

ASX Announcement

17 August 2010

Commissioning of world's first solar thermal Kalina Cycle® power plant, during Expo 2010 in Shanghai, China.



- Integration of Kalina Cycle® technology into an innovative solar thermal application
- Wasabi Energy hosts high-level dignitaries from industry and government
- Immediate market opportunities for widespread adoption of Kalina Cycle® technology
- Chinese licensee (SSNE) accelerates the development of Kalina Cycle® projects

In a world first, Wasabi Energy (ASX: WAS) subsidiary, Global Geothermal Limited¹ and exclusive Kalina Cycle® licensee for the Chinese market, Shanghai Shenghe New Energy Resources Science and Technology Co Ltd (SSNE), recently commissioned a solar thermal power plant operating with the highly efficient, Kalina Cycle® technology. The Kalina Cycle® power plant was integrated with the design and construction of the Shanghai Corporate Pavilion (*figures 1-3*) as part of EXPO 2010 in Shanghai, and has been on public display since the 1st of May this year. The Kalina Cycle® power plant (*figure 3*) utilises heated fluid of 90 - 95°C from a solar thermal array installed on the roof of the Pavilion (*figure 4*), to generate approximately 50 kilowatts (kW) of emission-free electricity to power the Corporate Pavilion.

Similar to all other Kalina Cycle® systems constructed to date, at the core of the Kalina Cycle® power plant installed at EXPO 2010, is a patented and thermodynamically superior working fluid consisting of a variable concentration ammonia-water mixture. The major innovation of the Kalina Cycle® system installed at EXPO 2010 is in the integration of the technology, specifically the working fluid, with a solar thermal array (*figure 4*). Although this is the first demonstration of the Kalina Cycle® technology

in a solar thermal application, the underlying principles of efficiently extracting thermal energy from a working fluid and generating electricity is similar to other industries, including geothermal and waste heat recovery, where the technology has been operating successfully, for more than a decade (*figure 7*).

The Kalina Cycle® power plant installed at the Corporate Pavilion will operate for the duration of EXPO 2010 (31st of October), and will then be relocated to an alternative site to again demonstrate the unique efficiencies of the technology.



Fig 1 - Solar thermal Kalina Cycle® power plant demonstration - EXPO 2010 Shanghai, China.

¹ - Global Geothermal Limited is a majority owned (~96%) subsidiary of Australian Securities Exchange listed, Wasabi Energy Limited (ASX: WAS).

² - Kalina Cycle® is a registered trademark of Global Geothermal Limited. The Kalina Cycle® is a patented power cycle technology owned by Global Geothermal Limited.



Fig 2 - Shanghai Corporate Pavilion with solar thermal Kalina Cycle® power plant (bottom right) .



Fig 3 - Construction of solar thermal Kalina Cycle® power plant by SSNE.



Fig 4 - Solar thermal array installed on the roof of the Shanghai Corporate Pavilion by SSNE.



Fig 5 - Solar thermal Kalina Cycle® power plant demonstration - EXPO 2010 Shanghai, China.

Kalina Cycle® - Industry and Government Engagement

In addition to increasing the profile of the Kalina Cycle® by showcasing the technology to the more than 40 million visitors that have already attended EXPO 2010, the Kalina Cycle® power plant has also been important in demonstrating the advantages of the technology to both industry and governments.

Global Geothermal Limited and SSNE have hosted numerous high-level industry delegations visiting the Kalina Cycle® power plant installed at EXPO 2010. Visits have involved a number of existing and prospective partners including major power plant engineering, procurement and construction (EPC) providers, which will be pivotal in the delivery of the Kalina Cycle® technology for larger capacity projects.

Wasabi Energy also hosted a number of dignitaries including the Hon. Jacinta Allan MP, the Victorian Minister for Industry and Trade, as well as the Minister for Rural and Regional Development, to highlight the world leading innovative power cycle technology commercialisation activities being conducted by Melbourne based, Wasabi Energy.

Kalina Cycle® - Global Solar Thermal Implications

One of the major technological breakthroughs achieved by the power plant installed at EXPO 2010, involves successfully achieving effective power generation from one of the lowest temperature (non-concentrating) solar arrays in the world - only made possible, due to the superior thermodynamic performance of the Kalina Cycle® technology.

The currently installed global solar thermal power generation capacity is approximately 1,000 megawatts (MW) and similar to other emerging renewable energy technologies, represents only a small proportion of the overall power generated by conventional (typically fossil fuel based) power generation. Recent corporate activity led by major global power companies in the solar thermal sector³, including the acquisition of Solel Solar by Siemens AG for US\$418 million last year and the acquisition of formerly Australian Ausra by Areva in February this year, highlights the expansion that is currently underway in the sector. According to a report released by Emerging Energy Research⁴ in April this year, the global concentrated solar thermal (CST) market is forecast to reach 16,000 MW of installed capacity by 2015.

The Kalina Cycle® is suitable for integration with the planned concentrating solar thermal power plants which typically operate with a working fluid of ~350°C. Importantly, the EXPO 2010 power plant has demonstrated, the Kalina Cycle® is also effective in generating power from lower temperature solar thermal fluids which may previously have been considered to be of an insufficient temperature for power generation.

³ - Bloomberg Businessweek, February 2010. Areva says solar thermal market may increase 30-fold by 2020.

⁴ - Emerging Energy Research, April 2010. Global concentrated solar power markets and strategies: 2010-2025.

Kalina Cycle® developments in China

The People's Republic of China is faced with unprecedented energy and emissions reduction challenges, in order to sustain the current rate of economic development. In light of these challenges, in recent years numerous public research institutions in China have dedicated immense effort and resources to identify innovative technologies suitable for improving energy efficiency and the generation of power from otherwise wasted heat resources. The key findings of many of these landmark studies have been published in leading industry journal publications including *Applied Energy* and various publications by the prestigious Institute of Electrical & Electronics Engineers (IEEE).

The majority of energy research in China is focused on identifying and developing applied solutions for specific applications within energy intensive industries. One such area of focus is the energy intensive Chinese cement industry, which produces approximately 1.5 billion tonnes of cement annually⁵, almost half of all global cement production.

In relation to the Chinese cement industry, a recent independent publication⁶ by Wang et al. from the Institute of Turbomachinery at Xi'an Jiaotong University found that; *"Compared with other cogeneration systems in cement plant(s), the Kalina Cycle® can achieve the best performance from the view point of exergy efficiency, and the ORC shows the lowest exergy efficiency under the same condition(s)."* Demonstrating the superior performance of the Kalina Cycle® over competing technologies, including the Organic Rankine Cycle (ORC).



About EXPO 2010 Shanghai China

Commencing on the 1st of May, EXPO 2010 is being held in Shanghai, and will run until the end of October, 2010. To date EXPO 2010 has attracted more than 40 million visitors and is expected to be the most visited international fair in history. The theme of EXPO 2010 is "Better City – Better Life" and signifies Shanghai's new status in the 21st century as the "next great world city".

Demonstrating the Kalina Cycle® at EXPO 2010 with Chinese licensee SSNE, has been an important opportunity for Global Geothermal Limited to showcase the advantages of the innovative Kalina Cycle® technology to a very wide and global audience.

Additional Information:
<http://en.expo2010.cn/>

China - Kalina Cycle® Licensee (SSNE) Progress

Recognising the enormous opportunities for the effective adoption of the Kalina Cycle® in China, in February 2009, Global Geothermal Limited granted SSNE an exclusive license for any and all Kalina Cycle® applications in China (refer to 24 February 2009, Wasabi Energy ASX announcement).

As part of the SSNE licensing agreement, Global Geothermal Limited and its wholly owned subsidiary, Recurrent Engineering LLC have provided SSNE with extensive training and the transfer of proprietary technology information relating to the design and construction of Kalina Cycle® power plants. The capabilities of the SSNE engineering teams were recently demonstrated by the successful and efficient assembly of the EXPO 2010 Kalina Cycle® power plant (figure 3), earlier this year.

SSNE has extensive experience in the Chinese cement industry and was also a key participant in International Cement Week 2010, where it released its latest findings⁷ confirming the effectiveness of the Kalina Cycle® in the cement industry. Building on the substantial progress made in the cement industry, SSNE recently commenced the front-end-engineering-design (FEED) of the first Kalina Cycle® waste heat recovery power plant in a cement facility, which is expected to be on line in 2011. In addition to having built a number of small capacity Kalina Cycle® units in China, SSNE is rapidly developing a larger scale manufacturing capacity to produce a substantial number of larger capacity units suitable for a range of industries.



上海盛合新能源科技有限公司

SHANGHAI SHENGHE NEW ENERGY RESOURCES SCIENCE & TECHNOLOGY CO.,LTD

About SSNE

Shanghai Shenghe New Energy Resources Science & Technology Co. Ltd (SSNE) is a developer of waste heat, geothermal and solar thermal power plants, specifically focused on delivering thermal power plant efficiency improvements. SSNE is experienced in a diverse range of energy intensive industries in China, and has assembled a team capable of delivering Kalina Cycle® projects.

SSNE has access to research and development funds through Chinese government agencies and is building a project ownership capacity (BOO) by leveraging funds from its parent companies. SSNE largest shareholders include Shanghai Sheng Pacific Investment Management Co., Ltd and Shanghai Guo Sheng (Group) Co., Ltd., with registered capital in excess of US\$1.5 billion.

Additional Information:
www.shanghaishenghe.com

⁵ - International Energy Agency, 2010. Cement Roadmap Targets.

⁶ - Exergy analyses and parametric optimizations for different cogeneration power plants in cement industry. Jiangfeng Wang, Yiping Dai, Lin Gao. *Applied Energy*, 2009.

⁷ - A new application of waste heat recovery power generation in clinker kiln. Zhang Gaozuo, Zhu Guozhen & Wang Chunli. Shanghai Shenghe New Energy Resources Science & Technology Co. Ltd. 2009.

Overview of the Kalina Cycle® technology

Global Geothermal's Kalina Cycle®, the proven and most thermodynamically efficient power cycle technology in the world, is now on the verge of large-scale adoption in:

- **Enhanced Energy Efficiency** (EEE), and
- **Renewable Energy Generation** (REG);

applications (figure 6), across the globe.

Building on the initial Kalina Cycle® Technology breakthroughs in the mid 1980's, the innovative technology has undergone intensive development, optimisation and large-scale demonstration with some of the most significant power generation and industrial companies in the world. A comprehensive suite of second generation Kalina Cycle® innovations including the patented RIP-Cycle and Multiple Heat-Source applications have recently been pioneered by Global Geothermal Limited, however the superior and unparalleled thermodynamic efficiencies remain firmly at the core of the Kalina Cycle®.

The superior efficiency of the Kalina Cycle®, provides an environmentally sustainable alternative for power generation, whilst offering significant savings in the construction of new power generation capacity and ongoing operational costs.

The thermodynamic power cycles which collectively constitute the Kalina Cycle® have been reviewed and verified by the U.S. Department of Energy (DOE), numerous leading universities and a variety of independent researchers and consulting engineers over a 20 year period, including most recently, Shaw Group's - Stone & Webster.

The Kalina Cycle® is the greatest innovation in power generation technology in over a century.

The adoption of the Kalina Cycle® is underpinned by a series of operational and economic advantages over alternative power generation technologies.

Operational Advantages

- Use of existing and proven power plant components
- Underlying principles are simple and understood
- Ammonia has no ozone depleting potential
- Less sensitivity to decreases in heat source temperature
- Safe power plant configuration
- Improved design performance on both hot & cold days

Economic Advantages

- 10% to 50% more power with the same heat input
- Lower power plant auxiliary loads
- Ammonia is a relatively inexpensive working fluid
- Very high capacity factor with minimal downtime
- Reduced capital cost for fixed output rating
- Optimise plant efficiency with ammonia-water variation

Global Geothermal's Kalina Cycle®.

The next-generation, power cycle technology.

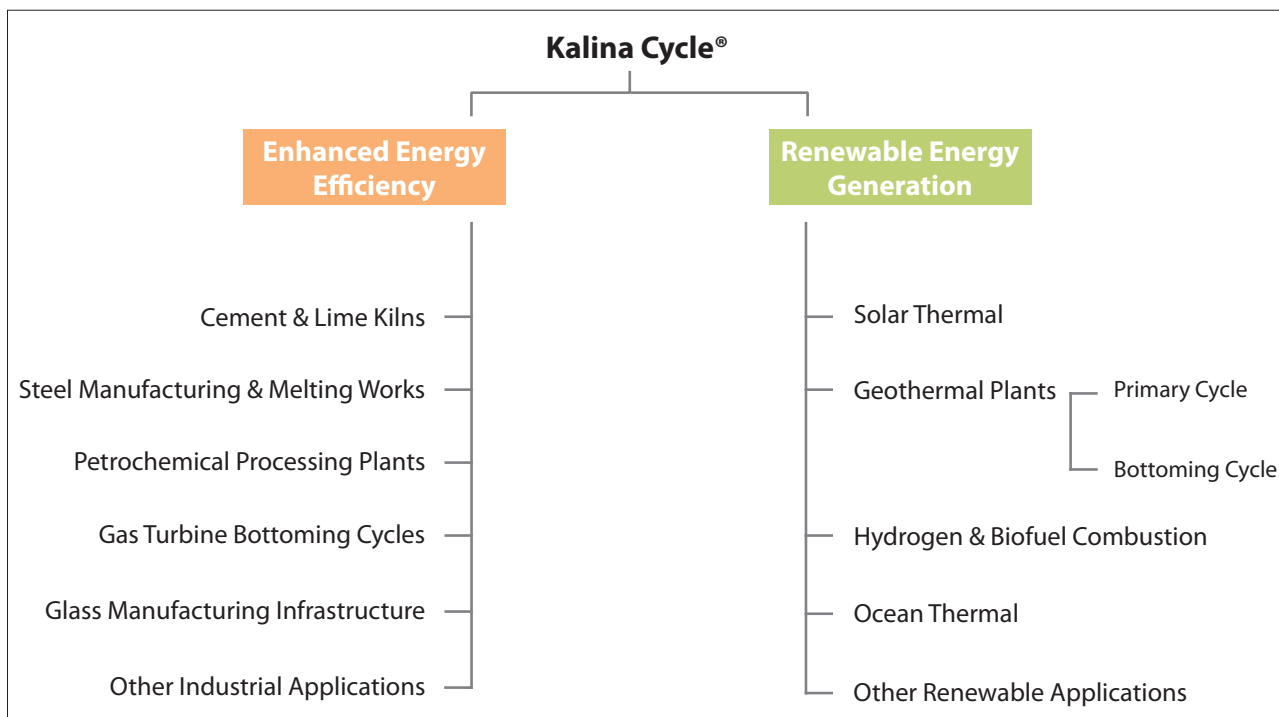


Fig 6 - Segmented applications for Kalina Cycle® technology. Adapted by Activated Logic from Global Geothermal Limited.



Fig 7 - The 3,450 kW Kalina Cycle® power plant installed at the Kashima Steel Works operated by Sumitomo Metals. The Kalina Cycle® power plant has been successfully operating since September 1999.

Update from the Chairman

The Executive Chairman of Wasabi Energy, Mr. John Byrne said; *"The successful installation of the first Kalina Cycle® power plant in China through our Global Geothermal Limited subsidiary and our Chinese partner SSNE, marks an important milestone in our plans to rapidly accelerate the adoption of the Kalina Cycle®, globally. SSNE used proven, simple, low-cost, mass-produced evacuated solar collector tubes to successfully demonstrate the simplicity and potential advantages of using the Kalina Cycle® technology for the purposes of low-temperature solar thermal power generation".*

"We continue to be encouraged by the enthusiasm with which our Chinese licensee (SSNE) has embraced the Kalina Cycle® technology and their current efforts dedicated towards building a significant Kalina Cycle® project development portfolio across a range of major industries in China".

"Furthermore, we understand SSNE are in the process of building a Kalina Cycle® assembly line in Shanghai capable of building up to 50 Kalina Cycle® plants annually, with individual power plant capacities of up to 6 megawatts (MW)".

Global Geothermal Limited receives licensing fees from its licensees (including SSNE) of up to US\$200,000 for each megawatt (MW) of installed Kalina Cycle® capacity, as well as generating additional revenues from engineering services.

"As SSNE transitions from designing and building demonstration scale Kalina Cycle® plants to larger scale commercial Kalina Cycle® plants during the next 12 months, we anticipate the commencement of a significant revenue stream from our Kalina Cycle® licensing activities in China".

"In addition to our activities in China, we are in active discussions with a number of major industry leading companies which we believe will assist in increasing the rate of adoption of the Kalina Cycle® in other global market segments. Wasabi Energy is well positioned to take advantage of the diverse Kalina Cycle® market opportunities (figure 6) as we move forward".

Yours Sincerely,

John Byrne
Executive Chairman

For further information contact

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Global Geothermal's Kalina Cycle®.
The next-generation, power cycle technology.

Corporate Information

General corporate information regarding Wasabi Energy and the companies Wasabi Energy holds a strategic investment in can be found in this section. Announcements regarding Wasabi Energy corporate developments are made to the Australian Securities Exchange (ASX) and are also available on the Wasabi Energy website. Additional information regarding the investee companies can be found at their respective web sites, details below.



About Global Geothermal Limited

Global Geothermal Limited (GGL) holds an extensive Kalina Cycle® intellectual property portfolio and is focused on licensing the innovative technology into two core business streams, Enhanced Energy Efficiency (EEE) and Renewable Energy Generation (REG).

In 2007, Global Geothermal Limited, a private company incorporated in the United Kingdom was established to consolidate the global Kalina Cycle® intellectual property interests, which involved the acquisition of U.S. based engineering firm, Recurrent Engineering LLC, now a wholly owned subsidiary. The initiation of new Kalina Cycle® projects generally requires Global Geothermal Limited issuing a Kalina Cycle® technology license to the project developer, and for Recurrent Engineering LLC to provide the power cycle engineering necessary for the design of the Kalina Cycle® power plant.

Global Geothermal Limited's majority shareholder, Wasabi Energy Limited has been progressively increasing its ownership interest in the Kalina Cycle® technology for over 5 years, through the acquisition of a range commercial interests and substantial intellectual property portfolios. Wasabi Energy currently holds ~96% of Global Geothermal Limited.



About Wasabi Energy

Wasabi Energy Limited is an Australian Securities Exchange listed public company (ASX:WAS) that holds strategic investments in companies and projects it believes can provide solutions to the world's energy and environmental challenges. Wasabi Energy is actively involved in the management of the respective investee companies and assists in the achievement of critical business milestones, financing growth and ultimately the delivery of results that matter.

Wasabi Energy has recently focused its portfolio of investments into three core business streams, renewable power, sustainable water and renewable biofuels. Each of these core business streams is represented by a strategic corporate investment by Wasabi Energy (Global Geothermal Limited, Aqua Guardian Group and Australian Renewable Fuels, respectively) and has been strategically selected to provide solutions for the key sustainability challenges facing the world.

Additional information:
www.wasabienergy.com



Wasabi Energy Ownership: 96%

www.globalgeothermal.com



Wasabi Energy Ownership: 50%

www.aquaguardiangroup.com



Wasabi Energy Ownership: 27.6%

www.arfuels.com.au

Renewable power

Sustainable water

Renewable biofuels