

NEWS



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Franz Bartels | President & CEO

Our Cover Story:

Vietnam: Rising Energy Demand for a Fast-Developing Country

The Socialist Republic of Vietnam: a country located on the eastern coast of the Southeast Asian mainland with an area of about 330,000 km² (127,000 mi²), occupied by 94.5 million inhabitants, 14th largest in population among the nations globally.

A development success story

Talking about Vietnam, many people will think about the long and arduous war it went through, that finally ended in 1975. Vietnam was unified under a communist government, impoverished, and politically as well as economically isolated. In the late 1980s, the government, recognizing the need to open and integrate itself into the world economy, initiated a series of political and economic reforms. What happened since then is a development success story. All trade embargos were abandoned, diplomatic relations established and in 2007, after years of negotiations, Vietnam became the 150th member of the World Trade Organization.

According to the World Bank*, the country has transformed from one of the poorest in the world with per capita income around \$100 in 1990 to lower middle income of around \$2,100 in 2015. Its self-defined goal



is ambitious: Vietnam wants to achieve the status of an industrialized nation by 2020. Through the gradual reform policy (“Doi Moi”), framework conditions for private sector involvement and international investors have improved, and the export business has developed well.

Vietnam’s per capita GDP growth since 1990 has been among the fastest in the world averaging over 6 percent annually from 2000 to 2016. Not only are incomes higher, but the Vietnamese population is better educated and has a higher life expectancy than most countries with a similar per capita income. The economic progress has contributed to an impressive reduction in poverty. In 1996, 53 percent of the population was living below the poverty line; in 2014 it was down to 13.5 percent, and the trend is expected to continue.

Access to basic infrastructure has also improved substantially. Electricity is now available to almost all households, up from less than half in 1993.

Energy Policy: Keeping Up with Progress

It is obvious that as the economy and the living standard grew, so did the demand for energy. In late March 2016, Vietnam published a revised Power Development Plan 7 (PDP 7) that describes the expansion of the nation’s power generation by using a mix of energy sources. The plan foresees \$148 billion worth of investment in generation (75 percent) as well as distribution capacity (25 percent) through 2030.

As part of its plan to increase installed generating capacity by about 100 GW, Vietnam plans to add substantial coal-fired capacity and also wants to build the first nuclear reactor in Southeast Asia (expected to come online in 2028) and the first offshore wind farm in Asia.

Coal

Coal is anticipated to contribute to more than half of the generated power by 2030, followed by hydropower and oil and natural gas. Thus, the use of thermal power is projected to increase notably from an average 34 currently to 53 percent. For Vietnam, coal is the least expensive, an indigenous fuel and, furthermore, a reliable power source. As of September 2016, coal has already overtaken hydropower as the leading source of electricity with about 38 % of the total output. **

Hydropower

Though hydropower is also expected to see greater investment under PDP 7, competing needs for water resources and the difficulties of managing unpredictable water levels for power generation have sharpened the focus on other sources of energy. Hydroelectric generation capacity is forecasted to increase from 17 GW to 27.8 GW by 2030, but its share in the mix is expected to drop from about 37 percent to 17 percent in the next 15 years.

Natural gas

Natural gas may also play an important role in Vietnam’s future energy mix, not only with

regards to energy needs but also for industrial use. The country itself has considerable natural gas resources, most of it located offshore, though, and with high carbon dioxide content. Nguyen Anh Duc, general director of the Vietnam Petroleum Institute, was cited in this context in an Oxford Business Group Report... “While the revised PDP 7 shifts some coal-fired power plants to natural gas, from a strategic standpoint Vietnam intends to use more gas to produce petrochemicals, with the ambition of becoming a refining and petrochemical hub in Southeast Asia”.**

Long-Term Business Relationships

For decades, the Clyde Bergemann Power Group already has strong business relationships with Vietnam. Be it process technology for efficiency improvement, state-of-the-art ash handling, reliable combustion gas control and cleaning, or sustainable energy recovery: we have built up a reputation as a top-quality and reliable partner for new build plants as well as for modifications and rebuilds.

* The World Bank: Country Overview Vietnam, updated 16-09-16
 ** Vietnam to augment power generation, Oxford Business Group, 16-04-30



Franz Bartels | President & CEO

i Franz Bartels
 Clyde Bergemann Power Group
 franz.bartels@cbpg.com

Clyde Bergemann Delivers Pneumatic Fuel Conveying and Bottom Ash Handling System for Biomass Conversion of Lynemouth Power Station

Clyde Bergemann Materials Handling Ltd., Doncaster, UK (CBD) and Clyde Bergemann GmbH in Germany (CBG), both part of the globally operating Clyde Bergemann Power Group, have agreed to multi-million Euro contracts for the supply of biomass pellet feed and bottom ash handling systems for the Lynemouth Power Station in the U.K.. The systems contribute to the conversion of the former coal-fired plant to biomass fuel in a project that will extend the plant's life by over 10 years.

The Lynemouth Biomass Conversion is one of a number of renewable energy projects financially supported under the U.K.'s electric market reforms. After 43 years of operation, the 420 MW power plant burned its last coal in December 2015 and will reopen, burning wood pellets, early in 2018.

Pneumatic Fuel Conveying System

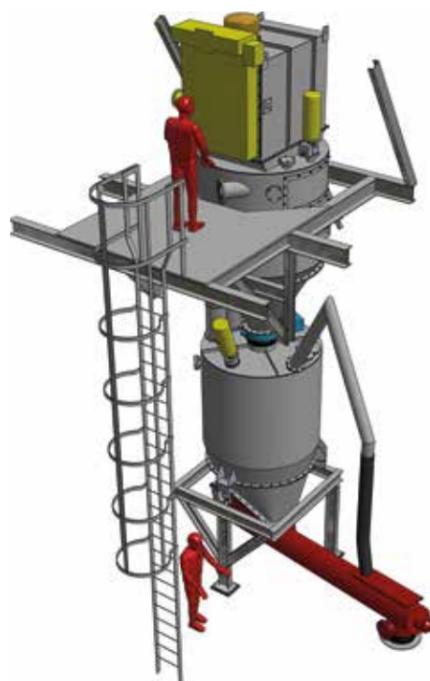
CBD, who has been supporting the conversion project with customer Sir Robert McAlpine (SRM) and end user Lynemouth Power Ltd (LPL) since late 2011, was chosen to deliver the pneumatic conveying systems. The system utilizes state-of-the-art Clyde Bergemann screw injector and loss-in-weight technology, which will provide the plant with a highly accurate and flexible system. The technology utilized is uniquely placed in the market to offer a high capacity, highly accurate fuel delivery system that provides clients with flexibility in their fuel store locations with no adverse effect on performance. This technology is not only designed for wood pellets but can cater for a range of fuels from coal to waste derived fuels.

Clyde Bergemann's system conveys the wood pellets from each of the three new day silos to the inlet of the fuel mills, which are located – depending on the boiler – between 80 m (262 ft) and 200 m (656 ft) away.

The unique screw injector technology ensures that the pellets are delivered out of



Top: surge hopper and screw injector
Bottom: receiving vessel and loss-in-weight-feeder



the pressure vessel and into the conveying pipe in such a way as to prevent pipe blockages before conveying the pellets to a filter/receiving hopper located on the feeder floor of the boiler house. The filter/receiving hoppers are designed to deaerate the pellets from the conveying air and to fast fill the loss-in-weight feeders located below. The loss-in-weight feeders are designed to operate continuously 24 hours per day providing a feed rate of between 9 and 22 tonnes per hour and mill with no drop in accuracy. The design of the system with weighing and dosing at the mill feed end of the system not only ensures accuracy, but above all reliability and flexibility of the whole process.

Bottom Ash Handling System

UK-based energy engineering firm Doosan Babcock has been awarded the contract to deliver the combustion and emissions systems. They selected CBG's patented dry bottom ash handling system "DRYCON™" for each boiler to replace the old submerged scraper chain, which uses water for ash conveying.

DRYCON™ is a steel plate conveyor that automatically conveys and cools the bottom ash utilizing ambient air only. The system operates by using the negative pressure inside the boiler to suck ambient air through a series of valves located along the belt. This air streams across the hot ash absorbing the heat and transferring it back into the boiler. The re-burning effect not only increases the boiler efficiency but also reduces coal usage and CO₂ emissions.

The eco-friendly system operates without using any water for ash cooling or conveying and so water related treatment costs do not accrue.

Deliveries are scheduled for December 2016 and January / February 2017.

i Mark Barnes, CBEU S&M
mark.barnes@uk.cbpg.com
Matthias Schumacher, CBG
matthias.schumacher@de.cbpg.com

A Continued Expansion of the European Market Position

Clyde Bergemann Continues to Expand its Market Position in Europe with Two More Orders for the New-Build Power Plant Ptolemais V in Greece

Previously in March 2013 the contracts for the construction of the new, highly efficient 660 MW lignite fired power plant "Ptolemais V" were signed. State energy supplier Public Power Corporation commissioned Terna SA, a Greek construction company, with the EPC contract. As Terna's sub-contractor, Mitsubishi Hitachi Power Systems Europe (MHPSE) is responsible for the design engineering, the supply of the steam generator and the entire flue gas cleaning system. Terna and MHPSE both recently awarded contracts to companies of the Clyde Bergemann Power Group (CBPG). Clyde Bergemann EP Tech S.r.l. (Italy) was chosen to supply a mechanical limestone handling system used for the reduction of SO₂ through flue gas desulphurization (FGD). Additionally, MHPSE entrusted Clyde Bergemann Germany (CBG) with the delivery and installation of process technology for efficiency improvement.

Limestone Handling System

The scope of this system includes design, manufacture, testing, certification, marking, transportation, supervision of assembly and documentation of limestone handling and relevant accessories.

The limestone is taken from existing hoppers by means of belt conveyor extractors and then conveyed and discharged into a big concrete silo through a system of belt conveyors, vibrating screens, bucket elevators and other auxiliary equipment.

Using unloading systems and vibrating extractors, the limestone is then taken from the concrete silo, conveyed and discharged into smaller metallic silos with two more systems of belt conveyors and bucket elevators.

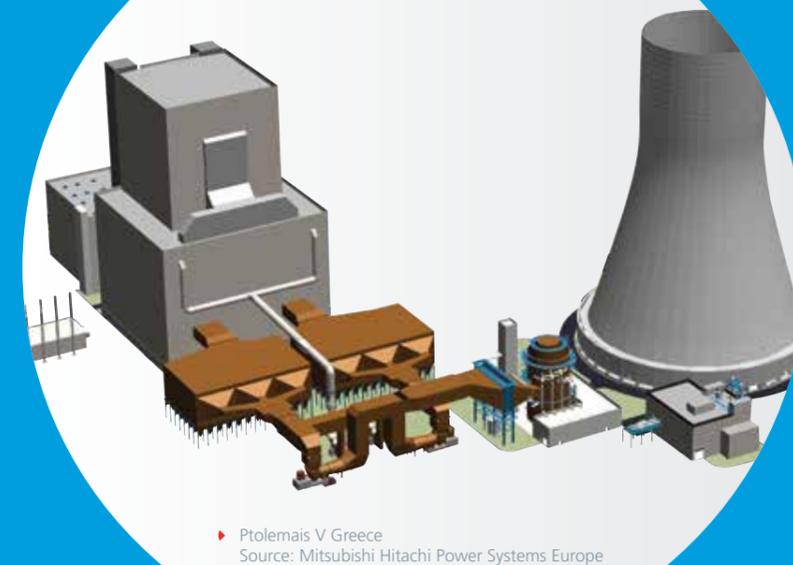
Delivery is scheduled from November 2017 to March 2018, commissioning for later

Process Technology for Efficiency Improvement

The latest order was related to boiler cleaning and efficiency equipment and awarded by MHPSE in August. The scope of supply includes the delivery of and controls systems for 16 "SMART Cannon" water cannons for cleaning of the furnace. Additionally, about 180 retractable and part-retractable sootblowers „PX-H" / „PS-HB" are installed for use in the superheater/reheater area and the flue gas waste heat recovery systems (FGWHRS).

Moreover, SMART Furnace, a sensor-based optimization system, was ordered to continuously monitor and assess the deposit situation in the furnace and initiate suitable and demand-oriented cleaning actions.

The application of the specific cleaning



Ptolemais V Greece
Source: Mitsubishi Hitachi Power Systems Europe

equipment and measures not only results in extended boiler availability, but also in increased boiler efficiency and a reduction of steam consumption, thereby leading to an effective and efficient operation of the plant.

As early as December 2016 the first 126 steam sootblowers are scheduled for delivery. The remaining consignments are due September/October 2017.

CBG's involvement since the early stages of this project and its fundamental expertise and continuous support during the difficult clarification phase were the decisive factors for winning the contract.

i Bernd Koester, CBEU S&M
bernd.koester@de.cbpg.com

Clyde Bergemann Power Group Americas (CBAM) Delivers Air Pollution Control Systems for Copper Smelter



No matter which industry, when it comes to Air Pollution Control systems, CBAM is first choice! The group recently received an order from a copper smelter in the western U.S. for the supply of a Dry Sorbent Injection System (DSI), a Pulse Jet Fabric Filter (PJFF) and an ash handling system for their smelter anode furnace.

The customer initiated process improvements at its smelter facility to comply with ambient SO₂ and particulate matter limits and CBAM was closely involved with the owner's engineers throughout the design process. The CBAM team proposed a combination of sorbent injection and a modular 10-compartment PJFF to treat the emissions from the anode furnace batch process. A powdered sorbent is injected into the flue gas where it reacts with the hydrochloric acid. The compound then is removed by the PJFF, also known as a baghouse.

Important safety features, such as inlet guillotines, that make it possible to isolate each PJFF compartment, were specially emphasized. Further, the baghouse is designed to operate continuously under heavy-duty service 24 hours a day, 365 days a year, subject to minimal maintenance outages, to provide high system reliability. One of the ways CBAM achieved this is by sizing the baghouse to be operable with one compartment out of service, thereby enabling the end user to

perform maintenance as necessary without taking the process offline.

Additionally, the package comprises an upstream lime injection system to continuously pre-coat the PJFF bags. This lime coating improves metallic fume collection through immediate contact between pollutant and sorbent and reduces the risk of "bag blinding" or corrosion during normal operation.

The scope of supply also includes a mechanical ash handling system comprised of knife gates, rotary airlocks, and drag chain conveyors provided under the hoppers to remove particulate matter from the PJFF system.

Design work for the project is well underway, with material delivery set for April 2017 and start-up of the unit anticipated by the end of 2017.

i Natalie Ho, CBAM
natalie.ho@us.cbpg.com

Helping a Global Leader in the Chemicals Industry Meet New Emission Regulations with Creative Design

Clyde Bergemann Power Group Americas (CBAM) received a major order for air pollution control systems from a world-class soda ash producer for its coal-fired power boiler in the western United States. The project includes the complete Engineering, Procurement, and Construction (EPC) scope for supply and installation of an Electrostatic Precipitator (ESP) complete with an ash handling system.

To comply with the local regulations for particulate matter (PM) emission limits, the customer required a new ESP to treat the flue gas from their boiler. CBAM was awarded the project, which includes the supply of foundations and equipment as well as the mechanical and electrical installation of the ESP system. Additionally, a vacuum ash handling system will be supplied as a part of the EPC project.

The original specifications required the ESP to be elevated about 130 ft (40 m) above grade and specified a very large ESP collecting surface area. The reason to propose this design was due to the limited capacity of the existing ID fan and the customer's concern about the pressure drop through the ESP

system. However, with a unique inlet duct design fully supported from the ESP structure, CBAM was able to move the ESP to grade while meeting the pressure drop requirement.

This allowed for significant cost savings as compared to the original design specified by the customer. Furthermore, with CBAM's extensive experience with coal-fired applications and state of the art technology such as high frequency power supplies, CBAM was able to offer a smaller ESP while ensuring particulate emission compliance.

CBAM's dedicated efforts in the preliminary design stage, which included eight design iterations, were appreciated by the customer and ultimately led to the project award.

The project presents unique challenges such as the foundation design as well as the design and support of the gooseneck inlet ductwork and the outlet plenum-mounted stack.

Additionally, the project is to be executed in an 11-month timeframe. The foundation work at site is already underway with CBAM's construction crew expected to begin erection of the unit shortly. The unit is

expected to be operational by February 2017.

With Clyde Bergemann's newly formed unit, Clyde Bergemann Environmental Technologies (CBET), the company is uniquely prepared to supply the end user with a complete turnkey solution. CBET combines advanced Materials Handling and Air Pollution Control technologies to provide tailor-made competitive and environmentally sound solutions to customers in the power and other energy-related industries. The range of supply includes advanced solutions for particulate capture and acid gas/heavy metal mitigation, as well as bottom and fly ash handling and pneumatic conveying systems.

i Ivan Sretenovic, CBAM
ivan.sretenovic@us.cbpg.com



▶ A soda ash plant

International Cement Review Publishes CBPG Article

OCTOBER 2016

Today's environmental legislation expects air pollution control systems to be reliable round-the-clock. This requires such systems to be as low maintenance as possible and where maintenance is required, an efficient procedure that minimises downtime of the equipment should be followed.

By Richard Davies, Clyde Bergemann Power Group Americas, USA

Widespread awareness of environmental protection, as well as health concerns will continue to be a key consideration of countries around the world. With more stringent legislation taking effect in many countries, industries are putting a strong focus on investment in pollution controls to ensure their standards comply with local and international requirements.

The global cement industry is at the forefront of adopting Maximum Achievable Control Technology (MACT) systems at their facilities in order to comply with these new regulations.

Proven Air Pollution Control (APC) technologies being utilized in the cement industry include modern electrostatic precipitators and fabric filter systems for particulate control, spray dryer absorbers and dry sorbent injection systems for acid gas removal, and activated carbon injection for removal of mercury and trace metals.

While these systems are often designed to be low in maintenance, an efficient maintenance process should be put in place to ensure continued operation of these systems. This article discusses each type of air pollution control technology, its benefits and any maintenance requirement.

Electrostatic Precipitators (ESP)

The Electrostatic Precipitator is a high efficiency particulate removal device that collects particulate matter from high temperature combustion or process gas streams. An ESP operates by negatively charging the particulate matter entrained in the gas stream with high voltage discharge electrodes. These negatively charged particles are attracted to and entrained onto positively grounded collecting plates within the ESP. The resulting particulate buildup on the collecting plates is removed by mechanical rapping of the plates and collected into hoppers at the bottom of the ESP for collection by a material handling system.

Benefits of an ESP include:

- Typical collection efficiencies exceed 99.95%
- Emissions can be reduced to less than 20 mg/Nm³
- Low cost of ownership (low capital costs, minimal maintenance and parts wear, and low pressure drop)
- Reliable designs with high durability to ensure long lifespan of technology.

Features and options to look for to enhance ESP performance and maintenance reliability:

- A virtually maintenance free design - entire rapping system should be located outside the gas stream, with no moving parts in the casing or gas stream
- Electric Single Impulse (ESI) rapping devices that are located on the casing roof so maintenance can be carried out during operation
- Frequency and intensity of rapping devices should be infinitely adjustable to handle changing process requirements
- Collecting Electrodes should be specifically designed to achieve exact plate alignment and structural integrity
- State-of-the-art microprocessor based ESP controls including DOCIV automatic voltage power controller can enhance overall ESP performance.

Fabric Filters

Fabric filters are high efficiency collection devices capable of collecting fine particulate (> 99.99%) from the gas stream. In a pulse jet fabric filter, particulate in the flue gas stream is deposited on the outside surface of the filter bag which then builds up to form a dust cake. When the dust cake accumulation reaches a level where gas flow is restricted, cleaning is initiated by the system. The dust cake is removed from the bags by the injection of a pulse of clean compressed air down the inside of the bag.

The collected dust cake is dislodged and falls down into the hopper for collection by the material handling system.

Fabric Filter features and options for high performance and low maintenance:

- An inlet manifold design for uniform gas distribution to all filter modules, which will reduce mechanical pressure drop, minimize particulate fallout in the inlet manifold and significantly improve gas flow distribution
- An inlet vane system to uniformly turn and distribute gas flow which will reduce bag wear, reduces pressure drop and extend bag life
- A guaranteed low pressure drop - reduces I.D. fan power consumption which lowers operational costs, and extends cleaning cycles for prolonged bag life.

ESP or Fabric Filter?

Both ESPs and fabric filters are highly efficient particulate removal devices with design efficiencies in excess of 99.5%. Next to stand-alone, hybrid solutions - a combination of the ESP and the bag filter - can be the right choice for a given application. The choice between these systems depends on a variety of factors including capital expenditures, maintenance considerations, available space, energy consumption, the operating environment, (humidity), particulate characteristics such as dust resistivity, gas temperatures, the acid dewpoint and system pressure drop.

Dry Scrubbing Systems for Acid Gas and Mercury Removal

A dry scrubbing system removes pollutants from an exhaust stream by injection of a reagent into the stream to neutralize or remove acid gases. Unlike wet scrubbing systems, the dry approach produces a dry residue and has no requirement for wastewater handling.

Two popular types of dry scrubbing systems are Spray Dryer Absorbers (SDA) and Dry

Sorbent Injection (DSI). Both of these technologies remove gaseous pollutants and heavy metals from exhaust gas streams. The systems introduce calcium, sodium or carbon based reagents to transform or capture gaseous and toxic pollutants into particulate matter, which can be collected by a downstream in a particulate collection device (Electrostatic Precipitator or Fabric Filter).

Spray Dry Absorber (SDA)

Spray dry absorber scrubbers use the principle of liquid chemistry for high removal efficiencies of the flue gas Sulfur Dioxide (SO₂), Hydrogen Chloride (HCl), and Sulfur Trioxide (SO₃). An SDA incorporates a vessel with direct drive-variable speed rotary atomizers, a pulse jet fabric filter or ESP particulate control device and a reagent storage and preparation systems built tight specifications.

Flue gas enters the SDA system through an inlet gas disperser located at the top of the vessel. Swirl vanes in the disperser turn the gas counter-current to the rotating atomizer disk and direct it into the chamber where it comes into contact with the atomized lime-reagent slurry to form a salt. Acid gas absorption, droplet evaporation and gas cooling occur as the flue gas mixes with the lime slurry. The scrubbed flue gas and entrained particulate exit through the outlet duct and into a downstream particulate collector.

Key system factors for high performance and low maintenance needs

- Precise control of droplet size
- Efficient mixing of gas and the atomized lime slurry
- Rapid response to variations of gas conditions
- Consistent emissions control performance
- Continuous operation during system maintenance when equipped with multiple atomizers.

Dry Sorbent Injection (DSI)

Dry sorbent injection systems injects "sorbents" into the gas stream to directly react with and remove pollutants such as acid gases, mercury and other heavy metals. These systems utilize proven material storage metering and conveying/injection technologies

to the various sorbents that can be used for mitigating emissions.

The injection systems are designed to utilize commercially available sorbents for pollution control. For SO_x, and other acid gas emissions, Trona™, sodium bicarbonate or hydrated lime is typically used for emissions reduction.

The preferred technology for mercury control is by the injection of activated carbon directly into the gas stream. The oxidized mercury is adsorbed onto the surface of the activated carbon particle, which is ultimately captured by a downstream particulate control device. Depending on the fuel and system characteristics, either a standard powdered activated carbon (PAC) or a brominated activated carbon (BPAC) can be injected into the flue gas stream to achieve a given reduction in mercury. Injection typically occurs downstream of the air heater where the gas temperatures are below 177°C/350°F.

Removal efficiencies and sorbent reagent consumption will vary according to the type of APC equipment downstream of the injection point. A fabric filter system can achieve mercury removal efficiencies greater than 90% whereas plants that utilize an electrostatic precipitator typically experience lower removal efficiencies and/or higher reagent

consumption rates.

Key features of a high performance, low maintenance DSI/ACI injection system include:

- Low capital investment costs compared to similar mitigation technologies
- Redundant system design allows for continuous operation even during maintenance events
- Optimized dispersion characteristics of the dry sorbent to maximize removal effectiveness
- Accurate controllability of the sorbent injection rate to minimize operating costs
- Compatibility with fabric filter and electrostatic precipitator technology
- Factory system pre-assembly and testing to reduce installation cost and schedule.

Summary

The global cement industry will continue to be required to meet stringent air pollution regulations. Although there is no "one-size fits all" method for all plants, various proven industry technologies are available to help individual plants meet these regulations. The right choice of products and systems needs to be analyzed and decided on a plant-by-plant basis.



From Estonia to the World: 25 Years of Sootblowers from Tallinn

Twenty-five years ago, the first Bergemann sootblower was manufactured in Tallinn, Estonia. Two years later, in August 1993, the success story of today's Clyde Bergemann Eesti AS (CBE) started by taking over the production sites of the former state-owned company RAS Ilmarine. Since then, the location has expanded immensely in terms of both space and production range.

To learn more about the company's development, Juergen Schroeder, Director of Production & Logistics in Wesel, Germany and „man of the first hour“ as well as Toomas Laasik, Managing Director in Tallinn, were interviewed.

1. Mr. Schroeder, how did the idea arise to establish a production site in Estonia?

J. S.: The cooperation between Bergemann and RAS Ilmarine started exactly 25 years ago. Ilmarine was the only company in the Soviet Union specialized in the production of cleaning equipment for heating surfaces. Besides sootblowers, they produced different other products, like heavy-oil burners, ignition modules and protection devices and the related controls systems. The first sootblower was produced 1991. In 1993 the opportunity arose to take over part of the company from the Estonian Trust Company and our President & CEO, Franz Bartels, realized this and took the chance.

2. What was the further development?

J. S.: In the course of the privatization, we first bought the production site and the warehouse, while the associated offices were rented. In 1996 the current offices were built in the direct vicinity of the production area. Today, the production area covers a total of 7,500 m² (81,000 sf), and the offices an additional 600 m² (6,450 sf).

3. You started with the production of sootblowers and accessories. Do you have an idea of how many cleaning devices have been produced in the meantime?

T. L.: More than just an idea. For our anniversary we took stock and counted up to 50,000 sootblowers. The longest one, an „RL-SL“ had a travel range of 15.8 m (52 ft)!

4. Do you only operate as an „extended workbench“ for the German production in Wesel?

T. L.: No, we support the whole Group – globally! Our range includes, in addition to the above mentioned Boiler Efficiency products, dampers for Air Gas Handling, pressure vessels and tubes for Materials Handling and DRYCON, our patented system to automatically convey and cool bottom ash.

5. What role do different certifications play for your location?

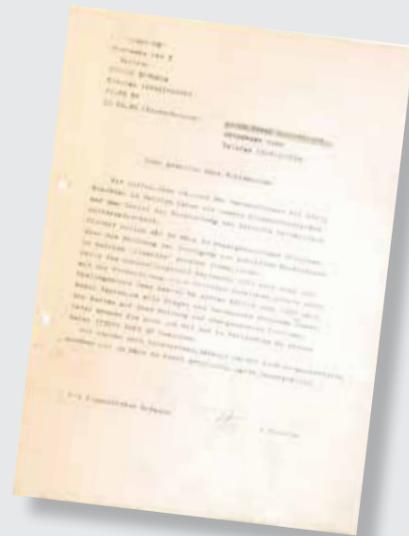
T. L.: They are a must! CBE is certified in accordance with all important standards. Since 1997 we have held the ISO 9001 quality management system certification. Additionally, we hold the American ASME Boiler and Pressure Vessel U-Stamp Certification that requires high standards for the production of pressure vessels.

6. To which countries do you ship your products?

T. L.: So far we have supplied to 56 countries, each continent was serviced.

7. What does Clyde Bergemann Eesti's production range include?

T. L.: We are versatile with a comprehensive range of machines, partly computer-based. Mechanical manufacturing and steelwork, welding, sandblasting and paintwork -- our spectrum is huge. Our motto is "everything is possible."



▶ Talking about sootblowers:
The initial correspondence started in 1990



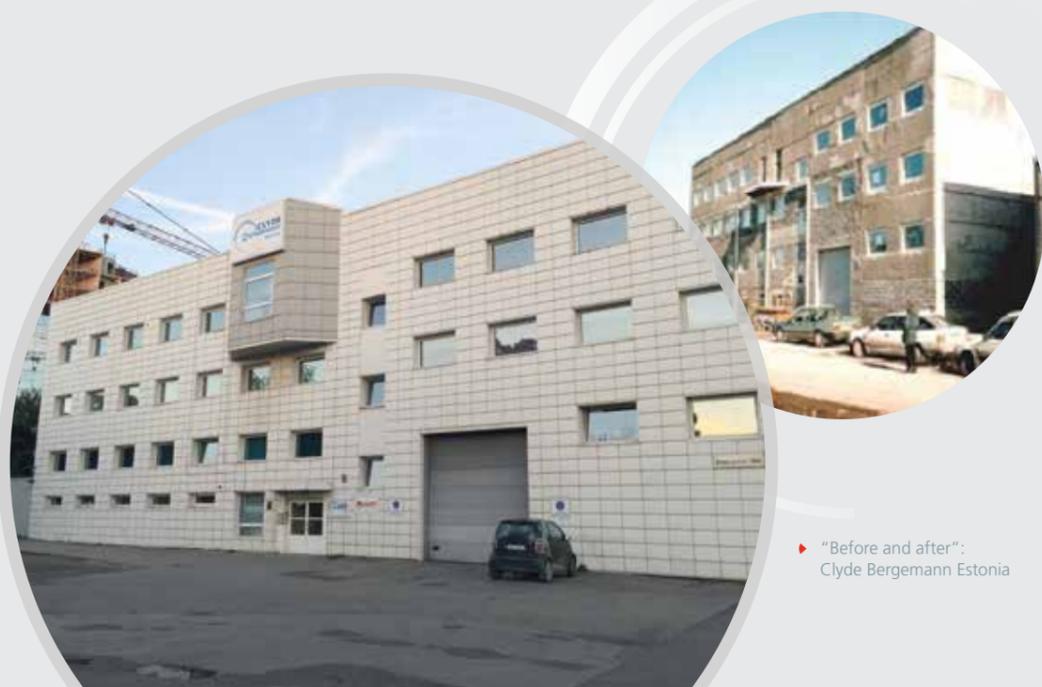
▶ "From Estonia to the world": sootblower production



Our Motto: "Everything is possible!"



▶ DRYCON production in Tallinn



▶ "Before and after":
Clyde Bergemann Estonia

New Primorskaya Power Plant Receives Bottom Ash Handling Systems and Boiler Cleaning Equipment from Clyde Bergemann

As one of the few non-Russian suppliers, Clyde Bergemann Germany (CBG) has secured an order for the delivery of the dry bottom ash handling systems and boiler cleaning equipment for the new-build 3 x 65 MW thermal power plant (TPP) Primorskaya in Russia.

The new TPP, operated by Inter RAO, was planned to ensure energy security of the Kaliningrad region. For its construction primarily Russian-produced components shall be used – with the exception of the dry bottom ash handling systems, the sootblowers and the Electrostatic Precipitators. CBG was awarded two of them: the delivery of three “DRYCON Compact” bottom ash

handling systems as well as the sootblowers for the cleaning of the furnace and superheater/reheater areas for each unit.

DRYCON Compact was especially designed for smaller power plants or industrial applications. It possesses all advantages of the well-proven version for large plants – protection of the environment, increased energy efficiency and low operating costs – adjusted to the needs of smaller boilers.

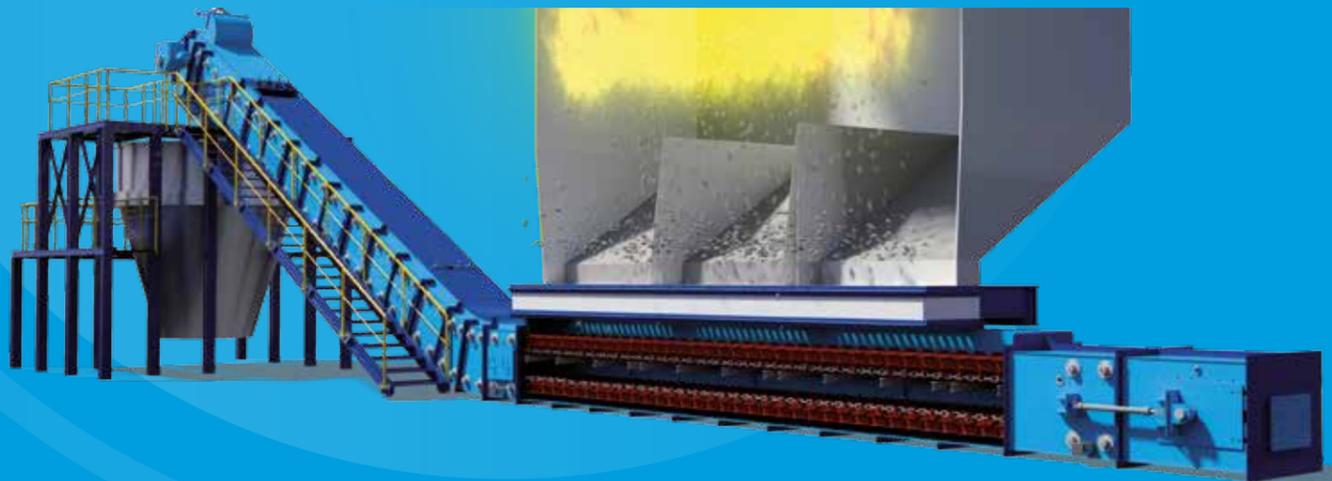
For the cleaning of the furnace and the superheater, Clyde Bergemann’s renowned PS-H retractable sootblowers and WLB 90 water lance

blowers will be deployed.

Delivery is scheduled for August 2017; the launch is planned for 2018.

Evgeny Kruglov, sales director Russia & CIS, summarizes: „Our Russian clients not only value Clyde Bergemann’s proven technology and the wide range of products and systems. They also rely on our long-term support and on-going collaboration during each phase of a project.”

i Evgeny Kruglov, CBEU S&M
evgeny.kruglov@de.cbpg.com



Leading the Way Forward in Africa Clyde Bergemann Africa’s Long-Term Service Contracts



Clyde Bergemann Africa (CBZ) has been successful over the years in winning multiple long-term service and maintenance tenders. This success has been driven by the fact that the team not only offers first class service and maintenance capabilities, but also understands the client’s needs. Whether for boiler cleaning or material handling systems, the group offers solutions to any issues that the operators experience on site.

While these successes have resulted in CBZ growing and expanding over the years, the focus is on building client relationships and ensuring an untouched reputation as the leading service provider in its field. Every new service contract is seen as a fresh opportunity to prove a reputation as the best in the business.

During the past few years alone, CBZ has won a number of major long-term service contracts, including:

- Camden Power Station – maintenance of valve sootblowers for five years;
- Kriel Power Station – maintenance of water cannons for three years; and
- Matimba Power Station – ongoing outage contracts.

Due to CBZ continually providing reliable products and accurate information, clients have returned time and again over the years requesting services.

Upon being approached by a client, the first priority is to understand exactly what they require. CBZ’s in-house engineers and professionals will visit the client, investigate the problems and write a proposal for the cli-

ent’s needs. The proposal will put forward suggestions in respect to pricing strategy, new technology, and how to manage the daily, weekly and monthly status of the plant on site.

CBZ understands the time and planning constraints within which customers have to work. CBZ not only ensures all services and products are available on time and in schedule, they also deliver superior quality products at cost effective prices. Hence, the result:

better equipment and advanced solutions.

By listening to the customer’s needs, and then thinking outside of the box to provide the best possible solutions, CBZ has gained an advantage over competitors by exceeding client expectations.

i Thobile Ramothwala, CBZ
thobiler@cbz.co.za



Clyde Bergemann Environmental Technologies (CBET) Wins Electrostatic Precipitator Maintenance Contract and Parts Agreement

A globally operating pulp and paper company has awarded Clyde Bergemann Environmental Technologies (CBET) a contract to provide Electrostatic Precipitator (ESP) maintenance services and repairs for its fleet of paper mills in the United States.

CBET, based in Malvern, PA/USA, is the specialist for Air Pollution Control (APC) technologies within the Clyde Bergemann Power Group Americas. It provides customers throughout the U. S. not only with proprietary, large-scale, custom-engineered systems but also with innovative solutions for parts, upgrades and services.

The steps of maintaining an ESP typically include:

- Mobilize to site, including necessary safety pre-outage training, delivery of tool trailer and site preparation and parts movement to precipitator.
- Rap down the precipitator while off-line to remove excess dust build up, evacuate hoppers and blow down or wash down internals to be ready for repairs.
- Inspect, clean and replace as necessary the rapper components, including:
 - Anvil plates
 - Shafts
 - Boot seals and clamps
 - Rappers (electric, pneumatic, mechanical)
- Inspect for clearances between collecting plates and high voltage electrodes to identify and map any deficient parts and repair or replace as necessary to regain design clearances.
- Clean, inspect and replace as necessary all high voltage insulators including high voltage rapper shafts, support insulators, and through put bushings.
- Remove dust buildup from interior surfaces such as collector plates, casing, duct work and penthouse areas of the precipitator.
- Inspect and repair as necessary all points of entry, including side access doors, hopper access doors, insulator compartment access doors, etc. (includes replacement of door seal materials and hardware to ensure air tight and man-safe seals).
- Clean and service power supplies as required.
- Inspect and repair steel structure including hopper, side walls, hot roof, cold roof, penthouse and duct work.

- Prepare inspection report to be used on a daily basis to prioritize repairs and parts requirements, and provide a wrap-up report at the end of the outage to be used to plan for the next outage scope of work and parts requirements.
- Optimize controls and power supply settings upon startup.

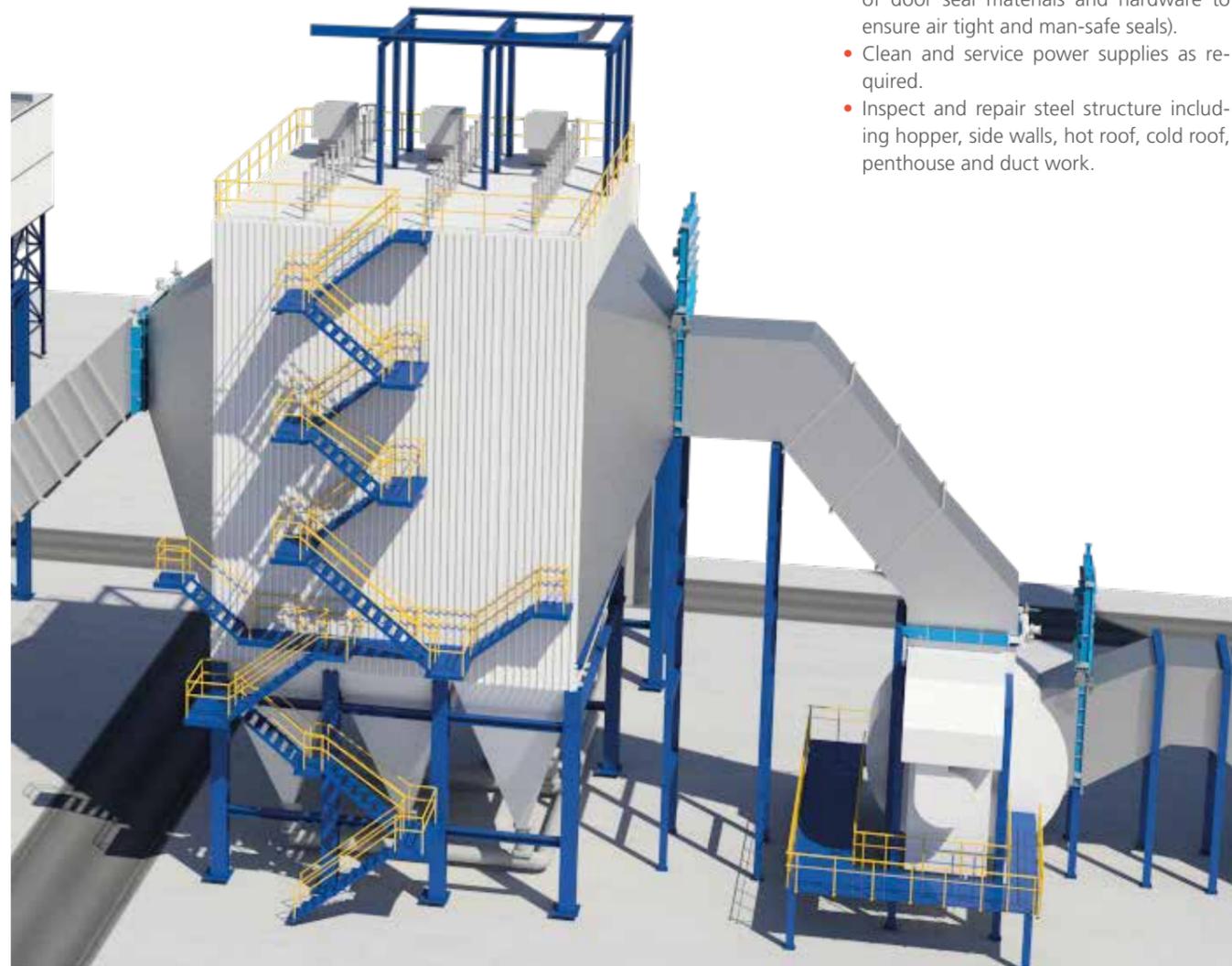
The contract allows issuance of service contracts at any of the customer's U.S. mills, including for recovery boiler (RB), power boiler (PB), and lime kiln ESPs.

Additional Options

CBET can offer other optional upgrades to improve the performance or reliability of the precipitators, which might include upgrading power supplies, rebuilding with comparable plate area and rebuilding or complete replacement with increased collecting plate area. In any of these scenarios, CBET can have an opportunity to support materials supply, installation services, or both.

In addition to the maintenance contract, CBET finalized a separate contract to be an approved supplier for replacement and spare precipitator parts for each mill. Part of the agreement includes incentives to help the customer reduce its Total Cost of Ownership (TCO).

 Mark Miller, CBAM
mark.miller@us.cbpg.com



Sootblower Maintenance Workshop

Aging sootblower equipment and the scarcity of qualified mechanics to maintain the sootblowers have been the primary factors for our customers to look for solutions to lower sootblower maintenance costs and increase their operational reliability. If this issue is left unaddressed, it will lead to the decrease in boiler heat transfer efficiency and costly unscheduled outage due to uncontrolled deposit buildup.

In the effort to better support our customers in dealing with this situation, Clyde Bergemann Power Group offers a one day hands-on sootblower maintenance workshop to educate the sootblower mechanics with the latest sootblower technology and the best practices in maintaining the sootblower, troubleshooting common issues, and dealing with emergency situations.

All accidents are preventable. This workshop aims at training the participants with the basic skill to perform regular maintenance work such as packing, poppet valve, feed, and lance tube replacements in a safe manner.

Participants learn:

- Troubleshooting most common sootblower issues
- Excessive condensate
- Short carriage life
- Binding and high motor amperage
- Leaking feed tube and poppet valve packings
- Plugged wallbox
- Ineffective cleaning

Dealing with Emergency Situations

- Stuck sootblower and emergency retraction
- Bent lance tube inside the boiler



 Danny Tandra, CBAM
danny.tandra@us.cbpg.com

Events Diary

DATE	NAME OF EVENT	COUNTRY, LOCATION
December 2016		
Dec 13. – 15.	Power-Gen International	Orlando, FL USA
February/March 2017		
Feb 27. – Mar 2	Reinhold 2017 NO _x -Combustion-CCR/PCUG Conference	Cleveland, OH, USA
June 2017		
Jun 20. – 22.	Power-Gen Europe	Cologne, Germany

Personnel

Dr. Patrick von Hagen

... took over the position as CFO and VP of the Clyde Bergemann Power Group with effect from 1st July 2016. Patrick has been with Clyde Bergemann since 2011, leading the Group Finance Team as VP Finance already in the last 3 years. He succeeds Graham Lees who after 13 successful years has decided to resign from his responsibility as CFO and VP.



Dr. Danny Tandra

... is appointed as Vice President of Clyde Bergemann Atlanta with effect from 1st June 2016. In addition to his previous responsibilities in the Technology and Sales areas of Clyde Bergemann Atlanta, Danny will drive all measures which increase sales in the future.



Adam Liu

... took over the position as Group VP & COO of Clyde Bergemann Southeast Asia effective from September 2016. He has been with Clyde Bergemann since 1996 in various management responsibilities, most recently as Managing Director of Shanghai Clyde Bergemann.



Yueqi Xin

... has taken over the position as MD for Shanghai Clyde Bergemann in September 2016. Yueqi has been Deputy General Manager of the Shanghai business since 2005, focusing in particular on new technologies.



Cristina von Eckardstein

... joined CB Africa as General Manager Finance in May 2016. She is responsible for all accounting and financial activities for the Company and oversees departmental responsibility for Finance, Supply Chain and Payroll.