
Doosan Lentjes

PRESS KIT 2021



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Section 1:

About Doosan Lentjes



1. About Doosan Lentjes

A global environmental technology provider

Doosan Lentjes provides proprietary environmental technologies for thermal waste treatment and power generation. Our areas of expertise include the incineration of renewable fuels such as waste, sewage sludge and biomass, heat recovery systems and flue gas cleaning equipment. We deliver flexible solutions for long-term waste disposal safety and climate-friendly steam and power generation.

As a member of the global Doosan Group, Doosan Lentjes is part of a strong international network of companies providing complementary technologies, skills, and value to customers the world over.

Integrated solutions

Doosan Lentjes has a long history of project management experience. The company offers integrated customised solutions and expertise for the waste management and power generation industry from a single source. Solutions are synonymous with technological leadership and developed on the basis of a true understanding of individual customers and their business requirements.

Important dates

- 1928: Ferdinand Lentjes founds boiler-manufacturing company
- 1982: Company designs, builds, and commissions the world's first commercial CFB boiler
- 1984: Acquisition of Gottfried Bischoff GmbH, a specialist in flue gas cleaning technology
- 1989: Company enters the grate-based waste-to-energy market
- 2011: AE&E Lentjes GmbH became proud member of Doosan Group to form Doosan Lentjes GmbH
- 2016: Doosan Lentjes celebrated the 40th anniversary of its CFB combustion technology
- 2018: 90th company anniversary & re-entry into the market for the incineration of municipal sewage sludge
- 2020/ 2021: Doosan Lentjes expands its market leadership in thermal waste treatment in Poland with further orders in Olsztyn and Warsaw



Part of the Doosan Group

As a member of the global Doosan Group, the environmental technology specialist Doosan Lentjes provides the resources to deliver complete process solutions from one trusted source.

With Doosan's global network, Doosan Lentjes combines international market know-how with German state-of-the-art engineering — a winning combination for providing innovative solutions for customers the world over.

Doosan Lentjes benefits from the Group's international sourcing and manufacturing capabilities. High quality workshops under the full control of Doosan in Changwon/Korea, Chennai/India and Vina/Vietnam provide best practice procurement of goods and services while maintaining and ensuring compliance with laws, regulatory guidelines, and internal control procedures. Procurement hubs in Beijing and Shanghai/China underline Doosan Lentjes' efforts for cost optimised solutions.



Top left and right: Changwon, Korea
Bottom left: Vina, Vietnam; bottom
right: Chennai, India

Section 2:

Doosan Lentjes at a glance



2. Doosan Lentjes at a glance

Full company name and address

Doosan Lentjes GmbH

Daniel – Goldbach – Straße 19 Tel.: +49 (0) 2102/ 166 – 0
40880 Ratingen dl.info@doosan.com
Germany www.doosanlentjes.com

Board of management

Board of Management Thomas Stetter, Chief Executive Officer (CEO)
Dirk Stokvis, Chief Financial Officer (CFO)

Areas of activity

Doosan Lentjes provides proprietary environmental technologies for thermal waste treatment and power generation.

Products

Waste-to-energy technologies
Sewage sludge incineration technologies
Circulating fluidised bed boilers
Air quality control systems

Media contact

Diana Baganz
Marketing Manager
Tel: +49 (0) 2102 – 166 – 1476
Fax: + 49 (0) 2102 – 166 – 2476
Mob: + 49 (0) 172 – 841 – 1476
Diana.Baganz@doosan.com



Section 3:

Environmental technologies and Doosan Lentjes



3. Environmental technologies and Doosan Lentjes

Our industry

The environmental technology industry is a key sector when it comes to reducing people's ecological footprint and creating a green future for generations to come.

Driven by climate change and global population growth, the demand for environmentally friendly waste disposal and energy generation is growing. While waste increasingly cannot simply be landfilled but must be given adequate, resource-based treatment, electricity generation must be as clean as possible. The goal is to support the ideas of a circular economy and to implement the global energy transition.

Our technologies

Doosan Lentjes is a specialist in the development of environmental technologies for thermal waste treatment and power generation. The company's product portfolio includes waste-to-energy (WtE), sewage sludge incineration (SSI) technologies, circulating fluidised bed (CFB) boilers and air quality control systems (AQCS).

Waste-to-energy

Doosan Lentjes' waste-to-energy technologies help to efficiently treat non-recyclable waste in a safe and environmentally friendly way. Doosan Lentjes has been commissioned to supply more than 80 lines worldwide that reduce the volume of waste and harness the energy contained in the fuel. Furthermore, residues from the incineration process can be fed into recycling processes to recover valuable materials such as metals and minerals.

Different flue gas cleaning (FGC) processes are available to comply with the requirements of the German 17th BImSchV or the revised European BREF (Best Available Techniques Reference) documents.

Sewage sludge incineration technologies

Doosan Lentjes' proven sewage sludge technologies have been developed to realise safe incineration of municipal sewage sludge according to the latest legal guidelines: The use of mono-combustion solutions enables the recovery of valuable phosphorus from the incineration ash in a separate process step. And reliable flue gas cleaning systems help to comply with the requirements of the German 17th BImSchV or the European BREF regulations.

In Germany and beyond, Doosan Lentjes has built more than 10 incineration plants, all of which ensure reliable and legally compliant disposal of municipal sewage sludge.

Circulating fluidised bed boilers

Doosan Lentjes circulating fluidised bed (CFB) boilers offer maximum flexibility in the combustion of renewable or alternative fuels whose combustion characteristics are often difficult. No matter how low the calorific value, reactivity value or ash melting temperatures may be, CFB boilers ensure efficient use of the fuels for steam and power generation.

To meet strict emission regulations, an integrated emission control system removes sulphur dioxide from the process by adding limestone, while a low combustion temperature prevents the formation of thermal NO_x.

Doosan Lentjes CFB boiler technologies contribute to efficient and environmentally friendly power generation to meet energy needs in line with climatic aspects.

Air quality control systems

Doosan Lentjes offers advanced flue gas cleaning technologies for waste and sewage sludge incineration plants, power stations and industrial plants. The (multi-stage) solutions include the (semi-)dry Circoclean® and dry direct injection FER-DI® processes, wet scrubbers, SNCR/SCR denitrification technologies and filters.

By means of these methods, acid gases, hydrocarbons, heavy metals, dust as well as nitrogen oxides are removed from the flue gases. The strict emission regulations according to the revised BREFs are complied with.

In more than 150 plants that Doosan Lentjes has supplied worldwide, emissions are reliably reduced to the applicable local guidelines.



Section 4:

Press releases



PRESS RELEASE

Doosan Lentjes is to deliver technology for the new waste-to-energy plant in Warsaw

11 May 2021

Doosan Lentjes is pleased to announce that it was selected to supply key grate and boiler technology for the new waste-to-energy facility in Warsaw, Poland. The contract includes the engineering, procurement, and delivery of the equipment as well as advisory services for construction, commissioning, and acceptance test.

As a key subcontractor to POSCO Engineering & Construction Co, Ltd of South Korea, Doosan Lentjes will deliver a complete boiler island including SNCR (selective non-catalytic reduction) to the new Warsaw facility. Doosan Lentjes will apply its proven air-cooled reciprocating grate and a horizontal-type steam generator.

The new plant will consist of two lines that nominally process a total of 265,200 tonnes of municipal solid waste per year and will make a decisive contribution to improving the local disposal infrastructure.

“This latest success is further proof that Doosan Lentjes' technology is in demand on the Polish market”, says Rafal Psik, Director at Doosan's Katowice office. “The construction of the incineration plant in Olsztyn was also awarded to a consortium of Doosan Lentjes and parent company Doosan Heavy Industries & Construction last year. With POSCO Engineering & Construction, we already successfully built the Krakow plant about eight years ago, which has been reliably thermally treating the residual waste of more than 750.000 local citizens ever since. Doosan Lentjes will use this extensive experience gained in previous projects for the benefit of the final customer, the Warsaw waste handling company MPO.”

After completion, expected in 2024, approximately 1/3 of the installed combustion capacity in Poland will be secured with Doosan Lentjes technology. The plants will support Polish efforts to comply with EU requirements for sustainable waste management. According to the European waste hierarchy, thermal recovery is given priority over simple landfilling. Feeding non-recyclable waste into the incineration process allows a reduction of the required landfill capacities and at the same time harnesses the energetic potential of the waste. In addition, valuable materials can be recovered from the incineration ash, which can be



used for, e.g., road construction. When completed, the new waste incineration plant in the Polish capital will be the largest of its kind in the country.

Doosan Lentjes is a specialist in the delivery of proven and reliable waste-to-energy technology, converting millions of tonnes of waste into valuable energy every year. This helps customers all over the world reduce their waste volumes and simultaneously provide a sustainable energy source.



PRESS RELEASE

Doosan Heavy Industries & Construction and Doosan Lentjes to deliver their first joint waste-to-energy project in Poland

13 October 2020

Doosan Heavy Industries & Construction (DHIC) and its subsidiary and consortium partner Doosan Lentjes have been awarded the turnkey contract to supply a new waste-to-energy (WtE) plant in Olsztyn, Poland. It is the first joint WtE project between the Korean EPC company and its German engineering technology subsidiary. The new plant will be based on Doosan Lentjes' proven water-cooled counter-reciprocating grate and boiler as well as flue gas cleaning technology.

Contracted by the plant owner and operator, Dobra Energia dla Olsztyna, the consortium will deliver the entire one-line plant including combustion grate, boiler and dry Circoclean flue gas cleaning, and Selective Catalytic Reduction (SCR). Furthermore, civil works and two gas-fired peak load boilers (PLB) along with site management will be part of the supply.

Commenting on the project, Gerhard Lohe, Product Director Waste-to-Energy at Doosan Lentjes, says: *"This project is the first waste-to-energy plant that DHIC and Doosan Lentjes are executing together. It proves that international EPC experience in large-scale plant construction projects as well as a rich heritage and competence in modern WtE technology is a strong combination of capabilities that meets the demands of the industry. Customers can therefore expect an interface-optimized delivery of the project from one source. Our two companies can look back on many years of experience in the execution of large, but also smaller power plant projects all over the world. The joint entry into the global WtE market now represents the next step in the exploitation of synergy effects within the Group."*

Co-funded by the EU, the plant will meet all European requirements with regard to recycling and disposal, while, at the same time, complying with the emission limits according to the new BREF documents (Best Available Techniques Reference).

The new plant, scheduled to be completed in 2023, will be capable of processing up to 110,000 tons of refused derived fuel (RDF) produced by the citizens of the greater Olsztyn area. Covering roughly 30% of the district heating demand in the region, the new plant will help to compensate for the heat loss that will accompany the closure of the local coal-fired Michelin power plant in the near



future. This will ensure a continuously reliable and secure supply of district heating to the local citizens. At the same time, using the energy contained in the waste offers a sustainable alternative to fossil fuels. In addition, the thermal treatment of the waste makes it possible to reduce the landfill space required.

Commenting on the project, Mariusz Marciniak, Director for Central and Eastern Europe, says: *“The new plant in Olsztyn will be a milestone in improving the waste management infrastructure in Poland. It is the eighth plant of this type to be built in the country and it is crucial for achieving the objectives of the EU waste hierarchy. This hierarchy gives priority to energy recovery from waste over simple landfill and, thus, requires the energy potential of solid waste to be harnessed. One of the eight plants, the one in Krakow, was built with the involvement of Doosan Lentjes as technology provider for both grate and boiler. The plant benefits from the technological experience of Doosan Lentjes and reliably converts municipal waste from the Krakow region into energy since 2013. Doosan Lentjes will apply the experience gained in Krakow to the second project recently won on the Polish market to the benefit of the customer and final client, the local energy provider, MPEC Olsztyn.”*

Doosan Heavy Industries & Construction is a leading EPC contractor offering a wide range of services ranging from the manufacturing of castings and forgings, power generation systems to the construction of power plants.

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PRESS RELEASE

Doosan Lentjes is to deliver lot 1 of the new wood-fired combined heat and power plant in Dinslaken

12 October 2020

Doosan Lentjes was awarded the contract by DHE (Dinslakener Holz-Energiezentrum) to build the lot 1 of the new wood combustion plant, located in Dinslaken. The order comprises the turnkey delivery, installation and commissioning of two incineration lines on a chute-to-stack basis. Start-up is expected to be in mid of 2023.

Once in operation, the new plant will thermally treat about 200,000 tons of waste wood (class I-III) per year. Applying effective incineration technology will ensure that the maximum of the climate-friendly energy contained in the wood is harnessed to generate sustainable electricity and heat. This will reduce the share of fossil fuels required to meet local energy needs and save more than 125,000 tons of CO₂ per year, helping the City of Dinslaken to pursue its strict decarbonisation policy.

Doosan Lentjes' scope of delivery will include the fuel supply and transports as well as the combustion and boiler plant based on water-cooled reciprocating grate technology. In addition, the company will provide a complete dry flue gas cleaning system, stack as well as electrical & control systems.

The modern air quality control facility will ensure compliance with emission limit values according to the revised European BREF (best available techniques reference) documents. Harmful acid gases, hydrocarbons and heavy metals will be treated and separated in the Circoclean® gas cleaning system to be installed, while the selective catalytic reduction (SCR) will remove nitrogen oxides.

Gerhard Lohe, Product Director Waste-to-Energy at Doosan Lentjes comments: *"In Dinslaken, we are ready to prove the flexibility of both our incineration and flue gas cleaning processes. Originally used in traditional waste-to-energy applications, we will adapt our grate technology to the combustion properties of biomass fuels and thus ensure efficient use of their energetic potential. Furthermore, the plant will be the first of its kind to comply with the new BREF requirements. This means that it will not only burn an almost CO₂-neutral fuel, but will also produce negligible emissions. This reflects our efforts to support the industry in shaping the energy transition and make tomorrow's heat and power generation more sustainable."*



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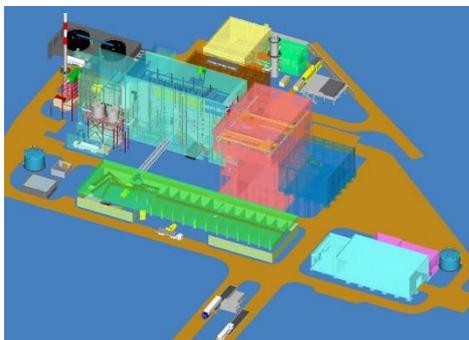


Section 5:

Selected case studies



Waste-to-energy, Olsztyn, Poland



Award date: 2020

Main fuel: Refuse derived fuel (RDF)

Doosan Lentjes, in consortium with Doosan Heavy Industries & Construction, will supply the new WtE plant in Olsztyn, Poland, on a turnkey basis. The new facility will apply Doosan Lentjes' proven water-cooled reciprocating grate, boiler, and flue gas cleaning technology. Compliance with all BREF emission limits will be secured.

Circulating fluidised bed boiler, Sodegaura, Japan



Award date: 2018

Main fuel: Biomass

Doosan Lentjes is currently providing key CFB boiler technology for the new 75 MWe biomass-fired power plant located in Sodegaura, Japan. The contract comprises engineering and procurement of the boiler island including the major boiler and flue gas cleaning equipment.

Flue gas desulphurisation, Can, Turkey



Award date: 2018

Main fuel: Lignite

For an existing power plant in Can, Turkey, Doosan Lentjes provided wet limestone FGD technology to the general contractor, EKON Industry. The contract included engineering, supply of key process equipment and consultancy services for both erection and commissioning. The retrofit allows the removal of more than 98% SO₂ from the flue gas, resulting in an improved environmental performance of the plant.

Section 6:

Environmental technologies in 360°



Environmental technologies in 360°

Visit our homepage, www.doosanlentjes.com, open the Virtual Doosan World and take a journey through our reference plants around the world.



Section 7:

Corporate Social Responsibility



Corporate Social Responsibility (CSR)

Doosan Lentjes takes corporate social responsibility (CSR) very seriously: We aspire to create a world driven by mutual respect. In this world, people live and do business in harmony with the environment and nature.

To this end, our CSR strategy is based on three key pillars that have been developed in line with these goals: People, sustainability, and charity.

People are at the heart of everything we do. Our efforts are focused on all the people we influence through our corporate existence. The aim is to create an environment that promotes motivation and creativity and gives top priority to physical and mental well-being.

The second pillar focuses on sustainability. Here, we not only implement individual measures to improve our environmental performance, but also understand sustainability as the basis of our business model and activities. Along our entire value chain, we prioritize the highest environmental standards and the reduction of our carbon footprint.

Charity forms the third pillar on which our CSR activities are built. With this element in our social responsibility strategy, we follow our conviction that it is our corporate duty to make a positive difference for others. In doing so, we do not limit ourselves to our community but help where help is urgently needed. Here, too, we do not implement measures from the top down but do so together with our employees.

