



**Silex**  
Systems Limited

## Investor Presentation

7 June 2022

Silex Systems Limited (Silex) (ASX: SLX) (OTCQX: SILXY) today provided an updated Investor Presentation, which includes an overview of the Company's commercialisation of the SILEX laser enrichment technology and the potential to address emerging opportunities across various components of the nuclear fuel supply chain.

**Silex CEO and Managing Director, Dr Michael Goldsworthy, said:** "There is no doubt that nuclear power is back in focus as a key source of zero-emissions base load electricity in a carbon-constrained world. Furthermore, recent dynamics in the nuclear fuel markets have the potential to generate nearer term opportunities for GLE and the SILEX technology."

"While no decision has yet been made, Silex and our partner Cameco are reviewing the feasibility of accelerating GLE's commercialisation program in response to these emerging opportunities, subject to alignment with evolving market conditions," he added.

The presentation is to support investor relations activities over the coming weeks.

***Authorised for release by the Silex Board of Directors.***

Further information on the Company's activities can be found on the Silex website: [www.silex.com.au](http://www.silex.com.au) or by contacting:

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# Silex Systems Limited

## Investor Presentation

(ASX: SLX) (OTCQX: SILXY)

**Dr Michael Goldsworthy**

*CEO/Managing Director*

**7 June 2022**

# Forward Looking Statements and Risk Factors

## About Silex Systems Limited (ASX: SLX) (OTCQX: SILXY)

Silex Systems Limited ABN 69 003 372 067 (**Silex** or **Company**) is a research and development company whose primary asset is the SILEX laser enrichment technology, originally developed at the Company's technology facility in Sydney, Australia. The SILEX technology has been under development for uranium enrichment jointly with US-based exclusive licensee Global Laser Enrichment LLC (GLE) for a number of years. Success of the SILEX uranium enrichment technology development program and the proposed Paducah commercial project remain subject to a number of factors including the satisfactory completion of the engineering scale-up program and uranium market conditions and therefore remains subject to associated risks.

Silex is also in the early stages of pursuing additional commercial applications of the SILEX technology, including the production of 'Zero-Spin Silicon' for the emerging technology of silicon-based quantum computing. The 'Zero-Spin Silicon' project remains dependent on the outcomes of the project and the viability of silicon quantum computing and is therefore subject to various risks. The commercial future of the SILEX technology is therefore uncertain and any plans for commercial deployment are speculative.

Additionally, Silex has an interest in a unique semiconductor technology known as 'cREO®' through its 100% ownership of subsidiary Translucent Inc. The cREO® technology developed by Translucent has been acquired by IQE Plc based in the UK. IQE has paused the development of the cREO® technology until a commercial opportunity arises. The future of IQE's development program for cREO® is uncertain and remains subject to various technology and market risks.

## Forward Looking Statements

The commercial potential of these technologies is currently unknown. Accordingly, no guarantees as to the future performance of these technologies can be made. The nature of the statements in this Presentation regarding the future of the SILEX technology as applied to uranium enrichment and Zero-Spin Silicon production, the cREO® technology and any associated commercial prospects are forward-looking and are subject to a number of variables, including but not limited to, unknown risks, contingencies and assumptions which may be beyond the control of Silex, its directors and management. You are strongly cautioned not to place reliance on any forward-looking statements, particularly in light of the current economic climate and the significant volatility, uncertainty and disruption caused by COVID-19 and other economic risk factors, as actual results could be materially different from those expressed or implied by such forward looking statements as a result of various risk factors. Further, the forward-looking statements contained in this Presentation involve subjective judgement and analysis and are subject to change due to management's analysis of Silex's business, changes in industry trends, government policies and any new or unforeseen circumstances. The Company's management believes that there are reasonable grounds to make such statements as at the date of this Presentation. Actual operations, results, performance, targets or achievement may vary materially from any projections and forward-looking statements and the assumptions on which those statements are based.

Except as required by law or regulation (including the ASX Listing Rules and OTCQX Rules for U.S. Companies), Silex does not intend, and is not obligated, to update the forward-looking statements and Silex disclaims any obligation or undertaking to update forward-looking statements in this Presentation to reflect any changes in expectations.

No representation, warranty or assurance (express or implied) is given or made in relation to any forward-looking statement by any person (including the Company or any of its advisers). In particular, no representation, warranty or assurance (express or implied) is given that the occurrence of the events expressed or implied in any forward-looking statements in this Presentation will actually occur.

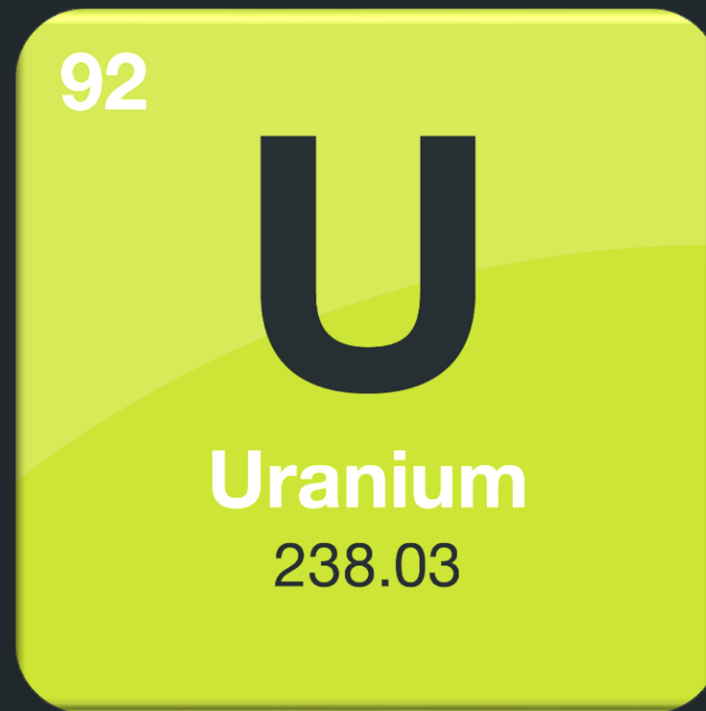
## Risk Factors

Risk factors that could affect future results and commercial prospects of Silex include, but are not limited to: ongoing economic and social uncertainty, including in relation to the impacts of the COVID-19 pandemic; the results of the SILEX uranium enrichment engineering development program; the market demand for natural uranium and enriched uranium; the outcome of the project for the production of 'Zero-Spin Silicon' for the emerging technology of silicon-based quantum computing; the potential development of, or competition from alternative technologies; the potential for third party claims against the Company's ownership of Intellectual Property; the potential impact of prevailing laws or government regulations or policies in the USA, Australia or elsewhere; results from IQE's commercialisation program and the market demand for cREO® products; decisions made or actions taken by the Company's commercialisation partners that could adversely affect the technology development programs; and the outcomes of various strategies and projects undertaken by the Company.





Our Mission: to commercialise the unique SILEX laser enrichment technology for application to:



Uranium production and enrichment (nuclear power)



Silicon enrichment (silicon quantum computing)



Other potential markets (e.g. medical isotopes)

Our strategy is focused on extracting maximum value from our core SILEX technology and expertise

# SILEX Technology Commercialisation Overview



51% Owned



## SILEX Uranium Enrichment via Global Laser Enrichment (GLE)

**Technology** SILEX laser enrichment  
Uranium application licensed to GLE

**Revenue Model** 51% ownership of GLE +  
7% (min.) perpetual royalty

**Partners**

**Market Size<sup>1</sup>.** Uranium Production: US\$8bn  
Uranium Enrichment: US\$6bn

100% Owned



## SILEX Zero-Spin Silicon (ZS-Si) via in-house production

**Technology** SILEX laser enrichment  
Silicon application wholly owned

**Revenue Model** Producer-based sales revenues  
for silicon quantum computing

**Partners**

**Market Size<sup>2</sup>.** ZS-Si for Quantum Computing:  
\$500m (est. - by 2040)

Other Isotope Markets



## Medical Isotopes and other industrial isotopes

**Technology** SILEX laser enrichment

**Revenue Model** Producer-based revenues  
TBD

**Partners** TBD

**Market Size** TBD

1. Based on UxC 2022 estimates, UMO Q2, 2022 and EMO Q1, 2022

2. CSIRO, Growing Australia's Quantum Technology Industry, May 2020  
and internal estimates of ZS-Si market penetration for raw materials

# Recent Highlights

## ***Global Laser Enrichment (GLE) Commercialisation Project / SILEX Uranium Technology:***

- GLE acquisition completed January 2021 - Silex 51% interest and Cameco 49% – operating as a jointly-controlled JV
- GLE ramping up activities in the SILEX technology demonstration project and commercialisation strategy execution
- HALEU fuel opportunity for advanced Small Modular Reactors - emerging as next generation nuclear power reactors
- GLE submitted response to the DOE<sup>1</sup> Request for Information regarding its HALEU Availability Program in February 2022
- Global disruptions energizing nuclear fuel markets – “triple opportunity” emerging for GLE and the SILEX technology

## ***Zero-Spin Silicon Project and Other highlights:***

- Zero-Spin Silicon (ZS-Si) project Stage 2 completed January 2022 – demonstration of ZS-Si production with prototype facility
- Stage 3 of the ZS-Si project is progressing towards completion of the pilot demonstration facility (by end of 2022)
- Assessment of other applications of the SILEX technology ongoing (focused on medical radioisotope opportunities)

1. DOE: US Department of Energy



# **Nuclear Fuel Supply Chain - Opportunities for GLE and the SILEX Technology**



# Global Trends and Issues Energizing Nuclear Fuel Markets

## Longer Term

- Population growth and underlying increase in energy demand
- De-carbonisation movement – Net Zero 2050 target
- Electrification of transport sector and clean hydrogen economy
- Energy security – risk mitigation and energy independence

## Medium Term

- Renewed focus on nuclear power: zero emissions, grid stability, affordability
- Depletion of idled inventories and other secondary sources
- Supply curtailments and under-investment in new resources / capacities

## Short Term

- Financial investors immobilising inventories (e.g. SPUT, Yellowcake)
- Central Asian supply - unrest and logistical risks (transportation through Russia)
- Russian invasion of Ukraine – potential supply disruptions due to sanctions and/or voluntary actions



# Russian Share of US Nuclear Fuel Requirements

	Russian Global Capacity <sup>1</sup>	Current US Imports of Russian Nuclear Fuel <sup>1,2</sup>
Uranium (U <sub>3</sub> O <sub>8</sub> ) <sup>2</sup>	14%	~16%
Conversion	27%	~18%
Enrichment (SWU) <sup>2</sup>	39%	~20%

1. UxC, LLC various reports Q1 and Q2, 2022

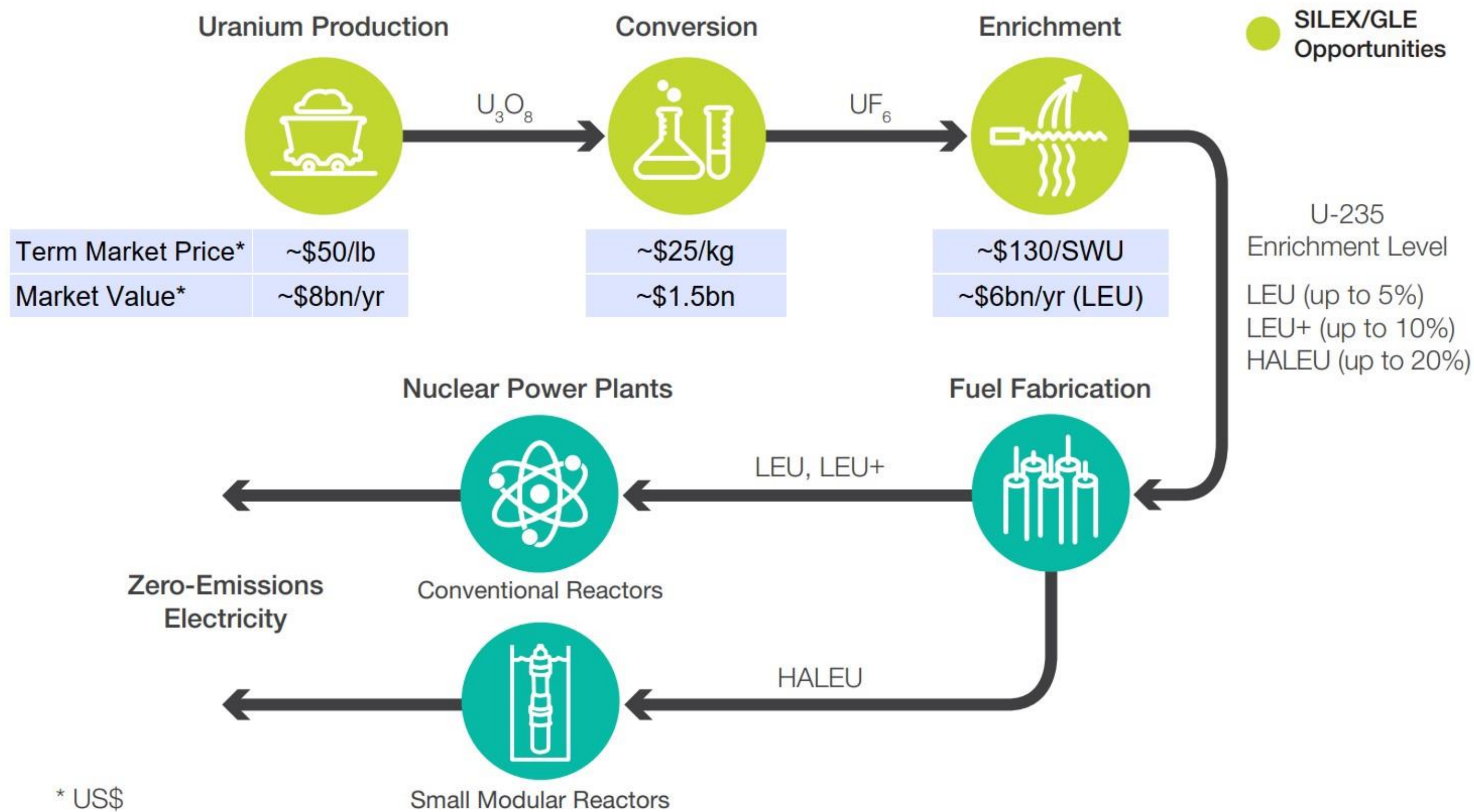
2. EIA, 2020 Uranium Marketing Annual Report, May 2021

- Concerns regarding reliance on Russia for supply of nuclear fuel
- US currently imports: ~90% of its uranium requirements (including ~16% from Russia)  
100% of its conversion requirements (including ~18% from Russia)  
~70% of its SWU requirements (including ~20% from Russia)

# Other Nuclear Industry Developments

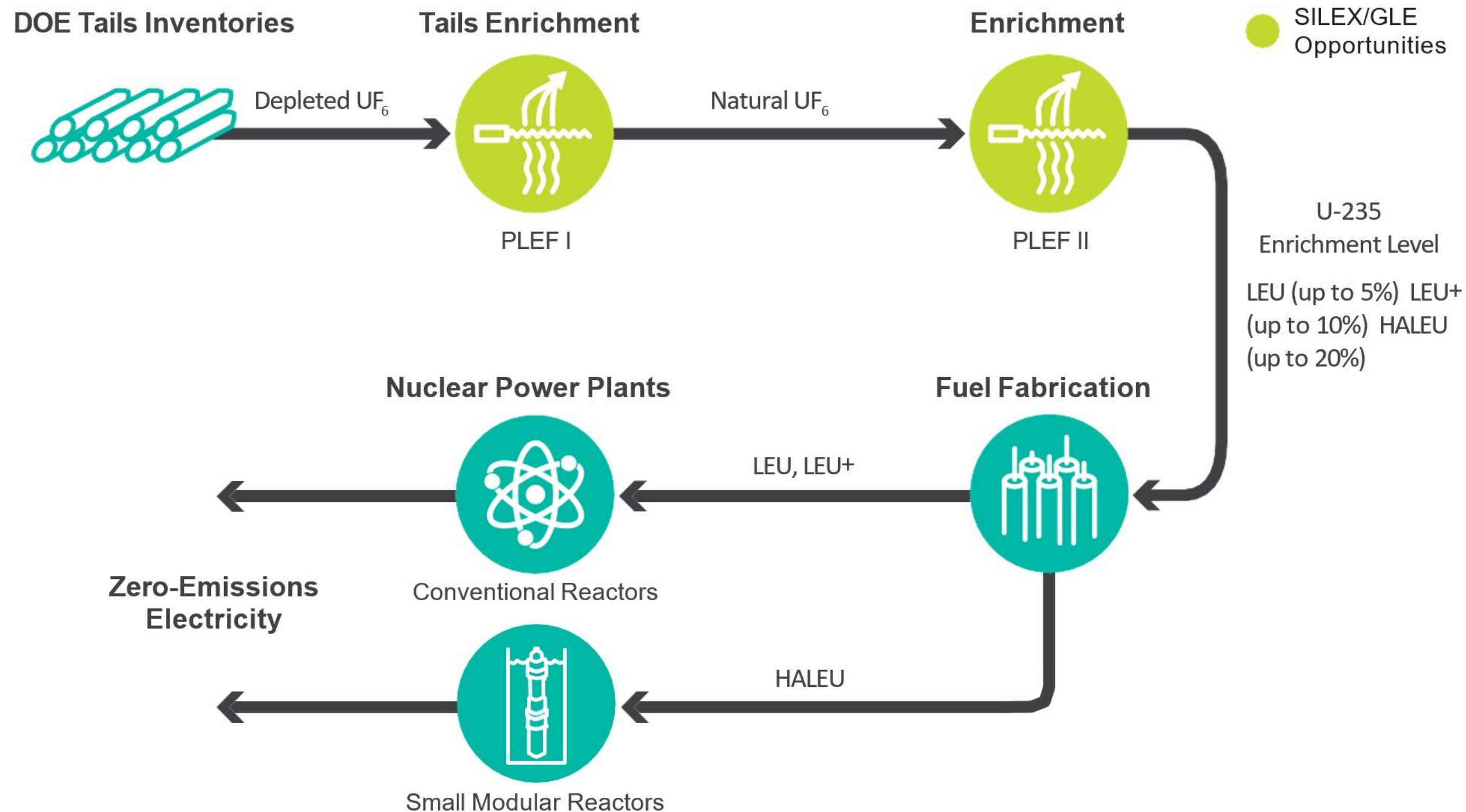
- **US:** legislation introduced to support nuclear generation, nuclear fuel supply and reduce geopolitical risks – 4 Bills currently before Congress (key bill relates to support for the DOE's HALEU Availability Program)
- **UK:** in April 2022, announced plans to build 8 new nuclear power plants and increase share of nuclear power generation in energy mix from 15% to 25% by 2050
- **EU:** EU Taxonomy expected to include nuclear power projects in its list of sustainable forms of energy
- **France:** recently announced plans to build up to 14 new large reactors and commercialise SMR designs
- **Belgium:** reversal of nuclear phase-out plans and announced plans for 10-year operating extensions
- **Germany:** announced that it may reconsider its nuclear phase-out plans
- **South Korea:** new pro-nuclear President elect stated intention to reverse phase-out plan and reset energy mix with nuclear to account for 30% of generation
- **China:** ambitious nuclear build program continues with 54 operable reactors, 19 under construction and another 201 reactors planned or proposed

# Nuclear Fuel Opportunities for GLE and the SILEX Technology

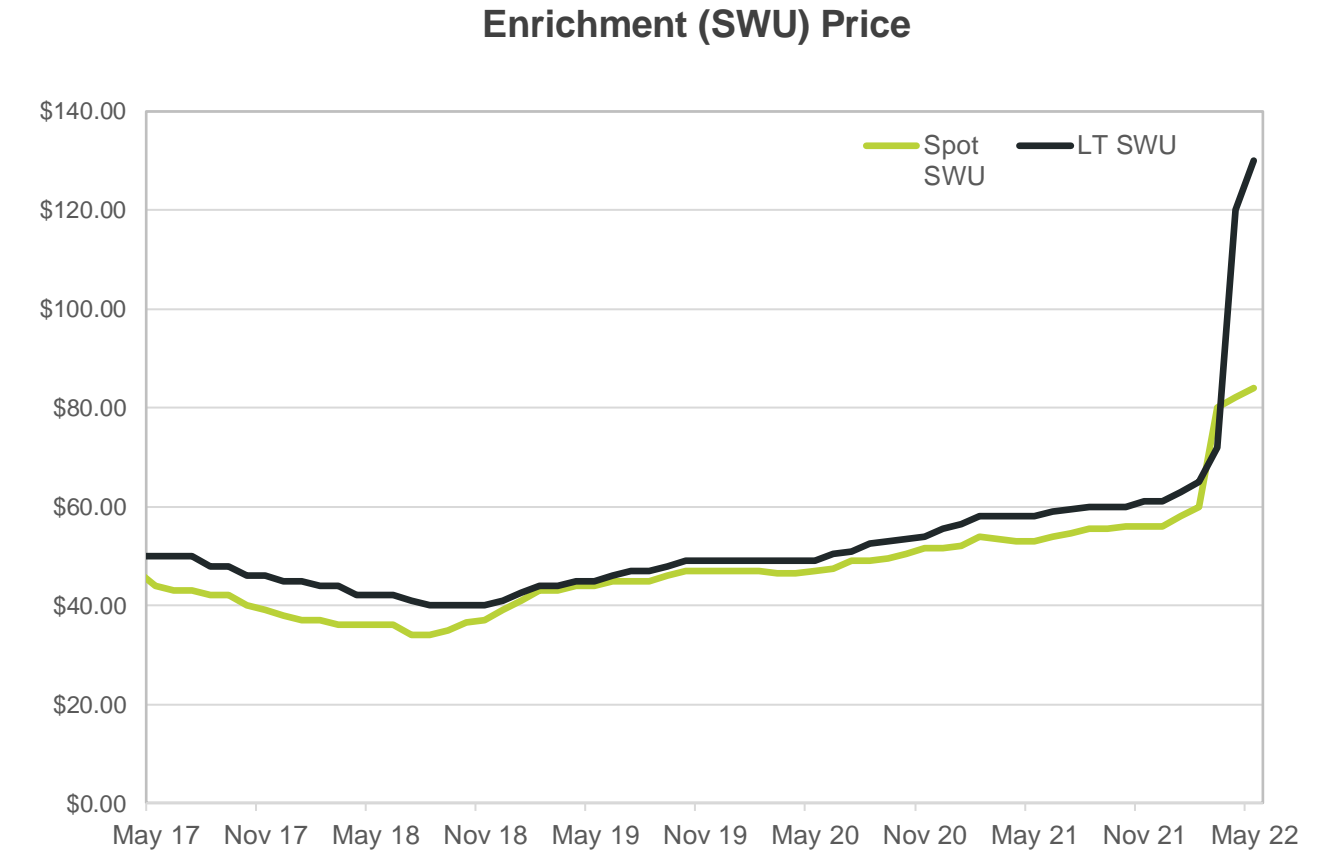
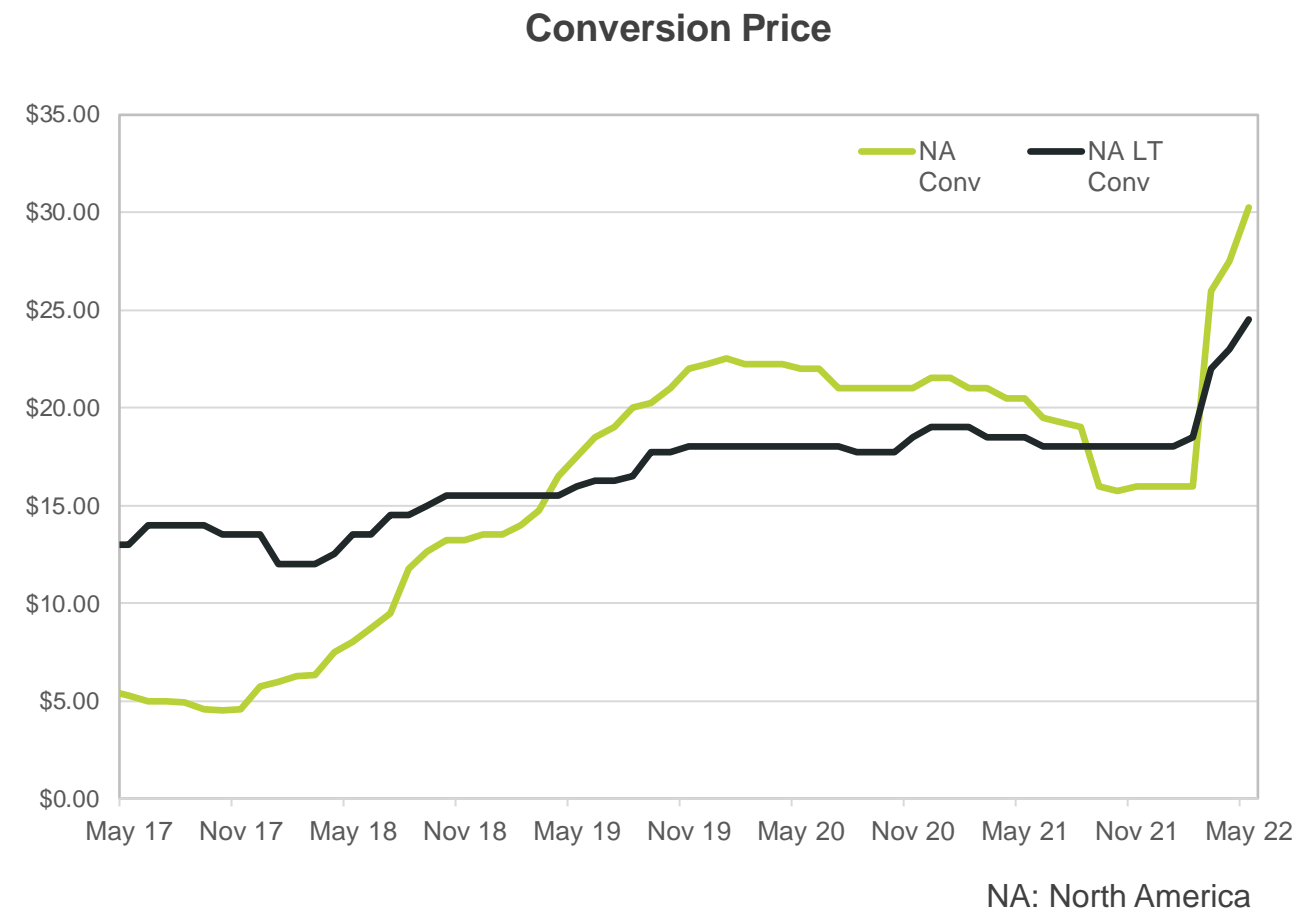
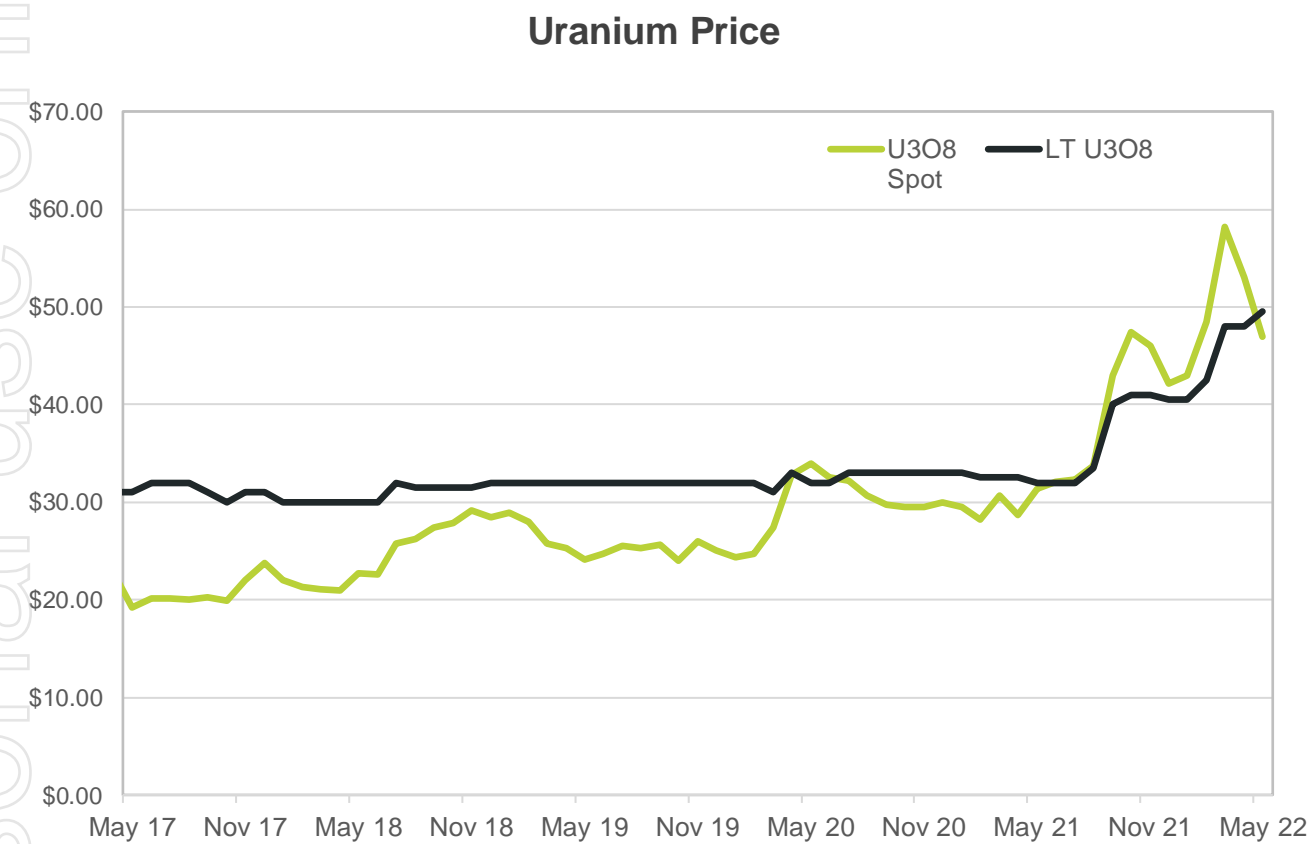




# Nuclear Fuel Opportunities for GLE and the SILEX Technology



# Key Components of Nuclear Fuel – Price Recovery



Source: UxC, LLC Historical Price Data (in US\$)

- Significant market price increases across key components of nuclear fuel from 2021
- Enrichment term price (SWU) increase of ~\$60/SWU to ~\$130/SWU in response to Russia/Ukraine conflict and nuclear fuel supply uncertainties

# Potential Implications for GLE and the SILEX Technology

GLE is uniquely positioned to address the 'Triple Opportunity' emerging in the global nuclear fuel supply chain:

- 1) Tails processing (PLEF<sup>1</sup> Project) to produce natural grade UF<sub>6</sub> and help alleviate UF<sub>6</sub> conversion supply pressure
  - 2) Build additional capacity to supply enrichment (SWU) to the market for the production of low enriched uranium (LEU) (<sup>235</sup>UF<sub>6</sub> assay up to 5%) and LEU+ (up to 10% enriched)
  - 3) Build additional capacity to produce high assay LEU (HALEU - fuel up to 20% enriched) for next generation advanced SMRs
- **Potential to accelerate GLE's commercialisation program in response to emerging nuclear fuel supply chain opportunities**
  - **Timing to be aligned with market conditions and contracting strategy**

1. PLEF: Paducah Laser Enrichment Facility



# The Paducah Opportunity



# The Paducah Opportunity – Foundation Commercial Project

## The Paducah Laser Enrichment Facility (PLEF):

- GLE's flagship Paducah project aims to enrich depleted tails with SILEX technology to produce natural grade  $\text{UF}_6$
- Paducah project is underpinned by the 2016 agreement with US DOE to purchase legacy tails inventories
- Over 200,000 metric tons tails to be processed to produce over 50,000 metric tons of uranium (as  $\text{UF}_6$ )
- Planned production rate is to up to 5 million pounds (equivalent) of  $\text{U}_3\text{O}_8$  per year for ~30 years
- Potential to add enrichment (SWU) capacity to respond to LEU demand and emerging LEU+ and HALEU needs

### *The GLE / SILEX Triple Opportunity:*

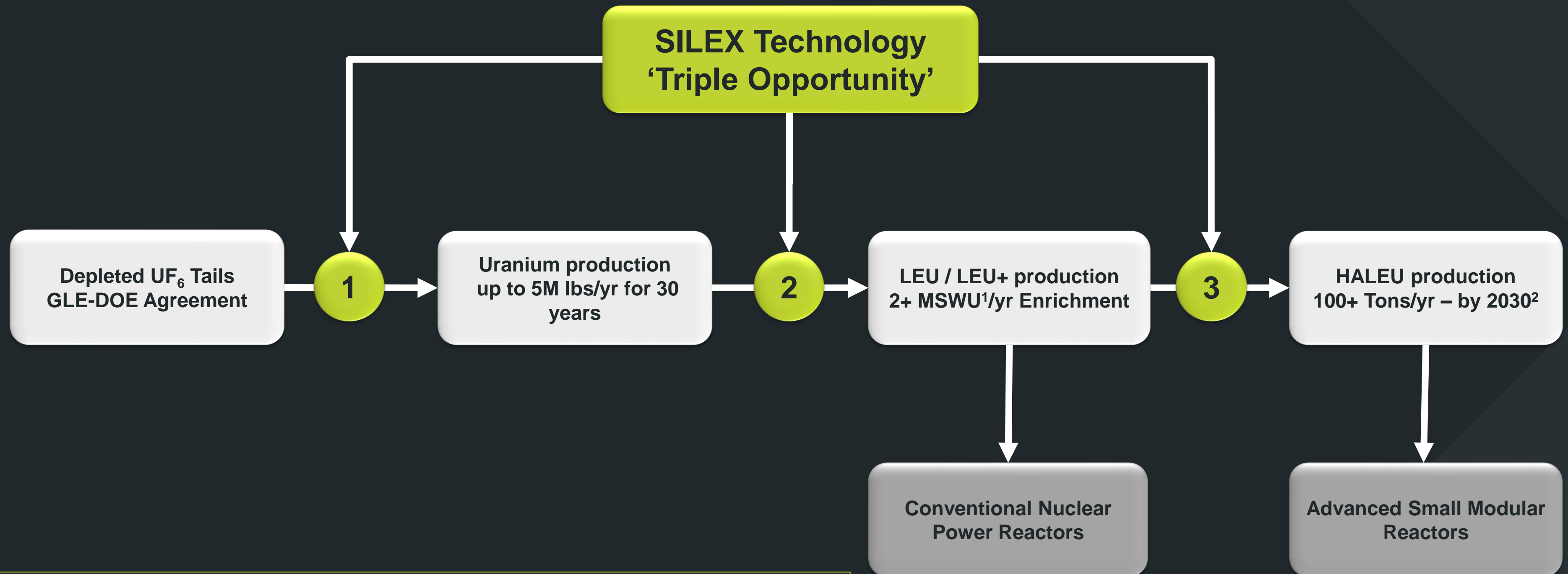
- PLEF Stage 1: Uranium production - via enrichment of legacy depleted tails
- PLEF Stage 2: Uranium Enrichment – from natural to LEU and LEU+
- PLEF Stage 3: HALEU production – further enrichment from LEU to HALEU

Paducah, KY Enrichment Plant Site



# The Paducah Triple Opportunity Value Chain

## Integrated Nuclear Fuel Supply Chain Model



1. 2 MSWU is the estimated enrichment capacity to process ~5M lbs U<sub>nat</sub> into LEU;  
SWU – Separative Work Unit - is the unit of enrichment traded in the market (current long term price ~US\$130/SWU);
2. US Nuclear Energy Institute estimates demand of 137 tons/yr by 2030 (2020 Letter to US DOE)



# Paducah Uranium Production Opportunity

(Stage 1 only – natural  $\text{UF}_6$  production)

## Target Commercial Operation Date

Tentatively late 2020's -  
potential to accelerate

## Akin to a 'Tier 1' Uranium Resource\*

Based on low cost and  
longevity of production  
(Silex estimate of all-in cost  
currently < US\$25/lb)

## Equivalent $\text{U}_3\text{O}_8$ Production

Planning for up to 5 million lbs  
p.a. for approximately 30 years

## Potential capture of Conversion Value

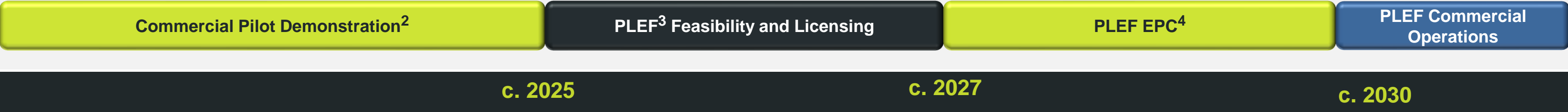
Feed and Product is  $\text{UF}_6$   
(current conversion value  
~US\$25/kg)

## Potential to enrich further

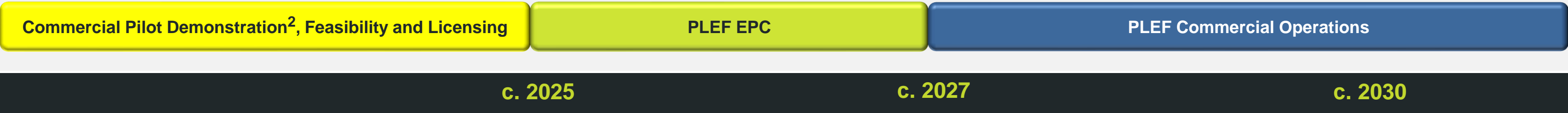
From natural grade (0.7%)  
to LEU (up to 5%)  
to LEU+ (up to 10%)  
& HALEU (up to 19.9%)

# GLE / SILEX Technology Commercialisation Timelines<sup>1</sup>

## Baseline - GLE Commercialisation Timeline:



## Potential Acceleration - GLE Commercialisation Timeline<sup>5</sup>:



- 1. Timelines subject to technology demonstration outcomes, market conditions, commercial support and other factors
- 2. Includes achievement of Technology Readiness Level 6 (TRL-6) as defined by DOE Technology Readiness Assessment Guide (G 413.3-4A)
- 3. PLEF: Paducah Laser Enrichment Facility
- 4. Engineering, Procurement and Construction (EPC) of commercial plant
- 5. Potential acceleration remains subject to due diligence assessment and may vary according to differing scenarios



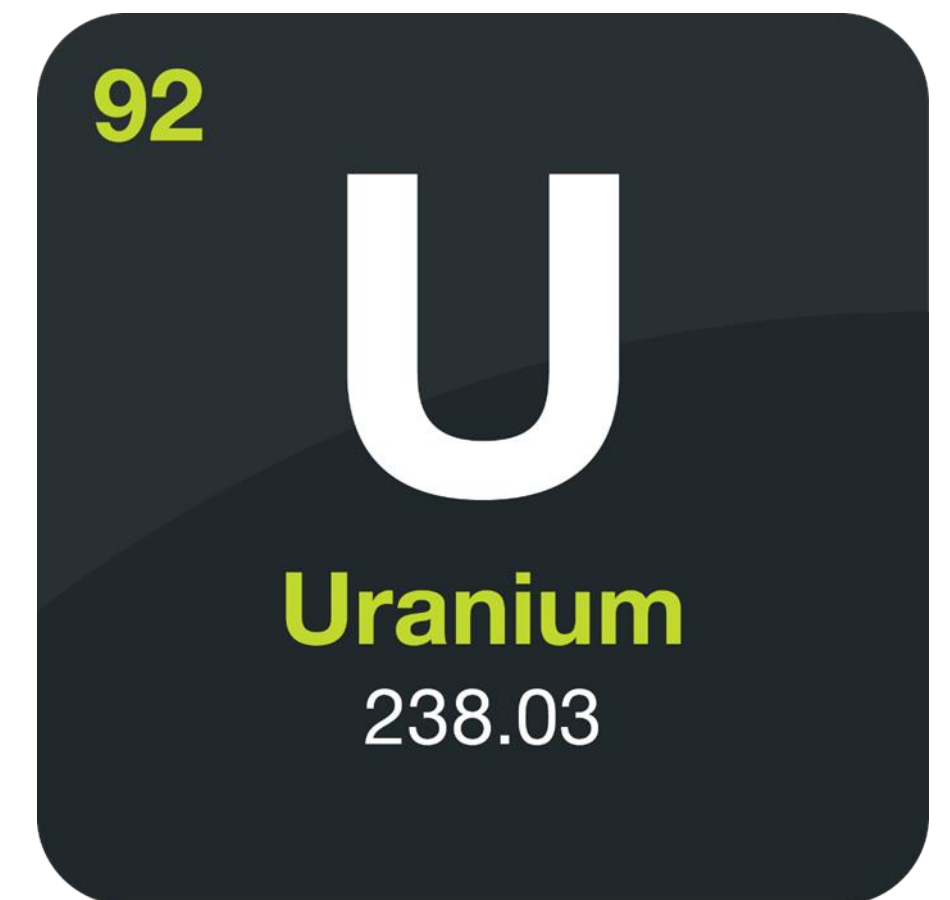
# SILEX Technology License and Cameco Equity Option

## Technology License:

- GLE holds exclusive worldwide license for use of SILEX laser technology for uranium enrichment
- License agreement includes US\$20 million in payments to Silex triggered by commercialisation milestones
- Perpetual royalty of 7% (min.) on GLE's enrichment SWU revenues from use of SILEX for production of natural and enriched uranium
- Royalty and milestone payments are in addition to any equity-based distribution of profits payable from GLE's commercial operations (currently Silex holds 51% ownership)

## Cameco Equity Option:

- Current GLE JV ownership is Silex 51% and Cameco 49%
- Cameco holds an option to purchase an additional 26% of GLE equity from Silex at fair market value
- Window for option exercise is from February 2023 until completion of PLEF feasibility study
- Cameco's transition to majority ownership subject to US Government approvals



# Evolution of Enrichment Technology

## 1st Generation Technology

### Gaseous Diffusion

Very low efficiency

High cost

Obsolete



## 2nd Generation Technology

### Centrifuge

Modest efficiency

Lower cost

Current technology



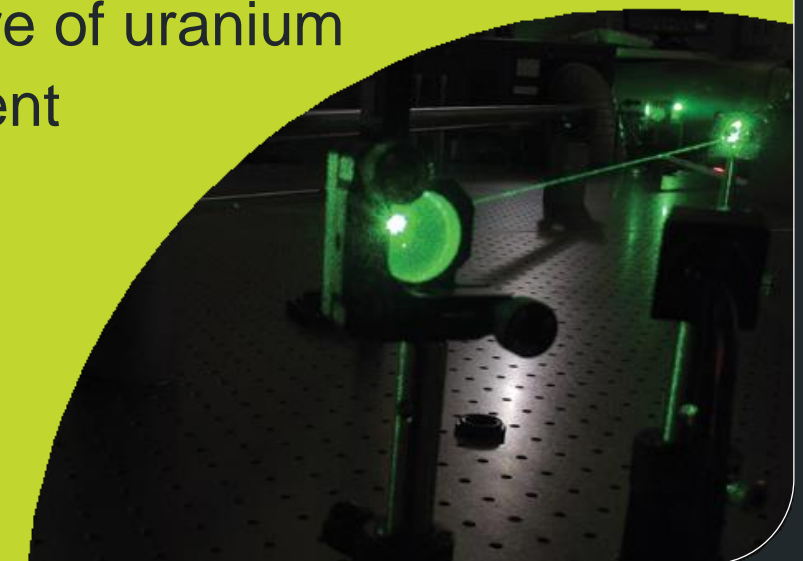
## 3rd Generation Technology

### SILEX Laser

High efficiency

Anticipated to be lowest cost

The future of uranium enrichment



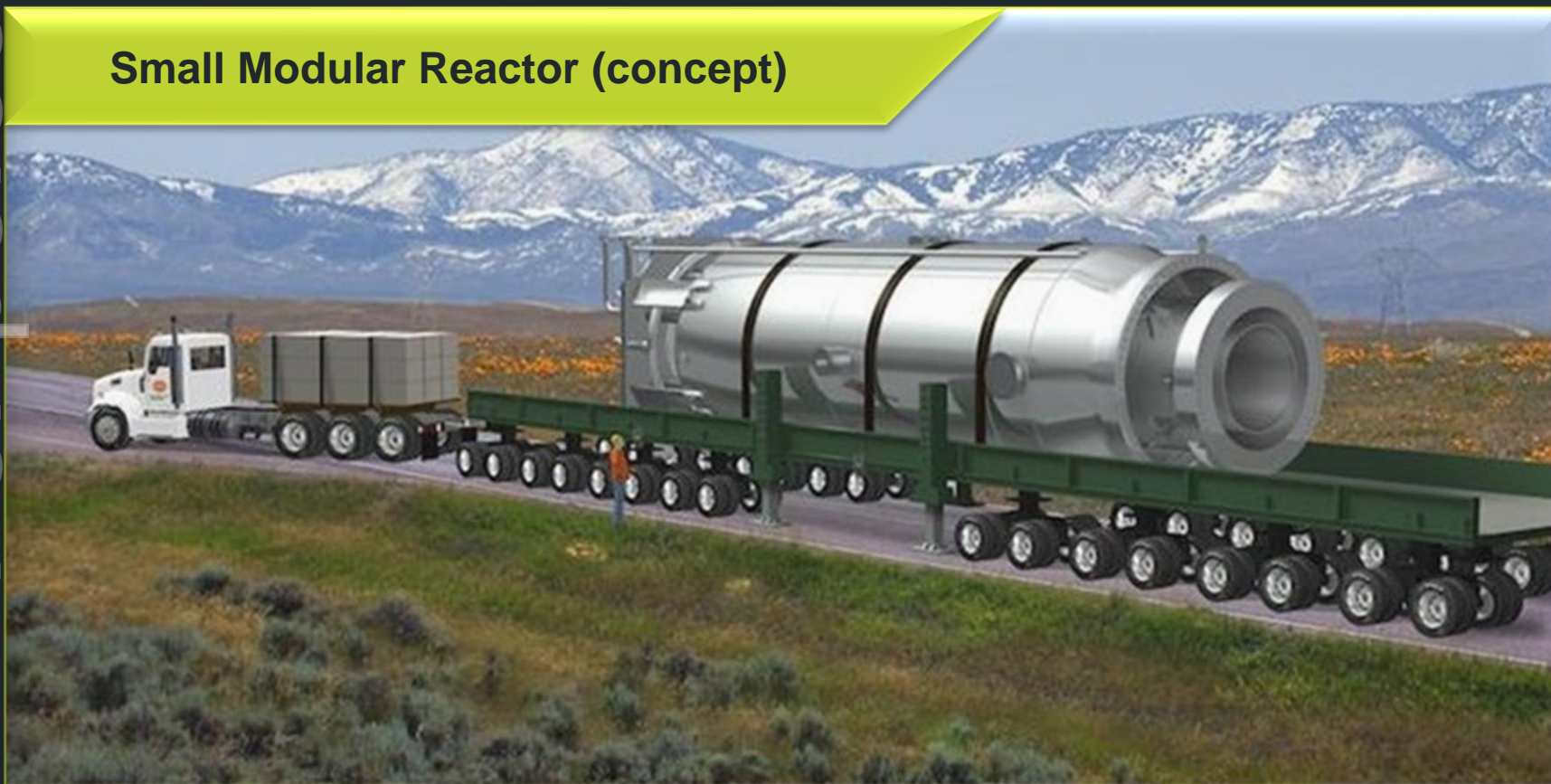
SILEX laser process → higher separation efficiency and throughput vs. centrifuge technology



# Emerging Opportunity – Small Modular Reactors\* (SMRs)

- Several next generation advanced SMR designs will use High Assay Low Enriched Uranium (HALEU)
- SILEX technology may provide a flexible low cost alternative to produce HALEU for advanced SMRs
- SMRs are modular, smaller size (50 MWe to 300 MWe) reactors allowing greater flexibility in deployment
- SMRs are designed for production-line manufacturing rather than conventional custom built capital projects
- SMRs are anticipated to provide significant reductions in capital costs (per MWe installed) and shorter construction times
- Leading SMR contenders are anticipated to be introduced commercially from the early 2030's in the US and Canada

Small Modular Reactor (concept)



VS

Conventional Large Scale Reactor



\* SMRs include conventional water-cooled small modular reactors which will consume LEU and LEU+ fuels, and 'advanced' small modular reactors which will consume HALEU or other non-LEU fuels

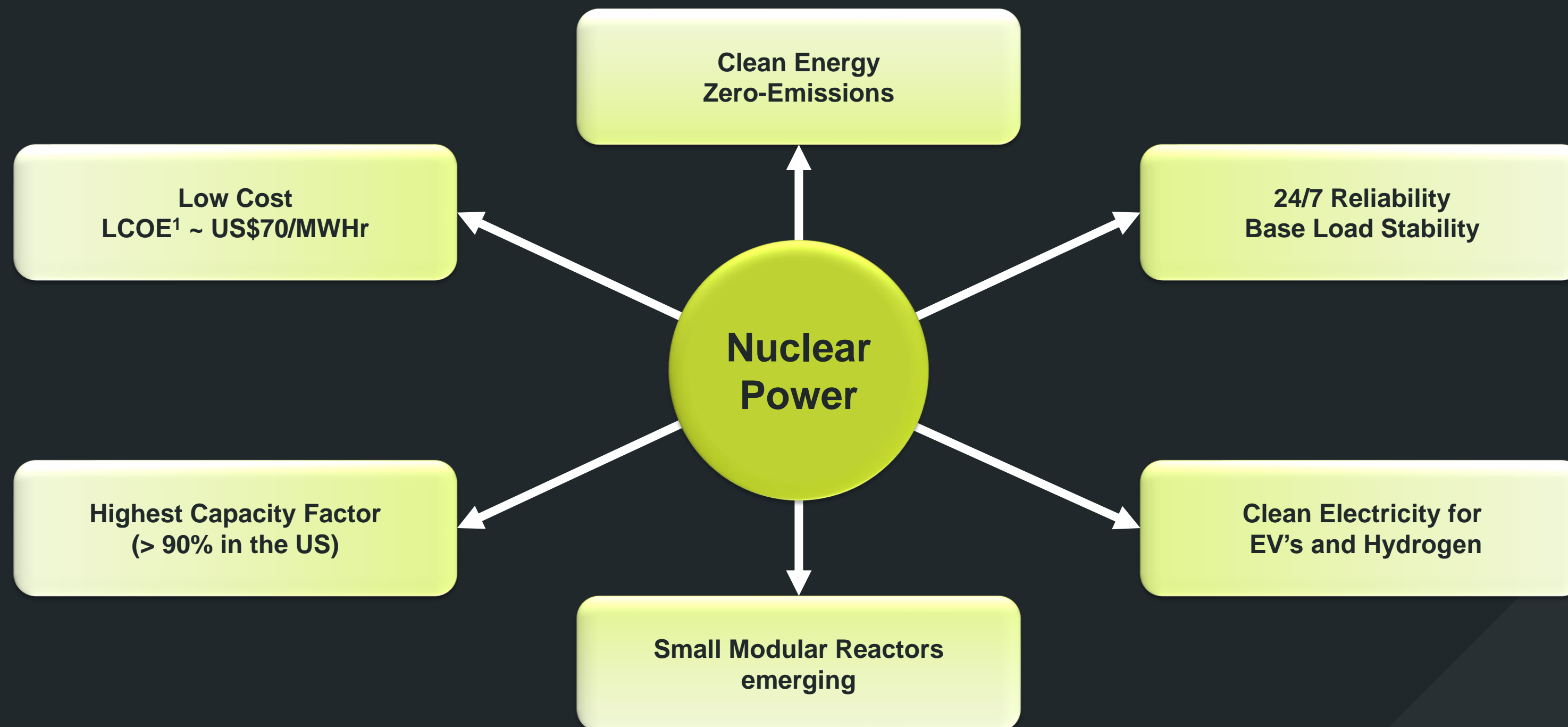


# Nuclear Power and the Nuclear Fuel Market Opportunity



# Why Nuclear Power is important to achieving Net-Zero

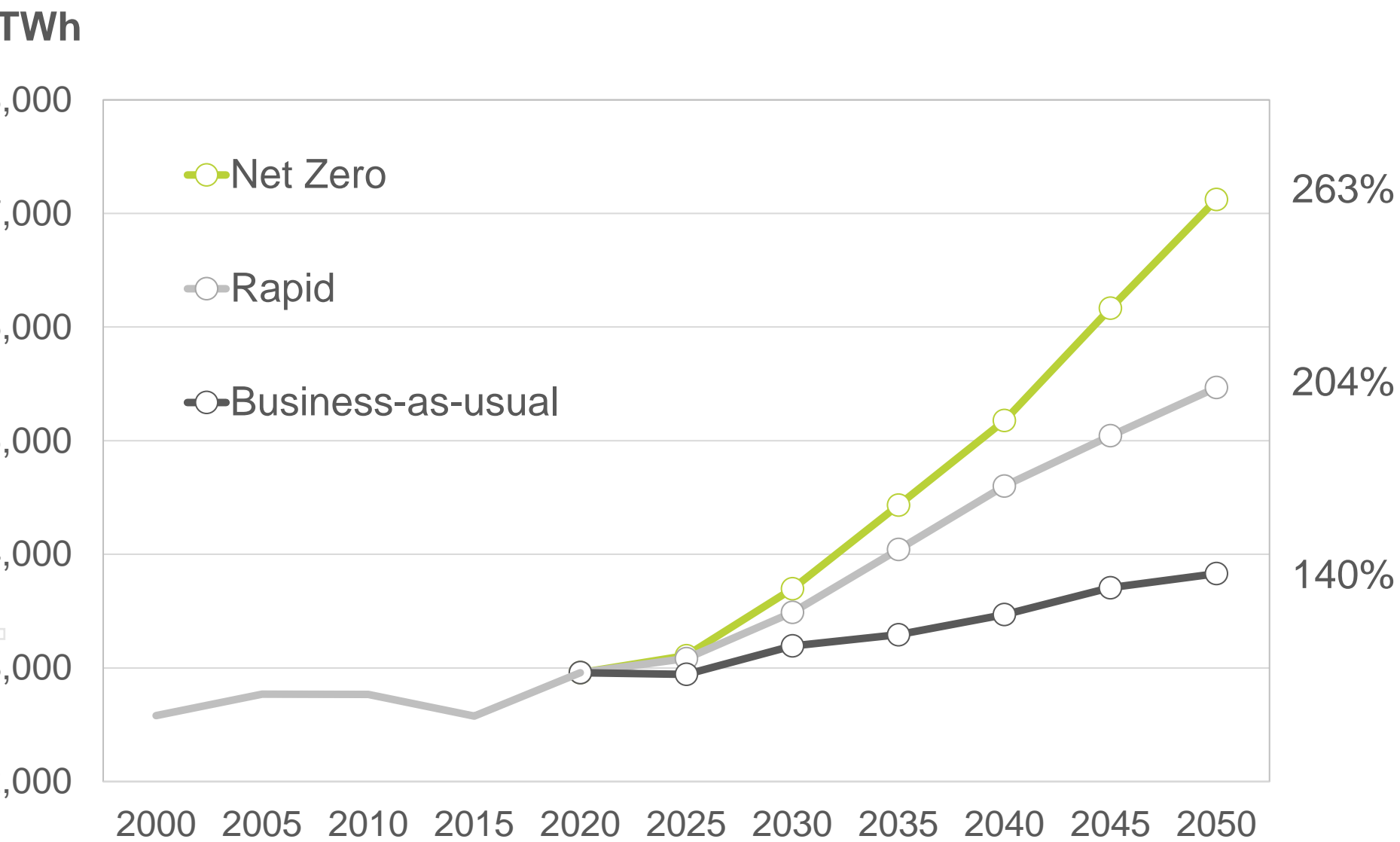
**Nuclear power is currently the only economic source of zero-emissions base load electricity**



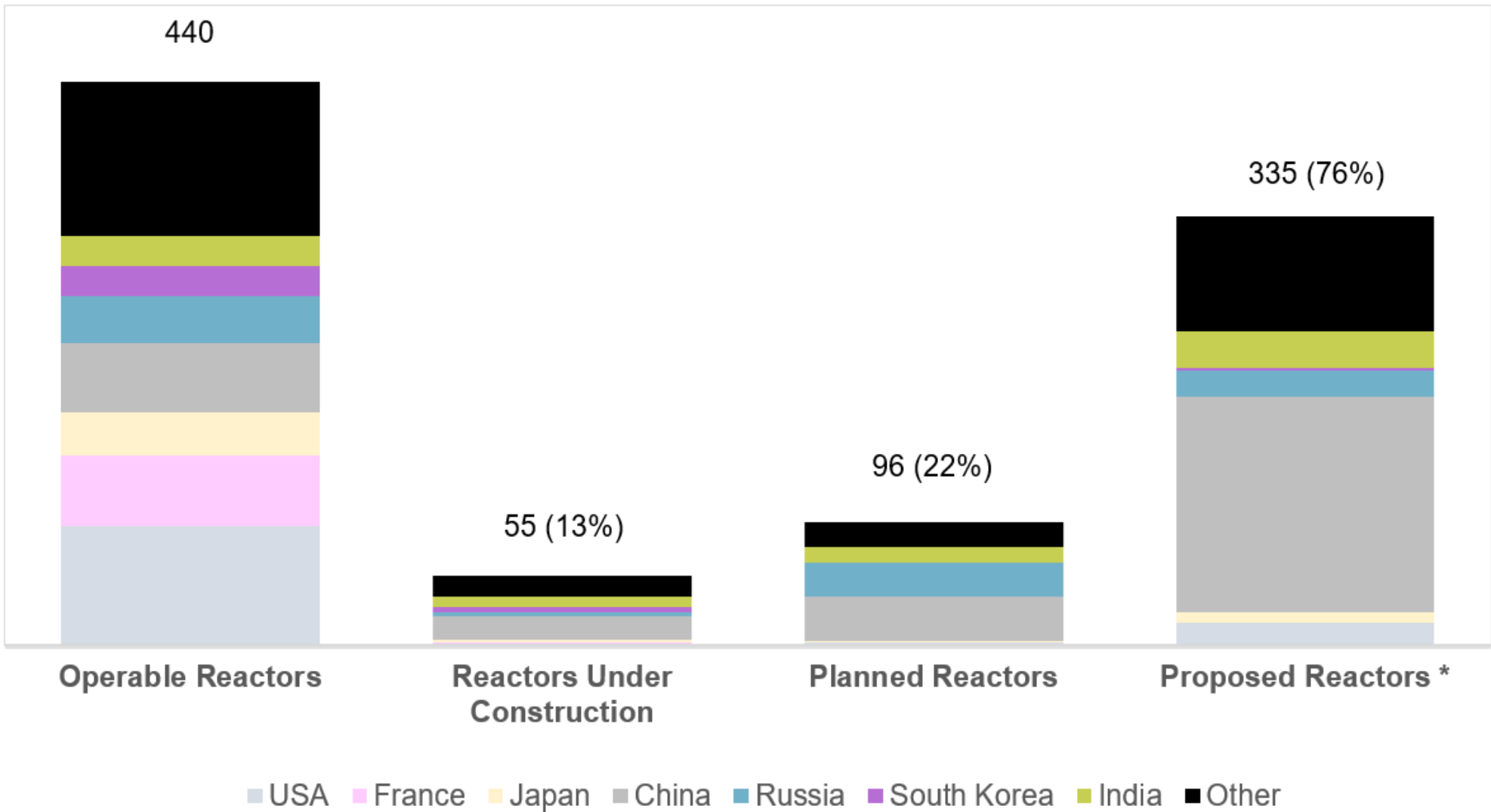
1. LCOE ~US\$70/MWHR, IEA Projected Costs of Generating Electricity 2020  
(LCOE = Levelised Cost Of Energy – all-in costs basis)

# Significant Nuclear Power Growth for Net Zero 2050

## Nuclear Generation Scenarios



## World Nuclear Reactor Population



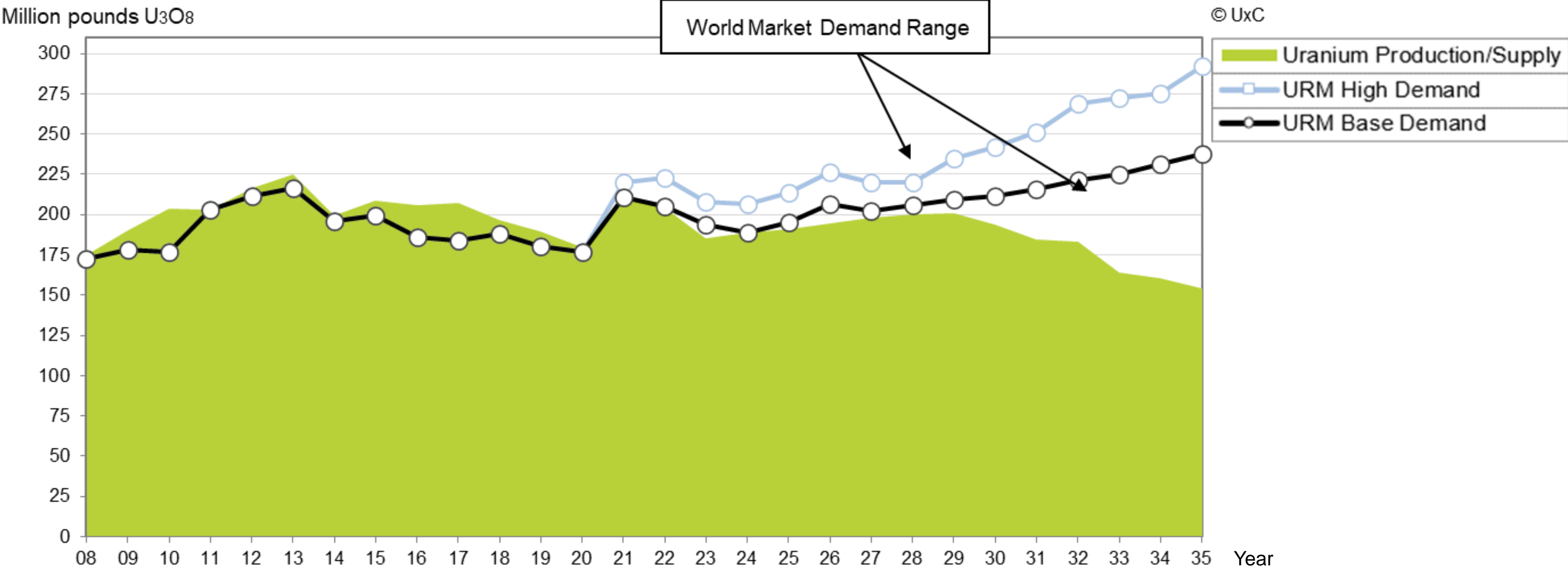
\* Other Proposed Reactors include 16 proposed in Saudi Arabia, 10 proposed in UK, 8 in Turkey and 8 in South Africa

Source: World Nuclear Association May 2022



# Uranium Market Outlook – Supply Shortage Forecast

Mid-Case Uranium Supply and Demand Forecast

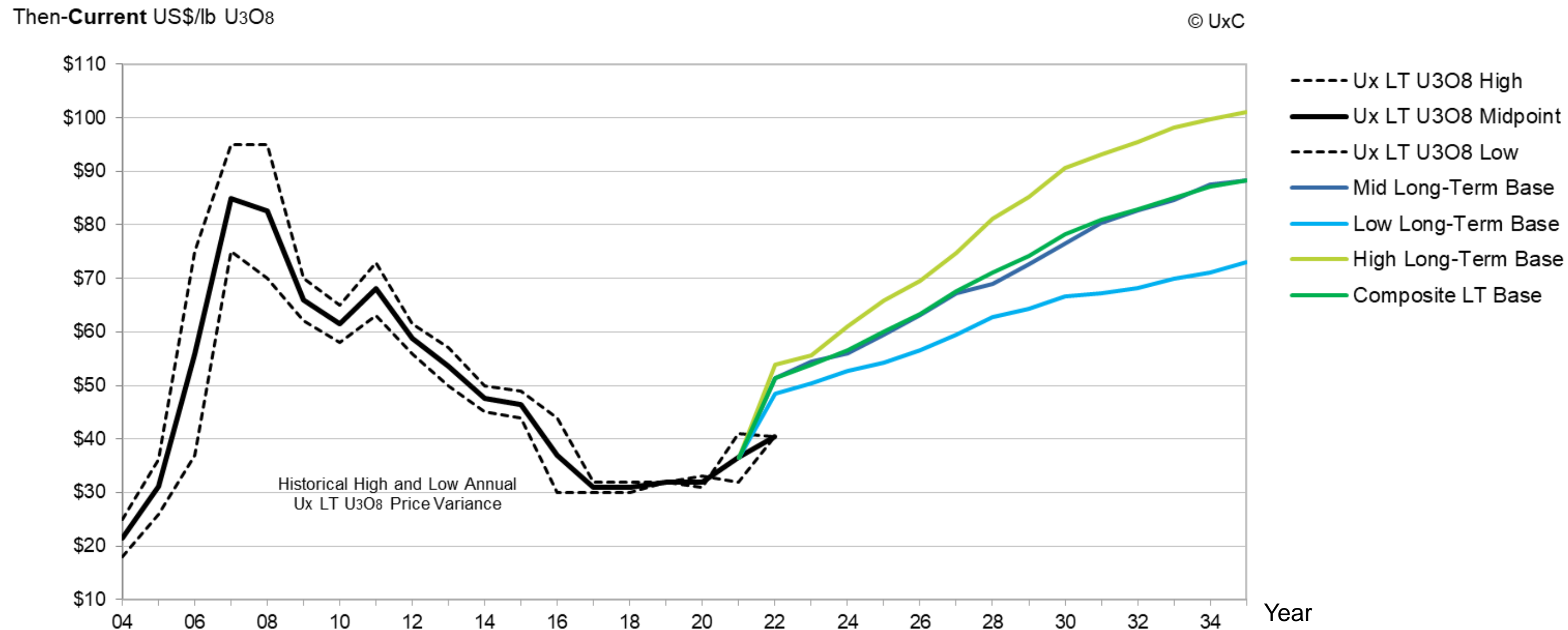


Source: UxC Uranium Market Outlook, Q2 2022

- Uranium supply forecasted to be insufficient to meet demand from mid-2020's

# Uranium Price – Price Recovery Underway

## Long-Term Uranium Base Price Forecast



Source: UxC Uranium Market Outlook, Q2 2022

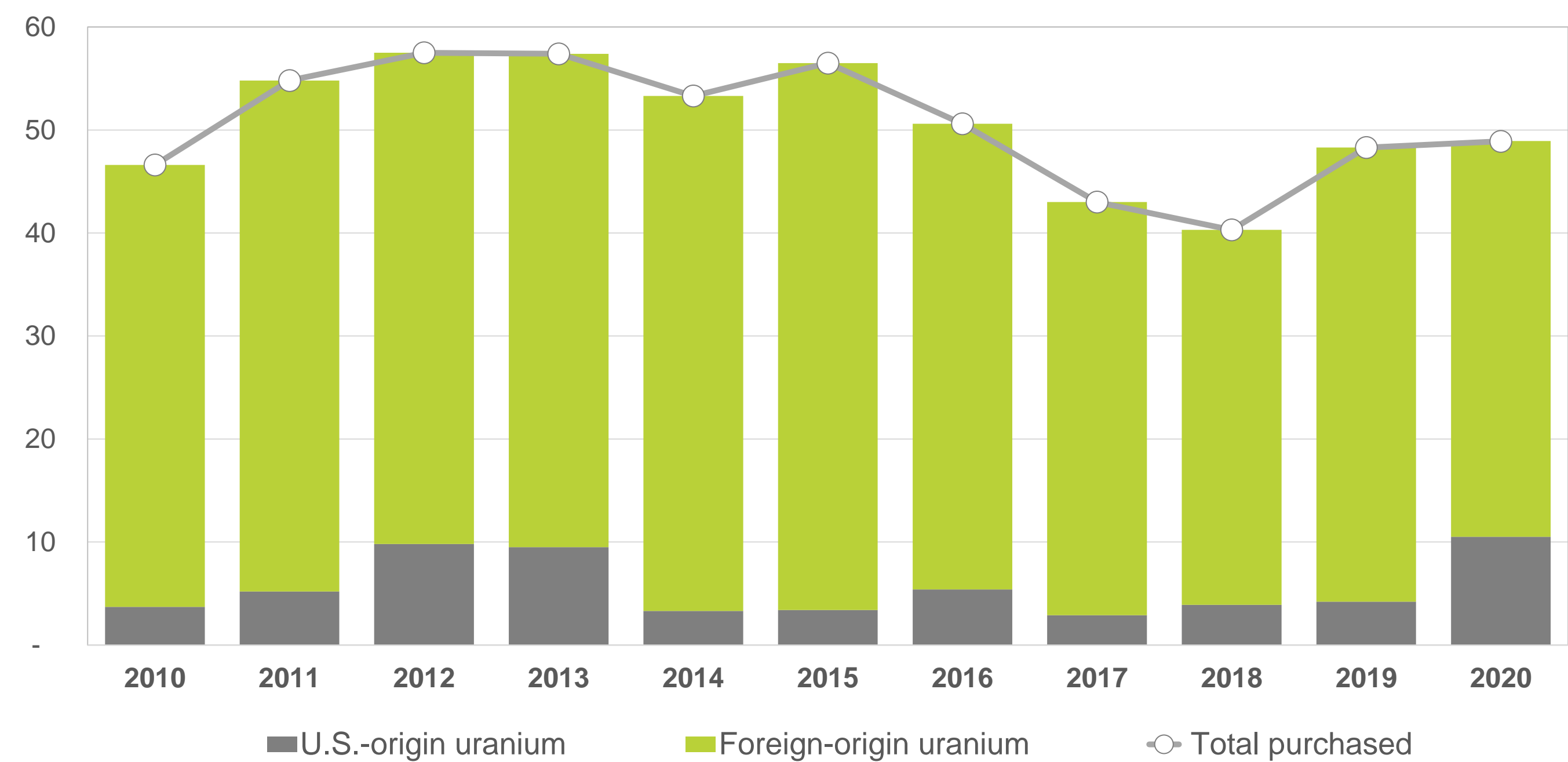
- UxC forecasts mid-case term uranium price ~\$60/lb by 2025 and ~\$77/lb by 2030
- Spot price currently ~\$50/lb (as at 3 June 2022) – up from a low of ~\$18/lb in 2016



# Paducah Opportunity may help address US Uranium Vulnerability

Uranium purchased for U.S. nuclear power reactors, 2010 - 2020

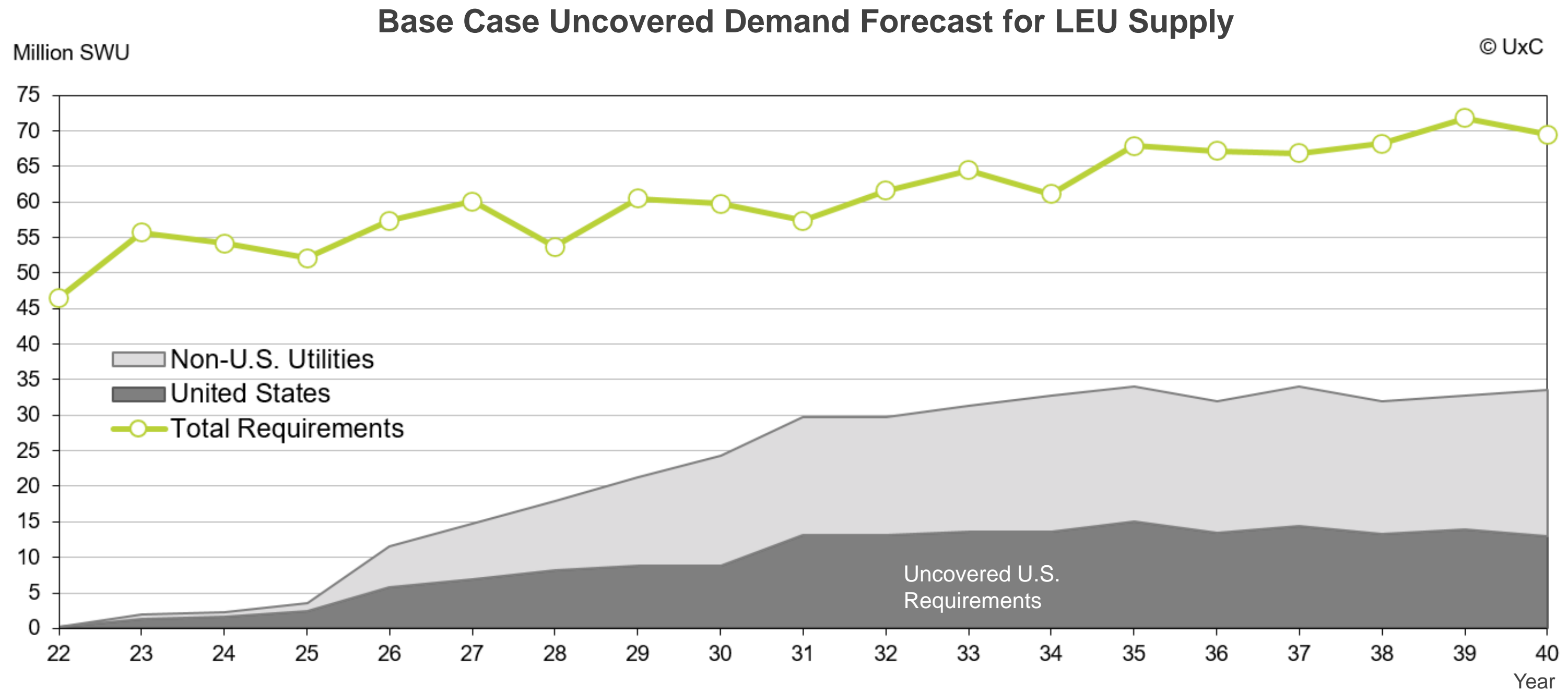
Million pounds  $U_3O_8$  equivalent



US Imports ~90% (avg.)  
of Uranium purchased

Source: 2020 EIA Uranium Marketing Annual Report  
(Released May 2021)

# Emerging Enrichment (SWU) Supply Opportunity for GLE



Source: UxC *Enrichment Market Outlook*, Q1 2022

- Forecast uncovered US SWU demand from 2027 is in excess of ~7 million SWU per year
- Significant enrichment (SWU) opportunity for LEU supply extends from the mid 2020's
- Current US forecast includes ~2.5 million SWU p.a. from Russia through 2027



# Zero-Spin Silicon for Quantum Computing



# SILEX Zero-Spin Silicon Opportunity

## Global race to develop world's first Quantum Computers

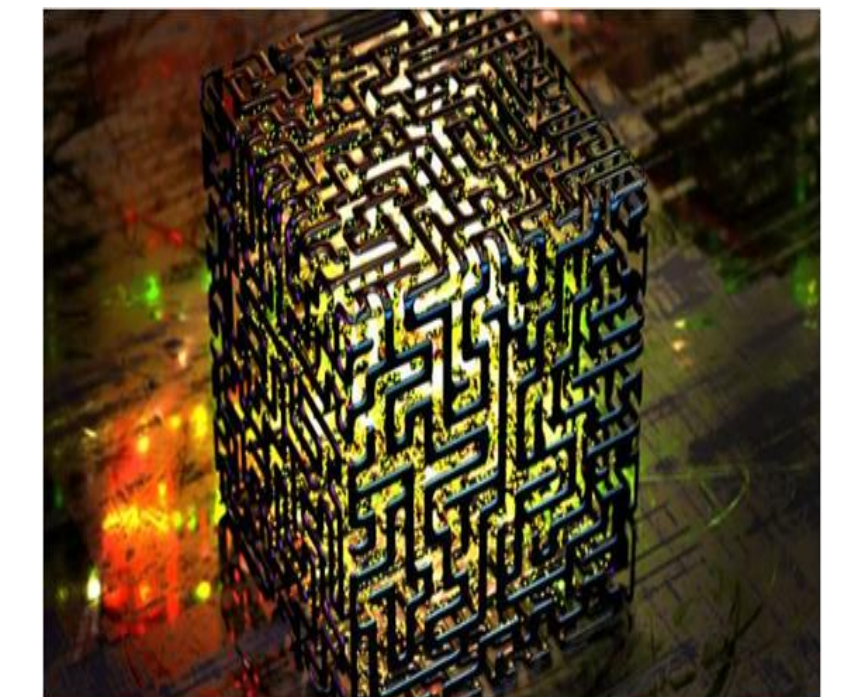
- QC's expected to be 1000's of times more powerful than today's conventional computers
- QC anticipated to create new opportunities in medicine, AI, cybersecurity, finance, logistics etc
- Governments around the world and corporates such as Intel, Google, IBM, Microsoft are vying for leadership in QC development

## Silicon Quantum Computing (QC) is a leading contender for QC technology

- Silicon QC is well placed to leverage off the existing global silicon semiconductor industry
- Silicon QC requires highly enriched silicon, currently in limited supply and high cost
- A reliable enriched silicon supply chain needs to be established to support commercial path
- With timely commercialisation of stable supply chain - silicon may potentially lead global QC efforts

## The SILEX Zero-Spin Silicon (ZS-Si) production opportunity

- SILEX technology already proven capable of producing enriched silicon in the form of ZS-Si
- Current ZS-Si project aims to scale-up to pilot commercial production by end of 2022
- Project partners Silicon Quantum Computing (SQC) and UNSW Sydney are initial customers
- Silex aims to engage with other potential customers, including major semiconductor companies





# SILEX Project for ZS-Si production gathering momentum

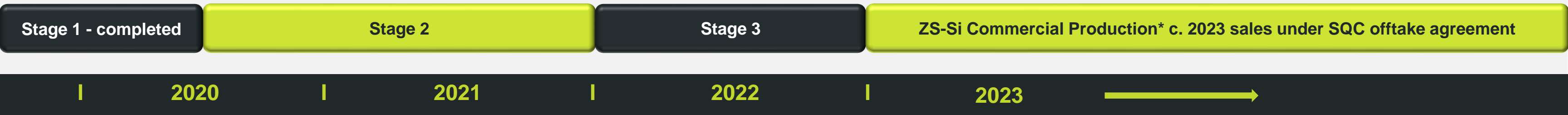
- Project partners SQC and UNSW part of the Federally funded ‘CQC2T Centre of Excellence’ – a world leader in silicon-based QC technology development
- 3-year project cost ~\$8m (includes pilot plant capex) supported by \$3m Federal CRC-P funding grant and \$1.8m from SQC (including \$0.9m in advanced ZS-Si purchases)
- Project objective is to establish reliable and cost effective production of ZS-Si for potential sale to domestic and offshore consumers in the emerging global QC industry

## 3-stage project aims to produce ZS-Si in increasing purity and quantity:

- **Stage 1** – Completed June 2020  
Established lab-scale ‘proof-of-concept’ for the SILEX process
- **Stage 2** – Completed January 2022  
Prototype validation of SILEX technology and scalability for ZS-Si production
- **Stage 3** – Underway  
Full technology demonstration for ZS-Si production at commercial pilot scale



## ZS-Si Production Commercialisation Timeline\*:



\* Subject to technology development program outcomes, market conditions and other factors.

# SILEX Zero-Spin Silicon Production Opportunity

## Aim

establish a reliable and  
economic supply of high purity  
ZS-Si

## Target Commercial Operation Date

2023

## Production

Commercial pilot scale  
production of up to 5 kgs per  
year, anticipated to increase  
over the next decade

## ZS-Si Target Purity

99.995% or higher

## Commercial Offtake Agreement with SQC

Other potential customers  
to be engaged



# Summary



# Summary



GLE's path to market focused on the Paducah opportunity - large, cost effective uranium production project, also capturing significant value in the contained conversion component



Consideration of accelerating deployment of SILEX uranium enrichment technology and GLE's commercial strategy in view of emerging imperative to replace Russian sourced nuclear fuel



Paducah opportunity has additional scope for uranium enrichment to produce LEU, LEU+ and HALEU nuclear fuels, with the PLEF becoming a multi-purpose nuclear fuel production facility



Long-term fundamentals for global growth in nuclear power remain positive, with emerging global supply disruptions energizing the near term markets and requirements for new nuclear fuel production capacity



SILEX silicon enrichment technology being developed to produce Zero-Spin Silicon (ZS-Si) in support of global efforts to commercialise silicon quantum computing



Silex assessing other applications of SILEX technology, potentially in the field of medical radioisotopes

***As at 31 December 2021, the Company had net assets of ~\$55m, including ~\$49.2m in cash and term deposits and approximately ~\$4.2m in IQE shares***





**Thank you**