



# Lightbridge<sup>®</sup>

**Advanced Nuclear Fuel Technologies**  
to impact the world's climate and energy problems  
soon enough to make a difference

NASDAQ : LTBR

February 2022

# Safe Harbor Statement

*With the exception of historical matters, the matters discussed in this presentation are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, including statements regarding the timing and outcome of research and development activities and other steps to commercialize Lightbridge Fuel, future developments regarding SMRs, the future development and utilization of nuclear power, government support and funding for nuclear power, and the Company's anticipated financial resources and position, including the adequacy of the Company's current cash for operations to the end of 2021. These statements are based on current expectations on the date of this presentation and involve a number of risks and uncertainties that may cause actual results to differ significantly from such estimates. The risks include, but are not limited to: the Company's ability to commercialize its nuclear fuel technology; the degree of market adoption of the Company's product and service offerings; market competition; dependence on strategic partners; demand for fuel for nuclear reactors; the Company's ability to manage its business effectively in a rapidly evolving market; changes in the political environment; risks associated with the further spread of COVID-19, including the ultimate impact of COVID-19 on people, economies, and the Company's ability to access capital markets; as well as other factors described in Lightbridge's filings with the Securities and Exchange Commission. Lightbridge does not assume any obligation to update or revise any such forward-looking statements, whether as the result of new developments or otherwise, except as required by law. Readers are cautioned not to put undue reliance on forward-looking statements.*

# Lightbridge - Pioneering Advanced Nuclear Fuel

Leading developer of nuclear fuel technology for current and future reactors that **enhances economics, proliferation resistance, and safety of nuclear power**, operating about 1000 °C cooler than standard fuel



Positioned to enable **carbon-free energy** applications that expand current use missions.

Incorporating Lightbridge Fuel™ with other advanced nuclear technologies can fast-track clean energy development to meet climate goals.

# Key Drivers for Growth



## **Lightbridge Fuel is well-positioned to enable advanced nuclear energy applications that expand its current use missions**

Lightbridge Fuel is a nimble technology that's reimagining applications of nuclear power to deliver clean, reliable energy.



## **Bipartisan government support through legislation, financial investment and policy change has spurred a race for nuclear innovation**

Lightbridge was awarded two DOE funding awards, with additional funding opportunities available.



## **Lightbridge Fuel increases safety and capacity while reducing carbon emissions and operator costs**

The world's energy and climate demands will only be met as nuclear energy becomes a bigger part of the energy-generating mix.



## **\$20+ billion addressable market for current worldwide nuclear reactor fleet**

Lightbridge Fuel is designed to operate with nearly every reactor in the world, including those under construction and planned. Lightbridge Fuel is also usable in coming small modular reactors.



## **Lightbridge has built a significant portfolio of patents in numerous countries, reflecting years of research and development**

The new patents will help safeguard the Company's intellectual property, which is an integral element of the Company's plans to monetize Lightbridge Fuel.



# Seasoned Leadership Team

## **Seth Grae - President and Chief Executive Officer**

*Member of Civil Nuclear Trade Advisory Committee (CINTAC) to the U.S. Secretary of Commerce, Nuclear Energy Institute's Board of Directors, Nuclear Security Working Group, Nuclear Energy and National Security Coalition, Working Group on Climate, Nuclear, and Security Affairs of the Council on Strategic Risks, Virginia Nuclear Energy Consortium Board of Directors.*

## **Andrey Mushakov, Ph.D. - Executive Vice President, Nuclear Operations**

*Oversees Lightbridge's nuclear fuel technology development, including a successful effort that resulted in a voucher award from the U.S. Department of Energy's Gateway for Accelerated Innovation in Nuclear program to support development of Lightbridge fuel in collaboration with Idaho National Laboratory.*

## **Larry Goldman, C.P.A. - Chief Financial Officer**

*Seasoned executive with over 40 years of experience in financial, assurance, tax and advisory services, working with Lightbridge since 2006, serving as Chief Accounting Officer since 2008 and Chief Financial Officer since 2018, serves on the Chief Financial Officers Committee of the New York State Society of CPAs and is a member of the American Institute of Certified Public Accountants, where he has served on the SEC Practice Committee and on the Management Consulting Committee.*

## **Aaron Totemeier, Ph.D. - Vice President, Fuel Cycle Technology and Fuel Fabrication**

*Leads the technology development for Lightbridge's advanced metallic fuel for power uprates and cycle length extension, providing technical oversight and direction for Lightbridge's research and development activities including coordination with partner entities and management of technical consultants.*

## **James Fornof - Vice President, Nuclear Program Management**

*Provides leadership, management and oversight of all projects involving government funding, and assisting the company with the implementation of corporate goals and strategic initiatives. Prior to joining the company in 2018, held several senior roles in nuclear projects and operations and power services, including as Director of International Nuclear Operations at Fluor Power Group, a global Fortune 500 firm, where he was responsible for nuclear projects globally, including new build EPC, operating plant capital improvements and decommissioning..*

## **Sherrie Holloway - Controller**

*Leads accounting professional with over 30 years of experience and leadership in a wide variety of corporate accounting functions for both public and private companies, including financial reporting, SEC reporting, monthly closing, external & internal audit, accounts payable, budgeting, reconciliations, restatements and post-merger acquisitions. Industry expertise spans 'Big 4' public accounting, energy and natural gas, transportation, and international companies. Member of the U.S. Women in Nuclear, an organization that aims to position the United States for the future of nuclear energy and technology through the advancement of women.*

## **Darla M. Bond - Human Resources Manager**

*Senior International Human Resources Professional, with over 30 years of diverse international human resources experience and leadership in both large corporate environments and small business entities. Since 2011, Darla has provided HR consulting services in all aspects of human resource operations. Darla's career included over two decades of human resource service in Insurance and Call Center Operations. National member of the Society for Human Resource Management (SHRM) and holds a Professional in Human Resources Certification, (PHR) from the HR Certification Institute.*

# Independent Board of Directors

## **Ambassador Thomas Graham Jr. - Chairman of the Board of Directors**

*Former Special Representative of the President of the for Arms Control, Non-proliferation and Disarmament, current Co-Chairman of the Atlantic Council's Nuclear Energy and National Security Coalition.*

## **Seth Grae - President and Chief Executive Officer - Director**

*Member of Civil Nuclear Trade Advisory Committee (CINTAC) to the U.S. Secretary of Commerce, Nuclear Energy Institute's Board of Directors, Nuclear Security Working Group, Nuclear Energy and National Security Coalition, Working Group on Climate, Nuclear, and Security Affairs of the Council on Strategic Risks, Virginia Nuclear Energy Consortium Board of Directors.*

## **Victor Alessi - Ph.D. - Director**

*President Emeritus of the U.S. Industry Coalition, former director of the Office of Arms Control and Nonproliferation in the U.S. Department of Energy, Governing Board of the International Science and Technology Center, Chairman of Science and Technology Center in Ukraine.*

## **Sweta Chakraborty, Ph.D. - Director**

*A globally recognized risk and behavioral scientist and expert on risks ranging from climate change to COVID-19. Advisor to government agencies on science and technology policy, specifically incorporating behavioral science in programmatic design and delivery, communication, and engagement activities. Designed and implemented internal and external communication strategies informed by behavioral science in collaboration with Fortune 100 global companies, such as Mars Inc., Novartis, and PVH Corp.*

## **Jesse Funches - Director**

*Former Chief Financial Officer of the U.S. Nuclear Regulatory Commission (NRC), served as Operations Research Analyst at the Office of the Secretary of Defense in the Pentagon. In addition to winning the 2004 Donald L. Scantlebury Memorial Award (the federal government's highest award for excellence in financial management), Mr. Funches is a three-time recipient of the Presidential Rank Award for Meritorious Senior Executives and a two-time winner of the NRC's Distinguished Service Award.*

## **Daniel Magraw Jr. - Director**

*President Emeritus of the Center for International Environmental Law, Senior Fellow at the Foreign Policy Institute at Johns Hopkins School of Advanced International Studies, former Director of the International Environmental Law Office of the U.S. Environmental Protection Agency, member of the Trade and Environment Policy Advisory Committee to the Office of the U.S. Trade Representative.*

## **Mark Tobin - Director**

*Over 24 years of experience in international investment banking and public company leadership. Currently serves as Chief Financial Officer at infrastructure services provider National Underground Group and serves on the board of data storage solutions provider Qualstar Corporation. Previously served as chief financial officer of global industrial printer manufacturer Printronix, independent director & audit committee chairman of Innovation Pharmaceuticals, Inc., and as executive vice president and chief financial officer of Nanoflex Power Corporation. Served as Director of Research and as a Senior Research Analyst at Roth Capital Partners, where he oversaw equity research on hundreds of small-cap public companies, publishing research on publicly-traded energy infrastructure companies including nuclear power, wind power, solar power, and electric transmission & distribution.*

# Lightbridge Fuel

# Highlights of Lightbridge Fuel

Metallic **high-assay low-enriched uranium (HALEU)** fuel for power uprates and longer fuel cycles; improves flexibility of fleet operations



Lightbridge Fuel test assembly

## **Large Market**

Lightbridge Fuel is designed to work in both new and existing (\$20+ billion market) reactors.

## **Waste Reduction**

There is less spent fuel created per plant output when using Lightbridge Fuel and the spent fuel is useless for weapons purposes.

## **Improved Safety**

Meets or exceeds the performance of conventional fuel in accident scenarios.

## **Improved Economics Compared to Conventional Nuclear Fuel**

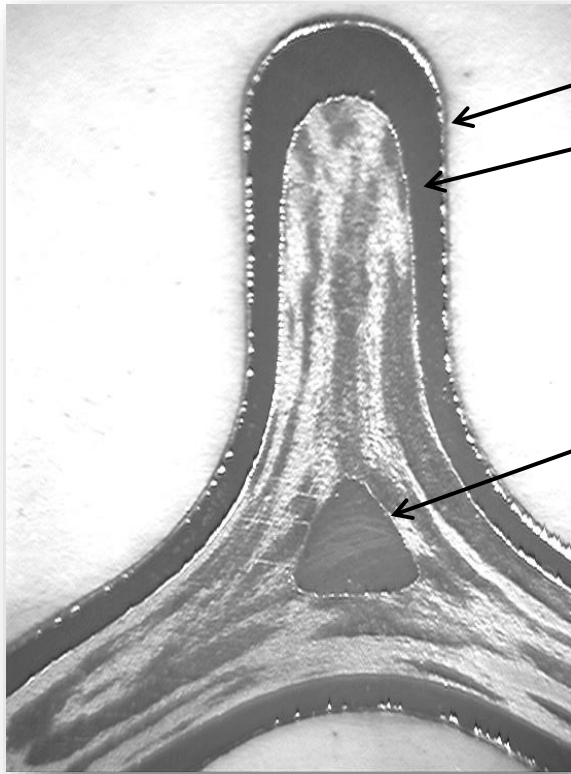
Our fuel increases power output and extends the length of the fuel cycle. Lightbridge Fuel also offers the lowest cost to add reliable zero-carbon electricity to the grid.

## **Quicker Ramp-Rate enables Load Following**

Lightbridge Fuel offers nuclear plants a better solution for load-follow operations on a grid with renewables, potentially replacing natural gas plants and coal plants at their existing locations, with zero carbon emissions.



# Lightbridge Fuel Features



Cross-section of tri-lobe fuel rod

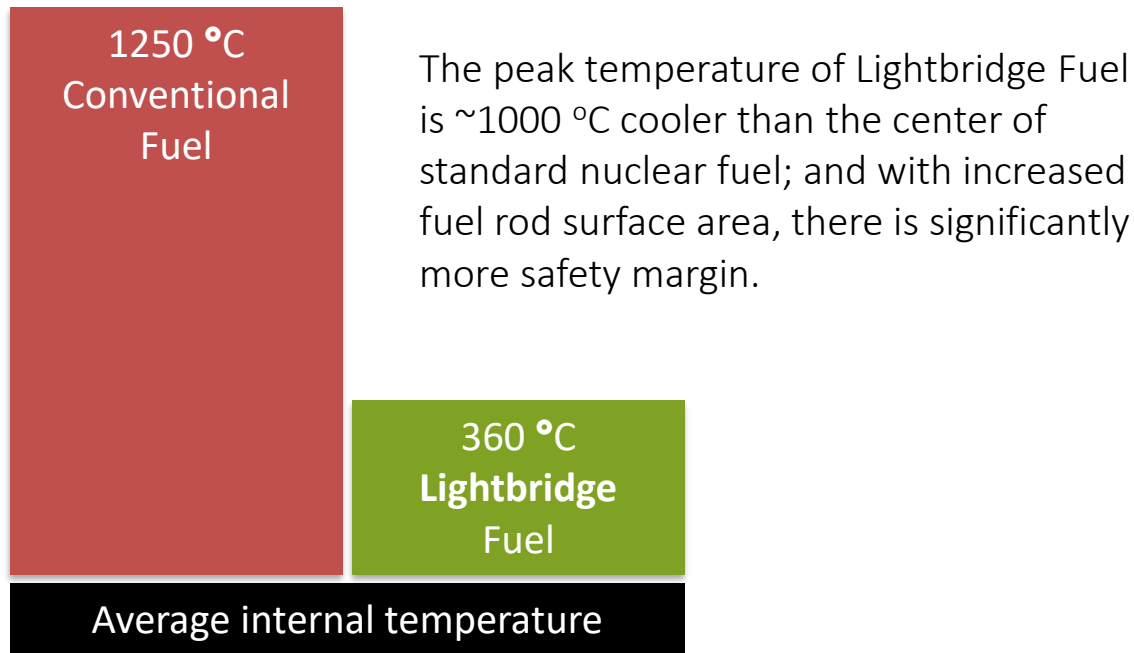
Cladding

Fuel Core

Displacer

- **Absence of spacer grids** reduces core pressure drop by ~50% which improves natural circulation of the water coolant
- **Metallurgical bond** between fuel components significantly reduces cladding breach due to fuel-cladding mechanical interactions
- **Increased cladding thickness** at lobes increases the durability of the fuel at the contact points
- **Absence of fuel-clad gap** eliminates the mechanism for widespread coolant-cladding interaction on the inner cladding surface
- **Coextrusion fabrication process** eliminates several possible sources of manufacturing defects (e.g., pellet chipping)

# Lightbridge Fuel is Designed for Safety



- ✓ Metal fuel has better heat transfer
- ✓ Reduces fuel operating temperature
- ✓ Does not generate hydrogen gas under design basis accidents
- ✓ Buys more time to restore active cooling during accidents
- ✓ Improves non-proliferation benefits of used fuel
- ✓ Enhances structural integrity of the fuel



Accident Tolerant Fuel Regulatory Activities

“The company Lightbridge is developing a new fuel design that incorporates an extruded metallic bar composed of a zirconium-uranium matrix within a zirconium alloy cladding.”

The potential benefits of extruded metallic fuel are:

- Significant increase in fuel thermal conductivity (compared to ceramics) promotes lower operating temperatures
- Complete retention of fission products means no burst release of those products upon cladding failure
- Supports higher power and longer fuel cycles

<https://www.nrc.gov/reactors/atf/longer-term.html#metallic>

Jan. 12, 2021

# How We Design Safer Fuel

## Fabrication

The three components of Lightbridge Fuel are metallurgically bonded during the fabrication process. This bonding **improves the structural integrity of the fuel rod and thermal conductivity** and reduces a potential radiation exposure to plant workers.

## Shape

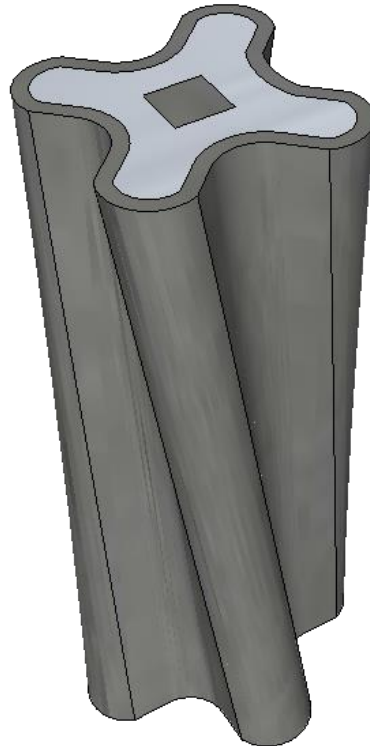
Helically-twisted multi-lobe fuel rod – increased fuel surface area and shorter distance for heat generated in the fuel rod to reach the water **improves coolability of the fuel.**

**Swelling** occurs primarily in the valleys between the lobes, maintaining the fuel rod diameter.

## Operations

At low fuel operating temperature, fission products behave like solids (versus gases) and remain where they are created.

No fission product release is anticipated during design basis events.



## Materials

1. Displacer: contains burnable poison elements for reactor control.
2. Fuel core: made out of a uranium-zirconium alloy, which has high thermal conductivity and **results in reduced fuel rod swelling.**
3. Metallurgically bonded barrier made out of corrosion-resistant zirconium-niobium alloy that provides increased protection at lobe tips.

# Robust Patent Portfolio Protects Return on Investment



Lightbridge has invented and developed its technology to meet the needs of the growing energy marketplace, **backed by a powerful worldwide patent portfolio**

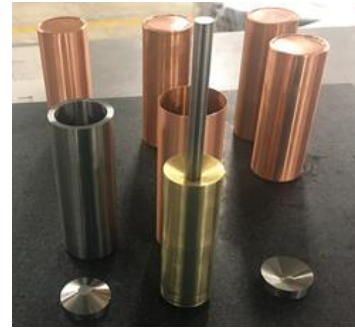
- Expanding our patent portfolio continues to be a strategic focus for Lightbridge
- These new patents will help safeguard the Company's intellectual property, which is an integral element of the Company's plans to monetize Lightbridge Fuel

## Patents related to the following core areas:

- Fabrication method using the casting route
- Fabrication method using the powder metallurgic route
- All-metal fuel assembly design
- Multi-lobe metallic fuel rod design

# Fuel Development Accomplishments in 2021

- ✓ Coextrusion of SMR-length rods using surrogate materials
  - ✓ Successful demonstration of Lightbridge's proprietary manufacturing process using an internally developed and patented high-temperature coextrusion process



- ✓ Awarded second US Department of Energy GAIN voucher for advanced nuclear technology innovation
  - ✓ Total project is \$663,000, with  $\frac{3}{4}$  paid by DOE
  - ✓ Remainder comprised of in-kind, non-cash contributions from Lightbridge
- ✓ Completed first GAIN voucher award at Idaho National Laboratory (INL)
  - ✓ Total project is \$845,000, with  $\frac{3}{4}$  paid by DOE
  - ✓ Allows INL to proceed with the development of the engineering and fabrication specifications and complete the safety case for sample insertion into the Advanced Test Reactor (ATR)



# Awarded Second GAIN Contract with US Department of Energy in 2021



**Pacific Northwest**  
NATIONAL LABORATORY

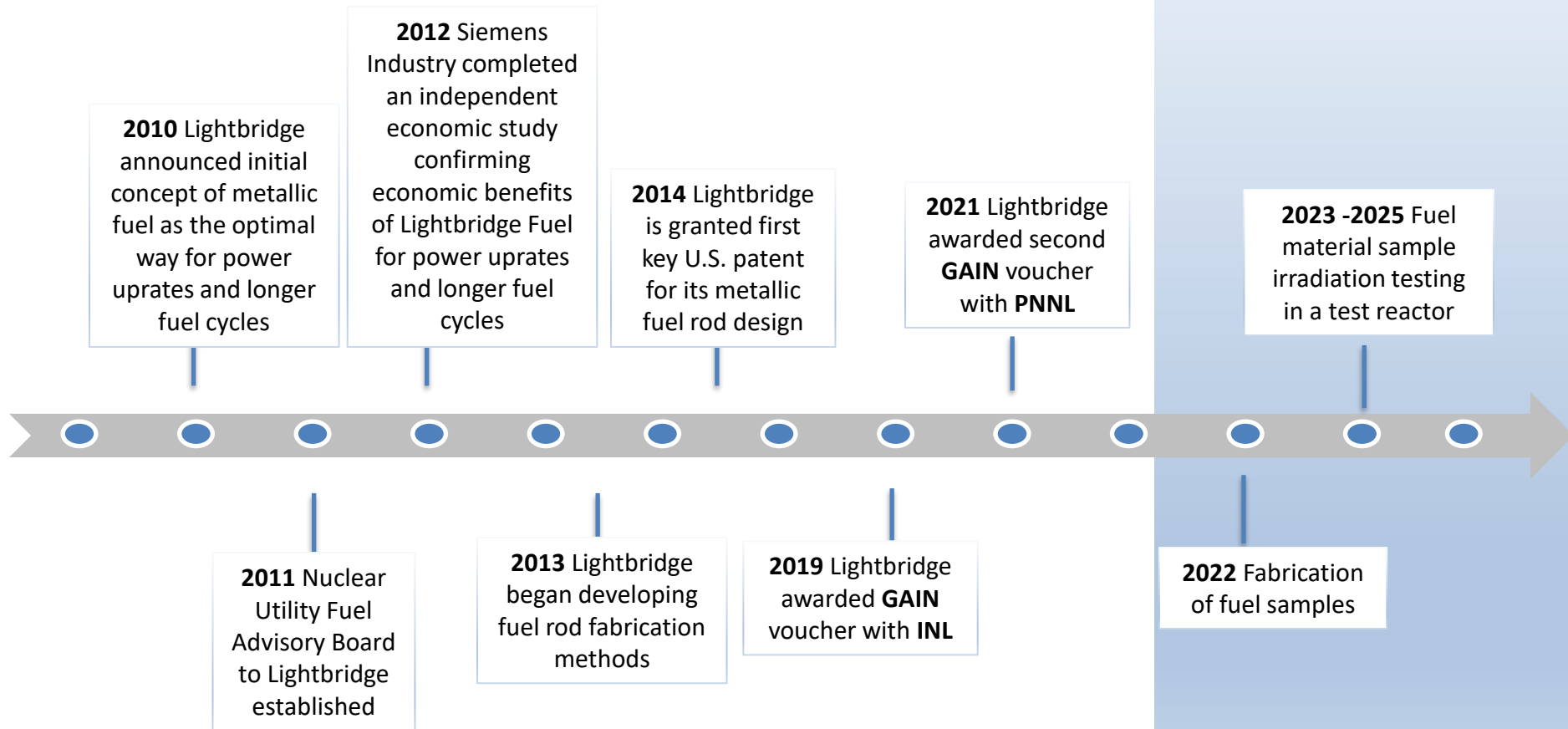


In terms of the size of the GAIN voucher, the DOE states that it only allocates awards **over \$500,000** *“in cases with a clear need and involving a truly exceptional technology or innovation.”*

Scope of the project (12 months in duration)

- ✓ Total project is \$663,000, with 3/4 paid by DOE
- ✓ Demonstrate Lightbridge's nuclear fuel casting process using depleted uranium, a key step in the manufacture of our fuel
- ✓ PNNL is uniquely qualified, in that they have capabilities for high-temperature vacuum melting and casting of our fuel alloy, which is a 50/50 weight alloy of zirconium and uranium
- ✓ Lightbridge will work with PNNL on a novel process to cast depleted uranium-zirconium material
- ✓ Project team will then cast uranium-zirconium ingots that will be available for future testing and analysis

# Timeline of Events & Milestones for Lightbridge Fuel



# Lightbridge's Role in the Global Energy Transition

# Our Focus: Small Modular Reactors and Existing Large Reactors

Lightbridge is going where the industry is heading. We expect the significant government funding for SMRs and clean energy in the coming years may help accelerate our fuel development for SMR applications.

- Lightbridge Fuel can provide SMRs the same benefits our technology brings to large reactors, but the benefits may be more meaningful to the economic case for deploying SMRs
  - Generate more power, reducing the cost per unit of electricity generated by the SMR
  - Enhance ability of SMRs to ramp up and down in power quickly, to pair with renewables on a zero-carbon electric grid
- Existing light water reactors
  - Our work today is applicable for fuel in large reactors as well as shorter length version of fuels for SMRs
  - Lightbridge Fuel will provide significant safety and economic benefits to utilities

**Our ongoing R&D initiatives are entirely compatible with Lightbridge Fuel powering SMRs for multiple purposes**

# Small Modular Reactors – Nimble Nuclear



*NuScale VOYGR™ SMR Plant*

## Strategic Advantages

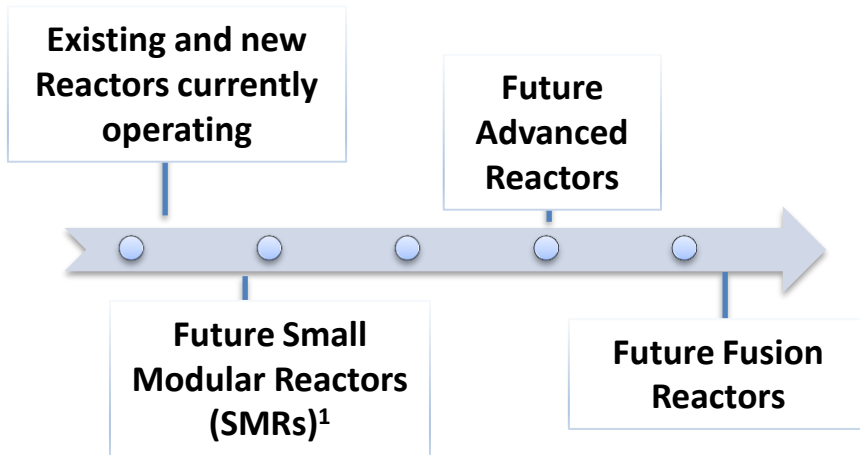
- Relatively small physical footprints
- Reduced capital investment vs large reactors
- Ability to be sited in locations not possible for larger nuclear plants
- Provisions for incremental power additions
- Security and nonproliferation advantages.

- SMRs currently under development represent a variety of sizes, technology options, capabilities, and deployment scenarios.
- These advanced reactors vary in size from tens to hundreds of megawatts
- Can be used for power generation, process heat, desalination, or other industrial uses.
- SMR designs may employ light water as a coolant or other non-light water coolants such as a gas, liquid metal, or molten salt.



# Lightbridge Fuel in Small Modular Reactors of the Future

## Reactor Timeline



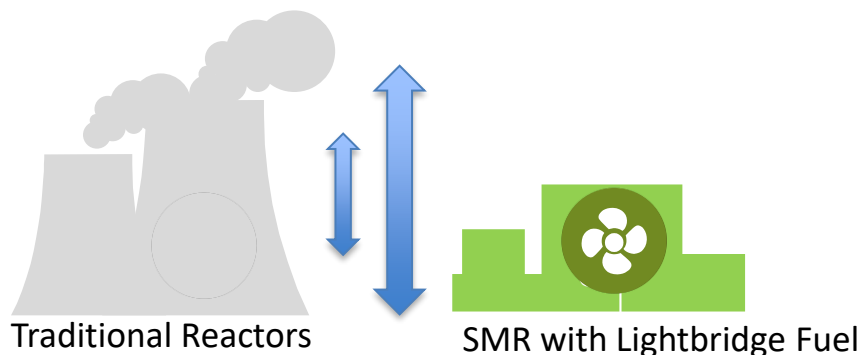
SMRs have several potential benefits compared to existing large power plants

- Emergency planning zone limited to site boundary (rather than paying for emergency services for a much larger radius)
- Fewer personnel in control room
- Fewer security personnel

Lightbridge Fuel is expected to **significantly improve the economics for SMRs**. An SMR can replace coal power plants and utilize the existing electrical switchyard already on the site, bringing employment back to the region. The US can support manufacturing of SMRs and fuel for domestic and export markets.

<sup>1</sup> Pressurized water reactors and boiling water reactors

# Lightbridge Fuel Can Offer Superior Ramp Rate for Load Following in SMRs – Facilitates Versatile and Efficient Use of Carbon-Free Energy at Greater Scale

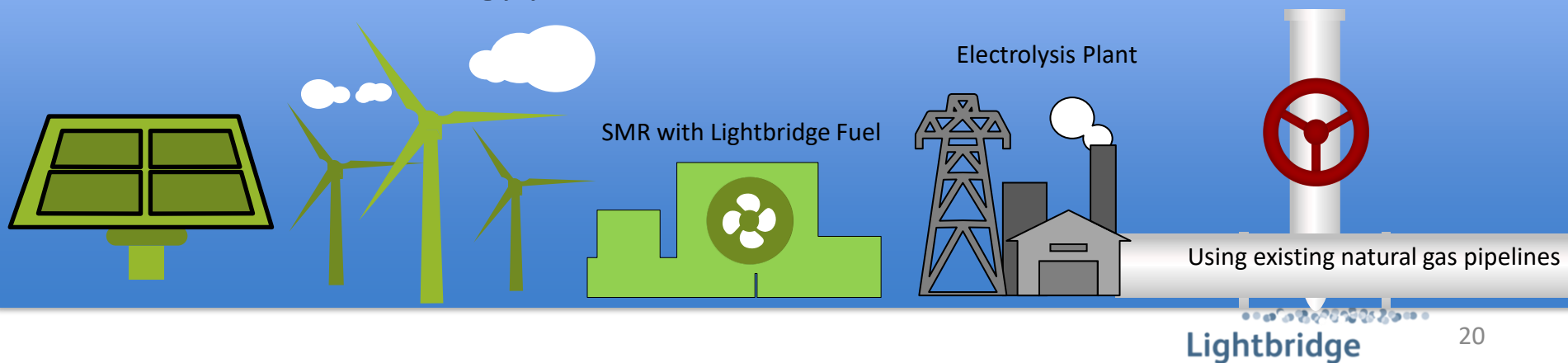


- SMRs powered with Lightbridge Fuel are expected to have a vastly improved load following capability compared to traditional reactors
- May allow SMRs to work more efficiently in different missions, including replacing natural gas plants to back-up renewables

An SMR designed to produce 30% more power uprate with Lightbridge Fuel may be used to produce liquid hydrogen-based fuels and utilize existing oilfield pipeline infrastructure to support the zero-carbon energy transition

## Zero carbon energy production

Can be used in hard-to-decarbonize sectors, including aviation, shipping, cement and steel production, heavy trucks, and trains



# Compelling Economics Surrounding Large Water Reactor Market (PWR, BWR & PHWR)

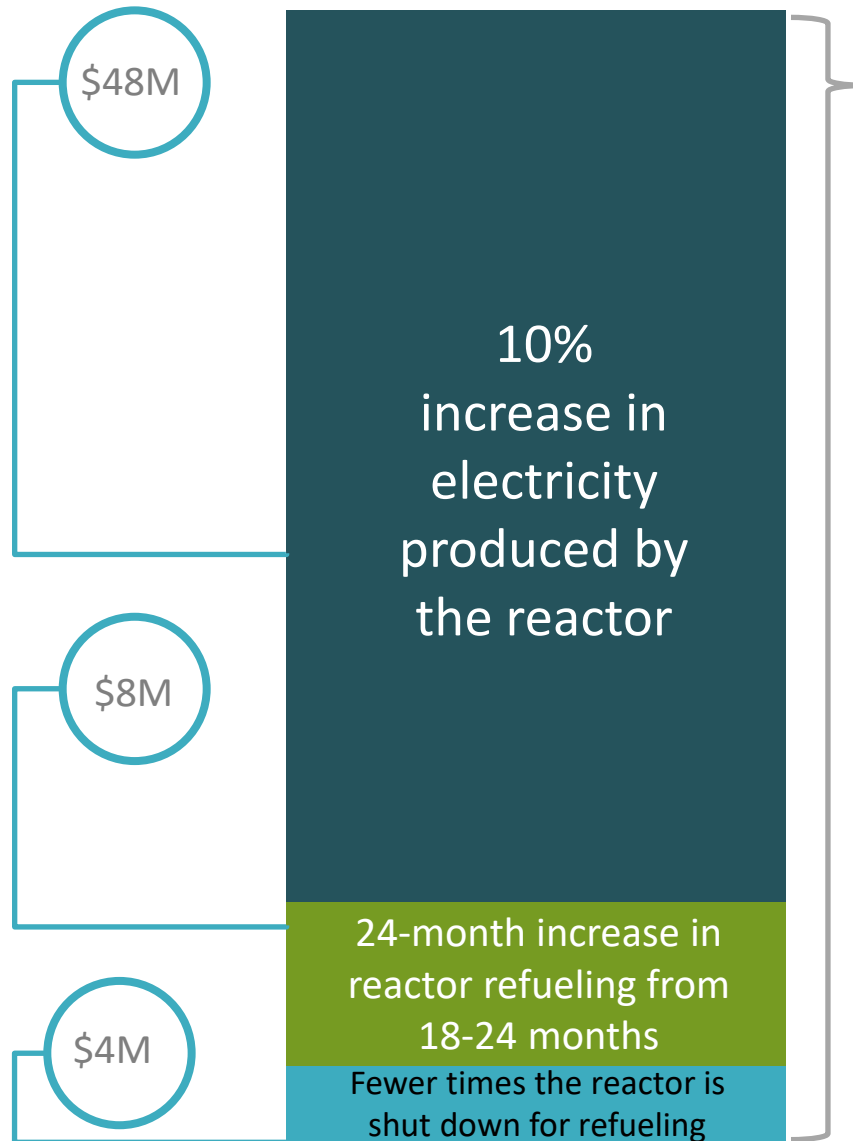
Nuclear fuel supply agreements will generate long-term, high margin recurring revenue.

Water reactors: worldwide	419
Water reactors: U.S.	100
Water reactors: NUFAB (U.S.)	49*
<b>Average annual fuel spend per reactor, per year</b>	<b>\$50 Million</b>
Total addressable market: U.S.	\$5 Billion
Total addressable market: worldwide	\$21 Billion

Lightbridge Fuel™ is designed to operate with nearly every reactor in the world, including those under construction and planned.

\*Includes 2 under construction

# \$60 Million Annual Gross Revenue Increase to Utility Per Large Pressurized Water Reactor



## \$60 million\*

per 1,100 MWe reactor

incremental annual revenue to utility with Lightbridge 10% power uprate

Does not include the added economic benefits of carbon credits or cost to utility of buying replacement power during an outage

- Assumes wholesale power price of \$55/MWh, which is the average wholesale power price in the U.S. over the past decade. Based on our discussions with regulated utilities, we believe this is the benchmark they would likely use in their long-term investment decisions as license extensions can add 20 years to the operating life of a nuclear power plant, while building new plants have about a 60-year operating life. Utilities are now exploring with the US Nuclear Regulatory Commission extending operating licenses to 100 years.

# Leveraging Bipartisan Support for Advanced Nuclear Energy



# Robust Bipartisan Federal Legislation for Nuclear

The Nuclear Fuel Working Group report (April 2020) reflected key policies that enjoy strong bipartisan support in the federal government

## Including:

- Commitments towards federal funding of R&D for advanced fuels and HALEU
- Complete HALEU enrichment demonstration program, and fund advanced water treatment technology for uranium mining and in-situ recovery
- Fund R&D for domestic origin commercial fuel replacements for international sale for use in foreign-origin reactors, including Accident Tolerant Fuel

**Currently, there are 47 bills\* related to nuclear power under consideration in the US Congress:**

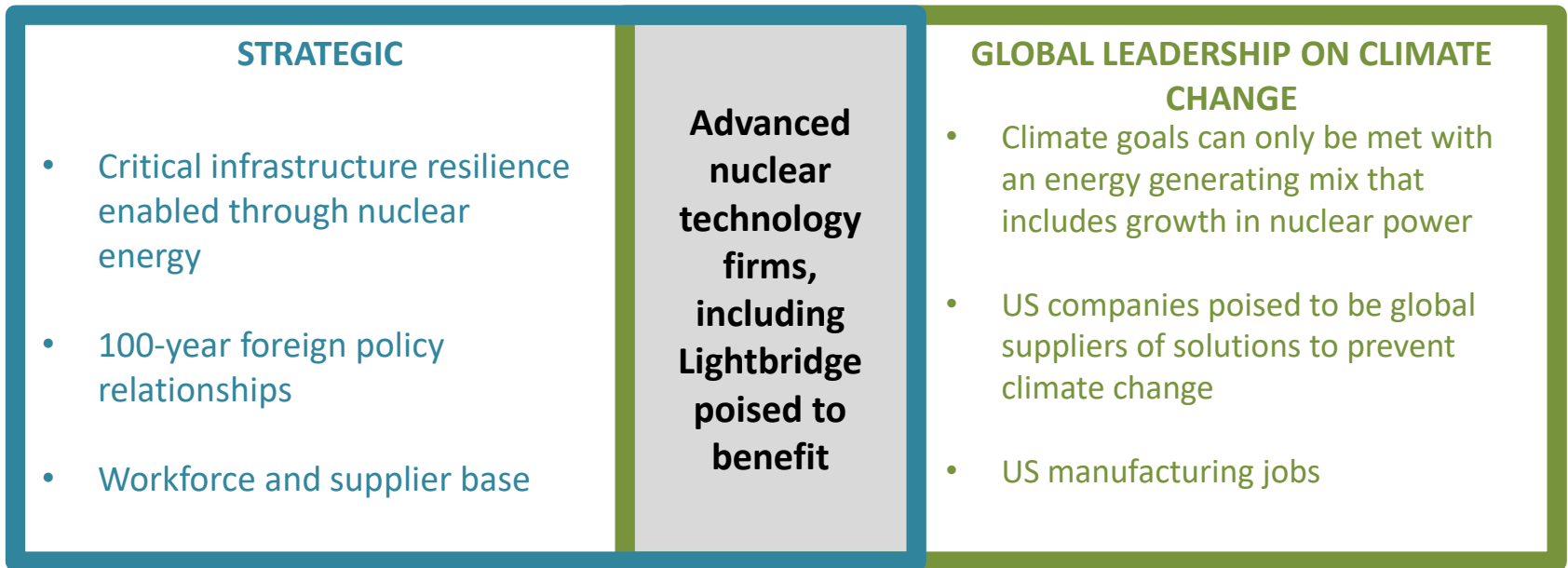
- Sponsored by Democrats: 26
- Sponsored by Republicans: 21

***Lightbridge's technology is aligned with US government goals, enabling policies outlined in the report because of the design of Lightbridge Fuel***

# Advanced Nuclear Technology Race Poses Unique Opportunities for Lightbridge

**Government support** through legislation, financial investment and policy change has spurred **A RACE FOR NUCLEAR INNOVATION**

The reasons for this are bipartisan, forward thinking, and highly lucrative for the winner



According to the Nuclear Fuel Working Group report, “The United States is missing out on a nuclear reactor market that the US Department of Commerce (DOC) estimates is valued at \$500-740 billion over the next 10 years.”

# Financial Overview

# Strengthened Financial Positioning

## Unaudited Condensed Consolidated Balance Sheets

	September 30, 2021	December 31, 2020
<b>ASSETS</b>		
Current Assets		
Cash and cash equivalents	\$ 16,133,652	\$ 21,531,665
Other receivables	110,000	—
Prepaid expenses and other current assets	247,211	172,460
Total Current Assets	16,490,863	21,704,125
Other Assets		
Trademarks	101,583	85,562
Total Assets	<u>\$ 16,592,446</u>	<u>\$ 21,789,687</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current Liabilities		
Accounts payable and accrued liabilities	\$ 1,107,865	\$ 382,130
Accrued legal settlement costs	-	4,200,000
Total Current Liabilities	<u>1,107,865</u>	<u>4,582,130</u>
Stockholders' Equity		
Preferred stock	-	-
Convertible Series A preferred shares	663	699
Convertible Series B preferred shares	2,667	2,667
Common stock	7,209	6,567
Additional paid-in capital	150,163,990	146,353,232
Accumulated deficit	(134,689,948)	(129,155,608)
Total Stockholders' Equity	<u>15,484,581</u>	<u>17,207,557</u>
Total Liabilities and Stockholders' Equity	<u>\$ 16,592,446</u>	<u>\$ 21,789,687</u>

- Cash position as of Sept. 30, 2021: \$16.1 million

- Two-year projected cash runway

- No debt

### Future Sources of Working Capital:

- Future anticipated government support following two GAIN vouchers (non-dilutive funding awards)

- At-the-Market (ATM) offering will be used opportunistically for additional fundraising at prevailing market prices

- Successfully exchanged all outstanding convertible preferred shares for common stock in December 2021

# Investment Case



## **Lightbridge Fuel is well-positioned to enable advanced nuclear energy applications that expand its current use missions**

Lightbridge Fuel is a nimble technology that's reimagining applications of nuclear power to deliver clean, reliable energy.



## **Bipartisan government support through legislation, financial investment and policy change has spurred a race for nuclear innovation**

Lightbridge was awarded two DOE funding awards, with additional funding opportunities available.



## **Lightbridge Fuel increases safety and capacity while reducing carbon emissions and operator costs**

The world's energy and climate demands will only be met as nuclear energy becomes a bigger part of the energy-generating mix.



## **\$20+ billion addressable market for current worldwide nuclear reactor fleet**

Lightbridge Fuel is designed to operate with nearly every reactor in the world, including those under construction and planned. Lightbridge Fuel is also usable in coming small modular reactors.



## **Lightbridge has built a significant portfolio of patents in numerous countries, reflecting years of research and development**

The new patents will help safeguard the Company's intellectual property, which is an integral element of the Company's plans to monetize Lightbridge Fuel.





# Lightbridge

Advanced Nuclear Fuel Technology for Current  
and Small Modular Reactors

*Improving reactor safety and economics*

Lightbridge Corporation  
[www.Ltbridge.com](http://www.Ltbridge.com)  
Twitter: @LightbridgeCorp  
[www.Linkedin.com/company/Ltbridge](http://www.Linkedin.com/company/Ltbridge)  
[ir@Ltbridge.com](mailto:ir@Ltbridge.com)

11710 Plaza America Drive  
Suite 2000  
Reston, Virginia 20190 USA

NASDAQ : LTBR