

2023 | 72<sup>nd</sup> edition

# Statistical Review of World Energy

In partnership with



KEARNEY

The Energy Institute (EI) Statistical Review of World Energy™ analyses data on world energy markets from the prior year. The Review has been providing timely, comprehensive and objective data to the energy community since 1952.

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# Foreword

Publishing the 72<sup>nd</sup> Statistical Review of World Energy is a significant moment for the Energy Institute (EI).

As the chartered professional membership body for people who work across the world of energy, the EI and its precursor bodies date back more than a century. This major addition to our body of work underpins our determination to bring the best evidence to bear in the vital decisions made by the business community, policy makers and academics in energy.

With our partners KPMG and Kearney, the continuing involvement of Heriot-Watt University and with enormous thanks to bp for seven decades' work building one of the world's most respected energy data sources, we are opening a new chapter in the story of the Statistical Review.

It continues to be **full, first and free**: the fullest, most reliable account of energy production, consumption, trade and emissions; the first data source to provide a complete global picture of the previous year; and completely free to access for users.

This year more than ever, it provides insight into how our energy systems are adapting to escalating environmental and geopolitical crises. The data shed light on a year in energy defined by three crises layered one on top of the other – on **supply, price and climate**.

Just as the world emerged from the huge impact on energy demand caused by the global pandemic, 2022 witnessed energy markets again in crisis, as Russia's invasion of Ukraine upended assumptions about supply and sent out ripples around the world. That in turn precipitated a price crisis and profound cost-of-living pressures across many economies.

**This year more than ever, it provides insight into how our energy systems are adapting to escalating environmental and geopolitical crises.**

More fundamentally, we have seen further and ever more dangerous impacts of climate change across all continents. And despite broad consensus on the need to reach net zero, global energy-related greenhouse gas emissions are still heading in the wrong direction.

The Statistical Review provides a high level view of the global energy system, of how global markets are faring under these pressures, and how the energy transition is evolving.

At the EI, the Statistical Review has a new, long-term, independent home. Users will find all of the familiar elements – both in print and online. We look forward to working with the user community to ensure it stays relevant as we work together to accelerate the transition to a cleaner, more secure energy future.



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CEO, Energy Institute



# 2022 Key highlights

Whilst 2022 saw energy demand continue to recover from the COVID-19 pandemic, legacy supply chain issues, along with conflict in Ukraine, continued to impact the global energy sector.

## Energy developments

- 2022 saw a 1% increase in total primary energy consumption taking it to around 3% above the 2019 pre-COVID level.
- Renewables' (excluding hydroelectricity) share of primary energy consumption reached 7.5%, an increase of nearly 1% over the previous year.
- Fossil fuel consumption as a percentage of primary energy remained steady at 82%.

## Carbon emissions

- Carbon dioxide emissions from energy use, industrial processes, flaring and methane (in carbon dioxide equivalent terms) continued to rise to a new high growing 0.8% in 2022 to 39.3 GtCO<sub>2</sub>e, with emissions from energy use rising 0.9% to 34.4 GtCO<sub>2</sub>e.
- In contrast, carbon dioxide emissions from flaring decreased by 3.8% and emissions from methane and industrial processes decreased by 0.2%.

## Oil

- Brent crude oil prices averaged \$101/bbl in 2022, its highest level since 2013.
- Oil consumption continued to increase, rising by 2.9 million barrels per day (b/d) to 97.3 million barrels per day (b/d), a smaller increase than was seen between 2020 and 2021. Consumption remained 0.7% below 2019 levels.
- Regionally, OECD consumption increased by 1.4 million b/d and non-OECD by 1.5 million b/d. Most of the growth came from jet/kerosene (0.9 million b/d) and diesel/gasoil (0.7 million b/d).
- Global oil production increased by 3.8 million b/d in 2022, with OPEC+ accounting for more than 60% of the increase. Among all countries, Saudi Arabia (1,182,000 b/d) and the US (1,091,000 b/d), saw the largest increases. Nigeria reported the largest decline in production (184,000 b/d) with production in Libya declining by 181,000 b/d too.
- Refining capacity increased slightly by around 534,000 b/d last year driven by an increase in capacity in non-OECD countries.

## Natural gas

- Natural gas prices reached record levels in Europe and Asia in 2022, rising nearly threefold in Europe (TTF averaging \$37/mmBtu) and doubling in the Asian LNG spot market (JKM averaging \$34/mmBtu). US Henry Hub prices rose over 50% to average \$6.5/mmBtu in 2022 – their highest annual level since 2008.
- Global natural gas demand declined by 3% in 2022 dropping just below the 4 Tcm mark achieved for the first time in 2021. Its share in primary energy in 2022 decreased slightly to 24% (from 25% in 2021).
- Global gas production remained relatively constant compared to 2021.
- LNG supply grew 5% (26 Bcm) to 542 Bcm in 2022, similar to 2021. LNG supply increases came mostly from North America (10 Bcm) and APAC (8 Bcm). All other regions made a positive contribution to LNG supply growth in 2022 (8 Bcm).
- The increase in global LNG demand was triggered by Europe (62 Bcm) in 2022. Countries in the Asia Pacific region reduced their LNG imports by 24 Bcm and those in South & Central America by 11 Bcm.

- Japan replaced China as the world's largest LNG importer and accounted for close to 60% of global LNG demand growth in 2022. The Asia Pacific region accounted for around 65% of global LNG demand but fell 6.5% compared to 2021 whilst Europe increased its LNG imports by 57%.
- Overall natural gas pipeline net trade fell ~15% globally in 2022 (78 Bcm). European pipeline imports fell by 35% (82 Bcm), almost entirely attributable to supplies from Russia. Overall, Russian total pipeline exports fell 38%. The Middle East increased its pipeline exports by 12%. China increased its pipeline imports by 5 Bcm.

## Coal

- Coal prices reached record levels in 2022, with European prices averaging \$294/tonne and the Japan CIF spot price averaging \$225/tonne (increases of 145% and 45% over 2021 respectively).
- Coal consumption continued to increase, rising 0.6% in 2021 to 161 EJ; the highest level of coal consumption since 2014.
- The growth in demand was largely driven by China (1%) and India (4%). Their combined growth of 1.7 EJ was sufficient to offset declines in other regions by 0.6 EJ.
- Coal consumption in both North America and Europe declined by 6.8% and 3.1% respectively. In 2022, OECD consumption was around 10% less than its 2019 pre-COVID level and non-OECD coal consumption over 6% higher.
- Global coal production increased by over 7% compared to 2021, reaching a record high of 175 EJ. China, India, and Indonesia accounted for over 95% of the increase in global production.

## Renewables, hydro and nuclear

- Renewable power (excluding hydro) rose 14% in 2022 to reach 40.9 EJ. This was slightly below the previous year's growth rate of 16%.
- Solar and wind capacity continued to grow rapidly in 2022 recording a record increase of 266 GW. Solar accounted for 72% (192 GW) of the capacity additions.
- The largest portion of solar and wind growth was in China accounting for about 37% and 41% of global capacity additions respectively.
- Hydroelectricity generation increased by 1.1% in 2022 whilst output from nuclear fell by 4.4%.

## Electricity

- Global electricity generation increased by 2.3% in 2022 which was lower than the previous year's growth rate of 6.2%.
- Wind and solar reached a record high of 12% share of power generation with solar recording 25% and wind power 13.5% growth in output. The combined generation from wind and solar once again surpassed that of nuclear energy.
- Coal remained the dominant fuel for power generation in 2022, with a stable share around 35.4%, marginally down from 35.8% in 2021.
- Natural gas-fired power generation remained stable in 2022 with a share of around 23%.
- Renewables (excluding hydro) met 84% of net electricity demand growth in 2022.

## Key minerals

- Lithium carbonate prices rose 335% to average a record high of \$47,000/tonne. Similarly, the price of cobalt increased 24% in 2021 to average \$64,000/tonne.
- Lithium and cobalt production rose sharply by 21%.

# 2022 Key charts

In 2022, the energy system switched from concerns around demand post-COVID to supply concerns arising from the conflict in Ukraine. These charts summarise some of the key highlights from this year's Statistical Review.

## Primary energy

Primary energy demand growth slowed compared to 2021, increasing 1.1% (6.6 EJ) in 2022 versus 5.5% (30.9 EJ) in 2021. Primary energy in 2022 was 16.6 EJ above 2019 pre-COVID levels with consumption increasing in all regions except for Europe (-3.8%) and CIS (-5.8%).

Primary energy consumption in non-OECD countries increased by 20.5 EJ compared to their 2019 pre-COVID levels, driven largely by growth in China (14.6 EJ) accounting for 72% of the increase. Primary energy demand in OECD countries was slightly down against 2019 levels at 234 EJ in 2022 versus 238 EJ in 2019. The increase in primary energy supply between 2019 and 2022 was largely driven by renewable (excluding hydro) energy sources (13.5 EJ) and coal (10.6 EJ), with increased gas production (2.7 EJ) also evident.

**Primary energy use in 2022 was 2.8% above 2019 levels.**

## CO<sub>2</sub> emissions

Emissions from energy continued to rebound strongly reaching a record high of 39.3 billion tonnes of carbon dioxide equivalent representing a 0.8% increase over 2021. Emissions from energy consumption contributed 87% of total global emissions.

## Commodity prices

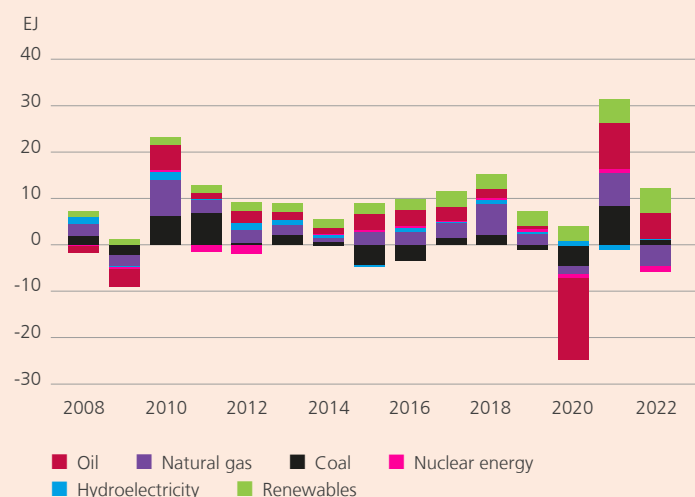
Global energy prices rose sharply in 2022 driven by energy supply concerns.

The most pronounced increase was in the price of lithium carbonate, which increased by over 300% in 2022. Oil prices rose by around 40%, with Brent ending the year averaging around \$101/bbl. Gas (Netherlands TTF) prices increased by over 130% to average around \$37/mmBtu, while coal prices also saw an increase with the Northwest Europe marker price increasing by 141% to \$294/tonne.

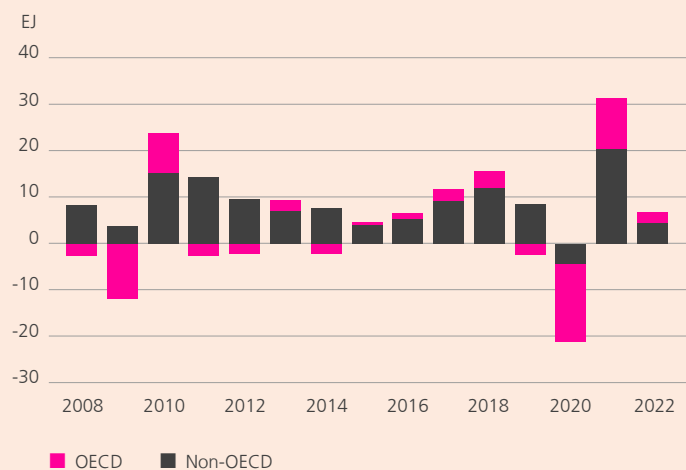
# Global greenhouse gas emissions continue to rise, reaching record levels in 2022.

Primary energy in 2022 reached a record level with non-OECD countries accounting for most of the increase.

Change in primary energy by fuel

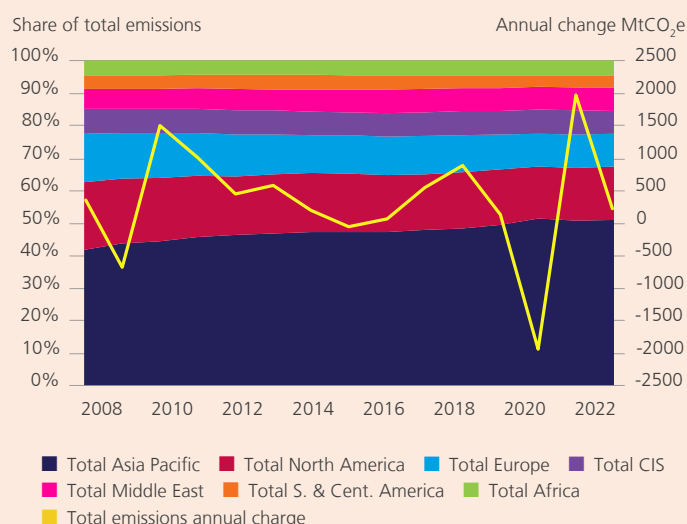


Change in primary energy by geography

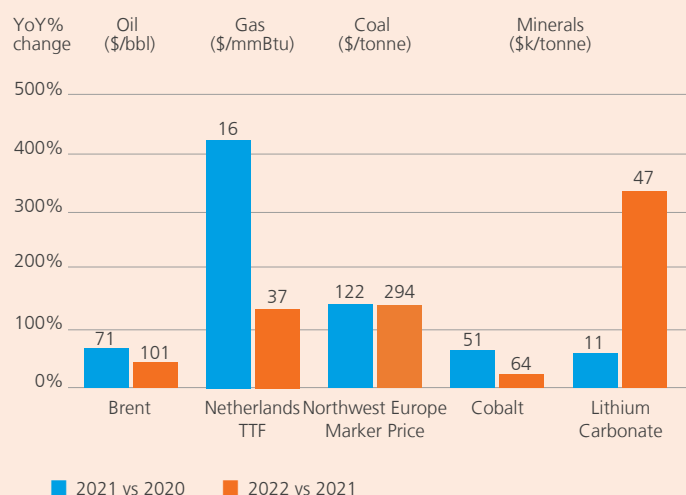


## Carbon emissions reached a record high in 2022

Asia Pacific region continues to increase its share of total global emissions



Energy and mineral prices rose sharply in 2022 with gas and lithium carbonate reaching record levels

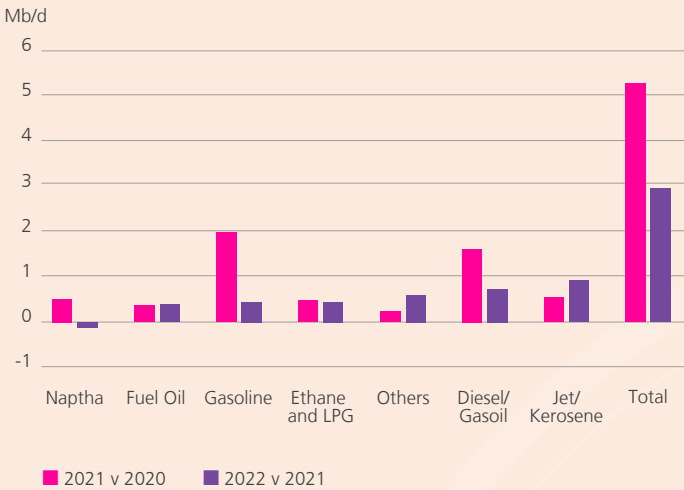


## Natural gas prices reached record levels in Europe and Asia Pacific regions.

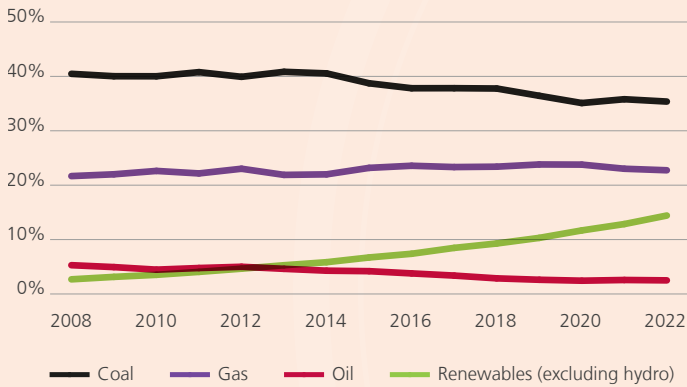
**Sources:**  
 Brent: S&P Global Platts, ©2023, S&P Global Inc.  
 TTF: ICIS Heren Energy Ltd  
 Northwest Europe marker price: S&P Global Platts, ©2023, S&P Global Inc.  
 Cobalt: London Metal Exchange  
 Lithium carbonate: Benchmark Mineral Intelligence  
 2022 vs 2021 percentage changes use the latest data available as of June 2023

# 2022 Key charts

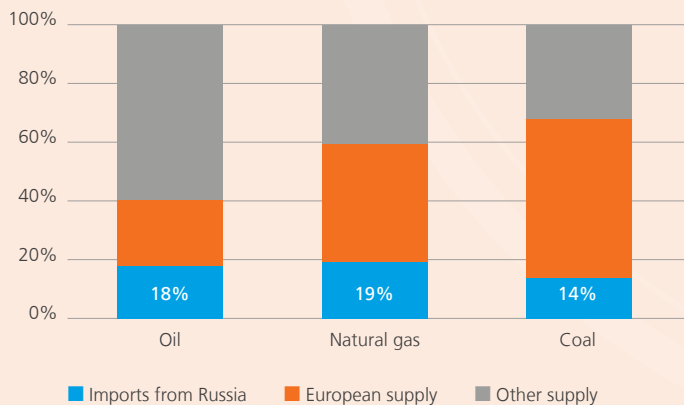
Refined product demand grew in 2022



The share of renewables in global power generation continued to increase



Russian share of European crude oil, natural gas, and coal supply



**Russia accounted for around 15% of Europe's gas use in 2022.**



# Despite a strong recovery, aviation-related oil demand remained below 2019 levels in 2022.

## Oil demand

Oil demand in 2022 was 0.65 Mb/d (0.7%) below 2019 levels. Gasoline (25%) and diesel/gasoil (29%) accounted for just over half of total demand.

Although aviation-related oil demand exhibited the strongest growth, it remained more than 1.7 Mb/d below 2019 pre-COVID levels.

Demand for gasoline in 2022 was similar to pre-pandemic levels, whilst demand for naphtha, diesel/gasoil, fuel oil, and other oil products in 2022 were above their pre-pandemic levels.

Naphtha demand fell between 2021 and 2022, whilst demand for all other products increased.

## Power by fuel

The share of renewables (excluding hydro) in global power generation continued its rising trend, driven by record new build of solar and wind. Their share of total global electricity production reached 14% in 2022, higher than that of nuclear energy (9%). The share of coal in the power sector stood at around 35% whilst the share of gas generation in 2022 remained close to its 10-year average level at 23%.

## Oil, gas and coal trade

Russian natural gas (pipeline and LNG) accounted for around 33% of Europe's total gas imports in 2022.

Crude oil from Russia made up 23% of total European crude oil imports.

Russian coal contributed 30% of Europe's coal imports in 2022.

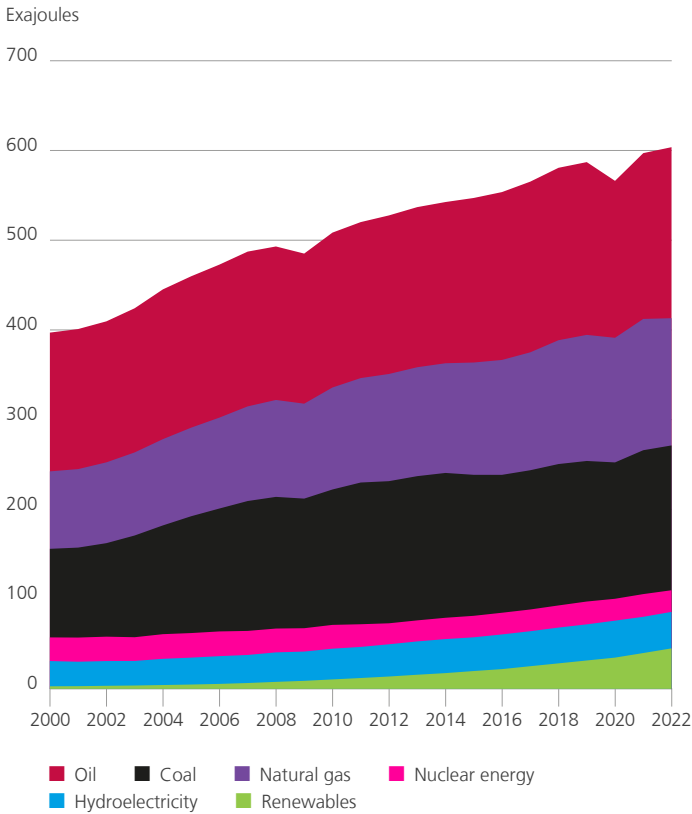
**Solar and wind recorded a record increase of 266 GW in 2022 with solar accounting for 72% of the capacity additions.**



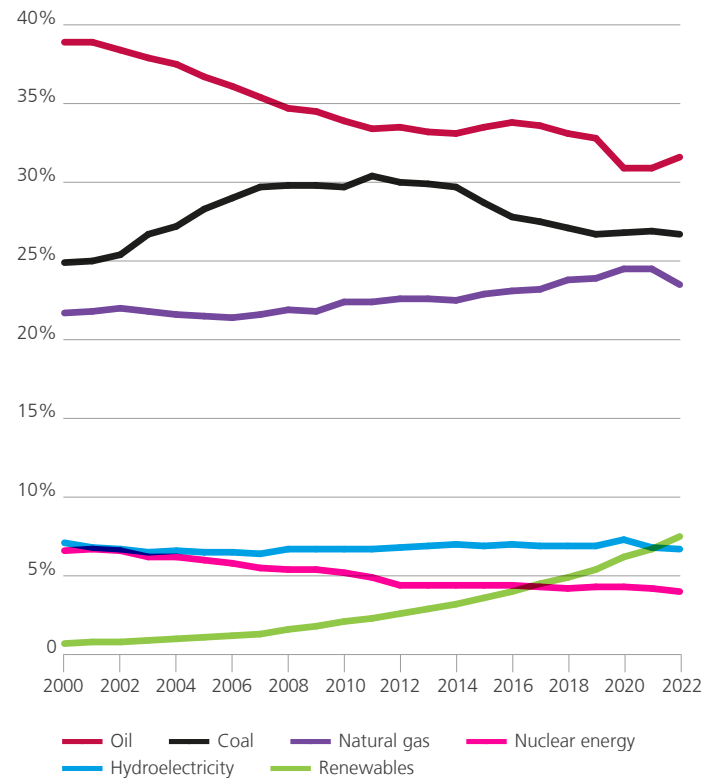




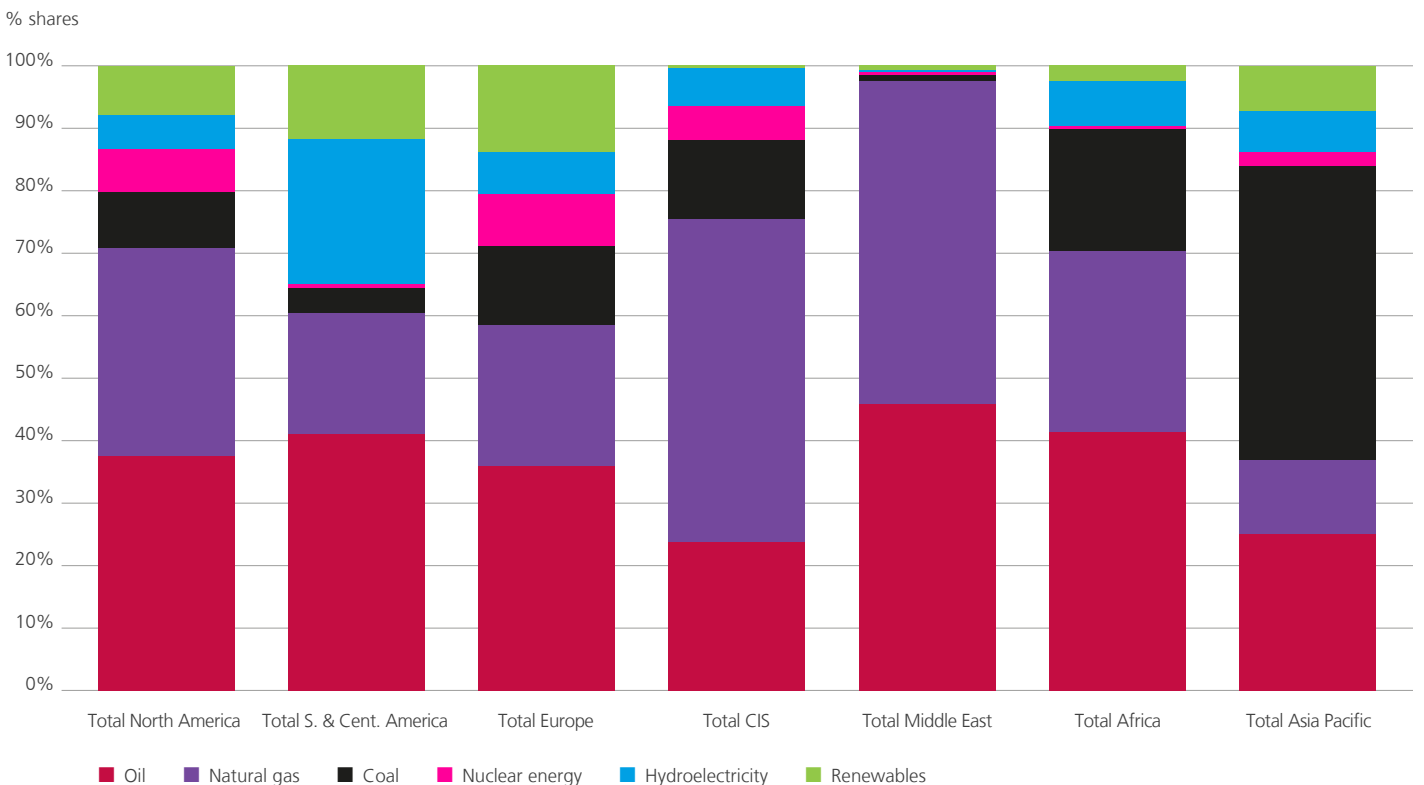
World consumption



Share of global primary energy



Regional consumption pattern 2022



\* In this review, primary energy comprises commercially-traded fuels, including modern renewables used to generate electricity.

















 **Oil** Natural gas liquids production in thousands of barrels per day\*

Thousand barrels daily	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Growth rate per annum		Share	
												2022	2012-22	2022	
Canada	490	514	513	525	595	597	647	682	660	669	708	5.9%	3.8%	5.6%	
Mexico	364	360	363	326	307	279	238	220	206	171	160	-6.6%	-7.9%	1.3%	
US	2408	2606	3015	3342	3509	3783	4369	4824	5175	5425	5883	8.4%	9.3%	46.4%	
<b>Total North America</b>	<b>3262</b>	<b>3480</b>	<b>3890</b>	<b>4194</b>	<b>4412</b>	<b>4659</b>	<b>5255</b>	<b>5726</b>	<b>6041</b>	<b>6265</b>	<b>6751</b>	<b>7.8%</b>	<b>7.5%</b>	<b>53.2%</b>	
Argentina	107	104	105	114	99	110	102	112	120	114	123	7.8%	1.4%	1.0%	
Brazil	84	86	87	88	97	110	104	102	90	84	85	1.0%	0.2%	0.7%	
Colombia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ecuador	1	1	-	-	-	-	-	-	-	-	-	-	-100.0%	-	-
Peru	45	54	54	49	50	48	47	49	48	46	43	-6.6%	-0.7%	0.3%	
Trinidad & Tobago	35	34	33	30	25	27	24	23	20	17	15	-7.9%	-7.9%	0.1%	
Venezuela	124	116	114	117	105	104	88	80	52	49	47	-5.0%	-9.3%	0.4%	
Other S. & Cent. America	16	17	14	13	12	15	14	13	13	13	12	-7.0%	-2.9%	0.1%	
<b>Total S. &amp; Cent. America</b>	<b>413</b>	<b>412</b>	<b>407</b>	<b>411</b>	<b>389</b>	<b>414</b>	<b>379</b>	<b>378</b>	<b>342</b>	<b>323</b>	<b>325</b>	<b>0.6%</b>	<b>-2.4%</b>	<b>2.6%</b>	
Denmark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Italy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway	306	305	324	338	349	352	335	300	292	252	196	-22.0%	-4.3%	1.5%	
Romania	4	3	3	3	4	3	3	4	4	4	3	-12.9%	-1.2%	†	
United Kingdom	62	55	62	60	82	92	90	99	88	67	67	-0.8%	0.8%	0.5%	
Other Europe	19	17	15	15	16	19	19	17	15	16	8	-48.6%	-7.9%	0.1%	
<b>Total Europe</b>	<b>390</b>	<b>380</b>	<b>405</b>	<b>416</b>	<b>451</b>	<b>466</b>	<b>447</b>	<b>420</b>	<b>399</b>	<b>339</b>	<b>275</b>	<b>-18.9%</b>	<b>-3.5%</b>	<b>2.2%</b>	
Azerbaijan	10	11	12	11	11	11	12	13	12	19	18	-6.0%	5.4%	0.1%	
Kazakhstan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Russian Federation	260	278	448	470	479	476	479	493	474	544	533	-2.0%	7.4%	4.2%	
Turkmenistan	14	17	17	17	20	21	23	27	30	27	31	14.1%	8.6%	0.2%	
Uzbekistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other CIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total CIS</b>	<b>284</b>	<b>307</b>	<b>477</b>	<b>498</b>	<b>510</b>	<b>508</b>	<b>514</b>	<b>533</b>	<b>516</b>	<b>590</b>	<b>582</b>	<b>-1.4%</b>	<b>7.4%</b>	<b>4.6%</b>	
Iran	412	418	441	461	488	364	378	384	386	469	509	8.5%	2.1%	4.0%	
Iraq	42	41	40	41	48	64	64	68	64	70	74	5.8%	6.0%	0.6%	
Kuwait	283	287	276	288	290	305	313	299	283	289	321	11.4%	1.3%	2.5%	
Oman	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Qatar	437	471	466	470	473	450	471	470	427	439	450	2.5%	0.3%	3.5%	
Saudi Arabia	1635	1518	1577	1578	1718	1717	1728	1687	1609	1560	1628	4.3%	†	12.8%	
Syria	25	14	10	8	8	8	8	9	10	10	10	-4.8%	-8.9%	0.1%	
United Arab Emirates	479	482	539	614	654	630	600	639	608	625	656	5.0%	3.2%	5.2%	
Yemen	24	24	25	26	26	27	28	28	28	28	28	-	1.5%	0.2%	
Other Middle East	10	10	10	10	10	10	11	19	18	15	16	6.5%	4.2%	0.1%	
<b>Total Middle East</b>	<b>3346</b>	<b>3266</b>	<b>3386</b>	<b>3494</b>	<b>3715</b>	<b>3575</b>	<b>3602</b>	<b>3602</b>	<b>3433</b>	<b>3504</b>	<b>3691</b>	<b>5.4%</b>	<b>1.0%</b>	<b>29.1%</b>	
Algeria	216	210	260	268	261	254	252	247	233	248	254	2.3%	1.6%	2.0%	
Angola	20	22	30	16	23	39	40	47	47	47	47	-0.9%	8.9%	0.4%	
Chad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Republic of Congo	12	9	8	7	7	7	7	7	7	7	7	-	-4.8%	0.1%	
Egypt	66	67	47	64	60	57	58	56	44	47	44	-4.3%	-3.9%	0.4%	
Equatorial Guinea	20	21	19	17	19	21	19	17	15	12	12	-0.7%	-5.2%	0.1%	
Gabon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Libya	40	22	8	15	15	20	21	27	15	40	40	1.1%	†	0.3%	
Nigeria	79	82	86	80	76	77	82	85	61	78	100	29.2%	2.4%	0.8%	
South Sudan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sudan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tunisia	5	6	5	5	5	4	4	3	3	2	2	-	-6.4%	†	
Other Africa	-	-	-	-	-	-	1	1	3	7	11	54.7%	-	0.1%	
<b>Total Africa</b>	<b>458</b>	<b>440</b>	<b>462</b>	<b>472</b>	<b>467</b>	<b>479</b>	<b>483</b>	<b>491</b>	<b>429</b>	<b>488</b>	<b>518</b>	<b>6.2%</b>	<b>1.2%</b>	<b>4.1%</b>	
Australia	67	66	67	56	64	59	60	97	103	109	101	-6.7%	4.2%	0.8%	
Brunei	13	13	12	11	12	13	12	12	10	8	7	-13.8%	-5.5%	0.1%	
China	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
India	140	136	136	133	143	153	174	174	158	147	128	-13.1%	-0.8%	1.0%	
Indonesia	58	46	58	52	44	36	36	35	34	33	32	-2.7%	-5.7%	0.3%	
Malaysia	65	39	39	35	59	58	60	62	67	66	64	-1.6%	-0.1%	0.5%	
Thailand	232	225	231	233	231	247	247	246	219	224	188	-16.2%	-2.1%	1.5%	
Vietnam	8	10	10	9	10	9	13	12	12	11	12	0.7%	3.5%	0.1%	
Other Asia Pacific	45	38	36	33	31	32	26	26	21	17	16	-8.1%	-10.1%	0.1%	
<b>Total Asia Pacific</b>	<b>628</b>	<b>572</b>	<b>589</b>	<b>561</b>	<b>594</b>	<b>607</b>	<b>627</b>	<b>664</b>	<b>622</b>	<b>616</b>	<b>548</b>	<b>-10.9%</b>	<b>-1.3%</b>	<b>4.3%</b>	
<b>Total World</b>	<b>8781</b>	<b>8857</b>	<b>9616</b>	<b>10046</b>	<b>10537</b>	<b>10708</b>	<b>11307</b>	<b>11813</b>	<b>11782</b>	<b>12124</b>	<b>12690</b>	<b>4.7%</b>	<b>3.8%</b>	<b>100.0%</b>	
of which: OECD	3722	3929	4364	4667	4922	5181	5757	6237	6536	6705	7128	6.3%	6.7%	56.2%	
Non-OECD	5059	4928	5252	5379	5615	5527	5550	5577	5245	5419	5562	2.6%	1.0%	43.8%	
OPEC	3362	3230	3398	3501	3704	3602	3594	3587	3381	3493	3695	5.8%	0.9%	29.1%	
Non-OPEC	5420	5628	6218	6545	6833	7106	7714	8226	8401	8631	8995	4.2%	5.2%	70.9%	
European Union	17	14	13	13	14	14	12	11	10	10	10	-7.3%	-5.3%	0.1%	

Source: Includes data from FGE Iran Service, ICIS Heren Energy Ltd.

\* Includes ethane, LPG and naphtha separated from the production of natural gas. Excludes condensates.

^ Less than 0.05.

† Less than 0.05%.

Note: Annual changes and shares of total are calculated using thousand barrels daily figures.









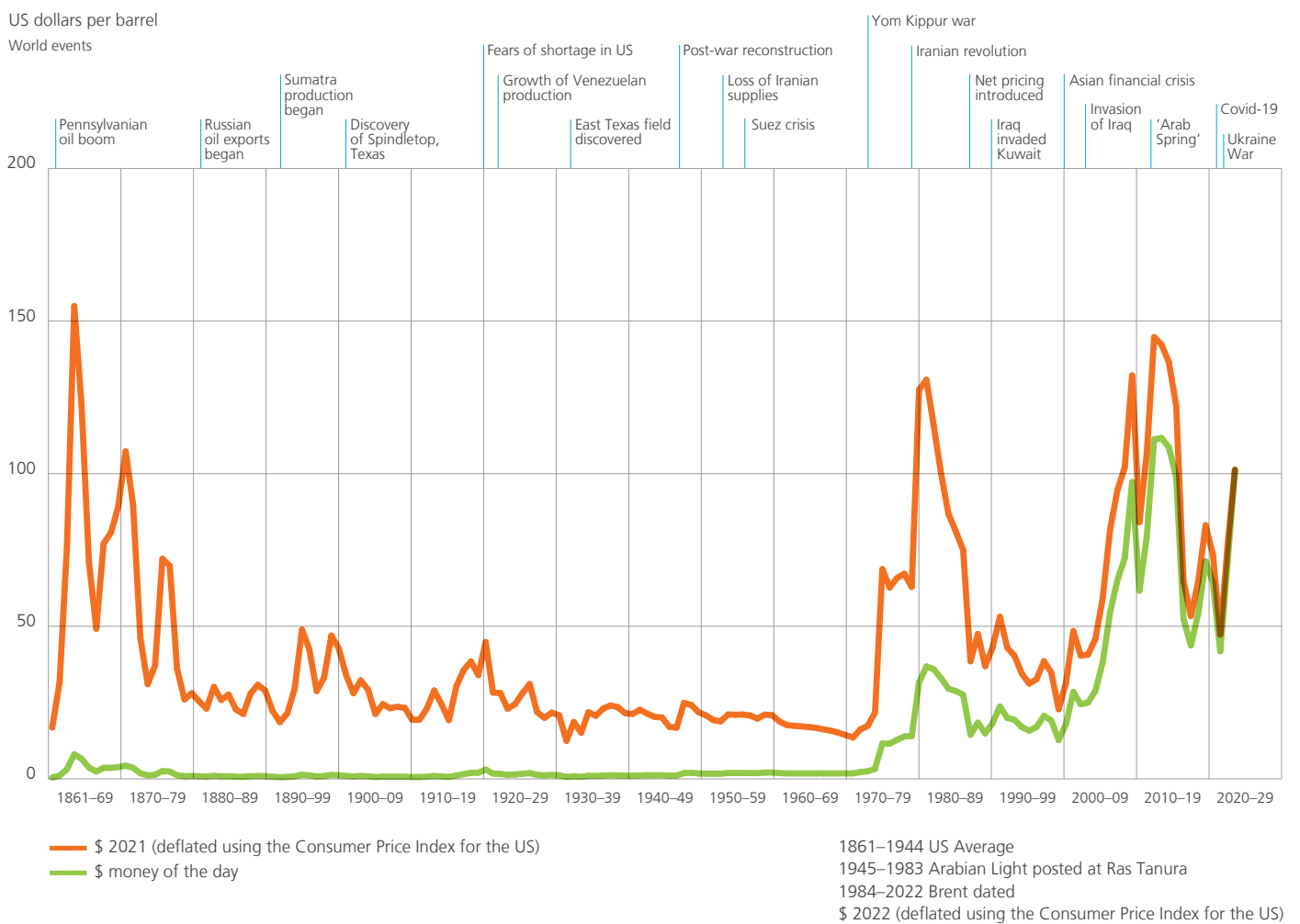




US dollars per barrel	Dubai \$/bbl *	Brent \$/bbl †	Nigerian Forcados \$/bbl	West Texas Intermediate \$/bbl‡
2002	23.60	25.02	25.04	26.16
2003	26.75	28.83	28.68	31.06
2004	33.51	38.27	38.13	41.49
2005	46.78	54.52	55.69	56.59
2006	61.48	65.14	67.07	66.04
2007	67.92	72.39	74.48	72.20
2008	94.28	97.26	101.43	100.06
2009	61.14	61.67	63.35	61.92
2010	77.78	79.50	81.05	79.45
2011	105.93	111.26	113.65	95.04
2012	109.06	111.67	114.21	94.13
2013	105.47	108.66	111.95	97.99
2014	97.02	98.95	101.35	93.28
2015	51.22	52.39	54.41	48.71
2016	41.02	43.73	44.54	43.34
2017	53.02	54.19	54.31	50.79
2018	70.15	71.31	72.47	65.20
2019	63.71	64.21	64.95	57.03
2020	42.41	41.84	42.31	39.25
2021	68.91	70.91	69.76	68.10
<b>2022</b>	<b>96.38</b>	<b>101.32</b>	<b>101.40</b>	<b>94.58</b>

Source: S&P Global Platts, ©2023, S&P Global Inc.  
 \* 1972 – 1985 Arabian Light, 1986 – 2021 Dubai dated.  
 † 1976 – 1983 Forties, 1984 – 2021 Brent dated.  
 ‡ 1976 – 1983 Posted WTI prices, 1984 – 2021 Spot WTI (Cushing) prices.

## Crude oil prices 1862-2022







Thousand barrels daily												Growth rate per annum		Share
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022	2012–22	2022
<b>Imports</b>														
US	10587	9859	9241	9451	10056	10147	9928	9142	7865	8475	<b>8330</b>	-1.7%	-2.4%	12.1%
Europe	12721	12920	12957	14005	14337	14968	14338	14324	12817	12929	<b>14383</b>	11.2%	1.2%	20.9%
China	6675	6978	7398	8333	9215	10241	11028	11873	13032	12724	<b>12156</b>	-4.5%	6.2%	17.7%
India	4168	4370	4155	4396	4945	4920	5196	5394	4898	5302	<b>5752</b>	8.5%	3.3%	8.4%
Japan	4743	4637	4383	4332	4180	4142	3940	3780	3310	3350	<b>3465</b>	3.4%	-3.1%	5.0%
Rest of World	17812	20012	21193	22915	28418	25625	25580	25694	23064	23776	<b>24729</b>	4.0%	3.3%	35.9%
<b>Total World</b>	<b>56706</b>	<b>58776</b>	<b>59328</b>	<b>63431</b>	<b>71151</b>	<b>70043</b>	<b>70009</b>	<b>70207</b>	<b>64986</b>	<b>66557</b>	<b>68815</b>	<b>3.4%</b>	<b>2.0%</b>	<b>100.0%</b>
<b>Exports</b>														
Canada	3056	3296	3536	3837	3889	4233	4498	4666	4418	4663	<b>4699</b>	0.8%	4.4%	6.8%
Mexico	1366	1347	1293	1321	1405	1283	1302	1252	1247	1216	<b>1172</b>	-3.6%	-1.5%	1.7%
US	2682	3563	4033	4562	5082	5881	7039	8010	8138	7959	<b>8761</b>	10.1%	12.6%	12.7%
S. & Cent. America	3830	3790	3939	4103	5736	3993	3711	3457	3503	3003	<b>2959</b>	-1.5%	-2.5%	4.3%
Europe	2181	2545	2467	3065	4834	3384	3349	3225	2822	2983	<b>2684</b>	-10.0%	2.1%	3.9%
Russia	7457	7948	7792	8434	8811	8981	8026	8090	7398	7816	<b>7948</b>	1.7%	0.6%	11.5%
Other CIS	1962	2166	2092	2045	2097	2232	2051	2107	2070	2110	<b>1976</b>	-6.3%	0.1%	2.9%
Saudi Arabia	8468	8365	7911	8008	8729	8352	8462	8349	8011	7780	<b>8874</b>	14.1%	0.5%	12.9%
Middle East (ex Saudi Arabia)	11742	12242	12699	13977	15902	16208	16038	14943	13685	14160	<b>15387</b>	8.7%	2.7%	22.4%
North Africa	2602	2127	1743	1747	1736	2594	2765	2794	1837	2335	<b>2073</b>	-11.2%	-2.2%	3.0%
West Africa	4724	4590	4849	4889	4458	4490	4516	4743	4243	3921	<b>3557</b>	-9.3%	-2.8%	5.2%
Asia Pacific (ex Japan)	6299	6307	6450	5895	6348	6549	6440	6603	6150	6625	<b>6548</b>	-1.2%	0.4%	9.5%
Rest of World	338	491	524	1549	2124	1863	1811	1968	1463	1986	<b>2177</b>	9.6%	20.5%	3.2%
<b>Total World</b>	<b>56706</b>	<b>58776</b>	<b>59328</b>	<b>63431</b>	<b>71151</b>	<b>70043</b>	<b>70009</b>	<b>70207</b>	<b>64986</b>	<b>66557</b>	<b>68815</b>	<b>3.4%</b>	<b>2.0%</b>	<b>100.0%</b>

Notes: Unless otherwise stated, this table shows inter-regional trade based on the regional classification in the table 'Oil trade in 2019 and 2020'.

Does not include biofuels trade. Bunker fuel use is not included as exports.

Annual changes and shares of total are calculated using thousand barrels daily figures.


**Oil Trade in 2021 and 2022**

Million tonnes	2021				2022			
	Crude imports	Product imports	Crude exports	Product exports	Crude imports	Product imports	Crude exports	Product exports
Canada	24.0	30.6	197.6	33.3	23.7	27.9	200.3	32.3
Mexico	†	58.6	52.8	7.4	†	59.6	49.4	8.6
US	304.4	112.9	139.6	246.6	312.6	98.2	172.9	253.0
S. & Cent. America	22.1	104.3	124.8	23.8	24.4	115.8	117.2	28.9
Europe	448.2	187.9	36.8	107.4	501.3	206.5	19.6	109.5
Russia	†	1.9	244.1	139.4	0.1	1.7	264.7	125.9
Other CIS	15.9	6.5	87.1	17.3	16.2	7.6	85.7	12.2
Iraq	†	10.2	176.0	14.4	†	9.0	191.0	12.5
Kuwait	†	3.1	92.3	20.8	†	2.5	90.3	29.8
Saudi Arabia	0.1	15.9	323.5	61.4	0.9	12.9	364.8	74.1
United Arab Emirates	7.2	27.9	144.2	81.7	5.0	39.8	172.9	89.5
Other Middle East	18.1	19.7	99.4	68.7	16.3	22.5	92.2	79.4
North Africa	9.9	30.6	88.5	26.7	8.3	34.1	76.5	25.7
West Africa	0.5	42.6	186.7	8.2	0.7	53.1	169.7	7.1
East & S. Africa	12.1	45.8	4.4	4.3	6.8	53.6	1.7	1.9
Australasia	14.9	29.0	9.2	5.4	10.3	48.1	8.9	4.3
China	526.0	103.4	1.6	60.5	508.2	93.3	1.3	54.1
India	213.7	48.3	0.1	75.1	231.2	53.1	†	83.3
Japan	122.1	43.0	0.4	11.0	132.5	38.5	0.4	16.9
Singapore	47.0	91.8	1.2	68.9	44.4	72.5	0.5	72.3
Other Asia Pacific	261.9	202.3	38.1	134.0	286.3	196.5	49.0	125.1
<b>Total World</b>	<b>2048.2</b>	<b>1216.2</b>	<b>2048.2</b>	<b>1216.2</b>	<b>2129.1</b>	<b>1246.6</b>	<b>2129.1</b>	<b>1246.6</b>

Thousand barrels daily	2021				2022			
	Crude imports	Product imports	Crude exports	Product exports	Crude imports	Product imports	Crude exports	Product exports
Canada	482	639	3967	695	475	583	4023	676
Mexico	‡	1226	1060	155	‡	1247	992	181
US	6114	2361	2804	5155	6278	2052	3472	5289
S. & Cent. America	443	2180	2506	497	491	2421	2354	605
Europe	9001	3928	738	2245	10068	4316	394	2290
Russia	‡	39	4903	2913	1	36	5315	2633
Other CIS	320	135	1748	361	325	158	1721	256
Iraq	‡	212	3534	302	‡	189	3836	261
Kuwait	‡	64	1854	434	‡	53	1814	623
Saudi Arabia	3	333	6496	1284	19	270	7325	1549
United Arab Emirates	144	583	2895	1709	100	831	3471	1871
Other Middle East	364	411	1997	1435	326	471	1852	1660
North Africa	198	640	1776	559	166	713	1536	536
West Africa	10	891	3749	172	14	1110	3408	148
East & S. Africa	243	958	88	90	137	1120	34	39
Australasia	300	606	186	112	207	1005	180	90
China	10562	2162	31	1266	10206	1950	27	1131
India	4293	1010	1	1570	4642	1109	‡	1741
Japan	2451	899	8	229	2661	804	9	354
Singapore	944	1920	23	1441	891	1516	10	1512
Other Asia Pacific	5260	4228	765	2801	5749	4107	983	2616
<b>Total World</b>	<b>41132</b>	<b>25424</b>	<b>41132</b>	<b>25424</b>	<b>42756</b>	<b>26059</b>	<b>42756</b>	<b>26059</b>

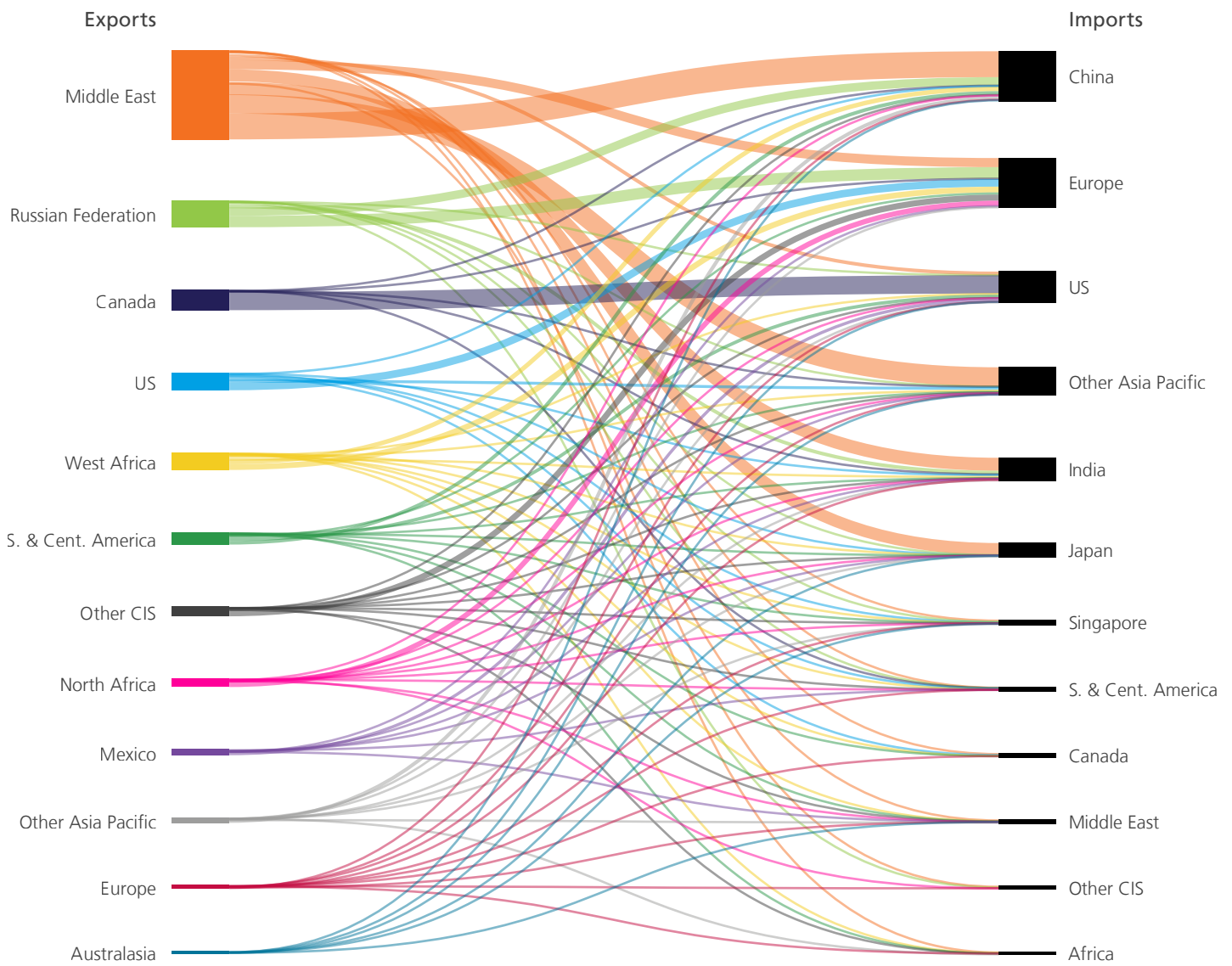
† Less than 0.05.

‡ Less than 0.5.

Notes: Does not include biofuels trade. Bunker fuel use is not included as exports. Intra-area movements (for example, between countries within Europe) are excluded.

Crude imports and exports include condensates.

# Oil Inter-area movements 2022 – Crude trade



International trade of crude oil was 2.1 billion tonnes in 2022, an increase of around 4% over 2021. The Middle East dominated exports accounting for 43% of the total followed by Russia at 12%. On the import side, the Asia Pacific

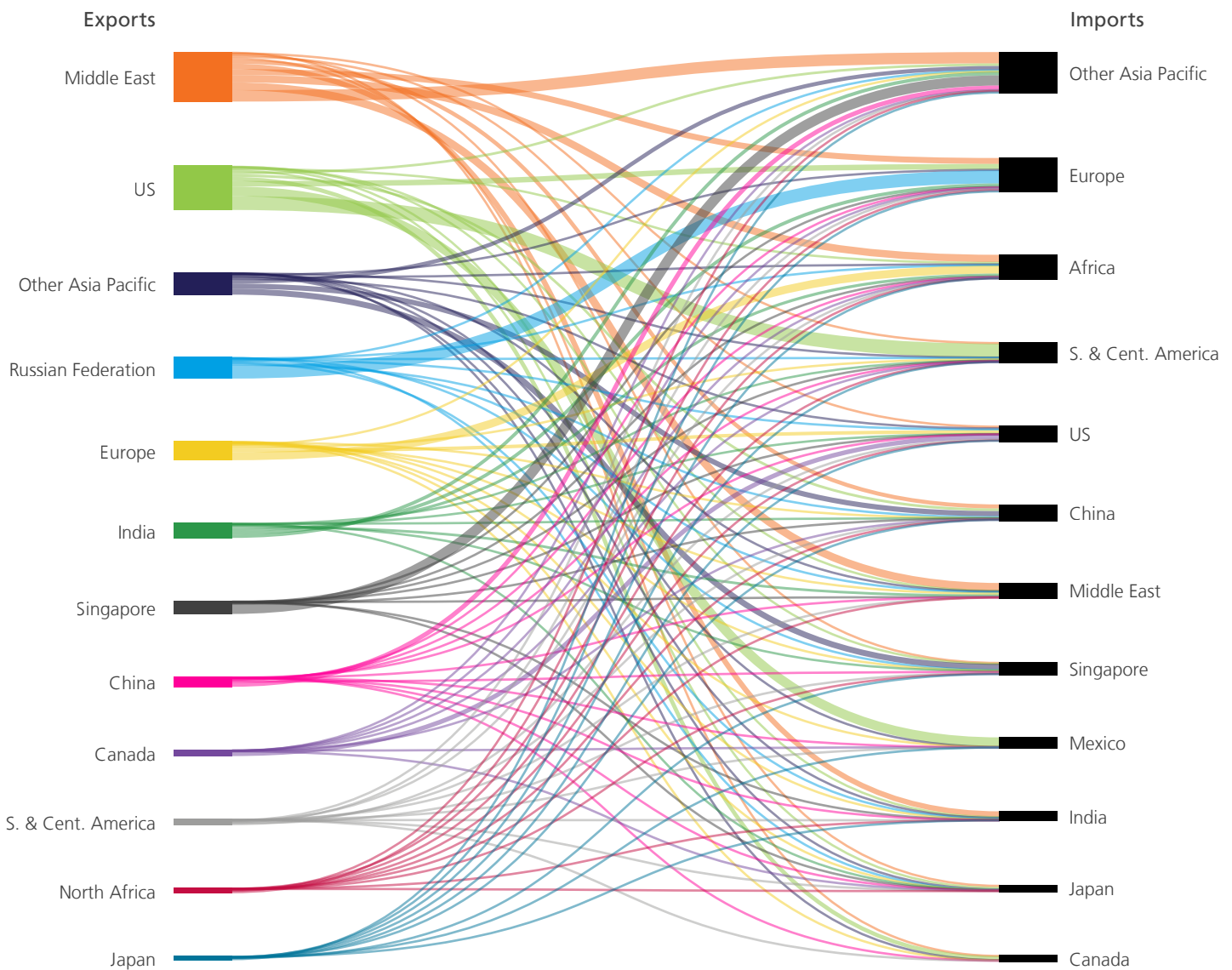
region accounted for nearly 60% of the total. China, India, and Japan were responsible for nearly 75% of the regions' total. At 0.5 billion tonnes, Europe was the second largest destination, representing around 24% of the total.

# Oil Inter-area movements 2022 – Crude trade

Crude (million tonnes)	To														Total	
From	Canada	Mexico	US	S. & Cent. America	Europe	Russia	Other CIS	Middle East	Africa	Australasia	China	India	Japan	Singapore	Other Asia Pacific	Total
Canada	-	-	188.9	0.3	6.3	-	-	†	†	-	4.0	0.2	-	†	0.5	200.3
Mexico	-	-	31.7	0.1	6.1	-	-	0.1	-	-	-	5.1	0.6	-	5.7	49.4
US	16.8	-	-	10.6	77.7	-	†	-	†	1.1	7.9	16.9	1.3	10.6	30.0	172.9
S. & Cent. America	0.6	†	35.1	-	22.8	†	-	2.6	0.6	-	37.3	6.9	2.8	3.5	5.0	117.2
Europe	0.3	†	2.9	0.6	-	†	0.1	0.1	0.2	-	8.2	4.2	-	0.8	2.1	19.6
Russia	-	-	1.0	0.7	116.9	-	15.9	-	†	0.4	86.2	37.0	1.9	0.1	4.4	264.7
Other CIS	†	-	1.1	0.3	62.7	†	-	3.8	0.7	0.2	6.0	0.8	0.1	0.2	9.7	85.7
Iraq	-	-	12.2	-	53.4	†	†	0.2	1.3	-	55.5	52.4	-	1.3	14.7	191.0
Kuwait	†	-	1.3	-	†	-	-	†	3.2	-	33.3	11.7	11.2	†	29.6	90.3
Saudi Arabia	4.0	-	22.7	4.7	38.8	-	0.1	11.7	5.4	-	87.5	40.2	52.5	5.3	91.9	364.8
UAE	-	-	0.6	†	1.5	†	-	†	0.1	1.2	42.8	22.5	49.2	12.4	42.6	172.9
Other Middle East	†	-	0.1	†	0.6	-	†	1.6	†	-	48.7	7.2	11.5	4.5	18.1	92.2
North Africa	-	-	4.8	1.1	54.1	-	0.1	0.3	†	1.1	3.9	4.0	0.1	0.6	6.5	76.5
West Africa	2.0	-	10.0	6.0	59.5	†	†	1.3	4.1	0.5	46.5	19.4	0.1	1.0	19.3	169.7
East & S. Africa	†	-	†	†	0.7	†	-	†	†	-	0.4	-	0.1	0.1	0.3	1.7
Australasia	-	-	0.1	†	†	-	-	0.2	†	-	2.0	-	0.3	2.5	3.8	8.9
China	-	-	-	-	-	-	-	-	-	-	-	-	-	†	1.3	1.3
India	†	-	-	†	†	-	-	†	†	†	-	-	-	†	†	†
Japan	†	-	-	†	†	-	-	-	†	-	†	-	-	-	0.4	0.4
Singapore	-	-	-	†	†	-	-	†	†	-	0.1	†	-	-	0.4	0.5
Other Asia Pacific	†	-	0.2	†	0.1	-	-	0.2	0.1	5.8	37.9	2.5	0.8	1.4	-	49.0
<b>Total imports</b>	<b>23.7</b>	<b>†</b>	<b>312.6</b>	<b>24.4</b>	<b>501.3</b>	<b>0.1</b>	<b>16.2</b>	<b>22.2</b>	<b>15.8</b>	<b>10.3</b>	<b>508.2</b>	<b>231.2</b>	<b>132.5</b>	<b>44.4</b>	<b>286.3</b>	<b>2129.1</b>

† Less than 0.05.  
 Notes: Does not include biofuels trade. Bunker fuel use is not included as exports. Intra-area movements (for example, between countries within Europe) are excluded. Crude imports and exports include condensates.

## Oil Inter-area movements 2022 – Refined product



At 1.2 billion tonnes, international trade of refined product was around 40% that of crude oil in terms of volume and only 2.5% higher than it recorded in 2021. Between them, the Middle East and the US accounted for 45% of the total exports at 0.29 and 0.25 billion tonnes respectively. At 0.5

billion tonnes, Asia Pacific region accounted for around 40% of total imports. Europe was the second largest importer of refined products at 0.2 billion tonnes, 60% below Asia Pacific region.

## Oil Inter-area movements 2022 – Refined product

Product (million tonnes)	To														Total	
From	Canada	Mexico	US	S. & Cent. America	Europe	Russia	Other CIS	Middle East	Africa	Australasia	China	India	Japan	Singapore	Other Asia Pacific	Total
Canada	–	0.1	26.8	1.0	0.6	†	†	†	0.1	†	0.7	†	2.0	†	1.1	32.3
Mexico	–	–	8.1	0.1	0.1	–	†	†	0.1	†	†	†	†	0.1	†	8.6
US	24.1	55.8	–	81.4	32.2	†	†	2.0	9.7	0.9	15.5	5.7	11.0	0.6	13.9	253.0
S. & Cent. America	0.1	0.5	7.1	–	4.9	†	†	0.6	3.2	†	3.3	0.6	0.9	6.0	1.6	28.9
Europe	2.9	2.0	20.5	11.8	–	0.4	1.5	9.4	47.0	0.1	2.0	2.5	0.8	4.1	4.6	109.5
Russia	†	†	6.1	3.7	76.4	–	5.6	6.5	2.6	†	9.6	7.3	0.2	1.7	6.3	125.9
Other CIS	†	†	0.6	0.1	7.6	0.9	–	0.3	1.0	†	0.4	†	–	0.4	1.0	12.2
Iraq	–	–	3.2	†	2.4	†	†	0.5	0.1	–	0.5	2.1	–	0.5	3.2	12.5
Kuwait	0.3	–	0.8	0.4	5.1	–	†	3.9	2.9	0.2	1.4	3.4	2.0	0.1	9.4	29.8
Saudi Arabia	†	–	4.9	1.8	13.3	†	†	14.5	16.4	†	2.1	9.1	1.4	1.6	8.8	74.1
UAE	†	–	1.3	3.0	6.9	†	†	8.8	16.2	0.1	11.0	9.5	4.8	5.4	22.5	89.5
Other Middle East	†	†	1.7	0.8	7.1	†	0.2	17.9	7.2	0.2	8.8	7.3	4.2	1.5	22.4	79.4
North Africa	†	–	2.3	0.8	11.7	†	†	0.7	0.4	†	1.4	0.1	0.7	1.0	6.7	25.7
West Africa	†	†	0.9	1.2	2.1	†	†	†	0.8	†	1.0	†	–	0.1	0.9	7.1
East & S. Africa	†	†	†	0.1	0.3	†	†	0.3	0.6	†	†	†	†	0.3	0.1	1.9
Australasia	†	†	–	0.1	0.9	†	†	0.1	†	–	0.6	†	1.5	0.3	0.9	4.3
China	0.1	0.5	0.3	4.2	6.3	0.2	0.1	1.5	5.1	2.3	–	0.6	0.6	7.7	24.5	54.1
India	†	†	3.3	2.8	20.3	†	†	15.2	16.9	4.7	0.5	–	0.5	3.3	15.7	83.3
Japan	†	0.5	1.3	0.8	0.9	†	†	†	0.1	3.4	1.1	0.1	–	3.1	5.5	16.9
Singapore	†	†	1.0	0.7	1.9	†	†	1.0	2.3	12.5	3.1	2.1	0.6	–	47.1	72.3
Other Asia Pacific	0.2	0.3	8.0	0.9	5.5	0.1	0.2	3.5	7.9	23.7	30.3	2.5	7.3	34.7	–	125.1
<b>Total imports</b>	<b>27.9</b>	<b>59.6</b>	<b>98.2</b>	<b>115.8</b>	<b>206.5</b>	<b>1.7</b>	<b>7.6</b>	<b>86.8</b>	<b>140.8</b>	<b>48.1</b>	<b>93.3</b>	<b>53.1</b>	<b>38.5</b>	<b>72.5</b>	<b>196.5</b>	<b>1246.6</b>

† Less than 0.05

Notes: Does not include biofuels trade. Bunker fuel use is not included as exports. Intra-area movements (for example, between countries within Europe) are excluded. Crude imports and exports include condensates.











US dollars per million Btu	LNG		Natural gas				
	Japan CIF <sup>1</sup>	Japan Korea Marker (JKM) <sup>2</sup>	Average German Import price <sup>3</sup>	UK NBP (ICIS NBP Index) <sup>4</sup>	Netherlands TTF (DA ICIS – Heren TTF index) <sup>4</sup>	US Henry Hub	Canada (Alberta) <sup>5</sup>
1984	5.10	–	4.00	–	–	–	–
1985	5.23	–	4.25	–	–	–	–
1986	4.10	–	3.93	–	–	–	–
1987	3.35	–	2.55	–	–	–	–
1988	3.34	–	2.22	–	–	–	–
1989	3.28	–	2.00	–	–	1.70	–
1990	3.64	–	2.78	–	–	1.64	1.05
1991	3.99	–	3.23	–	–	1.49	0.89
1992	3.62	–	2.70	–	–	1.77	0.98
1993	3.52	–	2.51	–	–	2.12	1.69
1994	3.18	–	2.35	–	–	1.92	1.45
1995	3.46	–	2.43	–	–	1.69	0.89
1996	3.66	–	2.50	1.87	–	2.76	1.12
1997	3.91	–	2.66	1.96	–	2.53	1.36
1998	3.05	–	2.33	1.86	–	2.08	1.42
1999	3.14	–	1.86	1.58	–	2.27	2.00
2000	4.72	–	2.91	2.71	–	4.23	3.75
2001	4.64	–	3.67	3.17	–	4.07	3.61
2002	4.27	–	3.21	2.37	–	3.33	2.57
2003	4.77	–	4.06	3.33	–	5.63	4.83
2004	5.18	–	4.30	4.46	–	5.85	5.03
2005	6.05	–	5.83	7.38	6.07	8.79	7.25
2006	7.13	–	7.87	7.87	7.46	6.76	5.83
2007	7.73	–	7.99	6.01	5.93	6.95	6.17
2008	12.55	–	11.60	10.79	10.66	8.85	7.99
2009	9.06	5.28	8.53	4.85	4.96	3.89	3.38
2010	10.93	7.72	8.03	6.56	6.77	4.39	3.69
2011	14.77	14.02	10.49	9.04	9.26	4.01	3.47
2012	16.75	15.12	10.93	9.46	9.45	2.76	2.27
2013	16.17	16.56	10.73	10.64	9.75	3.71	2.93
2014	16.33	13.86	9.11	8.25	8.14	4.35	3.87
2015	10.27	7.45	6.72	6.53	6.44	2.60	2.01
2016	6.93	5.72	4.93	4.69	4.54	2.46	1.55
2017	8.10	7.13	5.62	5.80	5.72	2.96	1.58
2018	10.07	9.76	6.64	8.06	7.90	3.12	1.18
2019	9.94	5.49	5.03	4.47	4.45	2.51	1.27
2020	7.78	4.39	4.06	3.42	3.07	1.99	1.58
2021	10.07	18.60	8.94	15.80	16.02	3.84	2.75
2022	n/a	33.98	24.17	25.10	37.48	6.45	n/a

<sup>1</sup> Source: EDMC Energy Trend, bp analysis.

<sup>2</sup> Source: S&P Global Platts ©2023, S&P Global Inc.

<sup>3</sup> Source: 1986-1990 German Federal Statistical Office, 1991-2022 German Federal Office of Economics and Export Control (BAFA).

<sup>4</sup> Source: ICIS Heren Energy Ltd.

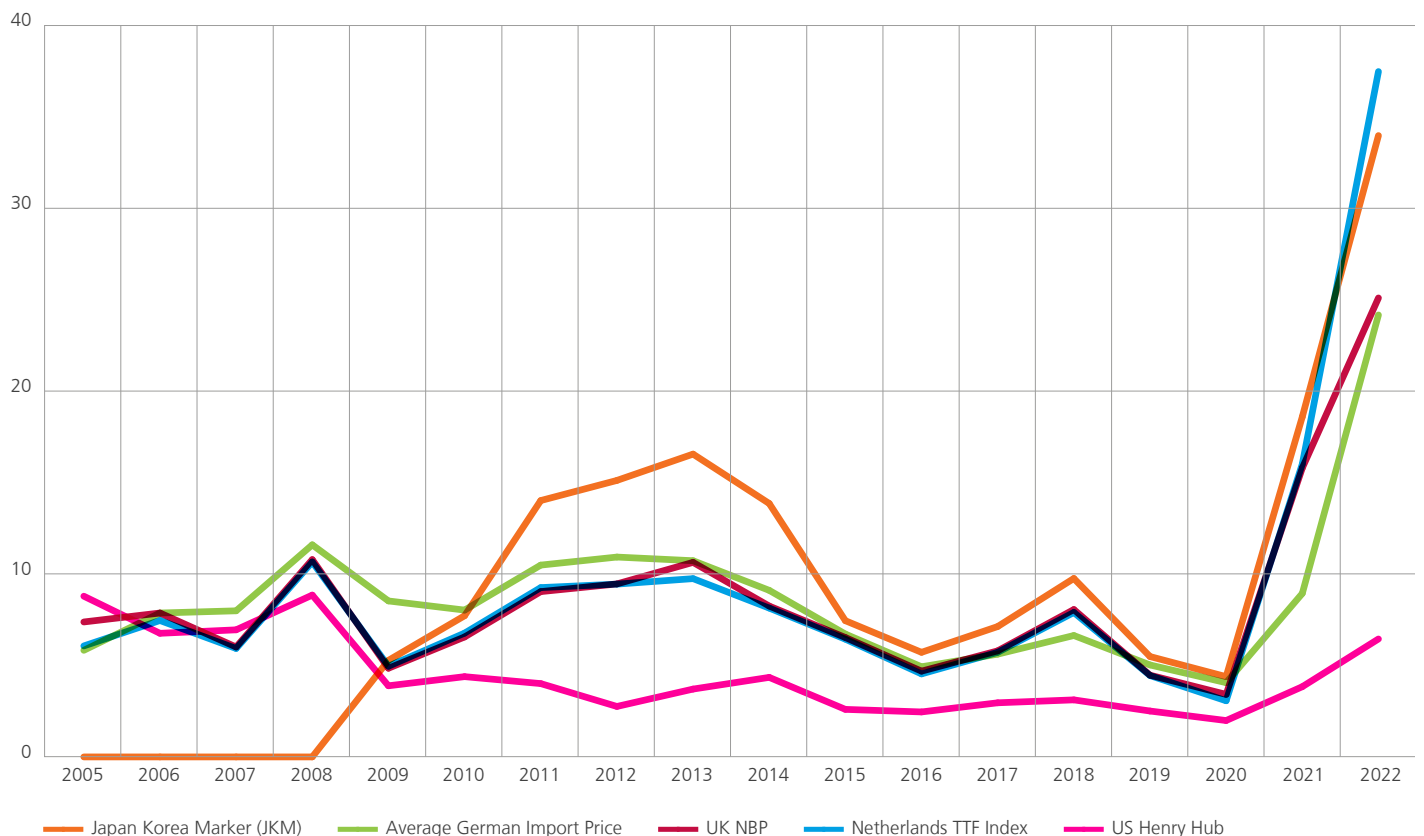
<sup>5</sup> Source: Energy Intelligence Group, Natural gas Week.

Note: cif = cost+insurance+freight (average prices).

n/a: not available.

## Prices

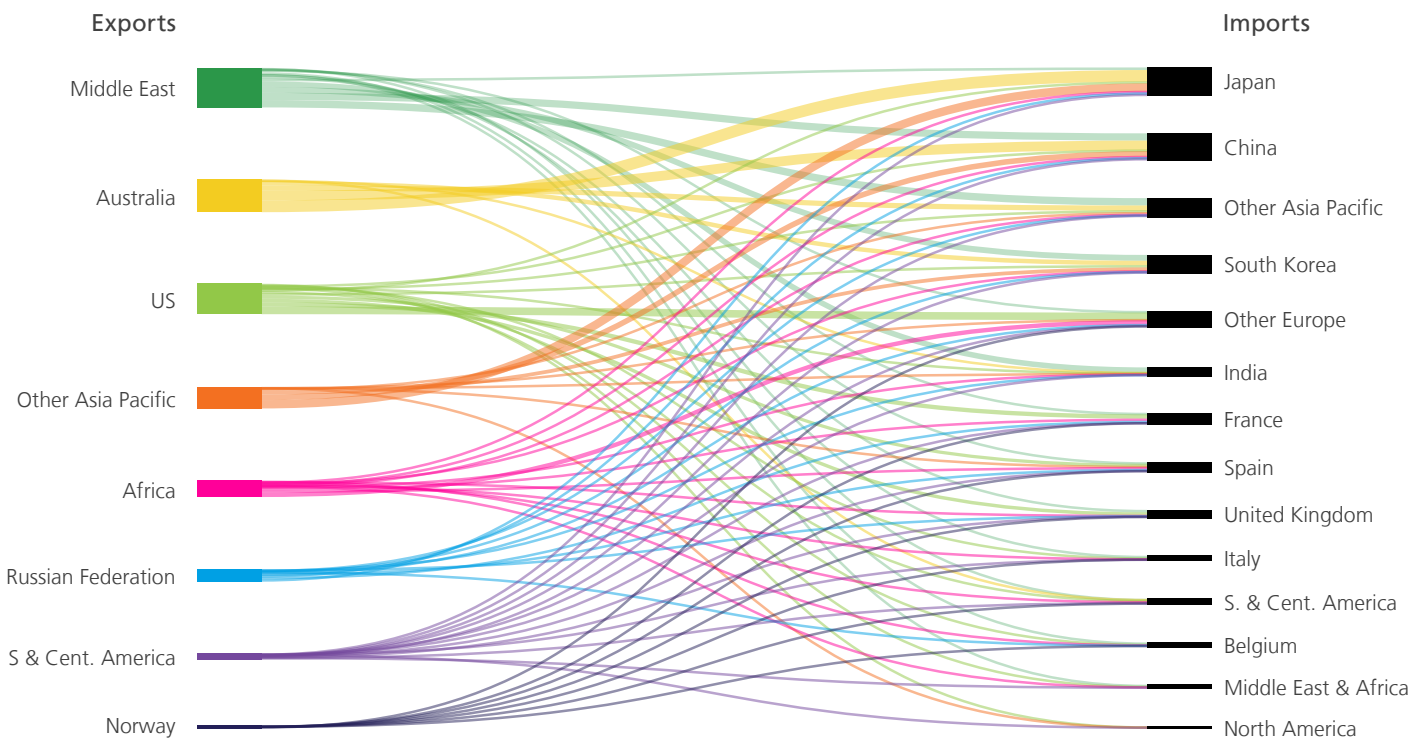
\$/mmBTU







# Natural gas Major trade movements 2022 – LNG



In 2022, international trade of natural gas as liquified natural gas (LNG) represented 56% of all inter-regional traded gas. At a total of 542 Bcm, it was up 5% on the previous year. The Middle East was the largest exporter of LNG and, together with Australia and the US, represented 65% of total

LNG exports. At 98 Bcm, Japan was the largest importer of LNG. Along with China, it accounted for 35% of total global imports. As a region, Asia Pacific imported around 65% of total LNG, followed by Europe at just over 30%.

## Natural gas Trade movements 2022 as LNG\*

Billion cubic metres	From																			Total imports					
	US	Peru	Trinidad & Tobago	Other Americas*	Norway	Other Europe**	Russian Federation	Oman	Qatar	United Arab Emirates	Yemen	Algeria	Angola	Egypt	Nigeria	Other Africa	Australia	Brunei	Indonesia		Malaysia	Papua New Guinea	Other Asia Pacific*		
Canada	†	0.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.1
Mexico	0.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.6
US	–	–	0.6	†	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.7
<b>North America</b>	<b>0.1</b>	<b>0.1</b>	<b>0.6</b>	<b>†</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<b>1.3</b>
Argentina	1.8	–	0.1	–	0.1	–	–	–	0.1	–	–	0.1	–	–	–	0.2	–	–	–	–	–	–	–	–	2.3
Brazil	1.9	–	–	–	–	0.1	–	–	0.1	–	–	–	–	0.1	0.1	–	–	–	–	–	–	–	–	–	2.3
Chile	0.8	–	1.1	–	–	–	–	–	–	–	–	–	–	–	–	1.2	0.3	–	–	–	–	–	–	–	3.3
Other S. & Cent. America	1.9	–	2.8	†	–	0.2	–	0.2	–	–	–	–	–	0.4	–	–	–	–	–	–	–	–	–	–	5.5
<b>S. &amp; Cent. America</b>	<b>6.5</b>	–	<b>3.9</b>	<b>†</b>	<b>0.1</b>	<b>0.3</b>	–	<b>0.2</b>	<b>0.2</b>	–	–	<b>0.1</b>	–	–	<b>0.5</b>	<b>1.5</b>	<b>0.3</b>	–	–	–	–	–	–	–	<b>13.5</b>
Belgium	2.3	–	–	–	0.1	0.1	2.9	–	6.8	–	–	0.1	–	0.1	–	–	–	–	–	–	–	–	–	–	12.4
France	15.5	0.1	0.4	–	1.3	0.1	7.4	–	2.2	–	–	4.8	1.0	0.8	1.3	0.2	–	–	–	–	–	–	–	–	35.1
Italy	3.1	–	0.3	–	0.1	0.9	–	–	7.1	–	–	1.5	–	0.6	0.2	0.4	–	–	–	–	–	–	–	–	14.3
Spain	11.6	0.2	1.2	–	0.1	†	5.0	0.5	1.4	–	–	0.4	0.3	1.4	5.7	0.9	†	–	–	†	–	–	0.1	–	28.8
Türkiye	5.3	–	0.4	–	–	0.2	0.3	0.1	0.1	–	–	5.4	0.1	2.2	0.8	0.1	–	–	0.1	–	–	–	–	–	15.1
United Kingdom	12.4	2.2	0.2	–	0.2	0.1	0.5	†	8.0	–	–	0.6	0.6	0.1	0.5	–	–	–	–	–	–	–	–	–	25.3
Other European Union	21.8	–	1.7	–	1.8	0.9	3.4	–	2.5	–	–	0.7	0.9	1.4	3.5	0.7	–	–	–	–	–	–	–	–	39.1
Rest of Europe	–	–	–	–	–	0.1	†	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.1
<b>Europe</b>	<b>72.1</b>	<b>2.4</b>	<b>4.1</b>	–	<b>3.7</b>	<b>2.4</b>	<b>19.6</b>	–	<b>0.8</b>	<b>28.0</b>	–	<b>13.4</b>	<b>2.9</b>	<b>6.5</b>	<b>12.0</b>	<b>2.2</b>	<b>†</b>	–	<b>0.1</b>	<b>†</b>	–	–	<b>0.1</b>	–	<b>170.2</b>
Egypt	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Kuwait	1.5	–	0.4	–	–	0.2	–	0.2	3.9	0.4	–	0.1	–	0.2	1.5	–	–	–	–	–	–	–	–	–	8.4
United Arab Emirates	–	–	–	–	–	–	–	–	0.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.9
Other Middle East & Africa	–	–	–	–	–	–	–	–	–	–	–	–	–	0.1	–	–	–	–	–	–	–	–	–	–	0.1
<b>Middle East &amp; Africa</b>	<b>1.5</b>	–	<b>0.4</b>	–	–	<b>0.2</b>	–	<b>0.2</b>	<b>4.8</b>	<b>0.4</b>	–	<b>0.1</b>	–	<b>0.3</b>	<b>1.5</b>	–	–	–	–	–	–	–	–	–	<b>9.4</b>
China	2.6	0.3	0.6	–	–	0.2	6.1	0.9	24.8	0.3	–	0.1	–	0.4	0.6	1.5	35.0	0.5	5.1	10.2	3.2	0.8	–	–	93.2
India	3.3	–	0.2	–	–	0.4	0.6	1.3	14.7	3.8	–	0.3	0.9	0.2	1.3	0.7	0.6	–	0.1	0.1	–	–	–	–	28.4
Japan	5.6	0.3	0.1	–	–	–	–	3.4	3.9	1.8	–	0.2	–	0.2	1.3	0.2	41.9	4.4	3.5	16.3	5.4	0.4	–	–	98.3
Malaysia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.8	1.0	–	–	–	–	–	–	3.8
Pakistan	0.1	–	–	–	–	–	–	–	8.6	0.2	–	0.1	0.1	0.1	0.4	–	–	–	–	–	–	–	–	–	9.7
Singapore	0.6	–	0.1	–	–	†	0.1	–	0.5	–	–	–	–	0.1	†	0.1	3.4	–	0.1	0.1	–	–	–	–	5.2
South Korea	7.8	0.9	0.2	–	–	0.2	2.7	6.9	13.4	0.6	–	0.1	–	0.7	0.8	0.4	15.9	0.3	4.4	7.5	0.8	0.4	–	–	63.9
Taiwan	2.9	0.2	–	–	–	–	1.5	0.5	7.2	0.3	–	–	–	–	0.4	0.2	10.1	0.1	1.5	0.8	1.8	–	–	–	27.4
Thailand	0.7	–	0.7	–	–	0.1	0.1	0.9	3.2	0.2	–	–	0.1	0.2	0.5	0.1	1.9	0.3	0.1	2.2	†	–	–	–	11.4
Other Asia Pacific	0.4	–	–	–	–	–	0.3	–	4.8	–	–	0.1	–	0.1	0.4	0.1	0.4	–	0.1	0.1	–	–	–	–	6.7
<b>Asia Pacific</b>	<b>24.1</b>	<b>1.7</b>	<b>1.9</b>	–	–	<b>0.9</b>	<b>20.6</b>	<b>13.8</b>	<b>81.1</b>	<b>7.1</b>	–	<b>0.8</b>	<b>1.2</b>	<b>2.2</b>	<b>5.6</b>	<b>3.2</b>	<b>112.0</b>	<b>6.4</b>	<b>14.9</b>	<b>37.4</b>	<b>11.4</b>	<b>1.6</b>	–	–	<b>347.9</b>
<b>Total exports</b>	<b>104.3</b>	<b>4.2</b>	<b>10.9</b>	<b>†</b>	<b>3.7</b>	<b>3.8</b>	<b>40.2</b>	<b>15.0</b>	<b>114.1</b>	<b>7.6</b>	–	<b>14.4</b>	<b>4.1</b>	<b>8.9</b>	<b>19.6</b>	<b>7.0</b>	<b>112.3</b>	<b>6.4</b>	<b>15.5</b>	<b>37.4</b>	<b>11.4</b>	<b>1.7</b>	–	–	<b>542.4</b>

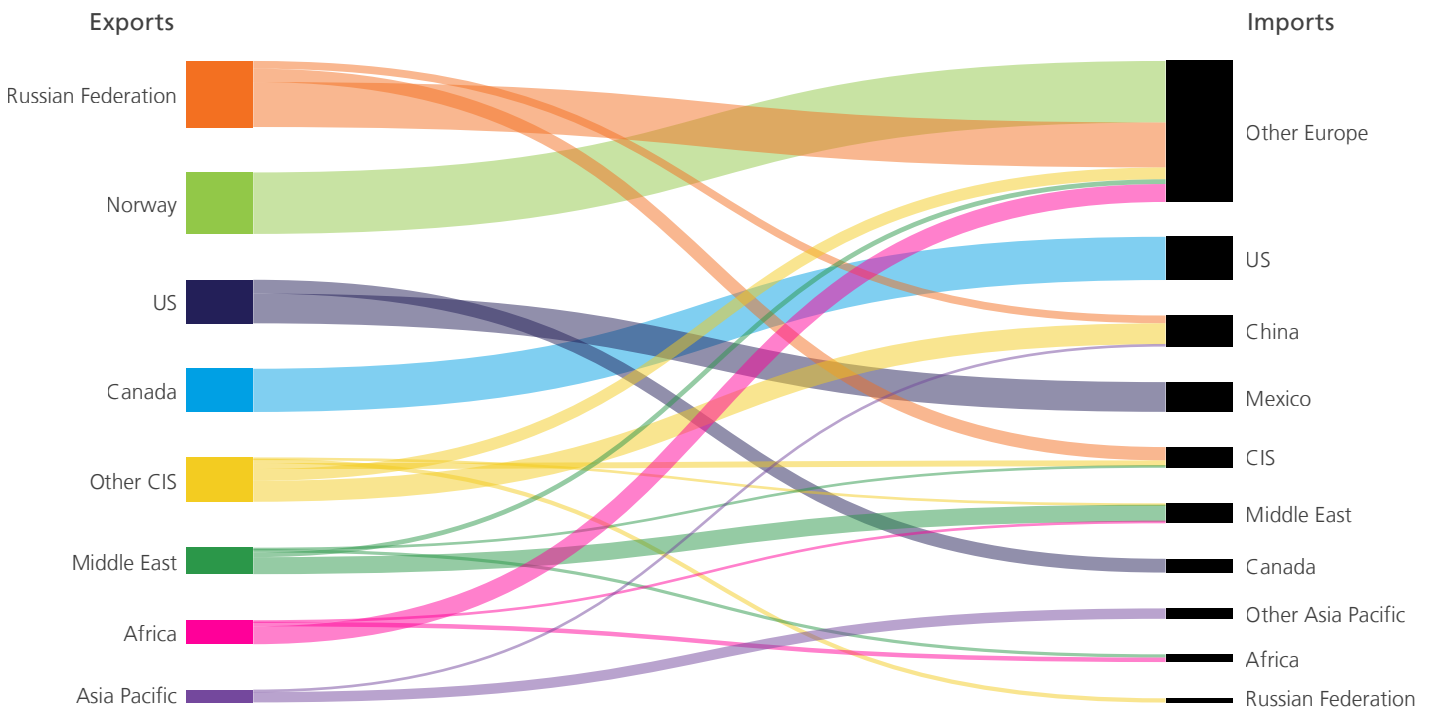
Source: Includes data from GIIGNL, IHS.

\* Includes re-exports.

† Less than 0.05.

Note: As far as possible, the data above represents standard cubic metres (measured at 15°C and 1013 mbar) and has been standardised using a gross calorific value (GCV) of 40 MJ/m³.

# Natural gas Major trade movements 2022 – pipeline



Unlike LNG trade that grew in 2022, international trade of natural gas via pipelines declined by around 15%, falling 78 Bcm compared to 2021. Over the past 10 years Russia has, on average, been responsible for around 43% of total

global gas exports via pipelines. In 2022, its share of total global pipeline exports fell to 29%, a drop of around 76 Bcm. Despite this, it still ranked highest at 25% of total global exports, followed by Norway at 23%.

## Natural gas Trade movements 2022 by pipeline

Billion cubic metres	From																			Total imports				
	Canada	Mexico	US	Bolivia	Other S. & Cent. America	European Union	Norway	Other Europe	Azerbaijan	Kazakhstan	Russian Federation	Turkmenistan	Uzbekistan	Iran	Qatar	Other Middle East	Algeria	Libya	Other Africa		Indonesia	Myanmar	Other Asia Pacific	
Canada	–	–	26.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	26.2
Mexico	–	–	56.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	56.5
US	82.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	82.1
<b>North America</b>	<b>82.1</b>	<b>–</b>	<b>82.7</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<b>164.8</b>
Argentina	–	–	–	3.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.7
Brazil	–	–	–	6.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6.1
Other S. & Cent. America	–	–	–	–	1.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.9
<b>S. &amp; Cent. America</b>	–	–	–	<b>9.8</b>	<b>1.9</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<b>11.7</b>
European Union	–	–	–	–	–	13.9	86.3	91.4	11.5	–	61.5	–	–	–	–	–	31.5	2.5	–	–	–	–	–	298.6
Rest of Europe	–	–	–	–	–	0.3	30.5	5.3	10.9	–	23.9	–	–	9.1	–	–	–	–	–	–	–	–	–	79.9
<b>Europe</b>	–	–	–	–	–	<b>14.2</b>	<b>116.8</b>	<b>96.7</b>	<b>22.4</b>	–	<b>85.4</b>	–	–	<b>9.1</b>	–	–	<b>31.5</b>	<b>2.5</b>	–	–	–	–	–	<b>378.5</b>
Belarus	–	–	–	–	–	–	–	–	–	–	18.5	–	–	–	–	–	–	–	–	–	–	–	–	18.5
Kazakhstan	–	–	–	–	–	–	–	–	–	–	2.0	–	–	–	–	–	–	–	–	–	–	–	–	2.4
Russian Federation	–	–	–	–	–	–	–	–	–	–	3.4	–	–	4.7	–	–	–	–	–	–	–	–	–	8.1
Other CIS	–	–	–	–	–	–	–	–	–	–	4.8	–	–	2.8	–	0.4	–	–	–	–	–	–	–	8.0
<b>CIS</b>	–	–	–	–	–	–	–	–	–	–	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>37.0</b>
United Arab Emirates	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	18.5	–	–	–	–	–	–	–	18.5
Other Middle East	–	–	–	–	–	–	–	–	–	–	0.2	–	–	–	–	9.4	1.6	2.8	–	–	–	–	–	14.8
<b>Middle East</b>	–	–	–	–	–	–	–	–	–	–	<b>0.2</b>	–	–	–	–	<b>9.4</b>	<b>20.1</b>	<b>2.8</b>	–	–	–	–	–	<b>33.4</b>
South Africa	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.6
Other Africa	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11.2
<b>Africa</b>	–	–	–	–	–	–	–	–	–	–	<b>0.2</b>	–	–	–	–	–	–	–	–	–	–	–	–	<b>14.8</b>
Australia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4.8
China	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	58.4
Malaysia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.2
Singapore	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8.2
Thailand	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6.6
<b>Asia Pacific</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	<b>78.2</b>
<b>Total exports</b>	<b>82.1</b>	<b>–</b>	<b>82.7</b>	<b>9.8</b>	<b>1.9</b>	<b>14.2</b>	<b>116.8</b>	<b>96.9</b>	<b>22.5</b>	<b>7.8</b>	<b>125.3</b>	<b>40.7</b>	<b>2.5</b>	<b>18.9</b>	<b>20.1</b>	<b>8.8</b>	<b>35.5</b>	<b>2.5</b>	<b>5.5</b>	<b>6.3</b>	<b>10.6</b>	<b>6.9</b>	<b>6.9</b>	<b>718.4</b>

Source: Includes data from FGE MENAgas service, IHS.

Note: As far as possible, the data above represents standard cubic metres (measured at 15°C and 1013 mbar) and has been standardised using a gross calorific value (GCV) of 40 MJ/m<sup>3</sup>.



Million tonnes												Growth rate per annum		Share
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022	2012–22	2022
Canada	67.3	68.4	68.3	62.4	62.4	60.6	55.0	53.2	46.1	47.6	45.1	-5.3%	-3.9%	0.6%
Mexico	15.2	14.6	14.9	12.3	11.4	12.9	11.9	9.8	7.7	5.5	5.5	0.1%	-9.6%	0.1%
US	922.1	893.4	907.2	813.7	660.8	702.7	686.0	640.8	485.7	523.8	539.4	3.0%	-5.2%	6.4%
<b>Total North America</b>	<b>1004.6</b>	<b>976.5</b>	<b>990.4</b>	<b>888.3</b>	<b>734.5</b>	<b>776.2</b>	<b>752.9</b>	<b>703.7</b>	<b>539.6</b>	<b>577.0</b>	<b>590.0</b>	<b>2.3%</b>	<b>-5.2%</b>	<b>7.1%</b>
Brazil	8.2	9.5	9.4	8.0	7.5	5.8	6.4	5.8	7.1	8.0	7.5	-6.8%	-0.9%	0.1%
Colombia	89.8	86.0	89.4	86.5	91.2	91.3	86.4	85.4	53.6	59.0	57.5	-2.5%	-4.3%	0.7%
Venezuela	1.9	1.2	0.8	0.8	0.7	0.7	0.7	0.4	0.3	0.2	0.2	-12.0%	-20.3%	†
Other S. & Cent. America	1.0	3.2	4.5	3.4	2.8	1.8	1.6	1.1	0.4	0.2	0.3	32.0%	-12.9%	†
<b>Total S. &amp; Cent. America</b>	<b>100.9</b>	<b>99.9</b>	<b>104.0</b>	<b>98.8</b>	<b>102.2</b>	<b>99.7</b>	<b>95.1</b>	<b>92.8</b>	<b>61.4</b>	<b>67.4</b>	<b>65.4</b>	<b>-3.0%</b>	<b>-4.2%</b>	<b>0.8%</b>
Bulgaria	33.4	28.6	31.3	35.9	31.3	34.3	30.6	28.3	22.6	28.4	35.6	25.2%	0.7%	0.3%
Czech Republic	55.2	49.1	47.1	46.5	45.5	44.9	43.8	41.0	31.6	31.5	35.2	11.7%	-4.4%	0.4%
Germany	196.2	190.6	185.8	184.3	175.4	175.1	168.8	131.3	107.4	126.3	132.5	4.9%	-3.8%	1.5%
Greece	63.0	53.9	50.8	46.2	32.6	37.7	36.5	27.4	14.1	12.4	14.0	13.3%	-13.9%	0.2%
Hungary	9.3	9.6	9.6	9.3	9.2	8.0	7.9	6.8	6.1	5.0	4.9	-1.2%	-6.1%	0.1%
Poland	144.1	142.9	137.1	135.8	131.0	127.1	122.4	112.4	100.7	107.6	107.5	-0.2%	-2.9%	1.3%
Romania	33.9	24.7	23.6	25.5	23.0	25.8	23.7	21.7	15.0	17.7	18.2	2.4%	-6.0%	0.2%
Serbia	38.2	40.3	29.8	37.8	38.5	39.8	37.6	38.9	39.7	36.4	35.1	-3.5%	-0.8%	0.4%
Spain	6.2	4.4	3.9	3.1	1.7	3.0	2.4	0.1	0.1	0.1	0.1	–	-34.4%	†
Türkiye	71.5	60.4	65.2	58.4	73.0	74.1	83.9	87.1	74.7	86.5	96.1	11.1%	3.0%	1.1%
Ukraine	66.2	64.9	45.7	30.4	32.2	24.7	26.8	26.1	24.4	24.9	16.5	-33.7%	-12.9%	0.3%
United Kingdom	17.0	12.8	11.6	8.6	4.2	3.0	2.8	2.6	1.7	1.1	0.7	-38.2%	-27.8%	†
Other Europe	65.6	70.7	67.2	64.5	61.7	65.1	92.2	56.8	50.2	47.6	49.5	4.1%	-2.7%	0.6%
<b>Total Europe</b>	<b>799.6</b>	<b>752.8</b>	<b>708.8</b>	<b>686.3</b>	<b>659.4</b>	<b>662.6</b>	<b>679.4</b>	<b>580.5</b>	<b>488.3</b>	<b>525.5</b>	<b>545.9</b>	<b>3.9%</b>	<b>-3.7%</b>	<b>6.4%</b>
Kazakhstan	120.5	119.6	114.0	107.3	103.1	112.3	118.5	115.0	113.4	116.2	118.0	1.5%	-0.2%	1.4%
Russian Federation	358.3	355.2	357.4	372.5	386.6	411.0	441.3	440.7	399.8	434.1	439.0	1.1%	2.1%	5.3%
Uzbekistan	3.8	4.1	4.4	3.5	3.9	4.0	4.2	4.0	4.1	5.1	5.4	5.9%	3.6%	0.1%
Other CIS	4.3	4.2	4.1	4.0	4.6	5.7	7.7	7.9	6.2	6.6	8.4	27.4%	7.0%	0.1%
<b>Total CIS</b>	<b>486.8</b>	<b>483.1</b>	<b>479.9</b>	<b>487.3</b>	<b>498.1</b>	<b>533.0</b>	<b>571.6</b>	<b>567.6</b>	<b>523.5</b>	<b>561.9</b>	<b>570.7</b>	<b>1.6%</b>	<b>1.6%</b>	<b>6.9%</b>
<b>Total Middle East</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.6</b>	<b>1.8</b>	<b>1.8</b>	<b>2.2</b>	<b>2.0</b>	<b>2.1</b>	<b>2.2</b>	<b>4.4</b>	<b>98.2%</b>	<b>11.7%</b>	<b>†</b>
South Africa	258.6	256.3	261.4	252.2	249.7	252.3	250.0	254.4	246.2	229.8	225.9	-1.7%	-1.3%	2.8%
Zimbabwe	1.6	3.1	5.8	4.3	2.7	2.9	3.3	2.6	2.7	3.2	3.9	21.7%	9.5%	†
Other Africa	7.1	8.3	9.4	9.7	9.2	15.9	20.0	14.6	12.3	15.7	21.2	35.3%	11.6%	0.2%
<b>Total Africa</b>	<b>267.3</b>	<b>267.7</b>	<b>276.6</b>	<b>266.2</b>	<b>261.6</b>	<b>271.2</b>	<b>273.4</b>	<b>271.7</b>	<b>261.2</b>	<b>248.7</b>	<b>251.1</b>	<b>1.0%</b>	<b>-0.6%</b>	<b>3.0%</b>
Australia	448.2	472.8	505.3	503.7	502.1	487.2	502.2	505.6	470.0	460.3	443.4	-3.7%	-0.1%	5.6%
China	3945.1	3974.3	3873.9	3746.5	3410.6	3523.6	3697.7	3846.3	3901.6	4125.8	4560.0	10.5%	1.5%	50.6%
India	605.6	608.5	646.2	674.2	689.8	711.7	760.4	753.9	760.2	812.3	910.9	12.1%	4.2%	10.0%
Indonesia	386.1	474.4	458.1	461.6	456.2	461.2	557.8	616.2	563.7	614.0	687.4	12.0%	6.0%	7.5%
Japan	1.3	1.2	1.3	1.2	1.3	1.4	1.0	0.8	0.8	0.7	0.7	3.3%	-6.2%	†
Mongolia	31.1	33.3	24.4	24.1	35.1	49.5	54.6	57.1	43.1	32.3	39.3	21.7%	2.4%	0.4%
New Zealand	4.9	4.6	4.0	3.4	2.9	2.9	3.2	3.0	2.8	2.9	2.6	-8.0%	-6.0%	†
Pakistan	3.0	3.0	3.4	3.3	4.1	4.2	4.4	7.1	9.5	10.2	9.9	-3.0%	12.6%	0.1%
South Korea	2.1	1.8	1.7	1.8	1.7	1.5	1.2	1.1	1.0	0.9	0.8	-8.7%	-8.9%	†
Thailand	18.1	18.1	18.0	15.2	17.0	16.3	14.9	14.1	13.3	14.2	13.6	-4.1%	-2.7%	0.2%
Vietnam	42.1	41.1	41.1	41.7	38.7	38.4	42.4	46.4	44.6	48.3	49.8	3.2%	1.7%	0.6%
Other Asia Pacific	39.6	39.8	40.4	44.9	61.4	54.2	52.6	39.5	54.1	54.8	57.2	4.3%	3.8%	0.7%
<b>Total Asia Pacific</b>	<b>5527.3</b>	<b>5673.0</b>	<b>5617.8</b>	<b>5521.6</b>	<b>5221.0</b>	<b>5352.0</b>	<b>5692.3</b>	<b>5891.0</b>	<b>5864.6</b>	<b>6176.8</b>	<b>6775.8</b>	<b>9.7%</b>	<b>2.1%</b>	<b>75.7%</b>
<b>Total World</b>	<b>8188.0</b>	<b>8254.5</b>	<b>8179.1</b>	<b>7950.0</b>	<b>7478.7</b>	<b>7696.5</b>	<b>8066.9</b>	<b>8109.2</b>	<b>7740.8</b>	<b>8159.5</b>	<b>8803.4</b>	<b>7.9%</b>	<b>0.8%</b>	<b>100.0%</b>
of which: OECD	2150.3	2111.8	2147.7	2016.4	1842.0	1871.9	1854.7	1737.9	1426.2	1491.6	1507.2	1.0%	-3.5%	18.3%
Non-OECD	6037.6	6142.7	6031.3	5933.5	5636.7	5824.6	6212.2	6371.3	6314.6	6667.9	7296.2	9.4%	1.9%	81.7%
European Union*	575.9	543.9	527.3	521.3	481.6	492.2	473.4	397.3	318.8	348.9	368.6	5.6%	-4.3%	4.3%

\* Commercial solid fuels only, i.e. bituminous coal and anthracite (hard coal), and lignite and brown (sub-bituminous) coal, and other commercial solid fuels. Includes coal produced for Coal-to-Liquids and Coal-to-Gas transformations.

^ Less than 0.05.

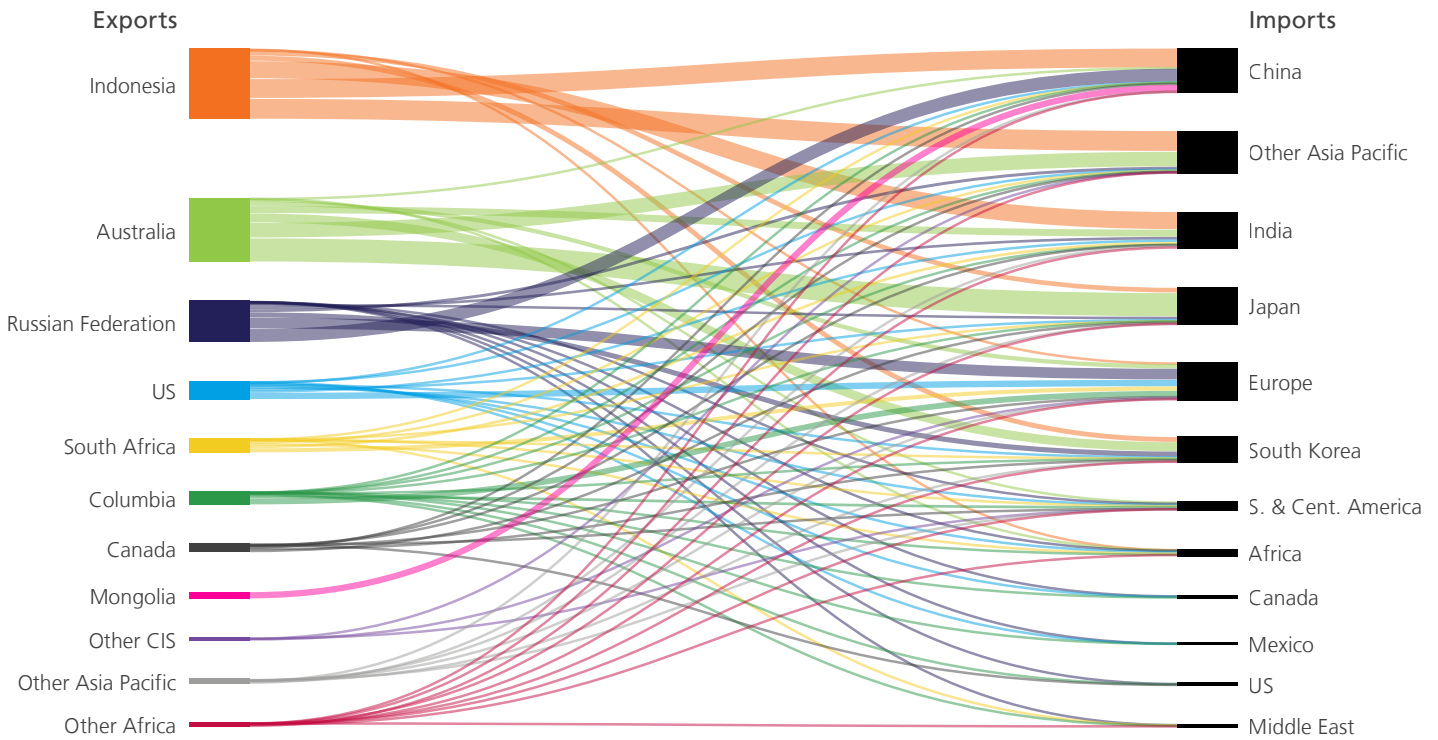
† Less than 0.05%.

# Excludes Estonia, Latvia and Lithuania prior to 1985 and Croatia and Slovenia prior to 1990.

Notes: Annual changes and shares of total are calculated using million tonnes figures.



# Coal Trade movements



**Notes:** Commercial solid fuels only, i.e. bituminous coal and anthracite (hard coal), and lignite and brown (sub-bituminous) coal, and other commercial solid fuels. Intra-area movements (for example, between countries in Europe) are excluded.

International coal trade fell by nearly 4% in 2022, its lowest level since 2017. Together Indonesia, Australia, and Russia were responsible for just over 71% of total global exports. Within this, Russia's coal exports fell by 12% relative to 2021. China was the largest importer of coal at nearly 6 EJ and,

whilst its imports from Indonesia fell by 0.5 EJ, it increased its imports from Russia and Mongolia by 1.5 EJ and 0.5 EJ respectively. Whilst Asia Pacific accounted for 74% of global coal imports, Europe was the second largest region seeing its coal imports increase by 10% over 2021.

# Coal Trade movements

Exajoules												Growth rate per annum		Share
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022	2012–22	2022
<b>Imports</b>														
Canada	0.22	0.26	0.22	0.19	0.22	0.23	0.22	0.21	0.17	0.19	<b>0.17</b>	-10.9%	-2.4%	0.5%
Mexico	0.20	0.22	0.23	0.21	0.34	0.22	0.20	0.24	0.13	0.05	<b>0.05</b>	4.5%	-13.2%	0.2%
US	0.24	0.28	0.28	0.25	0.19	0.27	0.24	0.17	0.15	0.14	<b>0.16</b>	18.2%	-3.6%	0.5%
S. & Cent. America	1.06	1.06	1.00	1.06	1.23	0.88	1.06	1.12	1.04	1.29	<b>1.07</b>	-16.8%	0.1%	3.3%
Europe	5.85	6.09	6.03	5.40	5.86	6.09	5.85	5.10	3.91	4.43	<b>4.87</b>	10.0%	-1.8%	15.0%
CIS	0.56	0.56	0.53	0.48	0.60	0.53	0.56	0.70	0.66	0.64	<b>0.49</b>	-23.6%	-1.3%	1.5%
Middle East	0.44	0.49	0.38	0.34	0.37	0.49	0.44	0.32	0.36	0.33	<b>0.22</b>	-33.5%	-6.8%	0.7%
Africa	0.81	0.37	0.44	0.50	0.63	0.31	0.81	0.92	0.53	0.71	<b>0.73</b>	2.8%	-1.1%	2.2%
China	7.63	6.62	4.69	5.65	5.87	6.71	7.63	6.40	6.61	6.67	<b>5.83</b>	-12.6%	-2.7%	18.0%
India	3.66	4.65	4.92	6.46	5.25	3.09	3.66	4.70	4.79	4.69	<b>5.01</b>	6.7%	3.2%	15.4%
Japan	5.06	5.00	5.05	5.01	5.06	4.87	5.06	4.90	4.56	4.84	<b>4.82</b>	-0.5%	-0.5%	14.8%
South Korea	3.32	3.43	3.54	3.53	3.89	3.30	3.32	3.73	3.28	3.35	<b>3.34</b>	-0.3%	0.1%	10.3%
Other Asia Pacific	3.61	2.73	3.96	4.60	5.00	3.65	3.61	5.26	6.39	6.33	<b>5.72</b>	-9.7%	4.7%	17.6%
<b>Total World</b>	<b>32.65</b>	<b>31.76</b>	<b>31.27</b>	<b>33.69</b>	<b>34.50</b>	<b>30.61</b>	<b>32.65</b>	<b>33.78</b>	<b>32.59</b>	<b>33.65</b>	<b>32.47</b>	<b>-3.5%</b>	<b>-0.1%</b>	<b>100.0%</b>
<b>Exports</b>														
Canada	0.99	1.13	1.00	0.86	0.94	0.99	1.13	1.02	0.95	0.97	<b>0.97</b>	0.7%	-0.1%	3.0%
US	3.02	2.88	2.38	1.89	2.39	3.02	2.88	2.21	1.74	2.18	<b>2.25</b>	2.9%	-2.9%	6.9%
Colombia	2.25	2.05	2.27	2.19	2.48	2.25	2.05	2.08	1.82	1.69	<b>1.59</b>	-5.7%	-3.4%	4.9%
Europe	0.20	0.68	0.13	0.10	0.19	0.20	0.68	0.24	0.22	0.25	<b>0.16</b>	-35.0%	-2.0%	0.5%
Russia	3.23	3.55	3.78	4.11	5.09	3.23	3.55	5.79	5.67	6.09	<b>5.36</b>	-12.1%	5.2%	16.5%
Other CIS	0.50	0.51	0.51	0.48	0.51	0.50	0.51	0.55	0.60	0.60	<b>0.64</b>	7.6%	2.5%	2.0%
South Africa	2.22	2.10	2.18	2.30	2.71	2.22	2.10	1.42	1.76	1.69	<b>1.75</b>	3.6%	-2.4%	5.4%
Other Africa	0.13	0.11	0.18	0.26	0.66	0.13	0.11	0.28	0.28	0.32	<b>0.40</b>	24.6%	12.0%	1.2%
Australia	7.96	9.19	9.12	9.95	9.70	7.96	9.19	9.63	9.35	9.65	<b>8.39</b>	-13.0%	0.5%	25.8%
China	0.28	0.28	0.36	0.45	0.42	0.28	0.28	0.34	0.18	0.28	<b>0.32</b>	12.8%	1.3%	1.0%
Indonesia	8.16	8.57	8.42	7.48	8.08	8.16	8.57	8.50	8.79	9.00	<b>9.19</b>	2.1%	1.2%	28.3%
Mongolia	0.63	0.49	0.53	0.41	0.95	0.63	0.49	1.04	0.83	0.49	<b>0.87</b>	76.9%	3.3%	2.7%
Other Asia Pacific	0.90	0.92	0.77	0.65	0.32	0.90	0.92	0.60	0.34	0.37	<b>0.44</b>	18.2%	-6.9%	1.4%
Rest of World	0.15	0.19	0.14	0.14	0.06	0.15	0.19	0.07	0.06	0.08	<b>0.15</b>	81.2%	0.1%	0.5%
<b>Total World</b>	<b>30.61</b>	<b>32.65</b>	<b>31.76</b>	<b>31.27</b>	<b>34.50</b>	<b>30.61</b>	<b>32.65</b>	<b>33.78</b>	<b>32.59</b>	<b>33.65</b>	<b>32.47</b>	<b>-3.5%</b>	<b>0.6%</b>	<b>100.0%</b>

^ Less than 0.005.

† Less than 0.05.

**Notes:** Commercial solid fuels only, i.e. bituminous coal and anthracite (hard coal), and lignite and brown (sub-bituminous) coal, and other commercial solid fuels. Intra-area movements (for example between countries in Europe) are excluded.



















Thousand barrels of oil equivalent per day												Growth rate per annum		Share
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022	2012-22	2022
Canada	17	19	22	22	23	22	21	23	22	22	21	-1.8%	2.1%	1.1%
Mexico	-	-	-	-	0	0	0	0	0	1	1	16.7%	-	†
US	534	562	597	614	655	678	701	693	632	685	728	6.3%	3.2%	38.1%
<b>Total North America</b>	<b>551</b>	<b>580</b>	<b>618</b>	<b>637</b>	<b>679</b>	<b>701</b>	<b>723</b>	<b>717</b>	<b>655</b>	<b>708</b>	<b>750</b>	<b>6.0%</b>	<b>3.1%</b>	<b>39.2%</b>
Argentina	43	38	49	38	53	58	51	46	27	40	45	11.7%	0.4%	2.3%
Brazil	268	313	329	353	331	334	401	429	411	391	409	4.6%	4.3%	21.4%
Colombia	12	12	13	13	13	12	14	13	12	15	15	0.9%	2.7%	0.8%
Other S. & Cent. America	3	4	6	6	7	6	7	9	8	9	9	-6.6%	9.6%	0.5%
<b>Total S. &amp; Cent. America</b>	<b>326</b>	<b>368</b>	<b>397</b>	<b>409</b>	<b>403</b>	<b>410</b>	<b>474</b>	<b>497</b>	<b>458</b>	<b>456</b>	<b>478</b>	<b>4.9%</b>	<b>3.9%</b>	<b>25.0%</b>
Austria	6	6	7	8	7	7	7	7	7	7	6	-16.2%	-0.6%	0.3%
Belgium	8	8	11	7	7	8	8	8	9	8	9	12.5%	0.8%	0.5%
Finland	5	6	7	8	2	6	6	7	7	7	7	0.3%	4.1%	0.4%
France	49	46	47	49	45	44	50	46	43	36	35	-3.5%	-3.4%	1.8%
Germany	54	58	64	59	60	61	63	66	63	66	62	-6.1%	1.3%	3.2%
Italy	6	9	10	10	10	12	13	15	17	21	19	-9.5%	12.4%	1.0%
Netherlands	24	28	33	32	28	37	35	38	37	39	39	0.2%	5.1%	2.0%
Poland	12	13	14	15	17	17	17	18	18	19	20	3.5%	5.2%	1.0%
Portugal	5	5	6	6	6	6	6	7	6	5	6	13.1%	1.6%	0.3%
Spain	11	14	19	21	22	35	40	39	33	31	31	1.3%	10.6%	1.6%
Sweden	4	4	4	4	4	3	7	8	8	9	10	5.5%	8.9%	0.5%
United Kingdom	6	9	7	6	10	14	13	11	10	10	11	2.9%	6.6%	0.6%
Other Europe	24	26	26	28	30	32	35	40	39	39	43	9.0%	5.8%	2.2%
<b>Total Europe</b>	<b>215</b>	<b>232</b>	<b>255</b>	<b>254</b>	<b>249</b>	<b>282</b>	<b>300</b>	<b>310</b>	<b>297</b>	<b>299</b>	<b>298</b>	<b>-0.4%</b>	<b>3.3%</b>	<b>15.6%</b>
<b>Total CIS</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>^</b>	<b>^</b>	<b>^</b>	<b>-</b>	<b>-42.8%</b>	<b>†</b>
<b>Total Middle East</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-100.0%</b>	<b>-</b>
<b>Total Africa</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>0.1%</b>	<b>-0.5%</b>	<b>0.1%</b>
Australia	4	5	5	4	2	2	2	3	2	2	2	6.4%	-6.9%	0.3%
China	38	42	47	40	39	31	44	53	56	58	66	14.4%	5.7%	3.5%
India	5	5	5	10	12	11	19	21	23	35	43	24.5%	24.8%	2.3%
Indonesia	33	41	59	24	54	50	91	124	126	151	174	15.6%	18.2%	9.1%
South Korea	7	7	7	8	8	8	13	13	13	11	12	5.5%	5.8%	0.6%
Thailand	24	30	34	36	33	36	40	44	44	39	36	-8.5%	4.4%	1.9%
Other Asia Pacific	21	28	33	37	33	31	35	53	46	48	52	8.4%	9.2%	2.7%
<b>Total Asia Pacific</b>	<b>132</b>	<b>158</b>	<b>189</b>	<b>159</b>	<b>180</b>	<b>170</b>	<b>243</b>	<b>312</b>	<b>311</b>	<b>344</b>	<b>386</b>	<b>12.1%</b>	<b>11.4%</b>	<b>20.2%</b>
<b>Total World</b>	<b>1226</b>	<b>1340</b>	<b>1462</b>	<b>1462</b>	<b>1513</b>	<b>1565</b>	<b>1742</b>	<b>1837</b>	<b>1723</b>	<b>1808</b>	<b>1914</b>	<b>5.8%</b>	<b>4.6%</b>	<b>100.0%</b>
of which: OECD	786	832	895	912	946	1000	1047	1048	972	1027	1068	3.9%	3.1%	55.8%
Non-OECD	440	508	567	550	567	565	695	789	750	781	846	8.4%	6.8%	44.2%
European Union	208	220	246	245	235	264	282	294	283	285	283	-0.7%	3.1%	14.8%

### Biofuels production by fuel type

Thousand barrels of oil equivalent per day	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022	2012-22	2022
<b>Biogasoline</b>														
Canada & Mexico	16	16	17	16	17	17	17	18	16	16	17	3.5%	0.5%	1.6%
US	475	479	516	534	554	575	580	569	501	542	554	2.3%	1.5%	51.9%
Brazil	228	269	278	294	275	270	322	341	315	291	317	8.8%	3.3%	29.7%
Other S. & Cent. America	9	12	15	17	18	19	21	21	17	21	21	2.4%	9.2%	2.0%
Europe	46	52	51	52	52	55	56	54	50	55	58	5.9%	2.3%	5.4%
CIS	-	^	^	^	^	^	^	^	^	^	^	-	-	†
Middle East	0	0	0	0	0	-	-	-	-	-	-	-	-100.0%	-
Africa	2	2	2	2	2	2	2	2	2	2	2	0.1%	-0.4%	0.1%
Asia Pacific	40	47	53	57	52	58	69	80	76	88	98	12.5%	9.3%	9.2%
<b>Total World</b>	<b>817</b>	<b>878</b>	<b>933</b>	<b>973</b>	<b>970</b>	<b>996</b>	<b>1066</b>	<b>1085</b>	<b>977</b>	<b>1014</b>	<b>1067</b>	<b>5.3%</b>	<b>2.7%</b>	<b>100.0%</b>
of which: OECD	543	554	591	608	628	652	660	647	572	618	633	2.5%	1.5%	59.4%
Non-OECD	273	324	342	365	342	345	406	438	405	396	433	9.5%	4.7%	40.6%
European Union	44	46	45	48	46	48	50	50	47	52	55	5.8%	2.1%	5.1%
<b>Biodiesel</b>														
Canada & Mexico	1	2	5	6	7	6	5	5	7	6	5	-14.0%	13.8%	0.6%
US	58	82	80	80	101	104	121	124	131	144	174	21.1%	11.6%	20.6%
Brazil	40	43	51	58	56	64	79	88	95	100	93	-7.5%	8.7%	11.0%
Other S. & Cent. America	49	43	53	40	54	57	52	47	30	43	47	8.6%	-0.4%	5.5%
Europe	169	180	204	202	197	227	244	256	248	244	240	-1.8%	3.5%	28.3%
CIS	1	0	0	0	0	0	0	0	-	-	-	-	-100.0%	-
Middle East	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Africa	^	^	^	0	0	^	^	^	^	^	^	0.3%	-15.8%	†
Asia Pacific	91	111	136	102	128	112	174	231	236	257	288	12.0%	12.2%	34.0%
<b>Total World</b>	<b>410</b>	<b>463</b>	<b>529</b>	<b>489</b>	<b>543</b>	<b>569</b>	<b>676</b>	<b>752</b>	<b>746</b>	<b>794</b>	<b>847</b>	<b>6.6%</b>	<b>7.5%</b>	<b>100.0%</b>
of which: OECD	243	278	304	303	318	349	387	401	400	410	434	6.0%	6.0%	51.3%
Non-OECD	167	185	225	186	225	221	289	350	346	385	412	7.2%	9.5%	48.7%
European Union	164	174	201	198	189	216	233	244	236	233	228	-2.1%	3.4%	26.9%

Source: Includes data from F.O. Lichts; US Energy Information Administration (March 2021).

\* Includes biogasoline (such as ethanol) and biodiesel. Volumes have been adjusted for energy content.

† Less than 0.05%.

Notes: Annual changes and shares of total are calculated using thousand barrels a day oil equivalent figures.

# Renewable energy Biofuels consumption\*

Thousand barrels of oil equivalent per day												Growth rate per annum		Share
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022	2012–22	2022
Canada	35	35	36	34	32	38	39	40	37	40	<b>38</b>	-4.9%	0.7%	2.0%
Mexico	2	2	3	3	3	4	4	4	5	4	<b>4</b>	7.2%	8.7%	0.2%
US	518	573	581	608	658	661	652	670	608	670	<b>699</b>	4.3%	3.1%	36.2%
<b>Total North America</b>	<b>555</b>	<b>609</b>	<b>620</b>	<b>645</b>	<b>693</b>	<b>703</b>	<b>695</b>	<b>715</b>	<b>650</b>	<b>714</b>	<b>742</b>	<b>3.8%</b>	<b>2.9%</b>	<b>38.4%</b>
Argentina	17	19	22	24	26	30	28	29	16	17	<b>22</b>	33.7%	3.0%	1.2%
Brazil	237	278	305	357	324	332	385	426	396	392	<b>390</b>	-0.6%	5.1%	20.2%
Colombia	12	12	13	13	13	12	15	16	13	15	<b>15</b>	2.4%	2.7%	0.8%
Other S. & Cent. America	14	15	15	17	18	19	19	19	17	20	<b>19</b>	-3.2%	3.5%	1.0%
<b>Total S. &amp; Cent. America</b>	<b>279</b>	<b>324</b>	<b>356</b>	<b>411</b>	<b>380</b>	<b>393</b>	<b>447</b>	<b>490</b>	<b>442</b>	<b>444</b>	<b>447</b>	<b>0.7%</b>	<b>4.8%</b>	<b>23.1%</b>
Austria	10	8	10	12	10	9	9	9	8	8	<b>8</b>	-4.4%	-2.1%	0.4%
Belgium	6	6	8	5	8	9	9	9	12	13	<b>14</b>	8.0%	8.3%	0.7%
Finland	3	4	8	8	3	7	6	7	7	12	<b>22</b>	87.8%	20.5%	1.1%
France	48	49	52	53	53	54	53	55	50	56	<b>67</b>	18.9%	3.5%	3.5%
Germany	56	50	53	50	50	51	53	52	63	56	<b>56</b>	-0.6%	-0.1%	2.9%
Italy	28	24	20	25	25	25	26	15	21	22	<b>20</b>	-11.6%	-3.5%	1.0%
Netherlands	6	6	7	6	5	6	10	13	15	15	<b>16</b>	4.5%	9.6%	0.8%
Poland	14	14	13	12	8	11	17	18	19	20	<b>20</b>	2.3%	3.6%	1.0%
Portugal	5	5	5	7	5	5	5	5	5	6	<b>5</b>	-18.5%	-0.1%	0.3%
Spain	39	17	18	18	21	24	31	31	26	26	<b>25</b>	-2.5%	-4.4%	1.3%
Sweden	12	12	16	19	25	28	27	27	25	29	<b>33</b>	13.1%	10.7%	1.7%
United Kingdom	17	19	22	17	18	17	24	31	29	26	<b>33</b>	28.8%	7.1%	1.7%
Other Europe	31	38	36	37	42	49	51	60	61	62	<b>64</b>	2.9%	7.6%	3.3%
<b>Total Europe</b>	<b>276</b>	<b>252</b>	<b>269</b>	<b>270</b>	<b>272</b>	<b>295</b>	<b>322</b>	<b>334</b>	<b>340</b>	<b>352</b>	<b>383</b>	<b>8.8%</b>	<b>3.4%</b>	<b>19.8%</b>
Total CIS	1	^	^	^	1	2	2	3	3	5	<b>6</b>	35.2%	27.3%	0.3%
Total Middle East	^	^	^	^	^	1	1	1	1	1	<b>1</b>	17.4%	17.5%	0.1%
Total Africa	1	1	1	1	1	1	2	1	1	2	<b>2</b>	1.1%	6.4%	0.1%
Australia	5	5	5	4	3	3	3	2	2	2	<b>2</b>	7.8%	-7.7%	0.1%
China	42	57	60	42	46	42	55	49	37	45	<b>45</b>	-1.2%	0.8%	2.3%
India	19	19	22	23	28	25	33	37	36	51	<b>58</b>	14.9%	11.6%	3.0%
Indonesia	11	17	28	15	46	39	56	95	125	139	<b>156</b>	12.3%	30.0%	8.1%
South Korea	7	10	9	8	8	8	13	13	13	11	<b>14</b>	24.5%	7.6%	0.7%
Thailand	18	24	28	30	31	34	37	42	42	38	<b>34</b>	-10.2%	6.6%	1.7%
Other Asia Pacific	13	16	18	21	24	25	26	31	33	39	<b>44</b>	11.9%	13.3%	2.3%
<b>Total Asia Pacific</b>	<b>114</b>	<b>148</b>	<b>170</b>	<b>144</b>	<b>185</b>	<b>177</b>	<b>224</b>	<b>270</b>	<b>287</b>	<b>325</b>	<b>353</b>	<b>8.6%</b>	<b>11.9%</b>	<b>18.2%</b>
<b>Total World</b>	<b>1226</b>	<b>1336</b>	<b>1417</b>	<b>1472</b>	<b>1533</b>	<b>1570</b>	<b>1692</b>	<b>1813</b>	<b>1726</b>	<b>1842</b>	<b>1933</b>	<b>4.9%</b>	<b>4.7%</b>	<b>100.0%</b>
of which: OECD	852	887	915	939	989	1021	1047	1075	1015	1090	<b>1151</b>	5.6%	3.1%	59.5%
Non-OECD	374	449	502	532	544	549	645	737	711	752	<b>782</b>	4.0%	7.7%	40.5%
European Union	255	223	241	246	245	263	284	286	298	313	<b>336</b>	7.6%	2.8%	17.4%

## Biofuels production by fuel type

Thousand barrels of oil equivalent per day												Growth rate per annum		Share
2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022	2012–22	2022	
<b>Biogasoline</b>														
Canada & Mexico	463	477	485	503	516	522	520	525	456	503	<b>504</b>	0.3%	0.9%	47.0%
US	28	28	30	30	30	32	34	34	31	32	<b>35</b>	7.4%	2.2%	3.2%
Brazil	197	236	255	299	268	269	305	339	301	291	<b>296</b>	1.7%	4.2%	27.7%
Other S. & Cent. America	15	18	20	23	25	27	28	30	24	28	<b>29</b>	3.4%	6.9%	2.7%
Europe	55	52	52	53	51	54	56	61	58	67	<b>78</b>	16.1%	3.6%	7.3%
CIS	—	—	—	—	^	1	1	2	2	3	<b>4</b>	45.3%	—	0.4%
Middle East	^	^	^	^	^	^	^	^	^	^	<b>^</b>	2.5%	-7.8%	^
Africa	1	1	1	1	1	1	2	1	1	2	<b>2</b>	1.1%	6.4%	0.2%
Asia Pacific	61	66	74	79	89	84	98	100	95	117	<b>124</b>	5.7%	7.4%	11.5%
<b>Total World</b>	<b>820</b>	<b>878</b>	<b>917</b>	<b>988</b>	<b>981</b>	<b>990</b>	<b>1044</b>	<b>1092</b>	<b>969</b>	<b>1044</b>	<b>1072</b>	<b>2.7%</b>	<b>2.7%</b>	<b>100.0%</b>
of which: OECD	556	566	577	597	609	621	623	633	558	614	<b>630</b>	2.6%	1.3%	58.7%
Non-OECD	264	312	339	391	371	369	421	458	411	430	<b>442</b>	2.8%	5.3%	41.3%
European Union	48	43	42	43	41	44	46	50	50	56	<b>63</b>	11.8%	2.8%	5.9%
<b>Biodiesel</b>														
Canada & Mexico	54	96	96	105	141	138	132	145	152	167	<b>195</b>	16.6%	13.7%	22.6%
US	9	8	8	7	6	9	10	10	11	12	<b>8</b>	-34.2%	-1.7%	0.9%
Brazil	41	43	50	59	56	63	80	88	95	101	<b>94</b>	-7.4%	8.7%	10.9%
Other S. & Cent. America	27	28	30	31	32	34	34	34	22	24	<b>28</b>	18.7%	0.4%	3.3%
Europe	220	200	217	217	221	241	266	272	282	285	<b>305</b>	7.1%	3.3%	35.4%
CIS	1	^	^	^	1	1	1	1	1	2	<b>2</b>	20.0%	14.9%	0.3%
Middle East	—	—	—	—	^	^	^	^	^	^	<b>^</b>	19.1%	—	0.1%
Africa	—	—	—	—	—	—	—	—	—	—	<b>—</b>	—	—	—
Asia Pacific	53	82	97	65	96	93	125	169	192	208	<b>229</b>	10.2%	15.7%	26.6%
<b>Total World</b>	<b>405</b>	<b>458</b>	<b>500</b>	<b>484</b>	<b>552</b>	<b>580</b>	<b>648</b>	<b>721</b>	<b>757</b>	<b>798</b>	<b>861</b>	<b>7.8%</b>	<b>7.8%</b>	<b>100.0%</b>
of which: OECD	296	321	337	342	380	400	424	442	457	476	<b>521</b>	9.5%	5.8%	60.5%
Non-OECD	110	137	163	141	173	180	224	279	300	322	<b>340</b>	5.5%	12.0%	39.5%
European Union	207	180	199	203	203	219	239	236	248	256	<b>273</b>	6.6%	2.8%	31.7%

Source: Includes data from F.O. Lichts; US Energy Information Administration (March 2021).

\* Includes biogasoline (such as ethanol) and biodiesel. Volumes have been adjusted for energy content.

^ Less than 0.5.

† Less than 0.05%.

Notes: Annual changes and shares of total are calculated using thousand barrels a day oil equivalent figures.



# Electricity Generation by fuel\*

Terawatt-hours	2021								2022							
	Oil	Natural gas	Coal	Nuclear energy	Hydro-electricity	Renewables	Other†	Total	Oil	Natural Gas	Coal	Nuclear energy	Hydro-electricity	Renewables	Other†	Total
Canada	2.9	80.1	34.4	92.0	382.8	49.8	4.8	646.8	2.7	81.0	34.1	86.6	398.4	52.1	4.7	659.6
Mexico	32.9	189.5	13.6	11.9	34.9	47.3	^	330.0	34.2	191.8	21.9	10.8	35.7	46.2	-	340.7
US	20.6	1698.1	977.8	820.7	249.0	622.0	12.7	4400.9	25.1	1816.6	904.2	812.1	258.6	719.5	11.5	4547.7
<b>Total North America</b>	<b>56.5</b>	<b>1967.6</b>	<b>1025.8</b>	<b>924.6</b>	<b>666.6</b>	<b>719.1</b>	<b>17.5</b>	<b>5377.7</b>	<b>62.0</b>	<b>2089.4</b>	<b>960.2</b>	<b>909.6</b>	<b>692.7</b>	<b>817.8</b>	<b>16.2</b>	<b>5548.0</b>
Argentina	13.1	89.9	2.4	10.2	19.6	17.4	0.5	153.2	16.7	80.4	2.1	7.5	23.9	19.4	0.8	150.8
Brazil	20.2	87.0	24.2	14.7	362.8	144.8	2.4	656.1	10.1	42.1	16.5	14.6	427.1	164.5	2.3	677.2
Other S. & Cent. America	65.7	106.7	46.9	-	286.3	64.1	-^	569.7	66.3	114.0	38.0	-	295.2	68.8	-^	582.4
<b>Total S. &amp; Cent. America</b>	<b>99.0</b>	<b>283.6</b>	<b>73.5</b>	<b>24.9</b>	<b>668.7</b>	<b>226.3</b>	<b>2.9</b>	<b>1378.9</b>	<b>93.1</b>	<b>236.5</b>	<b>56.6</b>	<b>22.0</b>	<b>746.2</b>	<b>252.8</b>	<b>3.1</b>	<b>1410.4</b>
France	2.0	35.3	4.1	379.4	58.7	61.4	6.8	547.6	2.3	46.9	3.1	294.7	44.6	68.0	8.1	467.7
Germany	4.6	90.3	164.7	69.1	19.7	214.4	26.5	589.3	4.4	79.8	180.6	34.7	17.5	236.5	23.8	577.3
Italy	12.0	144.0	16.0	-	45.4	68.2	3.5	289.1	9.7	156.3	17.6	-	28.2	72.0	3.6	287.3
Netherlands	1.3	56.7	17.3	3.8	0.1	40.4	2.5	122.1	1.6	47.8	17.3	4.2	0.1	48.3	2.7	122.0
Poland	2.0	15.8	129.8	-	2.3	28.2	1.4	179.6	1.7	11.6	127.4	-	2.0	34.7	1.7	179.1
Spain	10.0	71.5	6.0	56.6	29.6	96.1	4.5	274.3	10.1	89.3	9.4	58.6	18.2	103.3	4.9	293.7
Türkiye	0.3	111.2	103.4	-	55.9	64.0	^	334.7	3.1	71.8	112.8	-	67.2	71.4	-	326.2
Ukraine	0.8	10.3	36.8	86.2	10.4	11.0	-	155.5	0.5	7.2	24.8	62.1	11.1	7.0	-	112.7
United Kingdom	1.8	123.2	6.5	45.9	5.5	116.7	9.1	308.7	2.1	125.3	5.6	47.7	5.3	129.5	10.5	326.0
Other Europe	17.8	141.7	146.9	241.3	426.9	242.6	25.5	1242.8	17.1	132.0	151.4	239.5	372.8	269.4	26.6	1208.8
<b>Total Europe</b>	<b>52.7</b>	<b>799.9</b>	<b>631.5</b>	<b>882.3</b>	<b>654.5</b>	<b>942.9</b>	<b>79.8</b>	<b>4043.6</b>	<b>52.6</b>	<b>768.0</b>	<b>650.0</b>	<b>741.5</b>	<b>566.9</b>	<b>1040.1</b>	<b>81.9</b>	<b>3900.9</b>
Kazakhstan	0.1	27.1	75.2	-	9.2	3.4	0.2	115.1	0.1	23.7	76.8	-	9.2	4.2	-	114.0
Russian Federation	8.1	519.9	181.2	222.4	214.5	5.7	5.2	1157.1	6.7	533.9	192.3	223.7	197.7	7.4	5.3	1166.9
Other CIS	4.6	156.9	6.4	7.8	41.2	1.2	0.6	218.7	4.0	159.8	6.2	7.5	40.9	1.6	0.6	220.7
<b>Total CIS</b>	<b>12.8</b>	<b>703.9</b>	<b>262.8</b>	<b>230.2</b>	<b>265.0</b>	<b>10.3</b>	<b>6.0</b>	<b>1490.9</b>	<b>10.7</b>	<b>717.3</b>	<b>275.4</b>	<b>231.2</b>	<b>247.8</b>	<b>13.3</b>	<b>5.8</b>	<b>1501.6</b>
Iran	33.8	290.6	0.8	3.5	14.9	1.8	-	345.3	31.2	300.2	0.8	6.6	7.5	2.0	-	348.1
Saudi Arabia	157.9	234.2	-	-	-	0.8	-	392.9	131.4	269.4	-	-	-	0.8	-	401.6
United Arab Emirates	^	132.2	-	10.5	-	6.3	-	149.0	^	127.7	-	20.1	-	7.0	-	154.7
Other Middle East	135.4	283.8	17.2	-	5.0	13.6	0.2	455.1	134.8	285.8	17.8	-	4.9	17.2	0.2	460.6
Total Middle East	327.1	940.9	17.9	14.1	19.9	22.4	0.2	1342.4	297.3	983.0	18.5	26.7	12.4	27.0	0.2	1365.1
Egypt	10.9	174.0	-	-	14.3	10.5	-	209.7	17.6	159.3	-	-	13.8	10.2	-	200.8
South Africa	3.2	-	206.1	12.4	2.0	15.9	4.7	244.3	3.6	-	197.2	10.1	3.1	16.3	4.5	234.8
Other Africa	45.0	202.0	36.9	-	136.1	22.5	0.5	442.9	49.4	203.9	39.2	-	139.8	24.3	0.5	457.1
<b>Total Africa</b>	<b>59.1</b>	<b>376.0</b>	<b>243.1</b>	<b>12.4</b>	<b>152.4</b>	<b>48.8</b>	<b>5.2</b>	<b>896.9</b>	<b>70.6</b>	<b>363.2</b>	<b>236.4</b>	<b>10.1</b>	<b>156.7</b>	<b>50.8</b>	<b>5.0</b>	<b>892.7</b>
Australia	4.7	47.6	137.4	-	15.9	61.3	0.4	267.5	5.0	46.3	130.9	-	17.1	73.7	0.5	273.6
China	11.8	287.1	5328.8	407.5	1300.0	1148.7	50.3	8534.3	11.9	290.6	5397.8	417.8	1303.1	1367.0	60.4	8848.7
India	2.3	59.8	1274.1	43.9	160.3	173.2	1.1	1714.8	2.5	47.0	1380.1	46.2	174.9	205.9	1.3	1858.0
Indonesia	6.6	56.3	190.0	-	24.7	31.5	0.3	309.4	6.1	56.1	205.3	-	27.3	38.0	0.6	333.4
Japan	34.0	326.1	301.9	61.2	79.6	136.4	80.6	1019.7	40.6	319.7	309.0	51.8	74.9	152.1	85.4	1033.6
Malaysia	1.3	60.9	78.0	-	30.9	3.7	-	174.7	1.8	68.4	76.4	-	32.5	3.9	-	182.9
South Korea	7.2	178.1	211.7	158.0	3.1	39.8	4.2	601.9	6.9	173.3	208.7	176.1	3.5	47.7	4.2	620.3
Taiwan	5.3	108.3	128.9	27.8	3.5	12.2	5.0	291.0	4.5	111.8	121.2	23.8	5.8	16.2	4.9	288.1
Thailand	0.7	113.1	36.1	-	4.5	21.9	-^	176.4	1.7	114.6	35.5	-	6.6	21.9	^	180.4
Vietnam	0.2	26.2	114.2	-	75.9	28.3	^	244.9	0.7	27.8	100.8	-	96.0	34.8	-	260.0
Other Asia Pacific	52.3	230.1	155.5	15.7	163.3	37.8	0.7	655.4	60.5	218.2	154.4	22.3	169.7	41.5	1.0	667.6
<b>Total Asia Pacific</b>	<b>126.4</b>	<b>1493.7</b>	<b>7956.4</b>	<b>714.1</b>	<b>1861.7</b>	<b>1694.8</b>	<b>142.5</b>	<b>13989.7</b>	<b>142.2</b>	<b>1473.9</b>	<b>8120.1</b>	<b>737.9</b>	<b>1911.5</b>	<b>2002.6</b>	<b>158.3</b>	<b>14546.4</b>
<b>Total World</b>	<b>733.5</b>	<b>6565.6</b>	<b>10211.1</b>	<b>2802.5</b>	<b>4288.8</b>	<b>3664.6</b>	<b>254.2</b>	<b>28520.2</b>	<b>728.6</b>	<b>6631.4</b>	<b>10317.2</b>	<b>2679.0</b>	<b>4334.2</b>	<b>4204.3</b>	<b>270.5</b>	<b>29165.1</b>
of which: OECD	153.5	3370.9	2247.8	1912.2	1450.2	1916.1	181.3	11232.0	163.0	3454.1	2197.3	1789.3	1408.2	2157.8	187.5	11357.3
Non-OECD	580.0	3194.6	7963.3	890.4	2838.5	1748.5	72.9	17288.2	565.6	3177.3	8119.8	889.7	2926.0	2046.6	83.0	17807.9
European Union	47.3	548.7	439.8	731.7	347.3	725.5	64.3	2904.6	43.9	556.2	461.2	608.6	276.9	801.7	63.5	2812.0

† Includes electricity generated from: geothermal, biomass and other sources of renewable energy (not already itemized).

\* Based on gross output. Includes uncategorised generation, statistical differences and sources not specified elsewhere e.g. pumped hydro, non-renewable waste and heat from chemical sources.

^ Less than 0.05.





**Cobalt and lithium prices**

Thousand US dollars per tonne	Cobalt*	Lithium carbonate†
2000	33.42	4.47
2001	23.26	1.49
2002	15.23	1.59
2003	23.37	1.55
2004	52.76	1.72
2005	35.19	1.46
2006	37.96	2.32
2007	67.35	3.53
2008	86.00	4.44
2009	39.38	5.16
2010	45.97	4.30
2011	39.66	4.29
2012	31.02	4.45
2013	27.07	4.75
2014	30.79	4.68
2015	28.46	5.11
2016	25.47	8.84
2017	55.79	12.07
2018	72.79	14.66
2019	33.20	11.31
2020	31.44	6.80
2021	51.39	10.76
<b>2022</b>	<b>63.52</b>	<b>46.82</b>

\* 2000-2012 spot grade for cathodes, source US Geological Survey. Data from 2013 onwards: min purity 99.8%, source London Metal Exchange.

† 2000-2008 unit value, data series 140, source US Geological Survey. Data from 2009 onwards: FOB South America, source Benchmark Mineral Intelligence.

# Methodology

The Statistical Review provides a globally consistent data time series. Here we outline the definitions, conversion factors and calculations we use to produce the report.

## Primary energy

Traditionally, in the Statistical Review of World Energy, the primary energy of non-fossil based electricity (nuclear, hydro, wind, solar, geothermal, biomass in power and other renewables sources) has been calculated on an 'input-equivalent' basis – i.e. based on the equivalent amount of fossil fuel input required to generate that amount of electricity in a standard thermal power plant. For example, if nuclear power output for a country was 100 TWh, and the efficiency of a standard thermal power plant was 38%, the input equivalent primary energy would be  $100/0.38 = 263$  TWh or about 0.95 EJ.

For many years, the efficiency of this standard power plant has been assumed to be 38%. However, in reality, the world average efficiency of fossil fuel-based power changes over time and has risen from around 36% in 2000 to over 40% today. Moreover, given the much higher efficiency of the most modern power plant (e.g. the thermal efficiency of a modern gas turbine plant is above 55%), the global average is expected to increase in the future.

Therefore, to better assess primary energy trends, we use a time-dependent thermal equivalence model. The conversion factor used each year to calculate the 'input-equivalent' consumption for a given level of generation is based on a simplified representation of measured average efficiency levels:

**1965-2000:** assumed constant efficiency of 36%

**2000-2017:** a linear increase from 36% to 40% based on observed data

**2018 onwards:** the annual rate of efficiency improvement is based on the simplified assumption that efficiency will increase linearly to 45% by 2050.

The table below quantifies these assumptions (rounded to 1 decimal place):

Thermal equivalent efficiency factors used to convert non-fossil electricity (excluding biomass powered electricity) to primary energy.

**Thermal equivalent efficiency factors used to convert non-fossil electricity to primary energy**

Year(s)	Efficiency factor	Year(s)	Efficiency factor
2001	36.2%	2012	38.8%
2002	36.5%	2013	39.1%
2003	36.7%	2014	39.3%
2004	36.9%	2015	39.5%
2005	37.2%	2016	39.8%
2006	37.4%	2017	40.0%
2007	37.6%	2018	40.2%
2008	37.9%	2019	40.4%
2009	38.1%	2020	40.5%
2010	38.4%	2021	40.6%
2011	38.6%	2022	40.7%

\*1965-2000 = 36.0%

In this year's Statistical Review, we use the updated thermal equivalent efficiency factor to convert electricity generation from biomass to primary energy equivalent. Prior to 2022, the same factor was used for biomass as for all non-fossil electricity. From 2022 onwards, we assume a constant efficiency of 32% for biomass power to better reflect the actual efficiency of biomass power plants.

Primary energy consumption is reported in net terms. The gross calorific value to net calorific value adjustment is fuel-specific.

Fuels used as inputs for conversion technologies (gas-to-liquids, coal-to-liquids and coal-to-gas) are counted as production for the source fuel and the outputs are counted as consumption for the converted fuel.

## Oil

### Oil reserves

Total proved reserves of oil are generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and geological conditions.

The data series for proved oil reserves in this year's review does not necessarily meet the definitions, guidelines and practices used for determining proved reserves at company level, for instance as published by the US Securities and Exchange Commission nor does it necessarily represent the EI's view of proved reserves by country. Rather the data series has been compiled using a combination of primary official sources and third-party data.

Oil reserves include field condensate and natural gas liquids as well as crude oil. This inclusive approach helps to develop consistency with the oil production numbers published in the Review, which also include these categories of oil. The reserves and R/P ratio for Canada includes Canadian oil sands and the reserves and R/P ratio for Venezuela includes the Orinoco Belt.

Liquid hydrocarbon fuels from non-hydrocarbon sources, such as ethanol from corn or sugar or synthetic oil derived from natural gas (so-called GTL or gas-to-liquids), are not included in either the reserves or production series.

We have provided a detailed explanatory note on reserves clarifying current definitions and terminology.

R/P ratios represent the length of time that those remaining reserves would last if production were to continue at the previous year's rate. They are calculated by dividing remaining reserves at the end of the year by the production in that year.

Reserves-to-production (R/P) ratios are available by country and feature in the table of oil reserves. There is a time series of crude oil reserves from 1980, which can be found in the Excel workbook. Data are measured in thousand million barrels.

Please note that these reserves tables have not been updated this year.

### Oil production

Oil production data includes crude oil, shale oil, oil sands, condensates (lease condensate or gas condensates that require further refining) and NGLs (natural gas liquids – ethane, LPG and naphtha separated from the production of natural gas). Excludes liquid fuels from other sources such as biofuels and synthetic derivatives of coal and natural gas. This also excludes liquid fuel adjustment factors such as refinery processing gain. Excludes oil shales/kerogen extracted in solid form.

The split of crude/condensate and natural gas liquids figures are available. The crude condensate table includes crude oil, shale/tight oil, oil sands, lease condensate or gas condensates that require further refining. Excludes liquid fuels from other sources such as biomass and synthetic derivatives of coal and natural gas. The NGL's table includes ethane, LPG and naphtha separated from the production of

natural gas. Excludes condensates.

World oil production tables are available in both thousand barrels daily and million tonnes.

### Liquids, oil and oil product consumption

Oil consumption as defined in previous Statistical Reviews (i.e. including biofuels) has been renamed 'liquids' consumption and a table is still included on this original basis. In addition, more granularity has been included on the product split of both oil products and biofuels (breaking out ethane & LPG and naphtha in oil products and the ethanol/biodiesel split of biofuels).

Total liquids consumption comprises inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of biogasoline (such as ethanol), biodiesel and derivatives of coal and natural gas are also included.

Oil consumption figures include inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of biogasoline (such as ethanol), biodiesel and derivatives of coal and natural gas are excluded. Derivatives of coal and natural gas are included.

Oil product consumption – Gasoline includes motor and aviation gasoline, gasoline and light distillate feedstock (LDF). Diesel/gasoil includes marine gasoil. 'Fuel oil' includes marine bunkers and crude oil used directly for fuel. 'Others' consists of refinery gas, solvents, petroleum coke, lubricants, bitumen, wax, other refined products and refinery fuel and loss.

Data are supplied in both exajoules and thousand barrels daily figures.

### Oil prices

The key crudes quoted are Brent, West Texas Intermediate (WTI), Nigerian Focados and Dubai in US\$ per barrel.

The spot crude price history from 1972 and annual crude price history from 1861 are available in the historical data Excel workbook.

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### Refining

The refinery capacity data presented in this Review represents the sum of reported atmospheric crude distillation and condensate splitting capacity. Capacity should comprise the amount of input that a distillation facility can process under usual operating conditions, taking into account scheduled downtime. Figures are in thousand barrels daily at year end per calendar day.

Refinery throughputs are based on the quantity of crude and condensate processed in atmospheric distillation units and condensate splitters. Figures are in thousands of barrels per day.

The refining margins presented are benchmark margins for three major global refining centres: US Gulf Coast (USGC), North West Europe (NWE – Rotterdam) and Singapore. In each case they are based on a single crude oil appropriate for that region and have optimised product yields based on a generic refinery configuration (cracking, hydrocracking or coking), again appropriate for that region. The margins are on a semi-variable basis, i.e. the margin after all variable costs and fixed energy costs.

# Methodology

## Oil trade movements

The tables exclude the intra-area movements of oil (for example, crude oil and products moving between countries within Europe). They do not include biofuels. Bunkers fuel is not included as exports. Crude imports and exports include condensates. Saudi Arabian exports from 1980 are also available in the oil trade movements table in the Excel workbook. The split of crude oil and products are detailed. Data in the tables are in million tonnes and thousand barrels per day.

## Natural gas

### Natural gas reserves

Total proved reserves of natural gas are generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

The data series for proved natural gas reserves in this year's Review does not necessarily meet the definitions, guidelines and practices used for determining proved reserves at company level, for instance as published by the US Securities and Exchange Commission nor does it necessarily represent the EI's view of proved reserves by country. Rather, the data series has been compiled using a combination of primary official sources and third-party data.

Although every effort is made to come up with a consistent series for reserves based on a common definition, different countries use different methodologies and the data have varying levels of reliability.

R/P ratios represent the length of time that those remaining reserves would last if production were to continue at the previous year's rate. They are calculated by dividing remaining reserves at the end of the year by the production in that year.

As far as possible, the data represents standard cubic metres (measured at 15°C and 1013 mbar) and have been standardised using a gross calorific value (GCV) of 40 MJ/m<sup>3</sup>.

There is a time series of natural gas reserves, which can be found in the Excel workbook. Data are measured in billion cubic metres.

Please note that these reserves tables have not been updated this year.

### Natural gas production

Gas production comprises marketed production and excludes gas flared or recycled gas. Includes natural gas produced for gas-to-liquids transformation.

As far as possible, the data above represents standard cubic metres (measured at 15°C and 1013 mbar); as they are derived directly from tonnes of oil equivalent using an average conversion factor and have been standardised using a gross calorific value (GCV) of 40 MJ/m<sup>3</sup>, they do not necessarily equate with gas volumes expressed in specific national terms.

Natural gas production is provided in three different units of measurement to accommodate regional customary usage. World natural gas production PDF tables are in both billion cubic metres, and exajoules. Data in the Excel workbook are also in billion cubic feet per day (bcf/d).

### Natural gas consumption

Natural gas consumption excludes natural gas converted to liquid fuels but includes derivatives

of coal as well as natural gas consumed in gas-to-liquids transformation.

As far as possible, the data above represents standard cubic metres (measured at 15°C and 1013 mbar); as they are derived directly from tonnes of oil equivalent using an average conversion factor and have been standardised using a gross calorific value (GCV) of 40 MJ/m<sup>3</sup> they do not necessarily equate with gas volumes expressed in specific national terms. The difference between these world consumption figures and the world production statistics is due to variations in stocks at storage facilities and liquefaction plants, together with unavoidable disparities in the definition, measurement or conversion of gas supply and demand data.

Consumption data in the PDF data table is in billion cubic meters (bcm) and exajoules, data in billion cubic feet per day (bcf/d) can be found in the Excel workbook.

### Natural gas prices

Annual prices are given for benchmark natural gas hubs together with contracted pipeline and LNG imports. The benchmark hub prices incorporate US (Henry Hub), Canada (Alberta), Netherlands TTF index and the UK (NBP). Contract prices are represented by LNG imports into Japan, the Japan Korea Marker (JKM) and Average German Import Prices.

The prices for LNG and European border are calculated as CIF prices, where CIF = cost + insurance + freight (average freight prices) in US dollars per million British thermal units (Btu).

### Natural gas trade movements

Trade flows are on a contractual basis and may not correspond to physical gas flows in all cases. The data illustrates the flow of pipeline natural gas and LNG between sources of production and the regions of consumption. LNG trade. As far as possible, the data represents standard cubic metres (measured at 15°C and 1013 mbar) and has been standardised using a gross calorific value (GCV) of 40 MJ/m<sup>3</sup>.

## Coal

### Coal reserves

Total proved reserves of coal are generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known deposits under existing economic and operating conditions.

Total proved coal reserves are shown for anthracite and bituminous (including brown coal) and sub-bituminous and lignite.

Reserves-to-production (R/P) ratios represent the length of time that those remaining reserves would last if production were to continue at the previous year's rate. They are calculated by dividing remaining reserves at the end of the year by the production in that year. The R/P ratios are calculated excluding other solid fuels in reserves and production.

R/P ratios are available by country and feature in the table of coal reserves. R/P ratios for the region and the world are depicted in the chart above and the Energy charting tool.

Coal reserve data is in million tonnes.

Please note that these reserves tables have not been updated this year.

### Coal production

Coal production includes data for commercial solid fuels only. Included in the hard coal

category are bituminous and anthracite (hard coal). The sub-bituminous coal includes lignite and brown coal. Other commercial solid fuels are also included. The data includes coal produced for coal-to-liquids and coal-to-gas transformations.

In the coal production PDF table, the units are in exajoules. The data can also be downloaded from the Excel workbook in million tonnes.

### Coal consumption

Coal consumption includes data for solid fuels only. Included in the hard coal category are bituminous and anthracite. The sub-bituminous coal includes lignite and brown coal. Other commercial solid fuels are also included. The figures exclude coal converted to liquid or gaseous fuels, but includes coal consumed in transformation processes.

Differences between world consumption figures and the world production statistics are accounted for by stock changes, and unavoidable disparities in the definition, measurement or conversion of coal supply and demand data.

### Coal prices

Annual prices quoted include the Northwest Europe marker price, Japan steam spot CIF price, China Qinhuangdao spot price and the US Central Appalachian coal spot price index. Coal prices except for the US Central Appalachian price are calculated as CIF prices, where CIF = cost + insurance + freight (average freight prices). The US Central Appalachian price is FOB = free on board. All prices are quoted in US dollars per tonne.

IHS Northwest Europe prices for 1996-2000 are the average of the monthly marker, 2001-2017 the average of weekly prices. IHS Japan prices basis = 6,000 kilocalories per kilogram NAR CIF. Chinese prices are the average monthly price for 2000-2005, weekly prices 2006-2017, 5,500 kilocalories per kilogram NAR, including cost and freight (CFR).

### Coal trade movements

Commercial solid fuels only, i.e. bituminous coal and anthracite (hard coal), and lignite and brown (sub-bituminous) coal, and other commercial solid fuels. Intra-area movements (for example, between countries in Europe, Other CIS, Other Africa, Other Asia Pacific) are excluded.

## Nuclear energy

The data are based on gross generation and not accounting for cross-border electricity supply. 'Input-equivalent' energy is the amount of fuel that would be required by thermal power stations to generate the reported electricity output. Details on thermal efficiency assumptions are available online.

Data for the units are in exajoules in the PDF. The data are available in the Excel workbook in terawatt-hours (TWh).

## Hydroelectricity

The data are based on gross generation and not accounting for cross-border electricity supply. 'Input-equivalent' energy is the amount of fuel that would be required by thermal power stations to generate the reported electricity output.

Details on thermal efficiency assumptions are available online.

In the hydroelectricity consumption PDF table, the units are in exajoules. The data are available in the Excel workbook in terawatt-hours (TWh).

# Methodology

## Renewable energy

The data are based on gross generation and not accounting for cross-border electricity supply. 'Input-equivalent' energy is the amount of fuel that would be required by thermal power stations to generate the reported electricity output. Details on thermal efficiency assumptions are available online.

Renewable power is based on gross generation from renewable sources including wind, geothermal, solar, biomass and waste, and not accounting for cross-border electricity supply.

## Biofuels production and consumption

The data includes biogasoline (such as ethanol) and biodiesel. Volumes have been adjusted for energy content.

The biofuels PDF tables are in thousand barrels of oil equivalent per day figures. The data are available in additional units in the Excel workbook.

## Electricity

Electricity generation is based on gross output.

## Carbon

Carbon emissions from primary energy use are estimated by applying the Default CO<sub>2</sub> Emission Factors for Combustion to the consumption of each energy product type (coal, natural gas and various oil products) from the list of IPCC emission factors. Biofuels are considered as not emitting CO<sub>2</sub>, consistent with the practice of the IEA. Second, the revised method takes account of fuel consumption used for non-combustion purposes, such as the use of oil products and natural gas in the petrochemicals industry or of oil to produce bitumen for road construction. Estimates of the share of non-combusted fossil

fuels taken from the IEA's energy balances are subtracted from the total consumption of fossil fuels before applying the relevant emission factors.

Carbon emissions from flared natural gas are calculated using data series on volumes of gas flared from two sources: Cedigaz up to 2012, and the Payne Institute for Public Policy, Colorado School of Mines, from 2013 onward. Payne Institute's data include flaring from upstream, downstream oil and gas, while Cedigaz include flaring from upstream only. Volumes of gas flared have been standardised using a Gross Calorific Value (GCV) of 40 MJ/m<sup>3</sup>. The IPCC Default CO<sub>2</sub> Emission Factor for Combustion for natural gas (56,100 kg CO<sub>2</sub> per TJ) is used and perfect combustion has been assumed. These emissions represent around 1% of total CO<sub>2</sub> emissions.

Data for methane emissions associated with the production, transportation and distribution of fossil fuels for 1990-2020 are sourced, where available, from IEA (2021, 2022) Greenhouse Gas Emissions from Energy (all rights reserved). For a selected number of fossil fuel-producing countries where methane emission data is not currently available, an estimate of historical methane emissions has been derived using regional average methane intensity of production. For 2021, methane emission estimates are derived for all countries using methane intensity of fossil fuel production in 2020. Total methane emissions at a global and regional level show a discrepancy with IEA data due to non-inclusion of residual emissions i.e. emissions which have not been allocated to named countries. There is a wide range of uncertainty with respect to both current estimates of methane emissions and the global

warming potential of methane emissions. To ensure alignment with financial and government reporting standards, the methane to CO<sub>2</sub>e factor is a 100-year Global Warming Potential (GWP) of 25, recommended by the IPCC in AR4.

Carbon emissions from industrial processes refer only to non-energy CO<sub>2</sub> emissions from cement production and are sourced for 1990-2021 from Andrew, R. M. (2019) Global CO<sub>2</sub> emissions from cement production, 1928-2018. Earth System Science Data 11, 1675-1710, (updated dataset May 2022).

## Minerals

Total proved reserves of minerals are generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known resources under existing economic and geological conditions.

The data series for mineral reserves in this year's review does not necessarily meet the definitions, guidelines and practices used for determining proved reserves at company level nor does it necessarily represent the EI's view of proved reserves by country. Rather the data series has been compiled using a combination of primary official sources and third-party data.

## Revisions and corrections

Each year revisions are made to historical data when updated or more reliable data sources become available. Corrections are also made when errors are identified in data. In this Statistical Review corrections have been made to the emissions, biofuels, historic oil prices and oil refinery throughput tables.

# Appendices Approximate conversion factors

### Crude oil\*

From	To				
	tonnes (metric)	kilolitres	barrels	US gallons	tonnes per year
<b>Multiply by</b>					
Tonnes (metric)	1	1.165	7.33	307.86	–
Kilolitres	0.8581	1	6.2898	264.17	–
Barrels	0.1364	0.159	1	42	–
US gallons	0.00325	0.0038	0.0238	1	–
Barrels/day	–	–	–	–	49.8

\*Based on worldwide average gravity.

### Oil products

From	To convert					
	barrels to tonnes	tonnes to barrels	kilolitres to tonnes	tonnes to kilolitres	tonnes to gigajoules	tonnes to barrels oil equivalent
<b>Multiply by</b>						
Ethane	0.059	16.850	0.373	2.679	49.400	8.073
Liquefied petroleum gas (LPG)	0.086	11.600	0.541	1.849	46.150	7.542
Gasoline	0.120	8.350	0.753	1.328	44.750	7.313
Kerosene	0.127	7.880	0.798	1.253	43.920	7.177
Gas oil/diesel	0.134	7.460	0.843	1.186	43.380	7.089
Residual fuel oil	0.157	6.350	0.991	1.010	41.570	6.793
Product basket	0.124	8.058	0.781	1.281	43.076	7.039

\*Based on worldwide average gravity.

### Natural gas (NG) and liquefied natural gas (LNG)

From	To convert						
	billion cubic metres NG	billion cubic feet NG	petajoules NG	million toe	million tonnes LNG	tonnes to gigajoules	tonnes to barrels oil equivalent
<b>Multiply by</b>							
1 billion m <sup>3</sup> NG	1.000	35.315	36.000	0.860	0.735	34.121	5.883
1 billion ft <sup>3</sup> NG	0.028	1.000	1.019	0.024	0.021	0.966	0.167
1 petajoule NG	0.028	0.981	1.000	0.024	0.021	0.952	0.164
1 million toe	1.163	41.071	41.868	1.000	0.855	39.683	6.842
1 million tonnes LNG	1.360	48.028	48.747	1.169	1.000	46.405	8.001
1 trillion Btu	0.029	1.035	1.050	0.025	0.022	1.000	0.172
1 million boe	0.170	6.003	6.093	0.146	0.125	5.800	1.000

### Units

1 metric tonne	= 2204.62 lb.
	= 1.1023 short tons
1 kilolitre	= 6.2898 barrels
1 kilolitre	= 1 cubic metre
1 kilocalorie (kcal)	= 4.1868 kJ
	= 3.968 Btu
1 kilojoule (kJ)	= 1,000 joules
	= 0.239 kcal
	= 0.948 Btu
1 petajoule (PJ)	= 1 quadrillion joules (1 x 10 <sup>15</sup> )
1 exajoule (EJ)	= 1 quintillion joules (1 x 10 <sup>18</sup> )
1 British thermal unit (Btu)	= 0.252 kcal
	= 1.055 kJ
1 barrel of oil equivalent (boe)	= 5.8 million Btu
	= 6.119 million kJ
1 kilowatt-hour (kWh)	= 860 kcal
	= 3600 kJ
	= 3412 Btu

### Calorific equivalents

One exajoule equals approximately:	
Heat units	239 trillion kilocalories
	948 trillion Btu
Solid fuels	40 million tonnes of hard coal
	95 million tonnes of lignite and sub-bituminous coal
Gaseous fuels	See Natural gas and LNG table
Electricity	278 terawatt-hours

All fuel energy content is net or lower heating value (i.e., net of heat of vaporisation of water generated from combustion).

1 barrel of ethanol = 0.58 barrels of oil equivalent  
 1 barrel of biodiesel = 0.86 barrels of oil equivalent  
 1 tonne of ethanol = 0.68 tonne of oil equivalent  
 1 tonne of biodiesel = 0.88 tonne of oil equivalent

### Other terms

Tonnes: Metric equivalent of tons

### Percentages

Calculated before rounding of actuals.

### Rounding differences

Because of rounding, some totals may not agree exactly with the sum of their component parts.

# Definitions

## Regional definitions

Country groupings are made purely for statistical purposes and are not intended to imply any judgment about political or economic standings.

### North America

US (excluding US territories), Canada, Mexico.

### Caribbean

Atlantic islands between the US Gulf Coast and South America, including Puerto Rico, US Virgin Islands and Bermuda.

### Central America

Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama.

### South and Central America

Caribbean (including Puerto Rico and US Virgin Islands), Bermuda, Central and South America.

### Europe

European members of the OECD plus Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Cyprus, Georgia, Gibraltar, Latvia, Lithuania, Malta, Montenegro, North Macedonia, Romania, Serbia and Ukraine.

### Commonwealth of Independent States (CIS)

Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Uzbekistan.

### Middle East

Arabian Peninsula, Iran, Iraq, Israel, Jordan, Lebanon, Syria.

### Northern Africa

Territories on the north coast of Africa from Egypt to Western Sahara.

### Eastern Africa

Territories on the east coast of Africa from Sudan to Mozambique. Also Madagascar, Malawi, Uganda, Zambia, Zimbabwe.

### Middle Africa

Angola, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea, Gabon, Sao Tome & Principe.

### Western Africa

Territories on the west coast of Africa from Mauritania to Nigeria, including Burkina Faso, Cape Verde, Mali and Niger.

### Southern Africa

Botswana, Eswatini, Lesotho, Namibia, South Africa.

### Asia Pacific

Brunei, Cambodia, China<sup>†</sup>, China Hong Kong SAR\*, China Macau SAR\*, Indonesia, Japan, Laos, Malaysia, Mongolia, North Korea, Philippines, Singapore, South Asia (Afghanistan, Bangladesh, India, Myanmar, Nepal, Pakistan and Sri Lanka), South Korea, Taiwan, Thailand, Vietnam, Australia, New Zealand, Papua New Guinea and Oceania.

† Mainland China

\* Special Administrative Region

### Australasia

Australia, New Zealand.

**OECD members** (Organization For Economic Co-operation and Development)

Europe: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye, UK.

**Other member countries:** Australia, Canada, Chile, Colombia, Costa Rica, Israel, Japan, Mexico, New Zealand, South Korea, US.

**OPEC members** (Organization of the Petroleum Exporting Countries)

**Middle East:** Iran, Iraq, Kuwait, Saudi Arabia, United Arab Emirates.

**North Africa:** Algeria, Libya.

**West Africa:** Angola, Equatorial Guinea, Gabon, Nigeria, Republic of Congo.

**South America:** Venezuela.

### European Union members

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

**Non-OECD** (Organization for Economic Co-operation and Development)

All countries that are not members of the OECD.

## More information

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