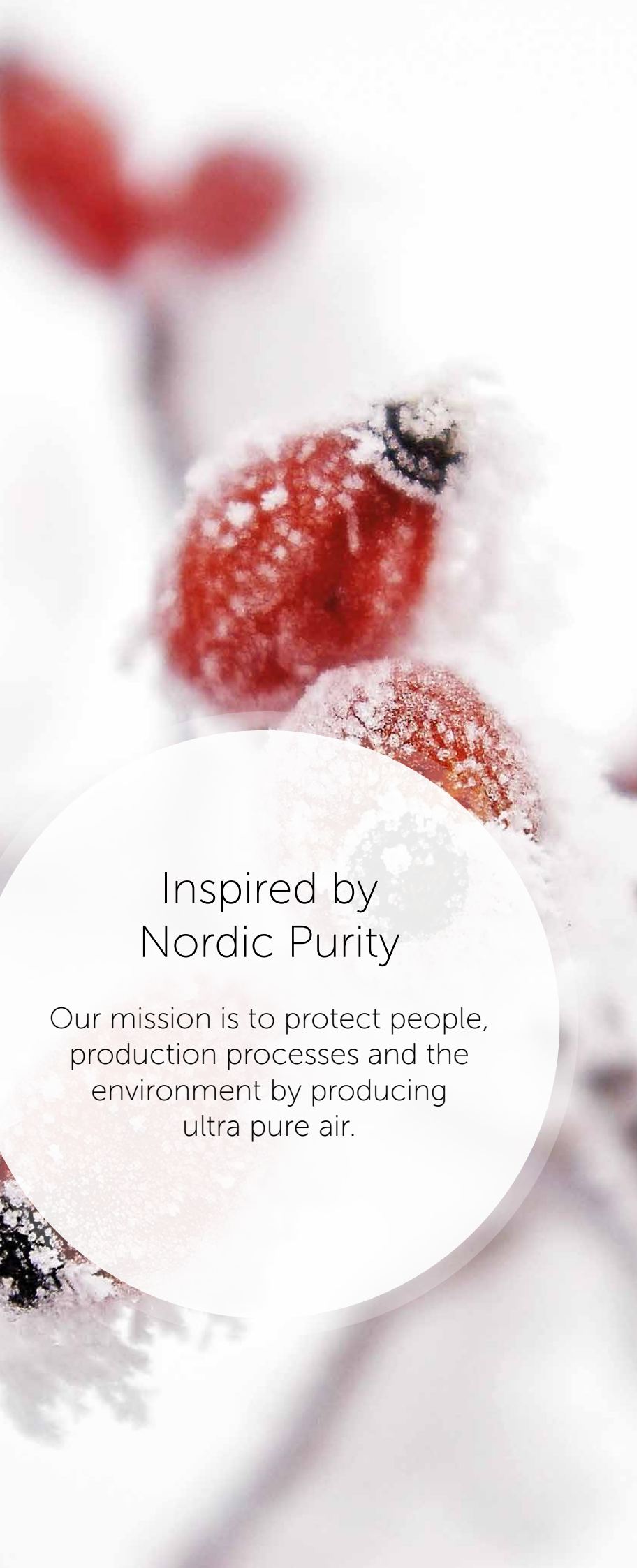


Smart & efficient VOC ABATEMENT with Catalytic Oxidation

Genano solutions



Inspired by Nordic Purity

Our mission is to protect people, production processes and the environment by producing ultra pure air.

Subsidiary of

Genano Group

***

Company founded in

1999

***

>5000
air purifiers manufactured

***

Operations in

30+
countries

***

>50
distributors worldwide

***

OWN
patented Genano-technology

***

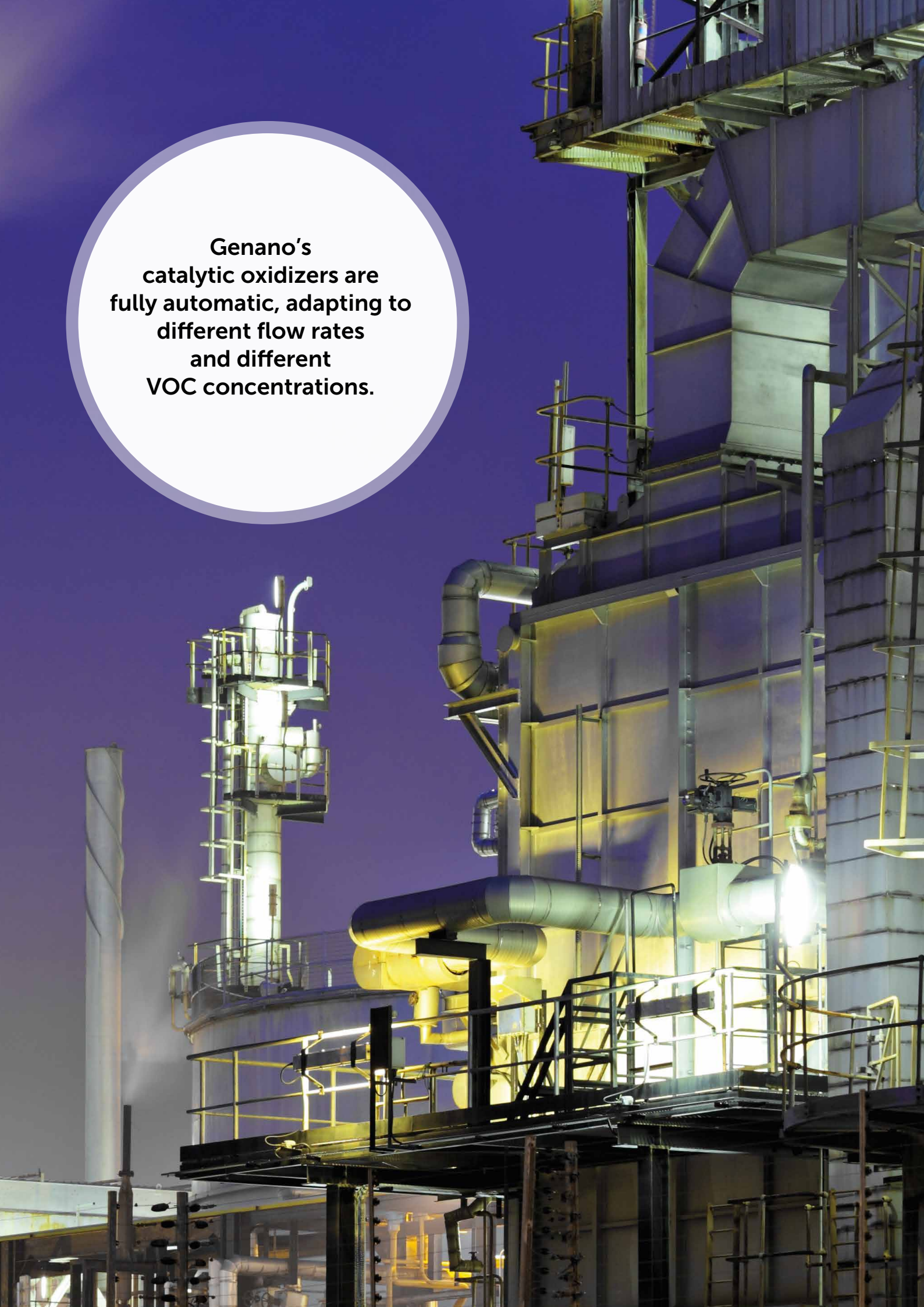
> 50
employees globally



VOC emissions are significant greenhouse gases

Industrial gas waste is a serious problem to the environment and people in many manufacturing processes, such as rubber, pharmaceutical and chemical products and many other industries.

Volatile organic compounds (VOCs) are chemicals that constitute one of the primary elements or air pollution. VOC emissions are significant greenhouse gases, and therefore regulated by national and European directives. VOC's are a concern, as they participate in atmospheric photochemical reactions that contribute to ozone formation and therefore are strictly regulated.



Genano's
catalytic oxidizers are
fully automatic, adapting to
different flow rates
and different
VOC concentrations.

Smart solution for emissions abatement

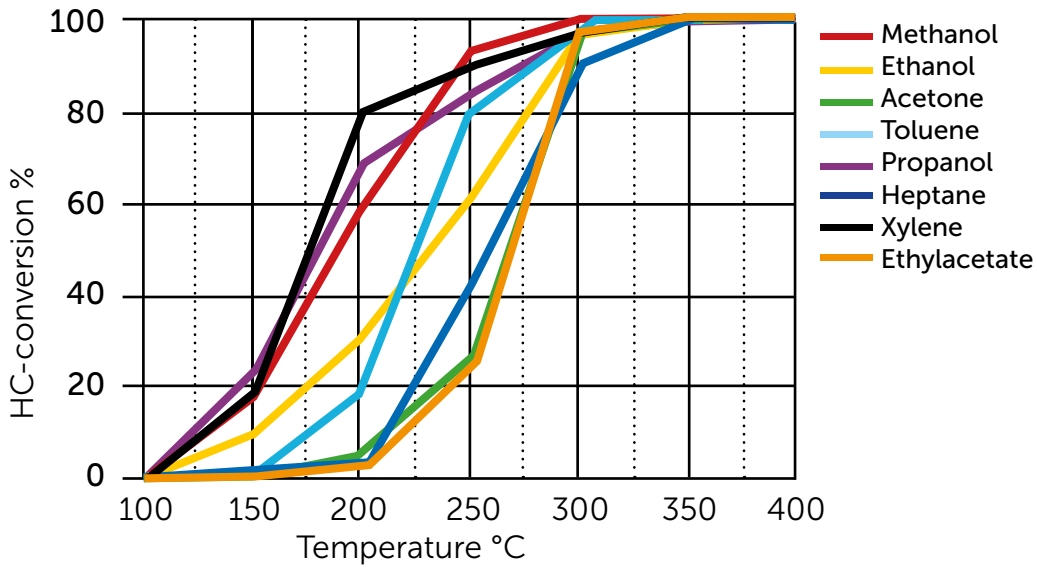
Regenerative catalytic oxidizer

Genano VOC series is a compact, state-of-the-art catalytic VOC and odor abatement system for energy efficient control of VOC waste gases.

Genano is using catalytic oxidation for oxidizing harmful VOC's. Therefore, the operation temperature is about 300°C – almost 500°C lower than in thermal oxidation! Due to high operation temperature, the thermal oxidation process generates NO_x as a by-product – which is a toxic greenhouse gas. Due to its particular toxicity, this gas limit will be highly reduced by local authorities after a catalytic oxidation the system only generates vapour (H_2O) and carbon dioxide (CO_2). Outcoming air is clean, and can be exhausted directly to outside air. The result with a Genano technology is a cleaner exhaust air with lower energy costs.

The lower operation temperature also causes significantly less thermal stress to the constructions of the oxidizer, which directly increase the lifecycle of the oxidizer while decreasing the maintenance costs.

Hydrocarbons conversion at low temperatures



Oxidizer

The oxidizer contains two or three parallel chambers operating in a regenerative mode. Contaminated air passes through the first chamber which is hot from previous operation. The air temperature is raised to minimum 300°C, cooling the mass within the chamber and commencing the decomposition reactions of the VOC within the catalyst.

The hot air stream passes through the second bed of catalyst and heat exchange mass, being cooled and heating the mass in the process.

The duty of the beds is rotated as the temperature in the oxidizing bed falls. If the VOC concentration of incoming air is not high enough, it does not produce enough heat to keep the temperature above 300°C. Then the heaters, located in the middle chamber, will heat the air stream further.

Then finally the air stream passes through the induced draught fan to the chimney.



Additional heating energy

During the start-up of the VOC oxidizer, and also in some situations where we don't reach the ATP-Auto Thermal Point, an additional heating energy is required. The heating system is operated by electricity due to its easy maintenance, and relatively small size, but can be also used by gas heating.

Control unit

The system includes a control unit, by which all necessary funcrions, as well as emergency functions of the catalytic VOC oxidizer can be controlled. The control unit is provided with all necessary inputs and outputs needed for remoting.

Valves & instrumentation

The system includes all instrumentation and electrical equipment needed in normal operations as well as in emergency situations.

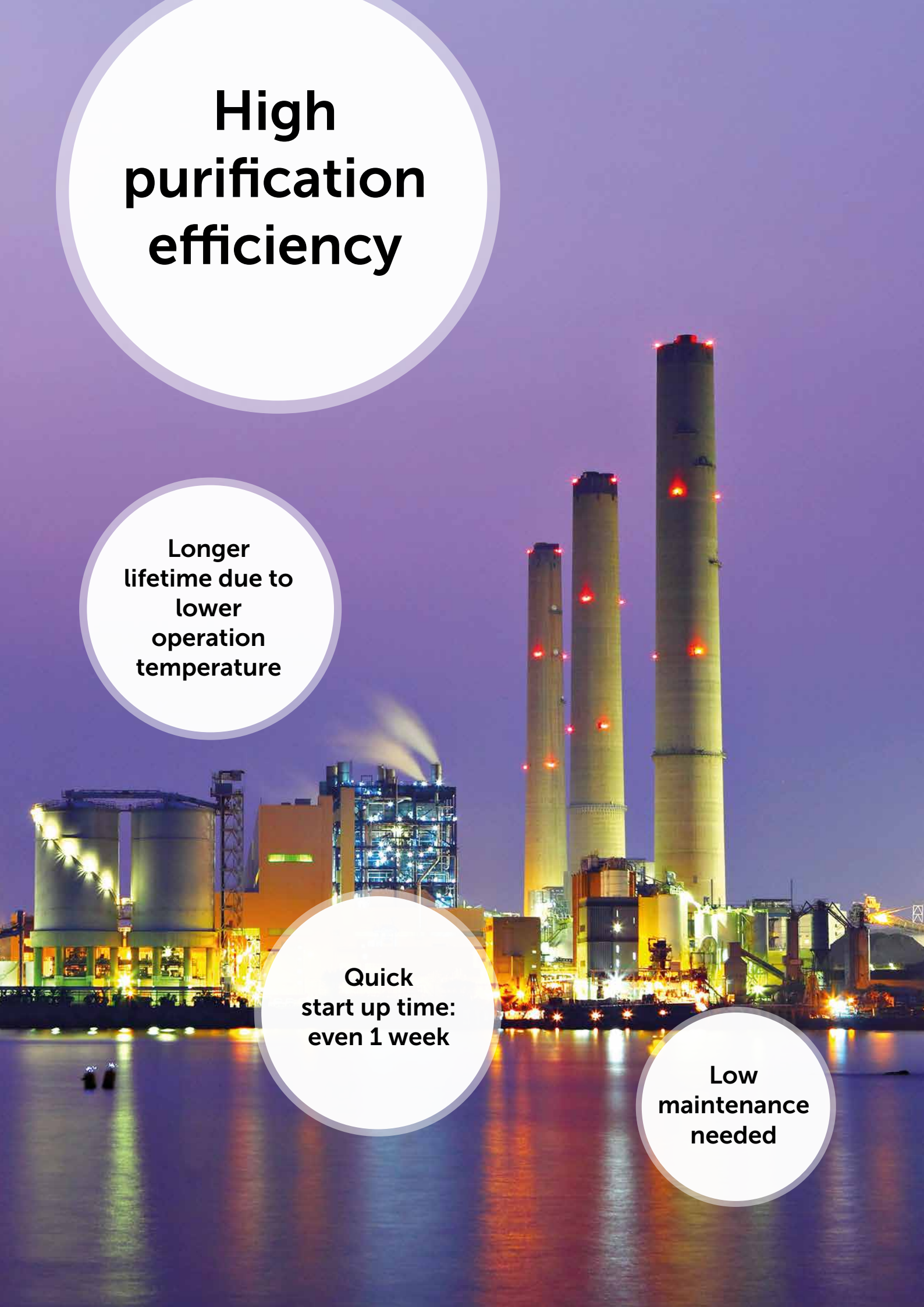




Energy consumption in RTO vs. RCO

PROCESS COMPARISON		
	RCO	RTO
Thermal efficiency	**94,0 %**	94,0 %
Incineration temperature	**300 °C**	800 °C
Autothermal point	**0,79 g/Nm³**	2,23 g/Nm³
Outlet temperature	**41,5 °C**	71,5 °C
Heating power	**17 kW**	286 kW
Heating energy	**147 MWh/a**	2 491 MWh/a

PROCESS SPECIFICATIONS	
Air flow rate	25 000 Nm³ / h
Inlet temperature	25.0 °C
Operation time	8700 h/a
VOC concentration	0,70 g/Nm³
VOC net heating value	27,0 kJ/g


High purification efficiency
Longer lifetime due to lower operation temperature
Quick start up time: even 1 week
Low maintenance needed

Genano fulfills the requirements of the EU VOC directive.

Significant benefits that guarantee short pay-back time

Significant cost savings

Catalytic oxidation functions at up to 500 °C lower temperatures than thermal oxidation, enabling lower operating costs.

No harmful by-products

Due to low operating temperature, the system does not produce harmful by-products such as carbon monoxide (CO) and nitrogen oxides (NO_x).

Fully automatic operation

The system automatically adapts to varying flow rates and VOC concentrations.

Compact size container

Catalytic oxidation requires only about one third of the physical space required for thermal oxidation installations. This enables easy transportation and installation.



Outcoming air is within the limits of EU directives, and can be exhausted directly to outside air.

Easy installation

The genano voc system is implemented as an easy external installation at the production facility and connected to the process exhaust. The waste gas is led to the voc abatement system. The voc incinerator has been designed to enable installation outdoors or inside the production plant if preferred. The needed area required is minimum and doesn't interfere with other existing installations. The container size depends on a capacity need.

Customer case samples

Case: Painting manufacturing

Background
Customer has painting process with solvent based paints.
Due to tightening legislation it was not allowed to lead
the emission to environment anymore.

Country: EU

Process data
Air flow: max 5000 Nm^3/h
Type of VOC compounds: Ethyl Acetate, Ethanol, Acetone and
others
Concentration: 1 g/Nm^3
Emission limit: 50 mgC/Nm^3

Solution
2 bed catalytic oxidiser
Capacity: 5000 Nm^3
Auto thermal operation (no extra heating energy)
Outlet emission: <50 mgC/Nm^3

Case: Iron casting

Background
Customer had a Odour and VOC emissions problem which were
caused by their iron casting process.

Country: EU

Process data
Air flow: max 25000 Nm^3/h
Type of VOC compounds: benzene, toluene, phenol, aldehydes, CO
Concentration: 600 mg/Nm^3
Emission limit: 10 mgC/Nm^3

Solution
3 bed catalytic oxidizer
Capacity: 25000 Nm^3
Significantly lower operation costs comparing to the thermal oxidizer
Outlet emission: <10 mgC/Nm^3

Our promise to you, our customer:

Trust

built through our understanding of your activities.

Expertise

equals knowledge of air impurities and of ways to remove them.

Ease

offered to our customers by our comprehensive service concept.

genano
— solutions —

Elektroniikkatie 3
90590 Oulu, Finland
www.genanosolutions.com

03/2019