



# Silex Systems Limited 2015 Annual General Meeting

(ASX: SLX) (OTCQX: SILXY)

Dr Michael Goldsworthy, CEO / Managing Director  
17th November 2015

# Forward Looking Statements



Silex Systems is a research and development Company whose assets are its proprietary rights in various technologies, including, but not limited to, the SILEX technology, Solar Systems technology and Translucent technology. The Company's technologies are in the development stage and have not been commercially deployed, and therefore are high-risk. Accordingly, the statements in this presentation regarding the future of the Company's technologies and commercial prospects are forward looking and actual results could be materially different from those expressed or implied by such forward looking statements as a result of various risk factors.

Some risk factors that could affect future results and commercial prospects include, but are not limited to: results from the SILEX uranium enrichment commercialisation program; the demand for natural and enriched uranium; the development of competing technologies; the potential for third party claims against the Company's ownership of Intellectual Property associated with its technologies; the potential impact of government regulations or policies; and the outcomes of various commercialisation strategies undertaken by the Company.

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# The Company

Silex Systems is an advanced technology company, primarily focused on the development and commercialisation of its innovative and potentially disruptive laser-based uranium enrichment technology

# Silex - The Year in Review

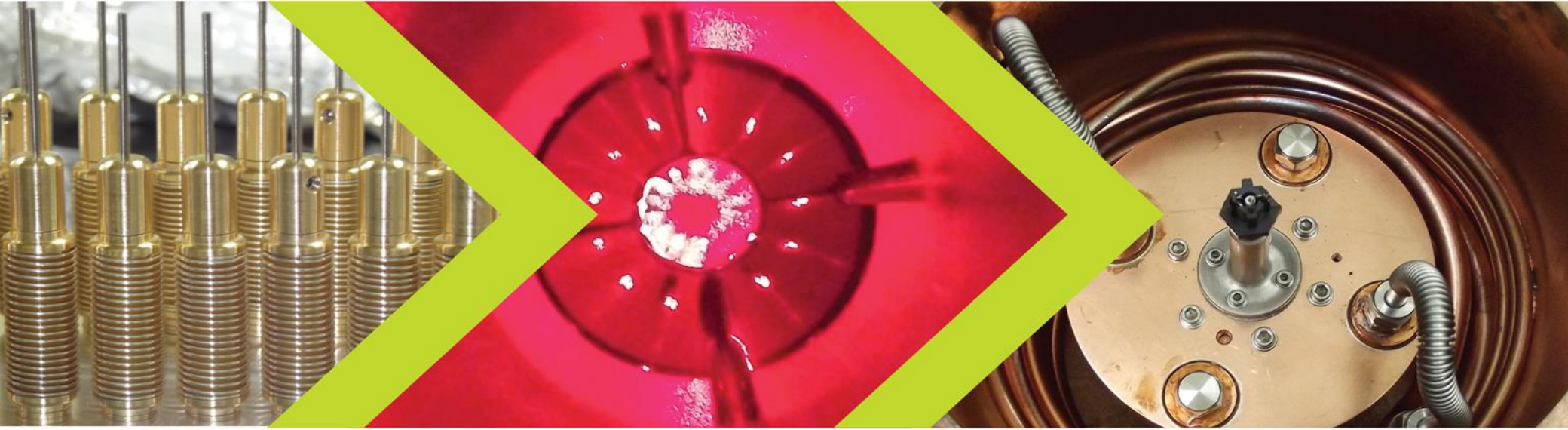


- Strategic review undertaken by Silex Board in June 2014 resulting in full company restructure
- Key decision – to return the primary focus of the company to the development and commercialisation of our foundation technology – the SILEX laser-based uranium enrichment technology
- The restructure is now largely complete with the following outcomes:
  - i) ChronoLogic** – closure of the ChronoLogic business in September 2014;
  - ii) Solar Systems** – cessation of the Solar Systems business in July 2015. IP and associated expertise retained to pursue residual opportunities;
  - iii) Translucent** – exclusive License and Assignment Agreement signed with UK-based IQE Plc in September 2015. Technology transfer to IQE and closure of the Palo Alto facility is well advanced; and
  - iv) Corporate** – 50% reduction in headcount and 50% reduction of leased space for our corporate office.
- The restructure is expected to deliver a significant reduction in cash burn to approximately \$3 million p.a., on a forward recurring basis (current cash reserves approximately \$50 million)
- Focussing on the commercialisation of the SILEX Technology considered the best path forward to create value for shareholders in the medium term as nuclear fuel markets return to positive growth

# The Translucent – IQE Agreement

- Translucent, a Silex subsidiary (99% ownership) based in California, USA, successfully developed a unique set of advanced semiconductor materials known as 'Rare Earth Oxides' (REO's)
- The REO's have potential application to key semiconductor growth sectors such as power electronics and wireless communications chips
- In September 2015, Translucent signed an exclusive worldwide license agreement with UK-based semiconductor company IQE Plc. IQE is the world's leading epiwafer supplier
- Under the agreement, a 30 month license has been provided to allow IQE to develop and commercialise initial products incorporating the REO materials, after which IQE may elect to acquire the technology
- Should IQE successfully commercialise products using the REO materials, a royalty of up to 6% of IQE's revenues derived from the technology will be payable to Translucent





# SILEX Laser Uranium Enrichment Technology



Silex

# GLE Restructure - Overview

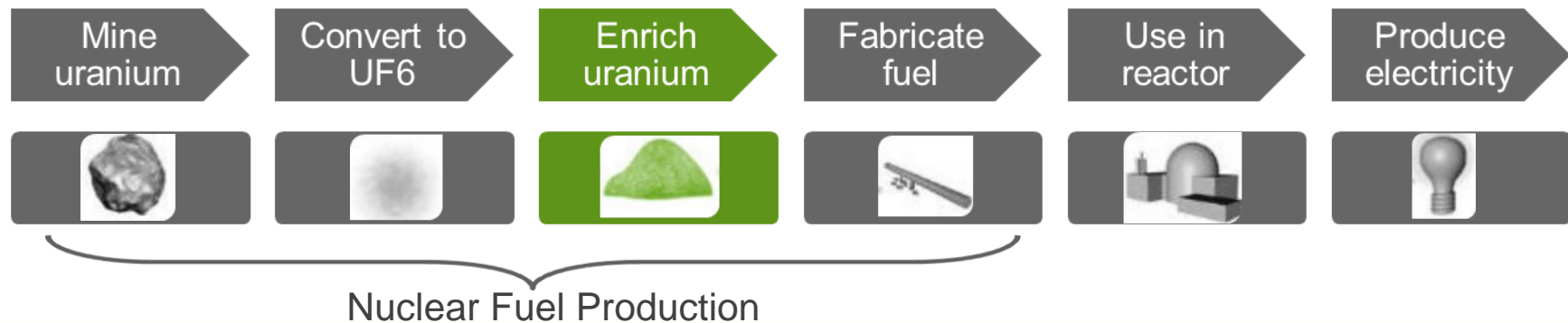


- SILEX Technology Licensee GE-Hitachi Global Laser Enrichment (GLE) announced a major restructure in July 2014, slowing the commercialisation project in response to adverse conditions in nuclear fuel markets (Fukushima effect)
- The GLE restructure resulted in funding cuts with a reduction in head count and closure of the Oak Ridge manufacturing support facility
- The downsized team in Wilmington, North Carolina has since made significant progress with process and engineering improvements, potentially improving process efficiency and economics
- The small team in Lucas Heights, Sydney is also making significant progress, completing a major development and demonstration milestone for a prototype plant scale laser system
- GLE continues to pursue the tails reprocessing plant opportunity in Paducah, Kentucky – negotiations with the US Department of Energy are nearing completion. Paducah is a key step on the path to market
- Medium to long term outlook for the global nuclear industry suggests a return to growth and recovery in the nuclear fuel markets, but timing for new enrichment capacity remains uncertain



# Advantages of the SILEX Technology

- Enrichment is the most difficult and costly step in making nuclear fuel for power reactors – around 35% to 40% of total fuel cost based on current market prices
- All enrichment today performed by gas centrifuge technology developed initially in the 1940's
- SILEX is a breakthrough in efficiency – most cost effective enrichment method
- Anticipated to have the lowest capital costs of all enrichment technologies
- The only 3rd generation laser-based enrichment technology being commercially deployed
- Classified technology - protected by the strictest security measures



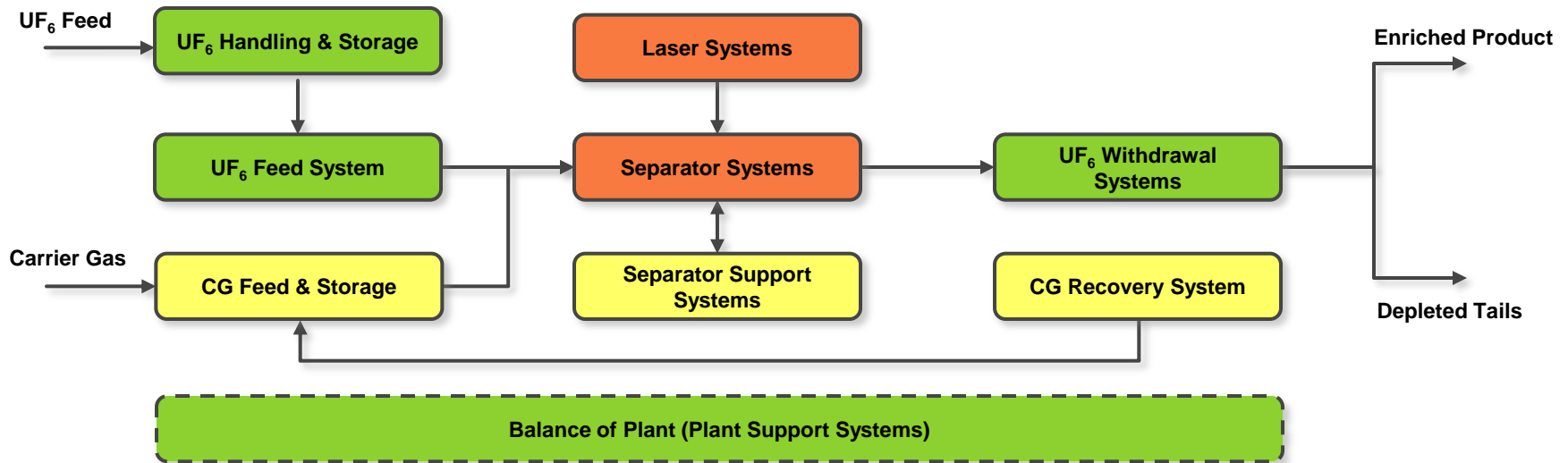
# Comparison of Enrichment Technologies




	Gas Diffusion	Gas Centrifuge	SILEX Laser
<b>Developed</b>	1940's	1940's	2000's
<b>Process</b>	Mechanical (high pressure diffusion)	Mechanical (centrifugal force)	Laser Excitation (molecular or atomic precision)
<b>Enrichment Efficiency</b>	1.004	1.3 to 1.5	2 to 20 <sup>(1)</sup>
<b>Cost Comparison</b>	Cost prohibitive	Capital intensive	Potentially attractive
<b>% of Existing Market <sup>(2)</sup></b>	0%	86%	0%
<b>Status</b>	Obsolete 1 <sup>st</sup> Generation	Operational 2 <sup>nd</sup> Generation	Under development 3 <sup>rd</sup> Generation

(1) This number is Classified – the range indicated is dictated by the technology Classification Guide

(2) Approximately 14% supplied from GDP inventory, RepU/MOX and other sources (UxC Enrichment Market Outlook Q3, 2015)

# SILEX Process Flow Diagram

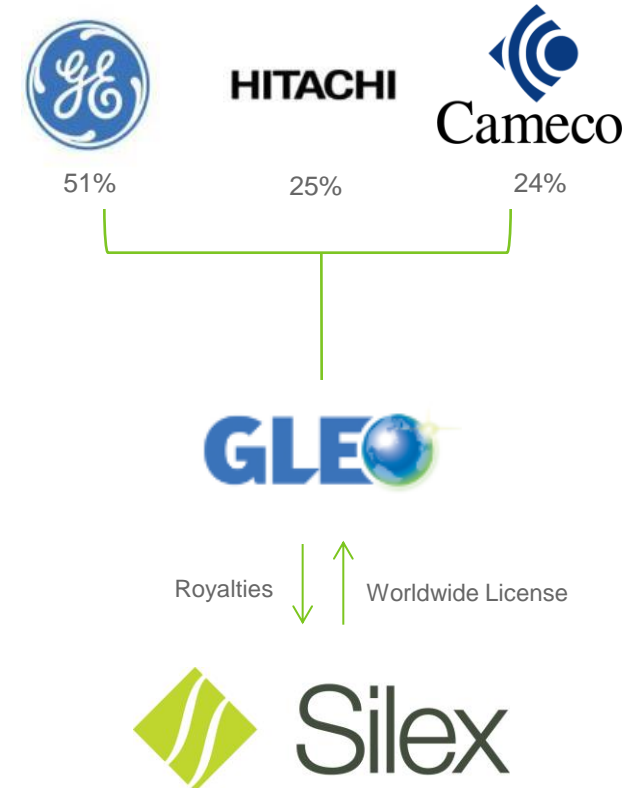


-  Mostly new technology
-  Known technology adapted
-  Same as gas centrifuge

# Commercialisation and License Agreement

## Perpetual Royalty Agreement with Global Laser Enrichment (GLE)

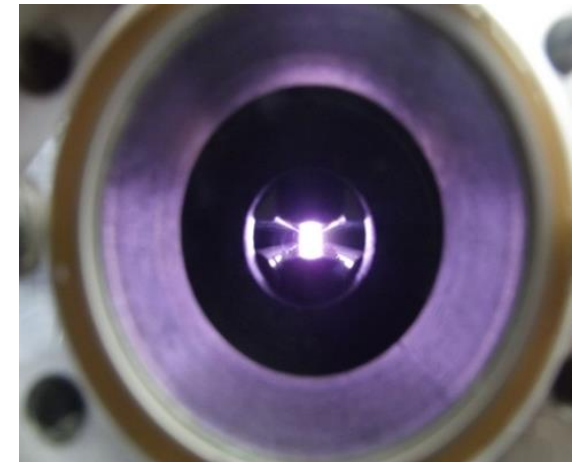
- Exclusive worldwide commercialisation and license agreement for the SILEX Technology – signed in 2006
- Phase I milestone completed in May 2013 – triggered US\$15 million payment to Silex
- Next milestone payment triggered by start of construction of initial commercial plant: US\$5 million
- Final milestone payment – US Nuclear Regulatory Commission (NRC) verification of construction compliance of initial commercial plant: US\$15 million
- **Perpetual royalty range of 7% to 12% of future GLE revenues from commercial operations**  
(based on calculation of cost per unit production installed)



# GLE's Phased Approach to Commercialisation

## Commercial Plant Options

- Plans include possible enrichment plant of up to 6MSWU in Wilmington, NC (US NRC construction & operating License received in 2012)
- Additional opportunity for a commercial plant in Paducah, KY – subject to negotiations with US Department of Energy (refer slide 14)
- Commercial plant decisions by GLE are dependent on market conditions
- Focus for the next few years on advancing the Phase II project to demonstrate full scale commercial production equipment



Phase	Objectives	Status
Phase I	Test Loop technology demonstration and NRC commercial plant license approval	Completed
Phase II	Economic and engineering validation for the initial commercial production module	Commenced in 2012
Phase III	Construction of the first full-scale commercial production facility	To be confirmed

# Paducah Enrichment Plant Opportunity

- Closure of last 1<sup>st</sup> generation gaseous diffusion plant in May 2013 – led to US Department of Energy (DOE) bid process for future operations
- GLE submitted a proposal to the DOE in August 2013 involving construction of a SILEX-based laser enrichment plant at the Paducah site
- DOE selected the GLE proposal exclusively in November 2013 for possible future commercial operations at Paducah
- Enrichment of DOE tails stockpiles potentially equivalent to one of the largest uranium mines in the world operating for around 40 years
- Plans will ultimately depend on a recovery in uranium market pricing from currently depressed levels
- Negotiations between the GLE and DOE are nearing completion



Paducah Enrichment Plant Site

# Nuclear Power Market Outlook

- Potential for significant increase in nuclear power capacity over the next two decades
- Energy security and climate change are two key drivers for nuclear power deployment

## Nuclear plant forecasts to 2030\*

Country	2015	2030
<b>TOTAL – all Countries</b>	438	608
US	99	109
China	29	94
India	21	49
Japan**	43	45

\* Approximate only - excludes 324 proposed plants, and includes ~ 60 older units shutdown

\*\* Currently 41 operable reactors offline, 2030 assumes 10 units shutdown

Source: World Nuclear Association (WNA) – November 2015

## Key Statistics

- ✓ 11 percent of global electricity
- ✓ 438 operable reactors currently
- ✓ 65 new plants under construction
- ✓ 165 plants planned
- ✓ 324 plants proposed

# Potential Market Recovery Drivers



## Economics

- Nuclear power continues to prove economically competitive - costs of electricity from nuclear generation comparable to coal and gas in most countries and less than (subsidised) renewables

## Energy Security

- Nuclear power will remain a key component of global electrical generation capacity - electricity demand is expected to increase by around 80% by 2040 compared to 2012 demand<sup>(\*)</sup> with the majority of growth in nuclear power in Asia (China, India, Korea) and Russia
- Global growth in nuclear power capacity will underpin growing demand for uranium and enriched uranium (positive for the Paducah and Wilmington opportunities respectively)

## Clean Energy and Low Carbon Emissions

- Climate change policies around the world are making fossil fuels less attractive – Paris 2015 Climate Conference aims to achieve first universal legally binding agreement on emissions

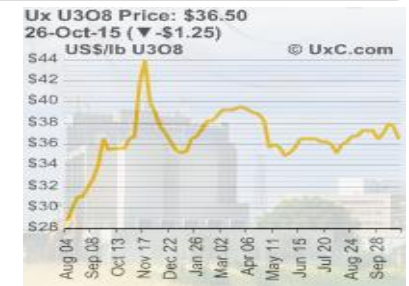
(\*International Energy Agency 2014)



# Uranium Enrichment Market Outlook

## Short Term Market Outlook – ‘Difficult’

- Short term market likely to remain depressed due to impact of Japanese industry shutdown
- Japanese reactor restarts slower than anticipated, with first 2 units at Sendai now back online
- Uranium market price down, but turning – Uranium is up ~30% since June 2014
- Enrichment market prices (term and spot) still very weak, with large inventories



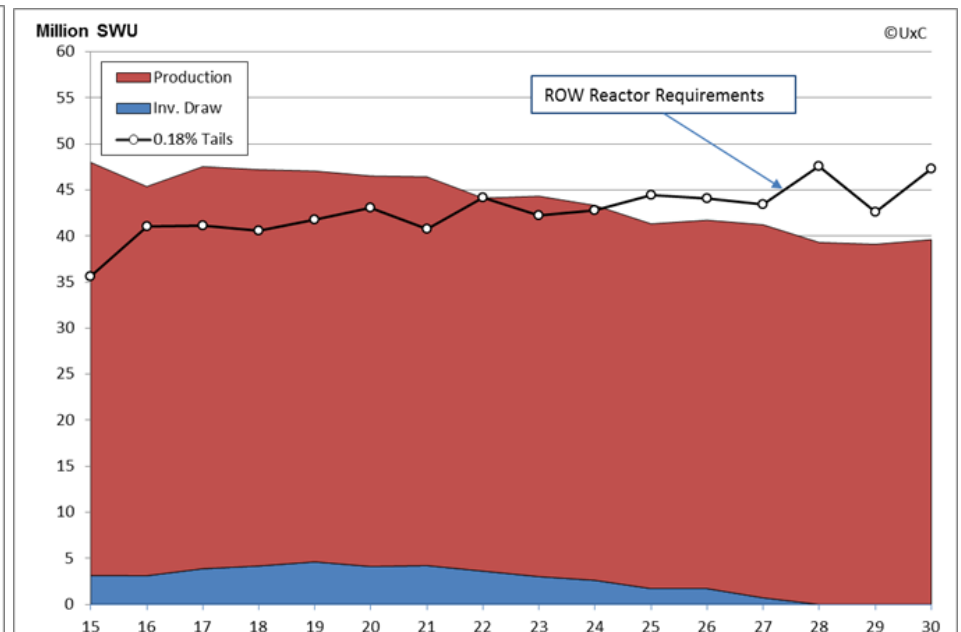
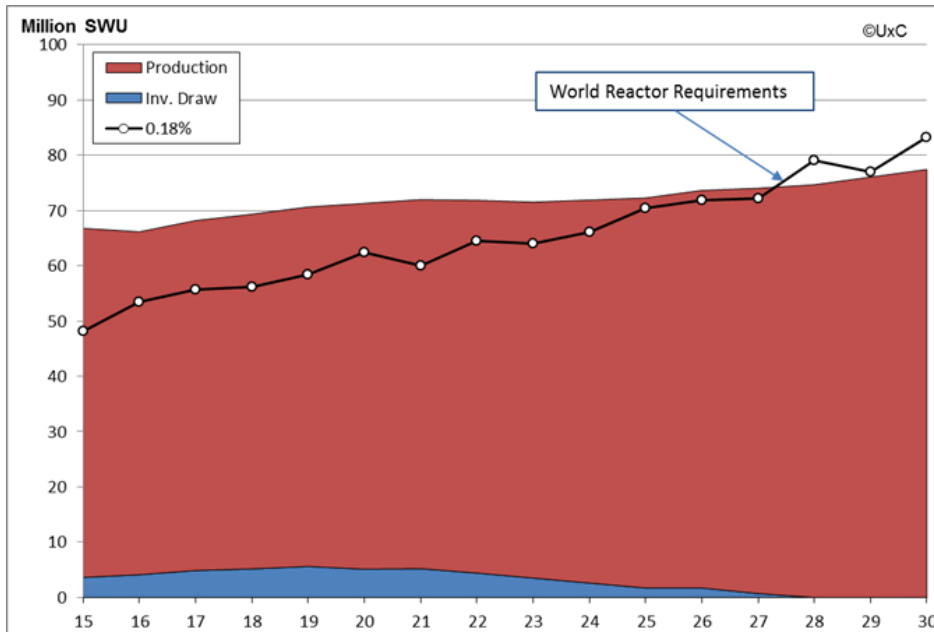
## Medium Term Market Outlook – ‘Recovery’

- Medium term highly dependent on several macro factors
  - Pace of Japanese reactors restarts – up to 38 units to come back online by 2020 (Source: UxC)
  - Russia - Ukraine situation and possible effect on Tenex - world’s largest enrichment player
  - Pace of global nuclear build and influence of environmental drivers (climate change)
- Market may come back into balance in the medium term timeframe – possible opportunity for introduction of SILEX capacity

## Long Term Market Outlook – ‘Bullish’

- Plans for nuclear capacity to increase significantly from 380 GWe currently, to ~630 GWe by 2035 (UxC data, 2015)
- Accordingly, potential for significant increase in demand for natural and enriched uranium within ‘accessible’ market

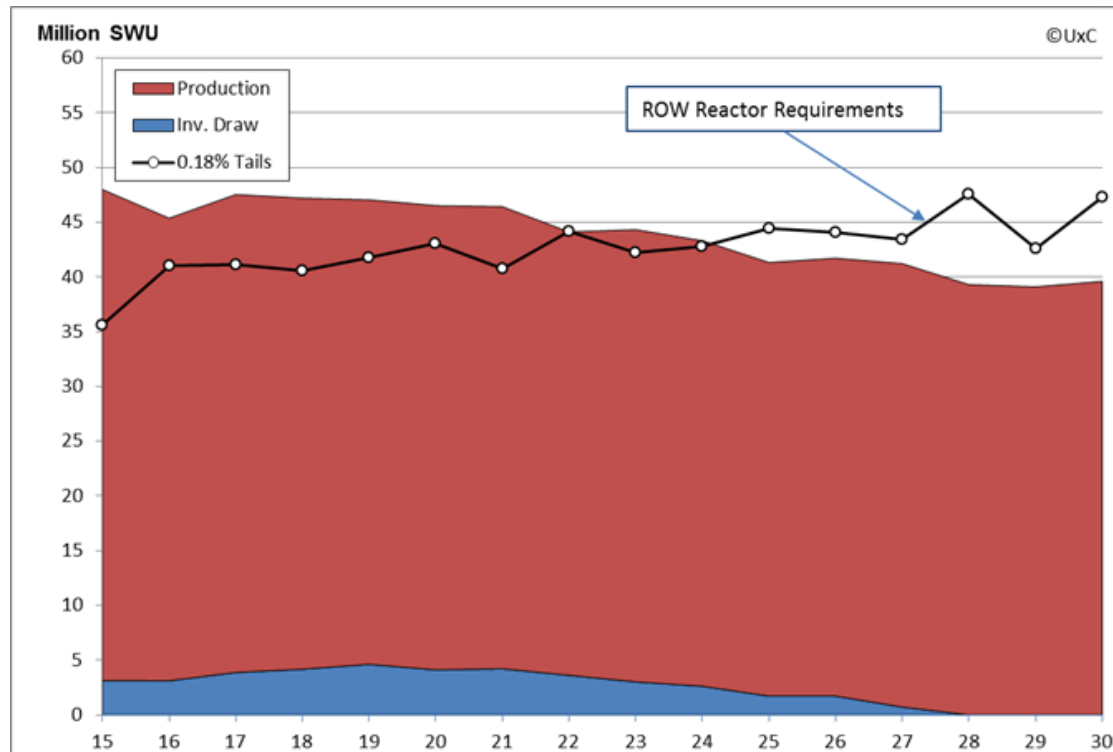
# Enrichment Market Outlook



Source: UxC Enrichment Market Outlook, Q3 2015

- World market supply/demand balance could tighten from around 2025 on current trends (left hand graph)
- Rest of World (ROW) (excluding China and Russia) indicates market tightening from around 2022 (right hand graph)

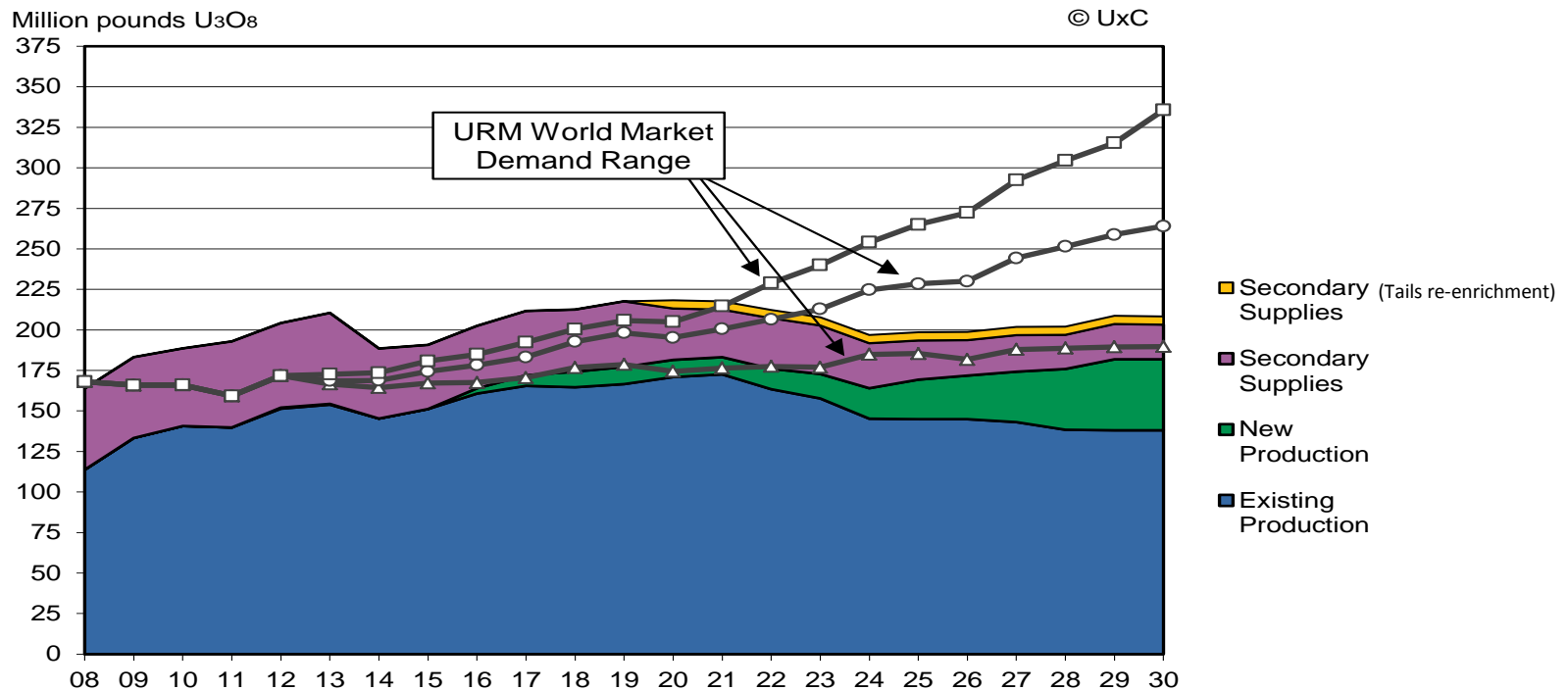
# Enrichment Market Outlook



Source: UxC Enrichment Market Outlook, Q3 2015

- ROW view shows market back into balance around 2022 and going into supply shortage around 2025
- SWU/Enriched Uranium Product Inventories also begin to phase out by 2025/2026 and are consumed by 2028
- By mid-2020s, additional SWU supply will be needed to meet market demand

# Uranium Market Outlook



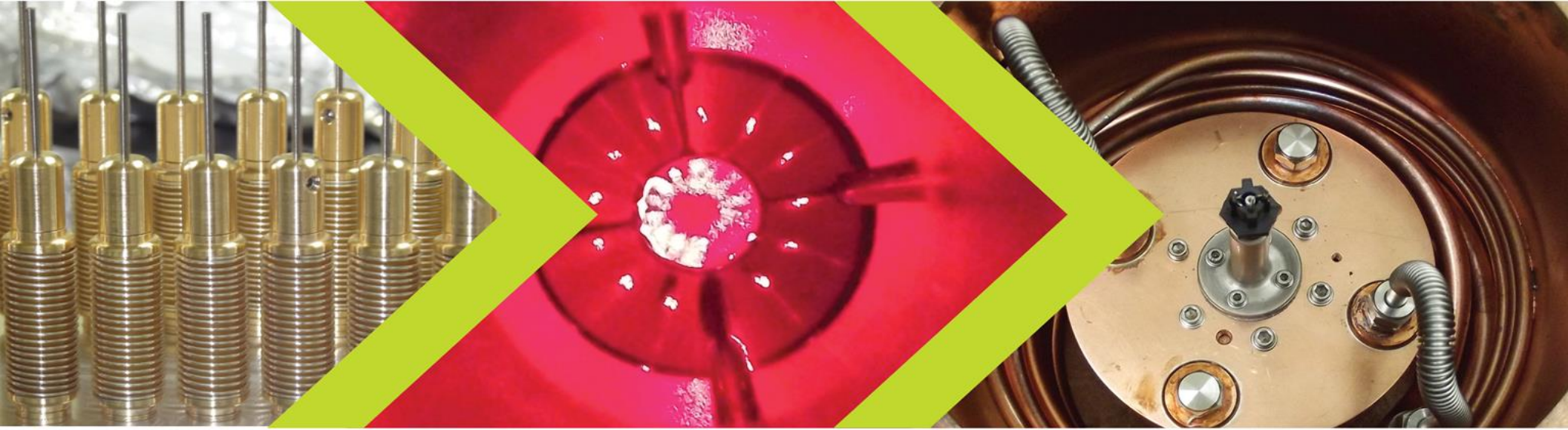
Source: UxC Uranium Market Outlook, Q3 2015

- Uranium supplies remain excess to market demand, under the mid case demand scenario, until 2022/2023
- Secondary supplies include uranium being produced by enrichers with excess SWU capacity through underfeeding and tails re-enrichment

# Summary



- The Company is nearing completion of a major restructure, resulting in a significant reduction in cash burn going forward (current cash reserves ~\$50m)
- SILEX Technology remains under exclusive licence to Global Laser Enrichment (GLE) - a business venture of GE (51%), Hitachi (25%) and Cameco (24%)
- GLE and Silex continue to support the SILEX Technology commercialisation program, albeit at a reduced pace in line with adverse short term market conditions
- The SILEX commercialisation program is believed to be the only significant development effort for 3<sup>rd</sup> generation laser-based enrichment technology in the world today
- Timing for the commencement of commercial production remains uncertain, dependent primarily on the outcome of Phase II work (economic validation) and market conditions. Silex believes the long-term fundamentals for nuclear are very positive
- The Paducah plant (to enrich depleted tails stock piles back to natural grade uranium) is the nearest term commercial opportunity and an ideal project for the initial deployment of SILEX Technology



Thank you

