

# Brillouin Energy Corp.

## Revolutionary Energy Systems



March 27<sup>th</sup>, 2012

The best way to predict the Future is to invent it

# Safe Harbor

This presentation contains forward-looking statements including, without limitation, statements concerning our business and possible or assumed future results of operations. Our actual results could easily differ from those anticipated in our forward-looking statements for many reasons including: the failure of our technology; our ability to continue as a going concern; insufficient funding of our operations; greater than expected costs; customer acceptance of our products or services; regulation of our products or services; intense competition in our markets and industry 2segments; adverse economic changes affecting markets we serve; our timing and profitability challenges in entering new markets; difficulties related to our integration of any businesses we may acquire; other common venture stage challenges we may face; and any other risks and uncertainties as may be detailed from time to time in our private or public announcements and any SEC filings. Although we believe that the expectations reflected in our forward-looking statements are reasonable, they relate only to events as of the date of this presentation. Our future results, levels of activity, performance or achievements could easily miss these statements of projection or expectation. While we intend to be as transparent as possible, we do not promise to update any of the forward-looking statements after the date of this document to conform these statements to actual results or to changes in our expectations, except as required by law. *Please see additional detailed “Risk Factors” in Brillouin’s full Business Summary document.*





# Brillouin Energy Corp. (BEC)

- Invents renewable energy systems that employ extraordinary new technologies
- Develops cleaner, cheaper heat energy sources using safe “Controlled Electron Capture Reactions” (“CECR”)
- Superior in applying state of the art engineering
- Enterprise value driven by expanding test results and IP for the scale-up of industrially useful “process heat”



# Technology

- Developed by Inventor & Founder, Robert Godes, the process is distilled from the early CECR science and engineered into useful products
- Hydrogen and electricity are sole inputs (no fossil fuels)
- Electrolyzes Hydrogen by loading into a metallic lattice, then catalyzing a unique reaction with high energy pulses resulting in the generation of significant process heat
- Contained in a pressure vessel, the reaction has been demonstrated to be consistent and controllable
- Key Breakthroughs: Zero Toxic Emissions, Controllable, and disruptively Low Cost





# Technology Progress

- Sealed boiler prototype with calorimeter developed
- Calorimetry instrumentation certified as accurate to within less than 5% variance by expert engineer in heat measurement systems at Therma Corp PE in San Jose
- Data showing excess heat of up to 110% power gain (“>2X”)
- Observable change in reactant isotopes indicates excess thermal energy, most likely from atomic conversion of mass to energy
- Test results independently reproduced



# What is CECR? – The Next Big Thing

- CECR is a form of very low level, non-harmful nuclear energy, invented by Brillouin's Founder Robert Godes
- However, CECR is NOT cold fusion
- Transmutation products are most consistent with a neutron absorption process
- Decay products are readily thermalized
- Very likely linked to the resonance of Hydrogen in/on a metallic lattice
- The only output is a large amount of excess heat and a small amount of helium
- BEC device can be turned ON/OFF and control operating temperature
- BEC device has predictive scientific Hypothesis
- Next step is to finish scaling commercial prototypes
- Competing devices have occasionally demonstrated significant amounts of excess heat, but have no clear hypothesis, have never shown ability to be turned ON/OFF or control temperature, and operate sporadically





# Why does Brillouin's CECR work?

1. CECR Draws on multiple scientific and engineering disciplines to provide a robust explanation for its source of neutrons, leading to the generation of excess process heat
2. Provides guidance on how to design reactors that drive the reaction (formation of neutrons).
3. Indicates how to prevent the transmutation (corruption) of the host lattice materials.



# Ramifications

- **Scalable:** Nuclear energy densities from  $\mu\text{W}$  to  $\text{GW}$
- **Portable:** No need for radiation shielding (because there is none!)
  - Adaptable to the full range of power plants, steam heat and transportation systems
  - Does not have the weight, safety issues, and costs of fission
- **Dramatic Shift in Fossil Fuel Use**
  - Decouples energetics from reaction mass
  - Fuel mass essentially goes away for air-breathing applications, reduces total mass
  - No GHG ( $\text{CO}_2$ ,  $\text{H}_2\text{O}$ , aerosols, ...) concerns
  - **Fuel is very cheap (Nickel abundant, electrolysis of  $\text{H}_2\text{O}$ )**
- **Potential replacement of fossil fuels for everything but synthetic organic chemistry**





# Risks & Validation points

## Remaining Risks

- Scaling the system to industrially useful application levels
- Making the system commercially reliable and controllable
- Penetrating markets highly doubtful of new technology, vs. their own efficient equipment and established customer bases
- Designing market applications that won't get mired in regulation

## Validation Points to build from

- Energy balance – power out minus power in
  - Thermal validation – quantity and quality of heat
  - Electrical validation – power gain produced
- Nuclear validation – Controlled Electron Capture Reaction (CECR) versus chemical
- System design and construction of commercial scale
- Strong Team with key Tech Partner at Stanford Research Intl



## Electro Magnetic Pulse Generator



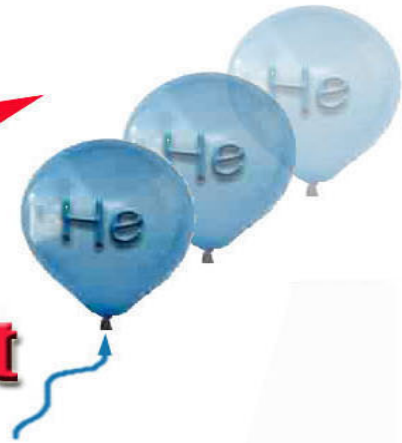
3  
2  
1

Electro Magnetic Pulse

Electro Magnetic Pulse

Electro Magnetic Pulse

Heat  
Heat  
Heat



Step 1) Q Pulse and electrons combine with hydrogen to form neutrons.



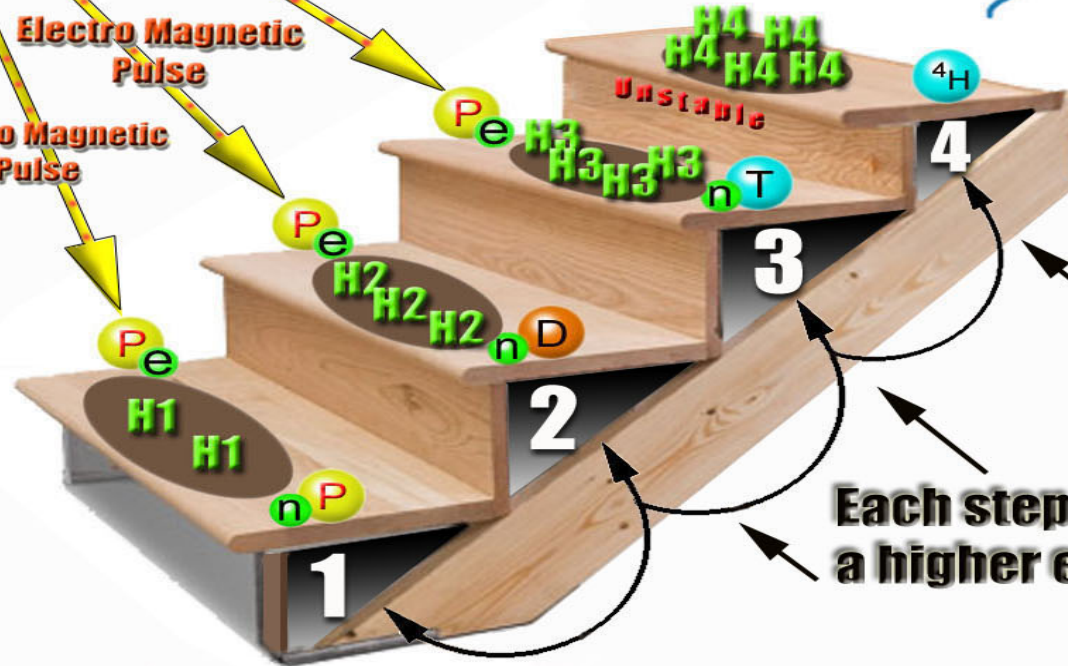
Step 2) Neutrons readily combine with the hydrogen ions in the lattice forming heavier hydrogen 2, 3 & 4.



Step 3) Hydrogen ions (P / 1, D / 2, & T / 3) move in the matrix to combine with the newly formed neutrons.



Step 4) Finally  $^4\text{H}$  decays into Helium releasing lots of energy.



Each step represents a higher energy level

# Brillouin Controlled Electron Capture Reaction





# Patents (IP)

- First International Patent applied for commercial viability of this technology, includes 22 additional Claims
- Key Trade Secrets are comprised of operational parameters used by Brillouin's unique Quantum (Q) Pulse Control
- BEC's CTO together with our Patent Attorney, Dr. David Slone, PhD, Esq. at Kilpatrick Townsend Stockton LLP have drafted extensive additional patent claims for commercial use, with much more to follow, subject to funding
- Ancillary IP as a by-product of original patent work, drafted to significantly improving the efficiency of electronically controlled electric motors by more than 25%



# Two Boilers

## Two Business Models

### Commercialization Path of BEC New Hydrogen Boiler™

- BEC's "New Hydrogen Boiler™" (NHB™) operates at 300°C - 500°C, uses simple Hydrogen gas with a nickel catalyst
- NHB™ has higher quality process heat optimal for merchant Power Plants and go-generation steam turbines, i.e., used for large industrial plant steam heat, generation of electricity and desalination
- NHB™ will retrofit and replace conventional fossil or bio fuel source in stranded asset power plants, making them competitively viable again

### Commercialization Path of BEC Brillouin Boiler™

- BEC's "Brillouin Boiler™" operates at 100°C - 150°C, uses simple electrolyte with distilled water and a nickel catalyst
- Brillouin Boiler™ has lower quality process heat optimal for conventional furnace / boiler market used for residential and commercial heating
- Brillouin Boiler™ licensable to conventional boiler manufacturers seeking a competitive edge





# (1) Brillouin New Hydrogen Boiler™ (NHB™) System

- Brillouin's proprietary Q-Pulse technology is applied to NHB™ where alumina tubes containing powdered nickel compound are stimulated in a fluidized bed while hydrogen gas is cycled through
- The hydrogen becomes highly energized within the nickel matrix resulting in the formation of neutrons as Controlled Electron Capture Reactions (CECR); the neutrons accumulate to form very unstable H4 which undergoes a Beta decay in micro-seconds, producing extremely high temperatures and forms stable  $^4\text{He}$
- This process continues billions of times per second creating a reliable heat source
- Brillouin has entered into a key services agreement with world renowned Scientists at Stanford Research Intl (SRI) in Menlo Park, CA, to work with our Engineers to complete development of a beginning commercial scale hydrogen gas "hot tube" boiler capable of operating at 300° to 500°C
- Such hot tube NHB™ will be capable of providing factories with process heat and coal and oil fired power generation stations with this green energy solution
- Subject to Brillouin's current capital raise below, this program will begin in April of this year with results expected before the end of 2012



# Brillouin NHB™ System (cont.)

- Brillouin has negotiated a “second stage” \$20M investment conditional agreement from Sunrise Securities of New York, NY ([www.sunrisecorp.com](http://www.sunrisecorp.com))
- The Sunrise offer would purchase 15% of BEC post-money, conditional on BEC moving ahead with and completing successful testing of its NHB™ at SRI
- Sunrise offer is also conditional on Brillouin striking preliminary agreement to acquire at least one “stranded asset” conventional fuel source small scale (5-10MW) Power Plant, with existing conventional co-gen equipment, and replacing (retrofitting) old fuel source with Brillouin’s hot tube NHB™, together with renewal of an operating power purchase or steam heat contract with an industrial or a utility
- Key expert affiliates of Sunrise, including former Director of the California Public Utilities Commission (CPUC)’s independent power division, have already provided potential acquisition candidates, available for negligible cost, with power contracts already in place
- Upon successful testing of NHB™ at SRI, the \$20M Sunrise offer will fund full commercial launch of this merchant power supply retrofit business model





# Multiple Stacked NHB™ Tubes

Replicating a series of Brillouin NHB™ Tubes and stacking them allows:

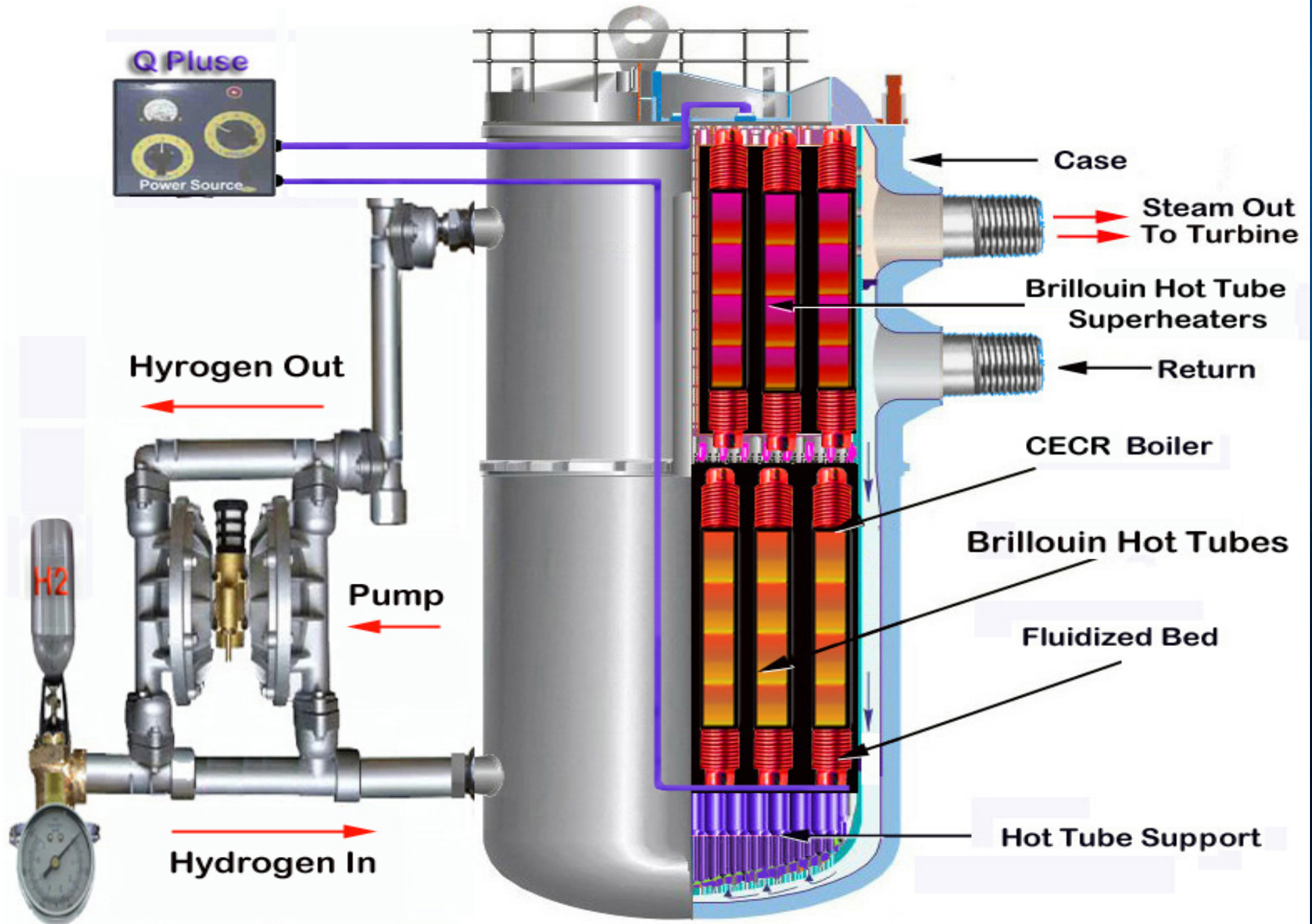
1. The lower tubes to flash water in the boiler to steam.
2. The upper series of NHB™ Tubes to super heat the steam.

This provides a direct replacement of the polluting fire box in fossil fuel boilers for Industrial processes and power generation.



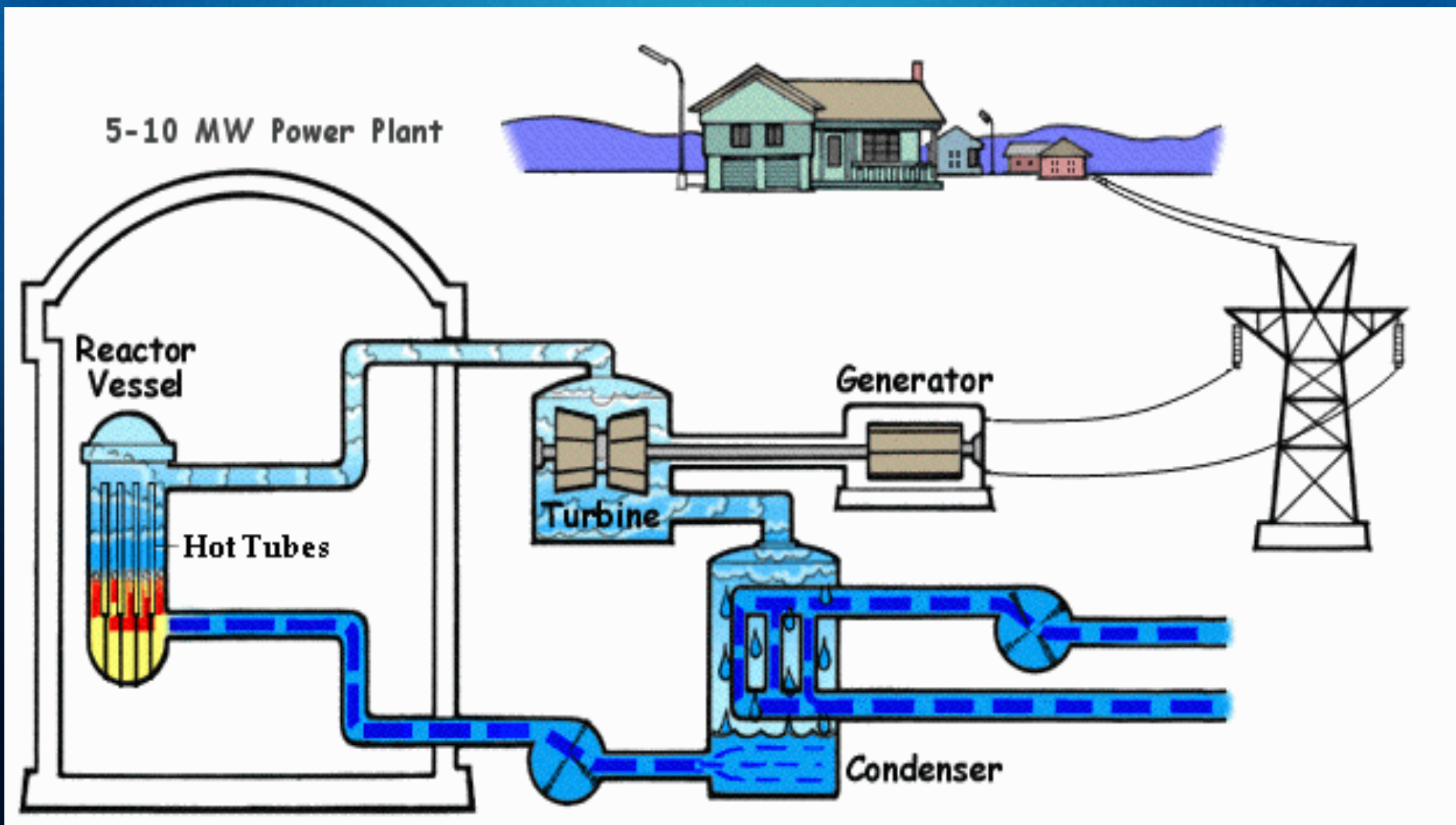
# Brillouin "Hot Tube" Boiler

Commercial Power Generation





# Power Plant Retrofit Model



## (2) Brillouin Boiler™ System

### Initial Target Market

- Initially, BEC intends to license its Brillouin Boiler™ technology to leading conventional boiler (furnace) manufacturers (shortest time to market)
- In the U.S. alone, estimates are that 581,000 commercial buildings use fossil fuel boilers for space heating or hot water, and 22,000 buildings use electric boilers
- Market estimates for a non-polluting energy efficient boiler like Brillouin's in just the U.S., is \$2 Billion over the next few years





# Brillouin Boiler™ System (cont.)

- BEC's existing wet Brillouin Boiler™ already has significant test data and prototype footprint in Company's Berkeley Lab, demonstrating up to 110% power gain (2.1X)
- Next step is to finish scale-up testing of heat output to commercial level of 3X and up
- Upon completed testing, Brillouin Boiler™ is optimal for global licensing & royalty model, ready to take to market, starting with conventional boiler makers
- Preliminary talks with several leading companies in this market have already shown strong interest evident upon next level submission of commercial data proof
- Initial goal thereupon is to establish five best-in class optimum license partners, paying a combination of significant up-front fees plus royalties on each unit sold
- As power gain (excess heat multiple) increases past 3X, more licensing applications with greater variety of power product manufacturers expand into other energy markets and multi-\$Billion opportunities
- Go-To-Market Plan is driven by data results, presented to lead target industrials, managed by CEO and lead Patent/License Counsel, all with expertise in negotiating such contracts



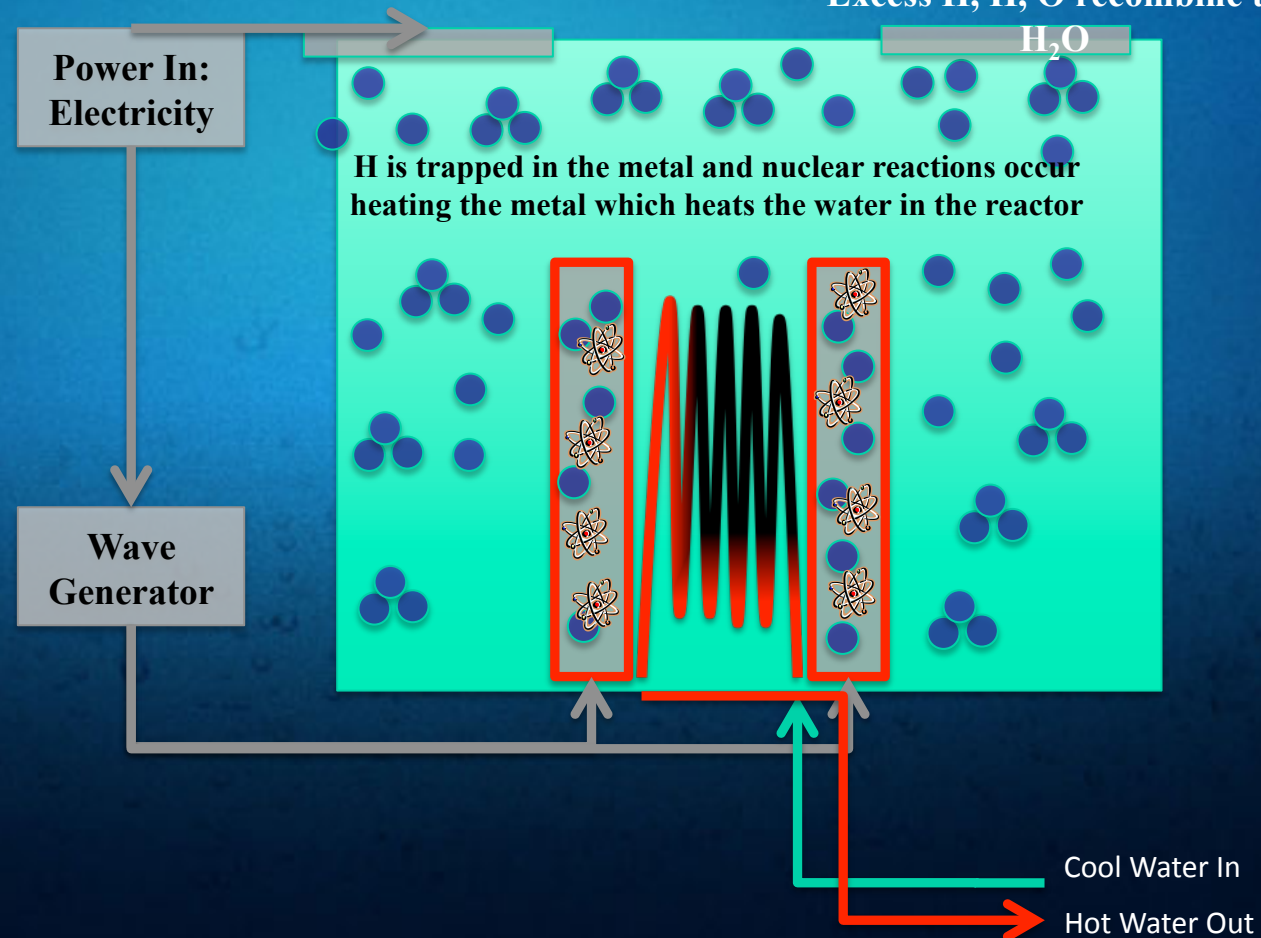
# This is a Brillouin Boiler™!

## Brillouin Boiler Operation

- Boiler is full of water ( $H_2O$ )
- Electrolysis splits the  $H_2O$  into H, H, and O
- A miniscule fraction of H is trapped in the quantum wells inside the Nickel crystal lattice
- Pulses bombard the Nickel Lattice with high electric fields and a current of electrons where a tiny fraction of the trapped H undergo a CECR reaction
- Energy from the reaction heats up the lattice and the surrounding water
- Cooling water is passed through the reactor to cool it and hot water is pumped out
- Excess H, H, O recombined to  $H_2O$  by a safety catalyst in a closed system

Electricity used to split  $H_2O$   
into H, H, and O

Excess H, H, O recombine to  
 $H_2O$



The hot water in the reactor is cooled  
by passing water through the reactor



# Potential Future Products

- As testing scale-up and operational results continue with either Boiler model, additional key markets become available such as scalable process heat, other steam turbine applications, distributable power supplies and inverse fuel cells, desalination of sea water, military un-manned aircraft, satellite technology, spaceflight, and eventually commercial aircraft safety and economics improvement by replacing jet fuel power sources, etc.



# Funding

- Offering size: Current Angel Bridge Round \$2,200,000
- Use of Proceeds: Formally hire key staff full time, purchase critical testing equipment, materials and software, implement dry NHB™ test plan at SRI, further lab testing of wet Brillouin Boiler™, additional patent, legal and licensing prep, necessary working capital and operational overhead items
- Goal: Complete successful SRI dry hot tube NHB™ testing plus wet Brillouin Boiler™ testing of at least 3X excess heat results (commercialization)





# Team

- **CEO - Robert W. George II** Managing Director of Grosvenor Financial Partners, LLC. A multi-disciplined executive with extensive experience in product design and commercialization, running successful companies in both the public and private sectors, and creating solutions for marketing, international licensing and joint ventures.
- **President & CTO - Robert Godes** Founder of Brillouin Energy Corp., and the Inventor of its technology. An innovative technical designer, electrical engineer, and creative solution inventor with over 25 years experience in identifying and developing technology products for diverse organizations.
- **Director of Engineering - Jim Aldridge** An accomplished engineer whose Silicon Valley career spans over 30 years working in over 25 technology companies (including 10 start-ups) directing engineering, technology business development and technology marketing projects.
- **Chemical Engineering Manager - David Correia** A chemical engineer with 25 years of professional experience developing new process equipment and mechanical designs that use chemical reactions to complete process steps for manufacturing. Well versed in troubleshooting chemical / mechanical systems.
- **CFO / COO – David Firshein** Investment banker with 27 years experience in the private capital markets, plus senior mgmt of venture startup operations. President of Cascade Capital Corp., a licensed commercial finance lender/broker; completed \$800 Million of wide variety of debt & equity transactions for development stage to Fortune 1000 companies to date, including many cleantech ventures.



# Advisory Board

- **Michael C. H. McKubre, PhD Chemistry and Physics** Victoria University Wellington, now Director, Energy Research Center, Physical Sciences Division, Stanford Research International (SRI). Internationally recognized LENR expert in PdH and PdD electrochemistry and calorimetry. Previously directed research and consulted for the Electric Power Research Institute (EPRI), Defense Advanced Research Program Agency (DARPA), US Naval Research Laboratory (NRL), and Office of Naval Research (ONR).
- **Edward Beardsworth, PhD Physics** Rutgers, multi-disciplinary scientist, senior tech investment banker, and marketing and business development strategist for major utility and energy industry companies. Now at Jane Capital, previously worked at top levels for EPRI and Brookhaven Labs.
- **Carl Page**, CEO of Page Technology Partners. Highly sought after advisor to technology, internet marketing, and emerging clean-tech companies. Significant investor in both hi-tech and clean-tech ventures. Co-Founder of E-Groups, which later became Yahoo Groups. Angel investor in technology companies .
- **Roger W. Fuller**, a Founder and the Senior Scientist at Maxim Integrated Products (MXIM). World class design engineer of innovative solutions for rapidly growing markets. Instrumental in designing MAX 1780 smart and flash0memory battery chips.
- **Adolfo O. Gutierrez, PhD Engineering Physics** Rensselaer Polytech (RPI), Executive Director and co-founder of Southern Pacific Research Institute for Advanced Technologies (SEPARI) in Chile. SEPARI conducts collaborative science and engineering research efforts in Chile and abroad.
- **Robert Clear, PhD Chemistry** UCSD, Guest Lecturer at Cal Poly, Staff Scientist for Lawrence Berkeley Labs in Applied Science Division. Author and co-author of thirty publications on energy issues and lighting.
- **Charles “Rusty” Holden, Esq.**, Studies and models advanced reactors that use thorium-containing fuels; studies and models devices that make useful medical isotopes through the computational platform available at the Pacific Northwest National Laboratory (Hanford).





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CBS News 60 Minutes:

[www.cbsnews.com/video/watch/?id=4955212n?source=mostpop\\_video](http://www.cbsnews.com/video/watch/?id=4955212n?source=mostpop_video)

US DOD DIA Report:

[www.brillouinenergy.com/DIA-Rpt\\_LEN.R.pdf](http://www.brillouinenergy.com/DIA-Rpt_LEN.R.pdf)

Berkeley, California

