

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

EQUITY RESEARCH ON GALP ENERGIA

RISING UP TO THE CHALLENGE
A TURLENT JOURNEY AIMING FOR DECARBONIZATION

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Abstract

This paper is the report of an Equity Research on Galp Energia, SA., a Portuguese Oil and Gas company, that operates in 11 different countries and distributes its products to more than 50 countries.

The company was valuated using the Discounted Cash Flow (DCF) and supported with a Multiples Analysis. Considering the risks in which Galp is exposed, multiple scenarios and sensitivity analyses were performed in order to evaluate how the share price changes with different variables used in the valuation.

Our final recommendation is to **BUY** Galp's stock. According to our DCF valuation, Galp will be traded at €13,15 as of 31st Dec.22, that yields a total investor return of 57% (thereof expected Cash Gain of 3%).

Keywords: Valuation, Finance, Galp Energia, Energy Transition.

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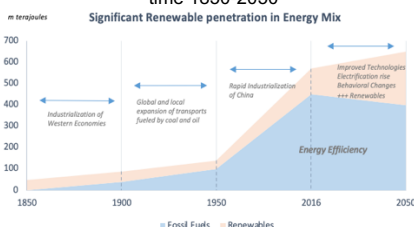
Industry Overview

Figure 1: Projected World Population until 2050



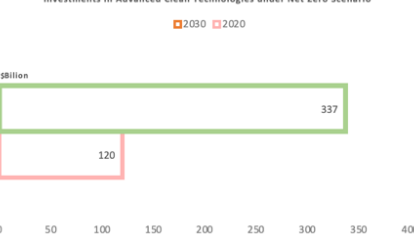
Source: United Nations

Figure 2: Renewables vs fossil fuels demand over time 1850-2050



Source: Our World in Data

Figure 3: Net Zero Investments 2020 vs. 2030



Source: IEA

Figure 4: Share of Electricity and Renewables energies in whole energy mix required under Net Zero (2010-2050)

	2010	Today	2030	2040	2050
Share of electricity TFEC	18%	20%	29%	38%	49%
Renewable energy share in power generation	20%	25%	57%	75%	86%

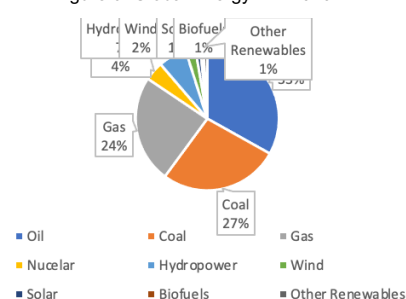
Source: IRENA.2019."Global Energy Transformation: A RoadMap to 2050"

Figure 5: Energy Intensity improvements and TFEC per cap. required under Net Zero (2010-2050)

	2010	Today	2030	2040	2050
Energy Intensity improvement rate (per year)	1%	2%	3%	3%	3%
Total final energy consumption per capita (GJ per cap)	51	53	43	41	38

Source: IRENA.2019."Global Energy Transformation: A RoadMap to 2050"

Figure 6: Global Energy Mix 2020



Source: Our World in Data based on BP Statistical Review of World Energy (2020)

The economic growth is **correlated with the population expansion** that, in turn, dictates the world energy consumption. The energy demand is indeed growing across various worldwide countries, as the population expands and gets richer. By 2050, and despite growing at a slower pace, the world population is expected to **reach 9.7 billion**¹, and that is especially important for the energy market, as the global GDP has been historically linked with increases in the global energy – and fossil fuels - consumption. Given that, meeting future energy demand plus conducting efforts towards the mitigation of an abrupt climate crisis, requires energy efficiency levels to accelerate and grow even faster vs. energy demand. The **Energy Efficiency** is crucial to deal with energy consumption bypassing supply, such that “clean” technological improvements (Figure 3), the growing of renewables (Net Zero (NZ)) requires Renewable energies to represent 86% of global power generation in 2050 vs. today’s 25%, with annual Solar PV additions and Wind projects expected to grow in 360GW/y by 2050 vs. 109GW/y today’s levels and in 240 GW/y by 2050 vs. 54GW/y today’s levels, respectively) (Figure 4), and the rise of electrification (NZ requires Electricity to represent 49% of global TFEC in 2050 vs. today’s 20%) (Figure 4) are critical to support the new energy economy. Having the world changing priorities and governments “running” to disclose adequate efficiency standards (e.g: Within EU, sustainable intermediate targets include a 40% cut in GHG emissions vs. 1990 levels, 32% of renewable energy and a 32,5% boost in energy efficiency by 2030) the Net Zero scenario could verify, having the global energy intensity improvement rate expectedly equaling 3,2% p.a. (2016-2050) vs. 1,2% p.a. (2000-2010) and the global TFEC 41GJ per cap (2016-2050) vs. 51GJ per cap. (2000-2010)- Figure 5.

Market Outlook: Upstream & Downstream Outlook

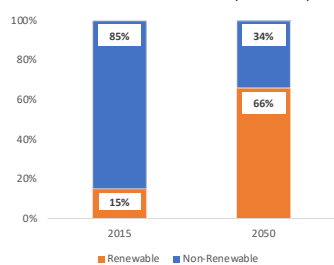
Energy demand Growth

As mentioned, the increased electrification within the whole energy mix, renewable energies and energy efficiency remain **at the hearth** of the pathway to net zero and climate objectives. Based on the current policies the total primary energy demand is expected to increase in 40% to 2050², such that the 1,5°C fulfilment requires the energy efficiency levels to reduce the primary energy supply below 2015 levels, that means to double globally, and renewables to represent more than **2/3 of total energy supply** by 2040. With this, the Global oil demand should **peak** by the **middle of the decade**, while having the world breaking down on fossil fuels and **shifting** to cleaner energies, mostly in

¹ United Nations. 2019. <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>

² IEA; 2021. "World Energy Outlook". <https://fortune.com/2021/10/13/oil-demand-peak-2025-world-invest-trillions-renewables-ia-world-energy-outlook/> & IRENA.2019. "Global Energy Transformation: A RoadMap to 2050". https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Apr/IRENA_Global_Energy_Transformation_2019.pdf

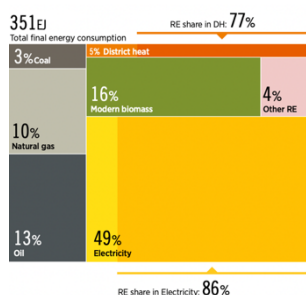
Figure 7: Total Energy Supply required under Sustainable Scenario (net zero)



Source: IEA; "Global Energy Transformation: A RoadMap to 2050"

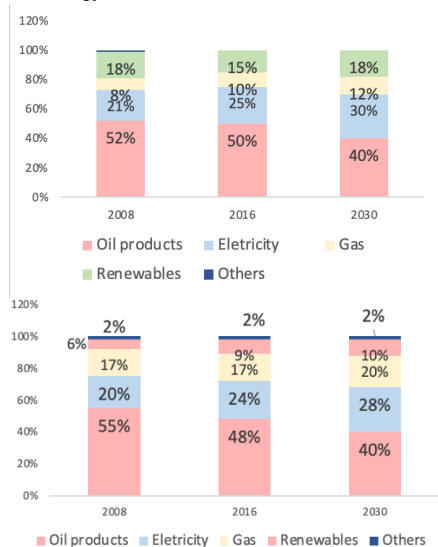
Figure 8: Passenger on electric cars and oil demand evolution required under NetZero

	2010 Today	2030	2040	2050	
Passenger electric cars on the road (in mn)	<0,5	6	157	745	1166
Oil Demand (mblbp/d)	87	95	60	41	22



Source: IEA; "Global Energy Transformation: A RoadMap to 2050"

Figures 10 & 11: Portugal and Spain: Evolution of the energy mix



Source: integrated National Energy - Climate Plan for 2021-2030

transport and industry (oil demand 95mboe p/d today vs. 41mboe p/d in 2040 and passenger electric cars to grow from today's 6mn to 157mn in 2030 and 1.166mn by 2050).

In Europe, the targets for the reduction of the CO2 emissions (less 40% by 2030 vs. 1990 levels) **require all CO2 emitting sectors** (with a special emphasis on energy sector) to make several improvements on the carbon footprint of their operations. Galp has competitive positions **mostly in Portugal and Spain**, countries committed to Net Zero, as well. Spain has committed to reduce emissions **by 20%** and Portugal by **20%-35% by 2030 vs. 1990 levels**³. The energy sector has the greatest carbon footprint, and the Net Zero scenario requires **the Iberian countries to reduce significantly the portion of oil products from their whole energy mix, already by 2030** (at least in -11% vs. 2016 levels)³. As such, Galp should expect **losses from oil demand drops**

following the Iberian governments efforts towards a significant replacement of fossil fuels for low-carbon alternatives. By 2030, the Iberian Governments pretends to double the proportion of renewable sources in the total energy consumption to 35%-42%³. Given that, Galp must start (as it seems it is) to **reshape its strategy** and adapt to the new energy consumption trends that demands biofuels, **greater electricity weights, and hydrogen energy sources** – Iberian's preferable sources to fuel transportation sector by 2040. While having the weight of electricity boosting until 2030 within the whole energy mix (+2% in Spain and +5% in Portugal)³, Galp could stay in an **advantageous position**, as this will encourage a greater dependence on renewable energies for electricity formation, a sector where the company is **already leading within Iberia**, through Solar power generation. With the recent Solar PV ACS transaction, Galp has secured a total gross renewable installed capacity of 2,9GW, to be operational in Iberia by 2024. By 2025, we estimate Galp to increase its total gross Iberian renewable installed capacity up to 4,11 GW (4,1GW Solar PV plus 0,012GW Wind), of which 3,3GW are targeted to be operational in Spain. With this, Galp has disclosed that it becomes the largest Iberian Solar PV player, with Repsol – most direct Solar PV Iberian competitor – disclosing a target renewable capacity of 3GW only to be operational in Spain by 2025. Oppositely, BP has recently acquired 14 solar plants in Spain (1,06GW) to be operational up to 2025 while EDP is targeting a Solar PV installed capacity of 2,4GW only in Europe 21-25F.

Galp: Strategy refreshment

³ CaixaBank: 2019. "The new Energy Mix in the Iberian Peninsula: The Fight Against Global Warming". <https://www.caixabankresearch.com/en/economics-markets/commodities/new-energy-mix-iberian-peninsula-fight-against-global-warming>

At this stage, we recognize Galp's efforts being focused mostly on the **scalation of the Renewables segment**, and on the development of **differentiated and refreshed energies** to accelerate the fulfilment of the **decarbonization** priorities. The company is focused on keep delivering growth, but mostly, on the possibility of linking it with the desire of presenting a **carbon neutral business** by 2050.

Decarbonization Path/ Energy Transition

Having the decarbonization of the business as its main priority, Galp has already **sustainable targets** to be achieved by the end of 2030: **(I)** Reduction of absolute emissions from operations by 40% (scope 1&2); **(II)** Decrease of the Carbon Intensity Index, both in production and sales sides, by 40% and by 20%, respectively (scope 1, 2 & 3). By 2050, Galp pretends to achieve **Net Zero GHG** emissions. Nonetheless, additional visibility on Galp's energy transition strategy is still welcomed, as the company **did not present concrete low-carbon actions** for the different units, neither further intermediate targets until 2030 nor 2050 – in line with what **peers have done**. As such we do not know if Galp's carbon intensity targets are to be achieved through targeted renewable generation only.

Figure 12: Galp's targets and measures on emissions reductions

Measure	Scope
% reduction of Carbon Intensity, production-approach	(a) 1+2+3
% reduction of Carbon Intensity, downstream sales-approach	(b) 1+2+3
% Absolute Emissions reduction	(c) 1+2

Time horizon for emissions reduction			
2025	2030	2040	Net Zero
(a) -	-40%	-	2050
(b) -	-20%	-	2050
(c) -	-40%	-	2050

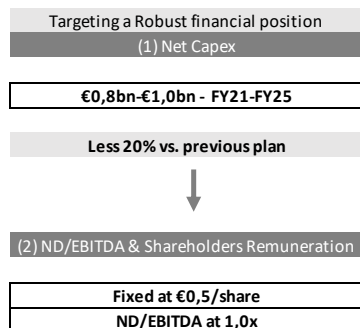
Source: Company's report

Further commitments on low-carbon projects beyond renewables will be key to support Galp's decarbonisation path.

Robust Financial Framework & Dividend Policy

Galp is focused on having a clear capital allocation framework with a resilient financial position, being targeting a Net Debt over EBITDA ratio of 1,0x FY21-FY25. As such, the company's Capex investment plans were reduced in 20% vs. previous plan, currently with a maximum ceiling of €0,8-€1,0bn p.a., and with 50% of which to be invested to energy transition projects post 2020. In fact, the optimization of assets utilization rates (e.g: increased refinery and cogeneration plants utilization rates to 90% vs. 4Y historical 83% and to 88% vs. historical 82% respectively) then translated in greater operational efficiencies, ended up resulting in significant savings on Capex, allowing Galp to be targeting an above average shareholder's remuneration with a base dividend of €0,50/share (21-25F).

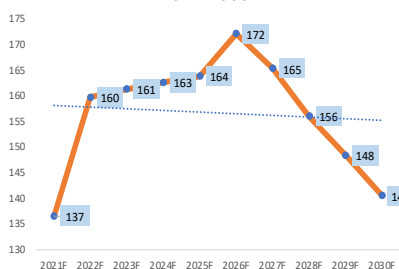
Figure 13: Galp's updated financial Framework



Source: Company's report

The decarbonisation of the business requires Galp to exploit new energy opportunities.

Figure 14: Upstream Average WIP consolidated 2021-2030



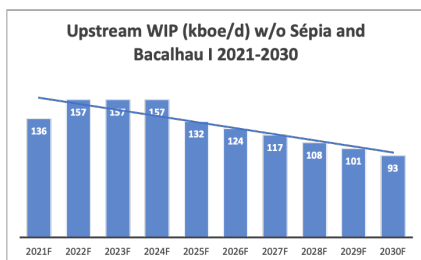
Source: Own estimates

Competitive Positioning

Swot Analysis: The year of 2022 could mark the beginning of a new energy economy and era for the O&G sector, considering the increased society pressures for a "greener" recovery. The current times will be a test of endurance for many O&G companies, and the Upstream and Downstream idiosyncrasies will shape Galp's future positioning and stock price performance within the industry.

Strengths: **(I) Upstream solid production growth** and **resilient FCF** generation at least for the coming years (but a word of caution for long-term). Despite having the operational issues brought by the pandemic remaining a headwind, Galp's

Figure 15: Average WIP kboe/d w/o Sépia and Bacalhau contribution



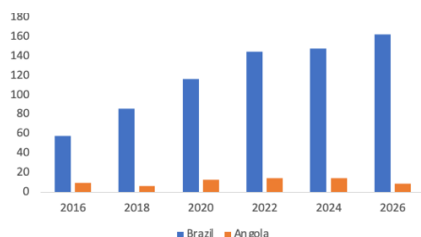
Source: Own estimates & Company's report

Figure 16: Galp and peers Upstream production and breakeven target 21-25F

Company	Upstream Production target 21-25	Barrels Breakeven
Galp	> c. 750 kboep/d	\$25 bbl
Repsol	c. 650kboep/d	\$40 bbl
BP	c. 600 kboep/d	\$35 bbl
OMV	c. 450-500 kboep/d	\$25 bbl
EXXON	< c. 750 kboep/d	\$35 bbl

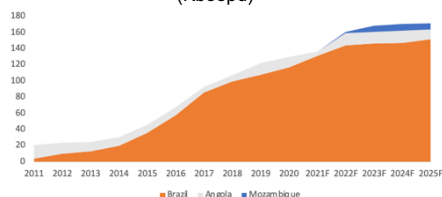
Source: Company's report

Figure 17: WIP Brazil vs. Angola (in %) 2021-2030



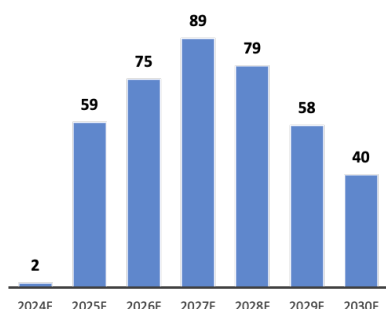
Source: Own estimates & Company's report

Figure 18: WI Production Curve by region (Kboepd)



Source: Own estimates & Company's report

Figure 19: Bacalhau's Project FCF (€mn)

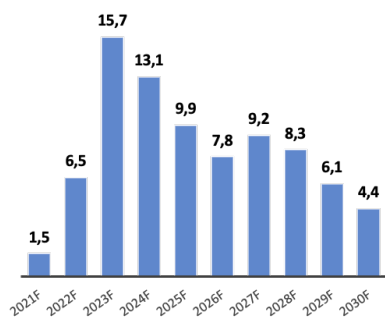


Source: Own estimates

upstream production is still expected to deliver a **CAGR 2019-2025 of 5%**. While having the group benefiting from **improvements** in the pandemic situation within Brazil, we have forecasted a level of WIP of 137kboepd for 2021 and an eye-catching 160kboepd for 2022. Moreover, Galp is targeting ~25% production growth to 2025 – and with this, a solid average upstream FCF around **€500mFY21-25** – that may even seem **too conservative** given the target's pipeline of new projects and the normalization of operations in Brazil post pandemic (**allowing faster ramp-ups in lara and start of Bacalhau I**). Nonetheless, Galp's future above-average Upstream growth (Figure 16) is **dependent on the ramp-up of Galp's already sanctioned projects**, (lara's), Sépia's and Bacalhau's contribution and the start of Coral FLNG in Mozambique, as well, as Tupi/Iracema project will initiate the declining phase soon in 2024, further threatening the future Upstream CF generation – **Galp's segment main historical CF contributor**. Galp's FCF expected to fall to €1940mn vs. €2310mn w/o Bacalhau and Sépia. Galp's commercial segment should remain resilient and contribute for a solid future production growth, following Galp's intentions of being a **leading commercial player** within the Iberian market through increases on the number of service stations, namely electric vehicle charging points, as well as on the sales of electricity and NG to end customers, by exploring differentiated supply basket offers. Overall, FY21-25F, we estimate Galp to be delivering an average **FCF of €370m vs an average of €220m FY15-20. (II) High quality upstream portfolio and High Margin barrels** due to the below average production costs and breakeven in the pre-salt Brazil vs. peers. In Brazil, Galp has a strong pipeline of low-cost assets with an average breakeven of **\$25/bbl vs. peers range \$30-\$40/bbl** (Figure 16).

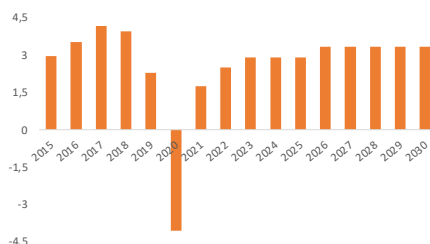
Weaknesses: (I) Significant lack of Upstream geographical diversification, as Brazil accounts for **~90%** of the total Upstream production. The Upstream average CFFO has been accounting for more than 50% of Galp's consolidated CFFO, (**90% of which are Brazilian**). Given that, any disruption within Galp's Brazilian assets massively impact the company's overall CFFO and the overall operating business, as well. The year of 2020 was a clear example of that, with the Brazilian offshore operations being one of the most affected by the pandemic context, – suffering from logistical and technical issues, labor crew changes, personnel, and restrictions on activities (delays on maintenance operations) – and that made Galp to **lose its (+10%) production guidance** for 2020 (equaled 7%) and 2021 (5%), and consequently to report a negative EBIT and net income FY20, with significant drops over the company's DPS and dividend yield (4,7% FY19 vs. 4% FY20), as well. In fact, Galp's differentiated Upstream growth story vs. peers, has been mostly fueled by its exposures to pre-salt low-breakeven Brazilian assets, and that even made the company's stock to trade at premium

Figure 20: S epia's Project FCF ( mn)



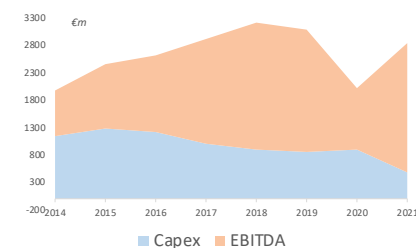
Source: Own estimates

Figure 21: Galp's refining margins (Eur/bbl)



Source: Own estimates & Company's report

Figure 22: Galp's historical CAPEX vs. EBITDA levels 2014-2021



Source: Own estimates & Company's report

vs. sector for a part of the last decade. Nonetheless, Galp's next growth leg is dependent on **further developments** on the company's assets in Brazil. With some FPSOs starting its declining phase in Tupi/Iracema and Angola, Galp's upstream production is expected to peak, approximately, in 2022-2024 until Bacalhau comes online in the middle of the decade. Besides Brazil, Galp has an Upstream presence in Angola (~10%) but already in decline. **(II)** Galp is a **non-operator** within its Upstream portfolio, which implies the **timings of the projects** and **output deliveries** to be something the company cannot control and that could affect refining activities and commercial sales. **(III)** **Lack of clear long-term carbon emissions cut targets**, as we believe that Galp's peers have been adding more visibility on their pathway to net zero, while presenting further relevant intermediate targets until 2050 and on all the 3 emission scopes. Up to now, Galp has disclosed **one** intermediate target only on its carbon emissions until 2050, but it does not account for the **3rd emissions** scope – responsible for 90% of total emissions –, possibly enhancing investors' difficulties on **being convinced** on the merits of Galp's energy transition strategy.

Opportunities: (I) Galp's **realized production efficiency gains** and **greater cost savings in Brazil**, hence lower barrels breakeven vs. peers following latest technological improvements and lower lifting costs achieved by Petrobras – targeted at **\$2,5/bbl vs historical \$8/bbl**. **(II)** Thanks to a greater level of **efficiency driven by superior refining assets' utilization rates**, Galp's **M/T refining margins will benefit** (average of \$3,4/bbl 2021-2030 vs. \$2,7/bbl 2011-2020). Also, the decision to close Matosinhos and the concentration of all refining activities in Sines enhances **the opportunity for fixed-costs dilution** hence average costs reductions. **(III)** Moreover, the closing of Matosinhos refinery (**~90m savings**) gives the company a **comfortable financial pillow** to be reinvested in energy transition mechanisms to improve the Sines' plant resilience towards the desired **decarbonization path**, potentially adapting it to the production of valued lower carbon – hence less carbon priced – alternatives such as biofuels and lithium batteries (higher margins vs. traditional petroleum products). Until 2030, Galp aims to **transform its Sines plant in a green energy hub**, focused on reducing its absolute emissions in 50%. The latter may be advantageous first, to **differentiate** Galp vs. peers within the low-carbon space, and secondly in **convincing investors** on the merits of the company's Energy Transition strategy and **resilience towards the exploration** of diversified businesses, other than the currently threatened Upstream. **(IV)** **Flexibility to content capex**: Galp's operational results have not been following capex declining trends (since 2015) emphasizing Galp's operational returns **non entirely dependence** on the company's ability to execute new investments, but rather more on its ability to **adequately rotate assets and explore operational**

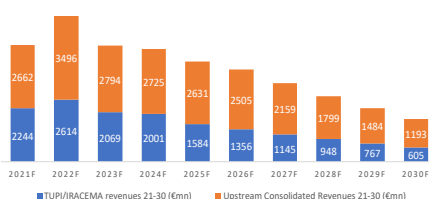
efficiencies. As such, in years where Galp could be facing financial distress, difficulties in sourcing new debt, or attempting to content its ND/EBITDA ratio, the company may evaluate whether capex could be even more rationally contained, without necessarily fearing of affecting the company’s operational results directly.

Threats/Investment Risks: (I) Market Risks: Oil price movements and refining margins fluctuations, that are influenced by **non-predictable scenarios** such as oil products supply/demand imbalances – following COP26, with either oil demand or supply peaking first, as evaluated within our scenario analysis –, disruptions in refinery capacity, weather disruptions and/or political instabilities.

(II) A significant share of Galp’s revenues come from countries with high economic and political risks (Lula/Iracema in Brazil – historically accounting for ~50% of Upstream revenues, (Figure 23), Angolan and Mozambique fields (+€1,07/sh)) and that could affect Galp’s ability to develop the current and planned production in a safe, reliable, and cost-effective way;

(III) Sub-optimal early-stage reservoirs characteristics, drilling and production risks, including unpredictable weather conditions, that could disrupt Upstream’s future production **guidance and growth** – that is Galp’s **main FCF** contributor; **(IV) The global Net Nero targets to be achieved by 2050 may put new oil supply at risk** as the 1,5°C scenario disclosed by IEA, shows the required cut on oil production (mboep/d) to be already below the estimates of the supply from the existing BP and Rystad wells – that **limits or destroys** Galp’s incentives to further explore and sanction new oil fields, further threatening the Upstream business and overall **CF generation.** Upstream CFFO averaged €550mn 2016-2020, expected to increase to €630mn 2021-2030 (~50% of consolidated CFFO), a huge financial pillow that Galp could end up losing, if Upstream business come to an end without being replaced by an equally profitable business. Additionally, challenging stakeholders’ pressures could emerge, given that large dividend payments and FCF have been mostly driven by **hydrocarbons** (Oil products).

Figure 23: TUPI/IRACEMA revenues in Upstream consolidated revenues



Source: Own estimates

Figures 24: Upstream projects characteristics

Analysis and Forecasts

Upstream: Galp has an enviable Upstream portfolio thanks to its exposures to the Santos Basin, offshore Brazil - where some of the highest-quality and lowest-breakeven barrels in the world are produced. Additionally, Galp is present in Angola through Blocks 14, 14k, and 32, and more recently in Mozambique through the world scale Rovuma LNG project (10% stake). Historically, Brazil has been Galp’s equity growth sponsor, mostly thanks to an impressive WIP ramp-up over the last years, especially in Tupi/Iracema, along with important operational improvements, decreasing ramp-ups and lifting costs, and that have positively impacted Galp’s barrels’ breakeven, hence its competitiveness vs. peers. In

Upstream - Units in Production in BM-S-11					
		Location	Start of production	Oil Capacity	Gas Capacity
FPSO #1	Cidade de Angra dos Reis	Tupi Pilot	October/2010	100 kbpd	5 mm³/d
FPSO #2	Cidade de Paraty	Tupi Northeast	June/2015	120 kbpd	5 mm³/d
FPSO #3	Cidade de Mangaratiba	Iracema South	October/2014	150 kbpd	8 mm³/d
FPSO #4	Cidade de Itaguaí	Iracema North	November/2015	150 kbpd	8 mm³/d
FPSO #5	Cidade de Maricá	Tupi Alto	February/2016	150 kbpd	6 mm³/d
FPSO #6	Cidade de Saquarema	Tupi Central	July/2016	150 kbpd	6 mm³/d
FPSO #7	P-68	Tupi South	May/2017	150 kbpd	6 mm³/d
FPSO #8	P-69	Tupi Ext. South	October/2018	150 kbpd	6 mm³/d
FPSO #9	P-67	Tupi North	February/2019	150 kbpd	6 mm³/d

Block BM-S-11	
Peak of Production	2022-2024
Last Year of Production	2045
Galp Stake	9,40%
Area	2,297 km²
Water Dept	2000-2500 meters
Type	Ultra-Deep Waters
Phase	Production

Upstream - Units in Production of Block BM-S-11A					
		Location	Start of production	Oil Capacity	Gas Capacity
FPSO #1	P-68	Berbigão/Sunuru	November/2019	150 kbpd	6 mm³/d
FPSO #2	P-70	Atapu	June/2020	150 kbpd	6 mm³/d

Block BM-S-11A	
Peak of Production	2023-2025
Last Year of Production	2047
Galp Stake	5,00%
Area	2,297 km²
Water Dept	2000-2500 meters
Type	Ultra-Deep Waters
Phase	Production

Upstream - Units in Production of Block BM-S-24				
FPSO #1	Location	Start of production	Oil Capacity	Gas Capacity
	Caioaca	Sépia	August/2021	180 kbpd 5 mm ³ /d

Block BM-S-24	
Peak of Production	2024-2026
Last Year of Production	2042
Galp Stake	2,40%
Area	1,394 km ²
Water Dept	2000-2500 meters
Type	Ultra-Deep Waters
Phase	Development

Upstream - Units in Production of Block BM-S-8			
FPSO #1	Location	Start of production	Oil Capacity
	Bacalhau	2024	220 kbpd

Block BM-S-8	
Peak of Production	2026-2028
Last Year of Production	2051
Galp Stake	20,00%
Area	2,297 km ²
Water Dept	2000-2500 meters
Type	Ultra-Deep Waters
Phase	Development

Upstream - Units in Production of Block 32			
FPSO #1	Location	Start of production	Oil Capacity
FPSO #1	Kaombo North	July/2018	125 kbpd
FPSO #2	Kaombo South	April/2019	125 kbpd

Block 32	
Peak of Production	2022-2024
Last Year of Production	2031
Galp Stake	5,00%
Area	5,090 km ²
Water Dept	1400-2000 meters
Type	Ultra-Deep Waters
Phase	Production

Block 14/14k			
Peak of Production	-	-	-
Last Year of Production	2028	2028	2028
Galp Stake	7,00%	7,00%	7,00%
Area	4,091 km ²	700 km ²	700 km ²
Water Dept	200-2000 meters	500-1000 meters	500-1000 meters
Type	Deep Waters	Deep Waters	Deep Waters
Phase	Production	Production	Production

Source: Galp's; Petrobras; Sonangol's reports

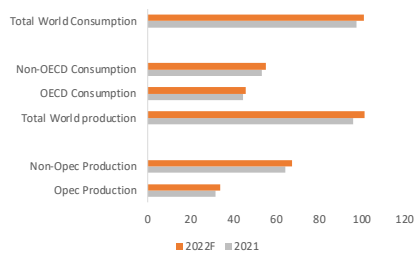
Brazil, there are currently eleven units producing (WIP CAGR19-25 of 5%, and even expected to be reinforced with the start of the Bacalhau I project, in 2024).

Valuation: For the Upstream valuation, it was only considered the **fields in production**, the **sanctioned** and the **pre-sanctioned projects**. For each field, we have forecasted their expected plateau dates, ramp-up periods and last year of production⁴, based on the operators' and Galp's own reports.

Typically, the Upstream production starts with the Ramp-up phase with the first wells delivering their first production. Within our valuation, it was assumed all Brazilian Ramp-up periods to last 13 months, approximately, in line with the information disclosed by Petrobras (21-25F), that following the new technological and innovation improvements, greater well productivity and drilling efficiency, it is targeting reduced ramp-up periods of **13 months**, and that we assumed in lara, Sépia and Bacalhau projects, as well. In the case of Block 32 in Angola, a ramp-up period of **24 months** was rather considered, considering Sonangol's forecasts on the Angolan fields future production levels. Furthermore, we assumed **equal plateau-phases (3 years)** for all the different projects. After plateaus are reached, we assumed the projects' annual production levels to **decline slightly over time, until the last year of production**⁵. In our DCF approach, we started by computing each project annual NOPLAT, in turn, driven by the annual **WI production** – influenced by each project's remaining reserves –, **Brent prices and production costs**.

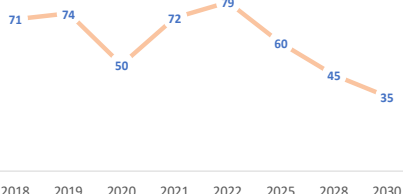
Brent oil prices depend on **exogenous variables**, and more specifically on the interaction between the oil supply and demand in the international markets. For 2021 and 2022 and due to a **positive recovery on the demand** for crude oil – once Covid-19 vaccines accelerate – IEA forecasts a brent price of **\$71,5/bbl and \$79,4/bbl respectively** (vs. \$50/bbl in 2020), and that we believe to be mostly driven not only by still existing failures on the oil supply-side that the corona crisis imposes – supply still not expected to cover the total global oil demand for the year (expected at 96,4mboep/d vs. 97,38mboep/d respectively), but also by the global natural gas shortages/increased prices that made the crude oil cheaper vs. NG, hence the global economies to be **relying on this alternative energy source** for power generation, and that, in turn, has increased its demand and final prices. For the 4Q2021, IEA expects oil prices to reach an average \$81/bbl. Nonetheless, FY22 IEA expects **Brent prices to decline** from

Figure 25: Crude oil Production vs. Consumption 2021-2022 (in mboep/d)



Source: Statista

Figure 26: Brent Price projections (\$/bbl)

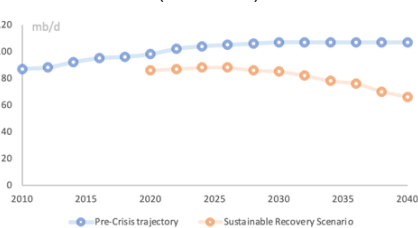


Source: IEA's NZE & Wood Mackenzie

⁴ Source: <https://app.powerbi.com/view?r=eyJrIjoib2VmNzI1MzQNTY1NC00ZGVhLTk5N2ItNzBkMDNhY2IxZTlxliwidCI6IjQ0OTImNGZmLTlQYTlYNGI0M1iN2VmLTExNGFmY2FKYzIxMyJ9>

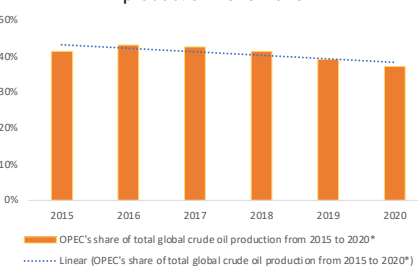
⁵ The projects' declining phases and last year of production was estimated based on Petrobras previous completed Upstream projects, and that we noticed have followed similar patterns. After Plateau-Phases are completed, Upstream projects annual production levels tend to decline slightly throughout time until remaining reserves are finally recovered.

Figure 27: IEA's Global Oil Demand by Scenario (2010-2040)



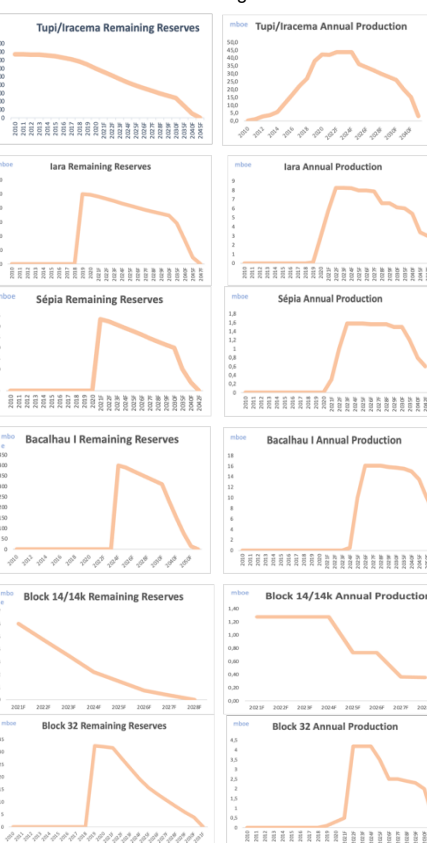
Source: IEA

Figure 28: OPEC's share of total global crude oil production 2015-2020



Source: Statista

Figures 29: Upstream projects annual production & annual remaining reserves



Source: Galp's, Petrobras' and Sonangol's reports

those current levels, to an annual average of \$79/bbl⁶ as it is not only expected the OPEC+, non-OPEC countries and U.S. tight oil production growth, to finally **bypass** the expected growth in the global oil demand (total global oil production expected at 101,45mboep/d vs. 101,01mboep/d total global oil demand), but also the consumers to **start moving** into low-carbon alternatives, (e.g: electric cars), reducing their dependence and demand of fossil fuels, and that as a consequence drives brent prices down. Afterwards, we based our model on the IEA's sustainable scenario – most likely one following latest COP26 remarks. In general terms, under the sustainable scenario, O&G demand is expected to **peak by the middle of the decade in 2025** (Figure 27), in line with the Paris Agreement, and that made us to revise our Brent price assumptions downwards to 2030, to a level of \$35/bbl⁷, having the oil producers adjusting oil prices in response to declining demand – if 2030 targets are to be fulfilled – with **brent prices most likely equaling marginal production costs**.

In terms of the consolidated WI production levels, Galp disclosed that it is forecasting a WIP within the range **125-135 kboep/d FY21**. While considering an **increased number** of upstream maintenance activities – now being catch up by the company once the pandemic restrictions allow for it – and given the new upstream projects and phases advancements, we predicted a level of WIP closer to our target's but **slightly higher to 137kboep/d FY21**. First because Sépia's project has started and delivered its first oil production by mid-August, and second because Berbigão's project reached Plateau. However, FY21, we still preferred **not to predict a higher level of WI** production – following the historical pre-pandemic YoY growth – as Brazil is **still one** of the most affected countries by the current pandemic. Afterwards, we forecasted a solid WI production of 160kboep/d FY22 while having Tupi/Iracema fields (all 9 FPSOs together) **reaching plateaus, Sépia's accelerating its ramping-up, and lara's peaking up on production levels**. Then, with some early-stage Tupi/Iracema fields starting their declining production levels, we assumed an almost flat annual WIP at ~161kboep/d until Bacalhau I comes online in the middle of the decade (The tough pandemic context led the consortium to delay the FID: FID now expected by the end of 2021). We assumed the first oil in Bacalhau to be delivered in 2024, with full contribution expected in 2026. The Blocks 14/14k in Angola are already on the declining phase. As a result, we expect the Angolan annual WI production levels to keep slightly declining until their ultimate year of production.

⁶Yahoo Finance.2021. "IEA hikes 2022 Brent Oil Price Outlook to 79\$ in 2022". <https://finance.yahoo.com/news/iea-hikes-2022-brent-oil-170000865.html>

⁷ IEA's NZE; Wood Mackenzie.2021."What different scenarios tell us about the future of oil and gas"; <https://www.woodmac.com/news/the-edge/what-different-scenarios-tell-us-about-the-future-of-oil-and-gas/>

Brazilian lifting costs targeted at \$2,5/boe FY21-30

Angolan lifting costs targeted at \$7,5/bbl FY21-30

Regarding the **operational costs**, we have treated the **lifting costs** separately from the remaining operational costs, such as **logistical, E&P and labor crew costs**, in both Brazil and Angola. On its last report, Petrobras disclosed the pre-salt lifting costs to present a significant decrease from an average **\$4,3/boe (FY15-19) to an average \$2,5/boe (FY20 and FY21F-25F)**, following the company's recent technological improvements and enhanced operational efficiencies. Considering that, Galp's realized production costs has also benefited, decreasing from \$3,6/boe in 2019 to \$2,3/boe in 2020. On the last CMD, Galp disclosed that FY21-25 it is targeting lifting costs <\$3/boe and that we assumed flat at \$2,5boe, in line with Petrobras prospects, throughout our forecasting period. For the Angolan fields, we consider the **same average lifting costs achieved** in 2020 for blocks 14/14k and 32 of \$7,5/boe (Sonangol's reports) over the forecasting period, as well. Oppositely to Petrobras, Sonangol did not disclose any information **regarding potential strategic objectives** and/or targets for future lifting costs/bbl reductions. Nonetheless, blocks 14/14k are in production since 1999, and we believe that their **advanced state of degradation** – old oil infrastructure – and their high maintenance costs will not allow for any **further decrease** on their lifting costs throughout our forecasting period. Also, we believe that the Angolan fields – already on declining phase – do not justify future eventual technological improvements that **could further reduce the barrels costs and breakeven**.

The projects' annual Capex levels were computed **individually** as we believe that different upstream projects have **different levels of complexity** (i.e +/- deep waters, +/- proven reserves, +/- operating wells needed), hence different needs for Capital Expenditures (explained below).

Lastly, we decided to apply a **discount factor** to all Upstream projects that either has not started yet or that are in early stages of production, (Sépia and Bacalhau I), as Upstream projects have always a certain degree of uncertainty over their true economic value, given the highly possible sub-optimal reservoirs' characteristics in early production stages fields, and that may fully disrupt future Upstream production. Hence, given the **high unpredictability** over the projects' downside risks, we found reasonable to include a discount over these projects' valuation of **40%**, considering recent data on offshore O&G exploration success rates over O&G reserves that are indeed recoverable (Energy Institute, 2021).

Area 4 in Mozambique includes offshore Coral South FLNG and the onshore Rovuma LNG. With the objective of capturing the potential of Rovuma project, we decided to value **GALP's stake on this project's areas separately**, based on **two important and representative 2017 transactions** (explained on Appendix) from two direct peers.

Figure 30: Mozambique Valuation

(2017 transactions)	Peer 1	Peer 2
Area 4 - Mozambique	<i>Area 4</i>	
	Exxon	Total
Asset	Rovuma LNG	Coral South FLNG
Total Capacity (mta)	15,2	12,89
Stake	25%	26,50%
Price paid (\$bn)	2,8	3,9
Exchange rate considered (\$/€)	1,2	1,2
Price per mta (in €m)	614,04	952,19
Galp Stake area 4 (Jointly)	10%	
Galp Project Ownership (in Mta)	1,404	
Galp Stake (€m)	862,1	1336,9
Galp M2 total average value (€m)	1099,5	
Value per share (€/sh)	1,33	
Uncertainty factor/probability of success	50%	
(€/sh)	1,07	
Galp M2 total value (€m) (today's)	885,37	

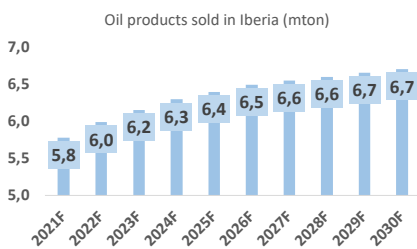
Source: Own estimates

Figure 31: Total Levered EV Upstream unit

€m	As of December 2022
Levered EV Upstream	2330

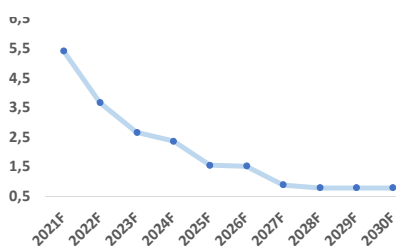
Source: Own estimates

Figure 32: Oil products sold within Iberia - forecasts



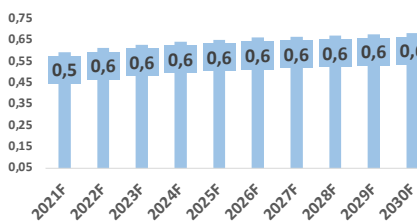
Source: Own estimates

Figure 33: Iberian "average" real GDP Growth



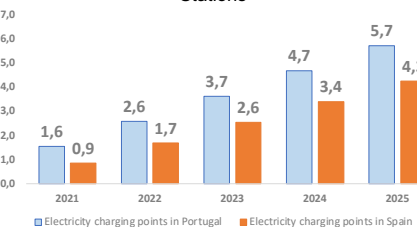
Source: Oxford Economics

Figure 34: Oil Products Sold in Africa



Source: Own estimates

Figure 35: Total Nr. Of points of Sale/Service Stations



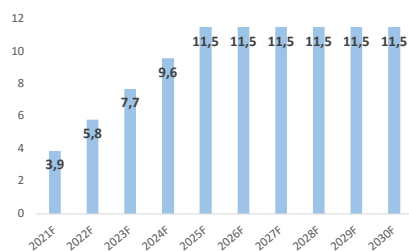
Source: Own estimates

Commercial: The Commercial segment involves the process of delivering oil products, mostly through Galp’s retailing network of **2.000 service stations** and electric charging points spread over Portugal, Spain, and Africa as well as gas, electricity, and other services, to both the wholesale and export markets. For the future, and within the oil products business, Galp pretends to maintain a relevant position within the African markets and to **keep reinforcing its Iberian retail network**. Focused on the embracement of the expected energy transition challenges, **Galp is targeting a c.10k. electricity charging points to be operational within Iberia already by 2025**. Within the G&P business, the company pretends to increase its sales of electricity and NG to end customers by exploring **differentiated supply basket offers**.

Valuation: Within Galp’s commercial segment, we decided to value the petroleum products **separately** from the Natural Gas and Electricity sales, as we consider **different variables to drive both parts’ profitability**.

Regarding the petroleum products, we believe the **Portuguese and the Spanish GDPs** as well as the **number of points of sale/service stations** that Galp operates within Portugal, Spain, and Africa to be the key drivers of the refined products’ part EBITDAs. In what concerns the total number of oil products sold, we decided to **separate and value them by location**, that is Iberia vs Africa. Furthermore, we assumed the number of oil products sold to be driven by the **implicit region real GDP annual growth rate**. In the case of Iberia, we found it reasonable to compute an “Average” Iberian real GDP and consider it as the main driver of the annual number of oil products sold within the region. The “Average” Iberian real GDP was computed as a function of the oil product sales that Galp makes in each Iberian market, that is in Portugal vs. Spain. Oxford economics projects Iberian Real GDP growth rates p.a. to keep declining over time, from 5,42% in 2021 to 0,8% in 2030 (Figure 33), then resulting in a slight growth of the Iberian oil products sales of **CAGR21-30 of 2%**. In Africa, as Galp’s commercial activities occur in 5 different countries, we did not use the African GDP as a future predictor of the future oil sales as we did not consider these countries as representative of the whole continent. Rather, and as we do not expect oil sales to fluctuate a lot in Africa (as Galp is not expected to increase its service stations in the region), we estimated the African oil sales by difference. In different words, given the fact that oil products sales occur mostly within the Iberian market (% of oil sales to Iberian market over the total commercial oil sales has been pretty stable throughout the historical only varying between 89%-93%), and after finding out the total oil sales within Iberia, that, as mentioned previously, are driven by Iberian countries average real GDPs - we computed the total consolidated commercial oil sales, as a proportion of the expected Iberian Market sales, that is, while applying the historical % – Iberian Oil sales vs. Total

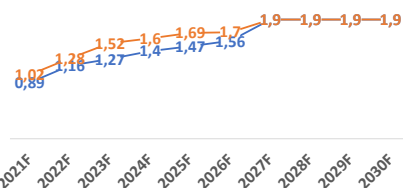
Figure 36: Electricity Charging Points 2021-2025



Source: Company's report

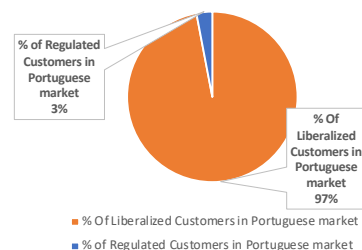
Figure 37: Inflation Rates PT vs. SP

INFLATION RATE PORTUGAL VS. SPAIN % - FORECAST



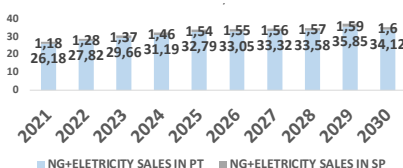
Source: Oxford Economics

Figure 38: Liberalized vs. Regulated customers in PT



Source: Company's report

Figure 39: Share of NG+Electricity sold in PT vs. SP



Source: Own estimates

Figure 40: European 2030 Climate Targets

2030 Climate and Energy Framework - current ambition	
Key targets for 2030:	
> At least 40% cuts in GHG emissions (from 1990 levels)	
> At least 32% share for renewable energy	
> At least 32,5% improvement in energy efficiency	

Source: European Commission

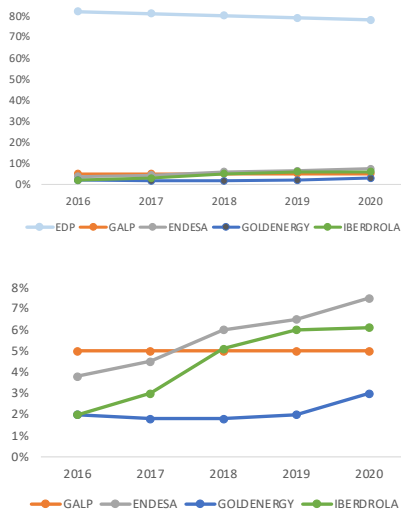
consolidated. Afterwards, African Commercial oil sales were deducted by difference.

Regarding the evolution of the number of points of sale, we believe that Galp is **not expected to increase its service stations in Africa** as the company did not disclose any related strategical information on its last CMD. On the opposite side, the company pretends to consolidate its position within Iberia, mainly through its electric mobility network as it is **targeting a c.10k electric charging points** to be operational by 2025 within the region. Considering Galp's 516 electric charging points in operation in 2020, we conclude that within 2020-2025 the company will invest in ~9,5k more Iberian electric charging points – if its 2025 target is to be fulfilled – that means ~1,9k to be added p.a. within Iberia until 2025. From 2026 onwards, we assumed a **constant number of points of sale within all markets the company operates, as we believe that even Galp lacks visibility on the future energy consumption patterns and consumers behavioral shifts timings**, being then difficult to accurately measure the **required electric charging points to be offered** so as to meet the implied consumers demand by that time, and that will massively depend on the EU commitments **towards Net Zero targets**, hence energy demand (Figure 38).

In what concerns the oil products average selling price, we assumed it to be driven by the **“average” inflation rates** of the locations on which Galp operates, Iberia and Africa, proportional to the sales levels operated in each region.

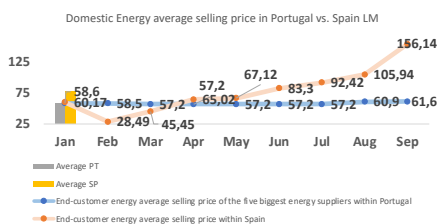
In what concerns the Natural Gas and Electricity sales, we first considered Galp's **exposures in both Spain and Portugal**. Secondly, we considered part of these sales to **be liberalized and part regulated** (Figure 38). On its last report, Galp disclosed that from the total Portuguese market, 97% were liberalized and the remaining regulated, percentages assumed to be maintained throughout our forecasting period. In the case of the Spanish customers, as of its small representativeness, we assumed all of them to be liberalized. Furthermore, we assumed the NG + Electricity Sales (in TWh) in both, Portugal, and Spain to evolve as a function of the respective countries real GDPs growth rates. Additionally, we decided to add a premium of 4%FY21-25 p.a. in line with Galp's disclosed Commercial ambitions of increasing its NG and Electricity sales in ~1,5x vs. 2021 levels. Nonetheless, our estimations FY21-FY25 anticipates the NG+Electricity sales to increase slightly less than Galp's targeted level (i.e: **1,3x 2021-2025 vs. Galp's target 1,5x 2021-2025**), mostly **following the growing pressure from regulators** to increase energy efficiency to reduce the energy consumption per capita (target of -32,5% by 2030 within EU). From 2026 onwards, we assumed the natural gas and electricity sales (in Twh) to grow with the Iberian real GDP growth, only. As such, CAGR21-25 equals 5% and CAGR26-30 equals 1%, following (I) **the deacceleration of the Iberian real**

Figures 41 & 42: PT major energy suppliers in respect to nr. of clients



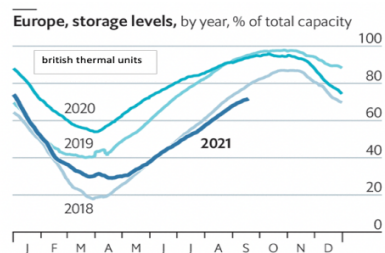
Source: ERSE

Figure 43: Domestic Energy Suppliers Average Selling Prices in PT. vs. SP.



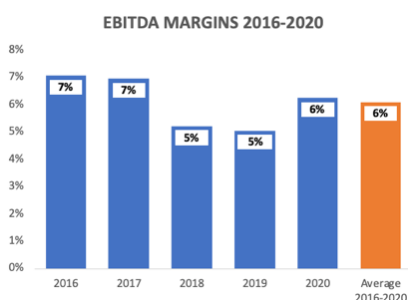
Source: ERSE and OMIE

Figure 44: European Natural Gas storage levels



Source: Economist

Figure 45: Commercial's EBITDA Margins



Source: Company's report

GDP growth and (II) decreases in energy consumption per capita following an improved energy intensity ratio with Iberian governments pressures for greater energy efficiency (Figure 40).

In terms of the energy selling prices, for the liberalized market, we guided ourselves on **ERSE indicators for Portugal and on OMIE for Spain**. FY21 the ASP was €58,4/Mwh for the Portuguese liberalized market, obtained through the average of the monthly average energy selling prices within the liberalized market, charged by the top-5 Portuguese domestic energy suppliers, including Galp (Figure 41 & 42). In the case of Spain, Iberdrola, Gas Natural Fenisa, Endesa and EDP lead the Spanish domestic energy market. As such, considering Galp's energy power marketing segment to operate in perfect competition, hence the company to "respond" as a simple price taker within Spain, FY21 Galp's ASP in the Spanish energy domestic market was assumed to be in line with the domestic energy Average selling price charged in the liberalized market and that equaled €78,2/Mwh, according to OMIE indicators. Afterwards, we assumed the average selling price to be driven by the **Iberian expected inflation rates**, according to Oxford Economics. Oppositely, the regulated business' selling price equals the annual regulated tariff, same as the one considered in the cogeneration business within the R&M unit.

The electricity final prices **have risen significantly** FY21. In the EU, the wholesale electricity price reflects the price of the last unit of energy bought via the auctions held in member states, **that means Natural Gas** – the energy source that is mostly used to generate electricity (rather than coal, more carbon intensive). Natural Gas prices have seen their biggest increase in EU in recent months, and that resulted in higher electricity prices, as well. Weather-related events, with rising climate changes (e.g.: droughts that curtail hydropower output in Brazil and lower than average wind generation in EU), and government policies to scale up clean energies, have been decreasing the incentives for added investments in NG infrastructure. Additionally, Russia has been reducing its exposure to European S/T NG sales without replacing its own NG storage sites in Europe to the historical levels, hence constraining the NG supply and NG storage levels, that consequently resulted in increased NG final prices for Europe. In fact, we expect electricity prices to keep rising within the explicit period, positively impacting Galp's liberalized sales, at the end (I) following the **increased inflations rates** (Figure 37), and (II) the increase in the **government pressures** for a greater electricity weight/demand within the whole energy mix. (III) Also, **NG shortages** are still expected, at least in short-term, as despite we believe new governmental investments on NG infrastructure will be put up front – critical to support Net Zero at least until renewable energy output still lags – these take time to implement, then **keeping NG prices still high**, consequently.

Figure 46: Total Levered EV Commercial

€m	As of December 2022
Commercial	7 105

Source: Own estimates

For the segment's EBITDA, we have computed the Commercial segment's 4Y historical EBITDA margins, very stable over the last years (5%-7%) (Figure 45) and we considered it to be representative of our forecasting period, as well. Considering the **EBITDA margins stability**, we believe that is highly important for **Galp to keep its EBITDA margins stable over time such that any increase in COGS is then traduced in a higher price of the final product.**

Discount Rates

The firm value was determined through **the DCF method**, by discounting the Free Cash Flows at the WACC. The DCF is the most suitable method to use as we assume that Galp will **manage its capital structure to a target level.**

Cost of equity: The cost of equity was determined through the **CAPM Model**. To determine Galp's levered beta, we regressed Galp's stock returns against the **STOXX 600 index**, using weekly data from a relatively short time period, that is the last 2 years, as the Beta is **time-varying and not constant**. Galp's levered beta was determined at 1,38. The **STOXX 600 index**, composed by a considerable number of European companies (600), hence well diversified, was chosen as a **good market proxy**. To determine the levered betas for the different business units, we selected comparable companies so as to obtain the average of their unlevered beta⁸. Then, each unlevered beta was **re-levered**, using Galp's respective **target capital structure**. The unlevered and levered betas estimated are represented in Figure 47. Based on the computed parameters, the estimated cost of equity are shown in Figure 48. **Cost of debt:** To determine Galp's cost of debt – assumed the same for each business unit – we assumed the sum of the risk-free rate plus the spread as a reasonable approach. Galp is not currently rated by rating agencies, such that a **Synthetic Credit Rating** needed to be estimated. In our case, we relied on Galp's comparable companies' ratings, such as OMV, Eni and BP, and we assumed a Credit Rating of A3/A-, resulting in a spread of 1,33%. Afterwards, we estimated Galp's cost of debt of 1,83%. **WACC:** To determine the WACC, the tax rate used was 31,5% and that equals Galps statutory tax rate. For the risk-free rate we use the "normalized" 10-year moving average of the 10-Year German Government Bonds that equalled 0,50%⁹ (on excel), which we believe to be an appropriate comparison period and that could be used as a reasonable proxy for the future. In fact, the corona crisis **has driven the risk-free rates artificially low** (and negative) and that made us to believe the current observable temporary decreases **not to be properly reflecting our investment horizon**. Regarding

Figure 47: Galp and businesses units unlevered and levered betas

	β unlevered	β levered
GALP & Others	0,76	1,38
Upstream	0,75	1,05
Refining and Midstream	0,82	1,17
Commercial	0,62	0,86
Renewables	0,56	0,76

Source: Own estimates

Figure 48: Galp and businesses units Cost of Equity

	Cost of Equity
GALP & Others	8,8%
Upstream	6,8%
Refining and Midstream	7,5%
Commercial	5,7%
Renewables	5,0%

Source: Own estimates

Figure 49: Galp and businesses units WACCs

	WACC
GALP & Others	6,0%
Upstream	10,0%
Refining and Midstream	5,2%
Commercial	4,0%
Renewables	3,6%

Source: Own estimates

⁸ Source: Bloomberg Values from the year of 2021

⁹ Source: 10 Year German Government Bond Yield – Bloomberg Values

Note: For the Upstream segment, we used the PV10 approach, which is a method of estimating the potential future earnings that an O&G proven deposit and reserves may produce, using a 10% discount rate. Source: <https://www.investopedia.com/terms/p/pv10.asp>

the Market Risk Premium (MRP), we considered it as a given input of 6%. Consequently, the Market Return achieved was of 6,50%, resulting from the sum of the risk-free rate plus the MRP. The target **D/E ratio is expected to keep constant at 58%**, resulting from Galp's Net Debt divided by the Market Capitalization¹⁰. Galp's tax rate, risk-free rate and MRP was assumed to be the same for each business unit. The estimated WACCs are shown in Figure 49.

Sensitivity Analysis

With the purpose of accessing the impact that changes in input variables have on Galp' share price, a Sensitivity Analysis was performed on the **WACC, cost of debt, and perpetual growth**.

Figure 50: Sensitivity analysis on WACCs

	Refining and Midstream		
	β unlevered	WACC	Price
Scenario w/ Orlen	0,77	4,9%	13,87
Scenario Base	0,82	5,2%	13,15
Scenario w/ Grupa Lotos	0,87	5,5%	12,59

	Commercial		
	β unlevered	WACC	Price
Scenario w/ A2A S.p.A.	0,62	4,0%	13,45
Scenario Base	0,62	4,0%	13,15
Scenario w/ Naturgy Energy	0,63	4,1%	12,86

Source: Own estimates

Figure 51: Sensitivity analysis on cost of debt

	Cost of debt	Price
A1/A+	1,57%	13,75
A2/A	1,68%	13,48
Credit Rating A3/A-	1,83%	13,15
Baa2/BBB	2,21%	12,38
Ba1/BB+	2,81%	11,36

Source: Own estimates

Figure 52: Sensitivity analysis on perpetual growth rate

	R&M/Commercial/Others	
	Growth (g)	Price
Scenario w/ Maximum	2,78%	13,73
Scenario Base	2,71%	13,15
Scenario w/ Minimum	2,58%	12,26

Source: Own estimates

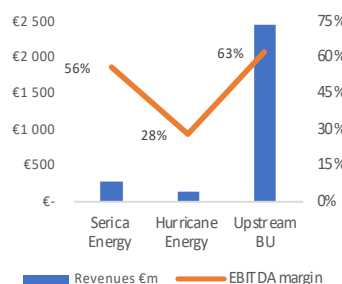
Regarding the WACC, a sensitivity analysis was performed considering the different unlevered betas of the different selected comparable companies (Figure 50). For the R&M business unit, with WACC values ranging from 4,9% and 5,5%, the share price changes between €12,59 and €13,87. For the Commercial, with WACC values ranging from 4,0% and 4,1%, the share price ranges from €12,86 and €13,45 (Figure 50). Therefore, **minimal changes in WACC input variables does not impact Galp's share price significantly**. The cost of debt was determined assuming a Credit Rating of A3/A-, based on Galp's comparable companies' ratings, as explained in the discount rates section. To access how sensible Galp's share price is to different Credit Ratings, a sensitivity analysis was performed. Based on Figure 51, we conclude that **different Credit Ratings does not influence significantly Galp's share price**. Afterwards, we tested how sensitive the share price is to changes in g (driven by higher or lower nominal GDP growths, due to increased globalization/deglobalization and/or changes in inflation rates). The range of possible values for g equals the minimum and maximum expected nominal EU GDP growths between 2030 and 2050, that is 2,58% and 2,78% respectively. Therefore, the share price ranges from €12,26 and €13,73 (Figure 52) and we conclude that relatively **small changes in g does not impact Galp's share price substantially**.

Multiples Valuation

To complement the DCF approach, a **multiples analysis** was developed for each individual business unit. The comparable companies were chosen based on their **own business models and geography** (mainly Europe) of operations. The most appropriate multiples to use in our analysis were the **EV/EBIT, EV/EBITDA, and EV/Sales**. First, and to consider the **high level of capital intensity of the sector**, that makes **depreciations/amortizations true**

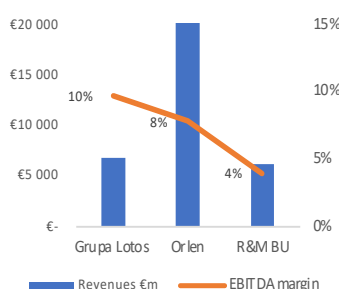
¹⁰ Bloomberg Values from the year of 2021

Figure 53: Upstream Comparable Companies



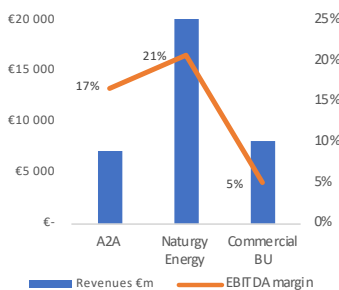
Source: Bloomberg (2019)

Figure 54: R&M Comparable Companies



Source: Bloomberg (2019)

Figure 55: Commercial Comparable Companies



Source: Bloomberg (2019)

Figure 56: Multiples Valuation

Sum of Enterprise Values	17 062
Others DCF Enterprise Values	74
GALP EV	17 136
Value Financial Debt	-2 175
Renewables DCF Enterprise Values (Equity Accounted)	874
Operating Outstanding Leases	183
Value of Equity	15 652
Non Controlling Interests	-884
Shareholder's Equity	14 768
Price per Share	Dec-22
Multiples (€/sh)	17,81

Source: Own estimates

economic costs, the EV/EBIT multiple was used for the Upstream business unit. Secondly, the EV/EBITDA multiple was used for the R&M since its EBIT was negative in 2022, making it not possible to conduct a multiple analysis through the EV/EBIT multiple. Thirdly, to account for the **end-customers sales** amount under the Commercial segment, the multiple EV/Sales was rather chosen.

For the **Upstream business unit**, the comparable companies chosen were Serica Energy PLC and Hurricane Energy PLC, with exploration and extraction of oil and natural gas activities. The average EV/EBIT multiple corresponds to 2.8x, resulting in an Enterprise Value of €6.375mn, in comparison to €2.330mn calculated through the DCF approach. Due to substantial differences in terms of sizes and profitability (Figure 53) and high EV/EBIT multiples vs. comparables, and mostly by the high Upstream EBIT FY22, following the “inflated” Brent price, the DCF approach is undervalued vs. relative valuation, leading to a misleading result. For the **Refining and Midstream segment**, the selected comparable companies were Grupa Lotos SA and Polski Koncern Naftowy Orlen SA, both based in Poland. Considering this, the average multiple reached was 3.9x EV/EBITDA that results in an Enterprise Value of €802mn, in comparison to €4.011mn estimated through the DCF approach. Thus, vs. relative valuation, the R&M’s DCF EV is significantly overvalued, and this can be explained mostly by the lower multiples of R&M segment comparable firm, as well as by the pretty low Galp’s R&M EBITDA FY22, following the weak refining environment imposed by corona crisis. In terms of profitability, the values are relatively identical, although Polski Koncern Naftowy Orlen has a significant larger size (Figure 54). For the **Commercial business unit**, the two comparable companies chosen were A2A S.p.A., and Naturgy Energy Group S.A, both with energy distribution and trading activities. The average EV/Sales multiple reached is 1.6x, which leads to an Enterprise Value of €9.886mn, close to the one forecasted by the DCF approach of €7.105mn. From Figure 55, we notice that ASA and the Commercial unit have similar revenues, but that ASA and Naturgy Energy are substantially higher profitable. For the **Renewables business unit**, it was not feasible to complete a relative valuation since we are referring to a segment that has only started operations recently, making its EBITDA value in 2022 far from representative of the segment’s future value creation. To overcome this difficulty, it was used the Renewables’ EV estimated through the DCF approach only. The same was done for the Others segment. The shareholders’ Equity equals €14.768mn and share price €17,81, that considering a Total Return of 105% results in a **BUY Recommendation**.

GALP ENERGIA

ENERGY

TERESA ROMÃO XAVIER & CAROLINA ROSEIRO

COMPANY REPORT

27 JANUARY 2022

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Rising up to the Challenge

A Turbulent Journey towards Energy Transition

- Energy transition risks poses inevitable trade-offs over Galp's Upstream growth potential, as it limits the incentives to explore new oil fields. Galp estimates Upstream production to grow around 25% to 2025, counting on new exploration successes, in Iara, Sépia and Bacalhau I. However, the company does not provide any projections beyond, **cooling down on its Long-Term Upstream growth prospects, and that is in line with investors' desires for lower environmental risks, hence lower Upstream growth levels.**
- Challenging on-growing stakeholder pressure, given that large FCF and dividend payments have been **mostly driven by hydrocarbons.**
- Refining margins** expected to recover in 2022 (\$3/bbl), despite still below historical averages. We assume a progressive recovery to a normalized \$4/bbl in the L/T, having Galp benefiting from Matosinhos closure (**costs dilution**) plus the likely entrance within production of **lower-carbon and higher margin alternatives** (e.g: advanced biofuels).
- By slowing down Capex (-20% vs. previous plan) **M/T FCF are stronger (€290mn FY21-30F vs. €50mn FY11-20)** even if **Renewables' contribution is not material** (high capex vs. still non-mature revenues) at least until 2030.
- Lack of GHG intermediate targets and decarbonisation levers** vs. peers may threaten Galp's ability to convince investors on the **merits of its energy transition strategy.** Nonetheless, Galp is rapidly **consolidating its solar PV leading position in Iberia**, aiming to reach 4GW & 12 GW of renewable capacity by 2025 and 2030, respectively.

Company description

Galp Energia SGPS SA, a PT integrated multi-energy company, has been developing (I) A fast-growing upstream oil business with exposures in Angola, Mozambique and, more notably, in Brazil, through its key stake over some of the highest quality and lowest breakeven pre-salt reserves, key for sustaining Upstream's Long-Term next growth leg; (II) Key oil refining assets in Portugal; (III) Gas & Power and Marketing activities in Portugal, Spain and Africa, and (IV) more recently a Renewable business.

Recommendation: BUY

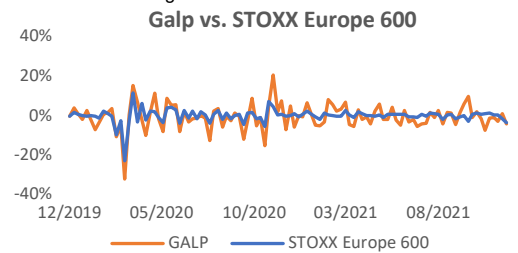
Price Target FY22: 13,15 €

Price (as of 31-Dec-2021) 8,52 €

Reuters: GALP.LS, Bloomberg: GALP: LI

52-week range (€)	8.06-11.00
Market Cap (€m)	7.76B
Outstanding Shares (m)	829
Total Share Return	57%
Expected Cash Gain	3%

Source: Bloomberg



Source: Reuters

(Values in € millions)	2020	2021E	2022F
Revenues	11568	11880	14329
EBITDA IFRS	1113	2352	3143
Net Profit	-533	400	758
EPS	-0,64	0,48	0,91
EBITDA Margin	10%	20%	22%
FCF	593	979	-172
Net Debt/EBITDA	2,06	0,77	0,69
Capex/EBITDA %	81%	20%	22%
Upstream Production (kboe/d)	130	137	160
Renewables installed Capacity (GW - Gross)	0,926	1,41	2,31

Source: Galp annual report and Nova SBE Equity Research

Abbreviations	
bbl	Barrel of Oil
kboe/d	Thousand boe per day
mb/d	Million bbl per Day
boe	Barrel of Oil Equivalent
CMD	Capital Markets Day
mta	Million Tonnes per Annum
WIP	Working Interest Production
FPSO	Floating Production Storage and Offloading
NG/LNG	Natural Gas/Liquefied Natural Gas
O&G	Oil & Gas
GHG	Greenhouse Gas emissions
S/T	Short-Term
L/T	Long-Term
IEA	International Energy Agency

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY MARIA TERESA ROMÃO XAVIER AND CAROLINA DIAMANTINO ROSEIRO, A MASTER IN FINANCE STUDENT 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)

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Figure 1: Projected World Population until 2050

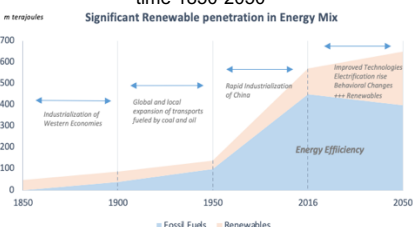


Source: United Nations

Industry Overview

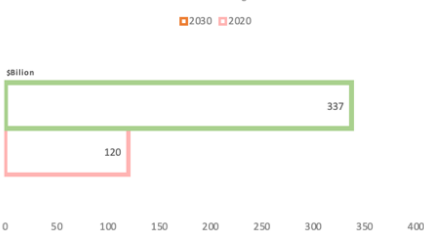
The economic growth is **correlated with the population expansion**, and that, in turn, dictates the world energy consumption. The energy demand is indeed growing across various worldwide countries, as the population expands and gets richer. By 2050, and despite growing at a slower pace, the world population is expected to **reach 9.7 billion**¹, and that is especially important for the energy market, as the global GDP has been historically linked with increases in the global energy – and fossil fuels – consumption. Given that, meeting future energy demand plus conducting efforts towards the mitigation of an abrupt climate crisis, requires energy efficiency levels to accelerate and grow even faster vs. energy demand. The **Energy Efficiency** is crucial to deal with energy consumption bypassing supply, such that “clean” technological improvements (Figure 3), the growing of renewables (Net Zero (NZ) requires Renewable energies to represent 86% of global power generation in 2050 vs. today’s 25%, with annual Solar PV and Wind projects additions expected to grow in 360GW/y by 2050 vs. 109GW/y today’s levels and in 240 GW/y by 2050 vs. 54GW/y today’s levels, respectively) (Figure 4) , and the rise of electrification (NZ requires Electricity to represent 49% of global TFEC in 2050 vs. today’s 20%) (Figure 4) are critical to support the new energy economy. Having the world changing priorities and governments “running” to disclose adequate efficiency standards (e.g.: Within EU, sustainable intermediate targets include a 40% cut in GHG emissions vs. 1990 levels, 32% of renewable energies and a 32,5% boost in energy efficiency by 2030) the Net Zero scenario could verify, having the global energy intensity improvement rate expectedly equaling 3,2% p.a. (2016-2050) vs. 1,2% p.a. (2000-2010) and the global TFEC 41GJ per cap (2016-2050) vs. 51GJ per cap. (2000-2010)- Figure 5.

Figure 2: Renewables vs fossil fuels demand over time 1850-2050



Source: Our World in Data

Figure 3: Net Zero Investments 2020 vs. 2030



Source: IEA

Figure 4: Share of Electricity and Renewables energies in whole energy mix required under Net Zero (2010-2050)

	2010	Today	2030	2040	2050
Share of electricity TFEC	18%	20%	29%	38%	49%
Renewable energy share in power generation	20%	25%	57%	75%	86%

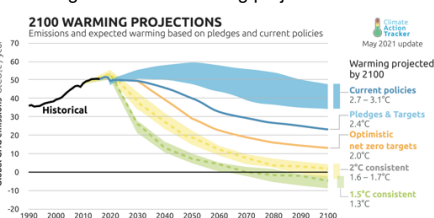
Source: IRENA.2019."Global Energy Transformation: A RoadMap to 2050"

Figure 5: Energy Intensity improvements and TFEC per cap. required under Net Zero (2010-2050)

	2010	Today	2030	2040	2050
Energy Intensity improvement rate (per year)	1%	2%	3%	3%	3%
Total final energy consumption per capita (GJ per cap)	51	53	43	41	38

Source: IRENA.2019."Global Energy Transformation: A RoadMap to 2050"

Figure 6: 2100 warming projections



Source: Climate Action Tracker, May 2021

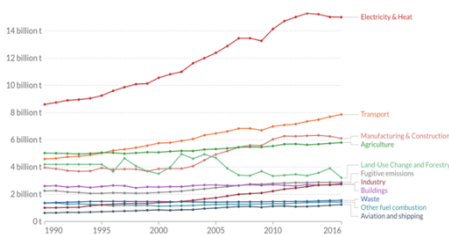
Transformational shift towards a greener future

Materializing Glasgow commitments, then Paris Agreement

The O&G industry is initiating **its path towards a greener future**, as a new energy order urges a **transformational shift**. There is an **increasing pressure** from the various stakeholders, including shareholders, creditors, regulators, and customers towards sustainability concerns, that is pushing companies to reinvent business models and own investment priorities. **Covid-19 Economic Recovery Plans are being implemented by several worldwide governments**, that are making huge efforts towards the opportunity of linking economic recoveries and future growth, together with significant decreases on the global carbon emissions, in line with the consensus achieved on COP26 – that focused on the implementation of the **Paris agreement climate actions**. In 2015, it was agreed

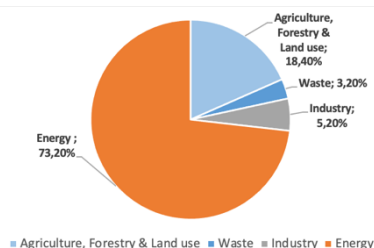
¹ United Nations. 2019. <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>

Figure 7: Global GHG emissions per sector 1990-2016



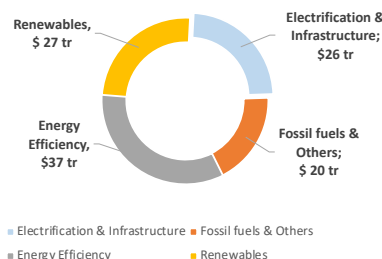
Source: Our World in Data

Figure 8: Global GHG emissions per sector 2020



Source: Our World in Data

Figure 9: NetZero required investments (2016-2050) (\$ trillion)



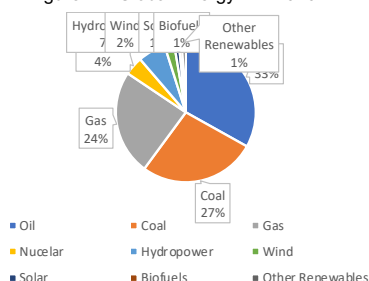
Source: IRENA.2019."Global Energy Transformation: A RoadMap to 2050"

Figure 10: Annual Solar PV/Wind projects required under NetZero Scenario (2010-2050) (in GW per year)

	2010 Today	2030	2040	2050
Annual Solar PV Additions	17	109	300	355
Annual Wind Additions	31	54	200	240

Source: IRENA.2019."Global Energy Transformation: A RoadMap to 2050"

Figure 11: Global Energy Mix 2020



Source: Our World in Data based on BP Statistical Review of World Energy (2020)

by various world leaders that there was an **urgency in limiting the global warming** to well below 2 degrees by 2100, and aiming for 1,5 degrees, an objective that demands the global emissions to reach net zero by 2050. Specialists even argue that the pandemic has just **accelerated the decarbonization of the economy**. Last year, following the US elections and the new Chinese, South Korean and Japanese Net Zero commitments, world economies accounting for **50% of global O&G demand** – including EU and UK – start being somehow committed to Net Zero by 2050. Under the current policies, the global temperature is still expected to increase up to 2,7°C by 2100, and mostly fueled by the energy sector that has been growing its GHG emissions produced (8,60bn ton in 1990 to 15,01bn ton in 2016) (Figure 7) – currently accounting for around 80% of global GHG emissions produced (Figure 8). In fact, the NZ scenario requires Energy-related emissions to fall by 3,5% p.a., and on Glasgow COP26, it was agreed that limiting global warming in 15°C by 2100, would require the commitment of private capital in around \$4trillion to be invested in clean energies p.a. until 2050², more specifically, on energy efficiency initiatives – including efficiency measures to be implemented aiming for improvements and structural changes over overall buildings and factories – Renewables – including investments on renewable technologies for power generation, such as Solar PV, Wind – Figure 10 –, and geothermal projects –, and on the electrification of transportation – including investments in electric vehicle charging points –, and heat. IRENA estimates energy efficiency measures to account for 35% of total NZ investments (c. \$37trillion 2016-2050), investments in electrification and heat to account for 23% (c. \$26trillion 2016-2050) and in Renewables for 24% (c. \$27trillion 2016-2050) hence being the least-costly renewable power source option to be used. (Figure 9)

Market Outlook: Upstream & Downstream Outlook

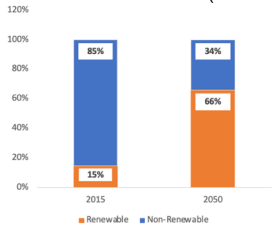
Energy demand Growth

As mentioned, increased electrification within the whole energy mix, renewable energies and energy efficiency remain **at the hearth** of the pathway to net zero and climate objectives. Based on the current policies the total primary energy demand is expected to increase in 40% to 2050³, such that the 1,5°C fulfilment requires the energy efficiency levels to reduce the primary energy supply below 2015 levels, that means to double globally, and renewables to represent more than **2/3 of total energy supply** by 2040³. With this, the Global oil demand should **peak by the middle of the decade**, while having the world breaking down on fossil fuels and **shifting** to cleaner energies, mostly in transport and industry

² Glasgow Financial Alliance for Net Zero. 2021. "Amount of Finance committed to achieving 1,5°C scenario". <https://www.gfanzero.com/press/amount-of-finance-committed-to-achieving-1-5c-now-at-scale-needed-to-deliver-the-transition/>

³ IEA; 2021. "World Energy Outlook". <https://fortune.com/2021/10/13/oil-demand-peak-2025-world-invest-trillions-renewables-ia-world-energy-outlook/> & IRENA.2019. "Global Energy Transformation: A RoadMap to 2050". https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Apr/IRENA_Global_Energy_Transformation_2019.pdf

Figure 12: Total Energy Supply required under Sustainable Scenario (net zero)



Source: IRENA; "Global Energy Transformation: A RoadMap to 2050"

(oil demand 95mboe p/d today vs. 41mboe p/d in 2040 and passenger electric cars to grow from today's 6mn to 157mn in 2030 and to 1.166mn by 2050).

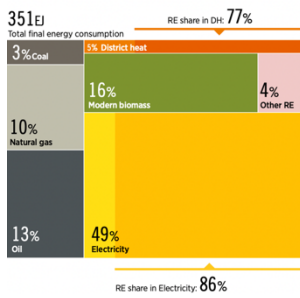
In Europe, the targets for the reduction of the CO2 emissions (less 40% by 2030 vs. 1990 levels) **require all CO2 emitting sectors** (with a special emphasis on energy sector) to make several improvements on the carbon footprint of their operations. Galp has competitive positions **mostly in Portugal and Spain**, countries committed to Net Zero, as well. Spain has committed to reduce emissions **by 20%** and Portugal by **20%-35% by 2030 vs. 1990 levels**⁴. The energy sector has the greatest carbon footprint, and the Net Zero scenario requires **the Iberian countries to reduce significantly the portion of oil products from their whole energy mix, already by 2030** (at least in -11% vs. 2016 levels)⁴. As such, Galp should expect **losses from Oil demand drops** following the Iberian governments efforts towards a significant replacement of fossil fuels for low-carbon alternatives. By 2030, the Iberian Governments pretends to double the proportion of renewable sources in the total energy consumption to 35%-42%⁴. Given that, Galp must start (as it seems it is) to **reshape its strategy** and adapt to the new energy consumption trends that demands biofuels, **greater electricity weights, and hydrogen energy sources** – Iberian's preferable sources to fuel transportation sector by 2040. While having the weight of electricity boosting until 2030 within the whole energy mix (+2% in Spain and +5% in Portugal)⁴, Galp could stay in an **advantageous position**, as this will encourage a greater dependence on renewable energies for electricity formation, a sector where the company is **already leading within Iberia**, through Solar power generation. With the recent Solar PV ACS transaction, Galp has secured a total gross renewable installed capacity of 2,9GW, to be operational in Iberia by 2024. By 2025, we estimate Galp to increase its total gross Iberian renewable installed capacity up to 4,11GW (4,1GW Solar PV plus 0,012GW Wind), of which 3,3GW are targeted to be operational in Spain. With this, Galp has disclosed that it becomes the largest Iberian Solar PV player, with Repsol – most direct Solar PV Iberian competitor – disclosing a target renewable capacity of 3GW only, to be operational in Spain by 2025. Oppositely, BP has recently acquired 14 solar plants in Spain (1,06GW) to be operational up to 2025 while EDP is targeting a Solar PV installed capacity of 2,4GW only, in Europe 21-25F.

Source: IRENA; "Global Energy Transformation: A RoadMap to 2050"

Figure 13: Passenger on electric cars and oil demand evolution required under NetZero Scenario

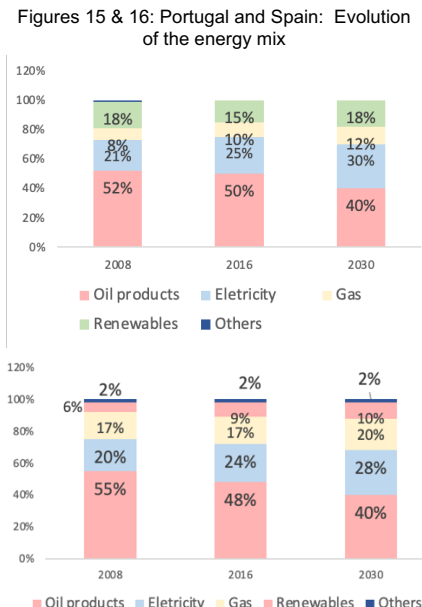
	2010	Today	2030	2040	2050
Passenger electric cars on the road (in mn)	<0,5	6	157	745	1166
Oil Demand (mmbblp/d)	87	95	60	41	22

Figure 14: Global Energy Mix required under NetZero



Source: IRENA; "Global Energy Transformation: A RoadMap to 2050"

Figures 15 & 16: Portugal and Spain: Evolution of the energy mix



Source: integrated National Energy - Climate Plan for 2021-2030

Galp: Strategy refreshment

At this stage, we recognize Galp's efforts being mostly focused on the **scalation of the Renewables segment**, and on the development of **differentiated** and

⁴ CaixaBank. 2019. "The new Energy Mix in the Iberian Peninsula: The Fight Against Global Warming". <https://www.caixabankresearch.com/en/economics-markets/commodities/new-energy-mix-iberian-peninsula-fight-against-global-warming>

refreshed energies to accelerate the fulfilment of the **decarbonization** priorities. The company is focused on keep delivering growth, but mostly, on the possibility of linking it with the desire of presenting a **carbon neutral business** by 2050.

Decarbonization Path/ Energy Transition

Having the decarbonization of the business as its main priority, Galp has already **sustainable targets** to be achieved by the end of 2030: **(I)** Reduction of absolute emissions from operations by 40% (scope 1&2); **(II)** Decrease the Carbon Intensity Index both in production and sales sides, by 40% and by 20%, respectively (scope 1, 2 & 3). By 2050, Galp pretends to achieve **Net Zero GHG** emissions. Nonetheless, additional visibility on Galp’s energy transition strategy is still welcomed as the company **did not present concrete low-carbon actions** for the different units, neither further intermediate targets until 2030 nor 2050 – in line with what **peers have done**. As such, we do not know if Galp’s carbon intensity targets are to be achieved through targeted renewable generation only.

Robust Financial Framework & Dividend Policy

Galp is focused on having a clear capital allocation framework with a resilient financial position, being targeting a Net Debt over EBITDA ratio of 1,0x FY21-25F. As such, the company’s Capex investment plans were reduced in 20% vs. previous plan, currently with a maximum ceiling of €0,8-€1,0bn p.a., and with 50% of which to be invested to energy transition projects post 2020. In fact, the optimization of assets utilization rates (e.g.: increased refinery and cogeneration plants utilization rates to 90% vs. 4Y historical 83% and to 88% vs. historical 82% respectively) then translated in greater operational efficiencies, ended up resulting in significant savings on Capex, then in an target above average shareholder’s remuneration with a base dividend of €0,50/share (21-25F).

Competitive Positioning

Swot Analysis: The year of 2022 could mark the beginning of a new energy economy and era for the O&G sector, considering the increased society pressures for a “greener” recovery. The current times will be a test of endurance for many O&G companies, and the Upstream and Downstream idiosyncrasies will shape Galp’s future positioning and stock price performance within the industry.

Strengths: **(I) Upstream solid production growth** and **resilient FCF** generation at least for the coming years (but a word of caution for long-term). Despite having the operational issues brought by the pandemic remaining a headwind, Galp’s upstream production is still expected to deliver a **CAGR 2019-2025 of 5%**. While having the group benefiting from **improvements** in the pandemic situation within Brazil, we have forecasted a level of WIP of 137kboepd for 2021 and an eye-

Figure 17: Galp’s targets and measures on emissions reductions

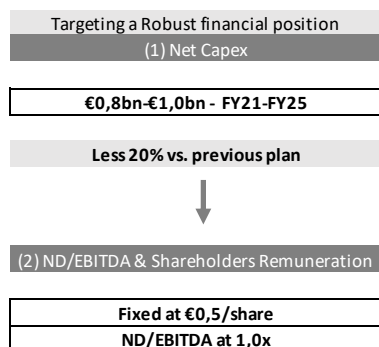
Measure	Scope
% reduction of Carbon Intensity, production-approach	(a) 1+2+3
% reduction of Carbon Intensity, downstream sales-approach	(b) 1+2+3
% Absolute Emissions reduction	(c) 1+2

Time horizon for emissions reduction			
2025	2030	2040	Net Zero
(a) -	-40%	-	2050
(b) -	-20%	-	2050
(c) -	-40%	-	2050

Source: Company’s report

Further commitments on low-carbon projects beyond renewables will be key to support Galp’s decarbonisation path.

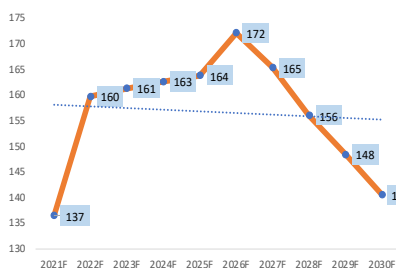
Figure 18: Galp’s updated financial Framework



Source: Company’s report

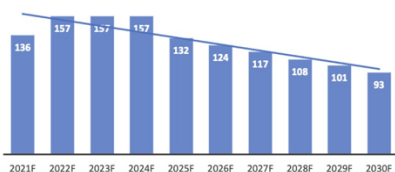
The decarbonisation of the business requires Galp to exploit new energy opportunities.

Figure 19: Upstream Average WIP consolidated 2021-2030



Source: Own estimates

Figure 20: Average WIP kboe/d w/o Sépia and Bacalhau contribution



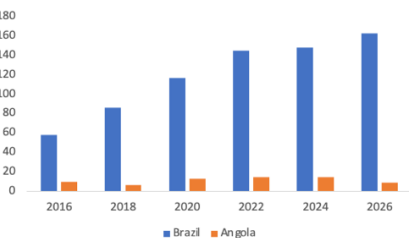
Source: Own estimates & Company's report

Figure 21: Galp and peers Upstream production and breakeven target 21-25F

Company	Upstream Production target 21-25	Barrels Breakeven
Galp	> c. 750 kboep/d	\$25 bbl
Repsol	c. 650kboep/d	\$40 bbl
BP	c. 600 kboep/d	\$35 bbl
OMV	c. 450-500 kboep/d	\$25 bbl
EXXON	< c. 750 kboep/d	\$35 bbl

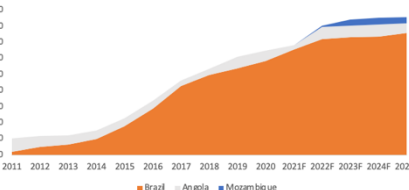
Source: Companies' report

Figure 22: WIP Brazil vs. Angola (in %) 2021-2030



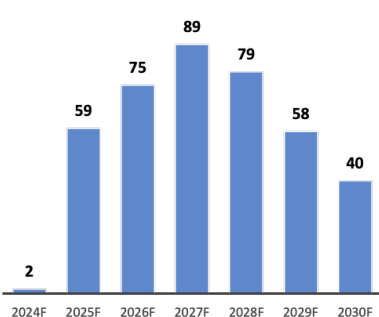
Source: Own estimates & Company's report

Figure 23: Working Interest Production Curve by region (Kboepd)



Source: Own estimates & Company's report

Figure 24: Bacalhau's Project FCF

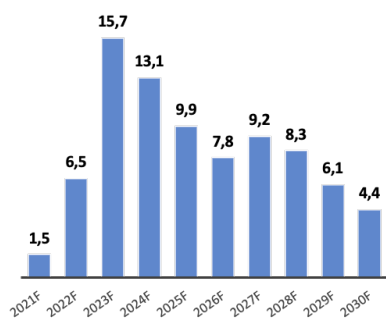


Source: Own estimates

catching 160kboepd for 2022. Moreover, Galp is targeting ~25% production growth to 2025 – and with this, a solid average upstream FCF ~€500m FY21-25 - that may even seem **too conservative** given the target's pipeline of new projects and the normalization of operations in Brazil post pandemic (**allowing faster ramp-ups in lara and start of Bacalhau I**). Nonetheless, Galp's future above-average Upstream growth (Figure 21) is **dependent on the ramp-up of Galp's already sanctioned projects**, (lara's), Sépia's and Bacalhau's contribution and the start of Coral FLNG in Mozambique, as well, as Tupi/Iracema project will initiate the declining phase soon in 2024, further threatening the future Upstream CF generation – **Galp's segment historical main CF contributor**. Galp's FCF expected to fall to €1940mn vs. €2310mn w/o Bacalhau and Sépia. Galp's commercial segment should remain resilient and contribute for a solid future production growth, following Galp's intentions of being a **leading commercial player** within the Iberian market through increases on the number of service stations, namely electric vehicle charging points, as well as on the sales of electricity and NG to end customers, by exploring differentiated supply basket offers. Overall, FY21-25F, we estimate Galp to be delivering an average **FCF of €370mn vs €220mn FY15-20. (II) High quality upstream portfolio and High Margin barrels** due to the below average production costs and breakeven in the pre-salt Brazil vs. peers. In Brazil, Galp has a strong pipeline of low-cost assets with an average breakeven **of \$25/bbl** vs. peers range **\$30-\$40/bbl** (Figure 21).

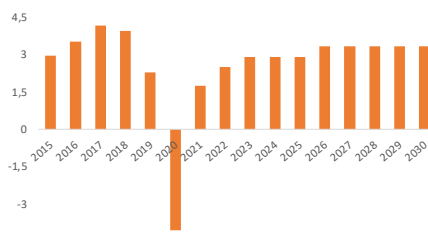
Weaknesses: (I) Significant lack of Upstream geographical diversification, as Brazil accounts for ~90% of the total Upstream production. The Upstream average CFFO has been accounting for more than 50% of Galp's consolidated CFFO, **(90% of which are Brazilian)**. Given that, any disruption within Galp's Brazilian assets massively impact the company's overall CFFO and the overall operating business, as well. The year of 2020 was a clear example of that, with the Brazilian offshore operations being one of the most affected by the pandemic context, – suffering from logistical and technical issues, labor crew changes, personnel, and restrictions on activities (delays on maintenance operations) - and that made Galp to **lose its (+10%) production guidance** for 2020 (equaled 7%) and 2021 (5%), and consequently to report a negative EBIT and net income FY20, with significant drops over the company's DPS and dividend yield (4,7% FY19 vs. 4% FY20), as well. In fact, Galp's differentiated Upstream growth story vs. peers, has been mostly fueled by its exposures to pre-salt low-breakeven Brazilian assets, and that even made the company's stock to trade at premium vs. sector for a part of the last decade (Figure 83). Nonetheless, Galp's next growth leg is dependent on **further developments** on the company's assets in Brazil. With some FPSOs starting its declining phase in Tupi/Iracema and Angola, Galp's upstream production is expected to peak, approximately, in 2022-

Figure 25: S epia's Project FCF



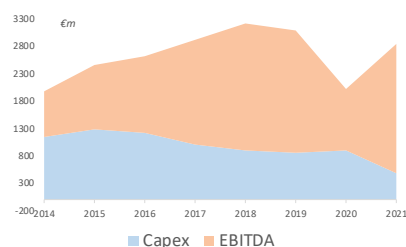
Source: Own estimates

Figure 26: Galp's refining margins



Source: Own estimates & Company's report

Figure 27: Galp's historical CAPEX vs. EBITDA levels 2014-2021



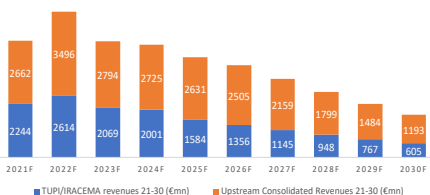
Source: Own estimates & Company's report

2024 until Bacalhau comes online in the middle of the decade. Besides Brazil, Galp has an Upstream presence in Angola (~10%) but already in decline. **(II)** Galp is a **non-operator** within its Upstream portfolio, which implies the **timings of the projects** and **output deliveries** to be something the company cannot control and that could affect refining activities and commercial sales. **(III) Lack of clear long-term carbon emissions cut targets**, as we believe that Galp's peers have been adding more visibility on their pathway to net zero, while presenting further relevant intermediate targets until 2050 and on all the 3 emission scopes. Up to now, Galp has disclosed **one** intermediate target only on its carbon emissions until 2050, but it does not account for the **3rd emissions** scope – responsible for 90% of total emissions –, possibly enhancing investors' difficulties on **being convinced** on the merits of Galp's energy transition strategy.

Opportunities: (I) Galp's **realized production efficiency gains** and **greater cost savings in Brazil**, hence lower barrels breakeven vs. peers following latest technological improvements and lower lifting costs achieved by Petrobras – targeted at **\$2,5/bbl vs historical \$8/bbl**. **(II)** Thanks to a greater level of **efficiency driven by superior refining assets' utilization rates**, Galp's **M/T refining margins will benefit** (average of \$3,4/bbl 2021-2030 vs. \$2,7/bbl 2011-2020). Also, the decision to close Matosinhos and the concentration of all refining activities in Sines enhances **the opportunity for fixed-costs dilution** hence average costs reductions. **(III)** Moreover, the closing of Matosinhos refinery (**~ 90mn savings**) gives the company a **comfortable financial pillow** to be reinvested in energy transition mechanisms to improve the Sines' plant resilience towards the desired **decarbonization path**, potentially adapting it to the production of valued lower carbon – hence less carbon priced – alternatives such as biofuels and lithium batteries (higher margins vs. traditional petroleum products). Until 2030, Galp aims to **transform its Sines plant in a green energy hub**, focused on reducing its absolute emissions in 50%. The latter may be advantageous first, to **differentiate** Galp vs. peers within the low-carbon space, and secondly in **convincing investors** on the merits of the company's Energy Transition strategy and **resilience towards the exploration** of diversified businesses, other than the currently threatened Upstream. **(IV) Flexibility to content capex**: Galp's operational results have not been following capex declining trends (since 2015) emphasizing Galp's operational returns **non entirely dependence** on the company's ability to execute new investments, but rather more on its ability to **adequately rotate assets and explore operational efficiencies**. As such, in years where Galp could be facing financial distress, difficulties in sourcing new debt, or attempting to content its ND/EBITDA ratio, the company may evaluate whether capex could be even more rationally contained, without necessarily fearing of affecting the company's operational results directly.

Threats/Investment Risks: (I) Market Risks: Oil price movements and refining margins fluctuations, that are influenced by **non-predictable scenarios** such as oil products supply/demand imbalances – following COP26, with either oil demand or supply peaking first, as evaluated within our scenario analysis –, disruptions in refinery capacity, weather disruptions and/or political instabilities. **(II)** A significant share of Galp’s revenues come from countries with high economic and political **risks** (Lula/Iracema in Brazil – historically accounting for ~50% of Upstream revenues, (Figure 28), Angolan and Mozambique fields (+€1,07/sh)) and that could affect Galp’s ability to develop the current and planned production in a safe, reliable, and cost-effective way; **(III) Sub-optimal** early-stage reservoirs characteristics, **drilling** and **production risks**, including unpredictable weather conditions, that could disrupt Upstream’s future production **guidance and growth** – that is Galp’s **main FCF** contributor; **(IV)** The global Net Zero targets to be achieved by 2050 may put **new oil supply at risk** as the 1,5°C scenario disclosed by IEA, shows the required cut on oil production (mboep/d) to be already below the estimates of the supply from the existing BP and Rystad wells – that **limits or destroys** Galp’s incentives to further explore and sanction new oil fields, further threatening the Upstream business and overall **CF generation**. Upstream CFFO averaged €550mn 2016-2020, expected to increase to €630mn 2021-2030 (~50% of consolidated CFFO), a huge financial pillow that Galp could end up losing, if Upstream business come to an end without being replaced by an equally profitable business. Additionally, challenging stakeholders’ pressures could emerge, given that large dividend payments and FCF have been mostly driven by **hydrocarbons** (Oil products).

Figure 28: TUPI/IRACEMA revenues in Upstream



Source: Own estimates

Figures 29: Upstream projects characteristics

Analysis and Forecasts

Upstream: Galp has an enviable Upstream portfolio thanks to its exposures to the Santos Basin, offshore Brazil – where some of the highest-quality and lowest-breakeven barrels in the world are produced. Additionally, Galp is present in Angola through Blocks 14, 14k, and 32, and, more recently, in Mozambique through the world scale Rovuma LNG project (10% stake). Historically, Brazil has been Galp’s equity growth sponsor, mostly thanks to an impressive WIP ramp-up over the last years, especially in Tupi/Iracema, along with important operational improvements, decreasing ramp-ups and lifting costs, and that have positively impacted Galp’s barrels’ breakeven, hence its competitiveness vs. peers. In Brazil, there are currently eleven units producing (WIP CAGR19-25 of 5%, and even expected to be reinforced with the start of the Bacalhau I project, in 2024).

Valuation: For the Upstream valuation, it was only considered the **fields in production**, the **sanctioned** and the **pre-sanctioned projects**. For each field,

Upstream - Units in Production in Block BM-S-11					
	Location	Start of production	Oil Capacity	Gas Capacity	
FPSO #1	Cidade de Angra dos Reis	Tupi Pilot	October/2010	100 kbpd	5 mm3/d
FPSO #2	Cidade de Paraty	Tupi Northeast	June/2013	120 kbpd	5 mm3/d
FPSO #3	Cidade de Mangalhalba	Iracema South	October/2014	150 kbpd	8 mm3/d
FPSO #4	Cidade de Itaguaí	Iracema North	November/2015	150 kbpd	8 mm3/d
FPSO #5	Cidade de Maricá	Tupi Alto	February/2016	150 kbpd	6 mm3/d
FPSO #6	Cidade de Saquarema	Tupi Central	July/2016	150 kbpd	6 mm3/d
FPSO #7	P-66	Tupi South	May/2017	150 kbpd	6 mm3/d
FPSO #8	P-69	Tupi East - South	October/2018	150 kbpd	6 mm3/d
FPSO #9	P-67	Tupi North	February/2019	150 kbpd	6 mm3/d

Block BM-S-11	
Peak of Production	2022-2024
Last Year of Production	2045
Galp Stake	9,40%
Area	2,297 km²
Water Dept	2000-2500 meters
Type	Ultra-Deep Waters
Phase	Production

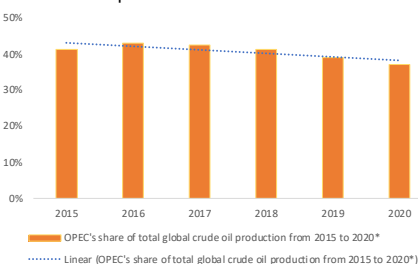
Upstream - Units in Production of Block BM-S-11A					
	Location	Start of production	Oil Capacity	Gas Capacity	
FPSO #1	P-68	Berbigão/Sunuru	November/2019	150 kbpd	6 mm3/d
FPSO #2	P-70	Atapu	June/2020	150 kbpd	6 mm3/d

Block BM-S-11A	
Peak of Production	2023-2025
Last Year of Production	2047
Galp Stake	5,00%
Area	2,297 km²
Water Dept	2000-2500 meters
Type	Ultra-Deep Waters
Phase	Production

Upstream - Units in Production of Block BM-S-24					
	Location	Start of production	Oil Capacity	Gas Capacity	
FPSO #1	Carioca	Sépia	August/2021	180 kbpd	5 mm3/d

Block BM-S-24	
Peak of Production	2024-2026
Last Year of Production	2042
Galp Stake	2,40%
Area	1.394 km²
Water Dept	2000-2500 meters
Type	Ultra-Deep Waters
Phase	Development

Figure 33: OPEC's share of total global crude oil production 2015-2020



Source: Statista

consequence drives brent prices down. Afterwards, we based our model on the IEA's sustainable scenario – most likely one following latest COP26 remarks. In general terms, under the sustainable scenario, O&G demand is expected to **peak by the middle of the decade in 2025 (Figure 32)**, in line with the Paris Agreement, and that made us to revise our Brent price assumptions downwards to 2030, to a level of \$35/bbl⁷ having the oil producers adjusting oil prices in response to declining demand – if 2030 targets are to be fulfilled – with **brent prices most likely equaling marginal production costs**.

In terms of the consolidated WI production levels, Galp disclosed that it is forecasting a WIP within the range **125-135kboe/d FY21**. While considering an **increased number** of upstream maintenance activities – now being catch up by the company once the pandemic restrictions allow for it – and given the new upstream projects and phases advancements, we predicted a level of WIP closer to our target's but **slightly higher to 137kboep/d FY21**. First because Sépia's project has started and delivered its first oil production by mid-August, and second because Berbigão's project reached Plateau. However, FY21, we still preferred **not to predict a higher level of WI** production – following the historical pre-pandemic YoY growth – as Brazil is **still one** of the most affected countries by the current pandemic. Afterwards, we forecasted a solid WI production of 160kboep/d FY22 while having Tupi/Iracema fields (all 9 FPSOs together) **reaching plateaus, Sépia's accelerating its ramping-up, and lara's peaking up on production levels**. Then, with some early-stage Tupi/Iracema fields starting their declining production levels, we assumed an almost flat annual WIP at ~161kboe/d until Bacalhau I comes online in the middle of the decade (The tough pandemic context led the consortium to delay the FID: FID now expected by the end of 2021). We assumed the first oil in Bacalhau to be delivered in 2024, with full contribution expected in 2026. The Blocks 14/14k in Angola are already on the declining phase. As a result, we expect the Angolan annual WI production levels to keep slightly declining until their ultimate year of production.

Regarding the **operational costs**, we have treated the **lifting costs** separately from the remaining operational costs, such as **logistical, E&P and labor crew costs**, in both Brazil and Angola. On its last report, Petrobras disclosed the pre-salt lifting costs to present a significant decrease from an average **\$4,3/boe (FY15-19) to an average \$2,5/boe (FY20 and FY21F-25F)**, following the company's recent technological improvements and enhanced operational efficiencies. Considering that, Galp's realized production costs has also benefited, decreasing from \$3,6/boe in 2019 to \$2,3/boe in 2020. On the last

Figures 34: Upstream projects annual production & annual remaining reserves



Source: Galp's, Petrobras' and Sonangol's reports

⁷ Source: Yahoo Finance.2021. "IEA hikes 2022 Brent Oil Price Outlook to 79\$ in 2022". <https://finance.yahoo.com/news/iea-hikes-2022-brent-oil-170000865.html> & IEA's NZE; Wood Mackenzie.2021."What different scenarios tell us about the future of oil and gas"; <https://www.woodmac.com/news/the-edge/what-different-scenarios-tell-us-about-the-future-of-oil-and-gas/>

Brazilian lifting costs targeted at \$2,5/boe FY21-30;

Angolan lifting costs targeted at \$7,5/bbl FY21-30

CMD, Galp disclosed that FY21-25 it is targeting lifting costs <\$3/boe and that we assumed flat at \$2,5boe, in line with Petrobras prospects, throughout our forecasting period. For the Angolan fields, we consider the **same average lifting costs achieved** in 2020 for blocks 14/14k and 32 of \$7,5/boe (Sonangol's reports) over the forecasting period, as well. Oppositely to Petrobras, Sonangol did not disclose any information **regarding potential strategic objectives** and/or targets for future lifting costs/bbl reductions. Nonetheless, blocks 14/14k are in production since 1999, and we believe that their **advanced state of degradation** – old oil infrastructure – and their high maintenance costs will not allow for any **further decrease** on their lifting costs throughout our forecasting period. Also, we believe that the Angolan fields – already on declining phase – do not justify future eventual technological improvements that **could further reduce the barrels costs and breakeven**.

The projects' annual Capex levels were computed **individually** as we believe that different upstream projects have **different levels of complexity** (i.e +/- deep waters, +/- proven reserves, +/- operating wells needed), hence different needs for Capital Expenditures (explained below).

Lastly, we decided to apply a **discount factor** to all Upstream projects that either has not started yet or that are in early stages of production, (Sépia and Bacalhau I), as Upstream projects have always a certain degree of uncertainty over their true economic value, given the highly possible sub-optimal reservoirs' characteristics in early production stages fields, and that may fully disrupt future Upstream production. Hence, given the **high unpredictability** over the projects' downside risks, we found reasonable to include a discount over these projects' valuation of **40%**, considering recent data on offshore O&G exploration success rates over O&G reserves that are indeed recoverable (Energy Institute, 2021).

Area 4 in Mozambique includes offshore Coral South FLNG and the onshore Rovuma LNG. With the objective of capturing the potential of Rovuma project, we decided to value **GALP's stake on this project's areas separately**, based on **two important and representative 2017 transactions** (explained on Appendix) from two direct peers.

Refining & Midstream: The Refining and Midstream unit includes **refining, cogeneration, and natural gas supply and trading businesses**. Currently, Galp owns **one refinery** in Portugal, located in Sines, after the decision of shutting down Matosinhos. Galp is the **only refining company** in Portugal, and the Sines' refinery has a coastal and port infrastructure location, that benefits the sourcing and the export of oil products. Galp's refinery is one of the largest refineries in Iberia – refining capacity of 220 kbp/d – being Cepsa's Iberian San Roque refinery the unique with a superior processing capacity (240 kbp/d).

Figure 35: Mozambique Valuation

(2017 transactions)	Peer 1	Peer 2
Area 4 - Mozambique	Area 4	
	Exxon	Total
Asset	Rovuma LNG	Coral South FLNG
Total Capacity (mta)	15,2	12,88
Stake	25%	26,50%
Price paid (\$bn)	2,8	3,9
Exchange rate considered (\$/€)	1,2	1,2
Price per mta (in €m)	614,04	952,19
Galp Stake area 4 (jointly)	10%	
Galp Project Ownership (in Mta)	1,404	
Galp Stake (€m)	862,1	1336,9
Galp M2 total average value (€m)	1099,5	
Value per share (€/sh)	1,33	
Uncertainty factor/probability of success	50%	
€/sh)	1,07	
Galp M2 total value (€m) (today's)	885,37	

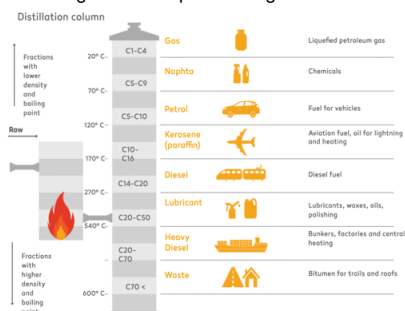
Source: Own estimates

Figure 36: Total Levered EV Upstream unit

€m	As of December 2022
Levered EV Upstream	2330

Source: Own estimates

Figure 37: Galp's Refining Overview



Source: Company's report

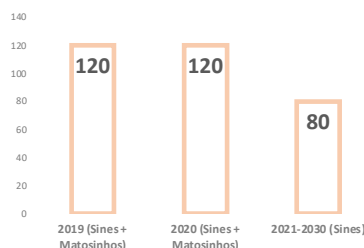
Figure 38: Iberian Refineries Processing Capacities (kbp/d)

	Processing Capacity (kbp/d)
Galp Sines	220
Repsol	
Cartagena	220
Bilbao	220
Tarragona	180
Puertollano	150
La Coruña	120
Cepsa	
San Roque	240
La Rábida	184
BP	
Castellón	108

Source: Companies' reports

Repsol's Cartagena and Bilbao's refineries processing capacities equal 220 kbp/d, same as Sines' (Figure 38). Overall Galp owns 14% of the Spanish refinery processing capacity and 100% of the Portuguese. Galp is an **integrated energy player**, that conducts Oil, Gas and Power products Supply and Trading activities, as well, and that once properly refined, are sold both, to the commercial activities and other Iberian operators. Additionally, the company **sources NG and LNG** – secured through long-term contracts –, ultimately distributed mostly in Iberia, and more recently, in the international market, through trading activities. Galp's **cogeneration business** consists of producing a type of electricity, that because relying on the recovery of residual heat generated in the power generation process – offering cost savings – is considered as **environmentally advantageous**, giving the company a priority whenever accessing to the grid, and that is sold at a regulated tariff, defined by ERSE in the case of Portugal.

Figure 39: Galp's annual Refining capacity 2019-2030 in mboe

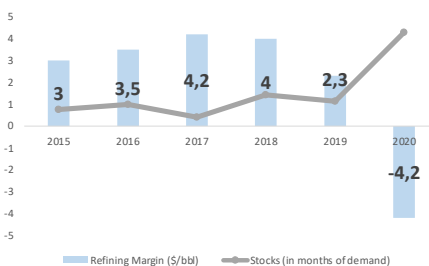


Source: Company's report

Valuation: In the R&M segment, we valued the Refining and the Gas & Power businesses separately considering their profitability to be **influenced by different value drivers**.

Regarding Galp's Refining business, we believe the **Processing capacity, the Raw materials processed, and the Refining margins** to be the value drivers of the Refining segment's profitability. Historically, Galp's Processing capacity was fixed at 330kboep/d (120mboe p.a.) total of both refineries, in Sines and Matosinhos. Nevertheless, FY21 Galp's processing capacity **was reduced** (from 330kboep/d to 220kboep/d) following the company's decision of discontinuing its Matosinhos refining operations. The Iberian's refinery environment is highly competitive (currently nine operating refineries with a total processing capacity of 1,6mboe/d – Figure 38); **hence, we do not expect** Galp to increase its refinery processing capacity at this stage, especially in the context of the Energy Transition/Long-term oil demand. Even if Galp decides to adapt its refining business to the production of low-carbon alternatives vs. fossil fuels (e.g.: Galp's targets of installing an HVO unit in Sines), we believe that the company **will adapt its current installed processing capacity without needing to fully rebuild it**, in line with what the company has been doing with the equipment it has been recycling from Matosinhos, for the purpose of decarbonizing Sines.

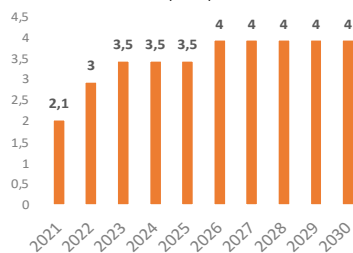
Figure 40: Galp's Refining margins vs. stock levels in PT



Source: KNOEMA, 2021

The refining environment is expected to remain challenging, **still in 2022**, following the **unprecedented conditions** that arose in 2020 with the corona crisis, where the combination of lower levels of economic activity and demand for oil products, led the sector to record **significant – and costly – inventory levels (Figure 40)**, traduced in a significant number of distillates cracks around refineries, and to **low or even negative** refining margins across the sector (Galp

Figure 41: Galp's Refining Margins Forecast (\$bbl)



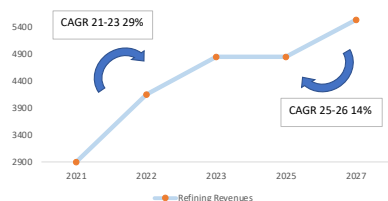
Source: Own estimates

Figure 42: Refinery News: Market Focus on Closures in Europe

** The Livorno refinery in northwest Italy will stop refining crude and suspend all related activities by the end of 2022.
 ** ExxonMobil permanently shut its Slagen refinery in Norway in June to convert the site into a fuel import terminal.
 ** Gunvor's Rotterdam refinery shuttered its two crude processing units, one in 2019 and the other in 2020, and is developing new processes around hydrogen and the coprocessing of vegetable oil.
 ** TotalEnergies said it would convert the Grandpuits refinery into a biofuel and plastics recycling complex, ending crude refining at the site in early 2021.
 ** Finland's Neste said it had discontinued refining operations at its smaller Naantali refinery at the end of March 2021. With Naantali shut down, the

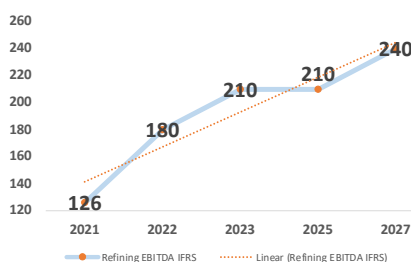
Source: S&P Global, Out 2021

Figure 43: Galp's Refining Revenues CAGR



Source: Own estimates

Figure 44: R&M EBITDA IFRS (€mn)



Source: Own estimates

Figure 45: European refineries utilization rates FY21

Refinery Utilization Rates 2021	
Repsol	76%
Total	58%
OMV Petrom	95%
ENI	71%
Tupras	93%

Source: Companies' reports

Figure 46: Galp's long-term NG/LNG contracts

Contract	Country	Amount (bcm p.a.)	Period (Years)	Start
Sonatrach	Algeria	1	5	2021
NLNG I	Nigeria	0,4	20	2000
NLNG II	Nigeria	1	20	2003
NLNG III	Nigeria	2	20	2006
NLNG IV	Nigeria	1,4	10	2021
Venture Global	U.S.	1,4	20	2023

Source: Company's report

recorded a negative refining margin of -€4,1/bbl in 2020). For 2022, we assumed a below-average refining margin of \$3,0/bbl, first due to the still **“inflated” brent price** of \$79/bbl expected on the year, that directly leads to an increase of Galp's refinery inputs' prices, hence to lower refining margins. Secondly, although we believe that the savings from Matosinhos will still allow Galp's refining margin to present a significant recovery vs. 2020 levels (Galp disclosed expected savings around €60mn in Opex from its Matosinhos plant shutdown), **we expect a great part of those costs to still exist in 2022**, as we believe most of them to be Human resources' related costs, that are traditionally **lengthy and complex processes**. It is assumed an increase on the refining margin to \$3,5/bbl in 2023-2025, believing the **imbalances on the crude oil supply and demand, hence brent prices, to be progressively corrected**. From 2026 onwards, we assumed the company's **refining margin to increase and to stabilize at \$4,0/bbl**, (I) driven by expected decreases on brent prices, (II) further reduction on the Iberian refinery capacity from companies facing financial losses or unable to adapt to the energy transition challenges (Figure 42) – giving the possibility for Galp to differentiate itself within low-carbon space –, and (III) by the company's ability to adapt its refining business and to enter through the production of low-carbon alternatives (e.g.: advanced biofuels and/or lithium batteries) – less carbon priced, then higher margin vs. the traditional oil products (as Galp disclosed, Sines reconfiguration will contribute to an annual reduction of c.900 kton of CO2 emissions (scope 1 + 2)). As a result, improved margins will enhance refining revenues by **CAGR21-23 of 29%** and by **CAGR25-26 of 14%** (Figure 43).

The lower Raw materials processed FY21 (72mboe) reflects not only **the slowdown of the fuels' unit at the Matosinhos refinery** – refining capacity was reduced from 120mboe p.a. to 80mboe p.a. – but also the operational **slowdowns** imposed by the pandemic. The drop FY21 vs. 2019 was not even more significant due to some verified recovery in the refinery operations for the 2ndH21, as the covid-19 vaccination proceeded, and the oil demand has progressively returned closer to normality (end of the lockdown restrictions in Iberia). Historically, Galp's refinery assets utilization rates averaged 83% (2017-2020), increased to 90% in 2021, after the closure of Matosinhos refinery, with Galp aiming for increasing the resilience and competitiveness of Sines, with improvements on the utilization rates of its refining assets. For the forecasting period, we assumed a **constant refinery utilization rate** of 90% – equal to 2021 – following Galp's intentions of keeping its Sines site competitive (that gives 72mboe of raw materials processed p.a.), – indeed above most of European refineries utilization rates recorded in 2021 (Figure 45).

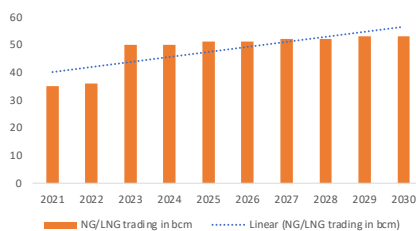
Galp's R&M profitability is also influenced by the company's active NG/LNG supply and trading businesses. The company's main sources of supply rely on

Figure 47: EU real GDP Growth

EU- real GDP growth	
2021	4,36%
2022	2,20%
2023	1,40%
2024	1,10%
2025	1,10%
2026-2030	0,80%

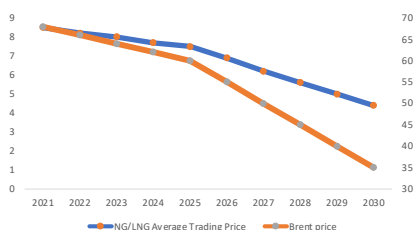
Source: Oxford Economics

Figure 48: NG/LNG quantity sold (in bcm)



Source: Own estimates

Figure 49: NG/LNG selling price vs. brent price



Source: IEA & Own estimates

Figure 50: Cogeneration Plants installed capacities & Utilization Rates

Installed Capacity (Mwh)	2021
Sines	82
Matosinhos	82
Others	9
Total (Mwh)	173
Total Installed Capacity annual	1515

	2018	2019	2020	2025	2030
Total Installed Capacity (Mwh)	173	173	173	173	173
Total Installed Capacity annual	1515	1515	1515	1515	1515
Sales of electricity to the grid	1295	1325	1339	1303	1303
Utilization Rate	85%	87%	88%	86%	86%

Source: Company's report

NG/LNG long-term contracts (Figure 46), mostly in Algeria for NG and in Nigeria for LNG. Given that, we believe that Galp's NG/LNG trading sales are driven by three main factors. First, the **EU real GDP growth rate** (historically linked with increases in the overall energy demand) (Figure 47) – as the company has been and pretends to keep consolidating its positioning within the European Union international markets. Secondly, by **increases in the bcm amounts** that the company secures p.a. because of new NG/LNG long-term contracts signed. Lastly, by the **NG/LNG average Trading Price**, that is naturally **linked/indexed to brent price fluctuations** (Figure 49).

FY22-26, we assumed the NG/LNG traded amount to increase based on the real EU-27 GDP growth rates (average of 1,34% p.a.) as well as on new long-term contracts that the company secures. As such, we assumed that from 2022 to 2023 the amount sold increases by 40% mostly driven by the **extra LNG amount secured (+1,4 bcm p.a.)** (Figure 48) through the new long-term contract that Galp has already signed with the Venture Global LNG. From 2027 onwards, **we do not expect further significant changes within NG/LNG Galp's trading activity** – CAGR25-30 of 1%. Not only the **EU real GDP is expected to deaccelerate** (Oxford Economics estimates it at an average of 0,8% real EU-GDP growth p.a. 2027-2050), but also the company **did not disclose any intentions to further look for new signed long-term supply contracts**. In fact, Galp is already working on one of the most relevant regions for the company's future NG/LNG production (in Area 4 Mozambique, that secures 1,4 NG/LNG mta p.a.), that we believe to make the company **almost independent** of other international NG/LNG supply sourcing options for the future. Secondly, NG/LNG trading prices are **indexed** to the oil prices, and that could make Galp's trading activity coming to an end pretty soon. With the oil demand peaking by the middle of the decade – which drives significant declines on the oil prices – any possible trading arbitrage opportunities **could rapidly erase**, as the trading margin obtained, indexed to oil prices, will most likely end up **not** being sustainable enough to cover the NG/LNG liquefaction plus transportation costs.

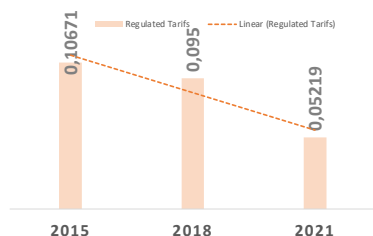
Additionally, Galp's R&M segment includes Galp's Cogeneration business. In our valuation model, we assumed the **cogeneration installed capacity**, the **plants' utilization rates**, and the **ERSE regulated tariff** at which the electricity is sold to the grid, as the drivers of Galp's Cogeneration business profitability. In 2020, Galp's cogeneration installed capacity totaled 173MW, with the main cogeneration units being installed in the Sines and Matosinhos refineries, both with a total installed capacity of 82MW. For our forecasting period, we assumed the cogeneration installed capacity to remain constant. As the company did not disclose any intentions to pursue further investments on this field, we believe that the cogeneration infrastructures **will not reach higher levels, at this stage**,

Decreased Regulated Tariffs pushes down new cogeneration plants investments.

especially given the expected **declines on cogeneration margins**. Galp's cogeneration plants' utilization rates have been stable over time, historically averaging 82%. In 2020, the company has sold 1339 GWh of electricity to the grid, and the utilization capacity reached a level of 88%, following Galp's strategic objective of enhancing its assets utilization rates. For FY21, we assumed the utilization rates to remain constant at 88%, as well, but do decline in 2022 to 86% and to remain constant throughout the future. The latter, in line with the **expected decrease of the Regulated Tariff**, hence on Galp's cogeneration margins that we believe will end up pushing the **company's cogeneration productivity and the business attractiveness downwards**. Rather, Galp may incorporate cogeneration electricity production in other processes such as own electricity consumption, if economically sustainable.

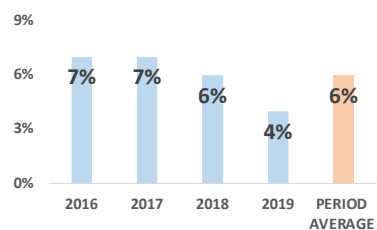
Galp's cogeneration plants operate under a **special regime production**, that gives the company a priority whenever accessing to the grid, and that is **sold at a regulated tariff** defined by the ERSE. The cogeneration is considered as an eco-friendly business as it facilitates the reuse of wasted materials. As such, not only companies have priority whenever accessing to the grid but rights over attractive governmental subsidies (feed-in-tariffs) that work as incentives to promote the increase of cogeneration electricity businesses. As a matter of fact, the implicit attractive conditions ended up resulting in increased installed cogeneration capacities and electricity supplied to the grid through cogeneration, and that ended up driving the Portuguese Tariff deficit upwards over time, with mismatches between the wholesale energy price and the energy price that is charged to end customers. **The regulated tariff** (at which cogeneration electricity is sold to the grid) **influences the wholesale energy price, as well** (at which the energy suppliers purchase the electricity – to REN in the case of Portugal), hence the existence of tariff deficit too, as the domestic customers **cannot be fully in charge of the increased energy costs**. In 2012, a Troika Memorandum was signed and that included the objective of limiting the existence of additional costs in the production of electricity under the Special Regime, such that the Regulated Tariff could be revised downwards, and the Portuguese tariff deficit eliminated by 2020. Nonetheless, in 2020 EDP announced the sale of the Portuguese Tariff Deficit by €0,3bn, which meant a failure in accomplishing Troika's Portuguese tariff deficit goal. In fact, we believe **the pandemic** to be the **one responsible for delays in eliminating the Portuguese deficit by 2020**. The final price of the electricity depends on the price of Natural Gas that, due to the significant shocks within the demand and supply sides that emerged during the corona crisis, has promoted increases on the Iberian electricity market spot (MIBEL), hence limiting the possibility of revising the Portuguese Regulated tariff downwards. In fact, the end of the Portuguese deficit tariff, through declines in

Figure 51: PT Regulated electricity tariffs



Source: ERSE

Figure 52: G&P EBITDA margins 2016-2020



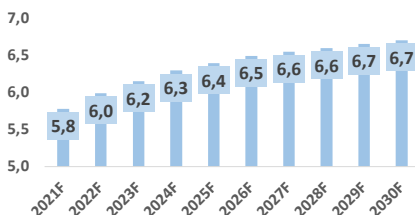
Source: Company's report

Figure 53: Total Levered EV R&M

€m	As of Decemcer 2022
R&M	4 011

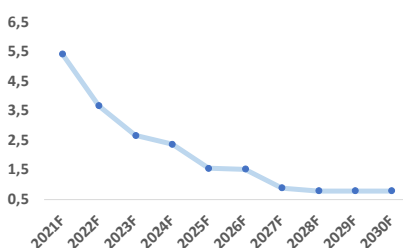
Source: Own estimates

Figure 54: Oil products sold within Iberia - forecasts



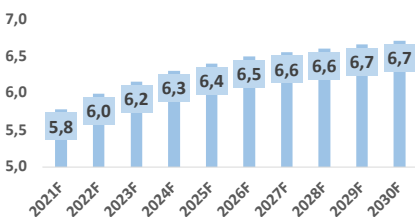
Source: Own estimates

Figure 55: Iberian "average" real GDP Growth



Source: Oxford Economics

Figure 56: Oil products sold within Iberia - forecasts



Source: Own estimates

the energy regulated tariff **drives important decreases on the wholesale energy price**, hence on the electricity selling price to end customers, and that ultimately results in an increased attractiveness of this energy source, hence in an increased weight of electricity within the whole energy generation mix – which is **aligned with the 1,5°C scenario**. As a result, **regulated tariffs have been decreasing since 2012** and we assumed a “final” decrease on the Portuguese regulated tariff in 2022 (post pandemic) to €0,044/GWh following the historical declining trends on regulated tariffs, and to remain constant afterwards assuming the Portuguese deficit tariff elimination, **to be finally completed by 2022**.

We assumed the forecasted **G&P's EBITDA margins** (Trading and Cogeneration businesses) to be equal to the historical **4Y average** (excluding 2020 that was a non-representative year), as we noticed them to stay stable within the whole explicit period (4%-7%) (Figure 52). Given that, we believe that it is highly important for Galp to keep its EBITDA margins **stable over time**, such that any increase in COGS is then traduced in a higher price of the final product.

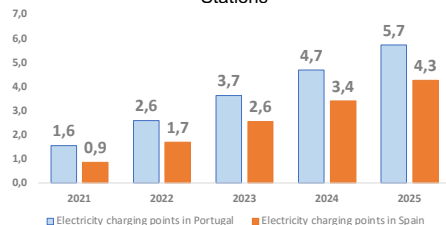
Commercial: The Commercial segment involves the process of delivering oil products, mostly through Galp's retailing network of **2.000 service stations** and electric charging points spread over Portugal, Spain, and Africa, as well as gas, electricity, and other services, to both the wholesale and export markets. For the future, and within the oil products business, Galp pretends to maintain a relevant position within the African markets and to **keep reinforcing its Iberian retail network**. Focused on the embracement of the expected energy transition challenges, **Galp is targeting a c.10k. electricity charging points to be operational within Iberia already by 2025**. Within the G&P business, the company pretends to increase its sales of electricity and natural gas to end customers by exploring **differentiated supply basket offers**.

Valuation: Within Galp's commercial segment, we decided to value the petroleum products **separately** from the Natural Gas and Electricity businesses, as we consider **different variables to drive both parts' profitability**.

Regarding the petroleum products, we believe the **Portuguese and the Spanish GDPs** as well as the **number of points of sale/service stations** that Galp operates within Portugal, Spain, and Africa to be the key drivers of the refined products' part EBITDAs. In what concerns the total number of oil products sold, we decided to **separate and value them by location**, that is Iberia vs Africa. Furthermore, we assumed the number of oil products sold to be driven by the **implicit region real GDP annual growth rate**. In the case of Iberia, we found it reasonable to compute an “Average” Iberian real GDP, and consider it as the main driver of the annual number of oil products sold within the region. The “Average” Iberian real GDP was computed as a function of the oil product sales

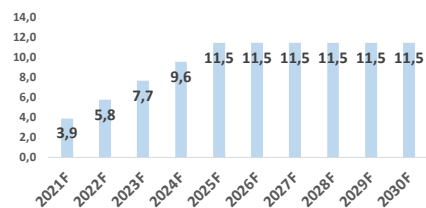
that Galp makes in each Iberian market, that is in Portugal vs. Spain. Oxford economics projects Iberian Real GDP growth rates p.a. to keep declining over time, from 5,42% in 2021 to 0,8% in 2030 (Figure 55), then resulting in a slight growth of the Iberian oil products sales equal to a **CAGR21-30 of 2%**. In Africa, as Galp’s commercial activities occur in 5 different countries, we did not use the African GDP as a future predictor of the future oil sales within the region, as we did not consider these countries as representative of the whole continent. Rather, and as we do not expect oil sales to fluctuate a lot in Africa (as Galp is not expected to increase its service stations in the region), we estimated the African oil sales by difference. In different words, given the fact that oil products sales occur mostly within the Iberian market (% of oil sales in Iberian market over the total commercial oil sales has been pretty stable throughout the historical, only varying between 89%-93%), and after finding out the total oil sales within Iberia, that, as mentioned previously, are driven by Iberian countries average real GDPs – we computed the total consolidated commercial oil sales, as a proportion of the expected Iberian Market sales, that is, while applying the historical % – Iberian Oil sales vs. Total consolidated. Afterwards, African Commercial oil sales were deducted by difference.

Figure 57: Total Nr. Of points of Sale/Service Stations



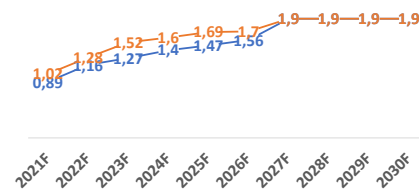
Source: Own estimates

Figure 58: Electricity Charging Points 2021-2025



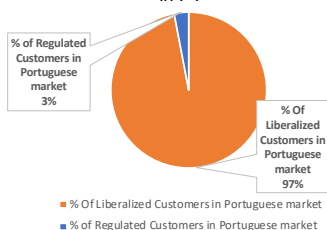
Source: Company's report

Figure 59: Inflation Rates PT vs. SP (Forecast)



Source: Oxford Economics

Figure 60: Liberalized vs. Regulated customers in PT



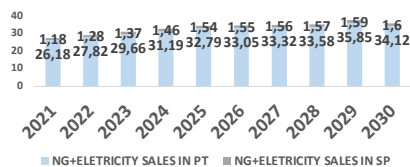
Source: Company's report

Regarding the evolution of the number of points of sale, we believe that Galp is **not expected to increase its service stations in Africa** as the company did not disclose any related strategical information on its last CMD. On the opposite side, the company pretends to consolidate its position within Iberia, mainly through its electric mobility network, as it is **targeting a c.10k electric charging points** to be operational by 2025 within the region. Considering Galp’s 516 electric charging points in operation in 2020, we conclude that within 2020-2025 the company will invest in ~9,5k more Iberian electric charging points – if its 2025 target is to be fulfilled – that means ~1,9k to be added p.a. within Iberia until 2025. From 2026 onwards, we assumed a **constant number of points of sale within all markets the company operates, as we believe that even Galp lacks visibility on the future** energy consumption patterns and consumers behavioral shifts timings, being then difficult to accurately measure the **required electric charging points to be offered** so as to meet the implied consumers demand by that time, and that will massively depend on the EU commitments **towards Net Zero targets**, hence energy demand (Figure 62).

In what concerns the oil products average selling price, we assumed it to be driven by the **“average” inflation rates** of the locations on which Galp operates, Iberia and Africa, proportional to the sales levels operated in each region.

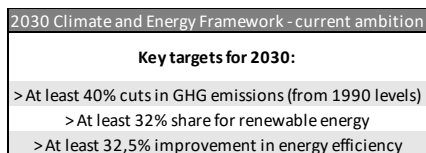
In what concerns the Natural Gas and Electricity sales, we first considered Galp’s **exposures in both Spain and Portugal**. Secondly, we considered part of these sales to be **liberalized and part regulated** (Figure 60). On its last report, Galp

Figure 61: Share of NG+Electricity sold in PT vs. SP



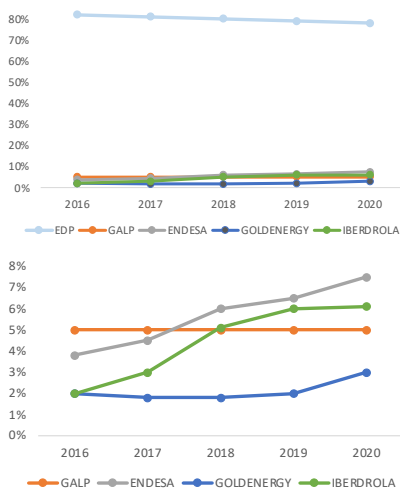
Source: Own estimates

Figure 62: European 2030 Climate Targets



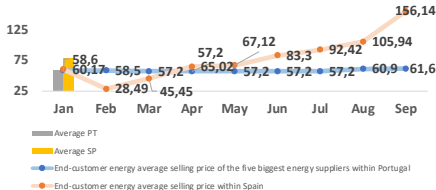
Source: European Commission

Figures 63 & 64: PT major energy suppliers in respect to nr. of clients



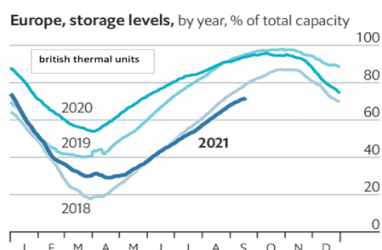
Source: ERSE

Figure 65: Domestic Energy Suppliers Average Selling Prices in PT. vs. SP.



Source: ERSE and OMIE

Figure 66: European Natural Gas storage levels



Source: Economist

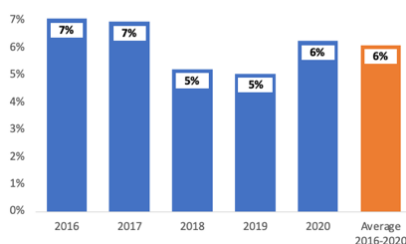
disclosed that from the total Portuguese market, 97% were liberalized and the remaining regulated, percentages assumed to be maintained throughout our forecasting period. In the case of the Spanish customers, as of its small representativeness, we assumed all of them to be liberalized. Furthermore, we assumed the NG + Electricity Sales (in TWh) in both, Portugal, and Spain to evolve as a function of the respective countries real GDPs growth rates. Additionally, we decided to add a premium of 4% for FY21-25 p.a. in line with Galp's disclosed Commercial ambitions of increasing its NG and Electricity sales in ~1,5x vs. 2021 levels. Nonetheless, our estimations for FY21-25 anticipates the NG+Electricity sales to increase slightly less than Galp's targeted level (i.e.: **1,3x 2021-2025 vs. Galp's target 1,5x 2021-2025**), mostly following the growing pressure from regulators to increase energy efficiency to reduce the energy consumption per capita (target of -32,5% by 2030 within EU). From 2026 onwards, we assumed the natural gas and electricity sales (in Twh) to grow with the Iberian real GDP growth, only. As such, CAGR21-25 equals 5% and CAGR26-30 equals 1%, only, following (I) **the deacceleration of the Iberian real GDP growth** and (II) **decreases in energy consumption per capita** following an improved energy intensity ratio with Iberian governments pressures for greater energy efficiency (Figure 62).

In terms of the energy selling prices, for the liberalized market, we guided ourselves on **ERSE indicators for Portugal and on OMIE for Spain**. For FY21 the ASP was €58,4/Mwh for the Portuguese liberalized market, obtained through the average of the monthly average energy selling prices within the liberalized market, charged by the top-5 Portuguese domestic energy suppliers, including Galp (Figure 63 & 64 & 65). In the case of Spain, Iberdrola, Gas Natural Fenisa, Endesa and EDP lead the Spanish domestic energy market. As such, considering Galp's energy power marketing segment to operate in perfect competition, hence the company to "respond" as a simple price taker within Spain, for FY21 Galp's ASP in the Spanish energy domestic market was assumed to be in line with the domestic energy Average selling price charged in the liberalized market and that equaled €78,2/Mwh, according to OMIE indicators. Afterwards, we assumed the average selling price to be driven by the **Iberian expected inflation rates**, according to Oxford Economics. Oppositely, the regulated business' selling price equals the annual regulated tariff, same as the one considered in the cogeneration business within the R&M unit.

The electricity final prices **have risen significantly** for FY21. In the EU, the wholesale electricity price reflects the price of the last unit of energy bought via the auctions held in member states, **that means Natural Gas** – the energy source that is mostly used to generate electricity (rather than coal, more carbon intensive). Natural Gas prices have seen their biggest increase in EU in recent

months, and that resulted in higher electricity prices, as well. Weather-related events, with rising climate changes (e.g.: droughts that curtail hydropower output in Brazil and lower than average wind generation in EU), and government policies to scale up clean energies, have been decreasing the incentives for added investments in NG infrastructure. Additionally, Russia has been reducing its exposure to European S/T NG sales without replacing its own NG storage sites in Europe to the historical levels, hence constraining the NG supply and NG storage levels, that consequently resulted in increased NG final prices for Europe. In fact, we expect electricity prices to keep rising within the explicit period, positively impacting Galp’s liberalized sales, at the end (I) following the **increased inflations rates** (Figure 59), and (II) the increase in the **government pressures** for a greater electricity weight/demand within the whole energy mix. (III) Also, **NG shortages** are still expected, at least in short-term, as despite we believe new governmental investments on NG infrastructure will be put up front – critical to support Net Zero at least until renewable energy output still lags – these take time to implement, then **keeping NG prices still high**, consequently.

Figure 67: Commercial’s EBITDA Margins



Source: Company’s report

Figure 68: Total Levered EV Commercial

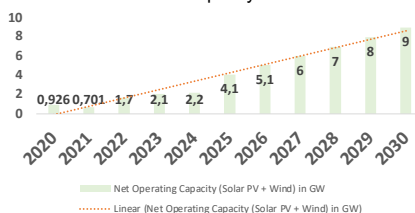
€m	As of Decemcer 2022
Commercial	7 105

Source: Own estimates

For the segment’s EBITDA, we have computed the Commercial segment’s 4Y historical EBITDA margins, very stable over the last years (5%-7%) (Figure 67) and we considered it to be representative of our forecasting period, as well. Considering the **EBITDA margins stability**, we believe that is highly important for **Galp to keep its EBITDA margins stable over time such that any increase in COGS is then traduced in a higher price of the final product.**

Renewables: In the Renewables unit, Galp is focused on developing an energy transition strategy to reduce the carbon footprint of its operations, as well as on creating innovative products, in line with the current market trends. In 2021, the total renewable gross installed capacity equaled 1,41GW, resulting from a combination of solar energy (1,40GW) and wind power generation capacities (0,012GW). During 2021 Galp strengthened its position as one of the leading producers of solar energy within Iberia counting with ACS transaction and more recently, with the final agreements signed with Enerland for the acquisition and construction of a renewable portfolio in Spain with capacity of more than 220mn. Additionally, Galp has entered in the Brazilian Renewable business with the acquisition of 594MWp Solar capacity – all critical steps towards Galp’s desire to nave 4GW and 12GW **gross** operating capacity by 2025 and 2030, respectively, spread in and outside Iberia. As a result, Renewables’ Capex are expected to sum €4bn (21-25F).

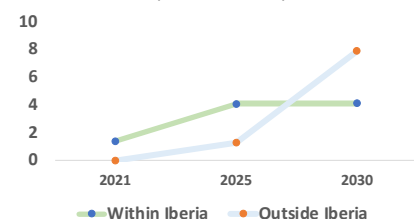
Figure 69: Net Operating Renewables Installed Capacity



Source: Company’s report

Valuation: We decided to value the Renewables segment, considering the current and future added Solar PV and Wind power generation capacities (**at Equity Value**). In fact, we considered the future added capacities (with a 50%

Figure 70: Gross Solar PV Installed Capacity (in vs. outside Iberia)



Source: Company's report

Figure 71: Renewables Valuation (Equity Value)

€m		
Price paid FY 2020	€/GW	150
Price paid FY 2022	€/GW	161
Total price Paid with ACS	€	326
Solar PV Added Capacity within Iberia (excluding ACS transaction)	GW	0,9
Solar PV Added Capacity outside Iberia	GW	5,916
Total Solar PV Added Capacity (in and outside Iberia)	GW	6,816
Probability of success considered	%	50%
Total Solar PV Added Capacity (in and outside Iberia) considering Probability of success	GW	3,408
Total Value from Solar PV considering ACS	€	875,1
Total Value from Wind generation capacity	€	1
Total Renewables Value net to Galp	€	876,1

Source: Own estimates

probability of success, that we assumed as reasonable) to meet the gross target of 12GW of Solar PV and Wind capacities (in and outside Iberia) by 2030, in line with Galp's strategic investment targets and priorities for the segment. Also, we assumed the target 12GW by 2030 to be gross for Galp, and we considered a **75% interest in future Solar PV pipelines**, in line with the capital structure achieved in the most recent ACS deal, and **50,05% in Wind capacity** – considering Galp's current stake on wind projects. Excluding the ACS transaction, Galp pretends to expand its Iberian Renewable Portfolio in 1,2GW and in 7,9GW outside Iberia by 2030 – both through Solar PV acquisitions, only.

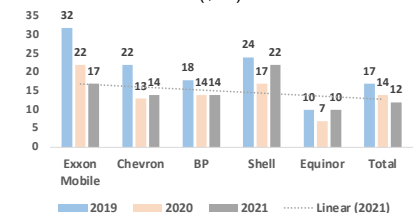
Galp has paid €326m to ACS (2020 transaction) for the stake acquisition (75%) and development costs associated with the portfolio, for an extra added Solar PV capacity of 2,9GW (100% basis in Iberia), which means 2,175GW for Galp given the company's 75% stake. Therefore, the value per GW that the company has paid to ACS was €326m/2,175GW = ~€150m/GW (Equity Value – 2020 value). For the future Renewable projects (in and outside Iberia), we followed the same logic, while assuming the same price paid per GW, for Solar PV and Wind capacities, as well. As the ACS price paid per GW corresponds to a 2020 value, and our valuation's time zero is considered in December 2022, we have first capitalized the price paid/GW in two years (from 2020 to 2022), using the computed WACC for the segment (Valuation on Figure 71). As the Renewables segment **was valued considering the value of the Renewable generation assets** (consolidating P&L and CF as equity method), the Renewables valuation was then incorporated as associates, **below our target EV**.

Financial Analysis

Capital Expenditures: O&G sectorial data shows the targeted **Capital Expenditures of the sector as being progressively reduced**, following the pressures from the various stakeholders so as to have companies to cut their investments on fossil fuels in favor of greener energies, traditionally much less capital intensive vs. typical oil infrastructure. Our Capex estimations are in line with Galp's **pipeline of new projects and investment plans for the segments**. To confirm the veracity of our estimations, we noticed our Capex allocations per segment to be in line with Galp's targeted Capex plans (21F-25F) disclosed on its last Capital Markets Day (CMD): 40% to Upstream, 29% in Downstream transformation businesses, 30% to the Renewables' growth and 1% to Others.

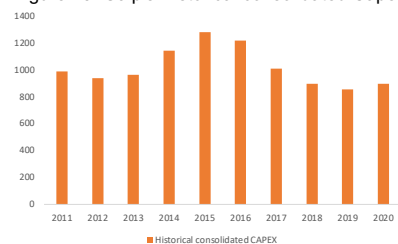
Upstream: Galp's Upstream's capital expenditures include **Exploration & Appraisal (E&A), well development and FPSO unit costs**. In 2015, Galp disclosed that it was guiding its finding costs (E&A costs) at \$1,1/bbl and we do not have more recent information regarding this caption. Nonetheless, the current market conditions emphasize the existent O&G reserves to be **each time more**

Figure 72: Major's Capital Expenditure 2019-2021 (\$bn)



Source: Oil & Gas journal, 2021

Figure 73: Galp's Historical consolidated Capex



Source: Company's report

Figures 74: Upstream Capital Expenditures

CAPEX base costs	Unit	
E&A appraisal activities	€/bbl	2,1
Cost of drilling a well	€/bbl per day per well	0,83
Number of days spent on drilling	days	120
FPSO unit	\$/bbl	1,9
Total drilling costs	€mn	2

Standard FPSO	unit	
Unit Capacity	kboep/d	150
Average well flow rate	kboep/d	20
Number of wells required (1 injector for each producer)		15
FPSO unit	€/bbl	1,42
Drilling costs		1,5

FPSO	Tupia	
Unit Capacity		143
Average well flow rate		20
Number of wells required (1 injector for each producer)		14
FPSO unit		1,4
Drilling costs		1,4

FPSO	Iara	
Unit Capacity		150
Average well flow rate		20
Number of wells required (1 injector for each producer)		15
FPSO unit		1,4
Drilling costs		1,5

FPSO	Sépie	
Unit Capacity		180
Average well flow rate		20
Number of wells required (1 injector for each producer)		18
FPSO unit		1,7
Drilling costs		1,8

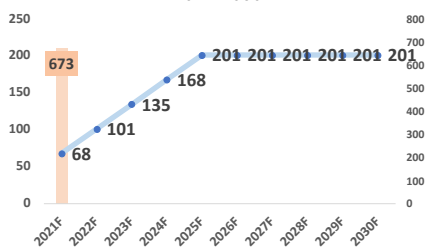
FPSO	Bacalhau	
Unit Capacity		220
Average well flow rate		20
Number of wells required (1 injector for each producer)		22
FPSO unit		2,1
Drilling costs		2,2

FPSO	Block 14/14k	
Unit Capacity		46
Average well flow rate		20
Number of wells required (1 injector for each producer)		5
FPSO unit		0,4
Drilling costs		0,5

FPSO	Block 32	
Unit Capacity		100
Average well flow rate		20
Number of wells required (1 injector for each producer)		10
FPSO unit		0,9
Drilling costs		1,0

Source: Petrobras and Galp's reports

Figure 75: Capex allocated to Commercial unit 2021-2030



Source: Own estimates

For the commercial unit, Galp is targeting a c. capex of €0,5-€0,6bn 21F-25F

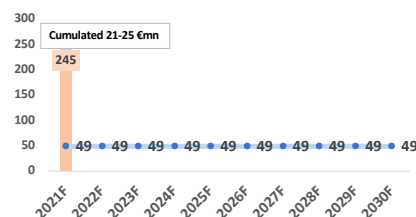
difficult to find and the output to extract, as of the physical formation of the remaining O&G deposits (e.g.: twisting, or in shale rock). In fact, companies have been trying to bypass the implicit challenges through more recent technology, that indeed increases the E&A activities costs. Given that, for Exploration & Appraisal costs, we guided them at \$2,5/bbl throughout our forecasting period, in line with the computed expected lifting costs. **The well development costs** (pre-production) are a function of (I) the cost of drilling a well, (Petrobras guides it at an average of \$1m/day); (II) the number of days spent on drilling operations and (III) the number of wells drilled. Petrobras has been successfully reducing the number of days spent on drilling – 310 days in 2010; 127 days in 2018, now targeted at 120 days (in offshore) – as it has been benefiting from learning curve and an optimized well design, as well. **The number of operational wells required is a function of each FPSO unit capacity.** We modeled a “standard” FPSO unit to have a maximum capacity of 150kboep/d. Assuming an average well flow rate of 20 kboep/d (Petrobras reports), that implies the need of 15 wells (1 injector for 1 producer) for a “standard” project. Petrobras states that a FPSO unit cost is estimated at \$1.7/bbl and that we have incorporated in our model, as well. As a result, the project’s annual Capex is a function of the annual WI produced (mboe) multiplied by the E&A activities costs per bbl and by each project specific FPSO unit cost/bbl (Figure 74).

Commercial: Regarding the Commercial unit we believe the future Capex plans to be mostly dependent on the **enhancement/renewing of the retail segment, hence on the extra points of sale, service stations and electric charging points that Galp is targeting for the area.** For FY21 Galp’s commercial capex levels equaled €53mn for an extra 1,9k electricity charging points added vs. 2020. Until 2025 Galp is targeting a c.10k electricity charging points within Iberia (~1,9k p.a). Given the constant number of electricity charging points to be added per year, we departed from the capex level in 2021, and we consider it to evolve as a function of the percentage growth on the annual charging points only, as we believe that the difference in annual capex comes from the additional maintenance expenses required for the implicit superior targeted number of charging stations. For the commercial unit, Galp is targeting a cumulated capex of €0,5-0,6bn (21-25F), which in line with our estimations. **Electric mobility is indeed less capital intensive than common petroleum infrastructures,** allowing the segment’s capex discipline to be respected, despite the huge pipeline of new investments Galp is targeting for the area.

R&M: We believe the R&M’s annual Capex to be mostly dependent on the **added refining capacity and on the improvements made on the refining system.** In fact, the company has massively benefited from its Matosinhos refinery closure, as it will allow the company to incur in ~€90mn savings (~70% opex/ 30% capex

For the R&MI unit, Galp is targeting a c. capex of €0,2-€0,3bn 21F-25F

Figure 76: Capex allocated to R&M unit 2021-2030 (€mn)



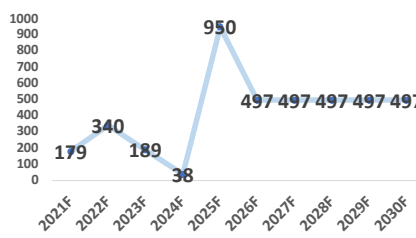
Source: Own estimates

Figure 77: Galp disclosure on Sines refinery closure



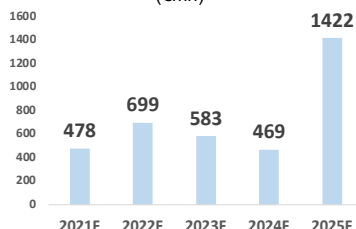
Source: Company's report

Figure 78: Capex allocated to Renewables unit 2021-2030 (€mn)



Source: Own estimates

Figure 79: Galp's Capex forecast 2021-2025 (€mn)



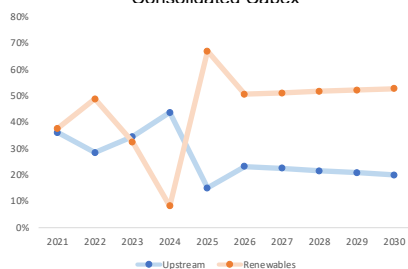
Source: Own estimates

p.a.) and that is intended to be **reinvested in mechanisms to enhance the Sines' refinery** resilience towards the energy transition period, also counting on operational equipment that Galp was able to recycle from Matosinhos refinery. In 2020, Galp disclosed that the R&M capex (€76mn) were mostly allocated to improvements in the refining system, similar at what we believe the company will be doing for the future. As a result, for **FY21-30F we assume the same level of capex p.a., but net of the capex savings from Matosinhos closure (~€27mn p.a), that equals €49mn p.a..** Furthermore, we believe that any increases on the annual R&M Capex would mostly result from increases in the refining capacity, and that we do not believe to occur within our forecasting period. Given that, we estimated equal Capex levels per year for R&M area and that, as Galp disclosed, will result from the transformation, exploration of HVO production (hydrotreated Vegetable Oil), and desulphurization of Sines refinery (from a grey to green refinery). For the R&M, Galp is targeting a cumulated capex of €0,2-0,3bn (21-25F), which is in line with our estimations, as well. In fact, we believe that Galp's capex discipline for its R&M area will be respected, despite the serious efforts for decarbonizing Sines Refinery, and mostly due to the company's ability to recycle equipment from Matosinhos, **preventing the need for extra investments**, because adapting its Refining segment without needing to fully rebuild it.

Renewables: For the Renewables unit, we believe the **Renewables generation installed capacity to drive the segment's Capex.** In 2019 and 2020, Galp's Renewable capacity totaled 0,006 and 0,701 GW (net to Galp), respectively. In 2020, Galp allocated capex in €350mn to the Renewable's segment, for an extra added capacity of 0,7GW (vs. 2019). For FY21, we have considered the added Renewables capacity that Galp is targeting for the year and we have computed the annual capex allocated to the Renewables segment considering the Capex allocated in 2020, for the extra renewable generation capacity added in that specific year. The same logic was followed throughout the forecasting period, always **considering the annual Renewables capacity additions that Galp is targeting until 2030 (net 9GW) given previous year's capex allocated vs. extra renewable added capacity on that specific year (simple math rule).**

In fact, and with the closure of Matosinhos, we notice Galp's future capex plans for the R&M to be significantly **reduced**, and consequently not to be high enough to cover the annual depreciations – that justifies the decline in the R&M level of assets until 2030. Nonetheless, it is obvious that Galp's strategy of containing capex cannot be sustainable throughout the entire future, as it would imply DD&A to keep absorbing annual capex, leading to a continuous reduction on the level of assets for the area – reaching zero at some point in time. Consequently, and believing that Galp will be still interested in optimizing its assets' utilization rates

Figure 80: Renewables vs. Upstream % over Consolidated Capex



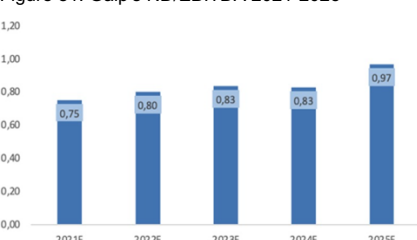
Source: Own estimates

so as to boost operational efficiencies, we agree that the company will intend to keep its **capex levels contained** at the minimum essential, aiming to keep its balance sheet resilient enough throughout the long-term, as well. Therefore, for the Commercial, R&M and Renewables & Other businesses areas, we assumed that from 2030 onwards Galp will target its Capex to **equal depreciations** to ensure an adequate level of tangible assets that allows the company to operate without affecting its operational results. Our capex assumptions for the future sees the Renewables Capex growing “**at the expense**” of the Upstream’s and that could indicate that the overall Upstream growth potential – despite still significant – is something for which investors will be, each time more, less willing to pay for, such that Galp’s Upstream Operator seems aware that the desire of growing Upstream projects within the Energy Transition could send bad signals to the equity market. At this stage, investors desire **lower environmental risks** hence lower Upstream growth levels - In 2025, Upstream Capex is expected to account for 15% of Total Capex (Renewables for 67%). Overall, we believe that Galp’s cut over its capex investments levels are fundamental for the company’s Net Debt/EBITDA target ratio to keep at 1,0x as well as for the base dividends of €0,5/share to be respected within 2021-2025. **Oil price shocks** are expected, following the peak of oil demand, consequently affecting Upstream’s hence Galp’s overall CFs generation. With those shocks occurring and without having Galp focused on keep its balance sheet resilient enough, its operating CF after the debt service has been paid, could risk of not being high enough to cover the targeted Capex/Shareholder remuneration, having Galp to source additional debt and possibly increasing its target ND/EBITDA to more than 1,0x for FY21-25.

Despite having Galp’s 2025 vision corporate strategy on CAPEX adjusting the portfolio opportunities with the investors’ preference for more FCF/less long-dated growth, **the company’s EBITDA margins remain resilient**, not declining w/ the investment levels. Rather, we notice them to increase to an average of 18% between 2021-2025 vs. 12% 2016-2020, reflecting **(I) an improved assets’ utilization rates/operational efficiency of the business (II) and a slight improvement in cost efficiency**, with operating costs over total operating revenues decreasing from 88% 2016-2020 to 86% 2021-2025. Galp’s EBITDA margins has been stable over time, most likely indicating Galp’s ability to increase final products prices whenever there is any increase in COGS. **Also, they have been higher than those of some direct European comparables** such as BP, Repsol and MOL reflecting Galp’s **superior operational efficiency**.

Regarding Galp’s value creation, Upstream ROICs **are expected high** – averaging 18% FY21-25 – but **decreasing** as the projects’ life cycles come to an end, where decreased levels of production, hence revenues do not support the huge capital intensity of the segment, leading to ROICs lower than WACC.

Figure 81: Galp's ND/EBITDA 2021-2025



Source: Own estimates

Galp has flexibility to content capex with EBITDAs not following capital investments declining trends.

Figure 82: EBITDA margin (%) Galp vs. Selected Peers

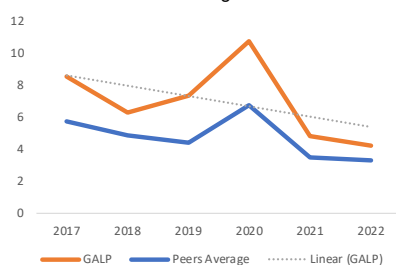
EBITDA Margin (%)	2020	2019	2018	2017
Repsol	-1	-1,7	9,2	12,5
BP	-3,9	9,1	10,1	9,1
MOL	12,9	12,2	13,8	16,3
AVERAGE	2,67	6,53	11,03	12,63
GALP	10	13	13	12

Source: Bloomberg

Upstream ROICs will reach their highest value (27%) in 2022, with increased NOPLATs benefiting from higher levels of WI production with the plateaus of Sépia and Lara's projects and the start of Bacalhau I. For the R&M segment, in 2022 ROIC is still expected negative with **refining margins environment still weak** – post corona crisis – and with revenues not able to cover operating costs plus high DD&A values for the segment. Despite closing Matosinhos refinery, **R&M tangible assets did not decrease significantly**, hence DD&As, as Galp pretended to recycle most of the equipment and use it in Sines' site. From 2023 onwards, we expect ROIC to recover, in line with improved refining margins – linked with the likely entrance in production of low carbon alternatives (lithium batteries/biofuels), higher margin, as well as from the decreased annual invested capital levels as, with the new reduced capex plans, Galp's R&M capex levels are **not high enough** to cover annual depreciations that drives annual tangible fixed assets (vs. t-1) down, hence invested capital. Looking into the last 2 years of the explicit period, we could estimate R&M long-term ROIC at 5,20% that is slightly higher than the segment's WACC considered, which means value creating to shareholders. Commercial's ROIC has been historically averaging 22% FY16-20. For 2021-2025 we estimated ROIC to average 19% and slight decrease to 10% over the long-term. Galp is targeting 10k electric charging points in Iberia until 2025, making the Commercial segment to be highly capital intensive – accounting for 20% of total Capex. As such, the decline in ROIC results from having Revenues not being high enough to along the rising Tangible assets, hence increased DD&As. Nonetheless, Commercial's ROIC FY30 is expected **still above WACC** (value creating) – with tangible fixed assets stabilizing post 2030, with annual capex equaling DD&As. However, competition is fierce within the R&M and Commercial segments and Galp's ability of renewing its business and products within the energy transition period – while differentiate itself vs. peers within the low-carbon space – is key for sustaining L/T ROICs above WACCs. We notice that R&M RR has been negative throughout the years with NOPLATs, being progressively lower than FCF. The R&M tangible fixed assets, hence DD&A, are expected to keep decreasing, which ultimately increases the core result before taxes, hence the statutory tax levels, negatively affecting NOPLATs. In the Renewables segment, it is expected a L/T negative ROIC – at least until 2030 – averaging -2% FY21-FY30. The segment is recent (2019), **not mature enough** yet, and revenues cannot reach high enough levels to cover the huge **capital expenditures** levels, hence DD&As demanded by the segment.

From the **EV/EBITDA graph** we notice that the company has **historically traded at premium to the sector**, driven by its above average Upstream growth profile, but that the premium has been **shrinking recently**. The **lower willingness** of investors to pay for upstream growth/higher upstream competitiveness vs. peers,

Figure 83: EV/EBITDA Galp vs. Selected Peers' Average



Source: Bloomberg & Own Estimates

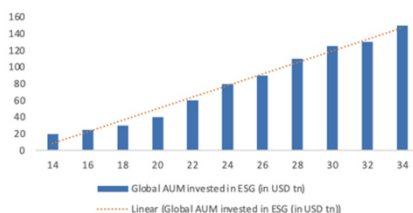
the **weaker refining margins environment** and the **lack of clear energy transition targets** and levers (vs. peers) apart from Renewables' additions targets to 2030, could be driving the **de-rating**. We see the positioning of the company as a **multi-energy integrated player** beyond renewables (e.g.: green hydrogen) to be critical to convince investors, following the threats towards L/T oil demand, and that would be key for a **potential positive re-rating of Galp**.

Galp's Environmental Path

With the energy transition era, investors are each time more looking towards the degree to which **companies' strategies are in line with Paris goals**, and that could make Galp's Upstream growth potential, that is still material, to be something for which investors have lost their appetite to pay a premium for. The O&G is an Environmental risky sector, having O&G companies to address the impacts of their operations over climate changes. Nonetheless, we see Galp's "ESG path" to be **currently delayed** vs. peers.

Although Galp has disclosed targets for reducing the Carbon intensity of its operations by 2030, **peers have indeed added more visibility** on their pathway to net zero (Figure 87: also in Appendix) while presenting relevant intermediate targets (for 2025 and 2040) and that may put Galp potentially less attractive for investors, at this stage. Furthermore, Galp's targets of absolute emissions **do not account for the 3rd scope**, that is responsible for 90% of total emissions. More than that, Galp is targeting **>20% production growth** for its Upstream production until 2025, which is not in line with the carbon budget, hence with the 1,5°C limit scenario (IEA's 1,5°C scenario requires the overall WIP kboep/d to start peaking by now). Also, under the 1,5°C scenario, the IEA estimates the required cut on oil production (Figure 86: also in Appendix) **to be already above BP's and Rystad oil supply** from their existing/sanctioned wells, that inevitably cut Galp's incentives to further explore new oil fields. Additionally, despite having commitments towards net zero by 2050, a Transition Pathway analysis shows a wide range of O&G companies, including Galp, not to be even strategically aligned **with the 2°C scenario**, given their "not enough" targets for GHG emissions reductions (Figure 88: also in Appendix). Furthermore, Galp's internal capital budgeting assumptions **are not aligned with Net Zero scenario** as the company is assuming a **flat brent price of \$60/bbl**, and IEA assumes brent prices to **be falling to \$35/bbl in 2030**, with brent prices most likely equaling marginal costs of production. Finally, Galp **did not indicate** a breakdown on **decarbonization levers** neither **concrete actions for individual segments** until 2030, such that we do not know if Galp's carbon intensity targets are to be achieved **through the company's target renewable generation only**.

Figure 84: Global AUM invested in ESG (in \$tn)



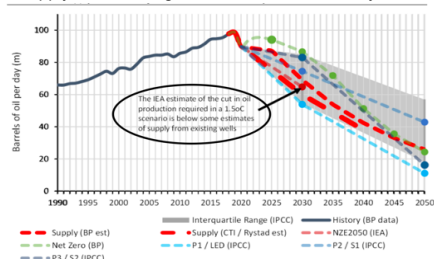
Source: Bloomberg

Figure 85: Iberian sectors per ESG risk

Iberian sectors ranked per ESG risk			
Low (1-2)	Medium (2-3)	High (3-4)	Very High (4-5)
Rail Transport	Food Retail	Utilities	O&G
Capital goods	Media	Food	
Healthcare	Telecoms	ulp & Puper	
	Tech & IT	Infrastructure	
	Renewables	Industrials	
	Insurance		
	Mail & Parcels		
	Real Estate		
	Business Services		
	Banks		
	Travel & Leisure		

Source: BPI/CaixaBank

Figure 86: Oil production/consumption trajectories consistent with a 1,5°C scenario (IEA) vs. estimates of supply from existing wells from BP and CTI/Rystad



Source: TPI, IEA

Figure 87: Galp is lagging European peers on emission targets

Company	Measure	Scope	Time horizon for emissions reduction			Net Zero
			2025	2030	2040	
Repsol	Absolute emissions reduction	1+2+3	-12%	-25%	-50%	2050
Shell	Absolute emissions reduction	3	-6%/8%	-20%	-	2050
BP	Absolute emissions reduction	1+2	-20%	30%/33%	-	2050
		3	-5%	>15%	-50%	2050
Total	Absolute emissions reduction	1+2+3	>11%	-40%	-	2050
		3	-	-15%	-35%	2050
ExxonMobil	Absolute emissions reduction	1+2	-15%/20%	-	-	2050
Chevron	Absolute emissions reduction	1+2	-	-35%	-	2050
Equinor	Absolute emissions reduction	1+2	Up Intensity <8kg CO2/boe by 2025	-	-	2050
ENI	Absolute emissions reduction	3	-	-15%	-40%	2050
OMV	Absolute emissions reduction	1+2	>10%	-	-	2050
		3	-4%	-	-	?
GALP	Absolute emissions reduction	1+2	-	-40%	-	2050

Source: Companies' reports

Figure 88: Carbon performance of European O&G companies



Source: Transition Pathway Analysis

ESG investments have been growing exponentially, and the money put in sustainability causes is shaping capital markets and stock performances, now reflecting the “ESG risk” that investors are willing to take. For the reasons above mentioned, we believe that **Galp has still some work to do vs. peers** in terms of its **Environmental path**, something we consider as critical **to get investors fully convinced on the merits of its energy transition strategy**. However, we cannot be indifferent to the most recent JV agreement (50/50) that Galp has recently established with Northvolt, for the development of the European greatest lithium processing plant, set to have an annual output capacity of up to 35k. tonnes of lithium-ion batteries. With this, not only Galp does an important step in positioning itself as a multi-energy company, focused on exploring low-carbon diversified energy sources, other than the threatened Upstream business but also it most likely enhances visibility towards the global equity market, then easiness in accessing to capital, as the lithium plant will be critical to position Europe within the right path towards decarbonization. (Note: Our valuation model does not include the JV agreement as it was only disclosed on the 14th of Dec. 2021).

Terminal Cash Flow

Figure 89: EU Nominal Long-term GDP growth Rate

$((1 + \text{Long-term real GDP growth rate}) \times (1 + \text{Long-term inflation rate})) - 1$	
Long-term real GDP growth rate	Long-term inflation rate
0,7%	1,95%
<hr/>	
Long-term nominal GDP	2,71%

Source: Oxford Economics

Figures 90: Possible scenarios on EU power system 2020-2050 (including total costs, and total costs as a % of EU-GDP)

Scenario	2050
Clean Scenario	
Share of Nuclear* + Renewable energy of total Generation Mix	90%
GHG total reduction vs. 1990 levels	95%
Total Power System Cost 2020-2050	€6255bn
% of EU cumulative real GDP	1,20%
Green Scenario - Net Zero	
Share of Nuclear + Renewable energy over total Generation Mix	93%
Renewable Generation (Target for EU achieved)	80%
GHG total reduction vs. 1990 levels	> 95%
Total Power System Cost 2020-2050	€6645bn
% of EU cumulative real GDP	1,30%

* Under green and clean scenarios investments are dominated by capital intensive technologies such as renewables and nuclear plants.

Scenario	2050
Lean Scenario	
Share of Nuclear + Renewable energy of total Generation Mix	= to 2020 levels
Fossil Fuel Generation over total Generation Mix	> 50%
GHG total increase vs. 1990 levels	28%
Total Power System Cost 2020-2050	€5730bn
% of EU cumulative real GDP	1,10%

* Under lean scenario investments remain dominated by conventional fossil plants with lower specific investment costs but higher operating costs.

Source: McKinsey; “Transformation of Europe’s power system until 2050”

The terminal cash flow is the first term of the perpetuity formula that defines the continuing value. The EU’s power system is **being subject to significant and challenging** changes, at least within 2020-2050, mostly driven by the EU commitments towards a range of sustainability targets to be achieved by 2050. In line with McKinsey’s report “Transformation of Europe’s Power system until 2050”, we have created three possible scenarios to assess the evolution of the power sector within the EU, **a clean, a green and a lean scenario** (represented on Figure 90). Within the three scenarios, **the total energy system costs implied for the power systems will represent quite stable and similar** (only possibly ranging from 1,1%-1,3%) percentages of the annual EU GDP over the referred period. Under our vision, the investments made on the Energy sector **must be proportional** to the value that the sector will be ending up adding afterwards to the overall EU economy, **hence to the weight of contribution the sector ends up having over the overall EU economy**, as well, and that, as mentioned, will remain stable throughout time at least to 2050. As a result, we assumed our company’s terminal growth rate to **equal the nominal long-term growth rate** of the EU economy, projected at 2,71% by Oxford Economics (L/T Real EU GDP at 0,7% and EU Inflation at 1,95%). Also, we assume Galp to keep its weight within the overall energy sector.

Discount Rates

The firm value was determined through **the DCF method**, by discounting the Free Cash Flows at the WACC. The DCF is the most suitable method to use, as we assume that Galp will **manage its capital structure to a target level**.

Cost of equity: The cost of equity was determined through the **CAPM Model**. To determine Galp's levered beta, we regressed Galp's stock returns against the **STOXX 600 index**, using weekly data from a relatively short time period, that is the last 2 years, as the Beta is **time-varying and not constant**. Galp's levered beta was determined at 1,38. The **STOXX 600 index**, composed by a considerable number of European companies (600), hence well diversified, was chosen as a **good market proxy**. To determine the levered betas for the different business units, we selected comparable companies so as to obtain the average of their unlevered beta⁸. Then, each unlevered beta was **re-levered**, using Galp's respective **target capital structure**. The unlevered and levered betas estimated are represented in Figure 91. Based on the computed parameters, the estimated cost of equity are shown in Figure 92. **Cost of debt:** To determine Galp's cost of debt – assumed the same for each business unit – we assumed the sum of the risk-free rate plus the spread as a reasonable approach. Galp is not currently rated by rating agencies, such that a **Synthetic Credit Rating** needed to be estimated. In our case, we relied on Galp's comparable companies' ratings, such as OMV, Eni and BP, and we assumed a Credit Rating of A3/A-, resulting in a spread of 1,33%. Afterwards, we estimated Galp's cost of debt of 1,83%. **WACC:** To determine the WACC, the tax rate used was 31,5% and that equals Galps statutory tax rate. For the risk-free rate we use the “normalized” 10-year moving average of the 10-Year German Government Bond that equalled 0,50%⁹, which we believe to be an appropriate comparison period and that could be used as a reasonable proxy for the future. In fact, the corona crisis **has driven the risk-free rates artificially low** (and negative) and that made us to believe the current observable temporary decreases **not to be properly reflecting our investment horizon**. Regarding the Market Risk Premium (MRP), we considered it as a given input of 6%. Consequently, the Market Return achieved was of 6,50%, resulting from the sum of the risk-free rate plus the MRP. The target **D/E ratio is expected to keep constant at 58%**, resulting from Galp's Net Debt divided by the Market Capitalization¹⁰. Galp's tax

Figure 91: Galp and businesses units unlevered and levered betas

	β unlevered	β levered
GALP & Others	0,76	1,38
Upstream	0,75	1,05
Refining and Midstream	0,82	1,17
Commercial	0,62	0,86
Renewables	0,56	0,76

Source: Own estimates

Figure 92: Galp and businesses units Cost of Equity

	Cost of Equity
GALP & Others	8,8%
Upstream	6,8%
Refining and Midstream	7,5%
Commercial	5,7%
Renewables	5,0%

Source: Own estimates

Figure 93: Galp and businesses units WACCs

	WACC
GALP & Others	6,0%
Upstream	10,0%
Refining and Midstream	5,2%
Commercial	4,0%
Renewables	3,6%

Source: Own estimates

⁸ Source: Bloomberg Values from the year of 2021

⁹ Source: 10 Year German Government Bond Yield – Bloomberg Values

Note: For the Upstream segment, we used the PV10 approach, which is a method of estimating the potential future earnings that an O&G proven deposits and reserves may produce, using a 10% discount rate. Source: <https://www.investopedia.com/terms/p/pv10.asp>

¹⁰ Bloomberg Values from the year of 2021

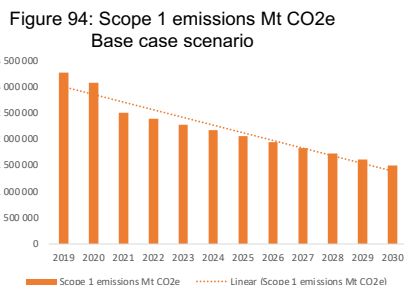
rate, risk-free rate and MRP was assumed to be the same for each business unit. The estimated WACCs are shown in Figure 93.

Scenario Analysis

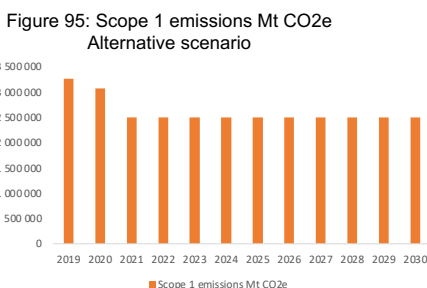
In fact, the on-going **climate changes** put limits on the amount of carbon emitted to the atmosphere, and that requires both, the production and consumption of fossil fuels to peak soon, with either demand or supply peaking first. As such, it was necessary to evaluate how sensitive the company’s share price is, whenever changes in certain key value drivers occur, such as **brent prices**, **NG/LNG prices**, in turn, indexed to brent, **refining margins** and **investment priorities**.

Our base case scenario follows the IEA’s Net Zero Scenario, the most likely one following the last COP26 climate conference, that, as mentioned, assumes ‘he oil demand to peak by 2025, **first than supply**, and that would imply oil producers to “run” to monetize their resources, hence brent prices declining to 2030. **An alternative scenario** would imply oil supply **peaking first than the oil demand** considering the recent declines in the O&G field development investments (\$740bn in 2015 to \$350bn in 2020) then limiting the future growth of oil production vs. demand levels. Within this, huge tensions within the oil market and increases on long-term brent prices could be expected, **and that were assumed to average \$80/bbl FY22-30**. In the alternative scenario, with consumers “delaying” shifting to greener energies, we assume the refining process to be mostly allocated to fossil fuel products (more carbon intensive), and with this, no further declines on Galp’s carbon emissions. Therefore, for the explicit period, we assumed the refining scope 1 absolute emissions to equal those of 2020, given the number of raw materials processed (mboe) (Figure 95).

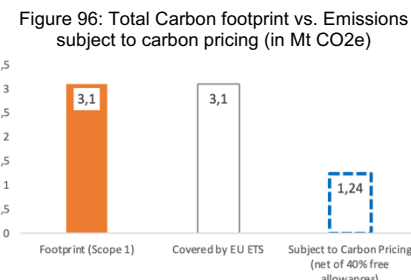
Nonetheless, **carbon prices constitute a critical method** for policymakers to promote a transition from fossil fuels to low-carbon energies, hence **expected to keep on track under both scenarios**, as well. Galp is currently subject to the **European Union emissions trading system (EU ETS)**, and the same EU ETS carbon prices are assumed in both scenarios, and that are expected to increase from €25/ton in 2020 to €60/ton in 2025. Reuters estimate EU ETS carbon price to reach €90/ton in 2030 (Figure 97). Under EU ETS, only the R&M emissions are included, with Upstream emissions not incorporated on the carbon system. Additionally, the EU ETS includes **the free allowances mechanism** and that implies **only 30-40%** of the EU companies’ eligible GHG scope 1 emissions to be effectively subject to carbon pricing. In 2020, Galp’s carbon cost reached €30mn in 2020 (3,1mton total scope 1 emissions – only 40% carbon priced -, carbon price at €25/ton). **Scope 1 emissions** come from sources that are controlled or owned by the company, and that makes most of the carbon pricing political efforts only accounting for scope 1 emissions, as it is the case of the EU ETS.



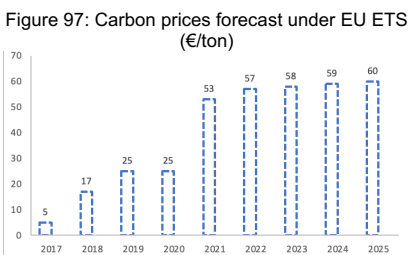
Source: Company’s Report & Own estimates



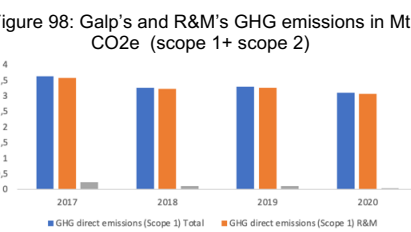
Source: Company’s Report & Own estimates



Source: Company’s Report



Source: Bloomberg; IEA



Source: Company’s Report

Figure 99: Alternative Scenario Share Price Performance

Alternative Scenario	
€m	As of Dec. 2022
Levered EV Upstream	4216
Levered EV Refining & Midstream	4 308
Levered EV Total	15 212,00
Shareholder's Equity	12 850,00
Shareholder's Equity	
Valuation Methods	2022F
DCF + SoP	12 850,00
Price per Share	
DCF (€/sh)	15,50
Number of shares outstanding	
Total Return	85%
Price as of 31-12-2022	8,52
Recommendation (BUY)	

Source: Own estimates

Figure 100: Base case scenario – pessimistic hypothesis – share price performance

Base Case Scenario - Pessimistic Hypothesis	
€m	As of Dec. 2022
Levered EV Upstream	1145
Levered EV Refining & Midstream	4 001
Levered EV Commercial	3 610
Levered EV Total	8 577,00
Renewables (Equity accounted)	437,00
Shareholder's Equity	5 835,00
Equity	
Valuation Methods	2022F
DCF + SoP	5 835,00
Price per Share	
DCF (€/sh)	7,04
Number of shares outstanding	
Total Return	-17%
Price as of 31-12-2022	8,52
Recommendation (SELL)	

Source: Own estimates

Figure 101: Alternative scenario – pessimistic hypothesis – share price performance

Alternative Scenario - Pessimistic Hypothesis	
€m	As of Dec. 2022
Levered EV Upstream	2359
Levered EV Refining & Midstream	4 297
Levered EV Commercial	3 407
Levered EV Total	9 882,00
Renewables (Equity accounted)	437,00
Shareholder's Equity	7 146,00
Equity	
Valuation Methods	2022F
DCF + SoP	7 146,00
Price per Share	
DCF (€/sh)	8,62
Number of shares outstanding	
Total Return	4%
Price as of 31-12-2022	8,52
Recommendation (NEUTRAL)	

Source: Own estimates

Figure 102: Sensitivity analysis on WACCs

	Refining and Midstream		
	β unlevered	WACC	Price
Scenario w/ Orlen	0,77	4,9%	13,87
Scenario Base	0,82	5,2%	13,15
Scenario w/ Grupa Lotos	0,87	5,5%	12,59
	Commercial		
	β unlevered	WACC	Price
Scenario w/ A2A S.p.A.	0,62	4,0%	13,45
Scenario Base	0,62	4,0%	13,15
Scenario w/ Naturgy Energy	0,63	4,1%	12,86

Source: Own estimates

Looking into Galp's scope 1 emissions' historical data, we notice first that more than **90% come from the Refining business**. Secondly, we conclude that scope 2 emissions are less than **10% of total GHG emissions** (scope 1 + scope 2) (Figure 98). As stated before, Galp did not disclose clear decarbonization levers neither climate-focused actions for the individual segments, explaining how absolute emissions would be reduced in 40% (on Galp's operations) until 2030. As such, for simplification, for our alternative scenario we will assume that the **40% reduction on absolute emissions will come from the refining business and solely from scope 1 emissions**.

If fossil fuels production are to be assumed until 2030, and not replaced by low-carbon alternatives, we wanted to test what **if the EU ETS free allowances mechanism would end** so as to increase the companies' total carbon price to pay per ton of CO2 produced, with the whole R&M scope 1 emissions start being carbon priced instead (not just the current 40%). Within the base case scenario, the lower carbon pricing, hence higher refining margins may be explained by **(I)** the existence of the 40% free allowances; **(II)** the continuous decrease on Galp's refining scope 1 absolute emissions (target of minus 40% by 2030 vs. 2021), implicitly reducing the total carbon cost paid. Under the alternative scenario, Galp's refining margins average **\$2,4/bbl vs. base case \$3,6/bbl FY22-30F**, resulting in a final price target of €15,50/share, higher than the base case price. In fact, the high long-term Brent price increases Upstream's EV **more than** the decline over the R&M' EV driven by lower refining margins, once again emphasizing Galp's **dependence** on Upstream, and L/T threatened - business.

Apart from this, for the base and alternative scenarios, we even wanted to test a **pessimistic scenario**. As such, within those, we have considered a cut of **30% in Tupi/Iracema project's annual production** – the greatest Upstream CF contributor – and the **non-materialization of Bacalhau I and Area 4 in Mz**, given the materialization of eventual geological and/or political risks, therefore assuming a cut of **30% in commercial oil sales** driven by the lower Upstream output. Lastly, we have even considered Galp to **miss half of its target renewable capacity** by 2030. Within base case **Galp's share price would decline to €7,04 (SELL)** and in the alternative to €8,52/share (**HOLD**).

Sensitivity Analysis

With the purpose of accessing the impact that changes in input variables have on Galp' share price, a Sensitivity Analysis was performed on the **WACC, cost of debt, and perpetual growth**.

Regarding the WACC, a sensitivity analysis was performed considering the unlevered betas of the different selected comparable companies (Figure 102).

Figure 103: Sensitivity analysis on cost of debt

	Cost of debt	Price
A1/A+	1,57%	13,75
A2/A	1,68%	13,48
Credit Rating A3/A-	1,83%	13,15
Baa2/BBB	2,21%	12,38
Ba1/BB+	2,81%	11,36

Source: Own estimates

For the R&M business unit, with WACC values ranging from 4,9% and 5,5%, the share price changes between €12,59 and €13,87. For the Commercial, with WACC values ranging from 4,0% and 4,1%, the share price ranges from €12,86 and €13,45 (Figure 102). Therefore, **minimal changes in WACC input variables does not impact Galp’s share price significantly**. The cost of debt was determined assuming a Credit Rating of A3/A-, based on Galp’s comparable companies’ ratings, as explained in the discount rates section. To assess how sensible Galp’s share price is to different Credit Ratings, a sensitivity analysis was performed. Based on Figure 103, we conclude that **different Credit Ratings does not influence significantly Galp’s share price**. Afterwards, we tested how sensitive the share price is to changes in g (driven by higher or lower nominal GDP growths, due to increased globalization/deglobalization and/or changes in inflation rates). The range of possible values chosen for g equal the minimum and maximum expected nominal EU GDP growths between 2030 and 2050, that is 2,58% and 2,78% respectively. Therefore, the share price ranges from €12,26 and €13,73 (Figure 104) and we conclude that relatively **small changes in g does not impact Galp’s share price substantially**.

Figure 104: Sensitivity analysis on perpetual growth rate

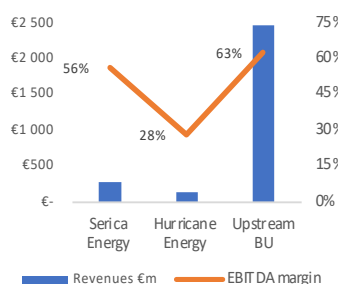
	R&M/Commercial/Others	
	Growth (g)	Price
Scenario w/ Maximum	2,78%	13,73
Scenario Base	2,71%	13,15
Scenario w/ Minimum	2,58%	12,26

Source: Own estimates

Multiples Valuation

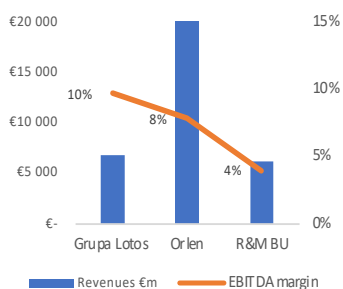
To complement the DCF approach, a **multiples analysis** was developed for each individual business unit. The comparable companies were chosen based on their **own business models and geography (mainly Europe) of operations**. The most appropriate multiples to use in our analysis were the **EV/EBIT, EV/EBITDA, and EV/Sales**. First, and to consider the **high level of capital intensity of the sector**, that makes **depreciations/amortizations true economic costs**, the EV/EBIT multiple was used for the Upstream business unit. Secondly, the EV/EBITDA multiple was used for the R&M since its EBIT was negative in 2022, making it not possible to conduct a multiple analysis through the EV/EBIT multiple. Thirdly, to account for the **end-customers sales** amount under the Commercial segment, the multiple EV/Sales was rather chosen.

Figure 105: Upstream Comparable Companies



Source: Bloomberg (2019)

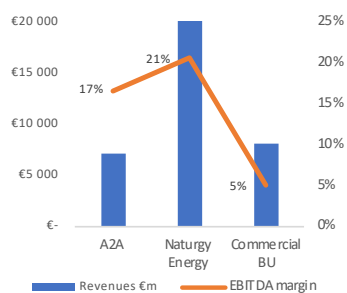
Figure 106: R&M Comparable Companies



Source: Bloomberg (2019)

For the Upstream business unit, the comparable companies chosen were Serica Energy PLC and Hurricane Energy PLC, with exploration and extraction of oil and natural gas activities. The average EV/EBIT multiple corresponds to 2.8x, resulting in an Enterprise Value of €6.375mn, in comparison to €2.330mn calculated through the DCF approach. Due to substantial differences in terms of sizes and profitability (Figure 105) and high EV/EBIT multiples vs. comparables, and mostly by the high Upstream EBIT FY22, following the “inflated” brent price, the DCF approach is undervalued vs. relative valuation, leading to a misleading result. **For the Refining and Midstream segment**, the selected comparable companies were Grupa Lotos SA and Polski Koncern Naftowy Orlen SA, both

Figure 107: Commercial Comparable Companies



Source: Bloomberg (2019)

Figure 108: Multiples Valuation

Sum of Enterprise Values	17 062
Others DCF Enterprise Values	74
GALP EV	17 136
Value Financial Debt	-2 175
Renewables DCF Enterprise Values (Equity Accounted)	874
Operating Outstanding Leases	183
Value of Equity	15 652
Non Controlling Interests	-884
Shareholder's Equity	14 768
Price per Share	Dec-22
Multiples (€/sh)	17,81

Source: Own estimates

based in Poland. Considering this, the average multiple reached was 3.9x EV/EBITDA that results in an Enterprise Value of €802mn, in comparison to €4,011mn estimated through the DCF approach. Thus, vs. relative valuation, the R&M's DCF EV is significantly overvalued, and this can be explained mostly by the lower multiples of R&M segment comparable firms, as well as by the pretty low Galp's R&M EBITDA FY22, following the weak refining environment imposed by corona crisis. In terms of profitability, the values are relatively identical, although Polski Koncern Naftowy Orlen has a significant larger size (Figure 106). **For the Commercial business unit**, the two comparable companies chosen were A2A S.p.A., and Naturgy Energy Group S.A., both with energy distribution and trading activities. The average EV/Sales multiple reached is 1.6x, which leads to an Enterprise Value of €9.886mn, close to the one forecasted by the DCF approach of €7.105mn. From Figure 107, we notice that ASA and the Commercial unit have similar revenues, but that ASA and Naturgy Energy are substantially higher profitable. **For the Renewables business unit**, it was not feasible to complete a relative valuation since we are referring to a segment that has only started operations recently, making its EBITDA value in 2022 far from representative of the segment's future value creation. To overcome this difficulty, it was used the Renewables' EV estimated through the DCF approach, only. The same was done for the Others segment. The Shareholders' Equity equals €14.768mn and share price €17,81, that considering a Total Return of 105% results in a **BUY** Recommendation.

Final Recommendation

With the energy transition era, the number of AUM looking for **ESG are growing at a fast pace among investors**, that are currently **less willing to own O&G on their portfolios** unless those companies can significantly reduce their carbon footprint and start being attractive enough in ESG aspects. In this aspect, we believe that Galp has two main disadvantages: **(I) it is an O&G company** (hence high risky in ESG aspects); **(II) Galp is relatively small vs. peers** hence most likely in a disadvantageous position to access to low-carbon investments in emerging – and higher return – markets, as within Iberia the low-carbon space seems highly competitive hence difficult for Galp to differentiate itself. Given that, we believe that Galp's Board may be interested in exploring two different options: **(I) Merging with other larger company** to gain visibility and valued resources to materialize its energy transition strategy; **(II) Buying back shares to reduce the dividend payment burden while spreading confidence over the equity market, at the same time.** Doing that, Galp will attempt to **extract value from its undervaluation period**, and once capable of materialize its energy transition strategy and investors' attractiveness for the overall sector returns, end the

Figure 109: Galp's Valuation Summary

€m	As of December 2022
Non-Operating IC	-252
Levered EV Upstream	2330
Levered EV Refining & Midstream	4 011
Levered EV Commercial	7 105
Levered EV Others	75
Levered EV Total	13 270
Value Financial Debt	-2 175
Renewables (Equity Accounted)	874
Operating Outstanding Leases	183
Value of Equity	11 786
Non Controlling Interests	-884
Shareholder's Equity	10 902
	Shareholder's Equity
Valuation Methods	2022F
DCF + SoP	10 902
Price per Share	Dec-22
DCF (€/sh)	13,15
Number of Shares Outstanding	829,25
Transactions with Equityholders	208
Expected Cash Gain	3%
Share Price as of 31-Dec-2021 (Bloomberg Values)	€ 8,52
Expected Capital Gain	54%
Total Return	57%
Recommendation	BUY

Source: Own estimates

buyback and **rise dividends, enhancing its attractiveness towards investors.** Our final recommendation is to **BUY** Galp's stock. According to our DCF valuation, Galp will be traded at €13,15 as of 31st Dec.22, that yields a Total investor Return of 57% (thereof expected Cash Gain of 3%).

Appendix

Financial Statements Appendix 1: Income Statement

Reformulated Income Statement

€m	HISTORICAL										FORECASTING									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Core Operations																				
Operating Revenues																				
Sales	16 363	18 041	19 102	17 479	14 877	12 504	14 574	16 535	15 962	10 771	-	-	-	-	-	-	-	-	-	-
Services Rendered	441	466	519	542	634	631	628	647	608	610	-	-	-	-	-	-	-	-	-	-
Other operating income	183	137	144	105	101	121	105	141	368	187	-	-	-	-	-	-	-	-	-	-
Total Operating Revenues	16 987	18 644	19 765	18 126	15 613	13 256	15 307	17 322	16 938	11 568	11 880	14 329	14 659	14 876	15 173	15 947	15 779	15 579	15 424	15 295
Check Line	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE										
Operating Costs																				
Inventories consumed and sold	-14 570	-16 196	-17 208	-15 701	-12 793	-10 136	-11 379	-12 763	-12 592	-8 461	-8 013	-9 407	-10 233	-10 443	-10 707	-11 449	-11 537	-11 597	-11 666	-11 736
Materials and services consumed	-914	-990	-1 069	-1 158	-1 236	-1 300	-1 617	-1 780	-1 650	-1 473	-1 172	-1 376	-1 497	-1 528	-1 567	-1 675	-1 688	-1 697	-1 707	-1 717
Personnel Costs	-327	-321	-347	-370	-343	-334	-320	-321	-346	-356	-245	-287	-313	-319	-327	-350	-353	-354	-356	-359
Impairments on accounts receivable	-24	-37	-52	-35	-15	-23	-15	-14	1	-8	-7	-8	-8	-9	-9	-9	-9	-10	-10	-10
Other operating costs	-87	-83	-99	-73	-66	-98	-78	-134	-132	-156	-92	-108	-117	-120	-123	-131	-132	-133	-134	-135
Op. Costs before DD&A	-15 922	-17 627	-18 775	-17 337	-14 454	-11 891	-13 409	-15 012	-14 719	-10 454	-9 529	-11 186	-12 169	-12 418	-12 732	-13 615	-13 720	-13 791	-13 873	-13 957
Depreciation, Amortisation and Other Impairments	-404	-426	-585	-614	-720	-835	-762	-691	-979	-1 289	-968	-650	-673	-664	-639	-751	-789	-813	-829	-844
Total Operating costs	-16 326	-18 054	-19 360	-17 950	-15 174	-12 726	-14 171	-15 702	-15 698	-11 743	-10 497	-11 836	-12 842	-13 082	-13 372	-14 366	-14 510	-14 604	-14 702	-14 800
Core Result Before Taxes	662	591	405	176	439	530	1 136	1 620	1 240	-175	1 384	2 493	1 817	1 794	1 802	1 581	1 270	975	721	495
Statutory Taxes	-192	-171	-118	-48	-119	-143	-307	-510	-391	55	-436	-785	-572	-565	-568	-498	-400	-307	-227	-156
Energy sector Extraordinary Contribution Taxes	-	-	-	0,2%	0,4%	0,5%	0,4%	0,3%	0,3%	0,4%	-	-	-	-	-	-	-	-	-	-
Recurring Tax Adjustments	0	0	0	-97	-65	-77	-268	-329	-357	330	-512	-918	-627	-600	-563	-495	-370	-250	-144	-49
Core Result	470	419	288	1	189	242	498	720	435	165	406	749	571	585	631	547	459	378	309	250
Non Core Operations																				
Provisions	-20	-32	-4	4	-16	12	-22	9	-8	-106	-97	-98	-98	-98	-98	-98	-98	-98	-98	-97
Net income from associates	73	78	116	30	19	17	163	129	121	220	158	158	158	158	158	158	158	158	158	158
Net profit from investments	1	4	0	-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest income	20	85	62	48	28	34	33	42	37	18	31	25	25	25	27	28	29	29	30	30
% of loan to Sinopec (ST & LT) + Investments in associates & Investments in other participated companies + Rights of use (IFRS 16)	7%	21%	12%	3%	2%	2%	2%	3%	2%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Exchange gain (loss)	0	2	-9	-27	-10	-9	-18	-31	-10	-78	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34
Mark-to-market of derivatives	-1	1	13	-18	-13	17	0	-28	81	-44	11	27	3	15	15	11	14	13	12	13
Other financial costs/income	-2	2	1	-9	-17	-14	-17	-19	-64	33	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17
Non-Core Result Before Taxes	72	140	180	16	-7	57	139	103	157	43	52	61	37	50	51	48	52	52	52	
Statutory Taxes (Tax Shield)	6	8	1	2	4	3	6	3	33	34	31	38	34	34	35	34	33	34	33	33
Non recurring tax adjustments	-4	-56	-80	-46	12	-51	64	95	-35	-697	0	0	0	0	0	0	0	0	0	0
Non Core Result	74	92	101	-27	9	3	209	196	125	-620	85	92	75	84	85	83	85	86	85	86
Financial Operations																				
Total Financial results:																				
Interest expenses	-141	-166	-207	-173	-148	-134	-107	-83	-53	-56	-42	-34	-40	-42	-42	-47	-51	-53	-54	-56
Capitalised interest	-	-	-	46	89	82	77	49	24	22	-20	-15	-17	-19	-19	-21	-23	-24	-25	-25
Interest leases (IFRS 16)	0	0	0	0	0	0	0	0	-90	-80	-71	-72	-70	-67	-80	-83	-86	-89	-91	-92
Financial Result before taxes	-141	-166	-207	-127	-59	-52	-30	-34	-119	-114	-133	-120	-128	-128	-140	-152	-160	-165	-169	-173
Tax Shields	41	48	60	34	16	14	8	11	37	36	42	38	40	40	44	48	50	52	53	54
Financial Result	-100	-118	-147	-92	-43	-38	-22	-24	-82	-78	-91	-82	-87	-87	-96	-104	-110	-113	-116	-118
Net Profit	444	394	242	-119	154	207	685	892	478	-533	400	758	559	582	620	526	435	350	279	218
Other comprehensive income/(loss) before allocation to noncontrolling interests	-46	-79	-294	276	-59	558	-726	-37	4	-461	0	0	0	0	0	0	0	0	0	0
Comprehensive income attributable to noncontrolling interest	27	25	-38	173	12	179	-113	128	392	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54
Total Comprehensive Income attributable to Galp Shareholders	371	290	-14	-15	83	586	72	727	90	-940	454	812	613	636	674	580	489	404	333	272

Note:

Dividends Distributed	166	199	239	287	344	413	456	522	580	290	498	415	415	415	415	415	415	415	415	415
Dividends per Share	0,2	0,2	0,3	0,3	0,4	0,5	0,6	0,6	0,7	0,35	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Number of Shares Outstanding	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829	829

Appendix 2: Balance Sheet

Reformulated Balance Sheet & Forecast

€m	HISTORICAL										FORECASTING									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Operating Business																				
Operating Cash	340	373	395	363	312	265	306	346	339	231	238	287	293	298	303	319	316	312	308	306
Trade Receivables	1770	3185	3168	1995	1704	1844	1803	1865	2174	1924	1545	1907	2044	2116	2067	2197	2192	2162	2127	2116
Inventories	1875	1976	1846	1210	873	869	970	1171	1055	708	690	1252	1427	1485	1458	1577	1603	1609	1609	1624
Trade Payables	2758	3008	2991	2375	2052	2039	2028	2017	2316	1524	1403	1639	1825	1848	1886	2020	2042	2048	2059	2073
Net Working Capital	1226	2526	2418	1193	837	938	1052	1366	1253	1339	1070	1807	1940	2051	1943	2074	2069	2035	1985	1973
Tangible fixed assets	4159	4490	4565	5052	5216	5910	5193	5333	5671	4878	4388	4437	4347	4152	4936	5169	5355	5506	5632	5733
Deferred tax assets	115	171	182	263	360	248	256	282	271	399	0	0	0	0	0	0	0	0	0	0
Deferred tax liabilities	81	126	124	120	109	66	76	196	299	479	0	0	0	0	0	0	0	0	0	0
Income tax payable	0	0	0	19	9	75	115	82	141	0	0	0	0	0	0	0	0	0	0	0
Other intangible assets	1301	1458	1545	1447	1403	268	407	547	577	532	738	863	872	879	886	930	894	843	802	760
Rights of use Assets (IFRS 16)	0	0	0	0	0	0	0	0	167	1002	901	911	893	853	1014	1062	1100	1131	1157	1178
Operating Invested Capital	6721	8519	8586	7816	7697	7223	6715	7250	8500	7671	7097	8018	8051	7936	8778	9234	9418	9516	9576	9643
Non-Operating Business																				
Goodwill	232	232	233	225	137	87	84	85	85	85	85	85	85	85	85	85	85	85	85	85
Investments in associates	304	399	516	787	1114	1432	1483	1295	870	483	676	580	628	604	616	610	613	611	612	612
Investments in other participated companies	3	3	3	3	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Loan to Sinopec	0	0	0	890	723	610	459	176	0	0	0	0	0	0	0	0	0	0	0	0
Assets available for sale	0	0	0	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Current Income tax recoverable	9	0	33	0	0	0	4	4	0	101	0	0	0	0	0	0	0	0	0	0
Financial investments	6	27	35	32	29	45	99	335	343	593	342	403	420	440	401	416	419	419	414	417
Non-current assets held for sale	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retirement and other benefit obligations	286	250	254	311	320	272	232	217	236	271	381	381	381	381	381	381	381	381	381	381
Other financial instruments	92	16	12	16	32	18	24	139	89	167	105	125	121	130	120	124	124	124	123	124
Provisions	111	138	154	185	429	429	619	658	819	1008	911	813	715	617	519	421	323	225	127	30
Non-current liabilities associated with non-current assets held	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Financial Assets	3844	2069	2569	2883	2734	2134	2193	2084	1774	2297	1823	2175	2267	2280	2565	2764	2871	2949	3017	3094
Leases liabilities (IFRS 16)	0	0	0	0	0	0	0	0	1223	1089	962	973	953	911	1082	1133	1174	1207	1235	1257
Equity attributable to Non-controlling interests	56	1305	1255	1420	1416	1563	1435	1460	1237	940	889	884	857	832	811	777	734	683	624	561
Equity Attributable to Shareholders	2885	5401	5161	5005	4772	4980	4344	4587	4420	3160	3129	3734	3890	3913	4402	4744	4928	5062	5179	5310
Total Financing	6785	8775	8985	9307	8922	8678	7972	8130	8655	7485	6804	7766	7967	7936	8859	9419	9707	9901	10055	10222

IFRS figures

GALP CF Map & Forecast

€m	HISTORICAL										FORECAST									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Operating FCF																				
Changes in Goodwill																				
Changes in Investments in associates																				
Changes in Investments in other participated companies																				
Changes in Loan to Sinopec																				
Changes in Assets available for sale																				
Changes in Current Income tax recoverable																				
changes in Financial investments																				
Changes in Non-current assets held for sale																				
Changes in Retirement and other benefit obligations																				
Changes in Other financial instruments																				
Changes in Provisions																				
Changes in Non-current liabilities associated with non-current assets held for sale																				
Non-Operating FCF (+ Other Comprehensive Income)																				
Adjustments as of the historical difference between the Galp's disclosed Fixed Assets, Dep. & Capex																				
Unlevered FCF																				
Financial Result																				
Tax shields																				
Minority Interests																				
Change in Financial Debt																				
Transactions with equityholders																				
Change in Leases liabilities (IFRS 16)																				
Cash Flow from Investors																				

IFRS figures

Upstream

€m	HISTORICAL										FORECASTING									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Truly Operational Results IFRS																				
Statutory Taxes/Corporate Taxes																				
Energy sector Extraordinary Contribution Taxes																				
Recurring Tax Adjustments - Includes SPT payable in Brazil & IRP payable in Angola																				
NOPLAT																				
DD&A																				
Operating Gross Free Cash Flow																				
ΔNWC																				
Total change of:																				
Deferred tax assets/Deferred tax liabilities/Income taxes payable*																				
Cash Flow From Operations (CFFO) - Operating Cash Flows																				
Change in Intangible assets																				
Change in Rights of Use (IFRS 16)																				
Net Capex																				
Operating Free Cash Flows																				

By Upstream Project (as of Dec/2022)	
BRAZIL	
Tupi/Iracema	
NPV RISKED	1476
Discount Factor considered	100%
NPV with discount factor	1476
€/per share	€2
Iara (sururu + berbigão + atapu)	
NPV RISKED	305
Discount Factor considered	100%
NPV with discount factor	305
€/per share	€0,4
Sépie	
NPV RISKED	59
Discount Factor considered	50%
NPV with discount factor	30
€/per share	€0,03
Bacalhau (Phase I)	
NPV RISKED	250
Discount Factor considered	50%
NPV with discount factor	125
€/per share	€0,1
ANGOLA	
Block 14/14k	
NPV RISKED	34
Discount Factor considered	100%
NPV with discount factor	34
€/per share	€0,04
Block 32	
NPV RISKED	126
Discount Factor considered	100%
NPV with discount factor	126
€/per share	€0,2

IFRS figures

€m	Refining and Midstream											FORECASTING									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	
Truly Operational Results IFRS	133	43	243	151	171	247	164	-72	-872	-92	-12	45	65	82	126	137	147	154	161		
Statutory Taxes/Corporate Taxes	-39	-12	-66	-41	-46	-67	-52	23	275	29	4	-14	-21	-26	-40	-43	-46	-49	-51		
Energy sector Extraordinary Contribution Taxes	-	-	-29	-65	-66	-62	-59	-36	-25	-23	-34	-39	-36	-33	-34	-33	-33	-33	-33		
NOPLAT	94	30	148	45	59	118	53	-85	-622	-86	-43	-9	9	23	52	61	67	73	77		
DD&A	218	269	288	274	293	302	288	320	476	240	216	191	170	153	138	125	114	104	96		
Operating Gross Free Cash Flow	313	299	436	319	351	420	341	235	-146	154	173	183	179	176	190	185	181	177	173		
ΔNWC	-658	61	628	180	-50	-33	-129	179	-58	221	-279	-126	-28	53	-97	-3	7	15	2		
Total change of:	-5	-7	-33	-60	68	21	28	63	-34	-22	0	0	0	0	0	0	0	0	0		
Deferred tax assets/Deferred tax liabilities/Income taxes payable*																					
Cash Flow From Operations (CFFO) - Operating Cash Flows	-351	353	1030	439	369	407	240	477	-239	353	-106	57	151	229	93	182	188	192	176		
Change in rights of use (IFRS 16)									-195	0	32	-2	3	7	-29	-9	-7	-6	-5		
Net Capex	-166	-139	-80	-103	-102	-89	-156	-142	-76	-49	-49	-49	-49	-49	-49	-49	-49	-49	-49		
Operating Free Cash Flows	-517	214	950	337	267	318	85	140	-315	336	-157	11	109	151	35	127	133	138	123		

IFRS figures

€m	Commercial											FORECASTING									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	
Truly Operational Results IFRS	247	202	-273	296	323	396	318	315	226	237	312	318	322	320	311	303	295	290	287		
Statutory Taxes/Corporate Taxes	-72	-59	74	-80	-87	-107	-100	-99	-71	-75	-98	-100	-101	-101	-98	-95	-93	-91	-90		
Energy sector Extraordinary Contribution Taxes	-	-	-1	-2	-2	-2	-1	-8	-10	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4		
NOPLAT	175	143	-200	214	234	287	216	208	145	159	210	214	216	215	209	203	198	195	192		
DD&A	53	64	70	66	71	73	70	95	94	100	41	50	62	77	94	109	122	133	142		
Operating Gross Free Cash Flow	228	208	-130	280	305	361	286	303	239	259	251	264	278	292	303	312	320	328	335		
ΔNWC	-599	49	569	162	-21	-68	-122	-15	8	75	-241	-71	-70	36	-32	-23	-10	1	-15		
Total change of:	-5	-6	-30	-52	57	19	25	83	-39	-39	0	0	0	0	0	0	0	0	0		
Deferred tax assets/Deferred tax liabilities/Income taxes payable*																					
Cash Flow From Operations (CFFO) - Operating Cash Flows	-375	251	409	389	341	312	189	371	208	295	11	193	208	327	271	289	311	328	320		
Change in rights of use (IFRS 16)									-144	18	14	-1	2	5	-20	-6	-5	-4	-3		
Net Capex	-118	-99	-57	-73	-73	-64	-111	-83	-127	-68	-101	-135	-168	-201	-201	-201	-201	-201	-201		
Operating Free Cash Flows	-493	152	352	316	268	248	78	144	99	241	-92	60	45	106	64	83	105	124	116		

IFRS figures

€m	Renewables											FORECASTING									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	
Truly Operational Results IFRS										-6	-9	-25	-67	-93	-75	9	-79	-88	-91	-85	
Statutory Taxes/Corporate Taxes										2	3	8	21	29	23	-3	25	28	29	28	
Energy sector Extraordinary Contribution Taxes										0	0	0	0	0	0	0	0	0	0		
NOPLAT										-4	-6	-17	-46	-63	-51	6	-54	-60	-62	-58	
DD&A										0	0	9	75	112	123	111	228	266	298	326	
Operating Gross Free Cash Flow										-4	-6	-8	29	49	72	117	174	206	236	264	
ΔNWC										-2	-2	0	-10	-5	-5	-22	-12	-12	-11	-12	
Total change of:										0	0	0	0	0	0	0	0	0	0		
Deferred tax assets/Deferred tax liabilities/Income taxes payable																					
Cash Flow From Operations (CFFO) - Operating Cash Flows										-6	-9	-9	19	43	66	95	162	193	224	280	
Change in rights of use (IFRS 16)										0	0	0	0	0	0	0	0	0	0		
Net Capex										-16	-350	-179	-340	-189	-38	-950	-497	-497	-497		
Operating Free Cash Flows										-22	-359	-188	-321	-146	28	-855	-335	-303	-273	-217	

IFRS figures

€m	Others											FORECASTING									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	
Truly Operational Results IFRS										-5	15	15	21	22	26	27	7	8	12	16	
Statutory Taxes/Corporate Taxes										1	-4	-4	-6	-6	-7	-9	-2	-3	-4	-5	
Energy sector Extraordinary Contribution Taxes										0	0	0	0	0	0	0	0	0	0		
NOPLAT										-4	10	11	15	16	19	18	-9	-5	5	8	
DD&A										4	3	4	4	5	4	4	9	13	13	7	
Operating Gross Free Cash Flow										0	14	15	19	21	23	22	0	8	18	15	
ΔNWC										-7	1	7	1	-2	-1	-2	0	-13	10	-6	
Total change of:										0	0	0	-1	1	0	0	2	-2	-1	0	
Deferred tax assets/Deferred tax liabilities/Income taxes payable																					
Cash Flow From Operations (CFFO) - Operating Cash Flows										-6	14	21	20	23	21	2	-6	26	8	12	
Change in rights of use (IFRS 16)										0	-79	5	10	-1	1	3	-11	-3	-3	-2	
Net Capex										-4	-1	-7	-4	-4	-4	-10	-15	-19	-10	-10	
Operating Free Cash Flows										-10	13	14	16	16	19	11	-92	-20	26	-2	

Appendix 4: Capex Historical

Capital Expenditures

HISTORICAL

€m	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Upstream	289	653	723	998	1 103	1 039	852	622	600	326
Commercial	290	118	99	57	73	73	64	111	83	127
Refining & Midstream	406	166	139	80	103	102	89	156	142	76
Renewables & New Businesses	-	-	-	-	-	-	-	-	16	350
Others	5	4	1	7	4	4	4	10	15	19
Capex	990	940	963	1 143	1 283	1 218	1 008	899	856	898

Forecast

Capital Expenditures

FORECAST

€m	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F	2033F	2034F	2035F
Upstream	172	198	200	205	212	227	219	207	197	188	183	183	183	183	159
Commercial	68	101	135	168	201	201	201	201	201	201	151	151	151	151	151
Refining & Midstream	49	49	49	49	49	49	49	49	49	49	89	89	89	89	89
Renewables & New Businesses	179	340	189	38	950	497	497	497	497	497	370	370	370	370	370
Others	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9
Capex	478	699	583	469	1 422	984	976	964	955	945	803	803	803	803	778

Appendix 5: Mozambique valuation (Solely Explanation of the Computations shown in the Table)

> Area 4 includes offshore Coral South FLNG and the onshore Rovuma LNG. With the objective of capturing the potential

(2017 transactions)	Peer 1	Peer 2
Area 4 - Mozambique	<i>Area 4</i>	
	Exxon	Total
Asset	<i>Rovuma LNG</i>	<i>Coral South FLNG</i>
Total Capacity (mta)	15,2	12,88
Stake	25%	26,50%
Price paid (\$bn)	2,8	3,9
Exchange rate considered (\$/€)	1,2	1,2
Price per mta (in €m)	614,04	952,19
Galp Stake area 4 (Jointly)	10%	
Galp Project Ownership (in Mta)	1,404	
Galp Stake (€m)	862,1	1336,9
Galp MZ total average value (€m)	1099,5	
Value per share (€/sh)	1,33	
Uncertainty factor/probability of success	50%	
(€/sh)	1,07	
Galp MZ total value (€m) (today's)	885,37	

of Rovuma project and to include its value within the overall value of the Upstream Business segment, we decided to value GALP's stake on this project separately based on two important and representative 2017 transactions, one from Exxon (in Rovuma LNG area) and one from TOTAL (in Coral South FLNG) that are two relative peers of Galp. Exxon acquired a 25% stake in Mozambique's Area 4 (more specifically in the Rovuma LNG) for \$2.8bn. What we know is that Area 4 Rovuma in Mozambique has a total capacity of 15,2 mtpa¹¹. Therefore, we can conclude that Exxon has paid a price of €614mtpa (2,8/15,2*0,25)/(1,2) given its 25% stake. On

the opposite side, Total has acquired 26,5% stake on Coral South LNG in MZ for \$3.9b. Coral South LNG has a total capacity of 12,88mtpa¹². Therefore, we can conclude that Total has paid a price of €952mta (3,9/12,88*0,265)/(1,2) given its 26,5% stake. Then, we decided to apply an average of both areas total capacities (in mtas) and multiply it by GALP's stake in the Area 4 project, as a whole - and that gave us (~1.404 mta) (12,88+15,2/2)*0,1. Therefore, we concluded that on the Rovuma FLNG Galp has a total stake value of 614*1,404=€862m and on the Coral South of 1,404*952=€1337m, and that corresponds to an average of stake/value in MZ of ((862+1337)/2)=€1099m, hence a value per share of €1,326 (1099/829,25). Furthermore, we may not forget that Upstream projects has always a certain degree of uncertainty over the true economic value/probability of success. We assumed a degree of uncertainty of 50%, as further explained. Also, considering that the previous transactions occurred in 2017, we were required to capitalize the price paid (in mta) in 5 years (to Dec 2022). Galp's Mozambique total value is then €885,37, which implies our MZ valuation to yield a price per share of €1,07.

¹¹ Source: Wikipedia. 2020. "Rovuma LNG terminal". https://www.gem.wiki/Rovuma_LNG_Terminal

¹² Source: NS Energy. 2020. "Mozambique LNG project". <https://www.nsenenergybusiness.com/projects/area-1-mozambique-lng-project/>

DISCOUNT FACTOR ON VALUATION: Upstream projects has always a certain degree of uncertainty over the true economic value. As a result, and given the non-predictability of eventual downside risks, we considered a discount over the valuation of 50%. In fact, the degree of uncertainty applied is driven by two main factors. First, Mozambique is passing through an increased worsened political instability that adds risks of the area 4 project to be further delayed. Mozambique LNG project was expected to deliver its first production by 2024. However, insecurity risks motivated by political disruptions within the region, along with the current corona crisis, have been increasing the risks of the project to be further delayed, possibly only post 2022, especially following the “F” score that has been attributed to the region as of current political violence. In fact, further delaying the Mozambique project would make it to be operational within the energy transition era, then being subject to enhanced regulatory hurdles – Natural gas is a non low-carbon alternative – hence carbon costs that, at the end may destroy demand if renewables end up being cheaper and a reasonable alternative energy source vs. Natural Gas. If regulatory hurdles end up destroying any possible own projects’ profitability the risk of the projects not to be even materialized enhances. Furthermore, even in the case Mozambique projects materialize and come online by 2024, some sort of geological uncertainty – common to all Upstream Projects - is always subject to exist.

Galp’s Corporate Governance

Appendix 6: Board of Directors Structure

Executive Committee	
Andry Brown	Vice-Chairman, CEO
Filipe Crisóstomo da Silva	CFO
Thore E. Kristiansen	COO (Production & Operations)
Carlos Costa Pina	COO (Corporate)
Teresa Abecasis	COO (Commercial)

Non-Executive Directors	
Paula Amorim	Chairwomen, NED
Miguel Atahyde Marques	Vice-Chairman, NED - Independent
Marta Amorim	NED
Francisco Teixeira Rêgo	NED
Carlos Pinto	NED
Luís Todo Bom	NED - Independent
Jorge Seabra de Freitas	NED
Diogo Mendonça Tavares	NED
Rui Paulo Gonçalves	NED
Edmar Almeida	NED - Independent
Cristina Neves Fonseca	NED - Independent
Adolfo Mesquita Nunes	NED - Independent

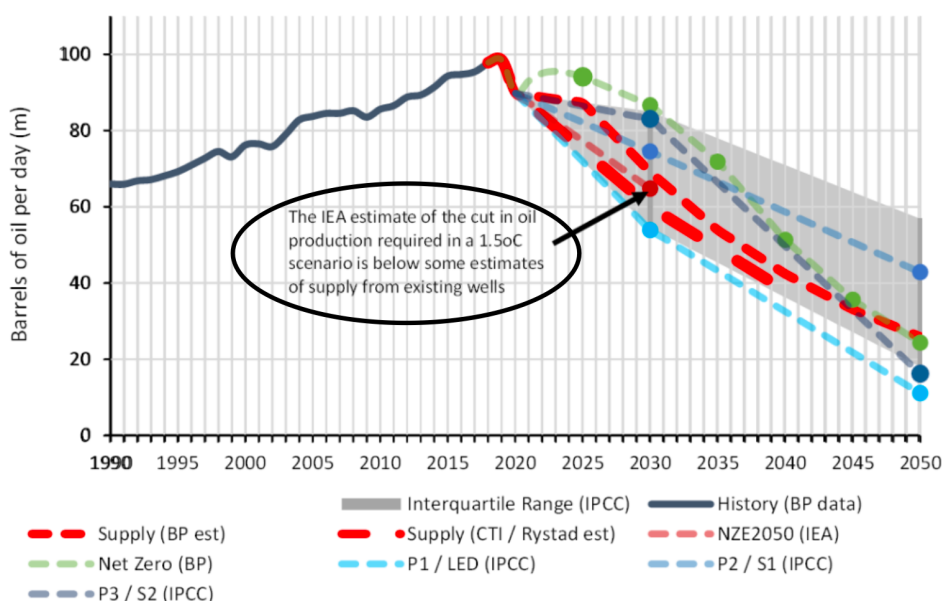
Appendix 7: Remuneration Policy

Variable
 (maximum of 60% based on the total annual fixed remuneration)

Annual (50%)	Quantitative Performance (65%)	Galp Value Added (33,3%) Total Shareholder Return (33,3%) EBITDA RC (33,3%)
	Qualitative Performance (35%)	Collective performance assessment, including env. Sustainability and energy efficiency
3 - years (50%)	Quantitative Performance (65%)	Total Shareholder Return (50%) EBITDA RC (50%)
	Qualitative Performance (35%)	Collective performance assessment, including env. Sustainability and energy efficiency

Figures – Zoomed In

Figure 86 – Zoomed in



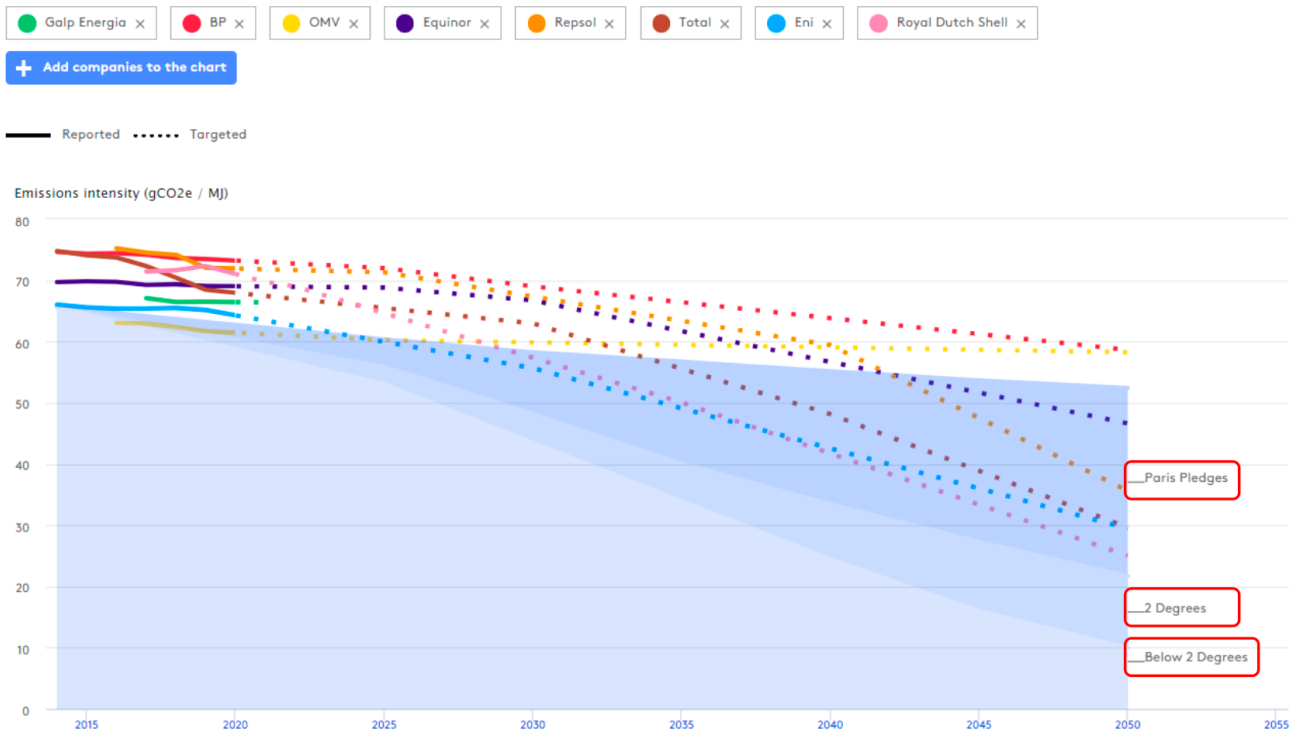
Source: TPI; IEA

Figure 87 – Zoomed in

Company	Measure	Scope	Time horizon for emissions reduction			Net Zero
			2025	2030	2040	
Repsol	Absolute emissions reduction	1+2+3	-12%	-25%	-50%	2050
Shell	Absolute emissions reduction	3	-6%/-8%	-20%	-	2050
BP	Absolute emissions reduction	1+2	-20%	30%/-35%	-	2050
		3	-5%	>15%	-50%	
Total	Absolute emissions reduction	1+2+3	>11%	-40%	-	2050
		3	-	-15%	-35%	
ExxonMobil	Absolute emissions reduction	1+2	-15%/-20%	-	-	2050
Chevron	Absolute emissions reduction	1+2	-	-35%	-	
Equinor	Absolute emissions reduction	1+2	Up. Intensity <8kg CO2/boe by 2025			2050
ENI	Absolute emissions reduction	3	-	-15%	-40%	2050
OMV	Absolute emissions reduction	1+2	>10%			?
		3	-6%			
GALP	Absolute emissions reduction	1+2	-	-40%	-	2050

Source: Companies' Reports

Figure 88 – Zoomed in



Source: Transition Pathway Initiative Carbon Performance Assessment (2020)

References

- **United Nations**. 2019. <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>
- Ritchie, Hannah, and Roser, Max. 2020. "Global greenhouse gas emissions by sector". Our World in Data. <https://ourworldindata.org/emissions-by-sector>
- **Glasgow Financial Alliance for Net Zero**. 2021. "Amount of Finance committed to achieving 1,5°C scenario". <https://www.gfzenero.com/press/amount-of-finance-committed-to-achieving-1-5c-now-at-scale-needed-to-deliver-the-transition/>
- **IEA**; 2021. "World Energy Outlook". <https://fortune.com/2021/10/13/oil-demand-peak-2025-world-invest-trillions-renewables-iea-world-energy-outlook/>
- **IRENA**. 2019. "Global Energy Transformation: A RoadMap to 2050". https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Apr/IRENA_Global_Energy_Transformation_2019.pdf
- **CaixaBank**. 2019. "The new Energy Mix in the Iberian Peninsula: The Fight Against Global Warming". <https://www.caixabankresearch.com/en/economics-markets/commodities/new-energy-mix-iberian-peninsula-fight-against-global-warming>
- Galp energia. 2021. "Capital Markets Day: Thriving through the energy transition". https://www.galp.com/corp/Portals/0/Recursos/Investidores/SharedResources/Apresentacoes/EN2021/CMD2021_vf_.pdf
- **Statista**. 2021. "OPEC's share of total global crude oil production from 2009 to 2020". <https://www.statista.com/statistics/292590/global-crude-oil-production-opec-share/>
- **Yahoo Finance**. 2021. "IEA hikes 2022 Brent Oil Price Outlook to 79\$ in 2022". <https://finance.yahoo.com/news/iea-hikes-2022-brent-oil-170000865.html>
- **IEA's NZE; Wood Mackenzie**. 2021. "What different scenarios tell us about the future of oil and gas"; <https://www.woodmac.com/news/the-edge/what-different-scenarios-tell-us-about-the-future-of-oil-and-gas/>
- **Wikipedia**. 2020. "Rovuma LNG terminal". https://www.gem.wiki/Rovuma_LNG_Terminal
- **NS Energy**. 2020. "Mozambique LNG project". <https://www.nsenergybusiness.com/projects/area-1-mozambique-lng-project/>
- **Knoema**. 2021. "Stock levels for oil products: Portugal". https://knoema.com/nrg_stk_oil/stock-levels-for-oil-products?geo=1022280-portugal
- **Turner, Elza**. 2021. "Refinery News Roundup: Market focus on closures in Europe". S&P Global. <https://www.spglobal.com/platts/pt/market-insights/latest-news/oil/100621-refinery-news-roundup-market-focus-on-closures-in-europe>
- **ERSE**. 2021. "Atualização da Tarifa da Energia do Setor Elétrico". <https://www.erse.pt/media/di2fcnat/documento-justificativo-atualizacao-2021.pdf>
- **ERSE**. 2021. "Relatório sobre os mercados retalhistas de electricidade e de gás natural em Portugal 2020". Page 23-31. <https://www.erse.pt/media/gu3jujqu/relatorioanual2020.pdf>
- **OMIE**. 2021. "Average and maximum price, liberalized market, Spain – 2021, Annual Scope". <https://www.omie.es/en/market-results/annual/daily-market/daily-prices?scope=annual&year=2021&system=1>
- **The Economist**. 2021. "What is behind rocketing natural-gas prices?". <https://www.economist.com/graphic-detail/2021/09/20/what-is-behind-rocketing-natural-gas-prices>
- **Oil&GasJournal**. 2021. "2021 capital spending to be mostly conservative". <https://www.oqj.com/general-interest/article/14201118/2021-capital-spending-to-be-mostly-conservative>
- **Bloomberg Intelligence**. 2021. "ESG assets may hit \$53 trillion by 2025, a third global of AUM". <https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/>
- **Gardiner, Dan, and Sullivan, Rory, and Jahn, Valentin**. 2021. "The oil and gas industry will need to scale back much faster to limit warming to 1,5°C". Transition Pathway Initiative. <https://www.transitionpathwayinitiative.org/publications/48?type=NewsArticle>
- **Albuquerque, Filipe**. 2020. "Carbon Leaders and Laggards in Europe's Oil Industry". <https://nordsip.com/2020/05/13/carbon-leaders-and-laggards-in-europes-oil-industry/>
- **Mckinsey&Company**. "Transformation of Europe's Power System until 2050". https://www.mckinsey.com/-/media/mckinsey/dotcom/client_service/epng/pdfs/transformation_of_europes_power_system.ashx

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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.

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