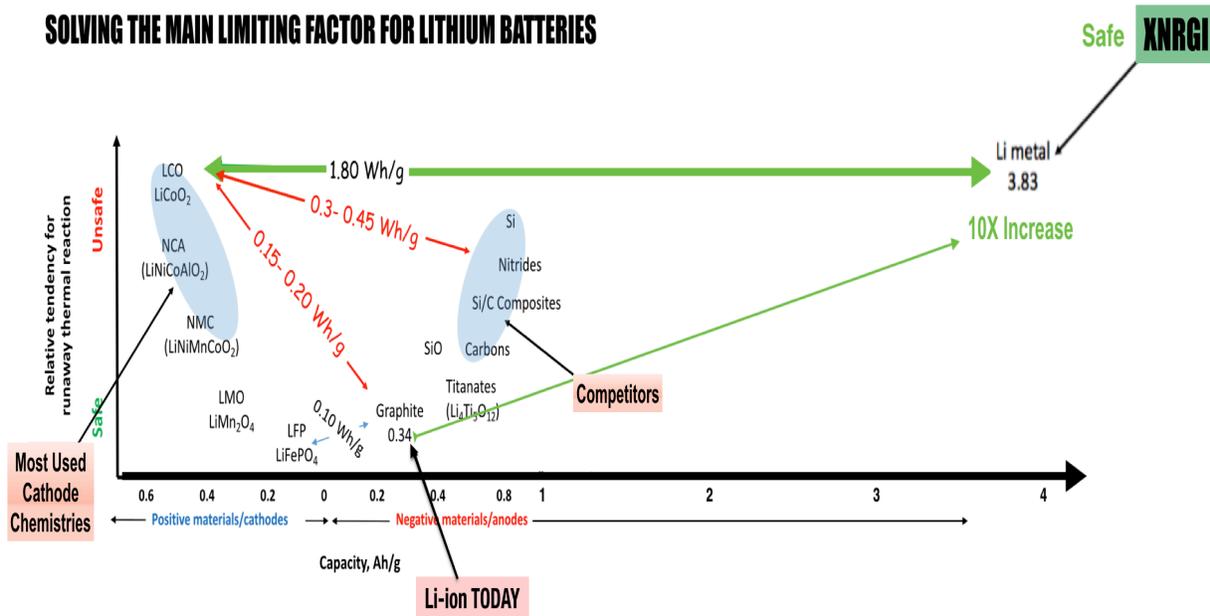




**BREAKTHROUGH PERFORMANCE BATTERY IN A SAFE, SCALABLE SEMICONDUCTOR PLATFORM**

XNRGI, recently funded by a US Department of Energy (DOE) grant for advance manufacturing of its X-PowerChip™, has developed a game-changing, high-performance, rechargeable lithium metal battery (using a 3D porous silicon structure as the electrode substrate). The XNRGI battery can be manufactured using a low-cost, contract-based, semiconductor foundry model to reduce CapEx costs by 95% (compared to traditional battery factories that require billions to build and years to construct). Most importantly, the semiconductor manufacturing foundation of the XNRGI battery will allow the technology to improve along the same path as semiconductor improvements (i.e., Moore’s Law), while lithium-ion technology is approaching its limited potential for improvement.

**SOLVING THE MAIN LIMITING FACTOR FOR LITHIUM BATTERIES**



The XNRGI technology platform is based on the most versatile manufacturing platform possible and has solved the numerous disadvantages of conventional battery technologies that have stifled the battery industry during the past 30 years.

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XNRGI's Lithium Metal anode has 10-times the energy density of a standard Lithium Ion anode. Combined with XNRGI's 3D pores that increase the active surface area of the battery by 70-times, performance is dramatically improved. At the same time, XNRGI's 3D pores create a cool and safe architecture for any battery chemistry, basically eliminating concerns of overheating and fire, which have plagued other Lithium Ion batteries.

The XNRGI battery design is "chemistry" agnostic as it does not restrict use of almost any cathode material, including the most common LCO, NMC, NCA, or LFP cathode materials. The main advantages of this method include: high energy density today demonstrating Lithium Metal battery at (> **1600 Wh/L**) **405 Wh/kg** and, XNRGI's next generation battery in 2021 Lithium Metal Air at (**4400 Wh/L**), **680 Wh/kg** with high currents that enable fast charge and discharge, long cycle life based on elimination of lithium dendrite formation and greatly improved safety.

XNRGI's 3D architecture provides a safe house of new chemistries to be safely contained for future high energy density materials, which can be manufactured in high volumes - a flexible architecture foundation platform for the evolution and design of batteries in the future.

### Technology Advantages:

XNRGI believes that its silicon architecture enables various advantages in performance, cost, manufacturability, and technology extendibility, including packaging, safety, power and energy density optimization, and an application for a range of sizes from micro batteries (for the Internet of Things) to large batteries (for EV and Grid scale storage).

XNRGI also has the ability to innovate battery enhancements every 18 to 24 months, thereby allowing continuous improvements unlike conventional battery architectures.

**xPowerChip™** is demonstrating the following characteristics:

- **Performance:** The xPowerChip™ delivers 300%-600% better performance than similar size lithium ion batteries (405 Wh/kg, 1600 watt/liter, without the traditional issues i.e. no dendrites, fire) and delivers a Fast Charge.
- **Safety:** The xPowerChip™ demonstrates none of the catastrophic characteristics of a traditional Lithium-Ion battery when punctured or damaged. Puncture tests of the xPowerChip™ yield no combustion or other failure.
- **Semiconductor Manufacturing:** XNRGI can produce and scale capacity to deliver more of its xPowerChip™ faster to customers than battery manufacturers. The xPowerChip™ is manufactured in existing

Page 2 of 3

XNRGI: Breakthrough Performance Battery in a Safe Scalable Semiconductor Platform

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semiconductor fabrication plants re-purposed to the customized manufacturing needs of the xPowerChip eliminating the need to construct expensive battery factories that typically take 3 to 5 years to build and commission. As a result, the xPowerChip™ battery can be produced in high volume from various locations around the world in a matter of months not years.

- **Market Scale:** The xPowerChip™ battery meets battery and energy storage requirements in all sectors of industry, from micro batteries to grid-scale mega systems. The xPowerChip™ architecture is more flexible than batteries and can be scaled easier, faster, and at less cost to TWh production to meet the ever- increasing market demand.

Feature	Benefit
3D structure gives 70X increase in area	High (3 to 5X) energy density, low local currents
Vast array of micro batteries	Rapid Charging and Discharge. Safe! No thermal runaway
Physical wall of separation, no separator	Eliminates dendrite growth, SEI, reduces cost, 3X Cycle Life
Silicon based foundry production	Low cost, short lead time to manufacturing
Lithium metal anode	10X better anode than conventional anodes
Technology platform	Serves range of battery types

**XNRGI’s Proprietary PowerChip™ Battery**

In addition to XNRGI’s IP Portfolio of 15 issued patents, 13 applications, and 6 patent disclosures, XNRGI’s PowerChip™ technology has a number of unparalleled, first-ever features that set it apart from any other battery technology: