



Energy Outlook – 2020

Insights from the Rapid, Net Zero and Business-as-usual scenarios – World

The world transitions to a lower carbon energy mix as renewables penetrate rapidly at the expense of fossil fuels, but with significant variation between scenarios

1. Global energy demand grows in all three scenarios, driven by increasing levels of prosperity in emerging economies
2. Under all three scenarios, the share of renewables in the energy mix increases significantly
3. The world continues to electrify, leading the power sector to play a central role in the global energy system

22% to 59%

Share of renewables in 2050, up from 5% in 2018

22% to 67%

Share of fossil fuels in 2050, down from 85% in 2018

34% to 52%

Share of electricity in total final consumption in 2050

-10% to -96%

Decline in net CO₂ emissions between 2018 and 2050

- ▶ Energy demand grows by 0.3% p.a. in **Rapid** and **Net Zero** and 0.7% p.a. in **Business-as-usual** (BAU). This is significantly slower than the past 20 years, reflecting weaker economic growth and faster improvements in energy intensity.
- ▶ Energy demand from the transport sector grows by 0.7% p.a. in both **Rapid** and **Net Zero** and by 0.9% p.a. in **BAU**. However, growth is significantly slower than the past 20 years (2.2% p.a.).
- ▶ On average, renewable energy consumption grows every year by 5.7% in **BAU**, 7.5% in **Rapid** and 8.5% in **Net Zero**, aided by falling costs of production and policies encouraging a shift to lower carbon energy sources.
- ▶ Between 2018 and 2050 net carbon emissions from energy use decline by 10% in **BAU**, 72% in **Rapid** and 96% in **Net Zero**.
- ▶ Oil and coal consumption decline in all three scenarios. For oil, the decline ranges from 10% to 78%. For coal the decline is more marked, ranging from 22% to 92%.
- ▶ The share of primary energy absorbed by the power sector increases from 43% in 2018 to 53% in **BAU** and 61% in both **Rapid** and **Net Zero**.
- ▶ Global energy intensity declines in all three scenarios. In **BAU** it declines by 45% and by 53% in both **Rapid** and **Net Zero**.
- ▶ Global carbon emissions decline by 10% in **BAU**, 72% in **Rapid** and 96% in **Net Zero** between 2018 and 2050.
- ▶ The outlook for gas is more durable than either coal or oil. Consumption in 2050 increases by 35% in **BAU** and drops by 4% in **Rapid** and 41% in **Net Zero**.
- ▶ The industrial sector remains the largest consumer of energy, albeit with small declines in its share under all three scenarios.
- ▶ Nuclear gains share in the energy mix in all scenarios, reaching 7% **BAU**, 9% in **Rapid** and 10% in **Net Zero**.



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	Level in 2050				2018	Shares in 2050 (%)			Change 2018-2050 (%)			Change 2018-2050 (% p.a.)		
	2018	Rapid	Net Zero	BAU		Rapid	Net Zero	BAU	Rapid	Net Zero	BAU	Rapid	Net Zero	BAU
Primary energy consumption (EJ)														
Total	576	625	625	725	100	100	100	100	9	9	26	0.3	0.3	0.7
Oil†	190	89	42	172	33	14	7	24	-53	-78	-10	-2.3	-4.6	-0.3
Gas	138	134	81	187	24	21	13	26	-4	-41	35	-0.1	-1.6	0.9
Coal	158	24	12	123	27	4	2	17	-85	-92	-22	-5.7	-7.8	-0.8
Nuclear	24	44	57	31	4	7	9	4	81	136	27	1.9	2.7	0.7
Hydro	38	57	62	51	7	9	10	7	51	65	37	1.3	1.6	1.0
Renewables (incl. biofuels)	27	277	370	161	5	44	59	22	>100	>100	>100	7.5	8.5	5.7
Oil† (Mb/d)	97	47	24	89	33	14	7	24	-51	-75	-8	-2.2	-4.2	-0.3
Gas (Bcm)	3845	3708	2263	5199	24	21	13	26	-4	-41	35	-0.1	-1.6	0.9
Transport^	119	147	159	147	21	24	26	20	24	34	23	0.7	0.9	0.7
Non-combusted^	38	44	28	53	7	7	4	7	18	-26	41	0.5	-1.0	1.1
Buildings^	169	179	177	234	29	29	28	32	6	5	39	0.2	0.1	1.0
Industry^	250	254	261	291	43	41	42	40	2	4	16	0.1	0.1	0.5
Power	245	423	483	388	43	68	77	54	73	98	59	1.7	2.2	1.5
Production														
Oil† (Mb/d)	98	47		89					-50		-9	-2.2		-0.3
Gas (Bcm)	3865	3717		5200					-4		35	-0.1		0.9
Coal	165	29		120					-82		-27	-5.2		-1.0
Emissions														
Net CO ₂ (Gt)	33.8	9.3	1.4	30.5					-72	-96	-10	-3.9	-9.4	-0.3

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. ^ Includes electricity and hydrogen; and their associated conversion losses.