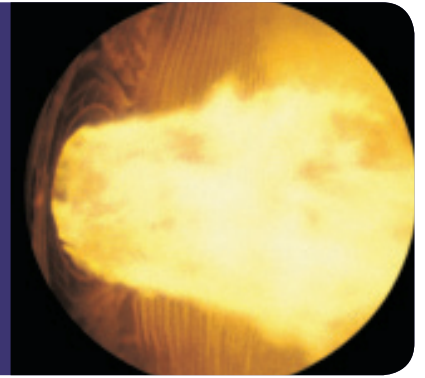


# Performance Services Combustion technologies

For lower emissions and costs



Our customized combustion solutions and products are for different kinds of combustion and fuels from pulverized hard coal, peat and biomass to oil and gas fired boilers. Our advanced low-NO<sub>x</sub> technology reduces emissions effectively and helps to lower the investments and maintenance costs.

## Our products and services include:

- Low-NO<sub>x</sub> system modifications for pulverized hard coal, peat, biomass and oil/gas fired boilers.
- Biomass co-firing solutions for pulverized fired boilers.
- Design, project and site operations, commissioning, operation and maintenance, warranty inspections and repairs and after sales services.
- Combustion consultancy such as boiler performance analyses, combustion process optimization and operation load range improvements.
- Feasibility studies and tailor-made solutions.
- Analyses and recommendations on suitability of new fuels.
- Problem mitigation and trouble shooting e.g. for: start-up and ignition systems and other auxiliary equipment, slagging, fouling and high temperature corrosion and combustion system and burner up-grades
- Solutions for wall and tangential firing system including over fire air system
- Computational modeling of combustion (CFD)
- Patented & licensed technology and in-house expertise
- Long-term co-operation with Japanese Babcock-Hitachi

## Key benefits:

- Excellent NO<sub>x</sub> performance with following features: rapid ignition, stable flame, high combustion efficiency, wide turn-down ratio, avoiding high temperature corrosion and slagging in furnace, controlling unburnt carbon (UBC) in fly ash
- Low investment costs
- Short implementation period
- Reduced maintenance costs
- Simplified concept and construction
- Minimum modification for auxiliary equipment
- Reliable and safe operation

Our references cover more than 600 low-NO<sub>x</sub>

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## Customer's voice

**Jan Kuilman**, Nuon Power, Heat and Services B.V.,  
Amsterdam, Holland

*"Fortum has modified low-NO<sub>x</sub> burners at Hemweg power plant unit 8 boiler in 2002. After modification the 650 MW boiler has been operated with NO<sub>x</sub> level below 300 mg/m<sup>3</sup>n. The quality of the executed modernization is good".*

**Matti Kivelä**, Lahti Energia Oy, Finland

*"Fortum has performed our Kymijärvi CHP power plant low-NO<sub>x</sub> modification of coal fired boiler of 360 MW in 2007. After installation of new low-NO<sub>x</sub> burners the boiler has been operated with NO<sub>x</sub> levels below 350 mg/m<sup>3</sup>n. The work has been implemented on very good technical level and according to time schedule. We recommend Fortum as a professional and reliable supplier of boiler combustion".*



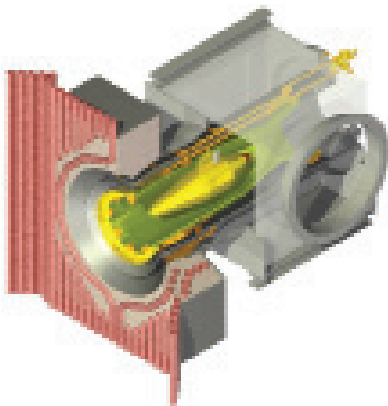
### Low-NO<sub>x</sub> burners for peat and biomasses

NR-LE burner is developed for peat and biomass combustion for the purpose of reducing the NO<sub>x</sub> emission and minimum load. The NR-LE burner is based on NR burner technology. The NR-LE burner has been developed in co-operation with Babcock-Hitachi and Fortum.



### Low-NO<sub>x</sub> burner for wall firing

NR burner invented and further developed by Babcock-Hitachi in Japan. The NO<sub>x</sub> reduction mechanism of the NR burner is based on high flame temperatures. The high temperature and stable flame are achieved by a Flame Stabilizing Ring.



### Low-NO<sub>x</sub> burner for tangential firing

A unique low-NO<sub>x</sub> technology of rapid ignition flame for corner and tangentially fired boilers. Ultra-stable flame makes it possible to reduce the boiler minimum load. The technology is patented by Fortum.