



bp Energy Outlook – 2024

Insights from India

In both scenarios, primary energy growth is led by renewables. This growth is underpinned by increasing population, industrialization and prosperity. Coal remains India's energy backbone in **Current Trajectory**

1. India's primary energy consumption grows by 90% and 21% by 2050 in **Current Trajectory** and **Net Zero**, respectively
2. Renewable energy grows strongly in both scenarios, becoming the largest energy source in **Net Zero**
3. Natural gas is the only fossil fuel that grows (in absolute terms) to 2050 in both scenarios

21% to 90%

growth in primary energy between 2022 and 2050

13% to 44%

share of coal in primary energy in 2050

25% to 64%

share of renewables in primary energy in 2050

-81% to +73%

net change in CO₂e emissions between 2022 and 2050

- ▶ India's economy grows at a rate of 4.9% per year in 2022-50, down from 7.0% per year over the past 20 years.
- ▶ Primary energy grows strongly in both scenarios, by 90% and 21% in 2022-50 in **Current Trajectory** and **Net Zero** respectively (2.3% and 0.7% CAGR respectively). As result of this strong growth, India accounts for around 12% of the global primary energy consumption in 2050 across both scenarios, up from around 7% in 2022.
- ▶ Coal's share of total primary energy modestly declines in **Current Trajectory**, down to 44% by 2050 from 48% in 2022. However, it declines sharply in **Net Zero** to less than 13% by 2050.
- ▶ India's natural gas production grows in **Current Trajectory** to 36 Bcm by 2050, up from 30 Bcm in 2022. It decreases to 8 Bcm by 2050 in **Net Zero**.
- ▶ The share of natural gas in primary energy grows in **Current Trajectory** from 5% in 2022 to 9% in 2050, driven by power, road transport and industry. Gas's share of primary energy remains broadly flat at around 5% in **Net Zero**.
- ▶ Renewables grow strongly in both scenarios, averaging 3-5% growth per year. Renewable energy becomes the largest source of primary energy in 2050 in **Net Zero**, and second largest in **Current Trajectory** (after coal).
- ▶ The use of modern biomass roughly doubles by 2050 in both scenarios, driven by industry and transport and – in **Current Trajectory** – by cofiring with coal in power.
- ▶ Solar and wind installed capacities in 2050 reach 1.2-2.7 TW and 0.4-1.5 TW, respectively, depending on the scenarios.
- ▶ Electricity generation in 2050 is more than three times of that in 2022 in **Current Trajectory**, and more than four times in **Net Zero**, with solar and wind power accounting for 60-100% of that growth.
- ▶ Hydrogen demand grows by a factor of two in **Current Trajectory** and up to an eightfold increase in **Net Zero**. In 2050, green hydrogen represents 37% of total hydrogen production in **Current Trajectory** and 89% in **Net Zero**.
- ▶ Carbon emissions vary significantly by scenario. In **Current Trajectory** emissions increase by around 73% in 2050. In **Net Zero**, emissions decrease by 81%.



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	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	42	80	51	100%	100%	100%	2.3%	0.7%
Oil†	10	16	5.3	24%	20%	10%	1.7%	-2.3%
Natural gas	2.1	6.9	2.8	5.0%	8.6%	5.5%	4.3%	1.0%
Coal	20	35	6.4	48%	44%	13%	2.0%	-4.0%
Nuclear	0.2	0.8	2.2	0.4%	1.0%	4.2%	5.7%	9.6%
Hydro	0.6	1.3	1.8	1.5%	1.6%	3.6%	2.5%	3.9%
Renewables (incl. biofuels)	8.9	20	32	21%	25%	64%	2.9%	4.7%
Primary energy consumption (native units)								
Oil† (Mb/d)	5.2	8.3	2.7					
Natural gas (Bcm)	58	191	77					
Total final consumption by sector (EJ)								
Total	32	61	45	100%	100%	100%	2.4%	1.3%
Transport	4.7	9.7	6.6	15%	16%	15%	2.6%	1.2%
Feedstocks	2.0	4.7	3.3	6.4%	7.7%	7.4%	3.1%	1.8%
Buildings	7.7	12	6.3	24%	19%	14%	1.5%	-0.7%
Industry	17	35	29	54%	57%	64%	2.6%	1.9%
Generation								
Power (TWh)	1,802	5,985	8,127				4.4%	5.5%
Hydrogen (Mt)	4.4	8.2	36				2.3%	7.7%
Production								
Oil† (Mb/d)	0.6	0.3	0.3				-3.0%	-3.2%
Natural gas (Bcm)	30	36	8.5				0.7%	-4.4%
Coal (EJ)	15	26	3.8				2.0%	-4.8%
Emissions								
Carbon emissions†† (Gt of CO ₂ e)	3.0	5.1	0.6				2.0%	-5.8%
CCUS (Mt of CO ₂)	0	-0.5	-668					

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