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Responsible Investment

Are Europe's oil and gas majors prepared for the climate change challenge?

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Highlights

- The science is undisputed: **Greenhouse gas (GHG) emissions linked to human activity have led to higher temperatures and, if unabated, will lead to even higher temperatures in the future.** In turn, the phenomenon of global warming has been linked to higher frequency of extreme weather events with clear negative consequences for societies and economies.
- **Three quarters of GHG emissions relate to the burning of fossil fuels.** To reduce them in any meaningful way, governments, businesses and individuals will all have to change habits and behaviours. Major companies in the sector, known collectively as the Integrated Oil Companies (IOCs), have faced growing pressure over their contribution to global GHG emissions and in turn, climate change.
- That pressure has now reached a point where the **IOCs have been pushed to act, and to do so rapidly.** This has encouraged a focus on the transition away from fossil fuels and in 2020 we saw a milestone year, when IOCs finally appeared willing to publicly address their contribution to climate change, perhaps because they realised their futures depended on it.
- **All European IOCs have now clearly outlined energy transition strategies with targets to achieve net zero by 2050** on direct (known as scope 1 and 2) and indirect (scope 3) GHG emissions. Some are at more advanced stages than others, and slight differences also exist in the way companies define their targets. This may complicate like-for-like comparisons, but all intend to use the same tools and act on the same levers to get there.
- This is a fast-moving theme for investors to understand and we expect to refresh and reassess the analysis below on a regular basis. Execution risk exists, but **so far it seems to us that IOCs will be able to reduce their scope 1 and 2 emissions in line with the targets they have set, at least to 2030.** Addressing the more prominent scope 3 (c.85% of total) emissions is more challenging – this will partly rely on technologies that are yet to mature or which do not yet exist, and on changes in the companies' business models. Most importantly, it will require drastic societal changes over which the IOCs have no direct control.
- **IOCs have an important role to play in the transition to a decarbonised energy system and world. They seem willing to play that role in order to survive as businesses** and, after reviewing their related strategies, we see Total and Repsol as having the most convincing plans overall. On the other side Eni although ambitious is a late starter while Shell faces a daunting task given its sheer size. We see BP, Equinor and OMV as being in the middle of the pack.

Note: We have not used 2020 data as the COVID crisis has significantly disrupted the industry and led to production and emission numbers being artificially low

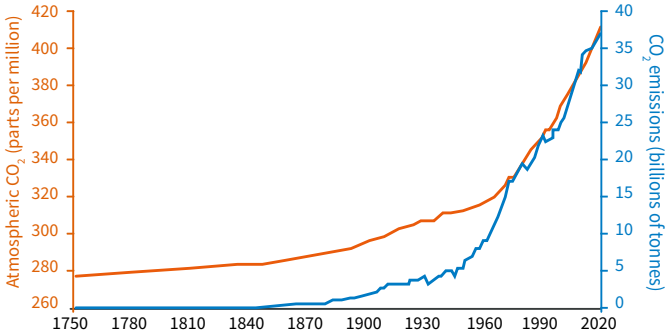
History and context

Climate change and its effects have become a defining theme of our time. Ever since the start of the industrial revolution, our economies have required the burning of carbon-intensive fossil fuels – primarily coal, crude oil and natural gas – on a massive scale, and this has led to equally massive emissions of greenhouse gases, including carbon dioxide (CO_2). Science has now charted this reality through clear and reliable data which starkly sets out the challenge before us.

Over the centuries, an increase in GHG emissions and their concentration in the Earth's atmosphere has led to a well-documented rise in average temperatures. In turn, this global warming has been linked to a higher frequency of extreme weather events – polar ice is melting at a faster rate, violent hurricanes have become more frequent and flooding risks have been affected by shifts in rain patterns. The list of very practical consequences that threaten humanity is long.

Figure 1: Charting the history of emissions

$C0_2$ in the atmosphere and annual emissions (1750 – 2019)



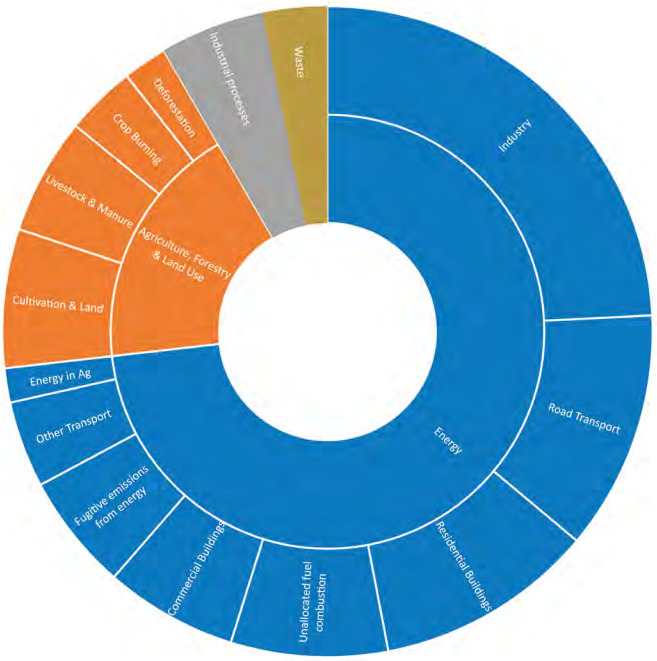
Source: NOAA, ETHZ, Our World in Data

The evolution of the global economy over time has meant that primary energy consumption has been the main source of GHG emissions. The fuel for our industries, cars and homes now accounts for about three-quarters of the total. Emissions linked to burning coal account for about 30% of the total, while it's roughly 25% for oil and 15% for gas. At 98.3 grammes of CO_2 per megajoule, coal is the most CO_2 intensive of the three; natural gas at 56.1 is the least, according to reports from the Intergovernmental Panel on Climate Change. We can see the relative intensity of coal clearly illustrated in **Figure 3** below detailing the carbon footprint of British utility SSE.

CO_2 accounts for the majority of GHG emissions but a quarter stems from other gases, primarily methane, which has 28 times the warming power of CO_2 and is mostly the result of agricultural activities and natural gas leaks in the energy infrastructure.

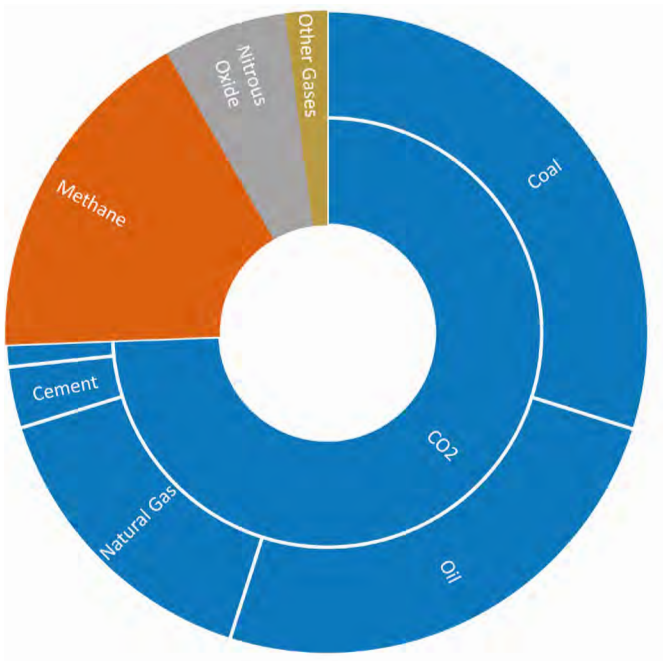
Figure 2: GHG emissions by sector and by fossil fuel

GHG emissions split by sector



Source: The World Resources Institute, via Our World in Data. As of 2016.

GHG emissions split by fossil fuel



Source: The World Resources Institute, via Our World in Data. As of 2016.

> **The fuel for our industries, cars and homes now accounts for about three-quarters of total GHG emissions**

GHG emissions and the oil & gas industry

Primary energy consumption and the burning of fossil fuels may be the main sources of GHG emissions, but CO_2 and other GHGs are emitted across the entire value chain of virtually any operating company. To account for the related emissions, they are classified in three categories:

- **Scope 1:** All direct GHG emissions linked to a company's own operations.
- **Scope 2:** Indirect GHG emissions stemming from the consumption of purchased electricity, heat or steam.
- **Scope 3:** Other indirect emissions coming from the supply chain of a company and from its customers (i.e. before and after its own operations, that is upstream and downstream).

So, how does that apply to the IOCs? The oil and gas value chain is long and complex, and commonly organised around three business areas:

Upstream: Exploration and production (the core business of finding and extracting hydrocarbons).

Midstream: Transportation and storage of hydrocarbons, natural gas processing.

Downstream: Oil refining (turning crude oil into gasoline, kerosene etc.), petrochemicals (production of plastics, motor oils etc.), distribution and marketing (forecourts etc.).

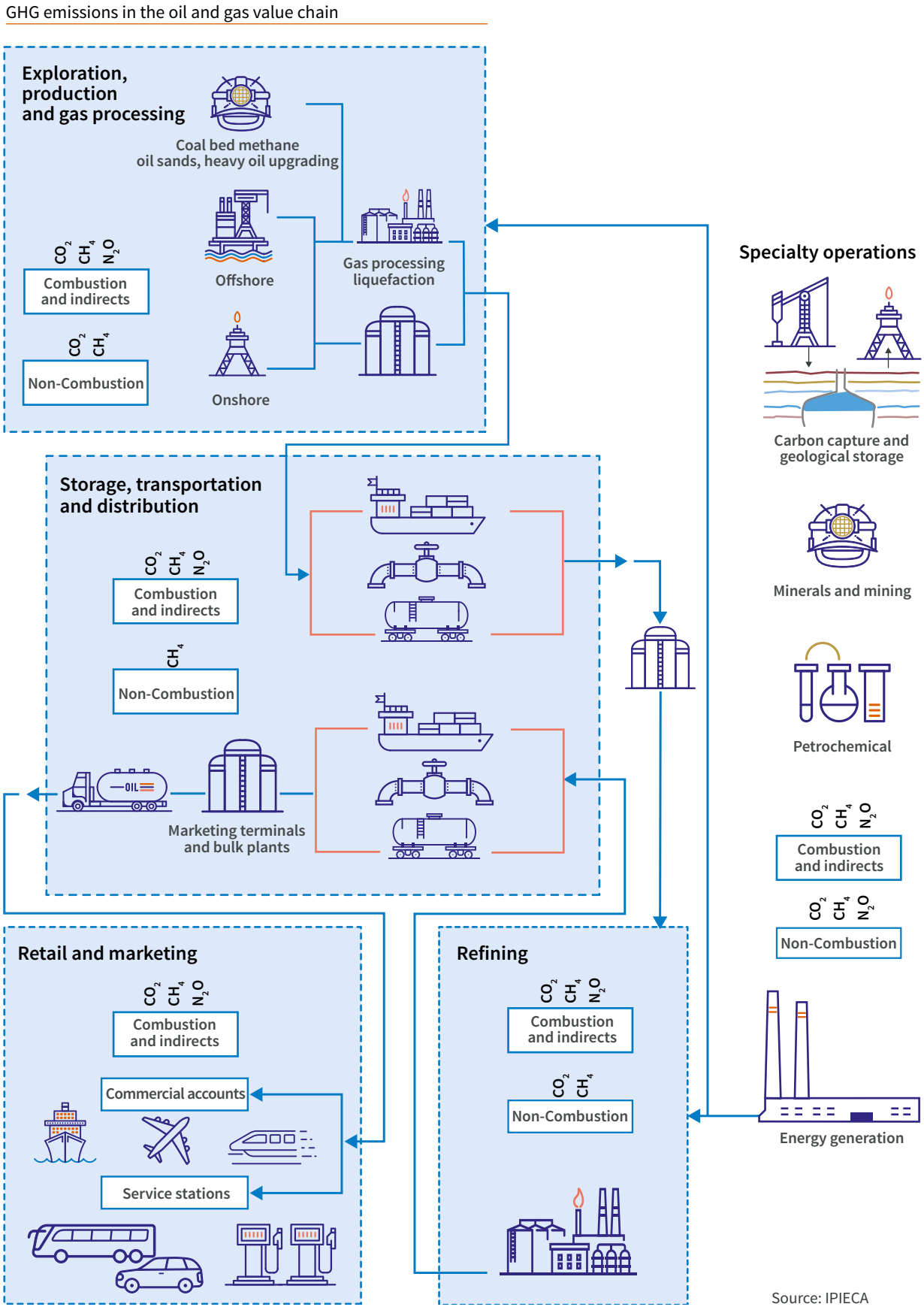
Figure 3: Coal's impact on SSE PLC

	Generation	Scope 1	Intensity
Coal	1 946	2 211	1 136
Gas	15 393	5 976	388
Hydropower	3 870	0	0
Wind	6 284	0	0
Others	993	24	24
Total	**28 486**	**8 211**	**288**

Generation in MW; scope 1 in million tonnes (Mt) of CO_2; intensity in grammes of CO_2 per kWh. SSE has since closed its last coal-fired power plant.

Source: SSE PLC 2020 CDP Climate Report

Figure 4: Tracking the impact through the value chain



Within the oil and gas industry, and along the value chain, scope 3 emissions are overwhelmingly dominant. Through their operations the IOCs do generate significant amounts of absolute scope 1 and 2 GHGs relative to other sectors, but they pale in comparison to scope 3 downstream emissions – in other words emissions from their customers, when oil products and natural gas are burnt, such as while driving your car. As per the scope 3 methodology then, the oil and gas industry bears the carbon weight of all the industries and activities that consume its products. Scope 3 overall accounts for 85%-90% of the sector's emissions (see **Figure 7**) and while this proportion is not uncommon (see **Figure 6**) the absolute tonnes are much higher than for most other sectors (**Figure 5**).

Figure 7: Scope 3 accounts for the vast majority of emissions across the sector

	GHG	Scope 3
BP	412	87%
Eni	297	86%
Equinor	262	94%
OMV	138	92%
Repsol	214	88%
Shell	775	90%
Total SA	460	90%

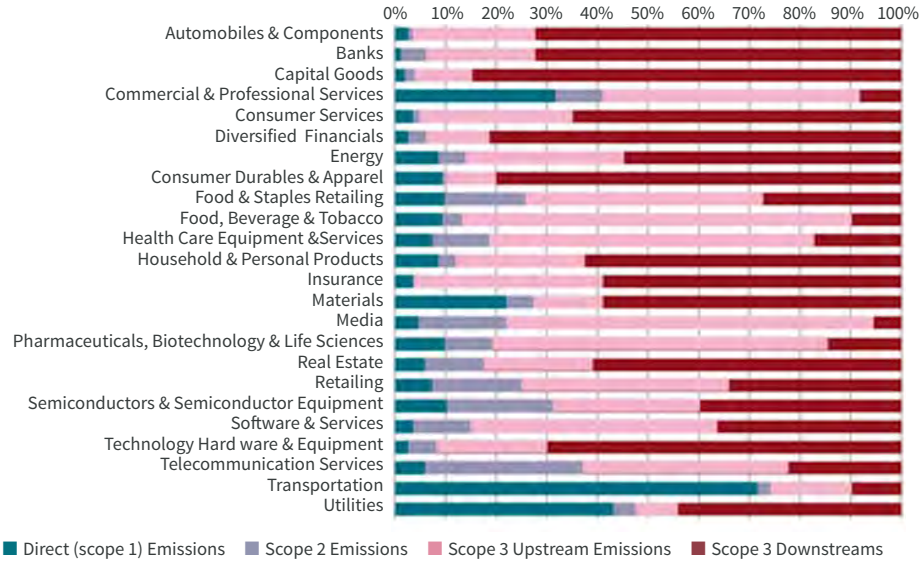
Source: 2019 data, from annual reports. GHGs in million tonnes.

Figure 5: The oil and gas sector's relative emissions

Carbon emissions by companies in the MSCI Europe Index				
In Mt of CO_2 equivalent	Scope 1	Scope 2	Scope 3	All scopes
Energy	259	23	3 126	3 409
Materials	599	104	1 726	2 429
Industrials	113	15	1 686	1 814
Consumer Discretionary	12	23	1 283	1 318
Utilities	436	37	637	1 110
Consumer Staples	23	20	494	537
Financials	4	8	320	332
Health Care	8	8	103	118
Information Technology	1	3	110	114
Communication Services	2	12	55	69
Real Estate	0	1	7	8

Source: Trucost, AXA IM, 2019

Figure 6: GHG scopes weights by industry: Upstream and downstream scope 3 emissions play a major role



Source: Trucost S&P, AXA IM, 2019

IOCs and climate strategies

Looking at the data in the previous section, particularly the scope 3 effect, we can easily grasp why IOCs are labelled as bearing much of the responsibility for global GHG emissions and in turn, climate change. They face growing societal pressure to make genuine, verifiable progress to tackle the issue. Government, regulatory and consumer momentum is pushing companies to act, and to do so rapidly. For IOCs, their role in the fight against climate change is all about delivering an effective energy transition.

In that regard, 2020 was a milestone year for the oil and gas industry and some of its largest players. Aside from the pandemic shock to demand and volatility in prices, we also saw what we believe was a quite drastic change in corporate rhetoric. It may be more survivalist than philanthropic, perhaps driven by the influence of active and engaged responsible investors in Europe and the US, but it is clear that the IOCs have finally been willing to publicly address one of the industry's main taboos – their contribution to climate change, and their strategic efforts to address it. We can characterise the overall response as a three-stage process. IOCs have, in effect, said:

- Yes, as companies, as GHG emitters, we are part of the problem. Yes, fossil fuels are not unlimited. Yes, to our business models this supply issue is exacerbated by the demand side of things: society's growing concern over climate change and a related shift in regulation and consumer behaviour. Yes, peak oil is coming sooner rather than later and: Yes, our mid- to long-term business models are challenged.
- But, we are part of the solution. We, and our hydrocarbon products nevertheless remain vital to our globalised economies: are there any viable or scalable combustion engine alternatives available yet (energy storage will be key here)? What about plastics alternatives? What about gas rather than coal for energy generation? Are we the only ones to blame when diesel, gasoline, kerosene, gas etc. is burnt?
- We the IOCs acknowledge and have identified our flaws and we will work on addressing them. As companies, we'll get cleaner and work on reducing our scope 1 and 2 GHG emissions. As moral entities, we'll help society transition to a better place – one where electricity holds the lion's share of energy production/consumption and where the remaining fossil fuels in use are "low carbon". To support that we will, among other things, invest massively in renewable sources and become "energy" (rather than oil and gas) companies in the process. To fund the energy transition we will rely on the strong cash generated by our legacy upstream and downstream assets. We will survive and grow alongside society.

This summary is at a fairly high level. The IOCs do share relatively similar targets and tools to get where they state they want to be, but there are some differences in the way they communicate, in how they define targets and metrics, and in the aggressiveness of their plans. This will make perfect like-for-like comparisons more difficult and we need to bear this in mind when assessing which companies are proposing the most credible energy transition strategy to help the world meet the Paris Agreement global warming targets (limiting the global temperature increase to well below 2°C, while pursuing efforts to limit the increase to 1.5°C).

> **Execution risk is real, but we believe the IOC targets to 2030 seem credible, overall**

Getting cleaner: Addressing scopes 1 and 2

IOCs are able to significantly reduce their own, direct emissions with existing solutions and technologies. It is often simply a question of choice and, as always, an economic issue. With their new strategic plans, the companies have come out with specific targets and ambitions to reduce scope 1 and 2 emissions. A majority of such emissions relate to the operating process within the oil and gas value chain and we present in **Figure 8** key operating data for the companies.

Figure 8: IOCs' key operating metrics

Hydrocarbons Producation Data	Oil (kbd)	Gas (Mcf/d)	Total (kbd)
BP	2 223	8 852	3 749
Shell	1 876	10 376	3 665
Total SA	1 673	7 364	3 014
Eni	893	5 284	1 871
Equinor	982	5 846	1 910
Repsol	250	2 575	709
OMV	210	1 609	487

Hydrocarbons Proved (1P) Reserves Data	1P Oil (Mbbls)	1P Gas (Bcf)	Total 1P (Mboe)	Reserve Life (Years)
BP	11 478	45 601	19 341	14.4
Shell	5 264	33 821	11 095	8.3
Total SA	6 006	36 015	12 681	12.5
Eni	3 601	19 832	7 212	10.7
Equinor	2 911	17 356	5 903	8.3
Repsol	621	8 531	2 092	8.0
OMV	634	2 335	1 332	8.5

Mid/ downstream Data	Refining		Marketing volumes	
	Capacity (kbd)	Throughput (kbd)	Sales (kbd)	% of refining capacity
BP	1 906	1 749	5 995	315%
Shell	2 670	2 614	6 561	246%
Total SA	1 959	1 669	1 845	94%
Eni	732	504	-	-
Equinor	334	295	-	-
Repsol	1 013	794	977	96%
OMV	486	375	410	84%

Mid/downstream Data (contd)	Chemicals	LNG	
	Capacity (ktonnes/p.a.)	Capacity (Mtonnes)	Sales (Mtonnes)
BP	15 100	14.9	-
Shell	13 573	39.7	74.5
Total SA	21 200	25.7	34.3
Eni	8 068	9.5	-
Equinor	-	1.5	-
Repsol	4 838	-	-
OMV	2 410	-	-

Source: Company data, UBS estimates, AXA IM. As of 2019.

Definitions as follows:
Kbd = thousand barrels per day;
Mcf/d = thousand cubic feet per day;
Mbbls = thousand standard barrels;
Bcf = billion cubic feet;
Mboe = thousand barrels of oil equivalent.

Looking at the production of hydrocarbons, BP (including its stake in Rosneft) and Shell stand at the top of the pack with about 3.6m barrels produced every day. On average, a majority of the peer group's production is biased towards oil though we note that gas accounted for 65% of Repsol's production. BP also holds first place in terms of proven (1P) reserves, followed by Total and Shell. On average, gas takes a (slight) lead here, especially for Repsol (70%). At the 2019 rate of production, and with no replacement, these reserves would take an average of about 10 years to deplete. Down the stream, Shell holds the largest refining capacity, Equinor the smallest. Shell and BP are the largest marketers/ traders of related products, with the particularity that the traded amounts stand substantially above their refining capacities (i.e. most of what they sell does not come out of their own assets). Total is currently, and by far, the largest petrochemicals player.

With this in mind it is not surprising that in the full year 2019 Shell and BP had the highest absolute level of scope 1 and 2 GHG emissions of the peer group, at 79.5 million tonnes of CO_2 equivalent (Mt CO_2e) and 54 Mt respectively, and compared to 14.4 Mt for Equinor, the lowest. With regards to Shell, we note that a majority were emitted at the downstream level, while for its peers upstream is usually the main source of emissions. This is because Shell's marketing and distribution activities are much larger than its oil and gas production units – in other words it sells much more than it produces (Shell owns more retail outlets than Starbucks or McDonalds).

The 2015 Paris Agreement defines net zero as the goal "to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases". While there will be some differences in terms of intermediary targets, all the IOCs expect to be net zero on their scope 1 and 2 emissions by 2050. It is to be noted that for most the target relates to their operated assets, that is where they have direct control over operations, which we believe is fair. In the upstream exploration and production part of the sector, it is a partnership industry. Companies enter into agreements to spread the wide array of risks associated with related activities (execution, long development time and costs etc.).

Figure 10 summarises the IOC's targets and timeframes. While BP has the most aggressive 2025 intermediary target, expecting a 20% reduction in scope 1 and 2 emissions by then (on its operated oil and gas operations), Eni expects to deliver net zero by 2040 (vs. 2050 for the others). We also note that while Equinor's target only relates to its upstream operations, its mid/downstream operations are also relatively much smaller than most of the companies in the peer group.

Figure 9: IOCs' FY19 scopes 1 & 2 GHG emissions by segment (Up/Mid/Downstream - in Mt CO_2e.)

	Scope 1 (S1)			S1 Total	Scope 2 (S2)			S2 Total	S1 +S2
	U	M	D		U	M	D		
Shell	12.9	16.3	40.3	**69.5**	1.1	1.6	7.3	**10**	**79.5**
BP	26.8		21.1	**47.9**	0.5		5.6	**6.1**	**54**
Total SA	17.7	2.6	20.4	**40.7**	0.2	0.2	3.2	**3.6**	**44.3**
Eni	22.8	10.5	8	**41.2**			0.7	**0.7**	**41.9**
Repsol	10.9	2	11.8	**24.7**			0.6	**0.6**	**25.3**
Equinor	9.9	4.6		**14.2**			0.2	**0.2**	**14.4**
OMV	3.5		7.7	**11.1**				**0.3**	**11.4**

Source: Company data, AXA IM

Figure 10: IOCs' Scope 1 & 2 reduction targets and timeframe

Scope 1 & 2	Base year	2025	2030	2050	Note - Comment
BP	2019	-20%	-30% to -35%	Net zero	On operated O&G operations (100% basis when operated) / Excludes Rosneft
Eni			Net zero (upstream)	Net zero (2040)	
Equinor			Carbon neutral (global operations)	Net zero (Norway)	Operational control 100% Norway
Repsol		-12%	-55%	Net zero	
Shell				Net zero	Own operations where Shell has direct control
Total SA	2015	-15%	-40%	Net zero	On operations by 2050 or sooner worldwide
OMV	2010			Net zero	

Source: Company data, AXA IM

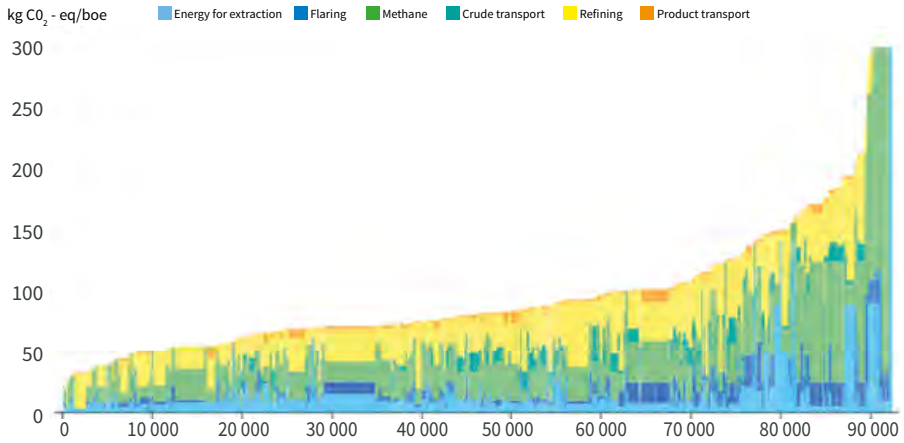
Execution risk is real, but we believe the targets to 2030 seem credible, overall. The 2050 ambitions, however, appear to be more challenging as they partly depend on new solutions and technologies that have yet to be invented or matured, and on proper regulatory frameworks that have to be designed. It is fair to say that this observation is not specific to IOCs and applies to all the carbon-intensive industries. The intensity of research and development and investments in technology however, bodes well for future progress.

There are several ways that IOCs can reduce their scope 1 and 2 emissions and existing data shows that a lot can be done by simply applying best practices. As reflected in **Figure 11**, a significant amount of emissions relates to flaring (i.e. methane burning at the well head) and methane leaks in the natural gas infrastructure.

This, and other things such as emissions from refining, can be in great part addressed by stricter operating policies, more efficient production processes and infrastructure. In **Figure 12** we can see how upstream geographical exposure is very relevant as carbon intensities vary widely by location, most often due to different regulations and practices, even if the nature of the resource (as shown by Canada and tar sands) matters.

Selective asset rotations to improve the asset mix can also play a key part and, overall, the IOCs intend to act on all these levers to deliver on their targets. This is mostly the case for the more prominent scope 1 emissions as, considering that scope 2 emissions relate to the electricity purchased/used by the companies, there is not much to be done here other than increasing the amount of electricity from renewables (i.e. from their providers or from their own capacity).

Figure 11: Carbon intensity in the crude oil value chain



Source: IEA. kg C0$_2$ - eq/boe = Kilogrammes of CO_2 equivalent per barrel of oil equivalent

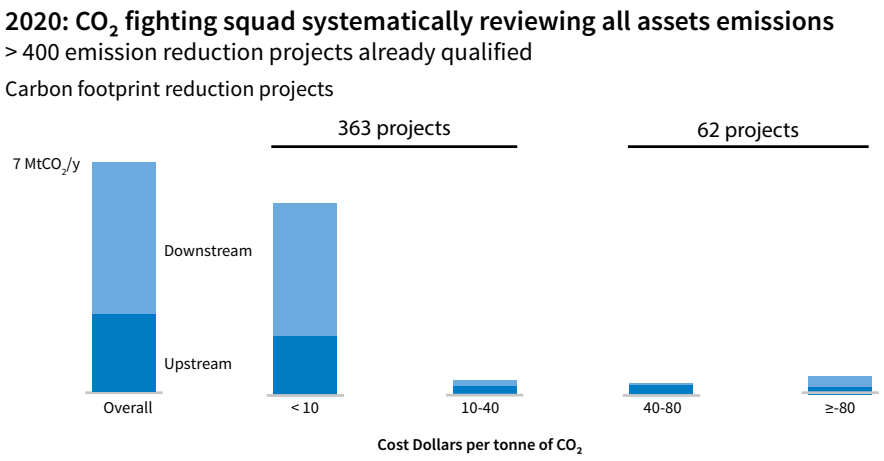
Figure 12: CO_2 emissions for the top 10 O&G producing nations in 2018

Country	CO_2 intensity (kg per boe)	Production (million boepd)	CO_2 emissions (million tonnes)
Norway	7	4.0	10
UAE	7	4.8	13
Qatar	9	4.5	15
Saudi Arabia	10	13.2	46
United States	12	31.5	133
Russia	14	23.1	116
China	16	6.9	36
Iran	21	8.4	66
Iraq	31	5.0	56
Canada	39	8.2	114

18 kg per boe global everage

Source: Rystad, AXA IM. Definitions as follows: kg per boe = kilos per barrel of oil equivalent; million boepd = millions of barrels of oil equivalent per day.

Figure 13: Total's efforts to reduce its carbon footprint



Source: Total, AXA IM

Our assessment is that fully electrifying Total's refining and chemical operations in Europe could result in a c.50% decline in emissions from those assets.

Figure 13, taken from Total's 2020 results presentation, illustrates the scope and financial reality of tackling emissions.

Addressing scope 3 to help society's energy transition

While reducing their scope 1 and 2 emissions largely relies on the IOCs improving their own operations, reducing the more significant scope 3 emissions (in absolute terms and/or in intensity) can only be done by selling less hydrocarbons (i.e. oil and gas) and more lower-carbon or carbon-free products. Reducing scope 3 emissions is thus achieved by reducing the carbon intensity of sales or removing carbon from the atmosphere. This implies developing renewable electricity businesses, developing carbon sinks and shifting the product mix towards lower-carbon products (typically more natural gas, more biofuels, and more chemicals – which trap the carbon if they are not burnt, like plastics). Scope 3 is therefore the real challenge for companies' current business models – the factor that is pushing them towards becoming energy companies rather than oil and gas companies.

In **Figure 14**, we can see a projection of the path for carbon intensity for some of the IOCs given their stated strategies. Although the expected reduction is steep at -50% or more by 2050, intensities do not go to zero. Hence, achieving net zero will require carbon sequestration – directly removing carbon from the atmosphere – in order to offset remaining emissions.

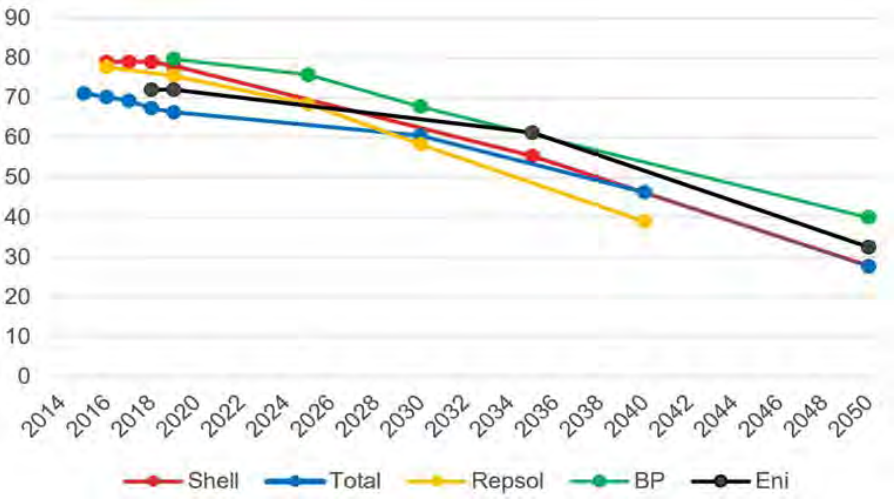
At the macro/society level, significantly reducing GHG emissions implies drastically modifying the primary energy mix of the global economy, to move away from fossil fuels (including coal) and develop carbon-free energy sources or increase efficiencies. Ultimately, net zero strategies mean that hydrocarbons are fully displaced whenever possible and that remaining emissions, when technical solutions have not yet been found, are offset through carbon sinks (natural or artificial). IOCs have a significant role to play in achieving such a goal, but this is clearly a much broader challenge that will involve everyone. After all, if all consumers can cut their scope 1 to zero, there is no scope 3 left.

Alongside a set of scope 1 and 2 targets, the IOCs have come out with absolute and intensity-based scope 3 goals. As reflected in the charts below, most expect to be net zero scope 3 emitters by 2050. There are once again some differences in the intermediary targets, with BP seemingly proposing the most aggressive goals. At the 2050 horizon, the main differences are in the selected perimeters, with Eni and Shell having the broader definition.

To help decarbonise their sales, IOCs intend to decrease their hydrocarbon production over the years, especially that of oil, while the proportion of gas should increase in the overall mix. Total expects natural gas to account for 50% of its sales by 2030 versus 45% in FY19, with oil at 35% and electricity at 15%. Eni targets its gas upstream production to account for 60% by 2030 and more than 90% by 2050 (versus 52% as at FY19). In terms of production cuts, BP stands as the most aggressive as it intends to have its production reduced by 40% by 2030 (mostly via asset disposals). Shell states that its oil production will never go back to pre-pandemic levels and that natural gas will go from c. 49% as of 2019 to 55% of production by 2030 (largely through growth in Liquefied Natural Gas, LNG).

The push towards renewables is also quite significant – with a bias toward solar but including wind and hydro too. With the targets announced, Total, BP and Eni should be the largest renewable players in the peer group. Total and BP intend to respectively own 50 GW and 100 GW of renewable capacity by 2030 while Eni is targeting 60 GW by 2050. To put things in perspective, a large renewable player like Iberdrola currently owns 35 GW of renewable generating capacity and expects that to reach 95 GW by 2030.

Figure 14: Projected carbon intensity at selected majors (grammes of CO_2e per million joules)



Source: Oddo BHF, AXA IM

Figure 15: IOCs' scope 1, 2 and 3 reduction targets and timeframe

Scope 1, 2 & 3	Base year	2025	2030	2035	2050	Notes on net zero commitments
BP	2019	-20%	-35% -40%		Net zero	Scope 3 based on size of equity stakes
Eni	2018		-25%	-65%	Net zero	Based on size of equity stakes / 2050 target accounts for carbon sinks
Equinor					Net zero	Scope 3 on use of own energy product, and based on size of equity stakes
OMV	2020	-9%				Scope 1, operated assets
Repsol			-30%		Net zero	Scope 3 based on size of equity stakes
Shell					Net zero	Scope 3 on use of own energy products
Total SA	2015		-30% (Europe) / "lower than 2015" globally		Net zero	Use by customers of energy product sold

Source: Company data, AXA IM. GW = gigawatts; TWh = terrawatt hours

Figure 16: IOCs' carbon intensity reduction targets and timeframe

Carbon Intensity	Base year	2025	2030	2035	2040	2050	Note - Comment
BP	2019	-5%	> -15%			-50%	Intensity of product sold (scope 1,2,3)
Eni	2018		-15%		-40%	Net zero	"Net emissions intensity of the energy products sold" - intensity footprint
Equinor	2019		-20%	-40%		Net zero	Scope 1/2/3
OMV	2010	-35%/-6%					2025 refers to scope 1/scope 3
Repsol	2016	-15%	-28%		-55%	Net zero	"Scope 3 emissions based on the use of the products from our upstream production"
Shell	2016		-20%	-45%		Net zero	On intensity footprint (vs. emissions)
Total SA	2015		-20%		-35%	Net zero	Scope 1/2/3 - "Net Carbon Intensity of energy products sold to our customers"

Source: Company data, AXA IM

Figure 17: IOCs' upstream production targets and timeframe

Upstream Production	2019	2025	2026	2030	Note - Comment
BP	c. 2,600 kboe/d	c. 2,000 kboe/d (i.e. -23% vs. FY19)		c. 1,500 kboe/d (i.e. -40% vs/ FY19)	
Eni	1,870 kboe/d	Plateau at c. 2,000 kboe/d and then "we plan a flexible decline in production, mainly on crude oil"			Gas accounting for 60% of production by 2030
Equinor	2,074 kboe/d		+3% CAGR		Value over volume / "In the longer term, Equinor expects to produce less oil and gas than today"
OMV	487	450-500	Lower		Emphasis on gas
Repsol	709 kboe/d		650 kboe/d		
Shell	3,665 kboe/d				Oil production to decline 1%-2% per annum. Growth in LNG. Gas to account for 55% of production
Total SA	3,014 kboe/d	+2% Compound annual growth rate			"40% LNG production growth over 2020-25. Oil production to be lower in 2030 than 2020"

Source: Company data, AXA IM. Kboe/d = thousand barrels of oil equivalent per day

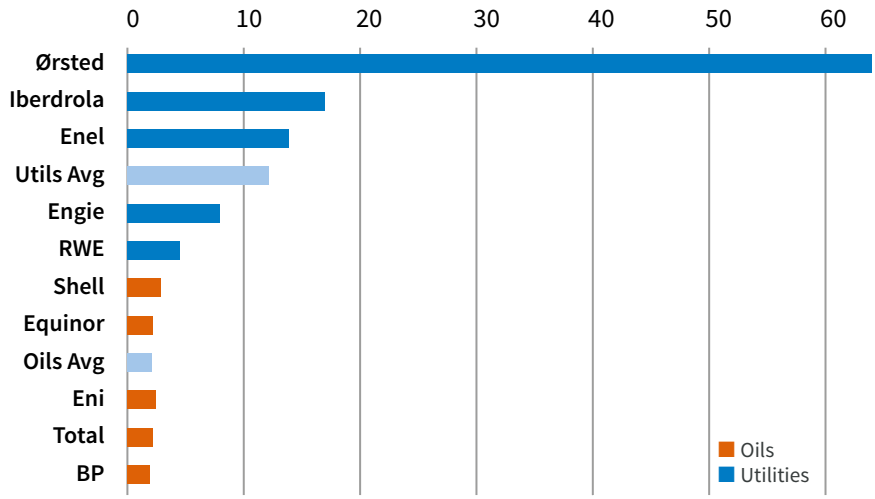
Figure 18: IOCs renewable energy capacity targets and timeframe

Renewable Energy	2019	2025	2026	2030	2035	2050	Note - Comment
BP	2.5 GW	20 GW		50 GW			Target sales of 500 TWh by 2030
Eni	0.2 GW	5 GW		15 GW	> 25 GW	60 GW	
Equinor	0.5 GW		4 GW - 6 GW	12 GW - 16 GW			Equinor equity share / "Equinor will establish renewables as a separate reporting segment from first quarter 2021"
OMV							No stated intention to develop capacity as yet
Repsol	3.5 GW	7.5 GW		15 GW			Solar / Wind / Hydro a majority. Includes co-generation and combined cycle gas turbine
Shell		5 GW					Target sales of >560 TWh by 2030
Total SA	7 GW (2020)	35 GW		100 GW			

Source: Company data, AXA IM. GW = gigawatts; TWh = terrawatt hours

In Figure 19, we highlight a few practical realities. Hydrocarbons have a higher energy density and require less investment to be produced than electricity – even if this is not a fully like-for-like comparison given that hydrocarbons are a primary source of energy while electricity is an energy vector. When an oil and gas major shifts one unit of investment from oil and gas production to electricity production, it will ultimately generate three to four times less energy (in joules). Basically, power generation is a more capital-intensive business than drilling and producing oil and gas. One associated challenge for the IOCs is that the process of replacing the energy they currently produce via their hydrocarbons will be a slow process that takes many years.

Figure 19: Capital expenditure per Energy Produced (in dollars per gigajoule)



Source: Morgan Stanley, 2020

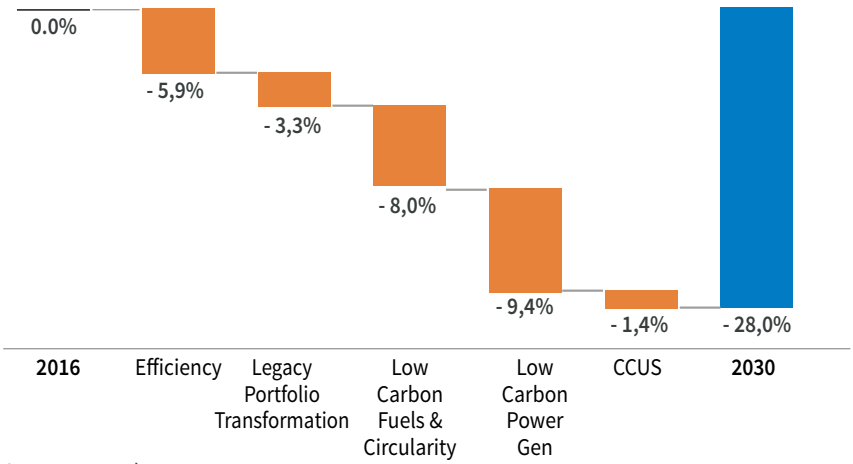
According to a Princeton University study, the energy transition is a broad-based effort with six levers to be pulled in order to support a transition to net zero.

1) End-use energy efficiency and electrification
2) Clean electricity: wind & solar generation, transmission, firm power
3) Bioenergy and other zero-carbon fuels and feedstocks
4) Co_2 capture, utilisation, and storage
5) Reduced non-Co_2 emissions
6) Enhanced land-sinks

To see how this kind of multi-pronged approach translates into the strategic plans of IOCs, **Figure 20** depicts Repsol's stated plan to achieve its intermediate goal to 2030.

Figure 20: Repsol's proposed route to carbon intensity reduction to 2030

Intensity reduction in % using Repsol's Carbon Intensity Index (baseline 2016)



Source : Repsol 2021

> The demand to tackle carbon emissions has reached a level of urgency that does not match today's technical capabilities

Reviewing IOC preparedness

IOCs operate in the same industry and geographies, with the same opportunities and constraints. As such it is not surprising to see all of them use the same toolbox to reduce their carbon footprints. The differences among them stem from their starting points, the mix of tools they will use and the scale and timing of their commitments and ambitions*.

Common points:

- The European majors have now all delineated energy transition strategies and offered a mix of commitments and ambitions around carbon reduction. We believe their commitments are genuine.
- They all largely rely on improvements that make their own operations more efficient (notably around methane leaks and methane flaring), developing large renewable electricity businesses, shifting their product mix towards lower-carbon products (typically more natural gas, more chemicals) and developing carbon sinks.

Common challenges and issues:

- Time discrepancy: The demand to tackle carbon emissions has reached a level of urgency in public opinion that does not match today's technical capabilities and the timeframe of business and technological developments.
- Geographical discrepancy: A one-size-fits-all strategy is not applicable as different regions of the globe have different energy profiles and different energy needs. Many analyses are focused on the western world and do not properly factor in areas where access to energy – be it in the form of electricity or natural gas – remains insufficient.
- Perception: Even the "greenest" oil and gas companies are first and foremost oil and gas companies. So far, their efforts have not been rewarded – unlike those of pure/purer players in the renewable energy space. Their legacy operations are overshadowing their efforts and new businesses ambitions.
- Scope 3 conundrum: As we have already mentioned, the fossil fuel economy will decline only when an alternative energy system is developed. In the meantime, the IOCs have to serve society's current energy needs as they prepare for what will come next.

IOC strategy breakdown

- **BP:** in September 2020, BP presented what we view as a radical corporate reorganisation articulated around its net zero ambitions. The company intends to shrink its upstream division – reducing production by a significant 1 million barrels of oil equivalent per day – grow its renewable power massively and increase the scale of its client-facing units to sell more low-carbon products.
- **Eni:** The company says it intends to pull all available levers: Transform its refineries into bio-refineries, increase the weight of natural gas in its upstream production mix and build a renewable power business. Eni is relying more than its peers on carbon sinks to achieve its goals (e.g. forestry and carbon capture and storage, known as CCS), targeting the sequestration of 90Mt of carbon per annum by 2050.
- **Equinor:** Offshore wind is the main lever the company will pull, arguing (rightly so in our view) that there are synergies with its traditional offshore oil and gas projects. Equinor is also investing into CCS and green hydrogen (hydrogen

* The references to oil and gas companies in this section relate only to our analysis of publicly available statements regarding their progress towards climate-related commitments. None of the content should be taken as a recommendation for an investment strategy or a personalised recommendation to buy or sell securities.

produced through electrolysis of water using renewable electricity). It is also worth highlighting the overall low carbon intensity of Equinor's upstream operations (10kg of CO_2 per barrel – half the world's average) thanks to stringent regulations in Norway.

- **OMV:** The strategy is to become an integrated, petrochemicals-focused company, and this should lower the share of products that are burnt. OMV is also looking to build a circular model for plastics, with the development of both mechanical and chemical plastic recycling hubs. OMV has no intention to create a renewable power division, but will increase its green electricity purchases.

- **Repsol:** The company claims all levers available are to be pulled: More electricity, more natural gas, bio-refining, carbon sequestration. There will be a focus on the Iberian peninsula, where the company is already a very large energy supplier and has a significant existing customer base.

- **Shell:** The specific angle is to leverage on its super-sized marketing footprint and develop low carbon solutions to address the different needs of its customers. In relation to that it is interesting to note that the company intends to simply sell, rather than also generate, electricity. LNG – a market where Shell is already the largest player – and petrochemicals will be further developed. As with Eni, Shell has strong ambitions in carbon sequestration.

- **Total:** The stated strategy is to become a broad energy supplier – hence the recent name change to TotalEnergies – by leveraging on all the available tools. Most notably, Total wants to grow its renewable power massively and to further develop its LNG portfolio. Should it reach its targets, the company will become an electricity major by 2030.

Figure 22: The path ahead for the IOCs

	Pros	Cons
BP	Massive model change Partnership strategies Downscalling upstream	Business model disruption Reduced scope 3 perimeter
Eni	Production at plateau by 2025 Shift to bio-refining Full scope 3 perimeter	Late start Reliance on carbon sinks
Equinor	Headstart in offshore wind Low carbon / barrel	Growing oil production Reduced scope 3 perimeter
OMV	Shift to petrochemicals Plastic recycling	Lack of details Plastic exposure
Repsol	Geographically focused Granular strategy	Reduced scope 3 perimeter
Shell	Technological depth Marketing know-how Full scope 3 perimeter	Scale of its energy sales Reliance on carbon sinks
Total SA	Headstart Electrification strategy	Production growth
FOR ALL	Integrated energy know-how Genuine ambitions	Materiality today Free cash flow consumption Many solutions not yet mature

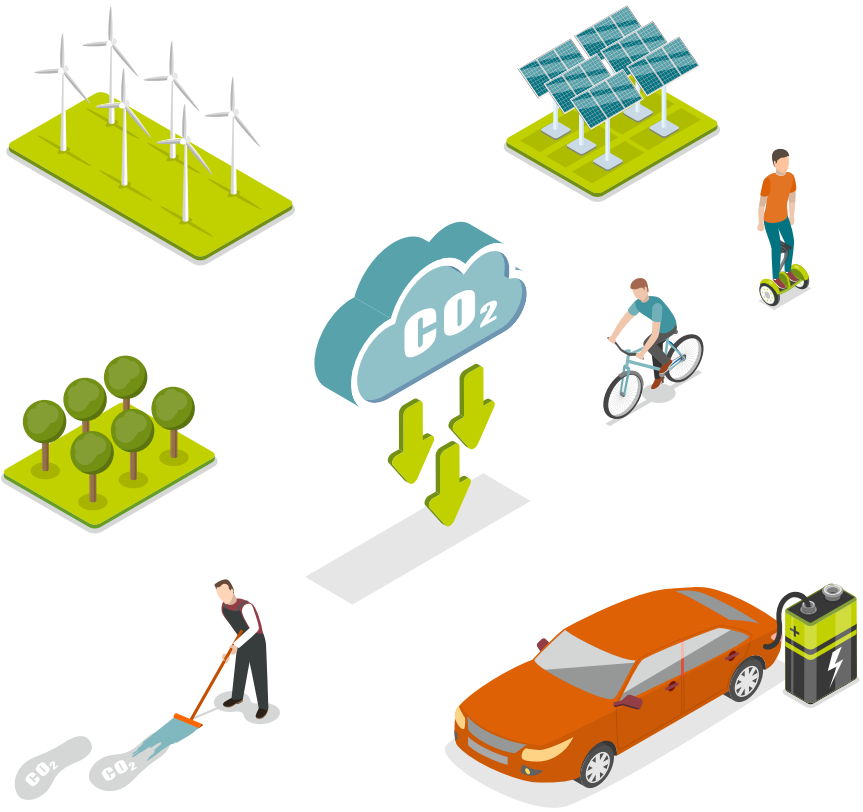


Figure 23: IOC assessment

Rank	Company
First tier	Total
	Repsol
Second tier	BP
	OMV
	Equinor
Third tier	Shell
	Eni

Progress report on the IOCs

First tier: Total and Repsol

- We view Total as the IOC with the most convincing strategy in this area overall, and not just for its energy transition ambitions. The company started work earlier than most on related matters and its strategy and operational setup have a level of maturity above that of its peers, in our opinion. This is especially the case for its renewable electricity efforts, as the company is on track to become a major utility in its own right (with mergers and acquisitions used to beef up its portfolio of electricity customers and a push into the key battery manufacturing space). A former weak point, namely too-narrow targets on scope 3, has been removed as the company listened to stakeholders and amended its climate objectives.
- Repsol's strategy has one clear and distinctive advantage – its regional focus. The company is concentrating on the Iberian Peninsula where it already owns and operates large and efficient downstream operations. We believe that the strategy of transforming its existing operations, adding a renewable power business and leveraging on its existing customer base, is very sensible. In an integrated fashion, Repsol's different investments should overall benefit from one another.

Second tier: BP, OMV and Equinor

- BP's strategic shift toward decarbonisation is dramatic and ambitious. Execution will be challenging, the capital required in the early years will be significant and the outcome should only be visible in the second half of the 2020s. The company is far from starting from scratch (it is already a large electricity trader in the US, its solar unit is growing fast, and it is a large biofuel producer in Brazil) but a lot still needs to be done. The ambition is clearly there, and the entire management team has put its credibility on the line. If successful, the strategy will make BP a greener company from 2030 onward, but the early days will be risky, in our view.
- OMV's objective to become a petrochemical company where carbon is sequestered in long-lived chemical products like plastics, sets it apart. OMV acquired Borealis in 2020 to accelerate the shift and it intends to let its oil production decline from 2025 onward. Question marks remain around the negatives associated with plastic, and whether OMV is simply trading one problem for another. The company's intention to actively take part in the plastics recycling value chain may alleviate some of the concerns.
- Equinor's energy transition strategy is very focused and as such clear to grasp and assess. The main challenge is that the company is primarily an upstream producer: it sells crude oil and natural gas and has limited retail-client-facing activities. Its scope 3 challenge relative to its peers is thus greater as it has less opportunity to add low-carbon products to its portfolio and reduce the carbon intensity of its sales.

Third tier: Eni and Shell

- Eni is not lacking ambition, quite the opposite, but it started later than most and is today at a less advanced stage than its peers. The company is thus required to significantly accelerate its efforts and to put massive capital at play. In other words, execution risk is higher than average. The company is also relying heavily on carbon offsets, through natural and artificial carbon sinks.
- Shell has set itself a very demanding goal by targeting to be net zero above and beyond its scope 3 perimeter (693Mt), aiming at a much larger self-defined 1,800Mt net carbon footprint. Whether Shell is shooting itself in the foot or taking on a heavier moral weight than its peers is a debate for another venue. The fact is that the gigantic scale of the endeavour makes it very challenging. We are also concerned by what we see as an excessive reliance on natural carbon solutions (i.e. nature-based offsets) for the company's 2030 targets. On the positive side, we believe Shell is very actively leveraging its industrial know-how and deep technological expertise to decarbonise its product offering. Time will tell, but at this stage we prefer to err on the side of caution.

Investment Managers

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