

The Dirty Dozen

The Climate Greenwashing of 12 European Oil Companies

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Executive Summary

1. What contribution does Big Oil make to the energy transition and to curbing climate emissions? After the record year of 2022, in which many oil companies reported the **highest profits in their history**, this question has become particularly relevant.

2. **This study** examines in detail the **balance sheets and activities of 12 oil companies in Europe**.

Among them are 6 of the largest oil companies worldwide (**Shell, TotalEnergies, BP, Equinor, Eni, Repsol**) and 6 oil companies that play a central role in the energy transition in their European home markets (**OMV, PKN Orlen, MOL Group, Wintershall Dea, Petrol Group, Ina Croatia**).

Part A of the study presents the key findings. **Part B** contains short portraits, facts and figures for each of the 12 sample companies studied.

3. The analysis shows that profits increased by an average of 75% in 2022, revenues by 70%. Investments climbed just by 37%.

4. There was a one-sided fossil dominance of investments in 2022: **92.7% on average were invested in the continuation of the fossil oil and gas path and only 7.3% in a change towards sustainable energy production and low-carbon solutions**.

5. The energy supply remained even more one-sided. Contrary to public perception, wind and solar power production by big oil companies is still surprisingly low. On average, of the 12 companies, **only 0.3% of the energy volume is accounted for by their renewable electricity production and 99.7% by their oil and gas production**.

6. Sustainable priorities are also not discernible in the coming years. Oil companies are focusing their strategic planning primarily on **CCS** and on **carbon offsets**, i.e. very controversial approaches whose effectiveness in reducing emissions is doubtful. Two companies are shifting their business model from fuels to petrochemicals. The remaining companies do not present any transparent climate strategy at all.

7. Other options such as advanced biofuels, green hydrogen or other green gases are frequently mentioned, but the provision is largely left to other industries. There is mostly talk of sales targets, but rarely of production targets or concrete investment volumes. Plus: All options are ultimately intended to serve the **extension of their own fossil fuel business model**.

8. A far-reaching reduction of emissions is not possible on this path. Although most of the sample companies are committed to "**net zero**" by 2050, a closer look shows that **none of them** has developed a coherent strategy to achieve this.

9. Most of the companies in the sample are therefore **scaling back their ambitions**. In several cases, only production-related emissions are to be gradually reduced (Scope 1+2) and residual emissions offset by CCS or carbon offsets.

10. In most cases, the **emissions resulting from the sale of oil and gas (Scope 3) are ignored or redefined**: instead of reducing the emission quantities, only the emissions per production unit (barrel of oil, cubic metre of natural gas), i.e. the emission intensity, are to be reduced. Shell, TotalEnergies and Equinor rely particularly heavily on this evasive definition.

11. This approach is further exacerbated by **postponing most of the decarbonisation efforts until after 2030**. This is not unexpected, as the vast majority of oil companies plan to **stabilise or even grow their oil and gas production at least until 2030**.

12. The result is an ever-widening **gap between PR claims and the reality** of the companies. This gap is closed by a multifaceted and imaginative **greenwashing** in company reports. Our study lists countless examples of this: misleading definitions of terms and numbers, deliberately misleading presentation of results, hiding of important information in footnotes, and even an almost comical visual presentation of the focus of company activities.

13. What follows from this? Meanwhile, the oil industry has a **50-year history of covering up climate change problems** and a more than 100-year history of environmental and climate damages caused by fossil oil and gas. Even today, massive lobbying is used to block or at least water down climate policy initiatives.

14. A long corporate history has produced a **mindset which appears unable or unwilling to face the challenges** of today's climate crisis. Most major shareholders, i.e. mainly **institutional investors, are not even interested** in a transformation since the energy world is mapped via their portfolio of assets, in which oil companies play a predetermined role as reliable profit machines and sources of high dividend payments.

15. Overall, it is therefore **not likely that IOCs will become protagonists or neutral bystanders** of the global **energy transition and climate protection**.

Similar to the coal sector, the focus should therefore be on a **rapid economic and political downsizing** of the industry, on **skimming profits, avoiding stranded assets** and, above all, on a **rapid reduction of oil and gas demand**.

A. Results and Recommendations

1. The role of oil companies in the climate debate

Oil companies knew about the dangers of climate change early on, even earlier than much of the scientific community. But little has happened in the ensuing 50 years. The annual company reports still look as if the climate crisis is an issue that has only recently been recognised and to which they are therefore only now beginning to react. More far-reaching adjustments in their own business model are regularly postponed far into the future or simply rejected with flimsy arguments.

The situation has worsened rather than improved in the course of 2023. Major players such as BP and Shell have increased their oil and gas production in 2023. Other oil companies such as TotalEnergies or Equinor have never departed from the growth path.

But shareholders are pushing for high dividends and rising share prices. The more modest returns in the power sector or in biofuels only get in the way. Management is not unwilling to give in to this pressure, because the easy changes such as portfolio shifts from oil to gas or side activities in floating offshore wind are quickly reaching their limits or now require more massive investments. The retreat to arguments such as shareholder value, security of supply or financial stability promises a return to familiar paths that also reflect the professional biography of current CEOs and board members.

The stop of Russian gas supplies and the supply risks of oil and gas in the wake of the Russian attack on Ukraine play into the hands of these arguments: under the guise of social responsibility, business-as-usual is being pursued again.

Occasionally, very open statements are made : "If we are forced to cut our supply...our customers would buy their energy from other suppliers". (Source: Shell: Our Progress in 2022 - Annual ESG Update 2023 - Speech Transcripts, March 2023). Mostly, however, more hypocritical arguments are put forward. A common argument throughout our sample companies: Higher oil and gas profits are necessary to provide the means to finance the Energy Transition. That would be like eating more to have the energy for the diet.

2. This study

Oil companies play a key role worldwide in combating the climate crisis. At least verbally, most companies seem to have accepted this challenge. Everywhere in advertising, reporting and investor presentations there is talk of sustainability, low carbon, transition and net zero.

But what does it look like in reality? To find out, we took a closer look at the reporting of 12 oil companies in Europe and analysed them.

In order to avoid controversies and interpretation errors, we only used data and figures from the companies themselves, i.e. the financial and non-financial reporting for the year 2022 (annual reports, sustainability reports, investor presentations, Excel data compilations etc.).

All original data can be found in the documents published on the websites of the 12 sample companies and are freely accessible. The company reports in the appendix of this study provide a first overview.

The study was authored by *Dr Steffen Bukold* (EnergyComment) based in Hamburg and commissioned by *Greenpeace in Zentral- und Osteuropa* based in Vienna.

The presentation of company data does not imply an endorsement or consent by Greenpeace or the author of this report.¹

¹ In particular, please note that regarding TotalEnergies emissions, Greenpeace France has published on November 3, 2022, a report challenging TotalEnergies carbon accounting (link : <https://www.greenpeace.fr/espace-presse/rapport-bilan-carbone-de-totalenergies-le-compte-ny-est-pas-la-major-serait-responsable-de-pres-de-quatre-fois-plus-demissions-de-gaz-a-effet-de-serre-que-ce-quelle-dec/>). This report is the subject of a SLAPP by TotalEnergies in front of French courts, TotalEnergies requesting the report to be deleted (link : <https://www.greenpeace.fr/espace-presse/justice-totalenergies-tente-de-museler-greenpeace/>).

3. Our sample: 12 oil companies in Europe

The 12 oil companies in our sample fall into two groups (see table on the next page):

1. There are 6 representatives of Global Big Oil, i.e. oil companies that are among the largest in their industry, that are active worldwide and that cover the entire value chain from oil and gas production to the end consumer, e.g. via petrol station networks. In the table below, these are, in order of turnover, Shell, TotalEnergies (formerly: Total), BP, Equinor (formerly: Statoil), Eni and Repsol. Shell, TotalEnergies, BP and Eni are also included in the group of so-called supermajors, i.e. the group of the most influential integrated oil companies in the Western world.

2. The second half of the sample consists of 6 European oil companies that are also internationally active but tend to be focused on Europe or their national home market. They also do not always cover the entire value chain, but focus, for example, on upstream production (i.e. the extraction of oil and gas) or on the downstream sector (i.e. refineries and petrochemicals in particular). In the table below, these are OMV, PKN Orlen (renamed *Orlen* in July 2023), MOL, Wintershall Dea, Petrol Group and Ina Croatia, also ordered by turnover.

The differences in size are of course enormous. Shell's turnover is almost 100 times larger than that of Ina Croatia. Nevertheless, the smaller players are also important and influential players in their respective home markets and sit at the decisive levers for the success or failure of the energy transition on the ground.

The Sample: 12 Oil Companies in Europe				
		Geographical Scope	Home Market	Sales in 2022*
1	Shell	World	Global (UK)	\$381.3 billion
2	TotalEnergies	World	Global (France)	\$281.0 billion
3	BP	World	Global (UK)	\$241.4 billion
4	Equinor	World	Norway	\$150.8 billion
5	Eni	World	Global (Italy)	€132.5 billion
6	Repsol	World	Spain	€78.7 billion
7	OMV	Central Europe	Austria	€62.3 billion
8	PKN Orlen	Central Europe	Poland	€59.2 billion**
9	MOL	Central & Southeast Europe	Hungary	\$26.3 billion
10	Wintershall Dea	Western & Northern Europe	Germany	€18.7 billion
11	Petrol Group	Central Europe	Slovenia	€9.5 billion
12	Ina Croatia	Central & Southeast Europe	Croatia	\$4.9 billion
		Notes: Average exchange rate in 2022: 1.0538 USD = 1 Euro; *External Sales; **277.6bn PLN		
		Sources: Company Reports		

4. The record year 2022: Steeply rising revenues & profits

Against the backdrop of Russia's war of aggression on Ukraine, Russian supply disruptions and steeply rising oil and gas prices, 2022 became the best year in the history of many oil companies.

The table shows a sea of green figures. This is true both for the comparison with the previous year and for the comparison with the three-year period 2019-2021. The only exception is the development at Petrol Group. It does not have its own oil and gas production and therefore could not benefit from the high prices.

This is not the case for the other 11 companies. Turnover and profits could be doubled or tripled in some cases. Even very large groups like Equinor managed to increase profits by 134% compared to the previous year because the company benefited from sky-high gas prices in Europe due to the war.

Rising Profits and Sales in 2022					
		Sales* 2022 vs 2021	Sales* 2022 vs Avg. 2019-2021	Profits** 2022 vs 2021	Profits** 2022 vs Avg. 2019-2021
1	Shell	+46%	+45%	+53%	+71%
2	TotalEnergies	+37%	+54%	+69%	+118%
3	BP	+53%	+71%	+48%	+68%
4	Equinor	+66%	+125%	+134%	+498%
5	Eni	+73%	+109%	+111%	+203%
6	Repsol	+51%	+70%	+69%	+129%
7	OMV	+75%	+147%	+142%	+279%
8	PKN Orlen	+111%	+153%	+150%	+294%
9	MOL	+39%	+58%	+34%	+80%
10	Wintershall Dea***	+140%	+227%	+100%	+180%
11	Petrol Group	+91%	+129%	-60%	-52%
12	Ina Croatia	+57%	+76%	+49%	+110%
Notes: *External Sales; **Adjusted Ebitda (or comparable indicators; see individual company chapters for details); ***Avg. 2020-2021 instead of 2019-2021 (cf. company chapter)					
Sources: Company Reports					

5. Investments (Capex)

What did the companies do with the gushing profits? The following table shows that capital expenditure (capex) did not keep pace with profits and sales. On average (unweighted) capex increased by 37%, but profits increased twice as much by 75% and sales by 70%.

The higher profits were largely spared windfall profit taxes. Large sums therefore went into higher dividends or share buy-backs, as is well known. This was especially true for the global players, who were particularly reluctant to invest and preferred to pass the money on to shareholders. For example, at Norway's Equinor, profits grew 8 times as fast as investments, at TotalEnergies 3 times as fast.

Capex vs Profits & Sales in 2022				
		Capex 2022 vs 2021	Profits** 2022 vs 2021	Sales* 2022 vs 2021
1	Shell	+26%	+53%	+46%
2	TotalEnergies	+23%	+69%	+37%
3	BP	+27%	+48%	+53%
4	Equinor	+17%	+134%	+66%
5	Eni	+54%	+111%	+73%
6	Repsol	+40%	+69%	+51%
7	OMV	+56%	+142%	+75%
8	PKN Orlen	+99%	+150%	+111%
9	MOL	+27%	+34%	+39%
10	Wintershall Dea	-8%	+100%	+140%
11	Petrol Group	+16%	-60%	+91%
12	Ina Croatia	+71%	+49%	+57%
	AVERAGE	+37%	+75%	+70%
		Notes: *External Sales; **Adjusted Ebitda (or comparable indicators; see individual company chapters for details), average is unweighted		
		Sources: Company Reports		

6. Low-carbon investments

The companies had more than sufficient funds at their disposal to put words into action. But how high was the share of low-carbon investments actually in the investment budget? The following table shows the investments for 2022 and the focus of future investments (2023-2030) as reported by the companies.

The first column of data shows the total capex budget for 2022. It ranges from a few hundred million dollars or euros for the smaller groups to \$16 billion for BP and TotalEnergies and even \$25 billion for Shell.

The second column shows the share of low carbon investments in the broader sense. This is a somewhat vague term that can also include very controversial or even counterproductive activities such as CCS (Carbon Capture & Storage), Blue Hydrogen (made from natural gas, but includes CCS) or carbon offsets, i.e. the controversial payments for an unchanged emissions behaviour.

- CCS plays a key role. The capture and permanent dumping of CO₂ via large infrastructures (yet to be built) in old gas fields or in aquifers is controversial because of the risks and high costs involved, especially if these storage facilities are to be used for emissions that could easily be avoided by other technology paths like renewable power, heat pumps etc.
- The climate balance of Blue Hydrogen is even worse, since the methane emissions during gas production and processing as well as the high energy input ultimately produce no climate benefit at all.
- The same applies to almost all biofuels and to biogas. On the one hand, most biofuel offers do not contribute at all or only marginally to emission reductions in a life-cycle assessment. Equally important in this context is that almost all reports by the oil companies talk about the use or marketing of biofuels/biogas, but not about their own production. The actual investments are therefore supposed to take place in other sectors and only the sale or blending is done through their own distribution networks.
- This „outsourcing of solutions“ also applies to CCS and hydrogen: here, too, the oil companies demand extensive subsidies and upfront investments by the state or other sectors before they invest their own money. In the end, they draw potentially useful instruments into their business model in order to prolong the fossil energy supply path without investing much.

It therefore makes more sense to define low-carbon activities more narrowly, such as solar and wind power, geothermal energy, hydro power or green hydrogen (produced from green power in electrolyzers).

The share of investments in these sectors is very low. Often well "hidden", but in most cases still traceable, is the information in the companies' reporting:

- Shell, for example, invests only about 9% of its budget in real low carbon; 11% if the controversial activities mentioned are also taken into account.
- At BP and Equinor the share is even lower at just 3%.

- TotalEnergies and Eni invest a meagre 12%.
- Only Repsol, with 18%, invests a somewhat higher percentage.
- The situation is even worse for the European oil companies. Here the share is only 1% or even close to zero.
- Relatively large oil and gas companies like Wintershall Dea, MOL or PKN Orlen seem to have little interest at all in a change towards climate protection.
- Only Petrol Group stands out because of its strong presence in the power sector.

The average values (unweighted) show the one-sided fossil dominance of investments in 2022: 92.7% on average were invested in the continuation of the fossil oil and gas path and only 7.3% in a change towards sustainable energy production.

This does not seem to change much in the coming years (5th data column). Most oil companies want to either keep their oil and gas production unchanged or even increase it in the years until 2030 (TotalEnergies, Eni). Shell and BP seemed more cautious for a while, but recent production numbers indicate that fossil production will rise rather than fall this year.

Equally questionable is the priority between instruments for reducing or limiting emissions (6th data column). Contrary to what is often presented in the media, oil companies are focusing their strategic planning primarily on CCS and on carbon offsets, i.e. very controversial approaches whose effectiveness in reducing emissions is doubtful. Two companies are shifting their business model from fuels to petrochemicals. The remaining companies do not present any comprehensible climate strategy at all.

As the climate benefits of these strategies necessarily appear meagre, they also resort to verbal greenwashing tricks (column on the right). Most companies also use their own definitions of "low carbon", "new energy" or "energy transition":

- For Shell, anything that produces even a fraction less emissions than conventional oil or gas is "low carbon".
- BP counts its investments in convenience stores at petrol stations as "low carbon" and uses an even broader approach for its „transition growth" capex.
- Many companies count normal energy efficiency investments as low-carbon or sustainability measures.
- For PKN Orlen, Ina Croatia and MOL, investments in oil refineries, which are primarily intended to make the fossil product mix more valuable, are also part of "sustainability", "transition" or "transformation".
- So, in the end, it seems only consistent when Eni elevates oil and gas exploration, i.e. the search for new oil and gas fields, to a "strategic pillar of [the] decarbonisation path" (Source: Eni: Factbook 2022, Rome 10 May 2023).

Low Carbon Capex

		Capex in 2022	Capex Share in 2022			Plans for 2023-2030		Greenwashing Labels
			1. Low Carbon incl. Controversial Activities**	2. Low Carbon excl. Controversial Activities*	3. Capex for fossil energy	Role of Oil and Gas Production	Featured Instruments for Emissions Reduction until 2030****	
1	Shell	\$24833 mn	11%	9%	91%		CCS Carbon Offsets Blue/Green Hydrogen Renewable Power Biofuels/Biogas	"low carbon energy products" include everything that produces fewer emissions than conventional oil or gas on a lifecycle basis
2	TotalEnergies	\$16303 mn	13%	12%	88%	growth of fossil production in the coming years	CCS Carbon Offsets Renewable Power	
3	BP	\$16330 mn		3%***	97%	fossil production growth until 2025, then reduction until 2030 below 2022 levels	CCS Renewable Power	BP's „Low Carbon“ definition calculates a 6% share but includes i.a. convenience stores at petrol stations, fossil power generation and power trading BP's „transition growth“ label (30% of capex) includes virtually everything that is not directly related to physical oil and natural gas production and processing
4	Equinor	\$9994 mn		3%	97%	oil & gas production volumes unchanged at least until 2030	CCS Hydrogen (Blue/Green) Electrification of oil/gas platforms	Equinor's own „Low Carbon“ definition calculates a 14% investment share
5	Eni	€8056 mn	14%	12%	88%	upstream production is to grow by 3-4% p.a.	CCS Carbon Offsets Renewable Power	„new energy solutions“ “The [oil and gas] exploration ... is a strategic pillar of [the] decarbonization path.”
6	Repsol	€4182 mn	21%	18%	82%	oil & gas production volumes unchanged at least until 2030	Biofuels CCS Renewable Power	"Low carbon technologies" include i.a. energy efficiency, marketing of biofuels and renewable power, CCUS
7	OMV	€4201 mn	1%	1%	99%	oil & gas production volumes unchanged at least until 2030	CCS Carbon Offsets Focus on petrochemicals	
8	PKN Orlen	€4340 mn	4%	1%	99%		Biofuels Wind Power	„energy transition“ includes refinery efficiency and shift to more petrochemicals mix, gas power plants, electricity grids.
9	MOL	\$2012 mn	2%	1%	99%	oil & gas production volumes unchanged at least until 2030	no tangible large-scale plans shift from fuels to petrochemicals	"Transformational CAPEX" includes refinery upgrades
10	Wintershall Dea	€970 mn	~0%	~0%	~100%		CCS Carbon Offsets Electrification of oil/gas platforms	
11	Petrol Group	€60 mn	36%	28%	72%		Renewable Power Energy Services	"Energy Transition" = includes natural gas, electricity, LPG and additives for conventional diesel
12	Ina Croatia	\$381 mn	1%	~0%	~100%	no changes planned	CCS renewable power (modest)	„sustainability strategy“ means refinery modernisation and CCS
	AVERAGE			7,3%	92,7%			
		Notes: Average exchange rate in 2022: 1.0538 USD = 1 Euro; percentage terms are rounded figures; average is unweighted * Mainly renewable power, green hydrogen, decarbonized green gases or fuels ** Mainly CCS, carbon offsets, blue hydrogen; oil/gas efficiency investment and manufacturing of base chemicals/plastics is excluded *** 2-3% range; BP provides only limited information in its financial reporting and does not present EU taxonomy capex tables **** excluding business-as-usual efficiency investments in oil/gas assets Sources: Company Reports						

7. Low-carbon energy production

Just as revealing as a look at the finances is a comparison of the amounts of energy produced. For years, the big oil companies in particular have been praising themselves as leading players also in the field of solar and wind power. There is talk of gigawatt capacities and billions in investments. The images and words suggest a rapid change by the corporations towards climate neutrality.

How much of this is reality? The following table compares the amount of renewable electricity generated by the companies (wind, solar, geothermal, hydro) with the amount of energy they provide through their own oil and gas production (1 boe oil/gas = 1700 kWh; boe = barrel of oil equivalent).

The results are sobering. Of the sum of this energy production, 99.98% is accounted for by oil and gas at Shell, for example, and only 0.02% by renewable electricity. The situation is hardly any better for the other companies. All six global players produce more than 99% fossil oil or fossil gas. Their renewable electricity production accounts for less than 1%. Only PKN Orlen just exceeds the 1% limit.

On average, of the 12 companies, only 0.3% of the energy volume is accounted for by their renewable electricity production and 99.7% by their oil and gas production.

	%-Share Renewable Power Production (1) (Wind, Solar, Geothermal, Hydro)	%-Share Upstream Oil/Gas Production (1)	Assuming higher efficiency of power vs fuels (3:1)	Oil/Gas Production in 1000 boe/d	Renewable Power Generation in 2022 (Wind, Solar, Hydro, Geothermal)	Renewable Power Capacity at Year-End 2022 (Wind, Solar, Hydro, Geothermal)	Notes
1 Shell	0.02%	99.98%	0.05%	2864	0.3 TWh*	2200 MW	* Delivered to grid; only number available
2 TotalEnergies	0.61%	99.39%	1.82%	2765	10.4 TWh	7700 MW	
3 BP	< 0.17%	> 99.83%	0.52%	2438	n.a. (-2.6 TWh*)	2200 MW	* Own estimate based on BP's capacity figures at year-end; BP does not provide power generation numbers
4 Equinor	0.13%	99.87%	0.38%	2039	1.6 TWh	600 MW	
5 Eni	0.26%	99.74%	0.78%	1610	2.6 TWh	2200 MW	
6 Repsol	0.82%	99.18%	2.46%	550	2.8 TWh	3870 MW	
7 OMV	< 0.04%	>99.96%	< 0.12%	392	< 0.1 TWh	n.a.	
8 PKN Orlen	1.35%	98.65%	4.05%	191	1.6 TWh	770 MW	
9 MOL	0.18%	99.82%	0.53%	92	< 0.1 TWh	30 MW	
10 Wintershall Dea	~0.0%	~100%	~0.0%	597*	~0 TWh	~0 MW	*including Russia (company left Russia only in 2023)
11 Petrol Group	n.a.	n.a.	n.a.	0*	< 0.2 TWh	n.a.	*No upstream production
12 Ina Croatia	~0.0%	~100%	~0.0%	26	~0 TWh	~0 MW	
AVERAGE	0.3%	99.7%					

Sources: Company Reporting (Financial and Non-Financial); rounded figures, equity share and net capacity data; average is unweighted
Note (1): Heating value 1 boe/d = 1700 kWh; boe = barrel of oil equivalent

8. Emissions und emission targets

The following overview shows the emissions reported by the companies. There are usually four segments here:

- **Scope 1** records the emissions that are directly caused by the company's activities. These include, for example, emissions caused by diesel engines or turbines during the extraction or transport of oil and gas; or methane emissions (converted into CO₂ equivalents = CO₂e) released during the extraction of oil and gas at the well site; or the very high emissions associated with the operation of oil refineries.
- **Scope 2** captures the emissions generated by the company's suppliers. In particular, this includes the CO₂ emissions from the power plants that supply the electricity needed by the oil company, and much more.
- **Scope 3** is the most controversial category. It covers a whole range of emissions directly or indirectly related to the use of the oil and gas products sold (Scope 3 Cat.11). This includes, in particular, emissions from end users, e.g. when motorists burn fuel purchased from an oil company in their vehicle's engine. Some companies, such as BP, focus on emissions resulting from the use of the oil/gas products they have produced themselves (net share). TotalEnergies uses a mixed approach that, depending on the product, uses either the quantity produced or the quantity sold to calculate emissions.
- Broader still is the concept of "**Total Emissions**" or "**Lifecycle Emissions**", which add up all emissions in Scope 1, 2 and 3 and other related emissions. BP, Shell and Eni provide numbers for this category.

Emissions in 2022							
	in million tons CO ₂ e	Scope 1	Scope 2	Scope 3	Scope 3 Cat.11 (use of sold products)	Emissions from carbon of own upstream production	„Total emissions“ or „Lifecycle emissions“
1	Shell	51	7		910		1240
2	TotalEnergies	51	5	441-446	381*		
3	BP	33.9	1.6			306.7	1334
4	Equinor	11.4	2.5		243		
5	Eni	39.4	0.8		164		419
6	Repsol	15.7	0.4		182		
7	OMV	11.7	0.9	132.8	99.4		
8	PKN Orlen	18.1	1.1	82.3	66		
9	MOL	6.6	0.7	58.8	55.6		
10	Wintershall Dea	1.9	0.01		76		
11	Petrol Group	0.006**	0.015**				
12	Ina Croatia	1.2	0.1	11.9			
Sources: Company Reports; rounded figures; Scope 2 is market-based if available; *emissions from sales volume of oil products/biofuels, but production volume of natural gas; **2021							

The table shows that companies already produce significant amounts of CO₂-equivalents (CO₂e includes CO₂, methane, etc.) during oil and gas production, i.e. Scope 1. Negative

frontrunners are Shell and Total with 51 million tonnes of CO₂e each. But medium-sized corporations like PKN Orlen also have high emissions in this segment with 18 million tonnes of CO₂e.

Scope 2 emissions are relatively low in comparison. As expected, Scope 3 emissions are high, but reported in different ways. The oil companies with large distribution and retail networks have the highest values, ranging from 200-400 Mt CO₂e (Total, BP, Equinor) to 900 Mt (Shell). For the reasons mentioned above, however, the figures are only comparable with each other to a limited extent.

The important question now is: Given these emission levels, how is the path to climate neutrality, to "net zero", to be achieved?

The following overview shows the emission targets of the 12 oil companies in our sample as published in the reporting for the year 2022. These reports were written between January and May 2023.

a) Most companies published targets for Scope 1 and 2 or a combination of the two segments. Only about half of the companies shared targets for Scope 3 or the sum of Scope 1,2 and 3. Almost all companies want to make at least the Scope 1 and Scope 2 emissions segments "net zero" by 2050.

b) Most companies in the sample made at least a clear verbal commitment to the goal of "net zero" in 2050. However, "net" already includes a significant restriction: almost all companies still want to produce or at least process fossil oil and gas in 2050. However, the associated emissions are to be offset or avoided via CCS, carbon offsets or by switching to petrochemicals ("non-energy products").

c) As mentioned, CCS has a key position in this, even if this is not always immediately clear in reporting. Since the big oil companies want to build or use CO₂ storage sites with more than 10, 20 or even more than 50 million tonnes of storage capacity, the expansion of CCS alone makes it possible to neutralise emissions of Scope 1 and 2 arithmetically. The rest could be done through the increased use of carbon offsets, so the calculation goes.

However, this opens the door to double counting or even triple counting of emission avoidances. If, for example, Equinor will soon be operating a CCS plant in Norway (Northern Lights), co-financed by project partners such as Shell or TotalEnergies, and CO₂ emissions e.g. from a fertiliser factory owned by Yara in the Netherlands are injected there, it will be worth taking a closer look at the accounting of these CO₂ emissions:

- Equinor could book the quantities for itself via "operator-based" accounting.
- The same quantities, in accordance with their project share, could be accounted for by Shell or TotalEnergies if they chose an "equity-based" accounting of their commitment.
- And finally, Yara could rightly point out that its emissions are now deposited under the Norwegian seabed and do not fuel the greenhouse gas effect, at least for now.

d) The plans known so far make it rather unlikely that the expansion of renewable electricity production, hydrogen, biofuels or new refinery processes will contribute to the decarbonisation of the oil companies on a larger scale. At least until well after 2030, there are no major contributions in sight.

e) Companies that plan to expand their oil and gas production naturally have particular problems announcing attractive emission targets. They resort to the auxiliary construct of carbon intensity, i.e. the amount of emissions caused by one barrel of oil/gas (produced or sold).

This says nothing about the volume of climate emissions to be expected, as the question of the production volume is left open. Shell, TotalEnergies and Equinor rely particularly heavily on this evasive definition.

Emission Targets										
	Indicator	Base Year	Status 2022	2025	2030	2035	2040	2050	Notes:	
1	Shell	Scope 1+2	2016	-30%		-50%			„Net Zero“	
		Only carbon intensity goal for Scope 3	2016	-3.8%		-20%	-35%		„Net Zero“	
2	TotalEnergies	Scope 1+2*	2015	-13%	-17%	-35-45%			„Net Zero“	*operated domain, not equity-based; percentage terms derived from absolute numbers (2015: 46Mt)
		Scope 3*	2015	-5%	-2.5% or more*	-2.5% or more*			„Net Zero“	*Percentage terms derived from absolute numbers; 2015: 410 Mt CO2e
		Only carbon intensity goal for Scope 1+2+3	2015	-12%	-15%	-25%			„Net Zero“ (Intensity Goal)	no Scope 3 emission volume goals (intensity down but production growing)
3	BP	Scope 1+2	2019	-41%		-50%			„Net Zero“	
		Scope 3*	2019	-15%	-10-15%	-20-30%			„Net Zero“	* Specific definition: emissions by use of own upstream production
		Carbon Intensity*	2019	-2%	-5%	-15-20%			„Net Zero“	* Lifecycle Carbon Intensity of Sold and Physically Traded Products
4	Equinor	Scope 1+2	2015	-31%		-50%			„Net Zero“	
		Only Carbon intensity goal for Scope 1+2+3:	2019			-20%	-40%		„Net Zero“	
5	Eni	Life Cycle Emissions*	2018	-17%		-35%		-80%	„Net Zero“	* Percentage terms derived from absolute numbers; 2018: 505 Mt CO2e
6	Repsol	Scope 1+2	2016	-37%		-55%			„Net Zero“	
		Scope 1+2+3	2016	-29%		-30%			„Net Zero“	after 2030 only indirect goals: „following government policies“
7	OMV	Scope 1+2	2019	+13% (-22%*)		-30%		-60%	„Net Zero“	* Two assessments provided (backdating of emissions of acquired companies; see company chapter for details)
		Scope 3	2019	+ 5% (-8%*)		-20%*		-50%*	„Net Zero“	* Company-specific definition of Scope 3
8	PKN Orlen	Scope 1+2	2022			- 25%			Qualified commitment	No Scope 3 emission volume goals (intensity down but production growing) 2050: achievement of net zero will depend on „the technological progress and the regulatory and legal context“
9	MOL	Scope 1+2	2019			-30%			„net carbon neutral“	Decarbonisation strategy very vague
10	Wintershall Dea	Scope 1+2	2020		-25%	Net Zero			„Net Zero“	
		Scope 3	-						„Supporting EU Climate goals“	goals remain vague: „steer our portfolio towards lower emissions“
11	Petrol Group	Scope unclear	-			„-55%“ (EU Goal)			„Climate Neutrality“	Decarbonisation strategy very vague
12	Ina Croatia	-	-			vague			vague	
Sources: Company Reports										

f) However, the situation is not much better for the other companies. Greenwashing is partly at work here, i.e. adjusting targets in order to be able to report success.

- BP has reduced its near-term targets without further ado, so that they may even report overachievement on the climate path for some categories.
- This is also true for Repsol, which, after its involuntary downsizing, has already overachieved its targets for 2022.

- TotalEnergies also remains on the safe side with a modest target of -2.5% in Scope 3 emissions over the long period from 2015 to 2030.
- Shell and Equinor are limiting themselves to Carbon Intensity anyway.
- Ina Croatia, Wintershall Dea, MOL, PKN Orlen do not pursue concrete Scope 3 targets.
- OMV reported an increase in its emissions by 2022 compared to 2018 or 2019 levels, against the general trend.²

g) Even if more ambitious targets are announced until 2030, it is noticeable for all companies in the sample that most of the climate efforts are shifted to the time after 2030. Only four companies (Shell, Equinor, Eni, OMV) communicate further interim targets on the way from 2030 to 2050. The "wait-and-see" approach dominates: announcing easily achievable targets for the period until 2030 (or not), committing to Net Zero in 2050, and leaving the rest in the dark.

9. More examples of greenwashing

a. Greenlabelling at its best: OMV

On the one hand, OMV openly admits the non-sustainability of its business model: „If we look at this rationally, OMV cannot afford to keep pursuing the same business model and we must radically change... we intend to gradually reduce our fossil fuel production and completely cease production for energy use by 2050 at the latest.“ Source: OMV: Sustainability Report 2022. Non-Financial Report, Vienna April 2023 (CEO Interview). OMV therefore intends to spend €7.5 billion in capex in the period 2022-2027 to achieve its climate targets, by 2030 as much as 13 billion euros.

On closer inspection, however, the details raise serious questions:

- 11% of these funds are to be invested in the "Decrease in fossil fuel sales/refining fossil throughput". Sounds good, but a reduction should not actually require any investment. Only the small-print explanation shows that this item also includes investments in the *expansion* of petrochemical production.
- Another 11% is to be invested in "neutralisation measures". This term includes the controversial CCS technology (underground storage of CO₂) and the even more controversial Offset Measures.
- Another 15% is to improve operational efficiency. These are actually standard investments that should happen anyway to save costs. The benefit of these measures for the climate is unclear.
- Another 38% are to go into "Increase in zero-carbon energy sales". The term „sales" would not necessarily imply any effort to *produce* zero-carbon energy. OMV may limit

² OMV: Sustainability Report 2022. Non-Financial Report, Vienna April 2023, p.149. The company has pointed out to us that there is a second emission table (p.150) where emissions actually *decrease* (backdating emissions of acquired companies).

itself to simply trading or selling the products, leaving the investment and manufacture to third parties.³

- The remaining 25% is earmarked for "Increase in recycled and sustainable feedstock". Again, the burden is on third parties to supply biomass, bio-waste etc. As for OMV's own contribution, the company's highlights its own ReOil technology or co-processing technologies. However, these provide only very modest climate benefits, as even OMV-sponsored studies have shown (cf. company chapter for details)

b. Gaps in the right place: BP

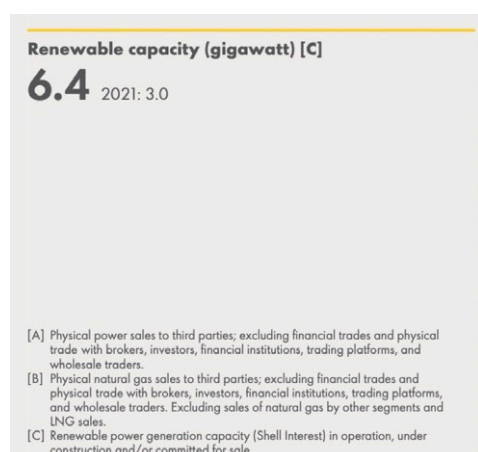
The financial reporting of oil companies, their sustainability reports and investor presentations show endless repetitions of the same vague sustainability goals. One often looks in vain, however for concrete goals and figures on what has been achieved so far.

In BP's 2022 reports, for example, which has been advertising its renewables ambitions for many years, there is no number that would show the amount of wind and solar power they have generated in 2022.

This lapse is only an indication that no major oil company can show a comprehensible plan for a "net zero" in 2050. There is, if at all, a slow start in the 2020s, which is then miraculously supposed to lead to a rapid transformation after 2030. In other words, the solution to the climate problem is postponed to the future or to the next CEO.

c. Misleading numbers: Shell

The next example is a clear misrepresentation. Shell reports a "renewable capacity" of 6.4 gigawatts for the 2022 financial year. Only in the footnote [C] does one learn that this figure also includes plants that are still under construction or committed for sale. The actual capacity at the end of 2022 was only 2.2 gigawatts, as the group admits in another place in its reporting.



Source: Shell: Sustainability Report 2022, March 2023.

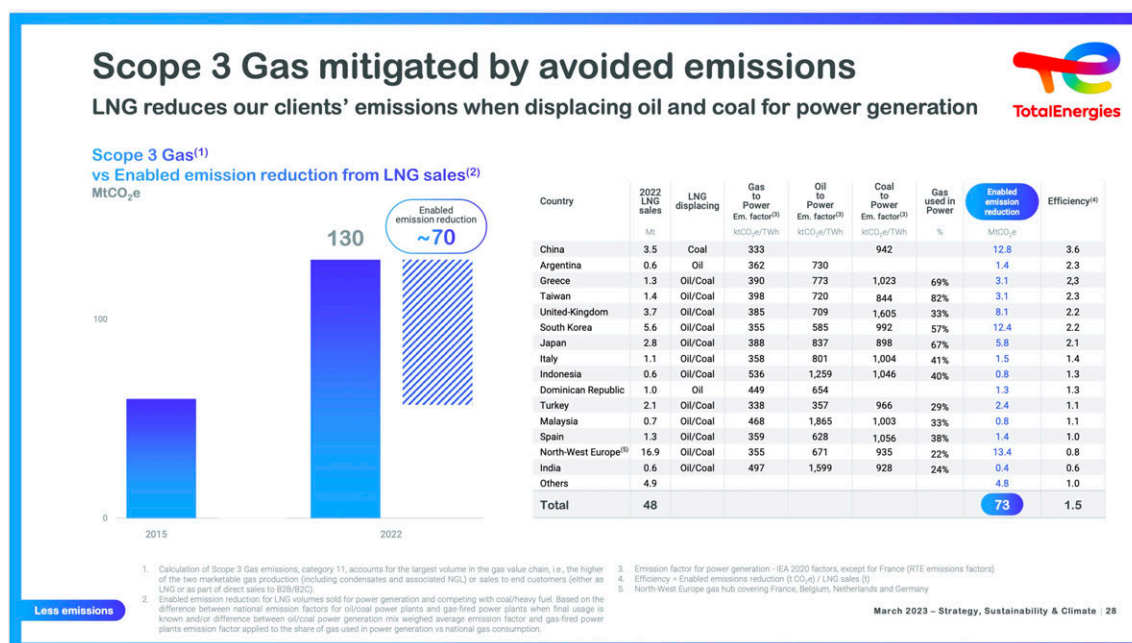
³ The company has informed us that the term „sales“ will also include production. The in-house production volumes, however, are still unclear in our opinion. The reports give no indication in this respect.

d. Misleading concepts: TotalEnergies

TotalEnergies is similarly aggressive in selling its rapidly growing global LNG supplies as a contribution to emissions reduction. The LNG tankers are said to have saved 13.4 million tonnes of CO₂e in north-western Europe alone, because otherwise coal would have been burned. On closer inspection, this seems doubly questionable.

On the one hand, an energy supply that is harmful to the climate is presented here as "useful" only because there are alternatives that are even more harmful to the climate. This conceals the fact that there are clearly better alternatives, especially in north-western Europe, ranging from accelerated energy saving to accelerated expansion of renewable energies.

The crucial point, however, is that in a realistic life-cycle assessment LNG has hardly any advantages, if any at all, over the combustion of hard coal, if the high upstream methane emissions are also taken into account. TotalEnergies' figure of 355 gCO₂e/kWh for the conversion of natural gas into electricity obviously completely ignores the upstream emissions and the emissions from the LNG supply chain.



Source: TotalEnergies: Strategy, Sustainability & Climate, Presentation, 21 March 2023.

e. PKN Orlen: Sorry, we have only just found out there is a climate crisis...

PKN Orlen is among the best examples for setting modest objectives. Some of its climate policy targets for the years 2021-2023 read extremely cautious and almost anachronistic:

- "Development of an approach to GHG Scope 3 (CO₂) emissions"
- "Development of a climate policy"

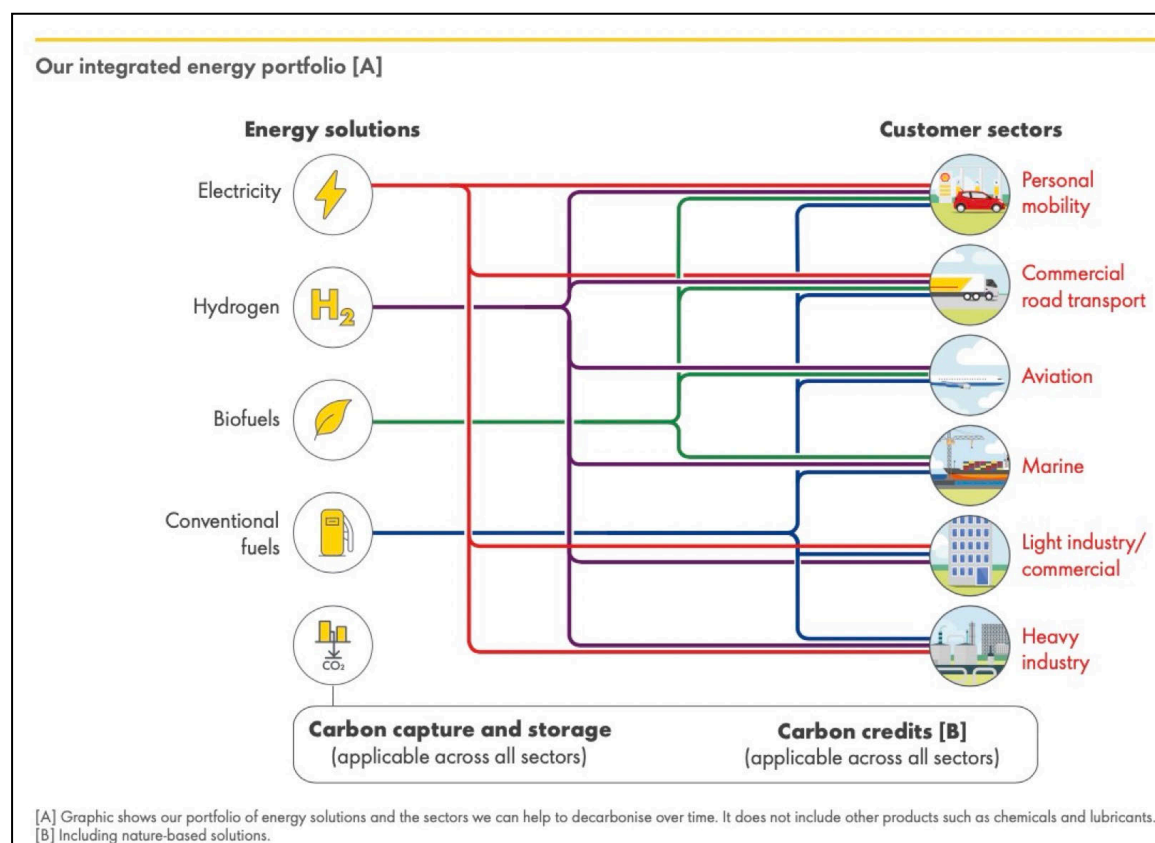
Source: Orlen Group: Non-financial Statement of the ORLEN Group and PKN ORLEN S.A. for 2022, Sustainability Report, 27. April 2023.

f. Visual design: Oil & gas only a side activity? (Shell)

It may seem a little petty, but the way in which company reports are presented can also be criticised. In the exuberantly colourful annual reports and presentations, oil companies can hardly be distinguished visually from organic food shops and garden centres.

However, if one looks at the sober figures of the balance sheets and leaves out the verbal greenwashing and misleading definitions of terms, one gets the impression that the topic of climate change has only been on the corporate policy agenda for a few months or not at all. Crucial information is often only to be found in the footnotes.

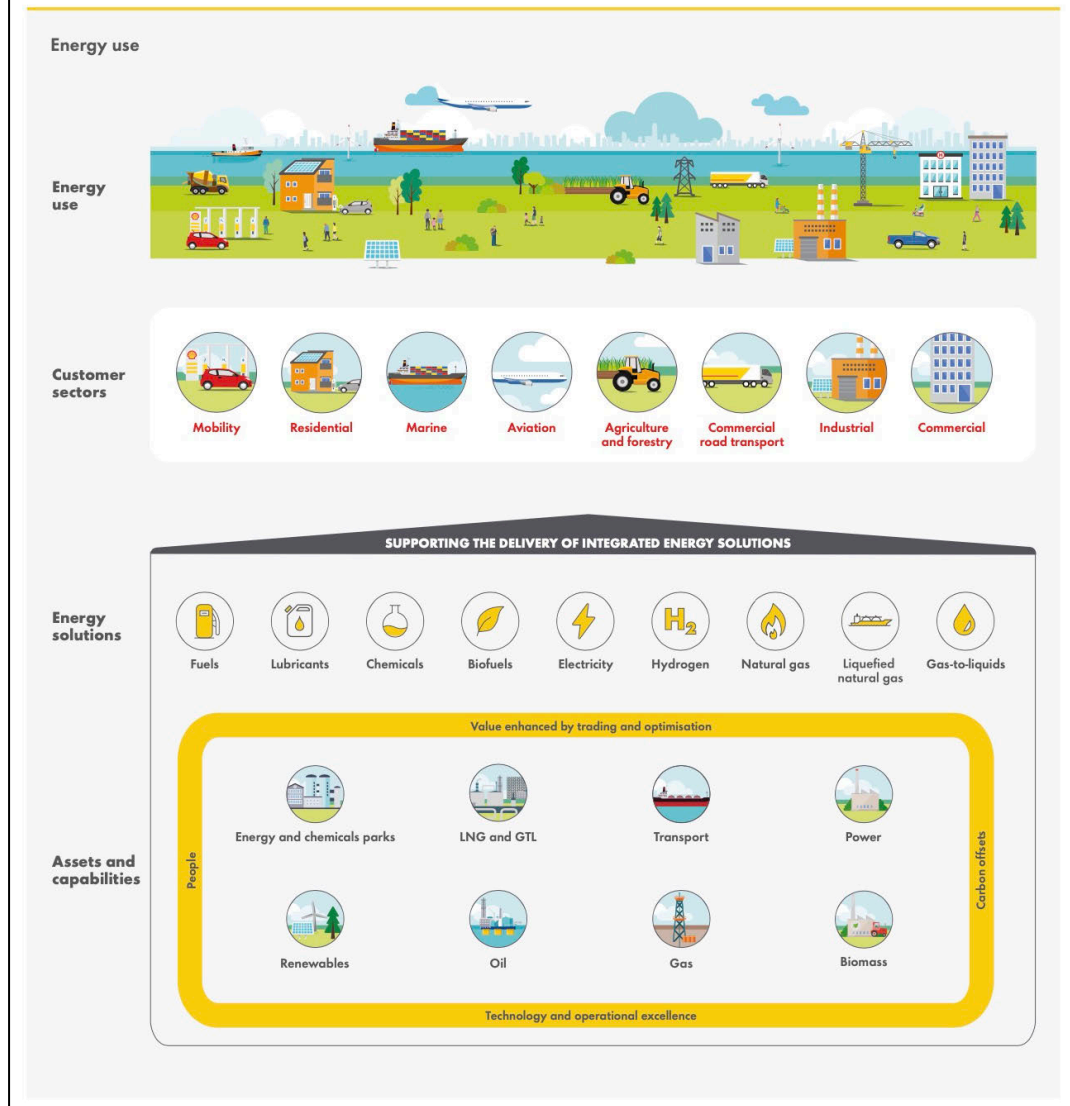
Shell presents its portfolio of activities in a visually completely misleading way. The following illustration suggests that we are Dealing with a highly diversified energy company that focuses on electricity, hydrogen, biofuels and only in fourth place on conventional fossil fuels. This ignores the fact that fossil oil and gas account for well over 90% of the energy supply and that, for example, potential low-carbon products such as green hydrogen are not even on offer. In addition, the group intends to withdraw from the electricity retail sector in a number of countries and that the quantities of green electricity offered only contribute a per mille share to its "Integrated Energy Portfolio".



Source: Shell: Energy Transition Progress Report 2022, 2023.

The second visual design of these business activities is more reminiscent of landscape planning than of an oil and gas company that, according to its own information, contributes directly or indirectly to the acceleration of the climate crisis with its fossil raw materials with 1.2 gigatonnes of lifecycle emissions.

Our business activities



Source: Shell: Sustainability Report 2022, March 2023.

10. Policy recommendations

a. The situation

International Oil and Gas Companies (IOCs) have a nearly 50-year history of covering up climate change and a more than 100-year history of environmental and climate damage caused by fossil oil and gas. Even today, massive lobbying is used to block or at least water down climate policy initiatives.

There is no sign of a fundamental reorientation. At best, some extremely climate and environmentally damaging sub-sectors are being sold, but operations continue with new owners. Limited production bans for some European or US IOCs would therefore have only

a limited climate and environmental effect. This is already clearly observable today, for example in oil sands or shale oil.

IOC investments in renewables such as photovoltaics or wind power are predominantly passive in nature, i.e. existing assets are simply acquired thanks to lavish profits from the oil and gas sector. Innovative impulses or a ambitious transitions at the expense of oil and gas sales are the exception and remain a marginal phenomenon to this day.

New topics such as CCS for mainstream natural gas consumption, blue hydrogen, e-fuels or biofuels primarily serve to continue the previous fossil paths. Most projects in these new sectors are controlled by IOCs or by NOCs (state-owned oil companies).

As things stand, none of these pathways can make a significant contribution to climate protection. Rather, it is more likely that the (very slow) progress in these sectors will steer investments in the wrong direction.

A second, often underestimated problem is IOC's corporate culture, which has become entrenched in more than 100 years of corporate history. It has produced a mindset which appears unable or unwilling to face the challenges of today's climate crisis.

A third problem is the ownership structure. Most major shareholders, i.e. mainly institutional investors, maintain their financial commitment to IOCs. They offer stable dividends and form only one element in an investment portfolio that also includes specialized companies from the PV or wind sector. These investors are therefore not interested in a transformation of IOCs, as the transformation of the energy world is mapped via their portfolio of assets, in which IOCs play a predetermined role.

b. The conclusion

Overall, it is therefore not very likely that IOCs will become protagonists or neutral bystanders of the global energy transition and climate protection.

Similar to the coal sector, the focus should therefore be on a rapid economic and political downsizing of the oil and gas sector, on skimming profits, avoiding stranded assets and, above all, on a rapid reduction of oil and gas demand.

c. Demand-side measures: Phaseout Roadmap for Oil

Supply- and business-oriented measures (see next chapter) can only have their full effect if they are accompanied by a predictable contraction in oil demand in the EU.

This contraction should follow a quantitative roadmap. This reduces the risk of stranded assets and increases the pressure on IOCs to adjust, as capital moves out of shrinking sectors. Thus, a fuel-oriented approach joins the previous sector-use approach ("transport," "buildings," etc.).

The end date for the complete phase-out of fossil oil and the quantitative intermediate steps should be clearly stated (cf. for more details here: Greenpeace European Unit: Energy Crisis Scenario - Energy Policy Recommendations, December 2022).

Reduction of oil consumption could be fastest in passenger car transport, followed by road transport (vans, trucks).

Oil consumption in air transport should be reduced by banning fossil-fueled short domestic flights and short international flights. A roadmap for carbon reduction in long-distance aviation may imply, for instance, an ETS-type auctioning of air plane travel rights. In parallel, the supply of zero-carbon fuels should be promoted by the state. The benefits of these new fuels must be independently confirmed in a life-cycle approach in order to exclude, for example, the use of biofuels, which can cause high climate damage along their production chain.

In sea shipping, too, a rapid, government-supported expansion of zero-carbon fuels is necessary. A clear phase-out plan for marine diesel and a phase-out plan for low-sulfur diesel are also vital. At the same time, the entry into bogus solutions such as LNG powered engines should be stopped.

Oil consumption in the petrochemical industry and in other industries should be reduced as quickly as possible through increased recycling or other raw materials.

Oil consumption in the petrochemical industry should be reduced as quickly as possible. On a global average, the per capita consumption of plastics will need to be drastically reduced by around 75% by 2050 to meet the objectives of the Paris Climate Agreement (<https://www.eunomia.co.uk/reports-tools/is-net-zero-enough-for-the-materials-production-sector/>).

This implies a much longer lifespan of essential plastic products and the elimination of all non-essential plastic uses. Approaches including reuse, refill and return are an essential midstream solution for addressing plastic pollution and should be prioritised over single-use products and recycling.

d. Supply-side Measures

WINDFALL PROFITS

A windfall profits tax in times of crisis, as in 2022 and probably 2023, is the right way to go. One problem, however, is that only a smaller proportion of IOC profits are generated in the EU.

As usual, the highest profits are generated upstream, i.e. outside Europe. In addition, there are opportunities to shift profits within the group in order to optimize them for tax purposes. A windfall profit tax can therefore only be effective to a limited extent.

RANKING OF OIL IMPORT SUPPLY CHAINS

In parallel with demand reduction for fossil oil, the most climate-damaging supply chains should be stopped. So supply chain requirements can be pushed higher year after year. This will be achieved by introducing strict MRV standards when importing crude oil and oil products into the EU, in particular documenting the associated CO₂ and methane emissions per barrel.

Criteria for ranking supply chains could include:

- Strategic criteria: At the moment, Russian oil and Russian oil products.
- Extent of upstream climate and environmental damage, e.g. oil sands, high methane emissions
- Extent of production risks (e.g. deepwater).
- Import restrictions, if exploration and development of new oil provinces is planned

EU-TERRITORY/NORTH SEA

Exploration stop for fossil oil and gas in Europe, especially no new exploration wells (cf. France). Development drilling only for a short transitional period. Production plans (EU//UK/ Norway) must be based on countries' carbon budgets. EU should influence other countries to pursue similar measures.

DECOMMISSIONING

Decommissioning of oil/gas infrastructure which is no longer in use must not be delayed. Decommissioning in the North Sea must include the entire infrastructure. Exceptions are possible only for some large concrete foundations.

Oil companies must pay into a decommissioning fund in time so that the Treasury does not have to step in for cash-strapped or insolvent oil companies when decommissioning is due.

STRONGER REGULATION OF IOC ACTIVITIES

General ban on advertising.

Stronger regulation of lobbying activities: Require full disclosure for contacts with national ministries, EU Directorates General and similar authorities. This applies to oil companies, their associations and commissioned PR or lobbying agencies.

Greenwashing should be more narrowly defined and legally sanctioned.

FINANCIAL COMMUNITY

Investment ban for public/government funds and banks in IOCs, even if IOCs are only part of index products or fund products.

Listing on exchanges will be linked to a credible zero-carbon strategy, compliance with interim steps, and robust reporting on these issues. Regulators will regularly review oil companies' reporting on climate targets.

- In case of violations: Warnings and obligation to ad hoc reporting.
- In case of repeated violations: IOC is removed from top indices (DAX, CAC 40, FTSE 100, EuroStoxx, etc.) and moved to a segment with similar cases ("non-reporters").
- In extreme cases: Delisting from European stock exchanges

EDUCATION / TRAINING

The material phasing-out of fossil oil and gas should be reflected in other areas. Therefore stop of public funds and governmental education offers (universities, academies, research

institutes) for study topics Dealing with skills for the exploitation of oil resources. However, the education for closely related topics, such as geothermal energy, should not be hindered.

MORE STRINGENT REPORTING REQUIREMENTS FOR IOCS

Financial and ESG reporting must follow tighter definitions: Stop breezy greenwashing texts!

Reporting must name quantitative decarbonization targets for five-year steps.

The measures to achieve these targets must be explicitly listed and quantified, i.e. no vague or even misleading target descriptions.

This roadmap should apply separately to the three areas of Scope 1 (emissions from company activities), Scope 2 (emissions from suppliers), and especially Scope 3 (emissions from the use/consumption of products sold).

The interim targets should show roughly linear or front-loaded reductions in emissions. No back-loading of emissions reductions where abrupt improvements can be postponed until the 2040s.

ACCELERATED REDUCTION AND IMPROVED REPORTING OF METHANE EMISSIONS

Mandatory reduction of methane emissions to below 0.1% (flaring, venting, leakage) of gas produced by 2030. Independent certification of supply chains.

Mandatory regular measurement especially at flares and gas processing facilities as well as other infrastructure such as tanks, pipelines, valves, etc.

If no reliable measurements are available, average values must be used in reporting, e.g. data from the IEA Methane Tracker or realistic US values (e.g. numbers by Howarth/Jacobson).

Translation in CO₂-equivalents must use 20-year periods (GWP₂₀) in lieu of 100 years (GWP₁₀₀). This implies an GWP factor of 82.5 for methane (CO₂ =1; cf. IPCC AR6)

REPORTING: ABSOLUTE EMISSION LEVELS INSTEAD OF INTENSITY

Carbon intensity targets are misleading. Especially when they are group-wide averages that can be easily reduced through acquisitions.

Absolute emission reduction must be the focus of reporting (i.e. CO₂ equivalents).

REPORTING ON OFFSETTING

Basically no recognition of 3rd party offsets in the calculation of emission reduction.

REPORTING OF MITIGATION OPTIONS, NO OIL-RELATED CCS, NO BLUE HYDROGEN

- Emission mitigation options must no longer be simply vaguely assumed in reporting, e.g. an abundance of green hydrogen or zero-carbon electricity

- This supply must be ensured by the IOC's own investment plans; alternatively, a clear indication that these infrastructures already have FIDs granted by 3rd parties
- Quantification and detailing of mitigation options: How much CO₂-equ. emissions will be avoided by when, e.g. by green hydrogen?
- Carbon offsetting is no longer recognized as a mitigation option
- CCS is no longer recognized as a mitigation option for oil and gas emissions, as CCS capacities are needed for the (mostly industrial) "last 10%" emission share
- Blue hydrogen (fossil natural gas + CCS) is no longer recognized as a mitigation option
- Green hydrogen (green power/electrolysis) only counts as mitigation option if used for (non-oil) industrial emissions, air or maritime transport, but not for CO₂ reduction in oil refineries or other processing in the fossil oil and fossil gas industry. In other words: Green hydrogen should not serve to prolong the path of fossil industries.

REMUNERATION OF MANAGEMENT

Growth targets should not be part of management variable remuneration provisions. Instead, climate targets should become more important. No bonuses for fake decarbonization, e.g. by switching from oil to natural gas.

PORTFOLIO CHANGES: NO OUTSOURCING OF EMISSIONS

Expanding business activities in fossil gas or LNG is not climate protection or a low-carbon solution, even if it makes the oil business share relatively seen less important.

Acquiring wind or PV assets does not increase the share of renewables in the global energy mix, it just changes ownership structures.

No sales of High Emission Projects just to make room for new oil and gas projects.

In the case of asset sales, a comprehensible demonstration should be mandatory that the buyers will comply with emission regulations and have sufficient financial resources and skills for proper decommissioning.

B. The Sample Companies: Portrait, Facts & Figures

1. BP

Portrait

Together with Shell, TotalEnergies, Eni, Chevron and Exxonmobil, BP is one of the six so-called supermajors, i.e. one of the largest oil and gas companies operating globally and vertically integrated from production to retail.

The payments due to the oil spill in the Gulf of Mexico (Deepwater Horizon 2010) had weakened the company financially and forced it to sell some assets. In recent years, however, the group has returned to a fossil growth course.

The analysis of the reporting is made more difficult by the division into only three main reporting segments, as they partly comprise completely different activities:

- Gas & Low Carbon Energy: The focus here is on the large integrated gas/LNG projects and the gas business in general. In addition, there is the electricity business, trading and projects in the area of solar and wind power, CCS and hydrogen.
- Oil Production & Operations: Here are mainly the upstream activities and some midstream activities focused on oil, i.e. the oil fields, terminals and pipelines.
- Customers & Products: This is where most B2B and B2C activities are located, from refineries, petrol stations and convenience stores to trading in refinery products from lubricants to jet fuel. The relatively small activities in biofuels, biogas and EV charging points can also be found here.

The shares are widely spread. Vanguard Group, Norges Bank Investment Management and Blackrock Fund Advisors are the largest shareholders with 2.5-3.5% of the BP shares each. BP shares are listed on the London Stock Exchange.

Revenues and profits

Revenues increased strongly last year (see Data Table). They climbed 53% to \$241 billion. Compared to the period 2019-2021, it was even an increase of 71%. The revenues were generated almost exclusively by the sale of oil/oil products and natural gas/LNG and related activities. The focus is on oil products sales (\$150 billion).

Operating profits also grew strongly, with balance sheet data varying by metric due to the withdrawal from Russia (Rosneft shares) and other special items.

Adjusted Ebitda profits, which roughly correspond to operating profits excluding special items, grew 63% in 2022.

Non-adjusted pre-tax profits (Ebit) fell by 0.2 per cent compared to 2021, but increased by 572 per cent compared to the period 2019-2021, while net profits in 2022 actually slipped into negative territory on the balance sheet.

Fossil production

BP produced 2.4 million barrels of oil and gas per day (2.4 mboe/d) in 2022. This is significantly less than in previous years, mainly because Russian volumes were eliminated (1.1 mboe/d) and production also fell outside Russia.

In the years until 2025, however, the volume is to be kept roughly stable. Production is expected to be at 2.3 mboe/d in 2025 and then fall slightly to 2.0 mboe/d by 2030, according to the BP reporting for the financial year 2022. The launch of 13 major oil and gas projects all over the planet is planned for the period up to 2030. "Between now and 2025, we expect to see growth in underlying production due to major project start-ups, deferred divestments and growth in bpx production." (Source: BP: Annual Report and Form 20-F 2022, March 2023; bpx = US onshore activities)

The sales volumes of fossil products (petrol, diesel, paraffin, etc.), which can come from BP or other producers, remained roughly constant. They fell during the pandemic, but rose again in 2021 and 2022 to 2.96 mb/d at last count.

In contrast, the production volumes for biofuels are insignificant. Since 2019, they have remained at a relatively constant level of 27,700 b/d at the last count, and only 18,000 b/d in fossil equivalents. This corresponds to less than one percent of the group's current fossil oil and gas production.

Capex

BP capex increased relatively modestly by 27% to \$16.3bn in 2022. The „low-carbon energy“ sector in the balance sheet accounts for just \$1.0bn of this, or 6.3%. Last year it was \$1.6 billion (12.1%).

However, the investment in this sub-sector differs from BP's definition of investment in „low carbon activities“: *“An activity relating to low carbon including: renewable electricity; bioenergy; electric vehicles and other future mobility solutions; trading and marketing low carbon products; blue or green hydrogen and carbon capture, use and storage (CCUS)”* (cf. BP: Sustainability Report 2022, Glossary, March 2023, p59).

The term of investments in "transition growth" is defined even more broadly to include virtually everything that is not directly related to the physical oil and natural gas business. Even investment in convenience stores at petrol stations are included here.

In most cases, definition problems can be sorted out by looking at the details of the investment chapters and the EU taxonomy tables, but BP is the only major oil company in our sample that does not provide EU taxonomy tables and among the few oil companies that provide only little information about their low-carbon investment. The firm does not even provide renewable power generation numbers which is highly unusual.

In 2022, BP invested \$4.9bn in „transition growth“. According to BP, more than 80% hereof related to „low carbon activities“, i.e. about \$4bn or 24.5% of the overall investment. Most of this investment was in biogas, offshore wind, EV charging and hydrogen, BP states.

A closer look at the scarce data shows, however, that low carbon investment in a more narrow sense is much smaller.

- The 2022 investment in the **hydrogen, renewables (w/o biofuels) and the power sector (fossil/non-fossil)** amounted to just \$1.0bn. A major element hereof may have been the acquisition of the EDF gas and power retail energy business in the US. The price is not known. Hydrogen investment also includes Blue Hydrogen investment which we do not count as low carbon due its high carbon and methane footprint.
- In addition there was investment in **biofuels/biogas** which is not individually quantified and which we do not count as low-carbon. Based on the strategic projects presented by BP we estimate the investment in biofuels/biogas at \$1bn or below.
- In addition there was investment in infrastructure for **EV charging** which we do not count as a low carbon activity in the narrow sense. The total 2022 investment in the combined sector of retail fuels, midstream, convenience and EV charging was \$1.8bn. Given the large convenience store expansion programme and other activities we again estimate the share of EV charging investment in this group of activities below \$1bn.

(Source for all numbers: BP: 2022 Full Year and 4Q. Financial Results & Update on Strategic Progress, February 2023)

Overall, it seems plausible to assume that in 2022 BP invested far less than \$1bn in low-carbon as we define it, i.e. in a narrow sense (renewable power/green hydrogen/others). Given the overall BP investment budget of \$16.3bn, we therefore estimate the low-carbon investment share at 2-3%.

Estimating low-carbon investment *including* controversial sectors (such as biogas/biofuels, Blue Hydrogen and others), but *excluding* non-related investment (retail power trading, non-renewable power activities or convenience stores etc.), presents a more difficult task. Given the segment group numbers presented above, we estimate these investments at less than \$3.0bn, i.e. less than 18% of total investment or less. Again, we want to stress the fact that this indirect estimate is due to the lack of transparency in BP data.

Emission data & EU Taxonomy

The emission figures for 2022 have fallen sharply in recent years for Scope 1 and Scope 2, primarily due to divestments. For Scope 3 („carbon in upstream production“), there was a decrease of 15%, but also a slight increase compared to 2021 (see table). Lifecycle emissions fell by almost 19 per cent since 2019.

BP does not present figures according to the EU Taxonomy. They are to be made available for the first time in 2025 containing the figures for 2024. BP is the only major oil company in our sample that does not provide this dataset which is essential to evaluate in detail the activities in the fields of sustainability and low-carbon.

BP Emissions	2022	2021	2020	2019
mn t CO2e, equity share (if applicable)				
Scope 1	33.9	36.5	41.3	46.0
Scope 2	1.6	2.6	4.2	5.7
Scope 3:				
Emissions from carbon in BP upstream oil and gas production	306.7	303.6	327.6	360.9
Aggregate average lifecycle emissions associated with sales of energy products („well-to-wheel“ or „well-to-wire“)	1334	1418	1410	1638

Source: BP

Emission Goals

BP scaled back its emissions reduction targets a few months ago - an unusual move. This leaves little to be done in Scope 1+2+3 by 2030 if oil and gas production is not expanded more than planned.

For Scope 1+2 emissions, a 41% reduction had already been achieved from 2019-2022, but largely (70%) through divestments, as the company acknowledges.

In terms of lifecycle carbon intensity, BP has achieved little in recent years. However, this indicator has now been redefined. In addition to sales to consumers, it now also takes into account physically traded oil and gas volumes. Since gas trading (especially LNG) is rising sharply, while oil trading will tend to stagnate according to most forecasts, the carbon intensity falls almost automatically as a result. This is true even if volumes increase, as it is only an intensity indicator.

Even taking this into account, it remains unclear how carbon intensity will fall so quickly in the years after 2030 towards 2050. The reporting does not elaborate on this. The goal of "net zero" by 2050 does not inspire confidence, especially in Scope 3. The pace of the Group's transformation would have to be radically accelerated compared to the 2020s.

Emission targets and current situation

Scope 1+2 (base 2019)

2022 minus 41% already achieved

2025 revised target minus 20% - thus already overachieved

2030 revised target -50% - only minor efforts still needed

2050 net zero

Scope 3 (base 2019 = 361 mn t CO₂/ combustion of BP upstream production)

2022 minus 15% already achieved
2025 revised target: minus 10-15% - already achieved
2030 revised target minus 20-30% - only minor efforts still needed
2050 net zero

Avg. Lifecycle Carbon **Intensity** of Sold and Physically Traded Products (base 2019)

2022 minus 2% already achieved
2025 minus 5%
2030 minus 15-20%
2050 net zero

Low Carbon Strategy

BP aims to become a net-zero company by 2050 at the latest - a distant goal that is shared by almost all oil companies in our sample.

In the years 2023-2030 BP plans a rapid expansion of its low-carbon activities (BP definition) and transition growth activities (BP definition):

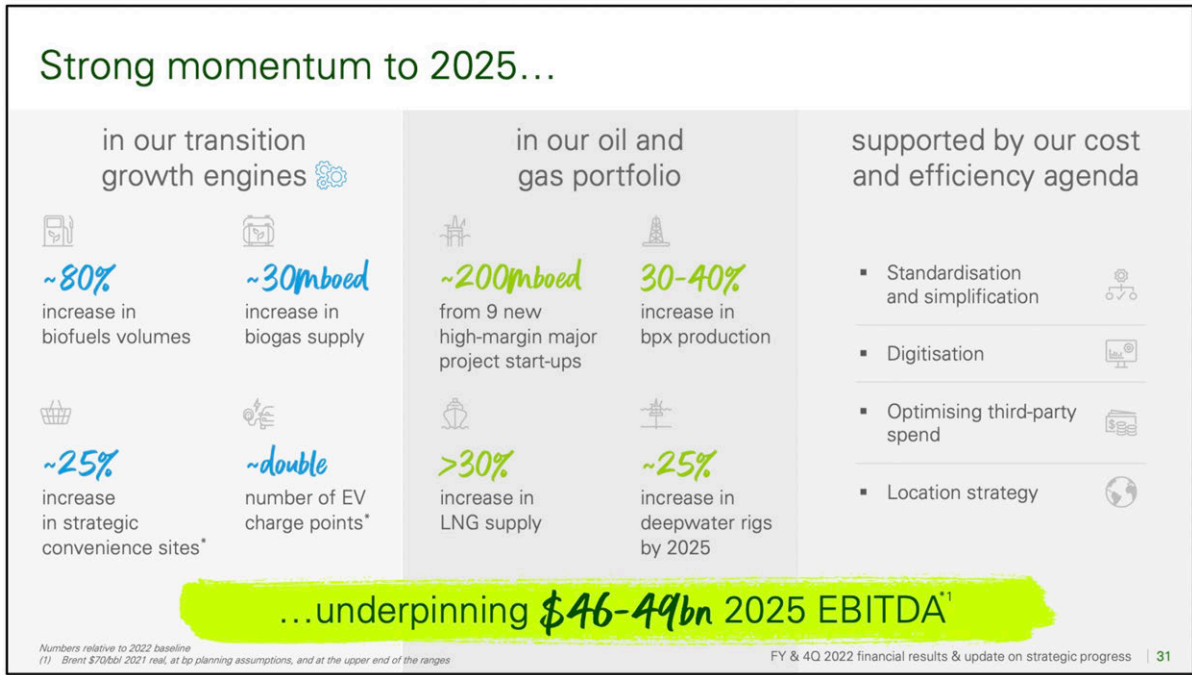
- \$30bn for hydrogen, renewables and power (2022 1.0bn; 2025 3-5bn; 2030 3-4bn)
- \$15bn for bioenergy
- \$15bn for convenience and EV Charging

The share of investment in transition growth (BP definition) is planned to increase considerably:

- 2022 30% of total investment = \$4.9bn
- 2025 40% of total investment = \$6-8bn
- 2030 50% of total investment = \$7-9bn

BP states that in 2030 more than 80% of this transition growth investments will fall into its broad category of low-carbon activities. As the composition of these heterogeneous groups is unclear these numbers are difficult to interpret from a energy transition perspective.

The fossil focus will continue to set the tone in the coming years. The diagram shows highlights of the BP path and until 2025.



Source: BP: 2022 Full Year and 4Q Financial Results & Update on Strategic Progress, February 2023.

Low Carbon Activities

CCS

BP wants to use CCS on a large scale in the coming decades. Project outlines suggest that by 2030, a CO2 storage capacity of 15 million tonnes of CO2 per year could be available. This would equal almost 50% of BP's current Scope 1 emissions.

Biofuels and Biogas

The amount of biofuels and biogas produced so far is small. The 27 kb/d of biofuels (equivalent to 18 kb/d of fossil fuels) in 2022 are to increase to 50 kb/d by 2025 and to 100 kb/d (66 kb/d of fossil fuels) by 2030. The 12 kboe/d of biogas so far is expected to climb to 70 kboe/d in 2030, following acquisitions in the US.

Since BP is targeting an overall production volume of 2.0 mb/d of oil and gas in 2030, this planned bioenergy volume would correspond to about 7 per cent of the group's production. In view of the high fossil energy input and, in the case of biogas, high methane emissions in the production of biofuels/biogas, the net saving in climate emissions will therefore remain low.

Hydrogen

BP does not give a target for the production of low-carbon hydrogen until 2030, i.e. Green Hydrogen (from green electricity) or Blue Hydrogen (from natural gas plus CCS). In 2030, 0.5-0.7 million tonnes of low-carbon hydrogen are to be produced. The volume is to replace

Grey Hydrogen used so far in the oil refineries, for the production of which natural gas is used (without CCS).

For Blue Hydrogen, BP would have to capture CO₂ in the oil refineries (or other facilities) and store it in old gas fields or aquifers. For Green Hydrogen, the company would have to buy green electricity or produce it itself. At the moment, BP is pursuing both paths in projects in the UK, the Netherlands and Australia.

Renewable power

Despite the prominent role of wind and solar power in reporting, BP has installed comparatively small amounts so far. For the end of 2022, the group reports a wind and solar capacity of 2.2 GW. It is unclear how much electricity was produced.

However, numerous projects are in the pipeline, so that 10 GW of wind/solar power capacity are expected by 2030. The amount of electricity to be expected here (assuming an average 20% capacity factor) would correspond to the energy output of a oil/gas field with approx. 20,000 boe/d production. That would be just under 1% of BP's current oil and gas production.

In this respect, it seems unlikely that BP will be able to significantly reduce the carbon intensity of its production of oil, gas and power through its own electricity production in the foreseeable future.

Sources

BP: Annual Report and Form 20-F 2022, March 2023.

BP: Environmental, Social & Governance, Investor Pack, February 2023.

BP: ESG Datasheet 2022, March 2023.

BP: Net Zero Ambition Progress Update, March 2023.

BP: Sustainability Report 2022, March 2023.

BP: 2022 Full Year and 4Q. Financial Results & Update on Strategic Progress, February 2023.

BP: Integrated Energy Company Strategy Update, 7 February 2023.

BP: 4Q 2022 Results: Webcast Q&A Transcript, 7 February 2023.

2. Eni

Portrait

Eni SpA is among the largest global oil and gas companies („supermajors“) and the largest Italy-based oil company. Eni is engaged in the exploration, development and production of hydrocarbons, in the supply and marketing of gas, liquefied natural gas (LNG) and power, as well as in the refining and marketing of petroleum products, in the production and marketing of petrochemicals and in commodity trading. Eni engages in oil and gas production in over 40 countries worldwide. Eni is listed on the Borsa di Milano and the New York Stock Exchange.

The Company's segments include:

- Exploration & Production
- Global Gas & LNG
- Refining & Marketing and Chemicals (Versalis)
- Plenitude & Power“ (mostly power production and gas/power retail services)

Fossil Fuels

Oil and gas production is at the heart of the business model. Last year, Eni produced 1.61 mboe/d of oil and gas. Of this, 0.75 mboe/d was liquids, i.e. mainly crude oil. The volume was below previous years. In 2018, 1.85 mboe/d were produced. In the current year 2023, the production volume is expected to increase slightly to 1.63-1.67 mboe/d.

The geographical focus of oil and gas production is Africa, with more than 50 per cent of the output. The most important single producing country is Egypt.

A second focus is the production of refined products. In total, 27.79 million tonnes were sold in 2022.

In addition, there is extensive gas trading (55.1 bcm) and LNG trading (9.4 bcm).

Petrochemicals activities are also extensive. Eni produced 6.8 mt of petrochemical products and sold 3.7 mt.

Finally, Eni is also a major electricity producer, mostly from gas power plants, and a large power trader. Power sales in the open market were 22.37 TWh in 2022.

Revenues and Profits

Net sales revenues jumped 73% last year to €132.5 billion. Compared to the period 2019-2021, it was even 109% more.

They are divided between the upstream business (production of oil and gas) with 31.2 billion euros, the international gas/LNG business (48.6 billion euros), the refineries, fuel retail and petrochemicals sector (59.2 billion euros) and the "Plenitude & Power" sector (20.9 billion

euros), which includes power generation, including with wind and photovoltaics, electricity and retail gas trading and other services.

These revenue figures make it clear at first glance that renewable energy is only a secondary activity for Eni in 2022.

This is even more true for profits. Pre-tax profit (Adj. Operating Profit/Ebit) more than doubled from €9.7 billion (2021) to €20.4 billion (2022). Net profit even tripled.

In terms of operating profits, 80 per cent (€16.4 billion) was generated in the oil and gas production (E&P) segment, another €2.1 billion in the Global Gas/LNG segment and €1.9 billion in the refining business (plus petrochemicals). The power business, including gas and solar/wind power, contributed only 3 percent to profits.

Investment (Capex)

Where will the high profits of 2022 go? Of the 8.1 billion euros in capex, about 90% went into the fossil areas of oil and gas production, large gas/LNG projects, refineries and petrochemicals.

Only 0.6 billion euros, or just under 8 percent, was invested in the collective segment "Plenitude & Power". Of this, in turn, only a part was invested in the area of renewable energies and other sustainable activities.

In other words, Eni is currently investing more than 90% of its capex in the continuation of its fossil business model.

EU Taxonomy

EU Taxonomy measures also indicate modest proportions for sustainable activities:

Sales: (total 132.5 bn Euro)

taxonomy-aligned: 0.6% (mostly biogas/biofuels)

taxonomy-eligible (excl. aligned): 6.9% (mostly plastics/chemicals, co-generation)

Capex: (total 12.4 bn)

taxonomy-aligned: 14.1% (mostly wind power, solar power generation)

taxonomy-eligible (excl. aligned): 3.4% (mostly co-generation, plastics/chemicals)

Opex: (total 4.2 bn)

taxonomy-aligned: 1.8% (mostly wind/solar power, biofuels/biogas)

taxonomy-eligible (excl. aligned): 10.3% (mostly waste water management, plastics, co-generation)

Data Table

Eni	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
mn €						
Net Sales	132512	76575	43987	69881	+73%	+109%
hereof:						
Exploration and Production	31200	21742	13590	23572		
Global Gas & LNG Portfolio	48586	20843	7051	11779		
Refining & Marketing and Chemical	59178	40374	25340	42360		
Plenitude & Power	20883	11187	7536	8448		
Corporate and other activities	1879	1698	1559	1676		
Other items	-29214	-19269	-11089	-17954		
Profits						
Operating Profit/Loss (adj.)	20386	9664	1898	8597	+111%	+203%
hereof:						
Exploration and Production	16411	9293	1547	8640		
Global Gas & LNG Portfolio	2063	580	326	193		
Refining & Marketing and Chemical	1929	152	6	21		
Plenitude & Power	615	476	465	370		
Corporate and other activities	-622	-593	-507	-602		
Other items	-10	-244	61	-25		
Net profit	13887	5821	-8635	148		
Net profit (adj)	13301	4330	-758	2876	+207%	+519%
Capex	8056	5234	4644	8376	+54%	+32%
hereof:						
Exploration and Production	6362	3861	3472	6996		
Global Gas & LNG Portfolio	23	19	11	15		
Refining & Marketing and Chemical	878	728	771	933		
Plenitude & Power	631	443	293	357		
Corporate and other activities	166	187	107	89		
Other items	-4	-4	-10	-14		

Emission Data

In the last four years, Scope 1 emissions fell, especially in the upstream sector, mostly due to the 13% drop in oil/gas production (2018: 1851 kboe/d, 2022: 1610 kboe/d). Scope 2 emissions increased.

Scope 1:

2018 43.35 mn t

2022 39.39 mn t

Scope 2:

2018 0.67 mn t

2022 0.79 mn t

Scope 3 and lifecycle emissions fell by almost 20 per cent over the period. Again, the decline in upstream production and the shift from oil to gas played an important role. This is also reflected in the fact that the net carbon intensity (Scope 1+2+3) remained almost unchanged. It was 68 gCO₂e/MJ in 2018 and 66 gCO₂e/MJ in 2022, only about 3 per cent lower.

Scope 3 (use of sold products):

2018 203 mn t

2022 164 mn t

Net GHG Lifecycle Emissions (Scope 1+2+3; calculated on equity basis):

2018 505 mn t

2022 419 mn t

Emission Reduction Goals

Eni, like most oil companies, is aiming for "Net Zero" by 2050. Here, too, the most rapid progress is postponed until after 2030.

The reference to "Net" in "Net Zero" is particularly relevant in Eni's case, as significant emissions are still planned in 2050. The remaining volume is to be "less than 25 million tonnes of CO₂ in 2050", so up to 25 million tonnes of CO₂e emissions could remain in 2050. They are to be balanced by offset measures.

Depending on whether Eni uses Scope 1+2+3 or GHG Lifecycle as a benchmark, the company could still emit 12% or 6% of its current emissions in 2050.

Eni goals and past numbers for GHG Life Cycle Emissions are:

- 2018: 505 Mt CO₂e
- 2022: 419 Mt CO₂e
- 2030: 328 Mt CO₂e
- 2050: Net Zero (incl. CCUS, Carbon Offsets)

- Minus 35% by 2030 (2018 baseline)
- Minus 80% by 2040 (2018 baseline)

Decarbonisation Strategy

1. Renewable Power Generation

In 2018, the amount of electricity produced by Eni from PV and wind was still insignificant at 12 GWh. In 2022, it was already 2553 GWh.

In parallel, the installed capacity, which is mostly based in Italy and the U.S., increased from 40 MW (2018) to 2198 MW (2022), of which about half is PV and half is wind power.

Energy production from renewable sources 2022:

- 2018 12 GWh
- 2022 2553 GWh

Installed capacity from renewables end 2022 (mostly in Italy, USA):

- 2018 40 MW
- 2022 2198 MW

However, this is still little in the overall context of Eni's electricity business. Fossil power production (almost exclusively gas power plants, 2.3 GW in total) was 21.37 TWh in 2022. Renewables therefore only had a share of 12 percent of power production.

By 2026, Eni wants to expand its renewable power capacity to 7 GW. By 2030, this should be over 15 GW, and by 2050 over 60 GW.

In the context of the whole group, the quantities are still small. The targeted 7 GW for 2026 could roughly generate 12 TWh of electricity (assuming 20% capacity factor). Measured in terms of heating value, this would correspond to about 1% of the group's fossil oil and gas production.

2. More Fossil Gas

Eni plans to shift its production structure from oil to gas. The share of natural gas in the oil/gas upstream mix is expected to climb to 60% by 2030 and to over 90% between 2040 and 2050.

„We plan to increase production in Algeria and Egypt...We will invest to revitalize national gas fields. ...and growing contributions are expected from the likes of Nigeria, Angola, Indonesia. Finally, Mozambique, the new frontier of world scale LNG projects...“

Source: Eni: Annual Report 2022, Rome 5 April 2023

Since oil produces more CO₂ emissions than gas during combustion and processing, Eni could reduce its emissions somewhat without having to reduce production volumes. However, this calculation depends on the volumes and the calculation of the climate effect of upstream methane emissions.

3. Biorefineries

Eni operates two so-called biorefineries, in Venice (since 2014) and Gela (since 2020). The combined capacity is 1.1 million tonnes/year. Production volumes, however, remained far below capacity in 2021 und 2022. In 2022, they sold production 428,000 tons of biofuels (e.g. diesel with lower carbon content). This is about 1.5% of Eni's refinery products sold.

Eni plans to expand biofuel capacities to 5 mn t in 2025.

4. Biomass import from overseas

In October 2022, a first cargo of vegetable oil for biorefining, produced at Eni's Makueni agri-hub in Kenya, has been shipped to Eni's Gela biorefinery. This marked the start of Eni's vertical integration of overseas agri-business with its biorefineries.

This supply chain is to grow to over 700,000 tonnes per year of bio-oil by 2026. Target countries are Kenya, Congo, Mozambique, Angola, the Ivory Coast, Rwanda and Kazakhstan.

5. Biochemicals

There are only small amounts of biochemicals so far. Overall revenues in the petrochemical segment are €6200 million in 2022; biochems amount to just €25 million. As for capex, total petrochem capex is €255 million in 2022, hereof „Decarbonization“ with 3 million; „Green & Circular“ activities with 20 million.

6. Hydrogen

The reports provide very little detail about Eni's hydrogen plans. One can assume, however, that blue and green hydrogen will play an important role in long-term decarbonization efforts.

7. CCS/CCUS

CCS/CCUS are seen as „key drivers of Eni transition strategy“. Eni plans to store 10 million tons of CO₂ per year by 2030 (equity share) and reach 50 million tons by 2050 (equity share). That includes services for third parties.

Currently, there is a only one large CCS project in the UK (Hynet). The project is scheduled to start in 2025. And a small CCS pilot project in Ravenna in cooperation with Snam.

8. Carbon Offsets

Carbon offset initiatives are expected to achieve a yearly portfolio of 15 million tons of CO₂ in 2030, 20 million tons in 2040 and up to 25 million tons of CO₂ in 2050.

Carbon Credits in 2020 were 1.5 million tons of CO₂e; in 2022 it was 3 million tons, representing a considerable share of the reported Scope 1 emission reduction over recent years.

9. Fusion reactor (SMR)

Eni invests in magnetic confinement fusion technologies. They expect a first industrial plant as soon as 2030.

Fossil focus remains in place

The capex share for „**new energy solutions**“, a term that probably encompasses most of the above mentioned initiatives, is to increase to 30% by 2026 and to 70% by 2030.

Conversely, this means that at least 70% of investments in the coming years will continue to be reserved for the fossil pathway. In the coming years, the focus of capex is indeed the start of numerous large-scale projects in the gas and oil sector. They include:

- Angola (Agogo West Hub; NGC Quiluma & Mubuqueiro) with start in 2026
- Congo LNG with start in 2023
- Libya (A&E Structure) with start in 2026
- Norway (Balder X, Breidablikk, Johan Castberg) with start in 2024
- Egypt, Indonesia, Italy, UAE, Ivory Coast with start in 2023-2025

The company states: *„Our strategic guidelines in the E&P segment are to maximize cash generation by focusing on highly profitable projects, to deploy our fast-track model of reserves development and to reduce direct emissions by gradually increasing the proportion of gas in our portfolio to 60% by 2030.“*

Source: Eni: Annual Report 2022, Rome 5 April 2023

The 2023-2026 Strategic Plan projects to grow upstream production by 3-4% p.a. over the next four years with a plateau expected through 2030. Upstream capex is seen in the range of €6 and €6.5 billion per year, i.e. on the same level as last year. Contractual LNG sales volumes are even to double from 9 million tons in 2022 to 18 million tons in 2026.

The fossil focus is even seen as a contribution to decarbonisation: *“The [oil and gas] exploration ... is a strategic pillar of [the] decarbonization path. It plays a dual role: replacing produced reserves and granting energy supplies that Eni will need in the transition phase...”*

Source: Eni: Factbook 2022, Rome 10 May 2023

Sources

Eni: Factbook 2022, Rome 10 May 2023

Eni: Annual Report 2022, Rome 5 April 2023

Eni: Fourth quarter and full year 2022 results, Rome 23 Feb. 2023

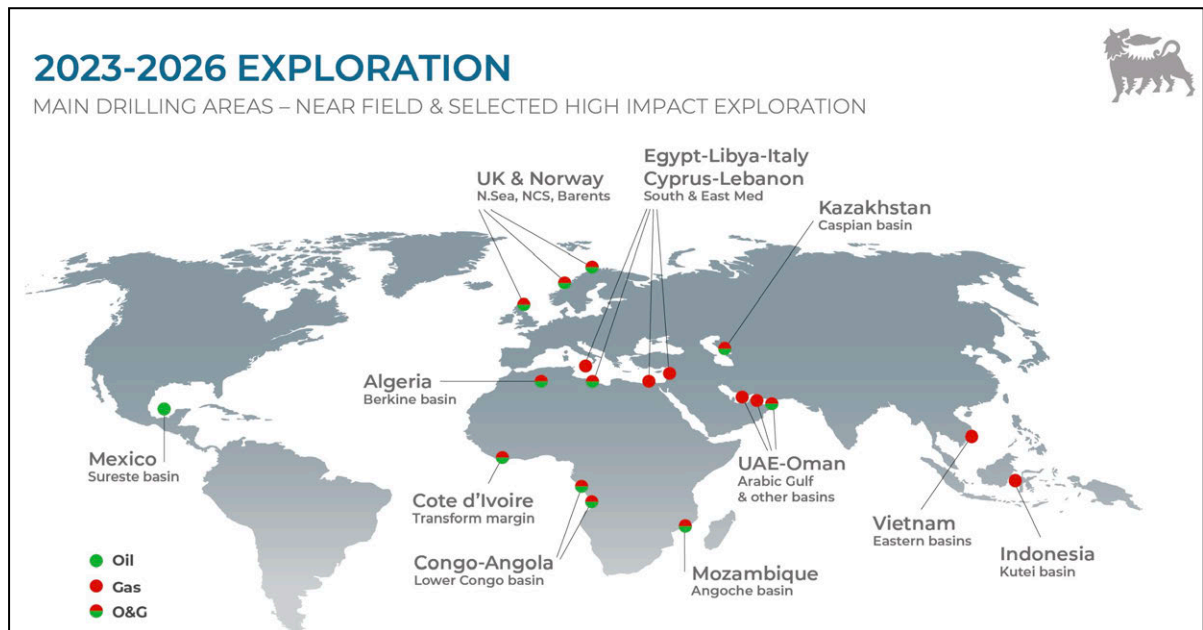
Eni: Capital Markets Update - Strategic plan 2023-2026, Rome 2023

Eni: 2023 Capital Markets Update & 2022 Full Year Results, Rome Feb. 2023

Eni: 2022 Consolidated Financial Statements and Draft Financial Statement of the Parent Company, no date (2023)

Eni: Breakout Sessions 2023. Capital markets update & 2022 full year results, Feb. 2023.

Maps / Diagrams



Source: Eni

3. Equinor

Portrait

Equinor ASA, formerly Statoil, is a large Norway-based international oil and gas company. It is focused on oil & gas upstream activities, but also engaged in transporting, processing and refining fossil fuels. Additionally, there are some minor offshore wind and CCS (carbon capture & storage) activities.

Equinor has five major reporting segments:

- Exploration & Production Norway (E&P Norway),
- Exploration & Production International (E&P International),
- Exploration & Production USA (E&P USA),
- Marketing, Midstream & Processing (MMP) which includes transport, marketing and trading of oil & gas and power; this segment also includes refineries and low-carbon solutions such as CCS.
- Renewables (REN), including wind and solar farms as well as energy storage.

The Norwegian state owns directly 67% of Equinor's shares; plus 3.4% through National Insurance Fund. The Equinor share is listed on the Oslo Stock Exchange and the New York Stock Exchange.

Fossil Production

Equinor produced 2.04 mboe/d oil and gas in 2022 (see table) and is responsible for about 70% of Norway's oil and gas production. Oil and gas have roughly the same shares in energy content terms.

Most products are exported from Norway to continental Europe and the UK. Activities outside Norway accounted for around one third of the company's total production.

Equinor is very active in the upstream sector, mostly offshore Norway but also globally. In 2022 alone, 7 new fields were brought on stream. 13 new plans for development of additional fields were submitted in 2022.

Revenues and Profits

Thanks to the high oil prices and especially the extremely increased gas prices in Europe, Equinor was able to strongly increase sales and profits in 2022. The company clearly benefited from its focus on the upstream sector.

Revenues rose 66% year-on-year to \$150.8bn, and by as much as 125% over the 2019-2021 period. The renewables segment accounted for only 0.1% of the clearly fossil-dominated business (see data table).

Profits grew even more strongly. Operating profits rose by 134% year-on-year in 2022, net profits by 225%. The comparison with 2019-2021 is even more extreme, as oil prices were low in the pandemic year of 2020. Again, renewables played virtually no role.

Investments

The clear fossil orientation of the business model is also evident in the investments. Of the almost 10 billion dollars in 2022, 8.3 billion dollars went directly into the expansion or stabilisation of oil and gas production. A further \$1.2 billion (MMP segment) can also be attributed almost entirely directly to the fossil business, as the "low carbon solutions" in this segment are either fossil-oriented or have not played a significant role to date.

The Renewables segment accounted for only 3 percent of investments in 2022. In the three years before that (see data table), this share also remained extremely low and was at times even less than 1 percent.

Equinor does talk about a share of 14% in 2022 (2021: 11%, 2020: 4%) for "Gross capex in renewables and low carbon solutions", but the definition is very broad and also includes, for example, the usual investments in energy efficiency in the fossil business segments (see below).

Equinor plans to increase investments across the group in the coming years. They are expected to be \$10-11 billion in the current year 2023. For the period 2024-2026, 13 billion dollars per year are planned.

EU Taxonomy

The taxonomy data show that the share of sustainable activities (aligned or just eligible) has been close to zero so far.

Turnover

In 2022, 0% of Equinor's total turnover could be classified as taxonomy-eligible and 0% as taxonomy-aligned.

CAPEX

In 2022, 3% of Equinor's total CAPEX could be classified as taxonomy-eligible (\$245 million) and 2% (\$157 million) as taxonomy-aligned. The aligned and eligible turnover stemmed from the investment in wind power, solar power and energy storage.

OPEX

In 2022, 0% of Equinor's total turnover could be classified as taxonomy-eligible and 0% as taxonomy-aligned.

Data Table

Equinor	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
mn USD						
Sales	150806	90924	45818	64357	+66%	+125%
hereof:						
E&P Norway	75930	39386	12019	18832		
E&P International	7431	5566	3489	6085		
E&P USA	5523	4149	2615	4239		
MMP	148105	87393	44963	60955		
REN	185	1411	181	353		
Other	187	355	132	271		
Eliminations**	-86554	-47335	-17581	-26379		
Profits						
Net operating income	78811	33663	-3423	9299	+134%	+498%
hereof:						
E&P Norway	67614	30471	3133	9631		
E&P International	3248	329	-3559	1471		
E&P USA	4022	1150	-3512	-2271		
MMP	3611	1163	376	1004		
REN	-84	1245*	-35	160		
Other	-178	-234	-122	-68		
Eliminations	577	-461	295	-629		
Net Income	28744	8576	-5496	1851	+225%	+1649%
Capex	9994	8506	9762	14782	+17%	-9%
hereof:						
E&P Norway	4922	4943	5004	7316		
E&P International	2623	1834	2588	2851		
E&P USA	764	690	1067	3004		
MMP	1212	517	1048	788		
REN	298	458	33	175		
Other	176	64	22	648		
Production volumes (equity) in 1000 boe/d						
Liquids and gas	2039	2079				
- liquids	1013	1076				
- gas	1026	1003				
Power Generation in GWh						
- renewable power generation	1649	1562	1662	1754		
- renewable capacity in GW	0,6	0,5	0,5	0,5		
	Notes: *profits due to sale of wind assets in the U.S.; **mostly inter-segment activities.					

Emission Data

The figures show significant progress over the last few years in Scope 1 emissions from 15.4 mn t (2016) to 11.4 mn t CO₂e (2022). For Scope 2, emissions remained almost unchanged.

Norway is considered a global leader in upstream and midstream emissions abatement. Therefore, the figures are comparatively low. Electrification of offshore oil and gas platforms will further reduce these emission levels, as electricity generation in Norway is largely decarbonised (mostly hydropower).

Scope 3 emissions (Cat.11, use of sold products), however, have hardly changed over the years and totalled 243 mn t CO₂e in 2022. The slight decrease compared to 2021 is explained by the decreasing oil and gas production.

Equinor Emissions	2022	2021	2020	2019		2016
mn t CO ₂ e						
Scope 1 (operational control)	11.4	12.0	13.3	14.7		15.4
Scope 2 (operational control, market-based)	2.5	2.7	2.5	2.9		2.6
Scope 2 (operational control, location-based)	0.1	0.1	0.3	0.2		0.3
Scope 3 (equity basis) (cat.11, use of sold products)	243	249	250	247		239

Emission Goals

Like most oil companies, Equinor is committed to the goal of being a "net zero company" by 2050. Residual emissions are to be offset by carbon offsets. Overall, the path towards this goal remains very vague, as Scope 3 emissions in particular are hardly addressed.

On the way there, the company formulates only a few interim targets:

Scope 1+2 emissions

2015-2030: minus 50% (of which 90% absolute reduction, rest offsets). Of these, savings of 31% have already been achieved in the 2015-2022 period.

Scope 1+2+3 emissions

For total emissions, the company only formulates intensity targets as pathways, i.e. emissions per unit of oil or gas produced:

- 2019-2030, the net carbon intensity (NCI) is to be reduced by 20%
- 2019-2035 NCI is to fall by 40%
- 2019-2050 NCI is to fall to "net zero".

Fossil production of oil and gas is to remain at an unchanged high level at least until 2030. The group does not specify whether or to what extent production is to fall in the years after 2030. In the current year 2023, it is expected to increase by about 3 per cent.

Even by 2050, the world will not be able to do without fossil oil and gas according to Equinor:

"In 2030 we aim to produce around 2 million barrels of oil and gas per day...Even within the most ambitious goals of the Paris agreement and the net-zero scenario of the International Energy Agency, there will still be a need for oil and gas in the 2050 energy mix."

Source: Equinor: 2022 Integrated Annual Report, 23 March 2023.

Low Carbon Strategy and Activities

Goals and major elements

Equinor defines "low carbon" as "new energy solutions" and "energy efficiency technologies", clearly an extremely broad approach. The share of these investments is expected to increase from 14% in 2022 to >30% in 2025 and >50% in 2050. The most important elements are:

- CCS
- Blue and Green Hydrogen
- Renewable Power Generation
- Electrification of oil/gas platforms in Norway
- Carbon Offsetting

CCS and Hydrogen

The final disposal of CCS in old gas fields or in aquifers is the core of the group's low carbon activities. Without CCS, the hydrogen strategy would also be blocked, as the high amounts of CO₂ in hydrogen production have to be disposed of to make Blue Hydrogen possible.

Equinor is the world's pioneer in CCS projects in the strict sense (i.e. excluding EOR) and is the only oil company with experience since the 1990s.

In 2016-2020, 0.9-1.4 million tonnes of CO₂ were stored annually. In 2021, it was 0.3 million tonnes, last year 0.5 million tonnes. Accumulated, Equinor has stored 26.3 million tonnes of CO₂ since 1996. However, this falling trend is to be reversed through the realisation of a series of large-scale projects.

In 2030, 5-10 million tonnes of CO₂ are to be deposited, in 2035 already 15-30 million tonnes. This would then correspond to approx. 10% of the group's current Scope 3 emissions.

However, the facilities will also be available to third parties and their respective climate pledges. In August 2022, Northern Lights, a joint venture owned by Equinor, Shell and TotalEnergies, signed the world's first commercial agreement on cross-border CO₂ transportation and storage.

Renewable Power

Renewable power has so far been only a marginal element of the Group's activities. In terms of energy content (excluding efficiency multiplier), the Group reported a share of only 0.13% of total energy production in 2022.

In 2022, 1.65 TWh of electricity was produced from renewables. These volumes have changed only slightly in recent years.

The installed capacity in 2022 was 0.6 GW (equity share). By 2030, Equinor aims to have grown the installed renewables capacity to 12-16 GW and produce 35-60 TWh annually. To this end, Equinor is involved in a number of large-scale projects, particularly in the area of offshore wind.

Electrification of Offshore/Onshore Installations

The electrification of offshore and onshore installations is a prerequisite for Norway reaching its national climate goals under the Paris agreement. They contribute about a quarter to Norway's overall emissions.

Hywind Tampen Offshore Wind Farm is expected to provide around 35% of the power need of the five Snorre and Gullfaks platforms. This is expected to cut CO₂ emissions from the fields by around 200,000 tonnes a year.

The expected reduction of CO₂ emissions per field in the coming years are considerable and will reduce Equinor's Scope 1 emissions further: Sleipner 150,000 tonnes a year, Gina Krog 320,000 tonnes a year, Oseberg 320,000 tonnes a year, Troll 450,000 tonnes a year, Njord 130,000 tonnes a year.

Equinor also plans installing electric onshore compressors for the Snøhvit field and electrifying operations at Hammerfest LNG. The development will expand gas processing capacity and cut CO₂ emissions by around 850,000 tonnes a year.

Carbon Offsetting

Equinor plans to reduce its Scope 1 and 2 emissions by 2030 predominantly (>90%) through absolute emissions reductions. The rest will be achieved by carbon offsets.

As for the 2050 goals, the role of carbon offsets is not yet entirely clear. The company states that negative emissions solutions and offsets will make „an important contribution“ to address the climate challenge.

Sources

Equinor: 2022 Integrated Annual Report, 23 March 2023.

Equinor: 2022 Energy transition plan, 22 March 2022

Equinor: Energy transition plan. Progress report 2022, 23 March 2023.

Equinor: Our Climate Policy Positions, no date.

Equinor: 2023 Capital Markets Update. Value creation through the transition, Torgrim Reitan (CFO), London 8 February 2023.

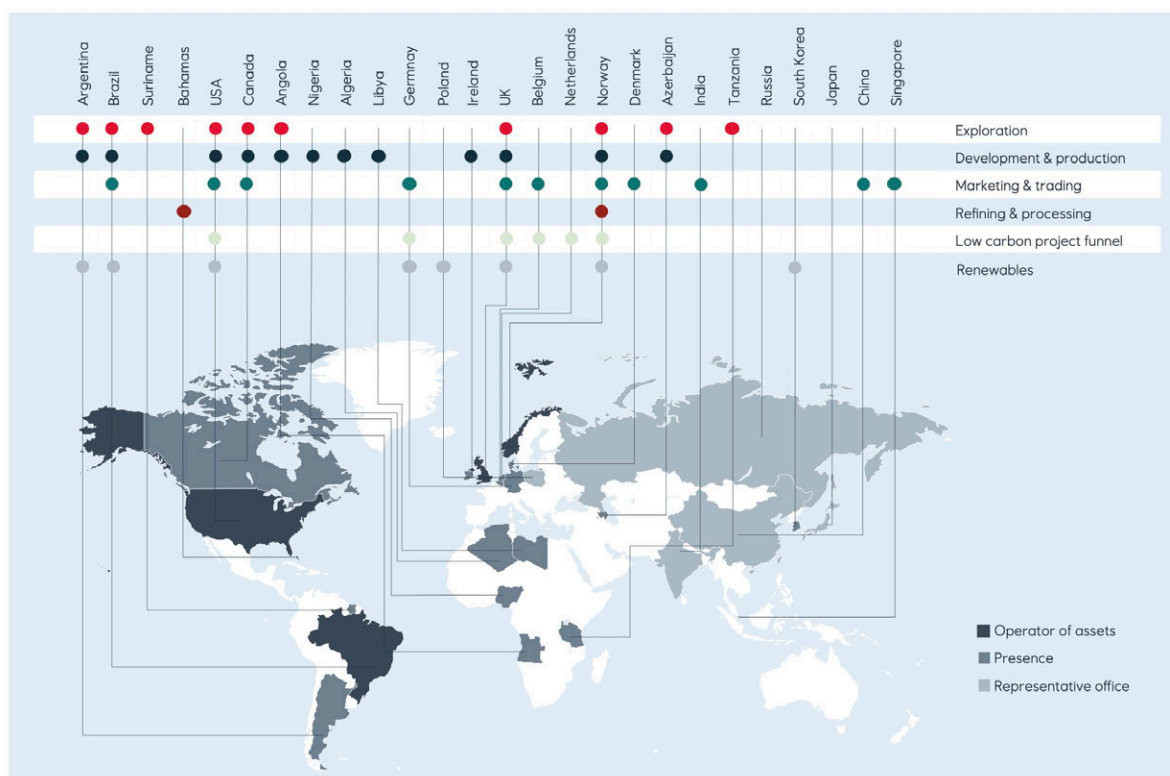
Equinor: 2023 Capital Markets Update. Appendix, London 8 February 2023.

Equinor: 2023 Capital Markets Update, London 8 February 2023.

Equinor: Fourth quarter 2022. Financial statements and review, no date.

Equinor: Greenhouse gas and methane intensities along Equinor's Norwegian gas value chain, Stavanger, 19 November 2021.

Maps and Diagrams



Source: Equinor

4. Ina Croatia

Portrait

INA Group (Croatia) is a smaller European oil company with a leading role in the Croatian market and activities in neighbouring countries and overseas.

The main focus is on the production of oil and gas, onshore and offshore Croatia, as well as the processing of crude oil in the refineries in Rijeka and Zagreb. From there, it is distributed in particular through more than 500 petrol stations in Croatia and neighbouring countries.

In addition, there is the import and trading of natural gas. INA has various subsidiaries, also in exotic locations such as the Marshall Islands (leasing of drilling platforms), but mainly in South-Eastern Europe.

INA Group is 49.08% owned by the Hungarian oil company MOL (see company chapter); another 44.84% is owned by the Croatian state; the remaining 6.08% is owned by private or institutional investors. INA is listed on the Zagreb Stock Exchange.

Revenues and Profits

Revenues in 2022 were 35.1 billion HRK (Croatian kuna; replaced by euros in 2023). This is the equivalent of 4.9 billion dollars.

Operating profits (Ebitda excl. special items) were HRK 5.1 billion (\$708 million) last year. This is 49% above last year and a huge 110% above the average for the previous three years (2019 to 2021). This was achieved despite the state regulation of petrol station prices and (from late autumn 2022) gas prices.

Net profits increased even more. They climbed by 95% year-on-year and by 436% over the 2019-2021 period.

The profits were overwhelmingly upstream, in the exploration and production of oil and gas. Higher oil and gas prices were key here.

Last year INA Croatia produced 12282 b/d of crude oil (b/d = barrels per day) and 12859 boe/d of natural gas (boe/d = barrels of oil equivalents per day). In addition, there were 912 boe/d of condensates. All three values were slightly below the previous year. The geographical focus of production was and still is Croatia, onshore and offshore.

The second cash generator was the refineries, which achieved much higher margins than in previous years. However, the result here was burdened by high investments and government price regulations. Refinery production in 2022 was 2.4 million tonnes, mainly diesel, petrol and fuel oil. The fuels were distributed through a network of more than 500 petrol stations. Natural gas sales totalled 745 million cubic metres.

Data Table

INA CROATIA	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
in HRK mn*						
Sales						
Net Sales Revenues	35114	22400	14788	22597	+57 %	+76 %
hereof:						
Exploration & Production	6725	3877				
Refining & Marketing, Retail & Consumer Services	34419	21912				
Profits						
Ebitda excl. special items	5068	3403	991	2859	+49 %	+110 %
hereof:						
Exploration & Production	4892	2515				
Refining & Marketing, Retail & Consumer Services	360	1253				
Ebitda	5068	3315	991	2859		
CCS Ebitda excl. special items	5481	3029	1783	2897		
Profit from operations	3230	1469				
Profit from operations exc. spec.items	3408	1557				
Net Profit/Loss excl. spec. items	2684	1373	-638	768	+95%	+436%
Capex						
Total	2728	1598	1282		+71%	
hereof:						
Exploration & Production	795	608				
Refining & Marketing, Retail & Consumer Services	1759	904				
hereof:						
Refining & Marketing	1617					
Retail & Consumer Services	142					
	Notes: *HRK = Croatian kuna; replaced by Euro in 2023; for 2022 apply 7,16 HRK = 1 USD					

Data Source: Ina Croatia

Investment (Capex)

The investments (capex) show an increase of 71% compared to the previous year, but the purely fossil orientation of the group remained unchanged.

Of the total capex of HRK 2.7 billion (\$380 million), almost HRK 1.8 billion went to oil refineries and HRK 0.8 billion to oil and gas production (E&P). The rest, HRK 142 million, went into consumer services and retail, i.e. the modernisation of the petrol station network.

The largest investment project of Ina Croatia is in the refinery sector: An upgrade of the Rijeka refinery, to achieve a higher valued product mix after completion. This project is the largest investment in INA Group's history.

The second focus is the Offshore Drilling Campaign. Its aim is to halt the decline of the Group's largely depleted gas fields.

Low Carbon: Capex and Strategy

No change in strategy is apparent in the reports for 2022. The targets for sustainability and energy transition published last year still apply.

INA Group's sustainability strategy (currently: "INA R&M New Course 2023") is based on the goals of its largest shareholder MOL Group ("Shape Tomorrow", "2030+ Strategy"). The focus here is on increasing the efficiency of the Rijeka refinery. This investment comes under the heading of sustainability.

The transformation of another refinery site in Sisak into a biorefinery is being considered, but has not been decided.

In a pilot project in the Sandrovac oil field, the injection of CO₂ is being promoted within the framework of an EOR project (2.3 million tonnes of CO₂ injection in seven years). In the longer term, CCS/CCUS services (Carbon Capture, (U)tilisation and Storage) are to be developed here in order to finally store larger quantities of CO₂ in empty gas and oil fields, for example from local fertiliser plants. However, details and concrete plans are not yet known.

So far, CO₂ injections (Sandrovac oil field) are pure EOR projects (Enhanced Oil Recovery). In the case of EOR, the injection of CO₂ increases pressure in the reservoir in order to perpetuate production levels. However, it is misleading to interpret this as climate measure, since in EOR often some of the CO₂ will return to the surface.

INA Group is holding back on the expansion of renewables. According to the Q3/2022 report, it has been building two smaller solar parks (9 MW / 3 MW) since spring 2022.

The capital flows into the fossil sector, very predominantly into the modernisation of a large oil refinery and the expansion of offshore gas production.

Ina Croatia openly acknowledges the predominantly fossil orientation of its corporate strategy. The statements on the topics of sustainability, climate crisis and energy transition are very vague throughout the report.

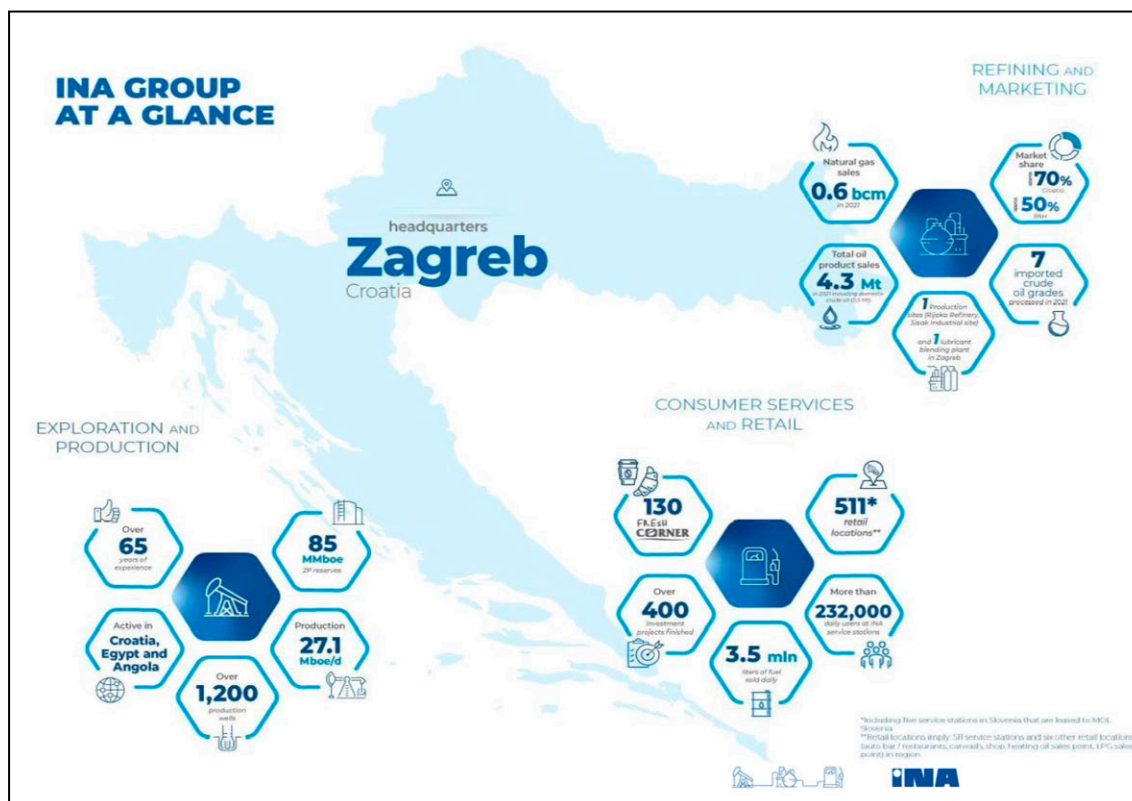
A change of direction in favour of renewables and true low-carbon solutions is hardly recognisable and, beyond some CCS plans mentioned above, is also not planned.

Emission data

The emission figures for 2022 are not yet known. The data for 2021 show the following amounts:

Scope 1: 1.22 mtCO₂e
Scope 2: 0.11 mtCO₂e
Scope 3: 11.89 mtCO₂e

Maps/Pictures



Source: Ina Group: Annual Report 2021, Zagreb 2022

Sources

Ina Group: Q4 & FY 2022 Financial Report, Zagreb February 2023.

Ina Group: Financial Report 2021, Zagreb 2022.

Ina Group: Q2 & H1 2022 Financial Report, Zagreb July 2022.

Ina Group: Q4 & FY 2020 Financial Report, Zagreb February 2021.

Ina Group: Annual Report 2021, Zagreb 2022.

Statistical Annex to Financial Reporting by Ina Croatia:
TFI-POD-INA-Grupa-Q4-2022-ENG.xlsx (<https://www.ina.hr>)
TFI-POD-INA-GROUP-Q3-2022-ENG.xlsx
TFI-POD-INA-dd-Q3-2022-ENG.xlsx

5. MOL Group

Portrait

The Hungarian MOL Group is a large integrated oil and gas group. It produces oil and gas, processes oil in its own refineries into oil products, which are distributed via its vast international petrol station network, and is a large petrochemicals player. The Group also transports and distributes natural gas and offers a range of customised energy services.

The geographical focus of its activities is on Hungary and the neighbouring Central and Eastern European countries. There, MOL has an often market-dominating position in the oil business, either directly or through shareholdings (e.g. 49.1% in INA Group/Croatia). Only last year, MOL bought over 400 petrol stations from the Polish Lotos Group. In addition, MOL is also active in a number of Asian countries and in Northern Europe.

So far, the MOL Group has relied almost exclusively on Russian oil and gas imports. At the moment, alternative supply routes are also being developed.

The shares are owned by a variety of players. Just under a third is owned by foreign, mostly institutional investors. The largest single shareholder is the MOL New Europe Foundation (MOL/state) with a share of 10.5%, followed by the Maecenas Universitatis Collegium Foundation (10%). MOL shares are listed on the Budapest and the Warsaw Stock Exchanges.

Fossil Production

MOL's own production is just under 100,000 barrels of oil equivalents per day (oil and gas), which is significantly lower than the refinery and distribution volumes. MOL therefore has to buy oil and gas, so far almost exclusively from Russia.

Last year, MOL produced 40,000 boe/d of crude oil, mainly in Hungary, Croatia and Azerbaijan. It also produced 37,900 boe/d of natural gas, mainly in Hungary and Croatia. In addition, there were 4,800 boe/d of condensates, mainly in Hungary. Total hydrocarbon production amounted to 92,000 boe/d.

Downstream, 18.9 million tonnes of hydrocarbons were marketed, of which 17.7 million tonnes were refinery products and 1.2 million tonnes petrochemical products. In terms of volume, fuels such as diesel (10.6 million tonnes) and petrol (3.6 million tonnes) dominate. They are distributed through a network of 2,391 service stations covering almost all of Central, Eastern and South-Eastern Europe, with a focus on Hungary, Croatia and Poland.

Revenues + Profits

Net Sales Revenues were \$26.3 billion last year, up 39% from \$19.0 billion in 2021 and up 58% compared to the 2019-2021 period.

Despite the political turmoil and fuel price regulations in 2022, MOL Group increased its profits (Ebitda) in 2022. Ebitda reached a new record of \$4.6 billion (+34%); compared to

same level as 2021, with the highest spending taking place in Azerbaijan. The home market Hungary and the neighbouring country Croatia are also important investment targets.

The distribution of capex shows the one-sided fossil orientation of the MOL Group. Almost all of the capital flowed into the upstream (oil and gas production), downstream (refineries, petrochemicals) and consumer services sectors, i.e. mainly the petrol station network. Only 1.2% of capex went to the power sector (cf. Data Table).

Of this \$2012 million, MOL classifies \$339 million in the category "Transformational CAPEX", which, however, only slightly overlaps with Energy Transition or Sustainability concepts, as it also includes costly refinery upgrades (Rijeka), which are only intended to improve the product range of the plants.

Outlook to 2030: Company and Capex Strategy

The MOL Group has published its medium-term goals in the strategy paper *Shape Tomorrow 2030+*. MOL Group's revenues are to be diversified while keeping the current fossil development path:

- adding higher-value petrochemicals and oil products
- adding a broader range of consumer goods at petrol stations.
- increased activities in recycling and in the Hungarian waste management sector.

Upstream

The strategic outlook maintains oil and gas production (upstream) at a high level: *"The upstream business continues to play a major role in terms of generating substantial free-cash allowing MOL Group to fund investments related to the transition"*. (Source: MOL Group: Integrated Annual Report 2022, April 2023). The oil and gas reserves are to be explored more quickly so that production volumes are secured. No end date or reduction of this search for oil or gas is mentioned.

Downstream

In the downstream sector, the refineries are being modernised at great expense. They are to produce a higher-quality product mix and there is a general transformation from "fuels to chemicals" - which also remains within the fossil pathway.

Central projects are the upgrading of the refinery in Rijeka, and the Polypol project, which initiates a gradual change from base chemicals (polypropylene) to polyol/glycol. Over the next few years, \$1.3 billion is to be invested here.

Consumer Services

In the consumer services segment, investments will be made in the modernisation and expansion of the petrol station network. Especially after 2025, more EV Chargers are to be located here. However, the number of charging points will remain relatively low. Only 500 EV Charging Points are planned in MOL's international petrol station network by 2025.

The expansion of the station network, which is intended to consolidate MOL's position as the leading retailer of fuels in Central and Eastern Europe, is apparently more important.

Waste Management

A relatively new investment target is waste management. Here, activities are to be expanded and the aspect of recycling raw materials is to gain in importance. MOL has obtained important state concessions in Hungary for this purpose.

Emissions data

MOL's GHG emissions have changed only marginally in recent years. In the period 2019-2022, Scope 1 and Scope 3 remained at roughly the same level. Only Scope 2 was reduced, albeit from a low level, so there was little change in the Group's overall balance.

MOL Group emissions	2022	2021	2020	2019
mn tons CO₂e				
Scope 1	6,64	6,77	6,81	6,84
hereof:				
Upstream	0,97			
Downstream	5,64			
Others	0,04			
Scope 2*	0,70	0,61	0,85	1,02
Scope 3	58,81	56,81	54,37	59,29
hereof:				
- Use of sold products	55,60	53,30	50,72	56,70
*market-based				

Source: MOL Group

Low Carbon Capex and Emission Targets

The MOL Group's low carbon strategy remains vague. It plans to change to a "low-carbon, sustainable business model" and become "net carbon neutral" by 2050. However, the low carbon efforts in the core business remain rather modest.

Significant investments in solar/wind power are apparently not planned. Solar power has been produced since 2018. The Hungarian subsidiary MOL Solar Operátor Kft. achieved a modest turnover of 4 million euros in 2022. It has plants with a capacity of 30 MW. In the wind power business, there is only one project that has not yet been completed.

Only the interim targets 2019-2030 are more concrete. Here, it remains unclear how emission reductions for Scope 3, i.e. primarily the sale of oil products, are to be achieved.

Targets for the period 2019-2030 are:

- downstream segment: minus 20% (Scope 1+2)
- upstream segment: Net Zero (Scope 1+2)
- consumer services: Net Zero (Scope 1+2)
- total MOL Group: minus 30% (Scope 1+2)

The realisation of the 2030 targets is to rely primarily on the following measures:

- downstream: higher efficiency of refinery processes, green hydrogen, biofuels, CCS/CCUS and portfolio changes
- upstream: CCS/CCUS, less flaring and less methane emissions

A first CCS project is targeted for 2026. For green hydrogen, there is only a small pilot project at Danube Refinery so far. A 10 MW PEM electrolyser with a planned output of 1,600t of hydrogen is scheduled to start operation in 2024.

This modest hydrogen plan leaves the partial decarbonisation of fuels up in the air. The market ramp-up of green hydrogen is uncertain and, not only in Hungary, massively subsidised by the state. If the production of solar and wind power is not expanded at the same time, there will also be a "cannibalisation effect", as this power will then be missing from the decarbonisation of the electricity supply.

It also remains unclear where the additional biofuels are to come from, especially larger quantities of second-generation fuels ("advanced bio").

EU Taxonomy

The classification of MOL activities in the EU taxonomy also shows the still one-sided fossil orientation. The few taxonomy-compatible activities are concentrated in the chemicals and plastics sector.

Sales Activities

Taxonomy-aligned: 0,2%

Taxonomy-eligible (not aligned): 8,8%

Opex:

Taxonomy-aligned: 1,2%

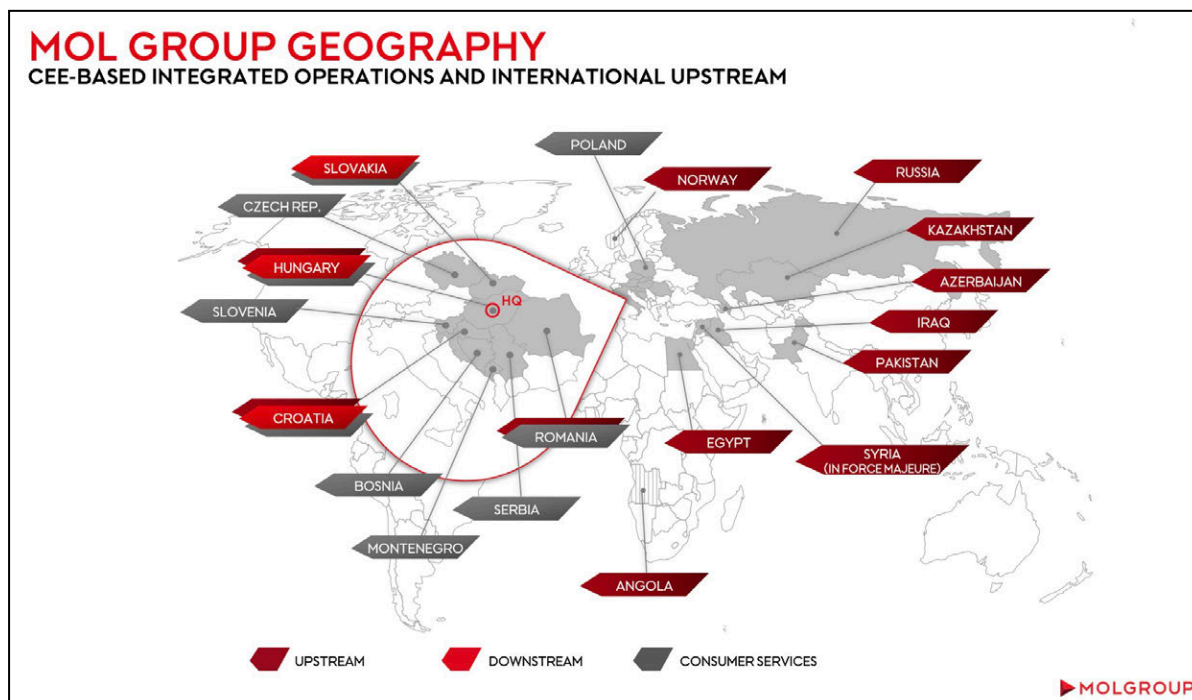
Taxonomy-eligible (not aligned): 4,2%

Capex:

Taxonomy-aligned: 4,8% (mainly base chemicals manufacturing and energy efficiency capex)

Taxonomy-eligible (not aligned): 10,6% (mainly plastics manufacturing)

Maps



Source: MOL Group: Investor Presentation, Feb. 2023

Sources

MOL Group: 2022 GRI Reporting Table, 28 April 2023.

MOL Group: Integrated Annual Report 2022, April 2023.

MOL Group: Third Quarter 2022 Results, 4 November 2022.

MOL Group: Investor Presentation, November 2022.

MOL Group: Flash Report tables 2022, February 2023.

MOL Group: 2022 results: strong EBITDA despite a turbulent year, press release, 17 February 2023.

MOL Group: Fourth Quarter 2022 Results, Presentation, 17. February 2023.

MOL Group: Investor Presentation, February 2023.

Mol Group: Data Library 2018-2022, 2023

mol_group_fr_tables_2012_2021q4.xlsx, no date.

6. OMV

Portrait

OMV is the dominant oil and gas group in Austria. It is a medium-sized, integrated group that covers the entire value chain from oil/gas production to retail. For some years now, petrochemicals have become increasingly important. In the future, it will be the main focus of the group. OMV along with its subsidiary Borealis is one of the largest producers of ethylene and propylene in Europe and one of the top ten polyolefin producers worldwide.

OMV extracts hydrocarbons in Central and Eastern Europe, Middle East and Africa, North Sea, and in Asia. It processes oil and gas in four countries and markets oil fuels and natural gas in 13 countries.

As of January 2023, OMV introduced a new corporate structure:

- Chemicals & Materials continues to cover the entire value chain for chemicals (incl. recycling).
- Fuels & Feedstock combines the previously separate segments Refining and Marketing & Trading
- Energy includes the traditional Exploration & Production (E&P) and Gas businesses, as well as Low Carbon. A new focus here is planned to be CCS and geothermal energy.

The largest shareholders are the state (31.5% ÖBAG - Austrian state holding company) and MPPH (24.9% Mubadala Petroleum and Petrochemicals Holding Company, Abu Dhabi). Major shareholdings are OMV Petrom (51%), Borealis (75%) and ADNOC Refining (15%). OMV stock is listed on the Vienna Stock Exchange.

Fossil Fuels

OMV is a mid-sized producer of oil and gas. Hydrocarbon Production in 2022 was 392 kboe/d, hereof 194 kboe/d liquids und 198 kboe/d natural gas. Geographical focal points are Romania, Norway, and, by 2022, also Russia. In 2021 hydrocarbon production (including Russia) was 486 kboe/d.

OMV has a global refining capacity of around 500 kb/d. The Group operates three refineries in Europe and holds a 15% stake in ADNOC Refining and ADNOC Global Trading in the UAE.

Fuels and other sales volumes Europe were 15.51 mn t in 2022. The retail network comprises around 1,800 service stations in ten European countries.

Polyolefins sales amounted to 5.7 mn t in 2022.

Natural gas sales volumes were 36.2 TWh in 2022. In total, OMV markets and trades natural gas with sales volumes amounting to 111.2 TWh in 2022.

Revenues and Profits

OMV was able to increase its sales last year by 75% compared to 2021 despite the supply and production shortfalls in Russia. Compared to the period 2019-2021, it was even an increase of 147%. The growth was concentrated in oil and gas production and oil refineries (see table below).

Profits increased even more. Compared to 2021, they rose by 142%, and by as much as 279% compared to the 2019-2021 period. This was achieved despite the fact that OMV's largest refinery (Schwechat) was out of operation for six months in 2022 due to a technical breakdown.

Once again, it was the oil and gas production and oil products and natural gas trading segments that made the largest contribution to the increase in profits thanks to much higher sales prices and larger margins.

Investment (Capex)

Capex shows a clear fossil focus over the years. Last year, a total of 4.2 billion euros was invested. Organic capex (i.e. excluding acquisitions) was 3.7 billion euros (see table).

Of the 4.2 billion euros, 1.9 billion euros went into Chemicals/Materials, 1.4 billion euros into Oil/Gas Production and 0.8 billion euros into Refining/Marketing. All three segments, with minor exceptions, are oriented towards the production, processing and sale of oil and gas.

Emission Data

Unlike most of the companies in our sample, OMV's emissions have increased rather than decreased in recent years due to large acquisitions. This is especially true for Scope 3 emissions. Overall, OMV's emissions (Scope 1+2+3) were around 145.4 mn t CO₂e in 2022. In 2019 it was 137.3 mn t CO₂e. OMV's GHG-Emissions increased by roughly 6 percent over the past years.⁴

The lack of progress is also shown in carbon intensity indicators (emissions per unit produced/marketed). The carbon intensity of the product portfolio fell only by 3 percent in the period 2010-2022.

Scope 1:

2019 10.8 mn t CO₂e

2022 11.7 mn t CO₂e

Scope 2:

2019 0.4 mn t CO₂e

2022 0.9 mn t CO₂e

⁴ OMV: Sustainability Report 2022. Non-Financial Report, Vienna April 2023, p.149. The company has pointed out to us that there is a second emission table (p.150) where emissions actually *decrease* (backdating emissions of acquired companies).

Scope 3:
 2019 126.1 mn t CO₂e
 2022 132.8 mn t CO₂e

Emissions from use of sold products (Scope 3, Cat.11)
 2019 110.0 mn t CO₂e
 2022 99.4 mn t CO₂e

Data Table

OMV Group	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
mn €						
External Sales	62298	35555	16550	23461	+75%	+147%
hereof:						
Chemicals & Materials	12269	10509	2368	753		
Refining & Marketing	25816	14095	12651	20121		
Exploration & Production	24197	10937	1527	2583		
Corporate & Other	17	14	4	4		
Profits						
Operating Profit/Loss	12246	5065	1050	3582	+142%	+279%
hereof:						
Chemicals & Materials	2039	1828	1568	532		
Refining & Marketing	3392	451	592	1315		
Exploration & Production	6936	2910	-1137	1879		
Corporate & Other	-86	-74	-56	-91		
Consolidation	-35	-51	83	-54		
Clean CCS Operating Result	11175	5961	1686	3536		
Net profit	5175	2804	1478	2147	+85%	+141%
Organic Capex (excl. acquisitions)	3711	2650	1884	2251	+40%	+64%
Capex (total)	4201	2691	6048	4916	+56%	-8 %
hereof:						
Chemicals & Materials	1896	835	4360*	35		
Refining & Marketing	821	633	570	2739		
Exploration & Production	1443	1194	1090	2070		
Corporate & Other	41	28	27	72		
	Notes: Organic Capex was just €257mn.					

Note: The data table is still structured according to the old Group structure, which was valid until the end of 2022.

EU Taxonomy

The taxonomy data show that the share of sustainable activities (aligned) has been close to zero so far. In the case of investments (aligned), there are only slight signs of a shift, so far mainly in the chemicals sector (recycling). Wind power was a distant second, accounting for only about 0.5% of OMV's investments.

Turnover

In 2022, 17.9% of OMV's total turnover could be classified as taxonomy-eligible but just 0.1% as taxonomy-aligned.

The aligned turnover (€37.1 mn) predominantly stemmed from the production of heat/cool using waste heat.

CAPEX

In 2022, 43.7% of OMV's total CAPEX could be classified as taxonomy-eligible and 9.5% as taxonomy-aligned. The aligned CAPEX (€347 mn) predominantly stemmed from the investment in manufacture of organic basic chemicals (€212 mn), followed by investment in wind power generation (€22 mn).

OPEX

In 2022, 41.2% of OMV's total OPEX could be classified as taxonomy-eligible but just 0.1% as taxonomy-aligned. Aligned OPEX stemmed mainly from the production of heat/cool using waste heat.

Sustainability Goals

Like most of the oil companies in our sample, OMV is also aiming for climate neutrality or net zero emissions by 2050. The path to this goal is to be achieved gradually at first, then faster towards the end.

Scope 1+2:

For Scope 1 and 2, OMV is aiming for an absolute reduction of >30% by 2030 and >60% by 2040 (base year 2019).

Scope 3:

Emission volumes are planned to be 20 per cent lower by 2030 and 50 per cent lower by 2040 (base year 2019). As usual, the main burden of reduction is shifted far into the future.

Decarbonisation Strategy

OMV openly admits the non-sustainability of its business model: „If we look at this rationally, OMV cannot afford to keep pursuing the same business model and we must radically change... we intend to gradually reduce our fossil fuel production and completely cease production for energy use by 2050 at the latest.“ Source: OMV: Sustainability Report 2022. Non-Financial Report, Vienna April 2023 (CEO Interview)

The limitation here lies in the expression "for energy use". Chemicals, i.e. the new focus of OMV's strategy, will therefore continue to be operated. Renewable fuels will also continue to be marketed and produced.

The reduction of emissions will be achieved, in this perspective, as oil and gas production and also crude oil distillation are to be gradually reduced. But the fossil fuel focus is not to be touched for the time being. According to the 2030 strategy, oil and gas should act as a cash engine for the group and finance the transformation.

A production level of around 370 kboe/d is targeted by 2025 and around 350 kboe/d by 2030. This is only slightly below the levels of 2022 (392 kboe/d). Crude distillation throughput at the Schwechat and Burghausen refineries is expected to fall from 12.9 million tonnes in 2019 to around 10.3 million tonnes in 2030.

The chemical business, on the other hand, is to grow and be decarbonised through higher recycling shares: „*This scale-up of zero-carbon energy product sales while decreasing fossil fuel sales is central to OMV's climate strategy...Meanwhile, our chemicals segment is projected to grow by 35% in monomer production volumes and 30% in polyolefins production volumes by 2030. In this non-energy segment, we will also reduce our Scope 3 emissions by pursuing circular economy technologies, but not at the same rate as our energy segments.*“

Source: OMV: Sustainability Report 2022. Non-Financial Report, Vienna April 2023

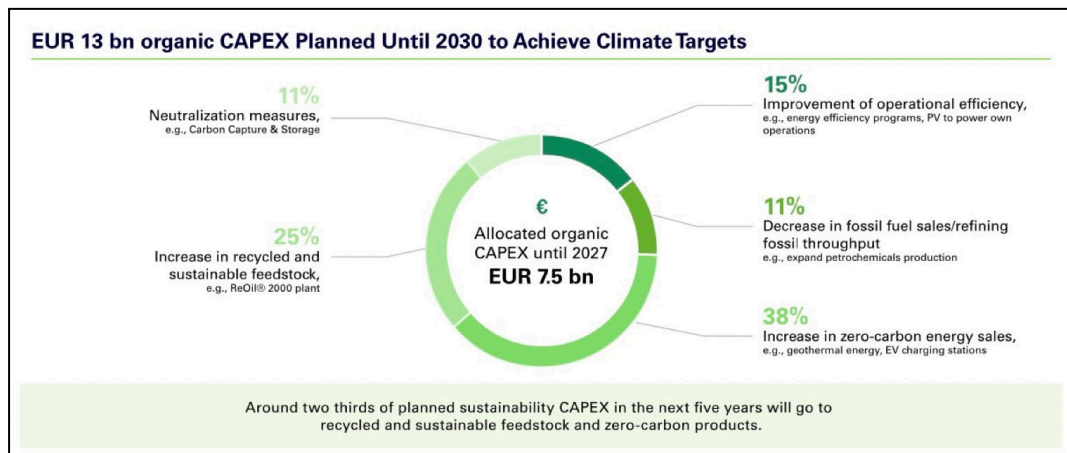
Low Carbon Plans

OMV intends to spend €7.5 billion in organic capex in the period 2022-2027 to achieve its climate targets. By 2030, the target is as much as 13 billion euros. On closer inspection, however, the definitions and the overall strategic direction raises questions:

- 11% of the funds are to be invested in the "Decrease in fossil fuel sales/refining fossil throughput". However, the reduction should not actually require any investment. Only the small-print explanation shows that this also includes investments in the *expansion* of petrochemical production.
- Another 11% is to be invested in "neutralisation measures". This includes the controversial CCS technology (underground storage of CO₂) and the even more controversial Offset Measures (see also below).
- Another 15% is to improve operational efficiency. These are actually standard investments that would happen anyway to save costs.
- Another 38% of the investments are to go into "Increase in zero-carbon energy sales". The term „sales" would not imply any effort to produce zero-carbon energy. OMV could therefore limit itself to simply trading or selling the energy produced by third parties.⁵

⁵ The company has informed us that the term „sales“ will also include production. The in-house production volumes, however, are still unclear in our opinion. The reports give no indication in this respect.

- The remaining 25% is earmarked for "Increase in recycled and sustainable feedstock", e.g. through the company's own ReOil technology or co-processing. However, these are only gradual decarbonisations of previous production paths (see below), which do not enable zero carbon.



Source: OMV: Sustainability Report 2022. Non-Financial Report, Vienna April 2023

Low Carbon Activities

Low Carbon Chemicals, Biomass, Hydrogen

OMV highlights the use of biomass in new **co-processing** concepts, i.e. using feedstock in the refining process instead of blending after production. A new co-processing plant at the OMV Schwechat refinery is planned to mix up to 160,000 tons of vegetable oil, waste products, or advanced feedstocks with fossil-based materials. The plant is planned to start up in the second half of 2023. It is unclear to what extent this new process would reduce emissions.

In 2022 OMV had a production capacity of 148,500 tons per year for recycled, biobased and other non-traditional chemical products. This is only a small fraction of overall chemical sales (5.7 mn t). OMV plans to produce 2 mn tons of „sustainable products“ in 2030 (Chemicals & Materials).

The OMV reports highly emphasize the „**ReOil**“ pilot plant project. The facilities recycle plastic waste into synthetic oil and base chemicals. A life cycle assessment, commissioned by OMV, came to the conclusion that the ReOil-Technology can save only 34% of CO₂e emissions when compared to traditional incineration.

In the area of **biogas** and **hydrogen**, the planned investments are rather low. In 2022, OMV invested 2.5 million euros in low-carbon hydrogen. For the years 2023-2027, 70 million euros are planned.

Renewable Power

OMV has hardly been involved in the field of renewable energies (wind, solar, etc.) so far. The plan to provide 10 TWh of renewable energy (wind, solar, geothermal) by 2030 therefore seems ambitious.

In 2022, OMV has invested 22 million euros in the wind power sector. Similarly for photovoltaics, it was only 6.8 million euros in 2022. However, a large solar park of 450 MW is planned in Romania with the Group subsidiary OMV Petrom in a JV with Oltenia.

Geothermal energy, which is close to omnipresent in OMV sustainability reports, has not yet progressed beyond initial analysis and the planning of small pilot projects. A geothermal energy capacity of up to 9 TWh per year is to be created in the Vienna Basin by 2030. Details are not yet known.

CCS

OMV wants to deposit 5 million tonnes of CO₂ per year via CCS by 2030, 2 million tonnes of which at the group subsidiary OMV Petrom. There are also plans for CCS plants in Norway.

In our opinion, CCS is along with recycling activities (petrochemicals) the core of OMV's decarbonisation investment.

Carbon Offsets

Carbon offset payments are to be used only in a "very limited" way. The maximum volume should not exceed 5% when compared to the (additional) planned emission reductions by 2030 and 2040. This would equal an estimated 2-3 million t CO₂e in 2040 (own calculation).

In 2022, OMV arranged an offset volume of 340,000 t CO₂e on behalf of its customers.

Sources

OMV: Sustainability Report 2022. Non-Financial Report, Vienna April 2023.

OMV: OMV Konzernbericht Jänner–Dezember und Q4 2022, Vienna February 2023.

OMV: Geschäftsbericht 2022 der OMV Aktiengesellschaft, Wien March 2023.

OMV: Q4 2022 Results Conference Call, Alfred Stern, February 2023.

OMV: Factbook 2021, August 2022.

OMV: OMV Factbook 2021 - Selected tables.xlsx, 2022.

7. Petrol Group

Portrait

Petrol Group is the largest Slovenian energy group. The focus is on oil trading and fuel retailing in Slovenia and, since 2021, also in Croatia following a major acquisition (Crodux). Moreover, Petrol Group has a strong presence in Serbia. At the end of December 2022, the group had 594 petrol stations.

In addition to oil products, there are extensive activities in gas trading and electricity trading following a series of acquisitions. In 2021, the group became the second largest electricity retailer in the country following the acquisition of an electricity company (E3). In this respect, Petrol Group can be defined as an energy group with a focus on oil, which is also active in the field of electricity and gas trading as well as other energy and environmental services.

Last year, 4.1 million tonnes of fuels and petroleum products were sold; in addition, 18.9 TWh of natural gas and 12.0 TWh of electricity. The group does not have any oil or gas production of its own, nor does it have refineries. However, it does own limited electricity generation capacity following acquisitions and its own projects.

As of 2022, the Group consists of three major business segments:

1. Fuels and petroleum products: sales of petroleum products, LPG and other oil- or fuel-related products.
2. Energy and solutions: Mainly the sale and trading of electricity and natural gas, but also energy services such as energy and environmental management systems for buildings, water systems, district heating and others.
3. Merchandise and services: Sale of non-fuel products mainly at service stations such as food, tobacco products, car wash and other services.

The Slovenian state directly or indirectly owns almost one third of the group. The rest of the shares are held by various domestic and foreign banks and a large number of private investors. Petrol Group is listed on the Ljubljana Stock Exchange.

Revenues and Profits

Petrol Group's sales rose by almost 90% to €9.5 billion last year, mainly due to higher oil and gas prices.

Since the Slovenian state and also neighbouring Croatia regulated energy prices heavily, profits did not keep pace with sales. The sanctions against Russian crude oil and oil products made the situation even more difficult.

As a result, Ebitda shrank from €238 million in 2021 to €96 million in 2022. The bottom line even came to a net loss of €3 million, after a plus of €125 million in the previous year. The management also expects a difficult earnings situation in 2023.

In "normal" years, i.e. without strong government intervention in oil product prices as in 2022, the fuels segment generates more than half of the profits.

In 2022, however, the Energy and Solutions collection segment generated higher revenues and higher profits. This was mainly due to record-high gas and electricity prices. Their trading accounted for 4.46 of the 4.55 billion euros in the revenues of this segment. The rest consisted of the smaller Energy Solution (41.7 million) and District Heating (23.5 million) segments, among others.

Data Table

Petrol	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
in mn Euro**						
Sales						
Net Sales Revenues	9457	4960	3079	4376	+91%	+129%
hereof:						
- Fuels and Petroleum Products	4375	2170				
- Merchandise and services	520	470				
- Energy and solutions	4554	2315				
- Other	7	6				
Profits						
Ebitda	96	238	167	197	-60%	-52%
hereof:						
- Fuels and Petroleum Products	2	127				
- Merchandise and services	69	61				
- Energy and solutions	18	48				
- Other	7	2				
Adjusted gross profit	393	543	427	473		
Net profit/loss	-3	125	72	105	n.a.	n.a.
Capex	60	52*			+16%	
	Note: *excluding acquisition of Crodux (€181.7 mn); figures rounded					

Investments and Energy Transition

In 2022, 59.8 million euros were invested (apart from expenditure on acquisitions), 48% of which was for "Energy Transition Projects" in the broadest sense of the word. A precise

analysis of the investments and their allocation to the business segments is not possible due to a lack of detail and in view of the relatively small investment sum overall.

In the "Strategy for the 2021-2025 period" of January 2021, it is planned that 35% of the investments in this period should flow into an - unspecified - "energy transformation". The target is repeated in the Annual Report 2022 with slight variations:

"Our goals until 2025 are ambitious:

- reducing the carbon footprint of our core activity by 40 percent;
- investing EUR 244 million in energy transition;
- 164 MW of installed renewable electricity production capacity."

The Petrol Group defines as "Energy Transition" almost everything that is not directly related to fossil oil, i.e. natural gas, electricity, district heating and energy services. In this respect, the term is largely identical with „non-oil“. Even LPG and additives for conventional diesel are included for „greening the energy mix“.

Sustainability is defined in a similarly broad way. This includes, among other things, the recycling of water in car washes and all kinds of energy efficiency.

Power and Renewables

2022: While electricity trading is extensive at 12 TWh, only 166.8 GWh was provided from own electricity production in 2022. This resulted in revenues of 10.7 million euros. Power generation took place mainly in three wind farms, supplemented by six smaller hydropower plants.

In February 2022, it was decided to build three solar parks in Croatia with a combined capacity of 22 MW. Completion is planned by summer 2023. In addition, there is a project for a small hydropower plant (1 MW) in Serbia and another solar park (1 MW) in Slovenia.

Sustainability Goals

Reporting in 2020/2021

The medium-term sustainability strategy was last formulated in the document "Strategy of the Petrol Group for the 2021-2025 Period" (January 2021). The Petrol Group sees itself as an "Integrated Partner in the Energy Transition" and on the way to becoming a "Low-Carbon Company".

In the period 2021-2025, 35% of the investments are to flow into a very broadly defined "Energy Transformation". Four themes are at the forefront of this:

- Renewable Electricity: Renewable electricity capacities are to reach 160 MW by 2025.
- Electromobility: The number of charging points is to increase to 1575. At the end of September 2022, Petrol Group had 278 normal charging points and 106 fast charging points for electric vehicles.
- End-user energy savings are expected to reach 73 GWh by 2025.
- The Circular Economy with a focus on wastewater treatment, recycling of carwash water, and re-use of industrial wastewater will be further advanced.

The Group aims to achieve "Climate Neutrality" by 2050. However, the path to this goal remains somewhat vague in the strategy. A growing share of natural gas and electricity (also in mobility) generally seems to fall under the heading "Energy Transition". The same applies to Water Services and Waste Circular Economy.

However, the financial scope of the group is limited after the unexpected losses in 2022. In this respect, it is unclear how high the actual investments will be in the following years.

Reporting in 2023

Only a few pages are devoted to the climate crisis in Petrol Group's reporting for 2022 and 2021. However, the Group is committed to the EU's climate targets. Emissions are to be reduced by 55% by 2030. "We are pursuing an interim goal for the European Union to reduce emissions by at least 55 percent by 2030, the Regulation on green investments or Taxonomy Regulation and the high national energy and climate targets." and "Our Promise - Through energy transition, we create a green future and make a significant contribution to protecting our environment." (Source: Petrol Group: Annual Report 2022 of the Petrol Group and Petrol d.d., Ljubljana April 2023)

For the year 2023, it says however: "Petrol Group plans to increase its sales of petroleum products...". At the same time, electricity production from renewable energies is to be expanded. The scale, however, remains unclear. (Source: Petrol Group: Annual Report 2022 of the Petrol Group and Petrol d.d., Ljubljana April 2023)

The latest sustainability report dates back to 2020 and a new report is planned for June 2023. So far, the headlines talk about "*Steadfastly moving towards a zero-carbon future*", but the practical contribution of the Petrol Group to zero-carbon and the compatibility with the sales of 4.1 million tonnes of fossil fuels remain in the dark.

CO2 Emissions and EU Taxonomy

According to the strategy for the period 2021-2025, Scope 1 and Scope 2 emissions are to be reduced by 40%. The current pace of progress, however, is unclear at the moment. For 2021, Petrol Group reported the following values for the group's Parent Company only (Petrol d.d., Ljubljana). They are comparatively low, as Petrol Group has no oil and gas production of its own:

Scope1: 6441 tCO₂e

Scope2: 15256 tCO₂e

Taxonomy

In the classifications according to the EU taxonomy, the Petrol Group shows significant differences between revenues and investments, mainly due to the fact that the overall investment volume was very low in 2022.

Sales: Taxonomy-aligned activities contributed just 0.9% of sales in 2022 (83,3 Mio. Euro)

- 31% hereof related to energy efficiency equipment, mainly in buildings
- 15% hereof related to gas transmission/distribution networks

Capex: Taxonomy-aligned activities contributed 54,2% of capex in 2022 (30,2 Mio. Euro)

- 39% hereof related to solar power generation
- 34% hereof related to energy efficiency equipment, mainly in buildings

Sources

Petrol Group: Annual Report 2022 of the Petrol Group and Petrol d.d., Ljubljana April 2023.

Petrol Group: Strategy of the Petrol Group 2021 – 2025, January 2021.

Petrol Group: Annual Report 2020, March 2021.

Petrol Group: Annual Report 2021 of the Petrol Group and Petrol D.D., Ljubljana, March 2022.

Petrol Group: Cornerstones and Goals 2020, no date.

Petrol Group: Report on the operations of the Petrol Group and Petrol d.d., Ljubljana in the first six months of 2022, Ljubljana August 2022.

Petrol Group: The Petrol Group's Business Plan and Key Targets for 2022 – Summary, December 2021.

Petrol Group: Sustainability Report of the Petrol Group 2020, Ljubljana July 2021.

Petrol Group: Report on the operations of the Petrol Group and Petrol d.d., Ljubljana in the first nine months of 2022, Ljubljana November 2022.

<https://www.petrol.eu/publications/2023/01/preliminary-unaudited-estimate-of-the-petrol-group-s-business-results-for-2022.html?type=javna-objava>

<https://www.petrol.eu/publications/2023/01/the-supervisory-board-endorses-the-business-plan-of-the-petrol-group-for-2023.html>

8. PKN Orlen

Portrait

The Polish PKN Orlen (renamed *Orlen* in July 2023) is the largest oil and gas group in Central and Eastern Europe. As of December 2022, the Orlen Group comprised of 181 companies, all controlled the Parent Company (PKN Orlen).

In August 2022, PKN Orlen merged with Grupa LOTOS, and in November 2022 with PGNiG. After the mergers, the ORLEN Group has increased the scope of its operations mainly in the upstream and gas segment. As a result, the group is now more vertically integrated.

LOTOS previously controlled about a third of the Polish fuel market from petrol to paraffin. PKN Orlen is also taking over the large refinery in Gdansk, various upstream projects off Norway and in the Baltic Sea, and a number of downstream and retail assets. Other parts of LOTOS were acquired by the Hungarian MOL Group.

The new ORLEN Group focuses on refining, petrochemicals, fuel retailing and the new extensive oil and gas production. In addition, there is a large gas business, power generation and heat generation and a number of side activities such as newspapers and financial services. The firm has major operations in Poland, Czech Republic, Slovakia, Germany, and the Baltic states as well as some operations overseas.

The largest shareholder of PKN Orlen is the Polish state with 49.9% of the shares, ahead of Nationale-Nederlanden OFE with 5.06% of the shares. PKN ORLEN is listed on the Warsaw Stock Exchange.

Fossil Production

In 2022, significantly more fossil oil and gas products were produced and sold by the Group's refineries, petrochemical plants, gas plants or retail outlets. The increase is mainly due to the acquisition or mergers mentioned above. The portfolio now includes:

- 7 large refineries (gross 30.5 mn t sales volume)
- numerous petrochemical plants (5.0 mn t sales volume)
- 3100 service stations (9.4 mn t sales volume)
- 13.5 GW thermal generation capacity
- 5.1 GW power generation capacity
- Upstream oil and gas production: 191,000 boe/d mostly in Europe; the main focus is on natural gas with a share of three-fourths, mainly in Poland and Norway.
- Gas business: 14 bcm/a gas imports and 11.3 bcm/a gas distribution volumes

Revenues and Profits

In 2022, net sales revenues amounted to PLN 277.6 billion (61 billion euros). Two-thirds of this was generated in the refinery business. This represents a doubling (+111%) of revenues compared to 2021 (PLN 131.3 billion), mainly due to higher oil prices and acquisitions.

Orlen Group achieved a net profit of PLN 33.6 billion and an Ebitda of PLN 48.0 billion in 2022. This represents an increase of 150% in Ebitda compared to 2021 and 294% compared to the 2019-2021 period.

The dominance of the refining business is also evident in profits, with Ebitda profits of PLN 20.6 billion, a huge jump from PLN 7.7 billion in 2021. For the first time, the upstream business (oil/gas production) is the second profit earner with PLN 6.6 billion, which is due to the aforementioned acquisitions. Only the (new) gas business recorded a loss of PLN minus 2.0 billion.

About PLN 4.0 bn is accounted for by the collection segment "Energy", i.e. about 8% of Ebitda. Here, too, fossil power generation (gas-fired power plants, coal-fired power plants, CHP plants) dominates, flanked only by a few renewable electricity and heat generators (hydro, wind, biogas/biomass).

Investments (Capex)

Is a transformation underway? A vague indication is provided by the investments (capex) in 2022 and the capex planning for 2023.

In 2022, capex totalled PLN 19.7 billion. Only PLN 4.4 billion of this will flow into the Energy segment, which includes electricity and heat generation from gas, coal, fuel oil and renewables.

The remaining investments are earmarked for the fossil segments Refining (PLN 4.3 billion), Petrochemicals (PLN 5.1 billion) and Upstream (PLN 2.3 billion) as well as Natural Gas (PLN 1.8 billion).

After the extensive acquisitions, the planned capex in the now larger Orlen Group is expected to rise steeply to PLN 36.2 billion this year (2023). The share of the energy segment could thus grow proportionally to PLN 7.0 bn, but the focus of investments remains unchanged in the fossil sector: refineries with an expected PLN 9 bn, upstream with PLN 6.4 bn as well as petrochemicals (PLN 6.5 bn) and natural gas (PLN 4.0 bn).

As for capex in renewables, the term "energy transition" is mentioned everywhere: *"These substantial funds are largely allocated towards an effective energy transition"*, (Source: PKN Orlen: Jednostkowy Raport 2022 - English, April 2023, Letter of the President), but the term „transition“ is defined so broadly that it includes every efficiency and product measure, i.e. also the shift in the petrochemical mix, more efficient refining processes, new gas power plants, denser electricity grids, etc.

In 2022, according to company data, only PLN 121.4 million was invested directly in renewable power generation. This is just 0.6% of total investments.

Capex: Key Projects in 2022/23

A list of the Group's main infrastructure projects shows the low share of non-fossil activities. Of the 12 major projects in 2022, only one infrastructure project is in the green power sector

(offshore wind farm). Another project falls into the biofuels category (bioethanol). The situation in 2023 is similar.

Key development projects in 2022:

- construction of a visbreaker unit in Płock;
- construction of hydrocracking unit–Lithuania;
- construction of second-generation bioethanol plant – ORLEN Południe;
- construction of HVO unit(hydrogenation of vegetable oils) – Płock;
- expansion of olefins production capacities at Płock;
- expansion of fertilizer production capacities at Anwil;
- upgrades of existing assets and connection of new customers
- construction of CCGT Ostrołęka and CCGT Grudziądz;
- construction of offshore windfarms in the BalticSea;
- expansion of the service station and non-fuel sales networks;
- launch of new services and products;
- focus on the most promising fields in the Upstream segment.

Key development projects in 2023:

Refining

- Construction of hydrocracking unit – Lithuania
- Construction of second-generation bioethanol plant – ORLEN Południe
- Construction of visbreaking unit – Płock
- Construction of HVO unit – Płock
- Construction of Hydrocracking Base Oils Unit – Gdańsk

Energy

- Upgrades of existing assets and connection of new customers
- Construction of CCGT Ostrołęka and CCGT Grudziądz
- Construction of solar PV farms
- Construction of offshore wind farm in the Baltic Sea

Gas

- Construction and upgrades of service lines – PSG Upstream
- Projects of PGNiG Upstream Norway and Lotos E&P Norge SA
- Projects of ORLEN Upstream in Poland and Canada
- Construction of marine petroleum products handling terminal on the Martwa Wisła river – Gdańsk

Petrochemicals

- Expansion of olefins production capacities – Płock
- Expansion of fertilizer production capacities – Anwil

Retail

- Expansion of the service station and non-fuel sales networks
- Expansion of the alternative fuels network
- Parcel lockers

Capex Plans for 2022-2030

By 2030, Orlen plans to spend PLN 320 billion on investment projects. Hereof:

- about 35% for fossil legacy activities such as refining, gas-fired power generation, conventional power generation, gas distribution, fuel retail and oil production
- about 60% for „strategic development“ (180-200bn PLN) which includes advanced petrochemical projects, renewable energy (9 GW therm. and elec.) and unspecified further activities. As for „renewable energy sources and new energy“, the company plans to allocate PLN 70 billion hereof. This includes e-mobility and HVO refinery production (hydrogenated vegetable oils) among other activities.
- about 5% (16bn PLN, own calculation) is planned for future technologies which are expected to have a major impact after 2030; this includes hydrogen, synthetic fuels, CCS/CCUS, SMR (nuclear) and recycling. Hereof, hydrogen is to receive 7,4 bn PLN for „low- und zero-carbon hydrogen“.

The Orlen Group calls 40% („120 bn) of this 320 bn portfolio „Green Projects“ but this is once again a broadly defined term including:

- renewable power generation (9 GW);
- biogas and biomethane (1 bcm)
- e-mobility (10.000 charging points);
- biofuel and biomaterial capacities (3 million tons FAME, HVO)
- recycling capabilities
- hydrogen capabilities (130,000 tons hydrogen by power, 60,000 t by waste and 120,000 t by fossil gas plus CCS)
- power networks
- CCS/CCUS for own activities and third parties
- SMR (nuclear power, see below)

At the same time, however, the fossil path will be maintained. The company plans:

- to expand its fossil gas production by 2030 from 8 to 12 bcm per year
- increase crude oil throughput at its refineries from 37 to 42 million tons per year
- increase its gas power plants from 1.7 to 3.8 GW

Renewable Power and Heat

In terms of power plant capacity, the share of renewables is currently still low: Heat 1.1%, Power 17%. In terms of electricity generation, the share of renewables is 13.7%. So far, Orlen operates about a dozen small wind farms, three small solar parks and 3 hydropower plants.

Renewable Capacity 2022 (2021):

- Windpower: 353 MW (353 MW)
- Solar Power: 36 MW (11 MW)
- Hydroelectric: 381 MW (381 MW)

- Biomass: 77 MWe und 141 MWth (77 MWe /141 MWth)

Orlen Group Total Capacity in 2022:

- 4965 MWe, 11762 MWth

Generation (Heat/Power) 2022:

- Natural Gas: 4729 GWh
- Hard Coal: 3459 GWh
- Lignite: 570 GWh
- Biomass: 107 GWh
- Wind power plants: 747 GWh
- Solar power plants: 20 GWh
- Hydro 821 GWh

By way of comparison, these 1.6 TWh of green electricity in 2022 (wind, biomass, PV, hydro) roughly correspond to the energy (calorific value) of 0.12 million tonnes of oil products, i.e. just 0.3% of the Orlen Group's refinery production.

The plans for 2030 are ambitious, however, and so far only partially concretised. By 2030, the renewable energy capacity is to be 9 GW. This would be 10 times the current capacity of 988 MW (power and heat), of which 389 MW is wind/solar.

So far, the taxonomy tables show a very low share of investments for solar, wind and also hydrogen for 2022:

- hydrogen 0.03% of total capex
- solar power generation 0.06% of total capex
- wind power generation 0.01% of total capex

In 2022, only one solar park with 62 MW was completed. As far as hydrogen is concerned, there are only pilot projects and one filling station so far. More activities are visible in the biogas/biofuels sector:

- bioethanol from cereal straw: annual capacity is to reach 25.000 tons of bioethanol
- a pilot plant for biogas is being built in Głębowo (Province of Olsztyn) with just 7 million cubic metres of biomethane annually; by 2030, Orlen expects to have an annual output of 1 bcm of biogas
- Orlen expects to be produce 3 million tonnes biofuels by 2030 (FAME, HVO)

Nuclear Power: SMR

Orlen intends to build at least one small nuclear reactor (SMR) in Poland by 2030. The company is in partnership with Synthos Green Energy and has exclusive rights to use GE Hitachi Nuclear Energy's BWRX-300 technology in Poland.

Data Table

Orlen Group	2022**	2021	2020	2019	2022 vs 2021	2022 vs ∅ 2019-21
in mn PLN*						
Net Sales**	277564	131341	86180	111203	+111%	+153%
hereof:						
Refining	187428	85544	52010			
Petrochemical	30174	18263	12640			
Energy	34801	19513	13462			
Retail**	65504	41167	30911			
Upstream	8469	798	483			
Gas	29651					
Profits**						
Ebitda	48009	19211	8465	8862	+150%	+294%
hereof:						
Refining	20618	7656	-2402			
Petrochemical	3280	4519	2205			
Energy	4044	3603	7697			
Retail	2787	2850	3193			
Upstream	6595	1305	-1100			
Gas	-1971					
Profit from Operations (Ebit)	41093	13870	3908	5365		
Net Profit	33630	11188	2825	4298	+201%	+451%
Capex**	19728	9890	8992	5457	+99%	+143%
hereof:						
Refining	4333	2376	3174			
Petrochemical	5065	3051	1912			
Energy	4368	2616	1722			
Retail	1409	1141	1329			
Upstream	2253	363	400			
Gas	1815	n.a.	n.a.			
	Notes: *1 PLN (Zloty) = 0.22 Euro; **Major M&A activities in 2022 may distort inter-year comparisons and sums					

EU Taxonomy Numbers

The low relevance of renewables and sustainability is also reflected in the taxonomy tables. They show the EU climate policy alignment or just the eligibility of Orlen activities:

Sales:

taxonomy-aligned: 0.85% of Orlen activities (mainly transmission/distribution of electricity)
taxonomy-eligible (excl. aligned): 8.42% (mainly base chemicals, plastics)

Capex:

taxonomy-aligned: 5.32% (mainly base chemicals)
taxonomy-eligible (excl. aligned): 5.87% (mainly gas power, CHP power plants).

Opex:

taxonomy-aligned: 2.94% (mainly power networks)
taxonomy-eligible (excl. aligned): 14.29% (mainly power plants, base chemicals)

Sustainability Goals for 2030 and 2050

Following the mergers in 2022, Orlen presented an updated Group Strategy for the years until 2030 in spring 2023. Although Orlen is committed to the 1.5 degree target of international climate policy and zero carbon in Scope 1,2 and 3, it clearly restricts this in a footnote:

„Achievement of our long-term targets will depend on the technological progress and the regulatory and legal context... Those factors may create more or less favourable conditions for the energy transition and accelerate or reduce the pace of our strategy implementation.“ (Source: Orlen Group: Management Board Report 2022, April 2023)

Sustainability goals for 2030 focus on two business segments:

- 2022-2030: 25% reduction in CO₂ in the refinery, petrochemical and mining segment (Scope 1+2). This corresponds to a decrease from 17 to 13 Mt CO₂e. It is to be achieved through improved energy efficiency and CCS/CCUS.
- 2019-2030: 40% reduction in carbon dioxide emission intensity in the energy segment (i.e. no volume reduction target).

In absolute terms, production in the energy segment is expected to increase from 29 to 55 TWh, while emission intensity is expected to fall from 370 kgCO₂e/MWh to 220 kgCO₂e/MWh. The bottom line is that absolute emissions will increase.

The Orlen Group wants to reduce coal-fired power generation and end it in 2035. Instead, more natural gas and more renewable energies are to be used.

The targets are thus very narrow and modest at the same time. In particular, there are no Scope 3 interim targets on the way to "net zero" in 2050. Some targets for 2022/2023 seem extremely cautious and almost anachronistic:

- „Addition of new emissions indicators“
- “Development of an approach to GHG Scope 3 (CO₂) emissions“
- “Development of a climate policy“

Emission volumes

Figures for Scope 3 or the Orlen Group's total emissions are not yet available for 2022. Due to the acquisitions in the course of 2022, there are several quite different ways of accounting for emissions.

For **2021**, the "old" Orlen Group reported:

- Scope 1: 18.1 mn t CO₂e (2019: 18.6).
- Scope 2: 1.1 mn t CO₂e (market-based) (2019: 1.7)
- Scope 3: 82.3 mn t CO₂e (2019: 86.9), hereof: 66.0 mn t CO₂e use of products sold; and 12.4 raw materials and services purchased (e.g. crude oil purchased from outside the Group)

For 2022, the Orlen Group reported 20.6 mn t CO₂e (20.2 mn t CO₂) for Scope 1 after (revised) 17.6 mn t CO₂ (CO₂e not reported) for 2021.

However, the emissions of the newly incorporated LOTOS and PGNiG groups are only included here on a pro rata basis (LOTOS 5 months, PGNiG 2 months). The emission volume in the Orlen Group will therefore be significantly higher in 2023 than before.

Sources

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9. Repsol

Portrait

Repsol is Spain's largest integrated energy company. However, the group is only a medium-sized oil and gas company compared to its global competitors.

It consists mainly of three business segments:

1. Upstream segment: oil and natural gas exploration and production in a large number of countries.
2. Industrial segment (Downstream segment): downstream activities, mainly oil refining (c. 1 mb/d) and marketing of oil products; production and marketing of chemicals; wholesale trading of gas and oil/oil products.
3. Commercial & Renewables Segment: a collective segment for all other activities. This includes service stations and retailing of non-fuel oil products such as lubricants, natural gas and electricity. Electricity production with renewables is also located here, i.e. PV, wind power and hydropower.

In 2019 and 2020, the group incurred high losses totalling €7.1 billion. They were largely offset by profits in 2021 and 2022. However, Repsol had to give up some company divisions. EIG bought a quarter of Repsol's upstream business in 2022 for \$4.8bn. Credit Agricole Assurance and EIP took 25% in Repsol Renewables.

Repsol's shares are widely dispersed. The largest single shareholders at the end of 2022 were investment funds and asset managers: Norges Bank (3.3%), BlackRock (5.5%) and Amundi (3.2%). Repsol shares are listed in Madrid, New York and London.

Fossil production

Repsol produced 185,000 boe/d of liquids and 366,000 boe/d of natural gas in 2022, for a combined total of 550,000 boe/d. They were mainly produced in Latin America and Europe.

Repsol Refineries were processing 42.1 million tonnes in 2022. The refining capacity was 1.01 mb/d. At the same time, 2.45 million tonnes of petrochemical products were sold.

Road Fuels from own and third party production were distributed in 2022 mainly through the petrol station network of 4651 stations.

Revenues and Profits

Revenues in 2022 amounted to 78.7 billion euros. This is an increase of 51% compared to the previous year and an increase of 70% compared to the average of the last three years.

As with other oil companies, profits increased massively:

- Operating Income grew 144% over 2021 and as much as 248% over 2019-2021. Ebitda rose by 69% and 129% respectively.
- Net Income (adj.) jumped 171% compared to 2021 and even 292% compared to the 2019-2021 period.

The relevance of each division to the group as a whole is shown by the profit distribution. Ebitda for the group as a whole was €13.8 billion in 2022 compared to €8.2 billion in the previous year. Of this €13.8 billion, €7.5 billion was generated in the upstream segment, i.e. oil and gas production. Another 5.2 billion euros came from the refining and petrochemical sector ("industrial", i.e. downstream).

The relatively modest remainder was generated in the collective segment "Commercial and Renewables". These 1.2 billion euros are attributable in particular to the petrol station business and electricity production with renewables.

Investments (Capex)

As for investments, the overall group's activities have not kept up with the increase in profits. Investments climbed by 40% in 2022 compared to the previous year.

In 2022, Repsol invested €4.2 billion, up from €3.0 billion the year before. About half of this (€2.1bn) was in oil and gas production (upstream) and another quarter (€1.0bn) in refining/petrochemicals (industrial).

The last quarter (0.9 billion euros) is accounted for by the hodgepodge of assets in the "Commercial and Renewables" segment, i.e. petrol stations, various energy services and renewable power (especially wind/PV).

Of this 0.9 billion euros, 771 million euros were invested in the Renewable Energy segment in 2022, i.e. 18 percent of the total group's investments. This is a slightly higher percentage than in 2021 (14%, 434 million euros) and also higher than in most other oil companies.

Of the 771 million euros, the largest share went to photovoltaics:

- Onshore wind 260 million euros (2021: 304 million).
- Solar 491 million euros (2021: 119 million)
- Conventional Hydro 11 million euros (2021: 3 million)
- R&D Biofuels 1st Gen 3 million euros (2021: 2 million)
- R&D Advanced Biofuels 6 million euros (2021: 4 million)

When looking at the figures for 2022, however, it is important to note that Repsol also divested a considerable amount by selling a quarter of its renewables (Repsol Renovables) to Credit Agricole Assurance and EIP. In net terms, therefore, less was achieved.

In the current year 2023, Repsol plans a similar distribution of investments. Of the approximately €5 billion to be invested in total, according to the annual plan:

- 47% is for the upstream sector, i.e. the global exploration and production of oil and gas

- 23% is for the industrial (downstream) sector, i.e. oil refineries, petrochemicals and a biorefinery (Cartagena), which is to produce sustainable aviation fuels from organic waste; however, most of the green-fuel projects are still at an early stage.
- 24% in renewable power, mainly wind and solar projects
- 6% in the commercial sector, i.e. mainly filling stations and customer-related energy services.

Repsol estimates the total share of low-carbon activities at 35% in 2023 and for the years 2024 and 2025. However, Repsol understands this term to address a wide range of activities, such as measures to increase efficiency, marketing, CCUS or charging stations for electric vehicles: *"Low carbon technologies and businesses: energy efficiency, renewable electricity generation, production and marketing of biofuels, renewable hydrogen, synthetic fuels, CCUS, marketing of renewable electricity, distributed generation and other value-added services such as electric mobility."* Source: Repsol: Integrated Management Report 2022, Madrid 2023, p.62.

So despite the frequently expressed goals of Sustainability and Low Carbon, capex, revenue and profit numbers show that Repsol is still a predominantly fossil energy group.

EU Taxonomy

The taxonomy data show that the share of sustainable activities, i.e. taxonomy-aligned or just taxonomy-eligible.

Turnover

In 2022, only 0.4% of Repsol's total turnover could be classified as taxonomy-aligned and 7% could be classified as taxonomy-eligible (but not aligned).

CAPEX

In 2022, 21% of Repsol's total CAPEX could be classified as taxonomy-aligned, predominantly from the investment in solar and wind power; 9% could be classified as taxonomy-eligible (but not aligned), predominantly from the investment in base chemicals and plastics.

OPEX

In 2022, 2% of total OPEX could be classified as taxonomy-aligned and another 17% as taxonomy-eligible (but not aligned).

Share of Renewable Energy

The share of renewable energy has been low so far. In 2021, renewable energy accounted for 3.7% of the group's total revenues, in 2020 for 2.4%. This is unlikely to have changed much in 2022, as the production of renewable power rose by 65% in 2022, while the fossil-based revenues of the group as a whole increased by 51% against the backdrop of sharply higher oil and gas prices. The share of renewable energy in 2022 is therefore likely to have remained below 5% and probably around 4% (own estimate).

Power Generation and Capacity

Repsol Group's power generation in 2022 was 8.7 TWh, a significant increase from the previous year (5.3 TWh). Of this, 2.8 TWh was PV, wind or hydro power (2021: 2.5 TWh):

- Hydro 876 GWh
- Onshore wind 1088 GWh
- Solar 821 GWh

The share of renewables in power generation was thus 32% in 2022. These plants are located in Spain, Chile and the USA.

Power generation capacity was 3870 MW in 2022, a slight increase compared to 2021:

- Hydroelectric/Pumping Plants: 693 MW
- Combined Cycle Gas Plants: 1625 MW
- Cogeneration Plants: 600 MW
- Wind 499 MW
- PV: 453 MW

The structure shows the low share of wind and solar capacities so far. However, this is set to change. Almost 2588 GW are under construction or have passed the FID hurdle:

- Wind projects after FID or under construction: 997 MW
- Solar projects with FID or under construction: 1591 MW

The purchase of the developer Asterion Energies for \$560 million in December 2022 should facilitate the realisation of the growth plans in this sector. Asterion's portfolio is only "mainly under development", but totals 7700 MW of wind and PV assets in Spain, Italy and France.

However, the acquisition is offset by the sale of 25% of Repsol Renovables last year for just under \$1 billion. This division includes all Repsol renewables minus US and minus hydro. In the coming years, green power capacity is to be expanded strongly, with a focus on wind and PV.

Emission data (CO₂e)

The published emission figures for 2022 are:

- Scope 1: 15.7 million tonnes (2022) vs 24.7 million tonnes (2019)
- Scope 2: 0.4 million tonnes (2022) vs 0.5 million tonnes (2019)
- Scope 3 (Use of marketed energy products): 182 Mt (2022) vs 205 Mt (2019)
- Scope 3 (Use of own refinery products): 161 Mt (2022) vs 180 Mt (2019)

Annual emissions from Scope 1+2 were reduced by 9.1 MtCO₂e over the period 2019-2021. The progress was made almost exclusively in the area of venting CO₂ and methane in oil and gas production. Here, there was a decrease from 7.6 to 0.7 Mt CO₂e. The other segments have made little progress so far.

Sustainability targets

In December 2019, Repsol was the first company among its peers to announce the commitment to net zero by 2050. The future path, however, seems somewhat unambitious.

Emission targets by 2030

Repsol chooses a relatively distant base year (2016) to define its emissions targets. By 2030, the target is:

- minus 30% for scope 1+2+3; but by 2022 the company has already achieved minus 29%
- minus 55% for Scope 1+2; by 2022 it has already achieved minus 37%

In other words, the targets by 2030 do not seem very ambitious, as they were already almost completely or mostly realised last year.

On the way to "net zero" in 2050, Repsol is giving itself leeway. Oil and gas production 2020-2030 *"remains stable in the range of 600-630 kboe/d"...* *"Until 2030, Repsol's refining activity will continue to be high"*.

Biofuels and green hydrogen are to reduce emissions:

- Biofuel production is planned to reach 1.3 Mt by 2025 and 2.0 Mt by 2030
- Renewable hydrogen production is to reach 0.55 GWe by 2025 and 1.9 GWe by 2030.

Emissions after 2030

For the period after 2030, Repsol intends to follow the climate policy scenarios as outlined by the IEA: APS (announced pledges), or SDS (trend), or NZE (net zero by 2050). Depending on which course government policies take, Repsol's own oil and gas production will fall more or less after 2030. Repsol is therefore committing itself only in a very indirect way.

„In 2050, hydrocarbon production is estimated to be at 350-400 kboed (APS scenario), 250-300 kboed (SDS scenario) or less than 100 kboed (NZE scenario)“, depending on the IEA scenario that emerges as the blueprint of government climate policies. In the refinery business, too, the path to 2050 remains vague: *"In the longer term, distillation of crude is expected to drop by 80-90% by 2050"*. (Source: Repsol: Repsol Group Integrated Management Report 2022, Madrid 2023)

At the same time, green hydrogen in particular is to be expanded to 10-15 GWe by 2050. However, these are orders of magnitude that are far below the amount of energy that has so far been provided by fossil fuels. The hydrogen will therefore probably be used primarily to reduce emissions from the company's own refineries or petrochemical plants.

The course for CCS/CCUS is also unclear and is apparently waiting for political guidelines. The volume target of CO₂ storage or usage is vague. By 2050, a volume of 10-15 Mt CO₂ per year CCS is "considered".

Capex 2030-2050

Accordingly, low-carbon investment does not jump to 100% of corporate investment, even according to the very broad definition of low carbon outlined above.

- If government policy at Repsol sites follows a moderate climate protection path (IEA APS scenario), the very broadly defined low-carbon share of investment should be 50-60% in the decade 2031-2040 and up to 60-70% in 2041-2050.
- Only if climate policy picks up speed and moves towards a clear Net Zero by 2050 (IEA NZE Scenario) this share will climb to 70-80% (2031-2040) and 80-90% (2041-2050).

If oil and gas production were to fall from the current 550 kboe/d (2022) to only "350-400 kboe/d" by 2050 (IEA APS scenario) and at the same time CCUS targets are only 10-15 Mt/y, it remains quite unclear how Repsol intends to cut its emissions.

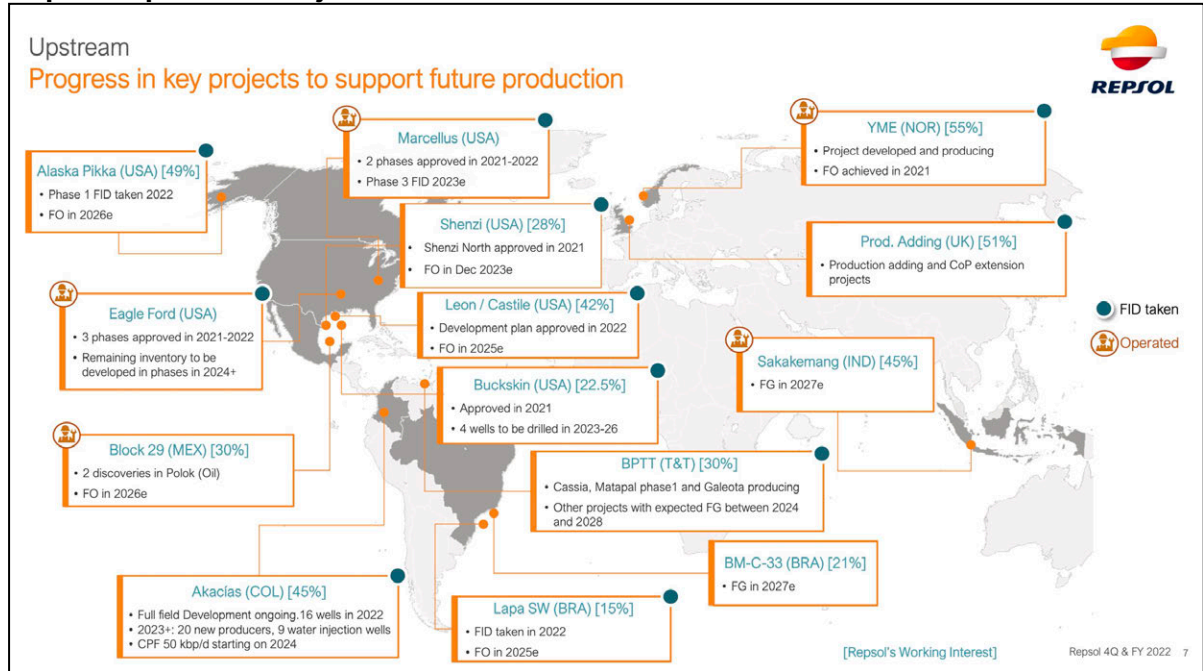
It is quite conceivable that Repsol would therefore only gradually adjust its course. The bottom line is that it remains unclear how the company's goal of "net zero emissions" by 2050 will actually be achieved.

Data Table

Repsol	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
in mn Euro						
Sales						
Net Sales Revenues	78724	52130	34.963	52.033	+51%	+70%
hereof:						
Upstream	10712	6809				
Industrial (Downstream)	61848	39956				
Commercial and Renewables	34185	21891				
Corporate and Others	-28021	-16526				
Profits						
Operating Income	10648	4372	1135	3661	+144%	+248%
hereof:						
Upstream	5705	3027	351	1969		
Industrial (Downstream)	4315	792	369	1189		
Commercial and Renewables	809	761	650	738		
Corporate and Others	-181	-208	-235	-235		
Ebitda	13813	8170	2730	7161	+69%	+129%
hereof:						
Upstream	7485	4429				
Industrial (Downstream)	5223	2654				
Commercial and Renewables	1248	1219				
Corporate and Others	-143	-132				
Adjusted Net Income	6661	2454	600	2042	+171%	+292%
hereof:						
Upstream	3029	1687	195	1050		
Industrial (Downstream)	3150	606	297	913		
Commercial and Renewables	540	542	485	541		
Corporate and Others	-58	-381	-377	-462		
Capex	4182	2994	2308	3861	+40%	
hereof:						
Upstream	2127	1223	948	2429	+74%	
Industrial	1025	859	565	885		
Commercial and Renewables	925	829	739	491	+12%	
Corporate and Others	105	83	56	56		

Maps/Pictures

Repsol: Upstream Projects for Future Oil & Gas Production



Sources

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Repsol: Repsol Group Information on oil and gas exploration and production activities 2022, Madrid 2023.

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10. Shell

Portrait

Shell, like its peers BP, Total, Eni, Chevron and Exxonmobil, is one of the six western supermajors operating globally and covering the entire value chain from oil and gas production to its 32,000 service stations. With a turnover of \$381 billion and 93,000 employees, Shell is also one of the world's largest companies across sectors, with operations in more than 70 countries. Shell shares are listed on the London Stock Exchange and Euronext Amsterdam.

Activities take place in five business segments in addition to cross-segment functions (Corporate):

1. **Integrated Gas:** The big LNG projects and numerous upstream and midstream activities focused on gas.
2. **Upstream:** Exploration and production of crude oil, natural gas and natural gas liquids. The segment also operates the infrastructure necessary to deliver them to the market.
3. **Marketing:** The segment consists of the three divisions Mobility (mainly petrol stations), Lubricants, and Sectors & Decarbonisation (marketing of fossil fuels and low-carbon energy solutions to aviation, marine and road transport).
4. **Chemicals & Products:** Petrochemicals and oil refineries, pipelines, oil trading and oil sands.
5. **Renewables & Energy Solutions:** Shell's power activities, comprising electricity generation, marketing and trading of power. It also includes pipeline gas and some low-carbon hydrogen projects, CCS, and trading of carbon credits.

Energy Production

Shell supplies oil, gas, biofuels and electricity to its customers, but concentrates its own production almost exclusively on fossil oil and gas in roughly equal parts.

Sales are larger than production. Some volumes are therefore purchased and traded. The table below shows the dominance of fossil fuels such as oil (44%), natural gas & LNG (42%) even among energy deliveries. Biofuels play almost no role.

Shell is a large electricity trader, which explains the 12% share of electricity. Shell traded 243 TWh of power (physical trade) in 2022. This is equivalent to just under 400,000 boe/d of oil or gas (Heating Value). As the share of renewable power is still far below 50% in almost all Shell markets (cf. the Net Carbon Intensity values further below), the bottom line is that well over 90% of Shell's total energy deliveries are of fossil origin.

The fossil share of Shell's own energy production is even higher. Shell produced 2.86 million barrels of oil and gas per day in 2022. There are no precise figures on biofuel production

(Shell's share) other than the 44% share of Brazil's Raizen (3bn litres). This would result in a Shell share of the equivalent of about 24,000 b/d, or just under 1% of oil and gas production in volume terms. In view of the high emissions from biofuel production (see Net Carbon Intensity below) and the lower energy content of biofuels, the net emission effect will be far below 0.5%.

Renewable electricity production is even smaller. At the end of 2022, Shell's renewable electricity capacity was only 2.2 GW. In the year as a whole, only 0.3 TWh of electricity was supplied to the grid. A further 2.2 TWh of wind/solar power was purchased from third parties. The 0.3 TWh is equivalent to only 0.02% of Shell's oil and gas production.

Data Table - Energy Production and Supply

Shell	2022	2021	2020	2019
Share of energy delivered in %				
Oil products and gas-to-liquids	44	45	47	56
Gas	22	25	21	17
LNG	20	18	19	18
Biofuels	1	1	1	1
Power (fossil equivalent, i.e. multiplier applied)	12	12	12	9
Energy Production				
Oil and Gas				
Oil and Gas Production (Group) in 1000 boe/d	2864	3237	3386	
Production in 1000 boe/d (only Shell Upstream Segment)	1897	2178	2324	
Sales of pipeline gas to end-use customers (TWh)	882	899	843	
Refinery Processing Intake in 1000 b/d	1402	1639	2063	
Chemical Sales Volumes (1000 tonnes)	12281	14216	15036	
Power				
External Power Sales (physical) in TWh	243	247	252	
Renewable Power Capacity in operation (Shell share) in GW	2.2	0.7	0.4	
Renewable Power Generation (exported to grid) in TWh	0.3	0.4	0.4	
Renewable Power purchased in TWh	2.2	2.2	1.8	

Data Table - Financials

Shell	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
mn USD						
External Sales	381314	261504	180543	344877	+46%	+45%
hereof:						
Integrated Gas	54751	29922	20865	29540		
Upstream	8352	9182	6743	9464		
Marketing	120639	83494	55845	84517		
hereof:						
- Mobility	83949	62965	40692	60340		
- Lubricants	12051	10890	8343	9204		
- Sectors & Decarbonisation	24681	9650	6789	14904		
Chemicals & Products	144342	116448	84657	209557		
hereof:						
- Chemicals	13131	16982	11716	13568		
- Products	131372	99200	73079	196099		
Renewables and Energy Solutions	53190	22416	12382	11754		
Profits						
Adjusted Ebitda	84289	55004	36533	56644	+53%	+71%
hereof:						
Integrated Gas	26569	16754	11908	16619		
Upstream	42100	27170	13045	26766		
Marketing	5324	6021	6455	6293		
hereof:						
- Mobility	3567	3957	3849	3694		
- Lubricants	1220	1640	1892	1611		
- Sectors & Decarbonisation	538	425	715	988		
Chemicals & Products	8561	5635	6032	7309		
hereof:						
- Chemicals	-773	2959	2131	1890		
- Products	9334	2676	3901	5419		
Renewables and Energy Solutions	2459	-21	25	425		
Corporate	-725	-554	-933	-768		
Income/Loss to Shell shareholders	42309	20101	-21680	15842	+110%	+790%
Adjusted Earnings	39870	19289	4846	16462	+107%	+195%
Capex (Cash Capex w/o Divestments)	24833	19698	17827	23919	+26%	+21%
hereof:						
Integrated Gas	4265	3502	3566	3462		
Upstream	8143	6168	7099	9845		
Marketing	4831	2273	1774	1779		
hereof:						
- Mobility	2893	1579	1387	-*		
- Lubricants	899	334	248	-*		
- Sectors & Decarbonisation	1040	360	139	-*		
Chemicals & Products	3838	5175	4198	7281		
hereof:						
- Chemicals	2429	3573	2640	-*		
- Products (Refineries, Trading)	1408	1602	1558	-*		
Renewables and Energy Solutions	3469	2359	928	1134		
Notes: *no numbers due to segmentation change						

Revenues & Profits

Shell increased its 2022 revenues by 46% to \$381 billion against a backdrop of high gas and oil prices. The largest contribution came from sales through petrol stations and oil trading/refining. However, the gas business showed the strongest growth.

Profits went up even more steeply. Adjusted Ebitda (roughly: operating profits adjusted for special items) rose by 53% last year, and by as much as 71% over the 2019-2021 period, to \$84 billion. Net profits increased even more, by 110% and 107%, respectively, compared to the previous year.

Investment (Capex)

Investments grew significantly slower than profits. They increased by 26% year-on-year, and by only 21% over the 2019-2021 period. Shell invested just under \$25 billion in 2022. Investments of \$23-27 billion are also planned for 2023.

Of this, \$3.5bn (14.0%) went into the renewables and energy solutions segment, i.e. the power and pipeline gas sectors, last year.

Shell defines about 33% of its total investments, about \$8.2 billion, as "Low-Carbon and Non-Energy". However, this is a title that may evoke misleading associations.

- "Non-energy" (capex \$3.9bn) includes all petrochemicals and lubricants, i.e. oil/gas products that are consumed but not burned to produce energy. Convenience store sales at petrol stations are also included here.
- According to Shell's definition, "low carbon energy products" (capex \$4.2bn) include everything that produces fewer emissions than conventional oil or gas: *"We define low-carbon energy products as those that have an average carbon intensity that is lower than conventional hydrocarbon products, assessed on a lifecycle basis."* (Source: Shell: Annual ESG Update - Slides, 22 March 2023) These include inter alia CCS, blue or green hydrogen, charging stations for electric cars, solar and wind power, „low-carbon fuels“ and various services.

The EU Taxonomy tables supplied by Shell show that \$1.1 billion was invested in wind power, \$1.7 billion in solar power, \$0.6 billion in biofuels/biogas, \$139 million in Green/Blue Hydrogen and \$17 million in CCS. That's a combined total of about \$3.6 billion.

According to the Taxonomy definition, a total of \$32.2 billion of Shell's expenditure counts as investment. Accordingly, only 11% of Shell's investments can be attributed to low-carbon energy in the broader sense. In the narrower sense (excluding biofuels/biogas, CCS, hydrogen), it would be just under 9%.

EU Taxonomy Data

Shell provides numbers for taxonomy-eligible activities but does not give an assessment of the (more strictly defined) taxonomy-aligned businesses, pointing out methodological

problems: „Shell elects to take a prudent approach, which for 2022 implies zero alignment.“ However, 9-10% of capex are seen as „close to alignment“ as well as 0.1-0.2% of turnover. (Source: Shell: Annual Report and Accounts for the year ended December 31, 2022, 2023)

Turnover

In 2022, 3% of Shell's total turnover could be classified as taxonomy-eligible (\$12bn). Shell does not provide numbers for taxonomy-aligned turnover.

CAPEX

In 2022, 21% of Shell's total CAPEX is classified as taxonomy-eligible (\$6.7bn). The biggest contribution make chemicals, plastics and renewable power. Shell does not provide numbers for taxonomy-aligned turnover.

OPEX

In 2022, 16% of Shell's total OPEX could be classified as taxonomy-eligible (\$0.8bn). Shell does not provide numbers for taxonomy-aligned turnover.

Emission Data

Scope 1+2

Shell's 2022 emissions figures show a significant decline in Scope 1 in recent years. The volumes fell from 71 to 51 mtCO₂e since 2018. Scope 2 also managed a reduction in recent years from 11 to 7 mtCO₂e.

According to Shell, the decline in Scope 1 is primarily due to divestments, i.e. the sale of assets. This mainly took place at refineries. In contrast, emissions in the gas sector rose against this trend from 13.0 to 14.7 Mt, which is mainly due to the growth of LNG activities (see table).

Scope 3

For total emissions from energy products sold (i.e. excluding petrochemical products or lubricants), two different data sets are presented for 2022.

a) The more comprehensive survey (well-to-wheel, including emissions for manufacturing of energy products sold by but not manufactured by Shell) results in 1240 MtCO₂e in 2022, down 28 per cent since 2018.

b) The figures for Scope 3 result in emissions of 1174 Mt CO₂e. Again, the reduction since 2018 is a significant 28 per cent.

c) If we only consider emissions from the use of products sold (Scope 3/Cat.11), the reduction is as much as 33 per cent. The absolute amount fell from 1351 to 910 Mt CO₂e. The savings were achieved disproportionately in products that originate from the company's own production. They show a fall of 44% in the years 2018-2022.

A look at the net carbon intensity (cf. table) shows that the emission intensity for oil has risen slightly in recent years, while it has fallen slightly for gas. Overall, the intensity has changed only slightly.

The changes in the portfolio were much more important for the reduction of total emissions. In 2018, production was 3.66 mboe/d of oil and gas; in 2022, it was only 2.86 mboe/d, a 22% decline. At the same time, there was a shift from oil to gas. Both factors together were crucial for the emission reductions in Scope 3.

Data Table - Emissions and Net Carbon Intensity (NCI)

Shell Emissions	2022	2021	2020	2019	2018
mn t CO2e, equity share (if applicable)					
Scope 1 (operational control)	51	60	63	70	71
hereof:					
- Integrated Gas Segment	14,7	15,5	14,1	16,3	13,0
- Downstream (Refining, Petrochemicals et al.)	27,3	32,6	35,8	40,2	42,7
Scope 2 (market-based)	7	8	8	10	11
Total emissions from energy products sold (NCI; equity boundary, incl. carbon offsets; well-to-wheel; including manufacturing of energy products not produced by Shell)	1240	1375	1384	1646	1731
Scope 3 Emissions based on energy product sales (NCI/equity boundary, incl. carbon offsets)	1174	1299	1305	1551	1637
hereof:					
- Purchased goods and services (Scope 3, Cat.1)	144	147	147	178	190
- Third-party Power (Scope 3, Cat.3)	115	136	103	102	96
- Downstream transport & distribution (Scope 3, Cat.9)	5	6			
- Use of Sold Products (Scope 3, Cat.11)	910	1010	1054	1271	1351
- hereof:					
- - own production	332	380	452	564	594
- - third-party products	578	630	602	708	757
Net Carbon Intensity (NCI) of Products Sold gCO2e/MJ	76	77	75	78	79
hereof:					
- Oil products and gas-to-liquids	91	91	89	89	88
- Gas	65	66	67	66	67
- LNG	70	70	70	71	71
- Biofuels	39	41	38	39	37
- Power	58	66	48	57	62

Low Carbon Goals and Strategy

Shell, like most of the oil companies in our sample, commits to the net-zero target by 2050: "As we invest in the energy needed today, our target to become a net-zero emissions energy business by 2050 remains at the heart of our strategy." (Source: Shell: Sustainability Report 2022, March 2023)

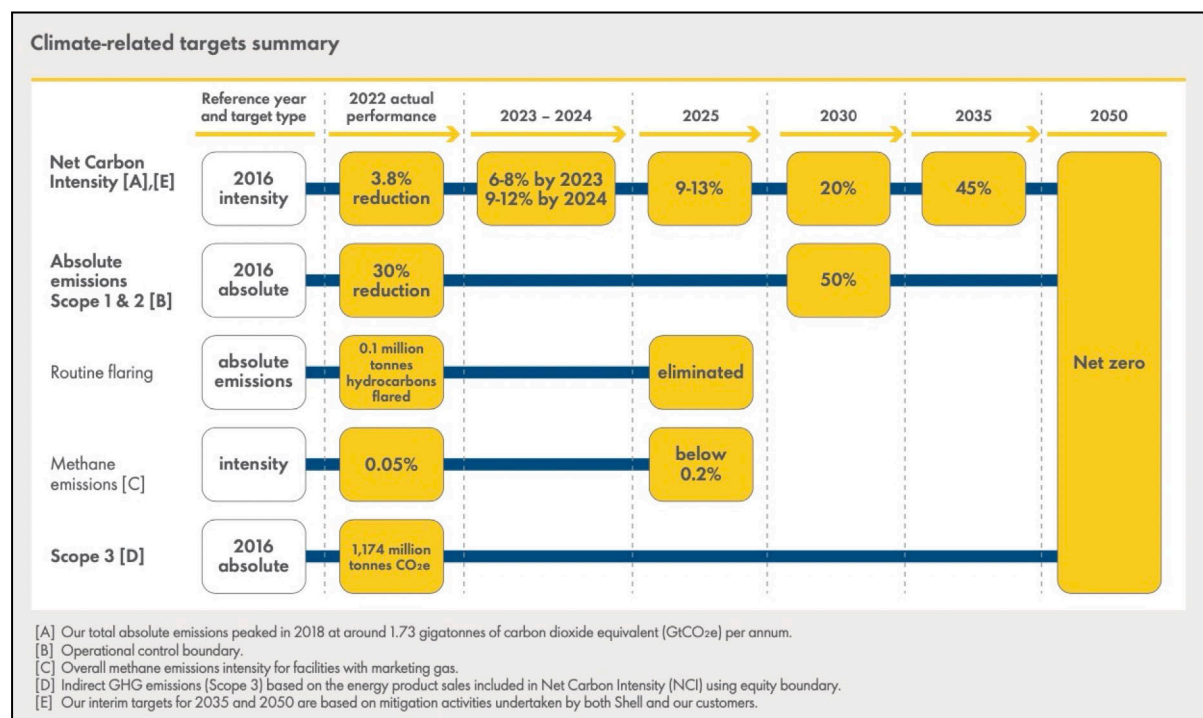
However, Shell does not make any statements about the production of oil and gas in 2050, as only the net carbon intensity of the energy products is to be reduced to zero by then: "Our target is to reduce the net carbon intensity of the energy products we sell by 20% by 2030...by 45% by 2035..and by 100% by 2050. This covers all emissions in Scope 1,2 and 3. And as I already said, Shell has reduced the net carbon intensity of the energy products it sells by 3.8% since 2016." (Source: Shell: Sustainability Report 2022, March 2023)

According to this target, Shell could still produce non-energy products such as plastics, chemicals, lubricants, etc. in 2050. It would also be possible to sell conventional oil and gas as long as "net zero" is achieved, i.e. these emissions are offset by carbon credits or other carbon sinks. This implies that Shell has no absolute Scope 3 targets.

For the time being, a cut in oil and gas production is rejected anyway, as consumption would remain unchanged: "If we are forced to cut our supply...our customers would buy their energy from other suppliers." (Source: Shell: Our Progress in 2022 - Annual ESG Update 2023 - Speech Transcripts, March 2023)

Even under the carbon intensity concept, Shell would obviously have to accelerate the transformation of the group. From 2016 to 2022, the carbon intensity of its products fell by only 3.8 percent. Already by 2030, the pace would have to increase significantly to reach the 20% reduction target. In the years 2030 to 2050, the remaining 80% of the task would then have to be implemented.

However, the concepts to achieve this target are only vaguely hinted at in the reporting and not quantified in more detail (e.g. amount of SAF, H2, biofuels, etc.).



Source: Shell: Annual Report and Accounts for the year ended December 31, 2022, 2023.

Low Carbon Activities

Beyond the downsizing of its own portfolio and the shift from oil to gas, it remains somewhat unclear how Shell plans to achieve the emission reductions on the way to Net Zero in 2050. The reporting lists many measures and numerous ongoing or planned acquisitions and projects, but at the moment the contribution to emissions reductions in the short and longer term appears small and/or uncertain.

Carbon credits

Carbon offsets are already included in the calculation of Shell's emissions. Expenditure was \$92mn at last count.

Shell retired 5.8 million credits (equals 5.8 mn tons of CO₂) in 2022, of which 4.1 million credits (2021: 5.1 million) are included in Shell's net carbon intensity and 1.7 million credits are associated mainly with the sale of non-energy products and Shell's business travel.

Without these carbon credits, total reported emissions in 2022 (1240 Mt CO₂e) would therefore be 4.1 Mt CO₂e higher. The reporting does not clarify what role carbon credits will play in the future.

CCS

Shell is planning or operating three large-scale CCS projects: Quest CCS (Canada), Gorgon CCS (Australia) and Northern Lights (Norway). 2022 operating costs and investment in CCS amounted to \$220mn, an increase of 51% over 2021.

Shell's equity share of captured and stored CO₂ was around 0.4 million tonnes in 2022. Shell deposited a total of 0.97 million tonnes of CO₂ in 2022, roughly constant since 2018. The reporting does not quantify what role CCS will play in the future.

Blue/Green Hydrogen

Hydrogen produced from natural gas with CCS (Blue Hydrogen) or from Renewable Power (Green Hydrogen) is repeatedly mentioned, as with other oil companies, but the expansion targets remain vague. The quantities produced so far are minimal.

At the end of 2022, Shell just owns and operates a 10 MW electrolyzer in Germany (capacity 1300 t/a) and has a 47.5%-interest in a 20 MW electrolyzer (capacity 3000 t/a) in China.

Power

Shell is one of the largest power traders in the world, but its own production in renewables is very small for a group of its size.

Power sales of 243 TWh in 2022 contrast sharply with Shell's own renewable power generation of only 0.3 TWh at the end of 2022 and an installed capacity (Shell's share) of wind/solar power of 2.2 GW, of which 307 MW was wind power and 1914 MW solar power.

However, Indian renewable power developer Sprng Energy was acquired last year (closing in 2023) for \$1.6 billion, and its capacity will only be included in the balance sheet of 2023. With many projects under construction or expected to pass the FID hurdle, the amount of renewable power will grow in the coming years.

For the time being, however, the volumes will remain in an order of magnitude that cannot noticeably change either the group's net carbon intensity or its fossil character.

Biofuels/Biogas

Shell buys large quantities of biofuels. 9.5 billion litres went into Shell's petrol and diesel in 2022. It is unclear, however, how much biofuels is produced by Shell. So far, Shell's main stake is 44% in Brazilian ethanol giant Raizen (3 billion litres). Also, Shell recently announced the acquisition of Denmark's Nature Energy, which produces renewable natural gas from waste, for around \$2 billion. Several projects and activities in the field of SAF, bioLNG, and renewable natural gas are mentioned but no company-wide target volumes are mentioned.

Sources

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11. TotalEnergies

Portrait

TotalEnergies is the largest oil and gas company in France. The company, like its peers BP, Shell, Eni, Chevron and Exxonmobil, is one of the six western supermajors operating globally and covering the entire value chain from oil and gas production to service stations.

The activities as presented in the reporting of TotalEnergies fall into four major segments:

1. Integrated Gas, Renewables & Power: integrated gas projects including upstream and midstream LNG activity; power activities including fossil and renewable power generation
2. Exploration & Production: oil and gas exploration & production; carbon sink activities such as CCS and carbon offsets
3. Refining & Chemicals: downstream activities including oil refining and chemicals; oil trading and shipping
4. Marketing & Services: global supply and marketing of petroleum products, including petrol stations.

Shareholdings are widely dispersed among approximately 1.5 million individual shareholders. The largest shareholders are BlackRock (6.6%) and the group of employee shareholders (6.8%). TotalEnergies shares are listed at stock exchanges in Paris, New York, Brussels and London.

Production

The product range is dominated in roughly equal parts by fossil oil and fossil gas. Volumes fell by around 8 per cent since 2019 to just under 2.8 mboe/d, but are expected to grow again in the coming years. In the group of supermajors, the TotalEnergies Group is probably the one that is pursuing the strongest growth course in its fossil production.

At the same time, electricity production has been expanding for several years. Last year, 33.2 TWh were produced. However, this corresponds to only about 2% of fossil oil and gas production, measured in terms of heating value (1 boe = 1700 kWh). Electricity from renewables was 10.4 TWh in 2022. The rest of the electricity production is accounted for by gas-fired power plants (CCGT).

Bioenergy has played only a minor role so far and will continue to do so for the foreseeable future. Biofuels from own production represent less than 0.3% of refinery production (c. 300kt in 2022). Biogas volumes are also very low, at 1 TWh in 2022.

The fossil share of the TotalEnergies Group's total production is therefore around 99% across all energy products.

In the case of product sales, the volumes are significantly higher, especially in the oil sector. Total petroleum product sales were 3.9 mb/d in 2022, three times the crude oil production. Of this, 2.0 mb/d was accounted for by trading, 0.4 mb/d by bulk sales and the remaining almost 1.5 mb/d by sales to consumers. At 55.3 TWh, electricity sales are also significantly higher than the amount of electricity produced by the company itself.

TotalEnergies Production	2022	2021	2020	2019
Hydrocarbon Production (1000 boe/d)	2765	2819	2871	3014
hereof:				
- Oil	1307	1274	1298	1431
- Gas (inc. condensated, assoc. NGL)	1458	1545	1573	1583
Total Refinery Throughput	1472	1180	1292	1671
Production in TotalEnergies's Refineries (net share)	1424	1137	1208	1606
hereof: renewable diesel and ETBE	5	9	6	5
Product Sales (1000 boe/d)				
Consolidated petroleum product sales	3891	3581		
hereof:				
petroleum product sales to consumer	1468	1503	1477	1845
bulk sales	411	383		
trading	2012	1696		
Power Sales in TWh (BtB and BtC)	55.3	56.6	47.3	
Gas Sales in TWh (BtB and BtC)	96.3	101.2	95.8	
Energy mix in % (sold products)*				
hereof:				
Petroleum Products	41	44	47	
Gas	50	48	45	
„Low-carbon energies“ (fossil and non-fossil power, biofuels, biomass, H2)	9	8	7	
Renewable Power - Installed Capacity				
- Net capacity	7.7	5.1	3.1	
- Gross capacity (incl. Adani, Clearway stakes)	16.8	10.3	7.0	
Net Power Generation (renewables + gas) in TWh	33.2	21.2	14.1	
hereof:				
Renewable Power Generation in TWh	10.4	6.8	4.0	
	Notes: **"excluding the COVID-19 effects", i.e. adjusted numbers			

Note for the Data Tables: The „Covid-19 effect“ factor

The Group occasionally applies an adjustment factor in its reporting, the "Covid-19 effect". This makes the comparison of values sometimes more difficult and confusing. The somewhat arbitrary procedure is described as follows:

„COVID-19 effect: the COVID-19 effect is assessed on the basis of a 10% decrease of petroleum products demand in 2021 compared with their structural demand. In 2022, this effect only applied to Scope 3 emissions during the first half of the year.“

Source: TotalEnergies: Universal Registration Document 2022, March 2023 (p.368).

Revenues & Profits

TotalEnergies grew its revenues by 37% to \$281bn last year, and by as much as 54% over the 2019-2021 period. This happened equally in the oil and gas sectors. Here, as with the other oil companies, higher consumer prices made themselves felt as costs remained stable or rose less steeply.

Profits climbed even more strongly. They rose by 69% year-on-year in Ebitda (adjusted) to \$71.6bn, and by 100% in net income (adjusted) to \$36.2bn. The comparison to the 2019-2021 period is even more positive in both cases: +118% and +220% respectively.

Capex & Capex Structure

Capital expenditure grew at a much slower pace than sales and profits. Net capital expenditure (organic capex plus net acquisitions) increased by only 23% year-on-year to \$16.3bn in 2022. This compares to a 13% increase over the period 2019-2021. TotalEnergies also plans to invest in this range in 2023 (\$16-18bn).

The upstream segment (Exploration & Production), i.e. oil and gas production, benefited most from higher investments. This segment attracted \$10bn, or over 60% of total investments.

This should help to increase the production of oil and gas in the coming years. The group wants to increase its energy production by about 4 per cent each year until 2030. This applies to oil, gas and electricity, but the gas segment in particular is to be strengthened. In 2030, 50% of sales are to come from the gas business, 30% from oil products and 20% from the electricity business.

However, it remains unclear how things will continue after 2030. Apart from milestones for carbon intensity, the plans for the years 2030-2050 remain largely in the dark.

EU Taxonomy

The fossil focus of the business model is also clear from the EU Taxonomy figures.

Turnover (Controlled Scope)

In 2022, 7.5% of total turnover is classified as taxonomy-eligible, less than in the two years before. Only 1.3% of turnover is classified more strictly as taxonomy-aligned.

CAPEX (Controlled Scope)

In 2022, 17.4% of total CAPEX is classified as taxonomy-eligible; 14.5% is classified as taxonomy-aligned. The biggest contributions stem from investments in solar (\$1060m) and wind power (\$938m). Biogas/Biofuels (\$54m), CCS (\$20m) and other activities play only a minor role.

TotalEnergies Financials	2022	2021	2020	2019	2022 vs 2021	2022 vs Ø 2019-21
mn USD						
Sales	280999	205863	140865	200316	+37%	+54%
hereof:						
Integrated Gas, Renewables and Power	48753	30704	15629	18167		
Exploration & Production	9942	7246	4973	7261		
Refining & Chemicals	121618	87600	56615	87598		
Marketing & Services	100661	80288	63451	87280		
Profits						
Adjusted Ebitda	71578	42302	21112	35163	+69%	+118%
Adj. Net operating income from business segments	38475	20209	6404	14554	+90%	+180%
hereof:						
Integrated Gas, Renewables and Power	12144	6243	1778	2389		
Exploration & Production	17479	10439	2363	7509		
Refining & Chemicals	7302	1909	1039	3003		
Marketing & Services	1550	1618	1224	1653		
Net Income (TotalEnergies's share)	20526	16032	-7242	11267	+28%	+207%
Adj. Net Income (TotalEnergies's share)	36197	18060	4059	11828	+100%	+220%
Adjusted Earnings						
Capex						
Organic Investments	11852	12675	10339	13397		
Net acquisitions	4451	632	2650	3780		
Net investments	16303	13307	12989	17177	+23%	+13%
hereof:						
Integrated Gas, Renewables and Power	3993	4506	4903			
Exploration & Production	10027	6523	6063			
Refining & Chemicals	1281	1285	1155			
Marketing & Services	914	923	900			

Emissions

The company reports of TotalEnergies showed little progress in terms of emissions over the past years.⁶

TotalEnergies Emissions	2022	2021	2020	2019	2015
mn t CO2e					
Scope 1* (equity-based)	51	49	52	55	50
Scope 2* (equity-based) (market-based)	5	5			
Scope 2* (operated domain) (market-based)	2	2	3	4	4
Scope 3 - Cat.11** Emissions from energy products sold (excluding „COVID-19 effect“ factor)	381	370	350	410	410
Scope 3 - Cat.11** Emissions from energy products sold (including „COVID-19 effect“ factor)	389	400	400	410	410
Scope 3 - excluding „COVID-19 effect“ factor hereof:					
Cat.1 Purchased goods and services	30				
Cat. 4 Upstream Transportation	9				
Cat.11 Use of sold products**	381				
Cat. 12 End of life treatment of sold products (non-energy products)	11				
Other categories	10-15				
Scope 3 Sum (own calculation)	441-446				
Scope 3 by Product** (excluding „Covid-19 effect“ factor)					
- Petroleum Products	246	255	270		350
- Biofuels	4				
- Gas	130	115	80		60
Lifecycle carbon intensity of energy products used by customers 2015=100 (73gCO2e/MJ) (excluding the „COVID-19 effect“)	88	90	92	94	100
	Notes: *Some numbers distorted through application or non-application of vaguely defined factor „COVID-19 effect“ in the years 2020 and 2021 (scope 1+2); or 2020,2021 and first half of 2022 (scope 3) **Sales of oil products, biofuels, natural gas excl. minority stakes in public companies				

⁶ Please note that regarding TotalEnergies emissions, Greenpeace France has published on November 3, 2022, a report challenging TotalEnergies carbon accounting (link : <https://www.greenpeace.fr/espace-presse/rapport-bilan-carbone-de-totalenergies-le-compte-ny-est-pas-la-major-serait-responsable-de-pres-de-quatre-fois-plus-demissions-de-gaz-a-effet-de-serre-que-ce-quelle-dec/>). This report is the subject of a SLAPP by TotalEnergies in front of French courts, TotalEnergies requesting the report to be deleted (link : <https://www.greenpeace.fr/espace-presse/justice-totalenergies-tente-de-museler-greenpeace/>).

At 51 Mt CO₂e, Scope 1 emissions are currently even higher than in the previous year and in the Group's preferred reference year 2015. Scope 2 emissions have been reduced in recent years but have been relatively modest.

Scope 3 emissions (Cat.11 *Emissions from energy products sold*) have also made little progress. They fell from 410 Mt CO₂e in 2015 to 381 Mt in 2022 (excluding the adjustment factor "Covid-19 effect"), i.e. by about 1 per cent per year.

If the other categories of Scope 3 are added, the total emission volume of 2022 rises from 381 to 441-446 million tonnes of CO₂e.

According to the reporting, the calculation of Scope 3 emissions (Cat.11) follows the method of selecting the highest quantities along the value chain, i.e. the production quantities or the sales quantities, as the case may be. In the case of oil and biofuels, these are the sales volumes, but in the case of natural gas it is the production volumes, as they are "higher than gas sales either as LNG or as part of direct sales to B2B/B2C", as the company states.

According to the reporting, that is 1.7 mb/d of oil product sales (254 Mt CO₂e), 1.1 mboe/d of natural gas production (130 MtCO₂e) plus 4 MtCO₂e from the relatively low sales of biofuel.

Emission Goals⁷

Production in 2050

In addition to green gases and low-carbon electricity, TotalEnergies still wants to produce 1 mboe/d of fossil oil and gas in 2050, i.e. more than a third of today's quantities. Of this, LNG is to account for 0.7 mboe/d (25-30 Mt) and oil for the rest, including recycled chemicals.

The associated Scope 1 and 2 emissions are to be offset via carbon offsets, according to company plans, unless reduced by other measures. The associated approx. 100 Mt CO₂e Scope 3 emissions are to be mitigated primarily by CCS with 50-100 Mt/y, by e-fuels and by carbon offsets.

2030 Scope 1+2 goals

TotalEnergies plans to reduce Scope 1+2 emissions from the current 40 MtCO₂e (operated domain, i.e. not equity-based) to 25-30 MtCO₂e.

⁷ On March 2, 2022, Greenpeace France, Friends of the Earth France and Notre Affaire à Tous, supported by ClientEarth, filed a lawsuit against TotalEnergies. In their claim, the organisations argue that TotalEnergies' advertising to French consumers is deceptive as it gives a false picture of the company's 'net zero' plans. A translation of the court claim, including an analysis of the net zero claims, based on the 2020 reports by TotalEnergies, can be found here : <https://www.clientearth.org/latest/documents/assignation-greenpeace-friends-of-the-earth-france-and-notre-affaire-a-tous-against-totalenergies/>. The case has been judged admissible by the Tribunal judiciaire de Paris on May 16, 2023.

- 2015 46 MtCO_{2e}
- 2022 40 MtCO_{2e}
- 2025 38 MtCO_{2e}
- 2030 25-30 MtCO_{2e}

2030 Scope 1-3 intensity goals

In the sum of Scope 1, 2 and 3, the company only pursues carbon intensity targets, i.e. no volume targets. The intensity is to be reduced by 30% by 2030 compared to 2015. Of this, 12 percentage points have already been achieved by 2022. The reporting shows that the reduction is to be achieved primarily through the expansion of the electricity segment, while the gas and oil volumes produced remain constant or increase.

Lifecycle carbon intensity 2015 = 100 (of energy products used by customers):

- 2022 -12%
- 2025 -15%
- 2030 -25%

2030 Scope 3 Oil emissions goals

In Scope 3, emissions are to be reduced primarily in the oil sector. This is to be achieved by reducing sales while production remains more or less stable. Other measures, such as CCS and carbon offsets in particular, are added. The contribution of hydrogen or biofuels is likely to remain small in view of the slow growth until 2030.

The target for 2030 is low anyway. A minus of -27% compared to 2015 was already achieved in 2022. For 2025 (-30%) and for 2030 (-40%), the climate ambitions in the oil sector are very limited.

2015 350 Mt
 2022 254 Mt = -27%
 2025 -30%
 2030 -40%

2030 Scope 3 Gas goals

The fossil gas segment is to be the Group's growth engine. Emissions will not decrease here.

„Scope 3 from our gas-related sales will not go down. It's actually going to go up. ...In 2022, we're talking about 130 million tons of CO₂. ... Selling gas to customers that would otherwise use coal or fuel oil is a net positive for the planet.“

Source: TotalEnergies: Sustainability & Climate 2023 Investor Meeting, Transcript, March 2023.

2030 Scope 3 Overall emissions goals

As mentioned above, this means that overall Scope 3 emissions are not expected to fall for the time being, as TotalEnergies intends to expand its production. After 389 Mt in 2022 (incl.

Covid-19 effect) for Scope 3 (Cat.11), only a volume target of "below 400 Mt" is issued for 2025 and 2030 alike.

2015 410 Mt
2022 389
2025 <400
2030 <400

Specific Low Carbon Activities

TotalEnergies relies on the usual arsenal of low carbon activities. The reporting highlights in particular the plans in the electricity sector and CCS. So far, however, there are hardly any successes to report in the expansion of low-emission group activities.

CCS

The group aims to have a CCS capacity of more than 10 million tonnes of CO₂ per year available by 2030 (equity share). According to reporting, and in contrast to far lower taxonomy capex data (see above), the investments for this were 100 million dollars in 2022 and are to increase to 300 million dollars per year by 2030.

By 2050, the quantities of CO₂ disposed of by CCS are then to rise to as much as 50-100 Mt/y. So far, however, the company could not report any major quantities.

Carbon offsets

In the area of carbon offsets/carbon credits, TotalEnergies wants to reach a level of 5-10 Mt CO₂ in 2030. In the reporting, it is not entirely clear to what extent this instrument was already used in 2022 to reduce emissions on the balance sheet.

Power

The power sector is at the centre of the company's low-carbon strategy, especially for reducing (i.e. diluting) the net carbon intensity of its products. The Group presents two figures for installed capacity in renewable power for 2022, including a gross installed capacity of 17 GW. However, the net capacity (the company's equity share) at the end of the year is only 7.7 GW.

It is therefore unclear what is meant by the expansion target of 100 GW of renewable power capacity by 2030. The graphs suggest a „gross capacity". The actual expansion target (equity share) could therefore be far lower. In parallel, TotalEnergies is expanding its fleet of gas-fired power plants (CCGT). In 2022, it produced twice as much electricity as the renewables.

Biofuels/Biogas/E-Fuels

The quantities of Bioenergy produced by the group so far are very small. The expansion plans are rather restrained.

In 2022, the production of biofuels was less than 0.3 million tonnes. By 2030, 1.5 million tonnes of SAF (Sustainable Aviation Fuels) are to be produced per year. However, this would only correspond to about 2 per cent of current fossil refinery production.

Biogas production was only 1 TWh in 2022. It is to increase to "up to 20 TWh" by 2030. More precise targets or plans are not set.

On the subject of hydrogen and e-fuels, the group remains very vague. For the year 2030, a production volume of 1 million tonnes per year is targeted. This would correspond to slightly more than 1 per cent of the current fossil refinery production. Overall, the topic of hydrogen appears less prominent ("positioning itself") than at other companies in the peer group.

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12. Wintershall Dea

Portrait

Wintershall Dea AG is the largest German oil company. Compared to its global peers, it is a medium-sized, Europe-centred player with an upstream focus, i.e. oil and gas production. It also owns some gas transport and trading activities.

The company was formed in 2019 by the merger of Wintershall Holding GmbH and Dea Deutsche Erdoel AG. The German chemical giant BASF holds 72.7% of the shares and LetterOne, a private investment business established by Russian oligarchs, the remaining 27.3%. An IPO has been repeatedly postponed, first because of the oil price crisis in 2020, and most recently because of heavy losses related to the group's Russian operations. Wintershall Dea stock is therefore not yet listed.

Fossil Production

Oil and gas production initially had two geographical focuses: Russia and Northern Europe (Norway, Denmark). Since the withdrawal from Russia, which took place as late as early 2023, only the focus on Northern Europe remains. In total, however, the company is active in 11 countries such as Argentina, Libya and Egypt.

Last year, it produced 597,000 boe/d of oil and gas. Of this, 72% was natural gas. In the years before, the volumes were at a similar level (see data table).

Revenues

The high gas and oil prices helped Wintershall Dea to jump in revenues and profits last year. Revenues increased by 140% to €18.7 billion compared to 2021. In particular, revenues from the gas business rose steeply from 5.2 to 15.3 billion euros.

Profits show a similar trend: They doubled last year to 7.7 billion euros (Ebitdax) and almost tripled compared to the period 2020-2021. Net profit (adjusted, i.e. without Russia effects) did even better: it increased last year from 0.95 billion euros to 2.4 billion euros.

In accounting terms, the withdrawal from Russia this year is spoiling the balance sheet. Impairments and deconsolidation adjustments were necessary. For 2022 the company has to record a net loss of €4.8 billion due to the deconsolidation of the Russian business and impairments of Nord Stream AG and Nord Stream 2 AG.

Data Table

Wintershall DEA	2022	2021	2020	2019*	2022 vs 2021	2022 vs Ø 2020-21
mn €**						
Sales	18714	7804	3642		+140%	+227%
hereof:						
gas production and gas trading	15346	5285	1809			
oil production and oil trading	3203	2326	1505			
other	165	193	328			
Profits						
Ebitdax	7675	3832	1643		+100%	+180%
Adjusted Net Income	2357	950	195			
Cash Flow from Operating Activities	4839	2998	1604			
Capex	970	1050	1268		-8%	-16%
hereof: Russia	6	6	12			
Production volumes in 1000 boe/d	597	634	623			
hereof:						
Liquids	166	180	177			
Gas	431	454	446			
hereof (liquids+gas combined):						
Production in Russia	276	303	295			
	* No 2019 numbers as company was only established in 2019. **All data including activities in Russia.					

Investment (Capex)

There have been only minor changes in the investment structure in recent years. In 2022, they fell slightly by 8 per cent to just under 1 billion euros. Almost all of the expenditure went into the exploration and production of oil and gas. Of the 970 million euros, 712 million euros was dedicated to activities in Northern Europe (mainly Norway). In 2021, the situation was similar.

The investment plans envisage similar volumes of 1 billion euros in the coming years. This is intended to stabilise oil and gas production at the current level of 350,000 boe/d outside Russia for a longer period.

Emission Data and EU Taxonomy

Scope 1 and Scope 2 emissions are relatively low due to the comparatively good infrastructure in the Norwegian oil and gas fields in which the Group has a stake. The focus is on Scope 3.

Scope 1: 1.87 mn t CO₂e (equity-based)

Scope 2: 0.01 mn t CO₂e

Scope 3: 76 mn t CO₂e (equity-based, use of sold products) (2021: 80 mn t; 2020: 78 mn t)

EU Taxonomy data are not provided. The company states that the reporting will be mandatory only in 2026 (for FY 2025).

Sustainability Goals and Low Carbon Strategy

Wintershall Dea supports the EU's climate neutrality goals, but does not detail a corporate plan in this direction. A clear commitment to "Zero Emission by 2050" for Scope 1+2+3, which can be found at almost all other oil companies in our sample, is missing. As for Scope 3, the targets remain vague ("steer our portfolio towards lower emissions"), without concrete figures.

However, emissions in Scope 1 and Scope 2 are to be reduced by 25% in the period 2020-2025 and fall to zero by 2030. The 2025 target should be easy to achieve after the involuntary withdrawal from Russia. The 2030 target, however, will then require more efforts.

Low carbon activities

As the focus of the Group's activities is strongly concentrated on the upstream sector, this is where projects to reduce emissions take place. Measures are planned, for example, to reduce emissions from the production platforms by electrifying them instead of burning gas or diesel fuel. Direct methane emissions and the extent of gas flares are also to be reduced.

However, only one project of significant size stands out: the Hywind Tampen Offshore Floating Wind Project is to provide electricity for the oil field in which Wintershall Dea has a stake. This is expected to save 0.2 mn t of CO₂ when completed.

The remaining Scope 1 and Scope 2 emissions are to be fully offset by carbon offsetting investments by 2030.

In the coming years, CCS projects are also expected to contribute to decarbonisation in Europe. The company even sees itself on the way to becoming the "leading independent European gas and carbon management company". The aim is to provide carbon storage services which avoid CO₂ emissions of 20-30 million tonnes per year by 2040.

Projects in Denmark (Greensand) and Norway (Luna, etc.) are expected to contribute to achieving this goal. The timetables seem somewhat vague at the moment and depend not

least on the timing and extent of government support measures and the provision of regulatory frameworks.

Sources

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