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

EDP – ENERGIAS DE PORTUGAL
EQUITY RESEARCH
ROAD TO CARBON NEUTRALITY – LEADING THE TRANSITION

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

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17/12/2021

Abstract

This Master Thesis takes form in an Equity Research of EDP - Energias de Portugal, with the main goal of this report being the elaboration of a recommendation to investors. This report is part of a two parts report. In this part, it was made an overview analysis of EDP, as well as a comparison with its peers and a macro economic analysis of the energy sector. Furthermore, it includes an analysis and valuation of the Networks segment of the company and an overview of the risks the company incurs, with a sensitivity analysis to the main ones. In order to get a price target, a SOTP method, valuing EDP following a DCF basis. Our valuation yields a price target of €6.05 for FY21, which represents an upside of 31% compared to the current market price, and therefore a BUY recommendation.

Keywords (up to four)

Networks, Distribution, Risks, Transmission

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

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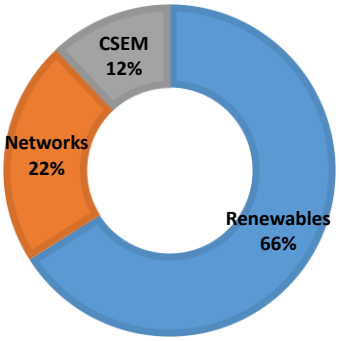

Source: EDP Reports

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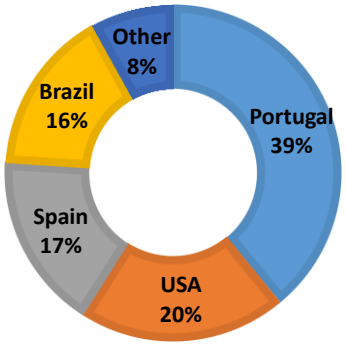

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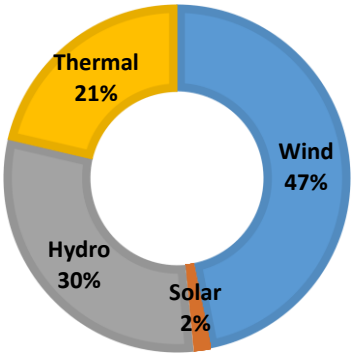


Source: EDP Reports
Thermal Installed capacity accounts for Coal, CCGT, Nuclear and Cogeneration.

Company overview

EDP – Energias de Portugal S.A. is a listed, Portugal-based energy generation, distribution and supplier company, with a presence not only in Portugal (with 39% of EDP's EBITDA), but also in Spain (17% of EDP's EBITDA) , Brazil and several other countries, both inside and outside the European continent. Its shares are publicly traded in Euronext Lisbon.

EDP is a multinational, vertically integrated utility company. Is the leading company in the industry in Portugal and one of the largest onshore wind generated electricity operators in Europe, with almost 66% of its energy supplied produced from renewable sources. Regarding other operations, the company has also a majority stake in the Spanish utility HC Energía. It generates and operates energy from renewable sources in 17 different countries. As of June 2021, it had an installed capacity in Iberia of 13 gigawatts and its distribution network totalized 282 thousand kilometers (With approximately 85% of market share in Portugal and 3% in Spain). Its is the largest electricity generator in Portugal, the third largest in the Iberian Peninsula and is also one of the largest privately owned generators in Brazil. Globally speaking, the company's installed capacity totalizes 24 gigawatt and its distribution network reaches 376 thousand kilometers (as of June 2021).

It was initially made a public company in 1976, with the merger and nationalization of Portugal's main electricity companies. Later, it started its privatization process, which went from 1997 to 2013. The company's core business started in Portugal, and later started to expand to Spain, given the geographical proximity, as well as the regulatory framework. Other than electricity, EDP has also a presence in the natural gas supply market, both in Portugal and in Spain.

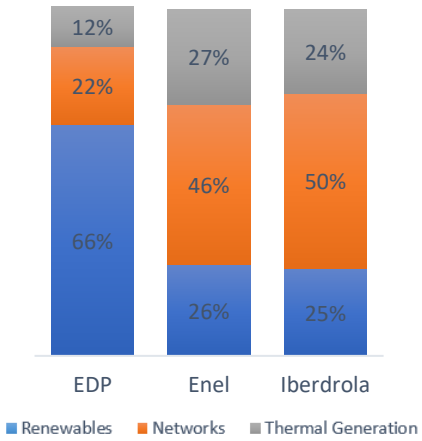
The company's operations are divided in three segments: **Renewables**, **Networks** and **Client Solutions & Energy Management.**

The first one, renewables, operated by one of EDP's subsidiaries, EDP Renováveis, accounts for about 66% of the company's EBITDA and it corresponds to the activity of generation of electricity from renewable sources, with special focus on wind onshore, wind offshore, solar and hydro power, under subsidiaries like EDP – Gestão da Produção de Energia, S.A. Its is a core part of EDP's business, not only for its current impact, but also for the future role it will have, considering the transition for renewable energy that the industry is going through. It has already built a considerable growth platform in Europe, North America and Brazil, and it is continuously looking at new opportunities for expansion, with more projects throughout Europe, and having recently entered the Asian market.

Secondly, the networks segment, which represents about 22% of the company's EBITDA and consists on the activity of electricity distribution and transmission in the Iberian Peninsula and in Brazil. It includes subsidiaries such as EDP Gás Serviço Universal S.A. and EDP São Paulo Distribuição de Energia S.A. In June 2021, its networks regulated asset base was of 6 billion euros, and it is also a segment with a lot of potential for development, considering the importance it will still gain, and which will require technological advances in order to create a smarter grid, more efficient and more adapted for the specific service required.

Finally, the Client Solutions & Energy Management division, which represents 12% of EDP's EBITDA and includes the activities of electricity generation from non-renewable sources (such as coal and gas), as well as electricity and gas supply and related energy solutions services to clients. It also incorporates the energy management business responsible for management of sales and purchases of energy in both Iberian and Brazilian markets and the corresponding hedging transactions. This is performed under subsidiaries such as EDP – Comercialização e Serviços de Energia, Lda and EDP – Comercialização e Serviços de Energia, S.A. In sum, most of the company's sales are generated by its electricity and network access. It has also a lot of potential for improvement, through technological advances and increasing the range of services offered, for example, through distributed solar and e-mobility services.

Figure 4
EBITDA by operating segment (2020)



Source: EDP, Enel and Iberdrola reports

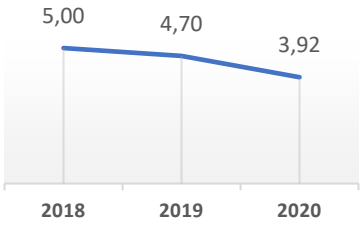
Peer comparison

Figure 5 – EDP's peer comparison (Source: Bloomberg)

At Dec. 31, 2020	EDP S.A.	Iberdrola S.A.	Enel SpA	Fortum Oyj
Market Cap (Mn €)	19 170	64 934	72 366	23 033
Revenues (Mn €)	12 448	33 145	62 623	49 015
CAGR Revenues 5Y	-4,31%	1,08%	-3,04%	69,93%
EBITDA (Mn €)	3 835	9 629	15 531	2 689
CAGR EBITDA 5Y	1,43%	4,76%	0,52%	16,12%
Net Income (Mn €)	801	3 601	2 610	1 823
Total Assets (Mn €)	42 947	122 518	163 453	57 810
Debt (Mn €)	29 200	75 300	121 096	42 233
Equity (Mn €)	13 078	47 218	42 357	15 577
Profitability Ratios				
EBITDA Margin	28,02%	28,32%	19,80%	-1,06%
EBIT margin	15,90%	17,15%	10,55%	-2,56%
Profit margin	6,43%	10,89%	4,17%	3,72%
ROE	9,76%	9,18%	7,32%	2,28%
ROA	2,00%	2,62%	1,18%	2,50%
Capital Stucture Ratios				
Net Debt/Equity	109,58	95,68	122,43	49,8
Net Debt/EBITDA	3,78	4,45	6,12	2,88
Liquidity Ratios				
Current ratio	1,06	0,82	0,83	1,08
Quick ratio	0,54	0,58	0,55	0,49
Cash ratio	0,39	0,22	0,19	0,14
Credit Rating				
Credit Rating (Fitch)	BBB	BBB+	A-	BBB

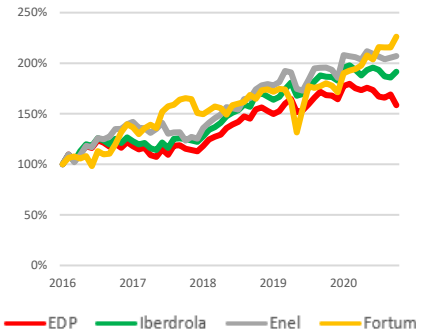
F

Figure 6
EDP 's Net Debt / EBITDA evolution (2018-2020)



Source: EDP reports

Figure 7
EDP's Peer Comparison Shareholders' 5Return



Source: Bloomberg

In Portugal, EDP is the largest producer and supplier of electricity whilst in the Iberian Peninsula is the third largest. We chose Fortum as one of EDP's peers because of its market capitalization, since it has a similar value to EDP. Then, Enel and Iberdrola, that despite having a significantly higher market capitalization, operate in the same regions as EDP, making them good comparables in this aspect. Moreover, it is one of the leaders in renewable energy production, with a higher percentage of electricity produced from renewables than almost all its peers (EDP has 66% of its EBITDA coming from the renewables segment, whilst Enel and Iberdrola have 26% and 25% respectively). It is also the eleventh largest European electricity company, regarding market capitalization.

As we can observe from the table above, in terms of Revenues and EBITDA, EDP is still quite behind its peers, since it does not have the size of any of them It has, except when compared to Enel, a higher Debt / Equity ratio than the others. It shows the lowest growth rate in revenues and EBITDA, which can be explained partially by a negative foreign exchange impact coming from the operations in Brazil.

Regarding liquidity ratios, in 2020, EDP's current ratio was 1.06, which represents the proportion of current assets compared to current liabilities, meaning EDP would be able to easily meet its short term obligations. The quick ratio was 0.54 and the cash ratio 0.39. Even though both these figures are bellow 1, we can state that EDP is in a strong liquidity position, specially when compared to its peers, since it has higher values in almost all the comparisons.

Furthermore, EDP was able to reduce its net debt to EBITDA ratio compared to its peers. This excess debt was in a way preventing EDP from showing a sharper growth, what we believe will be shown in the next few years.

The company has also the best return on equity among its peers, a very positive sign for investors. However, despite having a significative lower value of total assets that the rest, the return on assets shows a slight lower value than the majority of the others.

On a final note, we can observe a good performance from each of these analyzed companies, in regard to the return given to shareholders, as we can observe in figure 7. However, among the four companies, EDP is still the one that presents a worse performance in this caption, with the main focus going to Fortum, which since 2019 was able to surpass the other ones.

Shareholder's structure

EDP has a total of 3 965.7 million shares outstanding, from which 54.31% are owned by institutional investors. Regarding the ownership type, 44.46% of the shares are owned by Investment advisors (companies that manage investor's assets), 26.08% by Corporations and 8.66% by Individual investors. To what

concerns the geographical distribution of the ownership, the United States and China dominate, with 28.37% and 24.96% of the shares belonging to entities from these two countries, respectively. 8.66% of the shares are owned by entities with unknown locations, and after that come the counties in Europe, with France, Luxemburg, Norway and Portugal having the most notable position in this geographical distribution.

Looking at the company's ownership structure, a few names stand out due to their more influent position. Firstly, there is China's statal energy company, China Three Gorges International, EDP's bigger shareholder, with over 754 million shares, correspondent to 19.03% of the company's equity. The Chinese giants bought a 21% stake of the company back in 2011 by 2.7 billion euros, with a 53.6% premium related to EDP's share price at the time. Later, in the beginning of this year (2020), the company sold 2.52% of EDP, equivalent to 100 million shares, for a total price of 534 million euros. They are a very strategic partner to EDP, having made significant investments in several of EDP's projects of up to 2 billion euros which was crucial for the company's development in the renewables department and also provide a credit facility of up to 2 billion euros (This credit facility was important for EDP due to the lack of access for credit in 2012, enhancing EDP's Balance Sheet). Next, there is the world's biggest asset management company, BlackRock Inc, with a position of 7,33%, with over 290 million shares. And finishing the top 3 shareholders, there is Oppidum Capital, the Spanish investments holding company, who owns about 285 million shares, giving them a 7.2% stake in the company.

After these three, other sounding names come up, such as Norway's central bank, Norges Bank, with a 2.95% position; the Vanguard Group, an American investment adviser company, that has a stake of 2.32%; the Sonatrach Group, Algeria's statal oil company, with 2.19%; Qatar Investment Authority, the sovereign wealth fund of Qatar, also owns a 2.09% stake in EDP; and finally, Crédit Agricole Group, the French bank and one of the biggest ones in Europe, who has 2% of the shareholder´s equity. With this, none of the shareholders has a majority position on the company, and therefore does not have a controlling position on the company's operation.

Figure 8
Shareholder's structure

Shareholder	% Shares
China Three Gorges	19,03%
BlackRock Inc	7,33%
Oppidum Capital	7,20%
Norges Bank	2,95%
Vanguard Group Inc	2,32%
Sonatrach Group	2,19%
Qatar Investment Authority	2,09%
Credit Agricole Group	2,00%

Source: EDP reports

China Three Gorges International (CTG) *Is a Chinese energy company an the leader on hydropower generation, operating in 47 countries with 89 ongoing international contracts and investments throughout the world. CTG has a total installed capacity of 124GW, a total of 35000 employees and a total of $120 Bn on its assets portfolio. The Group specializes in the development of renewable sources in China and overseas.*

Macroeconomic analysis

On what regards the macroeconomic analysis on the energy sector, it is our belief that the four main regions where EDP has a bigger presence deserve a more extensive analysis, being this four Portugal, Spain, Brazil and the United States of America.

However, firstly, we should have a look into a more general context of the sector. The energy sector is in a transition state. Since its beginning, the main sources of energy were non-renewable energy sources, such as oil, natural gas

Figure 9
World Electricity Generation Breakdown by Source

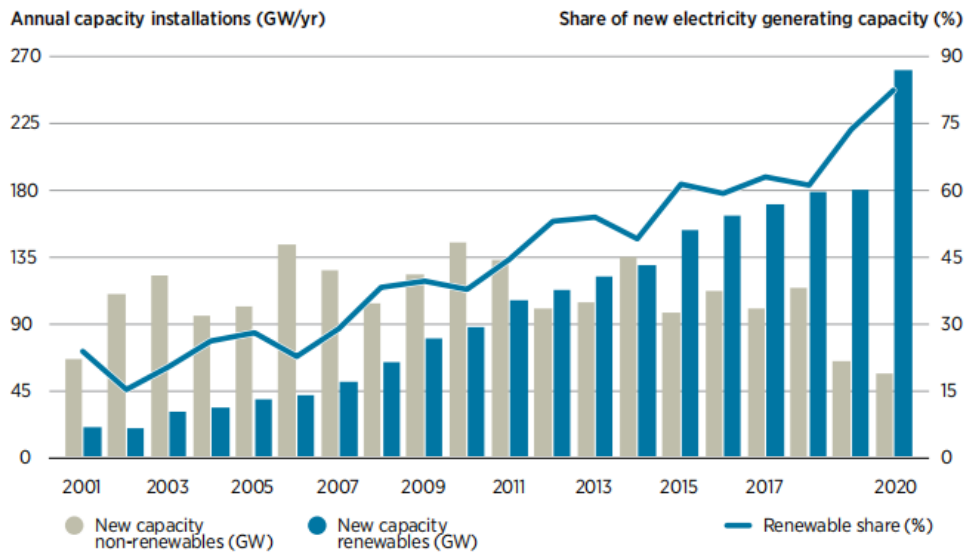
Year	1990	2000	2010	2020
Coal	38%	38%	40%	35%
Gas	16%	18%	22%	23%
Nuclear	17%	17%	13%	10%
Oil	9%	8%	5%	4%
Renewables	20	19%	20%	28%

Source: Our World in Data

and coal. This led, as we now know, to an overconsumption of these resources and to a major climatic impact, contributing to the global warming crisis we are now facing, as well as troubles with energy poverty and energy security. Nevertheless, with the crescent knowledge we started having, aligned with the raising awareness around this subject, we are now forced to find alternatives and to make changes in our energy production process. One of the measures that contributed the most to the need for this transaction was the consensus to keep the global warming increase to 1.5º until 2050.

This being, in the latest years, renewable energy sources have become more and more popular and we are seeing an effort from energy production companies to follow this trend, with big investments being seen in solar, wind and hydro, and in the last seven years, the annual increase in the energy grid was more from renewable power than from fossil fuels and nuclear energy combined (in 2020, the renewable grid added globally was over four times the capacity added from other sources (figure 10), with a record of 260 GW of renewable generation capacity added). This also contradicted the effect of the pandemic, which affected negatively almost all supply chains worldwide EDP is no exception. In fact, over 66% of its energy supplied coming from renewable sources. Overall, from 2010 to 2020, the share of renewable sources in electricity generation increased from 20% to 28%, with this trend being expected to increase even more.

Figure 10 – Share of new electricity capacity, 2001-2020 (Source:IRENA World's Energy Transition Outlook)

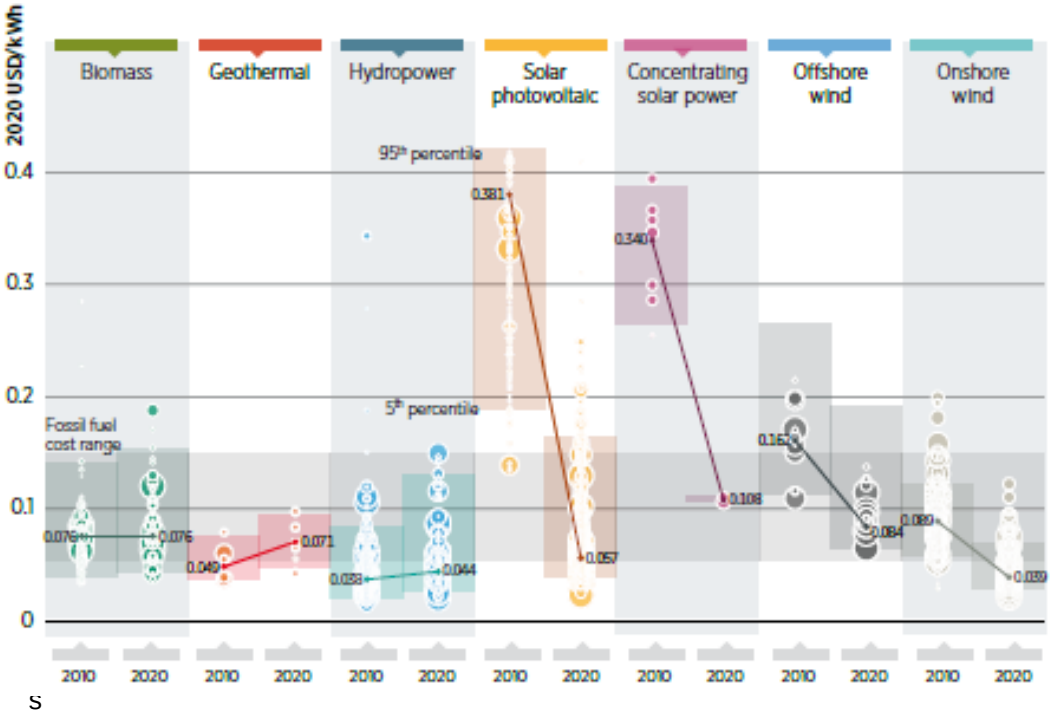


Renewables are increasingly the lowest cost sources of electricity in many markets

This is leading to the renewable sources to become the cheapest form of energy, generating another incentive for the investment in these forms of energy. Considering newly commissioned projects, the global weighted average LCOE (levered cost of energy) of utility-scale Solar PV fell by 85% between 2010 and 2020, from USD 0.381/kWh to USD 0.057/kWh. This is a precipitous decline. At one time more than double the cost of the most expensive fossil fuel fired power capacity, utility-scale solar PV can now compete with the cheapest new fossil fuel fired capacity. On the last decade, the average cost of onshore wind generated electricity decreased by 56% (from USD 0.089/kWh to USD 0.039/kWh).Lastly, for the offshore wind, the global weighted average LCOE of newly commissioned projects declined from USD 0.162/kWh in 2010 to USD 0.084/kWh in 2020, a reduction of 42% in ten years. Falling technology costs continue to affect auctions, where new record-low prices continued to emerge even amid the global pandemic. For example, in July 2020, Portugal saw a USD 0.0135/kWh bid for solar PV.

The cost of fossil fuel fired power generation varies by country and fuel is an estimated range between USD 0.055/kWh and USD 0.148/kWh.

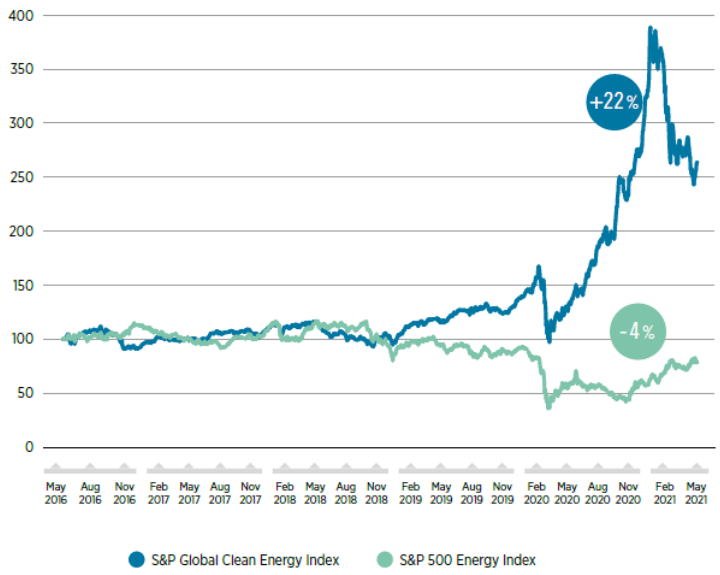
Figure 11 – Global LCOE of newly commissioned renewable power generation technologies, 2010-2020 (Source:IRENA World's Energy Transition Outlook)



changing trend of the energy market is also creating opportunities for investors, and a moving trend for the opportunities created by renewable sources of energy is already being showed. Even with the pandemic, the value of clean energy stocks showed a significant appreciation. When comparing the S&P indexes for clean energy (S&P Global Clean Energy Index) and for fossil energy (fossil-fuel-heavy S&P 500 Energy Index), we can see that in the last five years, the first one showed a 22% increase in value, whilst the second one was down 4%. The

investment in these clean energy sources hit an all-time record in 2020, reaching USD 524 billion, being the most on renewable energy technology.

Figure 12 – New energy vs old energy:S&P Global clean Energy and Energy Indices (Source:IRENA World's Energy Transition Outlook)

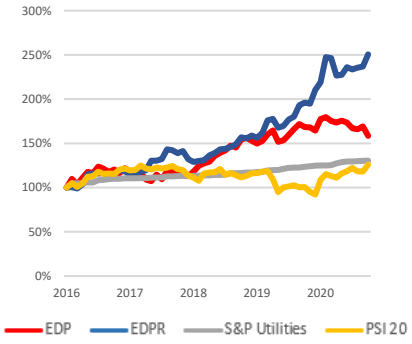


Another area that is fomenting the energy sector is the transportation industry. Being one the main industries which uses fossil fuels, it is also under great pressure to join the transition to clean sources of energy, and electricity-powered cars are becoming more and more a reality throughout the world, as policy makers also start to encourage this usage.

Now, one of the problems caused by this increase in the demand for variable renewable energy is its supply, not only related to the installed capacity, but also other matters related to the process of generating and distributing energy such as the storage. A series of measures are being implemented worldwide to address this. Several technological advances have been made in developing the storage capacity of the batteries, as well as more efficient grids (such as smart grids, a development of grids that uses IT to monitor and optimize the supply of energy). Another increasingly searched technology for the sector are virtual power plants (cloud-based plants which aggregates different energy resources from several different sources in order to effectively provide power). The market for this technology is expected to grow at a CAGR of 27.2% until 2027, when it should reach the value of USD 2.85 billion.

Finally, and regarding the shareholders' return EDP is generating, as we can see in Figure 13, the company has been performing quite well, surpassing both the Index of the Portuguese largest companies, PSI20, and the S&P500 Utilities Sector Index. More specifically, EDPR, the subsidiary that controls EDP's renewables sector, is showing an even higher return that the whole group. This

Figure 13
EDP and EDPR shareholders' return vs. PSI20 and S&P500 Utilities Sector Index



Source: Bloomberg

means that in the analysed interval, shareholders would be better off investing in EDP than in either one of the two indexes.

Now, as mentioned above, we shall look to a more geographic perspective, starting with Portugal, EDP's main market. In 2020, operations in Portugal represented 39% of the company's EBITDA, a significant portion. The country was severely hurt by the COVID pandemic, with a 5.1% decrease in the GDP in 2020. Nevertheless, the projections are good and the country is expected to start recovering right in 2021, with the financial help coming from the European Union. The country's energy market is a very liberalized one, with the free market representing 94% of the total. One thing to account in Portugal are the high taxes when compared with the average of the European Union. Despite this, and according to Eurostat, the final energy prices are only slightly higher than the average of the European Union, which might represent a lower profit margin for the industry's companies. Regarding the natural gas market, it is also almost fully liberalized, with 98% of it being consumed in the free market, being that most of the country's consumption of it comes from the outside, being imported. As in most other countries, Portugal offers incentives for the production of energy from renewable source. These incentives come mostly on the form of feed-in tariffs, which is a long-term mechanism which guarantees energy producers an above market price for the energy produced, giving them a return for every MWh produced. The inflation rate is expected to be around 1.5% in 2022 and 1.2% in 2023, according to the econometric models.

There are two main types of renewable support mechanisms: **Tarif-Based Instruments** and **Quantity-Based Instruments. The Feed-in Tariff is an example of Tarif-Based instrument.**

"The number of countries with renewable policies has grown significantly. With that, the number of auction schemes have increased from 16 in 2010 to 143 in 2020, leading to a significant decrease of the renewables average selling price" **- Source IRENA World Energies Outlook**

Regarding the Spanish market, in 2020 it contributed to 17% of EDP's EBITDA. It is, similarly to Portugal, a very liberalized market, specially in the generation and commercialization phases of the process. The final energy prices in Spain in 2021 were slightly higher than in Portugal, therefore also above the EU average, however the taxes are lower, meaning the companies operating in the country might benefit from better margins, when compared to Portugal. Here, the public incentives for the production of renewable energy are quite the same as in Portugal, with a premium paid so as to compensate the shortfall up to a contracted return.

With the pandemic, the country's GDP suffered a 10% decrease, meaning a significant economic loss and the country's inflation rate was 2.24% in 2021, with the projections estimating this rate to be around 1.6% for the following years.

Now concerning the Brazilian market, it works on a different way from the rest of them. The energy distribution's operating model is a centralized one, as National Organizations are responsible for controlling the plants' generation level. Expectedly, this can cause the industry's players some setbacks when expanding

however, EDP has already approved plans for an expansion in transmission lines, which will allow them to increase their market share in the country.

Similarly to the rest of the world, 2020 was a difficult year for the Brazilian economy, with its GDP suffering a decrease of 4.06%. This is expected to start recovering in 2021 with a 5.23% increase, with this increase to stabilise around 2% by 2023. Regarding the inflation, 2021 marked a high growth in it, with the rate being of 7%. It is expected be around 5% in 2022 and after that stabilize in around 3%. The market accounted for 16% of EDP's total EBITDA.

Finally, looking at the United States. Here, the market is much higher than in any of the other countries, with several more players. Despite representing 20% of EDP's EBITDA, the company's market share is only of 3.2% (in 2020). It is following the trend of dropping the usage of fossil fuels, with the coal usage already dropping by half, which creates opportunities for companies like EDP, which are already with a main usage of renewable sources of energy.

Since Joe Bidden has been elected, USA had re-joined the Paris Agreement meaning that it joined the plan to achieve 100% clean energy and net-emission by 2050, with a $2 trillion plan. For EDP, this election was also favourable for its shareholders. When he was announced president, the share prices of EDP and EDPR increased 2.47% and 3.86% respectively (while with Trump election EDP had lost 15% of its Market Cap).

PTC (Production Tax Credit), **ITC** (Investment Tax Credit) and **MACRS** (Modified Accelerated Cost Recovery System) are the tax incentives that the US government uses to support renewable energy projects. It has been strong in the last few years and EDP has been benefiting significantly from it.

RPS (Renewable Portfolio Standards) require that a given percentage of the electricity supplied by a utility is generated through renewable sources

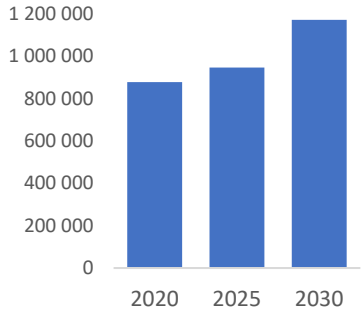
.

Moreover, it is one of the countries that offers the most incentives to move to greener forms of energy. Their primary programs are PTC, ITC and MACRS, which have a role in allowing the accelerated depreciation of certain major equipment components over a five-year period. Another stimulus is the implementation of RPS, on which utilities must demonstrate that a given percentage of the energy supplied in a specific area is generated through renewable sources, which are already mandatory in most states. Furthermore, there are the income tax incentives. The federal government of the United States has been implementing these measures, more specifically by giving tax credit per kWh of electricity generated through renewable sources and also ITC reductions of up to 40% of the capital invested in projects related to renewables. Given the US' size and previous climate incentives (in which under Trump's Presidency the share of renewables in electricity has remained at 11%), we anticipate that President's Biden new investment plan will have a higher impact than the European green deal, since EDPR has an appealing exposure to US renewables. We estimated that the United States will account for roughly (34%) of the EDPR's assets by the end of 2030 (vs 9% in 2020). As a result, the recent renewal of the PTC, ITC and Biden's plan should clearly benefit EDP.

With the Covid pandemic, the country faced a 3.41% decrease in the GDP, but with the projections expecting an increase of almost 6% in 2021 and stabilizing on around 2% growth from 2023 onwards. The inflation in the country is also showing an increasing trend, motivated by the interventions of the federal reserve and the low interest rates, and expected to increase around 2.5% annually from 2021 onwards.

Networks

Figure 14
Networks' EBITDA evolution



Source: Analysts' estimates

The networks department incorporates the activities concerning the electricity distribution in the Iberian Peninsula and in Brazil, as well as the transmission activities in Brazil. The distribution is generally regulated through concessions and licenses, and due to its high level of regulation and extended time duration, it provides a stable long-term cash flow stream, as well as potential for increase, following the energy transition the industry is facing. During the year of 2020, EDP managed to distribute 76 272 GWh of electricity to over 11 000 supply points. Note that currently, EDP's does not include gas distribution, which was discontinued back in 2017. In the three countries on which this segment operates, the revenues are determined by a remuneration framework based on regulatory asset base, by which regulators approximate the amount of money that a distribution network company invests in the infrastructures and gives a return on that same investment. These investments are allowed by the regulating authorities and a benchmark is used for the cost of the investment, which may be outperformed or underperformed. This makes the revenues less dependent on the demand, however, in Brazil, the demand it still plays a role in determining the remuneration. In 2020, the EDP's RAB totalized €6 billion (which represented a 9% increase compared to the previous year), from which 76% came from the Iberian Peninsula and 24% from Brazil.

Figure 15: Networks' electricity distribution (Source: Analysts' estimates)

2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
45 666	44 143	45 625	44 555	45 229	45 593	45 578	46 249	46 808	47 321	47 903	48 455
8 262	7 559	8 435	8 458	8 488	8 546	8 583	8 686	8 793	8 896	9 000	9 105
25 591	24 421	25 275	26 111	26 946	27 782	28 617	29 696	30 775	31 854	32 934	34 013

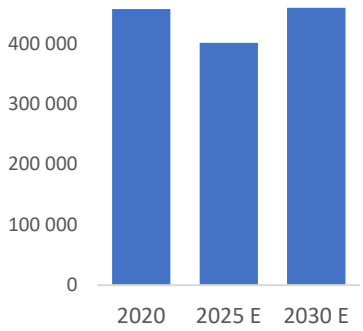
To what concerns this segment, the company's Revenues and EBITDA have been stable for the last few years. In 2020, it totalized 877 million euros, which represents roughly 22% of the company's total EBITDA, being that from the networks EBITDA, about 52% comes from the operations in Portugal, 18% from Spain and 30% from Brazil, representing the overseas operations a significant part of the segment. In the last year, it had a slight decrease, however we expect it to have a significant rise until

2030. This rise will be due to, on one hand, the consolidation of market share in Portugal and, on the other hand, the forecasted expansion in Brazil, on which the Return on the Regulatory Asset Base is higher than in Portugal (and expected to rise even more), and where EDP is also expected to increase its market share in the coming years as well as complete the installation of several more transmission lines. Contrarily to this, the company's operations in Spain are expected to remain the same on this segment, with its EBITDA increasing only slightly throughout the years, which is due to, similarly to Portugal, the increase in the RAB.

Portugal

To what concerns Portugal, specifically, EDP has secured long term distribution contracts, which leads us to believe that the Portuguese RAB will not suffer any major changes, with EDP keeping its big market share stable. The concession for distribution of high and medium voltage of electricity (which accounts for about 60% of the Portuguese RAB) belongs to EDP until 2044. Regarding low voltage electricity, despite the concession ending in 2022, considering the leadership position that EDP has in the Portuguese electricity market, it is assumable that this concession will be renewed without major risks. With this said, our projection is that the RAB will remain stable, while the return on RAB should suffer a decrease. This because the government bonds on which the RoRAB is based (10-year bonds) are expected to keep their very low levels, of near 0, since a change of Portugal's rating is not projected for the near future.

Figure 16
Networks Portugal EBITDA evoltion

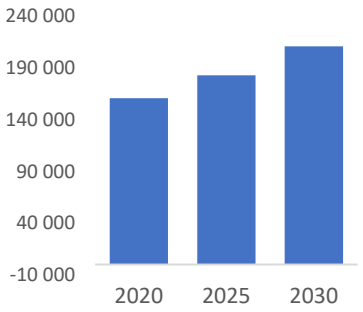


Source: Analysts' estimates

Spain

To complete the Iberian market, we must also look at Spain. Here, the first thing to mention is the acquisition of Viesgo, the Spanish energy company. This will result in a considerable increase of the RAB considering the investment made. After that, similarly to the Portuguese one, it should remain stable for the coming years. Now, the RoRAB should keep a stable value at least until the new regulatory period, which will occur in 2026. By then, we believe it will decrease slightly to 5%. Its EBITDA, which only accounts for 18% of the total networks EBITDA, is expected to keep constant levels over the next years, considering that there are no major expansion plans for this geographical area.

Figure 17
Networks Spain EBITDA evolution



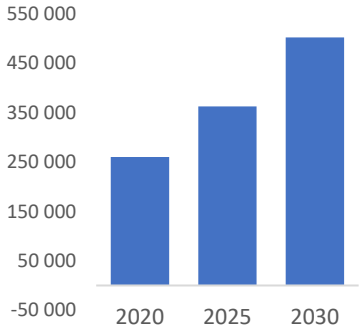
Source: Analysts' estimates

Figure 18: Networks Iberia Valuation (Source: Analysts' estimations)

Networks Iberia	*(In Million €)*	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
EBIT		317	310	201	206	216	225	235	247	260	272	285
Income taxes on EBIT		-84	-81	-53	-54	-57	-59	-62	-65	-68	-72	-75
NOPLAT		233	229	148	152	159	166	173	182	191	201	210
Depreciation		299	307	348	341	346	349	349	354	358	362	366
Operational Cash Flow		532	536	497	493	505	515	522	536	549	563	577
Change in Net Working Capital		100	-297	-436	18	-15	-10	-3	-17	-15	-14	-15
Net Capex Investment		-51	-2 081	-414	-294	-378	-368	-350	-389	-389	-390	-398
Change in Other Assets and Liabilities		-41	-5	12	0	0	0	0	0	0	0	0
Unlevered CF		540	-1 846	-341	218	112	137	169	130	146	158	163
WACC		2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%
Levered EV				**9 073**	9 199	9 304	9 379	9 495	9 598	9 691	9 782	

Brazil

Figure 19
Networks Brazil EBITDA evolution



Source: Analysts' estimates

Now, looking at the Brazilian market, the system is slightly different. Despite still following the RAB model, if the energy contracted is below 105% of the actual demand, electricity companies can charge the costs to the costumers, through tariffs. However, if the energy contracted surpasses 105% of the actual demand, the companies must support these costs themselves. This means that, contrarily to the Iberian market, in Brazil, demand plays a key role in EDP's accounts. However, considering that EDP has captive consumers and has been working hard on their service quality, it is not expected that its demand will decrease in the coming years and therefore its energy contracted should not surpass the 105%, meaning the company should not have to support those costs itself. Both the EBITDA and the gross profit are expected to show a significant rise, mostly due to the expansion the company has projected for the country. The other factor for this rise is the expected increase in the RAB, caused by the recognition of value-added investments, which aligned with a stable return on RAB, will lead to a very significant increase in the allowed EBIT.

Finally, on what concerns the transmission business, as was mentioned before, EDP was allowed the concession for the installation of five more transmission lines in Brazil, with an initial investment of R$3.1B. These new lines are expected to take two to three years to become operational (unless an unusual situation, such as a new Covid outbreak, happens and the installation stops). This expansion, aligned with the low interest rates in Brazil (which result both from the country's economic environment and from an effort of the government to potentiate the economy after the Coronavirus pandemic), allow EDP to finance this project at a low cost, which will reduce the cost of the company's debt and, consequently, its WACC, so that the ROIC will become even higher compared to the cost of capital than it is already. With this, the EBITDA should grow until the full operationalization of the new transmission lines and, after that, its growth should stabilize.

Figure 20: Networks Brazil Valuation (Source: Analysts' estimates)

Networks Brazil *(In Million €)*	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
EBIT	282	185	204	222	240	258	277	299	323	347	373
Income taxes on EBIT	-75	-48	-54	-59	-63	-68	-73	-79	-85	-91	-98
NOPLAT	207	137	150	164	177	190	204	221	238	256	275
Depreciation	69	75	72	78	80	83	86	88	91	95	98
Operational Cash Flow	275	212	222	242	257	273	289	309	329	351	373
Change in Net Working Capital	-65	-21	-10	-27	-23	-23	-24	-29	-30	-31	-33
Net Capex Investment	-245	-485	-128	-108	-111	-113	-116	-127	-131	-134	-137
Change in Other Assets and Liabilities	-16	0	2	1	1	1	1	1	1	1	1
Unlevered CF	-51	-294	86	107	124	137	151	154	169	186	204
WACC	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%
Levered EV			**6613**	6865	7119	7373	7640	7906	8169	8431	

Valuation

On an overall perspective, the Networks segment of EDP should present a steady growth throughout the next ten years, catalyzed by the investment the sector will have. We expect it to show a 10% increase in the EBIT until 2030. To what regards the FCF, it is predicted to show the same steady growth, which together with the computed WACC leads us to project a value of €15,686 million for this section of the company.

Sensitivity Analysis

In this section of the report, a sensitivity analysis was performed to some the variables that might suffer changes throughout time and affect the company's valuation. EDP is subject to a series of different risks, whether related to the commercial or to certain market risks.

Business activities risks

Firstly, there are the risks directly related to the company's business activities. Here are incorporated the possibilities of a decline in energy selling prices caused by unpredictable market conditions, as well as changes in the demand in any of the several countries EDP has business in. There is also the risk of a natural disaster, which would not only change the conditions on which renewable energy is produced, but could also compromise severely the company's property, plants and equipment. Finally, considering the sector EDP works on, it is highly dependent on laws and regulations related to safety, health or ESG, which can be changed in short periods of time, not giving the company much time to adapt.

Strategy related risks

Moving on to the strategy related risks, energy is an industry in constant technological development and, in recent times, it has been evolving a lot on this subject, meaning companies in the sector can easily stay behind competitors if

they do not adapt quickly to these changes. It also depends a lot on partnerships with third parties, such as in the frequent joint ventures in the business, which makes them somehow dependent on the decisions of others, which can sometimes not be the ones that benefit EDP the most. Also, by being an international company, present in many countries, it is always subject to increasing competition in any of them, which becomes harder to manage as more countries are added to the business.

Operational risks

Regarding operational activities, more risks are incurred. Being an industry highly reliable on connections, transmission lines and distribution through great areas, it can easily find delays in the process. Furthermore, by working with a lot of physical materials, this equipment in the power plants can have mechanical flaws, for example. The powerplants are also subject to accidents, on which both equipment and employees can be harmed and compromise the operational process.

Financial activities risks

Finally, we have the risks related to the company's financial activities. Being present in different countries across different continents, the company faces severe foreign exchange risks. The exchange rates fluctuations can have a negative impact on the company's performance. Moreover, being a company with high values of capital expenditures, there is the risk that it cannot fully finance these projects, whether due to lack of internal funds or by not managing to get external funding, which can be related to a change of credit rating, for example, another risk the company faces.

Sensitivity Analysis

Figure 21: Renewables installed capacity sensitivity analysis(Source: Analysts' estimates)

	Negative Scenario			Base Case	Positive Scenario		
Gross Aditions	24 443	27 499	29 027	30 554	32 082	33 610	50 000
Capex	24 000 940	27 001 058	28 501 117	30 001 175	31 501 234	34 651 357	56 704 513
Aditions/Capex	982	982	982	982	982	982	982
% of base case	80%	90%	95%	100%	105%	110%	164%
Share Price	**4.45**	**5.25**	**5.65**	**6.05**	**6.45**	**5.68**	**4.42**

In this analysis, firstly, we decided to look at an eventual fluctuation in the renewables installed capacity. Being that the energy in this segment mostly comes from hydro, wind or the sun, its output is somehow dependent on the meteorological conditions. For example, sunshine hours, wind intensity, stream flows or rainfall vary a lot both from the geographical location and the time of the year. Moreover, despite being "clean" sources of energy, there are still a lot of

restrictions on where to install them due to the fact that it also generates visual pollution and climatic concerns such as reduction of water flow.

This being, our analysis focused on a fluctuation of 5%, 10% and 20% on the downside, and 5%, 10% and 64% on the upside (this last one in order to achieve the target gross additions of 50 000). The conclusions were explicit: in each of the cases we could see a change in the share price. On the most important, the downside ones, the share price would decrease to 5,65€ and 5,25€ (on a 5% and 10% decrease in installed capacity, respectively) and in both of these cases our recommendation would keep being to buy. As stated before, we do not expect EDP achieving the strategy update gross additions to 2030 and looking into the sensitivity analysis for this scenario the Share Price would be 4.42 with a net debt of €44 156 Million.

Figure 22: Networks electricity distibuted sensitivity analysis (Source: Analysts' estimates)

	Negative Scenario			Base Case	Positive Scenario		
Total Electricity Distributed (GWh)	577 507	721 883	802 093	844 308	886 523	975 176	1 121 452
% base case	80%	90%	95%	100%	105%	110%	115%
Share price	**5.26**	**5.66**	**5.86**	**6.05**	**6.25**	**6.45**	**6.65**

Secondly, we chose to perform a sensitivity analysis on the amount of electricity distributed through networks. The rationale behind this choice comes from another of the company's risks. Considering that EDP has a lot of their network business subject to licenses granted for a specific period in a specific location, and these licenses are very depended on the local legislation. This being, the licenses are subject to an unexpected early termination which can happen due to judicial proceedings or changes in regulations. Given the high initial investment that networks require, the premature termination of these contracts and licenses could have a major impact on the company's revenues.

Bearing this in mind, we performed the analysis considering an eventual 5%, 10% and 20% decrease in the electricity distributed through the networks department. These setbacks, even though it would result in a notable decrease in our share price estimation (from 6.05€ to 5.86€, 5.66€ and 5.26€, respectively), it would not, in any of the cases, change our final recommendation. The estimation, even in the worst-case scenario, would be considerably above the current price, making us recommend investors to buy.

EDP - ENERGIAS DE PORTUGAL S.A.

COMPANY REPORT

UTILITIES

17 DECEMBER 2021

STUDENT: CAETANO ARAÚJO/ HENRIQUE CANTEIRO

44794/45666@novasbe.pt

Road to Carbon Neutrality

Leading the transition

- With the world moving more and more to decarbonization, the energy industry faces one of the biggest transitions yet. Target emissions are forcing companies to move towards renewable sources of energy, replacing fossil fuels and government are implementing incentives. In North America, with the application of the Biden plan, EDP is benefiting from tax incentives (ITCs and PTCs).

- With already 66% of its electricity generation coming from renewable sources, and with a target of reaching 100% by 2030, EDP is positioning itself as one of the leaders of this transition.

- EDP managed to get its credit rating upgraded to a BBB grade. This, alongside with a constant and sustainable dividend policy, are making the company each time more attractive to investors.

- **Investment Thesis:** Given our price prediction of 6.05€ per share by the end of 2022, which represents a 31% upside potential compared with the current market price, we propose taking a **BUY** position.

Company description

EDP – Energias de Portugal is a Portuguese vertically integrated utility company which presents in the generation, distribution and supply of electricity, as well as gas commercialization. It holds a portfolio of renewable assets through its 74.98% owned subsidiary EDP Renováveis and has a strong presence in Brazil, via 51.3% holding in EDP Brazil.

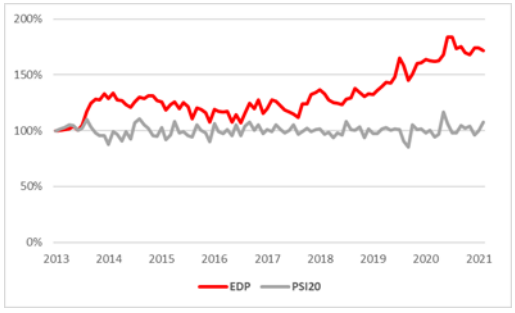
Recommendation:	**BUY**
Vs Previous Recommendation	-
Price Target FY21:	**6.05 €**
Vs Previous Price Target	-
Price (as of 17-Dec-21)	**4.75 €**

Reuters: EDP.LS, Bloomberg: EDP.PL

52-week range (€)	4.21-5.76
Market Cap (€m)	18,845
Outstanding Shares (m)	3,966

Source: Bloomberg

EDP vs PSI20 comparison



Source: Bloomberg

(Values in € millions)	2020	2021E	2022F
Revenues	12448	11981	12449
EBITDA	3949	3430	3655
EBITDA margin	32%	29%	29%
Comprehensive Result	516	685	919
DPS	0.10	0.13	0.17

Source: Analysts' estimates

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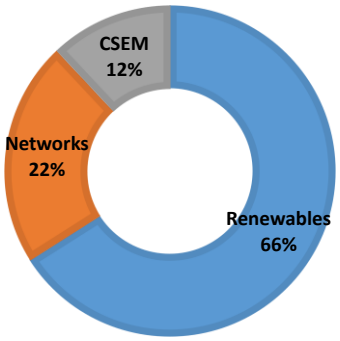
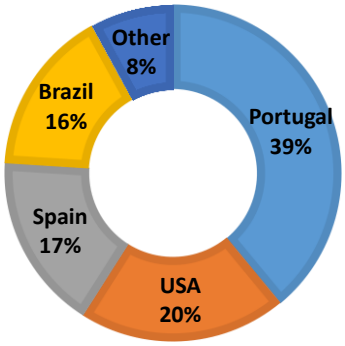
Figure 1
EDP's EBITDA by Segment (2020)



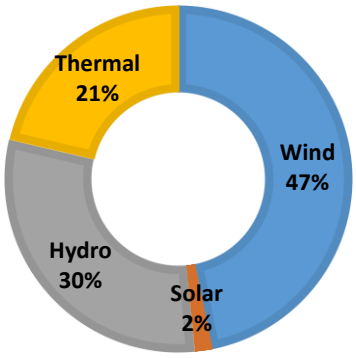
Source: EDP Reports

Figure 2
EDP's EBITDA by region (2020)



Source: EDP Reports

Figure 3
EDP's Installed Capacity by Source (2020)



Source: EDP Reports
Thermal Installed capacity accounts for Coal, CCGT, Nuclear and Cogeneration.

Company overview

EDP - Energias de Portugal S.A. is a listed, Portugal-based energy generation, distribution and supplier company, with a presence not only in Portugal (which represents 39% of EDP's EBITDA), but also in Spain (17% of EDP's EBITDA), Brazil and several other countries, both inside and outside the European continent. Its shares are publicly traded in Euronext Lisbon.

EDP is a multinational, vertically integrated utility company. Is the leading company in the industry in Portugal and one of the largest onshore wind generated electricity operators in Europe, with almost 66% of its energy supplied produced from renewable sources. Regarding other operations, the company has also a majority stake in the Spanish utility company HC Energía. It generates and operates energy from renewable sources in 17 different countries. As of June 2021, it had an installed capacity in Iberia of 13 gigawatts and its distribution network totalized 282 thousand kilometers (with approximately 85% of market share in Portugal and 3% in Spain). It is the largest electricity generator in Portugal, the third largest in the Iberian Peninsula and is also one of the largest privately owned generators in Brazil. Globally speaking, the company's installed capacity totalizes 24 gigawatts and its distribution network reaches 376 thousand kilometers (as of June 2021).

It was initially made a public company in 1976, with the merger and nationalization of Portugal's main electricity companies. Later, it started its privatization process, which went from 1997 to 2013. The company's core business started in Portugal, and later started to expand to Spain, given the geographical proximity, as well as the regulatory framework. Other than electricity, EDP has also a presence in the natural gas supply market, both in Portugal and in Spain. The company's operations are divided in three segments: **Renewables**, **Networks** and **Client Solutions & Energy Management.**

The first one, renewables, operated by one of EDP's main subsidiaries, EDP Renováveis, accounts for about 66% of the company's EBITDA and it corresponds to the activity of generation of electricity from renewable sources, with special focus on wind onshore, wind offshore, solar and hydro power. It is a core part of EDP's business, not only for its current impact, but also for the future role it will have, considering the transition for renewable energy that the industry is going through. It has already built a considerable growth platform in Europe, North America and Brazil, and it is continuously looking at new opportunities for expansion, with more projects throughout Europe, and having recently entered the Asian market.

Secondly, the networks segment, which represents about 22% of the company's EBITDA and consists of the activity of electricity distribution and

transmission in the Iberian Peninsula and in Brazil. It includes subsidiaries such as EDP Gás Serviço Universal S.A. and EDP São Paulo Distribuição de Energia S.A. In June 2021, its networks regulated asset base was of 6 Bn euros, and it is also a segment with a lot of potential for development, considering the importance it will still gain, and which will require technological advances in order to create a smarter grid, more efficient and more adapted for the specific service required.

Finally, the Client Solutions & Energy Management division, which represents 12% of EDP's EBITDA and includes the activities of electricity generation from non-renewable sources (such as coal and gas), as well as electricity and gas supply and related energy solutions services to clients. It also incorporates the energy management business responsible for management of sales and purchases of energy in both Iberian and Brazilian markets and the corresponding hedging transactions. This is performed under subsidiaries such as EDP – Comercialização e Serviços de Energia, Lda and EDP – Comercialização e Serviços de Energia, S.A. In sum, most of the company's sales are generated by its electricity and network access. It has also a lot of potential for improvement, through technological advances and increasing the range of services offered, for example, through distributed solar and e-mobility services.

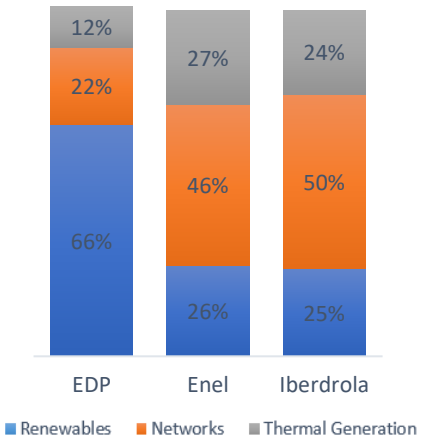
Peer comparison

Analysis of EDP and its peers on what regards the main captions of the companies' reports, as well as profitability, capital structure, liquidity and rating

Figure 4 – EDP's peer comparison (Source: Bloomberg)

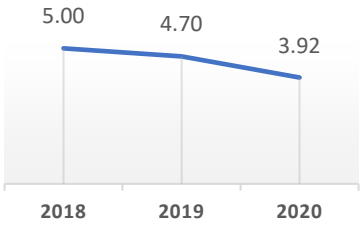
At Dec. 31, 2020	EDP S.A.	Iberdrola S.A.	Enel SpA	Fortum Oyj
Market Cap (Mn €)	19 170	64 934	72 366	23 033
Revenues (Mn €)	12 448	33 145	62 623	49 015
CAGR Revenues 5Y	-4,31%	1,08%	-3,04%	69,93%
EBITDA (Mn €)	3 835	9 629	15 531	2 689
CAGR EBITDA 5Y	1,43%	4,76%	0,52%	16,12%
Net Income (Mn €)	801	3 601	2 610	1 823
Total Assets (Mn €)	42 947	122 518	163 453	57 810
Debt (Mn €)	29 200	75 300	121 096	42 233
Equity (Mn €)	13 078	47 218	42 357	15 577
Profitability Ratios				
EBITDA Margin	28,02%	28,32%	19,80%	-1,06%
EBIT margin	15,90%	17,15%	10,55%	-2,56%
Profit margin	6,43%	10,89%	4,17%	3,72%
ROE	9,76%	9,18%	7,32%	2,28%
ROA	2,00%	2,62%	1,18%	2,50%
Capital Stucture Ratios				
Net Debt/Equity	109,58	95,68	122,43	49,8
Net Debt/EBITDA	3,78	4,45	6,12	2,88
Liquidity Ratios				
Current ratio	1,06	0,82	0,83	1,08
Quick ratio	0,54	0,58	0,55	0,49
Cash ratio	0,39	0,22	0,19	0,14
Credit Rating				
Credit Rating (Fitch)	BBB	BBB+	A-	BBB

Figure 5
EBITDA by operating segment (2020)



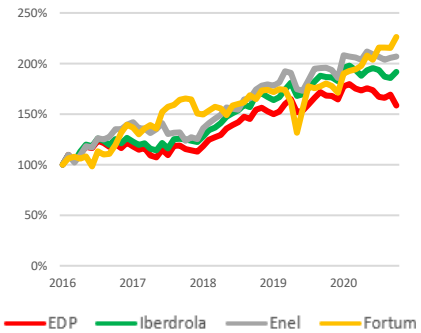
Source: EDP, Enel and Iberdrola reports

Figure 6
EDP 's Net Debt / EBITDA evolution (2018-2020)



Source: EDP reports

Figure 7
EDP's Peer Comparison Shareholders' Return



Source: Bloomberg

In Portugal, EDP is the largest producer and supplier of electricity whilst in the Iberian Peninsula is the third largest. We chose Fortum as one of EDP's peers because of its market capitalization, since it has a similar value to EDP. Then, Enel and Iberdrola, that despite having a significantly higher market capitalization, operate in the same regions as EDP, making them good comparables in this aspect. Moreover, it is one of the leaders in renewable energy production, with a higher percentage of electricity produced from renewables than almost all its peers (EDP has 66% of its EBITDA coming from the renewables segment, whilst Enel and Iberdrola have 26% and 25% respectively). It is also the eleventh largest European electricity company, regarding market capitalization.

As we can observe from the figure 4, in terms of Revenues and EBITDA, EDP is still quite behind its peers, since it does not have the size of any of them It has, except when compared to Enel, a higher Debt / Equity ratio than the others. It shows the lowest growth rate in revenues and EBITDA, which can be explained partially by a negative foreign exchange impact coming from the operations in Brazil.

Regarding liquidity ratios, in 2020, EDP's current ratio was 1.06, which represents the proportion of current assets compared to current liabilities, meaning EDP would be able to easily meet its short-term obligations. The quick ratio was 0.54 and the cash ratio 0.39. Even though both these figures are below 1, we can state that EDP is in a strong liquidity position, especially when compared to its peers, since it has higher values in almost all the comparisons.

Furthermore, EDP was able to reduce its net debt to EBITDA ratio compared to its peers. This excess debt was in a way preventing EDP from showing a sharper growth, what we believe will be shown in the next few years. It has also the same credit rating as Fortum, and a lower one than Enel and Iberdrola (one and two grades below, respectively), according to Moody's.

The company has also the best return on equity among its peers, a very positive sign for investors. However, despite having a significative lower value of total assets that the rest, the return on assets shows a slight lower value than the majority of the others.

On a final note, we can observe a good performance from each of these analyzed companies, in regard to the return given to shareholders, as we can observe in figure 7. However, among the four companies, EDP is still the one that presents a worse performance in this caption, with the main focus going to Fortum, which since 2019 was able to surpass the other ones.

Shareholder's structure

EDP has a total of 3 965.7 Mn shares outstanding, from which 54.31% are owned by institutional investors. Regarding the ownership type, 44.46% of the shares are owned by investment advisors (companies that manage investor's assets), 26.08% by Corporations and 8.66% by Individual investors. To what concerns the geographical distribution of the ownership, the United States and China dominate, with 28.37% and 24.96% of the shares belonging to entities from these two countries, respectively. 8.66% of the shares are owned by entities with unknown locations, and after that come the counties in Europe, with France, Luxemburg, Norway and Portugal having the most notable position in this geographical distribution.

Figure 8
Shareholder's structure

Shareholder	% Shares
China Three Gorges	19,03%
BlackRock Inc	7,33%
Oppidum Capital	7,20%
Norges Bank	2,95%
Vanguard Group Inc	2,32%
Sonatrach Group	2,19%
Qatar Investment Authority	2,09%
Credit Agricole Group	2,00%

Source: EDP reports

Looking at the company's ownership structure, a few names stand out due to their more influent position. Firstly, there is China's statal energy company, China Three Gorges International, EDP's bigger shareholder, with over 754 Mn shares, correspondent to 19.03% of the company's equity. The Chinese giants bought a 21% stake of the company back in 2011 by 2.7 Bn euros, with a 53.6% premium related to EDP's share price at the time. Later, in the beginning of this year (2020), the company sold 2.52% of EDP, equivalent to 100 Mn shares, for a total price of 534 Mn euros. They are a very strategic partner to EDP, having made significant investments in several of EDP's projects of up to 2 Bn euros which was crucial for the company's development in the renewables department and also provide a credit facility of up to 2 Bn euros (This credit facility was important for EDP due to the lack of access for credit in 2012, enhancing EDP's Balance Sheet). Next, there is the world's biggest asset management company, BlackRock Inc, with a position of 7,33%, with over 290 Mn shares. Finally, finishing the top three shareholders, there is Oppidum Capital, the Spanish investments holding company, who owns about 285 Mn shares, giving them a 7.2% stake in the company.

China Three Gorges International (CTG)
Is a Chinese energy company an the leader on hydropower generation, operating in 47 countries with 89 ongoing international contracts and investments throughout the world. CTG has a total installed capacity of 124GW, a total of 35000 employees and a total of $120 Bn on its assets portfolio. The Group specializes in the development of renewable sources in China and overseas.

After these three, other sounding names come up, such as Norway's central bank, Norges Bank, with a 2.95% position; the Vanguard Group, an American investment adviser company, that has a stake of 2.32%; the Sonatrach Group, Algeria's statal oil company, with 2.19%; Qatar Investment Authority, the sovereign wealth fund of Qatar, also owns a 2.09% stake in EDP; and finally, Crédit Agricole Group, the French bank and one of the biggest ones in Europe, who has 2% of the shareholder´s equity. With this, none of the shareholders has a majority position on the company, and therefore does not have a controlling position on the company's operation.

Macroeconomic analysis

On what regards the macroeconomic analysis on the energy sector, it is our belief that the four main regions where EDP has a bigger presence deserve a more extensive analysis, being this four Portugal, Spain, Brazil and the United States of America.

However, firstly, we should have a look into a more general context of the sector. The energy sector is in a transition state. Since its beginning, the main sources of energy were non-renewable energy sources, such as oil, natural gas and coal. This led, as we now know, to an overconsumption of these resources and to a major climatic impact, contributing to the global warming crisis we are now facing, as well as troubles with energy poverty and energy security. Nevertheless, with the crescent knowledge we started having, aligned with the raising awareness around this subject, we are now forced to find alternatives and to make changes in our energy production process. One of the measures that contributed the most to the need for this transaction was the consensus to keep the global warming increase to 1.5º until 2050.

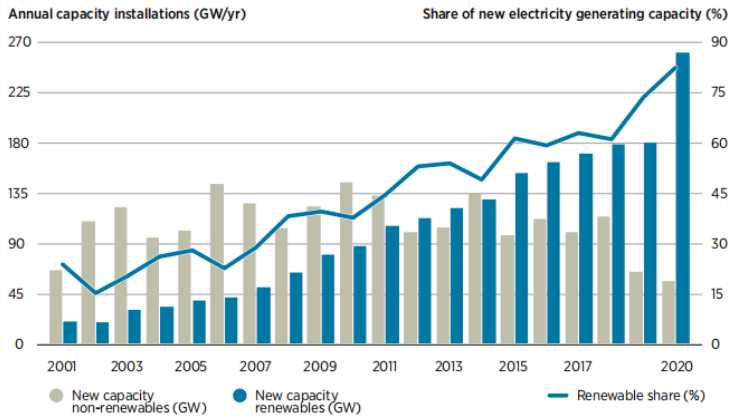
Figure 9
World Electricity Generation Breakdown by Source

Year	1990	2000	2010	2020
Coal	38%	38%	40%	35%
Gas	16%	18%	22%	23%
Nuclear	17%	17%	13%	10%
Oil	9%	8%	5%	4%
Renewables	20	19%	20%	28%

Source: Our World in Data

This being, in the latest years, renewable energy sources have become more and more popular and we are seeing an effort from energy production companies to follow this trend, with big investments being seen in solar, wind and hydro, and in the last seven years, the annual increase in the energy grid was more from renewable power than from fossil fuels and nuclear energy combined (in 2020, the renewable grid added globally was over four times the capacity added from other sources (Figure 10), with a record of 260 GW of renewable generation capacity added). This also contradicted the effect of the pandemic, which affected negatively almost all supply chains worldwide EDP is no exception. In fact, over 66% of its energy supplied coming from renewable sources. Overall, from 2010 to

Figure 10 – Share of new electricity capacity, 2001-2020 (Source:IRENA World's Energy Transition Outlook)



2020, the share of renewable sources in electricity generation increased from 20% to 28%, with this trend being expected to increase even more.

Renewables are increasingly the lowest cost sources of electricity in many markets

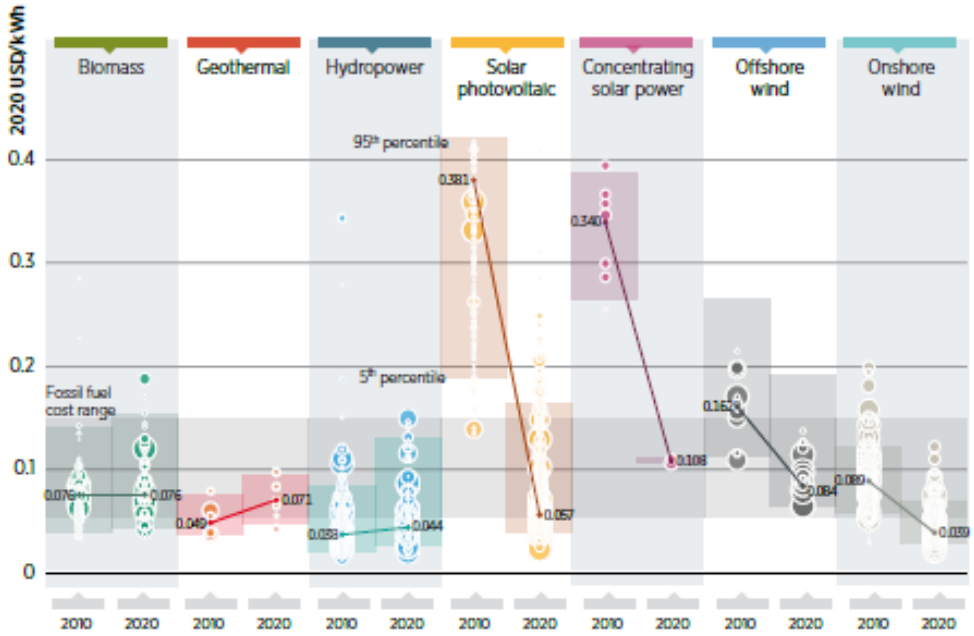
This is leading to the renewable sources becoming the cheapest form of energy, generating another incentive for the investment in these forms of energy. Considering newly commissioned projects, the global weighted average LCOE (levered cost of energy) of utility-scale Solar PV fell by 85% between 2010 and 2020, from USD 0.381/kWh to USD 0.057/kWh. This is a precipitous decline. At one time more than double the cost of the most expensive fossil fuel fired power capacity, utility-scale solar PV can now compete with the cheapest new fossil fuel fired capacity. On the last decade, the average cost of onshore wind generated electricity decreased by 56% (from USD 0.089/kWh to USD 0.039/kWh). Lastly, for the offshore wind, the global weighted average LCOE of newly commissioned projects declined from USD 0.162/kWh in 2010 to USD 0.084/kWh in 2020, a reduction of 42% in ten years. Falling technology costs continue to affect auctions, where new record-low prices continued to emerge even amid the global pandemic. For example, in July 2020, Portugal saw a USD 0.0135/kWh bid for solar PV.

The LCOE (Levelized Cost of Energy) is an economic measure of the costs of generating electricity throughout the lifetime of a generating facility

$$\text{LCOE} = \frac{\text{sum of costs over lifetime}}{\text{sum of electrical energy produced over lifetime}}$$

The cost of fossil fuel fired power generation varies by country and fuel is an estimated range between USD 0.055/kWh and USD 0.148/kWh.

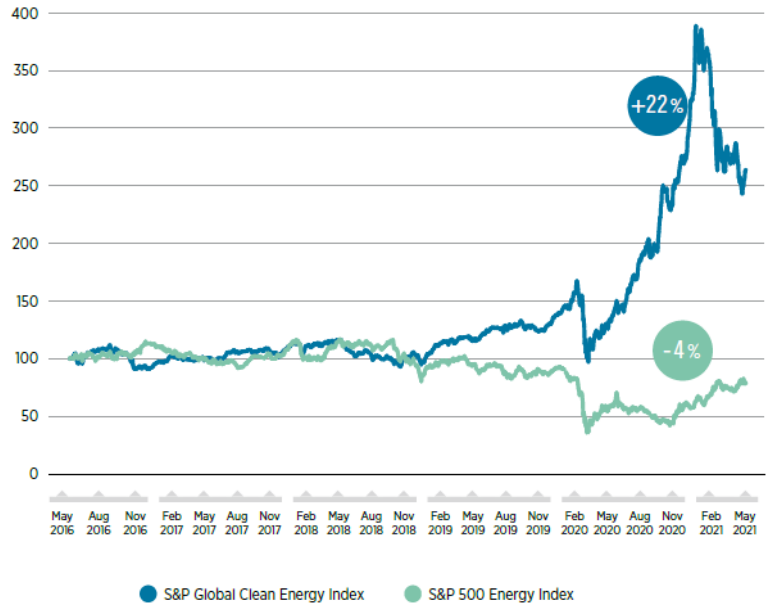
Figure 11 – Global LCOE of newly commissioned renewable power generation technologies, 2010-2020 (Source:IRENA World's Energy Transition Outlook)



This changing trend of the energy market is also creating opportunities for investors, and a moving trend for the opportunities created by renewable sources

of energy is already being showed. Even with the pandemic, the value of clean energy stocks showed a significant appreciation. When comparing the S&P indexes for clean energy (S&P Global Clean Energy Index) and for fossil energy (fossil-fuel-heavy S&P 500 Energy Index), we can see that in the last five years, the first one showed a 22% increase in value, whilst the second one was down 4%. The investment in these clean energy sources hit an all-time record in 2020, reaching USD 524 Bn, being the most on renewable energy technology.

Figure 12 – New energy vs old energy:S&P Global clean Energy and Energy Indices (Source:IRENA World's Energy Transition Outlook)



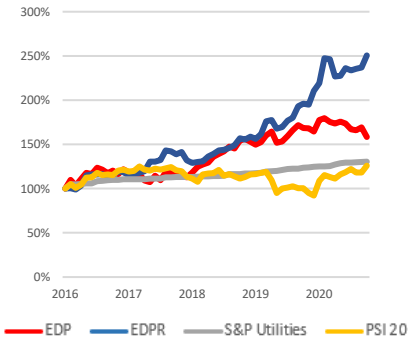
Another area that is fomenting the energy sector is the transportation industry. Being one the main industries which uses fossil fuels, it is also under great pressure to join the transition to clean sources of energy, and electricity-powered cars are becoming more and more a reality throughout the world, as policy makers also start to encourage this usage.

Now, one of the problems caused by this increase in the demand for variable renewable energy is its supply, not only related to the installed capacity, but also other matters related to the process of generating and distributing energy such as the storage. A series of measures are being implemented worldwide to address this. Several technological advances have been made in developing the storage capacity of the batteries, as well as more efficient grids (such as smart grids, a development of grids that uses IT to monitor and optimize the supply of energy). Another increasingly searched technology for the sector are virtual power plants (cloud-based plants which aggregates different energy resources from several different sources in order to effectively provide power). The market for this

technology is expected to grow at a CAGR of 27.2% until 2027, when it should reach the value of USD 2.85 Bn.

Finally, and regarding the shareholders' return EDP is generating, as we can see in Figure 13, the company has been performing quite well, surpassing both the Index of the Portuguese largest companies, PSI20, and the S&P500 Utilities Sector Index. More specifically, EDPR, the subsidiary that controls EDP's renewables sector, is showing an even higher return that the whole group. This means that in the analysed interval, shareholders would be better off investing in EDP than in either one of the two indexes.

Figure 13: EDP and EDPR shareholders' return vs. PSI20 and S&P500 Utilities Sector Index



Source: Bloomberg

Now, as mentioned above, we shall look to a more geographic perspective, starting with Portugal, EDP's main market. In 2020, operations in Portugal represented 39% of the company's EBITDA, a significant portion. The country was severely hurt by the COVID pandemic, with a 5.1% decrease in the GDP in 2020. Nevertheless, the projections are good and the country is expected to start recovering right in 2021, with the financial help coming from the European Union. The country's energy market is a very liberalized one, with the free market representing 94% of the total. One thing to account in Portugal are the high taxes when compared with the average of the European Union. Despite this, and according to Eurostat, the final energy prices are only slightly higher than the average of the European Union, which might represent a lower profit margin for the industry's companies. Regarding the natural gas market, it is also almost fully liberalized, with 98% of it being consumed in the free market, being that most of the country's consumption of it comes from the outside, being imported. As in most other countries, Portugal offers incentives for the production of energy from renewable source. These incentives come mostly on the form of feed-in tariffs, which is a long-term mechanism which guarantees energy producers an above market price for the energy produced, giving them a return for every MWh produced. The inflation rate is expected to be around 1.5% in 2022 and 1.2% in 2023, according to the econometric models.

Regarding the Spanish market, in 2020 it contributed to 17% of EDP's EBITDA. It is, similarly to Portugal, a very liberalized market, especially in the generation and commercialization phases of the process. The final energy prices in Spain in 2021 were slightly higher than in Portugal, therefore also above the EU average, however the taxes are lower, meaning the companies operating in the country might benefit from better margins, when compared to Portugal. Here, the public incentives for the production of renewable energy are quite the same as in Portugal, with a premium paid so as to compensate the shortfall up to a contracted return.

There are two main types of renewable support mechanisms: ***Tarif-Based Instruments*** *and* ***Quantity-Based Instruments. The Feed-in Tariff is an example of Tarif-Based instrument.***

"The number of countries with renewable policies has grown significantly. With that, the number of auction schemes have increased from 16 in 2010 to 143 in 2020, leading to a significant decrease of the renewables average selling price" ***- Source IRENA World Energies Outlook***

With the pandemic, the country's GDP suffered a 10% decrease, meaning a significant economic loss and the country's inflation rate was 2.24% in 2021, with the projections estimating this rate to be around 1.6% for the following years.

Now concerning the Brazilian market, it works on a different way from the rest of them. The energy distribution's operating model is a centralized one, as National Organizations are responsible for controlling the plants' generation level. Expectedly, this can cause the industry's players some setbacks when expanding however, EDP has already approved plans for an expansion in transmission lines, which will allow them to increase their market share in the country.

Similarly to the rest of the world, 2020 was a difficult year for the Brazilian economy, with its GDP suffering a decrease of 4.06%. This is expected to start recovering in 2021 with a 5.23% increase, with this increase to stabilise around 2% by 2023. Regarding the inflation, 2021 marked a high growth in it, with the rate being of 7%. It is expected be around 5% in 2022 and after that stabilize in around 3%. The market accounted for 16% of EDP's total EBITDA.

Finally, looking at the United States. Here, the market is much higher than in any of the other countries, with several more players. Despite representing 20% of EDP's EBITDA, the company's market share is only of 3.2% (in 2020). It is following the trend of dropping the usage of fossil fuels, with the coal usage already dropping by half, which creates opportunities for companies like EDP, which are already with a main usage of renewable sources of energy.

Since Joe Bidden has been elected, USA had re-joined the Paris Agreement meaning that it joined the plan to achieve 100% clean energy and net-emission by 2050, with a $2 trillion plan. For EDP, this election was also favourable for its shareholders. When he was announced president, the share prices of EDP and EDPR increased 2.47% and 3.86% respectively (while with Trump election EDP had lost 15% of its Market Cap).

Moreover, it is one of the countries that offers the most incentives to move to greener forms of energy. Their primary programs are PTC, ITC and MACRS, which have a role in allowing the accelerated depreciation of certain major equipment components over a five-year period. Another stimulus is the implementation of RPS, on which utilities must demonstrate that a given percentage of the energy supplied in a specific area is generated through renewable sources, which are already mandatory in most states. Furthermore, there are the income tax incentives. The federal government of the United States has been implementing these measures, more specifically by giving tax credit per kWh of electricity generated through renewable sources and also ITC reductions of up to 40% of the

PTC *(Production Tax Credit),* ***ITC*** *(Investment Tax Credit) and* ***MACRS*** *(Modified Accelerated Cost Recovery System) are the tax incentives that the US government uses to support renewable energy projects. It has been strong in the last few years and EDP has been benefiting significantly from it.*

RPS *(Renewable Portfolio Standards) require that a given percentage of the electricity supplied by a utility is generated through renewable sources*

capital invested in projects related to renewables. Given the US' size and previous climate incentives (in which under Trump's Presidency the share of renewables in electricity has remained at 11%), we anticipate that President's Biden new investment plan will have a higher impact than the European green deal, since EDPR has an appealing exposure to US renewables. We estimated that the United States will account for roughly (34%) of the EDPR's assets by the end of 2030 (vs 9% in 2020). As a result, the recent renewal of the PTC, ITC and Biden's plan should clearly benefit EDP.

With the Covid pandemic, the country faced a 3.41% decrease in the GDP, but with the projections expecting an increase of almost 6% in 2021 and stabilizing on around 2% growth from 2023 onwards. The inflation in the country is also showing an increasing trend, motivated by the interventions of the federal reserve and the low interest rates, and expected to increase around 2.5% annually from 2021

Generation Estimation

Figure 14 – Electricity Generation per Region (Source: Our World in Data and Enerdata - EnerOutlook 2050)

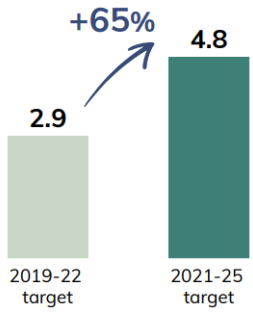
(In TWh)	2015	2020	2025	2030	2035	2040	2045	2050
World	**24 327**	**26 482**	**29 955**	**33 708**	**37 410**	**41 056**	**44 563**	**47 722**
Europe	3 803	3 916	4 016	4 260	4 486	4 657	4 786	4 913
Asia-Pacific	10 528	12 548	15 090	17 429	19 704	22 022	24 194	25 911
Africa	800	840	980	1 229	1 542	1 902	2 294	2 720
Middle-East	1 112	1 206	1 378	1 637	1 849	2 015	2 213	2 480
North America	4 979	4 981	5 166	5 431	5 664	5 947	6 229	6 458
Latin America	1 349	1 400	1 639	1 948	2 265	2 537	2 805	3 205
CIS	1 531	1 476	1 586	1 674	1 799	1 876	1 941	2 035

Figure 15 – Share of renewables Generation per Region (Source: Our World in Data and Enerdata – EnerOutlook 2050)

	2015	2020	2025	2030	2035	2040	2045	2050
World	**23%**	**28%**	**30%**	**33%**	**37%**	**41%**	**45%**	**51%**
Europe	34%	38%	44%	47%	52%	54%	56%	60%
Asia-Pacific	20%	25%	26%	30%	34%	38%	44%	48%
Africa	18%	22%	27%	30%	34%	39%	46%	51%
Middle-East	2%	3%	6%	8%	14%	25%	36%	44%
North America	21%	26%	29%	34%	40%	43%	46%	62%
Latin America	52%	69%	69%	69%	69%	68%	67%	66%
CIS	16%	19%	20%	21%	21%	23%	25%	26%

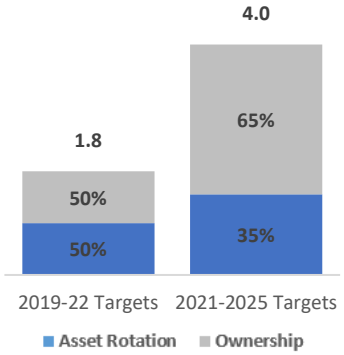
Based on Enerdata's forecasts and "Our World in Data", we created a model to see not only EDP's market Share but also how the Electricity Market is going to change in order to meet the Paris Agreement (the 1.5ºC target). This will require an adoption of more and more renewable sources for the generation of electricity, and a consequent reduction of the usage of fossil fuels.

Figure 16
Evolution of EDP's Yearly Capex



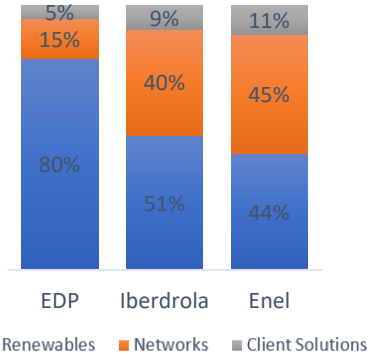
Source: EDP Strategy Update (2021-25)

Figure 17
Expected Yearly Gross Additions (comparison to last strategic update) (GW/yr)



Source: EDP Strategic Update (2021-25)

Figure 18
CAPEX targets by segments (2020-25)



Source: EDP, Enel and Iberdrola's Reports

Looking at this figure we can see that EDP is much more focused on delivering a growth on renewables, than Enel and Iberdrola.

Considering the forecasted increase in the demand of electricity, by 2050, electricity generation almost doubles compared to 2020, with renewables supplying more than 50% of total electricity, up from 28% in 2020. To meet this target, no additional new coal units should be built, and the phase-out of existing ones must start now. And here, EDP stands on a good position. Being one of the companies in the industry with the most % of electricity generation coming from renewable sources, we can say it is well positioned for this transition.

Strategy of EDP

EDP's aim is to be at the forefront of the energy transition while also providing better value to shareholders. EDP presented a new strategic update for the period 2021-2025 in February 2021 in order to realize this ambitious objective. Three strategic axes support the plan: (1) accelerated and sustainable growth; (2) future-proof organisation; and (3) ESG excellence and attractive returns. This strategy is further supported by EDP's commitment to decarbonisation and sustainability pursuant to its 2030 vision of having 100% electricity generated from renewable sources.

1. Accelerated and sustainable growth

EDP announced at the strategic update a €24 Bn investment plan for the period of 2021-2025, reinforcing its position as a leader of the energy transition. EDP intends to significantly increase its annual investments, targeting approximately €4.8 Bn per year in CAPEX for the period 2021-2025, a 65% increase in comparison with the previous target for the 2019-2022 period (Figure 16). To accelerate growth and enable a less capital-intensive growth model, EDP's asset rotation strategy (targeted at €8 Bn for the period 2021-2025) will be linked with the planned sale of majority shares in selected renewable assets.

In line with EDP's objective to reinforce its distinctive "green" positioning and low risk profile, nearly 95% of capital expenditure is expected to be allocated to regulated and long-term activities with a focus on renewables (approximately 80% of total CAPEX) and networks (approximately 15% of total CAPEX) (Figure 18). In geographical terms, most of the investment is targeted to the Europe and North America whereas Latin America and Asia would have approximately 20% of the CAPEX allocated (Figure 19).

EDP is a pioneer in the field of renewable energy and has a proven track record. EDP is one of the major wind power operators in the world, according to its estimate of wind generation numbers from top wind manufacturers, with 12.2 GW of wind and solar installed capacity as of 2021. This position is the result of excellent

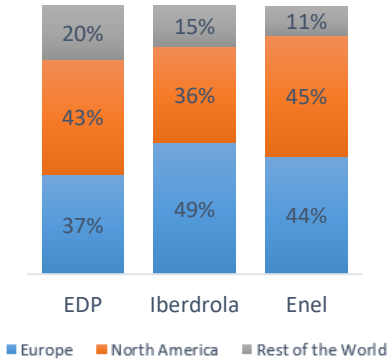
operational performance, which includes asset availability, cost, and load factors, among other things.

EDP has 19.3 GW of renewable installed capacity in 2021, with 7.1 GW of hydro power (in Iberia and Brazil) and 12.2 GW of wind and solar electricity (mostly in Europe and the United States). EDP now generates around 66 % of its power from renewable sources, up from 20 % in 2005. EDP aims to add 20 GW of renewable power to the grid by 2025, with a concentration on Wind Onshore (62%) and Solar PV (28%), as well as Wind Offshore (10%). As November 2021, around 41% of the projected capacity expansions, which are scheduled to be completed by 2025, have already been secured through PPAs (1), feed-in tariffs, or other long-term agreements.

EDP's wind offshore portfolio strategy is to construct projects in collaboration with other market players in order to diversify its risk exposure to this technology. In January 2020, EDP and Engie formed "Ocean Winds," a 50-50 joint venture for the construction of fixed and floating offshore wind turbines. The new company, which combines EDP and Engie's offshore assets, has two projects in operation with a combined capacity of 0.5 GW and another 3.2 GW under construction and in advanced stages of development. This firm is EDP's and Engie's exclusive investment vehicle for offshore wind opportunities across the world, through its subsidiary EDP Renováveis. EDP intends the joint venture to become a significant worldwide leader in the industry, combining both firms' industrial competence and research and development capabilities.

Networks are also an important part of EDP's expansion plan. EDP sees networks as critical enablers of the energy revolution, as well as a reliable source of long-term cash flow. EDP is always looking for ways to increase network efficiency while maintaining great service quality. Networks are being modernized and digitalized as part of these efforts to meet the difficulties of the energy transition, which necessitate smarter grids to support a rising weight of intermittent renewable power and real-time demand management. The acquisition of Viesgo, which was completed in December 2020, is a key driver of growth in this segment because it expands EDP's presence in electricity distribution in Spain, with nearly 700,000 customers and a 32-thousand-kilometer network, perpetual licenses, and regulatory visibility until 2025, strengthening EDP's business risk profile by increasing EDP's exposure to regulated networks. Another important driver of investment in networks in the short term is the growth in the transmission segment in Brazil. As June 2021, EDP had invested 3,9 Bn Brazilian Real on eight transmission lines, representing 80% of the total estimated investment.

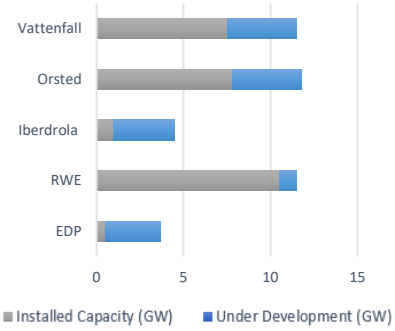
Figure 19
CAPEX targets by Region (2020-25)



Source: EDP, Iberdrola and Enel Reports

(1) Power purchase agreement (PPA) is a contractual agreement between energy buyers and sellers. They come together and agree to buy and sell an amount of energy which is or will be generated by a renewable asset. PPAs are usually signed for a long-term period between 10-20 years.

Figure 20
Wind Offshore's developers installed Capacity



Source: Vattenfall, Orsted, EDP, eports

Looking at this figure EDP is well behind comparing with other market players.

Regarding the client solutions and energy management, EDP focuses on active portfolio management allowing for generation hedges with customers as well as between renewables and thermal assets. EDP also aims to provide value to its nearly 9 Mn customers by increasing service quality and offering new creative solutions that match their demands while also speeding up the energy transition, such as decentralized solar and e-mobility solutions.

Delivering on these growth ambitions while keeping a strong financial profile and completely dedicated to a good investment grade rating (BBB) is a key aspect of EDP's strategy. EDP's financial policy is to improve the visibility of free cash flow production over the medium term, with tight financial criteria guiding investment decisions, timely project execution, and a risk-managed development plan.

EDP's portfolio includes a large number of operations that are either long-term contracted or regulated. As a result, its revenues are reliant on the outcome of government and other regulatory decisions. To mitigate its regulatory risk, EDP maintains constant interaction with regulatory authorities to guarantee correct and proper regulatory treatment, including the amount of returns EDP obtains on capital used in conjunction with its fully regulated network activities.

Some of EDP's operations are exposed to liberalized markets, which are vulnerable to changes in energy demand, supply, and pricing in both EDP's core markets and linked overseas markets. EDP uses an integrated generation and supply model to reduce its exposure to these sources of volatility, as well as a hedging strategy that aims to enable it to secure pricing for a significant portion of its fuel needs, as well as electricity and gas supply, in the liberalized markets for a period of 12 to 18 months.

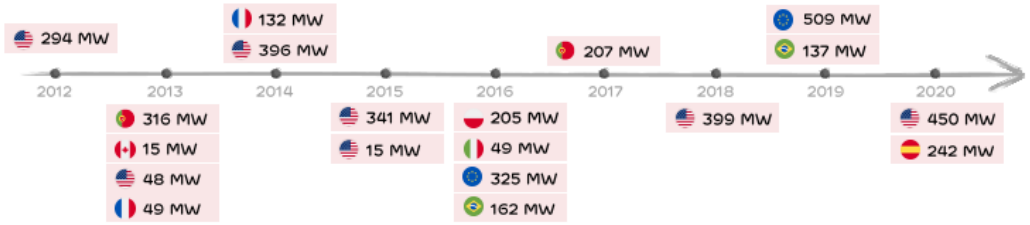
Asset Rotation Strategy

Up until 2018, the asset rotation plan operated on a lesser scale, with only minority holdings being sold. Following that, EDP ramped up its operations and is currently concentrating on selling majority holdings. Since 2012, 19 asset rotation agreements have been completed, totalizing 4.3 GW and €5.5 Bn in revenues, with €2.3 Bn coming in the previous two years. These sorts of deals have become a fundamental component of EDP's recurrent business plan after nine years, and EDP expects to keep executing them.

Between 2021 and 2025, EDP expects to profit €8 Bn through asset rotation agreements. It's worth noting that, although the business had previously expected to sell around half of its gross additions through asset rotation, it now aims to sell 40% in 2021-23 and 30% in 2023-25, accelerating its ownership of the properties it keeps. According to the management team, some of these assets have long-term

strategic value, and this strategy will enable the company to achieve scale and synergies related to its growing fleet, such as turbine procurement and technical and operational know-how. The asset rotation approach is based on upfront value crystallization in order to support organic growth and produce greater value without significantly increasing capital utilized. We feel that EDP has been able to profit from asset rotation since a running wind park is deemed more valuable in its early phases. The project's kick-off, timely completion of the building phase, and the power purchase agreement are the main risks connected with the creation of new wind parks. Because EDP carries these risks, the market is ready to pay a higher price for early-stage projects, allowing EDP to carry out asset rotation and reinvest the proceeds in new initiatives.

Figure 21: Timeline of EDP's asset rotation deals (Source: EDP's Strategy Update)



Reinforcing EDP's low risk profile

By growing contractual exposure (targeting more than 85 % of EBITDA) and maintaining EBITDA weight in the European and North American markets (approximately 80 %), EDP hopes to strengthen its portfolio while keeping their low-risk profile. EDP went through the process of selling non-strategic assets to achieve this (Figure 22). EDP's exposure to hydro volatility was reduced as a result of the sale of six hydro plants, which improved financial leverage. Because the purchase was made at a higher EV/EBITDA multiple than the industry average (14.4x vs 10.9x), we feel it was advantageous to shareholders. Furthermore, the earnings were utilized to partially support investments in wind and solar projects, while EDP retained its 5.1 GW installed capacity in hydro generation in Portugal. Furthermore, the sales of the two CCGT power plants and the B2C energy supply firm were meant to realign the portfolio in accordance with the strategic strategy, with the gains being used to partially support the acquisition of Viesgo, further increasing the business risk profile.

Figure 22 : EDP's Disposal deals from Non-strategic Assets (Source: EDP's Strategic Update)

Date	Facility	Market	Capacity	Amount
Dec-19	Six hydro plants	Portugal	1689 MW	€2.2 Bn
May-20	Two CCGTs power plants	Spain	843 MW	€515 Mn
	B2C energy supply business	Spain	NA	

EDP has already raised €2.7 Bn from asset sales, much above than the €2 Bn EDP has already raised €2.7 Bn from asset sales, much above than the €2 Bn objective set for 2019-2022. Both agreements complement EDP's new aim of less than 45 % (EBITDA) exposure to Iberia by reinforcing the company's low risk profile and the importance of regulated and long term contracted activities on EBITDA. These agreements also helped EDP achieve one of its long-term goals: The **Road to Carbon Neutrality**.

What this means is that EDP has met all of its disposal objectives for 2022 two years ahead of schedule, and while the current contracted exposure is still below the target (70 % vs 85 % of EBITDA), we assume that EDP would meet its 2025 targets.

2. Future-proof organisation

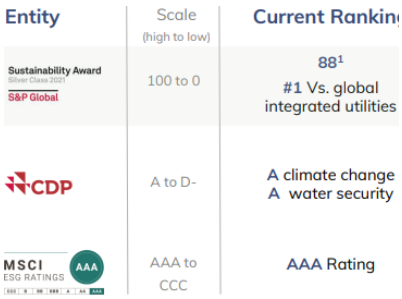
EDP is preparing for accelerated and sustained growth by focusing on becoming a more global, agile, and efficient organization, as well as improving decision-making processes and simplifying organizational structure, to meet the targets presented at the strategic update for the period 2021-2025.

With a €2 Bn investment through 2025, EDP is pursuing an innovation and digital transformation strategy aimed at increasing organizational efficiency and adopting new technologies at various stages of the value chain. It aspires to become a global leader in innovation, primarily via venture capital and entrepreneurial investments, the creation of an open innovation ecosystem, and the delivery of innovative solutions in four core areas: clean energy, storage and flexibility, smarter grids, and client solutions. The digitization of processes, the zero-based budgeting (a type of budgeting in which all spending must be justified for each new period) and synergies from the Viesgo purchase in Spain are all part of EDP's operational expenditures reduction initiative, which seeks to save €100 Mn by 2025.

3. ESG Excellence and attractive returns

EDP is dedicated to providing attractive returns through a long-term dividend policy based on a target distribution of 75 to 85 % of recurring net profit, with a dividend floor of €0.19 per share that allows for future dividend increases in accordance with sustainable earnings per share growth. But, having a pay-out ratio so high, could lead to a potential increase in leverage pressure for the EDP's goal, since EDP is trying to maintain its level of debt but at the same time is having an aggressive approach when it comes to its growth on Renewables (Figure 24). Furthermore, EDP is focused on delivering values to shareholders through a sustainable business model which is dedicated to and has reported in compliance

Figure 23
EDP's ESG recognition from top tier institutions



Source: EDP's Investors Presentaion

Figure 24
Dividend per share and payout ratio from EDP and two peers

	DPS	Payout Ratio
EDP	0.19	75%-85%
Enel	0.33	70%
Iberdrola	0.40	65%-75%

Source: EDP, Enel and Iberdrola reports

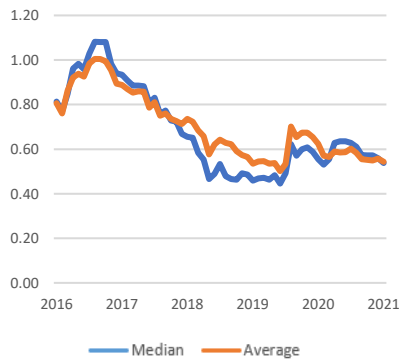
We can see that EDP has the highest Pay-out Ratio, meaning that it will have a lower amount of money to invest from its earnings.

Figure 25 : EDP's Peers for Beta estimation

EDP
Iberdrola SA
Naturgy Energy Group SA
Enel SpA
The Southern Company
RWE AG
Renewables
Albioma SA
Edoardo Raffinerie Garrone (ERG SpA)
Brookfield Renewable Partners LP
Encavis AG
Falck Renewables SpA
Networks Iberia
Red Electrica Corporacion
Enagas SA
Terna
Networks Brazil
Cemig
CPFL Paulista
Engie Brasil Energias SA
Eletrobras

Source: Analyst's estimates

Figure 26: Rooling Beta EDP



Source: Analyst's estimates

Figure 27 – Bloomberg's Beta Estimation

Linear Beta	Range 1
Raw BETA	0.958
Adjusted BETA	0.972
ALPHA (Intercept)	0.265
R^2 (Correlation^2)	0.582
R (Correlation)	0.763
Std Dev of Error	2.779
Std Error of ALPHA	0.273
Std Error of BETA	0.080
t-Test	11.924
Significance	0.000
Last T-Value	1.557
Last P-Value	0.939
Number of Points	104
Last Spread	5497.19
Last Ratio	0.001

Source :Bloomberg

**Financial Literature: "Valuation: Measuring and Managing the Value of Companies, McKinsey & Company"*

with the UN Global Compact Principles since 2003. EDP has endorsed nine of the 17 Sustainable Development Goals (SDGs) since 2015, and in 2018, it pledged to adopt the Taskforce on Carbon-related Financial Disclosures recommendations until 2022. In this respect, EDP has committed to setting a CO2 emission reduction target that is compatible with what climate science deems required to keep global warming below the Paris Agreement's most stringent threshold. EDP intends to be coal-free by 2025 and have 100 % renewable power by 2030 as part of its decarbonization strategy. These goals were accepted by the Science Based Target Initiative (SBTi), an organization that examines and verifies firms' actions for a low-carbon economy while combating climate change.

Valuation

As for valuation, in line with the strategy presented, we separated the EDP operating business into three segments, Renewables, Networks and Client Solutions and Energy management, separating Networks between Iberia and Brazil, since EDP has different growth perspectives for these two different geographies, but also it has different regulations and risks. For the valuation methodology we used the Discounted Cash Flow method to value the core operating segments, and for the non-operating segments we used their book value.

Starting from the risk-free estimation, since the market is currently under low interest rates as of Central Banks intervention through quantitative easing, we estimated our risk free as a proxy of a 10 Year German Bond, since are the ones with the lowest credit risk and we choose this maturity since it matches the duration of our cash flows. Regarding the Expected return of the market, as proposed in the financial literature, it is believed that a 5 % return is appropriate. We assumed this value of market return for all the segments except for the Networks Brazil we assumed 7% since it's a market with high volatility (This value was obtained from the expected return from the MSCI Brazil ETF (EWZ)).

As indicated in the recommended financial literature*, computing the cost of equity is highly complex. The Capital Asset Pricing Model (CAPM) was used for this estimation. We picked some of the company's peers (Figure 25) for the estimation of each operational segment beta, and because this value cannot be directly seen, we regressed each peer's stock last 60 month returns against a well-diversified market portfolio such as the MSCI World Index to estimate each raw beta (Figure 26). To undo the effect of leverage, we used Franco Modigliani and Merton Miller's theories and used each company's Market Debt-to-Equity ratio, focusing only on the operating risk, and calculating the industry unlevered beta by computing the median and mean of the unlevered betas, before releveraging the industry beta of EDP's

target debt-to-equity ratio. As previously said, determining the equity beta is an inaccurate procedure. It is advised that the company's 60 Month unlevered beta be plotted to check if beta is moving in a predictable manner and if the present beta is the greatest predictor of future beta for the industry. However, because the raw beta measured differs significantly from the raw beta predicted by Bloomberg, we've made an adjustment because the equity beta was too low (Estimated 0.45 vs Bloomberg 0.958). If this change was not done, our WACC would be too low in comparison to the Energy Industry's average WACC, overvaluing our model.

*Formula Cost of debt = [Yield to maturity – Probability of Default * Loss Given Default*]

Regarding the cost of Debt, EDP's credit rating is BBB and Baa3, according to S&P and Moody's respectively. We used an EDP bond that is issued and is outstanding in the market, with a maturity of 5 years and cash flows in Euros, to discover an appropriate approximation to the yield to maturity, reaching a figure of 1.01%. The annualized likelihood of default and loss given default were estimated using data provided by Moody's (0.36% and 40% respectively). Using the formula proposed in the financial literature*, we ended up with a cost of debt of 0.79%. Finally, we calculated as market value for each part of EDP's capital structure, bringing the D/E closer to the industry average (75 %), which we believe is EDP's aim. It's worth mentioning that less riskier divisions have larger leverage ratios.

*Formula WACC = (D/EV*Cost of Debt*(1-Corporate Tax Rate) + E/EV*Cost of Equity*

Figure 28: WACC Calculation (Source : Analysts' estimates)

	EDP	Renewables	Networks Iberia	Networks Brazil	CSEM
Rf	-0.27%	-0.27%	-0.27%	-0.27%	-0.27%
E(Rm)	5.00%	5.00%	5.00%	7.00%	5.00%
MRP	5.27%	5.27%	5.27%	7.27%	5.27%
Cost of Equity (Re)	6.89%	6.81%	3.85%	9.23%	6.89%
Cost of Debt (Rd)	0.79%	0.79%	0.79%	0.79%	0.79%
D/EV	0.43	0.43	0.43	0.43	0.43
E/EV	0.57	0.57	0.57	0.57	0.57
Target D/E	0.75	0.75	0.75	0.75	0.75
Corporate Tax Rate	29.50%	29.50%	29.50%	29.50%	29.50%
WACC Corporate Tax	**4.36%**	**4.31%**	**2.62%**	**5.69%**	**4.36%**
ROIC	5%	5%	4%	12%	3%

To access if Capex is actually creating value for the company, we should compare the segments ROIC to their cost of capital. Looking at Figure 28 we can see that all the segments are creating value, except for the CSEM segment. This could be explained as the impact of the hedging strategy since we expect a significant reduction of this operation mainly due to the decrease/cease of production from non-renewable sources.

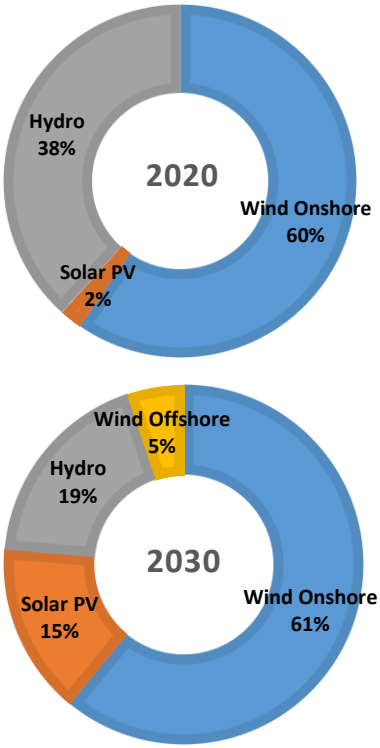
Figure 29 – SOTP Valuation

	€Mn	Per Share
Renewables	**31 806**	8.02
Networks Iberia	9 073	
Networks Brazil	6 613	
Networks	**15 686**	3.96
CSEM	**1 875**	0.47
EV	**49 367**	**12.45**
Net Debt	**-17 453**	-4.40
Non-Operating Items	**-1 599**	-0.40
Minorities	**-6 312**	-1.59
Equity Value	**24 004**	**6.05**
Shares (M)	**3 966**	
Dividends		0.17
Actual Share Price		**4.75**
Return		**31%**

Regarding the growth estimation we computed the growth rate as the ROIC*Retention rate since the energy market is increasing more than the GDP and we assume that it will have the same trend in the long term.

After having our model's cash flows and growth rate stabilized (in 2030), with the DCF method we obtained an Enterprise Value for each segment, which summed accounted for €49,367 Mn. After subtracting the Net Debt, the minority interests and the Non-operating Items using it's Book Value, we ended up with an Equity Value of €24,004 Mn and a Share Price of €6.05, with a potential upside of 31% (Figure 29).

Figure 30 – Evolution of EDP's Renewable Sources share (Source: Analyst's Estimates)



Source: Analysts' estimates

Figure 31
EDP's Installed Capacity evolution (MW)

	2020	2025	2030
Wind Onshore	11 103	20 644	23 437
Solar PV	378	3 466	5 929
Hydro	7 126	7 126	7 126
Wind Offshore	0	640	1 975
Total	**18 607**	**31 876**	**38 467**

Source: Analyst's estimates

Renewables

In 2020, the Renewables division accounts for 66% of EDP's EBITDA. EDP has a considerable market share in Europe, North America and Brazil (Figure 33). Its Renewable energy portfolio includes Hydro, Wind and Solar technologies. Wind and Solar accounts for 62% of EDP's renewables portfolio in 2020, but based on our study, it will account for a larger % in 2030, since EDP is focused on boosting its installed capacity in this area (Figure 31).

Wind and Solar

The Wind and Solar businesses have as the main drivers the Installed capacity, Load factor and the Average selling price.

Installed Capacity

Regarding the installed capacity, the renewable energy market has been growing every year and presents quite optimistic prospects. As referred in the Strategy of EDP, it aims to add 20 GW of installed capacity until 2025 and 30 GW from 2025 to 2030 with an average ownership of 65%. From 2025 to 2030, we didn't go in line with the expected growth presented in the Strategy update 2021-2025, since we want to maintain a healthy balance sheet with the same credit rating for EDP. This assumption could be explained with EDP's main pillar of keeping EDP's value to shareholders (Impacts on leverage are further explained on the risk analysis).

This expansion ended up increasing the installed capacity by 172% until 2030 (at a CAGR of 11%), focusing mainly on the expansion in North America, Europe and the entrance in the Asian Market with the acquisition of Sunseap, while reducing the exposure to Iberia. Additionally, this expansion will also change the

portfolio of renewables, reducing the weight in hydro, maintaining the weight in Wind Onshore, and Increasing the weight in Wind Offshore and Solar (Figure 30).

Figure 32
EDP's Installed Capacity evolution (Wind and Solar) in MW

	2020	2025	2030
Portugal	1 207	2 049	2 658
Spain	2 137	2 428	2 428
Rest of Europe	1 443	3 047	4 462
North America	6 258	11 967	13 526
Latin America	436	2 647	2 767
Asia	0	2 611	5 500
Total	**11 481**	**24 750**	**31 341**

Source: Analysts' estimates

Figure 33
EDP's Renewables Market Share Evolution

	2020	2025	2030
Portugal	19.06%	29.93%	37.06%
Spain	5.73%	6.90%	6.61%
Rest of Europe	2.82%	6.25%	9.57%
North America	3.25%	5.49%	5.10%
Latin America	1.74%	7.13%	6.21%
Asia	0.00%	0.18%	0.39%

Source: Analysts' estimates

Load Factor

When it comes to energy production, one of the most essential considerations is the Load Factor, which will define the performance and have a direct influence on the production of wind and solar energy. To understand how the load factor will change over time, we must first define what it depends on. As a result, the load factor is an output design that is not wholly dependent on wind intensity and turbulence, because for a turbine with a 30-year lifespan, weather changes will eventually average out. The design of the blades also influences wind generation, typically, a high load factor is linked to blade length (The longer the blades, the better). It is, nevertheless, inextricably tied to rotor size and hub height. However, there are two other factors that have an impact on power generating levels: maintenance and power storage.

It is subject to improvement as an engineering measure, just like any other technology, and the industry's evolution is substantial with yearly advances. According to IEA data, the load factor of wind onshore improves by 0.5 % every year, whereas wind offshore increases by 0.2 %. Since EDP is rapidly increasing its installed capacity with new projects, these new projects are projected to have a greater load factor than older ones, resulting in lower O&M costs because turbines will require less maintenance.

Figure 34
Evolution of Average Load Factors

	2020	2030 E	CAGR
Portugal	25%	32%	3%
Spain	23%	31%	3%
Brazil	29%	31%	1%
Rest of Europe	22%	28%	2%
North America	32%	32%	0%
Latin America	0%	38%	NA
Asia	0%	32%	NA

Source: Analyst Estimates

Regarding the Solar PV load factor, since EDP in 2020 doesn't have that many projects. We obtained the load factors from the Irena report 2020 and although solar load factors have the potential to improve, since historically the evolution of Solar load factors was insignificant, we assumed to be constant in the future.

Looking at the Figure 34, most of the average load factors increased, except for North America. This was mainly caused by the increase of the Solar PV portfolio in this country (Solar PV has a lower load factor comparing with Wind load factors 19% vs 32% (Average Load Factors in the US in 2020)).

Selling Price

"The number of countries with renewable policies has grown significantly. With that, the number of auction schemes have increased from 16 in 2010 to 143 in 2020, leading to a significant decrease of the renewables average selling price" **- Source IRENA World Energies Outlook**

Tenders and auctions are becoming more common in the renewable energy sector. Countries can ensure that they can meet their clean energy objectives in the most effective way possible while maintaining competitive pricing in this way. This not only lowers the expense of assistance that governments must still pay in some circumstances, but it also allows them to track technological advancements. We anticipate that auctions will continue to grow in popularity, resulting in more

competitive prices, which, along with a lower LCOE, will lower the average selling price in the long run.

Regarding the selling price estimation, we assumed a correlation between LCOE and average auction price, since we are in a competitive market (As costs decreases, average auction selling prices also decreases), and based on the IEA report 2020 it's expected a decrease in the LCOE at a CAGR of 1.8% until 2030, but this decrease is only applied on EDP's new projects. Looking at the average selling prices for each country we can see that some of them are increasing, and others are decreasing. The ones that are increasing it's mainly due to a low number of new projects and it's not coping with the inflation. The Countries that are decreasing its selling price it's mainly due to having more new projects.

Figure 35
EDP's List of Countries with Auction Based systems.

Country	Auction Based
Portugal	Yes
Spain	Yes
France	Yes
Poland	Yes
Romania	No
Italy	Yes
Belgium	No
Grece	Yes
US	Yes
Canada	No
Mexico	Yes
Brazil	Yes

Source: EDPR handouts

Figure 36: Wind and Solar's average selling price (Source: Analysts' estimates)

Average price (€/MWh)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Portugal	90	88	86	87	87	88	89	90	91	91	92	93	94
Spain	106	107	102	103	100	98	100	102	103	105	107	109	110
France	132	132	82	84	85	86	87	88	89	90	92	93	94
Belgium	106	0	47	48	48	49	50	52	53	54	55	56	57
Poland	73	48	46	47	47	48	50	51	51	53	54	55	57
Romania	63	42	40	41	42	43	44	45	47	48	49	50	52
Italy	204	134	127	128	129	130	132	133	135	137	139	140	142
Hungary	0	0	0	0	0	55	57	59	60	62	64	66	68
Greece	0	0	0	0	46	45	46	47	48	49	50	50	51
UK	0	0	0	0	0	47	48	49	46	47	48	49	50
North America	40	40	30	27	26	25	25	24	24	24	24	24	23
Brazil	40	47	45	48	49	50	52	48	50	52	53	55	57
Colombia	0	0	0	0	0	45	46	47	49	50	52	53	55
Chile	0	0	0	0	0	0	0	0	42	44	45	46	48
Asia	0	0	0	35	35	35	34	34	34	33	33	33	33

Hydro

To begin with, as part of EDP's strategy of portfolio optimization and low risk profile, since Hydro is a capital-intensive technology with long lead times for development and construction due to the significant feasibility assessments, planning, design and civil engineering work required, the company recently sold six hydro facilities in Portugal and seven mini hydro facilities in Brazil to decrease hydrological risk. As result management says it has no plans to build or sell any additional hydro plants in the near future.

The load factor of Hydro depends mostly on the hydro conditions of each year, and it is very volatile, given the unpredictability of this source of energy (in the last 3 years the load factor varied from 15% to 40%). As a result, since properly forecasting the load factor is challenging, we computed the generation (Figure 37)

Figure 37
Hydro Generation Estimation (GWh)

	2020	2025	2030
Portugal	12 571	14 176	16 095
Spain	677	1 112	1 262
Brazil	5 543	3 378	4 015

Source: Analysts' estimates

as a market share of generation from the model we've made based on Enerdata's forecast of electricity generation by source.

Finally, in terms of average selling price (Figure 38), most of the hydro generation in Iberia is sold in the liberalized market, exposing it to both price and volume risk, whereas in Brazil, the majority of EDP's hydro generation is contracted with long-term PPAs, reducing price risk, and only a small portion is sold in the liberalized market. First, since we couldn't find any information on the average selling price, we concluded that it was linked to the prices collected from Wind and Solar sources. Secondly, because we're getting the same average selling prices in Iberia and Brazil, we anticipated that the price would only fluctuate due to inflation. Our reasoning is that, while climatic challenges may have a major influence over short periods of time, they are projected to average out over time.

Figure 38
Hydro Average Selling Prices

(€/MWh)	2020	2025	2030
Portugal	62.1	66.0	71.1
Spain	62.1	66.7	72.4
Brazil	62.1	77.6	90.4

Source: Analysts' estimates

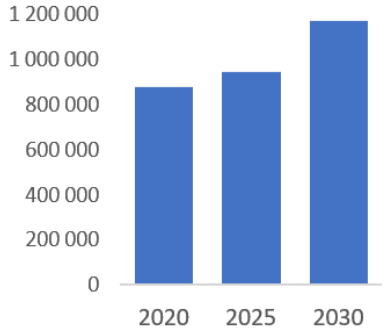
Valuation

The increase in installed capacity at EDP is predicted to result in a large rise in EBIT in 2030 (+42%). Based on the aforementioned assumptions, NOPLAT is predicted to grow at a CAGR of 3.7 %. Nonetheless, the FCF is predicted to drop sharply until 2025 as a result of EDP's ambitious CAPEX strategy for Wind and Solar, but it is expected to rebound from 2027 onwards. Using the computed WACC for this sector (4.31%) and a perpetual growth rate of 2.2 %, we projected the value of this section to be €31,806 Mn.

Figure 39: Renewables' valuation (Source: Analysts' estimates)

Renewables *(In Million €)*	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
EBIT	1 765	1 468	1 632	1 764	1 762	2 098	2 104	2 145	2 260	2 383	2 514
Income taxes on EBIT	-461	-386	-430	-464	-464	-552	-554	-565	-595	-628	-662
NOPLAT	**1 304**	**1 081**	**1 202**	**1 299**	**1 298**	**1 545**	**1 550**	**1 580**	**1 665**	**1 756**	**1 852**
Depreciation	850	792	825	919	1 037	1 067	1 361	1 469	1 512	1 556	1 599
Operational Cash Flow	2 154	1 874	2 027	2 218	2 335	2 613	2 910	3 050	3 177	3 311	3 451
Change in Net Working Capital	38	399	30	56	-27	271	1	-25	-28	-33	-37
Net Capex Investment	-814	-1 431	-2 795	-3 406	-1 688	-7 250	-3 653	-2 380	-2 423	-2 466	-2 509
Change in Other Assets and Liabilities	39	14	-12	-14	-7	-23	-17	-9	-9	-10	-10
Unlevered CF	**1 417**	**855**	**-750**	**-1 145**	**612**	**-4 389**	**-759**	**636**	**717**	**803**	**895**
@Wacc	4.31%	4.31%	4.31%	4.31%	4.31%	4.31%	4.31%	4.31%	4.31%	4.31%	4.31%
Levered EV			**31 806**	34 322	35 189	41 096	43 626	44 869	46 087	47 270	

Figure 40: Networks' EBITDA evolution



Source: Analyst's estimates

Networks

The networks department incorporates the activities concerning the electricity distribution in the Iberian Peninsula and in Brazil, as well as the transmission activities in Brazil. The distribution is generally regulated through concessions and licenses, and due to its high level of regulation and extended time duration, it provides a stable long-term cash flow stream, as well as potential for increase, following the energy transition the industry is facing. During the year of 2020, EDP managed to distribute 76 272 GWh of electricity to over 11 000 supply points. Note that currently, EDP's does not include

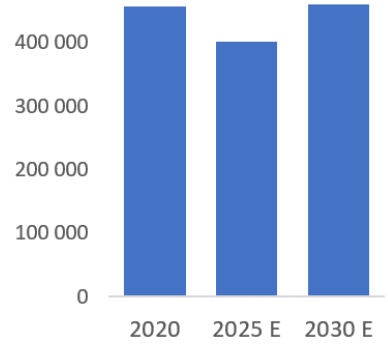
gas distribution, which was discontinued back in 2017. In the three countries on which this segment operates, the revenues are determined by a remuneration framework based on regulatory asset base, by which regulators approximate the amount of money that a distribution network company invests in the infrastructures and gives a return on that same investment. These investments are allowed by the regulating authorities and a benchmark is used for the cost of the investment, which may be outperformed or underperformed. This makes the revenues less dependent on the demand, however, in Brazil, the demand it still plays a role in determining the remuneration. In 2020, the EDP's RAB totalized €6 Bn (which represented a 9% increase compared to the previous year), from which 76% came from the Iberian Peninsula and 24% from Brazil.

Figure 41: Networks' electricity distribution (Source: Analysts' estimates)

Electicity distributed (GWh)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Portugal	46 059	45 666	44 143	45 625	44 555	45 229	45 593	45 578	46 249	46 808	47 321	47 903	48 455
Spain	9 360	8 262	7 559	8 435	8 458	8 488	8 546	8 583	8 686	8 793	8 896	9 000	9 105
Brazil	25 007	25 591	24 421	25 275	26 111	26 946	27 782	28 617	29 696	30 775	31 854	32 934	34 013

To what concerns this segment, the company's Revenues and EBITDA have been stable for the last few years. In 2020, it totalized 877 Mn euros, which represents roughly 22% of the company's total EBITDA, being that from the networks EBITDA, about 52% comes from the operations in Portugal, 18% from Spain and 30% from Brazil, representing the overseas operations a significant part of the segment. In the last year, it had a slight decrease, however we expect it to have a significant rise until 2030. This rise will be due to, on one hand, the consolidation of market share in Portugal and, on the other hand, the forecasted expansion in Brazil, on which the Return on the Regulatory Asset Base is higher than in Portugal (and expected to rise even more), and where EDP is also expected to increase its market share in the coming years as well as complete the installation of several more transmission lines. Contrarily to this, the company's operations in Spain are expected to remain the same on this segment, with its EBITDA increasing only slightly throughout the years, which is due to, similarly to Portugal, the increase in the RAB.

Figure 42
Networks' Portugal EBITDA evolution



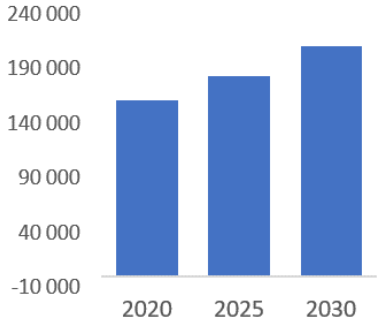
Source: Analyst's estimates

Portugal

To what concerns Portugal, specifically, EDP has secured long term distribution contracts, which leads us to believe that the Portuguese RAB will not suffer any major changes, with EDP keeping its big market share stable. The concession for distribution of high and medium voltage of electricity (which accounts for about 60% of the Portuguese RAB) belongs to EDP until 2044. Regarding low voltage electricity, despite the concession ending in 2022, considering the leadership position that EDP has in the Portuguese electricity market, it is assumable that this concession will be renewed

without major risks. With this said, our projection is that the RAB will remain stable, while the return on RAB should suffer a decrease. This because the government bonds on which the RoRAB is based (10-year bonds) are expected to keep their very low levels, of near 0, since a change of Portugal's rating is not projected for the near future.

Figure 43
Networks' Spain EBITDA evolution



Source: Analyst's estimates

Spain

To complete the Iberian market, we must also look at Spain. Here, the first thing to mention is the acquisition of Viesgo, the Spanish energy company. This will result in a considerable increase of the RAB considering the investment made. After that, similarly to the Portuguese one, it should remain stable for the coming years. Now, the RoRAB should keep a stable value at least until the new regulatory period, which will occur in 2026. By then, we believe it will decrease slightly to 5%. Its EBITDA, which only accounts for 18% of the total networks EBITDA, is expected to keep constant levels over the next years, considering that there are no major expansion plans for this geographical area.

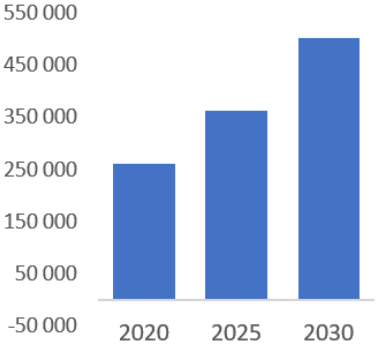
Figure 44: Networks' Iberia valuation (Source: Analysts' estimates)

Networks Iberia *(In Million €)*	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
EBIT	317	310	201	206	216	225	235	247	260	272	285
Income taxes on EBIT	-84	-81	-53	-54	-57	-59	-62	-65	-68	-72	-75
NOPLAT	233	229	148	152	159	166	173	182	191	201	210
Depreciation	299	307	348	341	346	349	349	354	358	362	366
Operational Cash Flow	532	536	497	493	505	515	522	536	549	563	577
Change in Net Working Capital	100	-297	-436	18	-15	-10	-3	-17	-15	-14	-15
Net Capex Investment	-51	-2 081	-414	-294	-378	-368	-350	-389	-389	-390	-398
Change in Other Assets and Liabilities	-41	-5	12	0	0	0	0	0	0	0	0
Unlevered CF	540	-1 846	-341	218	112	137	169	130	146	158	163
WACC	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%	2.62%
Levered EV			**9 073**	9 199	9 304	9 379	9 495	9 598	9 691	9 782	

Brazil

Now, looking at the Brazilian market, the system is slightly different. Despite still following the RAB model, if the energy contracted is below 105% of the actual demand, electricity companies can charge the costs to the costumers, through tariffs. However, if the energy contracted surpasses 105% of the actual demand, the companies must support these costs themselves. This means that, contrarily to the Iberian market, in Brazil, demand plays a key role in EDP's accounts. However, considering that EDP has captive consumers and has been working hard on their service quality, it is not expected that its demand will decrease in the coming years and therefore its energy contracted should not surpass the 105%, meaning the company should not have to support those costs itself. Both the EBITDA and the gross profit are expected to show a significant rise, mostly due to the expansion the company has projected for the country. The other factor for this rise is the expected increase in the RAB, caused by the recognition of value-added investments, which aligned with a stable return on RAB, will lead to a very significant increase in the allowed EBIT.

Figure 45
Networks' Brazil EBITDA evolution



Source: Analyst's estimates

Finally, on what concerns the transmission business, as was mentioned before, EDP was allowed the concession for the installation of five more transmission lines in Brazil, with an initial investment of R$3.1B. These new lines are expected to take two to three years to become operational (unless an unusual situation, such as a new Covid outbreak, happens and the installation stops). This expansion, aligned with the low interest rates in Brazil (which result both from the country's economic environment and from an effort of the government to potentiate the economy after the Coronavirus pandemic), allow EDP to finance this project at a low cost, which will reduce the cost of the company's debt and, consequently, its WACC, so that the ROIC will become even higher compared to the cost of capital than it is already. With this, the EBITDA should grow until the full operationalization of the new transmission lines and, after that, its growth should stabilize.

Figure 46: Networks' Brazil valuation (Source: Analysts' estimates)

Networks Brazil *(In Million €)*	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
EBIT	282	185	204	222	240	258	277	299	323	347	373
Income taxes on EBIT	-75	-48	-54	-59	-63	-68	-73	-79	-85	-91	-98
NOPLAT	207	137	150	164	177	190	204	221	238	256	275
Depreciation	69	75	72	78	80	83	86	88	91	95	98
Operational Cash Flow	275	212	222	242	257	273	289	309	329	351	373
Change in Net Working Capital	-65	-21	-10	-27	-23	-23	-24	-29	-30	-31	-33
Net Capex Investment	-245	-485	-128	-108	-111	-113	-116	-127	-131	-134	-137
Change in Other Assets and Liabilities	-16	0	2	1	1	1	1	1	1	1	1
Unlevered CF	-51	-294	86	107	124	137	151	154	169	186	204
WACC	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%
Levered EV			**6613**	6865	7119	7373	7640	7906	8169	8431	

Valuation

On an overall perspective, the Networks segment of EDP should present a steady growth throughout the next ten years, catalyzed by the investment the sector will have. We expect it to show a 10% increase in the EBIT until 2030. To what regards the FCF, it is predicted to show the same steady growth, which together with the computed WACC leads us to project a value of €15,686 Mn for this section of the company.

Client Solutions and Energy Management

Client Solutions and Energy Management accounted for 48.5% of EDP's revenues but only for 11.6% of its EBITDA in 2020, owing to a drop in profitability in Thermal Generation, which is attributable mostly to the rising of commodity prices, impacting the segment's Gross Margin. This segment was split into two parts: Thermal generation and Supply.

Thermal Generation

Concerning this segment, we considered the main drivers as the electricity generated from each source, and the spreads from each source based on our achieved baseload.

In Iberia, thermal generation is a liberalized activity, and it includes the generation of Nuclear, CCGT and Coal. In Brazil, on the other hand, Thermal generation have a PPA for remuneration according to technical availability. For simplicity reasons we assumed all the thermal generation working as a liberalized activity.

Generation

Figure 47: Thermal net electricity generation (Analyst's estimates)

Thermal net electricity generation (GWh)	2018	2019	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
Portugal	**12 340**	**10 026**	**7 623**	**6 311**	**5 331**	**5 237**	**5 118**	**5 534**	**4 619**	**3 704**	**2 789**	**1 831**	**872**
CCGT	4 091	5 838	5 653	5 514	5 204	5 110	4 991	4 793	3 834	2 876	1 917	959	0
Coal	8 067	4 025	1 832	669	0	0	0	0	0	0	0	0	0
Cogeneration	182	163	138	127	127	127	127	127	127	127	127	127	127
Hydrogen	0	0	0	0	0	0	0	613	657	701	745	745	745
Spain	**8 512**	**8 805**	**7 779**	**6 459**	**5 353**	**5 349**	**5 446**	**5 271**	**4 311**	**3 351**	**2 391**	**1 432**	**472**
CCGT	1 242	4 346	4 107	4 068	4 244	4 319	4 496	4 401	3 521	2 640	1 760	880	0
Coal	5 948	3 129	2 403	1 202	0	0	0	0	0	0	0	0	0
Nuclear	1 196	1 223	1 196	1 116	1 037	957	877	797	718	638	558	478	399
Cogeneration	126	107	73	73	73	73	73	73	73	73	73	73	73
Brazil	**3 455**	**3 707**	**1 586**	**1 269**	**952**	**634**	**317**	**0**	**0**	**0**	**0**	**0**	**0**
Coal	3 455	3 707	1 586	1 269	952	634	317	0	0	0	0	0	0
Total Generation	**24 307**	**22 538**	**16 988**	**14 039**	**11 636**	**11 220**	**10 881**	**10 805**	**8 930**	**7 055**	**5 181**	**3 262**	**1 344**

Regarding our thermal generation from each source, we used our generation model from Enerdata to compute the market share for each source and estimate the generation until 2025. For CCGT we aligned the generation to EDP's strategy update, where it assumes that from 2030 onwards EDP electricity production comes only from renewable sources. For Coal Generation, EDP expects to reach 0 MW of installed capacity by 2025, but for Iberia it's expected to cease its operations in 2022. For the Nuclear generation, it is expected that the Spanish Nuclear plant that EDP has a participation in is going to be dispatched until 2035. Lastly, EDP is transforming a coal central in Sines to a Hydrogen Hub that will be introduced in 2025. Although producing electricity from hydrogen is costly, we are assuming that with the incentives that the EU is giving for the hydrogen transition and the capture of green hydrogen from renewable sources, the fuel cell production (electricity production from hydrogen) will have almost the same costs as producing electricity from renewable sources.

Baseload Estimation

Figure 48: Spreads (Source: Analyst's estimates)

Spreads (€/MWh)	2018	2019	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
Spark Spread	4.5	5.5	6.9	9.9	8.1	5.1	3.9	1.5	-0.5	-2.7	-5.2	-8.6	-16.7
Dark Spread	-3.5	-2.0	-1.0	-21.5	-15.4	-7.5	-6.4	-6.8	-6.6	-6.6	-7.0	-8.0	-13.7
Domestic Dark Spread	-10.5	-9.0	-8.0	-28.5	-22.4	-14.5	-13.4	-13.8	-13.6	-13.6	-14.0	-15.0	-20.7
Hydrogen Spread	5.7	-2.8	-7.7	1.3	2.7	2.5	4.4	5.2	6.5	7.6	8.5	8.6	4.0
Cogeneration Spread	34.4	26.0	21.1	28.0	27.2	24.9	24.6	23.2	22.4	21.4	20.1	18.0	11.3
Nuclear Spread	11.2	2.7	-2.2	4.7	3.9	1.6	1.3	0.0	-0.9	-1.9	-3.2	-5.3	-12.0
Final Baseload per MWh	**48.7**	**40.2**	**35.3**	**42.2**	**41.4**	**39.1**	**38.8**	**37.5**	**36.6**	**35.6**	**34.3**	**32.2**	**25.5**
EBITDA (Thousand €)	-40 314.1	17 610.6	27 366.5	12 755.3	29 834.4	21 137.2	17 391.9	9 281.0	1 961.4	-2 728.4	-4 625.1	-3 629.1	221.1

Thermal production, as we assumed, is sold in the liberalized market, in which several technologies offer their production at marginal cost and the last technology (the most expensive) to satisfy demand determines the price (Market clearing price) that all technologies which make up supply will receive. Here is interesting to distinguish between baseload prices and peak load prices. The first one is the price in the hours of the day when there is less demand, and it can be satisfied with technologies with a cheaper marginal cost (Renewables). The second one is the price when there is more demand and more expensive technologies satisfy the demand (Thermal Generation). Since EDP separates the revenues from renewables and thermal generation we are assuming as our Baseload the final price from the thermal generation. Since it's difficult to estimate the generation prices from nonrenewable sources, and the baseload price varies from day to day, we computed the average yearly baseload prices based on the generation from the nonrenewable sources at country level and not at EDP's level, since there are other players in this market, and there are other sources to produce electricity such as petrol sources. We are assuming the Iberian and Brazilian market as a whole for the Baseload estimation since we are using the commodity prices of the world market (Prices of the commodities do not change with geographical location). As for this estimation we obtained each commodity price and its generation and with that we obtained the average Baseload Price.

Figure 49
Evolution of CO2 Permits Prices

Source: Trading Economics

Looking at the Figure 48 we can see a downward trend for the Baseload estimation (at a CAGR of -3.19%). This is explained by the incentives for reduction of thermal generation due to the increase of the CO2 Licenses (Figure 49). We've made an aggressive approach for this estimation since we assume that thermal generation in the future would have a negative impact for companies' balance sheets, since governments are applying CO2 Licenses to reduce this production. Only Hydrogen and Cogeneration would have a positive outcome since are the only "renewable" sources on the thermal generation.

Regarding the thermal generation EBITDA, as expected, it has a significant reduction mainly due to the disposal of CCGT generation and the reduction of the Baseload price.

Supply

In 2020, the Supply division accounted for roughly 10.8% of EDP's EBITDA. To compute the EBITDA, we used the total amount of electricity and gas sold as well as EBITDA/GWh as drivers.

The EBITDA decline from 2020 to 2021 (-23.3%) in the Supply segment is mostly explained by the disposal of the B2C portfolio in Spain. Nonetheless, from 2021 onwards, we expect a steady increase at a CAGR of 2.02%. This is due to a growth in electricity per user (as a result of rising digitalization, according to our generation model), but the effect will be largely mitigated by energy efficiency gains and a minor drop in gas demand as renewable sources eventually replace fossil fuels. Furthermore, the increased penetration rate of novel energy solutions (26.1% in 2020) such as distributed solar and e-mobility services will contribute to an increase in consumer demand and, as a result, sales volume. As a result of an anticipated rise in demand to meet Brazil's economic and demographic expansion, the amount sold in Brazil Supply is expected to expand at a CAGR of 2%.

Figure 50: Electricity and gas supplies (Source: Analyst's estimates)

Electricity and Gas Supplied (GWh)	2018	2019	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
Portugal	21 973	21 990	21 389	21 250	20 283	20 491	20 566	20 794	20 539	20 240	19 924	19 609	19 283
Spain	27 249	27 295	23 128	24 279	24 431	24 594	24 797	24 971	25 237	25 509	25 776	26 047	26 320
Brazil	18 102	24 036	25 554	23 329	24 100	24 871	25 642	26 414	27 410	28 406	29 401	30 397	31 393
Total	**67 324**	**73 321**	**70 071**	**68 857**	**68 814**	**69 957**	**71 005**	**72 179**	**73 185**	**74 154**	**75 101**	**76 054**	**76 996**
EBITDA (Thousand €)	351 817	444 722	424 924	326 031	313 671	362 339	345 405	351 932	367 983	371 313	380 962	390 739	398 224

Valuation

The decline in depreciation, which more than covers the impact of the B2C disposal in Spain, is predicted to boost EBIT and NOPLAT by a large amount (+141 % and +139 %, respectively) in 2030. On the other hand, the FCF is expected to decline at a CAGR of -22.5 % from 2021 to 2030, as result the absolute amount of CAPEX converges to the value of depreciation (Because it is anticipated that all investments would be maintenance to compensate for the loss of value, Capex will equal depreciation). We assessed the value of this sector at €1,875 Mn using the computed WACC of 4.36 % and a growth rate of 1.12 % (provided by ROIC*RR, as previously stated ROIC is lower than WACC, this segment is destroying value to shareholders).

Figure 51: CSEM Valuation (Source: Analyst's estimates)

CSEM *(In Million €)*	2020	2021 E	2022 E	2023 E	2024 E	2025 E	2026 E	2027 E	2028 E	2029 E	2030 E
EBIT	2 318	1 835	2 145	2 283	2 350	2 709	2 771	2 839	2 998	3 167	3 354
Income taxes on EBIT	-605	-483	-565	-601	-619	-713	-730	-748	-790	-834	-883
NOPLAT	1 713	1 352	1 581	1 682	1 731	1 995	2 041	2 092	2 209	2 333	2 471
Depreciation	1 632	1 595	1 510	1 671	1 734	1 771	2 060	2 183	2 234	2 290	2 335
Operational Cash Flow	3 345	2 948	3 090	3 353	3 465	3 766	4 101	4 275	4 443	4 623	4 806
Change in Net Working Capital	-231	189	-18	-160	37	255	-85	-62	-110	-131	-134
Net Capex Investment	-3 095	-2 028	-3 651	-4 033	-2 445	-7 947	-4 450	-3 165	-3 227	-3 254	-3 308
Change in Other Assets and Liabilities	43	38	-11	-14	-7	-22	-17	-8	-9	-9	-9
Unlevered CF	62	1 147	-590	-853	1 049	-3 948	-450	1 040	1 097	1 229	1 354
WACC	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%
Levered EV			**1 875**	1 901	1 820	1 778	1 830	1 821	1 864	1 887	

Multiples Valuation

The degree of consistency between market and intrinsic valuation, which resulted in DCF was tested using multiple valuation. For this study, we compiled a list of firms that Bloomberg utilizes to calculate "Equity Relative Valuation." The multiples for EV/EBITDA, EV/EBIT, and P/BV were employed in this analysis. Since they yield share prices of 6.36 and 5.86, we can confirm our purchase recommendation based on this study. EDP is undervalued based on the DCF and Multiples valuation (Figure 52).

Figure 52
Multiples Valuation

Name	Ticker
EDP	EDP PL
Public Power Corp SA	PPC GA
BKW AG	BKW SW
Fortum Oyj	FORTUM FH
Verbund AG	VER AV
Iberdrola SA	IBE SM
SSE PLC	SSE LN
Enel Spa	ENEL IM
Endesa SA	ELE SM

Summary	EDP	Industry	EV (k€)
EV/EBITDA	3 655 223	10.92	39 906 625
EV/EBIT	2 145 484	16.78	35 998 868
Mean			**37 952 747**

Summary	EDP	Industry	EV (k€)
EV/EBITDA	3 655 223	10.11	36 954 302
EV/EBIT	2 145 484	16.60	35 612 467
Median			**36 283 384**

Summary	EDP	Industry	Equity (k€)
P/BV	10 159 208	3.56	36 152 559
EV/EBITDA	3 655 223	10.92	21 714 152
EV/EBIT	2 145 484	16.78	17 806 395
Mean			**25 224 369**

Summary	EDP	Industry	Equity (k€)
P/BV	10 159 208	3.23	32 814 243
EV/EBITDA	3 655 223	10.11	18 761 829
EV/EBIT	2 145 484	16.60	18 090 911
Median			**23 222 328**

	Share Price
P/BV	9.12
EV/EBITDA	5.48
EV/EBIT	4.49
Mean	**6.36**
Median	**5.86**

Source: Analysts' estimates

Sensitivity Analysis

In this section of the report, a sensitivity analysis was performed to some the variables that might suffer changes throughout time and affect the company's valuation. EDP is subject to a series of different risks, whether related to the commercial or to certain market risks.

1. Business activities risks

Firstly, there are the risks directly related to the company's business activities. Here are incorporated the possibilities of a decline in energy selling prices caused by unpredictable market conditions, as well as changes in the demand in any of the several countries EDP has business in. There is also the risk of a natural disaster, which would not only change the conditions on which renewable energy is produced, but could also compromise severely the company's property, plants and equipment. Finally, considering the sector EDP works on, it is highly dependent on laws and regulations related to safety, health or ESG, which can be changed in short periods of time, not giving the company much time to adapt.

2. Strategy related risks

Moving on to the strategy related risks, energy is an industry in constant technological development and, in recent times, it has been evolving a lot on this subject, meaning companies in the sector can easily stay behind competitors if they do not adapt quickly to these changes. It also depends a lot on partnerships

with third parties, such as in the frequent joint ventures in the business, which makes them somehow dependent on the decisions of others, which can sometimes not be the ones that benefit EDP the most. Also, by being an international company, present in many countries, it is always subject to increasing competition in any of them, which becomes harder to manage as more countries are added to the business.

3. Operational risks

Regarding operational activities, more risks are incurred. Being an industry highly reliable on connections, transmission lines and distribution through great areas, it can easily find delays in the process. Furthermore, by working with a lot of physical materials, this equipment in the power plants can have mechanical flaws, for example. The powerplants are also subject to accidents, on which both equipment and employees can be harmed and compromise the operational process.

4. Financial activities risks

Finally, we have the risks related to the company's financial activities. Being present in different countries across different continents, the company faces severe foreign exchange risks. The exchange rates fluctuations can have a negative impact on the company's performance. Moreover, being a company with high values of capital expenditures, there is the risk that it cannot fully finance these projects, whether due to lack of internal funds or by not managing to get external funding, which can be related to a change of credit rating, for example, another risk the company faces.

Sensitivity Analysis

Figure 53: Renewables installed capacity sensitivity analysis (Source: Analysts' estimates)

	Negative Scenario			Base Case	Positive Scenario		
Gross Aditions	24 443	27 499	29 027	30 554	32 082	33 610	50 000
Capex	24 000 940	27 001 058	28 501 117	30 001 175	31 501 234	34 651 357	56 704 513
Aditions/Capex	982	982	982	982	982	982	982
% of base case	80%	90%	95%	100%	105%	110%	164%
Share Price	**4.45**	**5.25**	**5.65**	**6.05**	**6.45**	**5.68**	**4.42**

In this analysis, firstly, we decided to look at an eventual fluctuation in the renewables installed capacity. Being that the energy in this segment mostly comes from hydro, wind or the sun, its output is somehow dependent on the meteorological conditions. For example, sunshine hours, wind intensity, stream flows or rainfall vary a lot both from the geographical location and the time of the year. Moreover, despite being "clean" sources of energy, there are still a lot of

restrictions on where to install them due to the fact that it also generates visual pollution and climatic concerns such as reduction of water flow.

This being, our analysis focused on a fluctuation of 5%, 10% and 20% on the downside, and 5%, 10% and 64% on the upside (this last one in order to achieve the target gross additions of 50 000). The conclusions were explicit: in each of the cases we could see a change in the share price. On the most important, the downside ones, the share price would decrease to 5,65€ and 5,25€ (on a 5% and 10% decrease in installed capacity, respectively) and in both of these cases our recommendation would keep being to buy. As stated before, we do not expect EDP achieving the strategy update gross additions to 2030 and looking into the sensitivity analysis for this scenario the Share Price would be 4.42 with a net debt of €44 156 Mn.

Figure 54: Networks' electricity distribution sensitivity analysis (Source: Analysts' estimates)

	Negative Scenario			Base Case	Positive Scenario		
Total Electricity Distributed (GWh)	577 507	721 883	802 093	844 308	886 523	975 176	1 121 452
% base case	80%	90%	95%	100%	105%	110%	115%
Share price	**5.26**	**5.66**	**5.86**	**6.05**	**6.25**	**6.45**	**6.65**

Secondly, we chose to perform a sensitivity analysis on the amount of electricity distributed through networks. The rationale behind this choice comes from another of the company's risks. Considering that EDP has a lot of their network business subject to licenses granted for a specific period in a specific location, and these licenses are very depended on the local legislation. This being, the licenses are subject to an unexpected early termination which can happen due to judicial proceedings or changes in regulations. Given the high initial investment that networks require, the premature termination of these contracts and licenses could have a major impact on the company's revenues.

Bearing this in mind, we performed the analysis considering an eventual 5%, 10% and 20% decrease in the electricity distributed through the networks department. These setbacks, even though it would result in a notable decrease in our share price estimation (from 6.05€ to 5.86€, 5.66€ and 5.26€, respectively), it would not, in any of the cases, change our final recommendation. The estimation, even in the worst-case scenario, would be considerably above the current price, making us recommend investors to buy.

Appendix

Financial Statements

EDP's Reformulated Income Statement (Thousand €)											
	2020	**2021 E**	**2022 E**	**2023 E**	**2024 E**	**2025 E**	**2026 E**	**2027 E**	**2028 E**	**2029 E**	**2030 E**
Core Business											
Revenues	12 448 205	11 981 020	12 449 476	13 552 194	13 580 628	14 240 124	14 991 459	15 398 696	15 959 169	16 588 724	17 226 546
COGS	-7 356 487	-7 202 168	-7 303 982	-7 893 274	-7 710 053	-7 716 348	-7 916 589	-8 007 961	-8 222 779	-8 484 726	-8 744 575
Gross profit	**5 091 718**	**4 778 851**	**5 145 493**	**5 658 919**	**5 870 576**	**6 523 775**	**7 074 870**	**7 390 735**	**7 736 391**	**8 103 999**	**8 481 970**
OPEX	-1 141 756	-1 347 957	-1 490 271	-1 704 492	-1 786 955	-2 044 427	-2 244 621	-2 368 067	-2 503 919	-2 647 492	-2 792 941
EBITDA	**3 949 962**	**3 430 894**	**3 655 223**	**3 954 428**	**4 083 621**	**4 479 348**	**4 830 249**	**5 022 668**	**5 232 472**	**5 456 507**	**5 689 030**
Depreciation	-1 631 831	-1 595 481	-1 509 738	-1 671 069	-1 733 852	-1 770 793	-2 059 546	-2 183 315	-2 234 200	-2 289 783	-2 335 011
EBIT	**2 318 131**	**1 835 413**	**2 145 484**	**2 283 359**	**2 349 768**	**2 708 555**	**2 770 703**	**2 839 353**	**2 998 272**	**3 166 723**	**3 354 018**
Adjusted taxes	-605 123	-483 303	-564 951	-601 257	-618 744	-713 220	-729 585	-747 661	-789 508	-833 865	-883 184
Core result	**1 713 008**	**1 352 110**	**1 580 533**	**1 682 103**	**1 731 025**	**1 995 336**	**2 041 119**	**2 091 691**	**2 208 764**	**2 332 858**	**2 470 835**
Non Core Business											
Financial Income	226 702	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921
Provisions	-112 093	0	0	0	0	0	0	0	0	0	0
Non Core Result Before Taxes	114 609	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921
Non Core Statutory taxes	-33 810	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292
Statutory taxes	0	0	0	0	0	0	0	0	0	0	0
OCI	-644 286	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634
Non Core Result	**-563 487**	**21 287**	**21 287**	**21 287**	**21 287**	**21 287**	**21 287**	**21 287**	**21 287**	**21 287**	**21 287**
Financing											
Financial Expenses	-897 326	-976 387	-967 837	-1 090 633	-1 154 547	-1 245 109	-1 327 253	-1 439 062	-1 474 089	-1 566 336	-1 603 876
Statutory taxes	264 711	288 034	285 512	321 737	340 591	367 307	391 539	424 523	434 856	462 069	473 143
Financing Result	**-632 615**	**-688 353**	**-682 325**	**-768 896**	**-813 955**	**-877 802**	**-935 713**	**-1 014 539**	**-1 039 233**	**-1 104 267**	**-1 130 732**
Comprehensive Result	**516 907**	**685 045**	**919 495**	**934 493**	**938 357**	**1 138 821**	**1 126 693**	**1 098 440**	**1 190 819**	**1 249 879**	**1 361 390**

EDP's Reformulated Balance Sheet (Thousand €)											
	2020	**2021 E**	**2022 E**	**2023 E**	**2024 E**	**2025 E**	**2026 E**	**2027 E**	**2028 E**	**2029 E**	**2030 E**
Net operating assets	3 784 616	4 488 495	4 568 476	4 842 344	4 753 242	5 041 708	5 131 224	5 146 838	5 204 002	5 272 462	5 336 732
Total Fixed Assets	26 191 649	26 623 801	28 765 071	31 126 965	31 838 528	38 015 220	40 405 220	41 386 755	42 379 104	43 343 192	44 316 673
Net other operating assets	144 695	110 255	123 285	138 258	146 356	170 129	188 507	198 705	209 314	220 407	231 878
Operating invested capital	**30 120 960**	**31 222 551**	**33 456 832**	**36 107 566**	**36 738 126**	**43 227 057**	**45 724 952**	**46 732 298**	**47 792 420**	**48 836 061**	**49 885 284**
Non-operating assets	2 926 801	2 715 760	2 715 760	2 715 760	2 715 760	2 715 760	2 715 760	2 715 760	2 715 760	2 715 760	2 715 760
Non-operating liabilities	4 486 454	4 314 408	4 314 408	4 314 408	4 314 408	4 314 408	4 314 408	4 314 408	4 314 408	4 314 408	4 314 408
Net non core Invested Capital	**-1 559 653**	**-1 598 648**	**-1 598 648**	**-1 598 648**	**-1 598 648**	**-1 598 648**	**-1 598 648**	**-1 598 648**	**-1 598 648**	**-1 598 648**	**-1 598 648**
Total invested capital	**28 561 307**	**29 623 903**	**31 858 184**	**34 508 918**	**35 139 478**	**41 628 409**	**44 126 304**	**45 133 650**	**46 193 772**	**47 237 413**	**48 286 636**
Net debt	15 482 898	15 404 430	17 452 746	18 518 861	20 029 502	23 728 193	25 593 256	26 177 517	27 716 263	28 342 448	28 971 981
Non-controlling interests	3 495 754	4 287 377	4 246 229	4 256 612	4 100 207	4 540 046	4 441 080	4 291 658	4 135 205	3 969 728	3 796 860
Common Shareholders' equity	**9 582 655**	**9 932 097**	**10 159 208**	**11 733 444**	**11 009 768**	**13 360 170**	**14 091 968**	**14 664 475**	**14 342 304**	**14 925 237**	**15 517 794**
Total funds reconciliation	**28 561 307**	**29 623 903**	**31 858 184**	**34 508 918**	**35 139 478**	**41 628 409**	**44 126 304**	**45 133 650**	**46 193 772**	**47 237 413**	**48 286 636**

EDP's Cash Flow Map (Thousand €)											
	2020	**2021 E**	**2022 E**	**2023 E**	**2024 E**	**2025 E**	**2026 E**	**2027 E**	**2028 E**	**2029 E**	**2030 E**
EBIT	2 318 131	1 835 413	2 145 484	2 283 359	2 349 768	2 708 555	2 770 703	2 839 353	2 998 272	3 166 723	3 354 018
Income taxes on EBIT	-605 123	-483 303	-564 951	-601 257	-618 744	-713 220	-729 585	-747 661	-789 508	-833 865	-883 184
NOPLAT	1 713 008	1 352 110	1 580 533	1 682 103	1 731 025	1 995 336	2 041 119	2 091 691	2 208 764	2 332 858	2 470 835
Depreciation	1 631 831	1 595 481	1 509 738	1 671 069	1 733 852	1 770 793	2 059 546	2 183 315	2 234 200	2 289 783	2 335 011
Operational Cash Flow	3 344 839	2 947 591	3 090 271	3 353 171	3 464 877	3 766 129	4 100 664	4 275 007	4 442 964	4 622 642	4 805 846
Change in Net Working Capital	-231 310	189 314	-17 574	-159 642	36 513	255 166	-84 985	-61 642	-110 315	-130 730	-134 031
Net Capex Investment	-3 094 932	-2 027 633	-3 651 008	-4 032 963	-2 445 415	-7 947 485	-4 449 546	-3 164 850	-3 226 549	-3 253 872	-3 308 492
Change in Other Assets and Liabilities	43 271	38 161	-11 292	-13 523	-6 624	-22 274	-16 584	-8 300	-8 620	-9 008	-9 287
Core Free Cash Flow	**61 869**	**1 147 433**	**-589 603**	**-852 957**	**1 049 352**	**-3 948 465**	**-450 450**	**1 040 215**	**1 097 481**	**1 229 033**	**1 354 036**
EBIT	114 609	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921	356 921
Income taxes on EBIT	-33 810	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292	-105 292
OCI	-644 286	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634	-335 634
Change in Non Core Invested Capital	3 265 561	38 995	0	0	0	0	0	0	0	0	0
Non Core Free Cash Flow	**2 702 074**	**-45 009**	**-84 004**	**-84 004**	**-84 004**	**-84 004**	**-84 004**	**-84 004**	**-84 004**	**-84 004**	**-84 004**
Unlevered Free Cash Flow	2 763 943	1 102 424	-673 607	-936 961	965 347	-4 032 469	-534 455	956 210	1 013 476	1 145 028	1 270 031
Tax Shield	264 711	288 034	285 512	321 737	340 591	367 307	391 539	424 523	434 856	462 069	473 143
Levered FCF	**3 028 654**	**1 390 458**	**-388 095**	**-615 225**	**1 305 938**	**-3 665 162**	**-142 915**	**1 380 734**	**1 448 332**	**1 607 097**	**1 743 175**
Financial Result before tax	-897 326	-976 387	-967 837	-1 090 633	-1 154 547	-1 245 109	-1 327 253	-1 439 062	-1 474 089	-1 566 336	-1 603 876
Change in Financial Debt	-2 060 817	-78 468	2 048 316	1 066 115	1 510 641	3 698 691	1 865 063	584 261	1 538 746	626 185	629 533
Change in Equity	-70 511	-335 603	-692 384	639 743	-1 662 033	1 211 581	-394 895	-525 932	-1 512 990	-666 946	-768 833
Financing CF	**-3 028 654**	**-1 390 458**	**388 095**	**615 225**	**-1 305 938**	**3 665 162**	**142 915**	**-1 380 734**	**-1 448 332**	**-1 607 097**	**-1 743 175**

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