Marketing Communication

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Investing in Nuclear Energy

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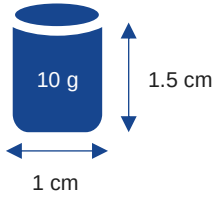
Uranium & Nuclear energy

Uranium is a radioactive chemical element naturally found in low concentrations in soil, rock and water.

Uranium is very energy-dense, meaning that a **small amount** of it **contains a large amount of energy**. According to the World Nuclear Association, one kilogram of uranium can produce 80 mil megajoules (MJ) of energy, ~2.6 mil times that of coal, ~1.5 mil times that of natural gas and ~1.8 mil times that of lithium.

Nuclear Energy is energy released by a nuclear reaction. It is typically generated using the process of fission in which the nucleus of an atom is split into smaller nuclei and some by-products, thereby releasing energy and heat.



One Uranium fuel pellet contains as much Energy as

~500
Cubic Meters of Natural Gas

~560
Liters of Oil

1
Ton of Coal

Source: NEI; National Nuclear Data Center; Wikimedia Commons under CC-BY-4.0

Revived Interest in Nuclear Energy

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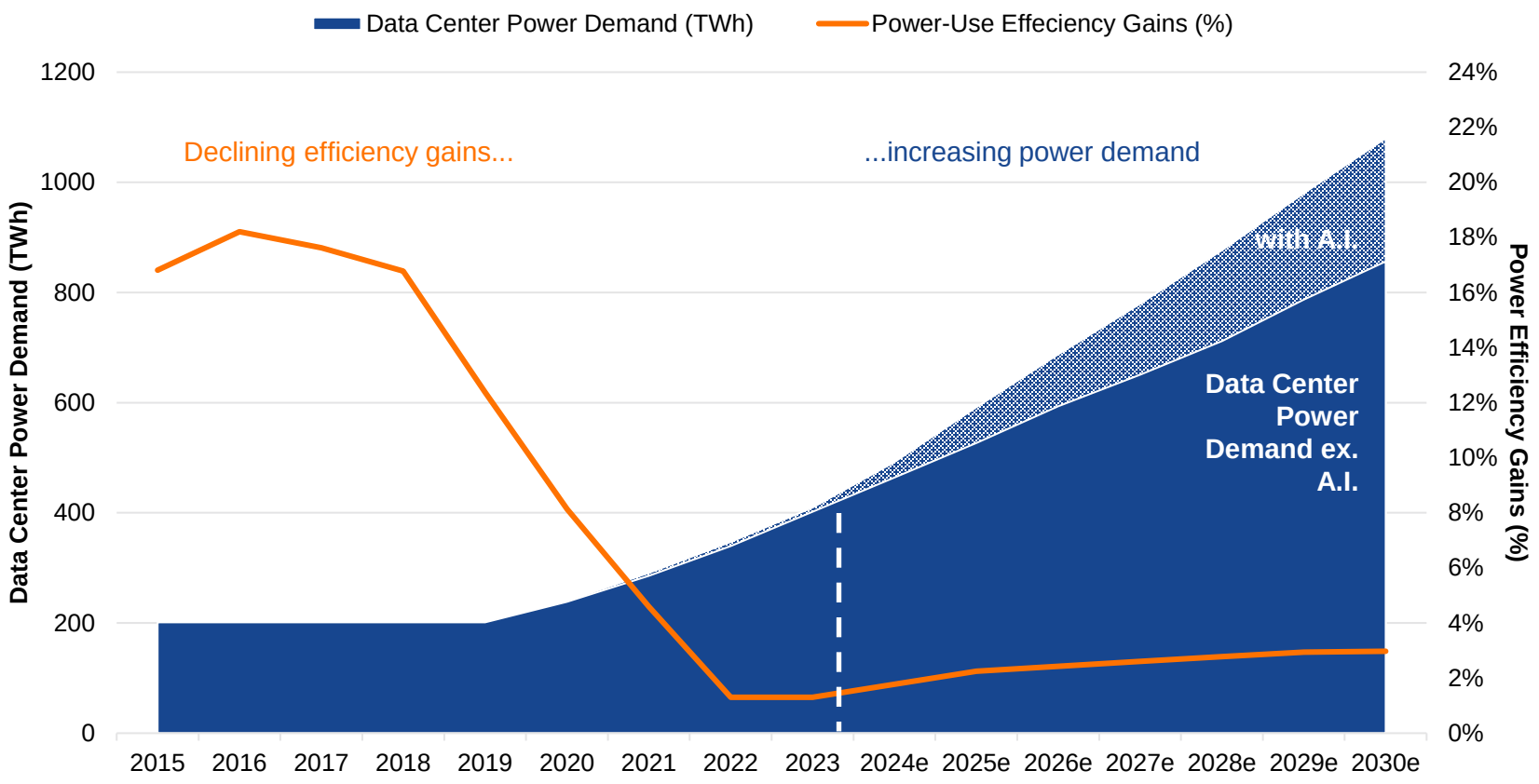
- Concerns about **energy security** drove European countries to extend lifetimes of existing nuclear plants, many of which were scheduled to shut down. Currently, 75 out of 109 European reactors received permissions to **continue operating** past their previously planned decommissioning date. Many European governments have reconsidered their nuclear energy policies and committed to **building new** nuclear reactors.
- 59 Nuclear reactors are currently **under construction** globally
    - 26 of these are in China, with a further 41 planned
    - India is another significant player looking to add nuclear to its energy mix, with plans to commission 20 new plants by 2031.
- In the wake of AI boom, low carbon footprint and stability of Nuclear Energy attract **large IT players** looking to limit their environmental impact, while keeping a consistent energy supply
    - Microsoft and US utility Constellation Energy signed a deal to revive a dormant unit of the Three Mile Island nuclear plant in Pennsylvania
    - Amazon to partner with US utility Dominion Energy on nuclear power for data centers
    - Google signed an agreement with startup Kairos Power to purchase energy from Small Modular Reactors (SMRs) starting 2030
- Five US miners are **restarting domestic operations** in Texas, Wyoming, Arizona and Utah mines that were closed in the aftermath of Fukushima disaster
- Nuclear is a focal point of the new US energy policy

Sources: IAEA, Reuters

Increasing Electricity Demand

Data Centers are Increasing Global Electricity Demand



Modern Drivers of Electricity Demand

- Artificial Intelligence
- Data Centers
- Electric Vehicles
- Extreme Weather
- Streaming

Deepseek Effect

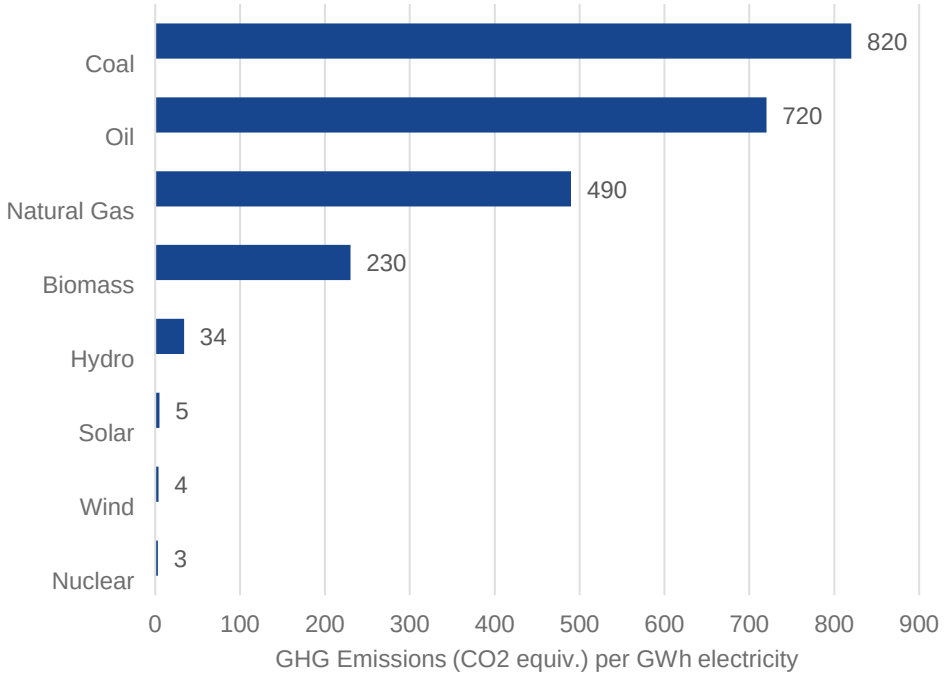
Lower energy demand for AI model training could be compensated by increased adoption driven by higher demand for AI inference

Source: Goldman Sachs (via Masanet et. al, 2020, IEA, Cisco and Goldman Sachs Global Investment Research). For illustrative purposes only.

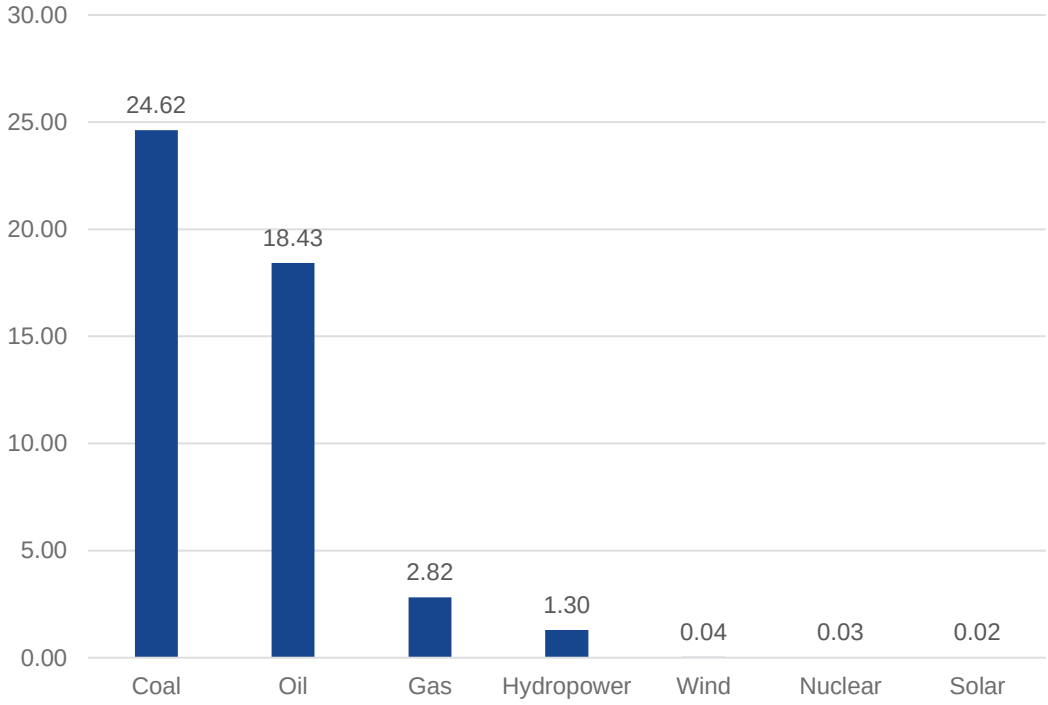
Nuclear Energy – Decarbonization

Nuclear power has one of the lowest lifecycle carbon footprints among conventional energy sources

Greenhouse gas footprint over lifecycle of the power plant



Deaths per TWh of electricity production

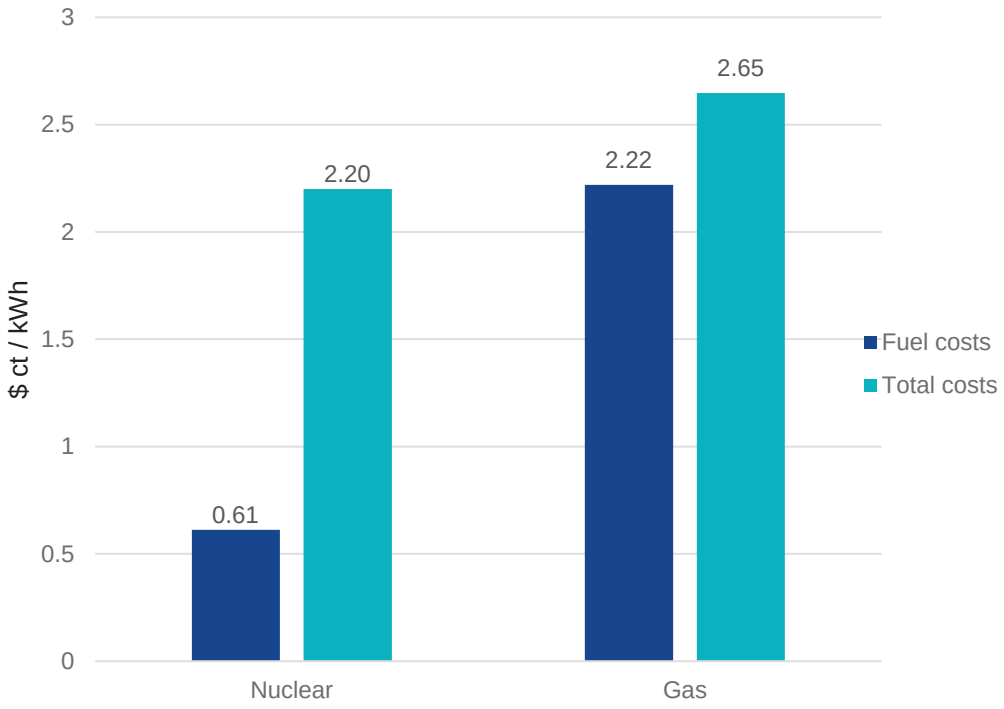


Sources: IEA, 2020; Our World in Data, 2021 - under CC-BY

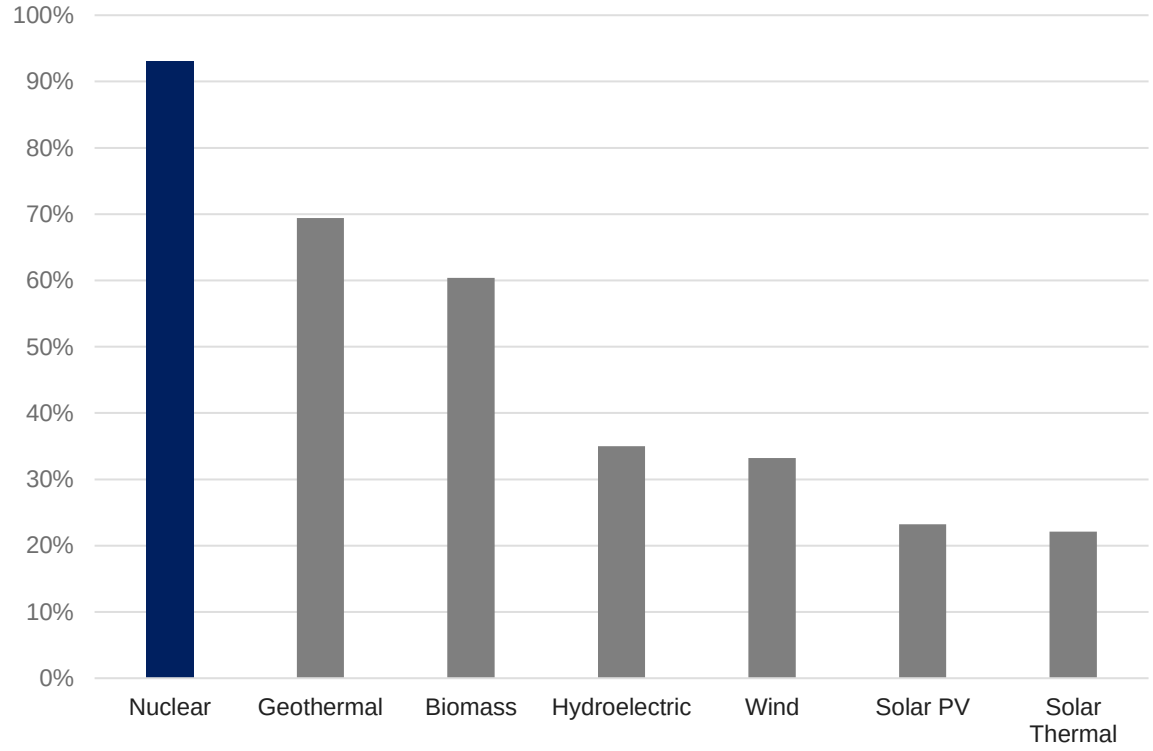
Nuclear Energy – Energy Independence

Nuclear energy is much less dependent on commodity prices compared to fossil fuels, providing crucial price stability. At the same time, nuclear power plants can generate electricity more consistently and with less downtime than other renewable energy sources, making them irreplacable as the backbone of the low-carbon grid.

Share of fuel costs in total operating costs



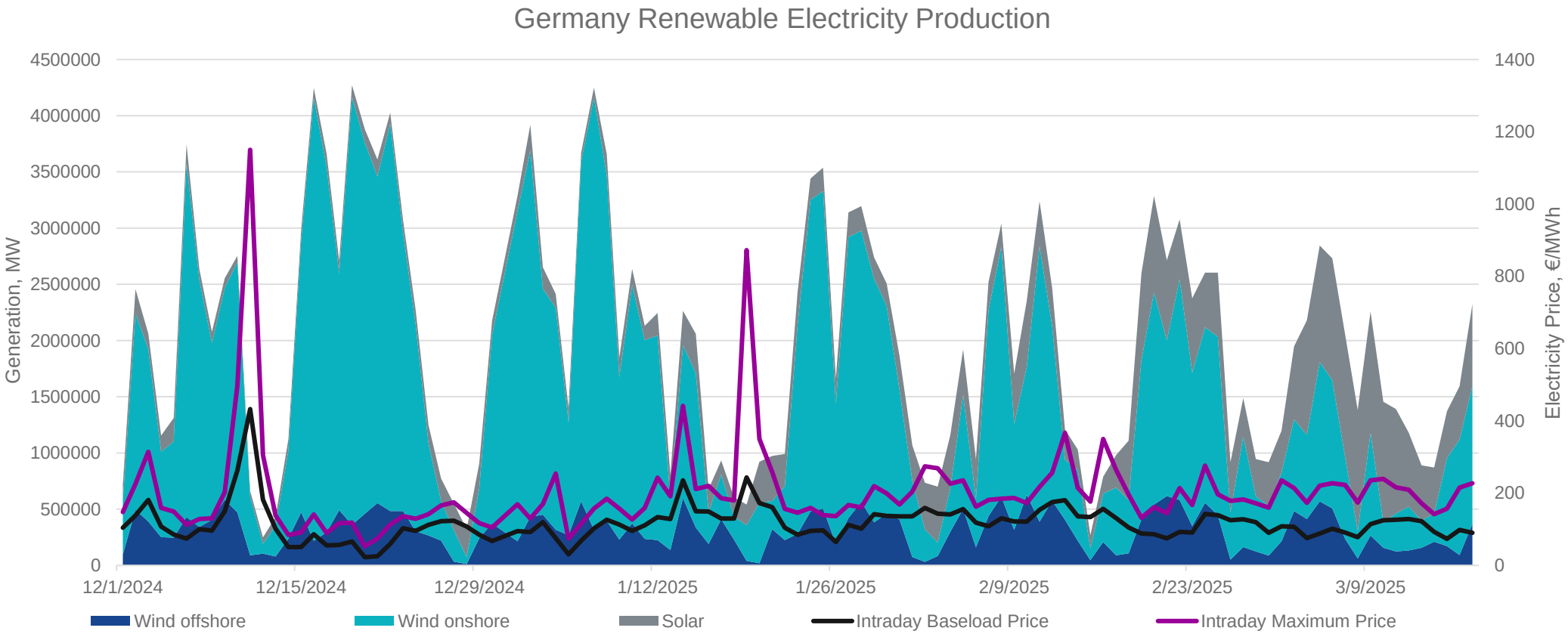
Low-carbon energy capacity factor, %



Sources: US Energy Information Administration, 2023, : IEA, 2020; Our World in Data, 2021 - under CC-BY, van Zalk & Behrens 2018, median power density figures. Capacity factor represents the ratio of actual electricity generation to the theoretical maximum electrical energy output.

Energy Independence and Stable Grid

- Germany's reliance on wind and solar leaves it vulnerable to periods of bad weather
- The missing generation is replaced either by fossil fuels or electricity imports
- Surge in electricity imports leads to higher prices in exporter countries
    - This indirectly caused a political crisis in Norway
    - Swedish government directly expressed their dissatisfaction with the current state of affairs



Sources: Entso-E, EPEX

The Future of Nuclear Energy

In addition to the proven Nuclear Energy solutions and designs, scientists are working on new technologies that would enable safer, cleaner, and more efficient nuclear power to meet the world's rising energy needs. From small modular reactors that could provide flexible, scalable power to advanced reactors that could offer enhanced safety and efficiency, the new nuclear technologies have the potential to significantly contribute to the low-carbon world.

Nuclear technologies of the future

Nuclear Fusion

Modular Reactors

Non-water-cooled reactors

Waste Transmutation

Source: Wikipedia, Wikimedia Commons under CC-BY-SA

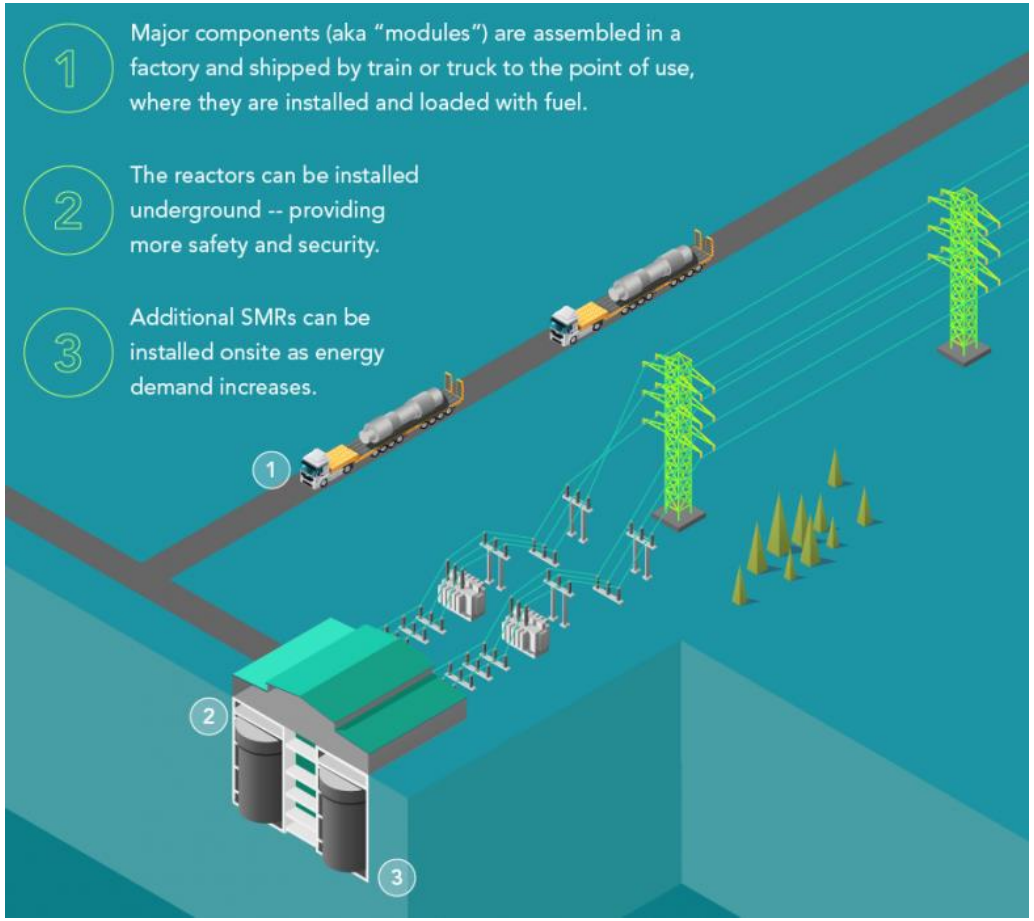
Small Modular Reactors (SMRs)

Small modular reactors (SMRs) are nuclear reactors that are smaller in size and power output compared to traditional nuclear reactors.

SMRs typically are designed to be factory-manufactured and transported to the site for assembly and installation, which means they can benefit from economies of scale in manufacturing and construction. This also gives them **location flexibility** and improves **scalability**, whereby modules can be installed to meet additional energy demand.

SMRs have a simpler design and fewer components compared to traditional large-scale nuclear reactors, reducing the risk of accidents and equipment failures. They also use less fuel and produce relatively less high-level radioactive waste compared to traditional large-scale nuclear reactors.

Small modular reactors – operating principle

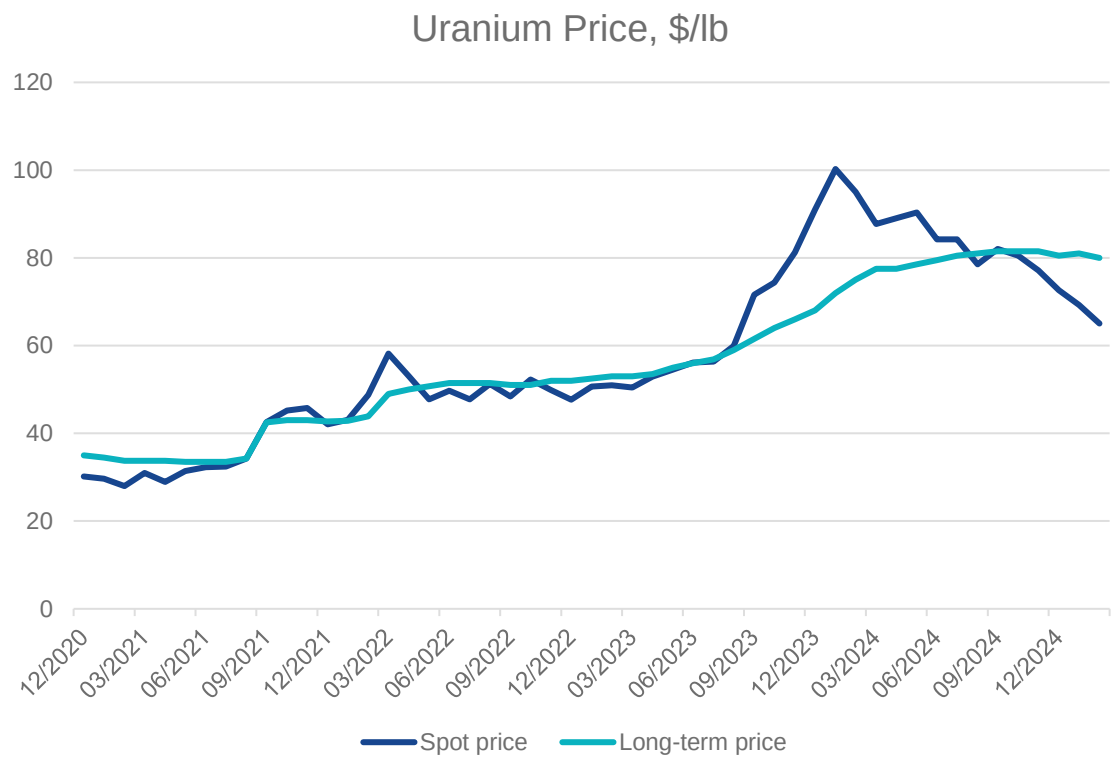


Source: US Department of Energy, Wikimedia Commons under CC-BY-SA-3.0

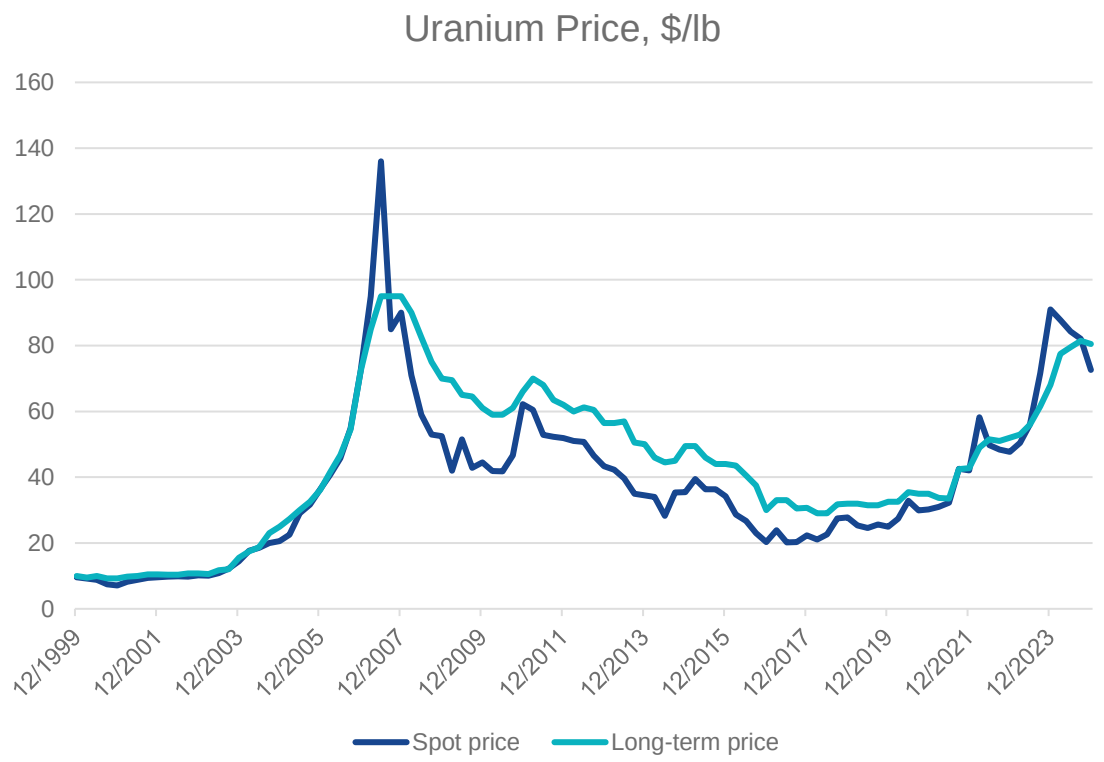
Uranium Markets

- Uranium trading is not institutionalized, and the metal prices are negotiated directly between the buyers and the sellers.
- There are 2 main Uranium price benchmarks, spot price and long-term price
- Major uranium miners usually sign their contracts 2-3 years in advance of deliveries, so they tend to focus on long-term prices.

Spot prices decline after the 2023 surge, long-term prices stable



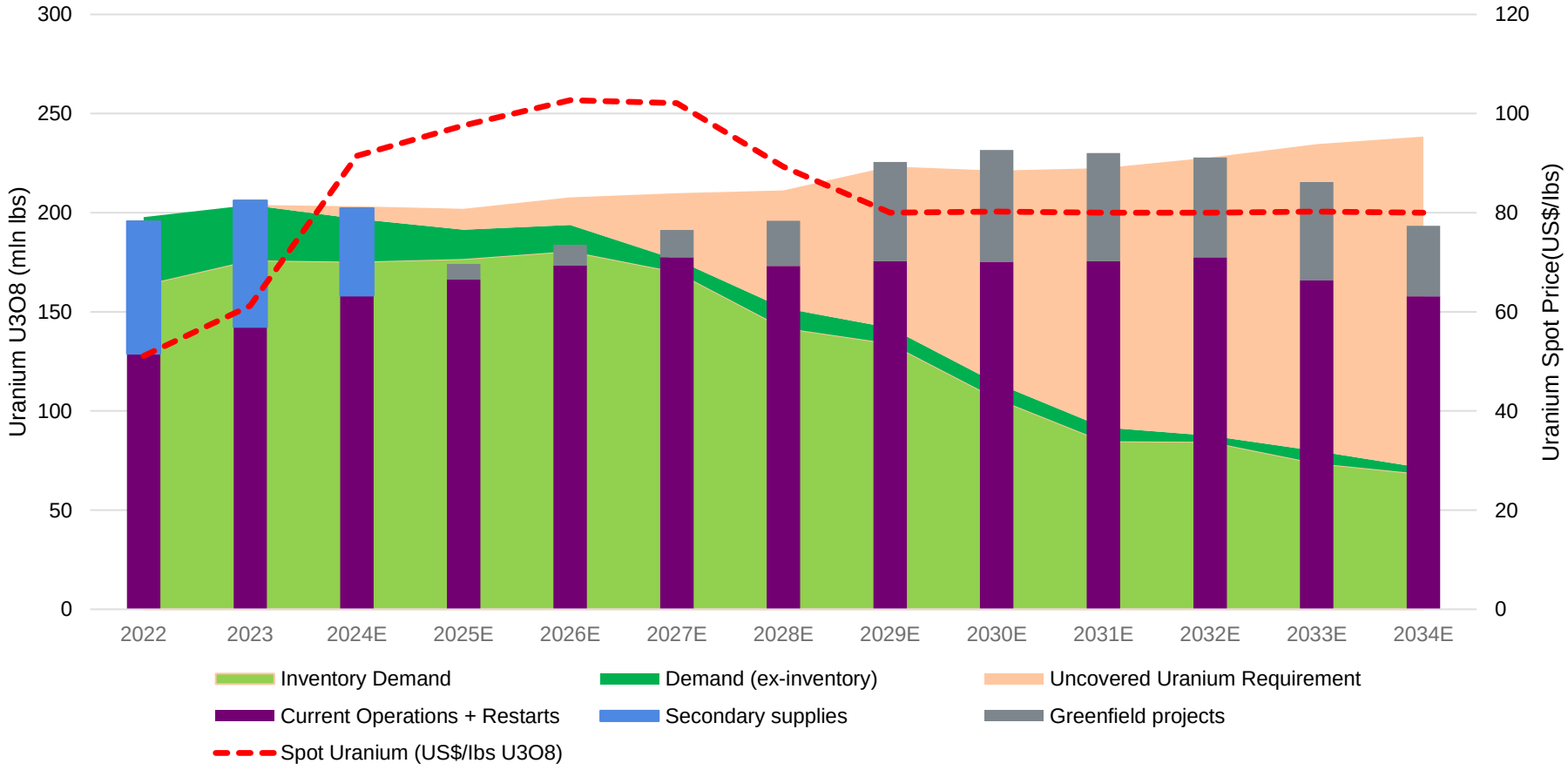
Long-term prices reached their post-Fukushima maximum in 2024



Source: Cameco

Uranium – Supply Dynamics

- Uranium prices could stay elevated for longer
- Secondary uranium supply likely to diminish
- Meeting long-term demand would require investments in new (greenfield) uranium mining operations



Source: UxC, 2024. Uncovered Uranium Requirement represents forecasted uranium demand not covered by existing contracts

Investing in Uranium/Nuclear Energy

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There are multiple ways of investing in Nuclear Energy, each one with their unique opportunities and drawbacks

Instrument type			
Equities	**Overall**	• Income generation potential	• Idiosyncratic risk
	Pure-play Nuclear Technologies	• The most direct way to invest in the nuclear industry	• Very small part of the nuclear supply chain is covered by listed pure-play companies
	Conglomerates with Nuclear Industry presence	• Usually established companies with stable business lines	• Limited upside due to diversified business lines
	Nuclear Utilities	• Can benefit from elevated nuclear energy demand	• Limited upside due to the nature of the business (regulation, capital intensive) • Could suffer from elevated Uranium prices
	Uranium Miners	• Potentially higher upside due to high beta to Uranium Prices	• Not always a direct relationship between commodity prices and miner returns • Not necessarily a direct relationship between nuclear adoption and Uranium prices
Commodities	**Physical Uranium (Closed-End Funds)**	• The easiest way to get direct exposure to Uranium prices • Can be traded as stocks, fairly liquid	• Possibility of a discount/premium to NAV, no redemptions • Not necessarily a direct relationship between nuclear demand and Uranium prices
	Uranium Futures	• Can be traded on major derivative exchanges	• Low adoption and liquidity • Not necessarily a direct relationship between nuclear adoption and Uranium prices
ETFs/Funds	**Nuclear/Uranium-focused funds**	• Diversified access to the theme • Can capture growth trends within the theme	• Can be invested in companies with limited exposure to the Nuclear Industry • Still subject to industry-specific risks

Index Methodology

MarketVector® Global Uranium and Nuclear Energy Infrastructure Index

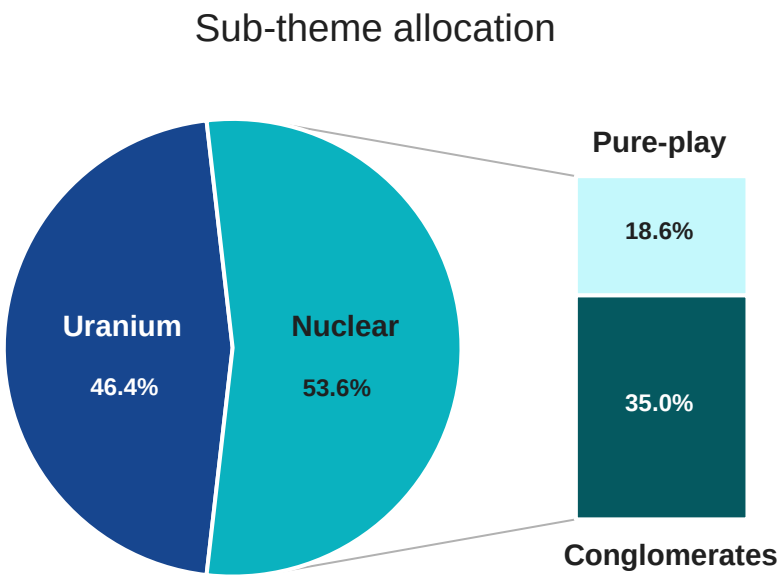
- **Selection universe**
  - Global universe of equity securities
  - Freely investable for foreign investors
  - Entry requirements: Market Capitalization >150 million USD **AND** 3M ADTV > 1 million USD **AND** >250k monthly shares traded over the last 6 months
- **Revenue Analysis**
  - Companies must:
  - Derive at least 50% of revenues from uranium (including uranium mining, or mining projects that have the potential to generate at least 50% of their revenues from uranium when developed)

  OR
  - Derive revenues from nuclear energy infrastructure (including projects related to the development and commercialization of nuclear fusion technology or molten salt nuclear reactor research; construction, engineering and maintenance of nuclear power facilities and nuclear reactors; or equipment and technology or services to the nuclear power industry)
- **Rebalancing frequency**
  - Quarterly
- **Index portfolio size**
  - At least 25 securities
  - Maximum component weight is 15% for the largest company, 10% for the second largest company, and 8% for all other companies.
  - Maximum weight for companies with less than 50% of their revenues from the uranium and nuclear energy infrastructure segments is 5%.
  - 500mn USD liquidity overlay is applied, whereby company's weight cannot be higher than ADTV divided by 500mn USD.
- **Buffer rule**
  - At each review, companies which generate 0% of revenues from nuclear infrastructure industry or less than 25% of revenues from uranium are removed from the index
- **ESG Exclusions**
  - Companies with an Overall ISS Norms-Based Controversy score of 9 or 10 (out of 10) or with very severe norms violations
  - Controversial weapons: biological, chemical, cluster or incendiary weapons, anti-personnel mines, depleted uranium, white phosphorus, nuclear weapons outside of NPT, civilian firearms
  - Sector exclusions: >5% revenue from coal, tobacco or oil sands
  - Companies currently not covered by ISS can be eligible for inclusion

Source: MVIS. The index is unmanaged and is not a security in which investment can be made. You cannot invest in an index. See disclosures at the end of the presentation.
For more information, please visit www.mvis-indices.com

Exposure to Nuclear Ecosystem

MarketVector® Global Uranium and Nuclear Energy Infrastructure Index



Uranium – Companies primarily involved in uranium mining or uranium investments

- **Cameco** (Canada)
- **Uranium Energy Corp** (US)
- **Paladin Energy** (Australia)

Nuclear (Pure-play) – Companies whose primary activity lies in the nuclear technologies / infrastructure sector

- **USEC** (US) – Nuclear Fuel
- **NuScale** (US) – Small Modular Reactors
- **Centrus Energy** (US) – Enrichment
- **Kepco E&C** (Korea) – Plant Construction and Maintenance

Nuclear (Conglomerates) – Diversified industrials with nuclear industry presence

- **Mitsubishi Heavy** (Japan)
- **AtkinsRealis** (Canada)
- **Jacobs Solutions** (US)

Source: MVIS, data as of 31 Dec 2024. The index is unmanaged and is not a security in which investment can be made. You cannot invest in an index. See disclosures at the end of the presentation. For more information, please visit www.mvis-indices.com

Exposure to Nuclear Ecosystem - Companies

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Cameco operates high-grade uranium mines, primarily in Canada and is one of the world's largest producers and refiners of uranium. It is also increasingly involved in the Nuclear side of the theme and recently took over Westinghouse (49% stake) in partnership with Brookfield Renewable Partners.

Centrus Energy is a US company that specializes in the enrichment of uranium for nuclear fuel. Originally part of the Department of Energy, the company provides services for both commercial nuclear power plants and government programs and is developing advanced uranium enrichment technologies.

AtkinsRéalis (formerly SNC-Lavalin) is a Canadian industrial conglomerate that provides comprehensive services across the entire nuclear lifecycle. As the steward of CANDU reactor technology, the company specializes in new reactor construction, refurbishment, and operational support. It is also actively engaged in the development of small modular reactors (SMRs), nuclear decommissioning and waste management.

VanEck Uranium and Nuclear Technologies UCITS ETF

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Key ETF Features

- Tracks the MarketVector Global Uranium and Nuclear Energy Infrastructure Index (MVNUCLTR)
- Companies contributing to advancement of Nuclear Energy.
- Exposure to leading Uranium miners
- Main risk factors: Risk of Investing in Natural Resources Companies, Liquidity Risks and Industry or Sector Concentration Risk
- Registered for public distribution in AT, CH, DE, DK, ES, FI, FR, IE, IT, LU, NL, NO, SE, PL, PT & UK

Performance*

Performance in %	YTD	1 Month	3 Months	6 Months	1 Year	3 Years	5 Years	Since Inception
ETF (NAV)	-6.90	-11.13	-18.60	5.15	10.87			22.89
MVNUCLTR (Index)	-6.81	-11.10	-18.47	5.47	11.58	18.53		23.45
Performance Differential (NAV - Index)	-0.09	-0.03	-0.13	-0.32	-0.71			-0.56

Trading Information

Exchange	ISIN	Currency	Ticker	Bloomberg	SEDOL	RIC
Borsa Italiana	IE000M7V94E1	EUR	NUCL	NUCL IM	BQCZXJ4	NUCL.MI
Deutsche Börse	IE000M7V94E1	EUR	NUKL	NUKL GY	BQCZXK5	NUKL.DE
Euronext Paris	IE000M7V94E1	EUR	NUCL	NUCL FP	NUCL.PA	NUCLEURINAV=I
London Stock Exchange	IE000M7V94E1	GBP	NUCG	NUCG LN	BQCZXG1	VVNUCG.L
London Stock Exchange	IE000M7V94E1	USD	NUCL	NUCL LN	BQCZXD8	NUCL.L

Fund Details

Inception Date	February 3, 2023
Base Currency	USD
Investment Strategy	Hard Assets
Product Structure	Physical (Full Replication)
Income Treatment	Reinvestment
Rebalance Frequency	Quarterly
TER	0.55%
Domicile	Ireland
AUM (28 February 2025)	$411.5M
Number of holdings	25

*Periods greater than one year are annualized.
Data as of 28 February 2025 unless otherwise noted. Historical performance is not indicative of future results. The index is unmanaged and is not a security in which investment can be made.
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VanEck Uranium and Nuclear Technologies UCITS ETF

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Holdings – Top 10, Sector Exposure, Country Exposure and Currency Exposure

Holding Name	Ticker	Currency	Country	Sector	% of Net Assets
Cameco Corp	CCJ US	USD	Canada	Energy	13.26
Bwx Technologies Inc	BWXT US	USD	United States	Industrials	9.82
Nexgen Energy Ltd	NXE US	USD	Canada	Energy	6.07
Samsung C&T Corp	028260 KS	KRW	South Korea	Industrials	5.92
Ihi Corp	7013 JP	JPY	Japan	Industrials	5.87
Atkinsrealis Group Inc	ATRL CN	CAD	Canada	Industrials	5.58
Jacobs Solutions Inc	J US	USD	United States	Industrials	5.50
Hitachi Ltd	6501 JP	JPY	Japan	Industrials	5.48
Oklo Inc	OKLO US	USD	United States	Utilities	5.07
Mitsubishi Heavy Industries Ltd	7011 JP	JPY	Japan	Industrials	4.97

Sector Exposure	% of Net Assets
Industrials	54.23
Energy	40.64
Utilities	5.07
Other/Cash	0.07

Country Exposure	% of Net Assets
Canada	31.78
United States	31.47
Japan	22.96
South Korea	7.53
Australia	3.87
United Kingdom	1.58
Kazakhstan	0.74
Other/Cash	0.07

Currency Exposure	% of Net Assets
U.S. Dollar	54.02
Japanese Yen	22.96
Canadian Dollar	9.97
South Korean Won	7.53
Australian Dollar	3.87
British Pound	1.58
Other/Cash	0.07

Source: VanEck. Data as of 28 February 2025. See disclaimers at the end of the presentation.

Risks

Risks

- VanEck UCITS ETFs provide no capital guarantee. They are linked to an index which may develop positively or negatively, i.e. the value of the ETF can rise or fall. The net asset value in particular can fall below the buying price at any time; in the event of a sale, this would therefore result in a loss of capital and in unfavorable circumstances (such as a market driven loss of all the index components) to total loss of the capital invested.
- In the interests of efficient portfolio management, financial instruments and techniques may be used to link the value of the fund to the performance of the index. Although prudent use of these financial instruments and techniques is generally advantageous, they also entail certain risks owing to the special characteristics of derivatives and the mechanisms of derivative markets.
- The equities which the index replicates may be traded in a different currency than that used by the investor. As a result, currency losses may have a negative impact on the return to the investor from the investment.
- The Fund will be sensitive to, and its performance will depend to a greater extent on, the overall condition of nuclear energy companies
- To the extent that the Fund continues to be concentrated in the basic materials (exploration/production of industrial metals) sector, the Fund will be sensitive to changes in, and its performance will depend to a greater extent on, the overall condition of the basic materials sector.
- The Fund will be sensitive to, and its performance will depend to a greater extent on, the overall condition of the natural resources sector. Investments in natural resources and the natural resources sector can be significantly affected by events relating to these industries, including international political and economic developments, embargoes, tariffs, inflation, weather and natural disasters, limits on exploration, often rapid changes in the supply and demand for natural resources and other factors

Source: VanEck

Important Information

This is marketing communication. Please refer to the prospectus of the UCITS and to the KID/KIID before making any final investment decisions. These documents are available in English and the KIDs in local languages and can be obtained free of charge at www.vaneck.com, from VanEck Asset Management B.V. (the "Management Company") or, where applicable, from the relevant appointed facility agent for your country.

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Investing is subject to risk, including the possible loss of principal. Investors must buy and sell units of the UCITS on the secondary market via a an intermediary (e.g. a broker) and cannot usually be sold directly back to the UCITS. Brokerage fees may incur. The buying price may exceed, or the selling price may be lower than the current net asset value. The indicative net asset value (iNAV) of the UCITS is available on Bloomberg. The Management Company may terminate the marketing of the UCITS in one or more jurisdictions. The summary of the investor rights is available in English at: complaints-procedure.pdf (vaneck.com). For any unfamiliar technical terms, please refer to ETF Glossary | VanEck.

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