brilliant LIGHT POWER

Business Presentation

March 11, 2023

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Situation Overview

Independently validated, working 250 kW pilot, entering commercialization phase

Discovered. Brilliant Light Power, Inc. ("BLP") believes that it has created a disruptive, non-polluting new primary energy source that is independent of fuels and grid infrastructure, from the conversion of hydrogen into a previously undiscovered, more stable form called "Hydrino®" that releases 200 times more energy than burning hydrogen.

Developed & validated working prototype. BLP has discovered and proven the existence of Hydrino®; developed a device, a SunCell®, to convert the radiant power release to electricity using concentrator PV to power essentially all thermal, cooling, electrical, and motive applications. Extensive tests/proofs have been validated at commercial scale. The Company began building a prototype of current SunCells® in 2018, completed development of and validation of a 250kW thermal boiler in 2020, and completed development of a commercial prototype optical power source to produce electricity by concentrator photovoltaic conversion in 2023.

Capital to commercialization. Raising equity funding to further develop and engineer the SunCell® product family to harness the power of the Hydrino® into various energy markets from the current commercial-scale pilot units, to field trial and production units enabling the Company to go public in 2024.

Brilliant Light Power Leadership Team

Randy Mills, Founder, principal shareholder and Chairman of the Board, CEO and President since 1991.

Awarded a BA in Chemistry, summa cum laude and Phi Beta Kappa, from Franklin & Marshall College in 1982, and a Doctor of Medicine Degree from Harvard Medical School in 1986. Following a year of graduate work in electrical engineering at Massachusetts Institute of Technology, began research in the field of energy technology.

Authored nine books, participated in over 50 presentations at professional meetings, and authored and co-authored over 100 papers regarding the field of energy technology that have been published in peer-reviewed journals.

Emilio Icaza, was appointed to the Board of Directors in 2018.

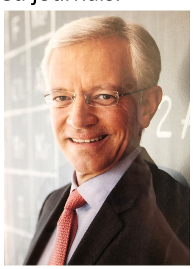
Co-founder and Chairman of the Board of Aspel, the market leader in small business accounting software in Mexico and in Colombia. Served as Co-Executive Director, in charge of Corporate Finance, Research and IR at GBM, one of the top brokerage houses in Mexico. Main shareholder of Enextra Energía, a licensee of Brilliant Light Power, Inc. contracted to serve energy customers in Mexico.

Instituto Tecnologico Autonomo de Mexico (ITAM) in Mexico City, BS Business Administration

Prachi Athnikar Patil, Business Development Manager joined the Company in 2021.

Mrs. Prachi Athnikar Patil has an MBA in Marketing from Pune University.

She has been a Business Development Manager with 9+ years of experience in solution selling and new business development. She is known for her ability to develop relationships with senior decision-makers (incl. CEOs, CFOs, CMOs, or VPs) of potential clients.



Luis Rebollar, VP of Business Development joined the Company in 2021.

34 years experience in senior managing roles at DuPont and Chemours, including President of spin-off The Chemours Company Mexico; VP of Titanium Technologies, President of DuPont, Mexico; and VP of Chemours' Chemical Solutions.

Universidad Iberoamericana (UIA) in Mexico, BS Chemical Engineering; Instituto Tecnológico Autónomo de Mexico (ITAM), MBA.

David Bennett, was appointed to the Board of Directors in 2018.

Consultant for strategic and operational areas of renewable energy and electric vehicles. CEO of Proterra, 2011 to 2013, launching electric bus development and commercialization. President of Eaton Vehicles Group in Asia Pacific, scaled new business, products, and operations in India and China.

Duke University BSE Mechanical Engineering; Drexel University MBA Operational Management.

Brilliant Light Power – At a Glance

Zero-pollution, low cost, primary energy source applicable to essentially all power applications

- **How it works.** The theoretically predicted energy breakthrough is based on reacting atomic hydrogen with a catalyst to cause the atom's electron to transition to a lower-energy orbital forming Hydrino®, a more stable chemical form of hydrogen. Tremendous energy is released in this reaction that is replicated and captured in a **SunCell®.**
- **Predicted and discovered the Hydrino®.** We discovered Hydrino® whose existence and power have been validated by many independent sources. We have Hydrino® "In a bottle" and spectroscopic results that identify Hydrino® in a dispositive manner by characteristic signatures that do not match any other known species.
- **Invented the SunCell®.** The SunCell® comprises a plasma cell that injects hydrogen and catalyst, and two electromagnetic pumps serve as electrodes by injecting intersecting molten tin streams from corresponding reservoirs wherein the connected streams carry a low voltage, high current to form a Hydrino®-reaction plasma with an energy release of **200 times that of burning the hydrogen obtained from water**. Independently validated results.
- **SunCell® developed and proven viable at commercial scale.** Our proprietary SunCell® has been validated by experts at an excess power scale of 300 kW producing blackbody radiation and 270 kW continuously producing steam. We have run internal thermal SunCell® pilot trials at a scale of 100-250 kW continuous power production and an extraordinary power density of up to 5MW/liter.
- **Next stage** commercial partnerships to commercial 250 kW autonomous, modular electrical power sources.

Reinventing thermal and electric power: *safe, accessible, affordable, clean*

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Brilliant Light Power – At a Glance

Working and independently validated boiler producing over 200 kW 100% clean, net Hydrino power

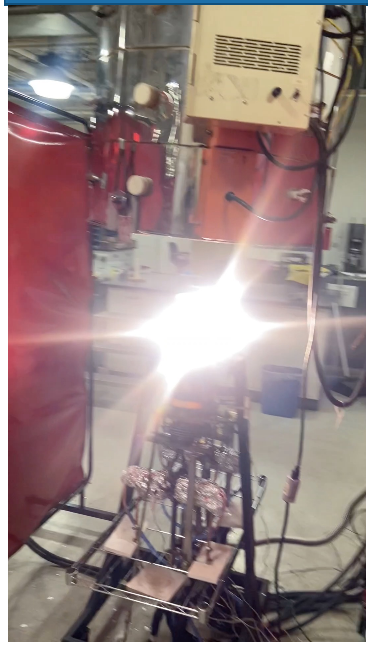
- **Breakthrough in 2020.** We have developed a demonstration 250 kW SunCell® steam boiler to produce hot water and steam - run continuously daily for over 100 hours in aggregate to prove the commercial competitiveness of the Hydrino power source.

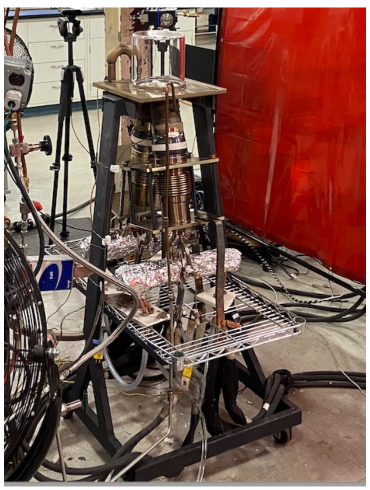
- **Independently validated** results by [3] leading professors/labs.

250 kW Commercial-Scale Boiler

Brilliant Light Power – At a Glance

Commercial prototype optical power source to directly produce clean electricity for essentially all applications





250 kW Optical Power Source

- **Breakthrough in 2023.** We have developed a commercial prototype SunCell® optical power source to produce electricity by concentrator photovoltaic conversion.
- **Solar Power Meter Measurements.** Power and gain are sufficient for a commercially competitive electric power source.
- **Optical power to be converted to electricity using commercial concentrator PV cells.** We are providing spectra and optical power data input to two concentrator PV OEMs.
- **Large addressable markets**: capable of serving the $16.3T/y electrical stationary power, electrical motive power, thermal markets corresponding to essentially the world's power markets.
- **Two hundred times cheaper**: $15/kW capital costs and $0.001/kWh on site electrical power, no transmission, distribution, or demand charges.
- **Total Electrification**: Essentially every imaginable power consuming device in the world can be electrified with proven, cost competitive, reliable, safe, UL approved, warranted systems, mass-produced and supported by the world's OEMs. The SunCell® can power these devices completely autonomously of fuels and grid infrastructure, operating in essentially any environment at greater power density and power to weight ratio than any prior known power source.
- **Will host demonstrations** in our facilities for major corporations (potential clients/partners) and investors.

Key Highlights

1. **Massive addressable markets** applications to displace virtually all energy sources

2. **Working pilot creating net positive energy** at commercial scale

3. **Independently validated** operation, science, theory, power output, & engineering

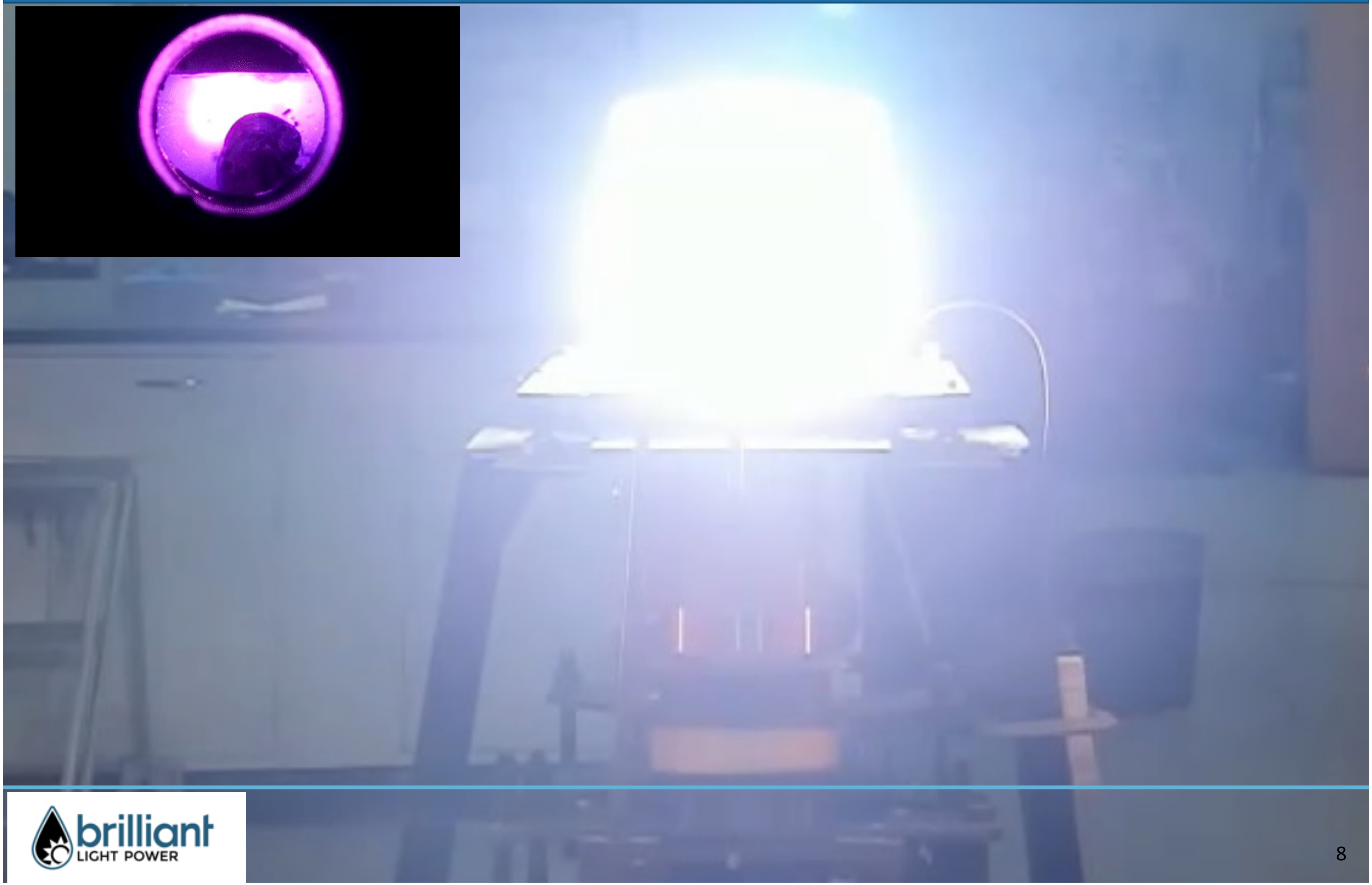
4. **Zero carbon emissions** or other pollutants (100% clean energy)

5. **Superior energy and power densities and economics** to other energy sources (+40x- 220x)

6. **Global patent portfolio** protects leading technology position

Our Invention: New Fire

The most revolutionary invention in modern human history



Building on 30 Years & $120 Million Invested

BLP now at an inflection point with a pilot SunCell creating over 200 kW positive power

$120 million invested

100+ published peer reviewed articles

80+ patents granted

100+ patents pending

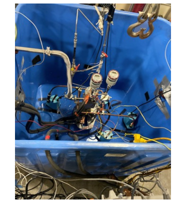
Theory complete and reviewed, analytical solves quarks to cosmos

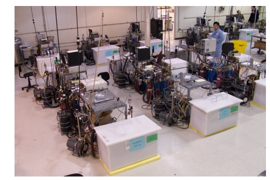
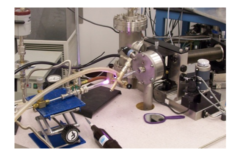
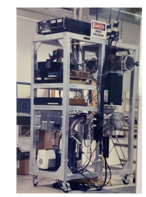
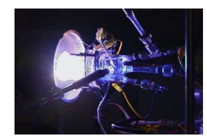
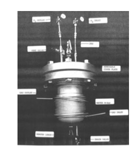
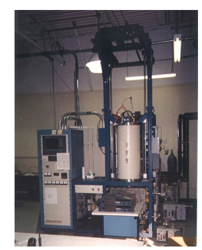
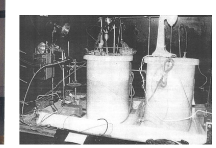
SunCell® at commercial scale and design

2021

- Patents issued worldwide
- 22+ hydrino identification methods with university validation
- 100's of evolutionary steps; 20 MW optical pulse power, SunCell®, 340 kW heat air, 275 kW steam University validation
- 1000's of molten salt electrochemical cells; University and industry validation 10 mW
- 100's of button electrochemical cells
- 6000 solid fuels; University and industry validation 100 mW-1000 W
- 1000's of plasma cells; University validation 10 W power and energetic Hydrino
- Gyrotron plasma to microwave power to DC power using a rectenna signatures
- 100's of filament plasma cells; University validation by national lab director
- Hydride battery; theory, analytical, button cells
- 3000 °C vacuum furnace gaseous catalyst reactor
- 100's of spillover catalyst cells; University validation 1 W scale
- 100's of permeation cells; industry validation 25 W
- 100's of electrolysis cells; industry and National Lab validation 100 mW -50W

1991



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Brilliant Light Power's SunCell®: Energy Game Changer

This is the breakthrough the world needs the most in this moment

	SunCell®	Solar	Wind	Coal	Natural Gas	Nuclear	Solid State Batteries
Zero Emissions	✓✓	✓	✓	Hydrocarbon	Hydrocarbon	–	✓
Safe to Operate	✓✓	✓	✓	Dangerous to mine	–	Operational risks	✓
Low Cost	✓✓	✓	✓	✓	✓	X	X
No Intermittency	✓✓	X	X	✓	✓	✓	✓
Conventional Input Materials	✓✓	Requires rare earth metals	Requires rare earth metals	–	–	Requires uranium	Requires rare earth metals
No Harmful Waste	✓✓	Hazardous materials	Blades not recyclable	Hazardous waste	Upstream flaring	Hazardous waste	Hazardous materials
Easy to Transport	✓✓	✓	Difficult to transport	–	–	Safety & security challenges	✓
Easy to Site	✓✓	Geographically limited	Geographically limited	–	–	X	✓
Completely Off-Grid w/o Related Costs	✓✓	–	X	X	X	X	✓

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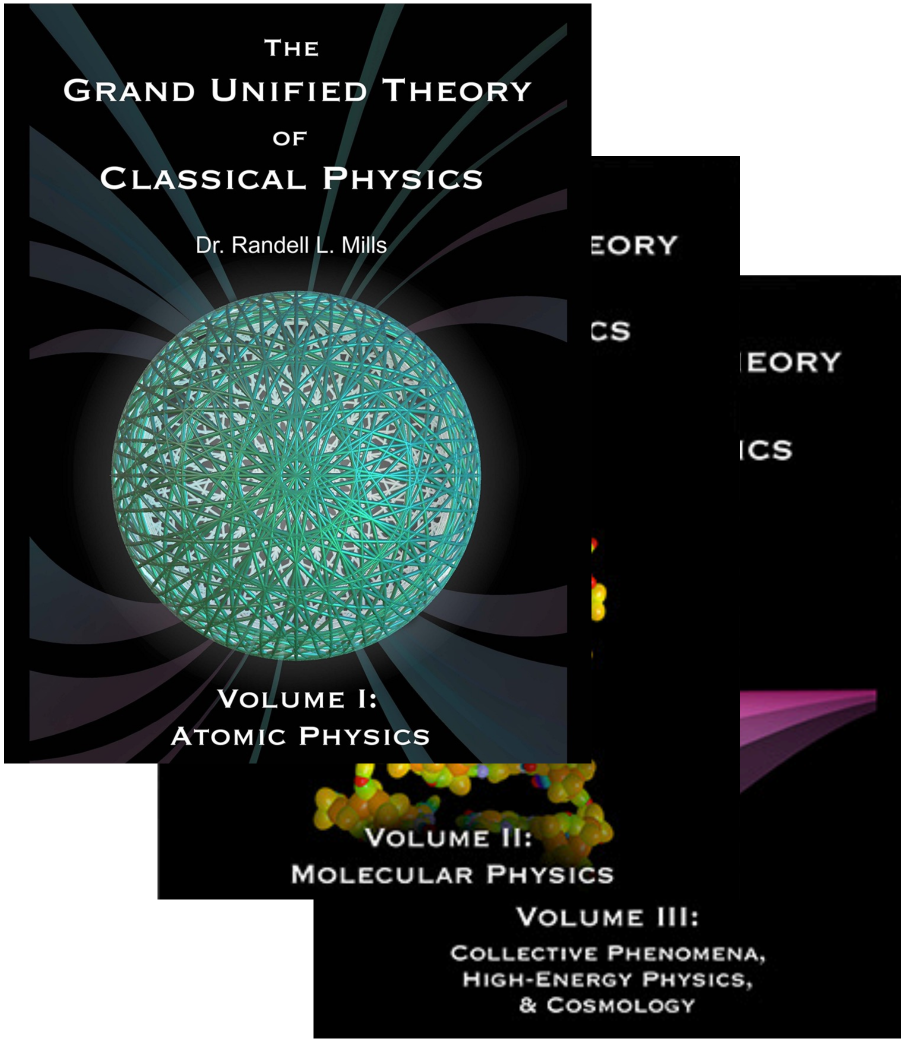
Hydrino®

Hydrino®: Applies Classical Physical Laws at the Atomic Scale

Grand Unified Theory predicted Hydrino®, refutes quantum theory and explains physical phenomena



Niels Bohr (left) with Albert Einstein in the late 1920s, when quantum mechanics was in its infancy.

PHYSICS

Quantum-theory wars

Ramin Skibba explores a history of unresolved questions beyond the Copenhagen interpretation.

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Theory Based on Classical Laws

Exemplary Exact Solutions: Millsian 2.0: Modeling Molecules

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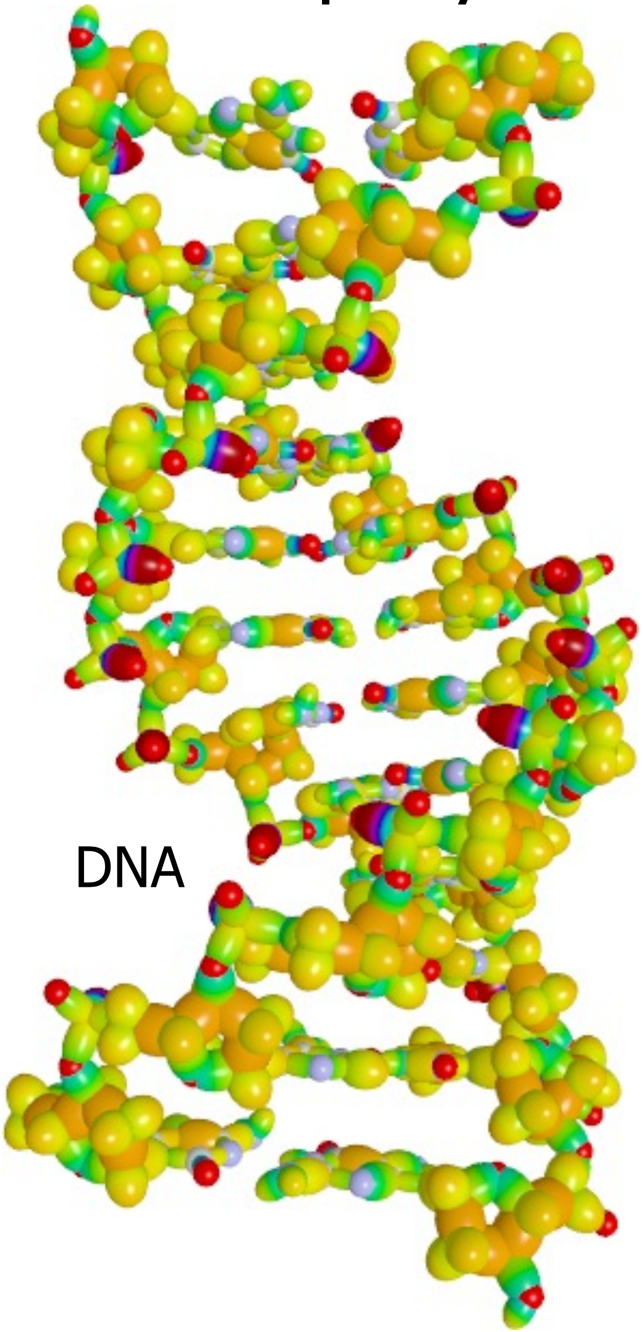
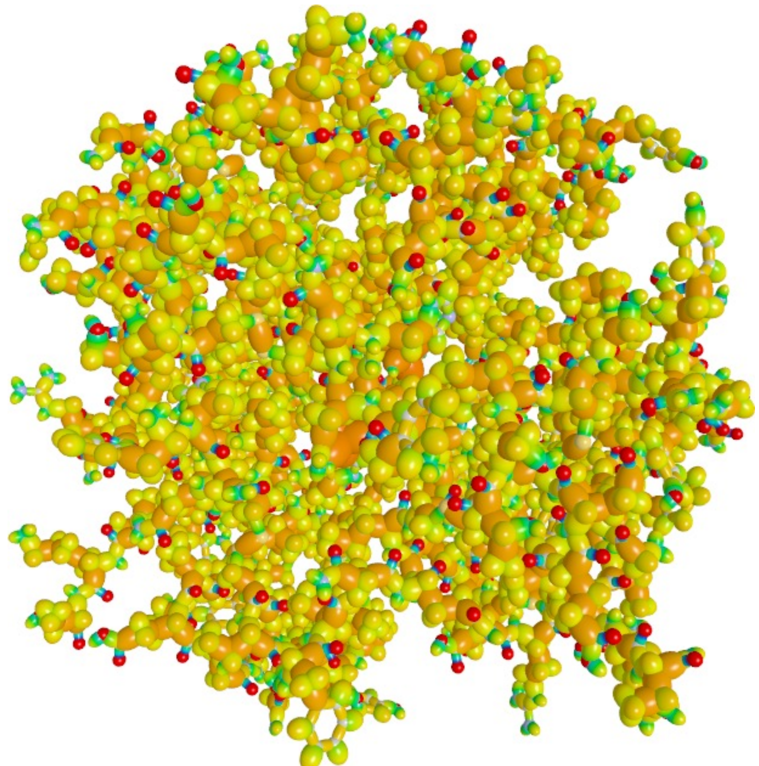
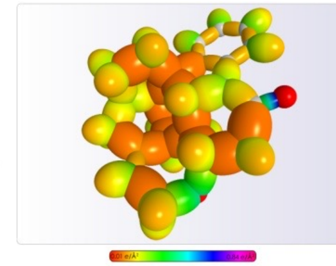


DNA

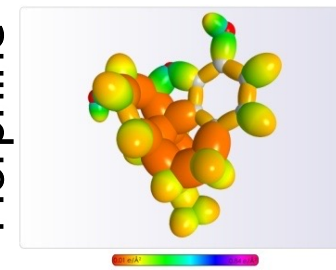


Insulin

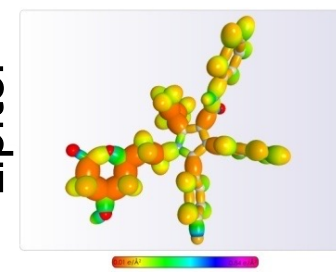
Strychnine



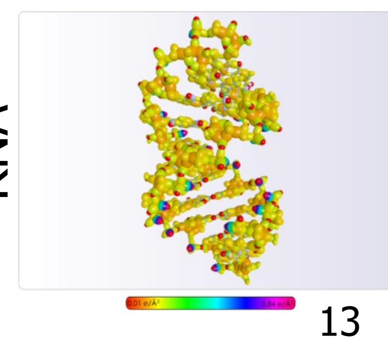
Morphine



Lipitor



RNA

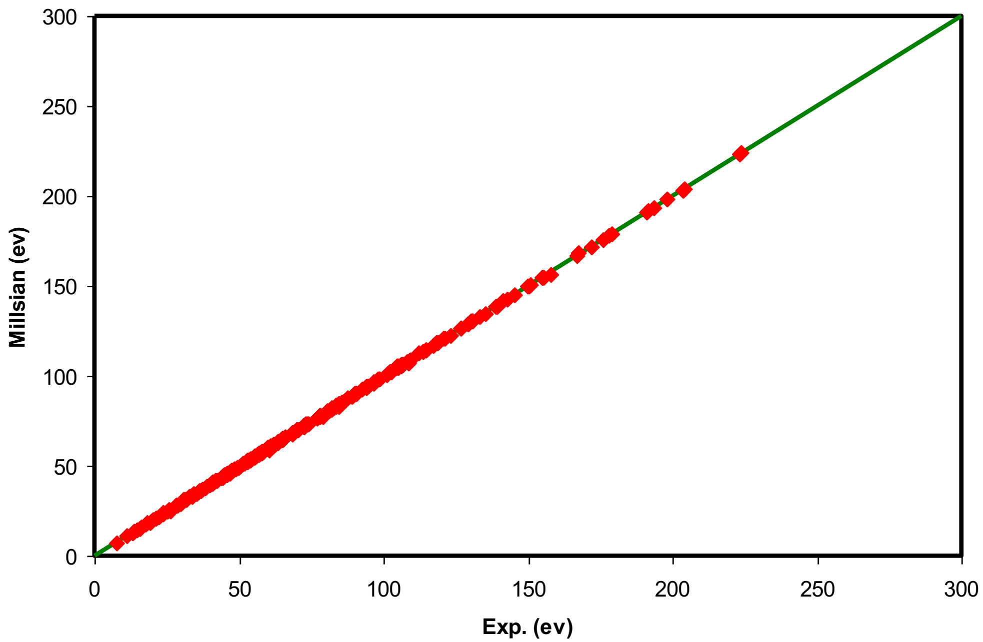


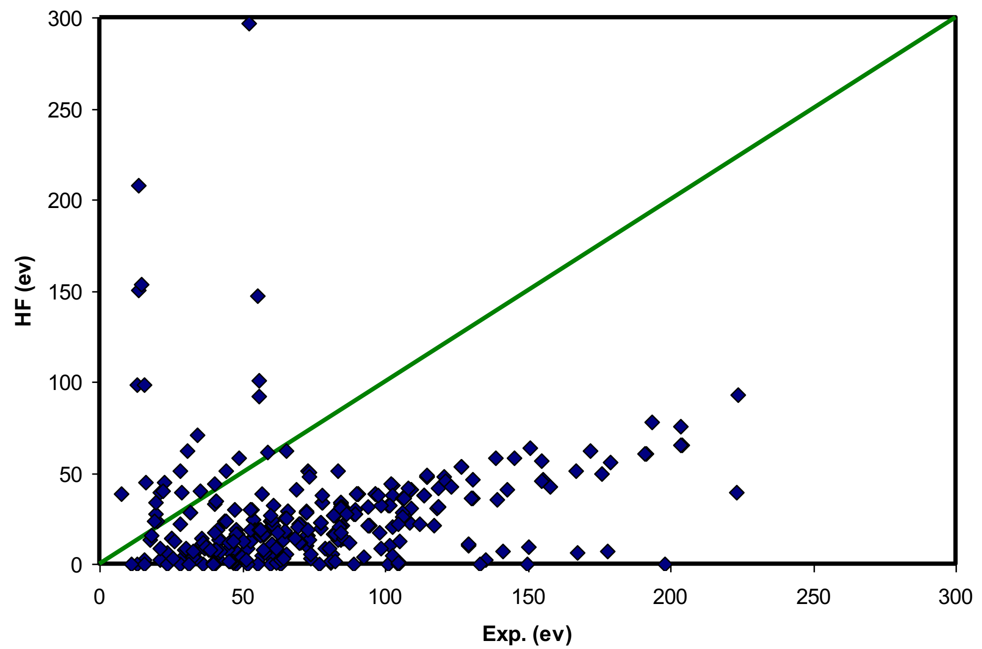
millsian.com

Comparison of Classical to Quantum Mechanical Performance

The total bond energies of exact classical solutions of 415 molecules generated by Millsian 1.0 and those from a modern quantum mechanics-based program, Spartan's pre-computed database using 6-31G* basis set at the Hartree-Fock level of theory, were compared to experimental values.

Millsian vs. 6-31G*



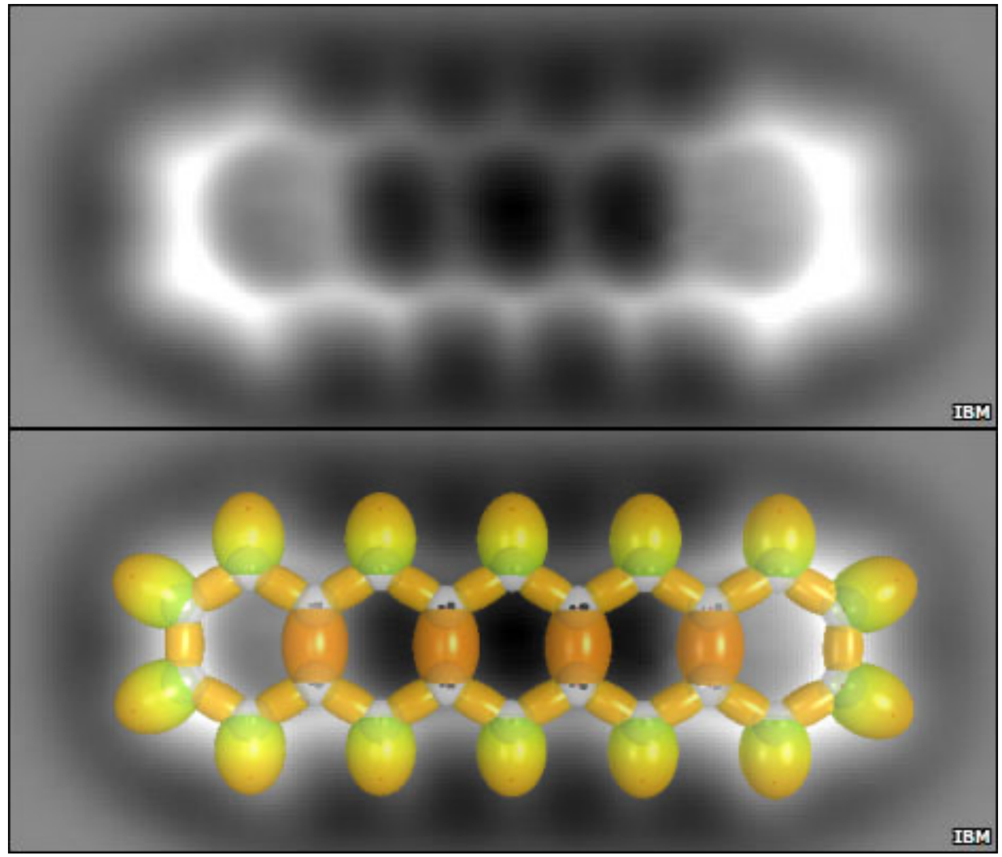


R. L. Mills, B. Holverstott, W. Good, A. Makwana, J. Paulus, "Total Bond Energies of Exact Classical Solutions of Molecules Generated by Millsian 1.0 Compared to Those Computed Using Modern 3-21G and 6-31G* Basis Sets," Phys. Essays 23, 153 (2010); doi: 10.4006/1.3310832

Physical Image Compared to Physical Solution

The polycyclic aromatic hydrocarbon pentacene was imaged by atomic force microscopy using a single CO molecule as the probe. The resulting breakthrough in resolution revealed that in contrast to the fuzzy images touted by quantum theoreticians as proof of the cloud model of the electron, the images showed localized bonding MOs and AOs in agreement with the classical solution.

Top, atomic force microscopy image of pentacene by Gross et al. Bottom, the superimposed analytical classical solution that matches the physical structure.



[L. Gross, F. Mohn, N. Moll, P. Liljeroth, G. Meyer, "The chemical structure of a molecule resolved by atomic force microscopy", Science, Vol. 325, (2009), pp. 1110-1114.]

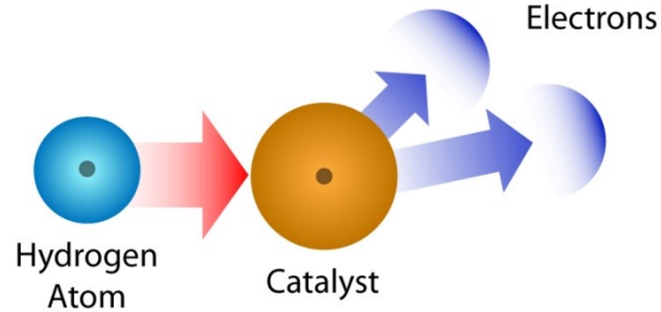
What is Hydrino®?

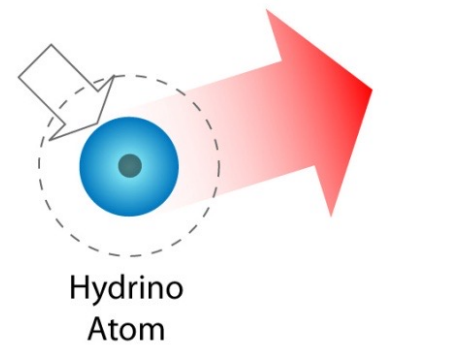
Catalytic Reaction of Atomic Hydrogen

- **Step 1.** Atomic hydrogen reacts with an energy acceptor called a catalyst wherein energy is transferred from atomic hydrogen to the catalyst which forms an ion due to accepting the energy

- **Step 2.** Then, the negative electron drops to a lower shell closer to the positive proton to form a smaller hydrogen atom called a "hydrino" releasing energy that ultimately is in the form of heat

- **Step 3.** The catalyst ion regains its lost electrons to reform the catalyst for another cycle with the release of the initial energy accepted from hydrogen. With the imposition of an arc current condition, the limiting space charge of the ionized electrons is eliminated and the rate becomes massively high.





Novel Compounds

$TBD Addressable Market

- Analytical identification completed for Hydrino® gas and a Hydrino® compound
- Hydrino® exhibits prior unknown optical, magnetic and other properties
- Samples available today and are being validated
- *Exploring applications with specialty firms*

Hydrino Characteristics Matches those of Dark Matter

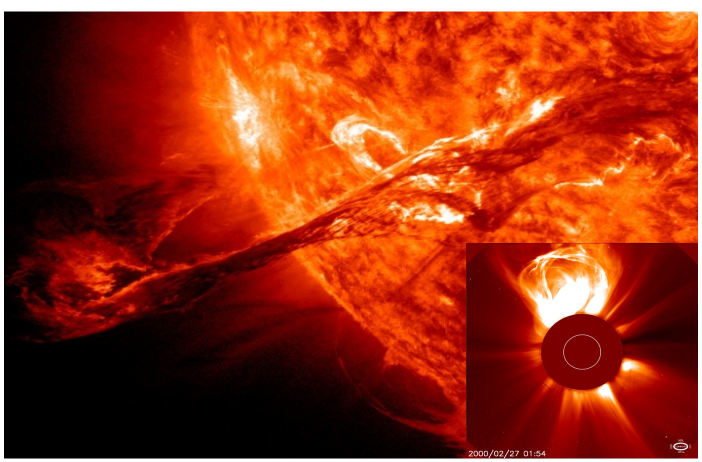
The Hydrino®, an allotrope of hydrogen, is ubiquitous in nature, and matches the conclusions of astrophysicists that so-named dark matter is a different chemical form of hydrogen. Hydrino transition EUV continuum results offer resolution to many otherwise inexplicable celestial observations with

(a) the energy and radiation from the hydrino transitions being the cause of sunspots and other solar activity, why the Sun emits X-rays, the missing energy balance, the source of extraordinary temperatures and power regarding the solar corona problem wherein the highly ionized ions are from EUV continuum radiation rather than thermal ionization,

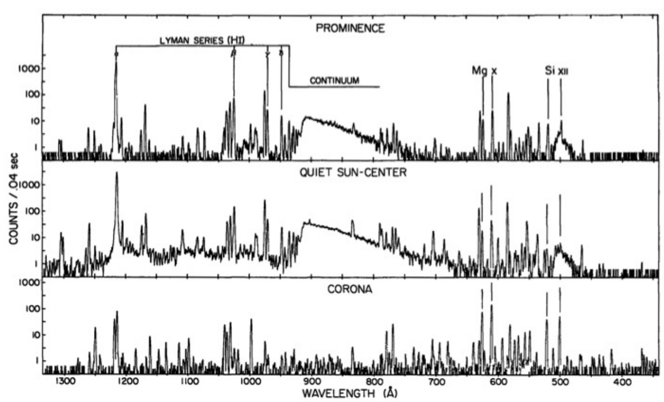
(b) the transition of H to H(1/4) being the source of the 10.1 nm cutoff EUV continuum radiation observed from interstellar medium,

(c) the hydrino continuum radiation being the source of the diffuse ubiquitous EUV and soft X-ray cosmic background, the radiation source behind the observation that diffuse Ha emission is ubiquitous throughout the Galaxy and widespread sources of flux shortward of 912 Å are required, and the source of ionization of the interstellar medium (ISM) wherein a large component of the baryonic matter of the universe is in the form of WHIM (warm-hot ionized media) in the absence of a conventional ionizing energy source,

Hydrino® power source in the Sun's corona



Hydrino® >912 Å continuum in the Sun's corona



SunCell® EUV continuum emission

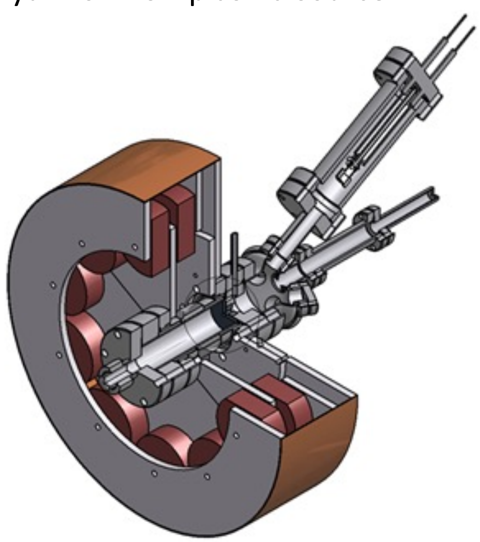
Hydrino transition EUV continuum results offer resolution to many otherwise inexplicable celestial observations with

(d) the transitions of H to H(1/2), H(1/3), and H(1/4) being the source of the continua bands in the EUV spectra of white dwarfs,

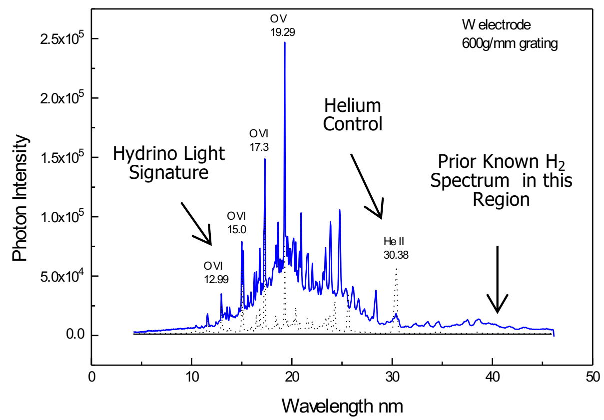
(e) the hydrino transition H to H(1/17) catalyzed by H(1/4) being the source of the 3.48 keV emission assigned to dark matter, (f) the energy release from H to H(1/4) being the source of the temperature of galactic halo gas is in the range of 86 eV to 215 eV,

(f) molecular hydrino rotational transitions with spin-orbital and fluxon linkage spitting such as those observed Raman spectroscopy and electron beam emission spectroscopy match the Diffuse Interstellar Medium (DIBs) lines and further match lines observed by electron paramagnetic resonance (EPR) spectroscopy at a 10^{-6} lower energy scale.

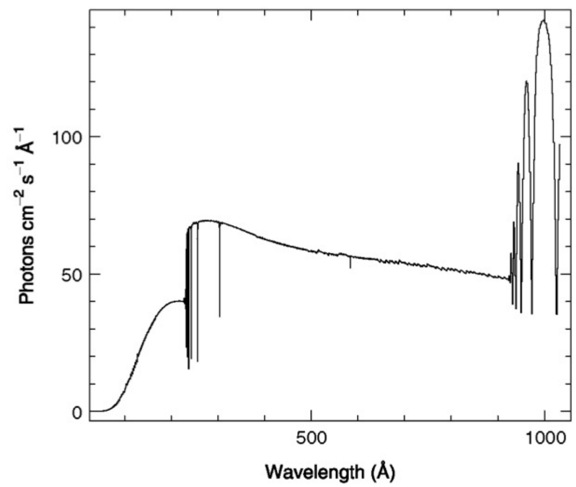
Hydrino® EUV plasma source



Hydrino® EUV continuum emission



EUV spectra of white dwarfs

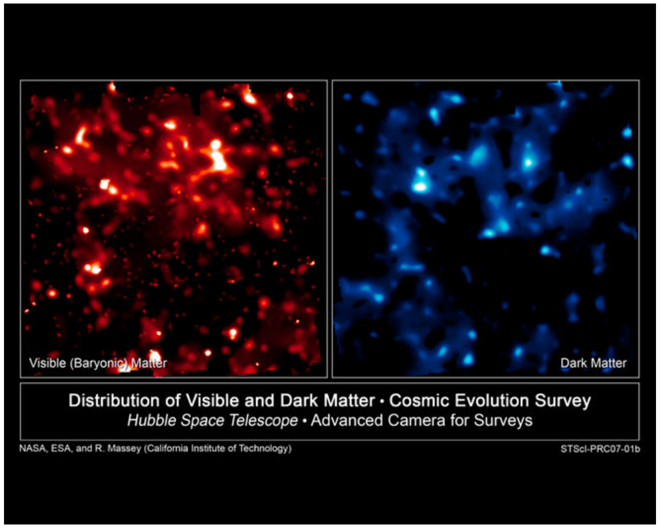


Hydrino transition EUV continuum results offer resolution to many otherwise inexplicable celestial observations with

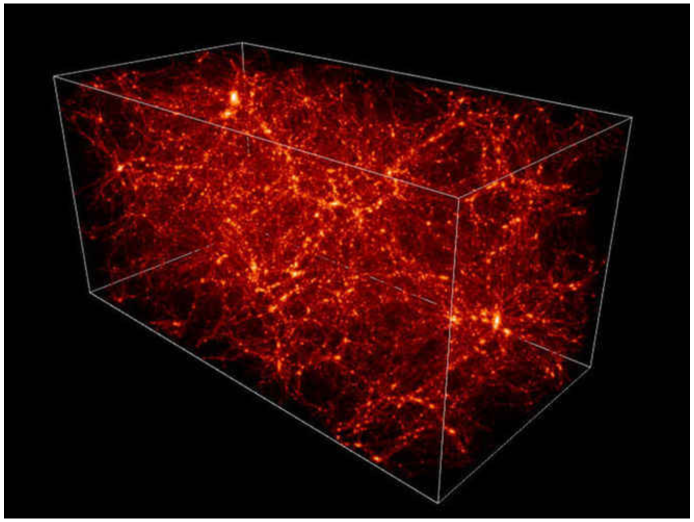
g) the identity of dark matter being hydrinos.

R. Mills, "Hydrino States of Hydrogen", https://brilliantlightpower.com/pdf/Hydrino_States_of_Hydrogen_Paper.pdf.
R. Mills, J. Lotoski, Y. Lu, "Mechanism of soft X-ray continuum radiation from low-energy pinch discharges of hydrogen and ultra-low field ignition of solid fuels", Plasma Science and Technology, Vol. 19, (2017), pp. 1-28.
R. L. Mills, Y. Lu, "Hydrino continuum transitions with cutoffs at 22.8 nm and 10.1 nm," Int. J. Hydrogen Energy, 35 (2010), pp. 8446-8456, doi: 10.1016/j.ijhydene.2010.05.098.
R. L. Mills, Y. Lu, K. Akhtar, "Spectroscopic observation of helium-ion- and hydrogen-catalyzed hydrino transitions," Cent. Eur. J. Phys., 8 (2010), pp. 318-339, doi: 10.2478/s11534-009-0106-9.
R. L. Mills, Y. Lu, "Time-resolved hydrino continuum transitions with cutoffs at 22.8 nm and 10.1 nm," Eur. Phys. J. D, Vol. 64, (2011), pp. 65, DOI: 10.1140/epjd/e2011-20246-5.
R. L. Mills, R. Booker, Y. Lu, "Soft X-ray Continuum Radiation from Low-Energy Pinch Discharges of Hydrogen," J. Plasma Physics, Vol. 79, (2013), pp 489-507; doi: 10.1017/S0022377812001109.
A. Bykanov, "Validation of the observation of soft X-ray continuum radiation from low energy pinch discharges in the presence of molecular hydrogen," http://www.blacklightpower.com/wp-content/uploads/pdf/GEN3_Harvard.pdf.

Distribution of visible (L) and dark (R) matter



Distribution of dark matter in the universe

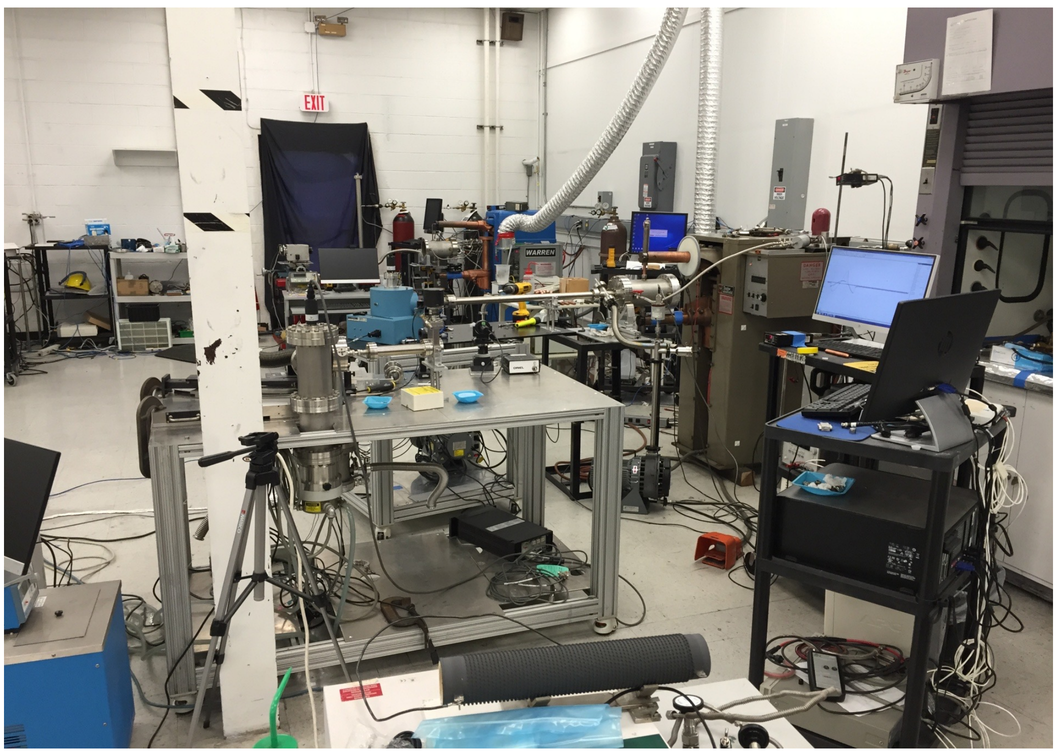


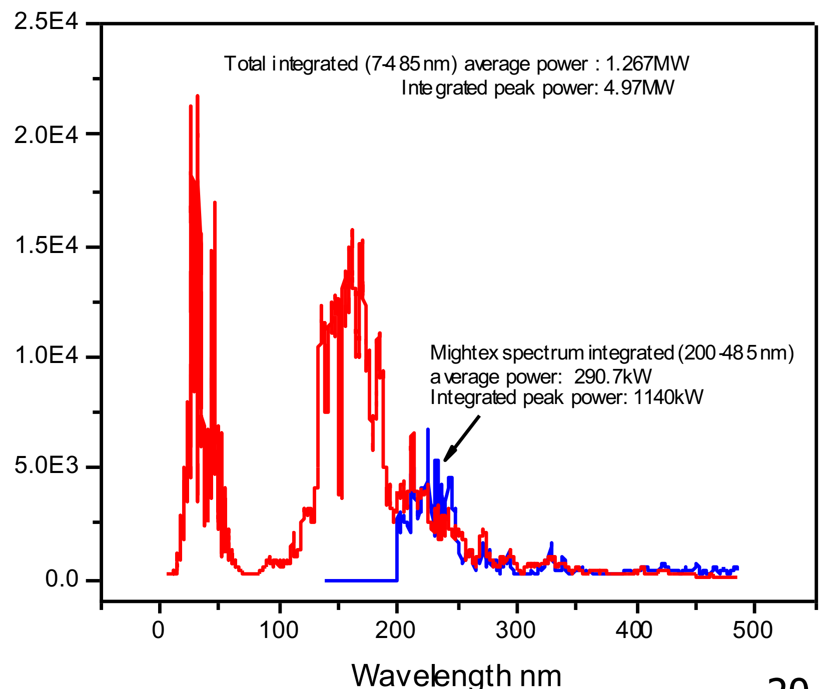
Dark matter ring in galaxy cluster

Optical Power Measurement Using NIST Standards Over 10-800 nm Region: Spectral Emission in the High Energy Region Only

Validated Hydrino Reaction's Extraordinary High-Energy Continuum Light and Optical Power at over 1,000,000W Levels

The continuum radiation with the predicted 10.1 nm cutoff confirms the production of H(1/4).



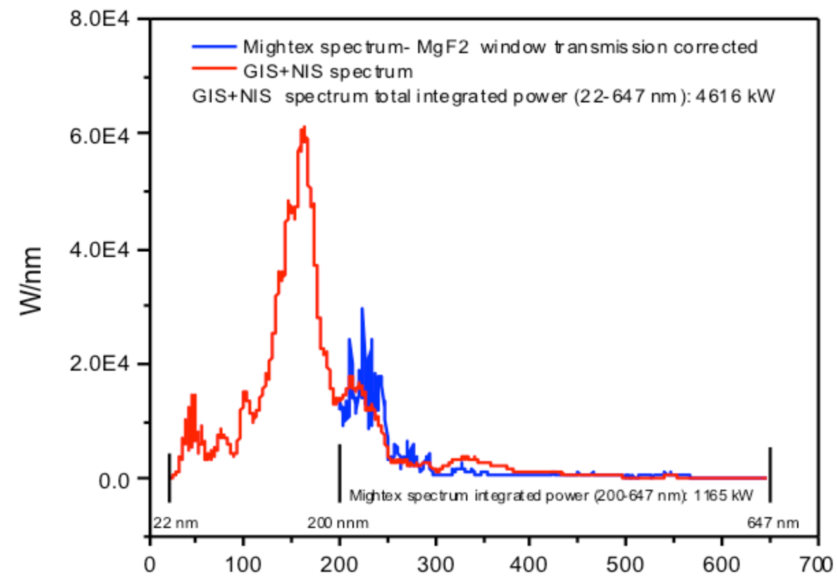


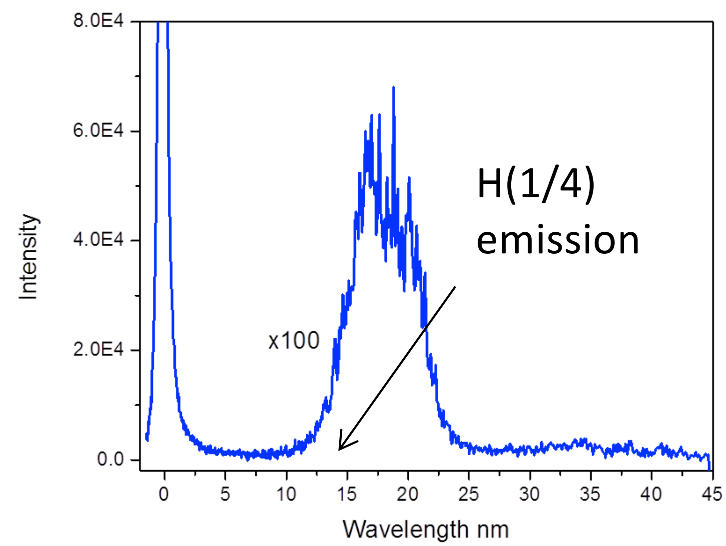
4.6 MW Characteristic H to H(1/4) Transition EUV Continuum Radiation with a Predicted 10.1 nm Cutoff

- Hydrated silver shots comprising a source of H and HOH catalyst were ignited by passing a low voltage, high current through the shot to produce explosive plasma that emitted brilliant light predominantly in the short-wavelength 10 to 300 nm region.

- The peak power of 20 MW and time-average power of 4.6 MW was measured using absolute spectroscopy over the 22.8-647 nm region wherein the optical emission energy was 250 times the applied energy.

- The wavelength calibrated and absolute intensity calibrated spectrum (10-45 nm) of the emission of hydrated silver shots recorded on the GIS with a Zr filter showed the EUV continuum cutoff at *10.1 nm that matches dark matter emission*.





R. Mills, Y. Lu, R. Frazer, "Power Determination and Hydrino Product Characterization of Ultra-low Field Ignition of Hydrated Silver Shots", Chinese Journal of Physics, Vol. 56, (2018), pp. 1667-1717.

Existence of Hydrino Confirmed by Over 22 Methods

There are multiple techniques wherein some alone can prove the existence of hydrino or the hydrino reaction.

- Electron paramagnetic resonance (EPR) spectroscopy: electron spin flip with spin-orbital coupling and fluxon coupling energies. [Princeton University, Delft University of Technology, Bruker Scientific LLC, Billerica, MA]
- Raman spectroscopy: molecular hydrino rotational transitions with spin-orbital coupling and fluxon coupling energies, and rotational-vibrational transitions. Deuterium shifted rotational transitions with spin-orbital coupling and fluxon coupling energies. Raman peaks matching those of the Diffuse Interstellar Bands (DIBs). [Duke University, Princeton University, ThermoFisher Scientific, University of Texas El Paso]
- High resolution visible spectroscopy of $H^-(1/2)$ binding and fluxon coupling energies. [Brilliant Light Power, Inc.]
- Infrared spectroscopy: application of a magnetic field permits molecular rotational infrared excitation by coupling to the aligned magnetic dipole of $H_2(1/4)$. [Princeton University]
- Electron beam emission spectroscopy: rotational-vibrational energies of molecular hydrino with spin-orbital coupling and fluxon coupling energies. [Rutgers University, Brilliant Light Power, Inc., University of Illinois]
- Gas chromatography: faster migration than any known gas, higher thermal conductivity than that of any known gas. [Brilliant Light Power, Inc. on three instruments]

Existence of Hydrino Confirmed by Over 22 Methods cont'd

- X-ray photoelectron spectroscopy: total bonding energy of hydrino of 496 eV with only a single peak corresponding to a single molecular orbital. [Lehigh University, Brilliant Light Power, Inc., Duke University, North Carolina State University]
- Extreme ultraviolet (EUV) spectroscopy: extreme ultraviolet continuum radiation with a 10.1 nm cutoff corresponding to the hydrino reaction transition H to H(1/4) and optical power of 20 MW. [Brilliant Light Power, Inc.]
- ToF SIMs shows K(K2CO3:H2)x+ polymers and intense H- due to the stability of hydrino hydride ion. [Charles Evans & Associates, MRL Lab, Brilliant Light Power, Inc., Case Western University]
- ToF SIMs shows K(K2CO3:H2)x+ polymers and intense H- due to the stability of hydrino hydride ion. [Charles Evans & Associates, MRL Lab, Brilliant Light Power, Inc., Case Western University]
- Electrospray ionization time of flight (ESI-ToF) novel inorganic hydrides in aqueous media [Rowan University, Brilliant Light Power, Inc., Ricerca]
- Nuclear magnetic resonance (NMR) spectroscopy and vibrating sample magnetometry: upfield shifted NMR peak and superparamagnetism due to the unpaired electron of molecular hydrino. [Spectra Data Services, Shell, University of Delaware]
- High performance liquid chromatography (HPLC): inorganic hydrino compounds behaving like organic molecules. [Ricerca, Inc., Rowan University]
- Vibrating sample magnetometry: super-paramagnetism of hydrino molecules in a diamagnetic matrix [University of Oregon].

Existence of Hydrino Confirmed by Over 22 Methods cont'd

Energetics of hydrino reaction:

- High resolution visible spectroscopy of extraordinary H Doppler and Stark line broadening [Brilliant Light Power, Inc., Technical University of Eindhoven, many other universities worldwide]
- H excited state line inversion [Brilliant Light Power, Inc.,]
- Shock wave development much greater than that of TNT [Brilliant Light Power, Inc.]
- SunCell® fully ionized energetic plasma and electromagnetic pulse [Brilliant Light Power, Inc.]
- Solid fuels calorimetry [Brilliant Light Power, Inc., University of Illinois, Auburn University, University of Norte Dame, Setaram, Perkin Elmer]
- Electrochemical power [Brilliant Light Power, Inc., Enser]

Existence of Hydrino Confirmed by Over 22 Methods cont'd

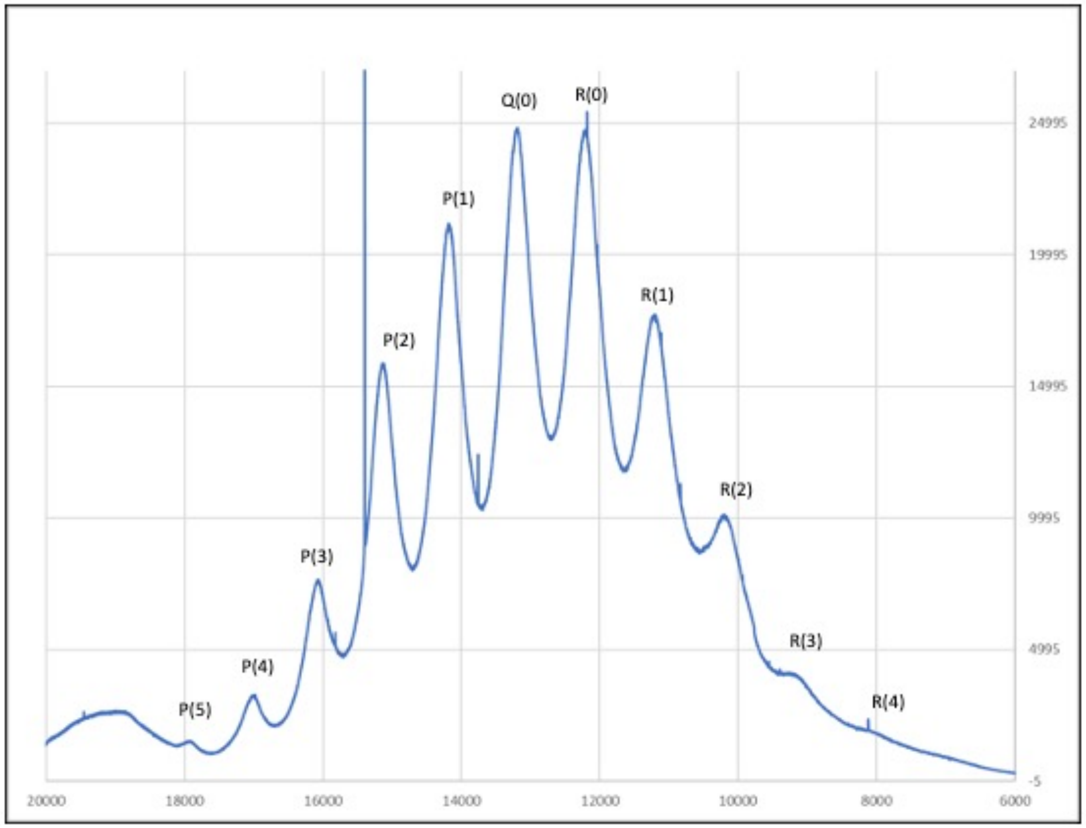
Energetics of hydrino reaction:

- Electrochemical power [Brilliant Light Power, Inc., Enser]
- Chemically produced hydrogen plasma [Brilliant Light Power, Inc., Ruhr-University Bochum]
- Plasma afterglow [Brilliant Light Power, Inc., Ruhr-University Bochum]
- 340 kW level SunCell® power development [Brilliant Light Power, Inc.]
- 210 kW SunCell® continuous steam production [Brilliant Light Power, Inc.]

The validators for these results are or were professors at or received their PhD from prestigious universities such as the California Institute of Technology, Massachusetts Institute of Technology, University of North Carolina, Rutgers University, INP Greifswald, University of California Berkley, University of Wisconsin-Madison, University of Pennsylvania, and others. Companies such as Samina SCI, ARA, Enser, and others were validators. Dates of results, journal references, and validation reports:
https://brilliantlightpower.com/pdf/Analytical_Presentation.pdf
https://brilliantlightpower.com/pdf/Hydrino_States_of_Hydrogen.pdf

Raman Confirmation of Molecular Hydrino of $H_2(1/4)$ in KCl Matrix Ro-Vibrational Band

- The spin of the molecular hydrino molecular orbital (MO) is ½(↑↑+↓↓) where each arrow designates the spin vector of one electron.
- Due to the unique electronic structure of $H_2(1/4)$ comprising a paired and an unpaired electron in the $H_2(1/4)$ MO requiring spin ½ conservation during transitions, the excitation and decay of ro-vibration states of molecular hydrino involve two-photons, each of ½ the energy of the ro-vibrational state.
- The Raman spectrum of KCl getter exposed to gas from the thermal decomposition of Ga_2O_3:$H_2(1/4)$ collected from the SunCell® wherein the spectrum was recorded with a Horiba Jobin Yvon LabRam ARAMIS spectrometer with a 325nm laser and a 1200 grating over a range of 8000-19,000 cm^{-1} Raman shift.
- The corresponding emission spectrum matched the ½ -energy emission spectrum of the 260nm e-beam band comprising rotational transitions of the matrix-shifted ν=1 to ν=0 vibrational transition.
- A long-pass edge filter confirmed the assignments wherein the series of peaks match the theoretical energies to within an error of less than 1%.



R. Mills, "Hydrino States of Hydrogen", (2022), submitted for publication https://brilliantlightpower.com/pdf/Hydrino_States_of_Hydrogen.pdf.
R. Mills, X Yu, Y. Lu, G Chu, J. He, J. Lotoski, "Catalyst induced hydrino transition (CIHT) electrochemical cell," (2012), Int. J. Energy Res., (2013), DOI: 10.1002/er.3142.
R. Mills, J. Lotoski, J. Kong, G. Chu, J. He, J. Trevey, "High-Power-Density Catalyst Induced Hydrino Transition (CIHT) Electrochemical Cell." Int. J. Hydrogen Energy, 39 (2014), pp. 14512–14530 DOI: 10.1016/j.ijhydene.2014.06.153.
R. Mills, Y. Lu, R. Frazer, "Power Determination and Hydrino Product Characterization of Ultra-low Field Ignition of Hydrated Silver Shots", Chinese Journal of Physics, Vol. 56, (2018), pp. 1667-1717.
R. Mills J. Lotoski, "H_2O-based solid fuel power source based on the catalysis of H by HOH catalyst", Int'l J. Hydrogen Energy, Vol. 40, (2015), 25-37.

Comparison of the theoretical emission energies and assignments, corresponding Raman transition energies, and observed Raman peaks.

Assignment	Emission Calculated (cm^{-1})	Calculated Raman (cm^{-1})	Raman Experimental (cm^{-1})	Difference (%)
P(5)	12,721	18,056	17,873	-1.0
P(4)	13,695	17,082	16,975	-0.6
P(3)	14,668	16,109	16,055	-0.3
P(2)	15,642	15,135	15,106	-0.2
P(1)	16,615	14,162	14,157	0
Q(0)	17,589	13,188	13,188	0
R(0)	18,563	12,214	12,174	-0.3
R(1)	19,536	11,241	11,172	-0.6
R(2)	20,510	10,267	10,159	-1.1
R(3)	21,483	9,294	9,097	-2.1
R(4)	22,457	8,320	8,090	-2.8

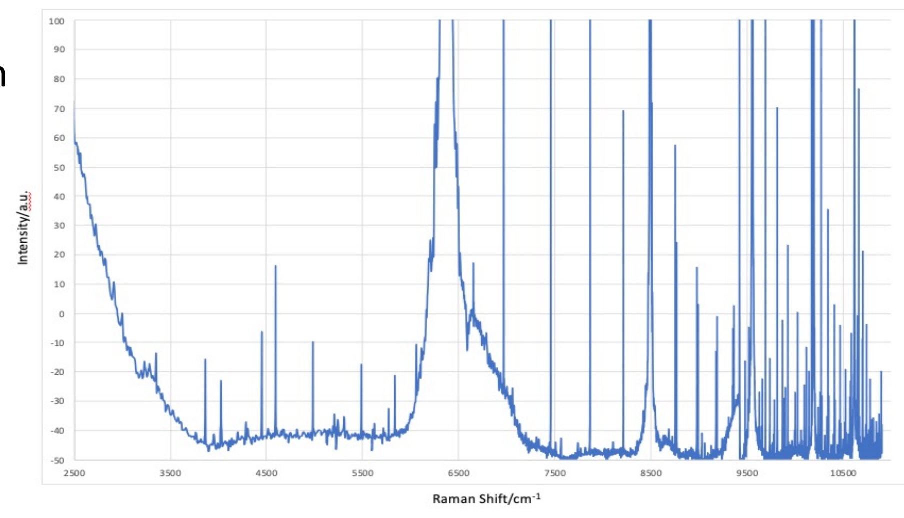
Confirmation of Molecular Hydrino $H_2(1/4)$ by Raman Spectroscopy

- Raman spectra obtained using a Horiba Jobin Yvon LabRam ARAMIS spectrometer with a 785 nm laser on a Ni foil prepared by immersion in the molten gallium of a SunCell that maintained a hydrino plasma reaction for 10 minutes. A. 2500 cm^{-1} to 11,000 cm^{-1} region. B. 8500 cm^{-1} to 11,000 cm^{-1} region.

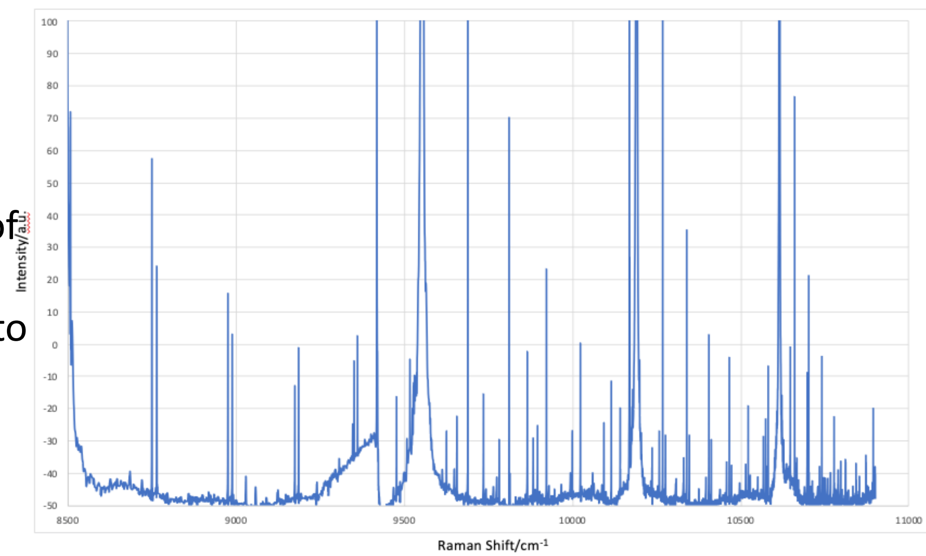
- All of the novel high-energy emission lines matched the double transition for final rotational quantum numbers $J'_p = 3$ and $J'_c = 0,1,2$.

- Corresponding spin-orbital coupling and fluxon coupling were also observed.

- The novel lines were eliminated by a Semrock long-pass edge filter (BLP01-785R-25) having an edge wavelength of 805 nm and $T_{avg} > 93\%$ 812.1 – 1200 nm placed between the sample and the detector confirming the assignment to high energy emission rather than low energy Raman transitions



(A)

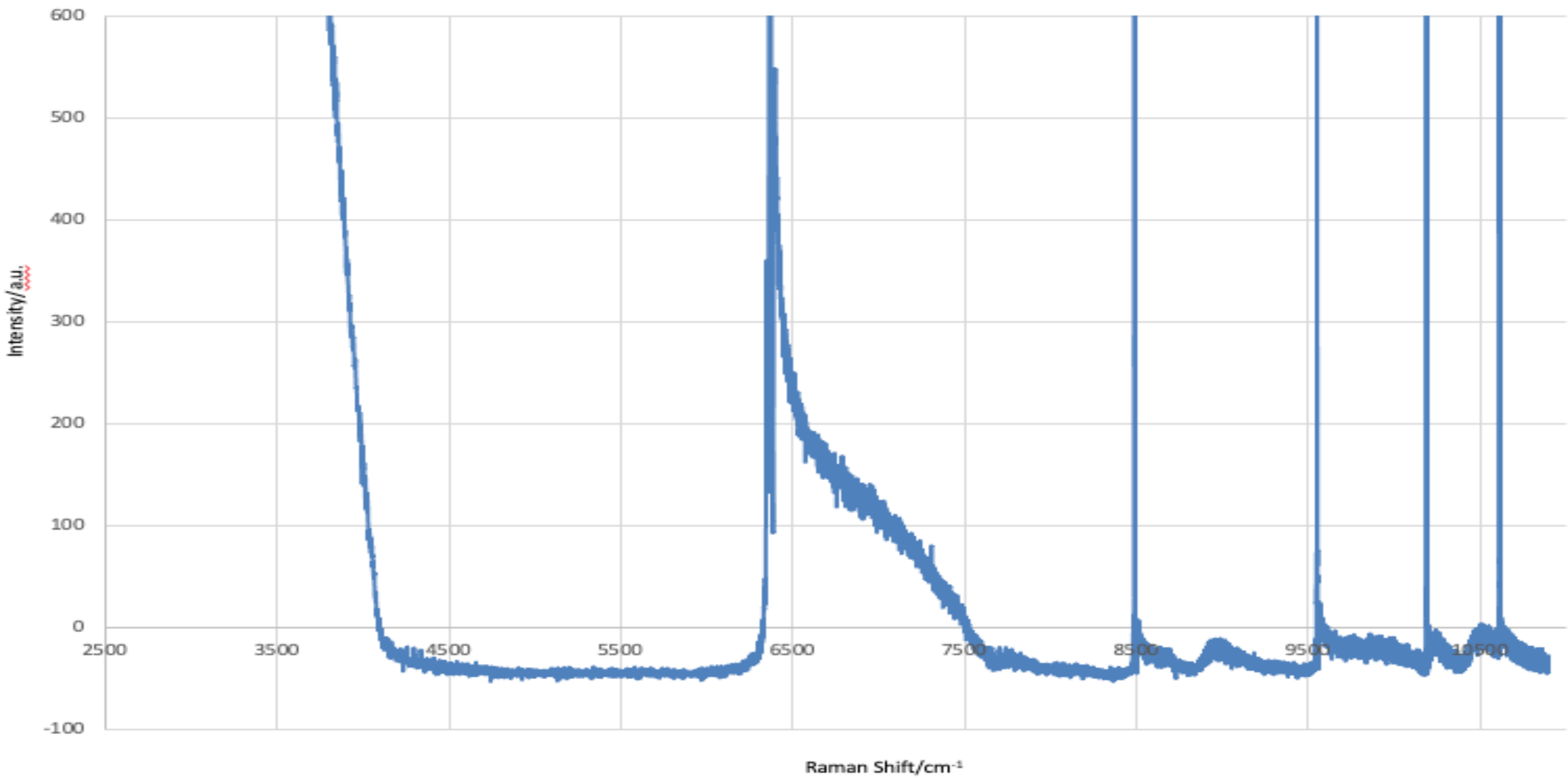


(B)

R. Mills, "Hydrino States of Hydrogen", https://brilliantlightpower.com/pdf/Hydrino_States_of_Hydrogen_Paper.pdf.

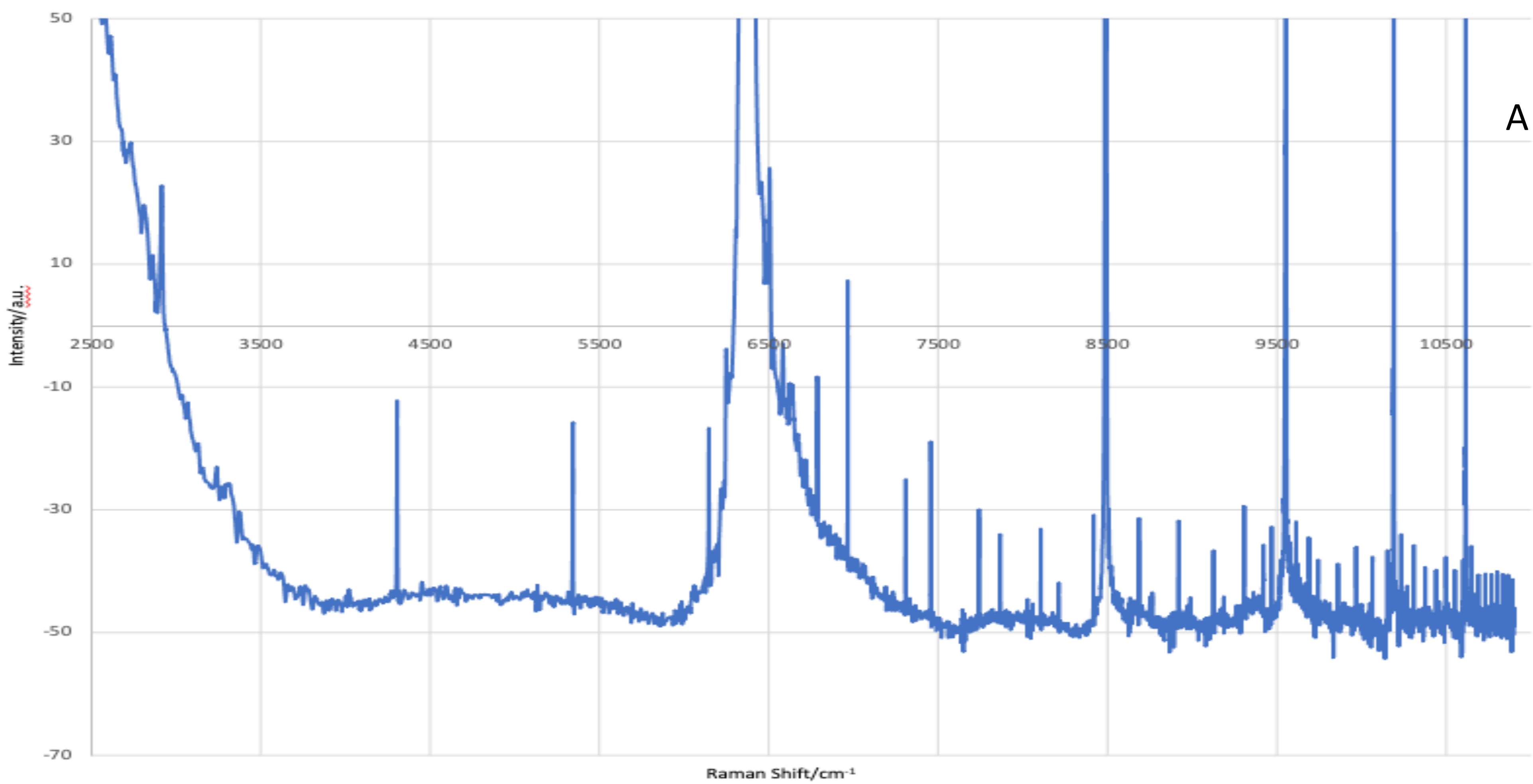
Control Sample for Confirmation of Molecular Hydrino $H_2(1/4)$ by Raman Spectroscopy

Raman spectra obtained using a Horiba Jobin Yvon LabRam ARAMIS spectrometer with a 785 nm laser on a Ni_3Ga alloy sample prepared by immersion of the Ni foil in the molten gallium of a SunCell that maintained a hydrino plasma reaction for 10 minutes. No lines were observed which confirmed that the novel lines observed in the Ni foil are real and not an artifact.

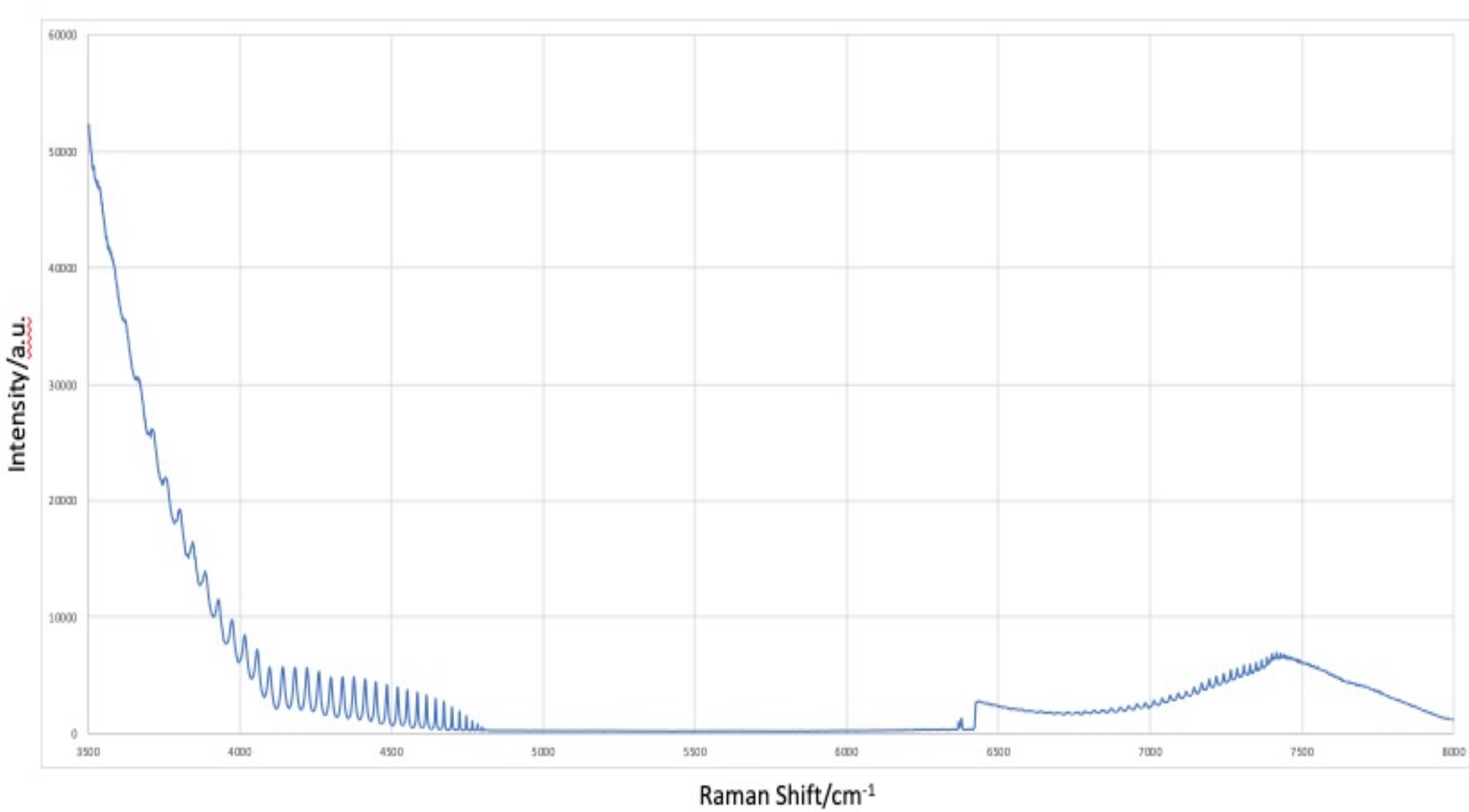


Confirmation of Molecular Hydrino HD(1/4) by Raman Spectroscopy

Raman spectra obtained using a Horiba Jobin Yvon LabRam ARAMIS spectrometer with a 785 nm laser on GaOOH:HD(1/4). A. 2500 cm^{-1} to 11,000 cm^{-1} region. B. 8000 cm-1 to 11,000 cm-1 region. All of the novel high-energy emission lines matched the double transition for final rotational quantum numbers J'_p =2(3) and J'_c = 1(0,1,2). Corresponding spin-orbital coupling and fluxon coupling were also observed. The rotational peaks shifted as predicted for the change in reduced mass of HD(1/4) compared to that of H_2(1/4).

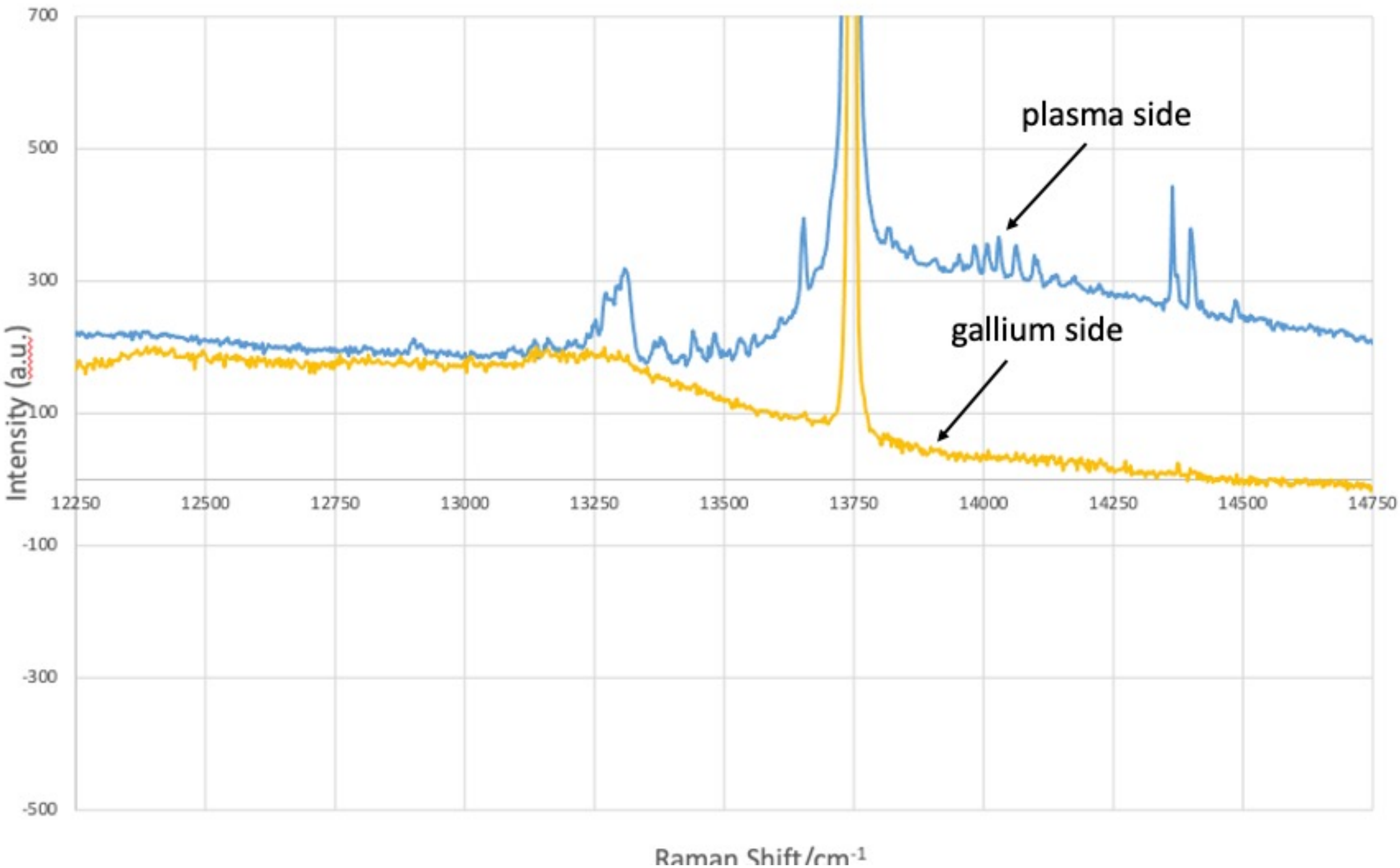


The Raman spectrum (3500 cm^{-1} to 8000 cm^{-1}) obtained using a Horiba Jobin Yvon LabRam ARAMIS spectrometer with a 785 nm laser on solid FeOOH powder prepared by ball milling for 10 hours showing the series of peaks assigned to the second and third order emission of fluxon linkages during the $H_2(1/4)$ double rotational and spin-orbital transition for final rotational, spin-orbital, and fluxon quantum numbers $J'_p=3$ and $J'_c=2$, $m=-1.5$, and $m_{\Phi 3/2}=2$, respectively.

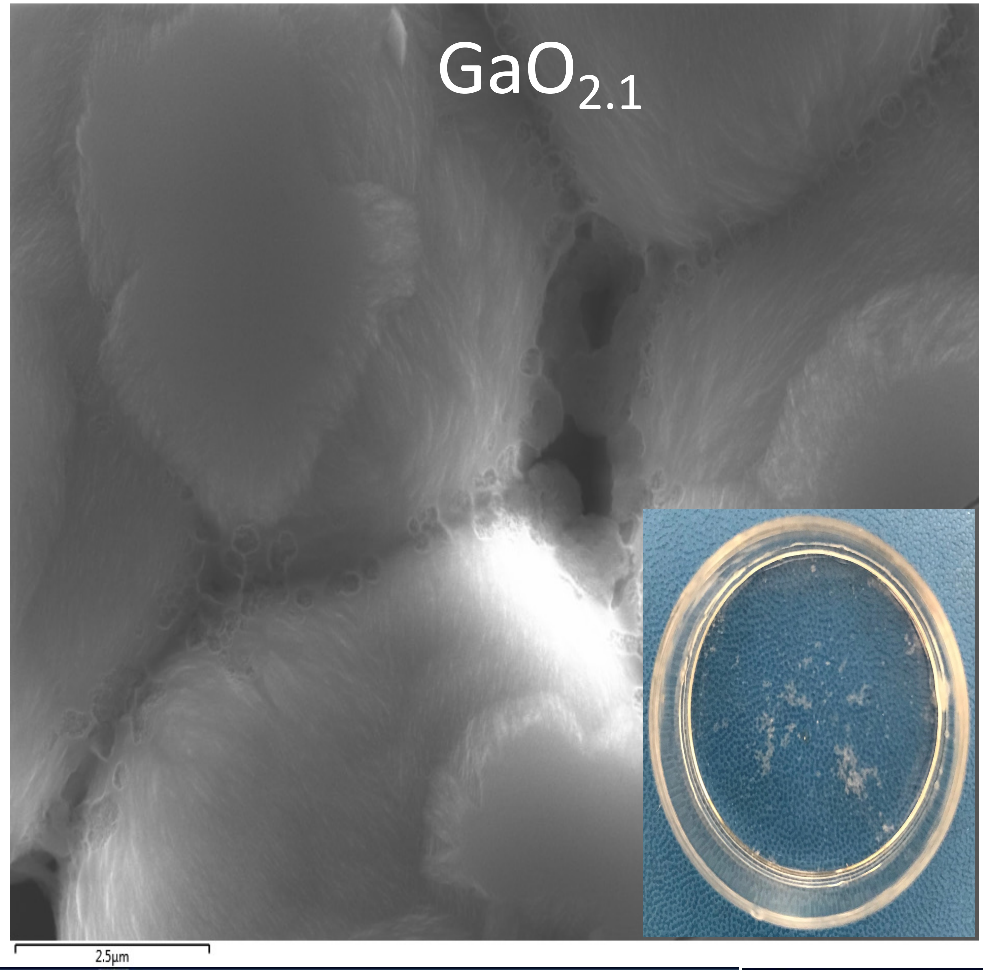


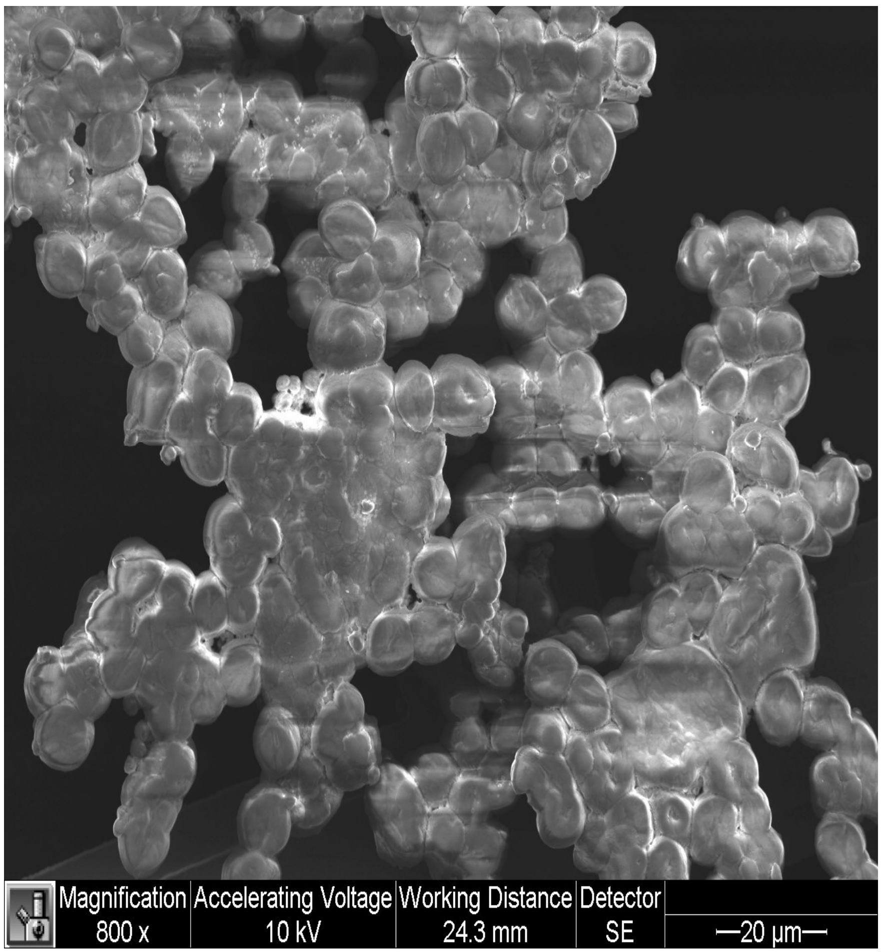
High-Energy $H_2(1/4)$ Ro-Vibrational Emission Lines (17,900-16,200 cm^{-1})

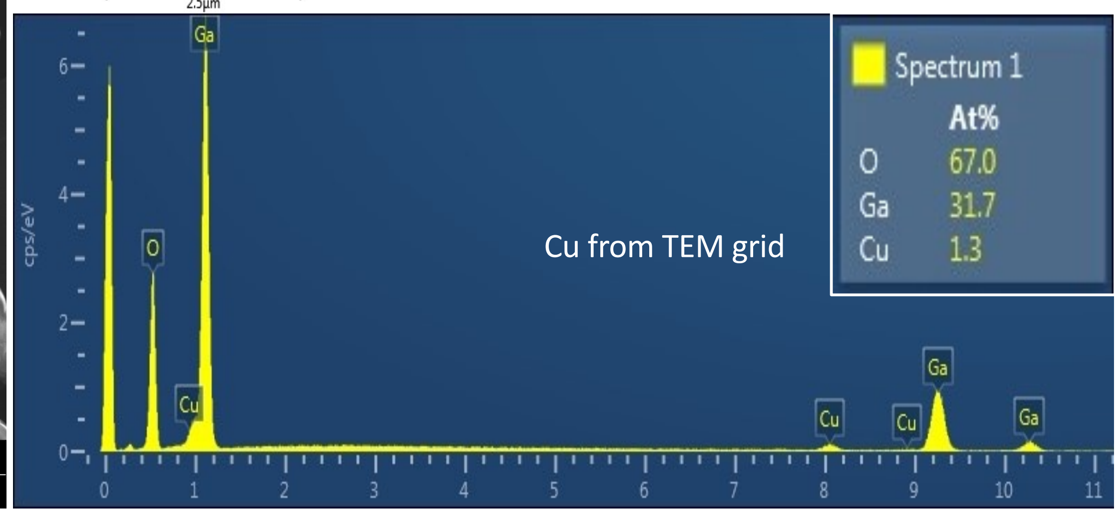
- 325 nm Raman spectra (12,250-14,750 cm^{-1}) were obtained on the plasma and molten gallium exposed surfaces of a Ni foil maintained in a SunCell® during a hydrino plasma reaction for 10 minutes.
- The corresponding series of emission peaks (17,900-16,200 cm^{-1}) observed on the plasma exposed side was assigned to 587.8 nm laser line excitation with emission from the $H_2(1/4)$ $J_p'=3$, $J_c'=1,2$ double rotational transition levels split by spin-orbital coupling and fluxon linkages.
- Many of the peaks matched those recorded on $GaOOH:H_2(1/4):H_2O$.
- Forty-five of the lines of the combined emission spectra match members of the Diffuse Interstellar Medium (DIBs).



SEM and Energy Dispersive X-ray Spectroscopy (EDS) of $GaOOH:H_2(1/4)$ formed by dissolving Ga_2O_3 collected from a hydrino reaction run in the SunCell® in 4M aqueous KOH, allowing fibers to grow, and float to the surface where they were collected by filtration. Particle size: KOH 100 nm; NaOH 40 nm. The hydrino compound is not soluble in concentrated acid (pH ~0) or concentrated base (pH ~14).





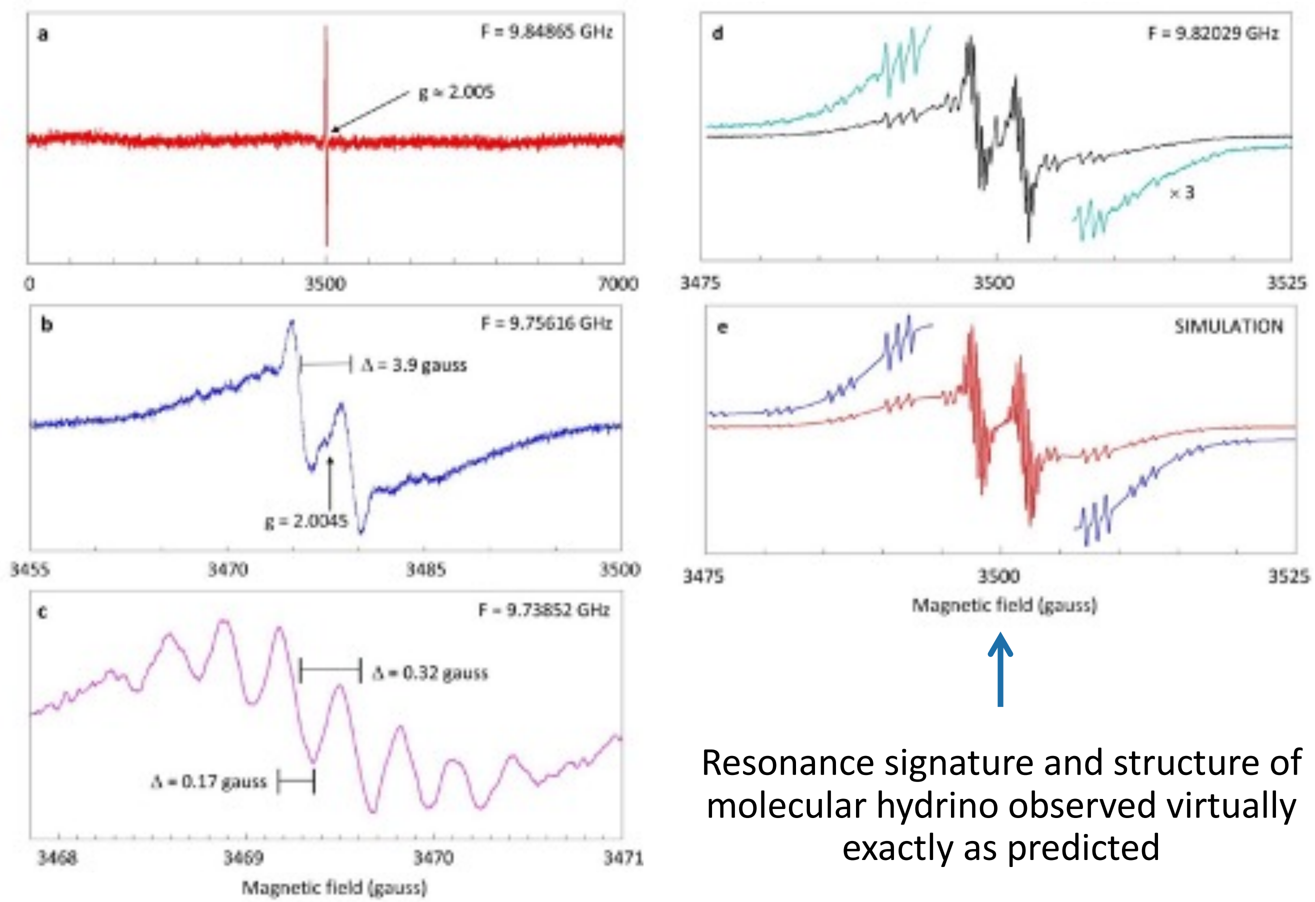


Hydrino®: Third Party Validation

Publication should trigger wider-spread acceptance

- Paper published in leading international journal authored by Dr. Wilfred R. Hagen.

- W. R. Hagen, R. L. Mills, "Electron Paramagnetic Resonance Proof for the Existence of Molecular Hydrino", Vol. 47, No. 56, (2022), pp. 23751-23761; https://www.sciencedirect.com/science/article/pii/S0360319922022406.



↑

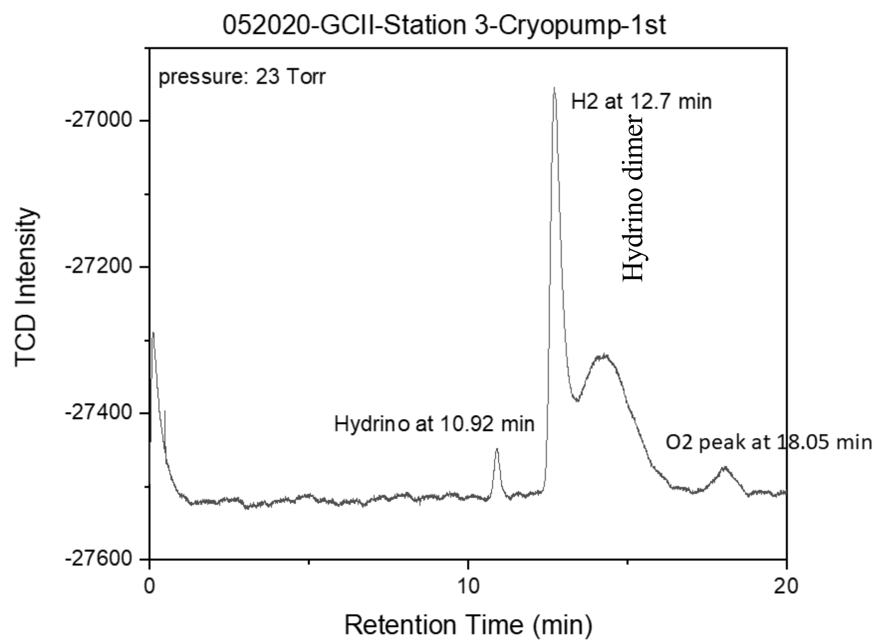
Resonance signature and structure of molecular hydrino observed virtually exactly as predicted

Isolation and Identification of Molecular Hydrino Gas Directly from SunCell® Gas Using a Cryopump

$H_2(1/4)$ gas was collected from a SunCell® operated at a cell pressure of 10-20 Torr over 100s using a valved microchamber connected to the vacuum line and cooled to 10.5 K by a cryopump system (Helix Corp., CTI-Cryogenics Model SC compressor; TRI-Research Model T-2000D-IEEE controller; Helix Corp., CTI-Cryogenics model 22 cryodyne). The SunCell® comprised a Type 347 stainless steel (SS) cylindrical tube measuring 7.3 cm ID, 19.7 cm in height, and 0.635 cm thick with 3.17 mm thick boron nitride (99%) liner and incorporating a 0.9 kg internal mass of liquid gallium wherein the gas flow rates were 2500 sccm H_2/50 sccm O_2, and the ignition current was 1500 A. Argon and trace oxygen were flowed before the reaction was initiated to serve as a solvent for hydrino gas $H_2(1/4)$.

The liquefied gas was warmed to room temperature to achieve 23 Torr chamber pressure and was injected into an HP 5890 Series II gas chromatograph with a capillary column (Agilent molecular sieve 5 Å, (50 m x 0.32, df = 30 µm) at 303 K (30 °C), argon carrier gas, and a thermal conductivity detector (TCD) at 60 °C.

- $H_2(1/4)$ was observed at 10.92 minutes, $[H_2(1/4)]_2$ was observed as a broad peak at 14-15 minutes, oxygen was observed at 18.05 minutes, and hydrogen that co-condensed with $H_2(1/4)$ gas was observed at 12.7 minutes.
- Hydrogen condensed under pressure and temperature conditions that violate the Clausius Clapeyron equation due to the raising of the H_2 liquefaction temperature by co-condensation with $H_2(1/4)$.



R. Mills, Z. Dong, J. Jenkins, R. Gandhi, N. S. Mehta, S. Mhatre, P. Sharma, "Hydrino states of hydrogen", Nature, supplemental data, in progress. [https://brilliantlightpower.com/pdf/Hydrino_States_of_Hydrogen_Paper.pdf]

SunCell®: Validation by Berkeley PhD

Net positive power balance in 210 kW test with continuous steam production

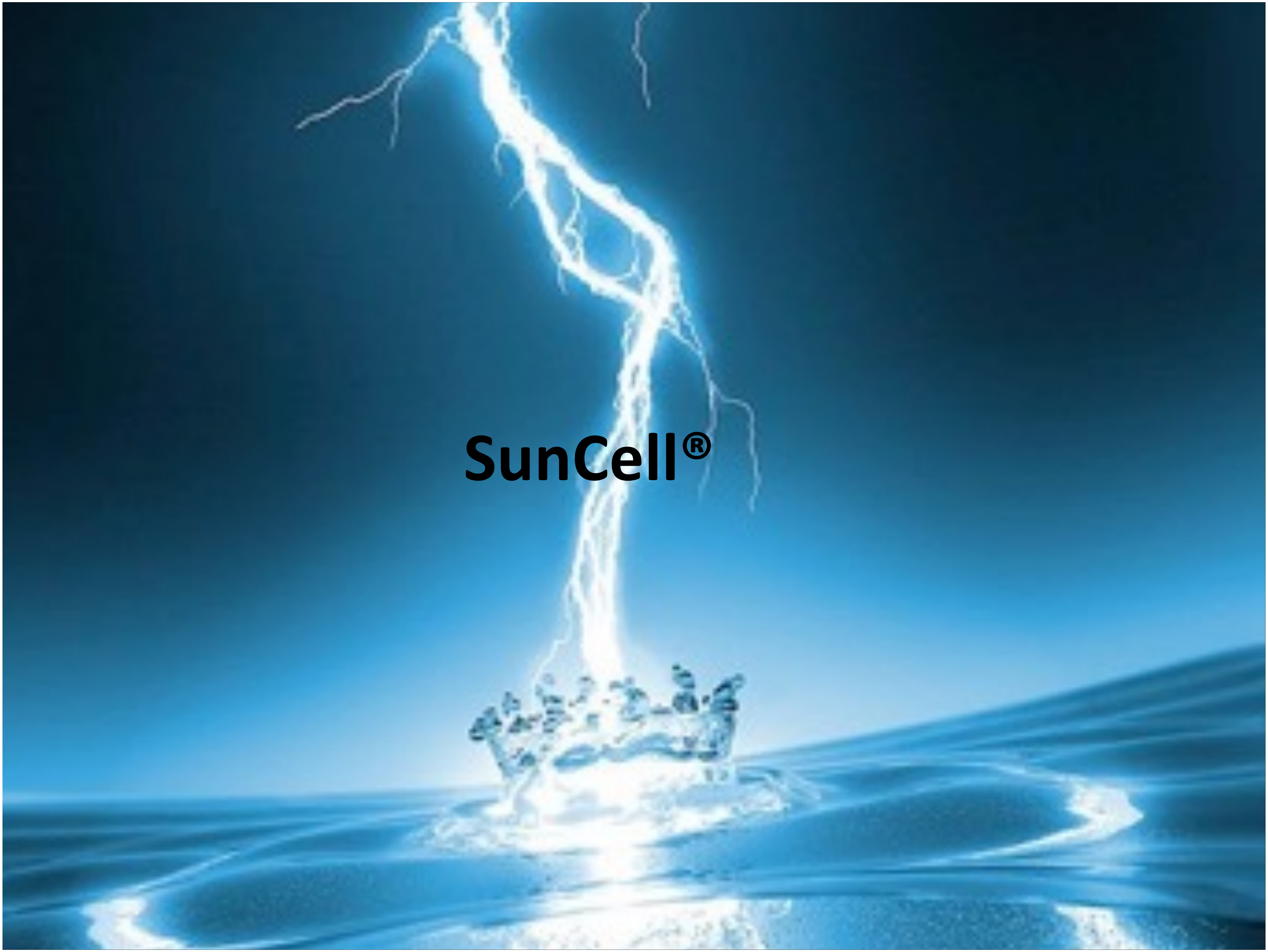
We have developed a 250 kW, direct SunCell® to steam boiler to produce hot water and steam. For heating applications, cooling applications & furnace & oven applications.

Validation. Dr. Mark Nansteel, Ph.D. University of California, Berkeley and heat transfer expert validated 210 kW of excess power produced by a hydrino plasma reaction maintained in a SunCell® using mass balance in the production of steam. The hydrino reaction was shown to be dependent on operating temperature and activation of the gas reactants by a glow discharge plasma. (https://brilliantlightpower.com/pdf/Report_on_Water_Bath_Calorimetry_12.04.20.pdf)

Steam production was maintained over a 100-hour duration in an internal pilot demonstrating the utility of SunCell® towards the goal of a commercial heater of over 100 kilowatts.

Discharge	Gallium Temperature (°C)	Duration (s)	Input power (kW)	Output Power (kW)	Power Gain	Net Excess Power (kW)
Yes	196	302	34.26	54.57	**1.59**	**20.3**
Yes	177	296	31.56	63.2	**2.00**	**31.7**
No	458	167	41.62	97.39	**2.34**	**55.8**
Yes	425	200	39	131.96	**3.38**	**93**
Yes	716	50	65	274.2	**4.22**	**210**

brilliant LIGHT POWER


SunCell®

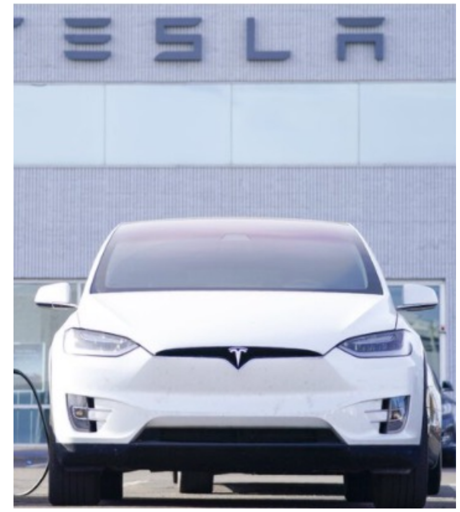
Hydrino®: Net Energy Release of 2.78 GJ (800 kWh) per Liter of Water Electrolyzed to H_2 Fuel (200 times the energy of burning the equivalent hydrogen)

1 liter H_2 (200 atm) electrolysis 1 liter of water

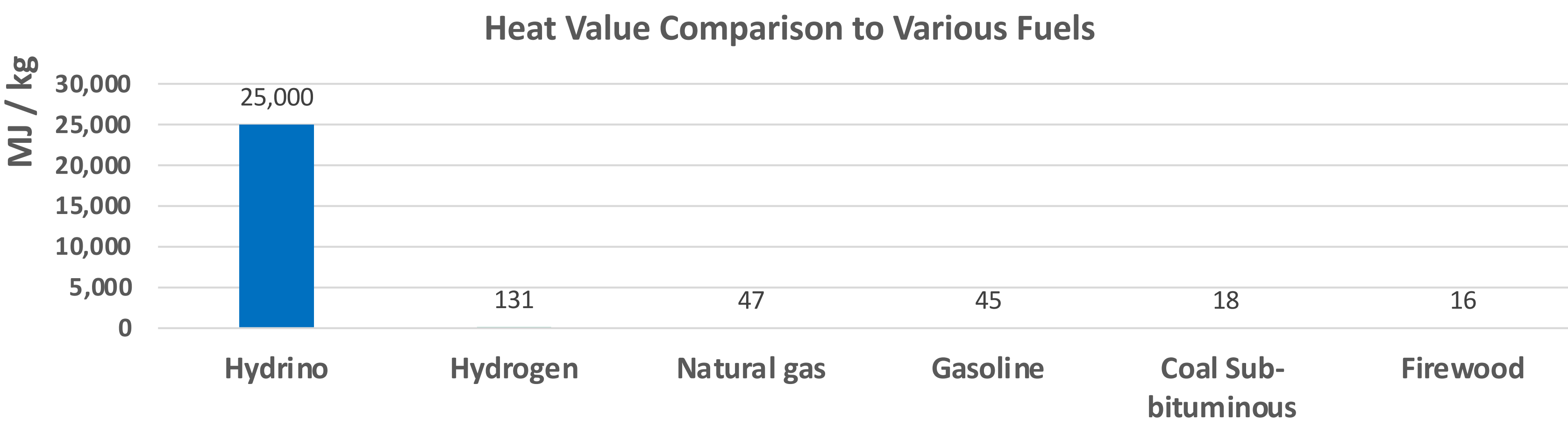
0.8 MWh of wind turbines

0.45 bbls (72 liters) of crude oil

0.13 tons of coal



2200 miles for a Tesla S



SunCell Economics

Current Annual Gross Earning Capacity of Any Electrical Generator:
- $1/W

Capital Cost:
- $10-$20/kW

Life Span:
- 20 years

Capital Cost Annually:
- $0.5/kW

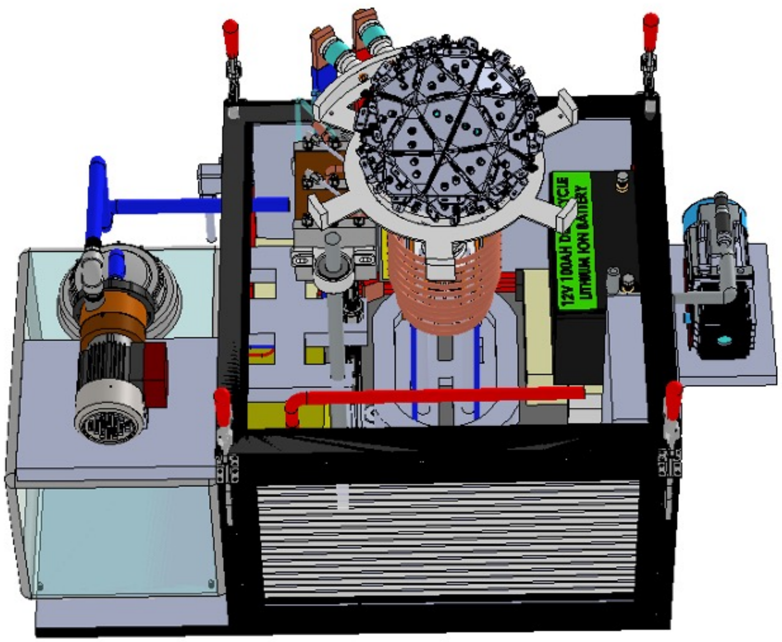
Maintenance Cost:
- $1/kW

Generation Cost:
- $0.001/kWh

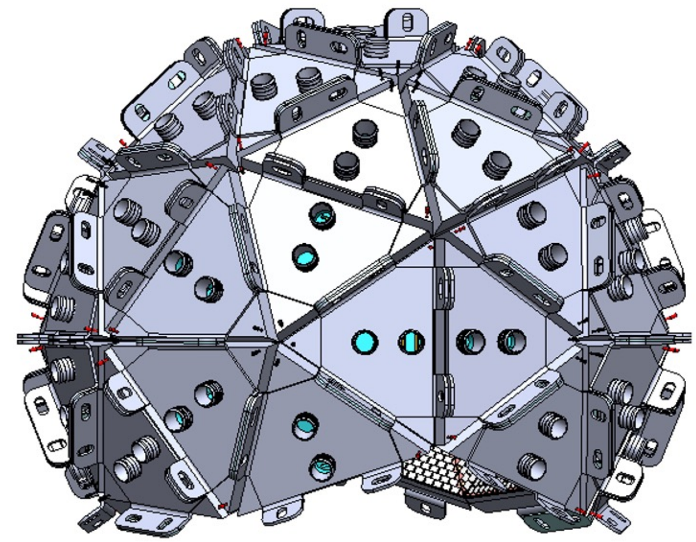
Compare Solar Capital Cost (2021):
- $1000/kW[a]

https://www.nrel.gov/solar/solar-installed-system-cost.html

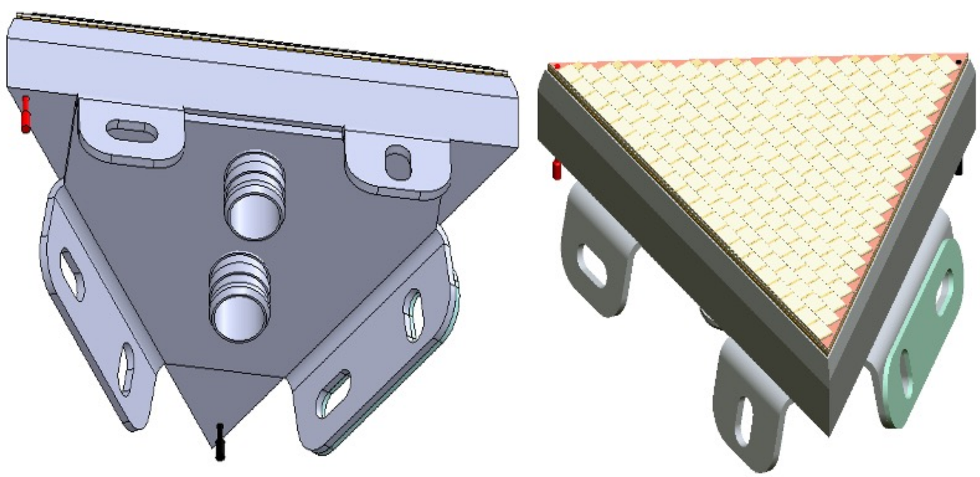
ThermoPhotovoltaic (TPV) SunCell®



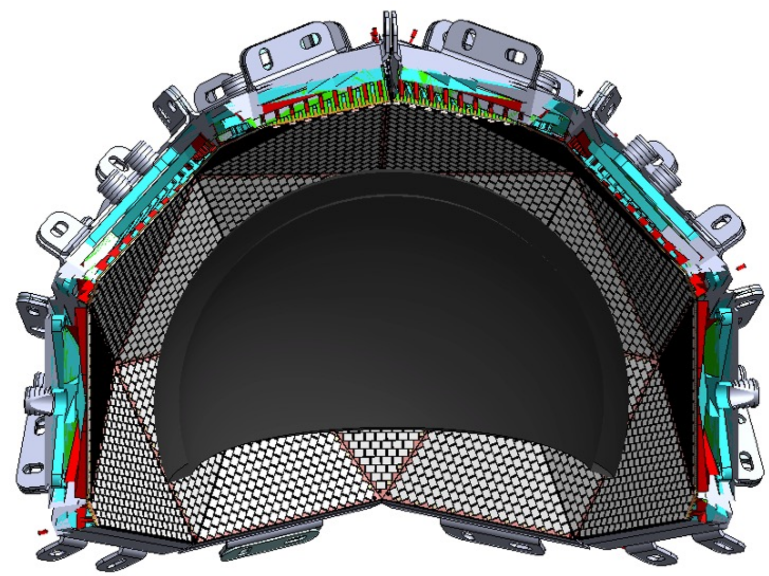
SunCell ® with TPV Converter



Cooling Side of Geodesic-Dome TPV Converter



Dense Receiver Array Element



Dense Receiver Array Side of Geodesic-Dome TPV Converter

Solar Power

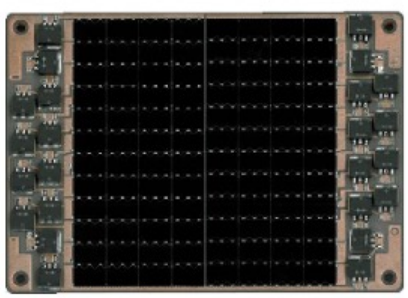
Solar cells have been optimized over five decades at a cost of more than one trillion dollars to convert sunlight into electricity. The capital cost of solar power is high due to the low power density of sunlight at the Earth's surface. Acres of land need be covered by panels to harvest a meaningful amount of power; thus, the appropriate namesake: "solar farm".

Jasper Power Project, South Africa's Northern Cape
96 MW on 247 acres (about 1 million m^2)

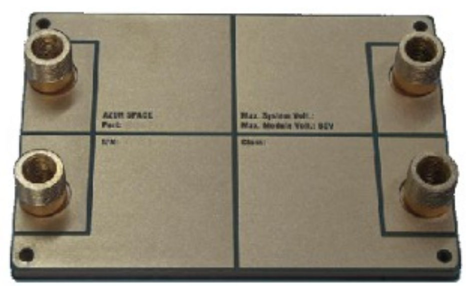
Concentrator Solar Power

To reduce costs by reducing the solar panel coverage area, less-expensive sunlight concentrators are employed to increase the sunlight intensity to a thousand times natural intensity. Concentrator solar cells of a dense receiver array typically comprise three layers or junctions of III-V elements engineered to be responsive to a selected wavelength region of the Sun's spectral emission such that the triplet set covers a substantial portion of the total emission, and the conversion efficiency is greater with higher concentration.

Due to the same low incident light concentration from the Sun, the typical scale is 100 MW on 250 acres (about 1 million m^2)

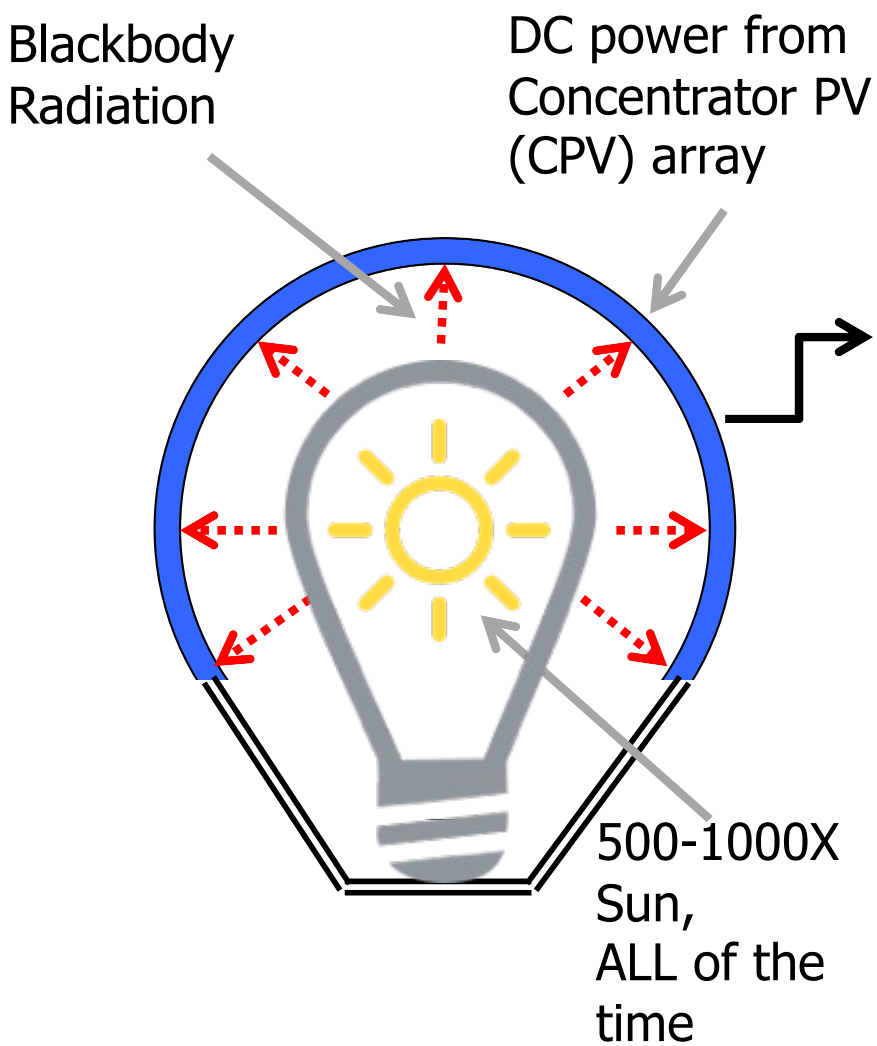


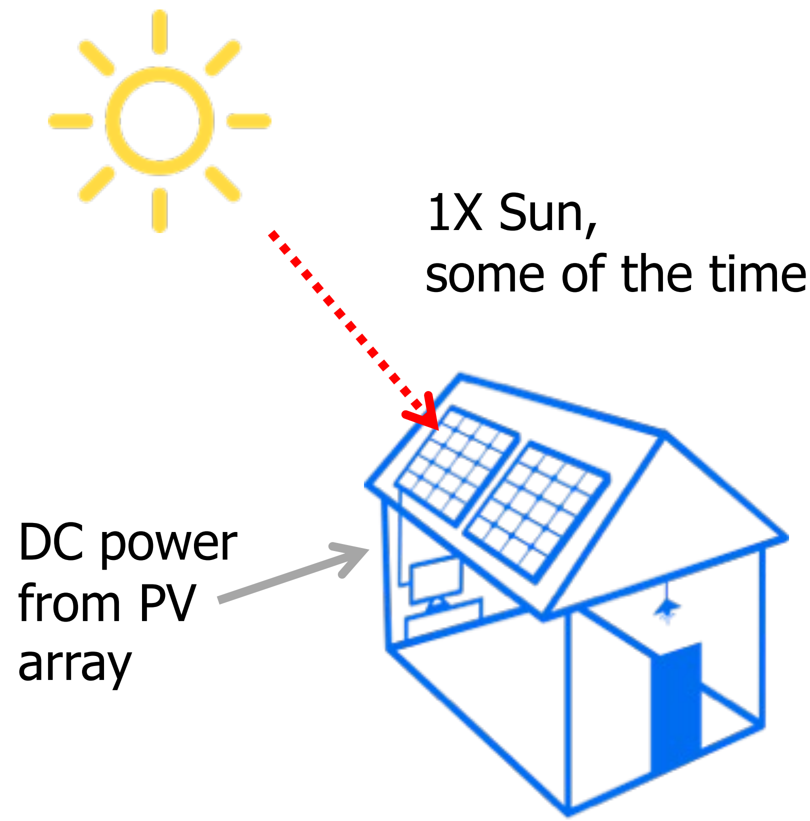
Front of Dense Receiver Array



Back of Dense Receiver Array
With Cooling Water Inlets and Outlets

ThermoPhotovoltaic SunCell® vs Solar PV





Thermophotovoltaic SunCell® vs Solar PV

An autonomous SunCell operating at up to 1000 Suns requires 5000 times less area and complexity than a matched conventional solar power station.

44 ganged 250 kW SunCells

11 MW

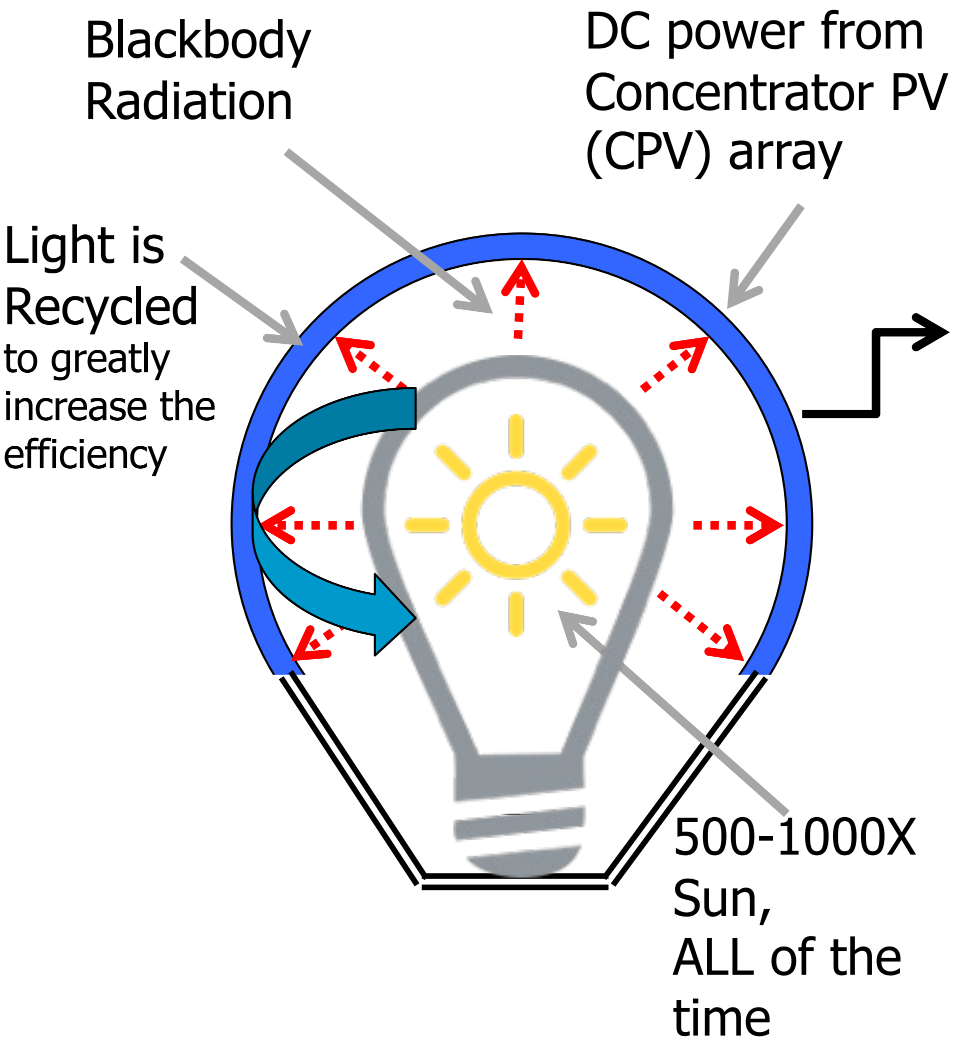
15 m^2

Planta Solar 10, Sevilla, Spain

11 MW

75,000 m^2 (nrel.gov)

ThermoPhotovoltaic SunCell® with Light Recycling

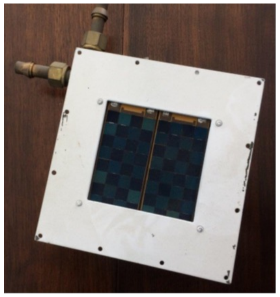


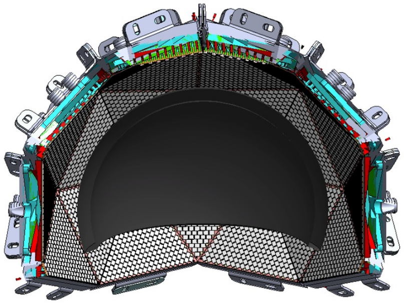
- Radiation transfers power at 10 to 100 times the power per area compared to conduction and convection.
- The 3000-5000K plasma emits radiation at a power density of 4.6 to 35 MW/m^2, corresponding to an extraordinary 150 kW to 1.14 MW transmitted through an 8-inch diameter window, respectively.
- Infrared light from the SunCell that is too low energy to be PV converted to electricity is reflected back to the SunCell and recycled.
- With light recycling the thermophotovoltaic efficiency radically increased by a factor of over 3.5 times, and with cell optimization the increase is projected to be about six times[a]

[a] Test of infrared light recycling: Z. Omair, et al., "Ultraefficient thermophotovoltaic power conversion by band-edge spectral filtering", PNAS, Vol, 116, No. 3, (2019), pp. 15356-15361.

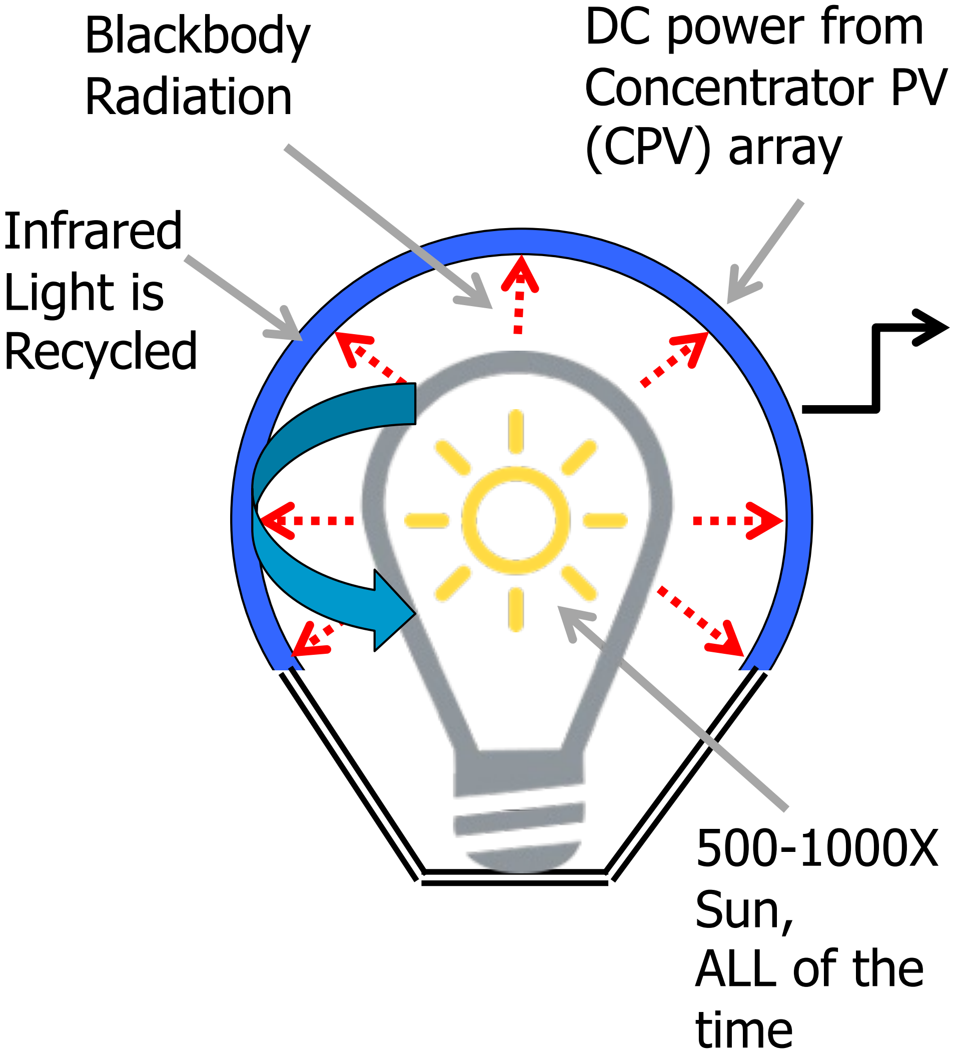
Silicon Concentrator Cells and DRAs

- Single junction (1J) silicon concentrator cells with light recycling can replace three junction (3J) III-V cells
- Si technologies are best choice; widely available
- Si-ideal band gap of 0.86 eV at the ideal operating temperature for cooling of 140°C (Cooling technology readily exists)
- Si paradoxically becomes more efficient at higher temperatures, due to collecting more of the 3000K blackbody radiator light
- The conversion efficiency for 3000K SunCell emission by a single junction concentrator silicon PV cell operating at 120 °C was calculated to be 84% with a practical expectation of 50%
- Commercially available cells
- Concentration- 500 Suns
- Better fit with SunCell Generator System Requirements
  - Less demanding cold plate solutions and cooling complexity
  - Higher operating temperature (smaller and less costly cooling equipment)
  - Lower cost PV cells
  - Existing mass production Si cell manufacturing capacity





How the TPV-SunCell® Works



The Process….

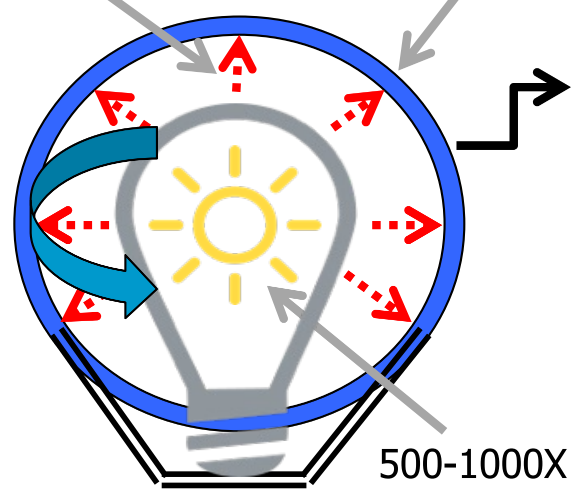
- Plasma is generated through Hydrino® process.
- Plasma comprises a 3000-5000 Kelvin blackbody radiator or heats a blackbody radiator to between 3000 and 3500 Kelvin. Alternatively, the reactor chamber wall at 1475K-2275K serves as the blackbody emitter.
- Blackbody radiator emits brilliant light, similar to the operation of a tungsten filament in a halogen bulb.
- Light emitted is converted by dense receiver array of concentrator PV cells delivering the power output.
- Infrared light that is PV inactive is reflected back to the blackbody, absorbed, and recycled as more blackbody radiation to greatly increase the efficiency.

Product Development Foundation

- TPV-SunCell plasma blackbody radiation replaces the emission of the Sun
- Blackbody temperature and response spectrum of commercial PV is adjusted to more closely match each other
- Rapid, low-cost development approach

Established Foundation

- Theory solved, IP issued
- Light source demonstrated
  - Internally certified
  - Externally certified
- Advanced thermophotovoltaic (CPV)
  - Suppliers selected
  - CPV cell design
  - Dense receiver array design
  - Cooling design
- SunCell radiator designed and developed
- Costed bill of materials
- Continuous 100-250 kW SunCell prototypes



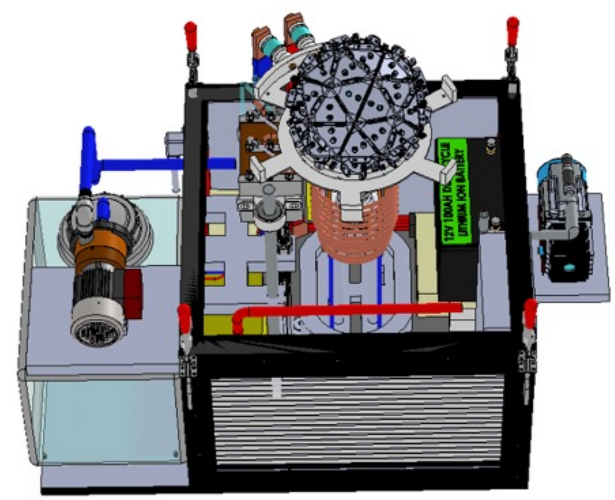
SunCell® CPV Cost Drops Dramatically with Scale

- At a volume of ~100 MW/yr, a three junction (III-V) SunCell® CPV converter is estimated to cost less than $75 per kW (1000 Suns concentration, 60% efficiency with light recycling of 3000K blackbody emitter).
- At 10 GW annual production which is equivalent to the global annual deployment of c-Si solar, the cost of SunCell® CPV converter is estimated to cost less than $32 per kW.
- The cost of single junction concentrator silicon at 500 Suns is estimated to be $60 per kW with a dramatic drop with large production volume and light recycling.

(Cost: Kelsey Horowitz, "A Bottom-up Cost Analysis of a High Concentration PV Module", CPV-11, 2015; NREL/PR-6A20-63947)

Stationary 250kW SunCell TPV materials cost under $40 /kW

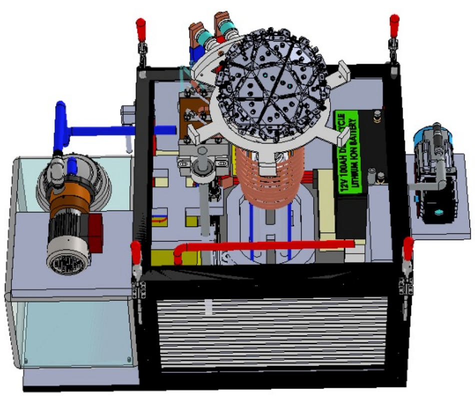
Stationary 250kW SunCell-TPV	Cost for Development Units	Cost for Initial Production	Cost for Mature Production
Magnet Assemblies	200	200	100
EM Pump Assemblies	100	100	50
Reactor Chamber	50	50	25
Reservoirs	30	30	15
Electrical Breaks	150	150	75
Injector Aligners	150	150	75
Structural Supports	50	50	25
Coatings	300	300	150
Tungsten Injectors	120	120	60
Tin	150	150	75
Plasma Window and Seals	200	200	100
Quartz Liner	50	100	50
PV Dense Receiver Array with Cooling	1,050	1,050	525
Controller	150	150	75
DC Vacuum Pump	500	500	250
DC Vacuum Pump Power Supply	200	200	100
DC EM Pump Power Supplies	100	100	50
DC Ignition Power Supply	200	200	100
	0	0	0
Contingency 100%, 50%, 10% by phase	3,750	1,900	190
PV Cell & Cooling Assembly Contingency $50/kW>$10kW	12,500	6,250	2,500
Structural Services (e.g. pad)	1,000	750	500
Total - 250 kW SunCell TPV	**21,000**	**12,700**	**5,090**
Per kW	**84**	**51**	**20**
User provided: Gas Connection or Electrolysis For Hyd.. & Oxy. Power connection for Startup Sequence Only. Inverter. Electrical Service Connection & Permits.			



- No moving parts, all parts are reusable or recyclable
- SunCell is extremely cost effective relative to market value
- Contingencies included to account for development lessons learned
- PV cells have multiple paths forward to achieve cost targets

TPV-SunCell®: Primary Power Source That Will Change the World

SunCell ® with Thermophotovoltaic (TPV) Converter (projected $15-20/kW capital cost)

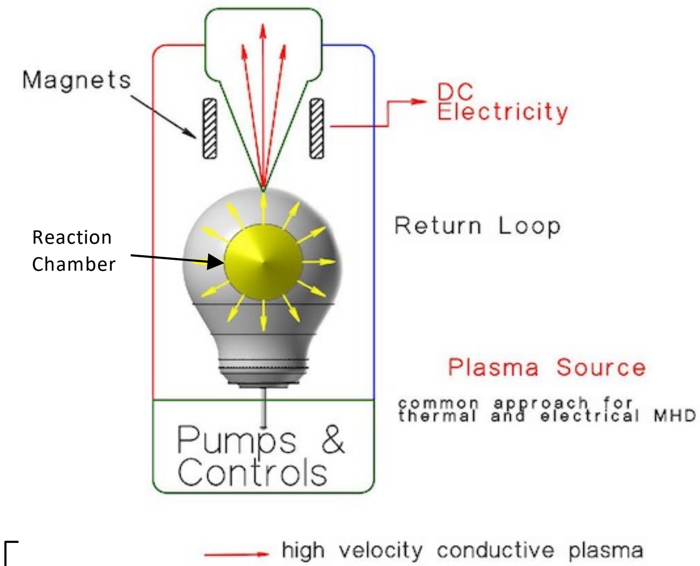


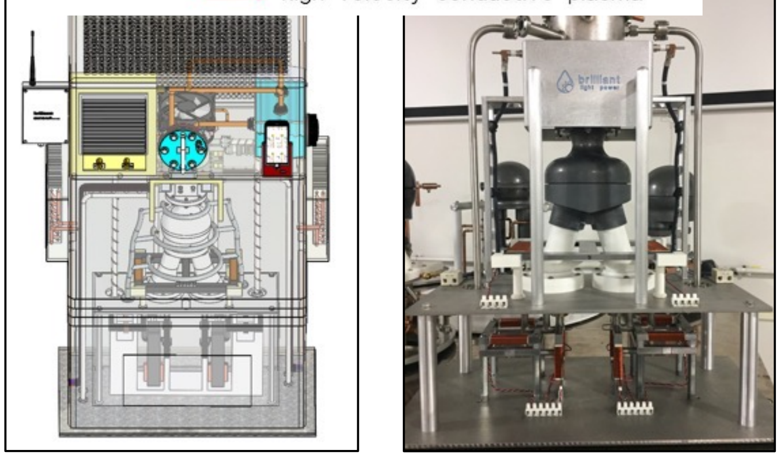
- No moving parts.
- Parts are commercially available.
- Parts are reusable or recyclable.
- Conventional materials in production – not subject to rare or obscure inputs.
- No supply chain issues.
- Massive photovoltaic manufacturing capacity at 1000 times conventional due to 1000 times intensity light.
- Modular and scalable to any power capacity by ganging-DC or AC with converter.
- No utility gatekeeper bottleneck-also no transmission, distribution, or demand charges.
- No OEM bottleneck gatekeeper.
- No FERC regulation due to lack of grid connection-local generator permit.
- Safe, sealed system at less than 1% atmospheric pressure.
- 1/10th Capital Cost , no metering, lease power model per diem (~$0.001/kWh DC cost).
- No pollution of any kind including greenhouse gases.
- No fuel availability, storage, price or supply volatility, or pollution issues-H_2 gas can be generated in-situ by electrolysis of water as the fuel.
- No infrastructure (e.g. grid, gas pipeline, river cooling) required.
- No Intermittency, complex installation, duct work, fuel storage, fumes, noise, and toxic exhaust.
- Grid for instant backup during learn-out.

Future Development: How the MHD SunCell® Works

Revolutionary DC Power Solution Potential for Even Higher Power Densities

Direct power extraction (DPE) with no moving parts: breakthrough MHD cycle technology enabled by the SunCell® to directly convert thermal & kinetic power to electrical power



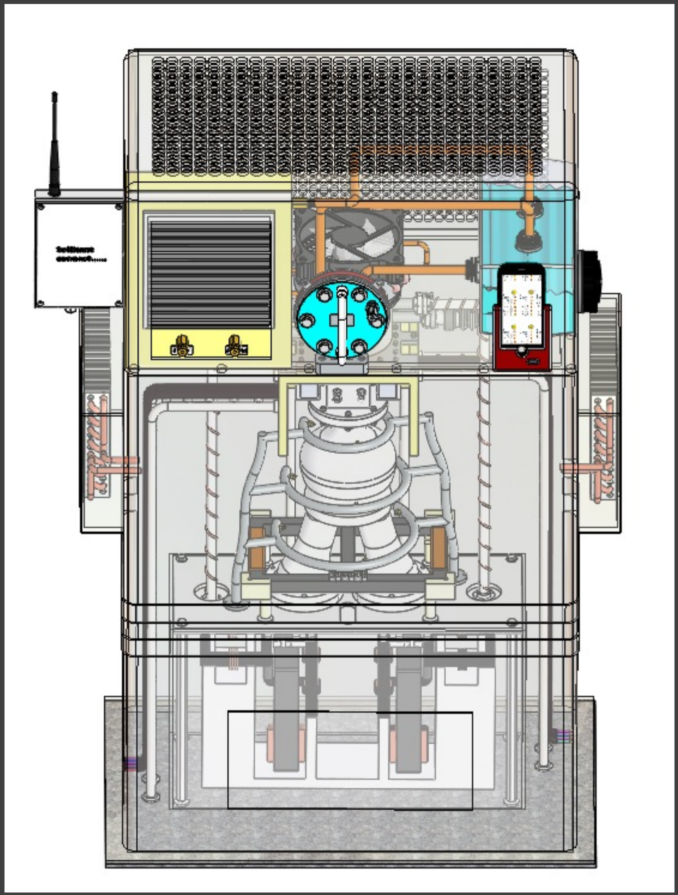


Development Models of MHD Electrical SunCell® Units

- We have invented a proprietary liquid metal nanoparticle magnetohydrodynamic (MHD) technology that has the prospect of power conversion at 23 MW/liter at near unity efficiency and costing less than 1/10 that of convention power conversion hardware.
- Oxygen absorbed by molten silver is released by the high temperature of the Hydrino®-reaction plasma.
- Oxygen causes molten silver to form molecular-like nanoparticles which in combination with released oxygen develop a high reaction chamber pressure.
- Expansion through a nozzle converts the power of the plasma into an extremely highly conductive kinetic flow at nearly unity efficiency.
- Supersonic flow through a magnetized channel with perpendicularly positioned electrodes converts the flow's kinetic energy into electricity at near unity efficiency.
- The silver reabsorbs oxygen and is pumped back to the reaction chamber as a liquid to close the power cycle.
- Prototype engineering design, drawings, and models have been developed.

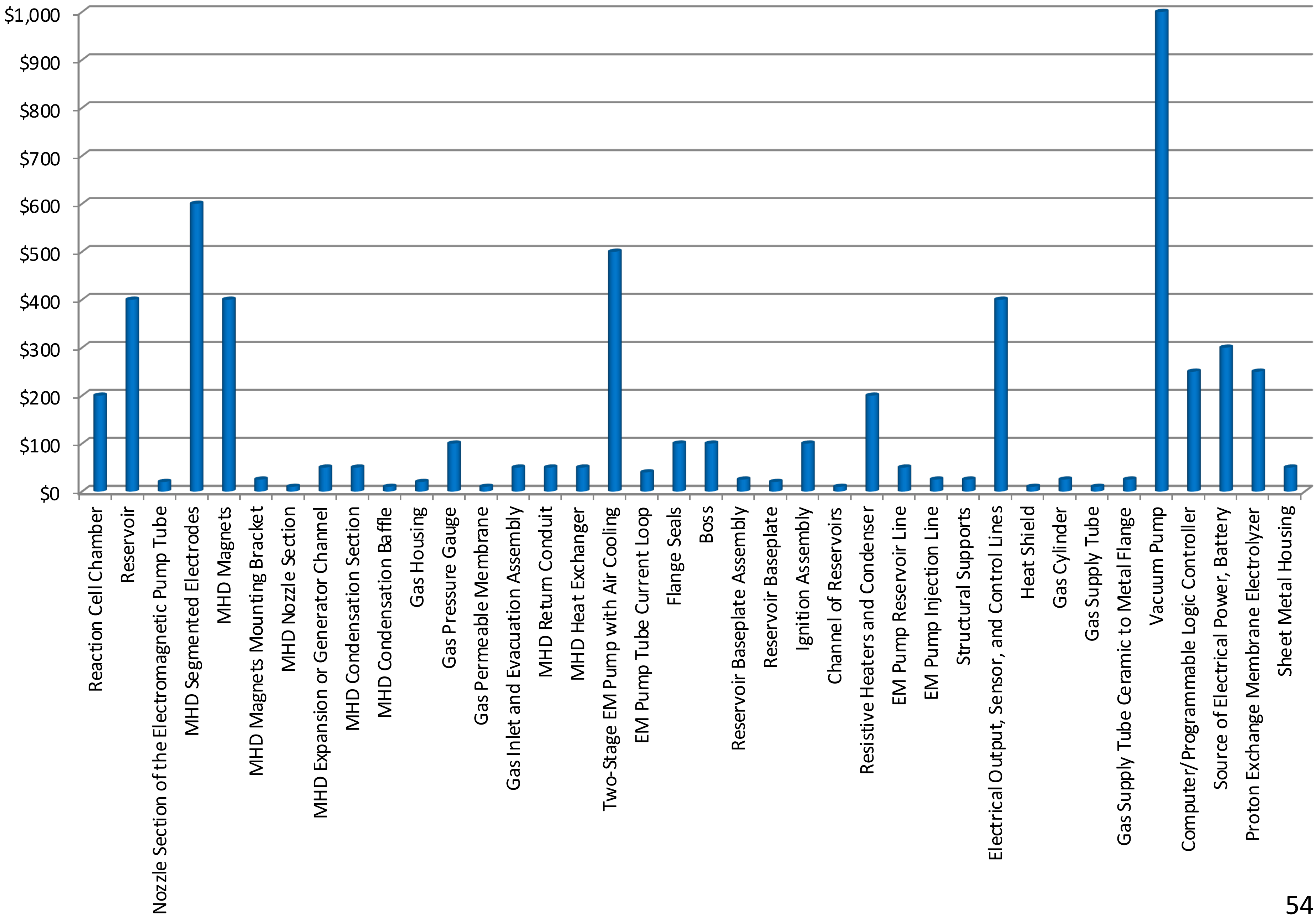
https://brilliantlightpower.com/pdf/MHD_Paper.pdf

brilliant LIGHT POWER

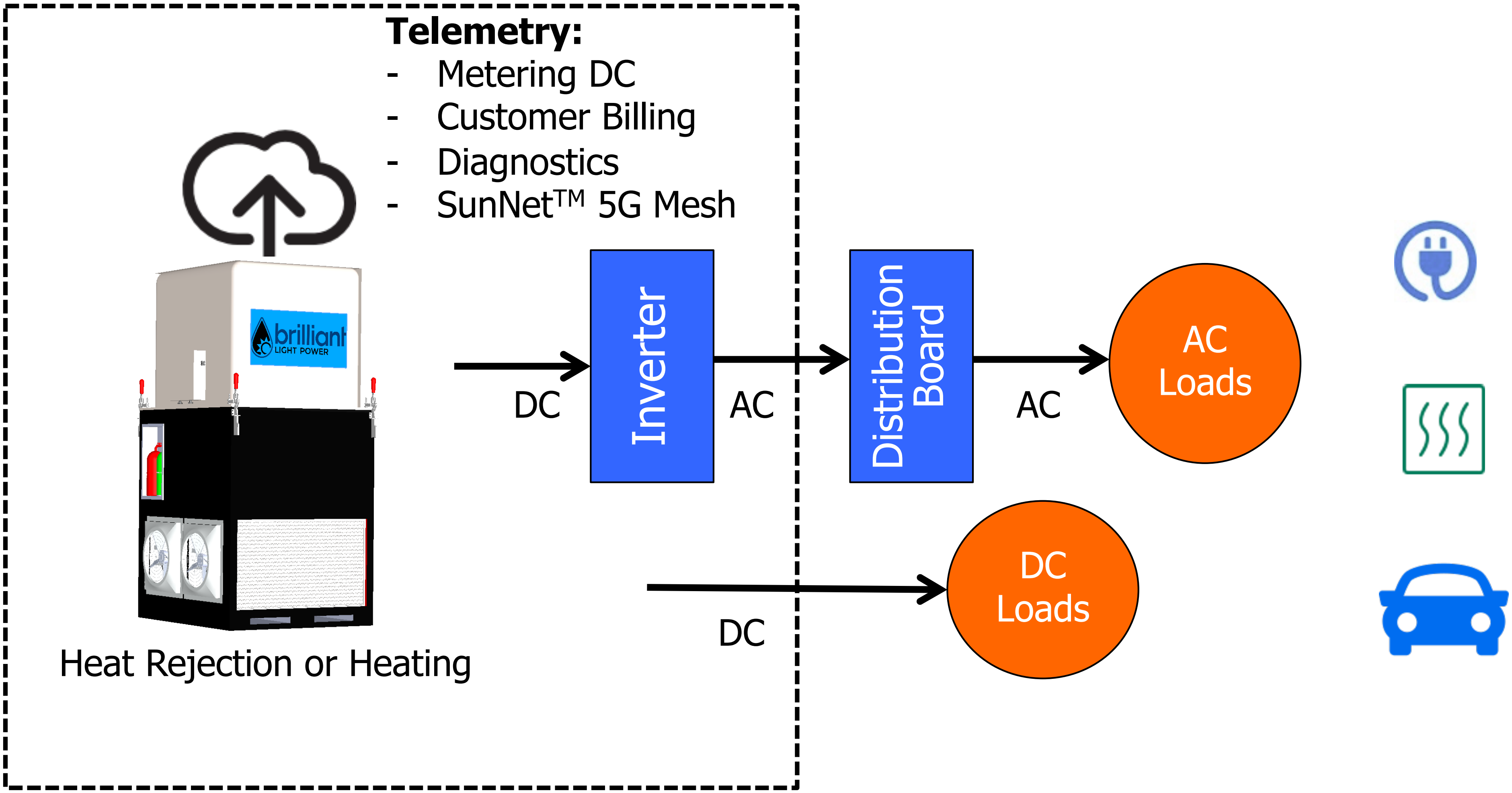


SunCell® with MHD Converter

FIRST OF A KIND MHD COMPONENT COST (<$25/kW electric)



TPV- SunCell® Turnkey System (Basic)



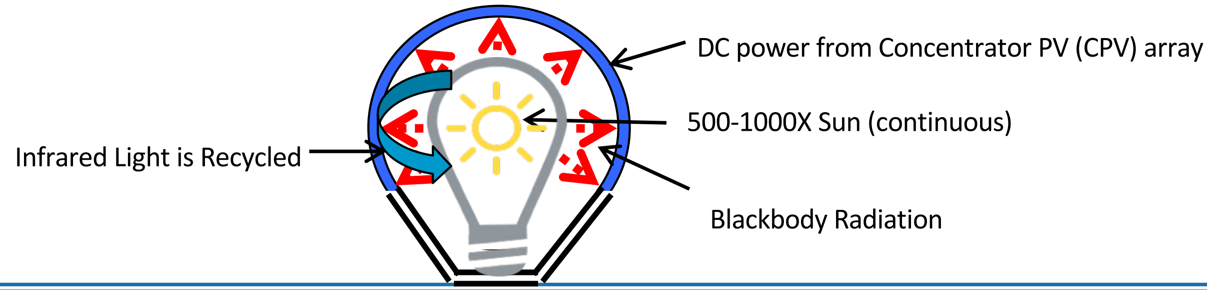
The SunCell® with an TPV converter can support either direct DC loads or AC loads with the addition of standard inverter technology as used by the solar industry today. Lessee just buys electric appliances and inverter if required. No development necessary.

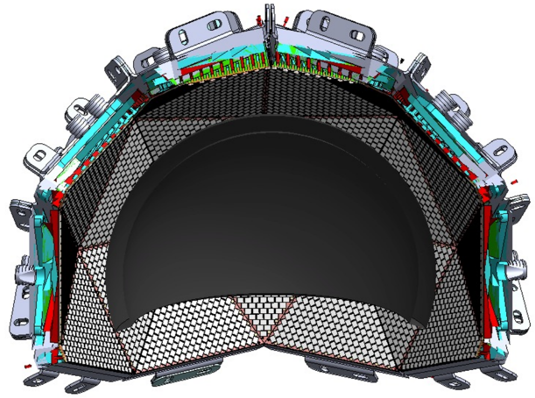
TPV-SunCell®: Summary of How It Works

Product with widest market implications utilizing existing TPV technology

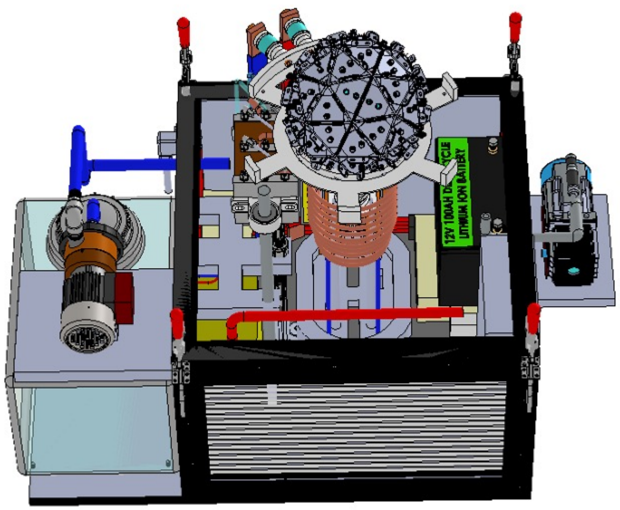
How it works:

- A plasma cell injects hydrogen and catalyst; two electromagnetic pumps serve as electrodes by injecting intersecting molten tin streams from corresponding reservoirs wherein the connected streams carry a low voltage, high current to form a Hydrino®-reaction plasma in a reaction chamber, and the tin is recirculated internally to continuously supply the injection.
- Plasma is generated through Hydrino® process.
- Plasma comprises a 3000-5000 Kelvin blackbody radiator that emits brilliant light similar to the operation of a tungsten filament in a halogen bulb.
- Radiation transfers power at 10 to 100 times the power per area compared to conduction and convection.
- The 3000-5000K plasma emits radiation at a power density of 4.6 to 35 MW/m^2, corresponding to an extraordinary 150 kW to 1.14 MW transmitted through an 8-inch diameter window, respectively.
- Light emitted is converted by dense receiver array of concentrator PV cells delivering the power output.
- Infrared light that is PV inactive is reflected to the blackbody, absorbed, and recycled as more blackbody radiation to greatly increase the efficiency to as high as 85%.





Dense Receiver Array Side of Geodesic-Dome TPV Converter



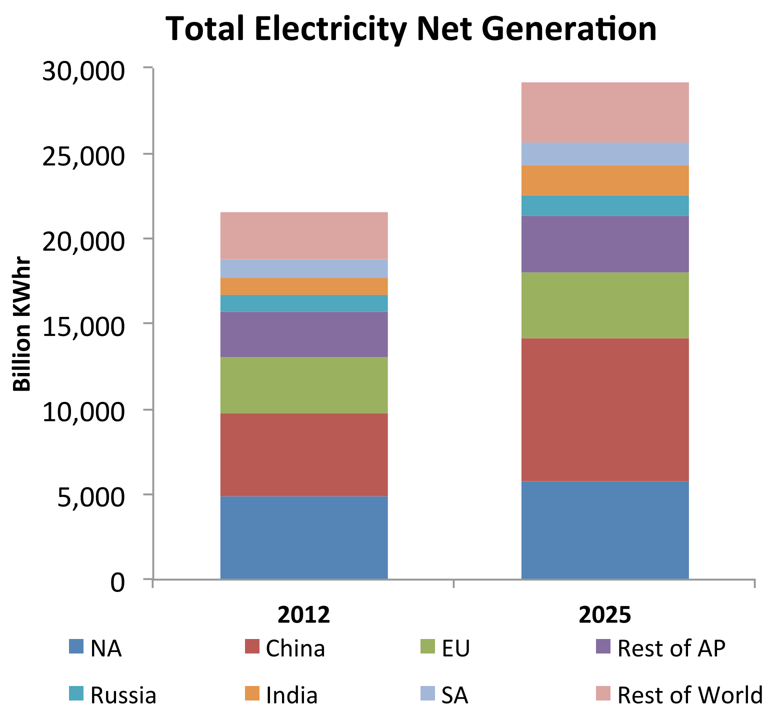
SunCell ® with TPV Converter

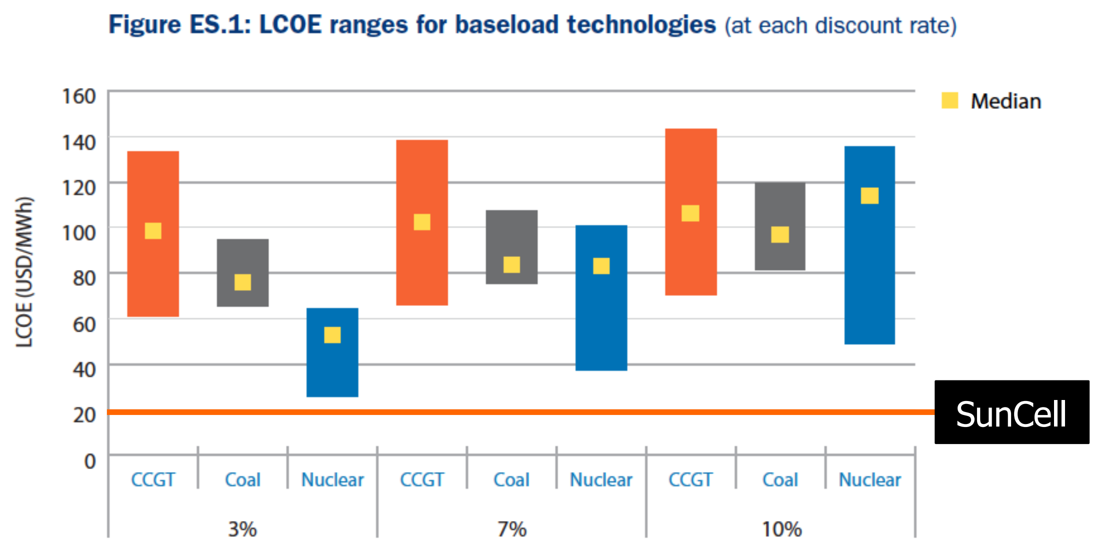
Global Established Accessible Market with Expansion Opportunities

- Reinvent electrification as autonomous, completely off grid, mass produced personal power.
- Flat per diem lease charge with no metering.
- Using cell redundancy being off grid is much cheaper than any grid connection and avoids all related utility regulatory leverage.
- Behind the meter during a short temporary learn out phase in the United States, then global push.

Global Electricity

- $4.8 trillion~ global market at $0.12 per kWh at site
- $2 trillion addressable market for SunCell at breakthrough rate of ~$0.05 per kWh
- 28% demand increase by 2025

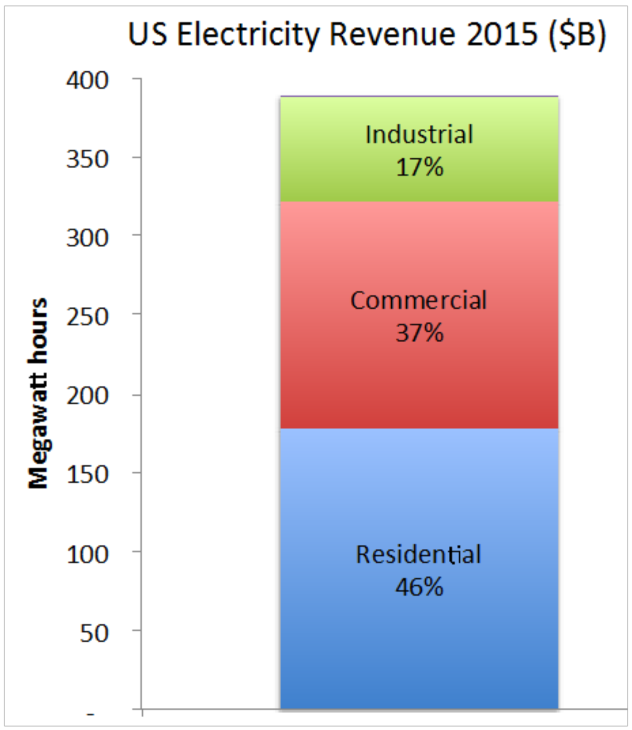




Sources: EIA Total Electricity Net Generation 2012, IEA Projected Cost of Generating Electricity, 2015 Edition.

US Electricity

- $400~ billion market
- Average consumer price of $103 per MWh, double SunCell goal of $50 per MWh
- US residential larger percentage than Global markets
- SunCell breaks entry barriers:
  - Always on power, low capital cost, low operating cost, huge power density, no pollution
  - Off grid without corresponding regulations or transmission and distribution costs of >$38 per MWh



Levelized Avoided Cost of Electricity (LCAE) New Generation

Advanced Coal	NG w/ Combined Cycle	NG w/ Advanced CC	Advanced Nuclear	Solar PV
$70.9	$71.4	$71.4	$72.1	$80.4

Levelized Cost of Electricity (LCOE)

Advanced Coal	NG w/ Combined Cycle	NG w/ Adv. CC	Advanced Nuclear	Solar PV	SunCell
$116	$75.2	$72.6	$95.2	$114.3	**$50-70**

Reference: EIA Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2015 (June 2015)

Stationary Market Launch

% Global Electricity	51%	12%	18%

Industrial

Commercial

Residential

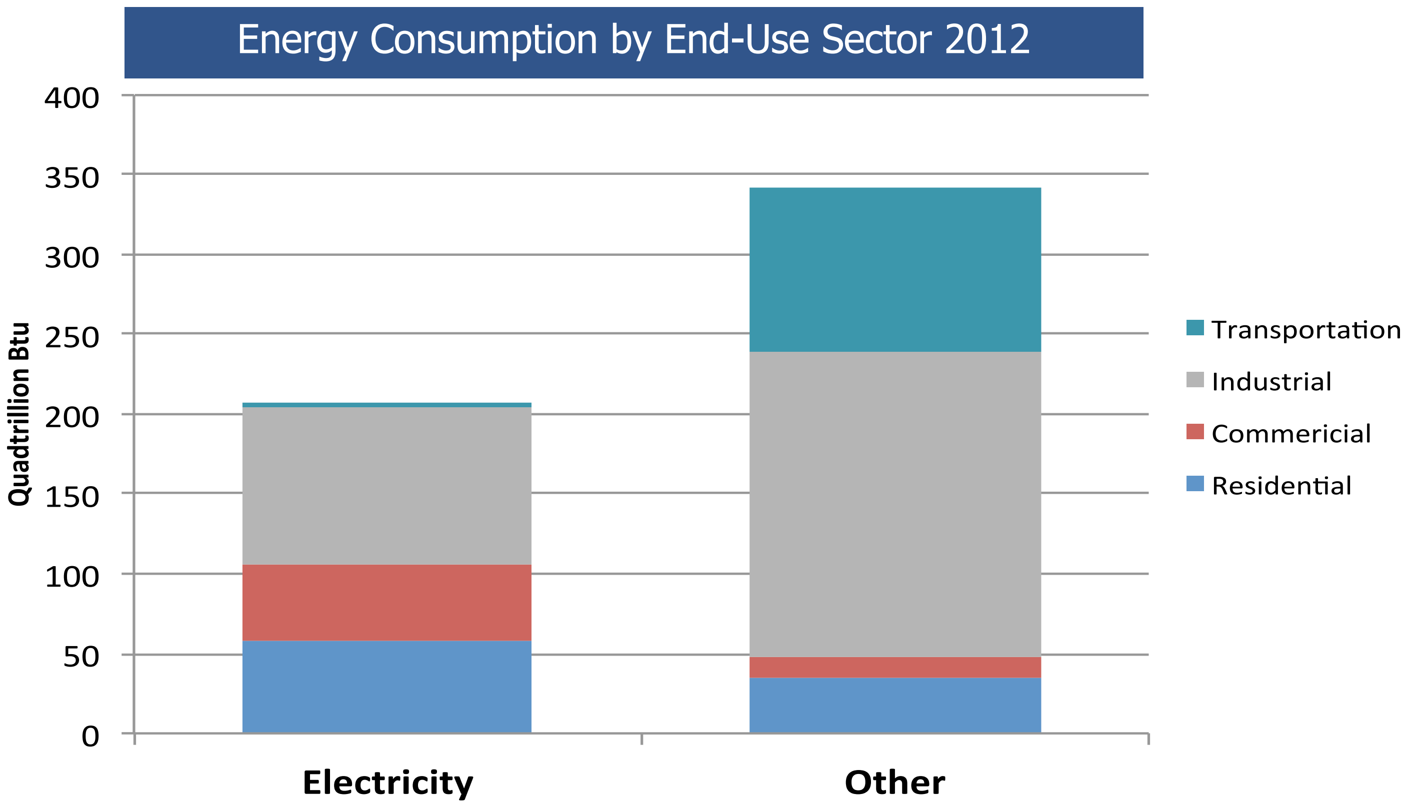
- DER (Distributed Energy Resource)
  - Multi SunCells off grid
  - No metering, only per diem lease fee based on capacity to suit historic and anticipated maximum load at peak
  - Ganged/Networked SunCell DERs within a large building, complex of buildings, or industrial or commercial site; interconnected by low voltage private grid.
  - Provide capacity, demand response
  - Redundancy, avoid disruption
  - Flexible ramping, smart controls to smooth peaking

SunCells:

- Core Power:
  - Paralleled systems: 250 kW-2 MW

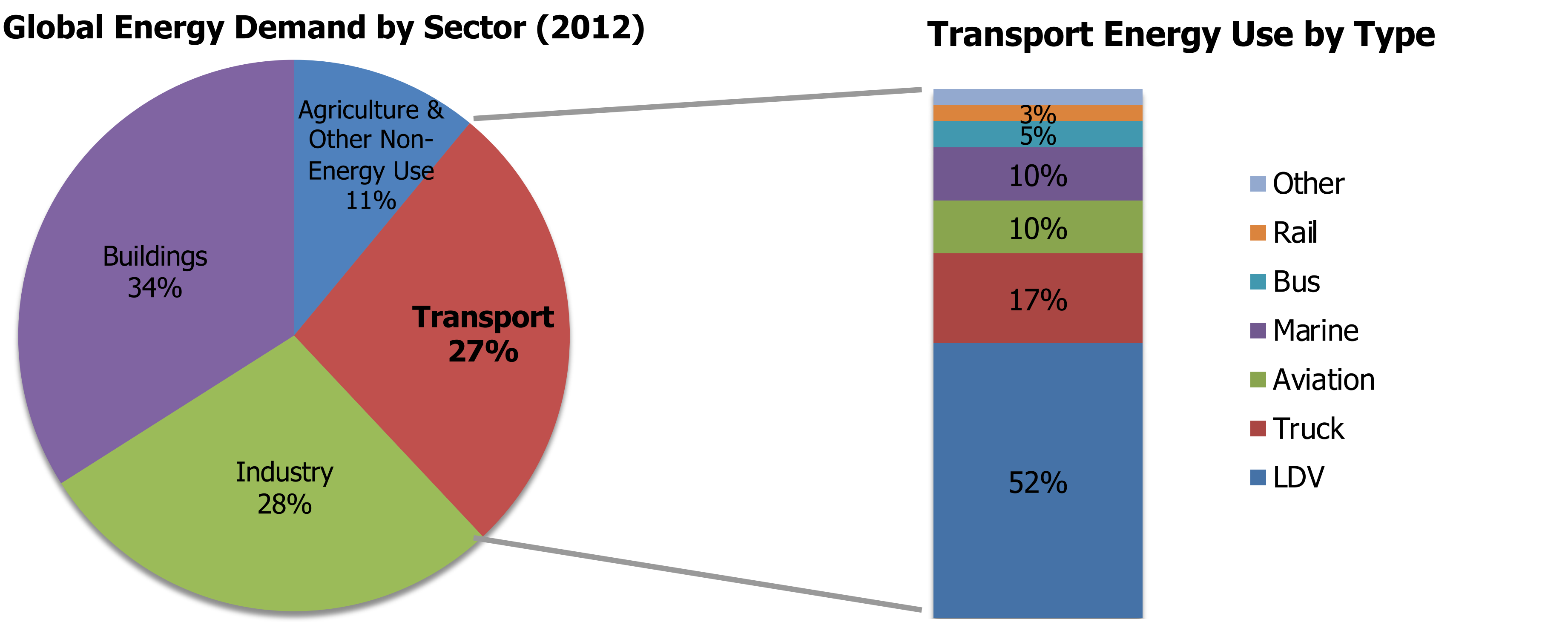
Global Electricity and Other Energy Sources

- Global electricity markets an obvious fit for SunCell – 42% value and 38% of total energy use
- SunCell applications in non-electric markets even bigger potential
- Energy use expected to expand with disruptive technology, as seen in telecommunications



Ref: DOE/EIA International Energy Outlook 2016

Global Motive Energy Use $8T addressable market.



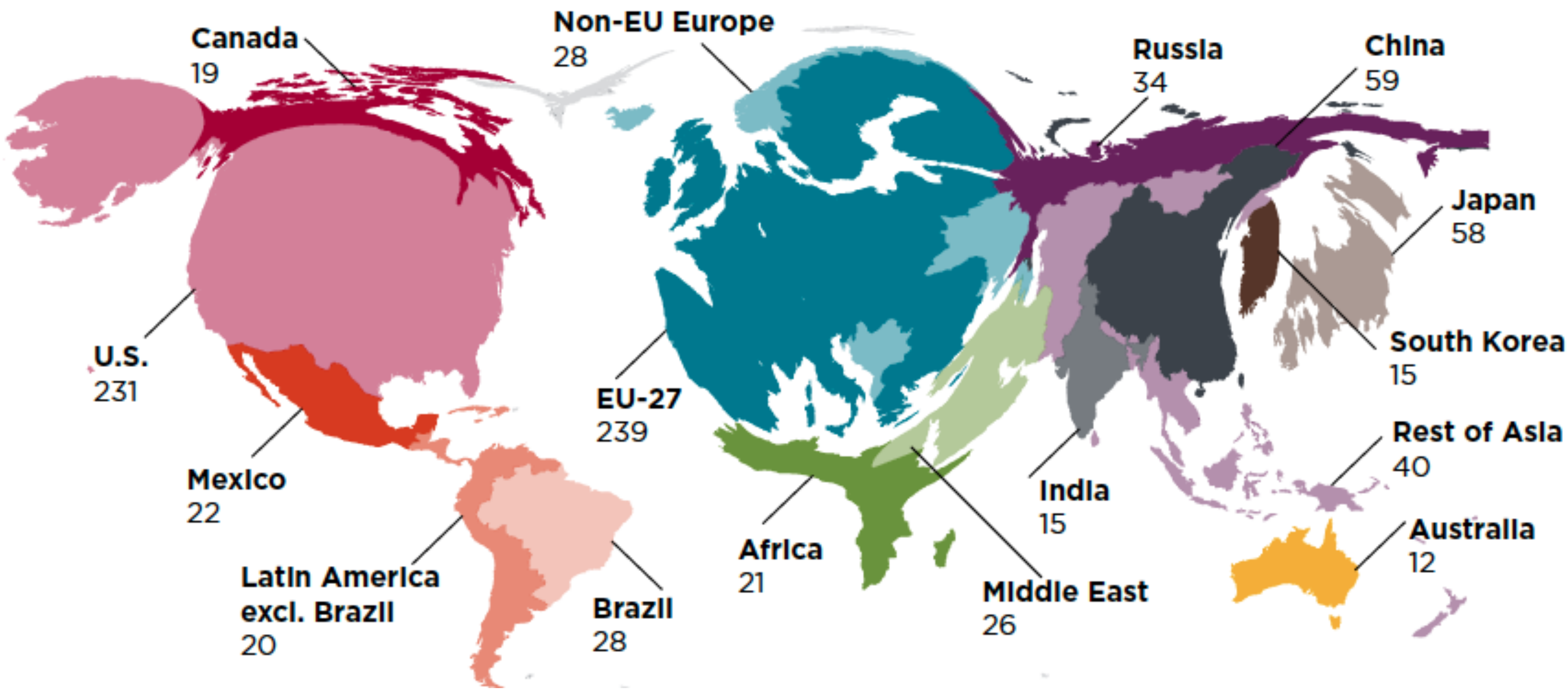
- Transportation consumes ~2,200 million tons of oil equivalent (Mtoe) of energy each year or 25,586 Terawatt hours.
- 700M+ Passenger Car population drives energy use, but hours of operation relatively low (~5% of time)

Light Duty Vehicles includes Passenger Cars and Light Duty Trucks <3.5T

Source: IEA, World Energy Outlook (2012), World Economic Forum, Repowering Transport April 2011 Ward's Automotive Group, Vehicles by Country 2011

Vehicle Population Provides Large Opportunity

Passenger Car Vehicle Stock 2013 (millions)



2015 Production: 68M Passenger Cars and 18M Light Duty Trucks

Source: European Vehicles Market Statistics, Pocketbook 2013
International Organization of Motor Vehicle Manufacturers 2016

Motive Markets

- ✓ 3.4M medium & heavy-duty trucks per year
- ✓ 0.3M buses per year
- ✓ Average of 200 kW power, utilized 30-70% of time
- ✓ 3,500 terawatt hour electricity potential (add per year)
- ✓ **> EU existing electricity generation**

- 86M automobile & light duty Trucks per year
- Average of 100 kW power, only used on road 5% of time
- SunCell generate power other 95%
- 46,000 terawatt hour electricity potential (added per year)
- **2X existing global electricity generation**

- ➢ Trains and ships comprise mobile electric power plants and have a substantial electric hotel load
- ➢ Unique requirements for aviation, unmanned aerial vehicles (UAV) and business jets may be entry points, early electric jets have been demonstrated as the industry moves towards electrification
- ➢ Zero carbon heat source to generate net-zero synfuels from carbon waste

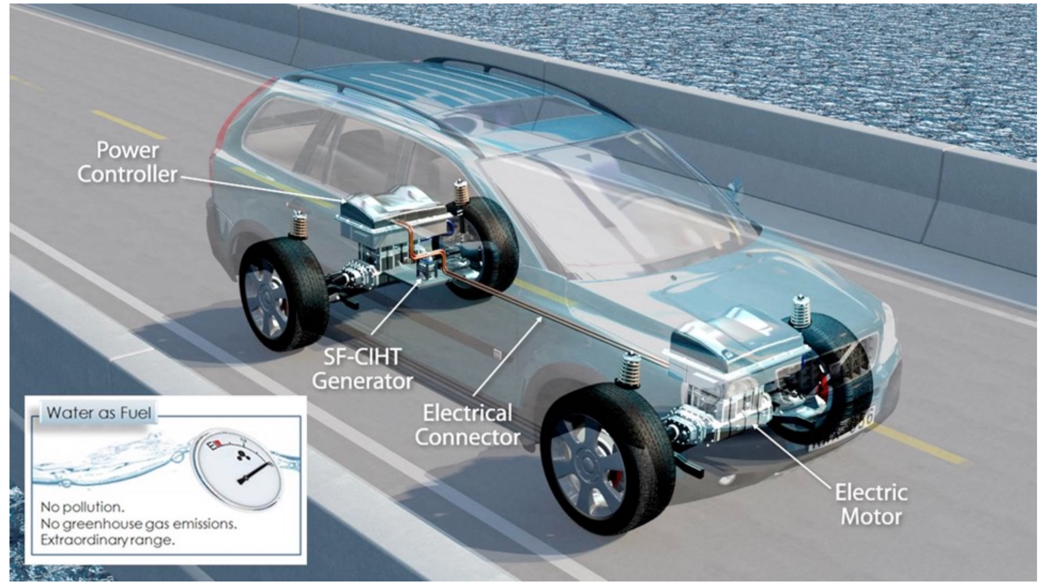
Source: ATKearney – Global Truck Study – Perspectives towards 2030
International Organization of Motor Vehicle Manufacturers 2016

Motive EV Charging: Car Market Launch

- EV's can replace internal combustion engine cars, but convenient high-power electricity is needed
- The cost of the required massive power plant and grid build out that would be in the trillions (doubling of the current infrastructure) is avoided by deploying autonomous distributed SunCell charging stations
- Batteries are more expensive than a SunCell of the same power, but a charging station can be run continuously such that the SunCell economics based on high utilization are better
- Charge $0.05 per kWh with savings of about half the current cost of electric battery charging
- We get paid per kWh. If we put a 250 kW SunCell in a car that is driven 1 hour per day we earn 250 kWh/day X $0.15/kWh = $37.5/day
- If we charge batteries, we earn 250 kW X 24 hours/day X $0.15/kWh = $900/day
- And, the capital cost is 1/24th that of putting 24 SunCells in 24 cars to earn the equivalent of one battery charging SunCell.

Motive Car Market Launch

- Over 2200 miles per liter of water.*
- Projected cost of $~10-20 per kW electric.
- One third the weight of an internal combustion engine (ICE).
- Projected 250 kW (333 HP) SunCell and electric drive system is less than that of a comparable combustion system.
- Has the potential of unsurpassed capability in terms of range, capital cost, power, logistics, and pollution abatement to zero including zero carbon dioxide emission.

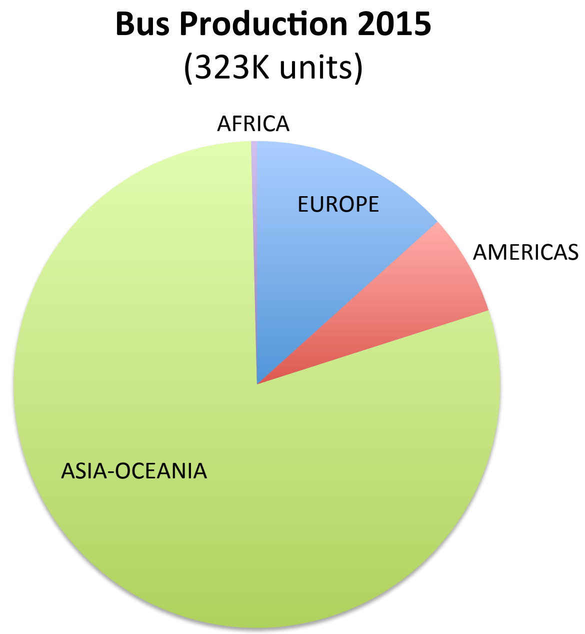


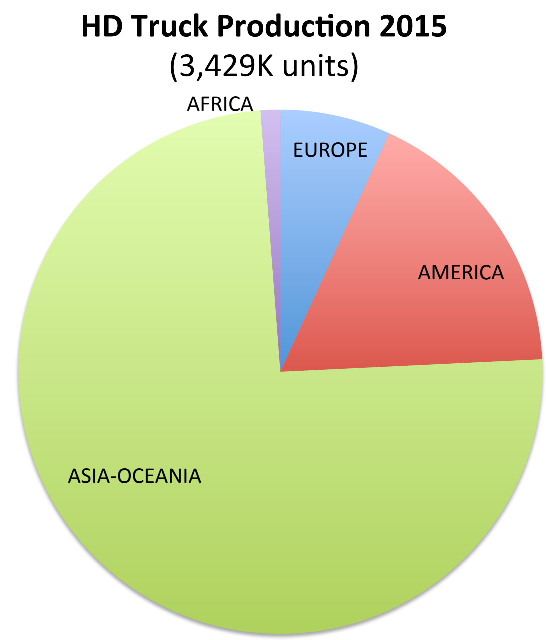
Given that cars only use about $20k in fuel ($2000/y), it makes more sense to sell with restrictions on use. Using the cost of the electric car battery, $20k which is also the fuel savings to the buyer, as a reasonable price for a car SunCell and given the volume of 100M cars/year, the projected annual revenue is 100M x $20k = $2T/y.

****Calculations:*** H_2O to $H_2(1/4)$ + $1/2O_2$ (50MJ/mole or 2.78 GJ/kg, 2.78 GJ/liter); Model S energy consumption rate of 291 Wh/mile (http://www.teslamotors.com/goelectric#savings)

1 Whr = 3600 J; Model S energy consumption rate of 1 MJ/mile; 2780 MJ/liter /(1 MJ/mile) X 0.8 (PV efficiency) = 2224 miles/liter

Trucks & Buses Have High Power Utilization



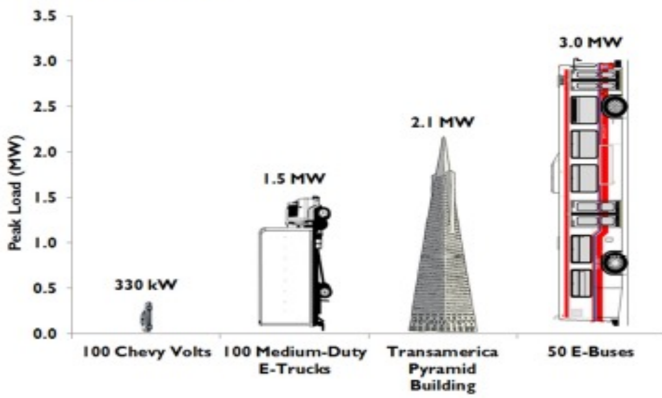


- 3.8 million units per year
- 22% of global transportation energy use with 4% of annual volume
- #1 cost driver is fuel; 39-71% of total operating cost
- High utilization rates
  - Buses: 12-20 hours of operation per day
  - Trucks: 8-14 hours of operation per day
  - Autonomous driver technology has potential to drive up utilization

Source: ATKearney – Global Truck Study – Perspectives towards 2030
International Organization of Motor Vehicle Manufacturers 2016

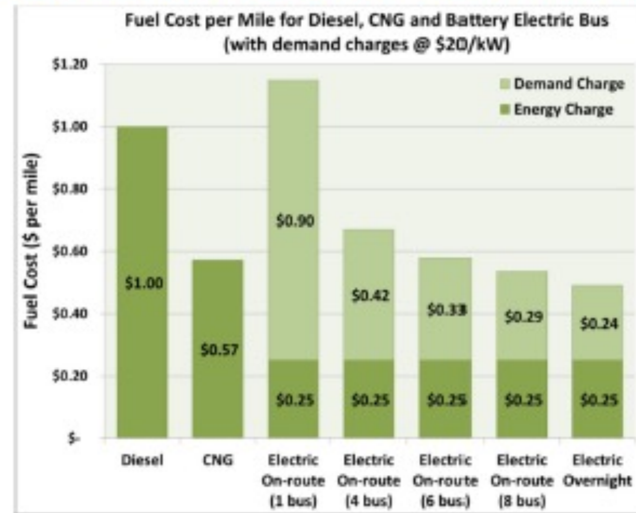
Motive EV Charging: Bus and Truck Market Launch

Figure 14: Peak loads for various electric vehicle fleets (without mitigating grid impacts)



Assumptions: the Chevy Volt charging rate is 3.3 kW, the medium-duty E-Truck charging rate is 15 kW and the E-Bus charging rate is 60 kW. The peak load for the Transamerica Pyramid building is from [26].

Figure 11: Impact of peak demand charges on E-Buses



Source: CALSTART [19]

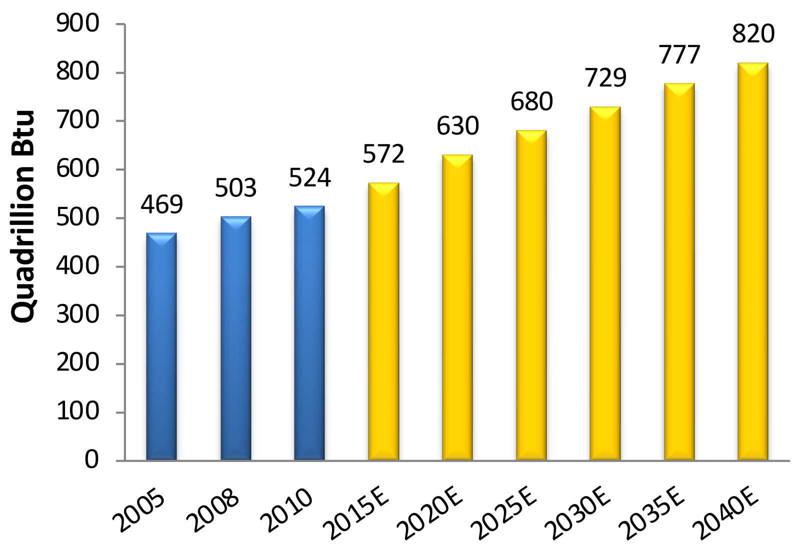
Assumptions:
Each bus drives 40,000 miles per year. The diesel bus has a fuel economy of 4 MPG and diesel is priced at $4.00 per gallon. The CNG bus has a fuel economy of 3.5 MPDGE and CNG is priced at $2.00 per DGE. The electric transit buses have an efficiency of 2.5 AC kWh/mile and electricity is priced at $0.10/kWh. One electric bus charging on-route draws 150 kW from the grid, 4 draw 280 kW, 6 draw 330 kW and 8 draw 380 kW. The electric bus charging overnight draws 40 kW from the grid.

- Municipalities are rapidly adopting electric buses
- Freight trucks are also being electrified
- SunCell charger eliminates demand charge, transmission charge, utility regulations and bureaucracy, electrical infrastructure build out
- Charge per kWh with savings of about half the current cost of electric battery charging
- Batteries are more expensive than a SunCell of the same power, but a charging station can be run continuously so the SunCell economics based on utilization are better

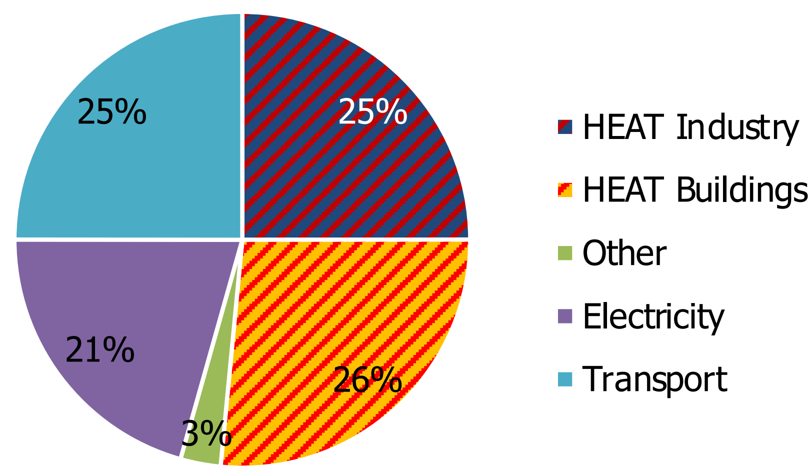
Global "Heat" Market

- $4.8 trillion~ expended on total fossil fuels globally in 2013; $3.5T electric thermal
- 1/2+ of final energy consumption for Heat applications in Industry and Buildings
- 3/4 Heat from fossil fuels
- 1/3 of worldwide CO2 emissions from Heat sources

Global Energy Consumption



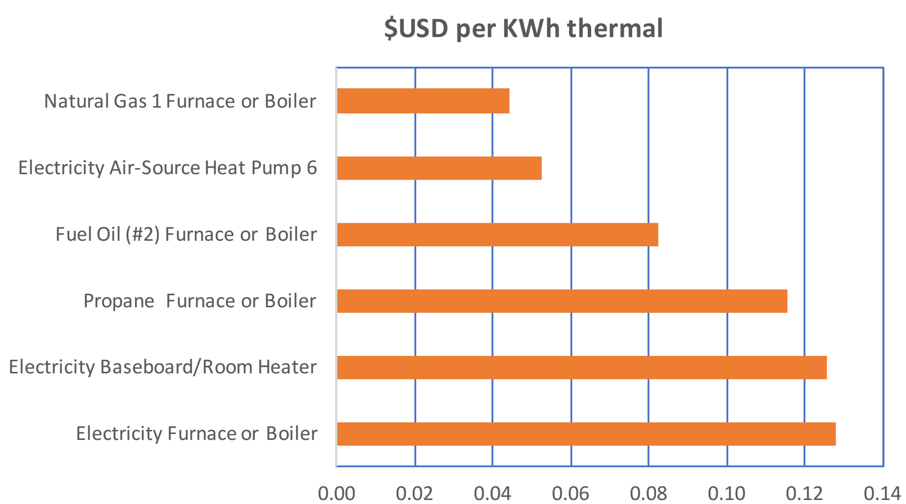
Final Energy Use



Sources: EIA IEO 2013, International Energy Agency and management estimates,
Heating Without Global Warming – International Energy Agency 2014
172 EJ for Heat = 163 Quadrillion Btu
Carbon emissions from burning biomass for energy, Partnership for Policy Integrity

Heat Costs & Equipment Vary Widely

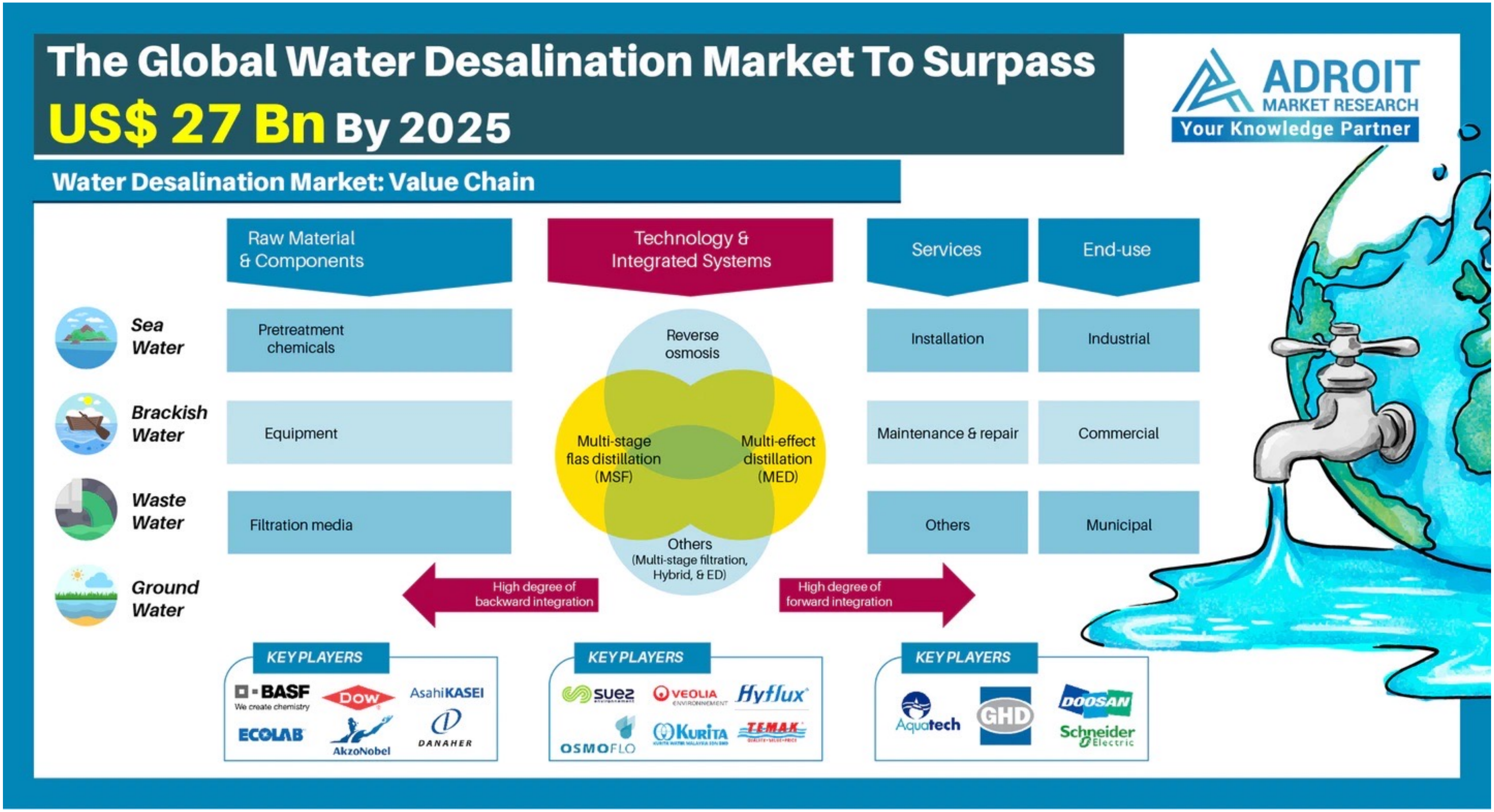
- Existing heat fuel sources are diverse
- Equipment offerings range from primitive to massively complex:
  - Biomass stoves & furnaces
  - Natural gas furnaces
  - Electrical heat pumps
  - Low-grade solar heat for air and water
  - Landfill gas for boilers,
  - Resistive electrical heaters
  - Direct geothermal
  - Co-gen power plant district heat
- US residential heating example
  - Costs vary almost 3X depending on the fuel and equipment combination
  - Small unit power for a SunCell®, but consider Buildings and Industry



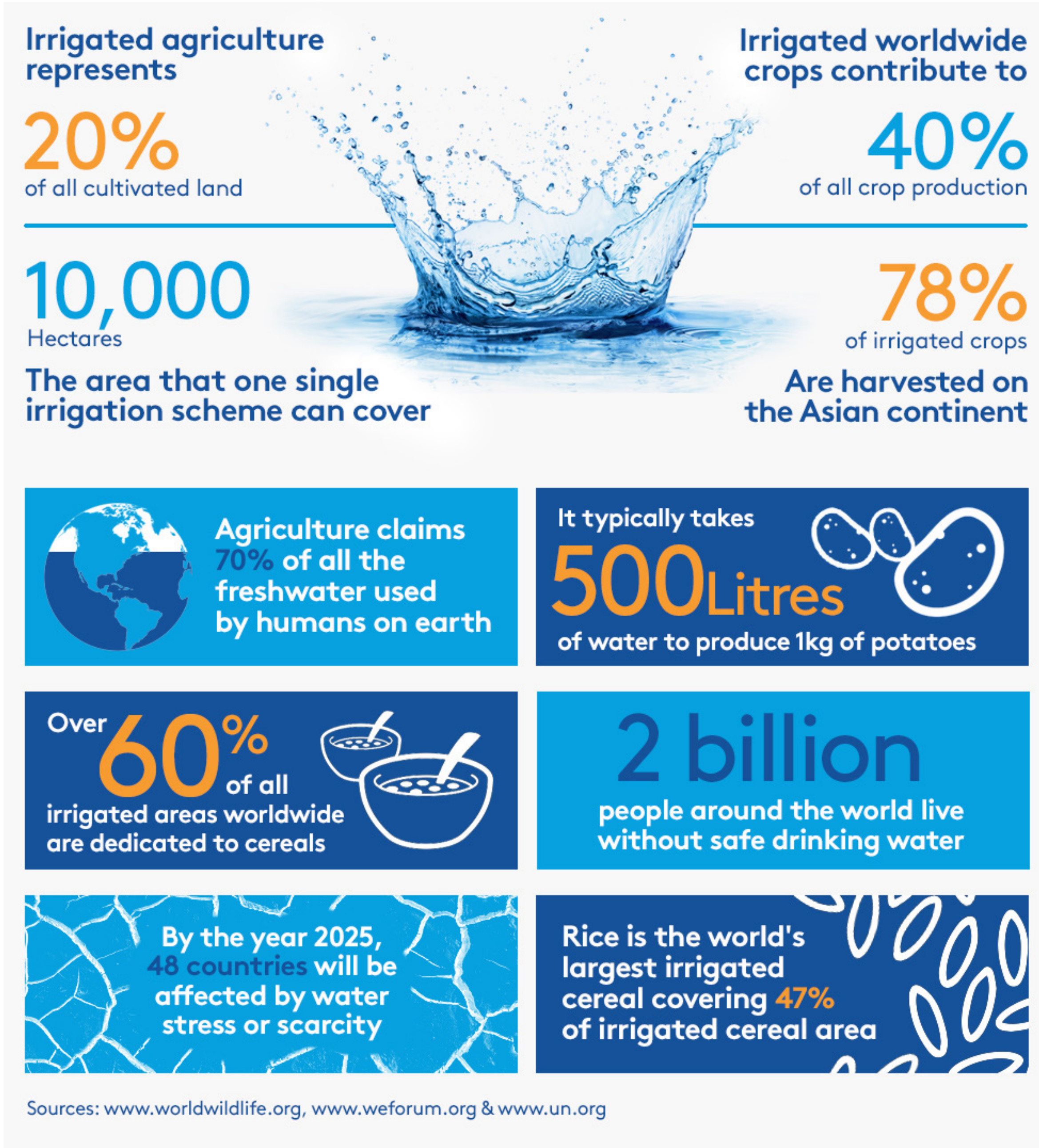
- Target high fuel cost segments & customers that match SunCell thermal output (200 KW to 1 MW)
- Target high-value industrial partners for applying SunCell to "standardized" segments

Sources: modeled cost using Heating Cost Calculator Auburn University https://ag.purdue.edu/extension/renewable-energy/Documents/ON.../heatcalc.xls

Desalination



Desalination cont'd




Market Summary

TPV-SunCell®: Stationary Electric Applications

$4.8T addressable market. Electric lease revenue model.

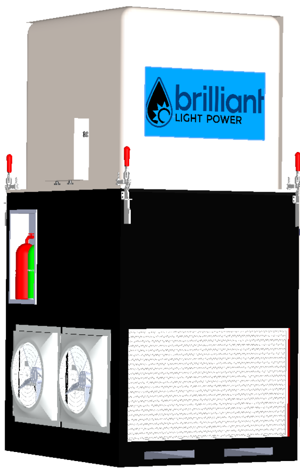
Industrial

Commercial

Residential

TPV-SunCell®: All-Electric Thermal Applications

$3.5T addressable market. Electric lease revenue model.



Baseboard Heater

Air Heater

Electric Boiler

Heat Pump

Air Conditioner

Electric Oven

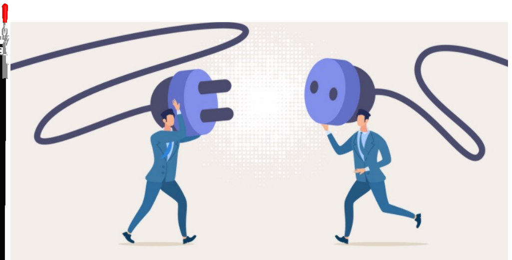
Commercial Baking Oven

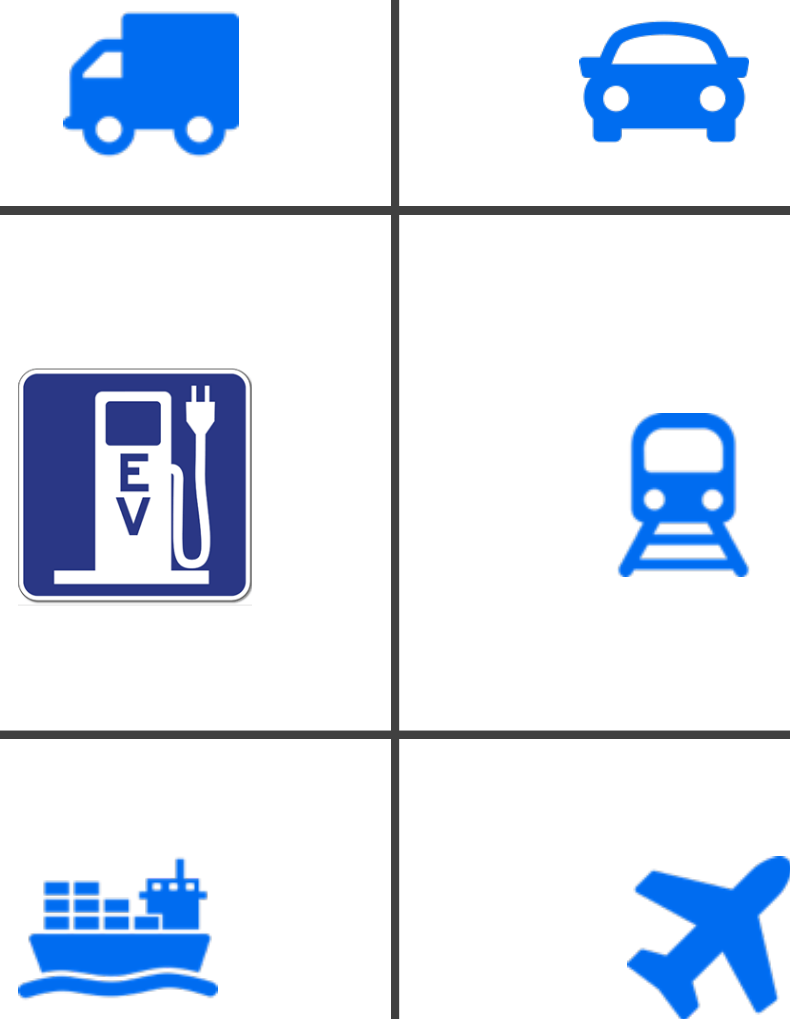
Electric Furnace

Electric Arc Furnace

TPV-SunCell®: Motive Electric Applications

$8T addressable market. Car sales revenue model. Lease revenue model for large kWh usage. Strong value for weight savings, range improvement, and operating costs.





Global Patent Portfolio

Over $20M invested in obtaining over 80+ global patents and 100+ patent applications

International Application No.	National Phase Countries Pending/Granted	Currently Granted In
PCT/US08/61455	AU, GC, HK, ID, IN, KR, MX, SG, TW, US, ZA	AU, HK, IN, ID, KR, MX, SG, ZA, TW
PCT/US09/52072	AR, AP, AU, BS, CN, CG, EA, GC, HK, ID, IN, IL, JM, JP, KR, MO, MX, PA, PK, SG, US, TH, VE	AP, AU, CN, EA, GC, HK, ID, KR, MO, MX, PA, TW, ZA
PCT/US10/27828	AP, EA, HK, ID, IN, MX, SG, US, ZA	AP, EA, ID, MX, ZA
PCT/US11/28889	AU, CN, EP, HK, ID, IN, IL, KR, MX, SG, US	CN, EP (DE, ES, FR, GB, IR, IT, ND), HK, ID, IL, MX, SG
PCT/US12/31639	CN, EA, AW, EP, GC, HT, HK, ID, JM, SG, US	AW, GC, ID
PCT/US2013/041938	CN, EA, JP, TW, US, ZA	EA, JP, TW, ZA
PCT/US2014/032584	AU, BR, CA, CN, EA, EP, HK, ID, IN, IL, JP, KR, MX, TW, US, ZA	CN, EP (DE, DK, CH, ES, FR, GB, IR, IT, ND), TW, ZA
PCT/IB2014/058177	AR, BR, CA, CN, EA, EP, HK, ID, IN, IL, JP, KR, MX, TW, US, ZA	CN, HK, TW, US
PCT/US2015/033165	AU, BR, CA, CN, EA, EP, HK, ID, IN, IL, JP, KR, MX, PK, SG, TW, US, ZA	CN, HK, ZA, US
PCT/US2016/012620	AE, AU, BR, CA, CN, EA, EP, HK, ID, IN, IL, JP, KR, KW, MX, OM, QA, SA, SG, TW, UE, US, ZA	JP, ZA
PCT/US2017/13972	AU, BH, BR, CA, CN, EA, EP, ID, IN, IL, JP, KR, KW, MX, OM, QA, SA, SG, TW, US, ZA	ZA
PCT/US17/35025	CA, CN, EP, JP, KR, MX, US, TW	
PCT/US18/17765	AU, BR, CA, CN, EA, EP, ID, IN, IL, JP, KR, MX, SG, TW, US	
PCT/IB2018/059646	AR, AU, BR, CA, CN, EA, EP, ID, IN, JP, KR, MX, SG, TW, US, ZA	
PCT/US04/010608	EA, JP, KR, SG, ZA	EA, KR, SG, ZA
PCT/US02/06955	AP, EA, KR, MX, TR, ZA	AP, EA, MX, ZA, TK
PCT/US04/035143	US	US
PCT/US01/09055	AU, IN, ZA	
PCT/US18/12635	US, EP, HK	
PCT/IB20/50360	TW, 30 Month Date in June 2021	

brilliant LIGHT POWER

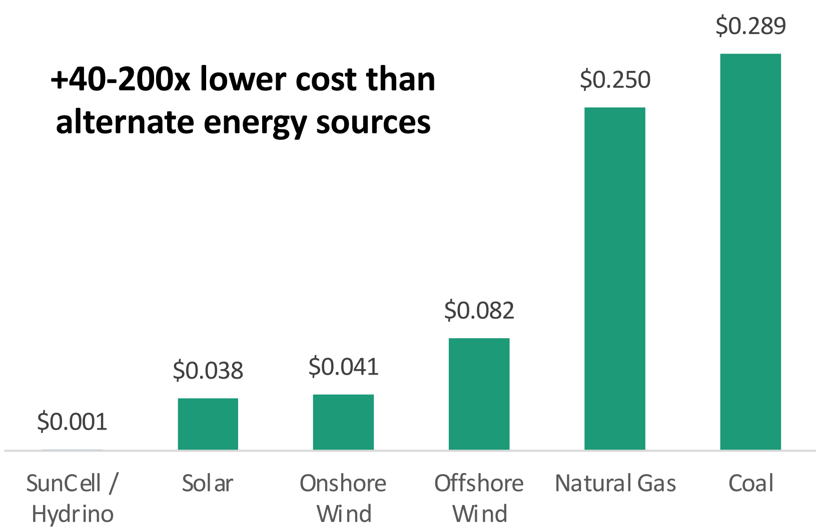

Commercialization

Significantly Advantaged Economics

Supports market adoption and robust future margins

Material cost advantage

Cost of Power ($ per kWh)



No supply chain challenges

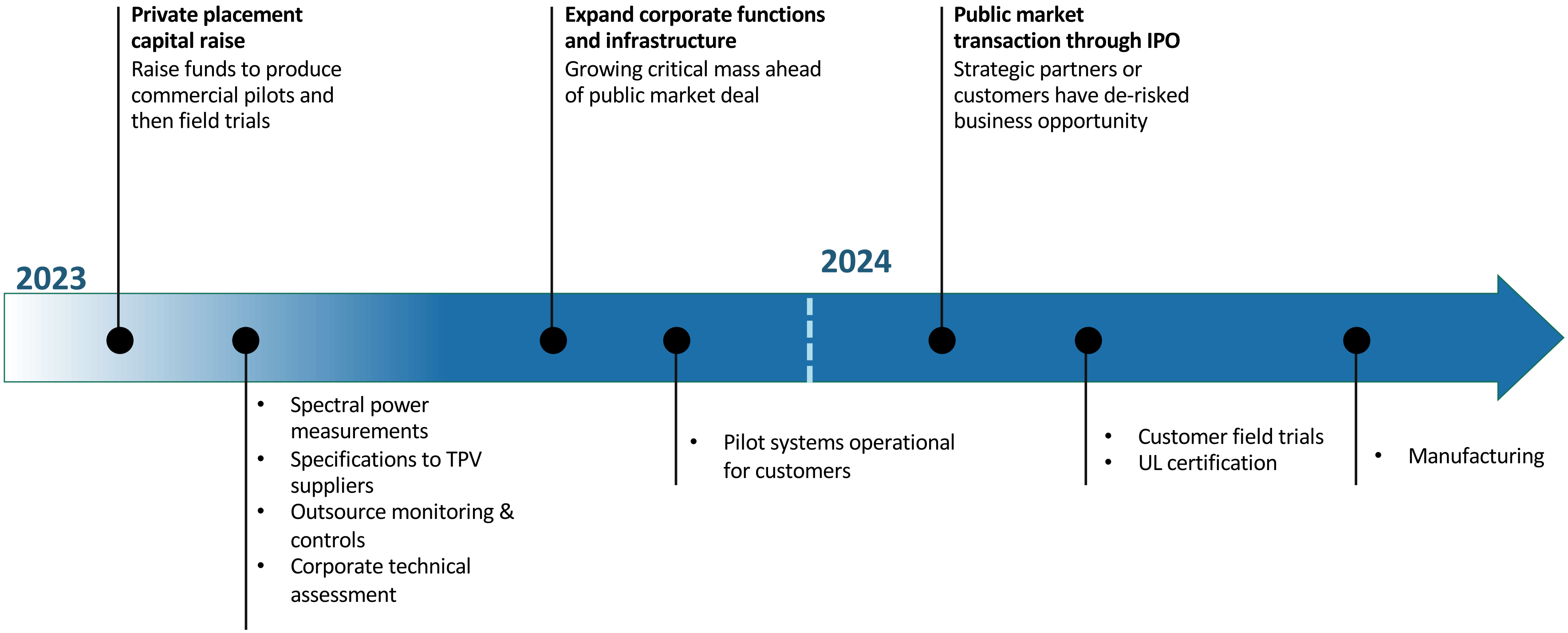
- Off-the-shelf components
- No rare-earth metals or other component bottlenecks
- Third party manufacturers with capacity lined up
- Short expected SunCell® production cycle

Ability to offer price discounts to gain market share

Source: 1H21 LCOE Data Set, Bloomberg New Energy Finance

Go-To-Market Model

Plans to advance to commercialization with TPV-SunCell® for total world electrification



Key Highlights

1 **Massive addressable markets** applications to displace virtually all energy sources

2 **Working pilot creating net positive energy** at commercial scale

3 **Independently validated** operation, science, theory, power output, & engineering

4 **Zero carbon emissions** or other pollutants (100% clean energy)

5 **Superior energy and power densities and economics** to other energy sources (+40x- 220x)

6 **Global patent portfolio** protects leading technology position

brilliant LIGHT POWER

Brilliant Light Power's Path Forward

- We are pursuing commercial electrical power sources for essentially all power markets at the modular scale of 100-250 kW.
- The TPV-SunCell Electric Power systems are capable of being commercialized using known vendor-supplied components given in the corresponding bill of materials.
- We are acquiring spectral power measurements on continuous commercial scale optical power to provide specifications to TPV manufacturers.

We believe that Brilliant's SunCell® is the most important energy technology ever.

Brilliant Light Power’s Path Forward

- We plan to at least partially outsource the development of commercial products from our current pilot systems using contract commercialization companies.
- We plan to outsource fabricated parts and assembly to large contract manufacturers such as Sanmina and Jabil and outsource installation and maintenance to EPC firms.
- To launch commercialization, we are pursuing validation through industry testing of the optical power and corresponding applications.
- Theory resistance will be addressed by further independent Hydrino analytical validation.

We believe that Brilliant’s SunCell® is the most important energy technology ever.

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brilliant
LIGHT POWER

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- Reinventing thermal and electrical power:
- *safe, accessible, affordable, clean*