

Kalina Cycle® - Enhanced Energy Efficiency Solutions

Wasabi Energy Subsidiaries Secure Contract with FLSmidth to build 8,600 kW Kalina Cycle® Power Plant.



Sustainable Power Generation

Efficient. Safe. Reliable. Proven.



Global Geothermal
Advanced Waste Heat Engineering

A Wasabi Energy Company

ASX Announcement

31 January 2011

Wasabi Energy Subsidiaries Secure Contract with FLSmidth to build 8,600 kW Kalina Cycle® Power Plant.



- Secures major Kalina Cycle® contract with the leading cement industry EPC provider - FLSmidth
- The innovative energy efficiency project will be the largest Kalina Cycle® power plant in the world
- Generation of licensing and engineering revenues through the Kalina Cycle® project contract
- The Khairpur Kalina Cycle® power plant is a platform to capture global cement industry opportunities

Wasabi Energy (ASX: WAS, AIM: WAS) is pleased to announce that through its subsidiaries¹, it has secured a major contract with FLSmidth to build an innovative Kalina Cycle®² power plant (*figure 1*) in the Khairpur region of Pakistan.

Once commissioned, the Kalina Cycle® power plant (the "Power Plant") will generate 8,600 kW of renewable power from the waste heat stream of the Khairpur Cement Plant, owned and operated by the D.G. Khan Cement Company⁴. Wasabi Energy will provide FLSmidth with front end engineering design (FEED), procurement and commissioning services in relation to the Kalina Cycle® technology, as well as a project specific sub-license.

Power generation from the Khairpur Kalina Cycle® power plant is expected to commence in the first quarter of 2012 and once fully operational, is expected to reduce the CO₂ emissions of the cement plant by up to 31,000 tonnes per year³.

As the first Kalina Cycle® power plant installed in the cement industry, the Khairpur power plant will be an important reference plant for the Kalina Cycle® technology in this highly energy intensive industry and will also provide a strong platform for targeting similar projects, globally.

Khairpur Cement Plant - Site of Kalina Cycle® Power Plant



Details regarding the Khairpur Kalina Cycle® power plant contract have been provided in the following sections:

- >> Key Aspects of Contract page 2.
- >> About FLSmidth page 2.
- >> Global Cement Industry page 3.
- >> Chairman's Comment page 4.

¹ - Global Geothermal Limited (U.K.) and Recurrent Engineering LLC (U.S.) are wholly owned subsidiaries of Australian Securities Exchange (ASX: WAS) and Alternative Investment Market (AIM: WAS) listed, Wasabi Energy Limited.

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.

³ - Based on IEA emissions intensity data for Pakistan of 432g CO₂/kWh, average annual output of 8,600 kW and a operational capacity factor of 95%.

Key Aspects of Contract

As engineering, procurement & construction (EPC) provider to D.G. Khan Cement Company⁴, FLSmidth has entered into an agreement to deliver a waste heat recovery solution, with the primary objective of improving the power efficiency of the Khairpur Cement Plant. Following a review of various waste heat recovery technologies potentially suitable for the Khairpur Cement Plant, FLSmidth selected the Kalina Cycle[®] as the most effective, efficient and safe option.

In turn, as owners and engineers of the Kalina Cycle[®] technology, Wasabi Energy subsidiaries¹ have been collectively awarded a significant contract requiring close collaboration with FLSmidth in the design and delivery of an innovative 8,600 kW Kalina Cycle[®] power plant. Key aspects of the contract between Wasabi Energy and FLSmidth include:

- Process & Mechanical Engineering Services
- Procurement Services & Major Equipment Supply
- Kalina Cycle[®] Commissioning Services
- Kalina Cycle[®] Process Guarantee
- Power Plant Performance Testing
- Kalina Cycle[®] Licensing Fee Agreement

Overview of the Kalina Cycle[®] Power Plant

The Kalina Cycle[®] power plant to be built at the Khairpur Cement Plant will be based on the Kalina Cycle[®] KCS1-2Aa system, a patented power plant configuration specifically developed for the cement manufacturing industry.

The Kalina Cycle[®] power plant will recover waste heat from the process gas streams; specifically from the preheater and clinker cooler exhaust gases (*figure 2* - steps 4 & 7, respectively). The Kalina Cycle[®] is particularly well suited to the typical heat sources available in a cement plant. The unique ammonia-water working fluid of the Kalina Cycle[®] exhibits important thermodynamic characteristics which include non-isothermal boiling and condensing. These thermodynamic characteristics combined with the flexibility to alter the ammonia-water concentration at various points in the power plant, improve the effectiveness of heat acquisition, regenerative heat transfer and heat rejection.

The thermodynamic advantages outlined above deliver improved heat transfer efficiencies and also increase power plant efficiency resulting in maximum power generation.

For additional information on the operational and economic advantages of the Kalina Cycle[®], refer to the following section:

>> Overview of the Kalina Cycle[®] *page 5.*

About FLSmidth⁵



FLSmidth in Brief

- Provides equipment, systems and services for the cement and minerals industries
- Founded in 1882 by Frederik Læssøe Smidth
- Listed on NASDAQ OMX Copenhagen (the former Copenhagen Stock Exchange) in the C20 index
- Employees: Approximately 10,500 of which 1,600 in Denmark
- Turnover 2009: DKK 23,134m (EUR 3,107)
- Offices in 42 countries world-wide
- Headquarters: Valby (Copenhagen), Denmark.

Corporate Overview

FLSmidth is a leading supplier of equipment and services to the global cement and minerals industries. FLSmidth supplies everything from single machinery to complete cement plants and minerals processing facilities including services before, during and after the construction.

FLSmidth is a global company with a local presence in more than 40 countries and project and technology centres in Denmark, USA and India.

The Group's in-house resources are primarily engineers who develop, plan, design, install and service equipment, with most of the manufacturing being outsourced to subsuppliers.

Over the past 128 years, FLSmidth has developed a business culture based on three basic values: competence, responsibility and cooperation, reflecting the way in which FLSmidth interacts with its stakeholders.

Research & Development

FLSmidth pursues an active research and development programme which reflects the aim of being the preferred partner and leading supplier to the global cement and minerals industries.

With the increasing focus on CO₂, higher energy prices and the increasingly stringent emissions standards in the world markets, FLSmidth deploys considerable resources to develop new solutions to meet the important future challenges faced by our customers.

⁴ - The Khairpur Cement Plant is owned and operated by D.G. Khan Cement Company, the largest cement manufacturing company in Pakistan. D.G. Khan Cement Company is a member of the Nishat Group.

⁵ - Information regarding FLSmidth has been sourced from a range of publicly available publications developed by FLSmidth and available on the FLSmidth corporate website, 2011.

Global Cement Industry

Global demand for cement, a key ingredient for the production of concrete, is increasing rapidly, driven primarily by the rapid industrialisation of developing countries, particularly across

Africa & Middle-East, Latin America and developing Asia. The increased demand for cement globally presents society with significant energy and carbon emissions reduction challenges.

Key-Statistics⁶

- 5** - Percent of all anthropogenic CO₂ emissions
- 75** - Mtpa of new cement kiln capacity⁵ required annually
- 100** - kWh/t power consumption in cement production
- 1,500** - Number of cement plants in the world today
- 2,800** - Mtpa of installed cement kiln capacity today
- 9,132** - MW of potential power generation from waste heat

Industry Emissions Reduction Mechanism

In a recent report titled *Cement Technology Roadmap*⁷ published jointly by the World Business Council for Sustainable Development and the International Energy Agency, a number of carbon emissions reduction strategies were identified. The first strategy relates to thermal and electrical efficiency, and specifically made the recommendation for; “deployment of existing state of the art technologies in new cement plants, and retrofit of energy efficiency equipment where economically viable”. The Kalina Cycle[®] technology is suitable for both new and existing plants.

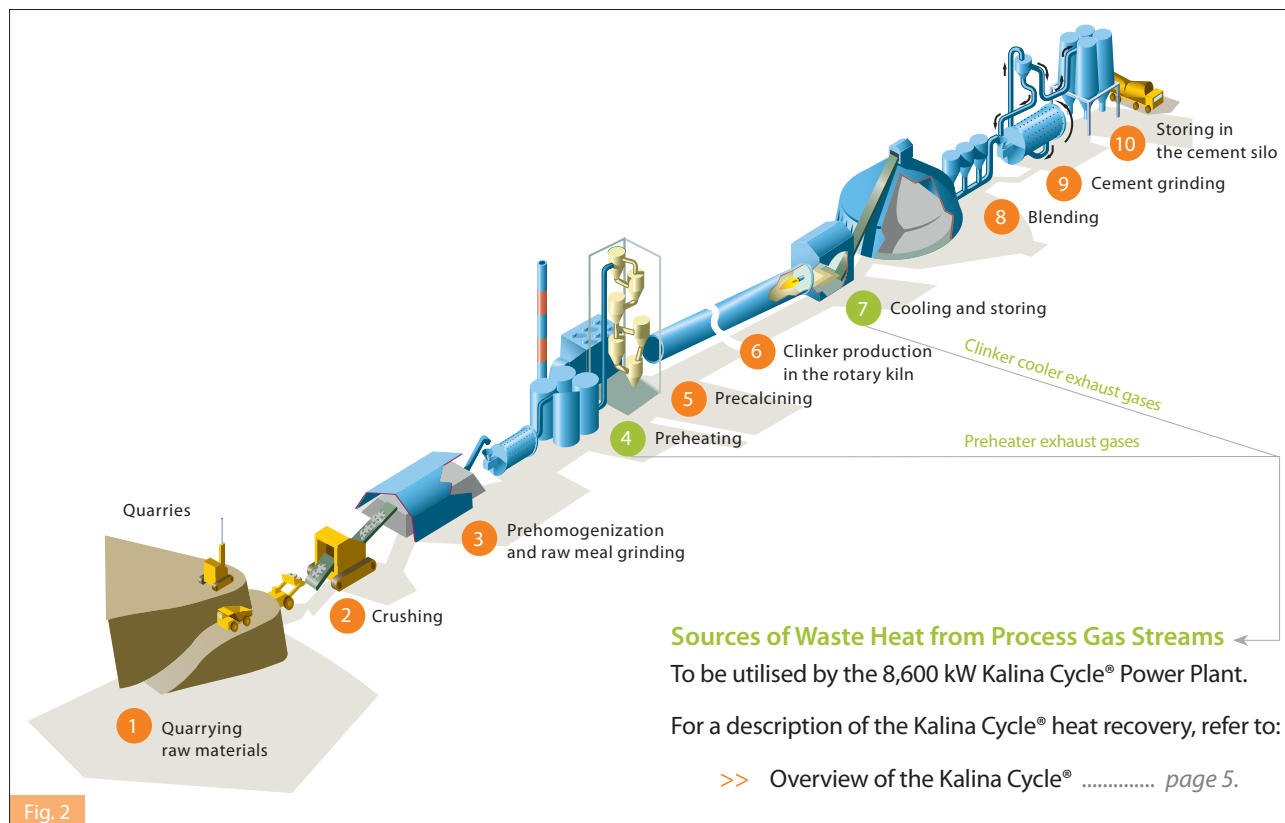
Energy intensiveness of Cement Production⁷

Cement production is a highly energy intensive process generally requiring between 89 and 130 kWh of electricity for each tonne of cement produced. Annual power consumption by the global cement industry is estimated to be approximately 300 TWh; as a result is directly responsible for about 5% of all anthropogenic CO₂ emissions, globally.

Kalina Cycle[®] Market Opportunity

Wasabi Energy estimates that the integration of the Kalina Cycle[®] technology into a cement plant in a waste heat recovery configuration has the potential to reduce overall power consumption by 10 - 20%. On this basis, the Kalina Cycle[®] has the potential to reduce power consumption of the global cement industry by up to 9,132 MW⁸.

Cement Production Process⁷ - Generalised Schematic



⁶ - Researched and compiled by Activated Logic from a range of public and proprietary sources, 2011.

⁷ - Cement Technology Roadmap 2009 - Carbon Emissions Reductions up to 2050. Published by the International Energy Agency (IEA) and the World Business Council for Sustainable Development (WBCSD).

⁸ - Analysis by Activated Logic, 2011. Key assumptions: Annual cement industry power consumption 300 TWh (IEA), energy recovery of 20% and power capacity factor of 75%.

Comment from the Chairman

Executive Chairman of Wasabi Energy and Director of Global Geothermal Limited, Mr. John Byrne commented:

"The contract with FLSmidth we are announcing today, is another important step towards the widespread adoption of the Kalina Cycle®. In recent months we have announced a number of renewable energy focused applications of the Kalina Cycle® including in the solar, geothermal and ocean thermal sectors, however, this deal with FLSmidth is a major milestone for our industrial Enhanced Energy Efficiency (EEE) business stream."

"We first recognised the enormous opportunities for the Kalina Cycle® in the cement industry a number of years ago. At the time, prevailing power prices were generally much lower and the interest from industry to improve energy efficiency as a means of reducing CO₂ emissions had not gathered sufficient momentum. Notwithstanding the market conditions at the time, we pressed ahead with developing and securing some key intellectual property relating to the integration of our core Kalina Cycle® technology with process gas streams in the cement industry."

"We are delighted to be working with FLSmidth on the Khairpur Kalina Cycle® power plant project and we recognise there are significant synergies with our patented technology and the core

capabilities of FLSmidth. FLSmidth is the largest EPC provider to the global cement industry and have installed more than 2,000 cement kilns throughout their 128 year history."

"We are pleased that FLSmidth has taken a leadership role in terms of implementing energy efficiency technologies in the cement industry and are equally encouraged that FLSmidth has selected the Kalina® Cycle technology as the best available waste heat to power generation technology for this plant."

"We recognise that the global opportunities for the Kalina Cycle® are as diverse as they are immense. In an effort to capture a broader range of opportunities and accelerate the adoption of the Kalina Cycle®; over a year ago we embarked on a strategy of establishing alliances with industry leading EPC contractors. Having now established our presence in the cement industry, our next target is the global steel industry as the energy efficiency and emissions intensity challenges are similar across these two major industries. Our position in the steel industry is more established, as our technology has been successfully operating at the Kashima Steel Works in Japan since 1999, however we plan to strengthen our capabilities in this industry by forming strategic alliances with leading organisations."

Yours Sincerely,



Mr. John Byrne
Executive Chairman

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Fig. 3

Sinai White Cement Plant

Image courtesy of FLSmidth

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, 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

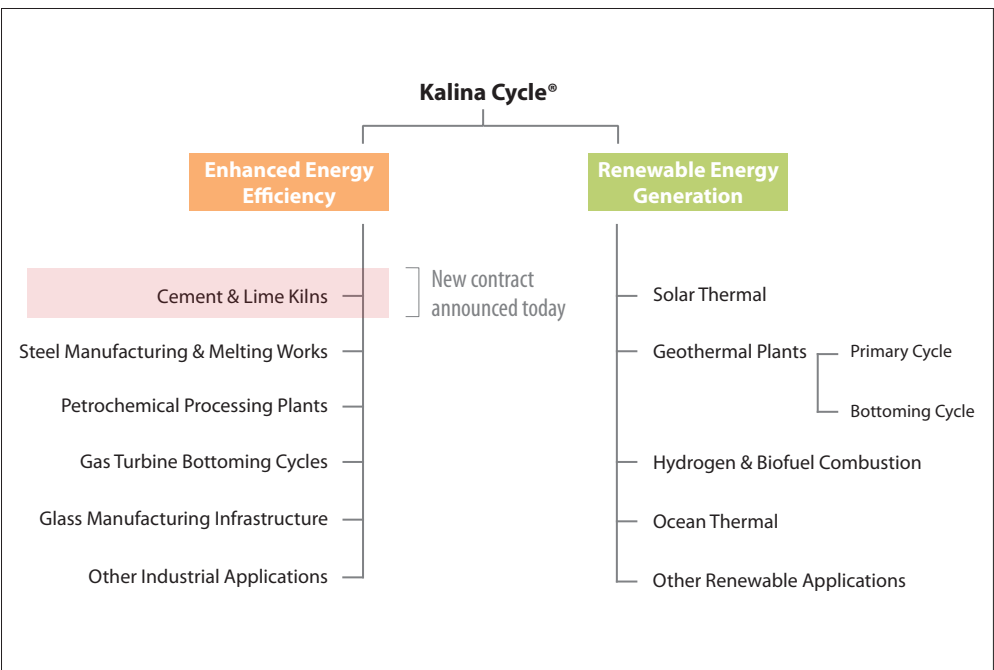
Economic Advantages

- 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.

Segmented Applications for Kalina Cycle® Technology



Recent Activity

Contract with FLSmidth, a leading supplier of equipment and services to the global cement and minerals industries, to build an 8,600 kW Kalina Cycle® power plant at the Khairpur Cement Plant, located in Pakistan.

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 the London Stock Exchange's, Alternative Investment Market (AIM), 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.

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 of commercial interests and substantial intellectual property portfolios. As of January 2011, Global Geothermal Limited is a wholly owned subsidiary of Wasabi Energy Limited.



About Wasabi Energy

Wasabi Energy Limited is an Australian Securities Exchange listed public company (ASX: WAS) with a secondary listing on the AIM market of the London Stock Exchange (AIM: 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: 100%

globalgeothermal.com



Wasabi Energy Ownership: 50%

aquaguardiangroup.com



Wasabi Energy Ownership: 23.3%

arfuels.com.au



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