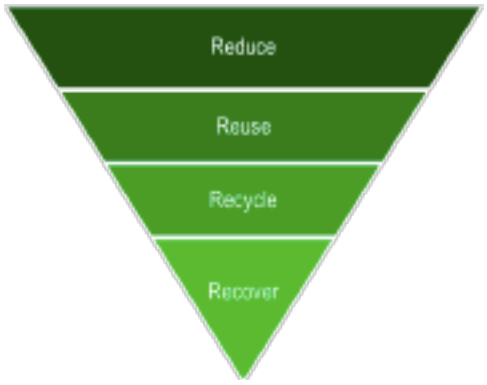
Recovered Energy Solutions

RECOVERED ENERGY SOLUTIONS
CORPORATE PROFILE / PROJECT HISTORY

Recovered Energy Solutions is an independent engineering and consulting firm dedicated to the promotion of the most current technologies for the recovery of energy from waste. Recovered Energy has been directly involved in all phases of the engineering and construction of over 20 plants in over a dozen different countries.

Recovered Energy Solutions was established to remedy the ecological damage caused by waste pollution, promoting management strategies and implementation of the best technologies for the "total elimination" of urban and industrial wastes while creating a clean sustainable solution for generating electricity.

As Recovered Energy Solutions we assume a strong conviction to the policies implemented by the federal government for waste management, focusing on prevention, collection, recovery, treatment and its transformation into energy, under the scheme of the 4R's:



At Recovered Energy Solutions we believe that sustainable development is not only the way for the preservation of our natural resources and safeguard the future of our planet, it is also a way to improve the financial performance of industrial operations and minimize the cost of public services and we achieve this through the Integrated Waste Management System.

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Executive Team

Richard Battaglia – Director Of Engineering Engineer / Principal

General Manager with more than forty years of proven power generation management.

Mr. Battaglia was formally Project Manager on the following projects & involved in all aspects of Engineering, Procurement, Construction (EPC) and facilities management.

James Koenig - Managing Partner

Mr. Koenig has 20 years of projects management experience and is currently senior project manager for Recovered Energy Solutions construction project in Reno, Nevada to install a large scale industrial Plasma processing circuit for the recovery of precious metals from electronic waste. James has lead the project in all phases of staffing, permitting, Engineering, design, procurement and construction.

Dennis Kalnas / Project Manager

Mr. Kalnas has over 25 years of diverse industrial experience in project management. Including, but not limited to, plant design and construction, engineering solutions, operating and training employees pertaining to and maintaining industrial processing systems. Mr. Kalnas handles the daily operations of Recovered Energy Solutions, Reno Nevada Facility.

Ron Walker / HMI Controls

Mr. Walker's 40 years experience and knowledge of HMI upgrades, control retrofits and installations is legendary. His expertise covers not just GE & Siemens gas and steam turbines used in the Power Generation and Oil & Gas industries, but also in use in a wide range of industrial operations to include Pulp & Paper and industrial processes.

Michael Barati

Director of International Acquisitions & Trade with 35 years of project management experience in Engineering, construction and sales, with the last 8 Years in the oil and energy sectors (power plant sales/marketing, oil field equipment & machinery (inspection, certification and purchasing), and petroleum products.
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Project History:

Project Management - All aspects, Engineering, Procurement, Construction (EPC)

1. Linden Co-Generation Center Elizabeth N.J. - 1000 MW CCPP
2. Newark Bay Co Generation Center Newark, N.J. - 135 MW CCPP
3. Kennedy International Airport Co-Gen Center, Jamaica, N.Y. - 125 MW CCPP
4. Stony Brook State University New York Co-Gen Center - 47 MW SCCHP
5. Hog Bayou Energy Co-Gen Energy Center Mobile, AL - 250 MW CCPP
6. Santa Rosa Co-Gen Energy Center Santa Rosa, FL - 250 MW CCPP
7. Bethpage Peaker Hicksville N.Y. - 47 MW SCPP
8. Bethpage Energy Center III Hicksville, N.Y. - 79 MW CCPP
9. 29 Palms Plasma Enhanced Melter Research & Development
10. Reno Plasma Enhanced Melter Phase II 1 MW Processing Facility
11. Bucharest Romania 480 MW Combined Heat & Power Engineering

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Project History

Linden Bay-Way Refinery Cogeneration Project CHP 600 MW 700MM USD 2 yr build time (8 modular units)

Newark Bay Cogeneration Energy Center CHP 135 MW, 120MM, 1 yr build time (3 Modular Units)

JFK International Airport CHP Plant with HVAC 110 MW $250MM 1.5 yr build time (3 Modular Units)

Stony Brook Cogeneration Energy Center, CHP 45MW 80 MM 1yr build time 1 Module Unit

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Hog Bayou Energy Center 240 MW CHP 150 MM 18-month build time

Santa Rosa Energy Centers, 240 MW CHP 155 MM 1yr build time 2 Modular Units

Bethpage 3rd Turbine Peaker Power Plant Project, 50MW, 50 MM 1 year

The Bethpage Energy Center III - 80 MW, 140 MM 1 yr build time

OUR SERVICES & PRODUCTS

- Flexible Hybrid Renewable to Electricity
- Municipal Solid Waste Refuse Derived (RDF) Fuel To Electricity
- Biomass to electricity
- Landfill Gas Methane Capture and Remediation To Electricity
- Natural Gas Hybrid Power Plants
- PowerPHASE FAST LIGHT Electric Storage & TurboPHASE
- Mobile Gas Turbine Generator Units
- Mobile Water Treatments / Oil Water Separators
- Photo Voltaic & Concentrated Solar Power
- Plasmafication Of Electronic Circuit Boards For Precious Metal Recovery

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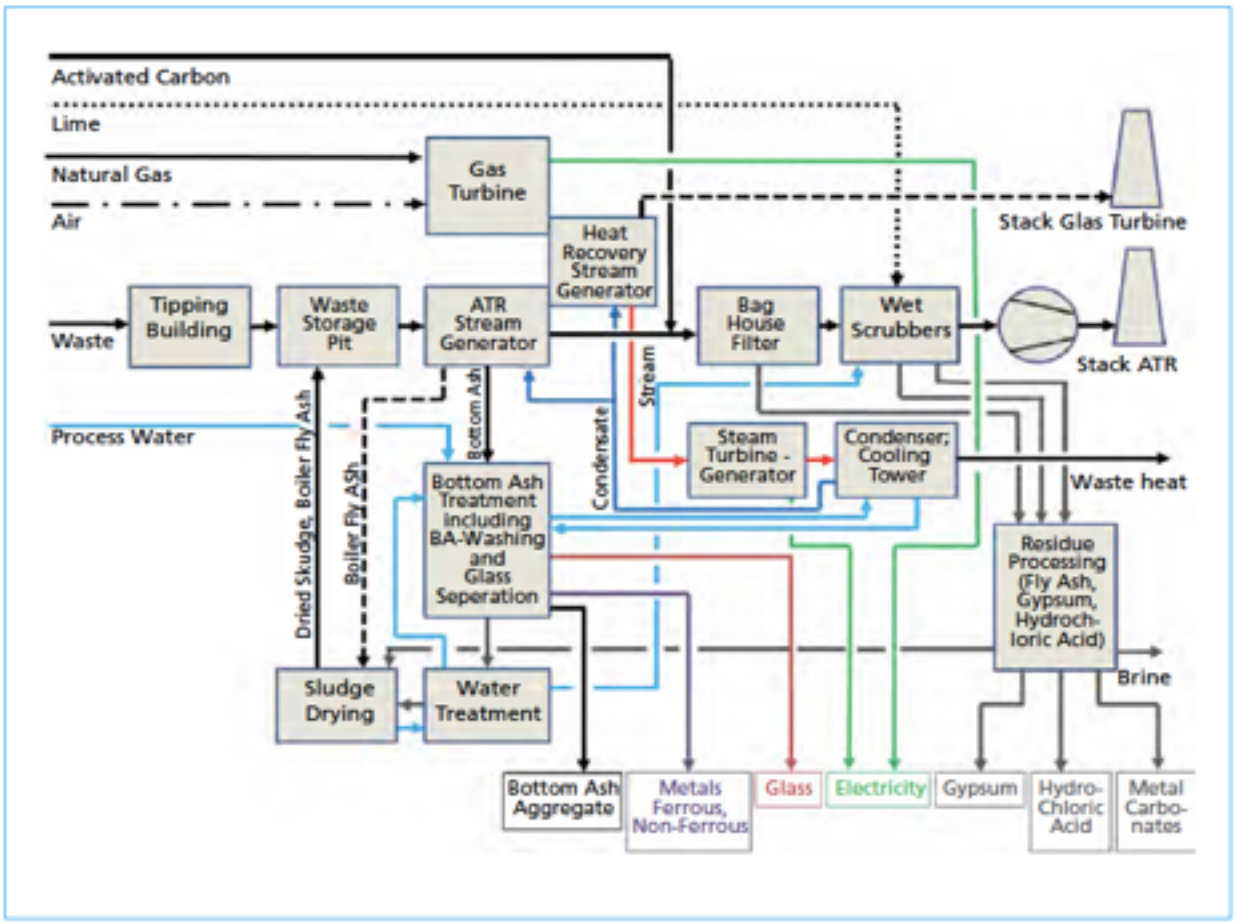
Hybrid MSW Waste To Electricity with Natural Gas To Electricity

The Waste Treatment Plant is designed as a WtE facility for municipal solid waste coupled with a Combustion Turbine Generator (CTG) unit. The energy recovery from the WtE facility will be enhanced by the operation of the gas turbine, fueled by the combustion of liquefied natural gas (LNG) or liquefied pressurized gas (LPG). The overall process is described by the following block diagram in Figure 1.



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Current Projects

PLASMA REFINING OF PRECIOUS METALS PHASE II

Our plasma arc furnace can revert metallurgical substrates back to their elemental constituents, separating any non-−metallic materials in the process, and generating detoxified metals as a final product. Following this process, the final product of pelletized metal must go through a chemical digestion process to separate and refine the desired metals. Applications include the recovery of precious metals from Electronic Waste.

29 Palms California

Reno Phase II

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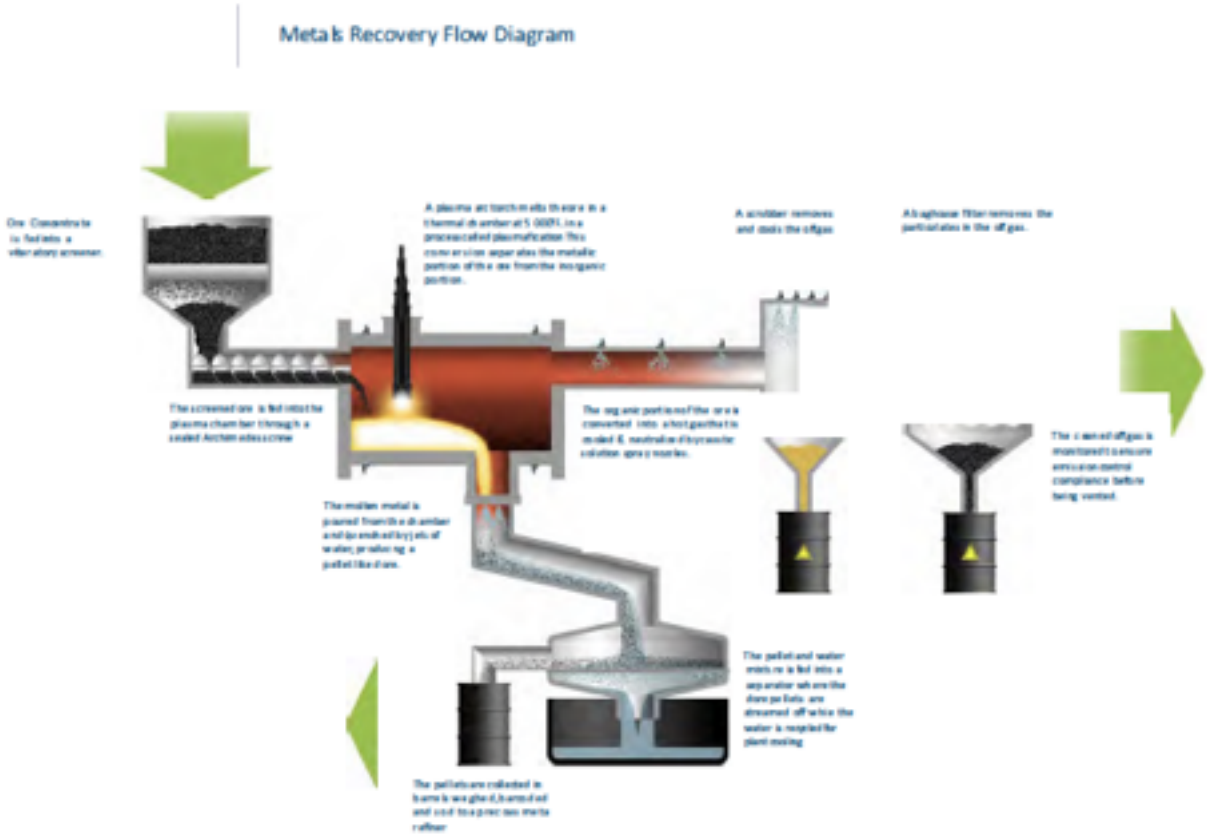
Recovered Energy Team is near completion of Phase II 1 MW Plasma Metal Recovery System and full refining circuit at their 40,000 sq ft state-of-the-art facility in Sparks, Nevada.



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Power Phase - Turbo Phase


POWER PHASE GAS
TURBINE POWER RECOVERY

Turbophase boosts the output of a gas-fired combined-cycle power plant by up to 15% and a simple-cycle plant by up to 20%. The incremental power comes at the same or similar heat rates to the combined cycle plant. Plant operators can expect a 2-3% plant heat rate improvement when citing TurboPHASE at simple cycle plant. A Turbophase system is composed of a series of skid-mounted Turbophase Modules that rely on an efficient reciprocating engine burning natural gas, diesel or any fuel required by the

customer. Each Turbophase Module also houses a four stage inter-cooled centrifugal compressor to inject hot, high-pressure air directly into the combustion section of the CT, thereby increasing mass flow through the turbine.

The TurboPHASE module compresses ambient air thru a multi staged, inter-cooled compressor driven by a turbocharged reciprocating engine. Each module is designed to deliver up to 350C air at up to 18 bara to the gas turbine at 6 kg/s.

The TurboPHASE module is a factory-assembled enclosed and weather-protected single-bedplate assembly, each measuring 8 feet x 32 feet x 15 feet high (2.4m x 9.8m x 4.6m) and weighing approximately 90,000 lbs (40,823 kg).

TurboPHASE is the most powerful, efficient and economical method to add new generation quickly to the existing electrical system.

TurboPHASE recovers the output that is missing from all gas turbines at high elevation or high ambient temperatures. TurboPHASE supercharges the existing gas turbine by increasing the mass flow to the combustion chamber and power turbine. The TurboPHASE compressed air injection system adds compressed, dry air into the compressor discharge of the gas turbine. Each TurboPHASE module (TPM) is capable of increasing a combined cycle F class gas turbine by 5.5MW.
TurboPHASE can be offered through a lease program and would be 5.00 $/kW-month for 15 years With this lease, we would install the units and we would include term maintenance and term warranty.

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Mobile Gas Turbine Generator Units



READY FOR ANYTHING, ANYWHERE. POWER MODULES

As economic development, population and infrastructure grows, so does the demand for energy. Now more than ever, a cost-effective and reliable energy supply is essential.
From mission-critical to everyday backup and standby power to continuous power and heat and cooling supply,

Recovered Energy Power Systems (REPS) Onsite Energy provides complete, dependable diesel and gas power generation solutions wherever—and whenever—reliability is needed. With thousands of installations worldwide, REPS Onsite Energy is trusted to provide complete power solutions to a variety of applications, such as healthcare, hotels, data centers, manufacturing and independent power plants.

Using proven technology, REPS Onsite Energy diesel generator sets and gas-powered cogeneration systems feature low lifecycle costs and peace of mind. That's why REPS Onsite Energy systems are trusted all over the world, providing reliable heat and power efficiently.

In a fast changing world of ever-increasing energy demands, you need a power generation supplier that can dependably and efficiently ensure a continuous flow of power.

With our power generation experience, REPS Onsite Energy offers you a full range of solutions tailored to your needs, and backed by our outstanding service and support network.

Recovered Energy Solutions

Mobile Water Treatment

MOBILE MODULE RE-300 TREATS UP TO 90 MGD OR 340,000 M3 / DAY

PRODUCED WATER TREATMENT SYSTEM - 100 gpm (22.5 M3/hr)

Oil Water Separators & Process Contaminated Water Treatment

Recovered Energy Solutions water treatment solution combines all the best properties of existing water treatment chemistries in one modular mobile system. The technology harnesses the cheap, industrial disinfection efficiency of chlorine, the environmentally friendly attributes of UV (no disinfection by-products), the oxidation power of ozone (but even more powerful), and the contaminant removal capabilities of a coagulant (clarified water) all into easily mobile and fast deployable modular design. Perfect for easy transportation from location to location.

The technology is based on the low cost production of a supercharged iron molecule known as ferrate, (iron 6+), or (FeO42-). The efficacy of ferrate chemistry and treatment applications for drinking water, wastewater and industrial effluents has been well documented, with over 450 peer-reviewed, scientific studies published worldwide. RES's water treatment system manufactures ferrate on-site, ready for immediate use.

Recovered Energy Solutions

Compared to conventional water treatment alternatives, ferrate offers unique treatment benefits, delivers multiple treatments from a single dose, creates no disinfection by-products, and solves difficult treatment challenges that competitors can't address.

All water treatment boils down to chemistry. Ferrate treatment is exceptional in that no other water treatment chemistry acts as a powerful oxidant, disinfectant and coagulant all delivered by a single dose. It reduces the number of process steps and cost of capital equipment required to complete a treatment train. Treatment chemistries are measured in volts as a reduction oxidation potential and ferrate is more powerful than ozone, permanganate, peroxide or chlorine. Only hydroxyl radicals have a higher redox potential and, because they are so short lived, their practical application is very limited.

Water Treatment Technologies

	Chlorine	Hydrogen Peroxide	Ozone	Ferrate
Oxygen atoms	None	2	3	4
Redox potential	1.39	1.78	2.08	2.20
Coagulant	No	No	No	Yes

Ferrate is a powerful oxidant with the ability to treat many contaminants where other water treatments are ineffective

Ferrate, a naturally green chemistry produced from the same form of iron found in our bodies and all living things, is extremely powerful, but its treatment by-product is benign. As ferrate (iron 6+) grabs electrons to perform treatment, it falls back down to an iron hydroxide (iron 3+), the same form of iron found in a handful of dirt, making it ideal for environmental applications.

A two year, $150,000 technology comparison and feasibility study backed by the Louisiana Department of Natural Resources found ferrate technology delivered the lowest lifecycle cost over chlorine, ozone and ultraviolet (UV) alternatives. Ferrate was further shown to treat municipal wastewater to the highest standard, allowing its re-use as a fresh water resource to restore the 28,000 acre bald cypress wetlands surrounding New Orleans.

Recovered Energy Solutions

Photovoltaic & Concentrated Solar



GENERATIONS AHEAD

Energy moves our world. It's the cornerstone of every modern society and economy. Growth and prosperity are determined by its abundance and reliability. Recovered Energy believes that clean, affordable solar electricity is not only viable, but essential. That is why we have been leading the charge to integrate reliable and affordable solar electricity into the energy mix on a global scale since our founding.

Cost Competitive Recovered Energy delivers solar energy that is cost competitive with conventional energy sources today. Our proven solutions diversify the energy portfolio and reduce the risk of fuel-price volatility, while delivering a levelized cost of electricity (LCOE) that is cost competitive with fossil fuels.

We offer the most bankable solar energy solutions in the world. With the strongest financial stability in the industry and unparalleled use of our technology in debt-financed projects, our bankable energy solutions provide access to capital and low-cost financing to leading utilities and energy investors.

We achieve breakthroughs throughout the entire power plant solution. By integrating technologies, services, and expertise across the entire solar value chain, Recovered Energy delivers more predictable and bankable PV energy solutions that increase energy yield, lower LCOE, and provide stable grid integration to maximize value and minimize risk for our customers and partners. Our system solutions include turnkey PV power plants that are are connected to the grid.

Recovered Energy Solutions

HYBRID CONCENTRATED SOLAR & NATURAL GAS TO ELECTRICITY

Today, solar is cheaper than diesel. With fixed pricing and no fuel-price volatility, solar represents a meaningful value proposition for anyone burning liquid fuel as their primary energy source. Our innovative hybrid system solutions provide cost-competitive solar energy as an alternative source of fuel, reducing fuel consumption and variable costs with reliable and affordable solar electricity.

Distributive Power

Distributed solar generation can be deployed rapidly. Since the energy generated is consumed locally, less energy is lost in transmission from the point of production. Our high-power density, mono-crystalline solar technology reduces installation costs and enables our customers to pack more power and energy production into each site constrained location.

Contact

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