About Brilliant Light Power

- Reinventing electricity, independence of being completely off grid
- New, sustainable, nonpolluting energy
- Technology and science validated by independent third parties
- Extensive proprietary methods and systems
- Electricity company, sales via lease agreement, no metering
- Partnership & outsource business model
- Transitioning from research to reality
- Profound implications for electric power – accessible, affordable, clean
SunCell® - Water Fueled Generator

<table>
<thead>
<tr>
<th>Feature</th>
<th>Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Output</td>
<td>150 kW DC or AC</td>
</tr>
<tr>
<td>DC Voltage</td>
<td>~380 or ~760</td>
</tr>
<tr>
<td>AC Inverter for 50/60 Hz</td>
<td>Option</td>
</tr>
<tr>
<td>SunCell dimensions (L,W, H)</td>
<td>0.5x0.5x0.5m</td>
</tr>
<tr>
<td>Photovoltaic Power Density</td>
<td>2000 Suns</td>
</tr>
<tr>
<td>Blackbody Radiator Power Density</td>
<td>5 MW/m2</td>
</tr>
<tr>
<td>Weight</td>
<td>100 kg</td>
</tr>
<tr>
<td>Warm-up Time</td>
<td>&lt;1 min</td>
</tr>
<tr>
<td>Self-consumption power</td>
<td>&lt;3 kW</td>
</tr>
<tr>
<td>Response Time (standby to peak)</td>
<td>~100ms</td>
</tr>
<tr>
<td>Service Life</td>
<td>15 years</td>
</tr>
<tr>
<td>Noise Emission</td>
<td>Sound Proofed</td>
</tr>
<tr>
<td>Degree of protection (per IEC 60529)</td>
<td></td>
</tr>
<tr>
<td>Climatic category (per IEC 60721-3-4)</td>
<td></td>
</tr>
</tbody>
</table>
The Energy Solution: SunCell®

- Continuous power source, developed with proprietary technology
- Non-polluting: by-product is harmless lower energy state of hydrogen called Hydrino®, lighter than air, vents to space
- System is sealed with H₂O fuel injected with nonreactive, recirculated silver, absolutely safe materials and operation
- Capital cost estimated at $50 to $100 per kW at production power & scale, versus $3,463 for solar
- No Metering: Electricity sold at about $0.05 per kWh via a per diem lease fee.
- Low operating cost, only consumable is minimal amounts of water
- Scalable from 10kW to 10 MWs
- Initially stationary, developing to motive
- Field test in 1H 2017
- Commercial launch in 1H 2018
SunCell Economics

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

Capital Cost:
  o $60/kW

Life Span:
  o 20 years

Capital Cost Annually:
  o $3/kW

Solar Capital Cost (2013):
  o $3,463/kW\(^a\)

Maintenance Cost:
  o $1.20/kW

Generation Cost:
  o $0.001/kWh

\(^a\)http://www.nrel.gov/analysis/tech_lcoe_re_cost_est.html
The SunCell® Development Timeframe

Theory & Invention

22 YEARS

3 YEARS

Commercial Product
A Long Journey…BUT not a lot of help!

“….it's extremely unlikely that this is real….”

“…there is no state of hydrogen lower than the ground state…”

"If you could fuck around with the hydrogen atom, you could fuck around with the energy process in the sun. You could fuck around with life itself."

Dr Randell L. Mills – World record for pissing-off the largest number of Nobel Laureates
Quantum Mechanics is falling apart since it never dealt with reality and can’t!

Why quantum mechanics might need an overhaul

Nobel laureate Steven Weinberg says current debates suggest need for new approach to comprehend reality

BY TOM SIEGFRIED 3:37PM, NOVEMBER 4, 2016

Owen Maroney worries that physicists have spent the better part of a century engaging in fraud.

Ever since they invented quantum theory in the early 1900s, explains Maroney, who is himself a physicist at the University of Oxford, UK, they have been talking about how strange it is — how it allows particles and atoms to move in many directions at once, for example, or to spin clockwise and anticlockwise simultaneously. But talk is not proof, says Maroney. “If we tell the public that quantum theory is weird, we better go out and test that’s actually true,” he says. “Otherwise we’re not doing science, we’re just explaining some funny squiggles on a blackboard.”

WHAT IS REALLY REAL?

A WAVE OF EXPERIMENTS IS PROBING THE ROOT OF QUANTUM WEIRDNESS

Is flawed science causing a failure to invent?

Are we out of big ideas?

Dwindling gains in science, technology and medicine are a hidden drag on economic growth

By Greg Ip

By all appearances, we’re in a golden age of innovation. Every month sees new advances in artificial intelligence, gene therapy, robotics and software apps. Research and development as a share of gross domestic product is near an all-time high. There are more scientists and engineers in the U.S. than ever before.

None of this has translated into meaningful advances in Americans’ standard of living.

Economies grow by equipping an expanding workforce with more capital such as equipment, software and buildings, then combining capital and labor more creatively. This last element, called “total factor productivity,” captures the contribution of innovation. Its growth peaked in the 1950s at 3.4% a year as prior breakthroughs such as electricity, aviation and antibiotics reached their maximum impact. It has steadily slowed since and averaged a pathetic 0.5% for the current decade.

Outside of personal technology, improvements in everyday life have been incremental, not revolutionary. Houses, appliances and cars look much like they did a generation ago. Airplanes fly no faster than in the 1960s. None of the 20 most-prescribed drugs in the U.S. came to market in the past decade.

The innovation slump is a key reason the American standards of living have stagnated since 2000. Indeed, absent a turnaround, that stagnation is likely to continue, deepening the malaise that has left the middle class so dissatisfied.

Economists hotly debate the reasons, but there are several clear forces at play. The hurdles for transforming ideas into commercially successful products have grown. The low-hanging fruit in science,
Late 1980’s

Theory & Invention

Genesis Moment

Commercial Product

22 YEARS

3 YEARS
Genesis Moment – Free Electron Lasers
Grand Unified Theory of Classic Physics

Spin Directions
Orbitsphere Current-Vector Field
Angular Momentum

THE ELECTRON ORBITSPHERE
Partial List of Physical Phenomena Solved by Classical Physics

- Stability of the atom to radiation
- Magnetic moment of a Bohr magneton and relativistic invariance of each of $e/m_e$ of the electron, the electron angular momentum of $\hbar$, and the electron magnetic moment of $\mu_B$ from the spin angular momentum
- De Broglie relationship
- Stern Gerlach experiment
- Electron and muon g factors
- Rotational energies and momenta
- Reduced electron mass
- Ionization energies of one-electron atoms
- Special relativistic effects
- Excited states
- Resonant line width and shape
- Selection rules
- Davisson Germer experiment
- Elastic electron scattering from helium atoms
- Ionization energies of multielectron atoms
- Hydride ion binding energy and absolute NMR shift
- Hydride lattice parameters and energies
- Excited states of the helium atom with singlet and triplet vector diagrams
- Proton scattering from atomic hydrogen
- Nature of the chemical bond
- Bond energies, vibrational energies, rotational energies, bond distances, magnetic moment and fields of hydrogen-type molecules and molecular ions, absolute NMR shift of $H_2$
<table>
<thead>
<tr>
<th>Partial List of Physical Phenomena Solved by Classical Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Lifetimes and line intensities</td>
</tr>
<tr>
<td>Correspondence principle</td>
</tr>
<tr>
<td>Orbital and spin splitting</td>
</tr>
<tr>
<td>Stark effect</td>
</tr>
<tr>
<td>Lamb Shift</td>
</tr>
<tr>
<td>Knight shift</td>
</tr>
<tr>
<td>Spin-orbit coupling (fine structure)</td>
</tr>
<tr>
<td>Spin-nuclear coupling (hyperfine structure)</td>
</tr>
<tr>
<td>Hyperfine structure interval of muonium</td>
</tr>
<tr>
<td>Nature of the free electron</td>
</tr>
<tr>
<td>Nature of the photon</td>
</tr>
<tr>
<td>Photoelectric effect</td>
</tr>
<tr>
<td>Compton effect</td>
</tr>
<tr>
<td>Wave-particle duality</td>
</tr>
<tr>
<td>Double-slit experiment for photons and electrons</td>
</tr>
<tr>
<td>Alpha decay</td>
</tr>
<tr>
<td>Nature of neutrinos</td>
</tr>
<tr>
<td>Proton radius puzzle</td>
</tr>
<tr>
<td>Molecular Ion and Molecular Excited States</td>
</tr>
<tr>
<td>Parameters of polyatomic molecules</td>
</tr>
<tr>
<td>Superconductivity and Josephson junction experiments</td>
</tr>
<tr>
<td>Integral and fractional quantum Hall effects</td>
</tr>
<tr>
<td>Aharonov-Bohm effect</td>
</tr>
<tr>
<td>Aspect experiment</td>
</tr>
<tr>
<td>Durr experiment on the Heisenberg Uncertainty Principle</td>
</tr>
<tr>
<td>Penning trap experiments on single ions</td>
</tr>
<tr>
<td>Mobility of free electrons in superfluid helium</td>
</tr>
<tr>
<td>Gravitational behavior of neutrons</td>
</tr>
<tr>
<td>Hyperfine structure interval of positronium</td>
</tr>
<tr>
<td>Structure of nucleons</td>
</tr>
<tr>
<td>Magnetic moments of the nucleons</td>
</tr>
<tr>
<td>Beta decay energy of the neutron</td>
</tr>
<tr>
<td>Binding energy of deuterium</td>
</tr>
</tbody>
</table>
Partial List of Particle and Cosmological Phenomena Solved by Classical Physics

- Equivalence of the inertial and gravitational masses
- Newton’s second law
- Deflection of light by stars
- Precession of the perihelion of Mercury
- Lepton masses
- Quark masses
- Hubble constant
- Age of the universe
- Observed acceleration of the expansion
- Power of the universe
- Power spectrum of the universe
- Microwave background temperature
- Uniformity of the microwave background radiation
- Microkelvin spatial variation of the cosmic microwave background radiation (CMBR)
- Polarization of the CMBR data
- Observed violation of the GZK cutoff
- Mass density of the universe
- Large scale structure of the universe
Quantum illustration of the probability densities in various states of the hydrogen atom

DNA (1DC0) model as generated by Millsian 2.0 Beta, and rendered with POV-ray.

Prediction with incredible accuracy
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.

Comparison of Classical to Quantum

Millsian vs. 6-31G*

Millsian 2.0: Modeling Molecules

DNA

Insulin

Strychnine

Morphine

Lipitor

RNA

millsian.com
Over 100 peer reviewed publications
OK... So I’ve solved the mysteries of the Universe.... Now what?
Let's create energy from water...
22 YEARS

Invention of Hydrino® energy

3 YEARS

Theory & Invention

1991-1995

GUT Theory

Commercial Product
Invention of the Hydrino® energy
The Hydrino® and the Sun's corona
Dark Matter: The Hydrino® observed in nature
Hydrino Light Signature

• Experimental Setup for the Observation of the Hydrino Light Signature
  
  • Light signature from pure hydrogen at much higher energy than deemed possible for this element in any known form
  
  • Continuum radiation showing H going below the level previously thought to be the “Ground State”

![Graph showing photon intensity vs wavelength with various peaks labeled for He II, O VI, O V, and prior known H₂ spectrum in this region.](image-url)
Dark Matter ring in galaxy cluster

\[ \lambda = \frac{91.2}{m^2} \text{ nm } (m = \text{integer}) \]
Hydrino Identification

- GUT
- Molecular modeling
- H(1/2) and H(1/4) hydrino transitions observed by continuum radiation
- Astronomy data verifying hydrinos such as H(1/2), H(1/3), and H(1/4) hydrino transitions
- H⁻(1/2) hyperfine structure
- H₂ (1/4) XPS binding energy
- H₂ (1/4) ro-vib spectrum in crystals by e-beam excitation
- H₂ (1/4) FTIR
- H₂ (1/4) Raman
- H₂ (1/4) Photoluminescence spectroscopy
- Fast H in plasma including microwave and rt-plasmas
- Rt-plasma with filament and discharge
- Afterglow
- Highly pumped states
- H inversion
- Power with multiple solid fuels chemistries
- SunCell energetic plasma
- ToF-SIMS and ESI-ToF identification of hydrino hydride compounds
- Solid H NMR
- H (1/4) spin-nuclear hyperfine transition
- Electricity gain over theoretical in CIHT cells
Data Comparison

A plot comparison between the theoretical energies and assignments given on the previous slide with the observed Raman spectrum.

![Diagram of Raman spectrum comparison]
1995-2013

Theory & Invention

GUT Theory

Hydrino® Energy

Commercial Product

Harnessing power – The process of invention

22 YEARS

3 YEARS
Harnessing power - The process of invention
some more invention
...and more invention
.....and still more invention
EUREKA! moment - The 3\textsuperscript{rd} 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.

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.

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.
Explosive power

Click the above image to view on YouTube:
https://www.youtube.com/watch?v=SDhRvnYZbg
Optical Power Measurement Using NIST Standard Over the UV Region: Spectral Emission in the High Energy Region Only

![Graph showing optical power measurement](image)

- Total integrated (7-485 nm) average power: 1.267 MW
- Integrated peak power: 4.97 MW

- Mightex spectrum integrated (200-485 nm)
  - Average power: 290.7 kW
  - Integrated peak power: 1140 kW
2014-2016

<table>
<thead>
<tr>
<th>GUT Theory</th>
<th>Hydrino® Energy</th>
<th>Harnessing Power Inventions</th>
<th>EM</th>
<th>Commercial Product</th>
</tr>
</thead>
</table>

Theory & Invention

Inventing the SunCell®

22 YEARS

3 YEARS
Slurry pumps, Pneumatic injectors & Cyclones
Rollers, Shot Systems & SunCell® Prototypes
A million watts in a teacup

Click the above image to view on YouTube:
https://www.youtube.com/watch?v=1G07iVwthno
Vaporizing tungsten electrodes
Key invention – Liquid electrode injectors
The SunCell® Commercial Design

Unveiled on October 25th at the Brilliant Light Power’s Industry Day

“This design fixes all of the outstanding engineering challenges required to manufacture the commercial product”

John DeCarlo, CTO of Columbia Tech, BrLP’s engineering partner
<table>
<thead>
<tr>
<th>GUT Theory</th>
<th>Hydrino® Energy</th>
<th>Harnessing Power Inventions</th>
<th>EM !</th>
<th>Commercial Product</th>
</tr>
</thead>
</table>

2014-2016

Theory & Invention

The SunCell®

22 YEARS

3 YEARS
How the SunCell® Works

DC power from Concentrator PV (CPV) array

Blackbody Radiation

2000X Suns of light
Spectral Emission in the High Energy Region Only

Plasma Ignition

Plasma Emission
(Power Calibrated Spectrum)

Measurement

Absorb to BB

Re-emit to CPV

SunCell Blackbody Radiator

Mightex spectrum integrated (200-485 nm) average power: 290.7kW
Integrated peak power: 1140kW

Total integrated (7-485 nm) average power: 1.267MW
Integrated peak power: 4.97MW

Quantum Efficiency

Concentrator PV
Power Conversion Spectrum

Wavelength (nm)

W/nm

0.0
5.0E3
1.0E4
1.5E4
2.0E4
2.5E4

0 100 200 300 400 500

Wavelength nm

0
500000
1.0e+06
1.5e+06
2.0e+06
2.5e+06

0 500 1000 1500 2000

Wavelength (nm)

SpectralCalc.com
Standard or Concentrated PV Uses the Same Massive Footprint

Due to the same low incident light concentration from the Sun, the typical scale is 100 MW on 250 acres (about 1 million m²)
SunCell® vs Solar PV

An autonomous SunCell operating at up to 10,000 Suns requires 75,000 times less area and complexity than a matched conventional solar power station.

SunCell

11 MW

1 m²

Planta Solar 10, Sevilla, Spain

11 MW

75,000 m² (nrel.gov)
Inductively Coupled Heater
SunCell Turnkey System (Basic)

Telemetry:
- Metering DC
- Customer Billing
- Diagnostics

Heat
Rejection
or Heating

DC

Inverter

AC

Distribution Board

AC

AC Loads

DC Loads

e.g. Heating, Lighting
Commercially available parts
## 250KW SUN CELL COST ANALYSIS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>TOTAL COST AT SUB ASSY LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BELL JAR VACUUM CHAMBER ASSY</td>
<td>$1,891.47</td>
</tr>
<tr>
<td>RESERVOIR ASSEMBLY</td>
<td>$484.17</td>
</tr>
<tr>
<td>INDUCTION COIL ASSEMBLY</td>
<td>$800.00</td>
</tr>
<tr>
<td>PIPING ASSY</td>
<td>$900.00</td>
</tr>
<tr>
<td>EM MAGNET ASSY</td>
<td>$380.00</td>
</tr>
<tr>
<td>ELECTRODE ASSEMBLY</td>
<td>$0.00</td>
</tr>
<tr>
<td>REACTION CHAMBER ASSY</td>
<td>$530.00</td>
</tr>
<tr>
<td>PV CELL ASSEMBLY</td>
<td>$15,000.00</td>
</tr>
<tr>
<td>BASE SKID</td>
<td>$400.00</td>
</tr>
<tr>
<td>VACUUM PUMP &amp; WATER PUMP</td>
<td>$4,600.00</td>
</tr>
<tr>
<td>MISC (RADIATOR)</td>
<td>$236.00</td>
</tr>
<tr>
<td><strong>TOTAL COST</strong></td>
<td><strong>$25,221.64</strong></td>
</tr>
</tbody>
</table>
TOTAL COST 250KW SUN CELL AT SUB ASSEMBLY LEVEL
SunCell® Road to Commercial Launch

<table>
<thead>
<tr>
<th>Engineering &amp; Self Sustaining Prototype</th>
<th>Alpha: Operational Prototype</th>
<th>Beta: Field Test Unit</th>
<th>Pilot Production Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Engineering prototype demonstrating continuous operation of SunCell® without catalyst &amp; hydrogen</td>
<td>a) Enclosed cell with automatic computer control of the reaction.</td>
<td>a) Operates continuously for days</td>
<td>a) Meet final product specs for power, reliability, cost, etc</td>
</tr>
<tr>
<td>b) Self sustaining prototype demonstrating self sustained continuous operation with catalyst &amp; hydrogen</td>
<td>b) Operates continuously for hours.</td>
<td>b) Generates ~60 kW of DC electricity</td>
<td>b) Generates ~100 kW of DC electricity</td>
</tr>
<tr>
<td></td>
<td>c) Restart capability</td>
<td>c) Can be connected to AC conversion and/or battery storage units</td>
<td>c) Built using production-like parts and processes</td>
</tr>
<tr>
<td></td>
<td>d) Integrated CPV with heat transfer/cooling</td>
<td>d) Has a product-like enclosure and safety features</td>
<td>d) Final enclosure and software, including user interface and connectivity</td>
</tr>
<tr>
<td></td>
<td>e) Generates ~30 kW DC net electricity</td>
<td>e) Operated by trained personnel only, user interface not optimized.</td>
<td>e) Meets safety and other regulations</td>
</tr>
<tr>
<td></td>
<td>f) Operated by BrLP and/or CT personnel only, does not need to have an overall enclosure or easy user interface/software</td>
<td>f) Has ability to capture and send data from locations outside BrLP/CT.</td>
<td>f) Can be easily serviced</td>
</tr>
<tr>
<td></td>
<td>g) Includes sensors and data capture to monitor key reaction parameters, inputs and outputs</td>
<td></td>
<td>g) Capable of being interfaced with an inverter to produce AC power</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>h) Capable of running at constant electrical power and rejecting excess power into a resistive load</td>
</tr>
</tbody>
</table>
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.
SunCell® in operation

Click the above image to view the video on YouTube:
https://www.youtube.com/watch?v=jUBheBH9eio