



# Silex Systems Limited

## Investor Presentation

(ASX: SLX) (OTCQX: SILXY)

**Dr Michael Goldsworthy**  
*CEO/Managing Director*

**22 February 2024**

# 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 technology commercialisation 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 nuclear fuel market conditions and therefore remains subject to associated risks.

Silex is also at various stages of development of additional commercial applications of the SILEX technology, including the production of 'Zero-Spin Silicon' for the emerging technology of silicon-based quantum computing. The 'Quantum Silicon' project remains dependent on the outcomes of the project and the viability of silicon quantum computing and is therefore subject to various risks. Silex is also conducting research activities in its Medical Isotope Separation Technology (MIST) Project, which is early-stage and subject to numerous risks. The commercial future of the SILEX technology in application to uranium, silicon, medical and other isotopes 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 very 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, Zero-Spin Silicon production, medical and other isotope separation projects, 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 should not place reliance on any forward-looking statements 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 Silex does not intend, and is not obligated, to update the forward-looking statements except to the extent required by law or the ASX Listing Rules.

Except as required by law or regulation (including the ASX Listing Rules and OTCQX Rules for US 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; geopolitical risks, in particular relating to Russia's invasion of Ukraine and tensions between China and Taiwan which may impact global supply chains, among other risks; uncertainties related to the effects of climate change and mitigation efforts; the results of the GLE/SILEX uranium enrichment pilot demonstration 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 outcome of the MIST Project; 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; whether IQE's commercialisation program for cREO® is resumed, the results from the program and the market opportunities for cREO® products; actions taken by the Company's commercialisation partners and other stakeholders that could adversely affect the technology development programs and commercialisation strategies; 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)



**Medical isotope enrichment**  
(new cancer therapies)

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

# Highlights of the Half Year Review and Recent Developments

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

- GLE is positioning to leverage, via the SILEX technology, the '***Triple Opportunity***' that has emerged in the global nuclear fuel market
- GLE's owners (Silex and Cameco) have agreed to a CY2024 plan and budget for GLE to continue accelerated activities for the technology pilot demonstration project for the SILEX uranium enrichment technology – aiming for completion in 2024 (previously end of CY2025)
- Construction (fit-out) of a new facility leased by GLE in Wilmington in mid-2023 is nearing completion – which will provide significant additional space for planned growth in GLE's engineering, in-house manufacturing and commercial activities
- In January 2024, the US DOE issued a final HALEU Enrichment Acquisition RFP for the HALEU Availability Program
- Various other US Government nuclear fuel funding initiatives, which may be applicable to GLE, are currently before the US Congress

## ***Quantum Silicon Project, Medical Isotope Project and Other Highlights:***

- The Quantum Silicon (Q-Si) commercial production project commenced in August 2023, following award of \$5.1m in funding from the Federal Government's Defence Trailblazer Program – construction of the first commercial production module progressing at Silex's Sydney facility
- In January 2024, Silex and offtake partner SQC expanded commercial arrangements for the Q-Si production project
- In December 2023, Silex announced successful completion of proof-of-concept in the Medical Isotope Separation Technology (MIST) Project, which is focused on developing a process to produce enriched Ytterbium (Yb-176), the key precursor required for Lutetium (Lu-177) production – a breakthrough therapy for advanced cancers
- ***As at 31 December 2023, the Company has cash and term deposit holdings of ~\$126.7m and no corporate debt***

# Primary Focus on GLE Commercialisation

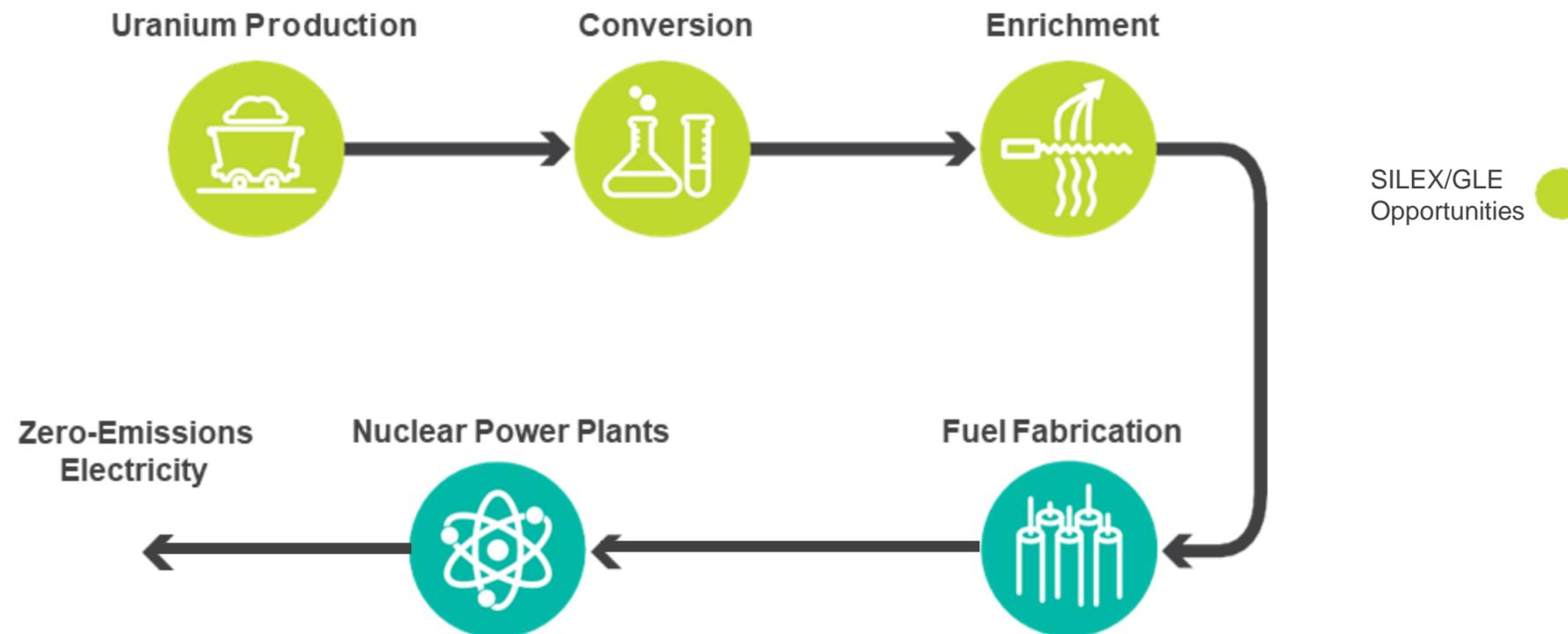


## Uranium production and enrichment (nuclear power)

- SILEX uranium technology licensee Global Laser Enrichment (GLE) is progressing towards commercialisation
- US-based GLE under JV ownership since 2021: 51% by Silex and 49% by Cameco Corporation (Cameco)
- Cameco is one of the world's leading uranium producers and nuclear fuel suppliers
- GLE has unique potential to address the '*Triple Opportunity*' that has emerged in the global nuclear fuel supply chain with the potential production of three forms of nuclear fuel:
  1. **Natural  $UF_6$  production** - from DOE\* tails inventories (support the rising demand for uranium and conversion)
  2. **LEU production** - fuel for existing reactor fleet (help mitigate supply risks for enriched uranium fuel)
  3. **HALEU production** - fuel for next generation reactors, including Small Modular Reactors (SMRs) (help establish HALEU capability in the US)

# Nuclear Fuel Supply and Current Issues

## The Nuclear Fuel Supply Chain



### Issues facing the Global Nuclear Fuel Supply Chain:

- Western supply chain recent history - curtailments and under-investment in resources and production capability
- Supply chain risks have been exposed by over-dependence on Russian-sourced nuclear fuel
- Conversion services – only 3 Western suppliers (Cameco, Orano, Converdyn) excluding Russia
- Enrichment services – only 2 Western suppliers (Urenco, Orano) excluding Russia
- HALEU fuel for advanced reactors, including SMRs – no Western-based suppliers – developers were relying on Russian HALEU

# US and EU Nuclear Fuel Requirements Supplied by Russia

	Russian Share of Global Production Capacity <sup>1</sup>	EU Nuclear Fuel Supplied by Russia <sup>2</sup>	US Nuclear Fuel Supplied by Russia <sup>1,3</sup>
Uranium (U <sub>3</sub> O <sub>8</sub> )	~14%	~20%	~14%
Conversion	~27%	~25%	~18%
Enrichment (SWU)	~45%	~31%	~24%

1. WNA and UxC, various sources 2023
2. Euratom Supply Agency Annual Report 2021
3. EIA, 2022 Uranium Marketing Annual Report, June 2023

- Major concerns regarding Western reliance on Russia for the supply of nuclear fuel
- US is the largest market for nuclear fuel, with ~25% of world's nuclear reactor fleet
- Open market<sup>^</sup> currently accounts for ~65% of global enriched uranium demand

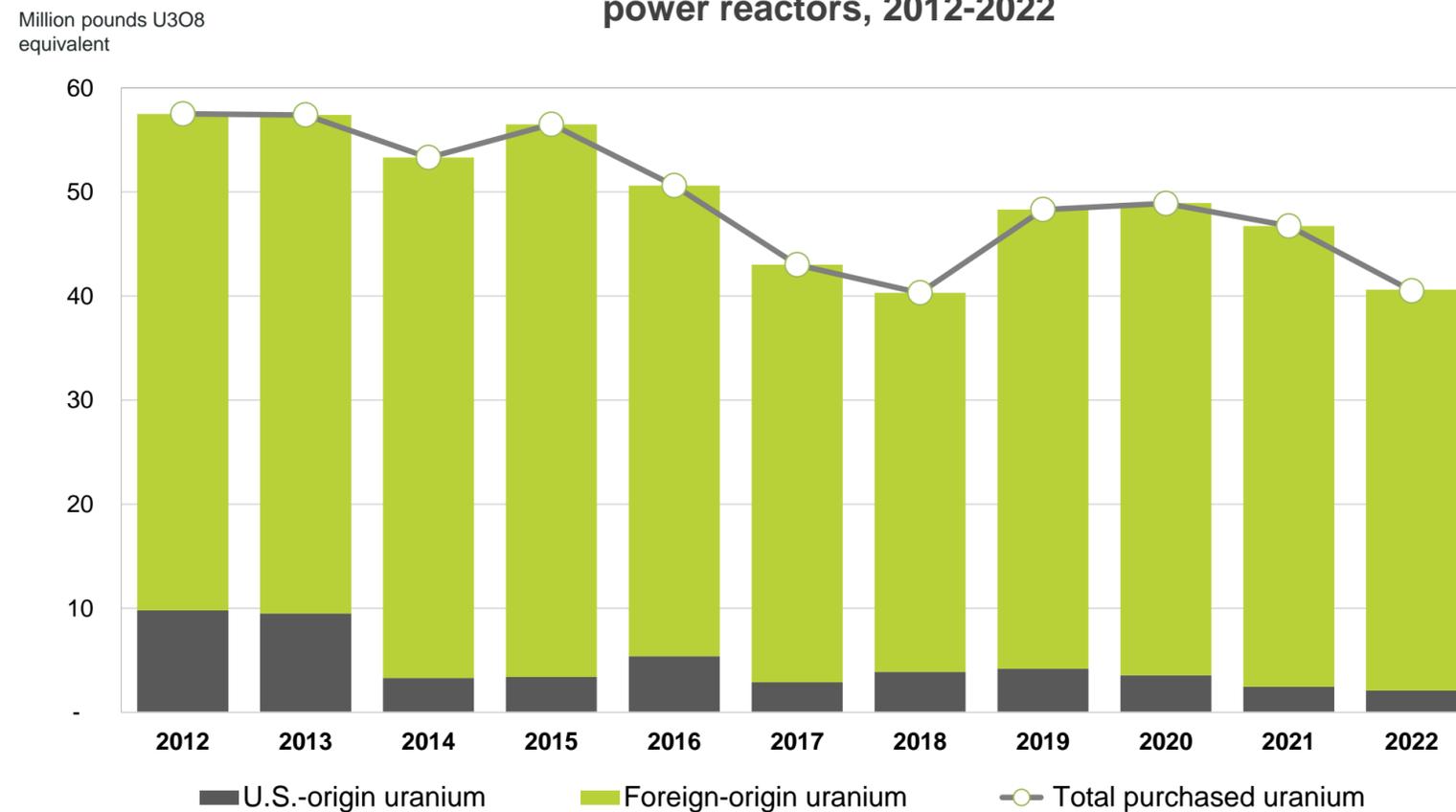
<sup>^</sup>Open market consists of North America, Europe, Northeast Asia, and various other parts of the world

# US Uranium and Enrichment Vulnerability

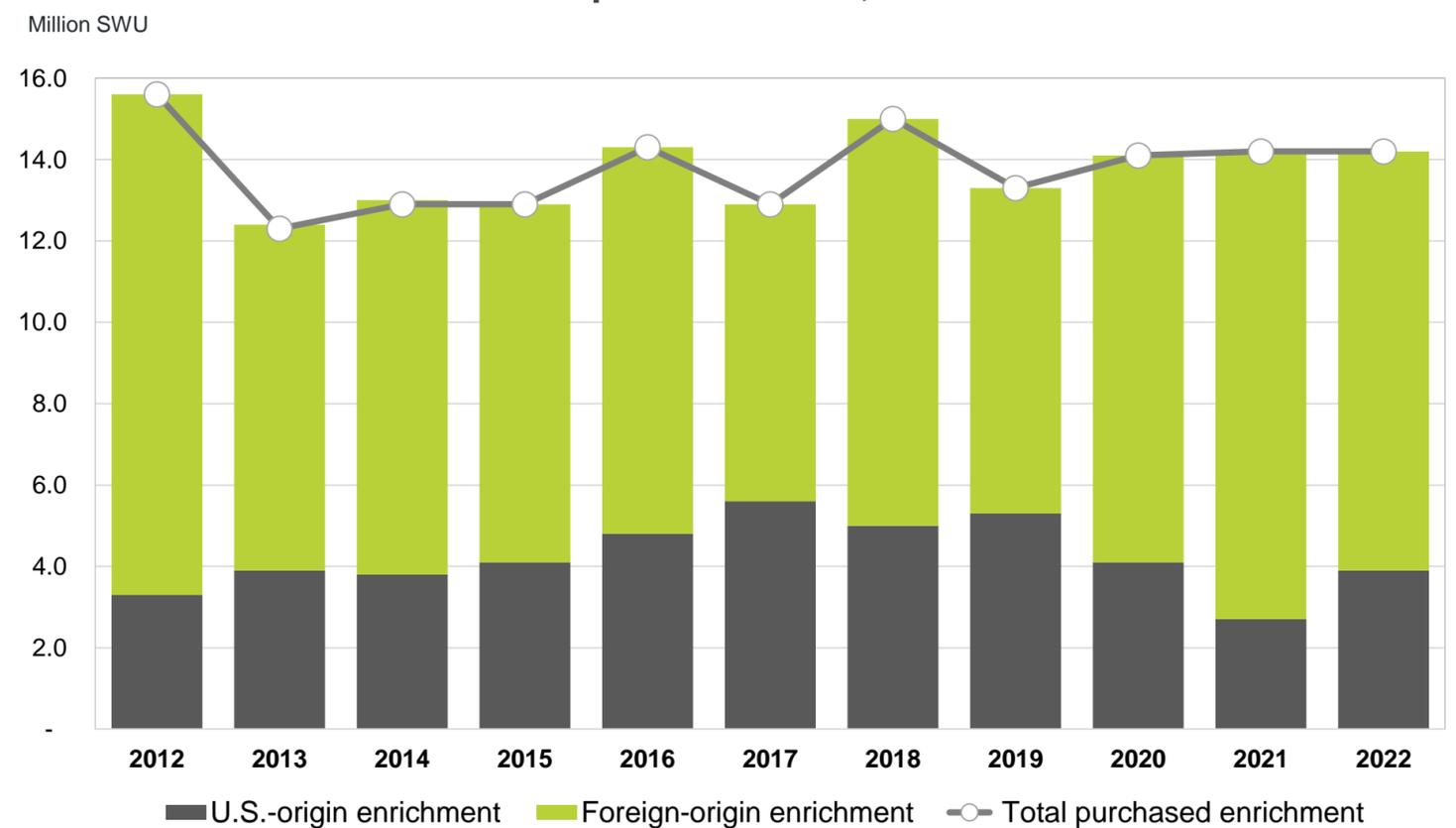
## US currently imports the vast majority of its nuclear fuel:

- 95% of its uranium requirements (including ~14% from Russia)
- 100% of its conversion requirements (including ~18% from Russia)
- 70% of its enriched uranium requirements (including ~24% from Russia)

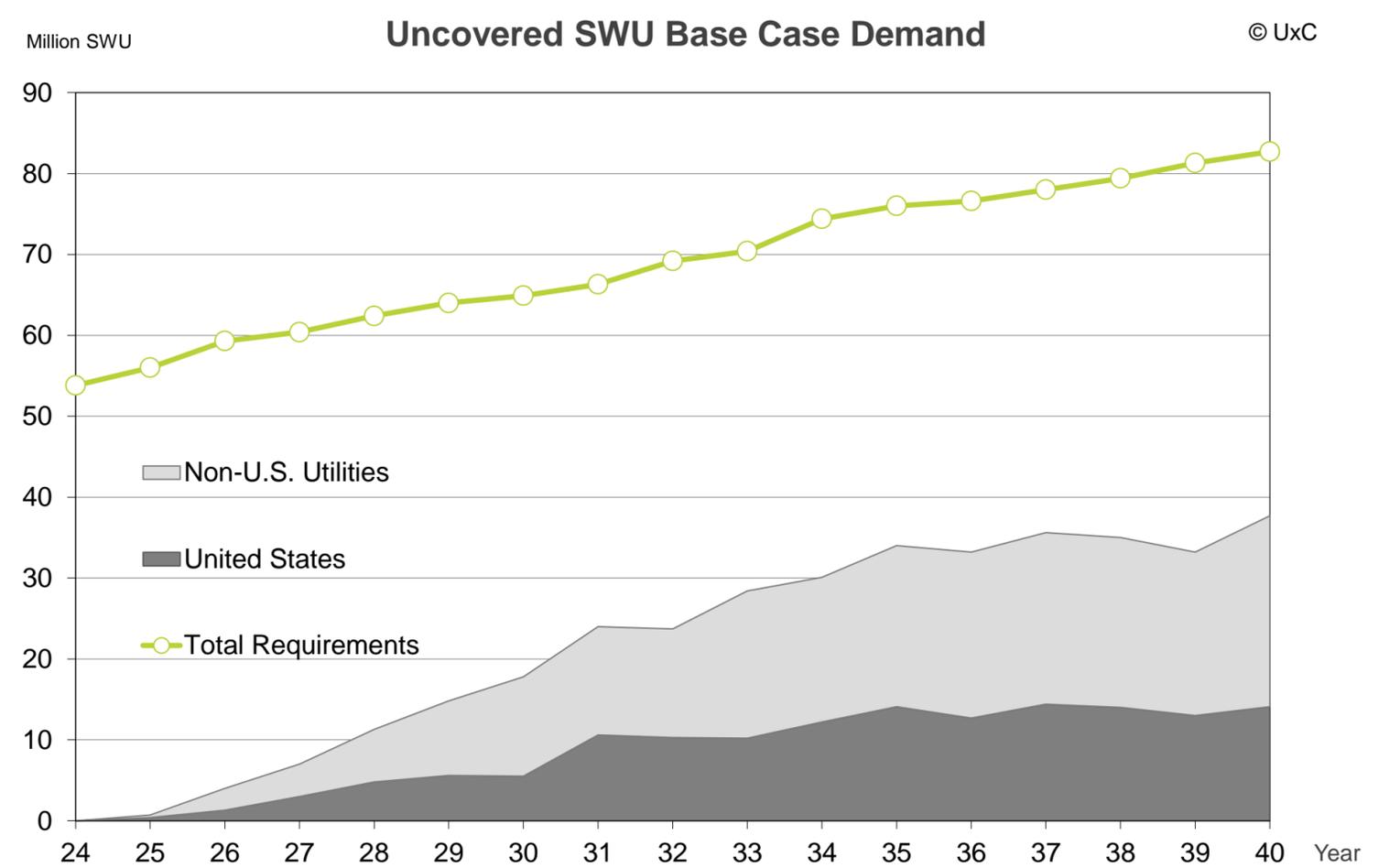
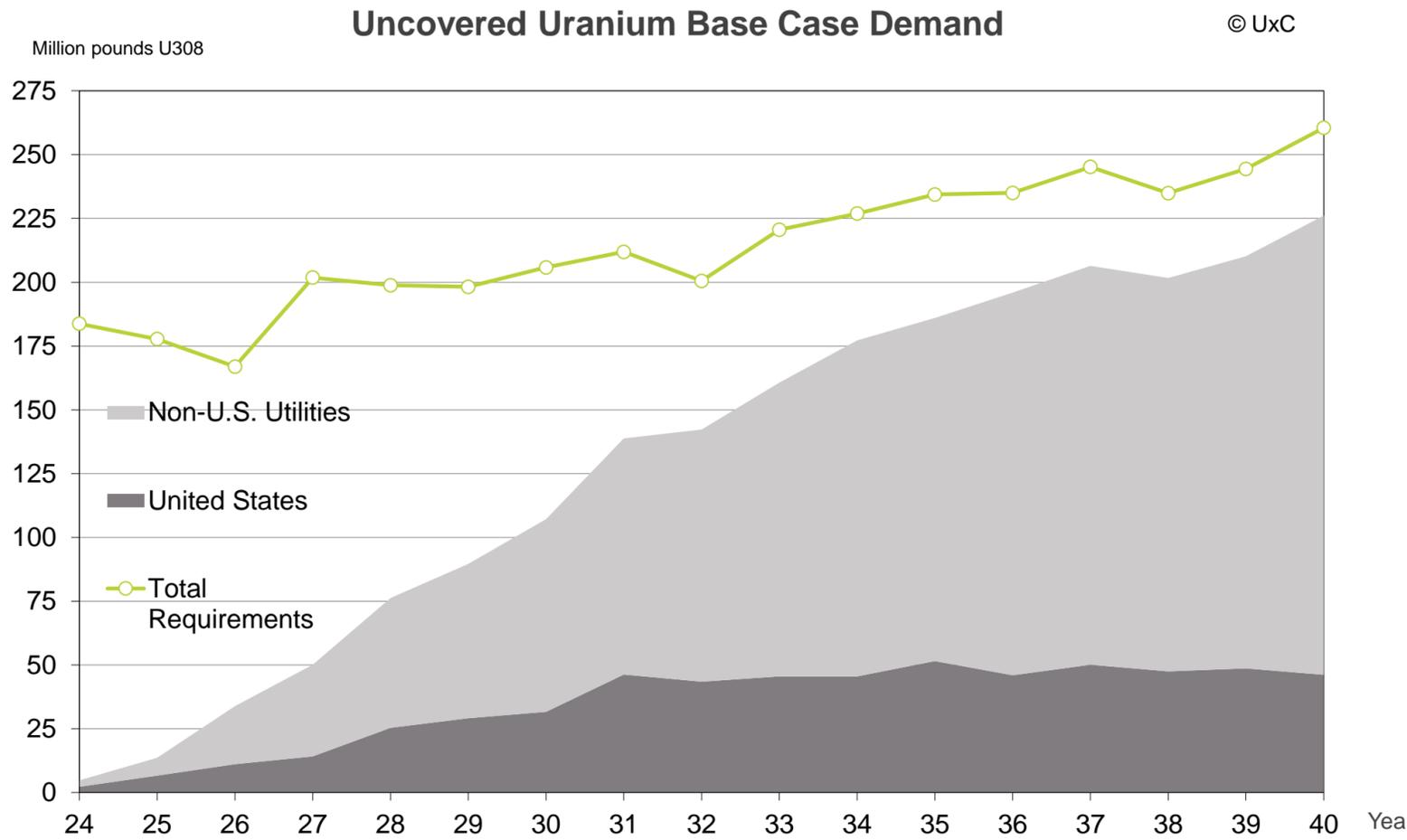
Uranium purchased by owners and operators of U.S. civilian nuclear power reactors, 2012-2022



Enrichment purchased by owners and operators of U.S. civilian nuclear power reactors, 2012-2022



# Emerging Nuclear Fuel Supply Opportunities for GLE



Source: UxC Uranium Market Outlook, Q4, 2023

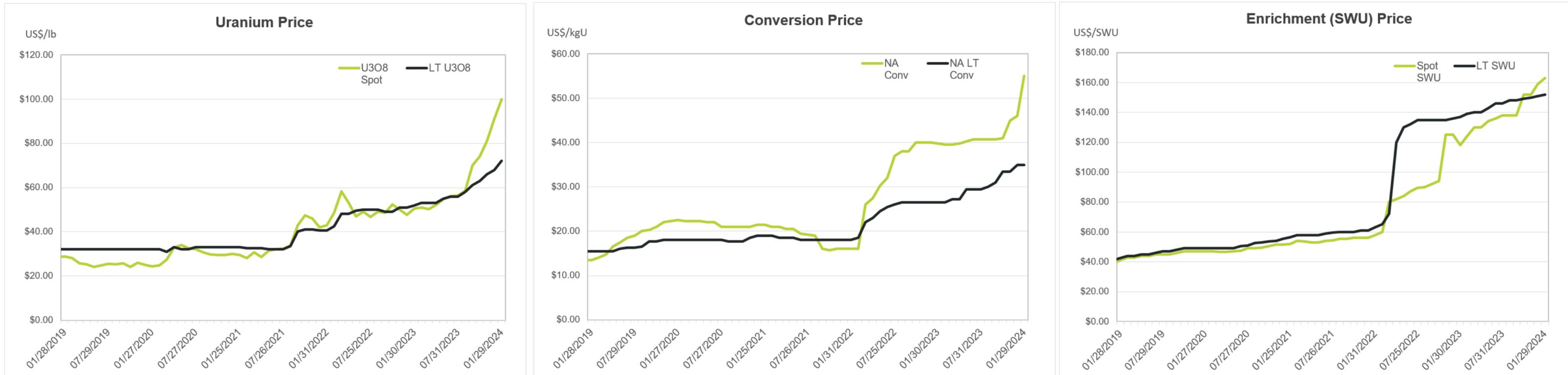
Source: UxC Enrichment Market Outlook, Q4, 2023

- Forecast uncovered **US Uranium demand** from 2028 is in excess of ~28 million lbs
- Forecast uncovered **US SWU demand** in 2028 is ~5 million SWU rising to ~12 million SWU by 2034

**Significant nuclear fuel opportunities for GLE extend from the late 2020s**



# Recent Nuclear Fuel Market Price Trends



Source: UxC

- Global nuclear fuel markets are pricing in the impact of a bifurcating market precipitated by looming Russian fuel sanctions/exclusions
- According to UxC, the uranium spot price has increased by ~300% from ~US\$24/lb (2019) to ~US\$100/lb (January 2024)
- Conversion term prices have increased ~120% over the same period to ~US\$35/kg
- Enrichment term prices have increased ~250% over the same period to ~US\$150/SWU

# Acceleration of GLE's Activities for the SILEX technology

## ***GLE has unique potential to address the 'Triple Opportunity' that has emerged in the global nuclear fuel supply chain:***

- GLE joint venture owners Silex and Cameco approved a plan and budget for GLE in CY2024 that continues to support the acceleration of activities in the technology demonstration project for the SILEX uranium enrichment technology<sup>1</sup>
- Successful demonstration of the SILEX technology with the pilot facility during CY2024 preserves the option of commencing commercial operations at the planned Paducah Laser Enrichment Facility (PLEF) as early as 2028<sup>2</sup>
- CY2024 also allows GLE to progress other key commercialisation activities, including Paducah, KY site acquisition activities, NRC license application for the PLEF, and completion of the new GLE corporate and manufacturing facility in Wilmington, NC

## ***Potential support emerging from the US Government and Industry:***

- US Government passed the 'Inflation Reduction Act' in August 2022 – includes US\$700 million in support for the DOE's HALEU<sup>3</sup> Availability Program
- Other Bills moving through Congress could provide additional funding for LEU / HALEU production
- Another Bill that may result in the banning of Russian imports of nuclear fuel to the US is currently before Congress
- GLE signed LOIs<sup>4</sup> with US utilities Constellation Energy Generation, Duke Energy and Dominion Energy to support GLE's commercialisation

1. Continued acceleration of GLE's commercialisation plans remains conditional on availability of industry and government support, and geopolitical and market factors

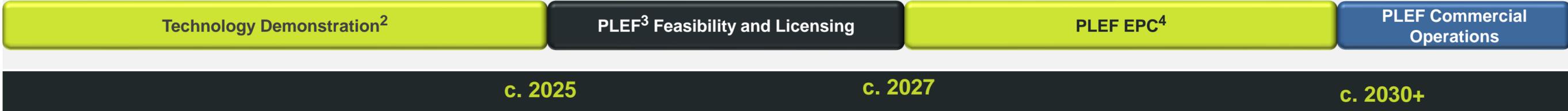
2. Timelines subject to technology demonstration outcomes, suitable market conditions, PLEF feasibility assessment, licensing, commercial support and other factors

3. High Assay Low Enriched Uranium

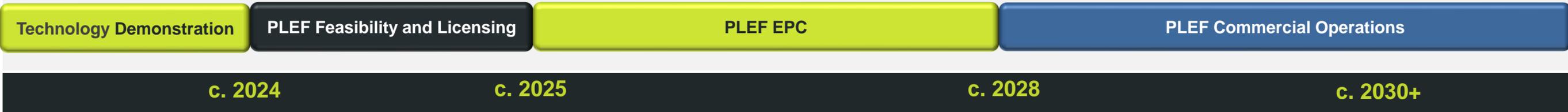
4. Letter of Intent

# GLE's Potential Timelines for Commercialisation of SILEX technology<sup>1</sup>

## Baseline - GLE Commercialisation Timeline:



## Accelerated - GLE Commercialisation Timeline<sup>5</sup>:



←  
*Up to 3 years earlier  
than originally planned*

- 1. Timelines subject to technology demonstration outcomes, market conditions, licensing, commercial support, PLEF feasibility assessment 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. Continued acceleration remains subject to due diligence assessment and may vary according to differing scenarios

# Status of Technology Pilot Demonstration Project<sup>1</sup>

## Laser Systems:

- Two full-scale pilot laser system modules (designed and built by Silex), installed and commissioned in GLE's Test Loop facility in Wilmington
- Currently being prepared for TRL-6 enrichment testing

## Separator and UF<sub>6</sub> Gas Handling Systems (GHS):

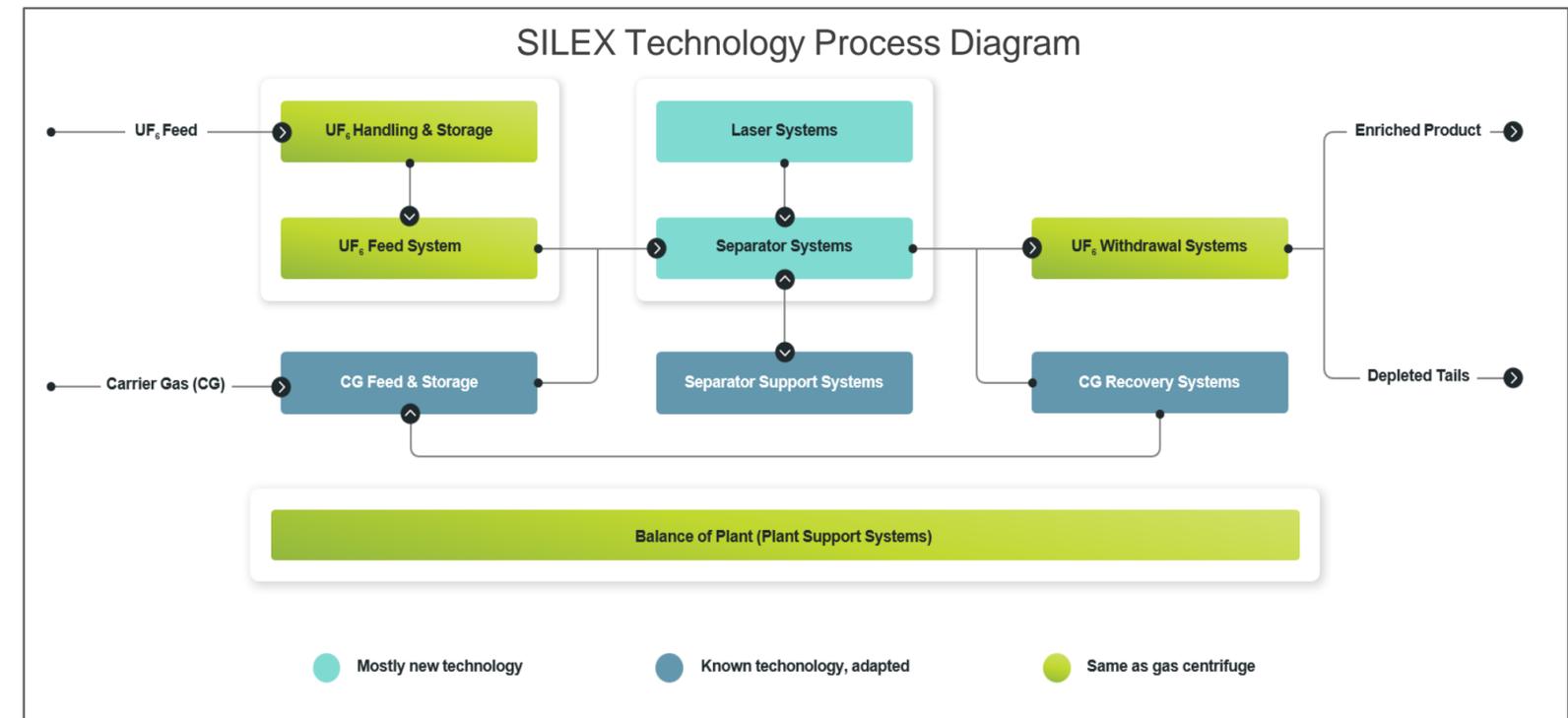
- Construction of pilot separator and GHS nearing completion with commissioning activities underway

## Integrated TRL-6 Enrichment Demonstration Facility:

- Nuclear Regulatory Commission (NRC) to conduct an Operational Readiness Review in late February 2024
- If all in order, UF<sub>6</sub> feed gas will be able to be loaded into the Test Loop

## TRL-6 Pilot Demonstration Project:

- Current focus largely on integration and commissioning of pilot facility equipment for commencement of enrichment testing
- TRL-6 pilot demonstration project includes completion of a favourable independent assessment and submission of a report to Silex and Cameco



1. All scheduling is tentative and depends on progress and delays - subject to change at any time

# GLE's PLEF Production Plant Opportunity

## The PLEF Triple Opportunity

Paducah Laser Enrichment Facility (PLEF) – an opportunity to deploy the SILEX technology in the US:

- **PLEF UF<sub>6</sub> Production:** Production of up to 5 million pounds (equivalent) natural grade uranium (as UF<sub>6</sub>) annually for up to 30 years - underpinned by GLE's 2016 agreement with US DOE to acquire over 200,000 tonnes of legacy tails inventories
- **PLEF LEU Production:** Add-on opportunity to enrich PLEF output to produce Low Enriched Uranium (LEU/LEU+) for nuclear reactor fuel
- **PLEF HALEU Production:** Additional opportunity to enrich HALEU for next generation advanced reactors, including SMRs

### PLEF UF<sub>6</sub>

#### Natural Grade Uranium (as UF<sub>6</sub>)

via enrichment of DOE inventories of depleted tails to produce natural UF<sub>6</sub> with U<sup>235</sup> assay ~0.7%

### PLEF LEU

#### Low Enriched Uranium (LEU)

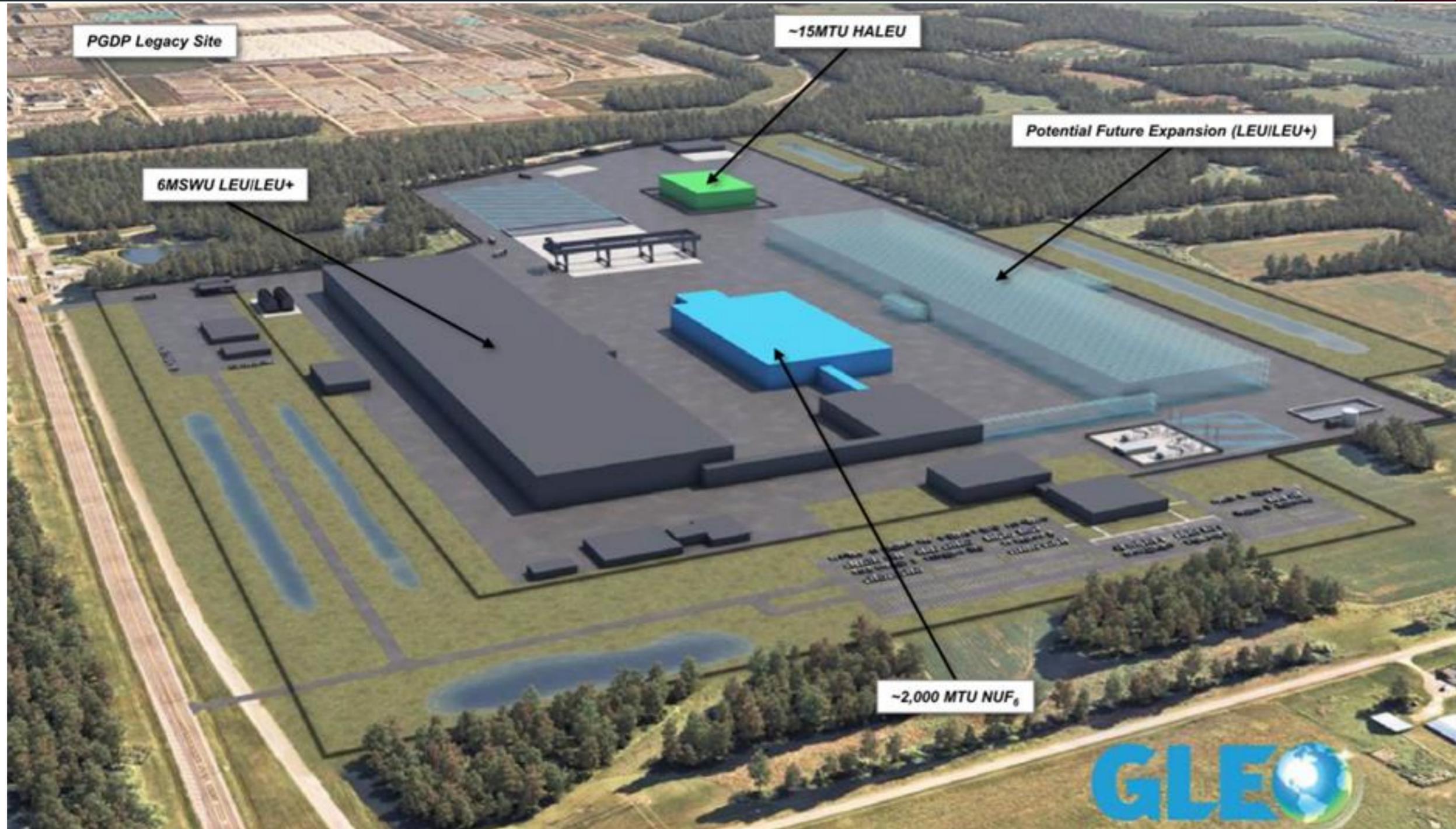
for conventional nuclear power reactors  
LEU includes U<sup>235</sup> assays of 3% to 5%  
LEU+ includes U<sup>235</sup> assays of 5% to 10%

### PLEF HALEU

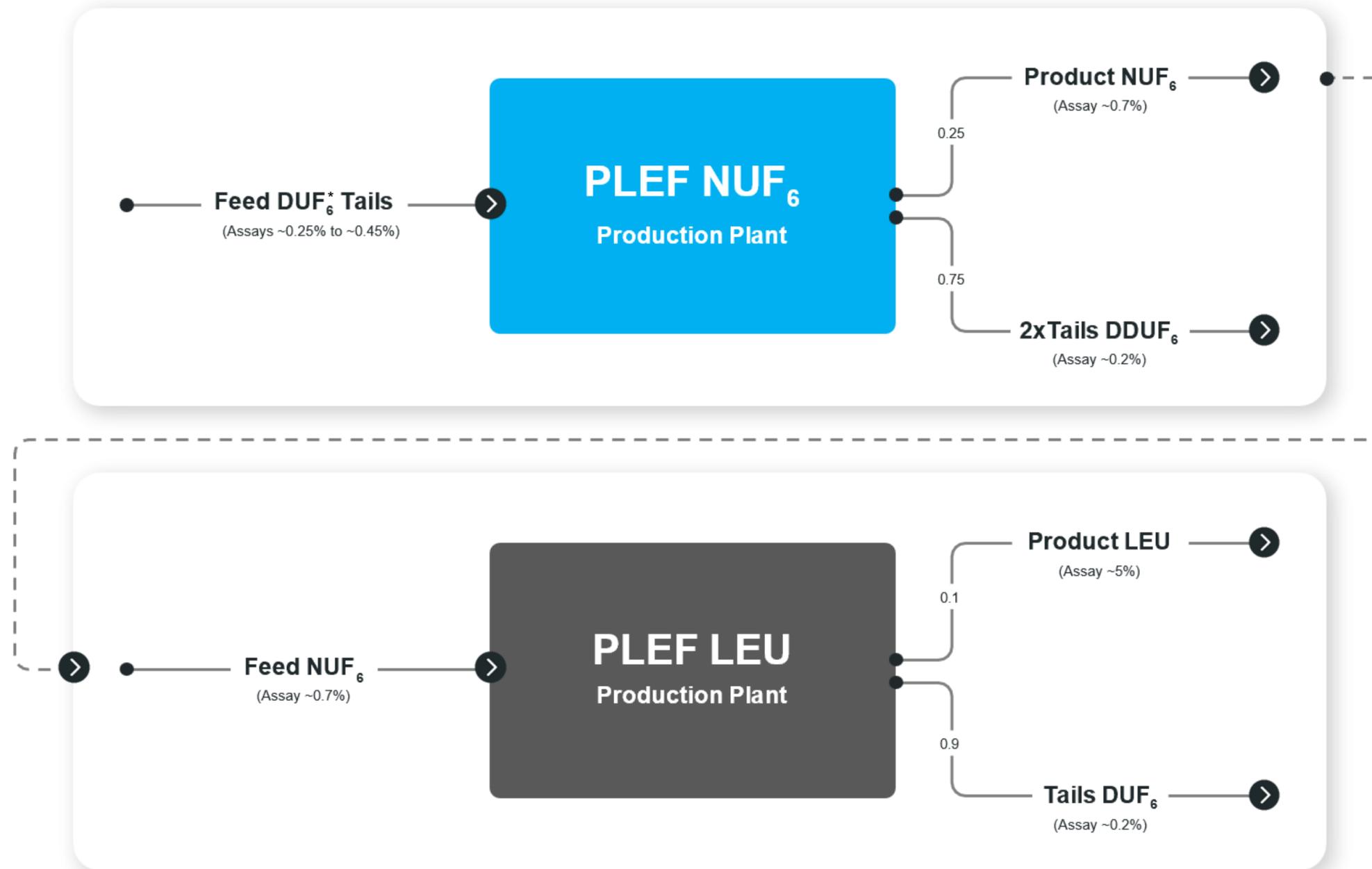
#### High Assay LEU (HALEU)

fuel for next generation advanced reactors, including SMRs  
includes U<sup>235</sup> assays up to 20%

# GLE's PLEF Multi-purpose Production Plant Opportunity



# GLE's PLEF Production Plant Opportunities



GLE PLEF Process streams – NUF<sub>6</sub> and LEU Production

# PLEF UF<sub>6</sub> Production Opportunity

(Natural UF<sub>6</sub> production from tails)

## Potential Accelerated Commercial Operation Date<sup>^</sup>

As early as 2028

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

Based on low cost and longevity of production

(Silex estimate of all-in cost currently < US\$30/lb)

## Equivalent U<sub>3</sub>O<sub>8</sub> Production

Up to 5 million lbs p.a. for approximately 30 years (~150m lb contained resource)

## Potential capture of Conversion Value

Feed and Product is UF<sub>6</sub>  
(current conversion value ~US\$35/kg)

## Potential to Enrich Further

From natural grade (0.7%):  
to LEU (up to 5%)  
to LEU+ (up to 10%)  
& HALEU (up to 20%)

# GLE Value Proposition for Silex\*

## 1) GLE Equity – Minimum 25%:

- Silex currently holds 51% – Cameco has a call Option to acquire an additional 26% at fair market value
- Option window opened 1 February 2023 – closes 30 months after successful TRL-6 demonstration
- Either way, Silex has a significant equity stake in GLE as a potential nuclear fuel supplier
- Attractive business case with Triple Opportunity and very high entry barriers

## 2) SILEX Technology Licence and Perpetual Royalty:

- Technology classified by Australian and US Governments with no patent disclosures permitted
- Technology kept as Trade Secret under strictest security mandates → no sunset on IP
- Perpetual SILEX royalty of 7% to 12% on GLE's enrichment SWU revenues could potentially reach, for example, ~US\$80m p.a. for 8 MSWU PLEF operations (at 7% royalty rate and current SWU price)

\* GLE's progress to commercialisation is dependent on several factors, including, but not limited to: successful completion of the technology demonstration program; availability of government and industry support; timely licensing activities; securing of PLEF site; PLEF feasibility assessment; and supportive market factors



# Significant Additional Opportunities



## Silicon enrichment (silicon quantum computing)

- SILEX technology proven capable of producing highly enriched silicon in the form of Zero-Spin Silicon (ZS-Si)
- Initial ZS-Si project (completed FY2023) achieved target milestones, including ~99.998% enriched Si-28 with the pilot demonstration facility

### **Quantum Silicon (Q-Si) Production Project:**

- Quantum Silicon Production Project focuses on transition from engineering demonstration to initial commercial production
- 3.5-year project announced in August 2023 being undertaken with SQC and UNSW
- Project supported by \$5.1m of Federal Government funding and SQC expanded their commercial arrangements in January 2024
- Project aim is to build and operate the first commercial production module and develop product conversion capability for Q-Si in solid and gaseous forms required by various potential customers



## Medical isotope enrichment (new targeted beta cancer therapies)

- Medical isotope project aiming to develop a process to enrich Ytterbium (Yb-176) for production of Lutetium-177 (Lu-177)
- Lu-177 radioisotope represents a breakthrough development for the diagnosis and treatment of aggressive metastatic cancers

### **Medical Isotope Separation Technology (MIST) Project:**

- 3-year MIST project commenced in February 2023 - aims to develop SILEX technology to enrich Yb-176 to high purity (~99%)
- In December 2023, Stage 1 of the Project – proof-of-concept was successfully completed
- Stage 2 is underway and aims to validate the process at prototype scale, including the first level of scale-up
- The MIST project provides further diversification and leverages the business case for the SILEX technology across multiple markets

# Summary



GLE's path to market is underpinned by the PLEF UF<sub>6</sub> project for cost effective production of natural uranium (in the form of UF<sub>6</sub>) and significant value of conversion contained in GLE's feed inventories



Acceleration of the technology pilot demonstration project continuing in CY2024, which if successfully completed, preserves the option to commence PLEF commercial operations as early as 2028



'Triple Opportunity' includes potential to add SILEX production capacity to produce LEU, LEU+ and HALEU nuclear fuels with the PLEF multi-purpose production plant, helping to alleviate dependence on Russian sourced fuel



Silex represents unique leverage into the nuclear fuel supply chain, with significant potential shareholder value through equity ownership in GLE (currently 51%) in addition to valuable perpetual royalty flows under the SILEX uranium technology license



SILEX Quantum Silicon Project launched August 2023 to construct the first Q-Si commercial production module and establish a sovereign capability and secure supply chain in support of the emerging global Silicon Quantum Computing industry



Silex is assessing other applications of the SILEX technology in the field of medical radioisotopes, initially for enrichment of Yb-176 – used for production of Lu-177 – a breakthrough in nuclear medicine cancer treatment

***As at 31 December 2023, the Company has cash and term deposit holdings of ~\$126.7m and no corporate debt***



**Thank you**