



bp Energy Outlook – 2024

Insights from developed economies

The energy system continues to decarbonize, with the share of primary energy consumption from renewables increasing four-fold by 2050 compared to 2022 in **Current Trajectory**, and six-fold in **Net Zero**

1. Oil, natural gas and coal consumption each decrease in both scenarios between 2022 and 2050
2. Total final consumption decreases in both scenarios – decreasing by 40% in **Net Zero** between 2022 and 2050
3. Solar and wind generate two-thirds of electricity in **Net Zero** in 2050

-0.4 to 4.9

Gt of CO₂e carbon emissions in 2050

22% to 40%

decrease in energy demand by 2050 compared to 2022

2.9% to 7.3%

average annual increase in low carbon hydrogen demand

731 to 1,280

Bcm natural gas consumption in 2050

- ▶ GDP grows at an average rate of 1.2% per year between 2022 and 2050.
- ▶ Carbon emissions fall from 12 Gt of CO₂e in 2022 to negative emissions in **Net Zero** by 2050, however around 5 Gt of CO₂e emissions remain in 2050 in **Current Trajectory**.
- ▶ Energy demand decreases by 22% and 40% respectively in **Current Trajectory** and **Net Zero** between 2022 and 2050, due to increasing energy efficiency.
- ▶ Renewables expand over the outlook, with their share in primary energy increasing from 9% in 2022 to 37% and 56% in **Current Trajectory** and **Net Zero** respectively.
- ▶ Electricity generation increases between 2022 and 2050 in the two scenarios, by 58% in **Current Trajectory** and 78% in **Net Zero**, equating to average increases of 1.6% and 2.1% per year respectively.
- ▶ There is an increased demand for low carbon hydrogen in 2050 compared to 2022. In **Current Trajectory**, average annual growth of 2.9% is required to meet demand, while in **Net Zero**, 7.3% annual growth is required.
- ▶ Oil demand falls by more than half from 44 Mb/d in 2022 to 21 Mb/d in 2050 in **Current Trajectory**. In **Net Zero**, oil demand in 2050 falls to around 7 Mb/d.
- ▶ Natural gas demand also falls over the outlook, although not as significantly as oil. Natural gas consumption in 2050 is 1,280 Bcm and 731 Bcm in **Current Trajectory** and **Net Zero** respectively, equating to 76% and 44% of the consumption level from 2022.
- ▶ Consumption of coal provided 31 EJ of energy in 2022, equating to 15% of primary energy consumption. In 2050, coal's share of primary energy consumption will be under 5% in **Current Trajectory**, and under 3% in **Net Zero**.



bp Energy Outlook – 2024

Insights from developed economies

	Level in 2050			2022	Shares in 2050 (%)		Change 2022-2050 (% p.a.)	
	2022	Current Trajectory	Net Zero		Current Trajectory	Net Zero	Current Trajectory	Net Zero
Primary energy consumption by energy type (EJ)								
Total	208	163	125	100%	100%	100%	-0.9%	-1.8%
Oil†	86	39	12	41%	24%	9.8%	-2.7%	-6.7%
Natural gas	60	46	26	29%	28%	21%	-1.0%	-2.9%
Coal	31	6.6	3.4	15%	4.1%	2.7%	-5.4%	-7.6%
Nuclear	6.6	6.0	7.1	3.2%	3.7%	5.7%	-0.3%	0.3%
Hydro	4.5	5.1	5.5	2.1%	3.1%	4.4%	0.5%	0.8%
Renewables (incl. biofuels)	20	59	70	9.4%	37%	56%	4.1%	4.7%
Primary energy consumption (native units)								
Oil† (Mb/d)	44	21	7.2					
Natural gas (Bcm)	1,680	1,280	731					
Total final consumption by sector (EJ)								
Total	179	148	107	100%	100%	100%	-0.7%	-1.8%
Transport	56	39	30	32%	26%	28%	-1.4%	-2.2%
Feedstocks	18	16	11	9.8%	11%	10%	-0.3%	-1.7%
Buildings	48	44	29	27%	29%	27%	-0.3%	-1.7%
Industry	57	50	37	32%	34%	35%	-0.5%	-1.5%
Generation								
Power (TWh)	10,891	17,165	19,360				1.6%	2.1%
Hydrogen (Mt)	18	41	131				2.9%	7.3%
Production								
Oil† (Mb/d)	27	16	4.2				-1.8%	-6.4%
Natural gas (Bcm)	1,524	1,484	713				-0.1%	-2.7%
Coal (EJ)	29	13	4.0				-2.8%	-6.9%
Emissions								
Carbon emissions†† (Gt of CO ₂ e)	12	4.9	-0.4				-3.2%	
CCUS (Mt of CO ₂)	-8.0	-450	-2,364				15%	23%

EJ = exajoules

† Oil supply includes crude oil, shale oil, oil sands, natural gas liquids, liquid fuels derived from coal and gas, and refinery gains, but excludes biofuels. Oil demand includes consumption of all liquid hydrocarbons but excludes biofuels. †† Carbon emissions include CO₂ emissions from energy use, industrial processes, natural gas flaring, and methane emissions from energy production.