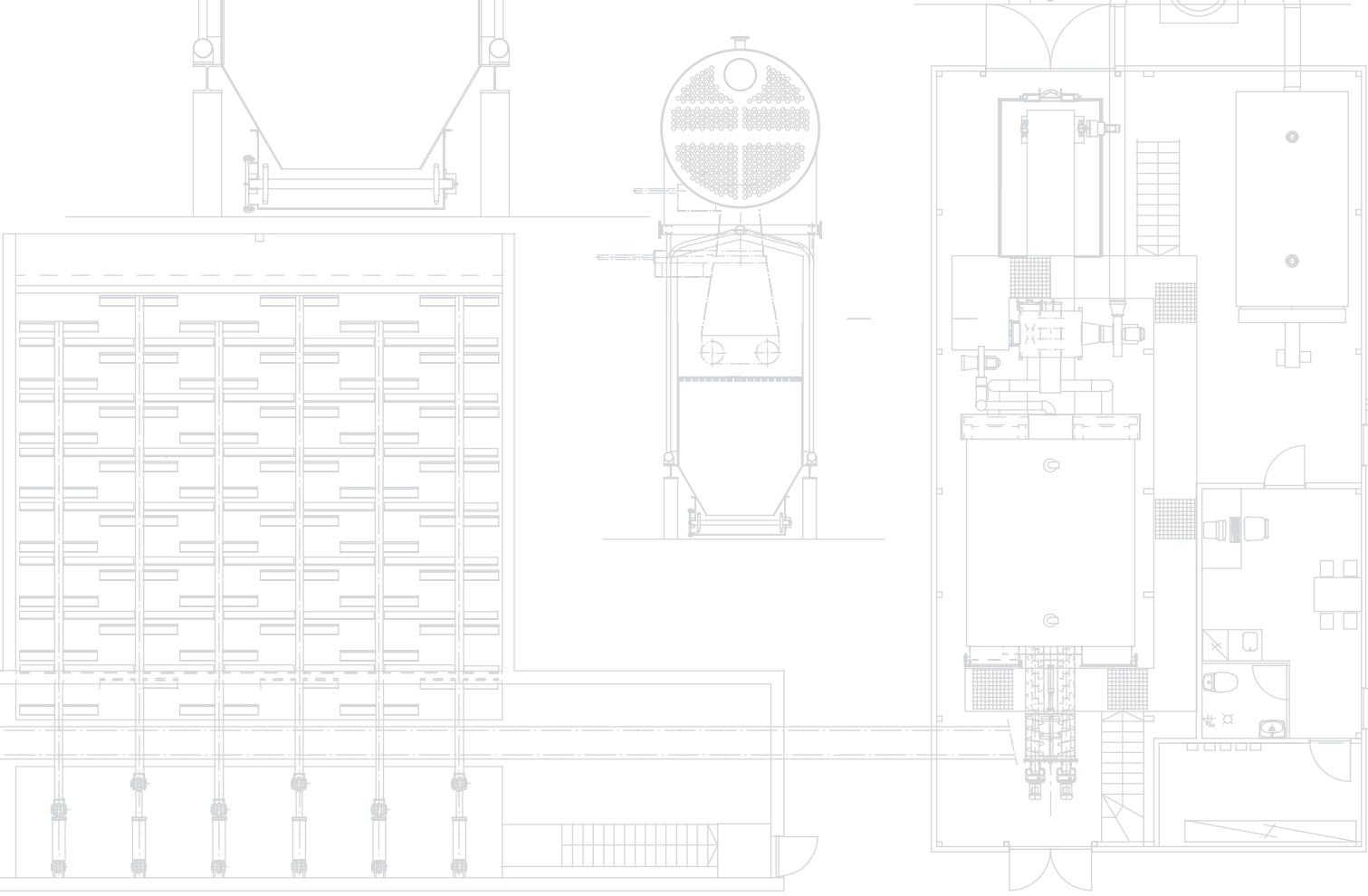
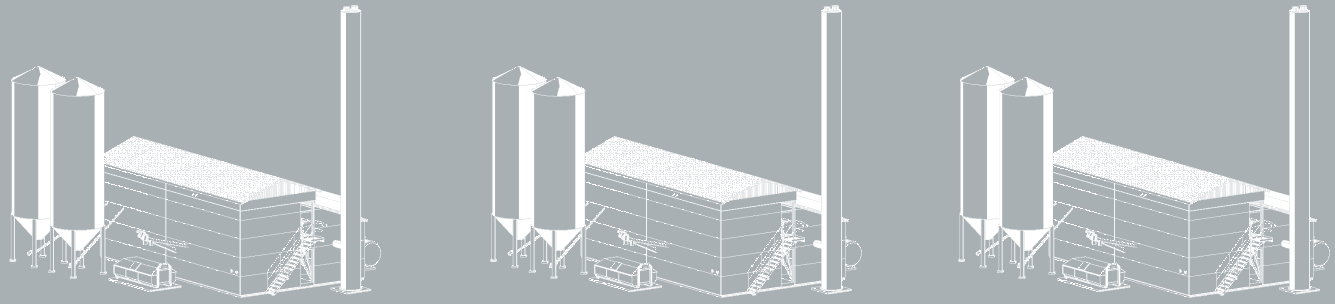


HLR BIOSOLUTION



VAPOR
BOILERS SINCE 1959



HLR BIOSOLUTION FOR EFFICIENT ENERGY PRODUCTION

Sustainable growth requires an increased use of renewable energy sources. The usage of CO₂ neutral combustibles contributes to combating climate change and also provides wide-ranging financial benefits. Vapor Finland's HRL boiler plant series is designed to provide long-term, energy efficient and ecological solutions. With our boilers, the final user can concentrate on the production of clean energy. Vapor relies on leading edge know-how, and our HRL plants are manufactured in Finland in the company's own facility, which has fifty years of experience in boiler and pressure vessel manufacturing. Our leading principle is to fulfil our promises and offer our customer the most advanced solutions at the market.

The HRL bioboiler plants of Vapor Finland in the efficiency range of 0,5-10 MW are excellent solutions for steam and heat production. HRL boiler plants are based on a patented grate solution. We offer comprehensive solutions, including design, manufacture, installation, commissioning and maintenance as required by the customer, covering the whole boiler plant process:

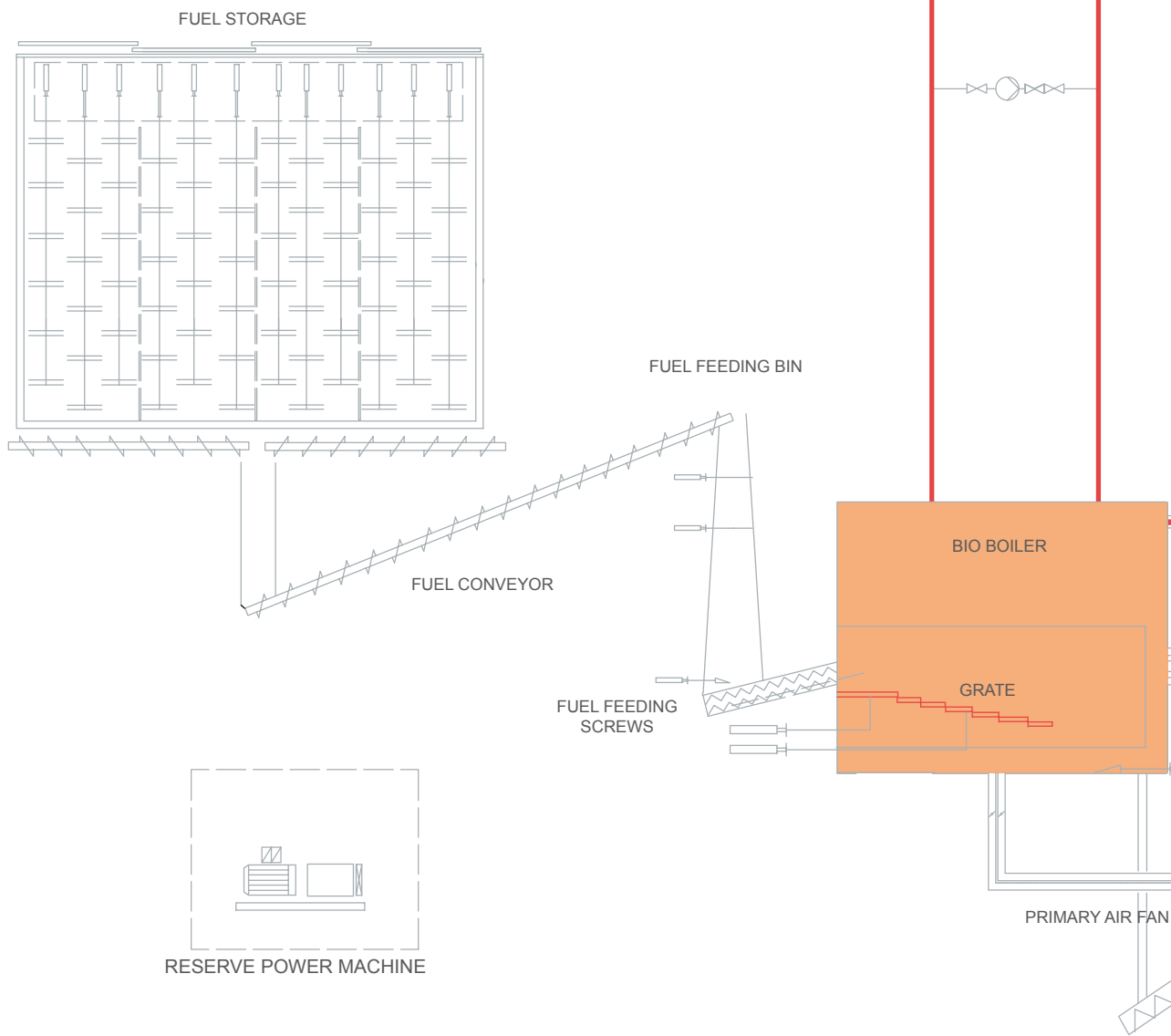
- Fuel reception and handling
- Fuel feeding equipment
- Combustion air and flue gas equipment
- District heating/steam system
- Boiler and convection unit
- Ash discharge equipment
- Flue gas treatment
- Electrification, instrumentation and automation
- Reserve power machine
- Boiler house construction including HVAC equipment
- Erection, commissioning and training

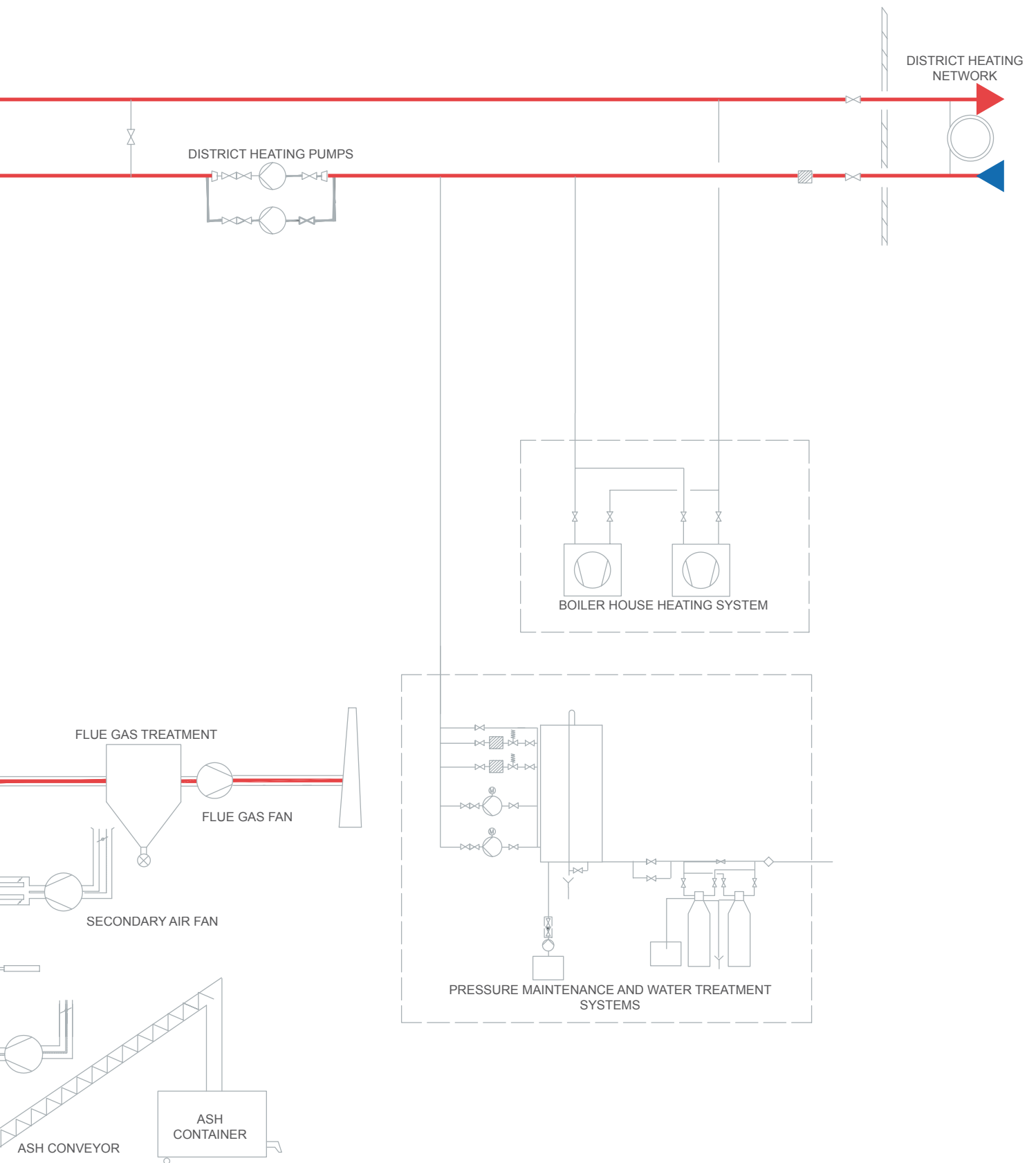
The HRL boiler plant process has been carefully designed and measured. The plants are highly automated, and thanks to this, the process is easy-to-use, highly controlled and safe. Our cooperation network comprises the leading component and system suppliers of the energy industry. Hence Vapor's plant deliveries incorporate the leading know-how of the sector, also as regards auxiliary devices.

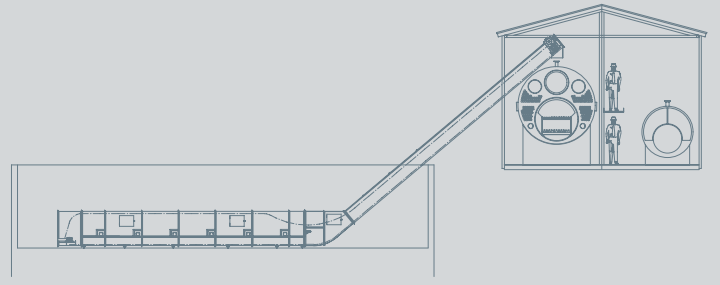
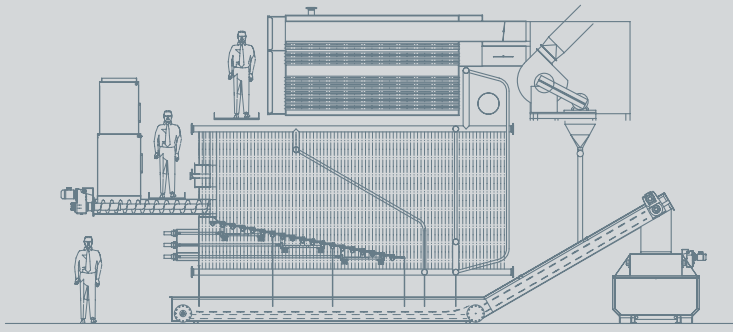


ADVANCED PLANT TECHNOLOGY

Suitable fuels for HRL bioboiler plants include woodchips, sod peat, wood and peat pellets, briquettes, bark and sawdust. The fuel is typically received and stored in a push feeder storage, from which conveyors move it to the feeding bin through screening and the crusher, if necessary. From the feeding bin, feeding screws take the fuel into a mechanical grate. An extremely high efficiency of combustion is achieved by well controlled air injection. Primary air is divided by means of multiple sections below the grate. The fuel bed burns evenly in the mechanical grate, as the movement of the grate can be adjusted to the required load range. Thanks to these features, combustion in the HR-grate is efficient and the share of unburned fuel very low. Vapor's HLR grate combustion is a reliable and functional technology.







QUALITY SOLUTIONS FOR ALL OUTPUT RANGES

In the output range of 0.5-3.5 MW, bioboiler plants are built with an integrated diagonal grate in the combustion chamber of the pressure vessel. This compact structure usually yields an efficiency exceeding 90 %. The round pressure vessel can be fitted to the pressure range of 6-16 bars, and the structure also enables the production of steam.

In the output range of 3.5-10 MW, the bioboiler plants utilize water tube boiler construction, where the grate is located in a water tube furnace. After the water tube boiler, the flue gases go through a flue gas convection unit. This solution enables the usage of high pressures. Both of these constructions have a low emission level, thanks to the efficient combustion and controlled air injection. The humidity of the combustible can vary between 8 and 55 %.

The usability of HLR plants is even higher than 95 %. Due to the large tubes the boilers do not soot easily, and the soot blowing is easy to do. The process does not have to be interrupted during the soot blowing. The high industrial standard of the components leads to a long service life, and the need for maintenance is low. The boilers have been designed for a service life of 25 years. All plants are designed to be controlled periodically, and all our plants come with a remote control option.

HLR bioboiler plants are delivered as removable block-constructed factory modules or, alternatively, the plant can be constructed on site. Vapor Finland's HRL plants are supplied as turnkey deliveries, enabling the customer to concentrate on energy generation with leading technology.





VAPOR

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