# **ASP** isotopes

## **Corporate Overview**

April 2024

## **Forward Looking Statements**

#### Forward Looking Statements

This presentation contains, and our officers and representatives may from time to time make, "forward-looking statements" within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based only on our current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, projections, anticipated events and trends, the economy and other future conditions. Forward-looking statements can be identified by words such as "believes," "anticipates," "expects," "estimates," "projects," "will," "may," "might" and words of a similar nature. Examples of forward-looking statements include, among others but are not limited to, statements we make regarding expected operating results, such as future revenues and prospects from the potential commercialization of isotopes, and our strategies for product development, engaging with potential customers, market position, and financial results. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict, many of which are outside our control. Our actual results, financial condition and events may differ materially from those indicated in the forward-looking statements involves known and unknown risks and uncertainties. Therefore, you should not rely on any of these forward-looking statements. There are many important factors that could cause our actual results and financial condition to differ materially from those indicated in the forward-looking statements, including: our reliance on the efforts of third parties; our ability to obtain regulatory approvals for the production and distribution of isotopes; the financial terms of any current and future commercial arrangements; our ability to complete certain transactions and realize anticipated benefits from acquisitions; contracts

#### Market and Industry Data

This presentation includes market and industry data and forecasts that we obtained from internal research, publicly available information and industry publications and surveys. Industry publications and surveys generally state that the information contained therein has been obtained from sources believed to be reliable. Unless otherwise noted, statements as to our potential market position relative to other companies are approximated and based on third-party data and internal analysis and estimates as of the date of this overview. Although we believe the industry and market data and statements as to potential market position to be reliable as of the date of this presentation, we have not independently verified this information, and it could prove inaccurate. Industry and market data could be wrong because of the method by which sources obtained their data and because information cannot always be verified with certainty due to the limits on the availability and reliability of raw data, the voluntary nature of the data-gathering process and other limitations and uncertainties. In addition, we do not know all of the assumptions regarding general economic conditions or growth that were used in preparing the information and forecasts from sources cited herein. All forward-looking statements herein are qualified by reference to the cautionary statements set forth herein and should not be relied upon.



## **ASP Isotopes: At a Glance**

ASPI's advanced technology leverages 20 years of R&D history to enrich isotopes in varying levels of atomic mass. Our goal is to use innovative technology to become an indispensable supplier of enriched isotopes to three multi-billion-dollar end markets.



#### Medical

Opportunity to be one of the few producers in the undersupplied global medical isotopes market, which is anticipated to grow from \$5.1bn in 2022, to \$11.4bn by 2032, growing at a CAGR of 8.8%<sup>2.</sup> This will be driven by increasing prevalence of cancers, rising demand for personalised medicine, and growing technological advancements in diagnostic imaging modalities.



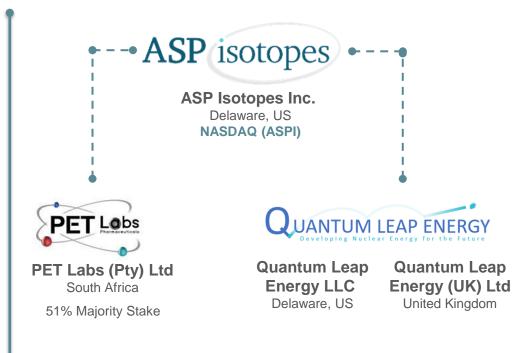
#### Semiconductors

The global semiconductor market is on track to surpass \$1tn by 2030. ASPI is partnering with the global semiconductor industry to supply large quantities of Silicon-28 through 2030 and beyond to allow the industry to unlock the significant performance benefits that arise from switching to Silicon-28 Nanowires.



#### **Nuclear Energy**

ASPI's subsidiary, "Quantum Leap Energy" ("QLE"), is looking to address the multi-billion-dollar opportunity in the nuclear sector, by applying its Quantum Enrichment technology to uranium to produce the essential fuels for next-generation nuclear power plants.





## **Target Milestones - 2024**



#### **Market Milestones**

- Secure at least 2 additional supply agreements for isotopes critical for new technologies and healthcare.
- Generate sufficient revenues for the company to have annual positive operating cash flow.
- Enter additional supply contracts for new isotopes in the 2025-2028 timeframe.



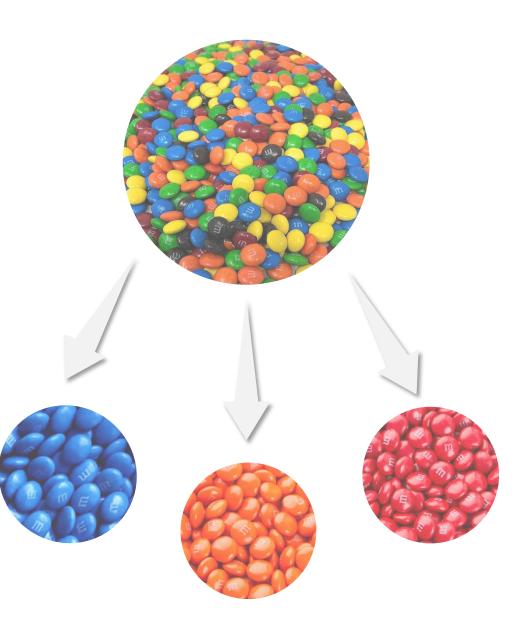
#### **Operational Milestones**

- Start commercial production of isotopes at our enrichment facilities in South Africa. – Mid-2024
- Start constructing a first isotope enrichment facility outside South Africa – which will be in a location with 100% renewable electricity supply, advantageous energy costs and reliable supply. – 2H24



Isotopes are like identical twins or triplets: very similar in most aspects, except for a few subtle differences.

- Isotopes are two or more atoms of the same chemical element with the same number of protons and electrons but slightly different numbers of neutrons.
- Isotopes are found in nature mixed together, just like M&M chocolate candies: same composition, taste, and size – just different colors. The isotope separation process should sort them into fractions of precisely the same types.
- This separation process is very challenging and expensive precisely because isotopes are so similar to each other, with only minor weight differences.





## **Isotope Supply Chain**



Isotope Market Producers<sup>1</sup>

Isotopes have one of the most **severely compromised supply chains of any material in the world** and are critical to many end markets including nuclear medicine, energy, food and water:

- Global isotope production is dominated by Russia (85%) with the remainder produced in the Netherlands (15%) by URENCO.
- The world remains susceptible to global disruption of industrial production, electricity generation, national defense, and the entire economy at large. The existence of many industries and defense capabilities faces existential risk without a secure isotope supply.

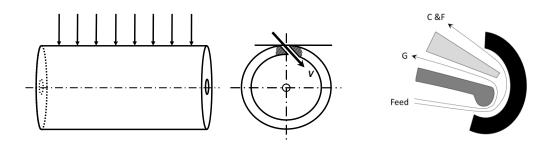


### **Our Technologies**

1

#### Aerodynamic Separation Process (ASP)

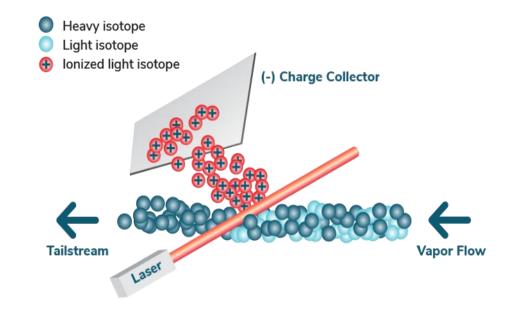
The Aerodynamic Separation Process utilizes gaseous diffusion via a stationary wall centrifuge paired with proprietary flow directors to separate isotopes of varying levels of atomic mass.



#### 2

#### **Quantum Enrichment (QE)**

Quantum enrichment technology employs precisely tuned lasers and quantum mechanical principles to efficiently separate isotopes based on their unique transition energies, achieving high selectivity for most elements.



## **ASP Isotopes:** Technology Highlights



#### **Cost-Effective**

Isotope enrichment facilities using our technology can be constructed at a fraction of capital cost and time vs. traditional isotope separation facilities.



#### Modular, Scalable Design

The plants can be small in footprint and modular in design, allowing for capacity expansion and growing demand.



#### **Environmentally Friendly**

Our enrichment plants are designed to harvest and enrich a natural mix of isotopes, producing zero waste (not radioactive or any other waste in any form).



## **The Opportunity in Nuclear Medicine**



## The Opportunity in Nuclear Medicine



 The global medical isotope market generated \$5.1 billion in 2022 and is anticipated to generate \$11.4 billion by 2032.<sup>2</sup>



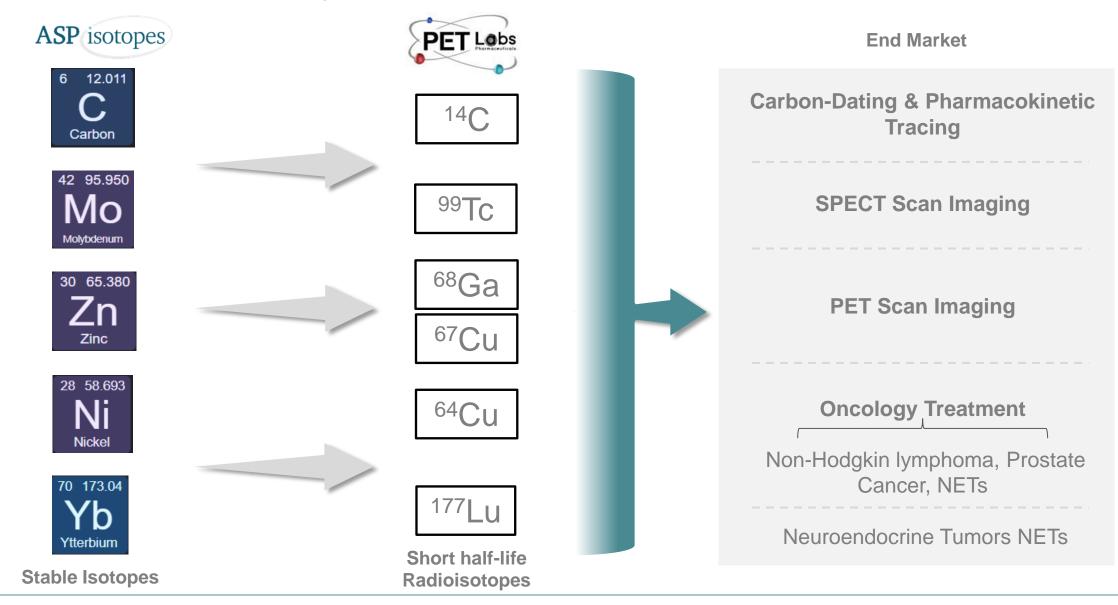
 Benefitting from increased regulatory approvals and R&D spend in the radiopharmaceuticals sector.



- Pipeline advancements have created multibillion-dollar opportunities.
- Currently, there are severe shortages of all medical isotopes.



## Nuclear Medicine: Isotopes of Interest

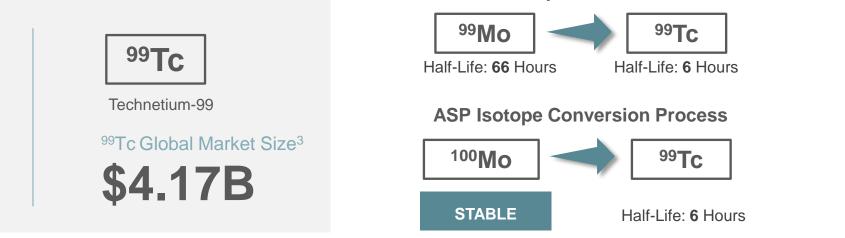


### **Isotope End Markets:** Molybdenum-100 (<sup>100</sup>Mo)

Single-photon emission computed tomography (SPECT)

Global Market Size<sup>3</sup>

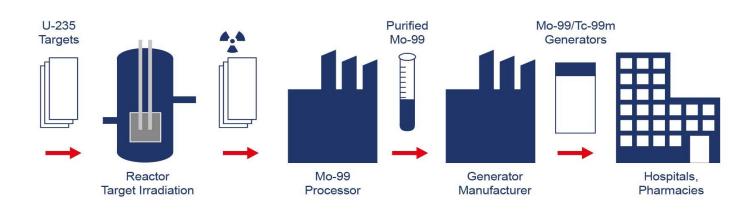
\$4.61B



**Current Isotope Conversion Process** 

- SPECT scans are used to examine the function of internal organs.
- This imaging technique helps detect certain types of cancer. It creates a 3-dimensional image that can provide information about blood flow and chemical reactions.
- 100Mo would result in a more convenient supply chain with lower shipping costs. Market entry date: H2 2024

#### Current <sup>99</sup>Mo Supply Chain



## Isotope End Markets: Ytterbium-176 (<sup>176</sup>Yb)

#### **Radiopharmaceutical Theranostics**

**Global Market Size** 

\$1.8bn

The radiopharmaceutical theranostics market is expected to be worth \$3.43bn by 2028, growing at a CAGR of 11.3%, with the <sup>177</sup>Lutetium segment expecting to remain the dominant product.

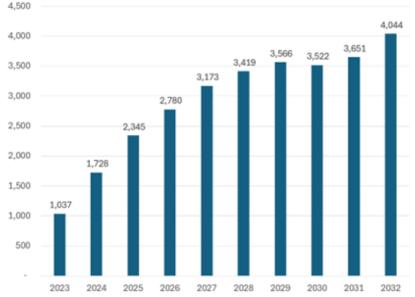


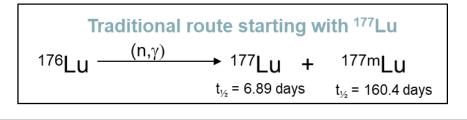
Ytterbium-176

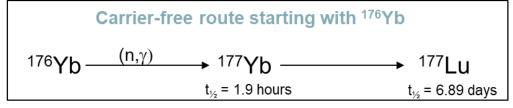
<sup>176</sup>Yb Global Market Size

\$100m









ĺΣ,

The <sup>177</sup>Lu supply chain is fragile and experiencing bottlenecks:

- <sup>176</sup>Yb provides a superior route to obtaining <sup>177</sup>Lu. The traditional route, beginning with <sup>176</sup>Lu requires separating its products, <sup>177</sup>Lu and <sup>177</sup>mLu, which is both difficult and carries a long half-life.
- Russia has historically been the world's primary producer of <sup>176</sup>Yb .
- Supply disruptions for the critical isotope provide an opportunity for ASPI to meet demand requirements and capture significant market share.



## Isotope End Markets: Zinc-68 (68Zn)

Positron emission tomography (PET)

Global Market Size<sup>4</sup>

\$1.15B



#### <sup>68</sup>Ga is the Key Diagnostic for Most Lutetium and Actinium Based Drugs in Development

~~	~15x Increase in Demand	•	There are currently two FDA approved <sup>68</sup> Ga labelled drug products. Additional near-term approvals and increase in use cases upon approval of PSMA therapeutic Radiopharmaceuticals likely drives a 15x increase in demand.
<u>~</u>	68Ga Generators Cannot Address Market Needs		The primary commercial source for Gallium is <sup>68</sup> Ga generators, which are unlikely to produce sufficient isotopes to meet anticipated demand. <sup>68</sup> Ga production using liquid targets are highly inefficient.
	<sup>68</sup> Ga Generator Install-Base Expansion is Cost Prohibitive	•	Assuming enough generators can be made to meet projected <sup>68</sup> Ga demand; the cost to secure those generators will likely be prohibitive.



## **Isotope End Markets:** Carbon-14 (<sup>14</sup>C)

#### **Medical tracing**

Global Market Size



- Medical tracing is a scientific technique used to track the passage of a molecule. The technique incorporates a radioisotope through a reaction, cell, organism, biological system, or metabolic pathway.
- <sup>14</sup>C is used as a radiolabeling compound due to its relatively harmless emission of alpha particles, and long-lasting half-life, which allows researchers to track drug molecules throughout the body.



ASPI's Carbon-14 enrichment facility

Historically, Russia has been the sole supplier of Carbon-14. Availability of the isotope since the start of 2022 has been intermittent and unreliable. Now customers are seeking alternative suppliers to meet

their demand.



We have the capacity to meet total global demand.

ASPI has entered into **multi-year** supply agreement with **minimum annual revenues of \$2.5M** per year.

ASPI expects to start commercial supply of Carbon-14 during 1H 2024.



Isotopes	End-Market	R&D Stage	R&D Evaluation	Under Construction	Anticipated Market Entry	Technology
Carbon-14	Pharma & Agrochem	$\checkmark$	$\checkmark$	$\checkmark$	2024	ASP
Molybdenum-100		$\checkmark$	$\checkmark$	$\checkmark$	2024	ASP
Molybdenum-98		$\checkmark$	$\checkmark$	$\checkmark$	2024	ASP
Ytterbium-176	Nuclear Medicine	$\checkmark$	$\checkmark$	$\checkmark$	2025	QE
Zinc-67/68		$\checkmark$			2025	ASP
Nickel-64		$\checkmark$			TBD	QE
Xenon-129/136		$\checkmark$			TBD	ASP



## **The Opportunity in Semiconductors**



## The Opportunity in Semiconductors: Materials

ASPI can establish itself as an indispensable part of the semiconductor supply chain.

- Using our proprietary technology and increasing capacity our goal is to become the world's leading supplier of enriched Silicon-28.
- We aim to enrich Silicon-28 content from 92.2% to the required >99.995% purity product, removing Silicon-29 and 30 isotopes.
- Preliminary research suggests that enriched Silicon-28 can deliver superior conductivity and transformational performance unlocking greater computing potential.

Demand for semiconductors and their materials is growing, with the market on track to surpass **US\$1tn by 2030**.<sup>6</sup>

Data Centres	
AI	
Consumer Electronics	
EVs	
Quantum Computing	

#### Our Silicon-28 enrichment plant in South Africa



ASPI is the world's only commercial supplier of Silicon-28 and is partnering with the global semiconductor industry to supply large quantities of Silicon-28 through 2030 and beyond to allow the industry to unlock the significant performance gains that arise from switching to Silicon-28 Nanowires.



### Silicon-28: Technological Breakthrough

- Electronics are relatively affordable because Silicon is cheap and abundant. But, although naturally occurring Silicon is a good conductor of electricity, it is not a good conductor of heat when it is reduced to very small sizes – and when it comes to fast computing, that presents a big problem.
- Silicon-28, an isotopically pure form of silicon, presents a solution. Its thermal conductivity is about 60% higher.
- Our technology has demonstrated the potential to produce enriched Silicon-28 at a commercial scale. We expect to supply semiconductor companies with highly enriched Silicon-28 from 2024.

For many decades, researchers theorized that chips made of pure Silicon-28 would overcome Silicon's thermal conductivity limit, and therefore improve the processing speeds of smaller, denser microelectronics. But purifying silicon down to a single isotope requires intense levels of energy which few facilities can supply – and even fewer specialize in manufacturing marketready isotopes.

- Lawrence Berkeley National Laboratory<sup>7</sup>

Isotopes	End-Market	R&D Stage	R&D Evaluation	Under Construction	Anticipated Market Entry	Technology
Silicon-28	Comisondustors	$\checkmark$	$\checkmark$	$\checkmark$	2024	ASP
Germanium-70/72/74	Semiconductors	$\checkmark$	$\checkmark$	$\checkmark$	2025	ASP



## Plan for Growth: Scaling into New Isotopes

**Iceland** is a desirable location for ASPI's expansion for several reasons. Here we expect to produce multiple enriched Isotopes supported by long-term contracts with significant partners. Planned isotopes include Silicon-28, Germanium-72 & 74, Xenon-129, Deuterium, Zinc-68, Molybdenum-100 & 98 and Chlorine-37.

We expect customers to contribute considerable amounts of capital to the construction of additional manufacturing capacity for new isotopes. Benefits include...

#### **Cost of Energy**

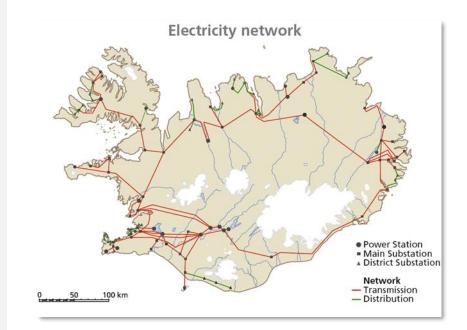
 A local green energy provider has provided a quote for 10+ year energy supply at <5¢/Kw/h – approximately one fifth of the cost in mainland Europe, a third of the cost in the US, and only 3% of current energy costs in South Africa.

#### Regulation

• Policy in Iceland aims to benefit the high-tech green industry, supporting the country's long-held ESG-based ethos. Regulatory applications are in progress and ASPI is well placed to receive support from relevant government ministries and non-proliferation regulators.

#### Location

• Plant location will be conveniently located near an international airport and shipping port. It is also a source of highly skilled workforce.



## The Opportunity in Nuclear Energy





## The Problem is Well-Known...Solving it is not as Straightforward

Global electricity production needs to double by 2050 and Net Zero targets have been set across the world.

- During COP28, 24 countries backed a Ministerial Declaration calling for the tripling of global nuclear energy capacity by 2050.
- UK aims to have up to 24 GW of nuclear capacity by mid-century, up from 6 GW today, which could meet around a quarter of the country's forecast electricity demand.
- China plans to build more reactors in the next 15 years than have been built globally in the last 35. It has 38 operable reactors; 19 are under construction, and the country plans to produce 70 GW of power by 2025.<sup>8</sup>
- India plans to build 10 new large reactors and Japan is targeting 20-22% of electricity generation from nuclear by 2030.<sup>9</sup>

#### Yes, nuclear can help answer the climate and energy security challenge

Are small modular reactors the solution to decarbonising the

#### industry sector?

Nuclear power generation to reach record high next year, IEA forecasts

'Nuclear renaissance' promised as Government banks on small reactors plan

To reach Net Zero emissions by 2050, the world must increase global electricity generation by 250% and double Nuclear energy output.<sup>10</sup>



## SMR (Small Modular Reactors): Next Wave in Nuclear Energy

#### The world is moving to a new type of nuclear reactor: SMR

The US DOE has already committed billions of dollars to Advanced Reactor Design Program (ARDP) to facilitate and accelerate development of advanced reactors.

- Modular, smaller size (50 MWe to 300 MWe) reactors allowing greater flexibility in deployment.
- Designed for production-line manufacturing rather than conventional custombuilt capital projects.
- Limited on-site preparation to substantially reduce lengthy construction times.
- Simplicity of design, enhanced safety features, economics and quality afforded by factory production, and more flexibility (financing, siting, sizing, and end-use applications).
- Can provide power for applications where large plants are not needed or sites lack infrastructure to support a large unit (e.g. smaller electrical markets, isolated areas, smaller grids, sites with limited water and acreage, or unique industrial applications).

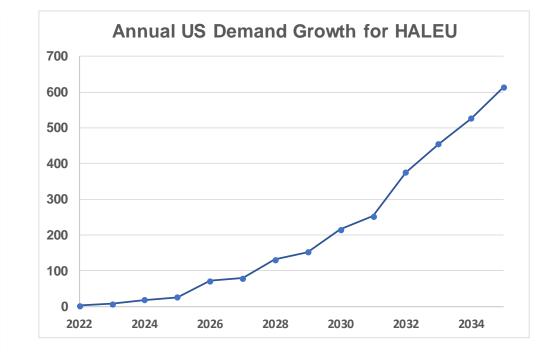


Rolls-Royce's SMR



## HALEU Supply: A Growing Concern for SMRs

- Current commercial light water reactors use low-enriched uranium (LEU) fuel which has less than 5% <sup>235</sup>U content.
- Many SMRs and advanced reactors will require High Assay Low Enriched Uranium (HALEU) with <sup>235</sup>U enrichment up to 19.75%.
- Currently, there is no commercial supplier of HALEU in the Western World. Without fuel these SMR's are unlikely to become a reality.
- Recently TerraPower delayed the start-up of its SMR from 2028 by at least 2 years due to the lack of availability of HALEU.
- The U.S. government has made a multi-billion-dollar commitment to help commercialize HALEU-fuelled advanced reactors.
- Many European and Asian countries are also in need of HALEU for SMRs.



The NEI estimates (above) that by 2035 US domestic demand for HALEU could reach >600 Metric Tons per annum.



We believe that our proprietary Single Stage Quantum Enrichment Technology provides an ideal solution...



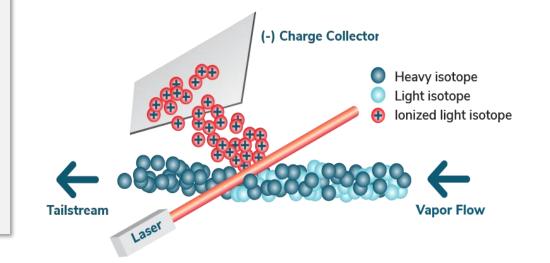
## **Our Technology:** What is Quantum Enrichment (QE)?

- Isotopes of every element have unique spectroscopic "signatures" defined by the electromagnetic radiation or "light" absorbed by their atoms from electron transitions.
- QE separates two isotopes by taking advantage of the slight differences in the transition energy between two isotopes. This method is described as a "quantum mechanics" method.

## In principle, Quantum Enrichment can separate isotopes of most elements, achieving desired enrichment in a single step.

A laser is a device that can produce large numbers of photons, all having almost precisely the same frequency or energy.

By precisely tuning lasers to a specific isotope's spectrum (color) signature, those atoms can be selectively photoionized and then electrically separated based on their electric charge.



## **Comparing and Contrasting Enrichment Methods**

	Gaseous Diffusion	Centrifugation	Atomic Vapor Laser Isotope Separation (AVLIS)	Silex Systems	Quantum Leap Energy	
Cost	High capital cost	Capital 1/10 of Diffusion	ion Low Capital, small size Low Capital, small si		Low Capital, small size	
Speed	High pressure	High speed	U metal 3000K	Adiabatic expansion nozzles (10 – 20K)	U metal 3000K	
Technology Notes	High technology	Rotor design & material	Selective Photoionization	Laser excitation transmission by skimmer	Enhanced resonant multiphoton ionization	
Selectivity	Selectivity $\alpha \ge 1.003$	Selectivity $\alpha \ge 1.15$	Selectivity $\alpha \ge 10-50$	Selectivity $\alpha \ge 2 - 20$	Selectivity $\alpha \ge 50$	
SWU	2500 kWh/SWU	50 kWh/SWU	40 kWh/SWU	Estimate < 50 kWh/SWU	40 kWh/SWU	
Stages Required	500 Stages to reactor grade	50 Stages	1-2 Stages	1-2 Stages	Single stage	



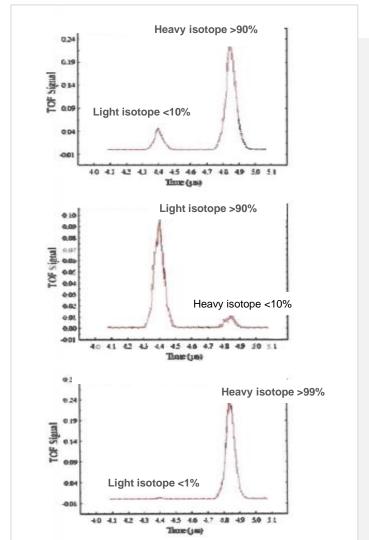
## **Quantum Enrichment:** Real World Experience

Our team have used lasers to enrich many different metals

- Uranium
- Lithium (the only isotopes where results have been published)
- Zirconium
- Zinc

The separation process shown on the right is for Lithium 6 and 7

- A metal with an atomic mass <100
- Mix of isotopes: ~5% is the light isotope (Lithium 6) and ~95% is the heavy isotope (Lithium 7)
- After a single enrichment stage -
  - In the product stream the light isotope (lithium 6) is >90% and the heavy isotope (lithium 7) is <10%</li>
  - Light side enrichment factor (b) of 112





Laser Enrichment of Lithium 6

### **Nuclear Fuel: Supply Chain and Prices**

- Uranium supply has been in a state of sustained deficit since 2018, which is widening due to years of underinvestment in uranium assets, resulting in production issues from the world's largest suppliers.
- Meanwhile, demand for front-end nuclear fuel (U<sub>3</sub>O<sub>8</sub>, UF<sub>6</sub>, EUP) continues to grow given ambitious global nuclear roll out strategies.
- Global geopolitics is adding pressure to an already bifurcated market, particularly in conversion and enrichment where Russia is the dominant player.
- China is the demand outlier and could procure over 7x global annual supply for themselves, and their domestic conversion and enrichment production will be used solely for their own reactor fleet.
- It takes several years, often over 12 years, for new permitted uranium supply to come on stream.

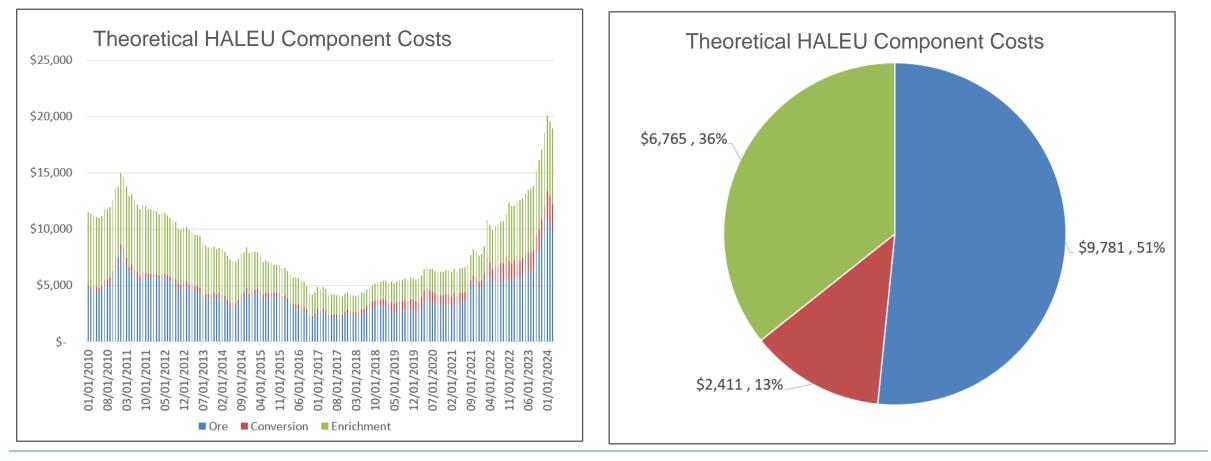


**ASP** isotopes

28

## **Implications for HALEU**

- If available (currently there is no Western Supplier of HALEU), HALEU would likely cost >\$18,000 per Kg.
- Many SMR companies based their business plans assuming HALEU <\$10,000 per Kg. We believe Quantum Enrichment may allow for HALEU production at significantly lower prices versus current indicative prices.



## Potential to Close the Loop on Nuclear Waste



Depleted tails from other uranium enrichers produce nuclear waste. The management of this waste is becoming a problem.



We believe that our technology can process this waste into HALEU -Potentially providing a solution to this growing environmental problem.



If we can secure access to this nuclear waste at an attractive cost, we should be able to **produce HALEU at highly competitive prices**.



Depleted UF6 Tails stored in Ohio, USA

Isotopes	End-Market	R&D Stage	R&D Evaluation	Under Construction	Anticipated Market Entry	Technology
Chlorine-37		$\checkmark$			TBD	ASP
Lithium-6	Nuclear Energy	$\checkmark$			TBD	QE
Uranium-235		$\checkmark$			TBD	QE and ASP

#### Leverage the following...

#### Proven Proprietary Technology

ASPI's advanced technologies leverage 20 years of R&D history to enrich isotopes in varying levels of atomic mass, allowing it to meet the growing demand in the Nuclear Medicine, Semiconductors, and Nuclear Energy industries.

#### Multiple Secular & Geopolitical Tailwinds

Favorable long-term market trends are expected to drive long-term secular industry growth. Recent geopolitical events have created high urgency for companies and countries to search for reliable sources of isotopes.

#### **Consistent Operational Performance**

Since incorporation, we have completed the construction of our first manufacturing facility, and we continue to expand our operating footprint in South Africa. Our South African facilities are expected to enter commercial production during 2024 and should drive free cash flow.

#### To capitalize on <u>three</u> multi-billiondollar opportunities...

#### **Nuclear Medicine**



#### Semiconductors





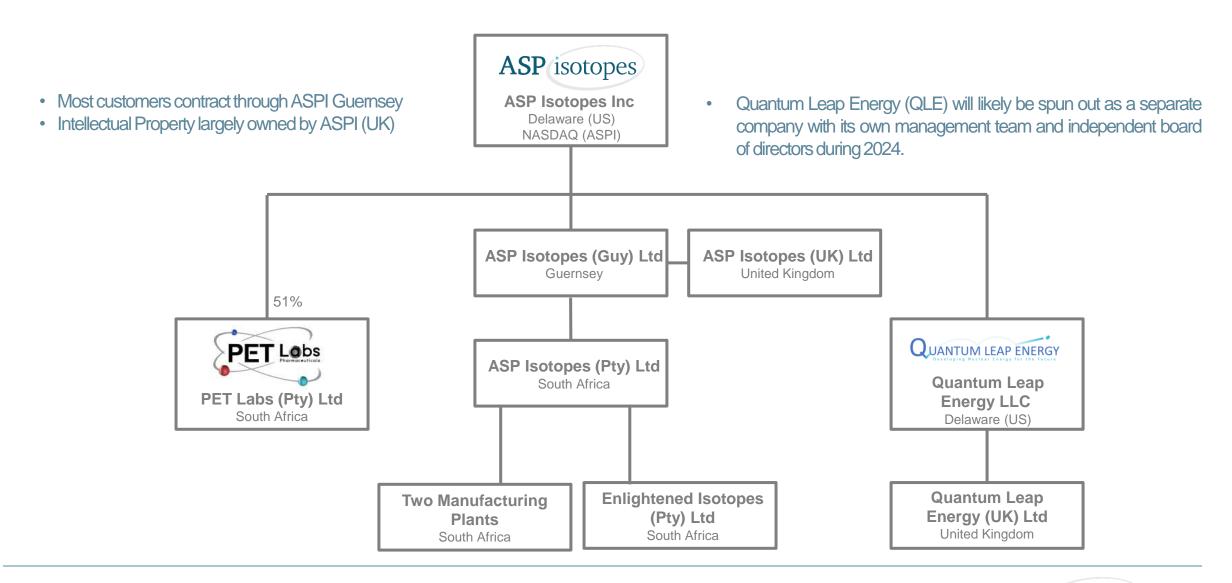


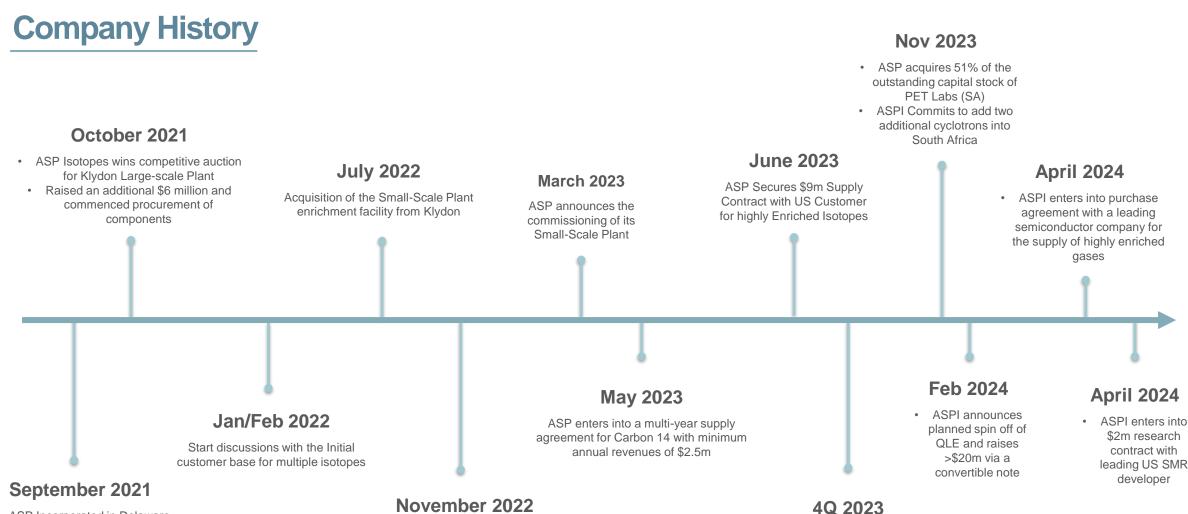


## Appendix



## **Current Group Structure**





 ASP Incorporated in Delaware Raised \$4 million in Pre-seed funding Received appropriate permits from the nonproliferation council of South Africa for ASP to Acquire Klydon's Plant

 Initial public offering (NASDAQ) raising \$5 million · Signed Supply agreement with BRICEM for enriched Molybdenum<sup>100</sup>

> **ASP** isotopes 34

Formation of Quantum Leap Energy

· Entered into 2 MOUs with US Small

focused on nuclear fuels

Modular Reactor Companies for production of HALEU.

## One of the Most Experienced Laser Groups in the World

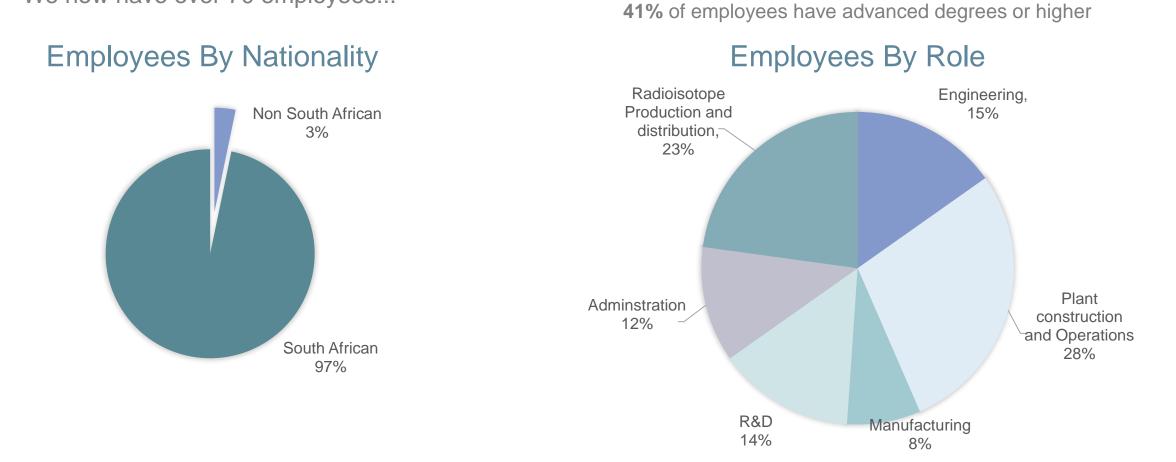
Our team has designed and constructed lasers for the following customers...





## **ASPI:** Employees Demographics

We now have over 70 employees...



© ASP Isotopes Inc.

ASP isotopes 36

**19%** of employees have PhDs

### **ASP Isotopes: Leadership Team**

PAUL MANN Chairman. and CEO  Co-founded ASP Isotopes in September 2021

- 20+ years of experience on Wall Street investing in healthcare and chemicals companies at Soros Fund Management, Highbridge Capital and Morgan Stanley.
- MA and MEng (Chemical Engineering) from Cambridge University, Research Scientist at Procter and Gamble. CFA charter holder.

HENDRIK STRYDOM, PhD Director, Chief Technology Officer

 Co-developer of "Aerodynamic Separation Process" (ASP) and CEO of Klydon, the predecessor company since 1993.

> =

- Extensive research on the laser separation of heavy isotopes (AVLIS, MLIS, SILEX).
- Dr. Strydom has PhD (Physics) (2000) from the University of Natal (Durban).

GERDUS KEMP, MD, PhD Medical Director, CEO PET Labs

- CEO Pet-Labs, a South African radiopharmaceutical operations company dedicated to nuclear medicine and the science of radiopharmaceutical production
- Medical Director Klydon, Medical Director Molybdos
- Ph.D. (Inorganic Chemistry) from the University of Johannesburg. Current Lecturer in Radiography, University of Pretoria



> =

Xandra Van Heerden, PhD 🔀 Head of R&D

- Head of Research & Development at ASP. Previously R&D Manager at a large biomedical engineering company
- Senior lecturer at the University of Pretoria for five years, with a focus on chemical mass transfer processes and separation technologies (Distillation)
- PhD (Chemical Engineering) from the University of Pretoria



- Process engineer with design experience in Petrochemical. Chemical. Water and Isotope Separation Plants
- Process Engineer and Engineering Manager at Klydon. Headed up design process on a MoF6 & Carbon-14 enrichment plant
- Beng (Chemical Engineering) from the University of Pretoria

#### **Ben Swanepoel** Head of Chemistry

- Head of Chemistry at ASP. Has 44 years of experience in petrochemical, nuclear, chemical process, aerospace and defense industries
- Previous chemist at UCOR SA (UCOR), Atomic Energy Corporation of SA (AEC), Termtron Technologies, Sasol and Klydon
- National Diploma (Chemistry) from Tshwane University of Technology



**Robert Ainscow** 



Chief Operating Officer and Chief Financial Officer

- Co-Founder, ASP Isotopes
- 20+ years experience on Wall Street in Capital Markets, Asset-Backed Finance, and Control at Investec Bank, Bear Sterns, and Morgan Stanley
- B.A. (Joint Hons) in Law and Modern Languages from Bristol University



## **ASP Isotopes: Scientific Advisors**

#### PROF EINAR RONANDER, PhD



Chief Scientific Advisor

- Globally recognized as a leading scientist in the field of isotope separation for medical and industrial applications
- Pioneered the Molecular Laser Isotope Separation (MLIS) and the Atomic Vapour Laser Isotope Separation (AVLIS) for heavy volatile isotopes
- Has extensive knowledge base and experience in gas centrifuge separation, distillation separation, electromagnetic separation, infra-red lasers for MLIS, and visible lasers for AVLIS. Einar obtained a PhD (Physics) at the University of Stellenbosch, a PhD (Chemistry) at the University of Pretoria, he serves on the Advisory Board for Science (Univ. Stellenbosch), and the Steering Committee of the Laser Institute at University of Stellenbosch.
- Einar serves as reviewer of global scientific papers for leading journals and his own published papers rate in the top 10% globally by citations standards, and he performs as invited speaker at global conferences and is an Extra Ordinary Prof (Physics).

#### SERGEY VASNETSOV

Consultant and Chemical Engineer

- Founder and Managing Director of ChemBridges, strategy consulting firm, since 2016.
- SVP of Strategy and M&A at LyondellBasell (NYSE: LYB) (2010-2016).
- Managing Director, Equity Research at Barclays Capital and Lehman Brothers (1996-2010).



### **ASP Isotopes: Non-Executive Directors**

## PROF MIKE GORLEY, PhD Director

- Director of Fusion Technology at the U.K. Atomic Energy Authority. and a visiting Professor at the University of Bristol, U.K. Mike is a well-known expert in fusion technology and fusion materials.
- Previously served as a Chief Technologist and Strategic leader and program area manager for fusion technology at the UK Atomic Energy Authority.
- Ph.D. (DPhil) in Materials Science from Oxford University, U.K

## TODD WIDER, MDDirector

- Executive Chairman and Chief Medical Officer, Emendo Biotherapeutics
- Active Staff (~20 Years) in reconstructive surgery at Mount Sinai Hospital in New York
- MD Columbia College, Residency in General Surgery and Plastic and Recon at Columbia Presbyterian, Postdoctoral fellowships at Memorial Sloan Kettering as Chief Microsurgery Fellow

## DUNCAN MOORE, PhD

- Partner at East West Capital Partners, specializing in investment opportunities within the Healthcare Industry across the APAC region.
- Global Head of Healthcare Equity Research at Morgan Stanley from 1991 to 2008,
- M.Phil & PhD in Biochemistry from Cambridge University

#### ROB RYAN Director

- 30+ years private investor with experience in investment banking, private equity and international financial law.
- Was a partner and MD of Balbec Capital LP.
- Worked at international investment banks after starting his career as a solicitor at a leading U.K. multinational law firm.
- LL.B. degree from the University of Leicester.



### **Data Sources**

Meeting Isotope Needs and Capturing Opportunities for the Future: the 2015 Long Range Plan for the DOE Isotope Program <a href="https://www.osti.gov/servlets/purl/1298983">https://www.osti.gov/servlets/purl/1298983</a>
 Medical Isotope Market to Reach \$11.4 Billion Globally By 2032 | CAGR:8.8% : Allied Market Research <a href="https://www.osti.gov/servlets/purl/1298983">Medical Isotope Market to Reach \$11.4 Billion Globally By 2032 | CAGR:8.8% : Allied Market Research <a href="https://www.osti.gov/servlets/purl/1298983">Medical Isotope Market to Reach \$11.4 Billion Globally By 2032 | CAGR:8.8% : Allied Market Research <a href="https://www.osti.gov/servlets/purl/1298983">Medical Isotope Market to Reach \$11.4 Billion Globally By 2032 | CAGR:8.8% : Allied Market Research <a href="https://www.osti.gov/servlets/purl/1298983">Medical Isotope Market to Reach \$11.4 Billion Globally By 2032 | CAGR:8.8% : Allied Market Research <a href="https://www.osti.gov/servlets/purl/1298983">https://www.osti.gov/servlets/purl/1298983</a>

3. Molybdenum-99 market Global Industry Analysis 2015-2019 and opportunity Assessment 2020-2030. Future Market Insights, 2020

4. Strategic Market Research, Positron Emission Tomography Market Size, Global Trends 2030. Strategic Market Research, April 2022, https://www.strategicmarketresearch.com/market-report/positron-emission-tomography-market.

5. Transparency Market Research, Gallium-68 Market - Global Industry Analysis, Size, Share, Growth, Trends, and Forecast, 2021-2031. Transparency Market Research, October 2021, <a href="https://www.transparencymarketresearch.com/gallium68-market.html">https://www.transparencymarketresearch.com/gallium68-market.html</a>.

6. https://www.mckinsey.com/industries/semiconductors/our-insights/the-semiconductor-decade-a-trillion-dollar-industry

7. New Silicon Nanowires Can Really Take the Heat https://newscenter.lbl.gov/2022/05/17/silicon-nanowires-take-the-heat/

8. Laura Gil, "How China has Become the World's Fastest Expanding Nuclear Power Producer." International Atomic Energy Agency, November 2017, https://www.iaea.org/bulletin/how-china-has-become-the-worlds-fastest-expanding-nuclear-power-producer.

9. Associated Press, "Japan Adopts Plan to Maximize Nuclear Energy, in Major Shift." VOA News, Decemeber 22, 2022, <u>https://www.voanews.com/a/japan-adopts-plan-to-maximize-nuclear-energy-in-major-shift/6887247.html</u>.

10. IEA, "Nuclear Analysis - Report." IEA, 2022, https://www.iea.org/reports/nuclear-electricity.

