bp Energy Outlook – 2023

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

Despite the strong long-term impact of the Russia-Ukraine war, Africa's demand for electricity increases strongly, with wind and solar deployment increasing exponentially under all three scenarios

1. The share of electricity in total final consumption of energy increases from 10% to 20%-54%, depending on the scenario
2. The share of wind and solar in electricity generation grows from 3% today to almost 70% in **Accelerated** and **Net Zero**
3. Natural gas production increases only in **New Momentum** to reach 10% of total global production from 6% today

28% to 73%
growth in primary energy in 2019-2050 under all scenarios

3× to 5×
increase in power generation in 2050-2019

25× to 112×
increase in wind and solar deployment in 2019-2050

41% to -75%
net change in CO_2 emissions by 2050

- The long-term impact of the Russia Ukraine war on economic growth is negative and significant, Africa grows at an average rate of 2.6% a year in 2019-2050, down from around 4% over the past 20 years.
- Primary energy consumption increases in all three scenarios, with renewables multiplying by a factor of two.
- Wind and solar used in electricity generation increase from around 30 TWh in 2019 to 650 TWh in **New Momentum** to 3,000 TWh in **Net Zero**.
- The large increase in renewable penetration reduces the carbon intensity of the electricity sector from around 575 gr/kWh to around 320 gr/kWh in **New Momentum**. The sector is virtually decarbonized in **Net Zero**.
- Modern bioenergy increases in all scenarios, between 15%-110%. On the other hand, traditional biomass used in the building sectors declines 90% in **Accelerated** and around 99% in **Net Zero.**
- Oil's share in Africa's fuel mix declines under all scenarios, falling from 25% in 2019 to between 20% and 8% in 2050.
- Natural gas is more resilient. The share of natural gas in total primary energy increases to 20% in **New Momentum** by 2050 from 16% 2019. However, there is a decrease in the other two scenarios with this share falling to 7-12%.
- Coal consumption is resilient in **New Momentum** with its share in the primary energy mix falling from 13% to 11% in 2019-2050.
- Production of oil declines in all scenarios in Africa. Oil production decreases sharply from 9 Mb/d today to 2 Mb/d in **Accelerated** and 3 Mb/d in **New Momentum**.
- Net CO_2 emissions increase by 48% in **New Momentum**, due to the relatively high share of fossil fuels in the energy mix in this scenario. However, in **Net Zero**, net emissions decrease by 75% and by 42% in **Accelerated**.

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		Level in 2050			Shares in 2050 (%)			Change 2019-2050 (% p.a.)		
	2019	Accelerated	Net Zero	New Momentum	Accelerated	Net Zero	New Momentum	Accelerated	Net Zero	New Momentum
Primary energy consumption by fuel (EJ)										
Total	**34**	**49**	**44**	**60**	**100**	**100**	**100**	**100**	**1.2**	**0.8**	**1.8**
Oil†	8.5	7.1	3.7	12	25	14	8.3	20	-0.6	-2.7	1.1
Natural gas	5.6	6.1	3.0	12	16	12	6.8	20	0.3	-2.0	2.5
Coal	4.3	0.8	0.5	6.6	13	1.5	1.0	11	-5.5	-7.0	1.4
Nuclear	0.1	1.0	1.3	0.3	0.4	2.0	2.9	0.5	7.1	8.0	2.8
Hydro	1.2	4.6	5.5	2.7	3.5	9.4	13	4.6	4.4	5.0	2.7
Renewables (incl. biofuels)	15	30	30	26	43	60	68	44	2.3	2.3	1.9
Primary energy consumption (native units)										
Oil† (Mb/d)	4.2	3.6	1.9	5.9						
Natural gas (Bcm)	155	170	83	329						
Total final consumption by sector (EJ)										
Total	**29**	**32**	**24**	**49**	**100**	**100**	**100**	**100**	**0.3**	**-0.6**	**1.7**
Transport	5.5	5.8	4.9	7.1	19	18	20	14	0.2	-0.4	0.8
Feedstocks	0.6	0.8	0.7	1.0	2.0	2.6	2.9	2.0	1.2	0.6	1.6
Buildings	14	12	7.4	25	49	38	31	51	-0.5	-2.1	1.8
Industry	8.9	13	11	16	30	41	46	32	1.3	0.7	1.9
Generation										
Electricity (TWh)	840	3,707	4,189	2,695					4.9	5.3	3.8
Hydrogen (Mt)	2.4	11	18	4.5					5.0	6.7	2.1
Production										
Oil† (Mb/d)	8.7	1.7	1.2	2.6					-5.2	-6.2	-3.8
Natural gas (Bcm)	244	194	112	442					-0.7	-2.5	1.9
Coal (EJ)	6.8	0.4	0.1	2.0					-8.8	-12	-3.9
Emissions										
Carbon emissions (Gt of CO_2e) ††	1.7	1.0	0.4	2.5					-1.7	-4.4	1.1
CCUS (Mt of CO_2)	0	116	208	1.6							

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.