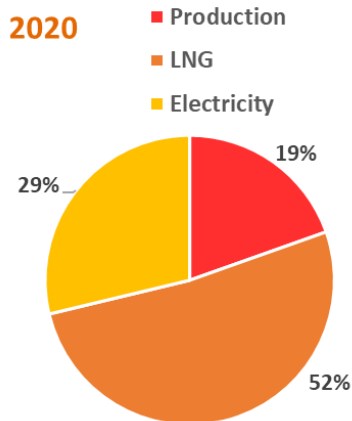


Figure 55 – Share (in %) of revenue originating from each main sales category from the integrated gas segment, in 2020. Source: Analysts' Estimates.

segment that follows an effective rate close to the statutory rate of 25%. Upstream is subject to higher taxation due to the nature of the business. **All scenarios stabilize at negative perpetual growth rates**, due to the industry transition into cleaner energies, with the **slow scenario having the highest growth rate** and the **fast scenario having the lowest growth rate**, and thus more harmful for the segment. **The basis scenario stabilizes in between both, at a growth rate of -2.8%.**

Integrated Gas Segment

Like the upstream segment, the integrated gas segment also sits at the top of the value chain, focusing mostly on **Shell's LNG portfolio**, and, like upstream, some part of the **oil and liquids and natural gas production**. Shell is also recently incorporating its new energies developments into this segment. For this reason, we analyse here Integrated Gas as a segment seeing a future transition between oil and gas products and renewable energies, in which Shell has been investing in order to attain the **2050 Carbon Neutrality Goal**. In 2020, we estimate that **52% of the segment's total revenue originates from LNG sales**, whereas **oil and liquids and natural gas only comprise 19% of the total**, with **electricity managed by shell returning 29% of total revenue**. LNG is thus estimated to be the most important IG business.

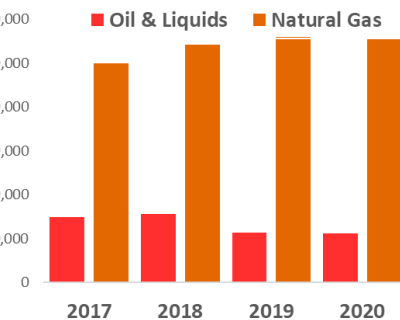


Figure 56 – Production (in K BOE per year) of oil and liquids and natural gas, from 2017 to 2020. Source: Analysts' Estimates.

Segment Production

Integrated gas relies heavily on property, projects, and exploration prospects to obtain raw inputs, which it sells directly to other segments and third parties. Furthermore, **it relies on investment on LNG terminals and transportation property**, and, more recently, on **solar and wind farms to produce renewable energy**.

■ Historical Production

Integrated gas's production of oil and liquids and natural gas is merged with upstream's production, sharing many projects. IG's share of upstream production has been estimated following analysis of historical production capacity, determining the projects corresponding to each segment and to both. Historically being a segment focusing more on **natural gas**, **its share of production was 77% in 2017, which grew to 83% just three years later**, due to both a decrease in oil production and an increase in the output of natural gas. **IG did not follow the oil production peak in 2019** as recorded by upstream. Like upstream, IG is also focusing its production on its consolidated subsidiaries, **which comprised 85% of the full oil and liquids and natural gas production in 2020**.

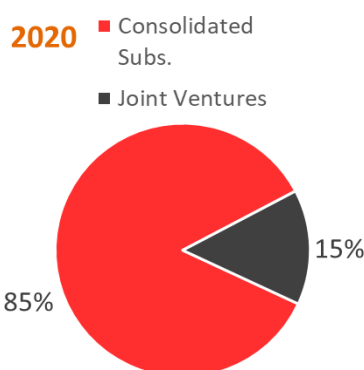


Figure 57 – Share (in %) of production of oil and liquids and gas by consolidated subsidiaries and joint ventures, as of 2020. Source: Analysts' Estimates.

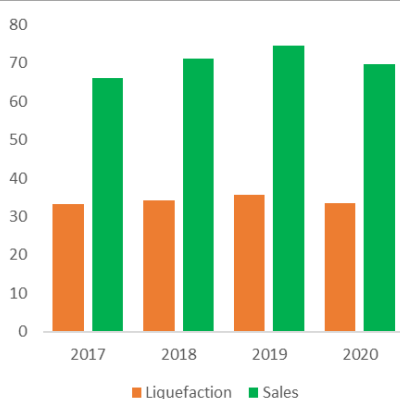
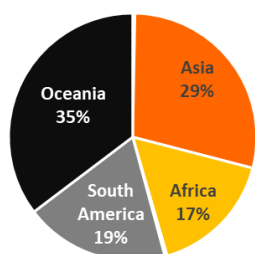


Figure 58 – LNG liquefaction and sales volumes, in MTPA, from 2017 to 2020. Source: Royal Dutch Shell.

2020



2020

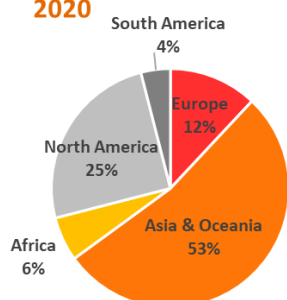


Figure 59 – Share (in %) of LNG liquefaction and share (in %) of LNG Exports, by region, in 2020. Source: Royal Dutch Shell and Analysts' Estimates.

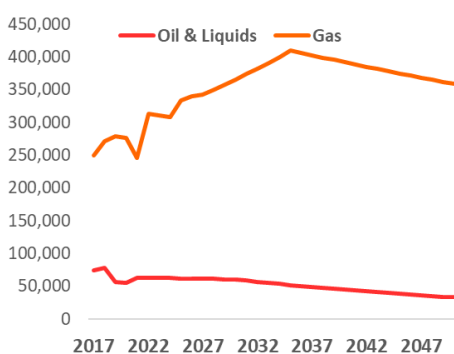


Figure 60 – Evolution of estimated oil and liquids and natural gas capacity, in K BOE per year. Source: Analysts' Estimates.

Integrated gas has recently also been developing its portfolio of LNG, with **LNG sales volumes growing almost 13% from 2017 to 2019**, with a natural reduction in 2020 due to the COVID19 pandemic. **Liquefaction volumes also increased almost 8% in the same period.** Liquefaction volumes are lower than sales volumes, **at around 50% per year**, due to Shell's current strategy of buying LNG to sell and producing about half of the amount sold. Projects which strongly develop Shell's LNG portfolio include agreements with **Qatar Gas**, the largest LNG producer in the world, **for an LNG train in which RDS has an interest of 30%.** Shell also detains many LNG projects in Australia, mostly due to the acquisition of BG Group, and several other large investments in **South America, Nigeria, Egypt, Oman and Russia.** We estimate that **53% of Shell's LNG sales are exported to Asia & Oceania**, with South America receiving the lowest share – **only 4%** - despite its higher liquefaction share (**19%**). In 2020, **Oceania is the region with the highest production share**, due to the large projects acquired in Australia. Royal Dutch Shell presents itself as the second largest company by LNG storage capacity, only slightly below Qatar Gas itself.

The electrical capacity managed and sold by Shell and reported in this segment is rather recent, including electricity both from renewable and non-renewable sources. Most electrical capacity is managed by **Shell Energy North America, managing a capacity of 10,000 MW** from several sources. Regarding renewable electricity sources, most projects are currently located in the Netherlands and in the USA. **In 2020, our capacity analysis estimates a total electrical production capacity of 96 TWh.**

■ Production Capacity

Production of oil and liquids and natural gas are assumed to follow upstream's capacity as new projects begin. For this estimation we always assume **upstream in the basis (moderate) scenario**, throughout the scenario analysis, as this production concerns the lowest share of revenue and we consider the basis scenario to be an adequate response for IG in the long run. By 2050, **the production capacity for oil and liquids is expected to decrease about 41% and for natural gas is expected to increase about 30%**, when compared to 2020.

Capacity of LNG liquefaction is expected to **increase in the next 5 years**, with North America and Oceania observing the largest growth in capacity. South America, Europe and Asia have no planned projects for capacity increase. From 2020 until 2026 **LNG liquefaction capacity is expected to grow 24%.**

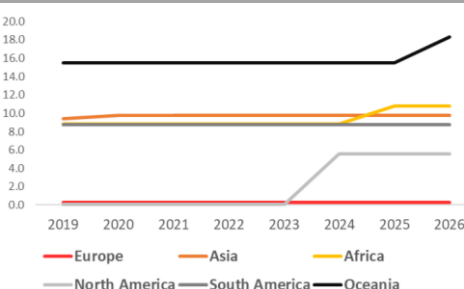


Figure 61 – Evolution of estimated LNG capacity, per region, in MTPA. Source: Analysts' Estimates.

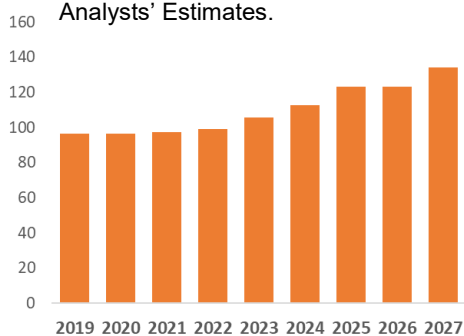


Figure 62 – Estimated electricity capacity, in TWh. Source: Analysts' Estimates.

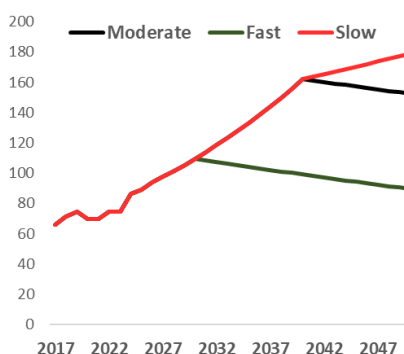
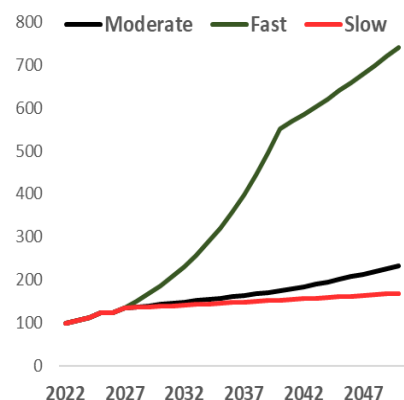


Figure 63 – Estimated electricity production (in TWh) and LNG sales (in MTPA), as per estimated scenario. Source: Analysts' Estimates.

Capacity of electricity production is also expected to increase with a series of new renewable energy products coming online. **From 2020 until 2027, capacity for electricity production is estimated to increase roughly 39%.**

Transition Scenarios

Like upstream, the production of integrated gas will depend on how the transition is made. More properly, it will depend on the demand for LNG, and consequentially for natural gas, and on the demand and ability to transition to renewable energies.

Production

The moderate scenario is chosen as the basis scenario for the scenario analysis. In this scenario electricity production is assumed to grow at **2% for the first 20 years** following demand outlooks for electricity, accelerating afterwards to **4%**. LNG sales are assumed to grow at **4% until 2040** following Shell's planning, for which we assume a slight decrease afterwards until 2050 in order to reduce carbon emissions closer to 2050. Asia and Africa are once again met with a lag in this decrease as happened for the upstream segment. Demand by continent is expected to change with Asia taking a share of **almost 60% by 2040**.

In the slow scenario, electricity managed is expected to grow slightly less than in the previous scenario, as Shell will still attempt to increase its share of renewable electricity, thus growing at a **CAGR of 1% for every region until 2050** following outlook analysis. Regarding LNG, sales are expected to grow as planned until 2040, like in the previous scenario, but now Shell is expected to keep increasing the production of LNG until 2050, albeit at a mediocre **rate of 1% for every region**.

For the fast scenario, the production of electricity is assumed to grow at a **CAGR of 11.5% from 2027 to 2040**. This scenario assumes that Shell is able to meet its goals of managing **about 560TWh of electricity**, although by 2040 since our capacity analysis does not indicate that such value could be likely attained by 2030 as ambitioned by Shell. LNG sales are still expected to grow at **4%** as planned by Shell, although we believe the company would begin transitioning into electricity sooner, and thus we assume said growth only until 2030, after which LNG sales are expected to **drop at a rate of -1%**.

Operating Costs and CAPEX

Costs also slightly differ per scenario. Exploration costs follow the same basis as described in the upstream scenarios, due to the need for exploration for

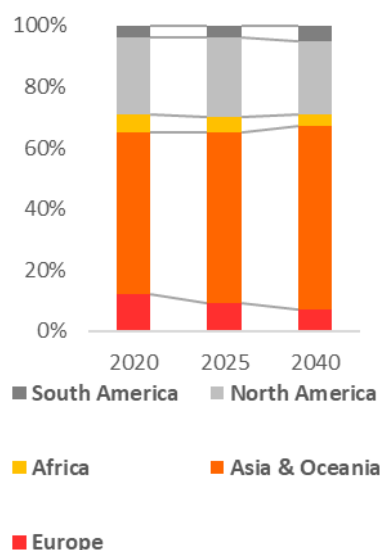


Figure 64 – Share (in %) of demand for LNG exports by region, as estimated by the indicated year. Source: Analysts' Estimates and LNG Outlooks.

Planned Upstream CAPEX	Moderate	Slow	Fast
Renewables	4,000	3,000	5,000
IG (Gas and LNG)	4,000	4,000	3,000
Total	8,000	7,000	8,000

Figure 65 – Estimated capital expenditure per year, in USD Million, from 2021 to 2025, split by type of integrated gas projects. Source: Royal Dutch Shell and Analysts' Estimates.

• Segment Core Value & Beta Analysis

Scenario	Slow			Moderate (Basis)			Fast		
Beta	0.78	1.034	1.28	0.78	1.034	1.28	0.78	1.034	1.28
Scenario	147,604	95,072	68,022	116,792	81,255	60,636	209,516	122,932	82,641
Growth Rate (G)	1.5%			0.3%			2.1%		

Figure 66 – Comparison between present values for estimated future integrated gas core free cash flows, depicting the segment's value, in USD Million, per scenario. These values are estimated as of the end of the year 2021. A beta analysis and perpetual growth rates are also displayed per scenario. Source: Analysts' Estimates.

gas fields to produce LNG. Research & Development costs are increasing in every scenario due to the transition, with the moderate scenario seeing the **R&D expenses increase 5% each year**, while the fast scenario sees the same expenses growing **at 7% a year**, due to more investment in renewable electricity projects, and the slow scenario sees an **increase of 3%**. Fixed costs are assumed to grow at a **stable rate of 2%** in all scenarios due to the high investment to increase the number of LNG terminals, transportation vehicles and renewable energy farms, all requiring maintenance. The variable costs in the moderate scenario include a conservative reduction of **20% by 2025**, differently from Shell's ambitions to do so by 2022. This value mostly regards operating expenses for the production of LNG. As such, in the slow scenario, this value is **assumed to be instead attained at 2022** due to larger investment in LNG. In the fast scenario, this reduction is assumed to never be attained as the focus is directed towards renewable energy.

CAPEX is aligned with Shell's planning for the next years, dedicating **between 3 and 5 billion USD** to invest in renewables, in the slow and fast scenarios respectively. CAPEX for gas and LNG is expected to remain the same in both the slow and moderate scenarios, at **4 billion USD**, due to similar production structure up until 2040. Overall, total CAPEX for integrated gas is expected to stay **between 7 and 8 billion USD**. **After 2025, CAPEX grows 1% in the fast scenario and decreases 1% in the slow scenario.**

The **basis scenario** yields again the lowest present value of core free cash flows. An average beta is selected between average betas of gas and LNG standalone companies and renewable companies, at **70% of gas companies and 30% of renewables**, based on IG's production shares. **The tax rate considered is 50%** and follows the same reasoning as for the upstream segment. Integrated gas is assumed to have the same tax rate for the WACC calculation as upstream, due to the nature of the business. **All scenarios stabilize at positive perpetual growth rates**, due to the industry transition into cleaner energies, with the **fast scenario having the highest growth rate** and the **moderate scenario having the lowest growth rate, at 0.3%**.

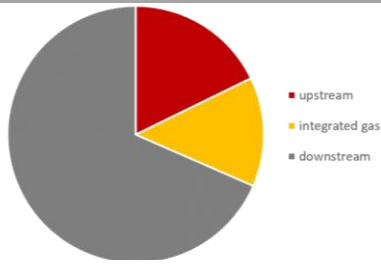


Figure 67 – Share of total Revenue by segment. Source: Analysts' Estimates.

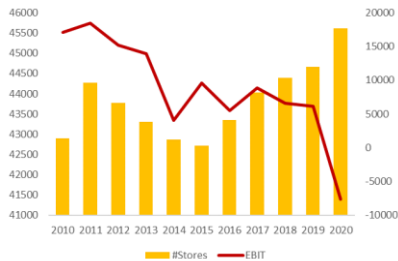


Figure 68 – Evolution in the number of stores VS EBIT in M\$. Source: Analysts' Estimates

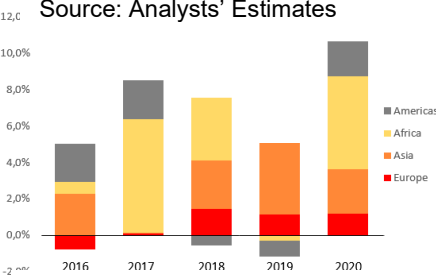


Figure 69 – Growth rate in the number of stores by region. Source: Analysts' Estimates.

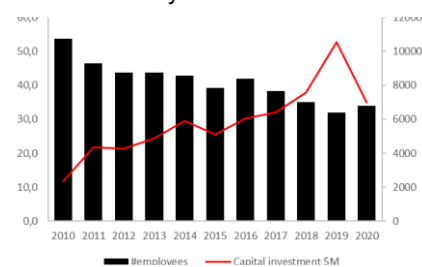


Figure 70 – Number of employees in thousands VS Capex in million \$. Source: Analysts' Estimates.

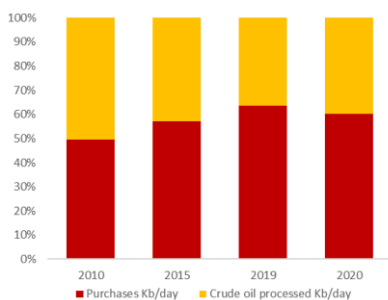


Figure 71 – Purchases evolution by year VS total crude oil processed in thousand barrels per day. Source: Analysts' Estimates.

Downstream Segment

The Downstream segment represents the branch of Shell's core activities directly related to serving the customer's needs concerning the end products of Shell's value chain. It manages more than **45 thousand retail stores across the globe** and 36 thousand employees working to fulfil the everyday energetic needs of private customers worldwide. Alongside with the B2C marketing elements of the segment, it manages 2 main branches of the integrated value chain.

Oil Products

This sub-segment corresponds to the processing and refining of crude oil and other types of feedstocks, to produce commercial end products such as gasoline, diesel, lubricants, fuel oil and other types of products constituting the vast portfolio of products Shell provides to its customers. This branch not only deals with the private customers directly but also performs trading and distribution to other businesses. As of 2020, oil products contributed to a share of **90% of the total Downstream's revenue** and close to **70% of Shell's overall consolidated revenue**.

Historical statistics

Over the last 10 years, the number of retail stores has presented slight changes, directly connected to fluctuation in the company's performance for this segment and also the demand affecting it. By analysing the geographical distribution of these stores, **Asia and Africa** have been the regions showing the **highest growth rate**, while Europe and Americas have been showing signs of stabilization. These results match the expectations for the future of the segment, where emerging economies are the ones still presenting growth in energetic needs, while developed economies show signs of stabilization and are looking for alternative solutions regarding climate change. At the same time, the number of employees has dropped at a constant rate, from levels around **54 thousand in 2010** to little over **30 thousand in 2020**. This does not seem aligned with the evolution of the number of retail stores, however the decline in employees can be associated with higher levels of investment, especially in better technological and service automatization solutions implemented in the company.

Considering the refining capacity of this branch, it has presented a **constant 2% to 3% decrease across the last 10 years**, explained by the divestment in refining plants together with a policy of increasing the **purchase ratio over production** in the same period. The utilization rate has kept relatively constant at around 90% in the last 10 years, except in 2020 due to lower overall demand for

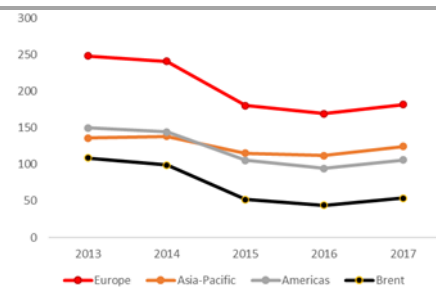


Figure 72 – Yearly evolution in the Price of Gasoline by region VS Brent's spot price. Source: Analysts' Estimates.
Volume (2000=100)

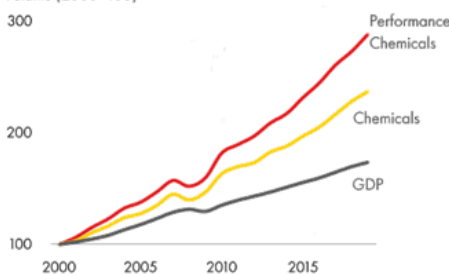


Figure 73 – Volume of Chemicals against evolution in GDP by Year. Source: Shell Presentations

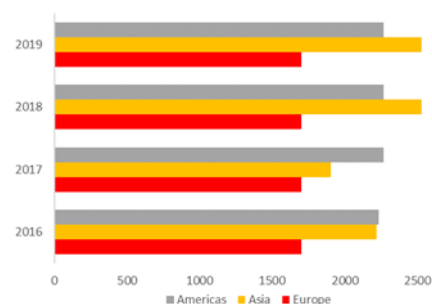


Figure 74 – Evolution in the capacity of Ethylene by Region (thousand of barrels per day). Source: Analysts' Estimates.

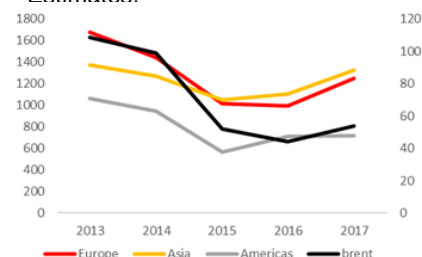


Figure 75 – Evolution in the price of Ethylene by Region VS Brent. Source: Analyst's Estimates.

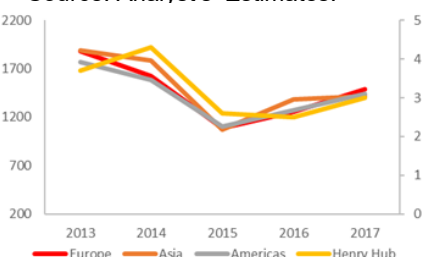


Figure 76 – Price of Styrene Monomer by Region VS Brent. Source: Analyst's Estimates.

oil products, especially fuels. The total amounts of purchases and production are distributed by the different products sold in this business unit. The main products considered were gasolines, kerosines (jet fuel), diesel, fuel oil and other products such as biofuels, the latter representing a market still to be further developed in the future.

In terms of **prices**, although they are not exactly similar to the price of oil and gas futures, associated with the premium from being a defined retail price, they still followed the **same pattern of movement as the main spots** for the oil and gas futures in the industry. To note that European prices are substantially higher for gasoline and diesel due to policy imposing higher taxation on these products.

Chemicals

The Chemicals unit focuses on the production and sale of base and intermediate petrochemicals essential for the production of everyday products like plastics and solvents. Thus, it is more connected with Downstream's B2B element, serving as a distribution point for the sale of chemical inputs to major retail manufacturers from a variety of industries. As of 2020. This sub-segment contributed to around **10% of total Downstream's revenue**, however the vast amount of end products dependent of these inputs create **future expectations of growth** within this area.

Historical Statistics

In terms of production and capacity, this subsegment has a different structure compared to Oil and Products. **Asia shows significant investment in this area**, confirmed by the **higher level of ethylene capacity achieved in 2018 when compared to Europe and Americas**. These are the only considered regions for Shell regarding this BU, since Africa does not have share of production nor of sales after 2016. Considering **capacity utilization**, this ratio has oscillated between **85% and 90%**, except for 2020 where it **dropped to 80%**. Regarding the revenue of this unit, it mostly derives from the production and sale of base and intermediate chemicals. For the valuation, the base chemicals share is represented by ethylene quantities, while intermediates & other share is represented by Styrene Monomer, Ethylene Glycol and High Olefins. The difference between the two is the level of processing, since ethylene is a simple hydrocarbon which has not been processed, while intermediates already have gone through one stage of processing and are expected to be used as inputs for a variety of final products.

The environment in prices also portrays a similar image to oil products, which is mainly related to the fact that the current production processes are

based on cracking methods to dismantle the complex organic molecules of crude oil and natural gas into simpler hydrocarbons such as these chemicals.

Transition in the production

As for the previous segments, three scenarios for the transition will be analysed. However, while Oil Products will be analysed with different implications for each scenario, the Chemicals unit is expected to evolve in parallel to the rest of Shell's activities. Although the link with energy spot prices is present, this assumption is justified by its lower share of revenue and because its operations serve more diversified industries, moving away from the basis of energetic demand. There are already some executive decisions taken by RDS regarding the **divestment in refinery plants**, one in **Europe** (Fredericia) and one in the **US** (Convent). Thus, the impact of these divestments will be replicated for the three scenarios, considering a **7% decrease in capacity** for the two regions by 2023, the expected date for the full closure of these refining plants.

Considering the **moderate scenario**, the capacity for oil products will follow a pattern consistent with their expected decrease in demand. For **Europe and Americas** after 2023 the **expected decrease** in capacity will be **1% per year until 2035**, while for the **emerging economies of Asia-Pacific and African** regions the **peak in demand presents a delay**, having increasing growth in capacities of **1% until 2026**, achieving the peak and stabilizing by 2030. Capacity utilization is expected to recover from the drop in 2020 reaching levels of past years, to later present a **0.5% decrease** each year for **Europe and Americas**, in the opposite direction to a **yearly increase of 1% in emerging economies**. The change in share of total production by regions follows the same path, with Asia absorbing a small but consistent share each year from both developed regions' share. Regarding the products themselves, **Europe and Americas** currently have a high share in **diesel and gasolines** respectively, hence we expect a **conversion shift** for these 2 products within both regions. Also, a shift for a higher share in **other fuels (biofuels)** was considered for this scenario. For the cases of Asia and Africa, there is small impact with a yearly increase in the share of gasoline assimilated from the share of diesel to balance these 2 sources, while after 2030 there is a slight increase in the share of other oil products.

The slow and fast scenarios differ from the moderate scenario in terms of capacity, its utilization ratio and the shifts in demand, being that these three variables are evaluated geographically. For the case of the **slow transition**, **capacity increases until 2030** where it peaks and starts to decrease at a small rate in Europe and Americas. Asia and Africa present a delay, **having stabilized by 2035**. The utilization ratio follows the same path with stable high levels of

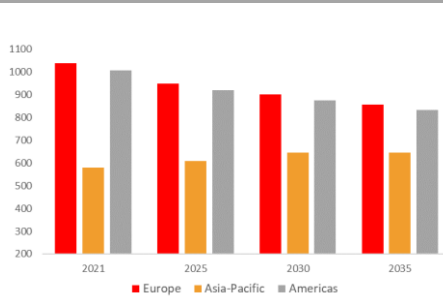


Figure 77 – Capacity change
Moderate scenario in Kb/day.
Source: Analysts' Estimates.

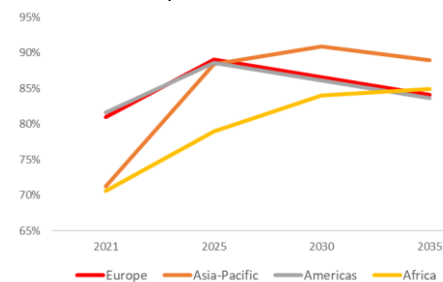


Figure 78 – Capacity utilization
ratio by year. Source: Analysts' Estimates.

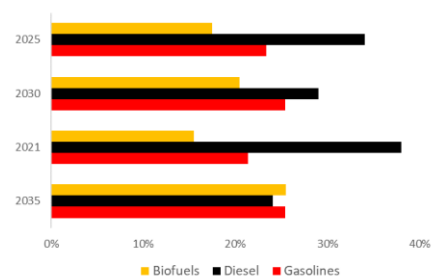


Figure 79 – Demand Shift for oil
products in Europe – Moderate.
Source: Analysts' Estimates.

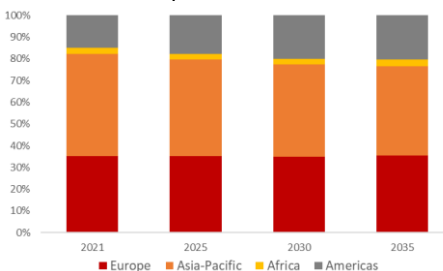


Figure 80 – Shift in share for
biofuels in the Moderate Scenario.
Source: Analysts' Estimates.

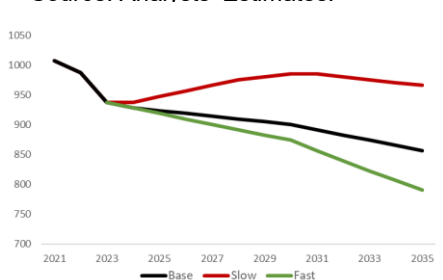


Figure 81 – Americas' effects by
transition scenario on capacity
(Kb/d). Source: Analysts' Estimates.

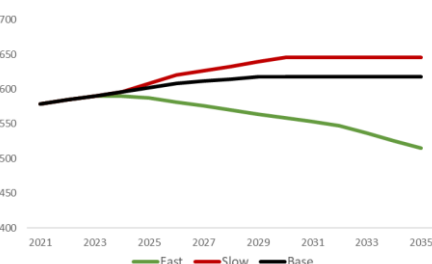


Figure 82 – Asia's' effects by transition scenario on capacity (Kb/d). Source: Analysts' Estimates.

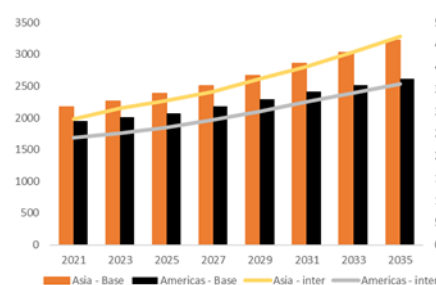


Figure 83 – Asia's production of base (bar) and intermediate (line) chemicals VS Americas. Source: Analyst's Estimates.

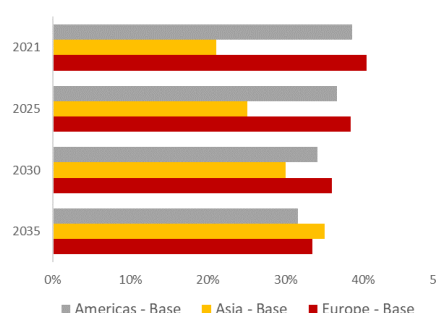


Figure 84 – Evolution of Base chemicals market share by region. Source: Analysts' Estimates.

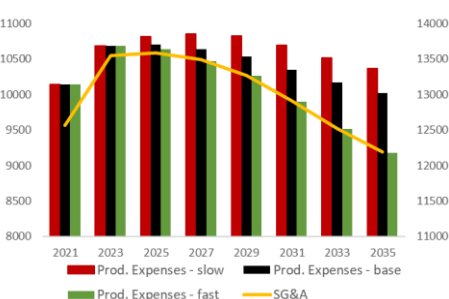


Figure 85 – SG&A and Production expenses by transition scenario. Source: Analysts' Estimates.

capacity for all regions and higher growth experienced in Asia and Africa. Regarding the shift in product demand, other fuels do not gain much share above its current level until 2030 when it starts to increase marginally by 0,5%, absorbing from gasoline and diesel's shares similarly across all regions. In the **fast transition** scenario, **capacity continues to decrease at 1% per year** after the full closure of the 2 refining plants, while **accelerating to 2% after 2030**. Simultaneously, capacity utilization drops around 8% for Europe and Americas and 3% for emerging economies from 2021 to 2035. Besides production itself, in this scenario **gasoline and diesel** have their share of sales **decrease** remarkably, contributing for the growth of biofuels across all regions, with rates of **2% per year for emerging economies** and **1.5% for Europe and Americas**.

Concerning the chemicals business unit, according to Shell's plans of investing towards the development of intermediate and performance chemicals, intermediates will have relatively higher growth acceleration compared to base chemicals. The overall capacity is expected to grow at an increasing pace, **1% for the first years** and finishing at **3% growth per year by 2035 in Europe and Americas**, while for **Asia this growth reaches 4%**. Following the higher investment in intermediate chemicals, the capacity utilization is expected to grow for both base and intermediates in all regions, however the maximum achieved in ethylene will be of 90% capacity while for intermediates it will rise until 92%. It is also expected that Asia absorbs significant share of the total sales by type of chemical, hence a **gradual 1% increase in the base chemicals share** was evaluated yearly, such that in 2035 it achieves the highest share among regions. For **Intermediates, Asia is already the leader with over 40% share** of the market, thus a yearly increase was evaluated but **capped at 45% until 2035**.

Costs & Capex

Downstream presents a cost structure significantly different from the other segments, since **selling and administrative expenses** account for a higher share of total operating costs, with a variable component associated with labour expenses. Variable costs were considered to represent around 70% of the total SG&A and are set as a percentage of total revenue that is expected to decrease until 2035 due to the historical trend of reduction in the number of employees. The fixed part is expected to remain constant throughout the period, following the historical trend in the number of retail stores. In the case of **production and manufacturing expenses**, they depend directly on the scenario for the transition, with **small growth for the first years after the divestments** and **small decline approaching 2030 in the slow transition**, while for the **moderate and fast transitions** these will demonstrate a **higher short term**

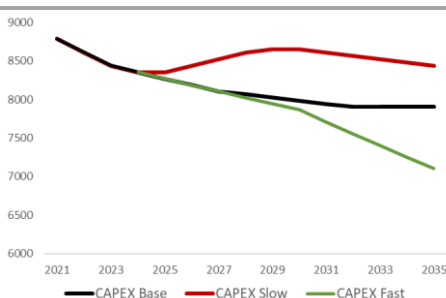


Figure 86 – CAPEX evolution by transition scenario (in million\$).
 Source: Analysts' Estimates.

decrease and long-term stabilization closer to the end of the considered period. CAPEX is calculated in line with revenue and adjusted with the three transition scenarios. **Until 2023 capex is reduced for the 3 scenarios** due to the confirmed divestments. After that year, in the **moderate** case it will **decrease at a gradually lower rate until it stabilizes in 2035**, while the **fast** transition is expected to translate a **decrease at an accelerating rate**, reaching **-2%** in 2030. The **slow** transition case has an **increase until the peak is reached by 2030**, when it starts to slightly decrease.

Segment Core Value & Beta Analysis

Scenario	Slow			Moderate (Basis)			Fast		
Beta	1	1.21	1.5	1	<u>1.21</u>	1.5	1	1.21	1.5
Total Value	88,060	67,823	50,492	59,253	<u>47,710</u>	37,138	39,595	32,962	26,606
Growth Rate (G)	1.8%			0.9%			0.2%		

Figure 87 – Comparison between present values for estimated future downstream core free cash flows, depicting the segment's value, in USD Million, per scenario. These values are estimated as of the end of the year 2021. A beta analysis and perpetual growth rates are also displayed per scenario. Source: Analysts' Estimates.

A Beta of 1.21 for the analysis of Downstream was retrieved with an average of Betas from listed companies presenting similar business models to the one of this segment, with both a refining unit for Oil Products and a Chemicals unit. This value was put to the test for the 3 transition scenarios, having we considered as well a Beta of 1 and of 1.5 for sensitivity purposes. In this case the basis scenario yields an intermediate level of Present Value of core FCF. This follows the changes in the growth rate manifested, which makes sense since the faster the transition the more the Oil Products branch of the segment will lose in performance, being that chemicals stay at their own level of growth for the three scenarios. The tax rate was set at 25%, confirmed by Shell's Contributions Reports data confirming the close level of effective rate against the Netherlands' statutory rate, while being around 25% lower compared to the one of Upstream and IG.

Figure 88 – Combination of present values for all segments in all scenarios and derivation of Shell's A Shares price, in euros. Source: Analysts' Estimates.

Valuation and Recommendation

Scenario	Slow			Moderate (Basis)			Fast		
Beta	LOW	AVG	HIGH	LOW	<u>AVG</u>	HIGH	LOW	AVG	HIGH
UPSTREAM	78,975	59,828	47,588	55,370	<u>45,708</u>	38,753	76,992	67,786	60,867
INTEGRATED GAS	148,557	95,982	68,889	116,723	<u>81,520</u>	61,065	209,516	122,932	82,641
DOWNSTREAM	88,060	67,823	50,492	59,253	<u>47,687</u>	37,138	39,595	32,962	26,606
TOTAL SHELL	315,592	223,633	166,969	231,346	<u>174,915</u>	136,956	326,103	223,680	170,114
SHARE PRICE (€)	51.18	32.65	21.23	34.20	<u>22.83</u>	15.18	53.30	32.66	21.86

All scenarios present gains to the investor except for the moderate scenario with higher beta and risk. Slow and fast scenarios present unlikely circumstances, hence presenting higher share prices. These are, however, likely to be met with higher risk, for which the valuation with higher betas presents as more suitable. **Our recommendation is based on the basis scenario and backed by the others, with average betas, for which we issue a BUY recommendation for Shell's A Shares, with a target price of 22.83€ as of December 31st, 2021, and with an expected capital gain of 41% until the end of 2021, a dividend yield of 2.6%, and a total expected return to the investor of 43.6% until the end of 2021, based on the current share price.**

Aggregated Valuation

We have also performed an aggregated valuation of Shell's A Shares, with the biggest difference lying on the fact that the **core FCF are being aggregated** instead of valuating each segment with their own beta from comparables and own tax rates. This valuation uses as such the beta derived from Shell's A Shares historical returns, regressed against the market. The market returns were estimated with historical prices data for the MSCI World index. **Royal Dutch Shell's beta is thus estimated at 0.955.** The aggregated valuation is also performed for the three scenarios depicted before, with the results being presented in the table below.

Scenario	Slow	Moderate (Basis)	Fast
Total Value	273,520	208,553	259,112
Growth Rate (G)	1.34%	0.25%	1.39%
SHARE PRICE (€)	42.70	29.61	39.80

Figure 89 – A Shares price, in euros, for the aggregated valuation by scenario. Source: Analysts' Estimates.

Again, the moderate scenario presents the lowest share price, as the other scenarios include less likely and risky decisions that the firm would take. It also provides a **smaller perpetual growth rate for the company, at 0.25%**. Based on the moderate scenario, **the total return to investors would be of 85%**, based on the current share price. This aggregate valuation assumes less risk due to the smaller beta, and hence displays higher values for the share price. **The results match and support our segmented valuation, with riskier beta assumptions, for which we reinforce our BUY recommendation for Royal Dutch Shell's A Shares.**

Multiples Valuation

We also evaluated RDS according to the multiples from its peers. **EV/EBITDA** was the metric chosen as **Enterprise Value multiple**, while **Price to Book** was chosen for the **Common Equity metric**. Within both we considered one multiple derived from the average of the peers, one from the median and one for the proxy with the lower end ratio (British Petroleum).

For the selection of comparable companies, we mainly focused on choosing the ones that present similar business models in comparison to RDS, while also having **significant size, geographical distribution of activities and no direct control or influence from governments**. For the latter reason we excluded China Petroleum and Saudi Arabian Oil Company from the list despite being aligned with the previous filters.

Shell presents an EV/EBITDA of 6, within its peers. Chevron presents an abnormal **EV/EBITDA** compared other peer firms, mostly due to a **low current 12-month EBITDA caused by high recent purchases and low revenue during 2020**. Regarding the **EV/EBITDA multiple**, the share price obtained for 2021 is significantly higher than our estimates for the average method, while the **median and the proxy provided similar results**. For the **Price to Book multiple**, all methods match our expectations, with the lower end proxy being more conservative on the level of return for the investor. Shell presents a **lower current price-to-book ratio of 0.94**, when compared to its peers, possibly pointing towards an undervaluation of Shell's share, supporting our recommendation.

Our estimations with both ratios point all towards an increase in the price of Shell's A Shares, with total returns for investors running from **26% to 117% for the EV/EBITDA ratio**, and from **16% to 41% for the price-to-book ratio**, with the latter one better matching our segmented and aggregated valuation above. For said information, **we reinforce our BUY recommendation for Shell's A Shares**. More detailed information about the returns for each ratio of the multiple valuation can be found in the tables below.

EV / EBITDA	
BP	5.56
Equinor	5.33
TOTAL	6.85
ENI	5.55
Chevron	16.17
Exxon	8.42
Average	7.98
Median	6.21
Proxy	5.56

Figure 90 – EV/EBITDA for comparable firms. Source: Bloomberg.

Price to Book	
BP	1.16
Equinor	1.92
TOTAL	1.12
ENI	0.92
Chevron	1.51
Exxon	1.59
Average	1.37
Median	1.34
Proxy	1.12

Figure 91 – Price-to-Book for comparable firms. Source: Bloomberg.

	EV / EBITDA	
	Share Price A	% return
Average	34.78	117,42%
Median	23.98	50,71%
Proxy	20.04	26,39%

	Price to Book	
	Share Price A	% return
Average	22.48	41,45%
Median	21.91	37,90%
Proxy	18.38	16,11%

Figure 92 – Multiple valuation results, by type of multiple. Source: Analysts' Estimates.

Appendix

Financial Statements

Integrated Gas	2019	2020	2021F	2022F	2023F	2024F	2025F
Revenue (including inter-segment sales)	45 602	36 697	49 081	40 179	40 673	44 550	48 299
Purchases	24 294	19 196	30 810	25 221	25 532	27 965	30 319
Operating expenses [A]	6 667	6 555	7 590	6 513	6 620	7 017	7 028
Exploration	281	611	1 100	1 100	1 100	1 100	1 100
Depreciation, depletion and amortisation	6 238	17 704	10 614	8 827	8 917	9 682	10 422
Result Before Taxes	8 122	(7 369)	(1 032)	(1 482)	(1 495)	(1 214)	(569)
Taxation charge	(3 323)	3 148	26	37	37	30	14
Share of profit of joint ventures and associates	1 791	562	1 826	1 495	1 513	1 657	1 797
Core Result Integrated Gas	6 589	(3 658)	820	50	55	473	1 242
Upstream	2019	2020	2021F	2022F	2023F	2024F	2025F
Revenue (including inter-segment sales)	46 413	28 330	39 626	41 045	40 573	40 326	40 948
Purchases	6 134	3 546	8 927	9 247	9 141	9 085	9 225
Operating expenses [A]	12 043	10 984	12 647	12 756	12 534	11 982	11 957
Exploration	2 073	1 136	2 045	2 045	2 045	2 045	2 045
Depreciation, depletion and amortisation	17 003	23 119	14 321	14 482	14 441	14 423	14 499
Result Before Taxes	9 160	(10 455)	1 686	2 515	2 413	2 791	3 222
Taxation charge/(credit)	(4 580)	784	(42)	(62)	(60)	(69)	(80)
Share of profit of joint ventures and associates	379	(7)	286	297	293	291	296
Core Result Upstream	4 959	(9 678)	1 930	2 749	2 647	3 014	3 438
Downstream	2019	2020	2021F	2022F	2023F	2024F	2025F
Revenue (including inter-segment sales)	294 677	141 253	231 525	260 703	255 617	256 650	258 323
Purchases	264 420	120 556	198 759	223 808	219 441	220 329	221 764
Operating expenses [B]	18 697	16 746	22 980	24 898	24 412	24 393	24 418
Depreciation, depletion and amortisation	5 413	11 589	8 489	8 342	8 198	8 128	8 058
Result Before Taxes	6 147	(7 638)	(39)	2 151	2 090	2 320	2 592
Taxation charge [A]	(1 537)	573	10	(538)	(522)	(580)	(648)
Share of profit of joint ventures and associates [A]	1 725	1 555	1 878	2 115	2 074	2 082	2 096
Core Result Downstream	6 336	(5 510)	1 849	3 728	3 641	3 822	4 040
Total core result	17 884	(18 847)	4 599	6 527	6 343	7 309	8 720
Non core Result	32	(1 463)	1 394	1 377	1 422	1 234	1 077
Financing	2019	2020E	2021F	2022F	2023F	2024F	2025F
Interest Expense	4 690	4 089	6 594	5 263	4 974	5 029	5 095
Result Before taxes	(4 690)	(4 089)	(6 594)	(5 263)	(4 974)	(5 029)	(5 095)
Adjusted Taxes	(1 173)	(1 022)	(1 649)	(1 316)	(1 244)	(1 257)	(1 274)
Financial Result	(3 518)	(3 067)	(4 946)	(3 948)	(3 731)	(3 772)	(3 821)
TOTAL	14 398	(23 376)	1 047	3 957	4 034	4 772	5 975

Integrated Gas	2019	2020	2021	2022	2023	2024	2025
Core Result	6 589	(3 658)	820	50	55	473	1 242
Invested Capital	90 363	74 744	82 724	77 986	77 707	78 890	79 738
Change in Invested Capital	(5 525)	(15 618)	7 980	(4 738)	(279)	1 183	847
Integrated Gas FCF	12 115	11 960	(7 160)	4 788	334	(710)	395
Upstream	2019	2020	2021	2022	2023	2024	2025
Core Result	4 959	(9 678)	1 930	2 749	2 647	3 014	3 438
Invested Capital	93 881	76 803	81 147	82 568	83 926	85 143	86 456
Change in Invested Capital	(2 865)	(17 078)	4 345	1 421	1 358	1 217	1 313
Upstream FCF	7 824	7 401	(2 415)	1 329	1 289	1 797	2 125
Downstream	2019	2020	2021	2022	2023	2024	2025
Core Result	6 336	(5 510)	1 849	3 728	3 641	3 822	4 040
Invested Capital	93 580	89 641	93 760	98 630	99 266	100 651	102 095
Change in Invested Capital	8 574	(3 939)	4 119	4 870	636	1 385	1 444
Downstream FCF	(2 238)	(1 571)	(2 270)	(1 142)	3 005	2 437	2 596

Integrated Gas Items	2019	2020	2021	2022	2023	2024	2025
<i>Assets</i>							
Operating Core Cash	2 129	2 335	2 294	1 878	1 901	2 082	2 257
Inventories	1 983	2 606	2 515	2 059	2 084	2 283	2 475
Trade and Other Receivables	6 073	7 341	6 537	5 351	5 417	5 933	6 432
Property, Plant and Equipment	73 337	62 930	62 251	61 696	61 134	60 518	59 851
<i>Liabilities</i>							
Trade and Other Payables	4 248	5 892	5 387	4 410	4 464	4 889	5 301
Decommissioning Provisions	8 456	10 303	10 261	10 233	10 207	10 180	10 184
Integrated Gas Core Invested Capital	90 363	74 744	82 724	77 986	77 707	78 890	79 738
Upstream Items	2019	2020	2021	2022	2023	2024	2025
<i>Assets</i>							
Operating Core Cash	2 167	1 802	1 852	1 918	1 896	1 885	1 914
Inventories	501	481	729	755	746	742	753
Trade and Other Receivables	6 181	5 667	5 277	5 466	5 403	5 371	5 453
Property, Plant and Equipment	91 615	78 614	80 425	82 235	84 045	85 856	87 666
<i>Liabilities</i>							
Trade and Other Payables	1 072	1 088	1 561	1 617	1 598	1 588	1 613
Decommissioning Provisions	10 563	12 872	13 257	13 640	14 033	14 442	14 918
Upstream Core Invested Capital	93 881	76 803	81 147	82 568	83 926	85 143	86 456
Downstream Items	2019	2020	2021	2022	2023	2024	2025
<i>Assets</i>							
Operating Core Cash ⁽¹⁾	13 759	8 987	10 820	12 184	11 946	11 995	12 073
Inventories	21 587	16 369	16 226	18 271	17 915	17 987	18 105
Trade and Other Receivables	39 245	28 257	30 834	34 720	34 043	34 180	34 403
Property, Plant and Equipment	55 945	49 634	51 062	52 461	53 833	55 190	56 535
<i>Liabilities</i>							
Trade and Other Payables	46 230	37 001	34 750	39 130	38 366	38 521	38 772
Downstream Core Invested Capital	93 580	89 641	93 760	98 630	99 266	100 651	102 095
Operating Core Invested Capital	277 824	241 188	257 632	259 184	260 899	264 684	268 288
Non-Core Invested Capital	9 063	6 658	7 078	7 258	7 395	7 443	7 166
Net Financial Assets	96 424	89 308	86 218	77 433	61 341	48 135	32 835
Total equity	190 463	158 537	154 294	155 998	157 735	159 790	162 363

Disclosures and Disclaimers

Report Recommendations

Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

This report was prepared by Gonçalo Parreira and Tiago Polónio, Master in Finance students of Nova School of Business and Economics ("Nova SBE"), within the context of the Field Lab – Equity Research.

This report is issued and published exclusively for academic purposes, namely for academic evaluation and master graduation purposes, within the context of said Field Lab – Equity Research. It is not to be construed as an offer or a solicitation of an offer to buy or sell any security or financial instrument.

This report was supervised by a Nova SBE faculty member, acting merely in an academic capacity, who revised the valuation methodology and the financial model.

Given the exclusive academic purpose of the reports produced by Nova SBE students, it is Nova SBE understanding that Nova SBE, the author, the present report and its publishing, are excluded from the persons and activities requiring previous registration from local regulatory authorities. As such, Nova SBE, its faculty and the author of this report have not sought or obtained registration with or certification as financial analyst by any local regulator, in any jurisdiction. In Portugal, neither the author of this report nor his/her academic supervisor is registered with or qualified under COMISSÃO DO MERCADO DE VALORES MOBILIÁRIOS ("CMVM", the Portuguese Securities Market Authority) as a financial analyst. No approval for publication or distribution of this report was required and/or obtained from any local authority, given the exclusive academic nature of the report.

The additional disclaimers also apply:

USA: Pursuant to Section 202 (a) (11) of the Investment Advisers Act of 1940, neither Nova SBE nor the author of this report are to be qualified as an investment adviser and, thus, registration with the Securities and Exchange Commission ("SEC", United States of America's securities market authority) is not necessary. Neither the author nor Nova SBE receive any compensation of any kind for the preparation of the reports.

Germany: Pursuant to §34c of the WpHG (*Wertpapierhandelsgesetz*, i.e., the German Securities Trading Act), this entity is not required to register with or otherwise notify the *Bundesanstalt für Finanzdienstleistungsaufsicht* ("BaFin", the German Federal Financial Supervisory Authority). It should be noted that Nova SBE is a fully-owned state university and there is no relation between the student's equity reports and any fund raising programme.

UK: Pursuant to section 22 of the Financial Services and Markets Act 2000 (the "FSMA"), for an activity to be a regulated activity, it must be carried on "by way of business". All regulated activities are subject to prior authorization by the Financial Conduct Authority ("FCA"). However, this report serves an exclusively academic purpose and, as such, was not prepared by way of business. The author - a Master's student - is the **sole and exclusive responsible** for the information, estimates and forecasts contained herein, and for the opinions expressed, which exclusively reflect his/her own judgment at the date of the report. Nova SBE and its faculty have no single and formal position in relation to the most appropriate valuation method, estimates or projections used in the report and may not be held liable by the author's choice of the latter.

The information contained in this report was compiled by students from public sources believed to be reliable, but Nova SBE, its faculty, or the students make no representation that it is accurate or complete, and accept no liability whatsoever for any direct or indirect loss resulting from the use of this report or of its content.

Students are free to choose the target companies of the reports. Therefore, Nova SBE may start covering and/or suspend the coverage of any listed company, at any time, without prior notice. The students or Nova SBE are not responsible for updating this report, and the opinions and recommendations expressed herein may change without further notice.

The target company or security of this report may be simultaneously covered by more than one student. Because each student is free to choose the valuation method, and make his/her own assumptions and estimates, the resulting projections, price target and recommendations may differ widely, even when referring to the same security. Moreover, changing market conditions and/or changing subjective opinions may lead to significantly different valuation results. Other students' opinions, estimates and recommendations, as well as the advisor and other faculty members' opinions may be inconsistent with the views expressed in this report. Any recipient of this report should understand that statements regarding future prospects and performance are, by nature, subjective, and may be fallible.

This report does not necessarily mention and/or analyze all possible risks arising from the investment in the target company and/or security, namely the possible exchange rate risk resulting from the security being denominated in a currency either than the investor's currency, among many other risks.

The purpose of publishing this report is merely academic and it is not intended for distribution among private investors. The information and opinions expressed in this report are not intended to be available to any person other than Portuguese natural or legal persons or persons domiciled in Portugal. While preparing this report, students did not have in consideration the specific investment objectives, financial situation or

particular needs of any specific person. Investors should seek financial advice regarding the appropriateness of investing in any security, namely in the security covered by this report.

The author hereby certifies that the views expressed in this report accurately reflect his/her personal opinion about the target company and its securities. He/ She has not received or been promised any direct or indirect compensation for expressing the opinions or recommendation included in this report.

[If applicable, it shall be added: *“While preparing the report, the author may have performed an internship (remunerated or not) in [insert the Company’s name]. This Company may have or have had an interest in the covered company or security”* and/ or *“A draft of the reports have been shown to the covered company’s officials (Investors Relations Officer or other), mainly for the purpose of correcting inaccuracies, and later modified, prior to its publication.”*]

The content of each report has been shown or made public to restricted parties prior to its publication in Nova SBE’s website or in Bloomberg Professional, for academic purposes such as its distribution among faculty members for students’ academic evaluation.

Nova SBE is a state-owned university, mainly financed by state subsidies, students tuition fees and companies, through donations, or indirectly by hiring educational programs, among other possibilities. Thus, Nova SBE may have received compensation from the target company during the last 12 months, related to its fundraising programs, or indirectly through the sale of educational, consulting or research services. Nevertheless, no compensation eventually received by Nova SBE is in any way related to or dependent on the opinions expressed in this report. The Nova School of Business and Economics does not deal for or otherwise offer any investment or intermediation services to market counterparties, private or intermediate customers.

This report may not be reproduced, distributed or published, in whole or in part, without the explicit previous consent of its author, unless when used by Nova SBE for academic purposes only. At any time, Nova SBE may decide to suspend this report reproduction or distribution without further notice. Neither this document nor any copy of it may be taken, transmitted or distributed, directly or indirectly, in any country either than Portugal or to any resident outside this country. The dissemination of this document other than in Portugal or to Portuguese citizens is therefore prohibited and unlawful.