bp Energy Outlook – 2023

Insights from the Accelerated, Net Zero and New Momentum scenarios – India

Under all scenarios, primary energy grows strongly, led by renewables and, to a lesser extent, natural gas and nuclear. This growth is underpinned by increasing population, industrialization and prosperity

1. Under all three scenarios, India's primary energy consumption more than doubles by 2050
2. Renewable energy grows strongly in all the scenarios, becoming the largest energy source in **Accelerated** and **Net Zero**
3. Natural gas is the only fossil fuel that grows (in absolute terms) throughout to 2050 in all scenarios

Over 100%
growth in primary energy in 2019-2050 in all scenarios

6% to 33%
share of coal in primary energy in 2050

33% to 68%
share of renewables in primary energy in 2050

-76% to +85%
net change in CO_2e emissions by 2050

- India's economy grows at a rate of 4.7% a year in 2019-2050, down from 7.4% a year over the past 20 years.
- Primary energy grows strongly in all three scenarios, more than doubling between 2019-2050. Average growth per year is between 2.4% and 2.6%. As result of this strong growth, India accounts for around 14% of the global primary energy consumption in 2050 across all scenarios, up from around 7% in 2019.
- The share of coal in total primary energy has been broadly stable around 2019 levels (45%) over the past 40 years. However, coal's share declines in all scenarios, reaching between 6% and 33% by 2050.
- India's natural gas production grows in all scenarios, up to 59-132 Bcm in 2050 (from 27 Bcm in 2019).
- The share of natural gas in total primary energy grows in all scenarios, increasing from 5% in 2019 to 7-11% in 2050, supported by industry and heavy road transport demand.
- Renewable energy grows strongly in all scenarios, at an average of 4-6% a year. As a result, renewable energy becomes the largest source of primary energy in 2050 in **Accelerated** and **Net Zero**, and the largest together with coal in **New Momentum**.
- Electricity generation in 2050 is around four times of that in 2019 in **New Momentum** and **Accelerated**, and five times in Net Zero, with solar and wind power accounting for 57% to 95% of that growth.
- Solar and wind installed capacities in 2050 reach 1.3-2.2 TW and 0.3-1.2TW, respectively, depending on the scenarios.
- Hydrogen demand grows by a factor of four in **New Momentum** up to a twelvefold increase in **Net Zero**. In 2050 green hydrogen represents 47% of total production in **New Momentum** and 80% in **Net Zero**.
- Carbon emissions vary significantly by scenario. In **New Momentum**, emissions increase by around 85% in 2050. In **Accelerated** and **Net Zero**, emissions decrease by 30% and 77%, respectively.

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	Level in 2050				Shares in 2050 (%)			Change 2019-2050 (% p.a.)		
	2019	Accelerated	Net Zero	New Momentum	2019	Accelerated	Net Zero	New Momentum	Accelerated	Net Zero	New Momentum
Primary energy consumption by fuel (EJ)											
Total	**42**	**88**	**88**	**94**	**100**	**100**	**100**	**100**	**2.5**	**2.4**	**2.6**
Oil†	10.0	9.3	4.7	16	24	11	5.4	18	-0.2	-2.4	1.6
Natural gas	2.1	8.5	6.4	10	5.1	9.6	7.3	11	4.5	3.6	5.2
Coal	19	8.3	5.0	31	45	9.4	5.7	33	-2.6	-4.1	1.7
Nuclear	0.4	5.9	6.8	2.6	1.0	6.6	7.7	2.8	9.0	9.5	6.2
Hydro	1.4	4.5	5.0	2.0	3.5	5.1	5.7	2.1	3.7	4.1	1.0
Renewables (incl. biofuels)	9.1	52	60	31	22	59	68	33	5.8	6.3	4.0
Primary energy consumption (native units)											
Oil† (Mb/d)	5.2	5.0	2.6	8.7							
Natural gas (Bcm)	59	235	177	286							
Total final consumption by sector (EJ)											
Total	**30**	**54**	**47**	**66**	**100**	**100**	**100**	**100**	**1.9**	**1.4**	**2.5**
Transport	4.6	12	11	12	15	21	24	19	3.1	2.9	3.2
Feedstocks	1.9	3.6	2.9	4.2	6.3	6.5	6.1	6.5	2.0	1.3	2.6
Buildings	9.7	12	9.9	16	32	22	21	25	0.7	0.1	1.7
Industry	14	27	23	33	47	50	49	50	2.1	1.5	2.7
Generation											
Electricity (TWh)	1,723	7,314	8,639	6,467					4.8	5.3	4.4
Hydrogen (Mt)	4.6	26	57	18					5.8	8.5	4.6
Production											
Oil† (Mb/d)	1.0	0.4	0.3	0.4					-2.9	-3.8	-3.0
Natural gas (Bcm)	27	86	59	132					3.8	2.6	5.3
Coal (EJ)	13	5.7	3.4	19					-2.5	-4.1	1.3
Emissions											
Carbon emissions (Gt of CO_2e) ††	2.8	1.9	0.7	5.1					-1.2	-4.5	2.0
CCUS (Mt of CO_2)	0	261	735	9.9							

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 CO_2 emissions from energy use, industrial processes, natural gas flaring, and methane emissions from energy production.

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