



HeatMatrix
TURNS WASTE HEAT INTO PROFIT

Waste heat from flue gas
31st January 2012

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Introduction HeatMatrix Group

- HeatMatrix's mission is to increase industrial energy efficiency through waste heat recovery
- HeatMatrix develops and markets an innovative plastic high efficiency heat exchanger
- Founded in 2008, employing 5 people with broad industrial experience

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- 1 Waste Heat Potential
- 2 HeatMatrix technology
- 3 HeatMatrix® LUVO

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Energy Efficiency Double Whammy

Energy Efficiency Reduce Fuel Expenditures and Realize CO₂ Savings

Fuel Cost Saving



CO₂ Reduction

World abatement by technology

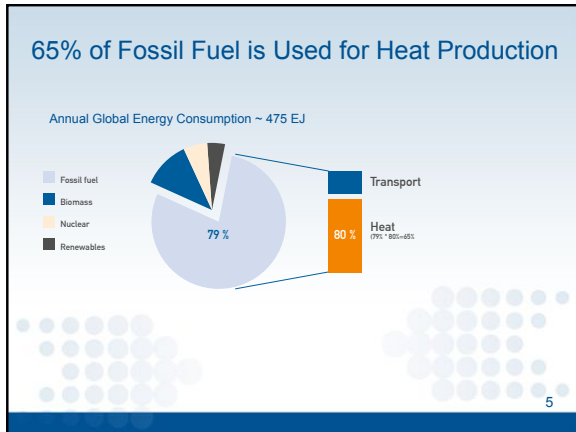
Technology	2020	2030
Renewables & biofuels	19.1%	23.1%
Nuclear	13.1%	10.1%
CCS	3.1%	16.1%

Efficiency: 65% (2020) to 57% (2030)

12M tracking

Higher Fuel and CO₂ Prices Increase the Value of Waste Heat

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1	Waste Heat Potential
2	HeatMatrix technology
3	HeatMatrix® LUVO

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Lasting Innovations are Simple

Drinking Straw (Friedman)	HeatMatrix Technology
Invention (Patent 1936)	Invention (Patent 2007)

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HeatMatrix Technology

100% counter flow honeycomb technology (patents pending) makes the plastic heat exchanger scalable for industrial use

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HeatMatrix Heatexchanger Advantages

Plastic	<ul style="list-style-type: none"> ✓ Corrosive resistant ✓ Low Weight 	<ul style="list-style-type: none"> Durable + Cost Efficient +
Design	<ul style="list-style-type: none"> ✓ Corrosive resistant (~215 m²/m³) ✓ Thin Wall ✓ Strong Honeycomb Structure ✓ 100% Counter Flow 	<ul style="list-style-type: none"> Excellent Heat Transfer Properties = Outstanding Efficiency

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HeatMatrix exchangers are cost effective

	HeatMatrix exchanger	Traditional metal exchanger	Current plastic exchanger	
Weight	10 x less	KG	KG	Lower infrastructure costs
Size	3 x lower	Large	Small	
Price	\$\$	\$\$\$	\$\$\$	Lower equipment costs

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HeatMatrix Recovery Beyond the Conventional

A significant share of the waste heat cannot be efficiently recovered with traditional heatexchangers

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- 1 Waste Heat Potential
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- 3 HeatMatrix® Products

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HeatMatrix® DISC

Market Potential

- Biogas CHP
- 1,500 coal-fired plants globally
- 2,400 waste incineration plants
- Biomass fired plants

Savings potential power plant

- 1% absolute plant efficiency improvement
- \$1 Mio/yr/plant
- 36 kton/yr/plant CO₂



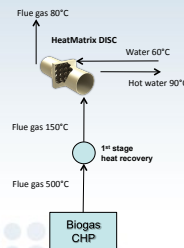
Unique Selling Points

- Compact retrofit design
- In-situ cleaning system
- Corrosion resistance
- Light weight



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HeatMatrix® DISC with CHP



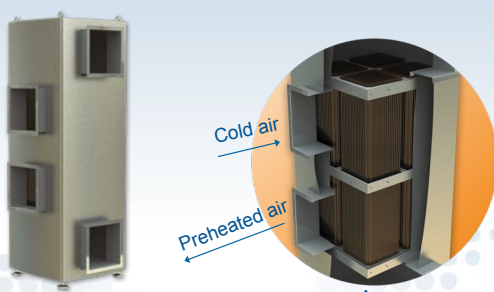
Unique Selling Points

- Recover heat beyond the acid dew point
- Improve thermal efficiency with >10%

Ultra high efficiency CHP!

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HeatMatrix® LUVO



Cold air

Preheated air

Hot flue gas

Application: Gas/Gas

- Integration flue gas/combustion air
- Drying Processes
- Biomass/Biogas combustion
- HVAC

Operating Range

- F: 1,000 – 10,000 m³/hr
- T: 225 °C
- P: atm
- ΔP: 4 mbar

Advantages:

- Compact
- Low Weight
- Counter Current
- Corrosion resistant

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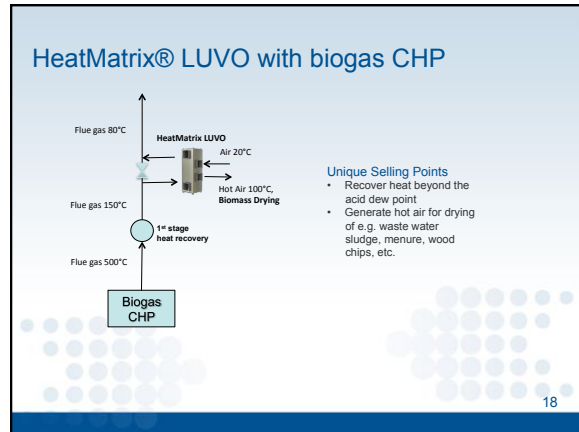
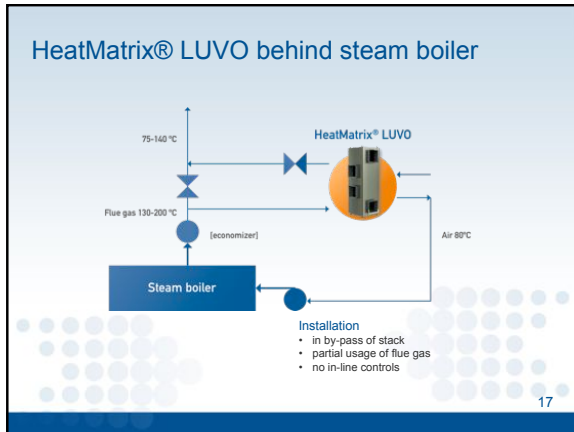
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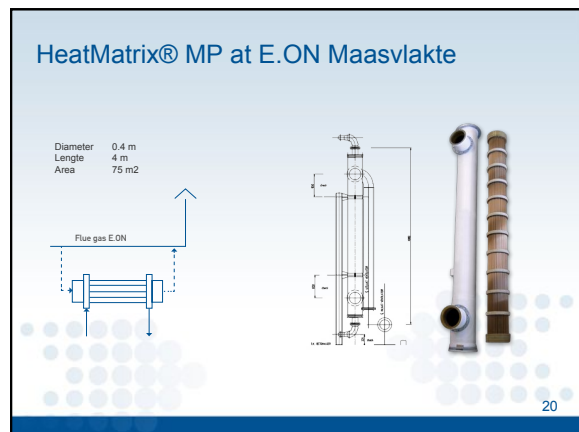


Spirits of Innovation Award

- HeatMatrix LUVU wins 'Spirits of Innovation Award'

Reactie jury: "Dit blijkt inderdaad een mooie innovatie. Dankzij toepassing van kunststof en de speciale matrix kan het tegen agressieve rookgassen en het kan gemakkelijk en goedkoop geplaatst worden."

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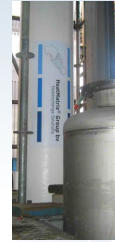


Flue Gas Condensor E.ON Maasvlakte



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Flue Gas Condensor E.ON Maasvlakte



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