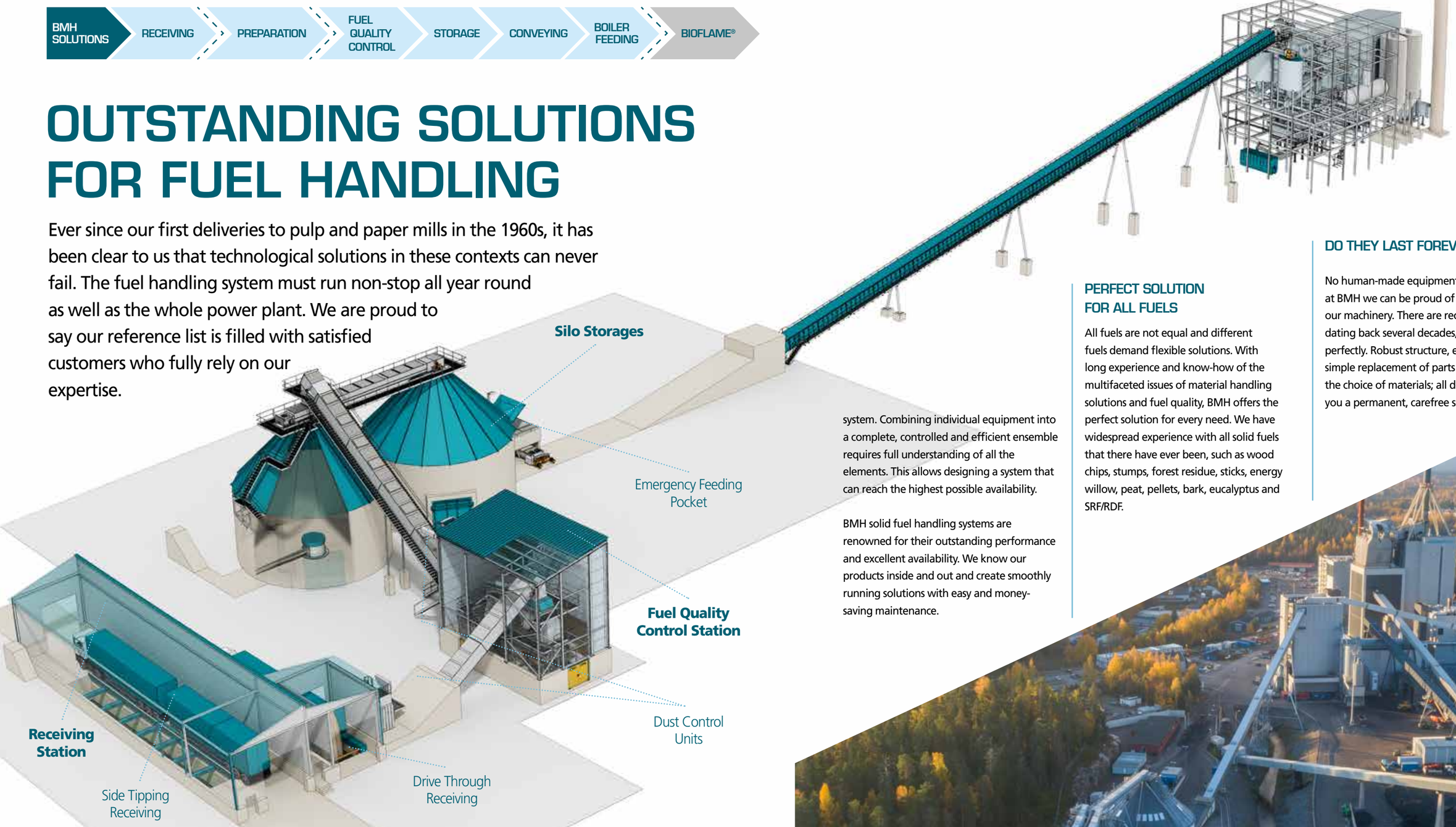
BMH TECHNOLOGY

SOLID BIOFUEL HANDLING SOLUTIONS

TYRANNOSAURUS MAKES STRONG SENSE

OUTSTANDING SOLUTIONS FOR FUEL HANDLING

Ever since our first deliveries to pulp and paper mills in the 1960s, it has been clear to us that technological solutions in these contexts can never fail. The fuel handling system must run non-stop all year round as well as the whole power plant. We are proud to say our reference list is filled with satisfied customers who fully rely on our expertise.



BMH solutions are based on strong knowledge of solid biomass, long experience and continuous product development, robust products manufactured by ourselves to ensure quality and long lifetime and, of course, high professionalism in safety and environmental matters.

Not only are our solutions excellent in terms of layout design, equipment quality and automation expertise, but our project know-how is also first class. BMH has delivered solid fuel handling systems to hundreds of sites all over the world. We do it turnkey and guarantee that every part of the solution fits together perfectly.

HIGHEST AVAILABILITY

BMH fuel handling solutions provide the highest availability in the business. We have gathered experience for over 70 years, tried out every potential new technology and kept only the best. The search for even better solutions continues as our R&D experts develop new ideas. You can feel confident that the solutions we offer you are the most secure and reliable in existence. Therefore, we have the courage to promise you the highest availability.

ALL FROM ONE SUPPLIER

It makes sense to contract only one supplier for the delivery of an entire fuel handling system. Combining individual equipment into a complete, controlled and efficient ensemble requires full understanding of all the elements. This allows designing a system that can reach the highest possible availability.

BMH solid fuel handling systems are renowned for their outstanding performance and excellent availability. We know our products inside and out and create smoothly running solutions with easy and money-saving maintenance.

PERFECT SOLUTION FOR ALL FUELS

All fuels are not equal and different fuels demand flexible solutions. With long experience and know-how of the multifaceted issues of material handling solutions and fuel quality, BMH offers the perfect solution for every need. We have widespread experience with all solid fuels that there have ever been, such as wood chips, stumps, forest residue, sticks, energy willow, peat, pellets, bark, eucalyptus and SRF/RDF.

DO THEY LAST FOREVER?

No human-made equipment lasts forever but at BMH we can be proud of the lifetime of our machinery. There are receiving stations, dating back several decades, which still work perfectly. Robust structure, easy maintenance, simple replacement of parts subject to wear, the choice of materials; all designed to give you a permanent, carefree solution.

RECEIVING SOLUTIONS – THE ANSWER TO ANY NEED

Receiving stations are the first step on the fuels' journey. Sometimes they constitute a small temporary storage as well. Receiving needs to be quick and safe, and it must allow for a big capacity.

FLEXIBLE RECEIVING IS THE KEY TO AN EFFICIENT POWER PLANT.

NO DUST IS A MUST

In a high-tech process dust is a serious matter, causing contamination and even risk of fire or explosion. BMH fuel handling systems have excellent dust control. It starts with receiving, where our role is to make sure our unloading processes keep the trucks and the area clean, paying close attention to ATEX issues.

TRUCK, TRAIN OR SHIP – ALL IS RECEIVED

BMH has delivered hundreds of receiving stations to dozens of countries. There are many different ways of unloading, often depending partly on the vehicles common in the country or region. We can handle them all.

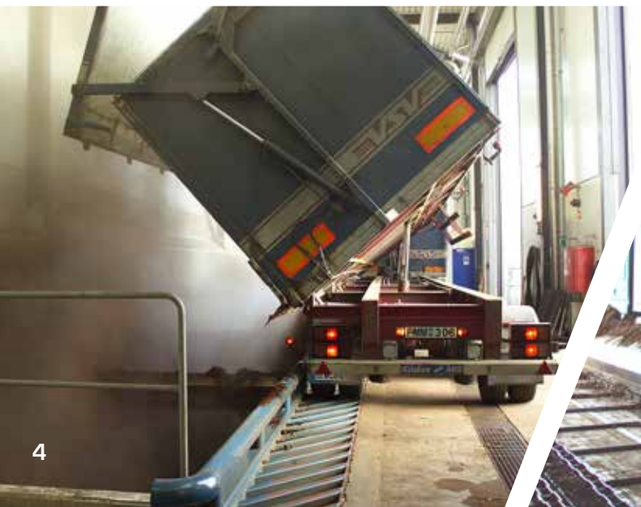
SAFETY FIRST

Drive-through rear unloading and rear tipping facilities are provided with safety covers. Typically the unloading is controlled from the monitoring room, not allowing human presence in the actual unloading point.

A typical fuel handling system from BMH with two optional receiving solutions.

Scan QR code to see a reference plant.

The fastest way for unloading is side tipping.



An overdrive reclaimer table is a combination of a fuel storage and a receiving station.

Ship receiving allows for transporting large volumes from a long distance at an affordable price.

Nokianvirran Energia Oy provides district heating to the city of Nokia and steam for industry. BFB boiler's total heat power is 68 MW_{th}. The boiler uses biofuels such as forest residues, peat, bark and wood chips. BMH delivery is a complete fuel handling system including receiving, fuel quality control, storage systems, conveyors and all auxiliary equipment (2016).

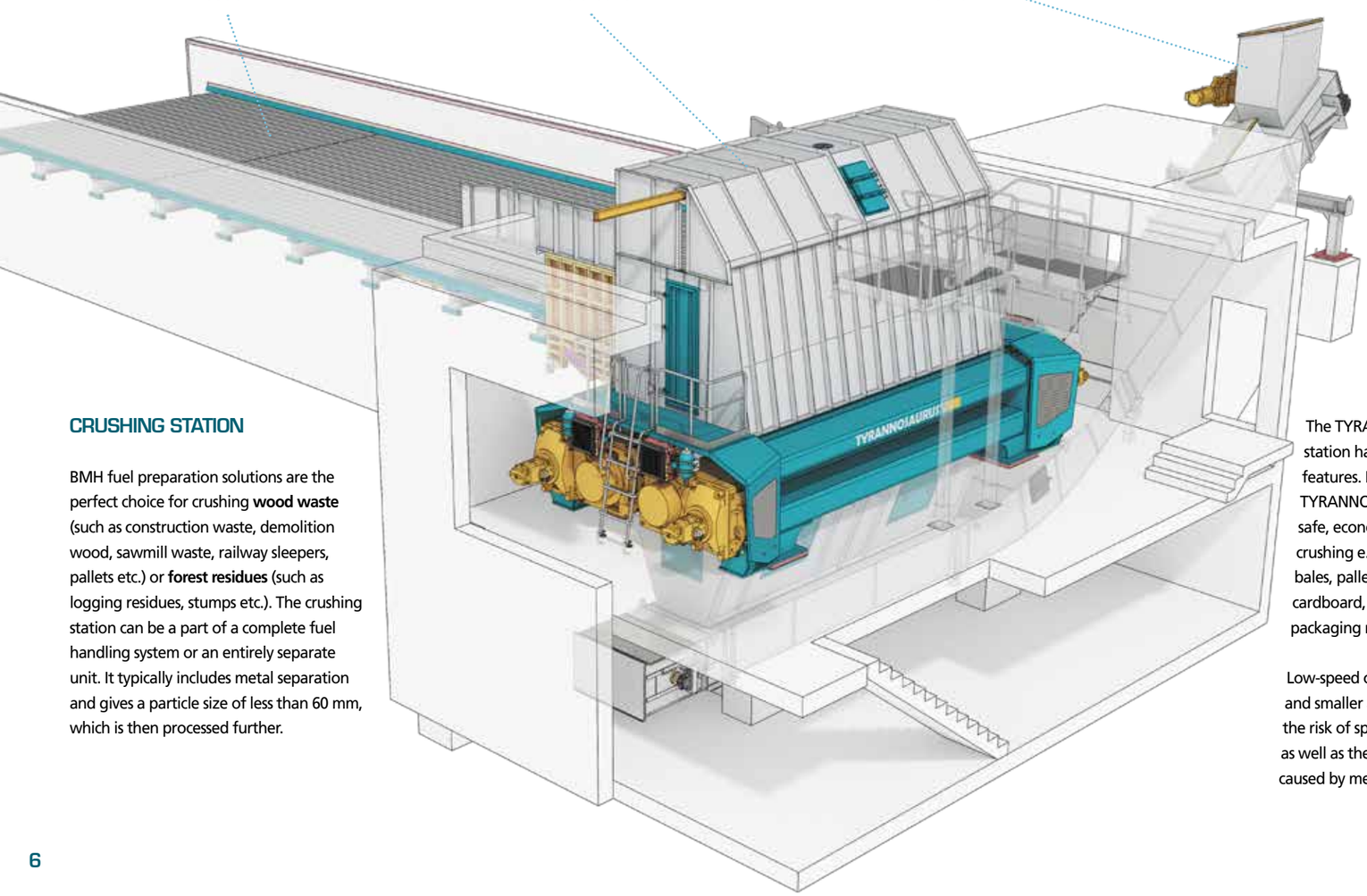
BMH delivery to Göteborg Energi AB is a complete fuel handling system for processing solid biomass. It consists of a receiving pocket for side-tipping trucks, fuel quality control with magnetic separation of metal contaminants and screening/crushing of oversized materials, two 5 000 m³ fuel storage silos with TYRANNOSAURUS® Rotating Screw Reclaimer and boiler conveyor systems. The capacities are 700 m³ per hour to the silos and 300 m³ per hour to the boiler (2004).

Fort St. James biomass plant in British Columbia consumes annually 400 000 m³ of biomass and produces 40 MW of electricity. The main fuels used are wood residues from local sawmills and logging operation as well as roadside debris. BMH delivery consists of two truck receiving units (700 m³/h), fuel quality control (700 m³/h) with oversize crusher and three storage silos, 6 500 m³ each (2013).

Etelä-Savon Energia's Pursiala power plant in Mikkeli supplies district heating and electricity to the nearby area. BMH delivery is a complete fuel handling system including truck receiving stations, fuel quality control station including ferrous separation, screening and oversize crushing, as well as a storage system, conveyors and auxiliary equipment. The fuel receiving capacity is 1 000 m³ per hour, fuel storage volume 7500 m³ with TYRANNOSAURUS® Rotating Screw Reclaimer and boiler's feeding capacity up to 600 m³ per hour (2017).

PREPARATION SOLUTIONS – THE FIRST STEP TO MAKING PREMIUM FUEL

Reliable and efficient fuel preparation is the first stage in making premium fuel. When ready fuel is not available or it is the customers' preference to prepare their own fuel, we can deliver compact fuel preparation systems.



CRUSHING STATION

BMH fuel preparation solutions are the perfect choice for crushing **wood waste** (such as construction waste, demolition wood, sawmill waste, railway sleepers, pallets etc.) or **forest residues** (such as logging residues, stumps etc.). The crushing station can be a part of a complete fuel handling system or an entirely separate unit. It typically includes metal separation and gives a particle size of less than 60 mm, which is then processed further.

The TYRANNOSAURUS® crushing station has several user-friendly features. Its core is the low-speed TYRANNOSAURUS® BioCrusher, a safe, economical and efficient way for crushing e.g. wood-based residues, bales, pallets or stumps as well as cardboard, paper rolls and other packaging material.

Low-speed crushing means less dusting and smaller amount of fines. It decreases the risk of sparks, fire and dust explosions as well as the likelihood to face damages caused by metal and stones. The TYRANNOSAURUS® BioCrusher produces even capacity with high availability and low operating costs.

The heavy-duty TYRANNOSAURUS® BioCrusher has a spacious in-feed chute located above the crusher to receive material either from a preceding conveyor or directly from a vehicle, even a whole truckload at a time. The rotor is armed with teeth, made of special steel, that can be turned and are easy to change. The rotor's running is reversible and crushing takes place in both directions.

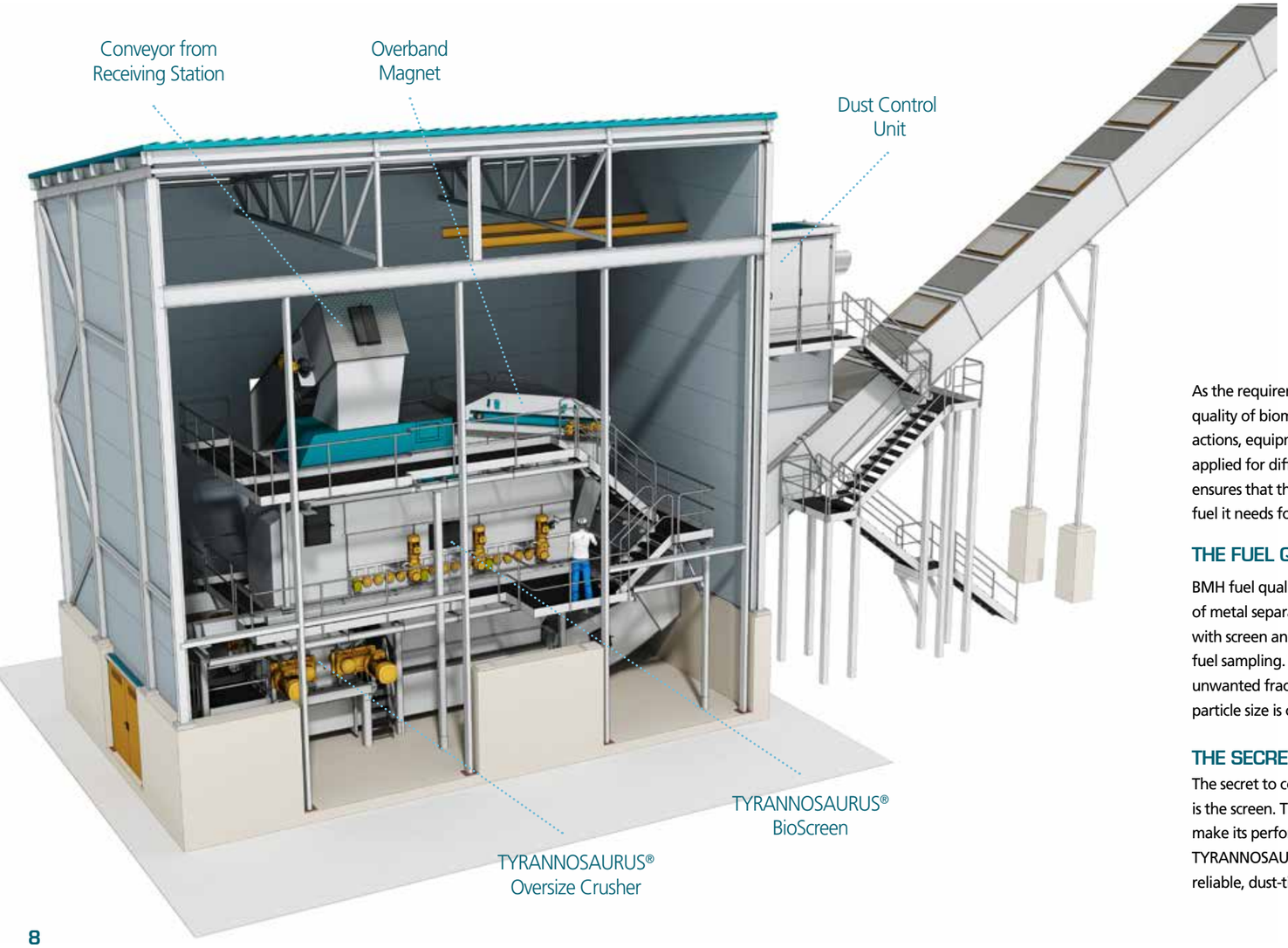
Päijät-Hämeen Jätehuolto Oy has a two-line plant in Lahti that produces high quality SRF (Solid Recovered Fuel) from wood-based waste and separately collected energy waste that contains mainly plastic, cardboard and paper. The wood waste processing line has a two-rotor low-speed TYRANNOSAURUS® BioCrusher. The process includes metal separation and it tolerates well impurities, such as stones (2011).

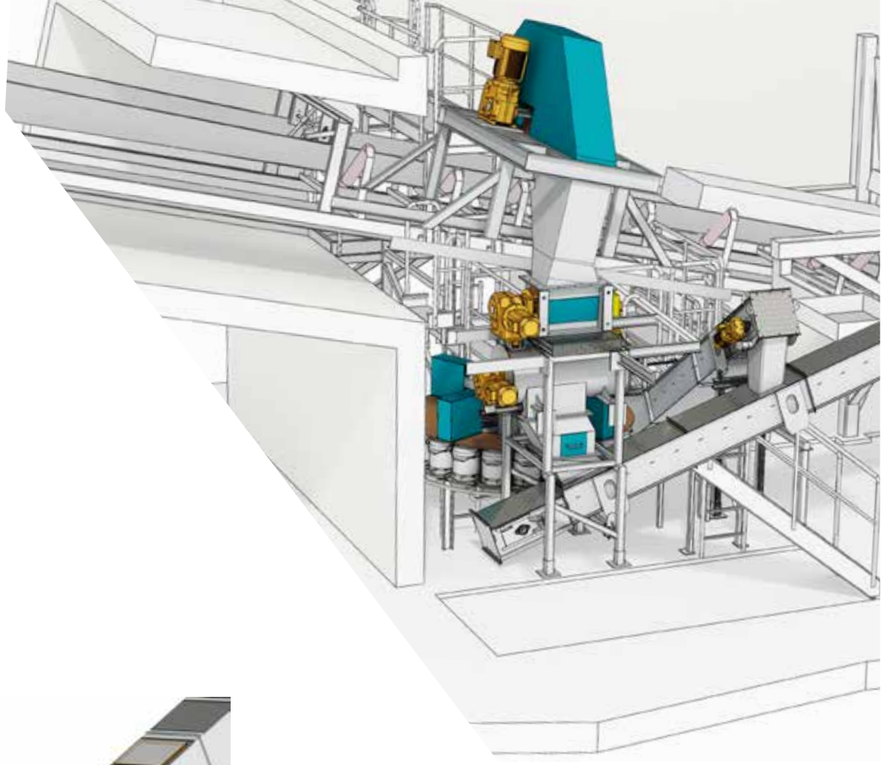
BMH delivery to Mälarenergi AB, Unit 7 is a complete fuel handling system for processing waste wood. It consists of a receiving pocket for wheel loaders as well as side-tipping and back-tipping trucks, fuel quality control with magnetic separation of metal contaminants and screening/crushing of oversized materials, a 6 000 m³ fuel storage silo with TYRANNOSAURUS® Rotating Screw Reclaimer and a boiler conveying system. The capacities are 700 m³ per hour to the silo and 350 m³ per hour to the boiler (2020).

UTE Biomasa Curtis's crushing plant for forest based logging waste in Galicia, Spain is the largest of its kind making 550 000 tons of fuel per year for a 50 MW_e power plant. BMH delivery includes seven different types of TYRANNOSAURUS® crushers, out of which three are the world's largest low-speed crushers in receiving and one smaller as an auxiliary unit. The delivery also includes a fuel quality control station and a 20 000 m³ A-frame storage system with TYRANNOSAURUS® Traversing Screw Reclaimer. In addition, the plant has a separate automatic sampling system for controlling the received forest bundles' quality (2019).

FUEL QUALITY CONTROL SOLUTIONS – THE SECRET TO OPTIMISED FUEL

BMH fuel quality control equipment constitute a compact, integrated and closed system. The purpose of the system is to improve and update the fuel quality as well as to optimise the particle size suitable for each particular boiler.





At predefined intervals, the sampler takes whole cross-sections of material from the conveyor. The samples go through the crusher and end up in the mixing tank. This is where the final sample is taken. Finally the remaining fuel is returned into the system.

As the requirements of the boiler and the quality of biomass vary a great deal, different actions, equipment and layouts have to be applied for different clients. Our experience ensures that the boiler will get exactly the fuel it needs for optimal results.

THE FUEL QUALITY CONTROL UNIT

BMH fuel quality control unit typically consists of metal separation, particle size control with screen and oversize crusher as well as fuel sampling. This equipment ensures that unwanted fractions are removed and the particle size is optimised.

THE SECRET OF QUALITY FUEL

The secret to controlling the fuel quality is the screen. The specially designed discs make its performance exceptionally good. TYRANNOSAURUS® BioScreen is a compact, reliable, dust-tight, cost-effective and robust piece of equipment, which cleans itself and has low operating costs. The screen is also designed to ensure that the fuel is correctly processed and does not clog or create an arch. Some of the latest BMH innovations are the disc screens developed for demanding fuels such as demolition wood and SRF/RDF.

CORRECT SAMPLE, CORRECT PRICE

Reliable sample taking is the basis for fulfilling the requirements laid by authorities. It also sets the correct price for the fuel. Manual sampling typically creates a measuring error of 5-10 %. BMH has developed a standardised, automatic sample taking system. It gives exact information, precludes contamination, homogenises the load, and gives the right price to the fuel. Weighing can be integrated with the conveyors around the sampling station.

The CEASA crushing plant for forest based logging waste in Navia, Spain is equipped with a TYRANNOSAURUS® BioCrusher. Advanced fuel quality control is executed with air classification screening, where the aim is to separate sand, stones (also flat ones), metals and oversize particles, which will then be handled by oversize crusher. The plant produces excellent quality fuel without harmful inerts and achieves correct particle size for the power boiler (2015).

BMH delivery to Jönköping Energi AB is a complete fuel handling system for processing solid biofuel such as wood chips, forest residues and bark. It consists of a receiving pocket for wheel loaders as well as side-tipping and back-tipping trucks, fuel quality control with magnetic separation of metal contaminants and screening/crushing of oversized materials, two 5 000 m³ fuel storage silos with TYRANNOSAURUS® Rotating Screw Reclaimers and boiler conveyor systems. The capacities are 700 m³ per hour to the silos and 300 m³ per hour to the boiler (2014).

Vantaan Energia is one of Finland's largest city energy companies, owned by local residents, producing electricity and district heating. Its old boiler of 120 MW_{th} ran on fossil fuels and was converted into using biofuels. BMH delivery is a complete biofuel handling system, which includes two receiving stations (capacity 1 000 m³/h), fuel quality control station, 2 x 7 500 m³ fuel storage silos, as well as feeding conveyors to boiler (2019).

Fortum's CHP plant in Czestochowa produces heat and power in a co-generation process. BMH Technology's delivery to Fortum is a biomass handling plant, a turnkey process line integrated with the power boiler of 130MW_{th}. The fuel handling system consists of a truck receiving station, a fuel quality control station, two storage silos with TYRANNOSAURUS® Rotating Screw Reclaimers, conveyors to the boiler and necessary auxiliary systems (2009).

STORAGE SOLUTIONS – WHERE EXPERIENCE COUNTS

There are several functions that a storage can have at its best. We have them all.

BMH storage solutions are the outcome of intense product development. Whether we are talking about a silo or an A-frame storage or even an outdoor storage facility for non-dusty material, even flow in and out is an important factor.

MULTIFUNCTIONAL SILO

BMH storage systems are designed with several important functions in mind. Altogether, they constitute an outstanding storage system for solid fuels.

First of all, the storage building comes in a compact layout. It requires only a small footprint, yet it has a large storage volume. Secondly, the storage is a completely closed structure, which means it creates no smell, dust or spillage. The third advantage is related to the fuel flow in and out of the storage. The silo has a first in, first out working principle, which not only secures the fuel quality but also increases safety by significantly reducing the risk of self-combustion. Fourthly comes homogenising the fuel quality. As fuel layers piling up in the storage are seldom equal in terms of general quality or moisture, it is vital to get a good mixture of all the layers. Thanks to the structure of the silo and the working principle of the rotating screw reclaimer on the bottom of it, the general quality as well as the moisture content within the fuel are balanced. Finally, the fifth advantage of the silo is providing an even and controlled material flow. The reclaiming is automated and adapted to the demand set by the following process.The structure of the storage is designed to prevent the fuel from forming an arch. This guarantees a constant material flow for the screw reclaimer.

A-frame storages are the most efficient storage systems for maintaining an even fuel quality.

The even flow of material to the different parts of the storage is essential for homogenising the fuel quality.

TYRANNOSAURUS® Screw Reclaimers are of heavy-duty construction, which guarantees a long lifetime. They are designed to reclaim material evenly from all parts of the storage to even further homogenise the quality. The screws are set with easily replaceable teeth for quick maintenance. Maintenance is facilitated by easy access to service points, and automatic lubrication takes place through a central lubrication unit. The screws have specially furnished linings and are made of materials matching the fuel characteristics.

POLAND

Fortum's CHP plant in Zabrze is a perfect example of synergy between waste handling and combined power and heat generation. It is the biggest multifuel boiler in Poland and able to combust up to 250 000 tons of RDF per year. BMH delivery is a coal and RDF handling systems that consist of unloading stations, fuel quality control system for oversize and fine material as well as ferrous and non-ferrous metals, a 7500 m^3 storage silo for RDF and conveyors to boiler. Unloading and screening capacity for RDF is 700 m^3 per hour. Feeding to boiler is 350 m^3 per hour. Power of the new boiler is 220MW where 145MW will be for heat generation and 75MW for electricity (2019).

SPAIN

The GESTAMP plant in Garray Soria, Spain has a capacity of 17 MWe and uses biomass from forests. BMH delivery includes receiving, fuel quality control with air classification screening, where the aim is to separate stones (also the flat ones), metals and oversize and a 6 000m^3 A-frame storage system. The capacities are 350 m^3 per hour from receiving to storage and from there 150 m^3 per hour, to the boiler (2013).

DENMARK

BMH delivery to Ørsted, Asnæsværket is a complete fuel handling system for processing wood chips. It consists of a travelling, quay-based receiving hopper for ships, belt conveyors transporting the biomass to either open-air storage or to a 5 000 m^3 fuel silo with a TYRANNOSAURUS® Rotating Screw Reclaimer via fuel quality control station. The fuel quality control station includes magnetic separation of metal contaminants and screening. The capacities are 1 000 m^3 per hour for each receiving hopper, 1 000 m^3 per hour for the fuel quality control station and 300 m^3 per hour to the boiler (2019).

POLAND

PGE is the biggest Polish energy company. With their CHP plant they provide district heating to half of the 400 000 citizens of Szczecin and sell green electricity to the national power grid.

BMH delivery is a biomass handling plant in a turnkey process line integrated with the power boiler of 180 MW_{th}. The fuel handling system consists of truck receiving stations, fuel quality control, an open-air storage for wood chips and two silos for willow and pellet integrated with a common conveying system to the fluidised bed boiler. The receiving capacity is 800 m^3 per hour and feeding to boiler 300 m^3 per hour (2011).

CONVEYING SOLUTIONS – GUARANTEED DELIVERY

Conveying is a part of the process that barely gets noticed when it works well. That is exactly the way we deliver them: reliable, durable, dust-proof and easy to maintain.

IMPORTANCE OF CONVEYING

Conveying is often considered the unintelligent part of fuel handling, where the value of fuel is not increased. However, at BMH we take it very seriously because at this stage a lot could go wrong. All joints and junctions, and obviously wear as well, could cause the material to be clogged or piled up, causing costly breaks and downtime. With BMH, this kind of issues are not an issue.

FUEL KNOW-HOW

The key to designing a fuel handling system that operates uninterrupted is to know different fuels and environmental conditions thoroughly. That will partly determine whether to apply belt, chain, tubular belt or screw conveyors or – if space is at a premium – elevators for the purpose of conveying material. The idea is to minimise electricity consumption and maintenance costs and to maximise the lifetime of the equipment. This is achieved by 'counting backwards', i.e. starting with the boiler's requirements. This in turn determines the needed capacity and speed of the conveyors, while taking into account the properties of the fuel.

BOILER FEEDING SOLUTIONS – TO ANY TYPE OF BOILER

Every moment the boiler is not doing what it should costs a lot of money. Therefore the power plant needs to be particularly careful in choosing the supplier of the fuel handling system.

BMH Technology has delivered internal fuel feeding solutions to all major boiler types. In addition to providing original systems, we have also modernised many existing systems.

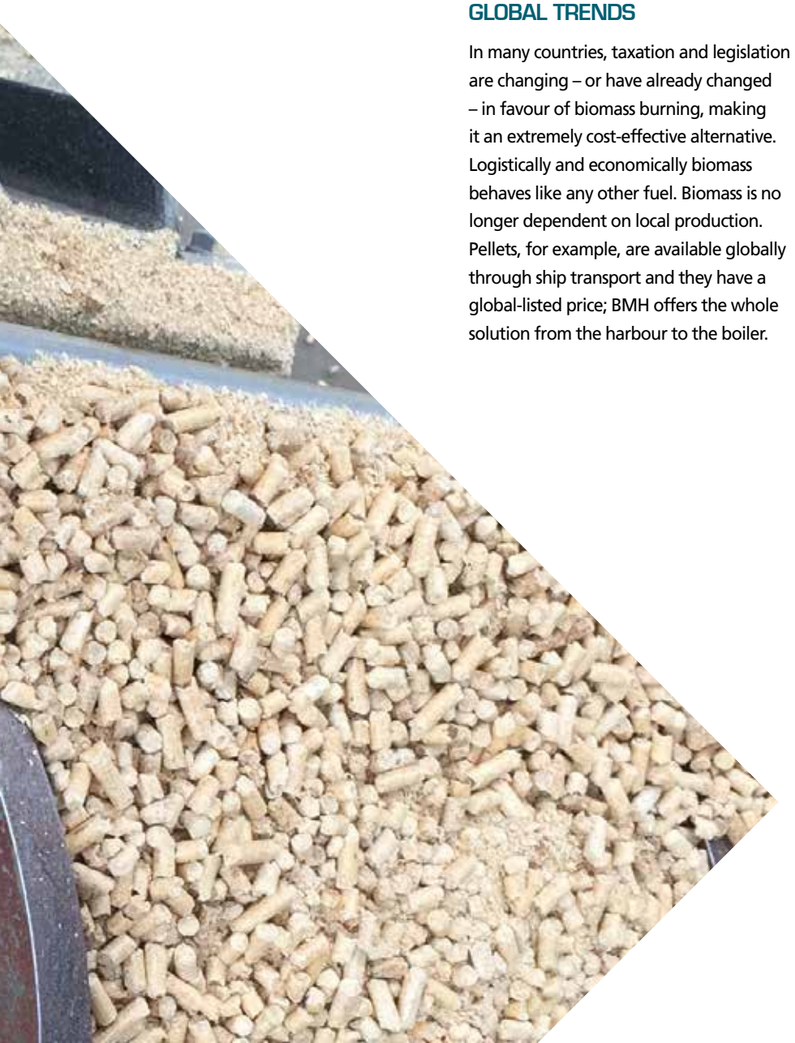
WHERE THERE ARE NO EXCUSES

What the boiler wants, the boiler gets. This is the place where no weakness or failure in the equipment is acceptable. Everything just has to work. Any chance of fuel blockage must be excluded. The BMH fuel handling solution ensures this state of affairs starting from the very beginning, the receiving station, but here we apply yet other methods of being absolutely certain. Even feeding is achieved by the correctly designed and manufactured buffer bins and feeding screws. The level measuring technology is absolutely accurate and highly automated, subordinated to the boiler automation.

Scan QR code to see a reference plant.

BIOFLAME® - PULVERISED BIOMASS TO BOILER

The fact is that environmental regulations are getting tighter, energy prices are increasing and fossil fuel resources are diminishing. Compared to coal and oil, burning biomass and SRF/RDF offers a serious opportunity to considerably reduce greenhouse gas emissions and our carbon footprint.



TAKE FINANCIAL ADVANTAGE OF GLOBAL TRENDS

In many countries, taxation and legislation are changing – or have already changed – in favour of biomass burning, making it an extremely cost-effective alternative. Logistically and economically biomass behaves like any other fuel. Biomass is no longer dependent on local production. Pellets, for example, are available globally through ship transport and they have a global-listed price; BMH offers the whole solution from the harbour to the boiler.

COMPLETE BIOMASS CO-COMBUSTION SOLUTION FROM ONE SUPPLIER

For coal-fired power plants and oil-heated district heating plants, BMH's comprehensive turnkey biomass co-combustion solution includes:

- biomass and SRF/RDF receiving systems for trucks, trains and ships
- storage systems
- dosing and boiler feeding systems
- process know-how that includes safety and dust-control equipment.

SAFE AND EFFICIENT HANDLING

BMH has vast know-how and expertise with receiving, storing and handling systems for different kinds of biomass, including dry raw materials such as pellets, briquets and wood residues from the furniture industry. We provide receiving stations for various modes of road and rail transport together with efficient ship-receiving solutions.

Also we offer a full range of storage facilities from boiler buffer pockets to high-volume automated harbour storage facilities for over 100 000 m³ of fuel. Safety issues are extremely important to consider when handling dry fuels. Safe handling of biomass and SRF/RDF is a priority for BMH and the right choice of equipment plays a vital role in ensuring safety. BMH's equipment are designed to conform to the ATEX directive, and feature the most effective dust control, suppressing and fire extinguishing systems.

Fortum Power and Heat Oy produces district heating to city of Espoo. Fortum changed two existing oil-fired boilers to use wood pellets in Kivenlahti, Espoo. BMH's Bioflame® solution consists of wood pellet receiving, fuel quality control, storage systems and feeding conveyor to the pulverised system. The plant has a 250 m³ per hour receiving capacity (2015).

BMH delivery to Hofor, Amagerværket is a complete fuel handling system for processing wood pellets. It consists of a travelling, quay-based receiving hopper for ships, a disc screen and belt magnet to secure the fuel quality and belt conveyors transporting the wood pellets to a 20 000 m³ fuel silo with chain reclaimers on the bottom of the silo. The capacities are 1 000 m³ per hour to silo and 1 000 m³ per hour to the boiler (2003).

Drax Power station was originally a huge coal-fired power station in New Yorkshire Selby, England. Several of the plant's boilers have been converted into using pellets. BMH delivery includes a road receiving system with a drive through truck receiving station that has the capability to receive several trucks per hour. Four 3 200 m³ storage silos with TYRANNOSAURUS® Rotating Screw Reclaimers are also included in the delivery. The receiving capacity for pellets is 550 m³ per hour and 750 m³ for silo reclaiming (2009).

BMH TECHNOLOGY

FUELLING A CLEANER FUTURE

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