Doosan Lentjes

Sustainable energy solutions for tomorrow

Your partner for clean steam and power generation

Doosan Lentjes is a leading German engineering specialist providing products and services for efficient and environmentally-sound generation of steam and power.

Advanced technologies for eco-friendly steam and power

Doosan Lentjes' advanced technologies covering circulating fluidised bed boilers, waste-to-energy, sewage sludge incineration and air quality control systems help customers around the world to efficiently generate environmentally-sound steam and power from both sustainable and conventional fuels.

One-stop partner

As a member of the global Doosan group, we have the resources to deliver complete process solutions from one trusted source, making us the one-stop partner of choice for all your energy requirements. Drawing on Doosan's global network, we combine international market know-how with proven German state-of-the-art engineering – a winning combination with the experience and capacity to make your project a resounding success.

Global references

Our wide range of global references reflects our rich heritage in developing advanced technologies and state-of-the-art products and services that are perfectly adapted to our customers' individual needs.

Our history

1928	1982	1984	1989	2011	2018
Ferdinand Lentjes founds boiler manufacturing company	Company designs, builds and commissions the world's first commercial CFB boiler	Acquisition of Gottfried Bischoff GmbH – a specialist in flue gas cleaning technology	Company enters the grate-based waste-to-energy market	The Doosan Group acquires the company – renamed to Doosan Lentjes	Doosan Lentjes re-enters the market for the incineration of municipal sewage sludge

Our global energy network

DOOSAN LENTJES

Our proprietary technologies and capabilities encompass:

Circulating fluidised bed (CFB) boiler technology

More than 110 installed units worldwide with capacities up to 350 MW_e in a single unit, totalling approximately 22 GW_{th}.

Applicable for a wide range of fuels ensuring highly efficient carbon burn out of 98-99% and low SO_2 and NO_x emissions.

Waste-to-energy (WtE) technology

Leading innovations to help reduce waste volumes by more than 90% and reduce reliance on fossil fuels.

77 units in 45 plants contracted around the world converting millions of tonnes of waste into energy every year.

Using advanced and dependable technologies, such as, grate combustion to maximise energy recovery from waste for commercial and domestic power use.

Sewage sludge incineration (SSI)

Advanced technologies deployed for more than 25 sewage sludge incineration units delivered in Germany and across Europe.

Using reliable flue gas cleaning equipment, such as, ESP and scrubber systems, enables the recovery of phosphor while achieving maximum sustained emissions reduction.

Air quality control systems (AQCS)

Desulphurisation technologies successfully installed in more than 150 locations worldwide.

SO_2 reduction efficiencies of up to 99% achieved with minimum space requirements.

Offering simple, low maintenance air quality control to suit environmental requirements and economic constraints.

POWERFUL COMPANIES

Doosan Babcock
A pioneering technology and service provider in thermal power, nuclear, oil and gas, petrochemical and process sectors.

Doosan Lentjes
A global power in CFB combustion, waste-to-energy, sewage sludge incineration and air quality control systems.

Doosan Škoda Power
A world leader in turbine technology and manufacture.

Combined

€760 MILLION turnover in 2017

WORLD FIRSTS

1932	Fusion welded steam drum
1956	Steam-raising plant for world's first commercial nuclear power station
1957	HRSG/Waste heat boiler
1960	Platen superheater
1982	Commercial CFB boiler
1989	Cooled cyclone CFB boiler
2002	Low mass flux positive flow once through boiler
2003	Largest operating downshot boiler for anthracite
2007	Low mass flux positive flow downshot supercritical boiler

1st

ENERGY PORTFOLIO

- BOILERS
- TURBINES
- WASTE TO ENERGY
- SEWAGE SLUDGE INCINERATION
- AIR QUALITY CONTROL SYSTEMS
- ASSET MANAGEMENT AND THROUGH-LIFE SUPPORT
- NUCLEAR

UNITED CULTURE

CULTIVATING PEOPLE

INHWA (TEAMWORK PHILOSOPHY)

LIMITLESS ASPIRATION

OPEN COMMUNICATION

TENACITY & DRIVE

PRIORITIZATION & FOCUS

We offer more than than

360

years of combined experience in world leading energy technology and innovation

OEM LEADERSHIP

1859	Škoda Engineering established
1891	Babcock and Wilcox established
1928	Lentjes boiler manufacturing established
2006	Babcock acquired by Doosan
2009	Škoda Power acquired by Doosan
2011	Lentjes acquired by Doosan
2013	Doosan Global Boiler and Turbine R&D Centres established

WORLDWIDE REFERENCES

Subcritical boilers 140,403 MW_e

Supercritical boilers 85,441 MW_e

Subcritical turbines 92,575 MW_e

Supercritical turbines 21,703 MW_e

Circulating fluidised beds (CFB) 22 GW_{th} + approx. 2 GW_e

Waste to energy plants 9,299,200 t/a

Sewage sludge incineration 26 units

Wet limestone FGD 83 GW_e

Seawater FGD 8 GW_e

Circoclean® FGD 13 GW_e

GLOBAL PRESENCE WITH A LOCAL TOUCH

We have seven key operational bases in the UK, the Czech Republic, Germany, Poland, the US and South Korea.

Further plants, projects and references in more than 30 countries across the Americas, Europe, Africa, the Middle East and Asia.

PARENT ORGANISATION

We are part of Doosan Heavy Industries & Construction (DHIC).

DHIC focuses on: Casting and Forging. Power and Environmental Plants. Water Desalination, Water/ Waste Water Treatment. Construction. 18,300 employees with €11 billion turnover in 2017.

COMMERCIAL STABILITY

We are owned by

The Doosan Group
Forbes Global 2000 company with

41,400 employees in **38** COUNTRIES

and

€13.6 billion turnover in 2017.

Doosan Lentjes is part of a powerful force in the building, maintaining and optimisation of energy facilities.

DOOSAN

The way we work

At Doosan Lentjes, we understand that our products and services are only as good as the people behind them, so we work hard to recruit, train and develop the very best in the industry.

People Focus

Corporate Social Responsibility

Quality Health, Safety and Environment

People Focus

Our people are at the centre of who we are, so we take genuine care in their development, making their cultivation our long-term priority. We are also committed to the development of new design, engineering and project management talent and retain an unparalleled expanse of knowledge within our company. Transferring knowledge and experience to the next generation strengthens the stability and longevity of our business and gives our customers reassurance that our engineering competency is sustainable for the long term.

Corporate Social Responsibility

In all territories in which we operate, we embrace customer and community visions for sustainability. Doosan Lentjes' Corporate Social Responsibility (CSR) programme is built on three pillars: Education, sustainability and community. This provides us with a framework through which to promote excellence in science, technology and engineering, minimise the environmental impact of our operations, and make a positive difference in our local community.

Quality, Health, Safety and Environment

Our performance is based on providing high levels of quality, outstanding safety performances and environmental vision – embracing our commitment for the safety and well-being of our people and local communities.

With our approach we aim to make safety transcend all our commercial operations – ensuring full commitment to our employees, partners and the communities we serve.

Doosan Lentjes delivers the highest level of customer satisfaction through best-practice procurement of goods and services. Our focus is on optimising cost and efficiency while achieving full regulatory compliance.

Our procurement capabilities

We define global sourcing strategies that draw on the full capabilities of the Doosan group while focusing on a geographically balanced and locally anchored portfolio of best-in-class suppliers who support us to identify the most valuable supply chain solutions.

We, at Doosan Lentjes, understand that our suppliers make a vital contribution to our performance which is why we aspire to create long-term mutually beneficial relationships that help to ensure consistent quality.

In pursuing project interests, we are always mindful of our ethical and social responsibilities and our commitment to sustainability and transparent business practices. In order to achieve this, we have established our Code of Conduct for Contractors that is based on our corporate values. This helps us to make sure our suppliers follow ethical and responsible behaviour, practices and standards while fully complying with all applicable laws and regulations.

Doosan Headquarters, Changwon, Korea

Doosan Chennai, India

Doosan Vina, Vietnam

We understand that flexibility and sustainability are vital to the success of your business, which is why our customised solutions are tailored to your specific environmental and economic goals.

Exceeding your expectations

Doosan Lentjes is proud to be the Doosan group's global Centre of Competence for circulating fluidised bed boilers, waste-to-energy technologies, sewage sludge incineration and air quality control systems.
We continuously invest in the advancement of our technologies to make sure we remain at the forefront of our industry, and consistently deliver products and services that exceed our customers' expectations. This ongoing investment also underpins a culture of continuous improvement that permeates our entire organisation.

In order to provide our customers with solutions that help to achieve their individual economic and environmental goals, we have developed the Doosan Lentjes Operating Model. This approach helps to maximise cost-efficiency, optimise project execution time and deliver high flexibility by integrating product requirements into modular solutions that are adapted to specific customer requirements. With the continuous integration of all lessons learned into the modular solutions during the project execution phase we ensure a consistent learning process to the benefit of all future projects. In combination with our continuous investment in the advancement of our technologies we are one step ahead when it comes to both state-of-the-art technology and a sustainable business performance, leading your project to an outstanding success – essential in times of changing market requirements.

We are driven by the anticipation of our clients' needs and differentiation through focused innovation. With the Operating Model we integrate, consolidate and realise synergies to achieve a sustainable performance in a challenging business environment.

Our operating model

Doosan Lentjes is a recognised pioneer and leader in CFB boiler technologies, providing efficient combustion solutions across a wide range of different fuel types.

Shaping the future of CFB boiler technologies

Our engineering and project management excellence is backed by the global capabilities of Doosan Heavy Industries & Construction (DHIC), including 175 GW_e installed capacity and a pressure parts fabrication facility with a production capacity equivalent to 9 GW_e per year.

At Doosan Lentjes, our CFB boiler technologies cater to multiple fuels, including those with the most demanding combustion properties, such as, low calorific values, high moisture levels, high ash content or lower ash melting temperatures.

Our CFB boiler solutions achieve the highest levels of cost-efficiency by utilising an integrated desulphurisation control system that requires no external emissions control, combined with an integrated design. This unique design gives you effective CFB combustion that fully delivers on your environmental and economic objectives.

Doosan Lentjes' research continues to shape the future of advanced CFB boiler technologies. Working together with our colleagues at DHIC, we develop products for supercritical and ultra-supercritical steam conditions.

Design

Utility-size circulating fluidised bed boilers ranging from 50 - 350 MW_e per unit. USC units with up to 600 MW_e under development

Fuels

All kinds of biomass, coals, waste coals, coal residues, pet coke, as well as, co-firing

References

Over 110 units in operation worldwide

Case study: Berlin, Germany

Contract award: 1987

Main fuels: Hard coal, lignite, biomass

Number of lines: 1

Plant output: 100 MW_e

In 1987, Doosan Lentjes was awarded the contract by BEWAG to provide a circulating fluidised bed (CFB) firing system for the 100 MW_e combined heat and power (CHP) plant located in Berlin, Germany.

In 1990, the plant received the International Power Plant Award for its efficiency and extremely low emissions. Thanks to the flexibility of the CFB system, the plant is now capable of reliably burning biomass fuels, such as, wood.

Case study: Harlingen, The Netherlands

Contract award: 2009

Main fuels: Municipal, bulky and similar pretreated waste

Number of lines: 1

Plant capacity: 1 x 280,000 t/a

In 2009, Doosan Lentjes was selected by RECB. V. – a subsidiary of Afvalsturing Friesland N.V., to deliver essential components, such as, grate, boiler and balance of plant (BoP) on an EPC basis for the waste-to-energy plant in Harlingen, the Netherlands.

An integrated and highly efficient combustion system enables high plant availability and a substantial reduction of operating costs while simultaneously providing high flexibility to meet the requirements of changing waste qualities.

Converting waste to energy

Doosan Lentjes is a leader in the generation of energy from waste. With almost 80 units contracted around the world equivalent to converting millions of tons of waste-to-energy every year, we are an experienced partner in planning and building individual process sections, chute-to-stack solutions or full turnkey plants.

Thermal waste treatment is an essential part of a modern waste management concept. At Doosan Lentjes, our technologies can reduce waste volumes by more than 90%, as well as, generate high levels of energy recovery. With our advanced technology, we help you to recover more than 65% of the energy initially contained in the waste, which can be subsequently converted into power and heat for local communities and industry.

Our flexible grate types, such as, reciprocating (air and water-cooled), as well as, roller grate are tailored to suit various waste incineration properties resulting from different waste characteristics, such as, moisture contents, calorific values and waste volumes.

Our proven flue gas cleaning solutions achieve reliable compliance with all applicable international emissions regulations by maximising the reduction of pollutants and toxins from your waste, thus, minimising the ecological impact of your plant.

Doosan Lentjes has vast experience with thermal treatment of municipal sewage sludge encompassing more than 25 incineration units built in Germany and across Europe. Our competence covers EPC responsibilities.

Ready to recover phosphorus from sewage sludge

We provide advanced sewage sludge incineration concepts based on the proven bubbling bed boiler technology. Our capabilities can cover solutions across the entire process chain from dewatering and drying, incineration, heat recovery and steam / power generation to flue gas cleaning and ash separation.

With our tailor-made plant concepts developed on the mono-incineration principle, we help you to comply with the new legal requirements in respect of sewage sludge treatment: An integrated Electrostatic Precipitator (ESP) separates the ash from the flue gas which, in a further process step, allows the recovery of the required phosphorus.

Our proven multi-stage flue gas cleaning applications ensure that even the most stringent emissions regulations are reliably met or exceeded. This is achieved by maximum removals of harmful pollutants, such as, acid gases, heavy metals and solid particles from the flue gas.

Doosan Lentjes' plant solutions benefit from their compact design and high process efficiency, thus, maximising their cost-efficiency.

Maximum combustion efficiency

Compliance with all legal requirements

Tailor-made plant designs

Case study: Belfast, Northern Ireland

Main fuels:
Sewage sludge, dewatered sewage sludge, screenings

Number of lines: 1

Total plant capacity (original substance):
54.6 t/h (sewage sludge)
4.14 t/h (dewatered sewage sludge)
0.12 t/h (screenings)

DR*-content at reception:
3.5% (sewage sludge)
25% (dewatered sewage sludge)
45% (screenings)

Doosan Lentjes designed and built the municipal sewage sludge mono-incineration plant located in Belfast, Northern Ireland. Today, Northern Ireland Water is the owner of the facility while the same is being operated by Veolia Water.

The plant design features a bubbling bed boiler and a multi-stage flue gas cleaning solution. An efficient waste heat recovery concept allows an auto-thermal operation of the entire plant. Designed as a mono-incineration plant, the facility is ready to recover phosphorus from the sewage sludge.

*DR: Dry Residue

With a heritage in air quality control systems that includes more than 50 years' experience and 150 installations worldwide, Doosan Lentjes is a leading provider of cutting-edge products and services that deliver cleaner, greener energy.

A breath of fresh air

Our environmentally-friendly flue gas desulphurisation (FGD) solutions are tailored to your individual requirements to help you achieve maximum sustained emissions reduction and compliance with even the most stringent environmental emissions directives.

Our proprietary proven technologies include:

- Wet limestone FGD – the world's most commonly used FGD process, especially designed to meet the specific requirements of high-sulphur applications and large oil and coal-fired power plants by effectively removing sulphur dioxides from the flue gases.
- Seawater FGD – a proven alternative for oil and coal-fired power plants located in coastal regions, delivering the same levels of desulphurisation as the wet limestone process.
- Circoclean® FGD – a beneficial solution to reliably remove pollutants, such as, dust and sulphur dioxides (SO_2) from the flue gas. The process can be used downstream of coal and oil-fired boilers, as well as, biomass, refuse derived fuel and domestic and industrial waste incineration plants.
- FER-DI® FGD/flue gas cleaning – a straightforward process suitable for moderate pollutant concentrations of WtE facilities and power stations fired with coal, oil or biomass. Pollutants to be removed involve acid gases, such as, SO_x, HCl and HF, as well as, hydrocarbons, such as, dioxins and furans and heavy metals like mercury.

Wet limestone FGD

Seawater FGD

Circoclean® semi-dry FGD

FER-DI® dry FGD/FGC

Case study: Kjøpsvik, Norway

Contract award: 2017

DeSO$_x$ technology: Seawater FGD

Application in the cement industry

Main fuels: Waste fuels

In 2017, Doosan Lentjes was awarded the contract by NORCEM AS, part of HeidelbergCement, to supply a turnkey seawater desalination system for their cement plant located in Kjøpsvik, Norway.

With Doosan Lentjes as the sole EPC supplier, the customer receives an integrated solution that meets the challenge of ongoing operations with minimal downtime during retrofitting.

Steam generation in 360° at Doosan Lentjes

Visit our homepage and take a virtual journey through our facilities around the globe – a great opportunity for you to experience our reference plants in an impressive 360° environment and convince yourself of our capabilities! To start the tours, please type the address below in your internet browser and open the Virtual Doosan World.

www.doosanlentjes.com

Doosan Lentjes

Doosan Lentjes is a global provider of processes and technologies for energy production from sustainable and conventional fuels. Our specific areas of expertise include circulating fluidised bed boilers, key technologies for the generation of energy from waste and sewage sludge, as well as, flue gas cleaning systems. We have been pioneering energy solutions for 90 years and convert millions of tonnes of waste into energy every year.

Doosan Lentjes is part of a powerful combination of companies united under the Doosan Group to deliver complementary technologies, skills and value to customers the world over.

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