

Clyde Bergemann News

Clean Energy Solutions

Edition 02/10



Indonesia – powering up for the future

As the population of the world's largest archipelago of 17,508 islands continues to grow, demand for electricity in Indonesia is set to increase annually between 7% - 9% up to 2020, and with the inability to meet existing demand through years of under investment and poor policymaking, Indonesia will focus on ensuring further blackouts, such as those in 2009, will be eliminated. To do so, the country expects to add 20,000 MW of power to the country's installed capacity by 2014. Projects will be predominantly coal-fired to reduce Indonesia's dependence on oil-fired generation and to promote the country's coal resources. [>> Page 2](#)

Content:

- | | | |
|--|---|--|
| - Indonesia - powering up for the future > Page 2 | - On-load boiler cleaning contract awarded for UK's largest waste-to-energy plant > Page 4 | - Simulating a DRYCON™ using the latest computational techniques > Page 7 |
| - First new standard modular sootblowers for Russian recovery boiler shipped > Page 3 | - Environmental retrofit project for NRG Energy completed > Page 5 | - Clyde Bergemann Power Group's UK subsidiaries accredited with Environmental Management System – ISO 14001:2004 > Page 7 |
| - First UK SCR project underway with Clyde Bergemann on-load cleaning technology > Page 4 | - Dense phase technology to replace lean phase ash slurry system on lignite-fired power plant in Serbia > Page 6 | - New on-load cleaning equipment manufacturing facility in India inaugurated > Page 8 |
| | | - Events diary > Page 8 |

Indonesia – powering up for the future

Indonesia is South East Asia's largest economy with a nominal GDP of US\$500 billion. It is also the world's fourth most populous country with a population of around 240 million.

Its power sector is currently made up of around 44% coal generation, 25% oil, 15% gas and 8% hydro. The country's electrification ratio remains low with over 70 million people having no access to electricity. Existing installed power generation capacity is over 30,000 MW with a power deficit of around 4,555 MW leading to frequent blackouts and making it clear that the country must increase capacity to meet current demand levels. Due to dwindling oil reserves and production facilities, a focus on coal and gas sources will be imminent in terms of new capacity.

In order to tackle the capacity shortfall the government launched the '10,000 MW Acceleration Programme' back in 2006 to add new capacity to the country by 2010. Under the plan, which focused mainly on coal-fired plants, 7,460 MW would be brought online in Java and another 2,513 outside of Java. Some projects are running to schedule however there have been some delayed projects as a result of financing problems leaving the programme behind schedule for the 2010 deadline. The global financial crisis also played its part on slowing down progress as it dwindled the already limited funding available.

Some measures have been taken to improve legal and institutional barriers in the sector including the draft of the new electricity law and PLN's new plan for reorganisation. More efforts will still be required to establish a stable and legal framework.

In addition to the '10,000 MW Acceleration programme', further projects will be

introduced through the second programme which is being prepared for 2010 to 2014. The government, along with Indonesia's largest state utility PT Perusahaan Listrik Negara (PLN), has introduced the action plan to address power shortage and aims to add 10,580 MW in the given timescale. Ninety three power plants are expected to be included in the second programme, with 4,000 MW from geo-thermal power plants, 3,310 MW from coal-fired plants, 1,660 MW from gas-fired combined-cycle plants and 1,240 MW from hydro-electric facilities. Around US\$15.96 billion is expected to be required to complete the programme.

In light of these market developments and future potential in Indonesia, Clyde Bergemann Power Group (CBPG) decided to open a business unit in the city of Jakarta. The locality of the new facility along with local knowledge of the team put in place to run the establishment, will ensure that CBPG are in a key position to support the market. Clyde Bergemann Indonesia (CBIA), as it is now known, opened its doors to business in May 2010, and is continuing its already established presence in the market from its new local venture.

Franz Bartels comments: "With CBIA we will ensure that also in the emerging Indonesian market we will reach a leading position as partner of the local power industry."

Acceleration of coal-based power plant construction programme

Power Plant	Capacity
PLTU Southern West Java	3 x 300 - 400
PLTU 1 East Java, Pacitan	2 x 300
PLTU Labuan	2 x 300 - 400
PLTU Tanjung Jati Baru	1 x 600 - 700
PLTU Rembang	2 x 300 - 400
PLTU 1 Banten, Suralaya	1 x 600 - 700
PLTU 3 Banten Project	3 x 300 - 400
PLTU West North Java	3 x 300
PLTU Tanjung Awar-Awar	3 x 300 - 400
PLTU Paiton Baru	3 x 600
PLTU Madura	2 x 100
PLTGU Bojonegara	3 x 740
PLTU Indramayu	2 x 300
PLTU Nusa Penida	2 x 100
PLTU Anyer	1 x 330
PLTU Kuala Tanjung	2 x 112
PLTU Banjarsari	2 x 100
PLTU Banyuasin	2 x 100
PLTU Baturaja	2 x 100
PLTU Tanjung	2 x 55
PLTA Poso	255
PLTU Arahau	4 x 600
PLTU Central Bangko	4 x 600
Total	24,648

Source: IHS Global Insight Report: Indonesia (Energy), April 2010.

Contact Details:

Franz Bartels
Clyde Bergemann Power Group
f.bartels@CBPG.de

❖ First new standard modular sootblowers for Russian recovery boiler shipped



Installation of RS-M sootblowers at site

Atlanta/GA based Clyde Bergemann, Inc. (CBA) recently shipped 68 x RS-M “Recovery Service” sootblowers for Metso, Finland’s new chemical recovery boiler that is currently being constructed at the Bratsk mill in Russia. The sootblowers are being supplied with the new Clyde Bergemann Power Group (CBPG) standard modular housings for retractable sootblowers.

The idea of a retractable sootblower with a housing that is bolted together from standard stock components was first born in early 2008. While many other mechanical components are now globally sourced and are available immediately from stock, sootblower housings “canopies” are custom fabricated to suit one particular order. The new modular concept now allows the assembly of housings from stock components to allow much quicker delivery. Also, the new design has many other distinct advantages for the traditional housing design.

After an initial prototype sootblower was successfully tested, the concept was further refined by a team of engineers from CBA and German based Clyde Bergemann GmbH (CBW), and is now available as a new global CBPG standard for retractable sootblowers.

Depending on the travel, the housing is formed by several standardised sets of two side panels with bolt-in track angles and gear rack and U-brackets, as well as one each front and rear plates and removable top covers. Special permanent fasteners are used to connect the panels and U-brackets. All components are bolted in or onto the housing in lieu of the welding carried out previously. This makes it easier to replace parts on the sootblower in future – if ever necessary.

The modular housing concept will be unique in the industry and be superior to what has been available. Appropriate patent applications have been filed to protect the design.

Prior to assembly of the Bratsk sootblowers CBA took the opportunity to further optimize the assembly process for retractable sootblowers by introducing an assembly line type process.



RS-M sootblower in workshop

This method needs less space, allows a better material flow and cuts down further on production time.

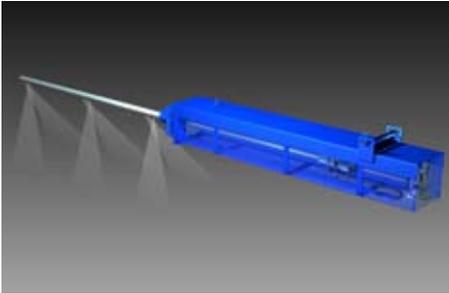
CBA plans to offer future sootblowers for new recovery boilers with modular housings. We believe that its advantages will further improve our leading competitive position in the pulp and paper industry.

The Bratsk order is the most recent of a total of 75 new recovery boiler installations for CBA’s RS sootblower since 1991 and the 35th order from Metso alone.

❖ Contact Details:

Hans Schwade
Clyde Bergemann Americas, USA
hans@clydebergemann.com

❖ First UK SCR project underway with Clyde Bergemann cleaning technology



3D image of PS-SB on-load cleaning model

Doosan Power Systems, UK, experts in steam generation technology for the global power market, awarded Clyde Bergemann Ltd, Scotland (CBS) the contract to deliver on-load cleaning systems for two new economisers on 1 x 500 MW unit at E.On's Ratcliffe Power Plant in the UK. The systems to be installed include 20 x PS-PB part retractable oscillating sootblowers and 4 x PS-SB part retractable fully rotating

sootblowers. The additional 3 x 500 MW units at the plant will be upgraded in subsequent years thereafter and will also be installed with Clyde Bergemann technology.

The plant is undergoing an environmental boiler upgrade known as the Ratcliffe Environmental Upgrade – REU, in order to ensure the plant meets legislative targets for reduced emissions, as agreed by the Large Combustion Plant Directive (LCPD). Part of the REU includes the installation of Selective Catalytic Reduction (SCR) technology to reduce NOx emissions. The SCR module includes a new economiser with the existing boiler back pass economiser also being replaced. Ratcliffe's SCR technology will be the first of its kind in the UK with other plants expected to follow in order to meet the timeline of the LCPD.

The technology to be supplied by CBS is designed to eliminate the build up of ash deposits on the economisers which can lead to a reduction in heat transfer during the boiler feedwater pre-heating process leading to increased operating costs.

CBS Sales Manager, Iain Carruthers, comments: "This was a targeted contract for CBS and we look forward to working as a key technology partner with Doosan Power Systems on what is the first installation of its type in the UK".

Contact Details: ❖

Iain Carruthers
Clyde Bergemann Ltd, UK
icarruthers@clydebergemann.co.uk

❖ On-load boiler cleaning contract awarded for UK's largest waste-to-energy plant



Front view image of Shower Cleaning System

Von Roll Inova, the Swiss subsidiary of the internationally active A-TEC INDUSTRIES AG conglomerate has awarded Clyde Bergemann with the turnkey delivery of three SCS Shower Cleaning Systems to be installed in the 72 MW Riverside facility. The SCS systems will be equipped to clean second and third open pass of all three

combustion lines. Each combustion line processes 31.8 tonnes of municipal and commercial waste per hour to generate enough electricity to serve roughly 66,000 households.

The use of waste as fuel is a procedural challenge, as the range of material delivered to a plant can vary from well-sorted domestic refuse, through mixed waste fractions to fuel mixtures that may additionally contain various types of biomass. By using Clyde Bergemann technology, the open passes are kept free of deposits so that the heat transfer is maintained constantly. Subsequently, deposit formation and high-temperature corrosion will be avoided resulting in optimised plant availability and reliability.

The SCS system uses water as the cleaning medium. The cleaning nozzle is mounted on a flexible, temperature-resistant metal hose. The nozzle enters the boiler guided by a flange. The SCS systems for the Riverside plant will be fully automated multiple-row units. The term "multiple-row" refers to the flange arrangement in multiple rows across the boiler roof. By using a crane runway, SCS enters these flanges to clean different sections of the boiler.

The scope of this turnkey supply comprises erection and commissioning as well as all works for laying of pipes and cables.

Contact Details: ❖

Volker Kruse
Clyde Bergemann GmbH, Germany
vkruse@cbw.de

Environmental retrofit project for NRG Energy completed



NRG's Huntley Power Plant, New York-USA



NRG's Dunkirk Power Plant, New York-USA

Clyde Bergemann EEC (CBEEC) has completed a three year environmental improvement project for NRG Energy, Inc. that reduces air emissions beyond requirements with lower operating costs and minimised boiler outage time. The project retrofitted two of NRG's coal-fired power plants in New York, the Dunkirk and Huntley stations, totalling six boilers and a nominal generating capacity of 1,000 MW, with state-of-the-art environmental control systems. The work, valued at more than \$170 million, included engineering, procurement, construction and commissioning. The project was completed within tight construction and outage schedules that allowed NRG to maximize service to its customers. Independent organisations have tested the systems and determined that they outperform guarantees on emissions reductions, leading to lower than expected operating costs.

This project is the first of its kind in the United States in which trona and Powder Activated Carbon (PAC) are simultaneously injected into the flue gases thereby reducing sulfur dioxide (SO₂) and mercury (Hg) from the plant's exhaust.

When NRG sought to reduce emissions of particulates, SO₂ and mercury at the two stations, the company selected CBEEC's environmental control technology based on its ability to meet the emissions requirements while significantly limiting the outage time required for installation. CBEEC's solution allowed for installation of most of the modular equipment while the power plant remained in operation.

For this project, CBEEC engineered and supplied all Air Pollution Control (APC) equipment and ancillary systems down to the foundations. The project included demolishing existing equipment, erecting new equipment, hot to cold ductwork conversions of all twelve air heaters, piping, low and medium-voltage electrical work, and thermal insulation. New emissions controls included:

- 10 pulse-jet fabric filters each with 12 shop-fabricated modules utilising long bag technology
- 6 trona storage and injection systems including 7 equipment buildings and 6,000 feet of transport piping to reduce SO₂ emissions
- 2 trona railcar unloading and 6 transfer systems and associated bulk storage silos
- 6 PAC injection systems to reduce Hg emissions
- 3 PAC unloading and storage systems

- 10 pneumatic dense-phase ash handling systems, including 120 ash vessels
- 2 ash-storage silos and unloading systems
- 12 ID fans, including 2500/1500 HP motors and VFD's
- Over 6,000 linear feet of elevated ductwork (nominal 16.5' square) and support towers
- Compressed air systems, including receivers and dryers
- 14 electrical equipment buildings including all associated MCC's and VFD's (controls)
- 6 integrated DCS control systems for all CBEEC equipment (interface)
- Other Balance of Plant items, including elevators, CFD model study for each APC/ductwork train, fire protection equipment, pipe bridges, equipment enclosures and complete structural analyses with modifications to existing boiler buildings

Performance tests indicate that emissions of SO₂ are reduced by over 55%, mercury levels reduced by over 90%, and particulate levels reduced to less than 0.010 lbs/MMBtu. All three exceed the guaranteed performance levels. Sorbent injection rates are well below those guaranteed and combined with lower than guaranteed pressure losses and power consumption will save in operating costs over the lifetime of the systems. Overall benefits of the CBEEC solution include low operating costs, low installation costs, and a cleaner environment while burning America's most abundant and lowest cost fuel--coal.

*Content approved by NRG

Contact Details:

Greg Golub
Clyde Bergemann EEC, USA
ggolub@clydebergemannec.com

❑ Dense-phase technology to replace lean-phase ash slurry system on lignite-fired power plant in Serbia



Managing Director of Clyde Bergemann Materials Handling Ltd, Jeff Hudson (front left), at the contract signing in EPS offices in Serbia

Serbian power company JP Elektroprivreda Srbije (EPS) awarded the turnkey contract to upgrade their ash collection system and replace the existing hydraulic ash handling systems at the TEKo A lignite-fired power plant in Kostolac, Serbia with Clyde Bergemann technology.

Clyde Bergemann DRYCON GmbH (CBDR) signed the official contract with EPS in January 2010, which consisted of replacing all existing wet hydraulic ash handling technologies with a more modern and environmentally acceptable dense phase pneumatic and hydraulic solution. The existing hydraulic slurry systems operated with water to ash ratio of greater than 10:1 and will be replaced with a more environmentally acceptable solution meaning water consumption can be reduced by a factor of 10 times.

The project has been realised following the already successful implementation of similar technologies at other sites across the Republic of Serbia and will continue to strengthen their application to join the EU by showing that Serbian coal-fired power generators are some of the

cleanest and most environmentally friendly in Europe. The above mentioned project is a common effort of the Governments of the Republic of Serbia and the Federal Republic of Germany and procurement is partly financed through a KfW Bank loan and Financial Contribution and partly from the Employer EPS Serbia.

The turnkey project will be jointly executed through a consortium of foreign and domestic companies lead by CBDR in Germany. The main technological solution will be developed and implemented from Clyde Bergemann Materials Handling Ltd in Doncaster, UK (CBD) who are current leaders in this specialist field and continue to act as materials handling 'Centre of Competence' for the Clyde Bergemann Power Group.

Together with their consortium partners CBD, GOSA-MONTAZA and GOSA-FOM, specialists in the field of power generation services, CBDR will execute the programme of works by the end of 2011.

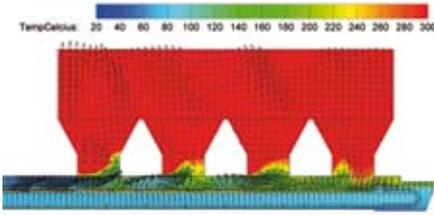
The combination of wet and dry dense-phase ash handling technologies will not only significantly reduce current water demand, but will also facilitate a substantial reduction in the contamination of ground and surface water contamination from breakdowns of the nearby ash dam.

Craig Buckley, Sales Manager of CBD comments: "This programme is vitally important to EPS and the power industry of Serbia. It is one of the last environmental refurbishment projects to be realised on existing power units and will contribute significantly to the Republic of Serbia's proposal to join the EU. Clyde Bergemann is delighted to be involved in such a prestigious project and look forward confidently to the successful completion by the end of next year."

Contact Details: ❑

Craig Buckley
Clyde Bergemann Materials Handling Ltd, UK
cbuckley@cbmh.co.uk

Simulating a DRYCON™ using the latest computational techniques



Sample of DRYCON™ simulation image

Clyde Bergemann Materials Handling Ltd in Doncaster, UK has teamed up with the Department of Energy Plant Technology from the University of Bochum in Germany to simulate the operation of the DRYCON™ dry bottom ash conveyor.

The motivation for this project is to further optimise the design of the DRYCON™ by reducing cooling air flows, reducing DRYCON™ size and identifying any other areas that can reduce the capital cost of the system.

Using some of the latest modelling techniques an entire DRYCON™ system is virtualised. Computational Fluid Dynamics (CFD) is used to model the air flow in the system and the Discrete Element Method (DEM) is used to represent the ash falling arbitrarily from the boiler throat onto the apron belt before being conveyed along its length.

The results are presented graphically complete with the mass flows, temperature distribution profiles and the velocities of both the air and the ash in the system.

These are not only useful for analysis purposes but provide a clear graphical description of the process to give existing and potential customers a better understanding of the benefits of the DRYCON™ conveyor.

It is possible to simulate the DRYCON™ with different design parameters and under different operating conditions. Further details will include the effect of different air inlet configurations between the top air inlet and the side inlet ports, the overall air flow distribution in the system and the distribution of ash on the belt. Based on the results of these variations the changes to the operation and design can be made and the simulations rerun.

The project has already provided interesting results which will be presented in the near future as they approach completion.

Contact Details:

Dan Young

Clyde Bergemann Materials Handling, UK
dyoung@cbmh.co.uk

Clyde Bergemann Power Group's UK subsidiaries accredited with Environmental Management System – ISO 14001:2004

In August 2010, Clyde Bergemann Power Group's UK subsidiaries (CBUK) based in Doncaster and Glasgow received the accreditation for ISO 14001:2004 in relation to their operations focussed on mechanical and pneumatic material handling systems, air pollution control systems and on-load cleaning technology 'sootblowers'.

The ISO 14001 is an internationally accepted standard which applies to the implementation of an effective Environmental Management System (EMS) of a company. The commitment of the organisation involved in this system will help to achieve a balance between profitability and environmental impact of the business.

Environmental accreditation is a growing pre-requisite in the global business environment, and mandatory under the investment rules of financial institutions. Global organisations such as original equipment manufacturers, utilities and government funded investments view environmental accreditation second only to quality accreditation.

Having been awarded ISO 14001, the CBUK organisations are well positioned to further strengthen their corporate identity and maximise involvement in these investment opportunities.

Jeff Hudson comments: "Although managing our businesses in accordance with good environmental practices, early in 2010 we recognised the increasing need to demonstrate our standards by seeking official endorsement. We see the achievement of this accreditation as a demonstration of our commitment to the environment whilst providing our customers with quality solutions supporting energy efficiency increases and emissions reduction"

Contact Details:

Jeff Hudson

Clyde Bergemann UK
jhudson@cbmh.co.uk

❖❖❖ New on-load cleaning equipment manufacturing facility in India inaugurated



Franz Bartels, CEO & President of Clyde Bergemann Power Group, addresses the ceremony attendees

The new sootblower assembly facility of Clyde Bergemann India, at Noida, Uttar Pradesh, India was inaugurated by Mr. Franz Bartels, CEO & President of Clyde Bergemann Power Group on 5th of March, 2010. This is CBPG's seventh sootblower manufacturing set-up worldwide.

Almost the entire range of Clyde Bergemann's on-load cleaning equipment shall be produced from this facility.

The inauguration ceremony was well attended by many of Clyde Bergemann India's customers and suppliers. Distinguished guests from customers like Doosan Babcock, IJT, Foster Wheeler India addressed the gathering and shared their views and expectations from Clyde Bergemann. Almost all of the eminent speakers agreed with the appropriate and opportune timing of setting up of the facility and echoed the need of Clyde Bergemann's world-class onload cleaning equipment and systems in the high growth period of Indian Industries at present and in the decades to come.

Mr. Franz Bartels, while speaking on the occasion, announced the formation of a new joint venture (between Clyde Bergemann and BSBK group) by the name of Clyde Bergemann Beekay India (CBBK). The JV will address the DRYCON™ (dry bottom ash handling system) and other new material handling systems business in India. Mr. Ajay Gupta, Managing Director

of Macawber Beekay Limited (CBPG's long-standing joint venture in India) also shared his experience and plans on the exciting opportunities in India's power sector, which is in a fast-track growth path. The Indian market is gradually shifting towards more environmentally friendly technologies for ash handling systems and CBBK aims to seize the market potential and significantly contribute with the DRYCON™ and other innovative technologies.

With this manufacturing facility, Clyde Bergemann India is now uniquely positioned to serve its Indian customers with CBPG's products for on-load cleaning, backed-up by prompt and effective after sales service and spares support.

Contact Details: ❖❖❖

Dilip Sinha
Clyde Bergemann India Pvt. Ltd, India
dsinha@clydebergemann.in

❖❖❖ Events Diary

OCTOBER	POWER-GEN Middle East 4th - 6th October Doha, Qatar	ABTCP-TAPPI 4th - 6th October São Paulo, Brazil	Conventional Power Boiler User Group 16th - 17th October 2010 Nottingham, UK	International Conference POWER PLANTS 2010 26th - 29th October 2010 Vrnjacka Banja, Serbia
DECEMBER	POWER-GEN International 14th - 16th December Orlando, USA			

Editorial

Publisher:

Clyde Bergemann Power Group Inc.

News Editors:

Gillian Aird

Clyde Bergemann Ltd, Scotland
eMail: gaird@clydebergemann.co.uk

Sonja Mayer

Clyde Bergemann GmbH, Germany
eMail: smayer@cbw.de

Printing:

Strachan Office & Print Supplies

Glasgow, UK