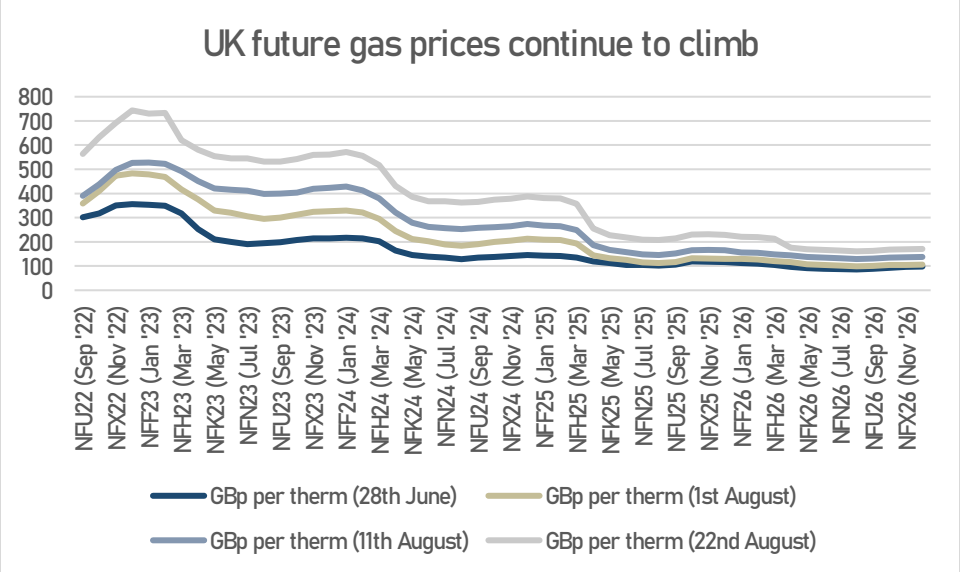
AozoraStep

The Energy Outlook

The current energy crisis is not only the result of the war in Ukraine and the sanctions against Russia, but also very much the result of the ESG movement. In Europe we have shut down nuclear plants, while discouraging oil & gas and coal production. This has led to a major mismatch in supply and demand where renewables are insufficient to fill the gap. The focus of this energy crisis is the gas market in Europe after Russia has reduced supply drastically and caused prices to increase more than 10-fold. The UK gas forward market has repriced rapidly over the space of two months and indicates that we will have to live with higher electricity bills for longer and a peak of $420 per barrel of oil equivalent (58 British therms = 1 barrel of oil, based on £7.3 per therm peak in Dec/Jan 22/23). Politicians are slow to act and even if we were to ramp up exploration, supply chain delays of components and labour shortages could not solve the imbalance very quickly…



Source: Barchart

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

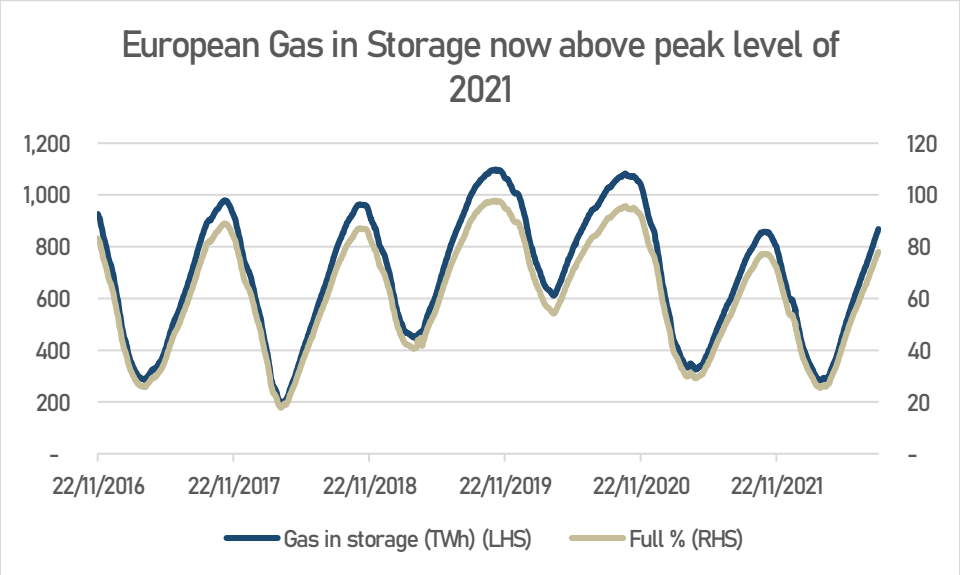
Europe is filling its gas storage tanks between April and October to then draw down on them during the winter. Despite a 30% reduction in Russian gas exports y-o-y (even a higher reduction to Europe), Europe has been able to source its gas from elsewhere to fill the tanks. However, Germany's storage tanks (the largest in Europe) only last for less than 3 months when being drawn down in the winter and considering no imports. Governments will make sure that Europe can make it through the winter, and this includes fuel switching and securing additional gas supplies from elsewhere, which has put tremendous pressure on prices – the question is whether we are overshooting and could be over delivering… The following notes will look at the natural gas, oil, coal, uranium and renewables & EVs market individually to explore how fuel switching and other factors will affect pricing into the winter.

European gas in storage compared to annual consumption (as of 23rd Aug 2022)

Area	Gas in storage (TWh)	Full (%)	Consumption (TWh)	Filling level compared to annual consumption (%)
All Europe	964	73	5,323	18
EU	868	78	4,152	21
Austria	61	63	98	62
Belgium	7	86	195	4
Bulgaria	3	59	34	10
Croatia	3	71	33	10
Czech Republic	36	82	92	39
Denmark	9	94	27	32
France	119	90	468	25
Germany	198	81	995	20
Hungary	42	61	117	35
Ireland	0	0	61	0
Italy	155	80	778	20
Latvia	12	55	12	98
Netherlands	104	73	420	25
Poland	36	100	248	15
Portugal	4	100	69	6
Romania	23	70	123	19
Slovakia	28	77	57	48
Spain	29	83	373	8
Sweden	0	91	12	1
Non-EU	96	29	1,171	8
Serbia	0	0	0	0
Ukraine	86	26	337	25
United Kingdom	10	100	834	1

Source: AGSI

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com



Source: AGSI

The Gas Outlook

When Germany raised the alarm bells in June and began filling the largest Western European gas storage facility, Rehden[1], which was previously used entirely for Russian gas, gas prices began spiking further out the curve. Towards the end of July, Europe began competing with Japan, China and South Korea for LNG in the market, as the world faced a record heatwave. At the same time, the US is exporting less LNG y-o-y to China (**128 TWh**), Japan (**54 TWh**) and South Korea (**64 TWh**), and more to Europe (**428 TWh**)[2]. While China is replacing US LNG with Russian and Central Asian LNG[3], South Korea and Japan are having to compete with Europe. Given the rapid increase in European gas in storage, I consider a realistic or worst case scenario on Russian gas imports and a best case scenario on non-Russian gas imports to Europe as the most likely scenario. The difference will be made up of fuel switching and demand destruction.

[1] https://www.energate-messenger.com/news/222990/the-rehden-reservoir-is-being-filled
[2] https://www.eia.gov/todayinenergy/detail.php?id=52659
[3] https://www.eia.gov/todayinenergy/detail.php?id=52258#:~:text=China's%20LNG%20imports%20averaged%2010.5,natural%20gas%20supply%20in%202021.

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Russian gas imports to Europe

Pipeline/LNG carrier	EU imports 2019 (in TWh)	Realistic scenario imports (annualised in TWh)	Worst case Scenario imports (annualised in TWh)	Best case Scenario imports (annualised in TWh)
Russia Yamal Pipeline	358	0	0	0
Russia Nord Stream Pipeline	596	238	0	596
Russia Ukraine Pipeline	433	87	87	173
Russia TurkStream Pipeline	347	347	347	347
Russia Blue Stream Pipeline	173	173	173	173
Russia LNG Carrier	228	228	0	228
Total	2134	1073	607	1517
Difference		**-1061**	**-1528**	**-618**

Non-Russian gas imports to Europe

Pipeline/LNG carrier	EU imports 2019 (in TWh)	Realistic scenario imports (annualised in TWh)	Best case Scenario imports (annualised in TWh)	Worst case Scenario imports (annualised in TWh)
Norway pipelines	1065	1200	1200	1200
Norway LNG Carrier	59	59	59	59
Qatar LNG Carrier	293	293	293	293
Algeria Pipeline	205	300	300	300
Algeria LNG Carrier	98	98	98	98
Libya Pipeline	49	49	49	49
US LNG Carrier	166	661	992	400
Nigeria LNG carrier	127	127	127	127
Trinidad and Tobago LNG carrier	59	59	59	59
Other LNG carrier	49	100	100	100
Total	2170	2946	3277	2685
Difference		**776**	**1107**	**515**

Source: https://mondediplo.com/maps/gas-pipelines#&gid=1&pid=1, Reuters, own estimates

Despite the very strong gas in storage levels in Europe, gas prices continue to reach new all-time-highs. Japan and South Korea have had to buy additional gas in the spot market due to unusually hot summer weather and resulting lower gas storage levels and are expected to secure more than 5mio tonnes of LNG

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

(**72 TWh**) in the spot market between August and October this year[4]. Japan and South Korea have long-term LNG contracts in place and therefore lower gas storage facilities, which lasts only 3-4 weeks. If Russia decides to stop gas exports to Japan and South Korea, this would have an impact of **123 TWh** additional demand.

Gas imports by region (2021)

Area	Annual Gas/LNG Imports (TWh)	Russian imports (TWh)
Japan	987	89
South Korea	567	34
China	1,123	168
All Europe	5,323	2,129

Source: EIA, AGSI

The Oil Outlook

The price of oil has declined from its peak of close to $130 a barrel in June to low $90 a barrel mid-August, while gas prices staged a strong comeback with forward prices doubling to $420 a barrel equivalent. Does this mean there is an arbitrage to use oil instead of gas for electricity and heat? There are a few obstacles in the way:

1. You would in most cases need diesel to generate electricity, which is currently priced at around £1.82 (equivalent to around £4.14 a therm) and therefore a lot more expensive than crude oil at around £1.4 per therm
2. You would need to have a generator that works with fuel oil/diesel
3. There is a shortage of refineries needed to create diesel in the West. Russia is a large supplier of diesel

In addition, the high gas prices are to a large degree not actually passed on to the end consumer yet and has mostly been put into storage tanks (Day-ahead prices are actually below £4.14 a therm). I would expect an urgency to begin with strategic fuel switching once the more expensive winter contracts settle and consumers face the costs with the first price hikes coming in October… The IEA expects 380k b/d of

[4] https://www.icis.com/explore/resources/news/2022/08/11/10794278/storage-analysis-how-much-spot-lng-will-japan-and-south-korea-need-this-winter/

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

additional oil demand in light of gas-to-oil switching in Europe & worldwide amidst the energy crisis[5], which is the equivalent of **235 TWh** annualized (4.4% of Europe's annual consumption – assuming that oil can replace gas at the same rate of efficiency). Below is a table of potential impacts on supply and demand of oil. Overall, the demand side is looking vulnerable, but Russia and OPEC are working on ensuring oil supply remains tight, which could hinder gas-to-oil switching…

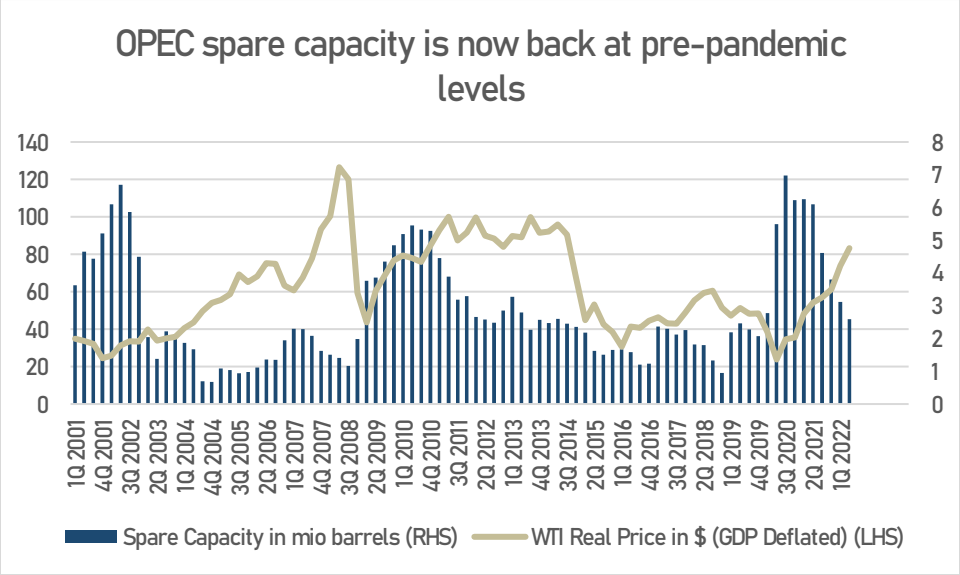
Major impacts on supply and demand of oil

Impact on supply	Thousands barrels of oil per day	Comment
Saudi Arabia + UAE spare capacity	2,200	IEA estimates their combined spare capacity drops to just 2.2mio bopd in Aug 2022[6]
Iran Deal	1,300	Current production 2.5mio bopd vs. 3.8mio bopd prior to nuclear deal pull-out[7]
US production	800	OPEC expects 1.2mio bopd production increase in 2023. I estimate this number to be slightly lower unless political stance changes[8]
Libya	500	Libya is targeting to improve production, but since 2011 has moved between 0 and 1.5mio bopd[9]
Norway gas focus	-500	Norway had heavy maintenance in offshore platforms over the summer and prioritised gas production[10]
Russia sanctions	-500	OPEC expects -370k bopd, but I estimate the number to be bigger as sanctions bite and they control supply[11]
SPR release/buyback	-1,000	By end of this year the SPR is being replenished with future delivery dates after FY 2023[12]
CPC pipeline closure	-1,400	Cracks in Russian/Kazakhstan pipeline likely due to sabotage[13]

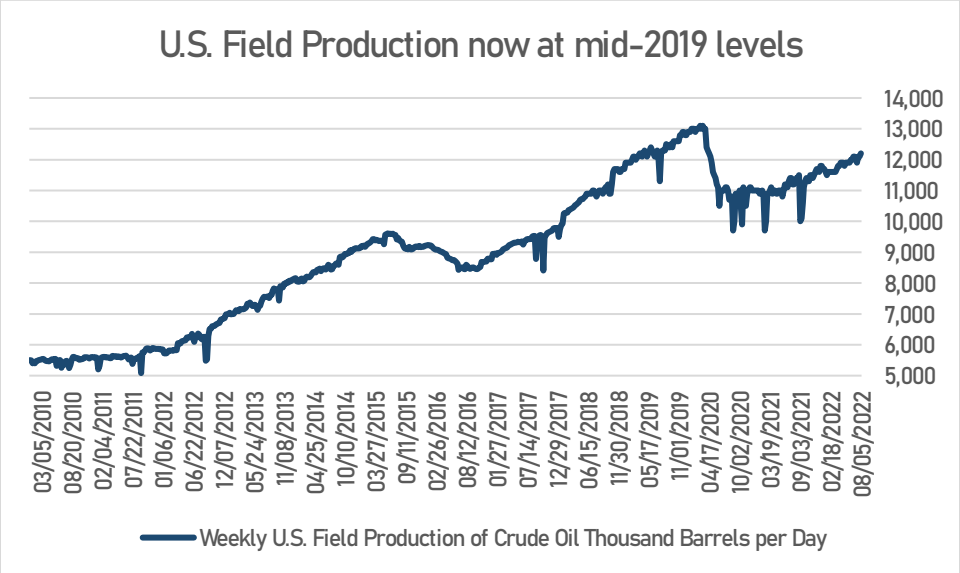
Impact on demand	Thousands barrels of oil per day	Comment
Gas-to-oil switching	380	Due to record high gas prices, oil is replacing gas to produce energy (IEA estimate)[14]
China zero Covid	-1,100	Standard Chartered estimates the April 2022 lockdowns caused a demand decline of 1.1mio bopd[15]
2008 type recession	-1,250	OPEC Dec 2008 report revised oil demand down by 1.25mio bopd for Q1 2009[16]
		Sources: Indicated in footnotes of comment

[5] https://www.iea.org/reports/oil-market-report-august-2022
[6] https://www.iea.org/reports/oil-market-report-july-2022?mode=overview
[7] https://www.reuters.com/business/energy/iran-can-reach-top-oil-output-2-months-after-nuclear-deal-oil-minister-2022-03-03/
[8] https://momr.opec.org/pdf-download/
[9] https://www.eia.gov/international/analysis/country/LBY
[10] https://www.eia.gov/international/analysis/country/LBY
[11] https://www.eia.gov/international/analysis/country/LBY
[12] https://www.whitehouse.gov/briefing-room/statements-releases/2022/07/26/fact-sheet-department-of-energy-releases-new-notice-of-sale-as-gasoline-prices-continue-to-fall/
[13] https://www.cpc.ru/EN/press/releases/2022/Pages/20220822-1.aspx
[14] https://www.reuters.com/business/energy/switch-gas-boosts-oil-demand-economic-headwinds-loom-iea-2022-08-11/
[15] https://jnews.uk/china-demand-worries-dull-oil-price-impact-of-eu-russian-embargo-plan/
[16] https://www.opec.org/opec_web/static_files_project/media/downloads/publications/MR122008.pdf

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

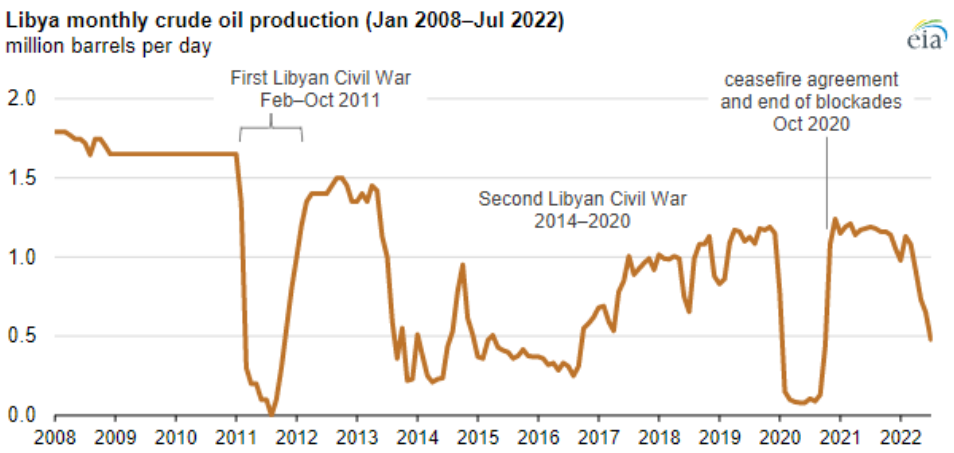


Source: EIA



Source: EIA

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com



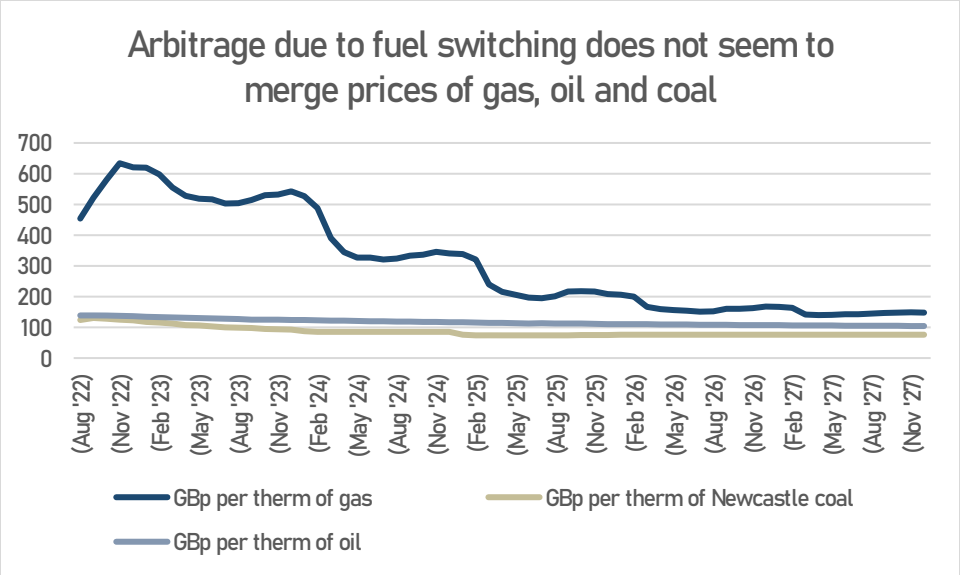
Source: EIA

The Coal Outlook

On 10th August the Russian coal important ban came into effect. Russian thermal coal imports (coal used to produce electricity) made up 70% of EU's thermal coal imports (51.6mio metric tons or **420 TWh** equivalent) – mostly to Germany and Poland[17]. 1 metric ton of Newcastle Coal is currently priced at around $420 as of 19th August, which is equivalent to 124p/th or $86.4 a barrel of oil equivalent. Similar to oil, there appears to be limited fuel switching happening that could merge the price of coal (and oil) to the price of gas. The major obstacle with fuel switching from gas to coal is a shortage of coal fired power plants, as many have been closed in recent years to reduce emissions[18].

[17] https://www.bruegel.org/blog-post/can-europe-manage-if-russian-oil-and-coal-are-cut
[18] https://beyond-coal.eu/europes-coal-exit/

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com



Source: Barchart, own conversions as of 19th Aug 2022

According to the German association of coal importers (VdKi), coal imports from Russia can be replaced from the US, Colombia, South Africa and Australia, and this is exactly what happened so far. Since July 18 there were no new coal imports from Russia to Europe with imports in June doubling y-o-y to 7.9mio metric tonnes, while only 2.3mio metric tonnes came from Russia.[19] This is an indicator that European governments only ban or sanction commodity flows that they are certain to be able to replace from elsewhere – exactly this is why there are no sanctions on natural gas for Russia. On the other hand, banning Russian coal also disables fuel switching, as thermal coal needs to be replaced first before it can be increasingly used instead of gas. Annualising the June thermal coal import of 7.9mio metric tonnes would increase thermal coal imports by 27% y-o-y (**162 TWh**). Together with fuel switching to oil, this would bring almost **400 TWh** of additional energy from oil and coal – exactly the amount missing in a worst case Russia supply scenario and a best case non-Russia supply scenario.

The Uranium Outlook

The trend in nuclear power plants has been clear in recent years: Developed nations decommissioned their plants and emerging countries began constructing plants. Over the last two years around **94 TWh**

[19] https://www.reuters.com/business/energy/europe-ramps-up-coal-imports-energy-supply-fears-grow-2022-07-26/

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

have been decommissioned vs. **85 TWh** of new nuclear plants generating first power. However, the tide will turn in 2023 with around **94 TWh** (**73 TWh** in 2024) of new nuclear plants generating first power vs. only **6 TWh** (**5 TWh** in 2024) of decommissioning. Most of these new plants coming to the grid remain in emerging countries. This year could also bring some surprises, as Japan is looking to restart at least 7 of their nuclear plants and Germany might extend their remaining three plants. The decision on Japan's nuclear power plants came just now as they seek to restart 7 plants by mid-2023, plans to bring another 10 plants online soon after and invest in new nuclear power plants. To bring these plants back online, Japan has uranium inventories that can be drawn from.

Nuclear power plants to be decommissioned 2020-2025

Country	Reactor	MWe	TWh	Decomissioning date
France	Fessenheim 1	880	5.1	2020
France	Fessenheim 2	880	5.1	2020
Russia	Leningrad 2	925	5.4	2020
Sweden	Ringhals 1	881	5.1	2020
USA	Indian Point 2	998	5.8	2020
USA	Duane Arnold	601	3.5	2020
Germany	Grohnde	1360	7.9	2021
Germany	Brokdorf	1410	8.2	2021
Germany	Gundremmingen C	1288	7.5	2021
Pakistan	Karachi 1	90	0.5	2021
Russia	Kursk 1	925	5.4	2021
Taiwan	Kuosheng 1	985	5.7	2021
UK	Dungeness B 1-2	1040	6.0	2021
USA	Indian Point 3	1030	6.0	2021
UK	Hunterston B	1288	7.5	2022
UK	Hinkley Point B	840	4.9	2022
USA	Palisades	805	4.7	2022
Belgium	Doel 3	1006	5.8	Oct-22
Germany	Isar 2	1410	8.2	2022 / TBD
Germany	Emsland	1335	7.7	2022 / TBD
Germany	Neckarwestheim 2	1310	7.6	2022 / TBD
Belgium	Tihange 2	1008	5.8	Feb-23
Russia	Kursk 2	925	5.4	2024
Russia	Bilibino 2	11	0.1	2025
Russia	Leningrad 3	925	5.4	2025
Belgium	Doel 1	445	2.6	Feb-25
Belgium	Tihange 1	962	5.6	Oct-25
Belgium	Doel 2	445	2.6	Dec-25

Source: World Nuclear Association

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Nuclear power plants to be connected to the grid 2020-2025

Country	Reactor	MWe	TWh	First power production
UAE	Barakah 1	1345	7.8	Aug-20
China	Tianwan 5	1060	6.1	Sep-20
Belarus	Ostrovets 1	1110	6.4	Nov-20
India	Kakrapar 3	630	3.6	Jan-21
Pakistan	K-2	1014	5.9	Mar-21
China	Tianwan 6	1060	6.1	Jun-21
Japan (restart)	Mihama 3	780	4.5	Jun-21
China	Hongyanhe 5	1061	6.1	Aug-21
UAE	Barakah 2	1345	7.8	Sep-21
Russia	Bilibino 3-4	22	0.1	Dec-21
Finland	Olkiluoto 3	1600	9.3	Mar-22
Pakistan	K-3	1014	5.9	Mar-22
Russia	Kursk II-1	1255	7.3	Apr-22
South Korea	Shin Hanul 1	1340	7.8	Jun-22
Slovakia	Mochovce 3	471	2.7	2022
China	Fangchenggang 3	1180	6.8	2022
Japan (restart)	Kashiwazaki-Kariwa 7	1356	7.9	Oct-22
Japan (restart)	Tokai 2	1100	6.4	Beginning 2023
South Korea	Shin Kori 5	1400	8.1	Mar-23
USA	Vogtle 3	1250	7.2	Q1 2023
Japan (restart)	Shimane 2	820	4.7	in 2023
Japan (restart)	Takahama 1	826	4.8	Jul-23
Japan (restart)	Takahama 2	826	4.8	Jul-23
Japan (restart)	Onagawa 2	825	4.8	Mid-23
Japan (restart)	Kashiwazaki-Kariwa 6	1356	7.9	Mid-23
Argentina	CAREM25	0.029	0.0	2023
China	Xiapu 1	600	3.5	2023
China	Fangchenggang 4	1180	6.8	2023
Russia	Kursk II-2	1255	7.3	2023
Slovakia	Mochovce 4	471	2.7	2023
South Korea	Shin Hanul 2, Ulchin	1400	8.1	2023
Turkey	Akkuyu 1	1200	6.9	2023
UAE	Barakah 3	1400	8.1	2023
USA	Vogtle 4	1250	7.2	Q4 2023
Bangladesh	Roppur 1	1200	6.9	2023 or 2024
China	Zhangzhou 1	1212	7.0	2024
China	Shidaowan 1	1500	8.7	2024
France	Flamanville 3	1650	9.6	2024
Iran	Bushehr 2	1057	6.1	2024
Turkey	Akkuyu 2	1200	6.9	2024

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

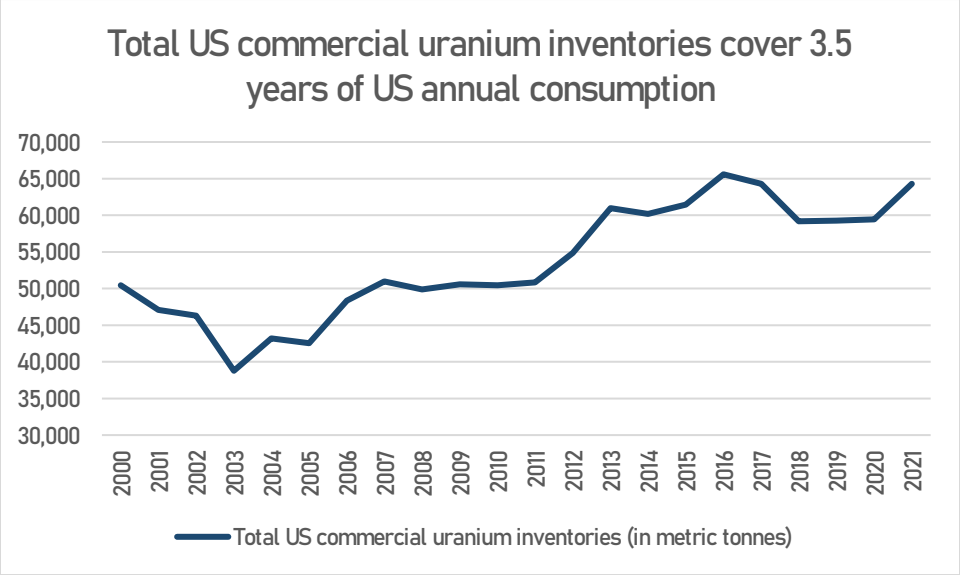
UAE	Barakah 4	1400	8.1	2024
Bangladesh	Roppur 2	1200	6.9	2024 or 2025
China	Zhangzhou 2	1212	7.0	2025
China	Huizhou Taipingling 1	1200	6.9	2025
China	Shidaowan 2	1500	8.7	2025
Slovakia	Bokunice New Block	1200	6.9	2025
Turkey	Akkuyu 3	1200	6.9	2025
Kazakhstan	Kurchatov	600	3.5	after 2025
Slovakia	Kecerovce	1200	6.9	after 2025

Source: World Nuclear Association

A 1000 MWe pressurized water reactor requires around 250 tonnes of natural uranium (including 3-5% enriched uranium), 15mio fuel pellets housed in over 45,000 fuel rods each year[20]. In 2023 a 15,000 MWe of net new nuclear power plants are expected to be connected to the grid, which would require 3,750 tonnes of additional uranium a year. Kazatomprom, the largest uranium producer with a 24% market share, has reduced production by around 20% for 2023 and by 10% in 2024, which is expected to remove global supply by around 5,000 tonnes in 2023[21] and 3,500 tonnes in 2024[22]. Although the group has around 9,276 tonnes of uranium inventory, given the additional demand due to new nuclear plants, this will likely increase the price of uranium for the next two years. The company also has a history of changing its CEO on an almost annual basis, which might be due to influence from Moscow. All supplies from Kazatomprom are being shipped via the port of St. Petersburg in Russia, which adds some uncertainty in the current environment. Furthermore, since the Ukraine invasion, governments and utilities have re-examined their supply chains and have increasingly sought longer term supply agreements, especially since the industry relies on Russian enrichment capacity by around 39%[23]. Typically, contracts range between 3-15 years and are directly negotiated between utilities and producers[24], and this is why the market is slow moving and certainly cannot help much with replacing a decline of natural gas supplies – also due to the duration it takes to build up new nuclear power plants. Last but not least, the largest uranium consumer (US with 1/3 of world share) has around 64,000 tonnes of commercial uranium inventories, which would cover their annual consumption 3.5x.

[20] https://www.nuclear-power.com/nuclear-power-plant/nuclear-fuel/fuel-consumption-of-conventional-reactor/
[21] https://otp.tools.investis.com/clients/uk/kazatomprom/rns/regulatory-story.aspx?cid=2438&newsid=1502968
[22] https://otp.tools.investis.com/clients/uk/kazatomprom/rns/regulatory-story.aspx?cid=2438&newsid=1616970
[23] https://www.cameco.com/invest/markets/supply-demand
[24] https://world-nuclear.org/information-library/nuclear-fuel-cycle/uranium-resources/uranium-markets.aspx

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com



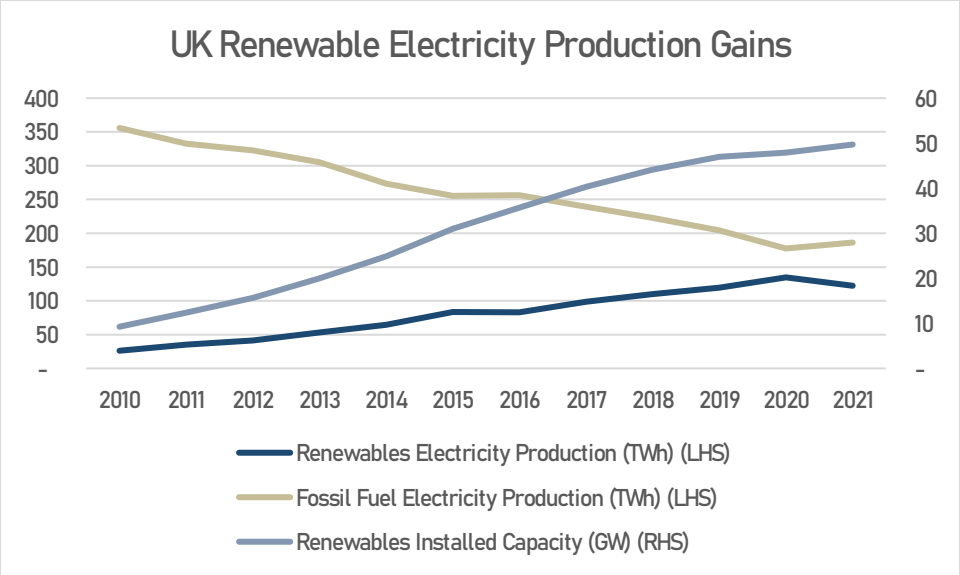
Source: EIA

The Renewables Outlook

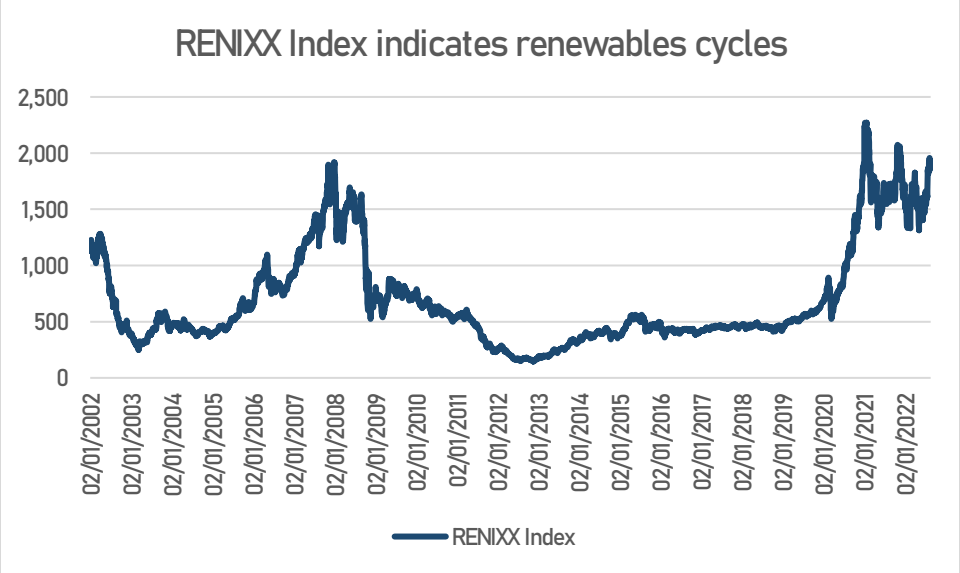
The EU & UK have enjoyed strong growth in renewable electricity generation to over 37%[25] & 44%[26] respectively in 2020 vs. 21% & 8% respectively 10 years earlier. However, the growth of installed capacity began to decelerate from 2017 onwards (UK). The reason for this is that renewables have followed cycles that can best be observed with the ups & downs of the RENIXX index. On average, it takes more than 10 years for a wind farm to generate electricity once the tendering process concluded. This is why the current renewable cycle will take until the end of this decade/beginning of 2030s to generate meaningful amount of electricity. In the UK, the growth in renewables will amount to around 1-3 TWh per year until mid-decade, which is just offsetting the reduction in nuclear power.

[25] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Renewable_energy_statistics#Share_of_renewable_energy_more_than_doubled_between_2004_and_2020
[26] https://www.gov.uk/government/statistics/energy-trends-section-6-renewables

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com



Source: Gov.uk



Source: Renewable-Energy-Industry.com

This brings me to the question whether the transition to EVs will be successful. A Brookings article states the simple thing that oil is used for transportation due to its high density of energy[27]. EVs therefore need

[27] https://www.brookings.edu/essay/why-are-fossil-fuels-so-hard-to-quit/

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

very large and heavy batteries to get the same amount of energy than with the internal combustion engine (ICE). The number of passenger cars in the EU[28] and UK[29] are combined 279mio. The average amount of kilometres a car is driven in the EU & UK is around 11,500km[30] per year. If we had 250mio EVs on the road driving an average 11,500km per year where 100km require 20kwh of electricity[31], this would require additional 575 TWh per year – or 11.5% of current annual EU & UK electricity consumption. In a world where the EU & UK is banning Russian gas imports (40% of total gas imports), to require an additional 11.5% electricity makes the case for EVs extremely grim, especially at the equivalent of $420 a barrel (including taxes, current £1.82 per litre diesel is the equivalent of $341 a barrel already – also a record).

The Shipping Outlook

In light of the rerouting of trade routes (Russia away from Europe and towards India, China and the US, Australia, Africa away from Asia and towards Europe) and a decline in pipeline energy transport, the question is what this means to the shipping market, as more LNG and oil products will need to be shipped and for longer distances. In the case of LNG it is clear that there is a shortage of LNG tankers. If we assume that 1,000 TWh (102 bcm) of Russian gas from pipeline is being cut, this gas needs to arrive by LNG tankers. However, there are only around 700 LNG tankers out there carrying 488bcm a year[32]. The move away from Russian gas would therefore require a 20% increase in LNG tankers – or 140 additional LNG tankers. The largest shipyards for LNG tankers have barely exceeded 50 a year and the additional capacity needed would take at least until 2026 and beyond to fill. Charter rates for LNG tankers have soared to a 10-year high of $120k a day as a result of the higher demand – up 50% y-o-y[33].

[28] https://www.acea.auto/publication/report-vehicles-in-use-europe-2022/#:~:text=In%202020%2C%20the%20EU%20passenger,on%20the%20road%20in%20total.
[29] https://www.statista.com/statistics/299972/average-age-of-cars-on-the-road-in-the-united-kingdom/#:~:text=Vehicles%20%26%20Road%20Traffic-,Number%20of%20cars%20on%20the%20road%20in,Kingdom%20(UK)%202000%2D2020&text=There%20were%20around%2032.7%20million,the%20United%20Kingdom%20in%202020.
[30] https://www.odyssee-mure.eu/publications/efficiency-by-sector/transport/distance-travelled-by-car.html#:~:text=Sectoral%20Profile%20%2D%20Transport&text=Large%20discrepancy%20of%20the%20average,km%2Fyear%20for%20the%20EU.
[31] https://insights.leaseplan.co.uk/electric-vehicles/ev-news/electric-vehicle-cost/
[32] https://www.statista.com/statistics/468412/global-lng-tanker-fleet/
[33] https://oilprice.com/Energy/Natural-Gas/The-Rush-Is-On-For-LNG-Tankers.html

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Number of ships that carry energy 2020/21

Type	Number	Amount carried a year
Oil tankers	2,210	1.86bmt
LNG tankers	700	488bcm
Bulk carriers	12,312	912mio dwt

Source: Statista, USDA

The tanker market is looking equally tight. Only 23 tankers were contracted to be built in the first six months of 2022 (a record low)[34] vs. 81 being demolished[35]. The decline in the number of tankers is expected to continue, as the monthly order book hits record lows[36]. On top of that, Russia is an important producer of diesel (2mio bopd vs. 30mio bopd global demand) with Europe importing around 700k bopd[37]. Replacing these supplies will be extremely hard, especially due to the low distillates inventories in the US.

Conclusions

- 2011 Japan earthquake serves as example for energy saving model[38]
- Unless this year's winter is extremely cold, Europe will likely exit the winter with strong gas in storage levels
- Gas in storage injections at current pace would lead to 100% gas in storage in Europe by beginning/mid-October, which could then lead to a significant downturn in gas prices (although from mid-October gas storage is usually being drawn from)
- Uranium is vulnerable to price spikes due to a mismatch of supply and demand in 2023/24 and could be the ultimate weapon of Putin against the West. Different to oil and gas, the Iran nuclear deal is also positive for uranium. The US would then end up drawing their inventories

[34] https://www.argusmedia.com/en/news/2353087-tanker-newbuilding-lowest-on-record-bimco
[35] https://lloydslist.maritimeintelligence.informa.com/LL1141599/Ship-scrapping-activity-sees-sharp-drop
[36] https://gcaptain.com/a-shrinking-oil-tanker-fleet-may-deepen-the-energy-crisis/?subscriber=true&goal=0_f50174ef03-bc4def86d5-170437283&mc_cid=bc4def86d5&mc_eid=61a021805a
[37] https://www.dailysabah.com/business/energy/sanctions-on-russia-may-trigger-global-diesel-supply-crisis
[38] https://www.reuters.com/world/asia-pacific/keep-calm-cut-air-con-japans-energy-saving-is-model-europe-2022-07-28/

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

- Tanker, LNG and bulker market should stay strong in light of longer travel distances from source to consumer due to avoidance of Russia by Europe and replacing gas from pipeline via LNG tankers
- Gas producers should hedge as much flow as possible at these levels. However, this is easier said than done due to margin calls that could require significant amount of cash
- The dramatic ESG movement since the pandemic began has resulted in the exact opposite of its intentions: Higher carbon emissions due to fuel switching to cheapest source of energy (coal)
- Energy security follows a very simple equation, which the West failed to engage on
- Political leaders got hooked on votes gained from the ESG agenda – but failed to explain voters on the inevitable outcome of this agenda and what changes to life it would bring
- As a result of the new bi-polar world, China will lose its crown of factory of the world over time and deglobalisation could stall, perhaps reduce energy demand over the medium term
- China has limited EVs mobility due to energy blackouts. In light of the new geopolitical landscape, I believe the likelihood of EVs replacing the ICE is reducing. The fact that we can drive with oil without affecting our electricity bill is very positive. It will probably take 10 years longer than estimated to switch to EVs as the electricity grid needs to be very well prepared

Appendix

Below are the top 10 producers, consumers and reserves of natural gas, oil, coal and uranium. What stands out is that NATO & its allies generally beat Shanghai Cooperation Organisation (SCO) in consumption of fossil fuels, but in most instances loses in terms of production and reserves. History has told us that access to energy has often determined the winner of wars. NATO & its allies certainly have an edge in renewables, but to win this war, there is no way round to increase production, exploration of fossil fuels and win allies with such reserves, especially for Europe.

NATO vs. SCO on energy supply & demand

	Region	% Production	% Consumption	% Reserves
Gas	NATO & Allies	41%	32%	20%
	SCO & Allies	32%	30%	61%
Oil	NATO & Allies	28%	31%	9%
	SCO & Allies	44%	28%	68%
Coal	NATO & Allies	18%	16%	46%
	SCO & Allies	67%	68%	41%
Uranium	NATO & Allies	31%	71%	49%
	SCO & Allies	68%	29%	38%

Source: All of the following below

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Natural Gas

Top 10 Largest Natural Gas Producers

	Country	Billion Cubic Metres	% Share of Total
1	United States	975	23%
2	Russia	791	19%
3	Iran	239	6%
4	China	209	5%
5	Canada	191	5%
6	Qatar	169	4%
7	Australia	143	3%
8	Norway	119	3%
9	Saudi Arabia	101	2%
10	Algeria	99	2%

Source: Enerdata World Energy & Climate Statistics – Yearbook 2022

Top 10 Largest Natural Gas Consumers

	Country	Billion Cubic Metres	% Share of Total
1	United States	862	21%
2	Russia	565	14%
3	China	365	9%
4	Iran	233	6%
5	Canada	133	3%
6	Saudi Arabia	101	2%
	Japan	101	2%
8	Germany	96	2%
9	United Kingdom	79	2%
10	Italy	76	2%

Source: Enerdata World Energy & Climate Statistics – Yearbook 2022

Top 10 Largest Natural Gas Reserves

	Country	Trillion Cubic Metres	% Share of Total
1	Russia	37	20%
2	Iran	32	17%
3	Qatar	25	13%
4	Turkmenistan	14	7%
5	United States	13	7%
6	China	8	4%
7	Venezuela	6	3%
8	Saudi Arabia	6	3%
9	UAE	6	3%
10	Nigeria	6	3%

Source: BP Statistical Review of World Energy 2021

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Oil

Top 10 Largest Oil Producers

	Country	Mio barrels per day	% Share of Total
1	United States	18.9	20%
2	Saudi Arabia	10.8	11%
3	Russia	10.8	11%
4	Canada	5.5	6%
5	China	5.0	5%
6	Iraq	4.1	4%
7	United Arab Emirates	3.8	4%
8	Brazil	3.7	4%
9	Iran	3.5	4%
10	Kuwait	2.7	3%

Source: EIA 2021

Top 10 Largest Oil Consumers

	Country	Mio barrels per day	% Share of Total
1	United States	19.8	20%
2	China	15.3	16%
3	India	4.7	5%
4	Russia	3.6	4%
5	Japan	3.4	4%
6	South Korea	2.6	3%
7	Canada	2.4	2%
8	Brazil	2.3	2%
9	Germany	2.1	2%
10	Iran	1.7	2%

Source: EIA 2021

Top 10 Largest Oil Reserves

	Country	Bn barrels	% Share of Total
1	Venezuela	304	18%
2	Saudi Arabia	259	15%
3	Iran	209	12%
4	Iraq	145	8%
5	Kuwait	102	6%
6	United Arab Emirates	98	6%
7	Russia	80	5%
8	Libya	48	3%
9	United States	47	3%
10	Nigeria	37	2%

Source: EIA 2021, OGJ

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Coal

Top 10 Largest Coal Producers

	Country	Million Tonnes	% Share of Total
1	China	3,969	50%
2	India	829	10%
3	Indonesia	592	7%
4	United States	523	7%
5	Australia	456	6%
6	Russia	435	5%
7	South Africa	244	3%
8	Germany	126	2%
9	Poland	108	1%
10	Kazakhstan	106	1%

Source: Enerdata World Energy & Climate Statistics – Yearbook 2022

Top 10 Largest Coal Consumers

	Country	Million Tonnes	% Share of Total
1	China	4,102	52%
2	India	1,024	13%
3	United States	497	6%
4	Russia	214	3%
5	South Africa	188	2%
6	Japan	182	2%
7	Germany	164	2%
8	Indonesia	138	2%
9	Turkey	124	2%
10	South Korea	117	1%

Source: Enerdata World Energy & Climate Statistics – Yearbook 2022

Top 10 Largest Coal Reserves

	Country	Million Tonnes	% Share of Total
1	United States	248,941	23%
2	Russa	162,166	15%
3	Australia	150,227	14%
4	China	143,197	13%
5	India	111,052	10%
6	Germany	35,900	3%
7	Indonesia	34,869	3%
8	Ukraine	34,375	3%
9	Poland	28,395	3%
10	Kazakhstan	25,605	2%

Source: BP Statistical Review of World Energy 2021

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Uranium

Top 10 Largest Uranium Producers

	Country	Metric Tonnes	% Share of Total
1	Kazakhstan	21,819	45%
2	Namibia	5,753	12%
3	Canada	4,693	10%
4	Australia	4,192	9%
5	Uzbekistan	3,500	7%
6	Russia	2,635	5%
7	Niger	2,248	5%
8	China	1,885	4%
9	India	615	1%
10	Ukraine	455	1%

Source: World-Nuclear.org

Top 10 Largest Uranium Consumers

	Country	Metric Tonnes	% Share of Total
1	United States	18,300	32%
2	China	10,800	19%
3	France	8,700	15%
4	Russia	6,200	11%
5	South Korea	5,100	9%
6	Japan	2,300	4%
7	Ukraine	1,900	3%
8	United Kingdom	1,800	3%
9	Canada	1,400	2%
10	Spain	1,200	2%

Source: Statista

Top 10 Largest Uranium Reserves

	Country	Metric Tonnes	% Share of Total
1	Australia	1,692,700	28%
2	Kazakhstan	906,800	15%
3	Canada	564,900	9%
4	Russia	486,000	8%
5	Namibia	448,300	7%
6	South Africa	320,900	5%
7	Brazil	276,800	5%
8	Niger	276,400	4%
9	China	248,900	4%
10	Mongolia	143,500	2%

Source: World-Nuclear.org

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

This note was created by David Herrmann in collaboration with Usman Khan, a remote summer intern in Pakistan & 2nd year LSE politics & economics student.

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com

Legal Disclaimer

The contents of this publication have been prepared solely for the purpose of providing information about AozoraStep Capital LLP and the services and products it intends to offer, which are targeted for UK-based professional investors only. The opinions and views expressed are those of AozoraStep, may change without notice and should not be construed as investment, tax, legal or other advice. AozoraStep does not guarantee the completeness and accuracy of the information provided and all content can become out of date. Products or services mentioned on this site are subject to legal and regulatory requirements in applicable jurisdictions and may not be available in all jurisdictions. Accordingly persons are required to inform themselves and observe any such restrictions. In respect to investments described on this website, past performance is not a guide to future performance. The value of investments and the income of any financial instruments mentioned on this website may fall as well as rise and may have tax consequences. The performance of AozoraStep is based on a personal track record and approved by Sedulo for the time period Q1 2019 - Q1 2021 only with further examinations being done on an occasional basis. AozoraStep Capital LLP is currently not authorized by the FCA, but is in the process of authorization. AozoraStep Capital LLP is registered in England and Wales with registered number OC436835. Registered Office: 57 Lansdowne House, Berkeley Square, London W1J 6ER, United Kingdom. Reproduction or distribution of any materials obtained in this presentation or linking to this presentation without written permission is prohibited.

57 Lansdowne House, Berkeley Square, London W1J 6ER
www.aozorastep.com · david@aozorastep.com