EGG EFFICIENCY RETROFITS

Energime Green Group, Ltd (EGG)

Hotel, Hospital and Municpal Efficiency Retrofits For Electricity, Heat, Steam & Sanitary Hot H2O

energime
SUSTAINABLE TECHNOLOGIES

Energime Power/
Tel. 425.221.9713
david@energime.com
www.energimeuniverity.org

Green BioProducts
Tel. +34-653-736-622
Www.Originclear.com
www.energime.com

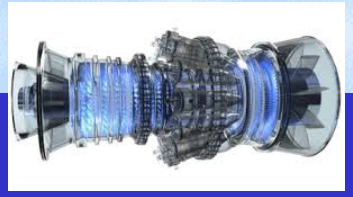
Hospital & Hotel Core Energy Reductions

1. ENERGY COSTS (reduction by 70%)
2. WATER Heating (reduction by 50%)
3. GAS & FOOD SERVICE COST -50%
4. Air Conditioning cost (-50%)
5. Back-up power costs (- 50%)
6. Lighting Cost lower by 50%
7. Heating lower by 60%
8. Outside Lighting -50%
9. Refrigeration Costs-60%

EGG EFFICIENCY
win-win-win!
Reduce upto70%

Hospital Cost & Mgmt Problems:
+ Energy Inflation @ 12% / year
+ Environmental Changes
+ Increasing Maintenance costs
+ Increasing Labor costs

Hospital energy demands are currently not managed
EGG's new Ortronic Amplifiers save 70% of power costs

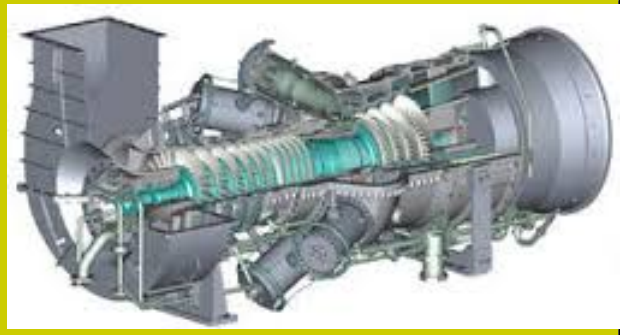


RED SUN & MOBILE STORAGE

Based on *Energime Green Group's Exclusive* Infrared Focusing Collection & Solid Heat Transfer and Storage Medium with a Combined Cycle Steam Power Plant – *96% of Sun's Energy used!*

Exclusive Solar Thermal infrared collection at 1800ºC, to run Large-scale 1.5 MW Rolls Royce Turbines with combined cycle to easily retrofit power plants, and sold in mobile system for running diesel engines off-site *without fuel* + *AC/Steam/heat using advanced technology* to transform the energy sector of Latin America & Asia!

Solar thermal above 1400ºC runs jet Turbines for the 1st Time!



RED SUN 163 MW Solar Thermal Project

Bangkok Thailand

Energime Green Group has 3 projects of CSP with Thermal Storage in Thailand. The Electricity is sold to Provincial Electric Authorities with 25 year Power Purchase Agreements. Projects also feature exclusive Red Sun solar thermal AC and Steam+ Heat sold to industrial clients.

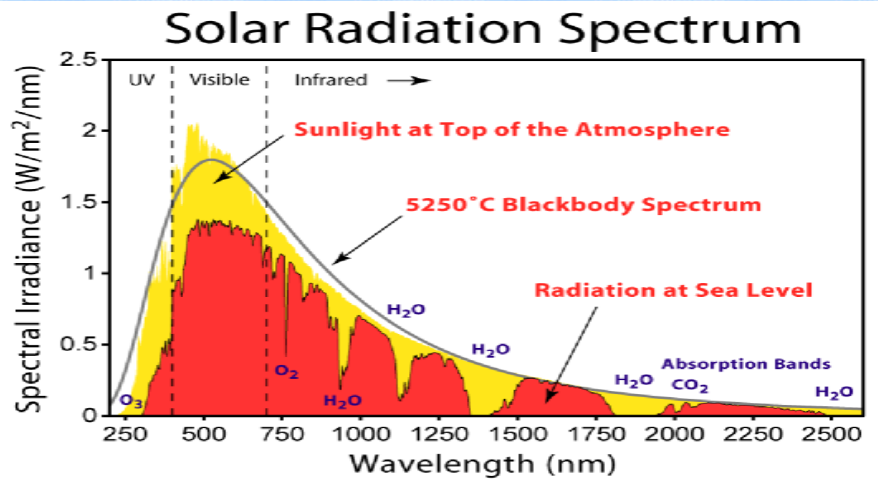
Tariff for these projects is $0.16 per kWh first 10 years, with the balance of 15 years paid at 15 cents per kWh. AC is in much demand and sells for 20 cents per kWh and heat and steam sells for 7 cents per kWh delivered. With 0 taxes for 1st 10yrs

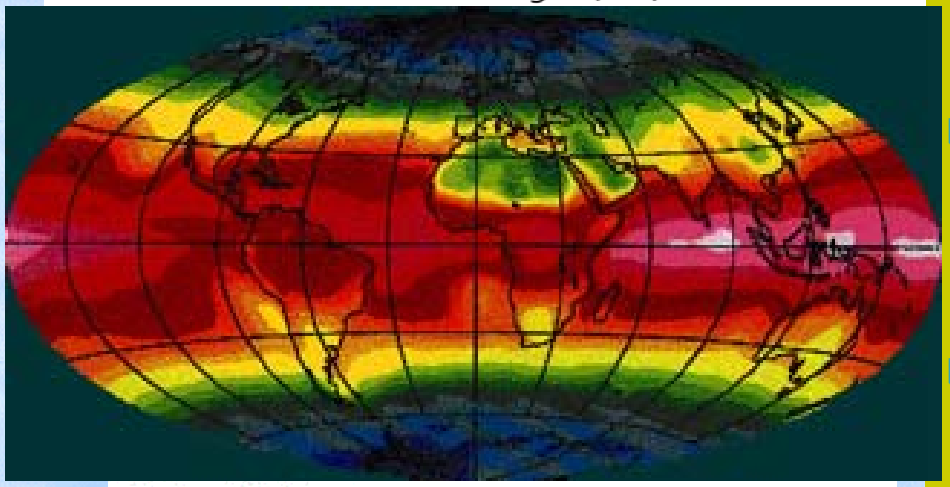
Thailand has a *Standard and Poor* rating of A-1, with Insurance wrap available from a top-rated Insurer on equipment, performance, and output, as well as on construction build-out.

energime
SUSTAINABLE TECHNOLOGIES

With 4 Modular Desalination contracts for 3 mil Liters per day for Samui Island, and new Power Purchase agreements pending for 100 Mwe on Smaui Island and 200 MW for the Military at Yotaga, for total of 300 Mwe+ 12 MML/day Desal

RED SUN Mobile Advanced Thermal Storage Unit



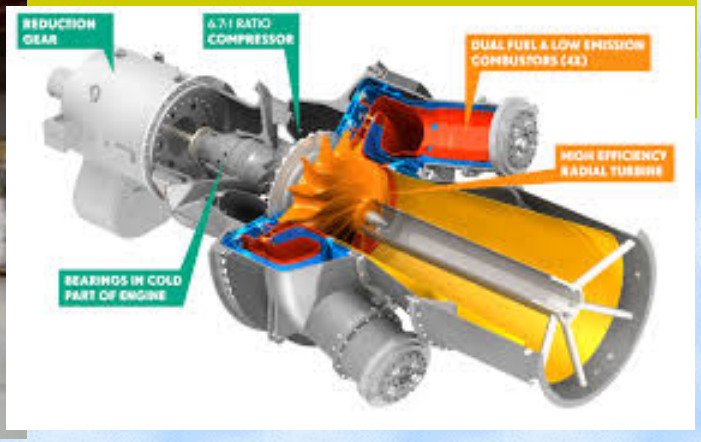


Long wave radiation is collected with visible spectrum to collect 96% of sun'energy & operate at 1800°C RED SUN features a solid state thermal battery made of graphite ceramics as storage unit that can store large amounts of thermal energy in a small footprint of 18m3

- A 40 MW RED SUN unit weighs 29 tons, is 18 M3 and can store up to 30 MW of thermal energy for in excess of **30** days.
- The unit will hold energy up to 1800°C to deliver energy in a measured and consistent manner. The thermal loss of the storage unit is 1.5°C per day.
- Using Diesel's original design to heat compressed air in modified Man, GE and Cummins diesel runs generators without fuel with Combined cycle low pressure steam gives overall 53% efficiency!
- A rail car shown on left is mounted with 90 MT of phase changing alloys can store 26,000 MMBTUs of thermal energy which is equivalent to over 1,000 ST of steam

Energime Green Group's exclusive *RED SUN & RED SUN MOBILE Thermal Power Plant*

Energime Green Group has developed technology tested & output-certified by ***Rolls Royce,*** *and* ***British Atmospheric Data Centre,*** running large 1.5 MWe turbines at high efficiency for over a year. ***RED SUN*** is the world-wide exclusive franchise for Infrared reflection to enable focusing & collecting the full spectrum of heat and light giving 1820°C for the 1st time! Additional co-patents allow molten steel 30 MW storage units 18m3 for 24 hr operations – 3-day operation with railcar storage of up to 212 MW for heat/AC & compressed Air modified Diesels: Boesch, Man, Gebruder Suizer, and Deutz.



RED SUN Thermal Storage System

With insurance on all equipment and performance based on over 50 years of successfully transporting molten steel to Sweden from Russia, Thyssenkrupp and *RAFT* provide the solid reliable thermal systems that are integrated into *RED SUN. With the full package now completed, including jv's, permit, power purchase agreements and approval by govt solar committee.*

Also, an *"ALL-INCLUSIVE"* insurance wrap for all equipment is arranged covering all retrofits and new construction, This lso includes covering all government contracts, purchase agreements, through two top-rated insurance companies. Energime Green Group & 3M have tested their systems for solar concentration for years, to generate power and electricity as well as making air conditioning, heat and steam to run combined cycle power plants. In some industrial locations

EGG Insurance agent is Steve Gannet, of Gannett & Assoc of Manhattan, NY, General Overseein Developer/EPC is Arcadis (www.arcadis.com) & EC Harris (www.ECHarris.com)

RED SUN Thermal Energy Storage to power industry with Compressed Air & Steam Power Plants 9,600 BTUs/kWh at 53% Efficiency

Electrical Induction Charger (Power from the Grid)

Direct Condensing Low Pressure Turbine Generator

Stage 2

Cooling Tower

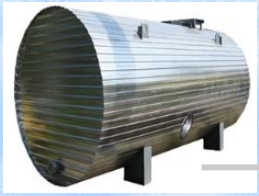
Steam Generator

condensor

Cooling Water Pump

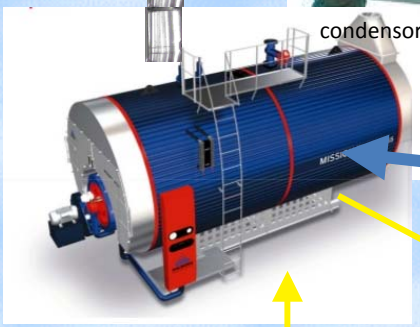
Condensor Pump

** High temperature superconductor* (1600-1800 oC)



Phase Changing Metal Thermal Energy Accumulator (Phase Changing Copper & Nickel Alloys)

** Heat Exchanger (convective induction)*



Super Heated Air Compressor at 1100 oC

Compressed Air

Air Accumulators

Mechanical Link

Low Pressure Air at 900 oC

Stage 1

MAN Diesel Generator Modified to Run on Heated Compressed Air

RED SUN CHARGING STATIONS: Solar Radiation 24 Hours/Day using Visible light & Infrared Spectrums to collect 96% of the sun's Energy!

- *Polished Aluminum*
- *& 3 M Film*
- *3 M film reflect up to 2800 um and polished aluminum reflect solar radiation up to 12000 um*

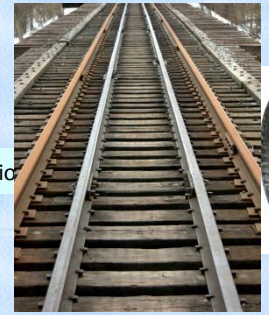
** Double Mirrow*

** Superconductor* (1000-1800 oC)

Each Dish produces 160 kW to 250 kWh of Thermal Energy

** Polished Aluminum on the dish reflects solar radiation*

fluxo em horário

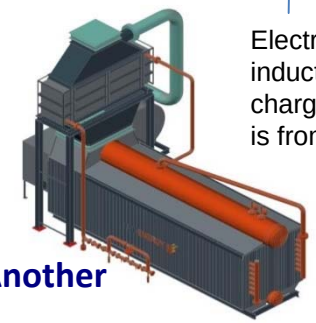


** Acumulador de calor (metais fundidos)*

Around 26,000 MMBTUs of transportable thermal energy Per 90 MW nominal thermal capacity. This is equivalent to over 1,000 ST of steam coal.

~~Superconductor~~ for heat (900° C to 1600° C

Thermal Energy storage units once charged can travel by rail to a load center for use. Energy can be stored for over 1 month



Electrical induction charger. Power is from the Grid

Other Applications to develop: Create Heat in One Location & Transport to Another Location to Use for Industrial Processes

Use of Dishes to Collect Solar Radiation to Substitute the Use of Electrical Induction for Heat Creation

Sistemas de infrarrojos patentados exclusivos centrados permiten 1800C con rated 22 Platos metros, con grafito 40 exclusivos sistemas de baterías MW cerámica destacados que relleno hasta en 2 horas para recoger la energía del parque eólico fuera de horas punta, mientras que la transformación del ferrocarril a la red con 1400-1800°C almacenado térmica energía a altas temperaturas y reducir la huella de la planta solar. Un plato solar colocado sobre una base de cemento tiene 500 m2 de película 3M y aluminio pulido. Los platos solares pueden crear concentraciones solares de hasta 950 soles y crear más 1,800°C en celo. La energía solar real disponible y capturado y entregado al sistema de almacenamiento térmico solamente incurre en una pérdida proceso de 7%.

Comederos no crean suficiente calor para el almacenamiento de energía. En lugar valles crean calor alrededor de 400°C y se utiliza de inmediato para producir vapor (base de carga). Comederos pueden concentrar el sol hasta 150 veces.

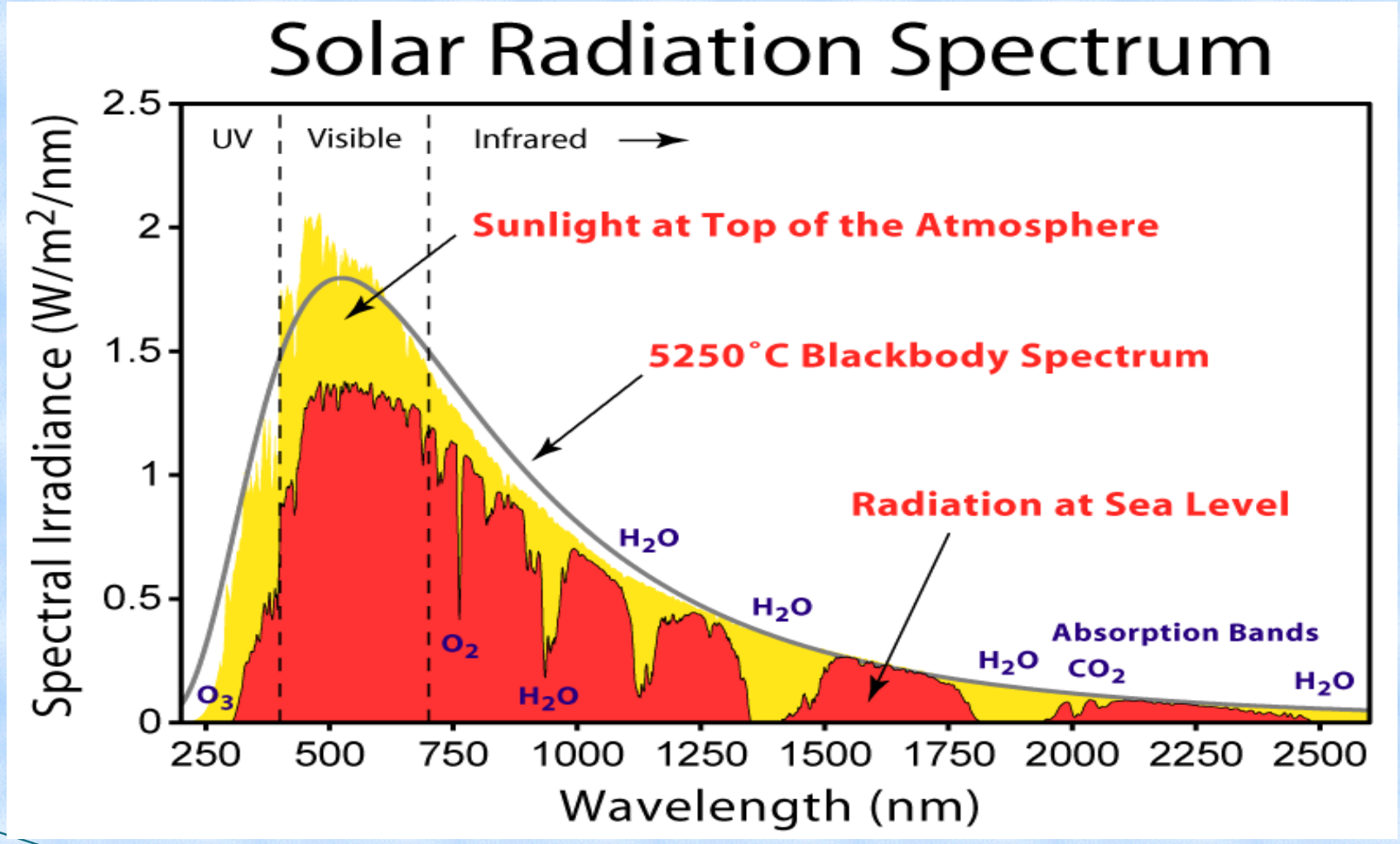
Pérdidas típicas para comederos para la conversión de la energía solar en energía térmica es de 18% a 20% debido a los efectos armónicos del viento. Comercio entre la necesidad de almacenar energía y Capex utilizando 22,6 metros clasificación platos solares, como se ve a continuación.

La planta de energía solar térmica propuesto requiere alrededor de 50% menos de área de una planta de energía de PVC convencional para producir una cierta cantidad de energía eléctrica.También SOL ROJO sigue más correctamente el diesel diseño original!

Oportunidad es eliminar los costes y las emisiones de la quema de combustibles fósiles en calderas de tamaño industrial + almacenamiento a 1800 ° C para funcionar comprimido aire modificado de as1840's motor diesel

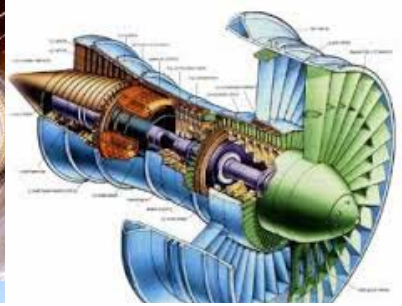
Además, algunos sitios industriales permiten ventas adicionales de vapor y el calor y el aire acondicionado (debido a la proximidad), a partir de $ 200 por MWh para CA y $ 70 por MWh para el calor y el vapor! SOL ROJO + exclusiva MÓVIL almacenamiento 30MW térmica en 18m3 hasta 212 MW en un vagón de tren!

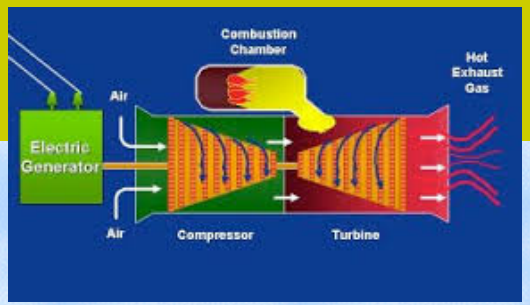
Phase II: Use of Dishes to Collect Solar Radiation to Substitute the Use of Electrical Induction for Heat Creation



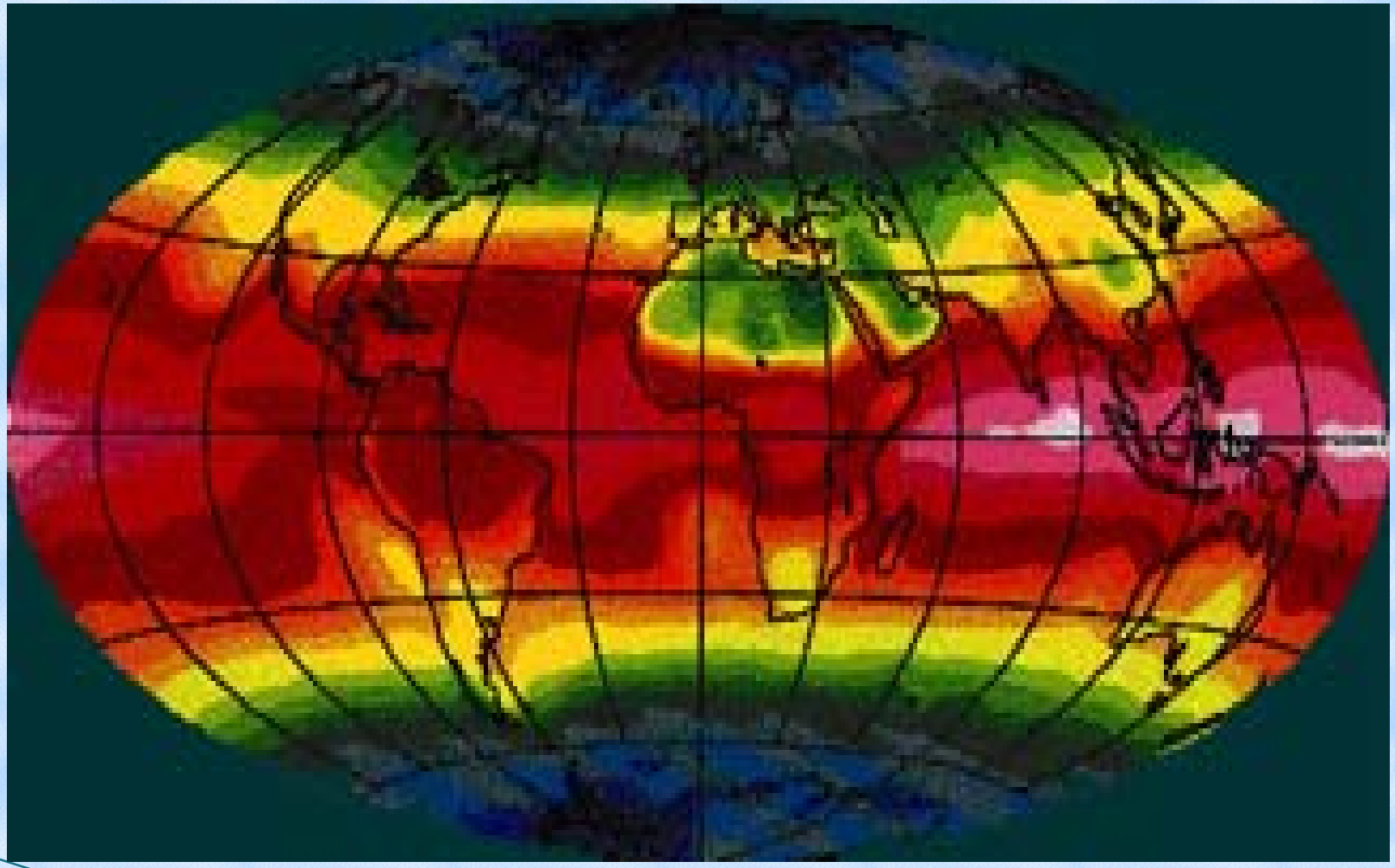
Why Long Wave Energy is nearly constant day and night throughout the year

1. The clouds and moisture in the atmosphere trap the long wave radiation and re-radiated as indirect radiation. This indirect radiation hits the Earth and is reflected back into space, only to be captured by the clouds and moisture in the air. This process begins again and continues, day and night throughout the year.
2. It is important to note that the ability to capture the long wave radiation and reflect it to a concentrator is the innovation that removes solar power from an intermittent energy source and allows it to have the same reliability as a fossil fuel plant.
3. The energy collected and converted to heat from the sun using the 3 M film with secondary mirrors is over 2 times greater than the energy captured and converted power by conventional PVC film. According to PV Watts, solar radiation measurements are typically 5 kWh/M2/Day based on visible light while long wave radiation captured produces over 400 Watts/M2/hr. or 9.6 kWh/M2/Day.
4. Long wave constant decrease dramatically. Once you go north or south of Cancer and Capricorn (23.5°), we lose 40 watts per M2. The loses until almost 40° latitude decreases another 10 to 15 watts per M2. There is another drop down to 350 to 300 watts per M2 beyond 40° to 44° latitude.

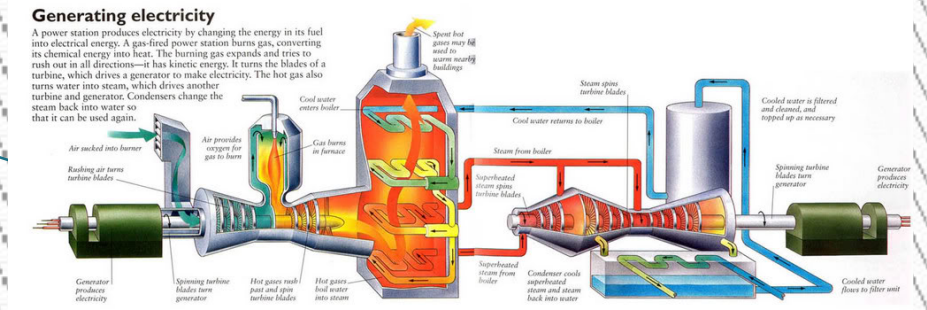




Long Wave Energy Concentration



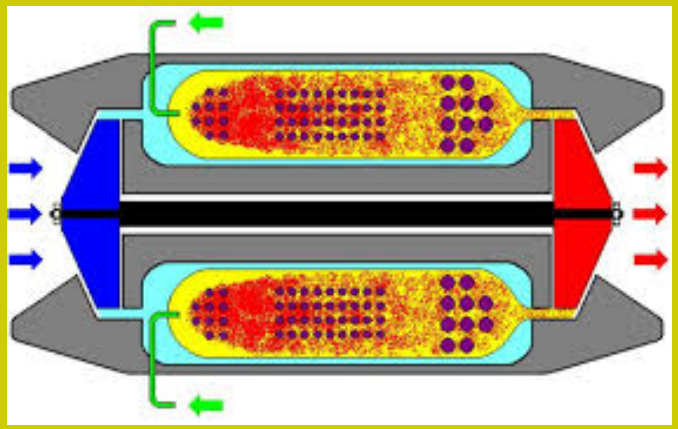
Advanced Solar Thermal – The Dish to Replace Power from the Grid (Phase 2 Upside once Solar Dish Certification is Completed)

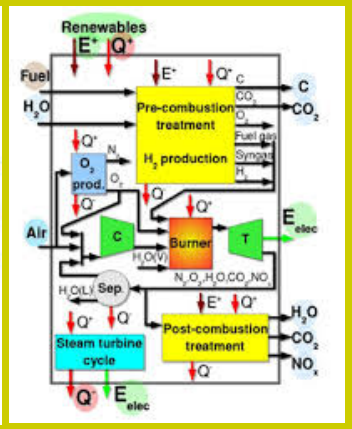


- The proprietary system captures up to 98% of the total solar spectrum as opposed to just visible light spectrum, which is 38%
- Other solar technologies capture only a fraction of the visible light spectrum
- A solar dish that has 500 M2 of 3M film and polished aluminum that collects 200 kWh of power. The Southeast of the United States, the power collected would drop to around 140 kWh.
- The dish is a compound curved deposit ABS plastic foam and coated with reflective 3M film.
- Under the 3M film there is a polished aluminium cladding that reflects long wave radiation.
- The expected medium capex per kw-installed thermal will be around $200 per kW-installed. For solar collector dishes.

Power Plant Based on Proven Technologies Proven for Decades and Sourced from Major Suppliers

- Rath AG www.rath-usa.com is producing the thermal core, insulation as well as the designs for the thermal dynamic model to ensure energy storage.
- EC Harris www.echarris.com is supplying engineering on thermal energy storage device.
- Posco Plantec www.poscoplantec.co.kr produces the pressure vessels, boilers and heat exchangers.
- Multiple suppliers will supply the balance of plant.
- For the mobile energy storage system, Thyssenkrupp would build the containment box, Bombardier or Budd Car would build the rolling stock, RATH AG, Thermal Dynamix or the Schaefer Group would be the induction system.





Selected Manufacturing Partners

Working with Best in Class Manufacturing Partners

Advanced Thermal Storage – Transfer of Thermal Energy

Thermal energy is transported without gas or liquid

- The Graphite foam tube has thermal conductivity of 4x that of molten silver
- The tube is capable of transporting 2.5 megawatts of thermal energy per hour
- An innovative thermal storage system that integrates high density phase change material, ceramics as well as graphite in a solid-state storage system.
- Energy can be stored thermally for days and up to weeks.
- Proposed thermal storage system is at least ¼ the cost of liquid salt systems used for thermal solar and does not have any environmental issues. The amount of energy stored in 18M3 of thermal storage designed by Energime Green Group (30 MW) is equivalent to several hundred cubic meters of liquid salt
- The proposed system has a very high energy density compared to the liquid storage systems used by conventional solar thermal plants. We can store heat up to 1720ºC. At 800˚ C, salt turns to gas and cannot resolidify.
- Higher the temperature stored means more energy for a given space.

RED SUN Mobile Advanced Thermal Storage Unit

- The storage unit is a solid state thermal battery that can store large amounts of thermal energy in a relatively small footprint. A 30 MW Unit is in the picture to the left.
- The unit weighs 29 tons, is 18 M3 and can store up to 30 MW of thermal energy for in excess of **30** days. If you reduce the size by 50%, you will reduce by 50% the energy that can be stored.
- The unit will hold energy up to 1600ºC and deliver that energy in a measured and consistent manner. The thermal loss of the storage unit is 1ºC per day.
- For a 30MW thermal energy storage device, the manufacturing costs will be around $100,000.
- A rail car mounted 90 MT of phase changing alloys can store 26,000 MMBTUs of thermal energy which is equivalent to over 1,000 ST of steam coal.

RED SUN Mobile Storage – runs all services

retrofitting to all diesel generators running hot compressed Air to make all electricity onsite

Runs AC

Ice Plants & desalination

On demand saves 50 % +

Runs genset

Can move

Filled-off-site

Fumeless Clean Power

Highly reliable & stable molten metal loses only 1.5ºC/day 7-25 d storage 40 MW total

Runs Rolls Royce, GE, Bladon Jet turbines 1.5MW

Operating @ 1400°C-1800°C

Runs steam combined cycle generators

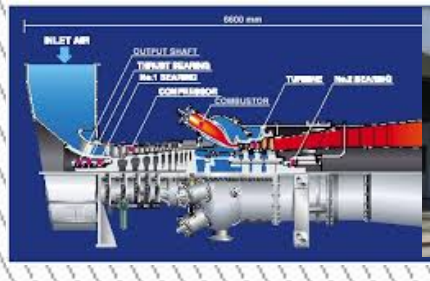
Self-contained

Mobile Energy Storage Rail Cars

Torpedo Rail Car Used to Transport Molten Iron

To start the thermal storage business, one needs to invest in 2 torpedo rail car units plus the costs to sign up a power source and na end user for the thermal energy. Most of the capital tied up in the business will be in the rail cars which will have a residual value based on the value of the metals used in the system.

- A Thermal energy storage system capable of transporting 90 MT of alloys will carry 26,000 MMBTUs of thermal energy which can be stored for over 1 month.
- The thermal energy transported is equivalent to over 1,000 ST of steam coal (10 coal cars).
- No pollution is created in the charging and use of thermal energy.
- Can recharge using 7600 MWH over 6-days.
- At $.04/kWh cost for power at a wind farm, the cost to recharge the thermal energy storage system will be $311,000 ($11.95/MMBTUs). This cost is not sensitive to rail freight costs. Energy can compete in price against any diesel-fired boiler/furnace and in some cases, against natural gas-fired boilers.
- System could deliver a high temperature heat (1400°C) to a power plant boiler such as a coal-fired boiler if one can use low cost electrical power from a wind power plant where land is cheap and deliver the renewable thermal energy to a fossil fueled boiler as a repowering project.
- Solar Thermal Power plants can be built to displace the need to buy electricity in order to improve even more the operating margins. If one owned thermal solar power plants to create the heat for the system, operating margins will be over 50%.



Project Economic Sensitivities

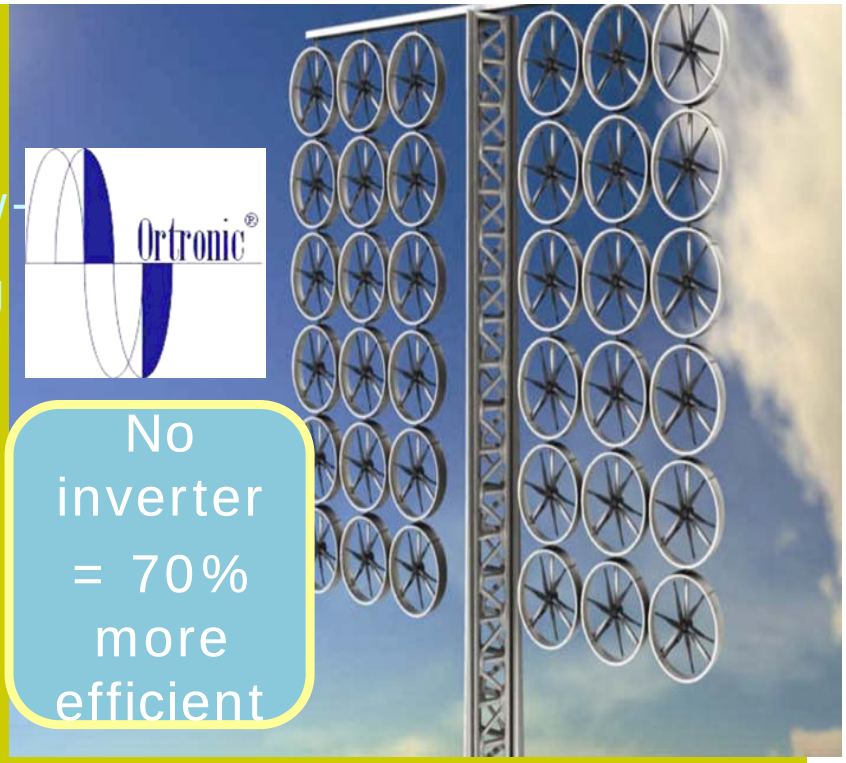
RED SUN LINES built without wires and solar thermal power to be integrated

The capital cost of the RED SUN thermal energy storage and infrared dish system works out to $0.041 per kWh over its 20 year life.The thermal storage is primarily a ceramic nanographite case, with copper and nickel-Fe core.

The combined cycle configuration is the most efficient design for the plant. The capex is basically what a genset configuration costs plus a low pressure steam power plant. The overall efficiency of converting electricity from the grid to thermal energy and back to electrical power by a combined cycle system is 53%. También SOL ROJO sigue más correctamente el diesel diseño original!

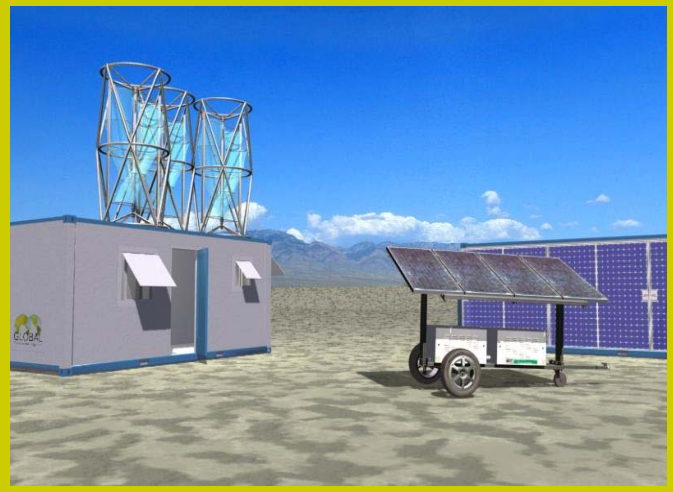
- The project's returns are dependent on transporting goods primarily
- The project will be servicing and be support for materials and labor for the TAPI pipeline project, also to be built by Energime Green Group technology
- Each thermal energy unit needs 6 hours to recharge completely overnight, which will require switching battery cars overnight while in the station..

POWER TOWER- flexible, roof-top systems combining dense power with low-weight 130 kW restrictions, while making power @ 3.3 mph!



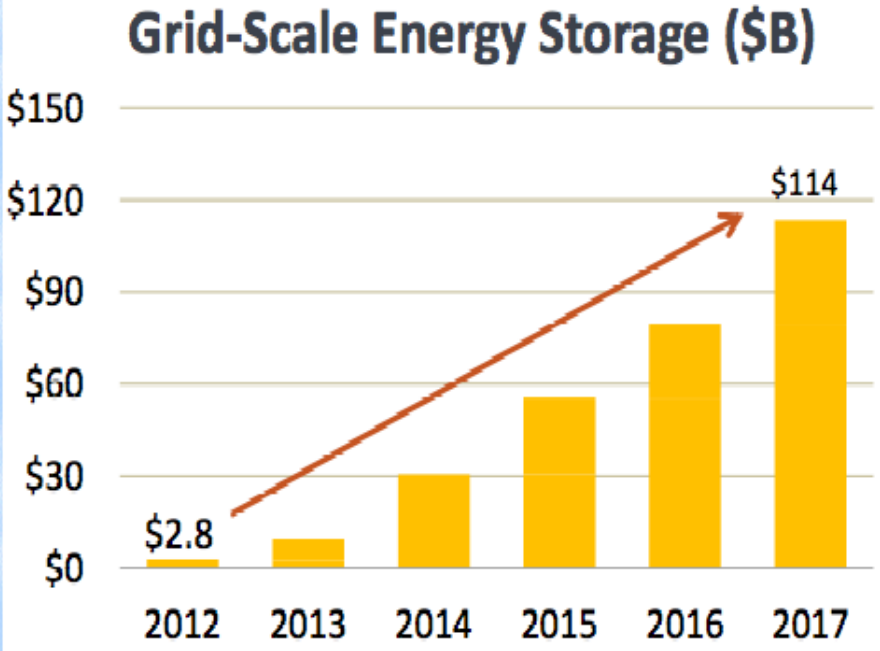
RED SUN- Efficient, easy, quick infrared hot water, steam & heat applications & runs turbines

RED SUN MOBILE thermal storage – converts lectricity to thermal at 98% efficiency. This dense power stored in graphite ceramic battery for 80 days of back-up power for electricity, air conditioning & heat (runs all energy systems in dense 18m3 central battery 29 tons in container)



Project Growth Potential

Energy Storage Market Potential



- Lux Research – $114 B by 2017
- Piper Jaffrey – $600 B market over 10-12 years
- Boston Consulting Group – $400 B market by 2020
- EPRI/DOE – annual savings of $50 billion/year via energy storage

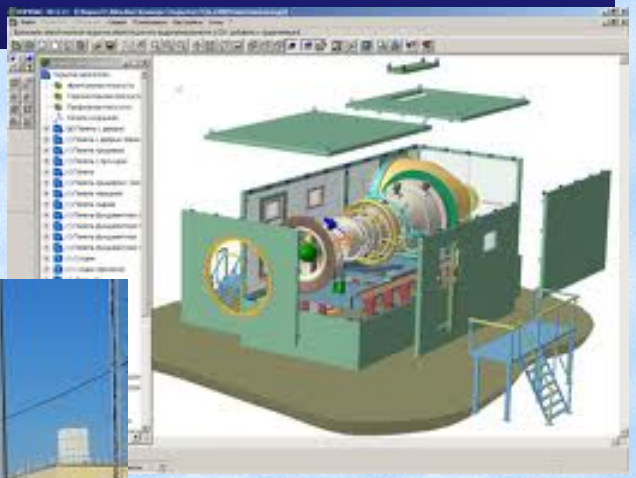
Plenty of market potential... for the right product at the right price

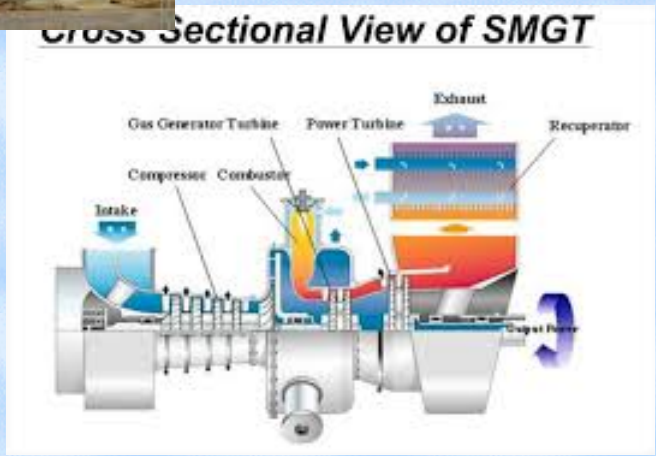
RED SUN 64 MW Pro forma + AC / Steam / Heat

Selling Electricity, Air Conditioning +Steam spectrum to operate at 1600ºC in the yellow and red zones shown in the solar radiation map below. RED SUN features a solid state thermal battery made of graphite ceramics as storage unit that can store large amounts of thermal energy in a relatively small footprint.

- A 30 MW RED SUN unit weighs 29 tons, is 18 M3 and can store up to 30 MW of thermal energy for in excess of 30 days. If you reduce the size by 50%, you will reduce by 50% the energy that can be stored.
- The unit will hold energy up to 1600ºC and deliver that energy in a measured and consistent manner. The thermal loss of the storage unit is 1ºC per day.
- For a 30MW thermal energy storage device, the manufacturing costs will be around $100,000.
- A rail car shown on left is mounted with 90 MT of phase changing alloys can store 26,000 MMBTUs of thermal energy which

All RED SUN STORAGE & Genertors come in Self-Contained Shipping Containers





Conclusions & Contact Information

Energime Green Group's RED SUN runs diesel without fuel, and can tranform the rail into large-scale electrical distribution for wind and solar farms using a relatively low-cost thermal storage power plants focusing infrared + visible to get triple heat at 1800°C to run stationary power plants and mobile cylinders for weeks while providing for heat and power to local communities and bases & charges fully in 2 hours! Runs from 3 days to 2 weeks

- All Train stations will become power plants by *RED SUN SOLAR THERMAL,* allowing *RED SUN Lines* to run without line, electricity, grid, or normal infrastructure required for train lines, transforming the country w/ 700mi rad
- The thermal storage system coupled with a low pressure steam loop with a 4 stage turbo generator is the lowest capex configuration for projects. Also, there are no on-site operators required at the plant when a low pressure steam and heating compressed air to run diesel engines was perfected in the 1840's. EGG's exclusive patented Solar Thermal Brayton Cycle reaches break-through temp1400-1800°Cto run GE jet turbine; & pending Infrared Focusing!
- Most reliable engine and steam systems available running for 40 + years!
- Epc-ARCADIS: www.arcadis.com & EC HARRIS – www.ECHarris.com
- Jay Dubinsky -Engineer~David Gershuny CFO ~Energime-Tel. USA - 425-221-9713 Green BioProducts+34-653-736-622 /34-971-099-339 Drrenewables@gmail.com David@Energime.com