

# INTELLIGENT CRANES



WASTE  
TO  
ENERGY  
&  
BIOMASS  
INDUSTRY

**KONECRANES®**

# The strength of experience

**By choosing Konecranes, you acquire a trusted source with global reach and knowledge combined with local know-how. Not only do we shift waste, but we can also give a lift to your entire business.**

## Good for business and environment

For us at Konecranes, corporate responsibility means that business operations are responsible economically, socially and environmentally. For long-term success, these three areas must be taken care of and be kept in balance. Corporate responsibility is part of our everyday business – starting with our company mission and vision, and guided by our policies and Code of Conduct. We always consider environmental issues throughout the lifecycle of every one of our products. In particular, we ensure the efficient use of materials, recyclability and conservation of energy. Over 98 percent of the materials used to build a typical Konecranes crane are recyclable. Our equipment can be fitted with energy-saving frequency converter technology, feeding up to 30 percent of braking energy back into the network.

## In-house analysis and engineering

Our own expertise and experience are available to you – we do not outsource our core competencies. Many of our engineers have extensive experience in waste and biomass handling processes, so they understand the demands of waste handling and the importance of reliable lifting technology.

## Using the latest technology

Konecranes is known worldwide for creating and promoting modern lifting technology. Smart features such as Load Control, Sway Control, Target Positioning and Protected Areas help to speed load movement, improve handling and reduce potential operator error.

## Keeping your crane running

We train your staff to operate and take care of your crane. We can provide you with specialized maintenance services for the life of your lifting equipment. Proper and timely maintenance should not be seen as an expense – it is an essential investment in your business.

Our goal is to keep your processes running safely and efficiently for decades to come.

We know  
waste-to-energy  
and biomass  
Processes

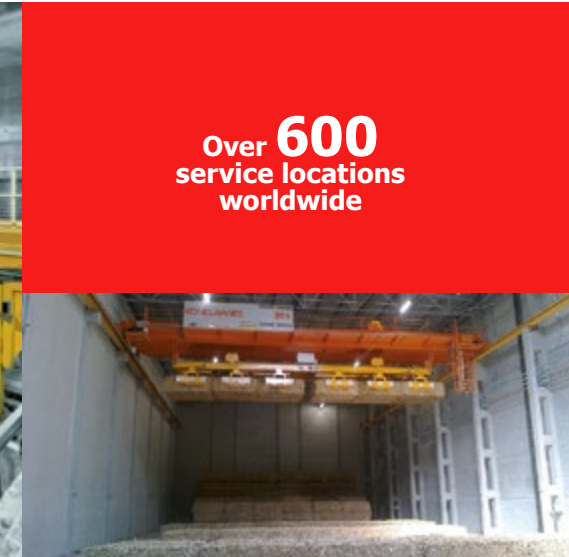
over 50 years  
experience in waste  
handling

Over 500  
waste-to-energy  
crane installations

The resources to  
deliver, install and  
maintain cranes on  
every continent

Over 600  
service locations  
worldwide

active in  
almost  
50  
countries





# Safety first, last and everywhere

**At Konecranes, nothing, no matter how urgent, is ever allowed to prevent us from working safely and properly.**

## Safety in the waste-to-energy plant

Harsh and dusty environments, high demands in waste handling and 24/7 processes create high requirements for safety in truck traffic, crane operations and protection of the control room. In every work environment and every process, safety must be built into the design, operation and maintenance of cranes.

## Safety in design

Konecranes has the experience to understand what works and what doesn't. We implement safety measures in every step of the crane design process, from considerations of environmental risks to minimizing problems resulting from user error. And you can be sure that our products are designed with local and international safety standards in mind.

## Safety in operation

Take advantage of our expert training to ensure that your operators work safely and with confidence. Features such as Overload Protection, Sway Control, Target Positioning and Protected Areas can make valuable contributions to safety when used correctly.

## Safety in maintenance

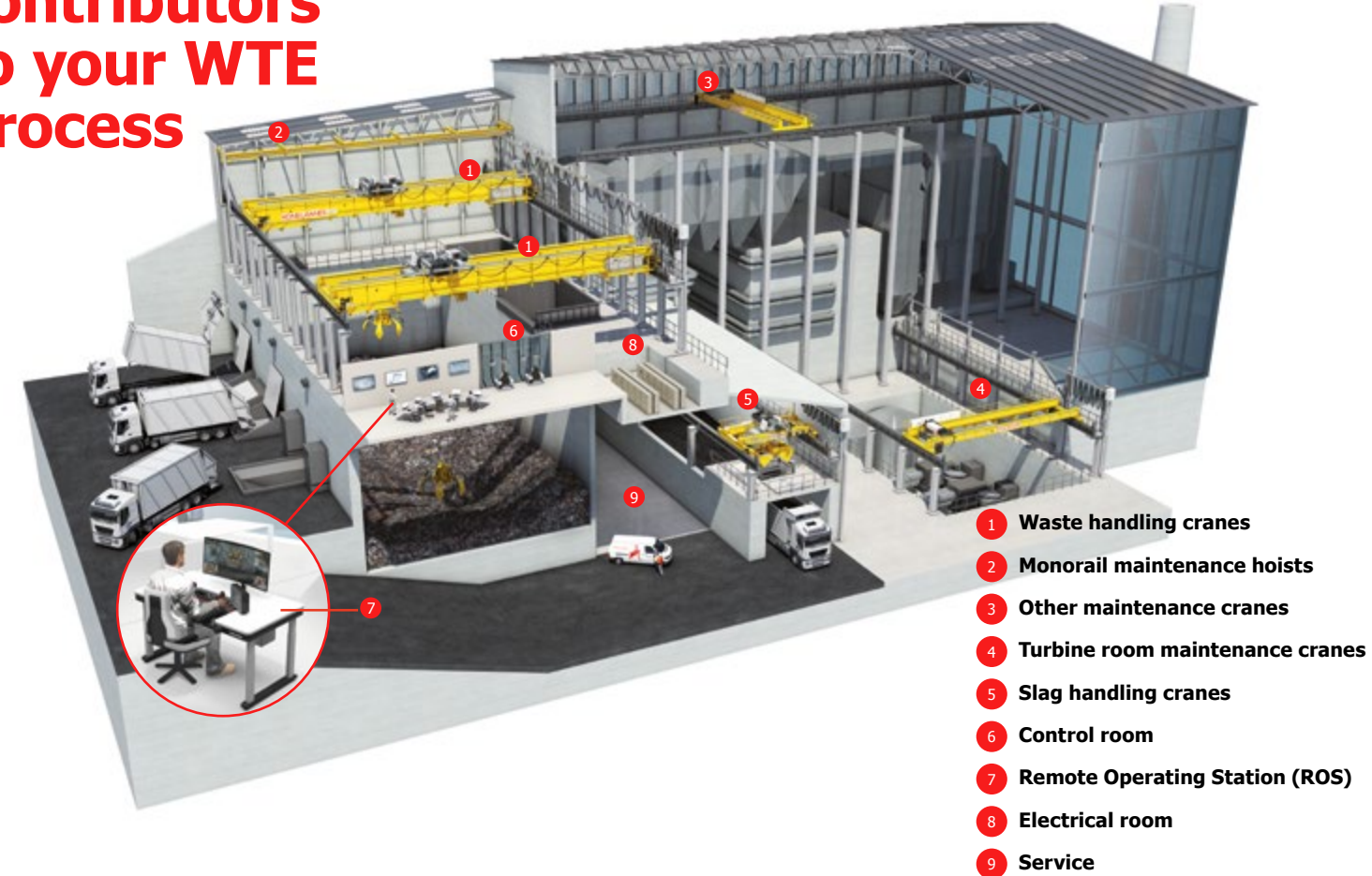
The better a crane is maintained, the safer it will be. We prefer to take care of your cranes across their entire working lives, and we will recommend a Konecranes service contract as an investment in the continuous safe and productive use of your cranes.



**A safe crane is the product of a good design, safe use and regular maintenance.**

Our cranes, people and expertise can be

# Essential contributors to your WTE process



- 1 **Waste handling cranes**
- 2 **Monorail maintenance hoists**
- 3 **Other maintenance cranes**
- 4 **Turbine room maintenance cranes**
- 5 **Slag handling cranes**
- 6 **Control room**
- 7 **Remote Operating Station (ROS)**
- 8 **Electrical room**
- 9 **Service**





We add value at every step – from homogenization to feeding the burners.

Konecranes helps handle millions of tons of waste every day.



Industrial and process expertise for a clean environment



**Remote operating station (ROS)**

# Enhanced safety, functionality and comfort

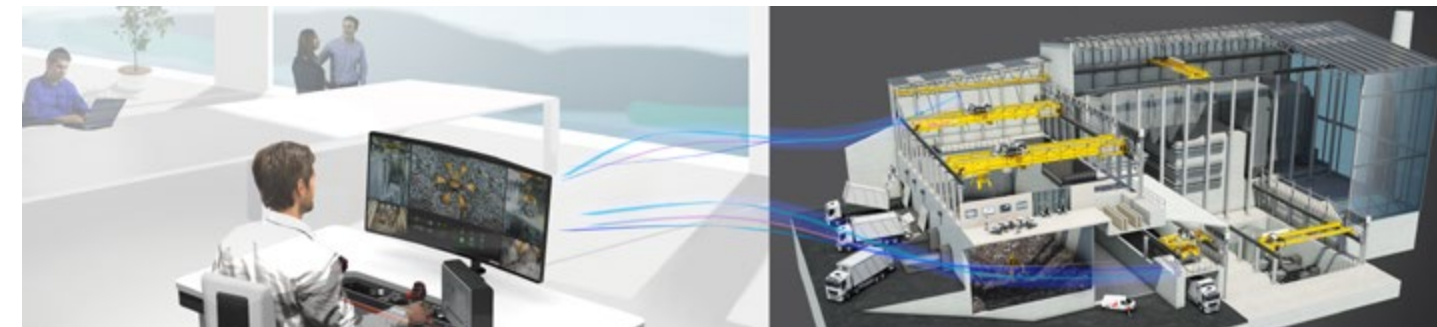
**The modern way to operate a crane is at a Remote Operating Station (ROS). A multifunctional electronic desk, the ROS features the same controls as a cabin on the crane structure, but lets operators drive cranes at a distance, in a central control room, or even off-site**

A Remote Operating Station features the same controls as an operator’s cabin. The ROS uses monitors showing real-time camera views, along with crane and process related information. It means the cranes can be driven from a distant control room away from the crane operating area and without a direct line of sight to the crane.

Fitted with the latest Konecranes technology, the ROS provides a safe, fully functional and ergonomic work area that improves process flow and productivity. More efficient crane use means a longer crane life, and a better return on investment.

**Customer benefits**

- Control room location follows your plant’s needs, improving safety and working conditions.
- Less building expenses: no operating cabin, access walkways or platforms.
- One operating location means no crane-specific control cabins.
- Lines of sight to where it is not normally easy to see the crane or its load.
- A realistically simulated crane cabin environment increases remote operating efficiency.
- Screenshots and DVR can monitor crane use or train operators.
- Regular service provides the most recent software updates and maintains monitoring devices.



**MUI – Main User Interface**

- The Main User Interface, or MUI, is a new standard for programming waste-to-energy automation
- The MUI features a computer and 23-inch LED panel screen, keyboard and mouse
- Fully integrated with the PLC system of the crane
- Isolated from outside networks
- The operator can schedule and program a week-long agenda that includes up to 20 different work routines in full automation
- Monday through Sunday agenda can be repeated indefinitely without accessing the crane - except to take it out of automation for scheduled inspections and maintenance.



**Design Ergonomics**

ROS design is based on good interaction design principles, avoiding cognitive load by presenting only relevant information making the users feel in control of the process and be comfortable using the system.

- Dashboard view shows the most important crane and process information needed to run the remote operation. There are tailor-made dashboard views for all applications.
- Monitor layout can be configured based on the number of cameras, most important information is located in the center of view.
- High-quality materials and mechanicals together with low latency give best-in-class haptic feedback and feel of control while operating the crane manually with joysticks.
- New table and joystick designs keep operators comfortable, even on long shifts.
- Audio features provides crane and environment ambient sounds and Speech messages of crane events
- Camera with Smart zoom, camera view follows the lifting device automatically.

**Benefits**

- The MUI monitors crane operations, including usage statistics, error messages and equipment condition.
- The system also generates summary reports to help managers optimize maintenance and alert them if more operator training is needed.

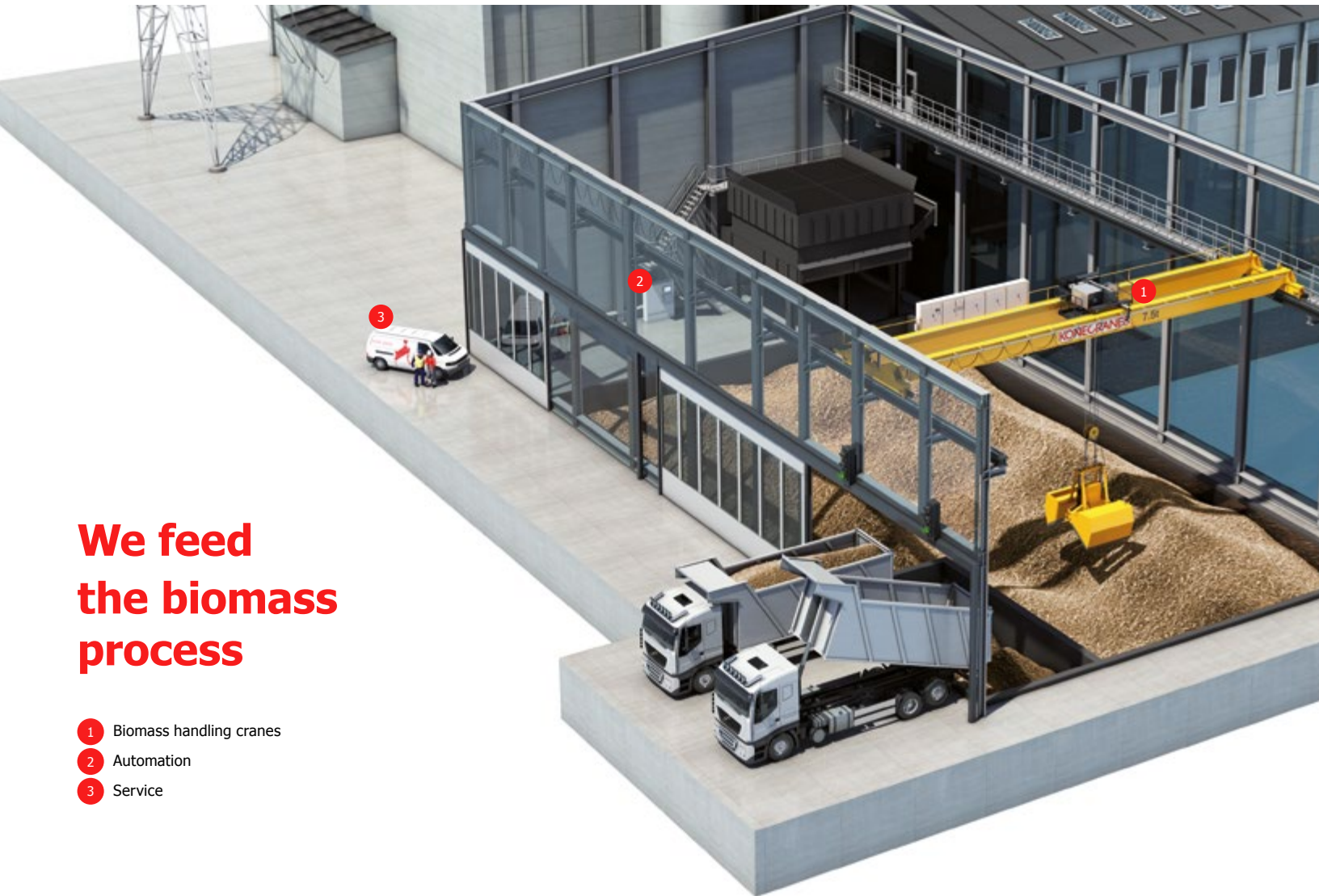






## WtE process

- 1 Automated WtE crane equipped with TRUCONNECT
- 2 WtE plant control room with equipment for monitoring of multiple automated cranes
- 3 Remote Operating Station (ROS)
- 4 Radio control and viewport for manual crane operation



## We feed the biomass process

- 1 Biomass handling cranes
- 2 Automation
- 3 Service



# Automation improves cost efficiency

## CXT®Biomass Crane Benefits

- More efficient operations with full automation
- Increased safety with Smart Features
- Compact design for efficient space use
- Less noise and emissions Hoisting inverter with Extended Speed Range (ESR) provides smooth and fast operation and reduced cycle times

### 1 Fully automatic movements

**CXT Biomass Crane** is a fully automated, completely operator-free system. The crane takes care of the fuel material management all by itself.

### Automatic cycles

**The receiving cycle** is used for moving biomass from the dumping area to the storage area. Trucks usually unload during standard working times. The crane picks up biomass from the dumping area and drops it into the storage area, or directly into the hopper. The crane clears the dumping area until the dumping bunker is empty.

**The feeding cycle** is used to feed the hopper. This process is the highest-priority operation in the plant, running continuously 7 days a week. The pickup area can be the storage bunker or the dumping area.

### 2 Slack rope prevention / Tilting limit switch

This prevents the grab from tilting and hoist ropes from slacking. These features are designed to prevent the grab from falling out of control, and stops the lowering of the grab when digging into material.

### 3 Active sway control

Active sway control feature, available only for standard duty biomass crane, automatically eliminates load sway during crane operation. It is based on continual measurement of the rope angle. Active sway control fine tunes the operator's speed command and stabilizes load movement in both trolley and bridge travel. Therefore, load sway is minimized throughout the duty cycle. Active sway control means improved operational safety, faster load cycle times, ease of crane operation and less wear and tear on crane components.





## Satisfied customers

Here are some examples of how waste experts around the world are using our waste-to-energy and biomass crane installations in their own unique ways.



"The capacity and usability of the grab cranes are instrumental to the reliability and profitability of the entire plant."

Petri Härmä,  
Head of Large Projects, Fortum



"It was very nice to work with Konecranes people, as they are professionals, and in the future, I will be happy to work with them again!"

Jonas Pugzlys,  
Project Manager, New Heat



"Our cranes were delivered on time and with good quality, and we are very satisfied with Konecranes."

The Beijing LuJiaShan

"Intelligent automation has revolutionized waste treatment and incineration technology."

Petri Onikki,  
Technical Director, Ekokem



"What made us decide to work with Konecranes France is, above all, the technical competence and the thorough knowledge of cranes and their components."

Fabien Gautier,  
Head of Bioenergy, Scaldis



"A fully automatic crane system and Remote Operating Station has proved to be a perfect combination. The plant's utilization rate has been very high during the first heating season and not a single malfunction has occurred."

Juha Räsänen,  
Managing Director, Riikinvoima



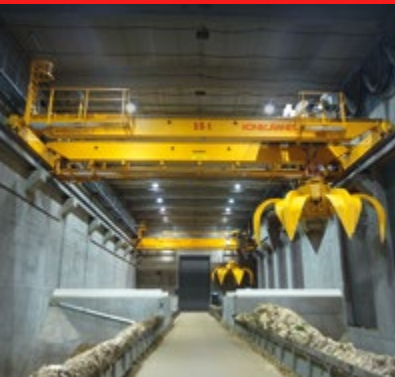
"All the employees who participated in this project treated us in a very professional, careful and dedicated way. We are very happy."

David Garcia,  
Plant Engineer, Tersa



"Konecranes has proven to be a local, competent supplier with global strength. We are looking forward to long-lasting cooperation with them."

Jan Brännström,  
Project Manager, Mölndals Energi





## Our approach to maintenance

We provide specialized maintenance services and spare parts for all types and makes of industrial cranes and hoists, from a single piece of equipment to entire operations. Our goal is to improve the safety and productivity of our customers' operations.

Konecranes Lifecycle Care is a systematic, consistent, comprehensive and professional approach to maintenance, supported by world-class tools and processes. Highest lifecycle value results from maximizing the productivity of uptime in addition to minimizing downtime costs. We believe that just keeping your cranes running is not enough. We must also help you achieve the highest productivity during every shift. We aim to deliver measurable improvements in safety and productivity that can be reported and reviewed, demonstrating a return on investment to you. Our crane experts apply a systematic risk and recommendation method of evaluation and a consultative planning and review process to drive continuous improvement in safety and productivity.

### The care preventive maintenance program

The CARE Preventive Maintenance Program has been designed to improve your equipment safety and productivity through the systematic application of preventive maintenance inspections, routine maintenance, our proprietary Risk and Recommendation Method, and remote-monitoring technology. When combined with corrective maintenance, retrofits and consultation services, lifecycle value is maximized.

Beyond preventive maintenance, Commitment or complete could be the answer

### The commitment maintenance program

If you want to enjoy the benefits of broad-scope maintenance outsourcing, our COMMITMENT maintenance program can be tailored to your requirements.

### The complete maintenance and operation program

If you are interested in outsourcing your entire material handling process, including operations and maintenance, our COMPLETE maintenance and operations program may be the answer.

**If you need just the basics, ask about condition or contact**

### The condition inspection program

If you are not ready to outsource your preventive maintenance, our CONDITION inspection program can help ensure that your company remains in compliance with your local statutory inspection requirements, and also support your own in-house maintenance actions.

### Contact on-demand service

We can respond quickly when you CONTACT us for parts, breakdowns and other short-term needs.



We provide spare parts for all crane makes and models, not just Konecranes equipment.





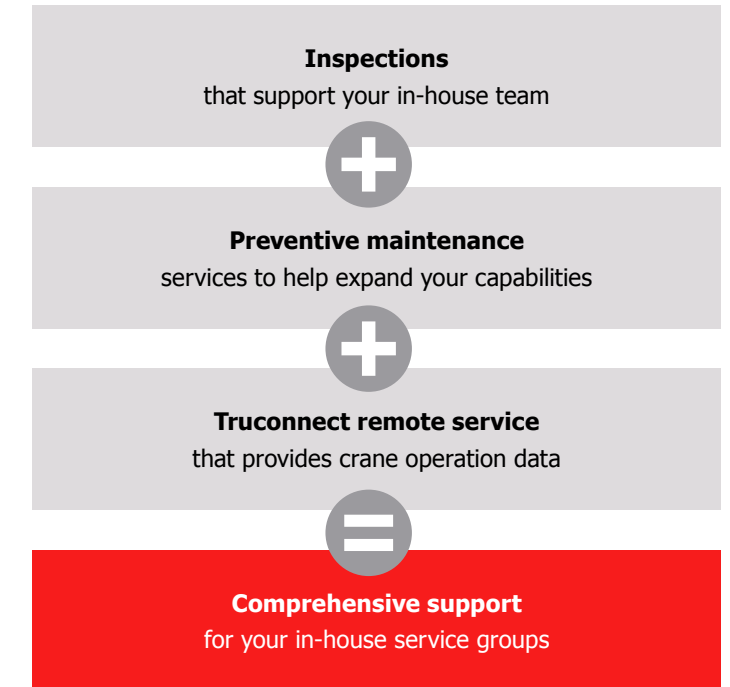
We can provide services that support and expand the capabilities of your in-house service teams.

## Supporting your maintenance teams

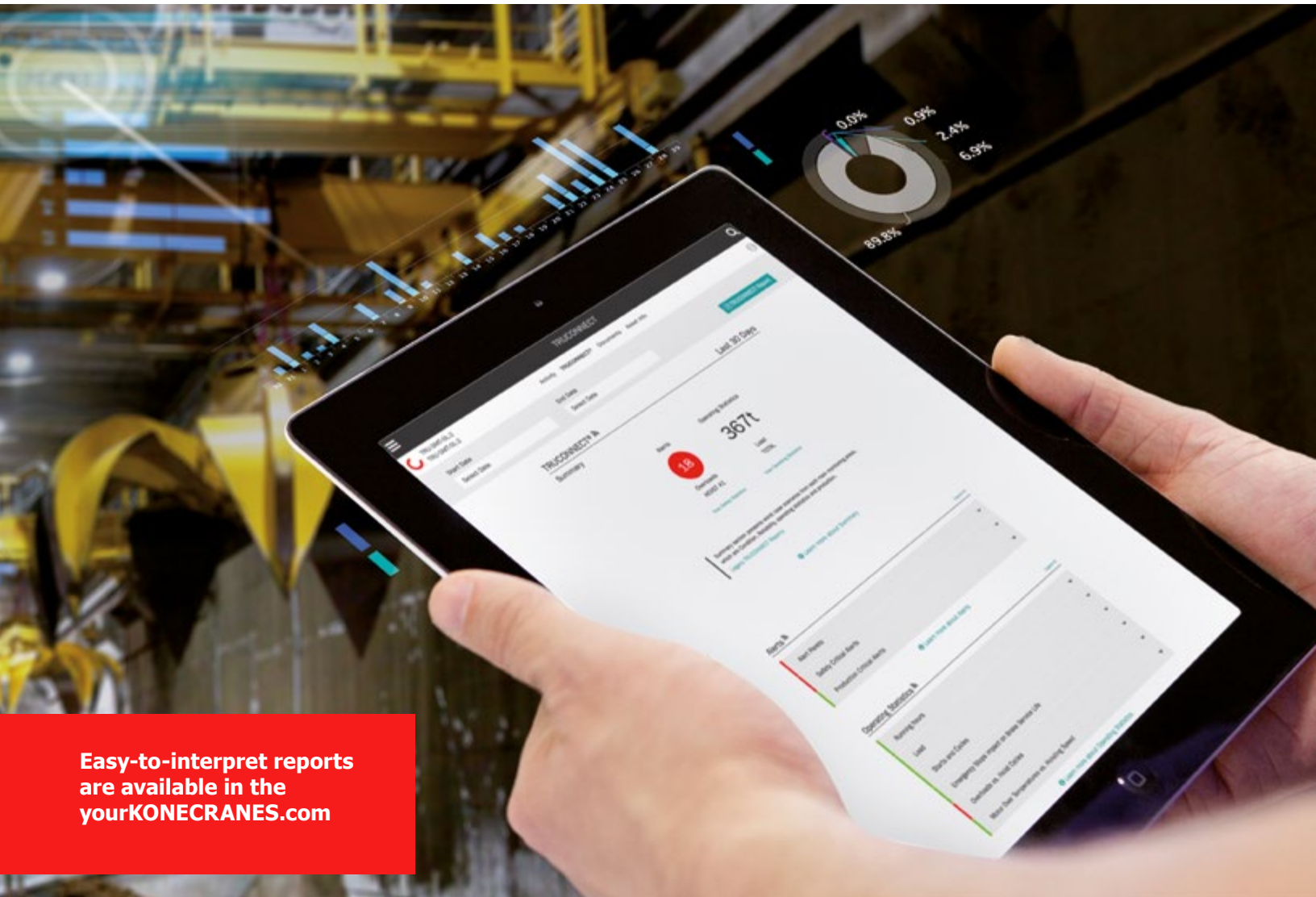
If you already have a dedicated preventive maintenance team at your facility, the Konecranes **CONDITION** Inspection Program can help fill any gaps in or add value to your inspection and maintenance procedures. We can offer expert inspections to support the work of your in-house team. And if you encounter preventive maintenance issues that cannot be resolved using your internal resources alone, we can provide the expertise and technology you need to address them safely and efficiently.

Konecranes TRUCONNECT Remote Monitoring provides asset usage and operating information that can be used to assess crane condition and help you develop new operator training goals.

### The Condition Inspection Program







Easy-to-interpret reports are available in the yourKONECRANES.com

## Plan future actions with better information

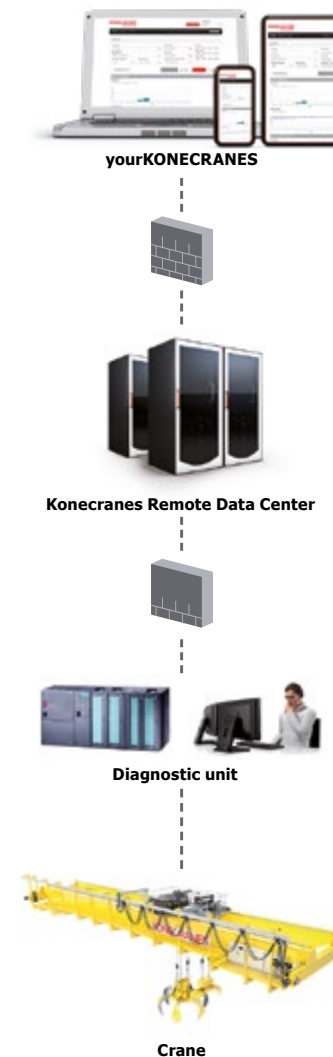
**TRUCONNECT® is a suite of remote service products and applications to support maintenance operations and drive improvements in safety and productivity. It is an important building block in delivering Lifecycle Care in Real Time.**

### Improved safety and optimized crane maintenance

TRUCONNECT Remote Monitoring uses sensors to collect data – such as running time, motor starts, work cycles and emergency stops. Brake and inverter monitoring is also available. This data and other crane usage information is visible on the yourKONECRANES.com customer portal. Remote Monitoring provides asset usage and operating information that is used to assess crane condition. Notification of hoist overloads, emergency stops and over-temperature occurrences are sent through text or email alerts, allowing for prompt response. Remote Monitoring also gives you an estimation of the remaining design working period (DWP) of selected components, such as hoist brakes and structures.

### Global network of crane know-how

TRUCONNECT Remote Support provides 24/7 access to a global network of crane experts and specialists, offering problem solving and troubleshooting to help reduce unplanned downtime. In controlled circumstances, two-way communication with the machines and their operators can be established in order to expedite corrective action.







**Extend the service life of your crane.**

## Extend the life of your crane with a modernization

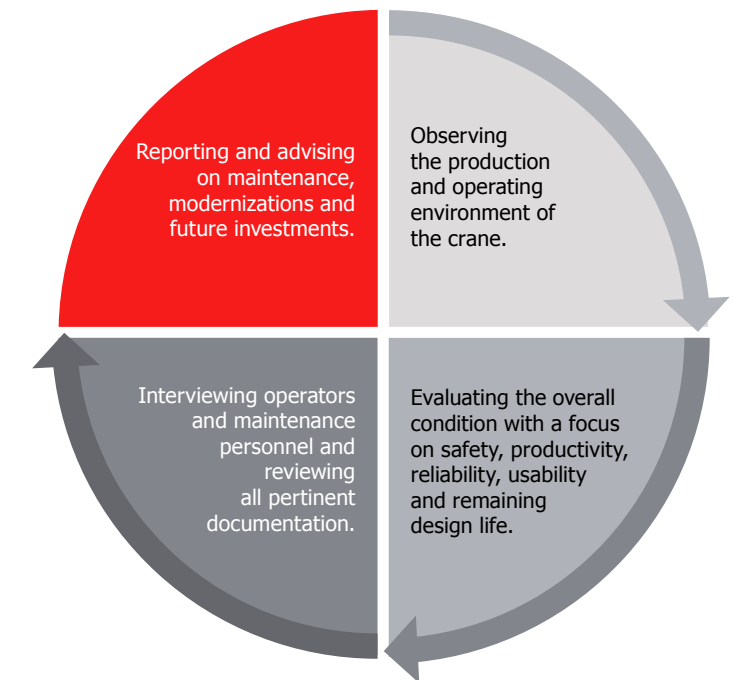
**Modernizations can provide an opportunity to add up-to-date technology or extend the lifetime of your existing crane. Typical modernization can include the replacement of hoists, trolleys and controls to achieve increased capacity, speed, duty and load control.**

With the right modernization, you can extend the lifetime of your crane and benefit from the latest technology updates. A modernization will help you comply with current safety regulations and may reduce the risk of downtime, injuries or damage to facilities, materials or products. Modernization can also improve the entire process and reduce operation costs.

With basic upgrades you can improve safety, reliability and performance. However, if your needs for crane modernization extend beyond this, we can rebuild your old crane to meet the demands of today's high-technology standards, typically at a substantially lower cost than for a new crane.

If you are unsure about the potential for a modernization on your crane, our Crane Reliability Study (CRS) can help give you an idea of crane condition and operative age. This study can provide you with an estimate of remaining crane service life and recommended actions for future use.

**The Crane Reliability Study (CRS) Process**







## Safety that saves you money

**We build safety, reliability and ease of maintenance into all of our cranes.**

We understand the harsh environment of the waste-to-energy and biomass plants, so we engineer our lifting and control equipment to endure humidity, dust and temperature variations. Konecranes lifting equipment can withstand tough operating conditions in corrosive, or otherwise hazardous environments. Key components, electronics and other sensitive parts of the crane are protected.

Crane operators need to be protected from the dangers of the working environment. With noise reduction, safe operation modes and ergonomic controls, we want to make the operator feel safe and comfortable in the control room. Smart Features make operating the crane more precise, minimizing errors and allowing total concentration on the task at hand.

The safety of your people is paramount. Konecranes Smart Features, such as Overload Protection, Sway Control, Load Positioning, Collision Avoidance and Protected Areas combine to make the crane safer to use and operate.

Our cranes are made for easy maintenance. The key systems of the crane are located at points of easy access. The crane operator can view the crane diagnostics in the control room. The Crane Monitoring System can be linked remotely to Konecranes, so you know the operating status of your cranes on demand.

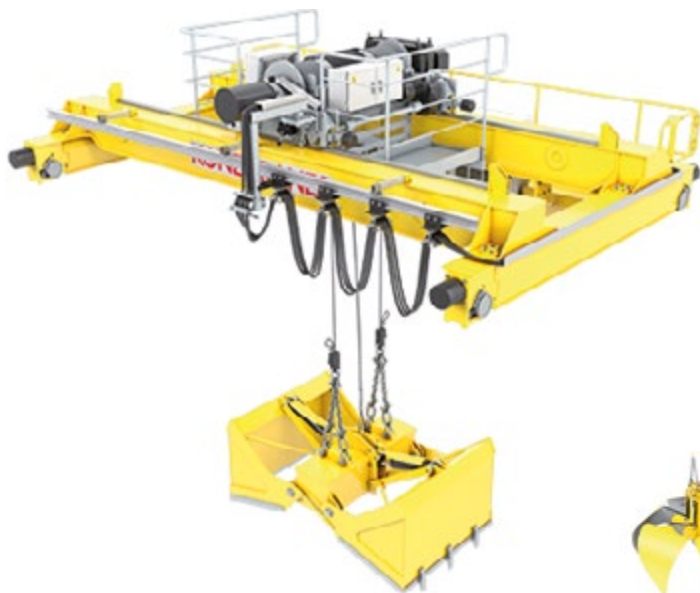




## Waste handling cranes

Normally there are two waste handling cranes above the waste pit, one of which serves as a backup. The primary crane carries out the main operating functions while the other is being serviced.

Key factors in specifying waste handling cranes are the total burning capacity of your incinerators, the layout of the handling area, the type of waste, and the time it takes to receive and process waste. To achieve high efficiency, waste must be mixed thoroughly.



Alternative lifting devices



## Slag handling cranes

The Konecranes slag handling crane is used to continuously distribute slag under the conveyor line to the other areas in the slag bunker. The crane is also used to load slag onto trucks during the day.

Sometimes the ferrous rejects have not been separated from the slag, causing higher requirements for the grab. To achieve better penetration into the slag, special teeth on the edges of the claws or fully closed orange peel type grabs can be used.

## Sludge Handling Cranes

In a sludge station, semi-fluid sludge is unloaded by trucks into storage bunkers. In the bunker, the sludge handling crane transfers the sludge into a storage area. From the storage area, the crane feeds the sludge to a process line. The material is very sticky, which is taken into consideration in the dimensioning of crane structures and machineries.

One continuously-operated, fully-automated crane is used in this application and the crane is controlled through a monitor from the central control room.



Alternative lifting devices



## Heavy-duty biomass cranes

Heavy-duty biomass cranes range in weight from 4.5 to 17 tons, with typical spans from 18 to 27 meters. Sway Control comes as standard, as do Smart features such as Sway Control, Protected Areas, Slack Rope Prevention, Shock Load Prevention and Target Positioning for feeding of the hopper, and TRUCONNECT. Regenerative braking saves energy, and the compact design saves space and energy. Lifting devices include "orange peel" or dual scoop grabs.



## Standard-Duty Biomass Handling Cranes

Standard-duty biomass crane range from 3.2 to 10 tons, with typical spans from 15 to 22 meters. Sway Control comes as standard and Active Sway Control is also available as an option. Automation is available for this type of crane, including a host of standard Smart Features.



## Turbine room maintenance cranes

Konecranes turbine hall cranes include many design features to improve performance, such as on-board diagnostics, precise positioning and remote operator controls.

## Maintenance cranes

Space under the crane and its excellent hook approaches. Because all the key mechanical components are designed especially for crane usage, manufactured and assembled in-house by crane experts, the CXT is a top performer.



## Monorail maintenance hoists

Compact and robust Konecranes monorail maintenance hoists are typically used in bunkers, parking places and maintenance areas. Their different trolley configurations ensures the best fit for the application. Typical monorail hoist is up to 5 tons lifting capacity and up to 32 meters height of lift.



## General-purpose and maintenance cranes

The Konecranes WtE industry offering includes standard cranes and hoists suited to the lifting work need in waste-to-energy plants. Our field-proven designs are regularly updated with the latest lifting technology, ensuring that you always have the machinery that is best fitted to the task at hand.

### Jib cranes

Konecranes jib cranes are very easy to install, use, and even relocate in your work environment. Their standard load capacity is up to 2 tons, so their application can adapt to your changing needs.



### Chain hoists

Konecranes chain hoists are flexible and durable in industrial applications. With variable speeds and a lifting capacity ranging from 60 kg to 5,000 kg, they are extremely versatile and long-lasting.





## Container cranes

Container cranes typically operate at port and railway terminals. The lifting capacities of this type of gantry crane, for lifting waste or ash containers, normally vary between 25 and 30 tons, with spans from 10 to 25 meters. Every gantry crane is equipped with a cabin, and such cranes are often semi-automated.



## Straw bale handling cranes

Straw bale handling cranes are used to unload straw bales from trucks. The crane can clamp up to 12 bales of hay at a time and is fully automated.

The Konecranes straw bale handling crane has microwave sensors for moisture control and a robust four-point scale.

## Intelligent Cranes: Smart, Intuitive and Connected

Technology is revolutionizing products into intelligent, connected systems. In today's world our cranes are not solely composed of mechanical and electrical parts, they have transformed into intelligent products, reshaping the industry boundaries and lifting businesses to the next level. With a century of experience, we have simplified applications and systems with the combination of sensors, microprocessors, software, and connectivity in myriad ways. Konecranes cranes with added intelligence and connectivity, across industries, help unlock limitless possibilities: increased uptime, reduced costs and improved workforce efficiency, real-time feedback to enable continuous improvement.

**Konecranes Intelligent cranes and services offering provides smart, intuitive, and safe user experience across material handling industry.**

[konecranes.com](http://konecranes.com)



## Why Choose Konecranes?

### Technology

We understand how lifting technology is critical throughout the waste-to-energy process. Our long years of experience and continuous investments in R&D drive our innovation.

### Expertise

The Konecranes technical and service teams know waste-to-energy process constantly striving to help your lifting needs.

### People

Our teams are strong because they are made of strong individuals; passionate, trained, motivated to serve customers and be the best in the business.

### Safety

At Konecranes no job is so important or service so urgent that we cannot take the time to do our work safely and correctly.






# WASTE TO ENERGY & BIOMASS INDUSTRY

INTELLIGENT CRANES IN THE WASTE-TO-ENERGY AND THE BIOMASS INDUSTRY

**Get connected**

© 2022 Konecranes. All rights reserved. 'Konecranes', 'Lifting Businesses',  SMARTON and TRUCONNECT are either registered trademarks or trademarks of Konecranes Global Corporation.

This publication is for general informational purposes only. Konecranes reserves the right at any time, without notice, to alter or discontinue the products and/or specifications referenced herein. This publication creates no warranty on the part of Konecranes, express or implied, including but not limited to any implied warranty or merchantability or fitness for a particular purpose.