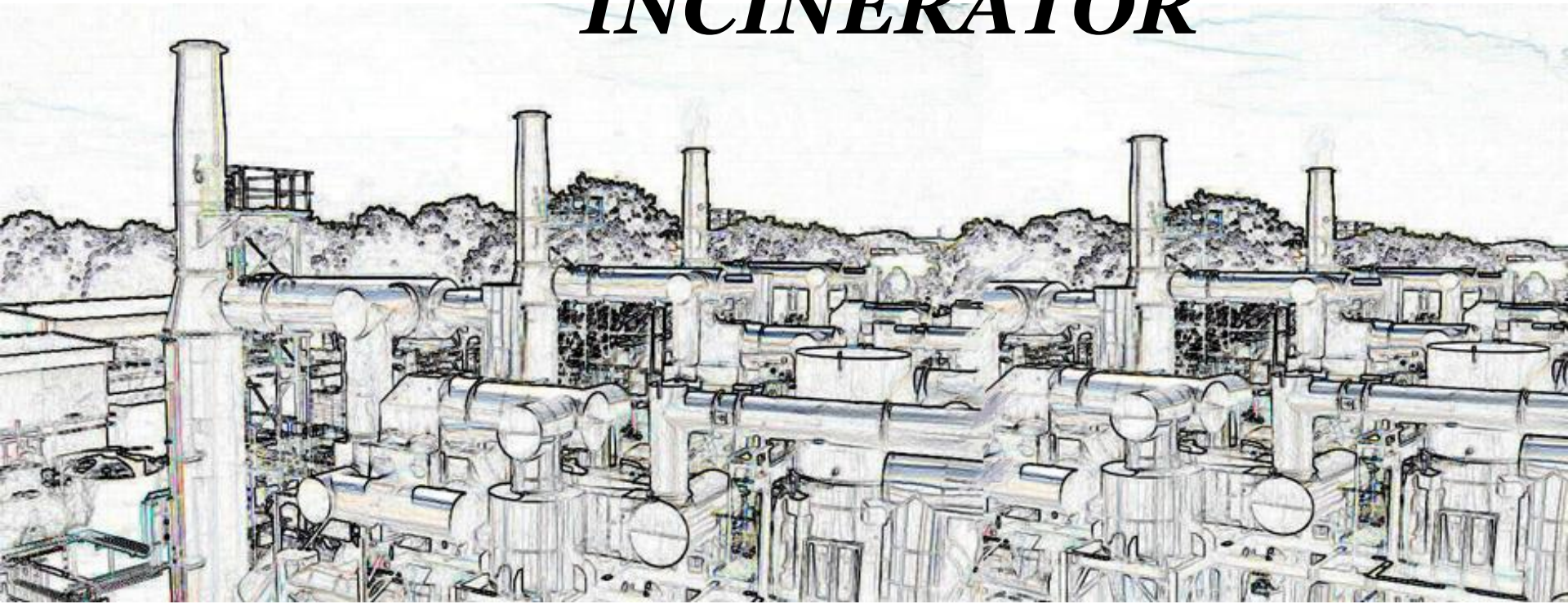




VORTEX SLUDGE DRYER & INCINERATOR



Established in 1915




株式會社 大和三光製作所

YAMATO SANKO MFG. CO., LTD.

Company Profile



Company Name	Yamato Sanko MFG. CO., LTD
Established	Oct. 05 th , 1915
Employees	Approx. 100
Head office	Tokyo
Factory	Fukushima
Products:	
<u>Industrial dryer</u> <u>Thermal treatment system</u> <u>Incinerator</u>	These products have been adopted making a variety of products, ranging from food to the latest industrial products. Some of them are also used as waste sludge treatment system.
<u>Partner Company</u> 	NIKUTEK ENGINEERING LTD CO General Geshevo 9 Dzhebel Kardzhali Bulgaria Tel: +359 895 106 530 www.nikutek.com

History of Vortex Sludge Dryer & Incinerator

1970

A vortex drying incinerator was developed.

1974

A patent for vortex drying incinerator was issued.

1977

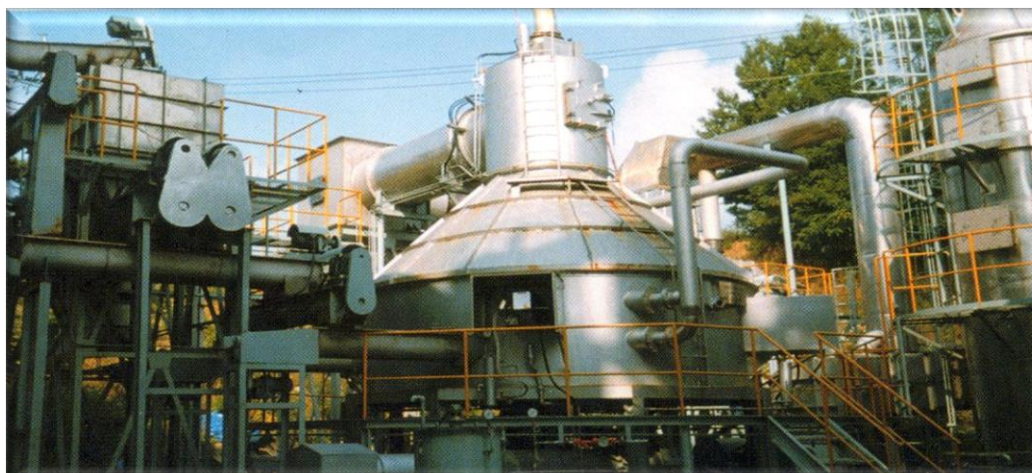
Since the first plant was put on sale, more than 200 plants have been sold.

2008

The sludge treatment plant was sold to Singapore.

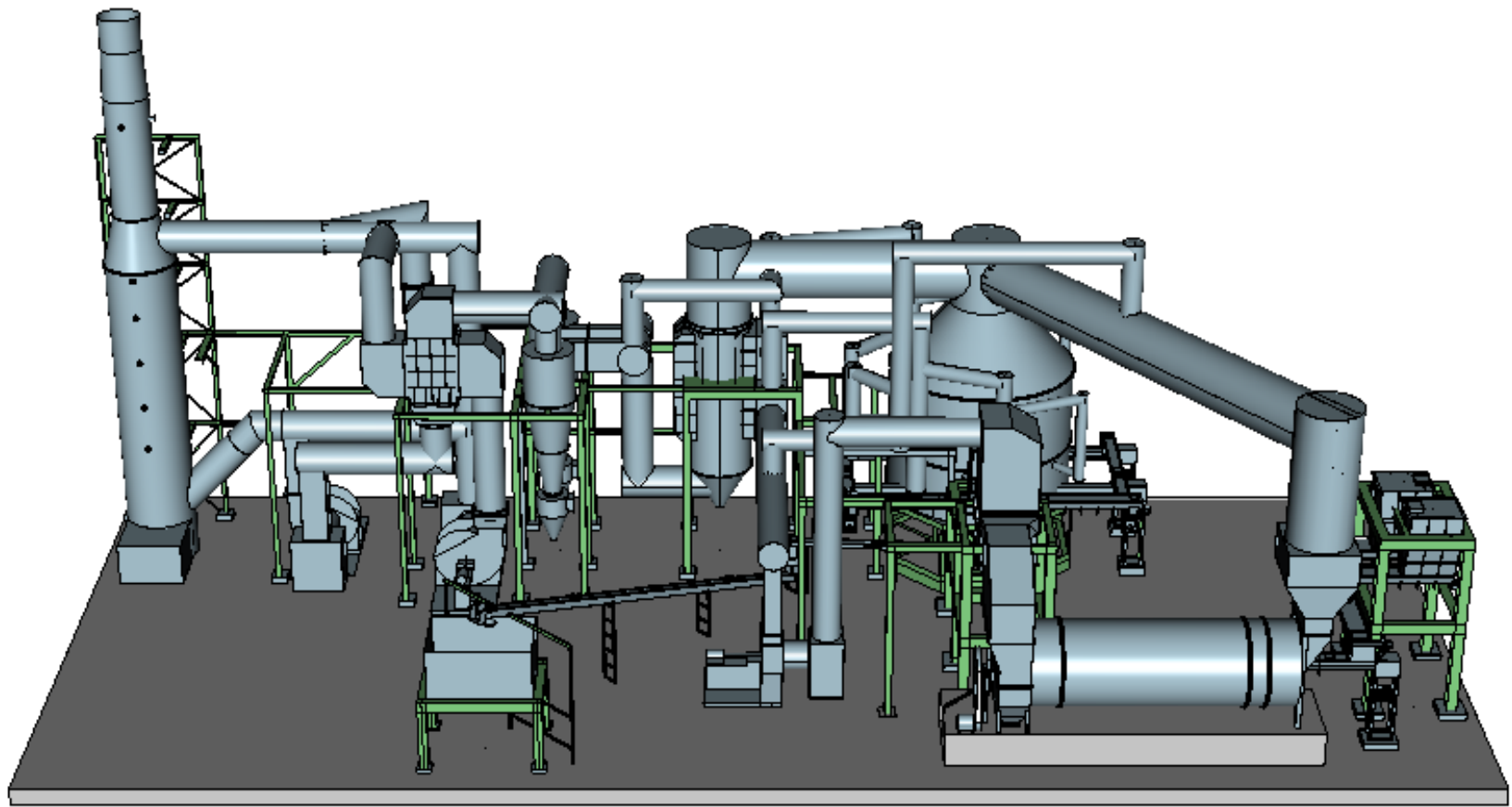
2009

The plant got the “Kyoto Protocol” CDM(Clean Development Mechanism) approval.





Birds-eye View



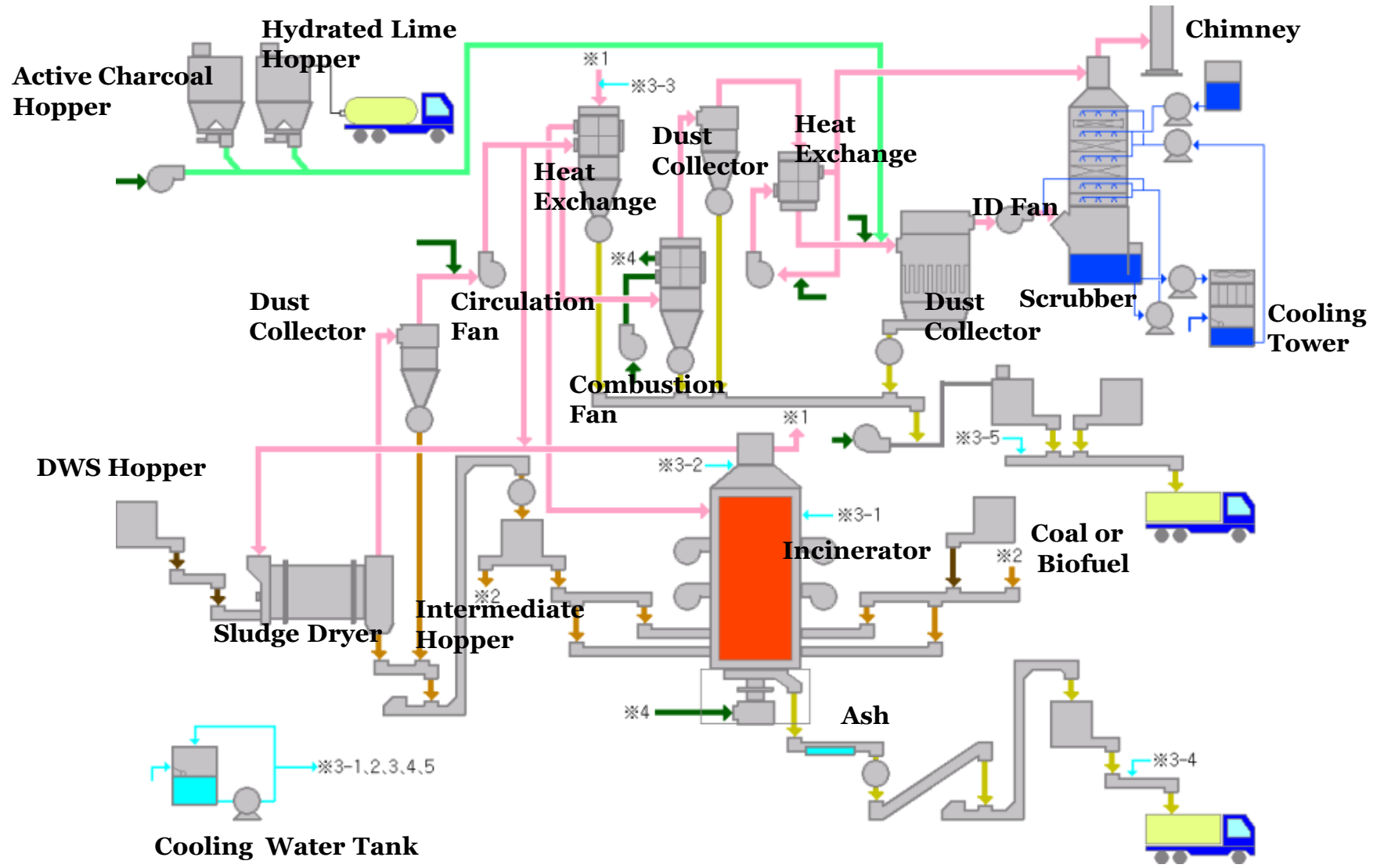


Feature



- *Steady operation*
- *Energy saving*
- *CO₂ reduction*
- *Very little clinker*
- *Very little unincinerated matter*
- *Short temperature rising time*
- *Low cost of equipments*
- *Adaptable for changes in sludge*

Flow Sheet

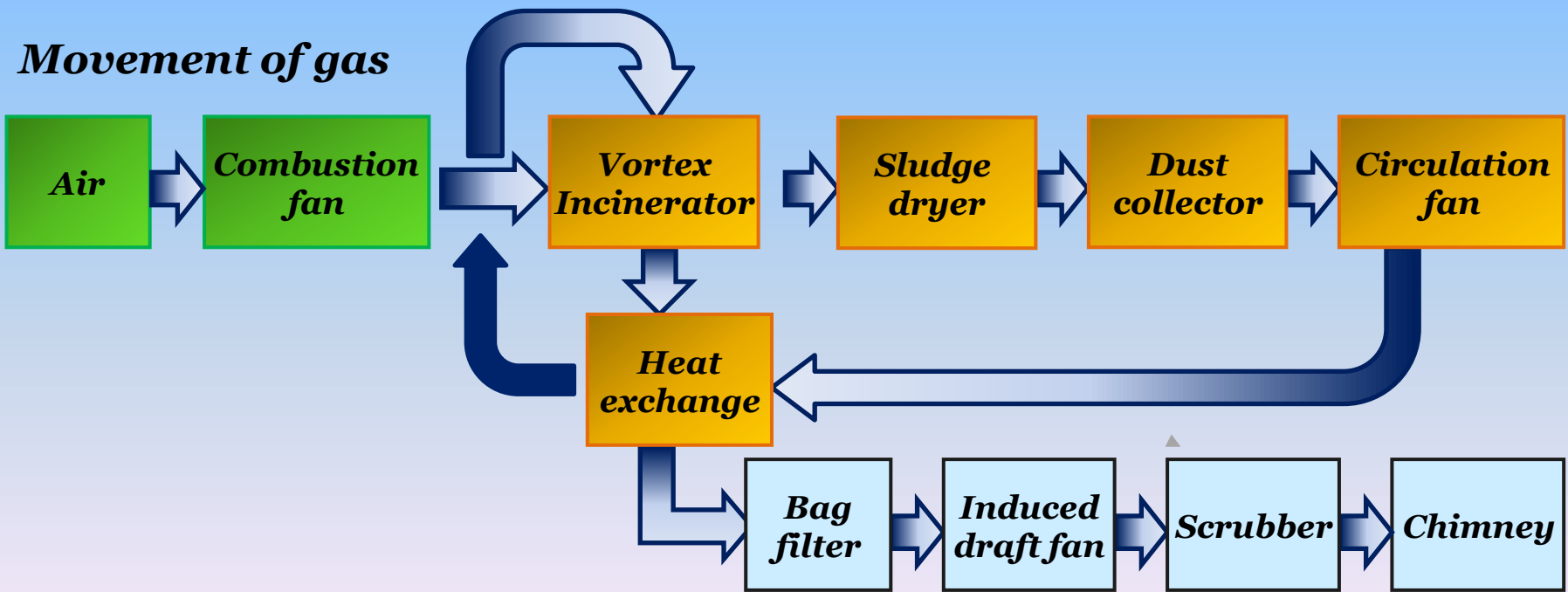


Flow sheet

Movement of sludge

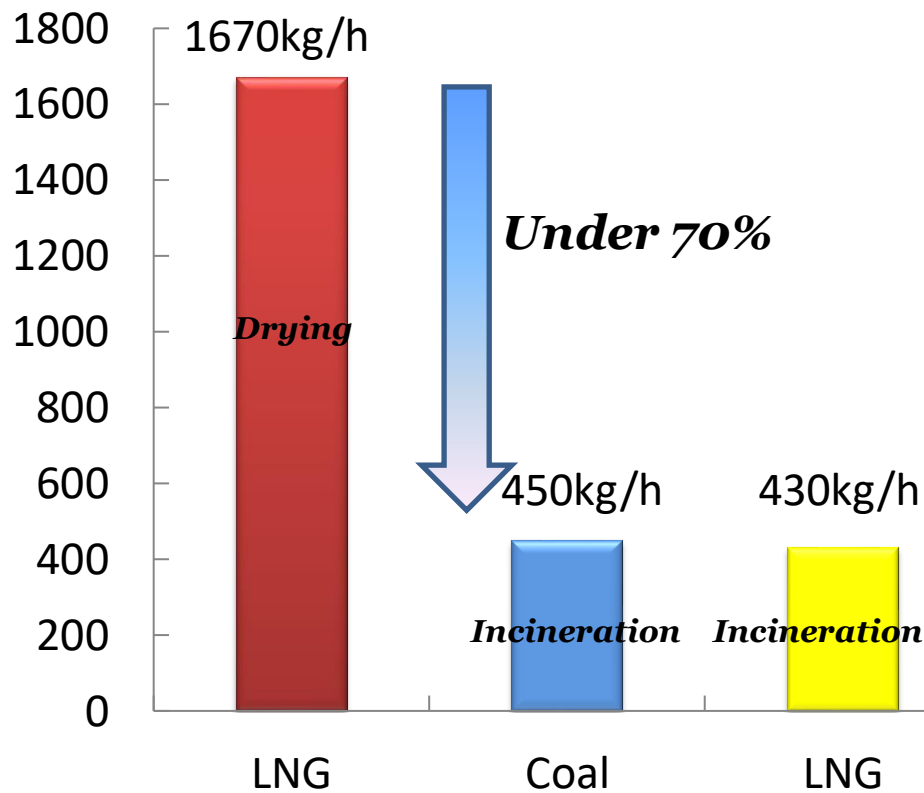


Movement of gas



Weight Reduction

Reduction of drying sludge and incineration ash weight



Treatment condition

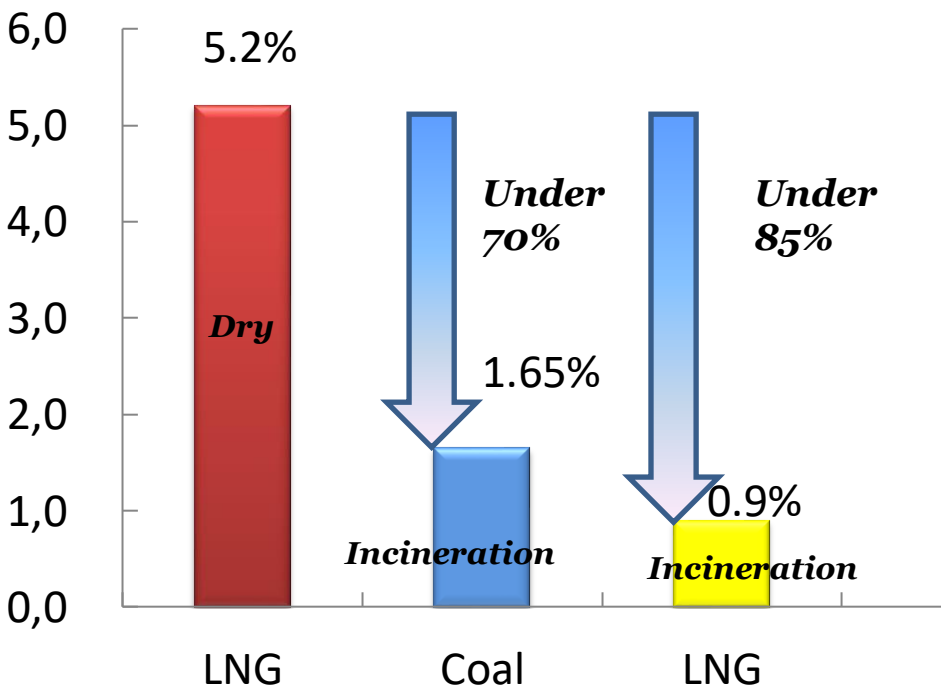
Throughput	5000kg/h
Pre-drying Water content	80 %
Post-drying Water content	40 %
Sludge ash content	42.4 %
Sludge calorific value	3000kcal/kg ·ds
Coal water content	19 %
Coal ash content	8.7 %
Coal calorific value	5000kcal/kg ·ds

At some circumstances, incinerated ash is output after humidification

Exhaust Gas Reduction

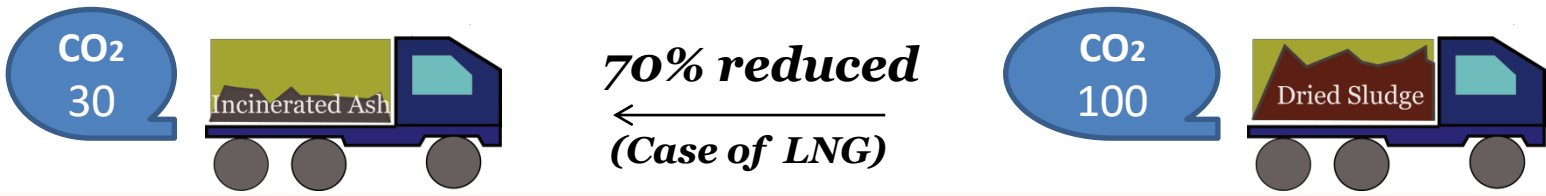
Treatment condition

Output of CO2



Treatment amount	5000kg/h
Water content Before drying	80%
Water content After drying	40%
Sludge ash content	42.4%
Sludge calorific value	3000kcal/kg · ds
Coal water content	19%
Coal ash content	8.7%
Coal calorific value	5000kcal/kg · ds

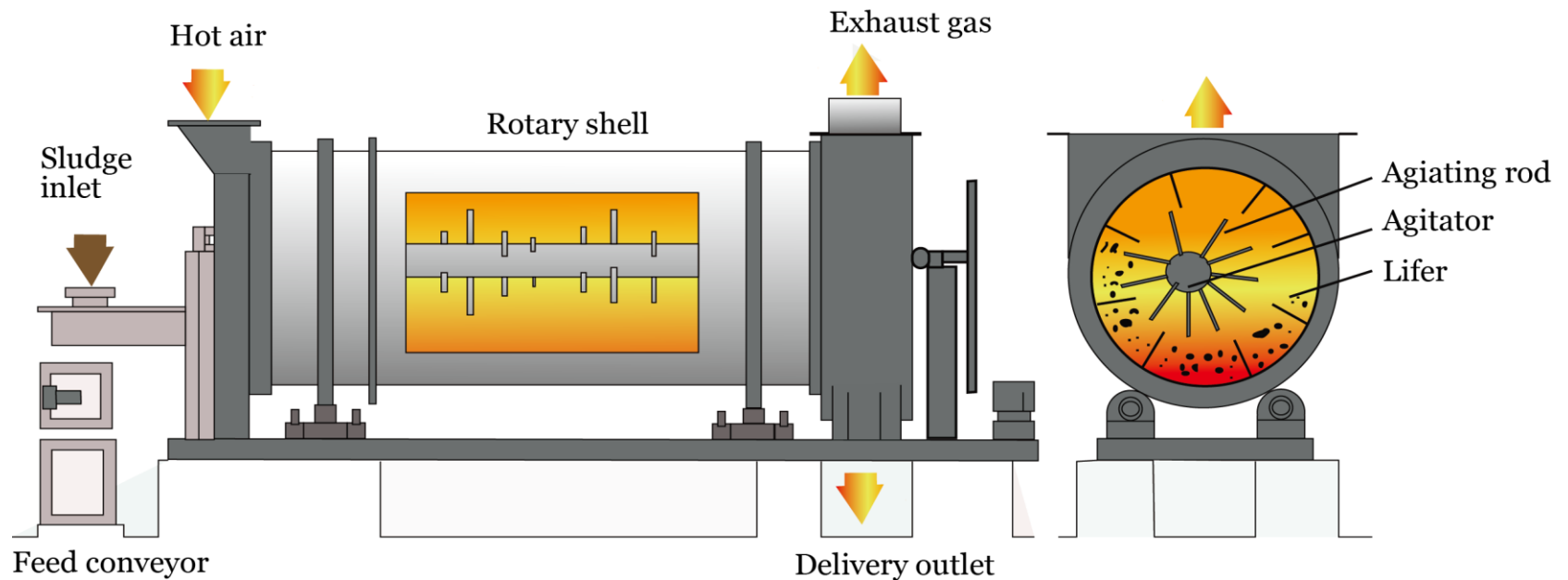
Since sludge is biofuel, the output of CO2 by sludge incineration is not accounted



Sewage Sludge Stability

	Digestion	Composting	Drying	Incineration	Melting	Carbonization
Reduction	×	△	○	◎	◎	○
Stabilization	△	○	△	○	○	○
Recycling	○	○	○	○	○	◎
Treatment Time	×	△	○	○	○	○
Secondary Pollution	△	×	△	○	○	○
Cost	△	○	△	△	×	×
Evaluation	△	△	○	◎	×	△

Sludge Dryer (Rotary dryer with agitator)



➡ **High drying rate**

➡ **High thermal efficiency**

➡ **Low exhaust gas**

➡ **Can be used for very wet, sticky and adhesive sludge**

➡ **Adaptable for changes in sludge**

➡ **Dried sludge of 1-5mm grain diameter can usually be obtained**

Appearance of Sludge Dryer

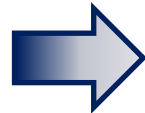


Rotary Dryer with Agitator

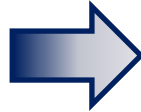


Inside of dryer

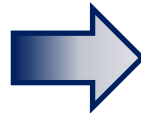
Vortex Incinerator



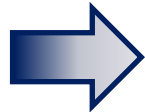
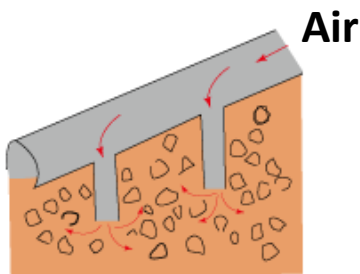
Short temperature rising time



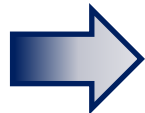
Less unincinerated matter



Very little clinker

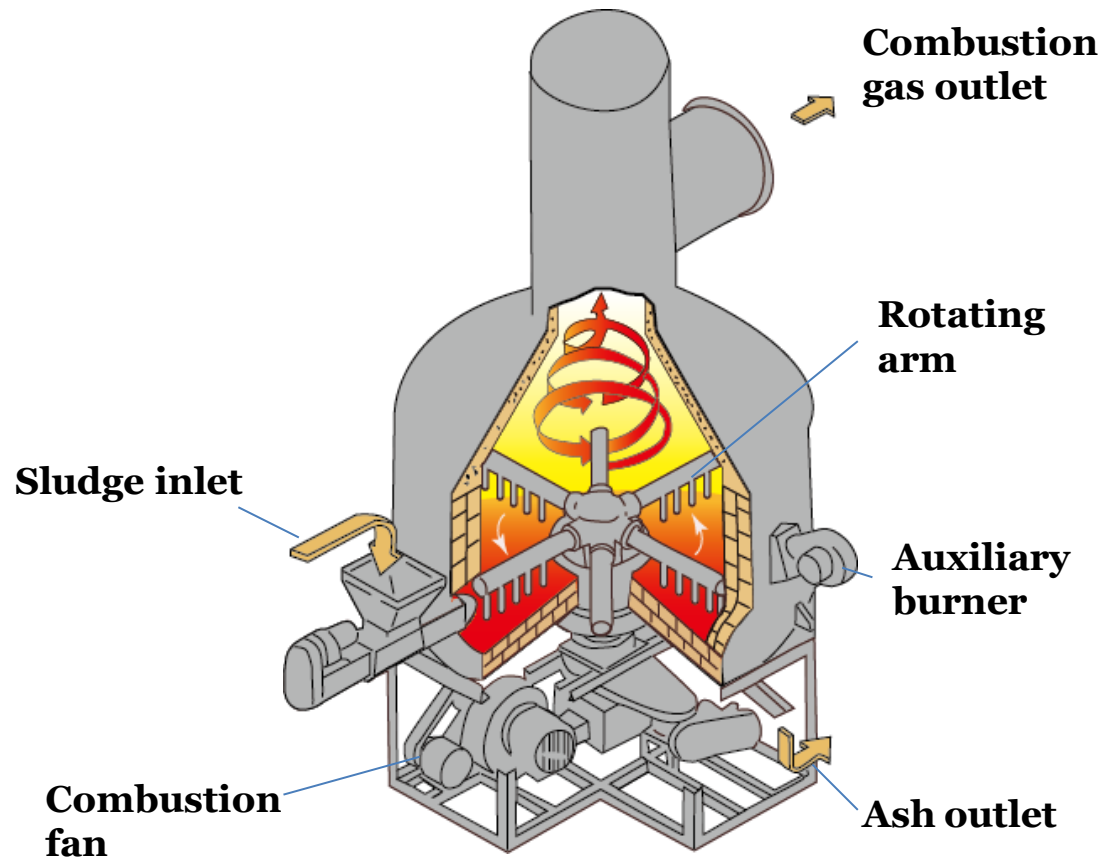


Deodorization equipment is incompatible



Excellent durability for the rotating arm

Vortex Incinerator



Appearance of Vortex Incinerator



Inside of incinerator



Vortex incinerator

Singapore Site

Site	Singapore
Year of completion	2009年
Sludge disposal amount	29200kg/h
Sludge water content	80%(W.B.)
Sludge value	4000kcal/kg-DS
Incinerator	20m²
Dryer	33m³
Line	6 Lines

Usable fuel	LNG 10% dried sludge
Values of exhaust gas	
Dust	1mg/m³N
Sulfur oxide	1mg/m³N
Nitrogen oxide	200mg/m³N
Hydrogen chloride	0.5mg/m³N
Dioxin	0.08ng-TEQ/m³N

Singapore Site



Appearance

Japan Site

Site	Shigaken Youkaichishi
Year of completion	1996
Sludge disposal amount	2993kg/h
Sludge water content	85%(W.B.)
Sludge value	3600kcal/kg-DS
Incinerator	16m²
Dryer	25m³
Line	1 Line

Usable fuel	Heavy oil A
<i>Values of exhaust gas</i>	
Dust	87mg/m³N
Sulfur oxide	163mg/m³N
Nitrogen oxide	205mg/m³N
Hydrogen chloride	8mg/m³N
Dioxin	0.024ng-TEQ/m³N

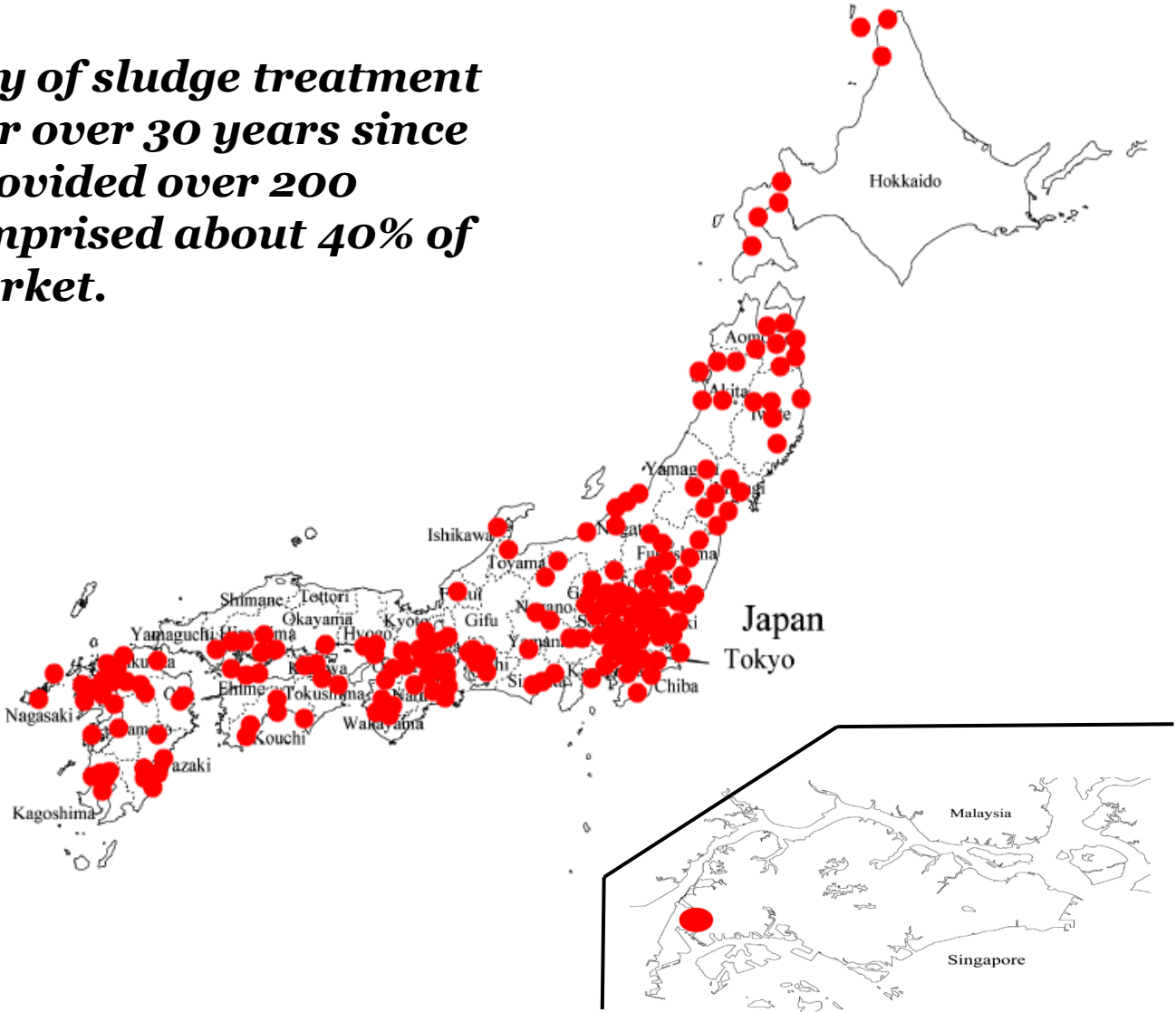
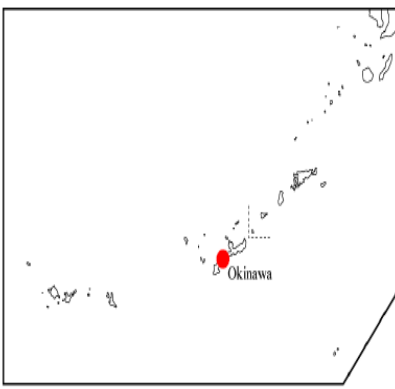


Japan Site

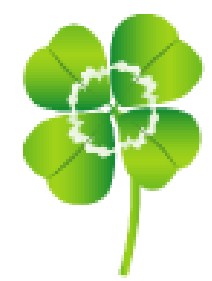


Performance

The technology of sludge treatment has developed for over 30 years since 1977, we have provided over 200 plants which comprised about 40% of the Japanese market.



Thanks for listening.



株式
會社

大和三光製作所

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