

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.

Leading the energy transition
- Proactive Portfolio Management -

JOSÉ MIGUEL GODINHO CARVALHO
29146

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Rosário André

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Abstract

This Master Thesis takes the form of an **Equity Research report EDP**, being the end goal to develop a recommendation to investors. It is relevant to underline that this report is inserted in a two parts report. In this part, it was made an assessment regarding the feasibility of the €24Bn Capex EDP's growth plan. Moreover, the highlights include an analysis of the Networks and Clients Solutions and Energy Management segments. To get to a price target, it was used a SOTP method with the businesses valued on a DCF basis. Our valuation for EDP yields a price of €6.44 for FY21, which reflects an upside potential of 42%, compared to the current market price and consequently a **BUY** recommendation.

Keywords (up to four)

Strategy, Networks, Supply, Thermal

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Shareholder Structure

Table 2. Shareholder Structure

Shareholders	% Capital
China Three Gorges	19.03%
Oppidium Capital, S.L.	7.20%
BlackRock, Inc.	7.10%
Norges Bank	3.13%
Qatar Investment Authority	2.27%
Sonatrach	2.19%
Bank of America Corporation	2.02%
Canada Pension Plan Investment Board	2.01%
EDP (Treasury Stock)	0.48%
Remaning shareholders	54.58%

Source: EDP Handouts, 2021

CTG profile

CTG is a Chinese energy corporation and the world's largest clean hydropower enterprise, operating in 47 countries with 89 ongoing international contracts and investment projects in Africa, Asia, Europe, and Americas. CTG has a total installed capacity of 124GW (17.7GW overseas), a workforce of around 35.000 people and total assets of RMB 698.6B. The group specializes in the development of new energy like wind and solar in China and abroad.

Note 1- *During the financial aid program to Portugal, where financing to Southern European countries was very limited.*

EDP share capital totals €3,966 Mn fully subscribed and paid up and is represented by 3,966 Mn ordinary shares with a nominal value of €1 each. As we can verify in *Table 2*, China Tree Gorges is the main shareholder with a stake of 19.03%, followed by Oppidium (7.2%) and BlackRock, Inc (7.1%). As of today, EDP owned 19 Mn treasury stock shares, which corresponded to 0.48% of the share capital.

Between 1997 and 2012, EDP went through a privatization process with eight phases that concluded with the Portuguese state selling a 21.35% stake in EDP to Chine Three Gorges Corporation. In addition to becoming a new shareholder, CTG became a new strategic partner. EDP and CTG combined efforts to become major players in renewable energy generation projects in which CTG committed to: (1) invest up to € 2 Bn in minority stakes in various EDP's projects and co-investments in certain wind power projects and (2) provide a credit facility of up to €2bn, at corporate level. The first pillar of the agreement already allowed EDP to use approximately 1.6 Bn of the €2 Bn in several wind and hydro projects. Moreover, the partnership enabled EDP to diversify growth opportunities through joint ventures with the purpose of further endorsing their cooperation, even outside of the initially agreed financing structure to be provided by CTG. Below we can find a summary of all CTG's investments in EDP. These equity investments are very advantageous to EDPR. Firstly, the investments done by CTG were directed at operational projects owned by EDP and thus, contributed to their self-funding strategic pillar (asset rotation). Secondly, the investments were also directed at more early projects with the co-financing of its developments and the sharing of future risks and benefits of the project. Overall, CTG's investments provided a solid financing structure to EDP, improving its financial position and allowing it to follow further growth opportunities.

Regarding the debt support commitment, the first part was given in 2012 which was critical, as it was given during a time of very difficult access to credit¹, enhancing EDP's financial flexibility. However, contrary to what was expected initially, the second part was not yet arranged by CTG. Nonetheless, it is important to highlight that as the market conditions improved gradually it was no longer critical to receive the second part.

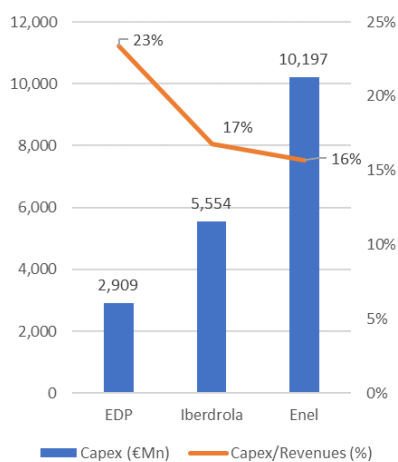
In 2020, CTG sold 100 Mn of EDP shares, representing 2.52% of EDP's share capital and thus, became holder of 19.03%. Nonetheless, following this transaction China Three Gorges stated that it "will continue to support the strategic partnership established by EDP and CTG", which is fundamental for their international strategy. Thus, based on the critical support provided by CTG to EDP since 2012 and their continuous commitment to this partnership, we assess CTG's ownership as positive for EDP. We believe that through this partnership, EDP will continue to enter in new markets with the financial support of CTG and CTG will continue to get exposure to other markets besides China.

Table 3. CTG's Investments in EDP

Closing Date	Investment	Market	Capacity	Stake	Transaction Amount
June 2013	Portfolio of wind assets - Portugal	Europe	644MW	49%	€368 Mn
June 2014	Hydro plants - Jari and Cachoeira-Caldeirão	Brazil	373MW and 219MW	50% (in both)	R\$420 Mn
November 2014	Hydro plant - São Manoel	Brazil	700MW	33%	NA
December 2014	EDP Asia	Asia (Macau)	-	50%	€110 Mn
May 2015	Portfolio of wind assets - Brazil	Brazil	321MW	49%	R\$472.5 Mn
October 2016	Portfolio of wind assets - Italy and Poland	Europe	548MW	49%	€363 Mn
June 2017	Portfolio of wind assets - Portugal (ENEOP)	Europe	422MW	49%	€242 Mn
December 2018	Offshore wind development - United Kingdom	Europe	950MW project	10%	£35 Mn

Source: EDP Press Releases & Annual Reports

Exhibit 14
CAPEX/Revenue comparison with peers



Source: EDP, ENEL and Iberdrola reports

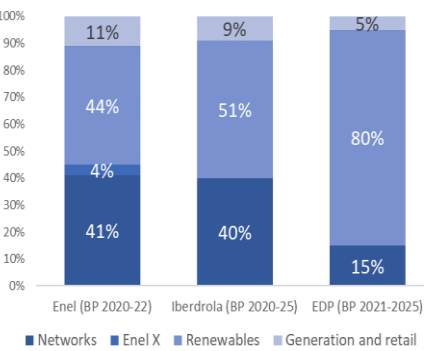
Strategy and Growth prospects: 21-25

In February 2021, EDP disclosed its new business plan for the period 21-25. This business plan is based on 3 key pillars: (i) Accelerated and sustainable growth; (ii) Future-proof organization and (iii) ESG excellence and attractive returns.

(i) Accelerated and sustainable growth with significant visibility

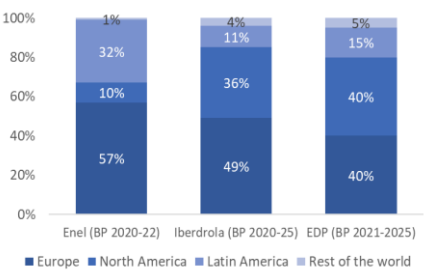
EDP's objective is to increase its annual investments, targeting an annual CAPEX of €4.8 Bn in the period 2021-2025 (€24 Bn total) corresponding to a 65% increase in comparison with the previous target for the 2019-22 period. When comparing to its peers, EDP exhibited in 2020 the highest CAPEX/Revenues ratio which suggests that the company is investing more aggressively as it can be seen in *Exhibit 14*. If EDP keeps creating value as the firm invests in profitable projects as they did in 2020 (ROIC of 7% against a WACC of 3%) we consider EDP's aggressive investment strategy as positive for the company.

Exhibit 15
CAPEX targets breakdown by segments (peer comparison)



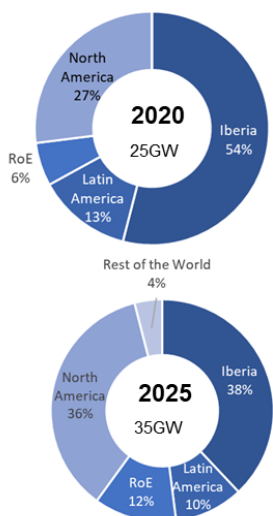
Source: EDP, ENEL and Iberdrola strategic plans

Exhibit 16
CAPEX targets breakdown by region (peer comparison)



Source: EDP, ENEL and Iberdrola strategic plans

Exhibit 17
Capacity breakdown by Region



Source: EDP Strategic Update 2021-25

This significant investment acceleration will have a strong focus in renewables (80% of CAPEX) and regionally in North America and Europe (80% of CAPEX) (see Exhibits 15/16). These investments will be allocated mostly to regulated/long term activities (almost 90%), while reducing thermal to decrease exposure. Considering the CAPEX targets of the two main European peers, Enel, and Iberdrola, we can verify their biggest focus will be identically distributed between renewables and networks, and regionally in Europe. Thus, we can notice that EDP is investing significantly heavier in renewables and the North American market.

To finance this expansion CAPEX (and €4 Bn in dividends), EDP plans to use the following sources: €12 Bn from organic cash, €8 Bn from asset rotation, €2 Bn from tax equity (creating value through the monetization of the investment and the production tax credits we have in US), €2 Bn debt, €2 Bn from portfolio optimization alternatives such as new hybrids, regulatory receivables, and forex, and lastly, around €2 Bn from what EDP considered “flexible funding sources”. Regarding that last point, EDPR has already successfully completed a €1,5 Bn capital increase, reducing EDP’s control of EDPR’s share capital from 81.6% to 74.98%.

Step-up green growth

EDP projects 20 GW gross additions in renewables installed capacity. The targeted growth until 2025 is already 45% secured (or will be secured in the short term). In fact, EDP has a total of 7.7GW of renewable projects secured with long term-contracts, of which 2.2 GW are already under construction.

Regionally, growth will be mainly focused on North America (45%) and rest of Europe (20%), reducing exposure to Iberia (which is planned to decrease from 54% to 38% of the total renewable portfolio, see Exhibit 17). Starting with the North America, a total of 8.8 GW will be added in this period (growing from 27% to 36% of the total installed capacity). This region is viewed as the key engine and a very liquid market with very attractive tax incentives (PTCs and ITCs). EDP already has a very diversified geographical footprint (EDPR operates in 20 states), which allows the company to take advantages of states with strong wind resources and low costs, and states in the coastlines with higher costs but with a very big predisposition to contract renewable projects. In Europe, 6.7 GW of capacity in the next 5-years are expected to be added into countries EDP has already operations. The growth in Europe will be driven by an increased in organized CfDs auctions and by corporate PPAs. In Latin America, mostly in Brazil, EDPR is looking to take advantage of future auctions to increase its installed capacity in a sizeable market with strong fundamentals (e.g., wind resources). Installed capacity growth in Latin America should account for 15% to the group’s total in the next 5-years or GW.

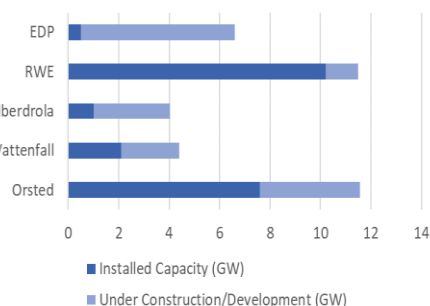
Lastly, 5% will be exploring to a limited extent some opportunities elsewhere in the world, creating an opening in new different markets.

Exhibit 18
Capacity breakdown by Technology



Source: EDP Strategic Update 2021-25

Exhibit 19
Wind Offshore's biggest developers installed Capacity



Source: EDP, RWE, Iberdrola, Vattenfall and Orsted reports

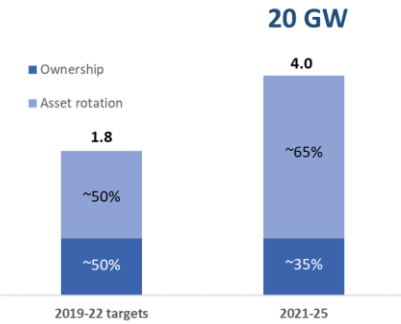
Technologically wise, EDP's wind onshore portfolio will be growing from roughly 11.5 GW, adding an additional 9.1GW (or 46% of the net additions) until 2025, mostly reinforcing their presence in core low-risk markets (Europe and the U.S.). Given the market appetite and EDP's track record with this technology, we believe these growth rates are achievable. Nonetheless, EDP will also be investing significantly in technologies other than wind, namely photovoltaic solar energy (increasing the weight of total installed capacity from 2% to 22%, see *Exhibit 18*), taking advantage of the increasing competitiveness of this technology largely due to declining costs, but also of the incentives granted by the recent extension of Investment Tax Credits (ITCs) in the US until 2022. Most of the new solar capacity installed will be in Europe (25%) and United States (60%, taking advantage of the ITCs). Regarding offshore energy production, EDP intends to establish itself as a big offshore player through Ocean Winds, the result of EDPR's 50:50 joint venture with Engie. In fact, this partnership was established to form a new entity as exclusive vehicle of investment of EDPR and ENGIE for offshore wind opportunities worldwide, bringing together the industrial expertise and development capacity of both companies (EDPR is the fourth largest wind producer in the world and ENGIE is the leader in wind energy in France). As agreed, EDPR and ENGIE, are combining their offshore wind assets and project pipeline in this new entity, having already an installed capacity of 0.5GW, 1GW under construction and 5.1GW under development, working together to become a big player in the sector by investing in offshore projects in different geographies which include Europe, United States, and Asian markets. Note that there was a significant delay (almost 2 years) in the forecasted COD of two projects in France because of COVID-19 challenges, but with the forecasted recovery from the pandemic, we expect EDP to be back on track from now on. Comparing EDP's offshore pipeline with some of the biggest developers in this technology (identified by Windpower Intelligence's research), we can see that in terms of current installed capacity EDP is a lot behind but considering its very ambitious expansion plan, EDP can become one of the top 3 European players (see *Exhibit 19*).

On a different direction, Hydro will have mostly maintenance investments as it is considered valuable for the company due to the technology's ability to generate strong cash flows, and its flexibility and storage capability. Furthermore, the company believes they already have a strong presence in this market, having sold part of its hydro portfolio in 2019 to reduce exposure to Iberia and market prices.

Accelerating ownership and asset rotation strategies

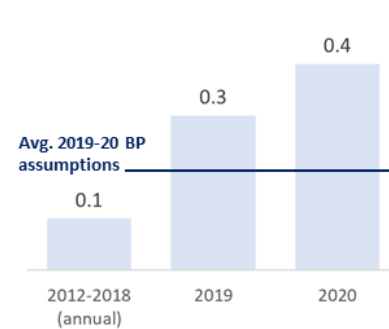
Exhibit 20
Acceleration of Renewables growth (added capacity, GW/yr)

EDP will accelerate the ownership of the assets.



Source: EDP Strategic Update 21-25

Exhibit 21
Asset rotation gains (€ Bn)

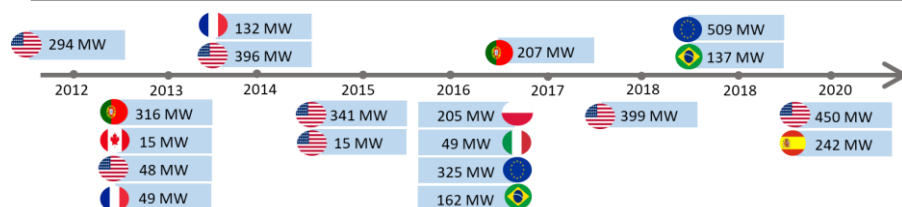


Source: EDP's Investor's presentation 2020

The asset rotation strategy was initially on a smaller scale and selling only minority stakes up to 2018. After that, EDP intensified this activity, and is now focusing on the sales of majority stakes. Since 2012, a total of 19 asset rotation deals were done, totalling 4.3GW and €5.5 Bn in proceeds of which €2.3 Bn were in the last two years (55% of the €4 Bn target which was a part of the BP 2019-2022). After nine years, these types of deals have become a key part of their recurring business plan and EDP intends to continue to do this going forward.

Between the period 2021-25, EDP is targeting €8 Bn in proceeds from asset rotation transactions. It is important to highlight that while in the past the company was looking at selling around 50% of the gross additions through asset rotation, it is now expecting to sell 40% in the period 2021-23 and 30% in the period 2023-25, accelerating the ownership of the asset that the company keeps (see Exhibit 20). Management believes that some of these assets have long-term strategic value and this strategy will allow the company to increase scale and synergies associated with that growing fleet, such as turbines procurement and technical and operational know how. The asset rotation strategy is based on upfront value crystallization to finance organic growth and generating extra value without increasing capital employed. We consider the reason EDP has been able to profit from asset rotation (and will be able to succeed in the future) is the fact that an operating wind park is considered more attractive on its early stages since the key risks associated with the development of new wind parks are mainly related to the kick-off of the project, the timely completion of the construction phase and the power purchase agreement. Since EDP bears these risks, the market is prepared to accept a higher price for the projects in the initial stages, making it profitable for EDP to perform asset rotation to invest the proceeds in new projects. EDP has reached roughly €700 Mn of asset rotation gains in the period 2019-2020 which is a clear outperformance of the previous 2019-22 business plan estimates (see Exhibit 21). EDP's track record in asset rotation accompanied by an increased market demand (from Infra, Pension and Sovereign Wealth Funds) gives us a lot of confidence on the performance of asset rotation activity for the period 2021-25.

Exhibit 22 - Timeline of EDP asset rotation deals 2012-2020



Source: EDP Investor's presentation

Distinctive and resilient portfolio

The company wants to improve their portfolio while reinforcing their low-risk profile, by increasing contracted exposure (targeting more than 85% of the EBITDA), and

Like its peers, EDP has been adversely affected by structural changes underway in the European electricity sector, with increases in renewable energy and higher carbon prices having pushed thermal capacity further out of the merit order and wants to reduce exposure to this market.

Note 1 -

The Viesgo acquisition was concluded in December, 2020, for an enterprise value (100%) of €2.7 Bn. Under this transaction, EDP acquired control of Viesgo which currently owns electricity distribution networks (with a RAB of around €1 Bn), renewables assets (511 MW) and soon to be decommissioned coal power plants in Iberia.

maintaining the EBITDA weight in the European and U.S. market (approximately 80%). To achieve this, EDP proceeded to the disposal of non-strategic assets (see Table 5). The six hydro plant sale decreased EDP's exposure to hydro volatility and merchant prices, and improved financial leverage (net debt impact of €650 Mn). We believe this deal was beneficial to shareholders since it was made at a higher EBITDA/EV multiple than our computed market average (14.4x vs 11-12x). Moreover, proceeds were used to finance the investment in wind and solar growth plan, while EDP retained its leading position in Portugal hydro power generation with 5.1GW. Moreover, the sale of the two CCGT power plants and the B2C energy supply business were also aimed to reshape the portfolio according to the new strategic plan, and the proceeds were used to partially finance the acquisition of Viesgo¹, which further strengthens the business risk profile. That is, the integration of Viesgo in EDP's portfolio will increase the EBITDA coming from regulated activities, with network assets under perpetual concessions and remunerated based on a transparent framework (with regulatory visibility until 2025), as well as a renewable portfolio with 87% under a regulatory regime.

EDP has already achieved €2.7 Bn from the proceeds, clearly above the €2 Bn target for the whole period 2019-22. Both deals reinforce the low risk profile of EDP and the weight of regulated and LT contracted activities on EBITDA while supporting the new target of less than 45% (EBITDA) exposure to Iberia. These deals also contributed to EDP's long term targets: getting rid of coal by 2025 and by 2030, to be carbon neutral.

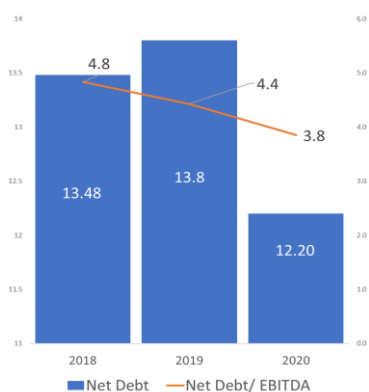
Exposure to Hydro/Merchant
In Iberia, EDP's hydro, nuclear and thermal generation, which accounted for 19% of group EBITDA in 2019, is exposed to volume risk and market prices.

Table 5. Disposal of non-strategic assets

Announcement Date	Investment	Market	Capacity	Transaction Final Consideration
Dec 2019	Six hydro plants	Portugal	1689 MW	€2.2 Bn
May 2020	Two CCGTs power plants (Castejón I & III)	Spain	843 MW	€515 Mn
	B2C energy supply business	Spain	NA	

Source: EDP Press Releases

Exhibit 23
Change in Net Debt (€ Bn) and Net Debt/EBITDA:



What this tell us is that so far, the company has achieved all its disposal targets for 2022 two years in advance and even though the current contracted exposure is still far from the target (70% vs 85% of EBITDA) we expect that with the portfolio reshuffling deals (included in the BP 2021-25) EDP will get there.

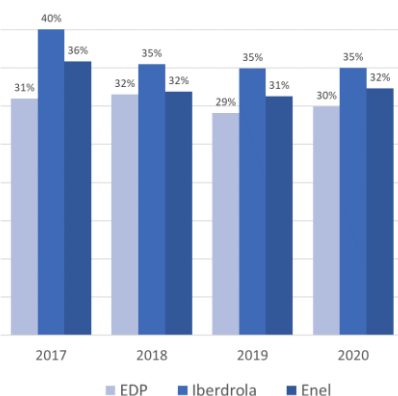
Solid balance sheet and low risk profile

Like it was already stated, EDP was able to achieve a Net Debt to EBITDA ratio close to its peers. In addition, as part of the strategic plan, EDP intended to target a BBB rating in the short term through the improvement of the FFO to net debt ratio (target of around 20% in the 2021-25 period), which is typically the metric that rating

Source: EDP reports and analysts' estimates

agencies look at. Taking a look at *Exhibit 23*, we can see that EDP successfully achieved their commitment to reduce their debt from 13.48 to 12.2 and the ratio net debt to EBITDA to 3.9 in 2020 (vs 4.8 in 2018). This was possible because of higher recurring organic cash flow and the €1 Bn rights issue closed in August 2020. Thus, based on the position they are now in and the flexibility EDP has to continue to reinforce the balance sheet (through hybrids, asset rotations and portfolio optimizations), in March of 2021, Standard & Poor's has already updated EDP to a BBB rating, which increased the computed cost of debt.

Exhibit 24
Change in OPEX/Gross Margin with peers (2017-2020)

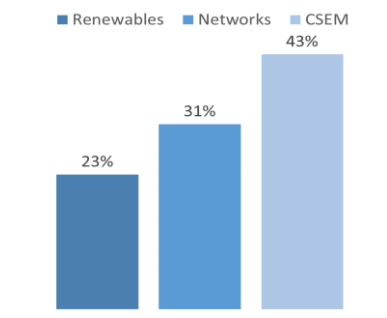


Source: EDP, Iberdrola and ENEL reports and analysts' estimates

(ii) Future-proof organization - Efficient and digitally enabled

Beyond the efforts for increasing revenue generation, EDP has a strong track record on cost optimization, which can be seen in the annual savings target of BP 2016-20 being achieved two years ahead of schedule (€200 Mn savings) and a 4% OPEX reduction in Iberia (nominal) and Brazil (real terms). In addition, during the period 2019-2020, the company achieved a €50 Mn of OPEX savings, representing a decrease in OPEX of 3% on like-for-like base which was due not only to tight cost control, but also to a fast acceleration of the digitalization fuelled by all the changes with pandemic (less traveling and less cost associated with that). Comparing the OPEX to gross profit ratio with peers (see *Exhibit 24*), we can verify that EDP has the lowest ratio (which further supports the idea of EDP's distinctive efficiency in generating revenue vs total expenses), but in recent years there has been a convergence in this ratio. This can be attributed to the increase in the weight of Renewables in all the companies' gross profit as this the segment that generates higher revenues with less operating expenses (see *Exhibit 25*).

Exhibit 25
Change in EDP's OPEX/Gross Margin between segments (2020)



Source: EDP reports and analysts' estimates





The company is now targeting €100 Mn cumulative savings in the period 2021-25 which is stepping up from the €50 Mn that were still missing from the 2019-2022 strategic plan, assisted by a leaner organizational structure (especially within networks), generational evolution and continue investing in digitalization to increase asset intelligence (e.g., smart meters) and operations and processes efficiency (e.g., advanced analytics and predictive maintenance). We estimate that Networks will alone generate €91 Mn (91% of the target) of cost savings within distribution.

(iii). ESG excellence and attractive returns

Step up green leadership positioning

EDP is one of the top European utilities in terms of green positioning (see *Table 6*). Nonetheless, EDP wants to reinforce their commitment to a more ambitious decarbonization targets to make sure it is ahead of the curve in relation to

Table 6. Recognition by ESG rating on EDP's sustainable corporate strategy

ESG rating	Ranking
 SAM Sustainability Award Gold Class 2020	#1 Global Integrated Utilities (Score 90)
 FTSE4Good	Top 3% Global Utilities (Score 4.5)
 EURONEXT vigeo eiris	#1 Global Integrated Utilities (Score 68)
 SUSTAINALYTICS	93rd Percentile Global Utilities

Source: EDP's investor's presentation

competitors. Thus, the company plans to be coal free in 2025 and carbon neutral in 2030. Comparing these targets to its European peers, we verify that EDP's Carbon neutral target is considerably more ambitious (2030 vs 2050). In addition, we consider that EDP is well positioned against risks arising from the carbon emission reduction policy, given its well-diversified generation portfolio across Iberia, Brazil, and the US. We expect carbon intensity to decrease further as the company shuts down coal-fired plants in Iberia and continues its build-out of renewables (EDP targets renewables to account for more than 80% of its generated electricity by 2025 and more than 90% by 2030).

Deliver a sustainable EPS growth and an attractive dividend policy

According to the BP 21-25, EDP is committed to a growth of 8% on average per year in net income, reaching €1 Bn in 2023 and being clearly, above the €1.2 Bn target in 2025. In addition, EDP's management team ensures delivering attractive returns through a sustainable dividend policy of 75 to 85% of recurring Net Profit, with a dividend floor at €0.19 per share, allowing for potential future increases in the dividend per share in line with sustainable earnings per share growth. We note EDP's payout ratio is higher than that of Enel (70%) or Iberdrola (65%-75%), putting greater pressure on EDP's target deleverage. We expect total dividends to average between €850 Mn and €910 Mn for the next two-to-three years (delivering both targets above) based on the track record exhibited in the past. Since 2005, EDP paid approximately €8 Bn in dividends, never changing their commitment to the floor and always sharing their growth with shareholders (DPS from 10 cents in 2005 to 19 cents). In 2019 and 2020, EDP delivered a dividend of €0.19 per share.

Table 7. Dividend policy and Payout ratio

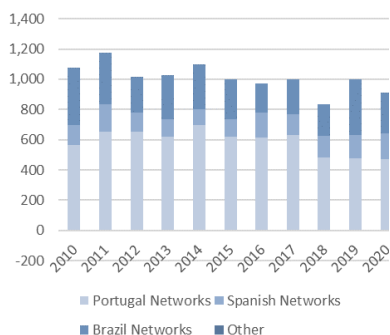
	Dividend paid 2020 (p/ share in €)	Payout ratio	CAGR in strategic plan
EDP	0.19	75%-85%	Growth in line with results (BP 2019-2022)
Enel	0.328	70%	7% (BP 2021-2023)
Iberdrola	0.4	65% -75%	Growth in line with results (BP 2020-2022)

Source: EDP's investor's presentation

Networks

Since 2010, Networks' EBITDA has remained stable (see *Exhibit 28*) as it is highly regulated under licenses and long-term concessions, exhibiting a small declining trend mostly driven by the devaluation in BRL and the reduction in the rate of return on the Regulated Asset Base (RoRAB) in Portugal. In 2020, Networks had an EBITDA of 2.6B€ (representing 23% of EDP's EBITDA), but we expect this figure to increase 27% until 2027 driven mostly by: (i) full integration of the Viesgo Operation; (ii) increase in Brazil's distribution RAB; and (iii) full operationalization of the 6 transmission lines in Brazil.

Exhibit 28 Networks EBITDA evolution (€ Mn) (2010-2020)



Source: EDP results

Table 16. RoRab vs WACC

	Estimated Pre-Tax WACC	Pre-Tax RoRAB (2020)
Portugal	2.1%	4.9%
Spain	2.1%	5.6%
Brazil	6.0%	8.1%

Source: EDP Report 2020

Formulas to estimate Iberian Network gross profit:

Allowed EBIT = RAB + RoRab

$$\text{EBITDA (t)} = \text{EBITDA (t-1)} + \text{Change in Allowed EBIT} + \text{Cost Savings}$$

$$\text{Gross Profit (NA)} = \text{EBITDA} + \text{OPEX}$$
Table 17. Networks Portugal

	2020	2021E	2027E	CAGR (21-27)
Average RAB (H/MV and LV)	2,940	2,918	3,052	1%
Average RoRAB	4.9%	4.8%	4.8%	0%
RAB & Return	145	141	148	1%
Cost savings achieved	-1.5	3.7	1.5	-14%
EBITDA	458	459	488	1%
OPEX	590	579	558	-1%
Other Segments, adjustments and Inter-segment eliminations	15	13	13	0%
Gross Profit	1,064	1,051	1,058	0%

Source: Analysts' Estimates

Table 18. Networks Spain

	2020	2021E	2027E	CAGR (21-27)
Average RAB	1,328	1,713	1,797	1%
RoRAB	5.6%	5.6%	5.0%	-2%
RAB & Return	74	96	90	-1%
Cost savings achieved	-1.5	3.7	1.5	-14%
EBITDA	161	186	198	1%
OPEX	58	74	68	-1%
Other Segments, adjustments and Inter-segment eliminations	-26	-13	-16	4%
Gross Profit	193	247	251	0%

Source: Analysts' Estimates

Revenue for electricity distribution is based on a RAB model. Under this long-term tariff model, regulators approximate the amount a company invested in its infrastructure and recognize a return on that investment. This way, EDP has a secure payback sufficient to service loans and generate profits. We believe that this model is beneficial for EDP, in comparison with cost-plus pricing system, since considering that remuneration is mostly dependent on RAB and the respective rate of return, EDP can retain the funds resulting from cost cutting. This is further supported when comparing the pre-tax RoRAB with our estimated pre-tax WACC, as the previous is always higher than the latter (see *Table 16*), making it an attractive investment. As of December 31, 2020 EDP had an aggregate RAB of distribution assets of €5,463 Mn.

In Portugal, EDP Distribuição is operated under a public service concession, performing approximately 99% of the electricity distribution in Portugal. We believe EDP will be able to maintain its natural monopoly, and do not expect any major change in Portuguese RAB as they are secured under long term contracts. The concession of the national distribution of high and medium voltage electricity (60% of Portuguese RAB in 2020) was given to EDP Distribuição until 2044, whereas the distribution of low voltage (40% of Portuguese RAB in 2020) was given to each municipality that then gave the concession to EDP Distribuição for a period of 20 years, 92% expiring until 2022. We consider renewal risk as negligible due to the incumbent position of EDP. This is, there is a legal obligation for newcomers to reimburse EDP with a value aligned with RAB. Thus, we expect Portugal's RAB to remain stable with a CAGR smaller than 1% until 2027 and performed a sensitivity analysis measure the impact of concession losses (results in *Sensitivity Analysis*). On the other hand, we project a RoRAB reduction to the floor level (4.75% for high and medium voltage assets with a premium of 25 bps for low voltage) as it is based on the 10-year government bond yields which we assume will remain close to 0 (recovery of confidence from international investors and rating agencies in Portugal and ECB purchases). Lastly, we expect the Portuguese Distribution Gross Profit to remain relatively stable as the increase in EBITDA (from the return on RAB and cost savings achieved) will match the decrease in OPEX (see *Table 17*).

In Spain, we expect a significant increase, in 2021, in Spain's average RAB (+28%), with the full integration of Viesgo in the portfolio (which added around € 0.8 Bn to the distribution RAB, see *Table 18*), and afterwards to remain relatively stable (with a CAGR of 0.8%) as EDP's investments in this segment will be mostly directed at maintenance. The RoRAB, on the other hand, will remain constant (at 5.58%) until the new regulatory period in 2026, where we expect, it will fall to the floor at 5%. Similarly, to Portugal, we expect the Spanish Networks gross profit to remain stable as the increase in EBITDA will meet the decrease in OPEX.

Formulas to estimate Brazil Distribution gross profit:

$$\text{Allowed EBIT} = \text{RAB} + \text{RoRab}$$

$$\text{EBITDA (t)} = \text{EBITDA (t-1)} + \text{Change in Allowed EBIT} + \text{Cost Savings} + \text{Volume}$$

$$\text{Gross Profit (NA)} = \text{EBITDA} + \text{OPEX}$$

Table 19. Networks Brazil

	2020	2021E	2027E	CAGR (21-27)
Distribution				
Average RAB	5,000	5,521	8,563	8%
RoRAB	8.1%	8.1%	8.1%	0%
RAB & Return Evolution	405	447	693	8%
Cost savings achieved	-186.4	10.0	5.0	-11%
Volumes	-76	37	54	7%
EBITDA	1,219	1,307	1,886	6%
OPEX	1,015	1,098	1,508	5%
Gross Profit	2,233	2,405	3,394	6%

Transmission				
Gross Profit	393	500	877	10%

Source: Analysts' Estimates

In Brazil distribution, electricity demand has a significant impact (contrary to Iberia), although it still follows a RAB model. This is, if the energy contracted is up to 105% of actual demand, the costs can be passed on to customers via tariff. If it exceeds 105%, the cost of all energy above this limit must be borne by the company. In fact, most distribution consumers are still legally obliged to purchase energy from local distribution companies. This way, EDP has captive consumers whose commercial relationship is regulated by ANEEL and considering its service quality has been improving throughout years, unless there is a sudden negative shock as the one caused by Covid-19, we expect EDP will not have any penalty regarding the demand component in future years. Regarding the evolution of RAB, we expect EDP to achieve its target of a RAB value of €1,300 Mn (R\$8,064 Mn) by 2025, supported by the recognition of value-added investments (RoRAB vs WACC), and afterwards to converge to the growth in Iberia. Assuming the RoRAB will remain constant at 8.09%, we expect the allowed EBIT (RAB*RoRAB) to increase 71% (in Reais terms) until 2027. This rise accompanied by the projected higher volumes in electricity supplied, driven by Brazil's economy growth (estimated at 3% p.a.), and cost savings achieved (greater efficiency in costs vs the ANEEL benchmark) is expected to increase EBITDA 54% and consequently, gross profit 51% (in Reais terms). Gross profit growth is reduced in relation to EBITDA's, consequence of the decrease in OPEX costs set by the regulatory target (see *Table 19*).

Regarding the transmission business, in addition to the transmission line concession awarded in 2016, EDP Brazil was awarded five more transmission lines, totalling 1300 km, requiring a budgeted investment of R\$3.1 Bn. Even taking into consideration the negative impact caused by Covid-19, we assumed the six lines would become operational over the next two to three years since EDP was months ahead of regulatory schedule in all projects. This prompt increase in CAPEX in the transmission sector was fostered by the low interest rate environment in recent years in Brazil. This is, considering that, in 2020, approximately 31% of EDP's financial debt was constituted by floating rate bonds, low interest rate levels considerably reduce the cost of debt, and consequently reduce WACC (increasing the already positive difference between implicit ROIC and WACC). In 2020, the Central Bank of Brazil decided to keep its benchmark interest rate at an all-time low of 2% and did not rule out additional reductions as policy makers seek to stimulate an economy ravaged by the coronavirus pandemic. Therefore, we predict that the investment in transmission will continue and from 2023 onwards the growth rate in EBITDA will be of 5% annually. We did not find EDP target feasible (18% 2020-25 CAGR vs our estimate of 14%), considering EDP is not a major player in the transmission sector in Brazil (approximately 1% of market share), and consequently growth in this segment can be adversely impacted by the competition EDP faces in competitive bids in auctions for new

Table 20.
Transmission Brazil market share (2020)

Competitor Name	Transmission lines (Km)	Market Share
Eletrobras and subsidiaries	71,050	46.50%
CTEEP	50,423	33%
Engie	2,800	2%
CEMIG	10,000	7%
Copel	6,735	4%
EDP	1,300	1%
Others	10,488	7%
Total	152,796	100%

Source: Analysts' research and estimates

concessions or renewal of existing ones. Therefore, we project an increase of transmission gross profit at a CAGR of 10% from 2021 to 2027.

Valuation

In Networks Iberia, EBIT is expected to exhibit a small upwards trend from 2020 onwards (at a 1.4% CAGR) which can be attributed to two factors: (i) a very stable Iberian RAB and return evolution, but most importantly (ii) significant cost savings achieved in Iberia (representing on average 79% of the change in EBITDA). The FCF, from 2022 onwards, are expected to follow the same upwards inclination of the EBIT, but at a significantly higher CAGR (of 12% in 2023-27), consequence of a significant but stable CAPEX mostly targeting maintenance which consistently offsets depreciation in this period. Using the computed WACC and a growth rate of 1% we estimated this segment to be valued at €6,432 Mn.

Table 21. Networks Iberia's Valuation

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	318	326	334	341	349	356	349	352
Taxes	-83	-96	-98	-101	-103	-105	-103	-104
NOPLAT	235	230	235	241	246	251	246	248
Depreciation	301	319	322	324	327	329	331	333
NWC	-142	-35	-56	-40	-46	-38	-18	-20
CAPEX	-2,060	-492	-496	-500	-504	-508	-515	-525
Change in Other Operating Assets and Liabilities - net	14	28	0	-1	0	0	0	0
FCFF	-1,651	50	6	24	23	35	44	37
Discount Factor			1.0	1.0	1.0	0.9	0.9	0.9
Discounted FCFF			5	23	22	33	41	34

EV	158	WACC	1.50%
Terminal Value	6,274	g	0.96%
Total EV	6,432		

Source: Analysts' Estimates

In Networks Brazil, EBIT and the NOPLAT from 2020 to 2027 are expected to register a significant increase (+6% and 5.3%, respectively) which can be mostly attributed to: (i) increase in RAB of Brazil distribution (at a CAGR of 8% in R\$); (ii) Cost savings achieved; (iii) increase in Electricity distributed (representing from 2021 onwards on average 54% of the EBITDA change in Brazil Distribution); and (iv) the growth in the Transmissions RAP. Nonetheless, the FCF are estimated to be significantly lower than the NOPLAT (high firm RR), consequence of the increase in CAPEX to support this growth. Using the computed WACC for this

segment and assuming a growth rate of 0.7%, we estimated this segment to be valued at €2,474 Mn.

Table 22. Networks Brazil's Valuation

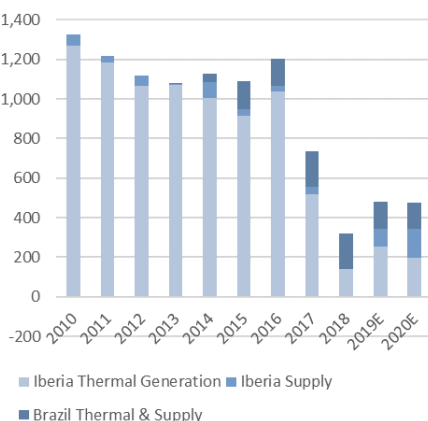
	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	190	192	214	226	241	256	271	286
Taxes	-50	-57	-63	-67	-71	-76	-80	-84
NOPLAT	140	135	151	159	170	181	191	201
Depreciation	71	85	95	106	114	123	131	137
NWC	3	9	-1	1	0	0	0	0
CAPEX	-696	-201	-221	-240	-259	-279	-284	-287
Change in Other Operating Assets and Liabilities - net	3	9	-1	1	0	0	0	0
FCFF	-479	36	24	26	25	25	37	51
Discount Factor			1.0	1.0	0.9	0.9	0.9	0.9
Discounted FCFF			23	25	23	22	33	44

EV	170
Terminal Value	2,474
Total EV	2,645

WACC	2.50%
g	0.72%

Source: Analysts' Estimates

Exhibit 29
CSEM EBITDA (€ Mn) (2010-2020)



Source: EDP results

Client Solutions and Energy Management

In 2020, Client Solutions and Energy Management represented 51% of revenues but just 12% of the EBITDA (vs 41% of EDPR, despite EDPR only having 1.6x CSEM installed capacity), having been decreasing at a CAGR of -10% in the past ten years (see *Exhibit 29*) driven by the fall of profitability in Iberian Thermal generation. In fact, the weight of the Iberian thermal generation decreased from 86% of this segment's EBITDA in 2016 to 41% in 2020 which can be mostly attributed to the increase in coal costs and consequently, the decrease in its gross Margin (from 23% in 2017 to 4% in 2020). As it was already explained, this segment can be divided in supply and thermal generation.

Supply

The Supply business represented approximately 9.5% of EDP's EBITDA in 2020. We used the total volume of electricity and gas sold and EBITDA/MWh as drivers to compute the EBITDA.

In Iberia, we forecast an EBITDA decrease of 63% in 2021 because of the disposal of the B2C portfolio in Spain and a continuing downward trend in the number of electricity clients as a function of price competition (even though gas customers have been relatively stable due to increase in dual offer rates). Nonetheless, from 2021 onwards we expect a steady increase in EBITDA at a CAGR of 0.8%. This results from an increase in electricity per customer (as electricity demand will rise 1% annually, according to IEA, linked to increasing digitalization), but the effect will

be partially offset by energy efficiency improvements, and a slight decrease in gas demand as it will be progressively substituted by renewable sources. Moreover, the increase in penetration rate of new energy solutions (26.1% in 2020) such as distributed solar and e-mobility services will contribute to an increase in the consumption per customer, and consequently the volume sold, whereas inflation will drive EBITDA/MWh up.

Table 23. Supply Iberia

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBITDA/MWh (€M)	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Volume sold - Portugal (MWh)	19,200	19,177	19,154	19,132	19,110	19,088	19,066	19,045
Volume sold - Spain (MWh)	16,893	242	244	245	247	248	250	252
EBITDA Supply Iberia (€M)	145	54	54	55	56	56	56	56

Source: Analysts' Estimates

In Brazil, we project EBITDA to increase at a CAGR of 5.4% in Euros due to two factors: an increase in volume sold (3.5% on average annually), consequence of a forecasted increase in electricity demand to accommodate Brazilian economic and population growth; and an increase in EBITDA/MWh which will evolve according to inflation (3% annually, on average).

Table 24. Supply Brazil

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Electricity Supplied (Gwh)	25,554	26,448	27,374	28,332	29,323	30,350	31,412	32,511
EBITDA/GWh (R\$M)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
EBITDA Electricity Supplied (€M)	33	32	34	36	39	42	45	48

Source: Analysts' Estimates

Thermal generation and energy management

In Iberia, thermal generation is a liberalized activity, and it includes the generation of nuclear, CCGT and Coal. Starting with the first, we identify as its main drivers the output (GWh) and the ratio EBITDA per MWh.

We consider the Nuclear output will remain constant as we expect no changes in its installed capacity and assume an average load factor of the previous three years (2018-2020). The ratio EBITDA per MWh, on the other hand, exhibits a declining trend (-10% CAGR) driven by a decreasing final power price (in which we forecast a declining proportion that is hedged) and an increasing cost of production due to an increasing OPEX.

Table 25. Nuclear

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Output (GWh)	1,196	1,205	1,205	1,205	1,205	1,205	1,205	1,205
EBITDA/MWh (€M)	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02
EBITDA (€M)	49	46	43	39	35	31	27	23

Source: Analysts' Estimates

Nuclear energy is only generated in Spain. The cost of production includes the OPEX and an ENRESA levy (€/MWh) which we assume to be constant in the future.

Nuclear Costs = cost of fuel (per MWh) + Generation tax + costs with ENRESA fund

Concerning the CCGT and Coal business in Iberia, its main drivers are the output (of each technology in GWh), the Spark and Dark spread and the OPEX.

Starting with the output, we expect a decreasing CCGT output due to the assumptions of no changes in installed capacity and a declining load factor (-1% p.a.) and a severely declining coal output until it reaches 0 GWh in 2023 due to a decreasing installed capacity (to meet EDP's coal free target in 2025) and an abrupt decrease in load factor due to increasing production costs. In relation to the spreads achieved for both technologies, we assumed that starting in 2021, when there is a higher demand for thermal energy (i.e., when technologies with lower marginal costs like renewables are not able to satisfy demand), Coal will be the most expensive technology to satisfy demand (switching with CCGT, see Table 27) until 2022. Afterwards, we expect EDP will not produce Coal anymore and CCGT to become the most expensive technology setting the price when there is higher demand. Thus, we expect the dark spread to decrease to 0 in 2021 and remain constant in 2022 (gross profit equal to 0 as price equals production costs) and the Spark spread to remain constant at the 2020 levels until 2027. Our assumptions are based on the deteriorated outlook for coal plants (in relation to CCGT): (i) worsening marketing conditions from the rise of Coal costs (increase of 35% in generation costs from 2018 to 2020) due to the green cent and the CO2 licenses (which are more expensive for coal-fired stations as they emit more carbon dioxide per MWh than gas-fired ones), and (ii) decline in natural gas prices and increase in abundance over the past decade (due to the shale gas revolution) which has also pushed down the average wholesale price of electricity. Nonetheless, despite the changes in gross profit, EBITDA will still increase at a 2.2% CAGR due to the decline in OPEX, which we expect to decrease proportionately to the reduction of installed capacity.

Spark Spread is the difference between the price received by a generator and the cost of CCGT needed to produce that electricity. A **Dark Spread**, on the other hand, is the difference between the price and the cost of coal.

Table 26. Evolution of the Spark and Dark Spread

	2018	2019	2020	2021E
Achieved Baseload power (€/MWh)	56	65	65	59
CCGT Costs + Levies (€/MWh)	67	65	65	58
Coal Costs + Levies (€/MWh)	49	61	63	59
Spark spread (achieved)	-11	0	1	1
Dark spread (achieved)	8	4	3	0

Source: EDP results

CCGT Costs = cost of gas + Taxes + CO2 licenses

Coal Costs = cost of coal + CO2 licenses + generation taxes + green cent

Notes:

- Taxes (CCGT) in Spain refers to the gas Green Cent and the generation tax and in Portugal the Clawback Tax.
- CO2 licenses have different costs depending on carbon emissions of each technology.

Table 27. CCGT and Coal

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Output CCGT (GWh)	9,759	7,314	7,061	6,808	6,555	6,301	6,048	5,795
Output Coal (GWh)	4235	1086	430	0	0	0	0	0
Spark Spread	1	1	1	1	1	1	1	1
Dark Spread	3	0	0	0	0	0	0	0
OPEX (€M)	124	117	109	102	94	87	87	87
EBITDA (€M)	148	143	151	158	165	173	173	173

Source: Analysts' Estimates

In Brazil, on the other hand, thermal generation corresponds to the 720 MW coal power plant located in Ceará which have a PPA for remuneration according to

Table 28. Thermal Generation Brazil

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Output (GWh)	720	720	720	720	720	720	720	720
EBITDA/MWh	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
EBITDA (€M)	99	87	87	87	87	87	87	87

Source: Analysts' Estimates

technical availability. We considered the main drivers of this business the capacity (GWh) and the EBITDA per MWh, which we assume will remain constant until 2027 and consequently, so will the EBITDA.

Valuation

EBIT and NOPLAT in 2027 are expected to register a significant increase (+49% and +40%, respectively) driven by the fall in depreciation which more than offsets the decrease in number of customers in Spain supply. On the other hand, the FCF is projected to decrease at a -30% CAGR from 2021 until 2027 as the absolute level of CAPEX converges to the value of depreciation, consequence of ending disposals (after 2025, EDP is expected to maintain its remaining installed capacity and thus, CAPEX will equal the depreciation as it is assumed all investments will be maintenance to compensate the reduction in value). Using the computed WACC for this segment of 2.95% and a negative growth rate of 0.19% (given by the ROIC*RR), we estimated this segment to be valued at €2,434 Mn.

Table 29. Client Solutions and Energy Management's Valuation

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	67	-80	26	35	63	86	103	100
Taxes	-18	0	-8	-10	-19	-25	-31	-29
NOPLAT	50	-80	18	25	44	61	73	70
Depreciation	390	427	326	323	303	285	267	271
NWC	31	-105	-20	-26	-25	-22	3	2
CAPEX	350	123	-310	-210	-207	-187	-285	-267
Change in Other Operating Assets and Liabilities - net	8	19	0	0	0	0	0	0
FCFF	828	383	14	113	114	137	57	76
Discount Factor		0.0	1.0	0.9	0.9	0.9	0.9	0.8
Discounted FCFF		0	13	106	105	122	50	63

EV	459	WACC	3.01%
Terminal Value	1,976	g	-0.19%
Total EV	2,434		

Source: Analysts' Estimates

APPENDIX

EDP – ENERGIAS DE PORTUGAL

UTILITIES

STUDENT: DIOGO PEREIRA / JOSÉ CARVALHO

COMPANY REPORT

20 MAY 2021

29163@novasbe.pt / 29146@novasbe.pt

Leading the energy transition

Growth in renewables driven by asset rotation, while proactively managing the portfolio

- **Investment Thesis.** Report's highlights. We recommend a Buy position given our price target for FY21 of €6.44 per share, which reflects an upside potential of 42%, compared to the current market price. Following a period when excessive leverage acted as a bottleneck inhibiting EDP's growth we expect EDP to exhibit an EBITDA growth at a CAGR of 4% between 2020-27.
- **Step-up green growth driven by lower costs.** We expect EDP to achieve 20GW gross additions to renewable pipelines until 2025, of which 45% will be in North America. EDP will benefit from attractive tax incentives (PTCs and ITCs) as well as new initiatives to implement Biden's USD 2 trillion Climate Plan.
- **Transmission as the engine of growth in Brazil.** After Renewables, Networks Brazil will be the segment with the highest growth, which will be fostered by the stable regulatory environment and the soar investment in transmissions portfolio.
- **Leverage and dividends.** EDP's credit rating was updated to a BBB. Moreover, we project EDP to deliver attractive returns through a sustainable dividend policy of 75-85% of recurring Net Profit, with a dividend floor at €0.19 per share.

Company description

EDP-Energias de Portugal is the main Portuguese vertically integrated utility company, which is present in the generation, distribution, and supply of electricity, as well as gas commercialization. It also holds a portfolio of renewables assets through its 82.6% owned subsidiary EDP Renováveis and has a strong presence in Brasil via its 51.3% holding in EDP Brasil.

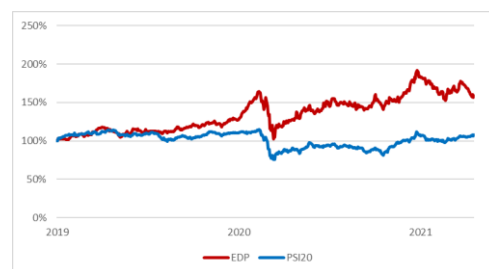
Recommendation:	BUY
<i>Vs Previous Recommendation</i>	-
Price Target FY21:	6.44 €
<i>Vs Previous Price Target</i>	-
Price (as of 28-Jun-21)	4.67 €

Reuters: EDP.LS, Bloomberg: EDP.PL

52-week range (€)	3.90-5.66
Market Cap (€m)	18,519
Outstanding Shares (m)	3,966

Source: Bloomberg

EDP vs PSI20 Comparison



Source: Bloomberg

(Values in € millions)	2020	2021E	2022F
Revenues	12,488	13,218	13,803
EBITDA	3,908	3,287	3,599
EBITDA Margin	31%	25%	26%
Net Income	1,161	967	1,255
EPS	0.29	0.24	0.32
DPS	0.19	0.19	0.19

Source: Company Report & Analysts Estimates

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY DIOGO PEREIRA AND JOSÉ CARVALHO, 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. (SEE THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

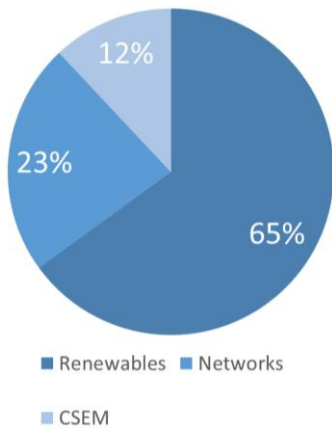
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Company Overview

Exhibit 1 EBITDA breakdown by operating segment (2020)

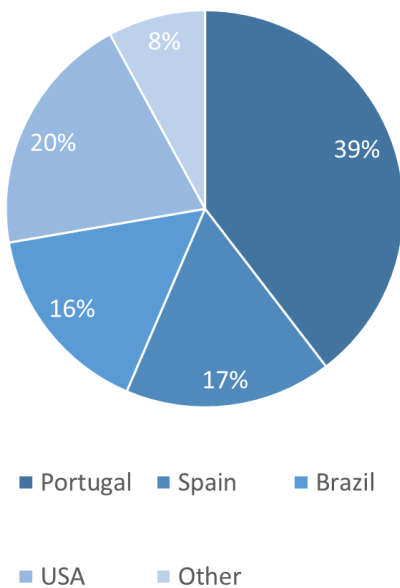
Business mix is focused on
renewables and regulated activities.



Source: EDP reports

Exhibit 2 EBITDA breakdown by region (2020)

Iberia accounts for more than half
of EDP's EBITDA



Source: EDP reports

EDP – Energias de Portugal, S.A. is a multinational, vertically integrated utility company which generated a consolidated revenue of €12.4 Bn and an EBITDA of €3.9 Bn in 2020 (see the breakdown in *Exhibits 1 and 2*). It is the leading utility company in Portugal, representing approximately 55% of installed power generation capacity, 99% of electricity distribution, and 41% of liberalised electricity supply in 2020. Additionally, EDP has a small share of Portuguese gas supply market (10%). Via its operations in Spain, EDP is the third largest electricity generator in the Iberian Peninsula. EDP is also present in the renewable energy sector through its 74.98% participation in EDP Renováveis (EDPR) and its hydroelectric generation assets in Iberia and Brazil. Lastly, EDP is present in Brazil via its 51.3% holding in EDP Brasil.

EDP operations are currently organized in 3 operating segments: **(1) Renewables** (65% of Group's EBITDA and 74% of Group's CAPEX) which includes EDP's hydro, wind, and solar power assets across 19 countries in 4 continents. EDP's renewables capacity accounts for 79% of total installed capacity, equivalent to 20 gigawatts (GW) (including Equity MW). **(2) Networks** (23% of Group's EBITDA and 22% of Group's CAPEX) which refers to electricity distribution activities in the Iberian Peninsula and Brazil, electricity transmission lines in Brazil, and last resort supply of electricity in Portugal. **(3) Client solutions & Energy Management** (12% of Group's EBITDA and 4% of Group's CAPEX) which includes EDP's supply activities in Iberia and Brazil, thermal generation, and energy management.

EDP is listed on the Lisbon Stock Exchange and is currently the largest group in the Portuguese Stock Index (PSI 20) with a market capitalization of around €18.5 Bn.

The Power and Utilities sector is highly regulated throughout its value chain, since some areas of activity have long-term contracts (concessions and licenses), receive incentives or are natural monopolies. EDP benefits from a higher share of a long-term contracted and incentivized renewable business, which brings its overall EBITDA regulated quasi-share to 65% in the end of 2020, opposing to the 35% that operate in the liberalized market constituted by the hydro capacity in Iberia, electricity and gas supply and thermal generation. We expect EDP to moderately improve the weight of regulated and quasi-regulated earnings to 80% by 2025. This is supported by the sale of merchant hydro assets in Portugal, the commissioning of Brazilian transmission lines, the positive regulatory reviews in distribution concessions in Brazil, and the growth of renewables over the period, net of asset rotation.

Peer Comparison

Table 1. EDP – Energias de Portugal – Peer Comparison (2020)

Industry Sector: Power & Utilities					
	EDP - Energias de Portugal S.A.	Iberdrola S.A.	Enel SpA	Nextera Energy, Inc.	The Southern Company (SO)
-- Fiscal year ended Dec. 31, 2020 --					
Credit Rating (Fitch)	BBB-	BBB+	A-	A-	BBB+
Market Cap (€ Mn)	20,346	72,007	84,112	132,644	59,220
Number of employees	12,180	36,915	66,717	13,900	27,700
Revenue (€Mn)	12,448	33,145	62,623	15,787	17,873
CAGR Revenues (2015-20)	-4%	1%	-3%	1%	3%
EBITDA (€ Mn)	3,947	9,692	20,217	9,486	8,397
CAGR EBITDA (2015-20)	0%	5%	1%	6%	6%
Net Income (€Mn)	1,161	3,970	3,622	2,078	2,722
Total Assets (€ Mn)	42,947	122,518	163,453	112,004	107,838
Debt (€ Mn)	15,483	42,832	64,476	46,200	46,711
Equity (€ Mn)	13,078	47,218	42,357	39,411	28,531
Profitability Ratios					
EBITDA margin	31.39%	29.05%	24.80%	52.93%	44.66%
EBIT margin (Operating margin)	12.33%	16.70%	13.36%	28.43%	23.98%
Net profit margin	9.33%	10.89%	4.17%	16.22%	15.38%
ROE	8.68%	9.88%	8.89%	7.94%	11.24%
ROA	1.88%	2.95%	1.56%	2.38%	2.59%
Capital Structure Ratios					
Net Debt/Equity	1.13	0.96	1.22	1.06	1.54
Net Debt/EBITDA	3.92	4.66	2.57	4.39	5.22
Liquidity Ratios					
Current Ratio	1.06	0.82	0.83	0.47	0.71
Quick Ratio	0.54	0.58	0.55	0.22	0.32
Cash Ratio	0.39	0.22	0.19	0.07	0.09

Source: Analysts' research and estimations

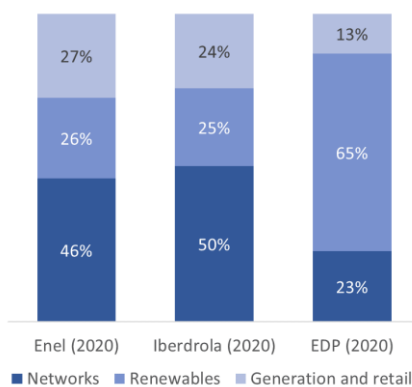
According to S&P Global Market Intelligence in 2020, EDP was the 11th largest European electric and multi-utilities company in terms of market capitalization. Looking at the table above, we can observe EDP is distant from the major vertically integrated utility players worldwide in terms of revenues, total assets, number of employees, and sum of debt book value and equity market value. Concerning the profitability margins, although EDP's EBITDA margin is close to the median of the sector, its greatest focus in renewables is responsible for a relatively lower operating margin comparing to European peers, driven by the higher depreciation which is a consequence of a larger depreciable assets in renewables.

During the last 5 years, EDP exhibits the lowest CAGR in revenues and contrary to its peers, a 0% CAGR in EBITDA which can be explained by a negative forex impact in the period (prompted by BRL and, to a lower extent, USD), low wind resources and the 25% fall in thermal energy production.

It is important to highlight that comparing to the European peers, EDP receives a lower contribution of pure networks activities (23% of 2020's EBITDA). For Iberdrola and Enel this figure is above 45% (see *Exhibit 3*). On the other hand, EDP generates a higher proportion of its energy production from renewables than peers Enel, Iberdrola, NextEra, and Southern Company. The company will try to leverage its position in the segment by continuously investing in the expansion of its renewable capacity, particularly onshore and offshore wind (which will represent 95% of the expansion investments until 2025; see more in Strategy and Growth prospects: 2021-25)

For this table, we included besides EDP, 4 P&U major players: 2 of them headquartered in Europe and 2 in North America. All of them are semi regulated utilities that own power transmission/distribution and generation businesses.

Exhibit 3 EBITDA breakdown by operating segments in 2020 (Peer comparison)



Source: EDP, ENEL and Iberdrola reports

Lastly, we note that EDP's has finally been able to reduce the net debt to EBITDA ratio, after being sustainably well above its peers over the past five years (estimated to be close to 5). This was mostly possible because of EDP's efforts to reduce net debt through the Portuguese hydro asset sale as well as the disposal of the B2C portfolio and CCGT in Spain. This is one of the main reasons we expect EDP to be able to achieve its growth targets for 2025, since excessive leverage that was acting as a bottleneck is no longer inhibiting EDP's growth.

Shareholder Structure

Important note: votes cast by a shareholder which exceed 25% of the issuer's share capital shall not be taken into consideration. Thus, EDP is not directly or indirectly controlled by any shareholder or entity.

Table 2. Shareholder Structure

Shareholders	% Capital
China Three Gorges	19.03%
Oppidium Capital, S.L.	7.20%
BlackRock, Inc.	7.10%
Norges Bank	3.13%
Qatar Investment Authority	2.27%
Sonatrach	2.19%
Bank of America Corporation	2.02%
Canada Pension Plan Investment Board	2.01%
EDP (Treasury Stock)	0.48%
Remaning shareholders	54.58%

Source: EDP Handouts, 2021

CTG profile

CTG is a Chinese energy corporation and the world's largest clean hydropower enterprise, operating in 47 countries with 89 ongoing international contracts and investment projects in Africa, Asia, Europe, and Americas. CTG has a total installed capacity of 124GW (17.7GW overseas), a workforce of around 35,000 people and total assets of RMB 698.6B. The group specializes in the development of new energy like wind and solar in China and abroad.

EDP share capital totals €3,966 Mn fully subscribed and paid up and is represented by 3,966 Mn ordinary shares with a nominal value of €1 each. As we can verify in *Table 2*, China Tree Gorges is the main shareholder with a stake of 19.03%, followed by Oppidium (7.2%) and BlackRock, Inc (7.1%). As of today, EDP owned 19 Mn treasury stock shares, which corresponded to 0.48% of the share capital.

Between 1997 and 2012, EDP went through a privatization process with eight phases that concluded with the Portuguese state selling a 21.35% stake in EDP to Chine Three Gorges Corporation. In addition to becoming a new shareholder, CTG became a new strategic partner. EDP and CTG combined efforts to become major players in renewable energy generation projects in which CTG committed to: (1) invest up to € 2 Bn in minority stakes in various EDP's projects and co-investments in certain wind power projects and (2) provide a credit facility of up to €2bn, at corporate level. The first pillar of the agreement already allowed EDP to use approximately 1.6 Bn of the €2 Bn in several wind and hydro projects. Moreover, the partnership enabled EDP to diversify growth opportunities through joint ventures with the purpose of further endorsing their cooperation, even outside of the initially agreed financing structure to be provided by CTG. Below we can find a summary of all CTG's investments in EDP. These equity investments are very advantageous to EDPR. Firstly, the investments done by CTG were directed at operational projects owned by EDP and thus, contributed to their self-funding strategic pillar (asset rotation, see more in *Table 3*). Secondly, the investments were also directed at more early projects with the co-financing of its developments and the sharing of future risks and benefits of the project. Overall, CTG's investments provided a solid financing structure to EDP, improving its financial position and allowing it to follow further growth opportunities.

Regarding the debt support commitment, the first part was given in 2012 which was critical, as it was given during a time of very difficult access to credit¹, enhancing EDP's financial flexibility. However, contrary to what was expected initially, the second part was not yet arranged by CTG. Nonetheless, it is important

Note 1- During the financial aid program to Portugal, where financing to Southern European countries was very limited.

to highlight that as the market conditions improved gradually it was no longer critical to receive the second part.

In 2020, CTG sold 100 Mn of EDP shares, representing 2.52% of EDP's share capital and thus, became holder of 19.03%. Nonetheless, following this transaction China Three Gorges stated that it "will continue to support the strategic partnership established by EDP and CTG", which is fundamental for their international strategy. Thus, based on the critical support provided by CTG to EDP since 2012 and their continuous commitment to this partnership, we assess CTG's ownership as positive for EDP. We believe that through this partnership, EDP will continue to enter in new markets with the financial support of CTG and CTG will continue to get exposure to other markets besides China.

Table 3. CTG's Investments in EDP

Closing Date	Investment	Market	Capacity	Stake	Transaction Amount
June 2013	Portfolio of wind assets - Portugal	Europe	644MW	49%	€368 Mn
June 2014	Hydro plants - Jari and Cachoeira-Caldeirão	Brazil	373MW and 219MW	50% (in both)	R\$420 Mn
November 2014	Hydro plant - São Manoel	Brazil	700MW	33%	NA
December 2014	EDP Asia	Asia (Macau)	-	50%	€110 Mn
May 2015	Portfolio of wind assets - Brazil	Brazil	321MW	49%	R\$472.5 Mn
October 2016	Portfolio of wind assets - Italy and Poland	Europe	548MW	49%	€363 Mn
June 2017	Portfolio of wind assets - Portugal (ENEOP)	Europe	422MW	49%	€242 Mn
December 2018	Offshore wind development - United Kingdom	Europe	950MW project	10%	£35 Mn

Source: EDP Press Releases & Annual Reports

Economic and sectorial overview

Part I – Micro and Macro Changes

Power and Utility Sector Value Creation for investors

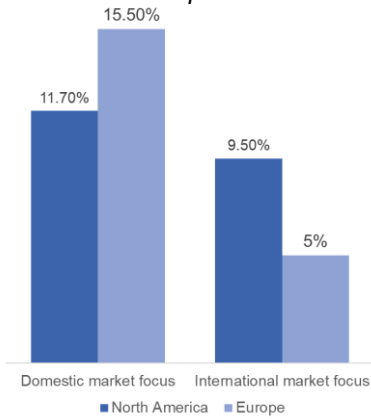
According to BCG's 2020 Value Creators Rankings, European and North American P&U companies delivered a median annual TSR¹ of 10.5% between 2015 and 2019, positioning the sector in the middle of the 33 industries analysed. Investors were attracted by the growth opportunities in renewables, and by the sector's appeal as a relative safe investment as a result of market regulation. In term of dividend yields, P&U players paid around 4% to 5%, comparing to the average of the other sectors of 2% to 3%, mainly due to the predictability of their cash flows.

Formula 1:

Total Shareholder Return =
(Current Price – Purchase Price + Dividend)/Purchase Price

Exhibit 4
TSR with Domestic market VS International market focus (2015-2019)

P&U companies focusing on domestic markets performed better.



Source: S&P Capital IQ; BCG Analysis, 2020

North American players average a median annual TSR superior to their European counterparts in the period under analysis (11% versus 6%). Moreover, the range of results was wider in Europe, which can be an indicator that the players in Europe faced higher exposure to unregulated segments, and consequently more volatile than North American Companies.

Semi-regulated integrated utilities, such as EDP, performed slightly worse on average than fully regulated counterparts. Nonetheless, they also contained the best and worst performers in terms of TSR, which, once again, is an indicator of the riskiness of less regulated segments (but also potentially more lucrative).

Another important result of the BCG analysis was that players with a strong domestic focus performed better on average than companies with more international orientation (see *Exhibit 4*). In fact, the annual median TSR was 10.5 percentage points higher. We believe this can be explained by the lack of expertise in local market know-how, in terms of customer preferences or regulatory management, by international players which is crucial in the P&U sector. Furthermore, companies with strong contribution from renewable generations sources outperformed the ones with higher share of fossil fuel's sources. The higher growth rate of renewables in the generation mix of energy demand, aligned with government subsidies and rising prices for CO2 emission allowances help explain this phenomenon (see more in The Case for Renewables part).

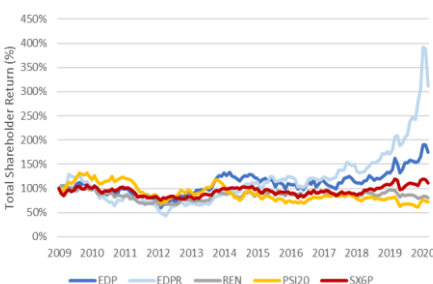
Good track record of Portuguese utilities

Since 2009, where we have data for the 3 main utility stocks in Portugal (EDP, EDPR, and REN), it is possible to observe that Portuguese utilities have outperformed Portuguese benchmark PSI20 on a total return basis. Even when compared with the European utilities sector benchmark (SX6P), Portuguese utilities have performed well (see *Exhibit 5*). Nonetheless, this performance pales when comparing with Spanish peers, which have done better than Portuguese utilities in the same period, apart from EDPR which has outperformed the Spanish counterparts recently (see *Exhibit 6*).

Moreover, Portuguese utilities have done fairly well comparing with the PSI20 during sensitive periods such as the sovereign crisis of 2011-14, and the blow up of the Espírito Santo Group in 2014. According to IEA, the drop in demand for energy has already been more significant than it was during the 2008 global financial crisis (a fall of 10% in Europe and 6.5% in North America, comparing with 5% and 4% respectively in 2008). The performance during difficult periods in the past, gives us confidence that P&U companies can recover from the Covid-19

Exhibit 5
Portuguese Utilities vs Benchmarks (Total Return, rebased Jan 08=100)

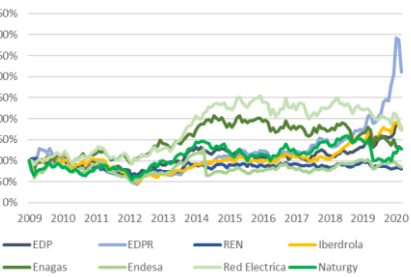
During the period under analysis, PSI20 and REN fell approximately 27% and 20% respectively. Whereas EDP, EDPR and SX6P rose 75%, 211%, and 11% respectively



Source: Bloomberg, March 2021

Exhibit 6
Portuguese Utilities vs Spanish Peers (Total Return, rebased Jan 08=100)

Spanish peers have been outperforming Portuguese counterparts, apart from EDPR which have risen sharply recently.



Source: Bloomberg, March 2021

pandemic faster than other sectors, fostered by the rise in energy demand as economic activity improves and from governments’ economic stimulus efforts (see *The Case for Renewables part*).

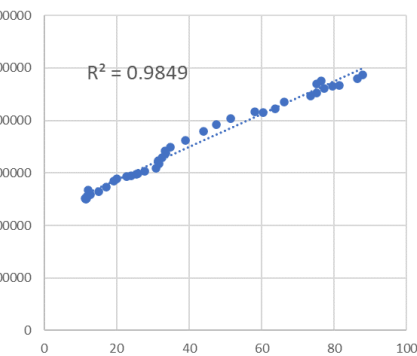
Macro-Economic Analysis

In 2020, EDP had 39% of its EBITDA in Portugal, while Spain, Brazil, and the U.S compose the remaining most relevant areas (17%, 16%, and 20% respectively). Therefore, it is important to analyse the macro environments of these countries.

Portuguese economy was severely impacted by the Covid-19 pandemic, leading to a fall in GDP by 5.1% in 2020. Nevertheless, according to OECD, it is expected a mild recovery by 1.7% in 2021 and 1.9% in 2022, mainly driven by EU’s Next Generation Funds and low interest rates which can foster a quicker economic recovery. Inflation rate is expected to be around 1% in the next years. According to BBVA, Spanish economy contracted by 11% in 2020, but is expected to grow by 5.3% in 2021 and 4.1% in 2022. Similar to the Portuguese situation, interest rates are expected to remain low to foster investment and consumption, whereas inflation is expected to be 0.8% in 2021 and 1.6% in 2022 according to the European Commission. In Brazil, OECD forecasts GDP to grow 2.6% in 2021 and 2.2% in 2022, after contracting 2.1% in 2020. Inflation will remain below target (2.9% in 2021 and 3.2% in 2022) and interest rates will record a new low at 2% which will support investment. Finally, the U.S. economy is expected to grow 4.6% in 2021 and 3.2% in 2022 after contracting 2.3% in 2020, according to the Congressional Budget Office. Furthermore, the Federal Reserve is committed to keep interest rates between 0% and 0.25% to encourage consumer and business spending and help the economy recover and will not raise short-term rates even if inflation rises, unless it surpasses the target of 2%.

Exhibit 7
Relationship between World’s GDP and Energy Consumption

The relation between the two variables is strong ($R^2=0.98$), but it does not prove there is a causality relationship



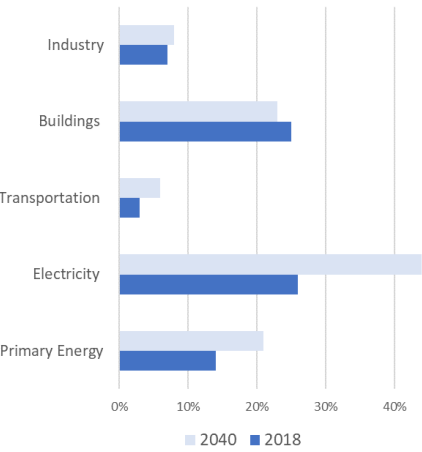
Source: Our World in Data (1980-2019)

Part II - The case for renewable energy

Electrification and decrease in renewable costs

As the world’s economy has been growing, so has energy consumption. As it is observable in *Exhibit 7* there is a strong correlation (R^2 of 98%) between World’s GDP and energy consumption. Even though the causality relationship is still a topic discussed, it is widely supported by various scientists. Despite the exceptional uncertainty caused by Covid-19, the International Monetary Fund still forecasts world’s economy continuing to grow in the following years, supported by drivers

Exhibit 8
Share of Renewables (2018 vs 2040)



Source: IEA, World Energy Outlook 2019

such as the growth in world’s population (Worldometer projects 9% until 2030). Thus, we believe energy demand will also evolve in the same direction.

Electricity consumption has been growing at a faster pace than energy consumption (3.5% vs 2% between 2010-2020, according to Enerdata), highlighting the existing trend of electrification of other energy uses. This helps explain the change in generation mix, with renewable sources’ weight being forecasted to increase the most since the electrification allows a higher penetration rate in a cost-effective manner of renewables, while reducing energy consumption as electric technologies are more efficient than conventional alternatives. In fact, according to IEA, by 2040, renewables are projected to increase its share in electricity consumption to 44% (compared to 21% in primary energy consumption, see *Exhibit 8*). In fact, renewables are taking the lead in new installations (from a renewable share of 50% in 2014 to 70% in 2019), which can be explained by several reasons. Firstly, policy makers have been instrumental in advancing the energy transition by enacting policies which support the deployment of renewable energy projects (see more below in Incentive Schemes). Furthermore, renewables are becoming competitive price wise. As you can see in Exhibits 9 and 10 below, the levelized cost of energy (LCOE) for wind and solar sources have the most significant reductions since 2010, and nowadays wind and solar technologies have the lowest costs among the other sources of energy generation. Decreasing installation costs, together with technological improvements, economies of scale, and increasing pressures from competition, helped make supply chains more efficient, and consequently made renewable sources cheaper, even when compared to fossil fuels.

The levelized cost of energy (LCOE) is a measure of the total cost over the lifetime of an asset divided by an appropriately discounted total of energy output generated from the asset over the assumed lifetime. It allows the comparison of different technologies on a consistent basis.

Exhibit 9
Change in LCOE between 2010 and 2018, by renewables

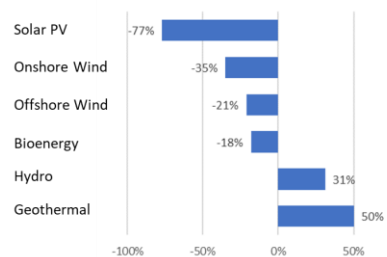
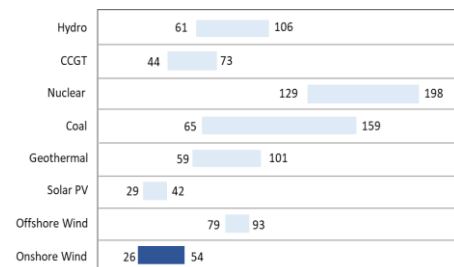


Exhibit 10
Levelized cost of generation (US\$/MWh in 2020)

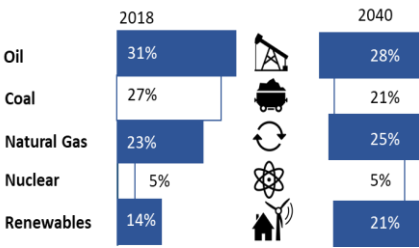


Source: Statista 2021, Lazard Estimates 2020

In contrast, the fossil fuels are expected to lose share in the energy mix of primary sources until 2040 (see *Exhibit 11*). This can be attributed to the forecasted increase in the prices of commodities (even if it is on a small degree) against the

Exhibit 11 Primary Energy Sources in the world (2018 vs 2040)

Generation mix is expected to change, with renewables verifying the highest increase, at the expense of fossil fuel.



Source: IEA, World Energy Outlook 2019

Table 4 Countries EDPR is present that have adopted RES auctions

Country	Auction or Tender
Portugal	Yes (for solar PV)
Spain	Yes (since 2016)
France	Yes
Poland	Yes
Romania	No
Italy	Yes
Belgium	No
Greece	Yes
US	Yes
Canada	No
Mexico	Yes
Brazil	Yes

Source: EDPR handouts

There are two main categories of regulatory generation focused renewable energy support mechanisms: **Tariff-based Instruments** and **Quantity-based Instruments**. The Feed-in Tariff is an example of the first and provide an economic incentive for generating electric using renewable sources.

An auction is considered a hybrid instruments as it combines aspects from both. In fact, in auctions **both the price and the quantity are determined through a price bidding process**.

decrease in the price of renewables. First, **oil prices** are expected to slightly increase in 2021, and from 2022 onwards, prices are projected to continuously increase at a slow pace. Concerning **natural gas**, followed by the significant decline in 2020, prices are expected to rise close to pre pandemic levels as consumption recovers in line with the global economy. Regarding **coal prices**, prices are expected to be broadly flat from 2021 onwards. Coal will continue to be negatively impacted by the shift towards renewables in electricity generation, fostered by the decline in the production costs of renewables as well as government policies to implement “green” Covid-19 recovery packages and plans to be carbon neutral in the future (by 2050 for the European Union with the Green Deal, and by 2060 for China). This will lead to higher generation costs for EDP to generate electricity from coal, CCGT and nuclear.

RENEWABLE ENERGY INCENTIVES IN VARIOUS COUNTRIES

More and more countries introduce auction-based systems

Tenders and auctions are becoming increasingly adopted in case of renewable energies (see *Table 4*). This way, countries can make sure they are able to fulfil their clean energy targets in the most efficient way, while achieving competitive prices. This not only reduces the cost of support that governments still need to provide in some cases, but also enables them to monitor technology developments, adjusting capitalizing on the savings that the sector is delivering each year. We expect that auctions will continue to increase in popularity to drive competitive prices, which accompanied with a decreasing LCOE will drive down the average selling price in the long term.

Nonetheless there are still other policies making renewable projects more attractive for investors which range from feed-in-tariffs to tax credits, green certificates, and accelerated depreciation.

Starting with Europe, in Portugal, the Feed in Tariffs remains the key mechanism to support the deployment of renewable energy to guarantee a return for every MWh of energy produced. Similarly, in Spain, before 2016, plant operators were entitled to a guaranteed bonus on top of the pool price. Regarding France, assets that were installed before 2016 received a Feed in Tariff and after that, the French Government released a Contract-for-Difference which is very similar to the FITs. On the other hand, in Poland and Romania they receive an established number of Green Certificates per MWh of energy produced. Lastly, in Italy, since 2013, the renewable capacity is auctioned and the wind farms winning will benefit from a Cfd scheme (contrary to the Feed-in-Tariff which was before 2013).

In the US, developers are eligible for tax incentives instead of feed-in tariffs (as in Europe). There are two types of them - Production Tax Credits (PTC) and Investment Tax Credit (ITC) (only one can be elected). PTC is a US\$25 (as of 2019) tax credit for every MWh produced during the first 10 years of operations, adjusted for inflation. ITC is a one-time payment after start of commercial operation of a wind farm and amounts to ~30% of eligible CAPEX. PTC structure normally provides higher returns for wind farm projects, while ITC is more favourable for Solar PVs or wind farms with low net capacity (load) factor and high CAPEX/MW. Another tax incentive for renewable energy producers is accelerated depreciation (MACRS), which allows depreciating ~85-90% of total CAPEX during first 5 years of the project life. Such a scheme allows reducing the tax basis dramatically during the first years and benefit from time value of this depreciation. Since EDP cannot fully benefit from the tax incentives with the profits generated by the operations in the US, the company partners with institutional investors to monetize future tax credits with which it finances growth in the region. The institutional partnership apportions the cash flows generated by the wind farms between the investors and the Company and allocates the tax benefits - PTCs, ITCs and accelerated depreciation - largely to the investor.

The world is joining efforts for a new decarbonized world: the green deal and Biden's election

On December 11th, 2019, the new European Commission presented the European Green Deal to reaffirm the global leadership in tackling climate change and becoming the first continent with neutral climate impact by 2050. Amid other actions, the plan includes the objective of stating a European Climate Law, reaffirming the commitment to achieve climate neutrality, establishing a plan to raise target ambitions of the European Union for 2030, reviewing the several legislation pieces and the development of multiple industrial strategies.

In September 2020, the European commission proposed to raise greenhouse gas emission reduction target to at least 55% in 2030 versus the 1990 levels, which we consider a substantial increase compared to the previous target of 40%. To implement the new proposed target, the Commission looked at the actions required across all sectors, including increased energy efficiency and renewable energy, and started the process of making detailed legislative proposals by June 2021 to implement and achieve the increased ambition. The Commission warned that speeding up renewables' expansion will be a key task for many countries and called on member states to link their plans with coronavirus recovery efforts. Thus, considering that several European countries are projected to fall short of new

Note 1 - The Next Generation EU is a broad financing instrument, covering a large spectrum of economic activities. For the energy sector in particular, the Next Generation EU reinforces the proposals of the Green Deal, namely the upgrade of the InvestEU program to include investment in technologies that support the energy transition.

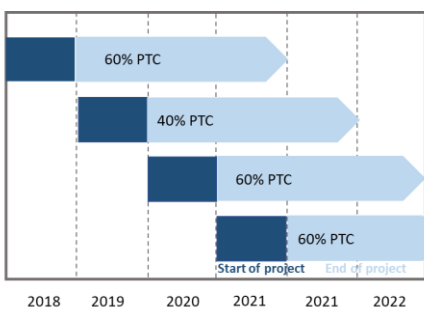
greenhouse gas reduction targets with existing measures, we consider that demand for renewable energy capacity should remain strong in the coming years.

In addition, the Green Deal developed the EU Strategy on Offshore Renewable Energy, which proposes to increase Europe's offshore wind capacity from its current level of 12 GW to at least 60 GW by 2030 and to 300 GW by 2050. Lastly, the next generation EU fund¹ (which will work as a recovery instrument against Covid-19) will provide additional liquidity with at least 30% of the €750 Bn being directed to the decarbonization project (the highest share ever of the European budget). This together with the EU's next long-term budget will reinforce the funds that are being allocated to the energy transition. To support the necessary investments, the Commission has also adopted today the rules for a new EU Renewable Energy Financing Mechanism, to make it easier for Member States to work together to finance and deploy renewable energy projects.

Moving on to the U.S, in January 2020, Joe Biden, who supports environment regulations and policy to tackle climate change, took office ending Trump's administration. To illustrate how the market reacted to President Biden election, who is likely to favour climate-friendly policies, we took a look at EDPR and EDP shares and saw they traded 3.86% and 2.47% higher with Joe Biden's spot win. In contrast, with Trump's elections win in 2016, EDPR shares traded 5.2% lower and lost 15% of its market cap shortly after the results were announced.

As a part of an ambitious clean energy plan, Joe Biden has pledged to re-join the Paris Agreement and proposed a \$2 trillion plan to set the United States on a course to achieve 100% clean energy and net-zero emissions by 2050. So far, Biden signed orders to suspend new oil and gas leases on public land, a review of leases that have already been granted, and a doubling of energy production from offshore wind by 2030, which signals that offshore wind will play a crucial role in the country's energy future, favouring EDP's renewables growth in the USA. Furthermore, in December 2020, US Congress extended the PTC at 60% of the full amount, or USD18/MWh for another year through December 31, 2021. The law previously called to reduce the PTC to 40%, but the COVID-19 pandemic urged lawmakers to implement relief measures for the renewable sector. Nonetheless, only solar, and offshore wind projects received an ITC extension (30% credit on projects that begin construction before 2022 and 2026, respectively) and the wind PTC is still scheduled to drop to 0% starting in 2022 (see on your left PTC phase out schedule in *Exhibit 12*). Given the size of the U.S. and the smaller efforts in relation to climate so far (the share of Renewables in US primary energy consumption has stagnated at 11% under Trump's mandate), we believe that a 'green revolution' in the United States could have a greater impact than the

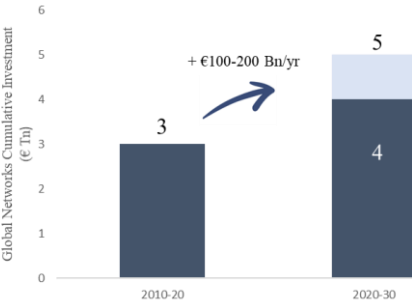
Exhibit 12
PTC Phase Out Timeline



Source: EIA

Exhibit 13
Global Networks Cumulative Investment, € Tn

Smarter and more resilient grids will be needed, requiring a significant investment in Networks (increase around € 100 to 200 billion per year)



Source: EDP's Strategic Update 21-25

Note 1. Smart grids: An electricity supply network which used digital communications technology to detect and react to local changes in demand.

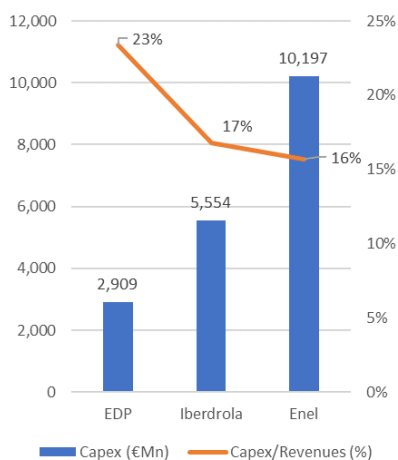
European green deal. EDPR provides an attractive exposure to US renewables. In fact, approximately 52% of the value of EDPR assets at the end of 2021 is in the US. Thus, the company should be a clear beneficiary from the recent extension of the PTCs and the ITCs and Biden's plan.

The critical role of Networks to energy transition

An unprecedented amount of investment in power grids is required to cope with the integration of renewables into the networks. EDP estimates an increase around €100-200 Bn per year to grid modernization to improve (see Exhibit 13).

Firstly, aging infrastructure needs to be replaced so that networks can withstand not only the increasing generation linked to distribution grids, but also to face extreme climate issues, such as the wildfires in California, or the polar vortex in Texas which we recently witnessed. Moreover, smart grids¹ are instrumental to accommodate an increasing weight of intermittent renewable generation, which unlike fossil fuels cannot be cheaply stored for prolonged periods, and to manage demand in real time. Another issued raised with the increased renewables share is that renewables generation comes both from scale projects as solar and wind farms, as well as numerous smaller ones such as residential PV solar connected to the distribution grid. Therefore, to ensure the transition to a decentralized generation model, the digitalization of grids is crucial.

Exhibit 14
CAPEX/Revenue comparison with peers



Strategy and Growth prospects: 21-25

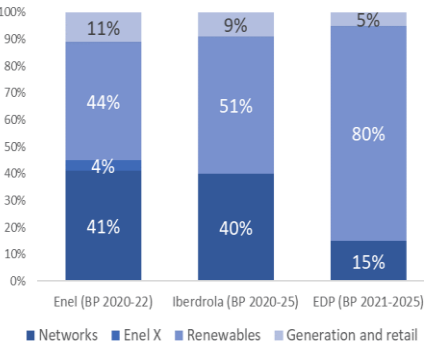
In February 2021, EDP disclosed its new business plan for the period 21-25. This business plan is based on 3 key pillars: (i) Accelerated and sustainable growth; (ii) Future-proof organization and (iii) ESG excellence and attractive returns.

(i) Accelerated and sustainable growth with significant visibility

EDP's objective is to increase its annual investments, targeting an annual CAPEX of €4.8 Bn in the period 2021-2025 (€24 Bn total) corresponding to a 65% increase in comparison with the previous target for the 2019-22 period. When comparing to its peers, EDP exhibited in 2020 the highest CAPEX/Revenues ratio which suggests that the company is investing more aggressively as it can be seen in Exhibit 14. If EDP keeps creating value as the firms invests in profitable projects as they did in 2020 (ROIC of 7% against a WACC of 3%) we consider EDP's aggressive investment strategy as positive for the company.

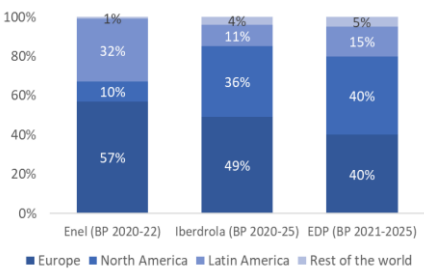
Source: EDP, ENEL and Iberdrola reports

Exhibit 15
CAPEX targets breakdown by segments (peer comparison)



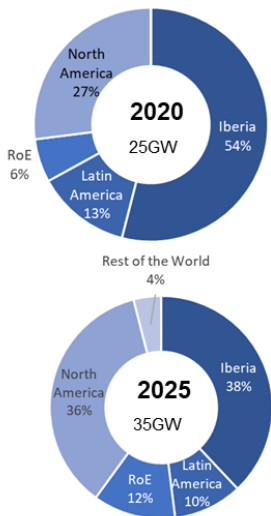
Source: EDP, ENEL and Iberdrola strategic plans

Exhibit 16
CAPEX targets breakdown by region (peer comparison)



Source: EDP, ENEL and Iberdrola strategic plans

Exhibit 17
Capacity breakdown by Region



Source: EDP Strategic Update 2021-25

This significant investment acceleration will have a strong focus in renewables (80% of CAPEX) and regionally in North America and Europe (80% of CAPEX) (see Exhibits 15/16). These investments will be allocated mostly to regulated/long term activities (almost 90%), while reducing thermal to decrease exposure. Considering the CAPEX targets of the two main European peers, Enel, and Iberdrola, we can verify their biggest focus will be identically distributed between renewables and networks, and regionally in Europe. Thus, we can notice that EDP is investing significantly heavier in renewables and the North American market.

To finance this expansion CAPEX (and €4 Bn in dividends), EDP plans to use the following sources: €12 Bn from organic cash, €8 Bn from asset rotation, €2 Bn from tax equity (creating value through the monetization of the investment and the production tax credits we have in US), €2 Bn debt, €2 Bn from portfolio optimization alternatives such as new hybrids, regulatory receivables, and forex, and lastly, around €2 Bn from what EDP considered “flexible funding sources”. Regarding that last point, EDPR has already successfully completed a €1,5 Bn capital increase, reducing EDP’s control of EDPR’s share capital from 81.6% to 74.98%.

Step-up green growth

EDP projects 20 GW gross additions in renewables installed capacity. The targeted growth until 2025 is already 45% secured (or will be secured in the short term). In fact, EDP has a total of 7.7GW of renewable projects secured with long term-contracts, of which 2.2 GW are already under construction.

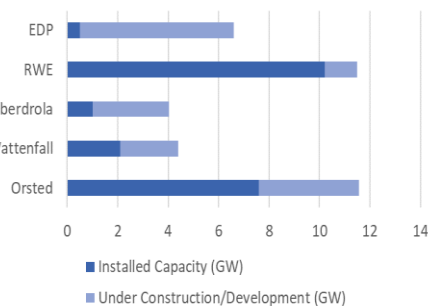
Regionally, growth will be mainly focused on North America (45%) and rest of Europe (20%), reducing exposure to Iberia (which is planned to decrease from 54% to 38% of the total renewable portfolio, see Exhibit 17). Starting with the North America, a total of 8.8 GW will be added in this period (growing from 27% to 36% of the total installed capacity). This region is viewed as the key engine and a very liquid market with very attractive tax incentives (PTCs and ITCs). EDP already has a very diversified geographical footprint (EDPR operates in 20 states), which allows the company to take advantages of states with strong wind resources and low costs, and states in the coastlines with higher costs but with a very big predisposition to contract renewable projects. In Europe, 6.7 GW of capacity in the next 5-years are expected to be added into countries EDP has already operations. The growth in Europe will be driven by an increased in organized CfDs auctions and by corporate PPAs. In Latin America, mostly in Brazil, EDPR is looking to take advantage of future auctions to increase its installed capacity in a sizeable market with strong fundamentals (e.g., wind resources). Installed capacity growth in Latin

Exhibit 18
Capacity breakdown by Technology



Source: EDP Strategic Update 2021-25

Exhibit 19
Wind Offshore's biggest developers installed Capacity



Source: EDP, RWE, Iberdrola, Vattenfall and Orsted reports

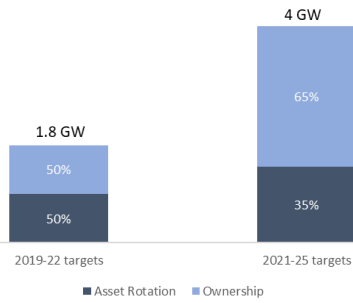
America should account for 15% to the group's total in the next 5-years or GW. Lastly, 5% will be exploring to a limited extent some opportunities elsewhere in the world, creating an opening in new different markets.

Technologically wise, EDP's wind onshore portfolio will be growing from roughly 11.5 GW, adding an additional 9.1GW (or 46% of the net additions) until 2025, mostly reinforcing their presence in core low-risk markets (Europe and the U.S.). Given the market appetite and EDP's track record with this technology, we believe these growth rates are achievable. Nonetheless, EDP will also be investing significantly in technologies other than wind, namely photovoltaic solar energy (increasing the weight of total installed capacity from 2% to 22%, see *Exhibit 18*), taking advantage of the increasing competitiveness of this technology largely due to declining costs, but also of the incentives granted by the recent extension of Investment Tax Credits (ITCs) in the US until 2022. Most of the new solar capacity installed will be in Europe (25%) and United States (60%, taking advantage of the ITCs). Regarding offshore energy production, EDP intends to establish itself as a big offshore player through Ocean Winds, the result of EDPR's 50:50 joint venture with Engie. In fact, this partnership was established to form a new entity as exclusive vehicle of investment of EDPR and ENGIE for offshore wind opportunities worldwide, bringing together the industrial expertise and development capacity of both companies (EDPR is the fourth largest wind producer in the world and ENGIE is the leader in wind energy in France). As agreed, EDPR and ENGIE, are combining their offshore wind assets and project pipeline in this new entity, having already an installed capacity of 0.5GW, 1GW under construction and 5.1GW under development, working together to become a big player in the sector by investing in offshore projects in different geographies which include Europe, United States, and Asian markets. Note that there was a significant delay (almost 2 years) in the forecasted COD of two projects in France because of COVID-19 challenges, but with the forecasted recovery from the pandemic, we expect EDP to be back on track from now on. Comparing EDP's offshore pipeline with some of the biggest developers in this technology (identified by Windpower Intelligence's research), we can see that in terms of current installed capacity EDP is a lot behind but considering its very ambitious expansion plan, EDP can become one of the top 3 European players (see *Exhibit 19*).

On a different direction, Hydro will have mostly maintenance investments as it is considered valuable for the company due to the technology's ability to generate strong cash flows, and its flexibility and storage capability. Furthermore, the company believes they already have a strong presence in this market, having sold part of its hydro portfolio in 2019 to reduce exposure to Iberia and market prices.

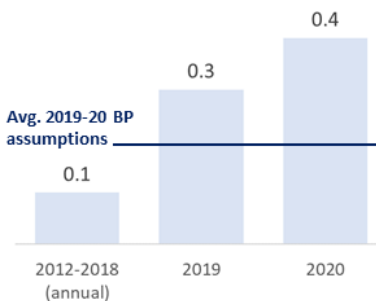
Exhibit 20
Acceleration of Renewables growth (added capacity, GW/yr)

EDP will accelerate the ownership of the assets.



Source: EDP Strategic Update 21-25

Exhibit 21
Asset rotation gains (€ Bn)



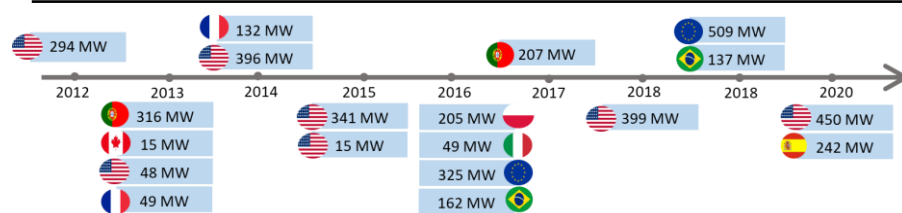
Source: EDP's Investor's presentation 2020

Accelerating ownership and asset rotation strategies

The asset rotation strategy was initially on a smaller scale and selling only minority stakes up to 2018. After that, EDP intensified this activity, and is now focusing on the sales of majority stakes. Since 2012, a total of 19 asset rotation deals were done, totalling 4.3GW and €5.5 Bn in proceeds of which €2.3 Bn were in the last two years (55% of the €4 Bn target which was a part of the BP 2019-2022). After nine years, these types of deals have become a key part of their recurring business plan and EDP intends to continue to do this going forward.

Between the period 2021-25, EDP is targeting €8 Bn in proceeds from asset rotation transactions. It is important to highlight that while in the past the company was looking at selling around 50% of the gross additions through asset rotation, it is now expecting to sell 40% in the period 2021-23 and 30% in the period 2023-25, accelerating the ownership of the asset that the company keeps (see Exhibit 20). Management believes that some of these assets have long-term strategic value and this strategy will allow the company to increase scale and synergies associated with that growing fleet, such as turbines procurement and technical and operational know how. The asset rotation strategy is based on upfront value crystallization to finance organic growth and generating extra value without increasing capital employed. We consider the reason EDP has been able to profit from asset rotation (and will be able to succeed in the future) is the fact that an operating wind park is considered more attractive on its early stages since the key risks associated with the development of new wind parks are mainly related to the kick-off of the project, the timely completion of the construction phase and the power purchase agreement. Since EDP bears these risks, the market is prepared to accept a higher price for the projects in the initial stages, making it profitable for EDP to perform asset rotation to invest the proceeds in new projects. EDP has reached roughly €700M of asset rotation gains in the period 2019-2020 which is a clear outperformance of the previous 2019-22 business plan estimates (see Exhibit 21). EDP's track record in asset rotation accompanied by an increased market demand (from Infra, Pension and Sovereign Wealth Funds) gives us a lot of confidence on the performance of asset rotation activity for the period 2021-25.

Exhibit 22 - Timeline of EDP asset rotation deals 2012-2020



Source: EDP Investor's presentation

Like its peers, EDP has been adversely affected by structural changes underway in the European electricity sector, with increases in renewable energy and higher carbon prices having pushed thermal capacity further out of the merit order and wants to reduce exposure to this market.

Note 1 -

The Viesgo acquisition was concluded in December, 2020, for an enterprise value (100%) of €2.7B. Under this transaction, EDP acquired control of Viesgo which currently owns electricity distribution networks (with a RAB of around €1 Bn), renewables assets (511 MW) and soon to be decommissioned coal power plants in Iberia.

Exposure to Hydro/Merchant
In Iberia, EDP's hydro, nuclear and thermal generation, which accounted for 19% of group EBITDA in 2019, is exposed to volume risk and market prices.

Distinctive and resilient portfolio

The company wants to improve their portfolio while reinforcing their low-risk profile, by increasing contracted exposure (targeting more than 85% of the EBITDA), and maintaining the EBITDA weight in the European and U.S. market (approximately 80%). To achieve this, EDP proceed to the disposal of non-strategic assets (see Table 5). The six hydro plant sale decreased EDP's exposure to hydro volatility and merchant prices, and improved financial leverage (net debt impact of €650 Mn). We believe this deal was beneficial to shareholders since it was made at a higher EBITDA/EV multiple than our computed market average (14.4x vs 11-12x). Moreover, proceeds were used to finance the investment in wind and solar growth plan, while EDP retained its leading position in Portugal hydro power generation with 5.1GW. Moreover, the sale of the two CCGT power plants and the B2C energy supply business were also aimed to reshape the portfolio according to the new strategic plan, and the proceeds were used to partially finance the acquisition of Viesgo¹, which further strengthens the business risk profile. That is, the integration of Viesgo in EDP's portfolio will increase the EBITDA coming from regulated activities, with network assets under perpetual concessions and remunerated based on a transparent framework (with regulatory visibility until 2025), as well as a renewable portfolio with 87% under a regulatory regime.

EDP has already achieved €2.7 Bn from the proceeds, clearly above the €2 Bn target for the whole period 2019-22. Both deals reinforce the low risk profile of EDP and the weight of regulated and LT contracted activities on EBITDA while supporting the new target of less than 45% (EBITDA) exposure to Iberia. These deals also contributed to EDP's long term targets: getting rid of coal by 2025 and by 2030, to be carbon neutral.

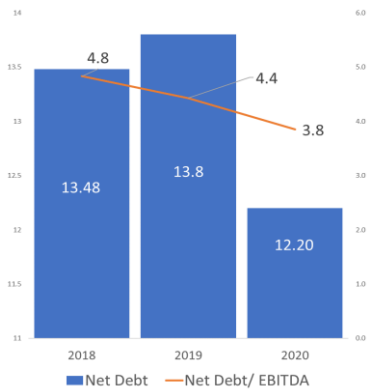
Table 5. Disposal of non-strategic assets

Announcement Date	Investment	Market	Capacity	Transaction Final Consideration
Dec 2019	Six hydro plants	Portugal	1689 MW	€2.2 Bn
May 2020	Two CCGTs power plants (Castejón I & III)	Spain	843 MW	€515 Mn
	B2C energy supply business	Spain	NA	

Source: EDP Press Releases

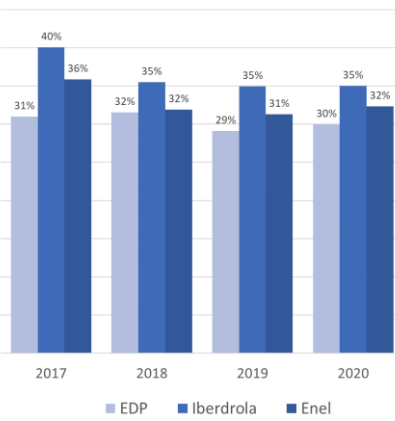
What this tell us is that so far, the company has achieved all its disposal targets for 2022 two years in advance and even though the current contracted exposure is still far from the target (70% vs 85% of EBITDA) we expect that with the portfolio reshuffling deals (included in the BP 2021-25) EDP will get there.

Exhibit 23
Change in Net Debt (€ Bn)
and Net Debt/EBITDA:



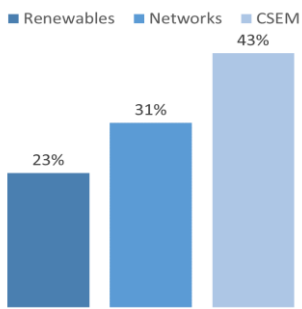
Source: EDP reports and analysts' estimates

Exhibit 24
Change in OPEX/Gross Margin
with peers (2017-2020)



Source: EDP, Iberdrola and ENEL reports and analysts' estimates

Exhibit 25
Change in EDP's OPEX/Gross
Margin between segments
(2020)



Source: EDP reports and analysts' estimates

Solid balance sheet and low risk profile





Like it was already stated, EDP was able to achieve a Net Debt to EBITDA ratio close to its peers. In addition, as part of the strategic plan, EDP intended to target a BBB rating in the short term through the improvement of the FFO to net debt ratio (target of around 20% in the 2021-25 period), which is typically the metric that rating agencies look at. Taking a look at *Exhibit 23*, we can see that EDP successfully achieved their commitment to reduce their debt from 13.48 to 12.2 and the ratio net debt to EBITDA to 3.9 in 2020 (vs 4.8 in 2018). This was possible because of higher recurring organic cash flow and the €1 Bn rights issue closed in August 2020. Thus, based on the position they are now in and the flexibility EDP has to continue to reinforce the balance sheet (through hybrids, asset rotations and portfolio optimizations), in March of 2021, Standard & Poor's has already updated EDP to a BBB rating, which increased the computed cost of debt.

(ii) Future-proof organization - Efficient and digitally enabled

Beyond the efforts for increasing revenue generation, EDP has a strong track record on cost optimization, which can be seen in the annual savings target of BP 2016-20 being achieved two years ahead of schedule (€200 Mn savings) and a 4% OPEX reduction in Iberia (nominal) and Brazil (real terms). In addition, during the period 2019-2020, the company achieved a €50 Mn of OPEX savings, representing a decrease in OPEX of 3% on like-for-like base which was due not only to tight cost control, but also to a fast acceleration of the digitalization fuelled by all the changes with pandemic (less traveling and less cost associated with that). Comparing the OPEX to gross profit ratio with peers (see *Exhibit 24*), we can verify that EDP has the lowest ratio (which further supports the idea of EDP's distinctive efficiency in generating revenue vs total expenses), but in recent years there has been a convergence in this ratio. This can be attributed to the increase in the weight of Renewables in all the companies' gross profit as this the segment that generates higher revenues with less operating expenses (see *Exhibit 25*).

The company is now targeting €100 Mn cumulative savings in the period 2021-25 which is stepping up from the €50 Mn that were still missing from the 2019-2022 strategic plan, assisted by a leaner organizational structure (especially within networks), generational evolution and continue investing in digitalization to increase asset intelligence (e.g., smart meters) and operations and processes efficiency (e.g., advanced analytics and predictive maintenance). We estimate that Networks will alone generate €91 Mn (91% of the target) of cost savings within distribution.

Table 6. Recognition by ESG rating on EDP's sustainable corporate strategy

ESG rating	Ranking
 SAM Sustainability Award Gold Class 2020	#1 Global Integrated Utilities (Score 90)
 FTSE4Good	Top 3% Global Utilities (Score 4.5)
 Euronext Vigeoiris	#1 Global Integrated Utilities (Score 68)
 SUSTAINALYTICS	93rd Percentile Global Utilities

Source: EDP's investor's presentation

(iii). ESG excellence and attractive returns

Step up green leadership positioning

EDP is one of the top European utilities in terms of green positioning (see Table 6). Nonetheless, EDP wants to reinforce their commitment to a more ambitious decarbonization targets to make sure it is ahead of the curve in relation to competitors. Thus, the company plans to be coal free in 2025 and carbon neutral in 2030. Comparing these targets to its European peers, we verify that EDP's Carbon neutral target is considerably more ambitious (2030 vs 2050). In addition, we consider that EDP is well positioned against risks arising from the carbon emission reduction policy, given its well-diversified generation portfolio across Iberia, Brazil, and the US. We expect carbon intensity to decrease further as the company shuts down coal-fired plants in Iberia and continues its build-out of renewables (EDP targets renewables to account for more than 80% of its generated electricity by 2025 and more than 90% by 2030).

Deliver a sustainable EPS growth and an attractive dividend policy

According to the BP 21-25, EDP is committed to a growth of 8% on average per year in net income, reaching €1 Bn in 2023 and being clearly, above the €1.2 Bn target in 2025. In addition, EDP's management team ensures delivering attractive returns through a sustainable dividend policy of 75 to 85% of recurring Net Profit, with a dividend floor at EUR 0.19 per share, allowing for potential future increases in the dividend per share in line with sustainable earnings per share growth. We note EDP's payout ratio is higher than that of Enel (70%) or Iberdrola (65%-75%), putting greater pressure on EDP's target deleverage. We expect total dividends to average between €850 Mn and €910 Mn for the next two-to-three years (delivering both targets above) based on the track record exhibited in the past. Since 2005, EDP paid approximately €8 Bn in dividends, never changing their commitment to the floor and always sharing their growth with shareholders (DPS from 10 cents in 2005 to 19 cents). In 2019 and 2020, EDP delivered a dividend of 0.19€ per share.

Table 7. Dividend policy and Payout ratio

	Dividend paid 2020 (p/ share in €)	Payout ratio	CAGR in strategic plan
EDP	0.19	75%-85%	Growth in line with results (BP 2019-2022)
Enel	0.328	70%	7% (BP 2021-2023)
Iberdrola	0.4	65% -75%	Growth in line with results (BP 2020-2022)

Source: EDP's investor's presentation

Valuation

We value EDP using a SOTP analysis where we deconstruct the company into four segments: its three operating segments (Renewables, Networks, and Client Solutions and Energy Management), and separating Networks between Iberia and Brazil, getting as much granularity as we can since we believe the difference in

Table 8. Comparables**EDP Group**

Naturgy Energy Group SA	RWE AG
Iberdrola SA	Fortum Oyj
Enel SpA	Verbund AG
ČEZ Group	Nextera Energy, Inc.
The Southern Company (SO)	

Renewables

Albioma SA	Falck Renewables SpA
ERG SpA	Terna Energy SA
Brookfield Renewable Partners	Ormat Technologies Inc.
Encavis AG	TransAlta Corporation

Networks Iberia

Red Electrica Corporacion	Terna
Enagas SA	Eli System Operator

Networks Brazil

Cemig	Engie Brasil Energias SA
Enel São Paulo	Coelba
CPFL Paulista	Eletrobras

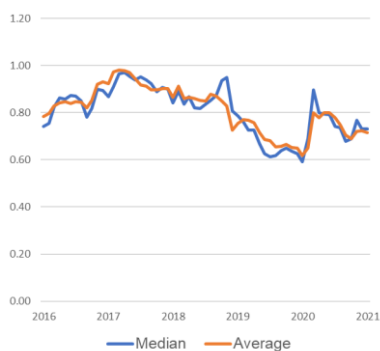
Source: Analysts' Research

regulations and macro-economic environment between these two geographies are significant. DCF is the methodology used to value the core operating segments, whereas concerning the non-operating items we used their book value.

First, we calculated the cost of equity using the CAPM formula. As the risk-free rate should be denominated in the same currency as the company cash flows, so that inflation can be modelled consistently between cash flow and discount rate, we used as a proxy the 10 Year German Eurobond, considering they are the ones with the highest liquidity and lowest credit risk. Regarding the market risk premium, we assumed a rate of 6%, according to empirical research¹. Concerning the industry adjusted beta of equity, we identified a group of comparables for each segment (*Table 8*). Following that, we regressed each company's stock last 5 years monthly returns against the MSCI World Index to determine raw beta. Afterwards, we unlevered each beta, using each company's market debt-to-equity ratio, to focus solely on operating risk, and determined the industry unlevered beta by calculating the median and mean of the unlevered betas. Finally, we relevered the industry unlevered beta to EDP's target debt-to-equity. Because estimates of beta are imprecise, we plotted the company's rolling 60-month beta to visually inspect for structural changes or short-term deviations. For example, when comparing the evolution of the 60-month rolling beta's median and average (see *Exhibit 26*), it is possible to observe that the values fluctuate around 0.80, which corroborate with our findings of an EDP Group Levered Beta of 0.82.

Considering that EDP has a credit rating of BBB and Baa2, according to S&P and Moody's respectively, the risk that the company defaults on its obligations cannot be ignored. Therefore, we did not use the yield to maturity of EDP's debt as a proxy for the cost of debt since it would overstate investors' expected return. Instead, we applied the formula in the margin. To find a suitable approximation to the yield to maturity, we used a representative liquid bond (500 million) which EDP issued and that was outstanding in the market, with a reasonable maturity (6 years) and cash flows in Euros, obtaining a value of 0.495%. The values of the annualized probability of default and loss given default were obtained using information reported by Moody's (0.245% and 46.15% respectively). Applying the formula², and assuming a tax rate of 29.5%, we estimated an after-tax cost of debt of 0.27%.

Lastly, we computed EDP's target capital structure at market value for each segment (D/EV converging to industry average, which is EDP's goal). It is important to highlight that less risky segments have higher leverage ratios. The final results for each segment's WACC are present in the table below.

**Exhibit 26
Median and Average 60 month
Rolling Beta comparison**

Source: Bloomberg (March 2021)

Formula 2:

$$\text{After-debt Cost of debt} = (\text{Yield to Maturity} - \text{Probability of Default} \times \text{Loss Given Default}) \times (1 - \text{Tax rate})$$

Table 9. WACC Estimation per segment

(all values in €)	Renewables	Networks Iberia	Networks Brazil	CSEM
Risk-free rate	-0.10%	-0.10%	-0.10%	-0.10%
Market Risk Premium	6.00%	6.00%	6.00%	6.00%
Beta of Equity	0.77	0.42	0.68	0.82
Cost of Equity	4.54%	2.42%	3.98%	4.84%
Loss Given Default	46.15%	46.15%	46.15%	46.15%
Probability of default (Annualized)	0.24%	0.24%	0.24%	0.24%
YTM	0.50%	0.50%	0.50%	0.50%
Cost of Debt	0.38%	0.38%	0.38%	0.38%
Tax Rate	29.50%	29.50%	29.50%	29.50%
After-tax cost of debt	0.27%	0.27%	0.27%	0.27%
Target D/EV	42.0%	43.0%	40.0%	40.0%
WACC	2.75%	1.50%	2.50%	3.01%
Implicit currency	EUR	EUR	EUR	EUR
Rate	Nominal	Nominal	Nominal	Nominal

Source: Analysts' Research and Estimates

Formula 1:

$$g = (1 + \text{GDP Nominal CAGR}) \times \left(\frac{\text{Sector's Weight (t)}}{\text{Sector's Weight (0)}} \right)^{\frac{1}{t}} - 1$$

In order to account for group adjustments and inter-segment eliminations, these were distributed between the three operating segments according to the gross profit weight of each segment. Furthermore, the terminal value was computed as a perpetuity in 2028 when our model's cash flows were stabilized. To compute the long-term growth rate, we used the GDP Nominal CAGR using as weight the revenues of each region for each segment, assuming that the sector's weight would remain the same in the long-term (see *formula 1*). Our rationale is that even though we expect EDP to achieve a high growth in the short term, empirical research shows us that signs of persistent growth in earnings are slim and it will tend to the growth rate of gross domestic product in the long term.

After discounting the free cash flows, we obtained the Enterprise Value for each segment, which summed accounted for €48,408 Mn. Afterwards, we subtracted net debt and added the non-operating items using its 2021 book value and deducted the minority interests. Minorities include the 49% stake in EDP Brasil and the 25% stake in EDP Renováveis, valued at its market value. This way, our STOP analysis yield a share price of €6.44, with a potential upside of 42%, corresponding to an equity value of €25,523 Mn (see *Table 10*).

Table 10. SOTP

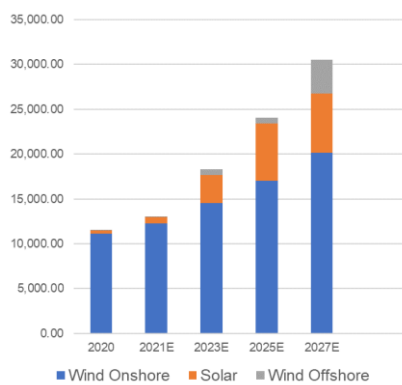
	€Mn	€	%	Methodology
Renewables	36,897	9.3	76%	DCF
Networks Iberia	6,432			DCF
Networks Brazil	2,645			DCF
Networks	9,077	2.3	19%	
CSEM	2,434	0.61	5%	DCF
Total EV	48,408	12.2		
Financial Debt	-15,279	-3.9		Book Value End 2021E
Non-Operating items	-1,752	-0.44		Book Value End 2021E
EDPR and EDPB Minorities	-5,854	-1.5		Market value
Equity Value	25,523	6.44		
Shares (m)	3,966			

Source: Analysts' Estimates

Renewables

The Renewables segment represented approximately 66% of the Group's EBITDA in 2020. In this segment, EDP has a considerable international exposure through

Exhibit 27
Renewable Installed Capacity
forecast (2020-2027) by
technology



Source: Analyst's estimates

Table 11. Installed Capacity
by region – Renewables

	2020	2027E	CAGR (2020-27)
Portugal	1,228	2,515	11%
Spain	2,137	3,553	8%
Brazil	436	2,925	31%
North America	6,296	14,393	13%
Rest of Europe	1,404	5,782	22%
Asian Markets	0	1,373	NA
Total	11,501	30,541	8%

Source: Analysts' Estimates

Table 12. Load Factor -
Renewables

	2020	2027E	CAGR (2020-27)
Portugal	24%	29%	2%
Spain	23%	29%	3%
Brazil	29%	43%	6%
North America	32%	31%	0%
Rest of Europe	25%	32%	4%
Asian Markets	-	39%	NA
Total	28%	32%	1%

Source: Analysts' Estimates

its presence in Europe, North America, and Latin America. Technologically wise, 62% of renewable's installed capacity concern to Wind and Solar, whereas Hydro constitutes the remaining 48%. Between 2018 and 2020, revenues decreased at a CAGR of -3.2% while EBITDA's CAGR over the same period grew at 9.2%, mainly driven by the increase in gains from disposals of the 6 hydro plants in Iberia.

Wind and Solar

The wind and solar business have as the main drivers the installed capacity, load factor and the average selling price.

Concerning the installed capacity (as it was already analyzed in *Strategy and Growth Prospects*), EDP expects to add 20GW of wind and solar renewable capacity during the 2021-2025 period (gross additions) and we assumed convergence to the industry growth projections per region for the next two years. These investments will represent an impressive expansion of the installed capacity by 165% by 2027 (at a CAGR of 8%), focusing mainly on North America (which will represent 42% of the targeted increase) while reducing the exposure to Iberia (from 29% of the total installed capacity to 20%). In addition, this expansion will also be responsible for significantly changing the mix of the portfolio, decreasing the weight of wind onshore from 97% in 2020 to 66% in 2027 (see *Exhibit 27*).

Regarding the **load factor**, we expect its levels to remain relatively stable with a small upwards trend (1.3% CAGR) moved by two factors: the change in the mix of technologies and the technological improvements. First, the load factor depends on the technology mix, as solar, wind onshore and wind offshore have significantly different load factors. Thus, only after computing the weight of each technology (using the installed capacity), were we able to get the load factor of each region. Starting with wind onshore, it was assumed for old projects the average load factor per region of the last 6 years (2015-2020) as we anticipate that the effect of weather conditions will average out in the long term. For solar and wind offshore projects, we assumed the average load factors per region published in the IEA Report (updated in March 2020). In addition, it was considered the technological improvements that have a positive impact in the load factor. For wind onshore and offshore projects we expect an increase of 0.75% and 0.3% p.a., respectively (based on *Irena 2019* load factor projections), driven by the increase in the dimension of blades and both reliability and durability of turbines without significantly increasing costs. On the other hand, even though there is potential for improvements in solar load factors, we did not find sufficient evidence and reliable data to include in our model.

Lastly, we expect the **average selling price**, which can be seen as revenue per unit of output, to exhibit an overall declining trend because of the increase in competitiveness, decrease in the LCOE and increase in the weight of solar projects (which have lower average selling prices). Nonetheless, from years 2025 to 2027 there is a slight increase (see *Table 13*) mostly driven by the increase in weight of offshore wind projects which have higher costs, and consequently higher price. It was considered for each geography: the inflation rate, the expected mix of technologies and the corresponding estimated average price of each technology. To compute that last part, we assumed an annual decreasing factor caused by the decrease in LCOE (as technology improves) and increase in competition (as auctions drive prices down), which was estimated to be approximately, on average per year, 3% for wind onshore projects, 7% for Solar projects and 8% for wind offshore projects. Note that these decrease in average selling price are only applied to new additions to the portfolio, as the former projects are secured under long-term contracts and thus, we assume their price to remain the same.

Table 13. Average Selling Price – Renewables

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Portugal	86.3	87.1	88.1	84.4	81.9	78.5	78.5	78.4
Spain	78.8	78.9	78.8	75.2	72.4	69.9	69.6	69.3
Brazil	37.0	30.8	32.3	32.4	32.6	33.0	34.1	35.1
North America	45.0	43.9	42.7	40.8	39.3	38.2	39.2	39.4
Rest of Europe	84.2	84.5	76.2	75.0	73.8	72.6	70.7	74.4
Asian Markets				39.3	39.1	38.9	38.9	47.0
Avg. selling Price	60.2	60.6	58.2	55.3	53.1	51.1	51.5	52.7

Source: Analysts' Estimates

Hydro

Table 14. Hydro's Drivers

	2020	2027E	CAGR (20-27)
Iberia			
Installed Capacity	5,527	5,527	0%
Load Factor	21%	20%	-1%
Avg. Selling Price	42	35	-3%

Brazil			
Installed Capacity	1,599	1,599	0%
Load Factor	39%	33%	-2%
Avg. Selling Price	33	28	-2%

Source: Analysts' Estimates

Hydro's revenue drivers are installed capacity, load factor and average selling price as it can be seen in *Table 14*.

Starting with the first, as part of EDP's strategy of continuous portfolio optimization and low risk profile, in order to reduce the hydrological risk, EDP recently sold several mini-hydro plants in Brazil, but according to management, it does not plan any more disposals in the hydro portfolio for the foreseeable future. Thus, we do not expect any more changes in future installed capacity until 2027.

Concerning Hydro's load factor, it mainly depends on the hydro conditions of each year and it is extremely volatile due to the unpredictable nature of this source of energy (in the last 5 years there was an amplitude of 18%). For this reason, as is very difficult to accurately forecast the load factor, we assumed the average load factor of the 2015-2020 period for the remaining years.

Lastly, we consider the average selling price. Hydro capacity in Iberia operates in

the liberalized market, bearing both price and volume risk. Thus, the average selling price of hydro depends on the pool prices, which were assumed to be our computed Iberian baseload prices. In Brazil, on the other hand, most of EDP's hydro generation assets are contracted with long-term PPAs, mitigating price risk, with just a small portion sold in the liberalized market. In 2019, 96% of EDP's hydro assets in Brazil were under PPAs, with only 4%, being sold in the liberalized market, and we do not expect any change regarding these percentages. First, we assumed the price of electricity being sold under long-term PPAs to vary according to inflation. Secondly, the price of the amounts sold in the liberalized market will vary according to fluctuations on the Settlement Price for Differences (PLD), and thus, depends on factors out of the control of EDP, such as future climate conditions, so we decided to use an average of previous years. Our rationale is that even though climate issues may have a significant impact when considering short periods of time, in the long term they are expected to average out.

Valuation

EBIT in 2027 is expected to register a significant increase (+56%) attributed to the more than doubling of installed capacity in EDPR. Taking into consideration the assumptions above, NOPLAT is expected to increase at an annual rate of 6% (CAGR). Nonetheless, the FCF are estimated to suffer a steep decrease until 2024, consequence of the aggressive CAPEX plan of EDP for wind and solar but is expected to pick up (only being positive in 2027) in the following years. Using the computed WACC for this segment and assuming a growth rate of 1.8%, we estimated this segment to be valued at €36,897 Mn.

Table 15. Renewable's Valuation

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	1,436	1,743	1,240	1,481	1,645	1,744	1,847	2,244
Taxes	-387	-456	-366	-437	-485	-514	-545	-662
NOPLAT	1,049	1,287	874	1,044	1,160	1,230	1,302	1,582
Depreciation	816	828	778	802	843	918	982	1,043
NWC	165	63	-65	237	191	166	163	406
CAPEX	1,601	-825	-1,393	-1,884	-2,791	-2,565	-2,565	-2,853
Change in Other Operating Assets and Liabilities - net	-212	18	60	-2	-1	-1	-1	-3
FCFF	3,419	1,371	253	197	-598	-252	-119	175
Discount Factor			0.0	1.0	0.9	0.9	0.9	0.9
Discounted FCFF			0	192	-567	-233	-107	153

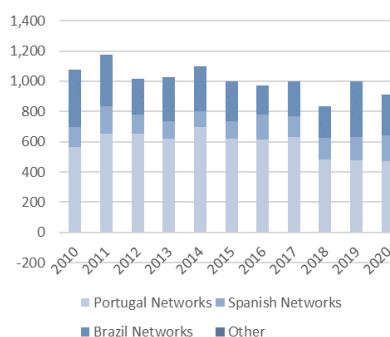
EV	-201
Terminal Value	37,098
Total EV	36,897

WACC	2.75%
g	1.76%

Source: Analysts' Estimates

Networks

Exhibit 28
Networks EBITDA evolution (€ Mn) (2010-2020)



Source: EDP results

Table 16. RoRab vs WACC

	Estimated Pre- Tax WACC	Pre- Tax RoRAB (2020)
Portugal	2.1%	4.9%
Spain	2.1%	5.6%
Brazil	6.0%	8.1%

Source: EDP Report 2020

Formulas to estimate Iberian Network gross profit:

Allowed EBIT = RAB * RoRab

EBITDA (t) = EBITDA (t-1) +
Change in Allowed EBIT+ Cost
Savings

Gross Profit (NA) = EBITDA +
OPEX

Table 17. Networks Portugal

	2020	2021E	2027E	CAGR (21-27)
Average RAB (H/MV and LV)	2,940	2,918	3,052	1%
Average RoRAB	4.9%	4.8%	4.8%	0%
RAB & Return	145	141	148	1%
Cost savings achieved	-1.5	3.7	1.5	-14%
EBITDA	458	459	488	1%
OPEX	590	579	558	-1%
Other Segments, adjustments and inter-segment eliminations	15	13	13	0%
Gross Profit	1,064	1,051	1,058	0%

Source: Analysts' Estimates

Since 2010, Networks' EBITDA has remained stable (see Table 28) as it is highly regulated under licenses and long-term concessions, exhibiting a small declining trend mostly driven by the devaluation in BRL and the reduction in the rate of return on the Regulated Asset Base (RoRAB) in Portugal. In 2020, Networks had an EBITDA of 2.6B€ (representing 23% of EDP's EBITDA), but we expect this figure to increase 27% until 2027 driven mostly by: (i) full integration of the Viesgo Operation; (ii) increase in Brazil's distribution RAB; and (iii) full operationalization of the 6 transmission lines in Brazil.

Revenue for electricity distribution is based on a RAB model. Under this long-term tariff model, regulators approximate the amount a company invested in its infrastructure and recognize a return on that investment. This way, EDP has a secure payback sufficient to service loans and generate profits. We believe that this model is beneficial for EDP, in comparison with cost-plus pricing system, since considering that remuneration is mostly dependent on RAB and the respective rate of return, EDP can retain the funds resulting from cost cutting. This is further supported when comparing the pre-tax RoRAB with our estimated pre-tax WACC, as the previous is always higher than the latter (see Table 16), making it an attractive investment. As of December 31, 2020 EDP had an aggregate RAB of distribution assets of €5,463 Mn.

In Portugal, EDP Distribuição is operated under a public service concession, performing approximately 99% of the electricity distribution in Portugal. We believe EDP will be able to maintain its natural monopoly, and do not expect any major change in Portuguese RAB as they are secured under long term contracts. The concession of the national distribution of high and medium voltage electricity (60% of Portuguese RAB in 2020) was given to EDP Distribuição until 2044, whereas the distribution of low voltage (40% of Portuguese RAB in 2020) was given to each municipality that then gave the concession to EDP Distribuição for a period of 20 years, 92% expiring until 2022. We consider renewal risk as negligible due to the incumbent position of EDP. This is, there is a legal obligation for newcomers to reimburse EDP with a value aligned with RAB. Thus, we expect Portugal's RAB to remain stable with a CAGR smaller than 1% until 2027 and performed a sensitivity analysis measure the impact of concession losses (results in *Sensitivity Analysis*). On the other hand, we project a RoRAB reduction to the floor level (4.75% for high and medium voltage assets with a premium of 25 bps for low voltage) as it is based on the 10-year government bond yields which we assume will remain close to 0 (recovery of confidence from international investors and rating agencies in Portugal and ECB purchases). Lastly, we expect the Portuguese Distribution Gross Profit to remain relatively stable as the increase in

Table 18. Networks Spain

	2020	2021E	2027E	CAGR (21-27)
Average RAB	1,328	1,713	1,797	1%
RoRAB	5.6%	5.6%	5.0%	-2%
RAB & Return	74	96	90	-1%
Cost savings achieved	-1.5	3.7	1.5	-14%
EBITDA	161	186	198	1%
OPEX	58	74	68	-1%
Other Segments, adjustments and inter-segment eliminations	-26	-13	-16	4%
Gross Profit	193	247	251	0%

Source: Analysts' Estimates

Formulas to estimate Brazil Distribution gross profit:

Allowed EBIT = RAB * RoRab

$$\text{EBITDA (t)} = \text{EBITDA (t-1)} + \text{Change in Allowed EBIT} + \text{Cost Savings} + \text{Volume}$$

$$\text{Gross Profit (NA)} = \text{EBITDA} + \text{OPEX}$$
Table 19. Networks Brazil

	2020	2021E	2027E	CAGR (21-27)
Distribution				
Average RAB	5,000	5,521	8,563	8%
RoRAB	8.1%	8.1%	8.1%	0%
RAB & Return Evolution	405	447	693	8%
Cost savings achieved	-186.4	10.0	5.0	-11%
Volumes	-76	37	54	7%
EBITDA	1,219	1,307	1,886	6%
OPEX	1,015	1,098	1,508	5%
Gross Profit	2,233	2,405	3,394	6%
Transmission				
Gross Profit	393	500	877	10%

Source: Analysts' Estimates

EBITDA (from the return on RAB and cost savings achieved) will match the decrease in OPEX (see *Table 17*).

In Spain, we expect a significant increase, in 2021, in Spain's average RAB (+28%), with the full integration of Viesgo in the portfolio (which added around € 0.8 Bn to the distribution RAB, see *Table 18*), and afterwards to remain relatively stable (with a CAGR of 0.8%) as EDP's investments in this segment will be mostly directed at maintenance. The RoRAB, on the other hand, will remain constant (at 5.58%) until the new regulatory period in 2026, where we expect, it will fall to the floor at 5%. Similarly, to Portugal, we expect the Spanish Networks gross profit to remain stable as the increase in EBITDA will meet the decrease in OPEX.

In Brazil distribution, electricity demand has a significant impact (contrary to Iberia), although it still follows a RAB model. This is, if the energy contracted is up to 105% of actual demand, the costs can be passed on to customers via tariff. If it exceeds 105%, the cost of all energy above this limit must be borne by the company. In fact, most distribution consumers are still legally obliged to purchase energy from local distribution companies. This way, EDP has captive consumers whose commercial relationship is regulated by ANEEL and considering its service quality has been improving throughout years, unless there is a sudden negative shock as the one caused by Covid-19, we expect EDP will not have any penalty regarding the demand component in future years. Regarding the evolution of RAB, we expect EDP to achieve its target of a RAB value of €1,300 Mn (R\$8,064 Mn) by 2025, supported by the recognition of value-added investments (RoRAB vs WACC), and afterwards to converge to the growth in Iberia. Assuming the RoRAB will remain constant at 8.09%, we expect the allowed EBIT (RAB*RoRAB) to increase 71% (in Reais terms) until 2027. This rise accompanied by the projected higher volumes in electricity supplied, driven by Brazil's economy growth (estimated at 3% p.a.), and cost savings achieved (greater efficiency in costs vs the ANEEL benchmark) is expected to increase EBITDA 54% and consequently, gross profit 51% (in Reais terms). Gross profit growth is reduced in relation to EBITDA's, consequence of the decrease in OPEX costs set by the regulatory target (see *Table 19*).

Regarding the transmission business, in addition to the transmission line concession awarded in 2016, EDP Brazil was awarded five more transmission lines, totalling 1300 km, requiring a budgeted investment of R\$3.1 Bn. Even taking into consideration the negative impact caused by Covid-19, we assumed the six lines would become operational over the next two to three years since EDP was months ahead of regulatory schedule in all projects. This prompt increase in CAPEX in the transmission sector was fostered by the low interest rate environment in recent years in Brazil. This is, considering that, in 2020,

Table 20.
Transmission Brazil market share (2020)

Competitor Name	Transmission lines (Km)	Market Share
Eletrobras and subsidiaries	71,050	46.50%
CTEEP	50,423	33%
Engie	2,800	2%
CEMIG	10,000	7%
Copel	6,735	4%
EDP	1,300	1%
Others	10,488	7%
Total	152,796	100%

Source: Analysts' research and estimates

approximately 31% of EDP's financial debt was constituted by floating rate bonds, low interest rate levels considerably reduce the cost of debt, and consequently reduce WACC (increasing the already positive difference between implicit ROIC and WACC). In 2020, the Central Bank of Brazil decided to keep its benchmark interest rate at an all-time low of 2% and did not rule out additional reductions as policy makers seek to stimulate an economy ravaged by the coronavirus pandemic. Therefore, we predict that the investment in transmission will continue and from 2023 onwards the growth rate in EBITDA will be of 5% annually. We did not find EDP target feasible (18% 2020-25 CAGR vs our estimate of 14%), considering EDP is not a major player in the transmission sector in Brazil (approximately 1% of market share), and consequently growth in this segment can be adversely impacted by the competition EDP faces in competitive bids in auctions for new concessions or renewal of existing ones. Therefore, we project an increase of transmission gross profit at a CAGR of 10% from 2021 to 2027.

Valuation

In Networks Iberia, EBIT is expected to exhibit a small upwards trend from 2020 onwards (at a 1.4% CAGR) which can be attributed to two factors: (i) a very stable Iberian RAB and return evolution, but most importantly (ii) significant cost savings achieved in Iberia (representing on average 79% of the change in EBITDA). The FCF, from 2022 onwards, are expected to follow the same upwards inclination of the EBIT, but at a significantly higher CAGR (of 12% in 2023-27), consequence of a significant but stable CAPEX mostly targeting maintenance which consistently offsets depreciation in this period. Using the computed WACC and a growth rate of 1% we estimated this segment to be valued at €6,432 Mn.

Table 21. Networks Iberia's Valuation

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	318	326	334	341	349	356	349	352
Taxes	-83	-96	-98	-101	-103	-105	-103	-104
NOPLAT	235	230	235	241	246	251	246	248
Depreciation	301	319	322	324	327	329	331	333
NWC	-142	-35	-56	-40	-46	-38	-18	-20
CAPEX	-2,060	-492	-496	-500	-504	-508	-515	-525
Change in Other Operating Assets and Liabilities - net	14	28	0	-1	0	0	0	0
FCFF	-1,651	50	6	24	23	35	44	37
Discount Factor			1.0	1.0	1.0	0.9	0.9	0.9
Discounted FCFF			5	23	22	33	41	34

EV	158
Terminal Value	6,274
Total EV	6,432

WACC	1.50%
g	0.96%

Source: Analysts' Estimates

In Networks Brazil, EBIT and the NOPLAT from 2020 to 2027 are expected to register a significant increase (+6% and 5.3%, respectively) which can be mostly

attributed to: (i) increase in RAB of Brazil distribution (at a CAGR of 8% in R\$); (ii) Cost savings achieved; (iii) increase in Electricity distributed (representing from 2021 onwards on average 54% of the EBITDA change in Brazil Distribution); and (iv) the growth in the Transmissions RAP. Nonetheless, the FCF are estimated to be significantly lower than the NOPLAT (high firm RR), consequence of the increase in CAPEX to support this growth. Using the computed WACC for this segment and assuming a growth rate of 0.7%, we estimated this segment to be valued at €2,474 Mn.

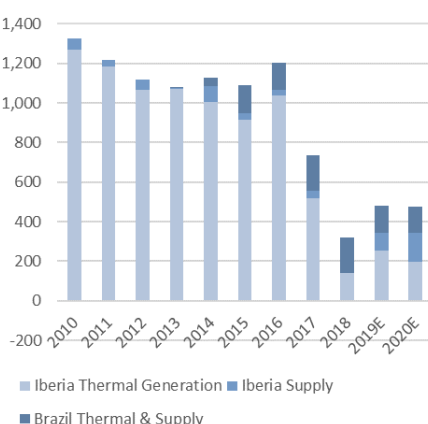
Table 22. Networks Brazil's Valuation

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	190	192	214	226	241	256	271	286
Taxes	-50	-57	-63	-67	-71	-76	-80	-84
NOPLAT	140	135	151	159	170	181	191	201
Depreciation	71	85	95	106	114	123	131	137
NWC	3	9	-1	1	0	0	0	0
CAPEX	-696	-201	-221	-240	-259	-279	-284	-287
Change in Other Operating Assets and Liabilities - net	3	9	-1	1	0	0	0	0
FCFF	-479	36	24	26	25	25	37	51
Discount Factor			1.0	1.0	0.9	0.9	0.9	0.9
Discounted FCFF			23	25	23	22	33	44

EV	170	WACC	2.50%
Terminal Value	2,474	g	0.72%
Total EV	2,645		

Source: Analysts' Estimates

Exhibit 29
CSEM EBITDA (€ Mn) (2010-2020)



Source: EDP results

Client Solutions and Energy Management

In 2020, Client Solutions and Energy Management represented 51% of revenues but just 12% of the EBITDA (vs 41% of EDPR, despite EDPR only having 1.6x CSEM installed capacity), having been decreasing at a CAGR of -10% in the past ten years (see *Exhibit 29*) driven by the fall of profitability in Iberian Thermal generation. In fact, the weight of the Iberian thermal generation decreased from 86% of this segment's EBITDA in 2016 to 41% in 2020 which can be mostly attributed to the increase in coal costs and consequently, the decrease in its gross Margin (from 23% in 2017 to 4% in 2020). As it was already explained, this segment can be divided in supply and thermal generation.

Supply

The Supply business represented approximately 9.5% of EDP's EBITDA in 2020. We used the total volume of electricity and gas sold and EBITDA/MWh as drivers to compute the EBITDA.

In Iberia, we forecast an EBITDA decrease of 63% in 2021 because of the disposal of the B2C portfolio in Spain and a continuing downward trend in the number of electricity clients as a function of price competition (even though gas customers have been relatively stable due to increase in dual offer rates). Nonetheless, from 2021 onwards we expect a steady increase in EBITDA at a CAGR of 0.8%. This results from an increase in electricity per customer (as electricity demand will rise 1% annually, according to IEA, linked to increasing digitalization), but the effect will be partially offset by energy efficiency improvements, and a slight decrease in gas demand as it will be progressively substituted by renewable sources. Moreover, the increase in penetration rate of new energy solutions (26.1% in 2020) such as distributed solar and e-mobility services will contribute to an increase in the consumption per customer, and consequently the volume sold, whereas inflation will drive EBITDA/MWh up.

Table 23. Supply Iberia

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBITDA/MWh (€M)	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Volume sold - Portugal (MWh)	19,200	19,177	19,154	19,132	19,110	19,088	19,066	19,045
Volume sold - Spain (MWh)	16,893	242	244	245	247	248	250	252
EBITDA Supply Iberia (€M)	145	54	54	55	56	56	56	56

Source: Analysts' Estimates

In Brazil, we project EBITDA to increase at a CAGR of 5.4% in Euros due to two factors: an increase in volume sold (3.5% on average annually), consequence of a forecasted increase in electricity demand to accommodate Brazilian economic and population growth; and an increase in EBITDA/MWh which will evolve according to inflation (3% annually, on average).

Table 24. Supply Brazil

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Electricity Supplied (Gwh)	25,554	26,448	27,374	28,332	29,323	30,350	31,412	32,511
EBITDA/GWh (R\$M)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
EBITDA Electricity Supplied (€M)	33	32	34	36	39	42	45	48

Source: Analysts' Estimates

Thermal generation and energy management

In Iberia, thermal generation is a liberalized activity, and it includes the generation of nuclear, CCGT and Coal. Starting with the first, we identify as its main drivers the output (GWh) and the ratio EBITDA per MWh.

We consider the Nuclear output will remain constant as we expect no changes in its installed capacity and assume an average load factor of the previous three years (2018-2020). The ratio EBITDA per MWh, on the other hand, exhibits a declining trend (-10% CAGR) driven by

Nuclear energy is only generated in Spain. The cost of production includes the OPEX and an ENRESA levy (€/MWh) which we assume to be constant in the future.

Nuclear Costs = cost of fuel (per MWh) + Generation tax + costs with ENRESA fund

Nuclear energy is only generated in Spain. The cost of production includes the OPEX and an ENRESA levy (€/MWh) which we assume to be constant in the future.

Nuclear Costs = cost of fuel (per MWh) + Generation tax + costs with ENRESA fund

Spark Spread is the difference between the price received by a generator and the cost of CCGT needed to produce that electricity. A Dark Spread, on the other hand, is the difference between the price and the cost of coal.

Table 26. Evolution of the Spark and Dark Spread

	2018	2019	2020	2021E
Achieved Baseload power (€/MWh)	56	65	65	59
CCGT Costs + Levies (€/MWh)	67	65	65	58
Coal Costs + Levies (€/MWh)	49	61	63	59
Spark spread (achieved)	-11	0	1	1
Dark spread (achieved)	8	4	3	0

Source: EDP results

Concerning the CCGT and Coal business in Iberia, its main drivers are the output

Table 25. Nuclear

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Output (GWh)	1,196	1,205	1,205	1,205	1,205	1,205	1,205	1,205
EBITDA/MWh (€M)	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02
EBITDA (€M)	49	46	43	39	35	31	27	23

Source: Analysts' Estimates

(of each technology in GWh), the Spark and Dark spread and the OPEX.

Starting with the output, we expect a decreasing CCGT output due to the assumptions of no changes in installed capacity and a declining load factor (-1% p.a.) and a severely declining coal output until it reaches 0 GWh in 2023 due to a decreasing installed capacity (to meet EDP's coal free target in 2025) and an abrupt decrease in load factor due to increasing production costs. In relation to the spreads achieved for both technologies, we assumed that starting in 2021, when there is a higher demand for thermal energy (i.e., when technologies with lower marginal costs like renewables are not able to satisfy demand), Coal will be the most expensive technology to satisfy demand (switching with CCGT, see Table 27) until 2022. Afterwards, we expect EDP will not produce Coal anymore and CCGT to become the most expensive technology setting the price when there is higher demand. Thus, we expect the dark spread to decrease to 0 in 2021 and remain constant in 2022 (gross profit equal to 0 as price equals production costs) and the Spark spread to remain constant at the 2020 levels until 2027. Our assumptions are based on the deteriorated outlook for coal plants (in relation to CCGT): (i) worsening marketing conditions from the rise of Coal costs (increase of 35% in generation costs from 2018 to 2020) due to the green cent and the CO2 licenses (which are more expensive for coal-fired stations as they emit more carbon dioxide per MWh than gas-fired ones), and (ii) decline in natural gas prices and increase in abundance over the past decade (due to the shale gas revolution) which has also pushed down the average wholesale price of electricity. Nonetheless, despite the changes in gross profit, EBITDA will still increase at a 2.2% CAGR due to the decline in OPEX, which we expect to decrease proportionately to the reduction of installed capacity.

CCGT Costs = cost of gas + Taxes + CO2 licenses

Coal Costs = cost of coal + CO2 licenses + generation taxes + green cent

Notes:

- Taxes (CCGT) in Spain refers to the gas Green Cent and the generation tax and in Portugal the Clawback Tax.
- CO2 licenses have different costs depending on carbon emissions of each technology.

Table 27. CCGT and Coal

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Output CCGT (GWh)	9,759	7,314	7,061	6,808	6,555	6,301	6,048	5,795
Output Coal (GWh)	4235	1086	430	0	0	0	0	0
Spark Spread	1	1	1	1	1	1	1	1
Dark Spread	3	0	0	0	0	0	0	0
OPEX (€M)	124	117	109	102	94	87	87	87
EBITDA (€M)	148	143	151	158	165	173	173	173

Source: Analysts' Estimates

In Brazil, on the other hand, thermal generation corresponds to the 720 MW coal power plant located in Ceará which have a PPA for remuneration according to technical availability. We considered the main drivers of this business the capacity (GWh) and the EBITDA per MWh, which we assume will remain constant until 2027 and consequently, so will the EBITDA.

Table 28. Thermal Generation Brazil

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Output (GWh)	720	720	720	720	720	720	720	720
EBITDA/MWh	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
EBITDA (€M)	99	87	87	87	87	87	87	87

Source: Analysts' Estimates

Valuation

EBIT and NOPLAT in 2027 are expected to register a significant increase (+49% and +40%, respectively) driven by the fall in depreciation which more than offsets the decrease in number of customers in Spain supply. On the other hand, the FCF is projected to decrease at a -30% CAGR from 2021 until 2027 as the absolute level of CAPEX converges to the value of depreciation, consequence of ending disposals (after 2025, EDP is expected to maintain its remaining installed capacity and thus, CAPEX will equal the depreciation as it is assumed all investments will be maintenance to compensate the reduction in value). Using the computed WACC for this segment of 2.95% and a negative growth rate of 0.19% (given by the ROIC*RR), we estimated this segment to be valued at €2,434 Mn.

Table 29. Client Solutions and Energy Management's Valuation

	2020	2021E	2022E	2023E	2024E	2025E	2026E	2027E
EBIT	67	-80	26	35	63	86	103	100
Taxes	-18	0	-8	-10	-19	-25	-31	-29
NOPLAT	50	-80	18	25	44	61	73	70
Depreciation	390	427	326	323	303	285	267	271
NWC	31	-105	-20	-26	-25	-22	3	2
CAPEX	350	123	-310	-210	-207	-187	-285	-267
Change in Other Operating Assets and Liabilities - net	8	19	0	0	0	0	0	0
FCFF	828	383	14	113	114	137	57	76
Discount Factor		0.0	1.0	0.9	0.9	0.9	0.9	0.8
Discounted FCFF		0	13	106	105	122	50	63

EV	459	WACC	3.01%
Terminal Value	1,976	g	-0.19%
Total EV	2,434		

Source: Analysts' Estimates

Sensitivity Analysis

Table 30.
Scenario Analysis – The exchange rates (EUR/BRL) and (EUR/USD) change



Source: Analysts' estimates

In this section we reflect upon the effects of changing some inputs to measure the impact on EDP's valuation.

Firstly, EDP is subject to potential risks from exchange rates fluctuations in revenues, cost of fossil fuels, and Capex in Non-Euro currencies. Therefore, a scenario analysis with respect to EUR/BRL and EUR/USD was performed since they are the most significant currency exposures. In the base case we assumed the most recent exchange rates and considered a 15% variation each side in EUR/BRL due to BRL's high volatility (depreciated 37% against the EUR between 2015-2020), whereas regarding EUR/USD we only consider a 5% variation as both currencies are relatively stable. In Table 30, it is possible to observe that there is only one extreme scenario where share price is in a Sell Position, and five in a Hold Position (out of 49 scenarios). Thus, our position would not maintain only in unlikely scenarios where both BRL and USD would depreciate against the EUR, so we do not regard it as sufficient to change our BUY recommendation,

Moreover, a sensitivity analysis relative to Renewable's installed capacity growth was performed as it requires €19.2 Bn from several sources such as asset rotation proceeds (€8 Bn), organic cash flow (€7 Bn), tax equity (€2 Bn), and flexible funding sources (€2 Bn). Therefore, scenarios regarding the most sensitive and not already secured sources of cash were created, such as EDP's inability to upgrade asset rotation proceeds per year verified between 2019-20 (€1.15 Bn/year vs €1.5 Bn/year) which is required to meet the objective. If EDP is unable to raise the required funds, it must reduce the planned Capex, and consequently reduce new renewable installed capacity additions. We measure the impact of the possible scenarios and only in the most extreme scenario (73% target Capex), our recommendation would change to HOLD position (see Table 31).

Lastly, the concession of 92% of low voltage distribution portfolio in Portugal expires in 2022. Although, as it was explained in the Networks segment, we do not believe EDP will have concession losses, we performed a sensitivity analysis. As it is possible to observe, only in the most pessimistic scenarios (we assume a probability close to 0 to all scenarios below 80% renewals), our recommendation would change (see Table 32).

Table 31.
Sensitivity Analysis 1 – EDP is not able to fund its renewables CAPEX plan.

CAPEX invested in Renewables (21-25) (Million €)	% of Actual CAPEX/Target CAPEX	Share Price (€)
19,200	100%	6.44
18,163	95%	6.12
17,126	89%	5.81
16,090	84%	5.49
15,053	78%	5.18
14,016	73%	4.86

Source: Analysts' estimates

Table 32.
Sensitivity Analysis 2 – EDP does not renew 100% of low voltage assets in Portugal Distribution.

Low Voltage Assets renewed(%)	Share Price
100%	6.44
95%	6.27
85%	5.94
69%	5.25
54%	4.93
39%	4.45
23%	3.94
8%	3.47

Source: Analysts' estimates

Appendix

Financial Statements

Reformulated Balance Sheet - EDP - Energias de Portugal (Thousand €)

	2019A	2020A	2021F	2022F	2023F	2024F	2025F	2026F	2027F
Net Operating Current Assets	1,433,444	1,478,313	1,674,860	1,514,436	1,388,884	1,293,576	1,190,301	800,266	437,784
Assets	26,878,354	28,519,330	28,875,019	30,241,675	32,386,211	34,259,869	36,078,593	38,243,900	40,368,259
Net Other Operating Assets	187,966	144,695	29,570	31,642	33,335	34,909	36,387	39,147	41,756
Provisions	1,052,517	1,253,019	1,253,019	1,253,019	1,253,019	1,253,019	1,253,019	1,253,019	1,253,019
Net Non-Operating Assets	2,728,481	-328,012	-1,752,132	-1,752,132	-1,752,132	-1,752,132	-1,752,132	-1,752,132	-1,752,132
Total Funds Invested	30,175,728	28,561,307	27,574,298	28,782,601	30,803,280	32,583,204	34,300,131	36,078,162	37,842,647
Financial Debt	17,543,715	15,482,898	14,330,747	15,279,231	17,005,986	18,465,814	19,836,222	21,193,386	22,472,266
Non-Controlling Interests	3,773,826	3,495,754	3,495,754	3,495,754	3,495,754	3,495,754	3,495,754	3,495,754	3,495,754
Common Shareholders' Equity	8,858,187	9,582,655	9,747,797	10,007,616	10,301,540	10,621,636	10,968,155	11,389,022	11,874,627
Total Funds Reconciliation	30,175,728	28,561,307	27,574,298	28,782,601	30,803,280	32,583,204	34,300,131	36,078,162	37,842,647

Reformulated Income Statement - EDP - Energias de Portugal (Thousand €)

	2019A	2020A	2021F	2022F	2023F	2024F	2025F	2026F	2027F
Core Business									
Revenues	14,333,009	12,448,207	13,217,799	13,803,479	14,308,878	14,794,692	15,238,354	15,843,270	16,419,033
Cost of Sales	-9,106,563	-7,337,145	-8,387,860	-8,528,904	-8,675,708	-8,834,922	-8,967,269	-8,918,049	-8,877,359
Total Gross Profit	5,226,446	5,111,062	4,829,939	5,274,575	5,633,170	5,959,770	6,271,085	6,925,222	7,541,674
EBITDA	3,675,747	3,907,839	3,286,950	3,599,235	3,844,509	4,058,562	4,265,993	4,740,356	5,188,481
Depreciation	-1,710,738	-1,589,707	-1,608,584	-1,544,951	-1,596,724	-1,662,278	-1,719,794	-1,772,323	-1,853,141
EBIT	1,965,009	2,318,132	1,678,366	2,054,284	2,247,785	2,396,284	2,546,198	2,968,033	3,335,340
Adjusted Taxes	-529,291	-606,084	-518,724	-606,014	-663,097	-706,904	-751,128	-875,570	-983,925
Core Result	1,435,718	1,712,048	1,159,642	1,448,270	1,584,689	1,689,380	1,795,070	2,092,463	2,351,415
Non Core Business									
Financial Income	387,817	226,702	623,848	623,848	623,848	623,848	623,848	623,848	623,848
Provisions	-101,530	-112,093	0	0	0	0	0	0	0
Result before Taxes and OCI	286,287	114,609	623,848	623,848	623,848	623,848	623,848	623,848	623,848
Adjusted Taxes	-77,076	-32,849	-184,035	-184,035	-184,035	-184,035	-184,035	-184,035	-184,035
OCI	35,806	-644,286	-216,193	-216,193	-216,193	-216,193	-216,193	-216,193	-216,193
Non Core Result	245,017	-562,526	223,620	223,620	223,620	223,620	223,620	223,620	223,620
Financing									
Financial Expenses	-1,057,591	-897,326	-897,326	-897,326	-897,326	-897,326	-897,326	-897,326	-897,326
Result before Taxes and OCI	-1,057,591	-897,326	-897,326	-897,326	-897,326	-897,326	-897,326	-897,326	-897,326
Adjusted Taxes	311,989	264,711	264,711	264,711	264,711	264,711	264,711	264,711	264,711
Financing Result	-745,602	-632,615	-632,615	-632,615	-632,615	-632,615	-632,615	-632,615	-632,615
Comprehensive Result	935,133	516,908	750,647	1,039,275	1,175,694	1,280,386	1,386,075	1,683,468	1,942,420

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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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