

# Clyde Bergemann News

Clean Energy Solutions

Edition 01/11



## ☐ South-East Europe - continued growth for the power sector

South East Europe (SEE), also referred to as the Balkans, has around 13 countries within its peninsula and a combined area of around 550,000 km<sup>2</sup>. The region's war damaged infrastructure, unrealistic power prices and lack of investment has resulted in a worsening situation in terms of power supply and the area is in much need of rehabilitation, new capacity and energy efficiency. Sourcing investment to do so has been a focus for these countries and one significant development was seen in 2006 with the signing of the EU's Community Energy Treaty with ambitious plans for the future. Continuing growth for the power sector is expected at around 2% per annum.

[>> Page 2](#)

### ☐ Content:

- |   |                               |  |                              |   |                              |
|---|-------------------------------|--|------------------------------|---|------------------------------|
| - South-East Europe - continued growth for the power sector                 | <a href="#">&gt; Page 2</a>   | - "Increase Your Earning Power" initiative and first results with the Ameren Coffeen Order               | <a href="#">&gt; Page 7</a>  | - Trona dry sorbent injection system to meet plant's acid gas permit requirements | <a href="#">&gt; Page 11</a> |
| - Prospering Colombian energy market to be supported by new sales office    | <a href="#">&gt; Page 3</a>   | - New power units at Porto Tolle power plant, Italy will use Clyde Bergemann on-load cleaning technology | <a href="#">&gt; Page 8</a>  | - Muja power plant, Australia to use Clyde Bergemann technology                   | <a href="#">&gt; Page 12</a> |
| - Clyde Bergemann sets up new sales hub in the city of Jakarta, Indonesia   | <a href="#">&gt; Page 3</a>   | - Upgraded air system to be supplied to Propal's Cali paper mill in Colombia                             | <a href="#">&gt; Page 8</a>  | - New Gas Turbine exhaust systems to be supplied to Chilca Uno power plant, Peru  | <a href="#">&gt; Page 13</a> |
| - Work on the world's largest dry-cooled power station is ahead of schedule | <a href="#">&gt; Page 4/5</a> | - DRYCON™, dry bottom ash conveyors, to be installed at Slovakian power plant                            | <a href="#">&gt; Page 9</a>  | - Success in waste heat recovery for marine offshore applications                 | <a href="#">&gt; Page 14</a> |
| - SMART Clean ISB systems to be installed at Carbon II power plant, Mexico  | <a href="#">&gt; Page 6</a>   | - ASHCON™ - Remote Submerged Scraper Conveyor technology unveiled  | <a href="#">&gt; Page 9</a>  | - ISO 9001:2008 certification awarded to Clyde Bergemann Atlanta                  | <a href="#">&gt; Page 14</a> |
| - Turkish power plant to modernise on-load boiler cleaning technology       | <a href="#">&gt; Page 6</a>   | - Clyde Bergemann secures US\$64 million order intake with ESKOM – South Africa                          | <a href="#">&gt; Page 10</a> | - Customer training courses advise the importance of technology maintenance       | <a href="#">&gt; Page 15</a> |
| - Clyde Bergemann Scotland sees continued success in the refining industry  | <a href="#">&gt; Page 7</a>   | - Clyde Bergemann awarded first US project for DRYCON™ technology  | <a href="#">&gt; Page 11</a> | - Clyde Bergemann representatives gather for annual Sales Conference              | <a href="#">&gt; Page 15</a> |
|   |                               |  |                              | - Events / Personnel  | <a href="#">&gt; Page 16</a> |

## ☐☐☐ South-East Europe - continued growth for the power sector

Since 2007, SSE has experienced many power shortages including a near system-wide blackout in 2009 as a result of the Russia/Ukraine gas dispute.

Ageing and war-damaged power plants throughout the region have led to inefficiencies with output. In addition, the lack of investment in refurbishment and new capacity has also contributed to the issues with power production. The World Bank estimates that around US\$40 billion would need to be invested in power generation, transmission and distribution over the next 15 years in order to meet the expected demand and potentially boost economic growth with exports.

### Forecast electricity demand growth in SSE, 2011-2020 %

Power Plant	2011-2015	2016-2020
Albania	2.0	2.0
Bosnia & Herz	3.5	3.0
Bulgaria	2.0	1.5
Croatia	3.0	2.5
Greece	1.5	1.0
FYRM	3.0	3.0
Romania	2.5	2.5
Serbia + Mont	2.0	2.0

Source: Electricity Markets in South-East Europe, World Energy Council, November 2010

In order to try and rectify the situation, the European Union is making efforts to improve the region's power issues and the Community Energy Treaty was one of the first steps in the right direction. This was signed in 2006 and includes ambitious plans for several areas of power improvements with a focus on increasing investments. Already in 2009, the European Bank for Reconstruction and Development pledged to invest US\$675 million towards the SSE power sector.

With a significant focus on the coal-fired power generation market, the Clyde Bergemann Power Group are monitoring and pursuing the rehabilitation, expansion and newbuild projects in this market with a view to supporting in energy efficiency and emissions reductions with our technology portfolio.

Some of the main countries with recent or planned investment in the coal-fired power sector include:

#### Serbia

Serbia, with an installed generation capacity of 8,355 MW, is currently dominated by coal-fired plants which account for 62% of generation.

Since 2007, in compliance with the adopted 2015 Energy Development Strategy, Serbia proposed to enhance its electric power sector with various modernisation and newbuild projects. Included in the strategy were the life extension and upgrades of Nikola Tesla A6, B2, and Kostolac A1. In terms of new facilities, projects include Kolubara B, TENT B3 and Kolubara A6.

#### Croatia

From 2009, Croatia planned to spend over US\$13 billion by 2020 in order to meet growing consumption as well as improvements in infrastructure.

In order to double its current capacity, it would need to invest over US\$6 billion, according to the government.

#### Macedonia

Macedonia is striving to become self-sufficient in electrical energy. Current capacity covers around 70% of the the country's needs and the country is increasingly dependent on power imports.

There are a number of new generation projects ongoing in the country, mainly focussing on taking advantage of hydro potential but also on increasing efficiency on existing plants which are over 30 years old.

The Bitola coal-fired power plant will undergo a US\$81.3 million upgrade which will add 25 MW of output to the plant. Oslomej coal-fired power plant is also contracting out work to upgrade their 125 MW unit.

#### Romania

Romania has the largest power sector in South-Eastern Europe with nearly 22.5 GW of capacity. Much of its installed capacity is old and in need of regeneration.

In January 2011, it was stated that Romania would have to shut down some of its outdated power plants generating around 30% of electricity capacity and replace them with new units by 2020.

Franz Bartels, President and CEO of the Clyde Bergemann Power Group, comments: "We are well positioned with our sales and service organisation to address these future markets."

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## ❖ Prospering Colombian energy market to be supported by new sales office



Head of Clyde Bergemann Colombia,  
Hector Inigo

South America can be considered one of the most attractive emerging energy markets in the world, with Colombia having become one of the leading economies in this region.

The upcoming projects for new fossil fired power plants as well as the existing fleet of power generation facilities led to the decision to set up Clyde Bergemann Colombia SAS (CBCOL) as the local sales office.

CBCOL is located in Bogotá and headed by Hector Inigo. Hector brings an experience of 13 years working with Clyde Bergemann's Atlanta office, and currently also holds the position of International Sales Manager for Clyde Bergemann Power Group Americas. He can now apply his experience to developing business for Clyde Bergemann technologies in Colombia.

Also key to the business is Sales Manager, Arturo Dulcey, who worked for the local distributor of Clyde Bergemann, as Commercial Manager, before joining Clyde

Bergemann in October 2009, serving the thermal energy field, pulp and paper industry, oil industry and sugar mills.

Within the Clyde Bergemann Power Group, CBCOL is part of the Clyde Bergemann Americas arm. CBCOL will support sales of all six business fields, which are Boiler Efficiency, Materials Handling, Air Pollution Control, Air-Gas Handling, Energy Recovery and Firing Solutions. Initially, CBCOL will focus on the systems and solutions for Boiler Efficiency, Materials Handling and Air Pollution Control. CBCOL will organise local service with its own capabilities or third parties.

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## ❖ Clyde Bergemann sets up new sales hub in the city of Jakarta, Indonesia



Managing Director, Agustinus Tjhay

With the establishment of Clyde Bergemann Indonesia (CBIA), the market leading company for systems and solutions for the energy services market is approaching high business potential in Indonesia, Malaysia, Singapore and the Philippines.

The Jakarta-based office is led by Agustinus Tjhay as Managing Director. He has a degree in mechanical engineering and a

Master of Business Administration from universities in Taiwan and the USA.

He worked in the pulp and paper industry before he joined Clyde Bergemann in January 2009.

John Cannon supports him as an additional member of the management team, working as Sales Manager. John Cannon has worked with Clyde Bergemann for many years and is very familiar with the energy market in South East Asia with experience of more than 14 years. CBIA's number of employees will initially be four and will be enhanced along with the development of the business.

Within the Clyde Bergemann Power Group, CBIA is part of the Clyde Bergemann SE-Asia arm.

CBIA will support sales and marketing of all six business fields, which are Boiler Efficiency, Materials Handling, Air Pollution Control, Air-Gas Handling, Energy Recovery and Firing Solutions.

Additionally, CBIA will organise local service with third parties or own capabilities which have to be increased.

The contact details of Clyde Bergemann's new sales hub in South East Asia are:

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## Work on the world's largest dry-cooled power station is ahead of schedule



View of Medupi power station, Lephalale, in South Africa

In February 2011, Franz Bartels, President & CEO of the Clyde Bergemann Power Group, used the opportunity to visit the construction site of the Medupi power station during a business trip in South Africa. Jaco van der Westhuizen, Managing Director of Clyde Bergemann Africa (CBZ), accompanied the tour and presented the excellent performance of the Clyde Bergemann construction staff on site.



Ready to start the tour: (from left to right) Wayne Lamont (Site Manager), Jaco van der Westhuizen (Managing Director CBZ), Franz Bartels (President & CEO Clyde Bergemann Power Group)

Medupi Power Station is a new dry-cooled coal-fired power station being built by Eskom near Lephalale in Limpopo province, South Africa.

When completed, the power station will have six supercritical boilers each powering an 800 MW turbine, producing 4,800 MW of power. This will be the largest dry-cooled coal-fired power station in the world.

In November 2008, Clyde Bergemann Wesel (CBW), Germany received the order for the supply of the on-load boiler cleaning solution. One year later, Clyde Bergemann Africa (CBZ) won the order to deliver the fly ash handling solution for Medupi.

The scope of supply for the on-load boiler cleaning solution comprises water cannons including control, pump station and valves as well as the optimisation system SMART Furnace-FACOS for the combustion chamber and RK type sootblowers for the convection part. CBW will also take care of erection control and the cold/hot commissioning.

The scope of supply for the fly ash solution includes all necessary equipment for the removal of fly ash from the bag houses to the storage silos and thereafter conditioning of fly ash onto overland conveyor belts. The project will be executed in six stages having similar ash conveying systems and two silo aeration and conditioning systems.

CBZ is not only acting as the on site construction supervisor taking care of erection control and commissioning services for the on-load boiler cleaning equipment, CBZ is also responsible for the design, construction, supply and commissioning of the fly ash handling and conditioning systems at Medupi.

The first shipments of on-load boiler cleaning equipment took place at the end of 2009 and is still going on according to the project schedule. The work on site for the fly ash solution started in July 2010 with the conditioner building. Ground preparation included fixing a crack in the rock with mass concrete before the foundation was laid and currently the installation of cones into the silos is taking place. The expected completion date for this is April this year – 2 months ahead of schedule.



Fly ash silos under construction



Construction work at the conditioner building



Conditioner building within the fly ash silos

The access to the first three silos is expected in March 2011 when the mechanical installation will start, including aeration pads, air slides, filters, conditioners and Dome Valves on top of the silos. This should be complete by February 2012, while the mechanical installation of all six silos and the conditioner complex will be finished by the end of 2011.

Currently, the expected access date for underneath the Pulse Jet Fabric Filter Plant (PJFFP) to install the twenty eight MD Pumps is September 2011.



Preparation of one section for the fly ash conveying systems

We are looking forward to the first fires in the boiler in February 2012. The commercial date for completion of the project is September 2012.



The first out of six supercritical 800 MW boilers under construction

We pride ourselves in the fact that we are running ahead of schedule and have

regular meetings with Eskom and other contractors to ensure that this remains the case.

Our staff live in Eskom housing in Lephalale and have been accepted into the local community with open arms. The houses are all brand new and very modern and comfortable. Some were built in what was previously bush veld, and people have to contend with bugs, spiders, snakes, etc. - but this is all part of life in Africa.



One of our site offices



The view from the site offices to the construction site

The CBZ personnel on site are:

- Rohann Schnetler, Project Engineer and Construction Manager
- Wayne Lamont, Site Manager
- John Patterson, Civils Supervisor
- Gerardine Henning, SHEQ Officer
- Lynette Lamont, Administration Clerk



The CBZ staff (from left to right): Gerardine Henning, Jaco van der Westhuizen, Rohann Schnetler, Lynette Lamont, Wayne Lamont

Rohann has over 4 years experience with CBZ and is a Young Talent from the Class of 2007, when he was a Junior Engineer. He soon moved on to the position of Project Engineer, followed by Systems Engineer and took on his current role towards the end of 2010.

Wayne has worked for a company that did maintenance work on CBZ's equipment at Matla & Kriel Power Stations and has extensive experience in our conveying systems. Our sub-contractors, Msweli Industrial Projects (Mechanical Installation) and Karrena Concor Joint Venture (Civils) supply the rest of the labour on site.

Our site is slowly but surely becoming 'home' for the staff and there are plans afoot to build a braai, which is a barbecue grid, and a lapa, which is a thatched outdoor entertainment area, very soon.



Duct work under construction



Medupi is the worldwide largest dry-cooled power station

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## ❖ SMART Clean ISB systems to be installed at Carbon II power plant, Mexico



Comision Federal de Electricidad's Carbon II Power Plant in Mexico

Clyde Bergemann Atlanta (CBA) was awarded two orders in July 2011 from Avaltec, SA de CV, our partner in Mexico for two complete SMART Clean ISB systems for two coal-fired units on Carbon II power plant in the north of Mexico. The plant is run by Comision Federal de Electricidad (CFE), the state owned power authority in Mexico.

The scope of supply includes SmartUS Blowers, SMART Cannons, SMART Controls, SMART Gauges (SHFM), SMART Convection (Thermodynamic Model), Targeted Cleaning Control Module, SMART Sensors and USB Sootblowers. The total value of the order is over US\$ 5.7 million.

Unlike Petacalco power plant, where the contract was awarded having CBA as sole source, this time CFE decided to bid the project openly. CBA equipment was the only equipment and solution that could meet the bid's requirements, confirming that our leading technology continues to dominate the market. CBA also used the plant operational and maintenance data costs as input for our boiler cleanliness configurator to show the economic impact for lost revenues.

Carbon II power plant is one of the three power plants in Mexico that uses coal as fuel. The plant is located in northern Mexico close to the USA border and has a total of four 350 MW front wall fired units (two Foster Wheeler and two Mitsubishi). After

the success CBA had in Petacalco power plant the previous year (first SmartClean ISB system in Latin America), CFE decided to bid the supply and installation for two of the units at Carbon II (FW units), as they were having unscheduled boiler outages due to tube leaks because of falling slag and low heat rate. Also, the sootblower compliment had low availability and high maintenance costs. The units were scheduled for an outage for major maintenance and it was the opportunity to replace the old blowers and install the new system.

As in the Petacalco project, our partner will handle the installation and commissioning of the system under CBA supervision. The first unit is scheduled for maintenance in February 2011 and the second unit for September 2011. Carbon II has two additional units made by Mitsubishi and will eventually be upgraded with our SMART Clean ISB System.

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## ❖ Turkish power plant to modernise on-load boiler cleaning technology

The fifth largest coal-fired power plant in Turkey will be equipped with a state-of-the-art on-load boiler cleaning system by Clyde Bergemann, consisting of fourty eight long retractable sootblowers and thirty two water cannons. The new system replaces the legacy cleaning devices of the power plant units 3 to 6.

The plant is operated by state-run company SEAS, whose goal it is to improve boiler availability and efficiency of the 990 MW facility by means of a plant specific designed on-load boiler cleaning system.

This modernisation project will be executed with EFOR Machinery Industry and Foreign Trade Inc., a well established specialist for power plant construction and services.

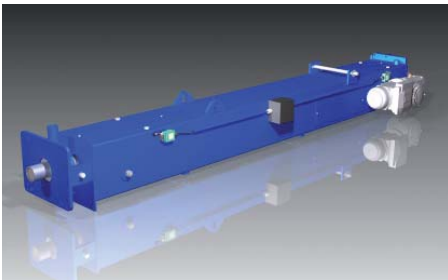
All necessary steam and water supply lines will be carried out by EFOR with the complete control system supplied by Clyde Bergemann.

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## Continued success in the refining industry for Clyde Bergemann Ltd, Scotland



3D image of Clyde Bergemann FH/E/2 model

Clyde Bergemann Ltd (CBS) based in Glasgow, Scotland, was awarded the contract for one-hundred and fifty eight on-load cleaning devices as part of an expansion project on a Middle Eastern refinery.

The contract was awarded by a major fired heater manufacturer in February 2011.

The FH/E/2 on-load cleaning 'sootblowing' technology, which uses steam or air as a cleaning medium, is proven to reduce the build up of residue on heat transfer surfaces, permitting increased heat transfer efficiency and ultimately increased plant availability leading to better efficiency on the heaters and reduced site operating costs. All sootblowers will be built at CBS's manufacturing facility in Glasgow, Scotland before delivery to site in September 2011.

The project is part of a refinery expansion to meet growing local demand for high-quality transportation fuels and to boost exports of intermediate and finished petroleum products.

The contract marks the largest single refining project for CBS.

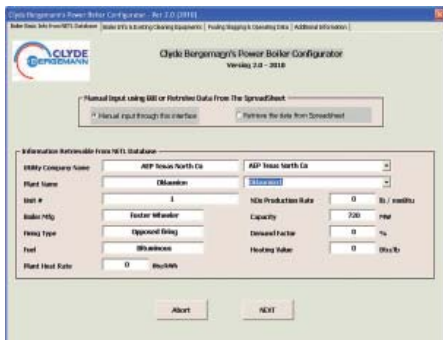
CBS is the centre of competence for the Clyde Bergemann Power Group's global petrochemical/refining markets. Their expertise in on-load cleaning lies in 85 years of experience with over 30,000 sootblowers installed in over 400 petrochemical/refining plants worldwide.

Michael Peoples, General Manager of CBS, comments: "Another excellent example of where our solutions and support approach, combined with market leading products, has led to another customer selecting Clyde Bergemann as their first choice provider of fired heater cleaning technology."

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## "Increase Your Earning Power" initiative and first results with the Ameren Coffeen Order



Clyde Bergemann's power boiler configurator

In an effort to unlock new market potential in Clyde Bergemann Atlanta's (CBA) existing territory of systems and solutions projects, CBA started the "Increase Your Earning Power" initiative in July 2010.

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The initiative required the accreditation process as a Market Creation Professional (MCP) and implementing the power and recovery boiler analyser tools into the systems and solutions sales process. The MCP accreditation provided the techniques and knowledge to adopt the behavioural characteristics demonstrated by leaders into CBA's sales process. The training also presented the hands on skills to use the power and recovery boiler analyser software (Economical Analysis Tools) created by the CBA product management and research and development teams.

A total of thirty six CBA sales representatives were accredited as MCP. As a result of the accreditation process, analyser calculation input data has been collected for thirty nine power and recovery boilers from the collective effort from the CBA sales force and the power and recovery boiler owners.

CBA is pleased to announce the initial success of this initiative for the Ameren Coffeen project. CBA sales team successfully created the need for the unique multi-mode oscillating technology using SmartUS/T30 to deal with tube erosion problems in Ameren Coffeen unit 2. The project started with insufficient capital budget. Upon the submittal of the analyser calculations along with the implementation of the suggested sales process, Ameren allocated additional US\$200,000 capital funding for the project.

CBA has been awarded with the contract for a total amount of US\$277,400 in November 2010.

## ❑ New power units at Porto Tolle power plant, Italy will use Clyde Bergemann on-load cleaning technology



Members of Clyde Bergemann GmbH and Burmeister and Wain Energy A/S sign the contract

The Danish power boiler supplier Burmeister & Wain Energy A/S (BWE) recently awarded a contract to Clyde Bergemann GmbH as the sole supplier of sootblowers for the new 3x660 MW ultra supercritical units located in Porto Tolle, Italy.

According to the specific deposit situation of the different boiler areas, e.g. furnace, superheater, economiser, air heater and DeNO<sub>x</sub>, the overall four-hundred and ninety eight sootblowers consist of the series wall, long retractable, helical and rake sootblowers. Besides the engineering and supply, Clyde Bergemann will be responsible for erection and commissioning supervision. The supply is scheduled to take place from 2012 to 2014.

BWE had been awarded the contract for the oil-to-coal-conversion of the Porto Tolle station by the operator Enel Produzione SpA as early as 2008. This task is part of a wider programme by Enel aimed at CO<sub>2</sub> reduction and capture.

For the necessary new construction, BWE will supply ultra supercritical Benson tower type boilers equipped with their Low NO<sub>x</sub> firing system. The Porto Tolle power plant utilises a fuel mix of coal and biomass.

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## ❑ Upgraded air system to be supplied to Propal's Cali paper mill in Colombia



Inboard stacked air ports on the west wall

The Anthony Ross division of the Clyde Bergemann Power Group (CBARC) has supplied an upgraded air system to Propal for a power boiler. Propal is a large paper producer with two mills in Colombia and uses bagasse, a byproduct from the sugar industry, to make pulp. Propal's plant #1 is located just north of Cali.

Their power boiler #5 burns biomass (bagasse) and coal. It produces steam for electric power generation and for the needs of the paper mill.

The project had several goals. One was to reduce particulate emissions in line with new stricter limits from the Colombian government. Another was to increase the amount of biomass burned and reduce the amount of coal used. This reduces the carbon footprint of the mill and creates more green energy. The efficiency of the boiler is also increased with the new air system.

CBARC used their Stacked Air System (SAS) for the power boiler #5 project. CBARC has supplied SAS on more than thirty five boilers, including a similar system on the recovery boiler at Propal's plant #2 a few years ago.

It has operated well and successfully demonstrated the technology to Propal. Power boiler #5 was the first application of SAS to a boiler burning biomass and coal. In addition to the air system, the scope of the project included a new fan and mechanical dust collector, as well as the mechanical installation. The SAS was installed in late August and power boiler #5 has been in regular production since then, serving the steam needs of the mill.

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## ☄ DRYCON™, dry bottom ash conveyors, to be installed at Slovakian power plant



DRYCON™ dry bottom ash handling system

Clyde Bergemann Materials Handling Ltd (CBM), Doncaster, England was awarded the contract for dry bottom ash handling and pneumatic conveying technology at the Kosice power plant in Slovakia. The plant, operated by Teplaren Kosice a.s. (Teko), is undergoing a rehabilitation project to upgrade two 150 MW coal-fired boilers.

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CBM received the order for the materials handling technologies from Istroenergo Group, a.s. (IEG), Slovakia who are heading up the refurbishment project for Teko.

Included in CBM's project scope is the design, supply, delivery and commissioning of dry bottom ash conveying systems, DRYCON™, including hopper and jaw crushers. CBM will also supply dense-phase pneumatic conveying technology to convey ash from the economisers and air preheaters.

The decision for the plant refurbishment was to upgrade existing technologies to increase plant efficiency and also to reduce aspects such as water treatment which were proving costly in the running of the plant. In order to do so, a decision was made to source dry bottom ash handling technology to replace the existing wet hydraulic conveying systems.

Clyde Bergemann's DRYCON™ technology which is designed to eliminate the use of water as well as returning heat energy to the boiler resulting in lower coal usage, was considered one of the preferred options for the dry bottom ash system. The contract was awarded to CBM in January 2011 and is scheduled to be operational the first quarter of 2012.

Craig Buckley, General Sales Manager of CBM, comments: "This is a tremendous achievement that is well overdue and a great start to the new year. This success comes from a culmination of efforts over the past 5 years and should send strong and positive signals to the industry regarding our position in the market to provide dry bottom ash technologies."

## ☄ ASHCON™ - Remote Submerged Scraper Conveyor technology unveiled



3D model of the ASHCON™ technology

Clyde Bergemann Delta Ducon (CBDD) introduces its newest technology, ASHCON™, a Remote Submerged Scraper Conveyor (RSSC). This technology offers a unique option for plants to eliminate their ash ponds. By intercepting the pipelines leading to the ash ponds, the slurry flow is diverted to an ASHCON™ RSSC.

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This patent pending invention was motivated by the movement in the USA towards eliminating all ash ponds while facing the reality that many existing plants do not have the access and headroom needed to retrofit Submerged Scraper Conveyors, SSCs, or DRYCON™ units directly under the older boilers. Previously, the only viable solution was to retrofit tall dewatering bins, settling tanks and surge tanks in a field beyond the boiler island. Invariably, this meant changing the existing jet pumps and water supply pumps for much higher water pressure and motor horsepower to deal with the higher total dynamic head, TDH.

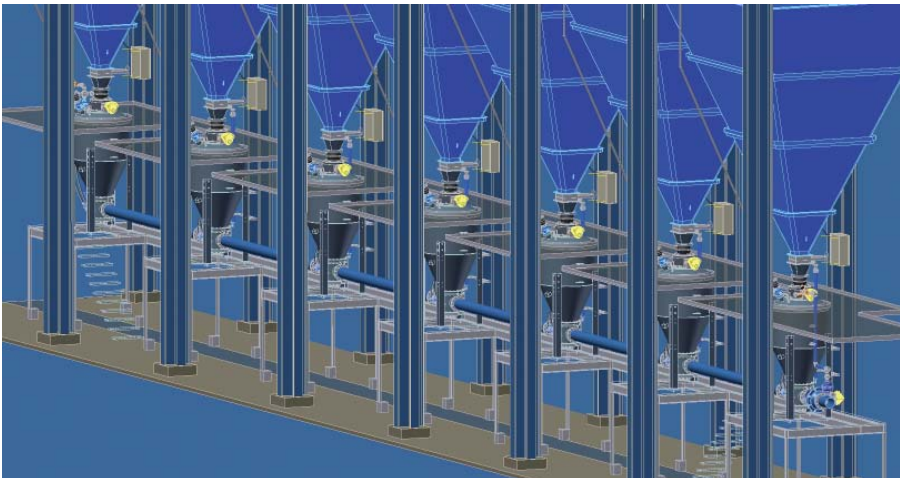
The low-lying RSSC concept eliminates the need for retrofitting jet pumps and water supply pumps to lift the ash slurry high into the air to reach traditional dewatering bins. This saves energy costs as well as outage related installation costs.

An ASHCON™ RSSC can be installed while the boiler is on-line and the tie-in connection requires very little outage time.

In smaller plants, one ASHCON™ can service several boiler units, providing an economical means to eliminate ash ponds in a shorter period of time.

While the use of an SSC or DRYCON™ conveyor is preferred from an energy cost standpoint, the ASHCON™ conveyors only deal with crushed material dropping a few feet from the incoming pipelines. This less severe service leads to greater reliability and longer conveyor life.

## ☐☐☐ Clyde Bergemann secures US\$64 million order intake with Eskom – South Africa



Pulse Jet Fabric Filter (left image) and MD pump outlet (right image)

Clyde Bergemann Africa successfully concluded a contract with Eskom for fly ash handling at Eskom's Kusile Power Station. The power station is currently being built by Eskom near Delmas in Mpumalanga. Eskom is state owned and the largest utility company in South Africa, headquartered in Johannesburg.

The order is worth around US\$50.1 million (R350 million) and Clyde Bergemann Africa will be responsible for the design, supply, construction and commissioning of the fly ash handling system. This includes the removal of fly ash from the bag houses to the storage silos and thereafter conditioning of fly ash onto overland conveyor belts.

In October 2009, the company was awarded the contract for the same scope of work at Eskom's Medupi power station, and the work is progressing on schedule. The holding company in Germany (Clyde Bergemann Power Group) was awarded the contract to supply sootblowers for Medupi and Kusile through Hitachi Power Europe, who are responsible for building the boilers.

Early in November, the African company was also contracted to do the complete design, supply and commissioning of a new Dust Handling Plant for Units 4 – 6 at Matla power station. The value of this contract is around US\$13.9 million (R95 million)

Clyde Bergemann Africa is the South African operation of the globally active Clyde Bergemann Power Group. Clyde Bergemann Africa offers a wide range of technologies to the power industry and is actively involved with dense-phase pneumatic conveying and boiler cleaning technologies.

Both technologies have a long history with Eskom's coal-fired power stations, including Matla, Kriel and Komati power stations for ash handling and various other power stations where they also handle the boiler cleaning operations from Clyde Bergemann.

Managing Director, Jaco van der Westhuizen comments: "As with Medupi, the bid was fiercely contested by all our traditional competitors. We believe in our products and the technology we offer and we have a track record for delivering excellent service and solutions at reasonable cost. We are making excellent progress at Medupi and the quality of our installation speaks for itself.

Our people are passionate, committed and dedicated and submitted a tender of exceptional quality. I think this gave us the edge."

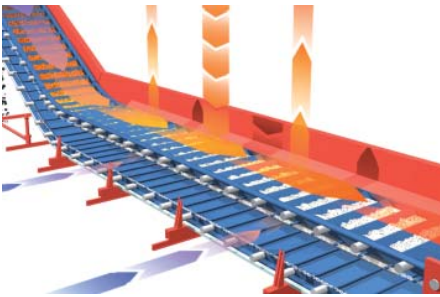
After Medupi, Kusile power station is the most advanced coal-fired plant project in Eskom. When completed, the power station will have six boilers each powering an 800 MW turbine, producing 4,800 MW of power, thus making it one of the biggest coal-fired power stations in the world when fully commissioned.

"This great success in South Africa confirms our market strategy to be close to local customers with a global organisation and excellent products and technologies. Booking these projects underpins a business development where after some market restraints we see stronger bookings kicking in now worldwide," stated Franz Bartels, President & CEO of Clyde Bergemann Power Group.

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## ☐☐☐ Clyde Bergemann awarded first US project for DRYCON™ technology



DRYCON™ airflow diagram

Clyde Bergemann Power Group Americas (CBAM) headquartered in Atlanta/GA has been awarded a contract to supply both the engineering and equipment to convert the existing wet bottom ash removal system of Seminole Electric's two 650 MW coal-fired units located in Palatka, Florida to a dry system utilising its DRYCON™ technology.

The contract will be executed by Clyde Bergemann Delta Ducon (CBDD), the Group's business unit for ash handling in the US with the turnkey installation performed by our strategic alliance partner, Roberts and Schaefer.

The DRYCON™ dry bottom ash systems will replace the plant's existing wet systems and will reduce maintenance costs and allow the sale of the ash. Seminole's selection of the DRYCON™ system was centered on its maintenance friendly and robust design as well as its ability to improve the plant's heat rate through a significant reduction of LOI. Included in Clyde Bergemann's project scope is the design, supply, delivery and commissioning of two complete dry bottom ash conveying DRYCON™ systems, including ash hoppers and jaw crushers.

conversion of a wet to a completely dry bottom ash system in almost twenty years in North America. With ever increasing environmental concerns over ash ponds and the desire of utilities to reduce water usage at their plants and enable sale of the ash, this type of equipment is expected to be in higher demand over the next few years.

The CBAM sales team worked very closely with the plant throughout the entire sales process to provide an optimum solution. The contract was awarded in March 2011 and the installation of the equipment is scheduled during a normal boiler outage in spring and fall of 2012.

Ron Tempesta, President of CBDD, comments: "We were pleased to be selected after a detailed evaluation process by Seminole and its engineering firm as the best dry bottom ash technology. This award is a major accomplishment for CBPG to demonstrate our capabilities to the North American utilities."

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This award marks the first utilisation of the DRYCON™ technology in North America and is a milestone for Clyde Bergemann Power Group. It is also the first

## ☐☐☐ Trona dry sorbent injection system to meet plant's acid gas permit requirements



Image of the Dry Sorbent Injection system

Clyde Bergemann Delta Ducon (CBDD) has been awarded a contract from Evergreen Community Power in Reading, PA for the design, supply and field support of a Trona Dry Sorbent Injection (DSI) system.

The technology will be installed to meet the plants PADEP HCl & SO<sub>2</sub> acid gas permit requirements.

Evergreen Power is a 30 MW Circulating Fluidised Bed (CFB) boiler that utilises wood debris & waste as fuel. The Clyde Bergemann scope being supplied to Evergreen will consist of two 100% feeding and conveying trains with a design flow rate of 2,000 PPH (max rate 7,000 PPH) of Trona with a usable storage silo capacity of 4,500 ft<sup>3</sup>. Additionally, Sturtevant milling technology will be utilised to increase the efficiency of the acid gas mitigation with minimal Trona usage allowing the plant to effectively meet their acid gas removal requirements.

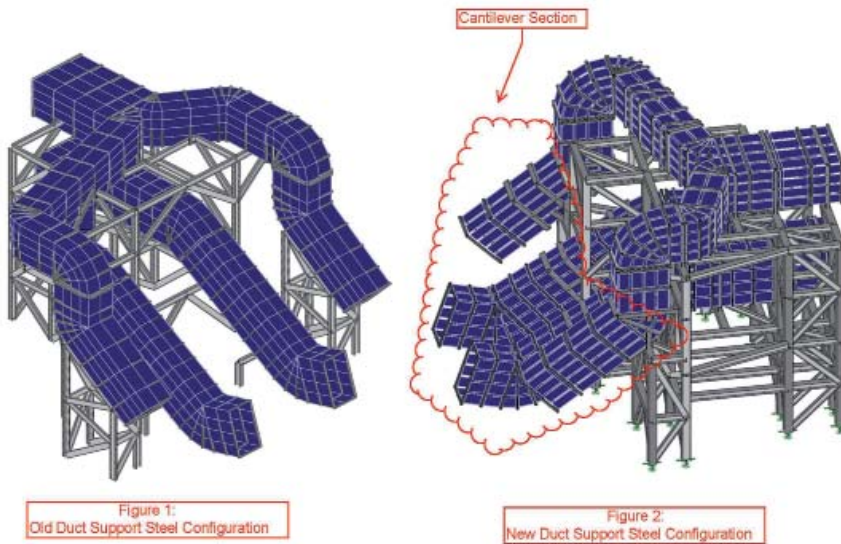
CBDD will also provide their Portable Sorbent Injection equipment, complete with milling equipment, on an interim basis to bridge the time gap between date of order placement and final erection and commissioning of the permanent system scheduled for May 2011.

CBDD, Clyde Bergemann Americas sales team and the local manufacturers representative worked together to build and maintain a strong relationship with all members of the Evergreen Power project team throughout the intense sales process to secure the US\$600k contract. The contract represents the first CBDD Trona injection system installation for a biomass-fired facility.

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## ❑ Muja power plant, Australia to use Clyde Bergemann technology



Before and after steel configurations of duct support



Image taken on-site

Clyde Bergemann Senior Thermal has been awarded a contract from Kempe Engineering Services (Australia) Pty Ltd for the design, partial supply and support services for the installation of four Pulse Jet Fabric Filters and associated fly ash handling equipment at the Muja power station stages A and B re-powering project.

As an essential requirement to the success of the project, this latest and most modern technology will meet WA regulations for stringent environmental emissions. The power station is currently being upgraded and refurbished by Kempe.

The Clyde Bergemann scope incorporates technologies and equipment provided by Clyde Bergemann EEC (CBEEC) of the USA, Clyde Bergemann Materials Handling (CBM) of the UK and Clyde Bergemann Senior Thermal (CBST) of Australia providing an example of the global presence Clyde Bergemann Power Group is providing to the energy industry.

When completed the Clyde Bergemann scope of supply will include four CBEEC Pulse Jet Fabric Filters, twenty-four CBD water cooled Dome Valves, ash vessels, ash storage silo, fly ash conditioning system with associated pumps, compressor plant, pipework and valving to capture and transport the fly ash from the power plant to the local ash dam approximately 2 kilometres away.

The Clyde Bergemann groups have worked closely together to ensure that Kempe and their operating partner VINALCO are receiving the technology which best meets the project technical requirements as well as meeting the very tight schedule required for the plant start up.

The end contract is the result of many months of close collaboration between CBST and Kempe to ensure the correct technical solution and project strategy is in place to ensure the ongoing success of this very important project.

CBST offers from the global group of Clyde Bergemann companies a wide range of technologies to the power industry and with this project now in place is actively involved with flue gas cleaning, as well as dense-phase pneumatic conveying, boiler cleaning technologies and heat recovery solutions.

“This success in Australia confirms our market strategy to be close to local customers with a global organisation providing clean energy products and technologies,” says Franz Bartels, President & CEO of the Clyde Bergemann Power Group.

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## ❖ New Gas Turbine exhaust systems to be supplied to Chilca Uno power plant, Peru



Existing gas turbine exhaust stacks at the Chilca Uno power plant, Peru

Clyde Bergemann Bachmann (CBBA) received a US\$5.4 million contract from POSCO Engineering & Construction Co. Ltd. for design, manufacturing and supply of three sets of Gas Turbine Exhaust (GTEx) bypass systems and complete auxiliaries for the Chilca Uno repowering project in Peru.

The contract also includes US\$225k service contract for training and technical advisory for erection, start-up, test and inspection, and performance test for acceptance of the combined cycle plant.

The existing power plant is a simple cycle facility that has no provision for waste heat recovery. To address the issues of increasingly stringent environmental regulations, plant efficiency and increasing power demand, Energia del Sur SA has committed to re-power the existing three Siemens gas turbine generators with combined cycle technology.

The repowering project will consist of the addition of three Heat Recovery Steam Generators (HRSG) and one steam turbine. Conversion to a combined cycle system will increase the installed capacity of the power plant in an amount of up to 800 MW.

The existing gas turbine exhaust stacks shown in the picture will be replaced with CBBA GTEx bypass diverter systems. The bypass systems, installed upstream of the new HRSGs will permit simple-cycle operation and continued electricity generation in the event of a steam turbine/generator failure.

The CBBA GTEx bypass exhausts systems comprise the horizontal components (transition from the GT exhaust flange, diverter and expansion joint) and the vertical components (transition, silencer, stack tube, structural steel, ladders, and platforms). The exhaust system components are designed to be shipped to the site in modules the size of which is determined by the local transport restrictions. The entire exhaust system is designed to meet the specified Peruvian wind and seismic conditions.

The Bachmann™ GFD Model 56 diverter design is state-of-the-art and is optimised for performance to today's standards. CBBA engineers, drawing from years of experience at over 100 installations around the world, have studied every component with attention to maximising longevity and optimising shipping sizes, while minimising cost, field assembly, and commissioning time. The Bachmann™ GFD comes in a full range of sizes including those for the largest and highest temperature turbine

exhaust systems in the industry today.

Major features of our diverter product offering include the diverter blade, hydraulically actuated toggle drive and double row of pressure assisted flexible metallic seals. These dynamic components are designed specifically for today's highly cyclic operating regimes. Previous designs do not meet the demands imposed by daily start stop cycles from peaking power stations. The previous generation of diverters had life expectancies of just a few hundred cycles. The Bachmann™ GFD design has been proven to have a life expectancy of more than 15,000 cycles.

A significant contributing factor to our success in pursuit of this important gas turbine power generation project is our considerable gas turbine exhaust experience, specific to repowering of existing simple cycle plants to combined cycle systems. Our international experience in repowering projects includes five units in Canada, one in China, two in Vietnam, four in Argentina, one in Chile, and prior to this award five previous installations in Peru.

A testament to the continuing success of CBBA outsourcing business model is that engineering, flow model studies and Finite Element Analysis (FEA) will be executed in the CBBA Auburn, Maine USA offices. The dynamic components of the diverter (blade, drive, and seals) will be fabricated in Canada, while the internally insulated diverter housing will be fabricated in Mexico of ASTM materials. The silencer baffles will be produced in Germany with DIN materials. All remaining equipment (e.g. transitions, expansion joints, blanking guillotine, stack and structure) will be supplied from People's Republic of China with ASTM materials.

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## Success in waste heat recovery for marine offshore applications



Three WHRU installed on Modec's Guara FPSO

Clyde Bergemann Senior Thermal (CBST) based in Sydney, Australia secured three separate orders for supply of waste heat recovery units to FPSO (Floating Production Storage and Offloading) operating companies in 2010.

The first order came in April of 2010 from Modec International Houston office for the supply of three hot water units recovering heat from three GE LM2500 gas turbines.

Heat recovered will be 17 MW producing 364 TPH of hot water at 120°C from each waste heat unit. The FPSO is called Guara and is destined to operate in Brazilian waters for Petrobras.

The second order came in July 2010 from SBM Gusto, Netherlands, for the supply of three hot water units recovering heat from three GE LM25000 Gas Turbines. Heat recovered will be 20 MW producing 670 TPH of hot water at 130°C. The FPSO will be called Cidade De Paraty and again destined for Brazilian deep waters operating for Petrobras.

The third order also came in July from OSX Brazil for the supply of one hot water unit recovering heat from a Solar Titan 130 Gas Turbine. Heat recovered will be 15 MW producing 155 TPH of hot water at 150°C. The FPSO was renamed OSX1 and will operate in Brazilian waters.

CBST was successful in securing these three orders due to the comprehensive package provided to these operators that took into consideration numerous factors including:

- Robust design that offers low maintenance including our trademark Steel H™ surface
- Integral bypass reducing the footprint in offshore applications
- Superior delivery and commercial offer compared to competitors
- Large transportable pieces reducing installation time in shipyards

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## ISO 9001:2008 certification awarded to Clyde Bergemann Atlanta

Clyde Bergemann Atlanta (CBA) has earned ISO 9001:2008 certification. CBA demonstrated compliance with the updated standards for quality management systems set forth by the International Organisation for Standardisation (ISO) in all of its core business areas - design, manufacture, assembly and distribution of custom fabrication, industrial equipment, and industrial cleaning equipment for boilers for various industries. The company's ISO 9001:2008 certificate was awarded by Det Norske Veritas Certification, Inc., an ANAB accredited registrar.

ISO 9001:2008 is an internationally recognised standard that provides companies with a set of principles that ensures systematic approaches to

achieving customer satisfaction. To obtain accreditation companies must undergo stringent auditing, management reviews, and process improvements. The standard identifies requirements designed to help companies create and maintain procedures to ensure quality in their products and services.

Shane Wamsley, Quality Manager at CBA, comments: "This achievement is a direct result of our company's ability to work together to achieve our goals. Having this certification accompanied by our superior leadership gives us the foundation needed to continue to produce and improve our reliable products."

Dominick Garton, President and CEO of CBA, adds: "The ISO certification is indicative of Clyde Bergemann's continued and renewed commitment to quality excellence. As such, it is a cornerstone in our strategy to deliver on our core commitment of achieving maximum customer satisfaction."

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## Customer training courses advise the importance of technology maintenance



Conference set-up at Clyde Bergemann GmbH's new facility in Wesel

The maintenance of on-load boiler cleaning equipment is an important task to maintain boiler's reliability and availability, consequently keeping up efficiency of the plant. Clyde Bergemann in Wesel, Germany offers customers a training course led by our own experts to refresh and expand one's knowledge of sootblower maintenance.

The agenda of the one day course is centered around communicating knowledge about deposit build-up and its effect on boiler operation as well as the optimised procedural setting of sootblowers.

Further topics are:

- Signals for preventative maintenance measures
- Optimisation of periodical maintenance work
- Improved sootblower design elements for lower cleaning costs, more safety and improved cleaning

Since the first maintenance training course in 2007, 120 customers attended this seminar.

In November 2010, the new training course "Engineering of on-load boiler cleaning equipment" took place. This seminar is addressed to key persons responsible for plant design at boiler manufacturing companies and utilities.

The agenda of this training course includes topics such as:

- Impact of on-load boiler cleaning on boiler performance

- Engineering basics for on-load boiler cleaning equipment
- Effect of the plant design to the layout of the boiler cleaning equipment
- Criteria to select the best suited cleaning device

A very important step in this new training course to solidify what the attendees have learned is to select and engineer an on-load boiler cleaning solution for a plant by teamworking.

Deliberately, the participant groups of both training courses are kept small to ensure that as many questions as possible can be handled and responded to through direct interaction with the instructors.

## Clyde Bergemann representatives gather for annual Sales Conference



Attendees of the CBPG Sales Conference congregate in the new manufacturing workshop of Clyde Bergemann GmbH, Germany

Clyde Bergemann Power Group (CBPG) held their annual Sales Conference from the 2nd to the 3rd of December 2010 at the new manufacturing workshop of Clyde Bergemann GmbH, Germany.

More than 100 key personnel attended the conference from CBPG's global sales and marketing and research and development teams.

The conference saw an opportunity to share knowledge and experience of technology developments, major projects and market information from around the world.

CBPG welcomed guest speakers including Dr. Peter Moser from RWE Power AG who presented information on capturing carbon from flue gas of coal-fired power plants.

Also presenting was Prof. Dr. Sc. Lars Strömberg, Vice President of Vattenfall AB who shared his knowledge on CO<sub>2</sub> capture and storage with reference to oxyfuel technology and reference site.

In all, the two days created an opportunity for learning and networking to circulate knowledge and expertise throughout CBPG's business units.

## Events Diary

<b>MAY</b>	<b>Biomass Conference and Expo</b> 2nd - 5th May St. Louis-MO, USA	<b>World of Coal Ash</b> 9th - 12th May Denver-CO, USA	<b>Electric Power</b> 10th - 12th May Chicago-IL, USA	<b>NAWTEC</b> 16th - 18th May Lancaster-PA, USA
<b>JUNE</b>	<b>POWER-GEN Europe</b> 7th - 9th June Milan, Italy			
<b>JULY</b>	<b>Reinhold APC Conference &amp; Expo</b> 10th - 12th July Cleveland-OH, USA			
<b>AUGUST</b>	<b>COAL-GEN</b> 17th - 19th August Columbus-OH, USA			

## Personnel Developments



**Patrick von Hagen** joined **Clyde Bergemann Power Group, Wesel, Germany** as **Corporate Finance Director**. Patrick will be responsible for the finance and reporting side of all companies within the division CBPG RoW and will support the referring COO of this division. Beyond this he will support the Group CEO and CFO in business development projects and acquisitions. Additionally, he will help to further optimise the Group Finance function.



**Stuart Westley** joined **Clyde Bergemann Materials Handling Limited, Doncaster-UK** as **Sales and Marketing Director**. In this position Stuart will have responsibility for the formulation and delivery of the Sales and Marketing strategy to support long term development of sales volumes from the company's materials handling and air pollution control divisions and also identify opportunities for business extension.

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