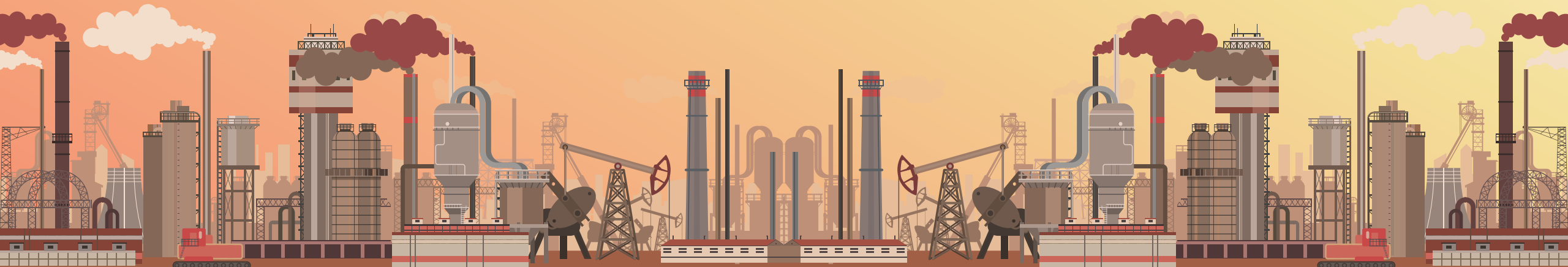


EEASCOO SOLUTION

Low temperature waste heat to power



Content



1

About

2

**How it works?
Core competitiveness**

3

Product

4

Carbon free future

About...



1

- ◆ Eascoo Solution provides one stop solution for Low temperature waste heat to power solution, from finance, design to operation.
- ◆ By using ORC(Organic Rankine Cycle) technology, turn low temperature waste heat to electrical power, and so generating free clean power, saving energy and reducing carbon footprint.
- ◆ We serve steel industry, thermal power industry, petrochemical, Cement industry, Paper industry, marine offshore, etc wherever low temperature heat source available.
- ◆ We design and manufacture Low temperature waste heat to power equipment, provide turn key service, EPC service and O&M for Low temperature waste heat to power plants, and if needed we can finance the whole project base on the waste heat condition. And we provide dropin replacement for Exergy, ADORATEC Turboden, Maxxtec AG, Ormat, Electra Therm, Alfa Laval, etc.



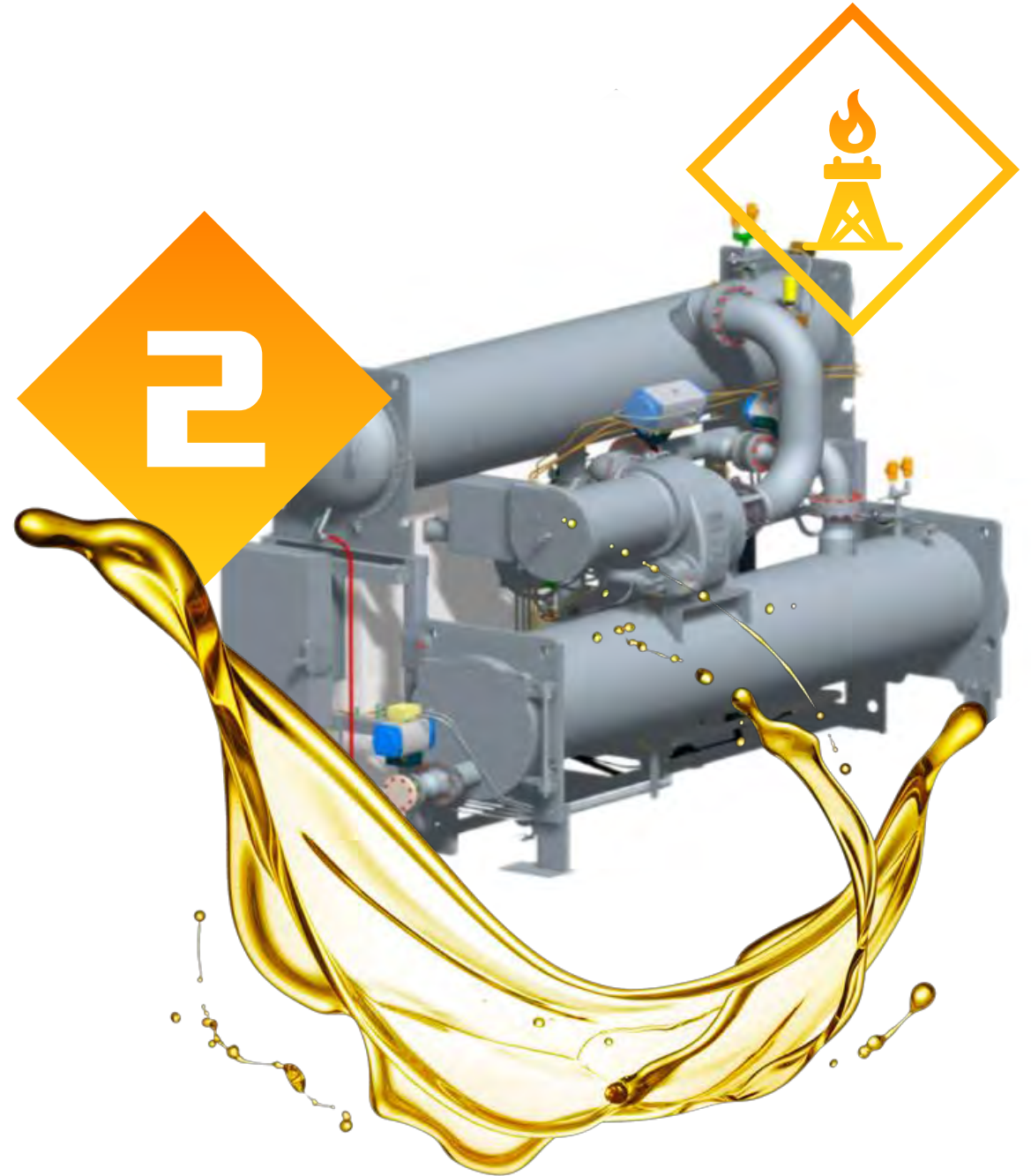
About

How it works?

- ◆ What is Low temperature waste heat
- ◆ What is Organic Rankine Cycle (ORC)?

Core competitiveness

- ◆ Independent designed ORC low temp. waste heat to power system.
- ◆ Independent R&D of radial turbine generator
- ◆ Online live plant management APP
- ◆ Modulized, Compact skidded unit



Low Temperature Waste Heat

- ◆ Low temperature waste heat refers to the relatively low-temperature thermal energy emitted in various processes during industrial production, where energy is not fully utilized (flue gas $>180\text{ }^{\circ}\text{C}$, hot water $>80\text{ }^{\circ}\text{C}$, steam $>100\text{ }^{\circ}\text{C}$).
- ◆ Around 60% of industrial energy consumption is converted into waste heat, of which low temperature waste heat below $300\text{ }^{\circ}\text{C}$ about 50% of the total waste heat.
- ◆ Global warming more and more serious, the recycling and utilization of low-temperature waste heat is urgently needed for CO₂ emission reduction.





Organic Rankine Cycle(ORC)

◆ Organic Rankine Cycle, (ORC)

O: Organic

ORC Uses organic media for operation. In chemistry, carbon based compounds (excluding carbon dioxide) are considered "organic". This is in contrast to the steam cycle that uses water (H₂O) as the working medium.

R: Rankine

Named after William John Macquorn Rankine. Renowned engineer and physicist, Rankin made many pioneering contributions in the field of thermodynamics.

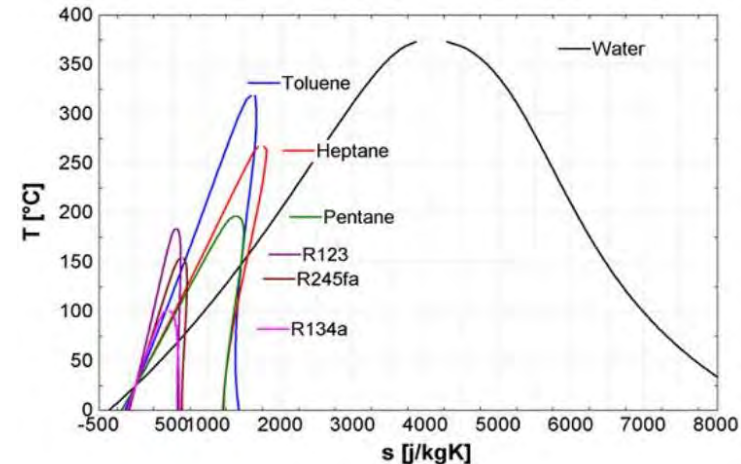
C: Cycle

ORC is a (closed) steam cycle.

- ◆ ORC is used for low-temperature waste heat recovery power generation, which is an effective technology for converting low-temperature thermal energy(such as industrial waste heat, solar thermal energy, geothermal energy, etc.) into electrical power.

ORC System - Working Media

ORC System uses refrigerants, hydrocarbons (butane, pentane, toluene, etc.), silicone oil, etc. These organic working fluids have boiling points lower than water at the same pressure, so they can recover heat and work at lower temperatures than traditional steam Rankine cycles.



ORC Media and Water T-S

01 Evaporation

02 Expansion

03 Condensing

04 Pumping

Core competitiveness

Independent R&D, Design of ORC System

- ◆ Quick start and stop at frequently to deal with complex working conditions
- ◆ Allowed wide range of load(30% to 120%)
- ◆ Suitable for hot water above 80 °C and steam at an absolute pressure of 0.1~0.6MPa, smoke above 180 °C
- ◆ Design life over 30 years

Online live plant management APP

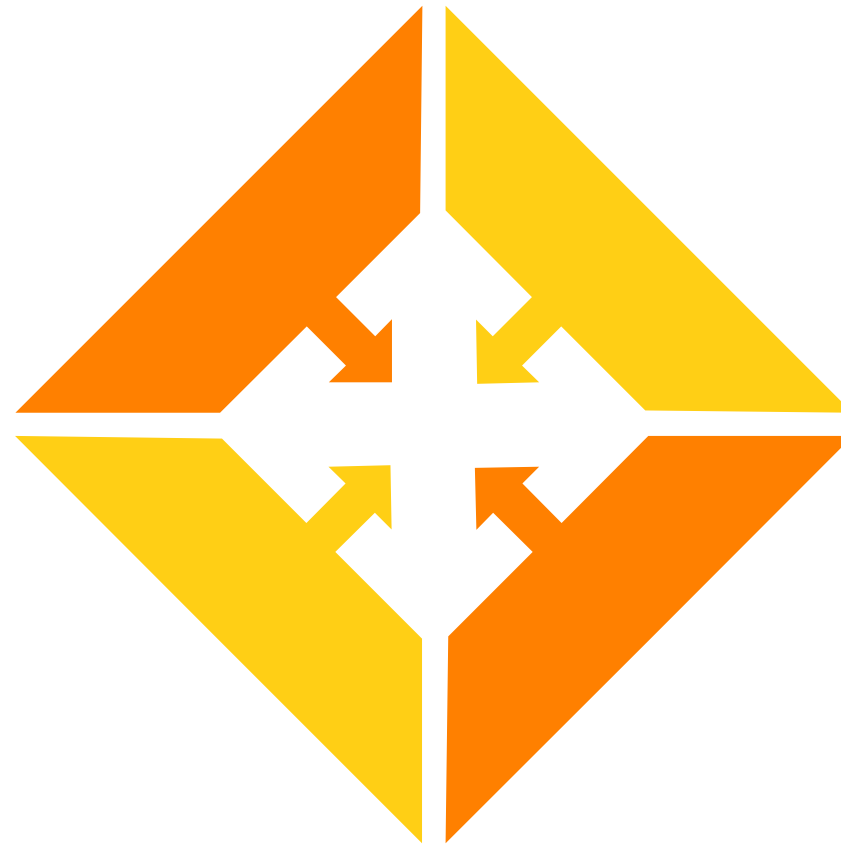
- ◆ Customized and extensible systems
- ◆ Remote control, switch start stop
- ◆ Monitoring and Analysis of ORC Equipment
- ◆ Visualized and real-time data analysis
- ◆ Remote alarm, unmanned operation

Independent R&D of radial turbine generator

- ◆ Efficiency: 25%~30% (traditional 15%~20%)
- ◆ Output power: 100~300kW (traditional 10~30kW)
- ◆ Asynchronous generator, no need for electronic devices

Modulized, Compact skidded unit

- ◆ Compact, Modulized, Reliable
- ◆ Easy transportation, installation and operation
- ◆ Factory tested, shorten on-site installation and commissioning time



Zero Investment
Free, Green Electricity

3

Products



Products

No.

Max. Power(Kwe)

Heat source temp.(°C)

Input heat(KWth)

Type of heat

Working Medium

Weight(kg)

Overall size L*W*H(m)

10KW

AS10-S

10

70-120

55-160

Water, Steam

R1233zd R245fa

566

1.2*0.8*1.8



100KW

AS100-S

100

70-120

800-1450

Water, Steam

R1233zd R245fa

2600

2.0*1.5*2.0



300KW

AS300-S

300

80-180

1000-4300

Water, Steam

R245fa

13000

6.0*2.3*3.5



1000KW

AS1000-S

1000

85-180

3000-15000

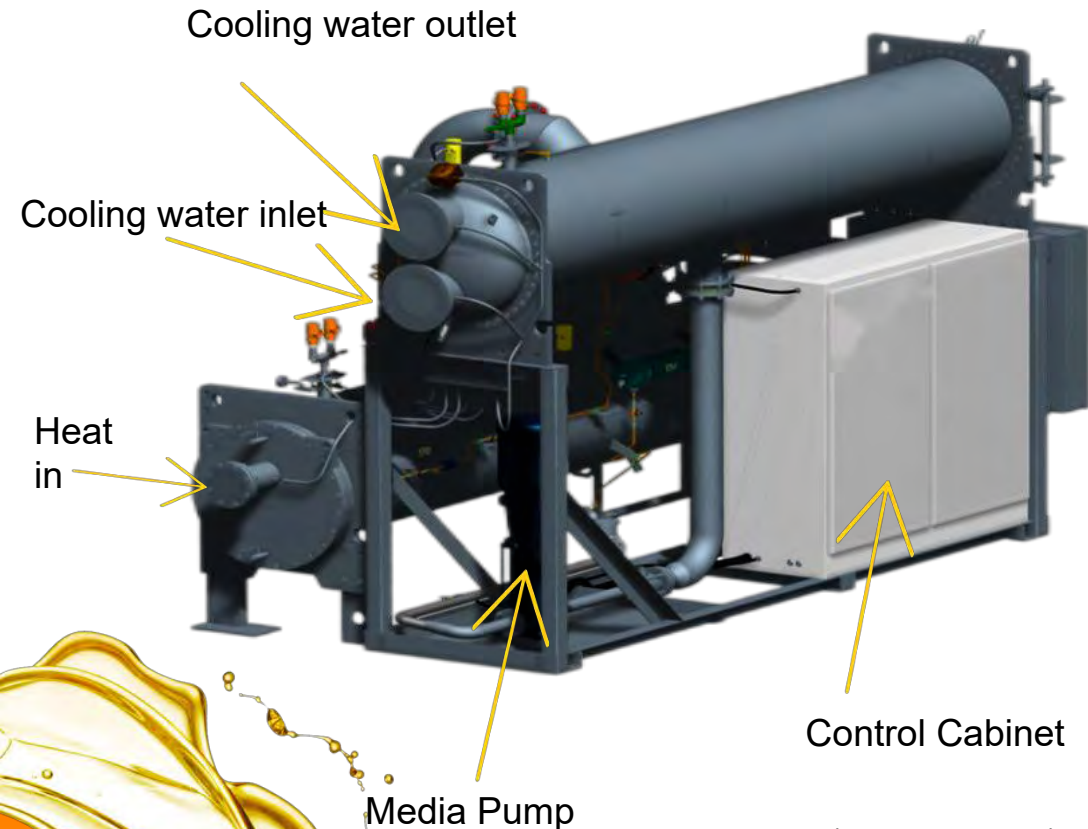
Water, Steam

R245fa

25000

6.9*2.5*5.5

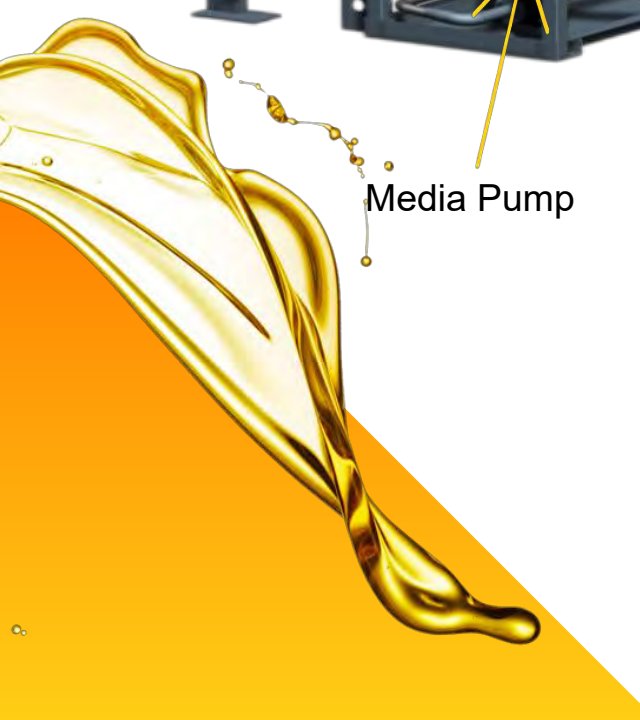




ORC Generator Set

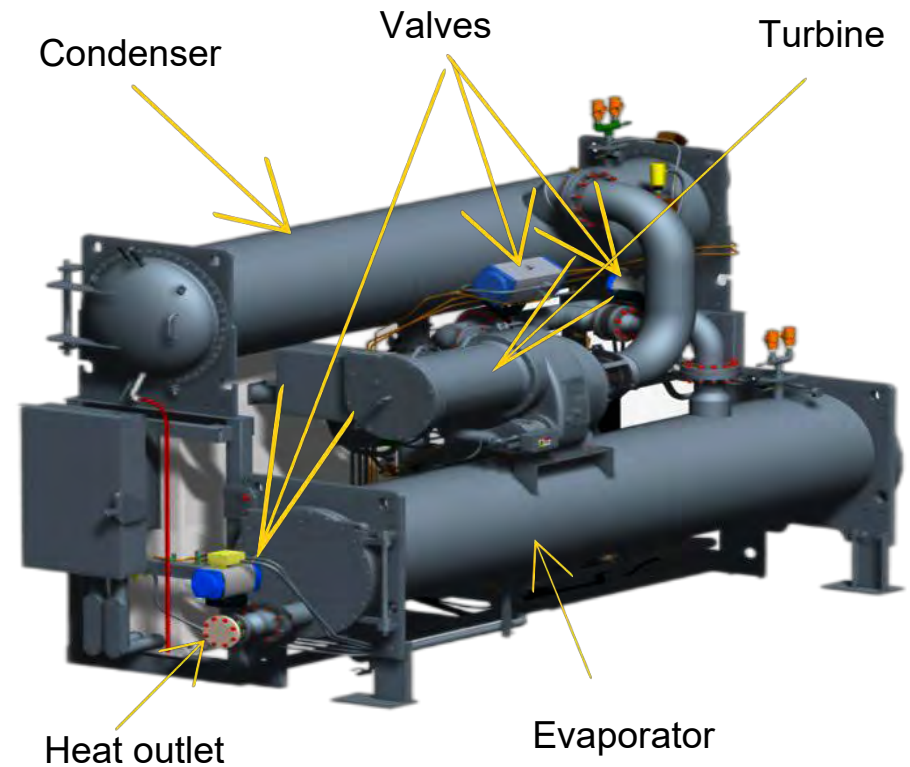
AS300-S

Overall size: 5.3 (L) *2.3(W)*3.3(H)



Media Pump

- ◆ Continuous operation, over 8000 hours a year.
- ◆ No external oil distribution or gas station needed.
- ◆ Modular design, high integration and reliability
- ◆ Easy transportation and installation
- ◆ Easy to operate, 100% tested before delivery
- ◆ Skidded, quick installation and commissioning.



Online Live Plant Management

- ◆ Customized and extensible systems
- ◆ Remote control, switch start & stop
- ◆ Monitoring and Analysis of ORC Equipment
- ◆ Visualized and real-time data analysis
- ◆ Remote alarm, unmanned operation



Industries for application



Cement



Geothermal



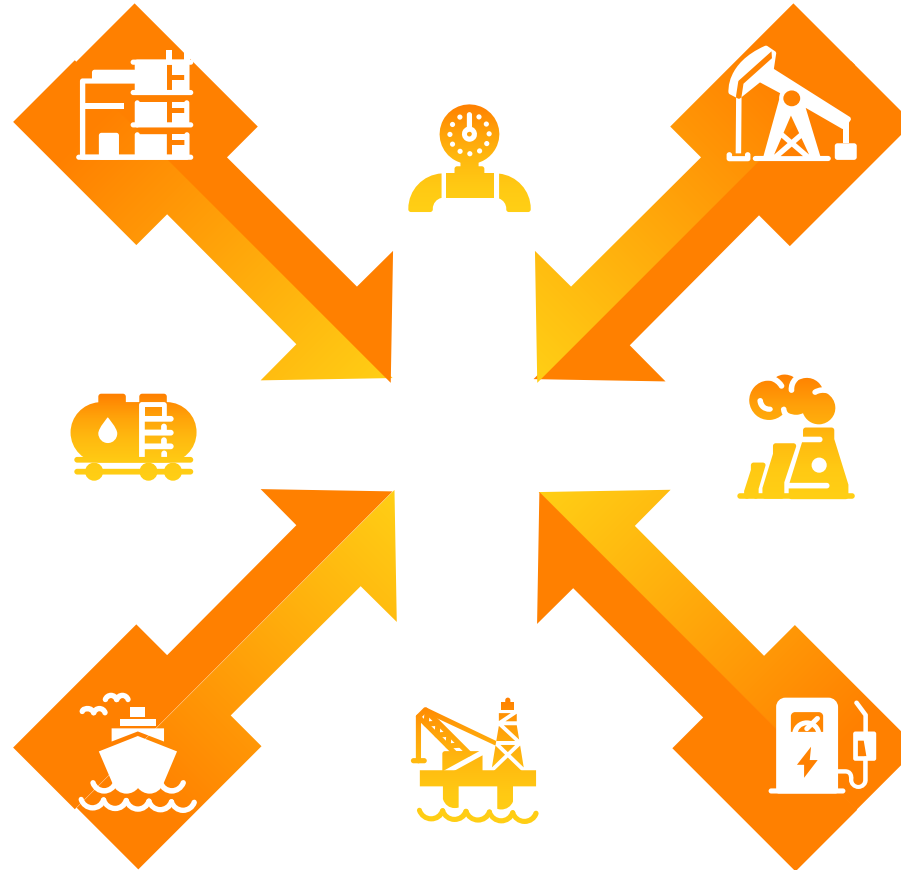
生物质能



Thermal Power Plant



Marine&Offshore



Steel



Paper



Petrochemical

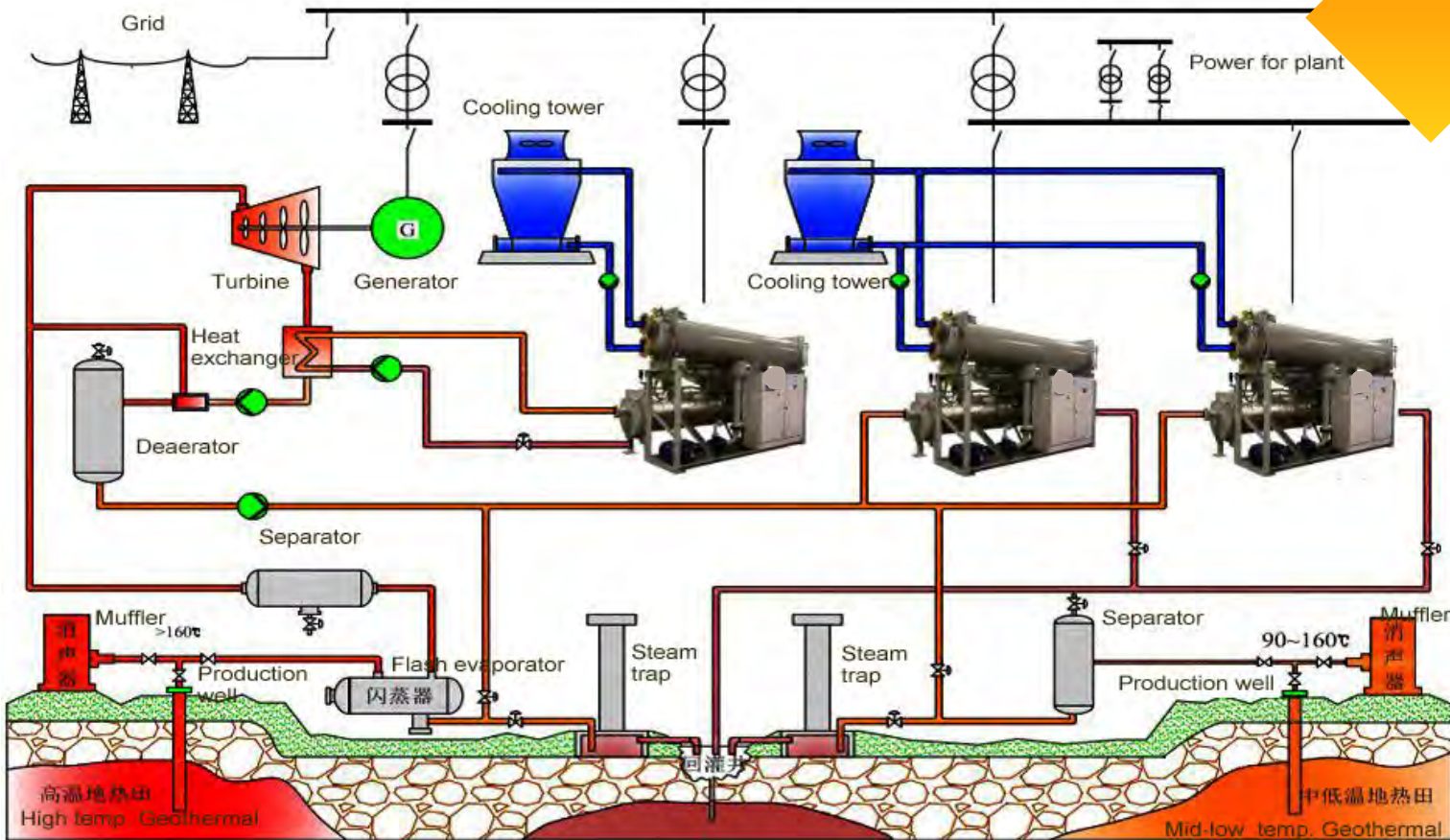


Fertilizer

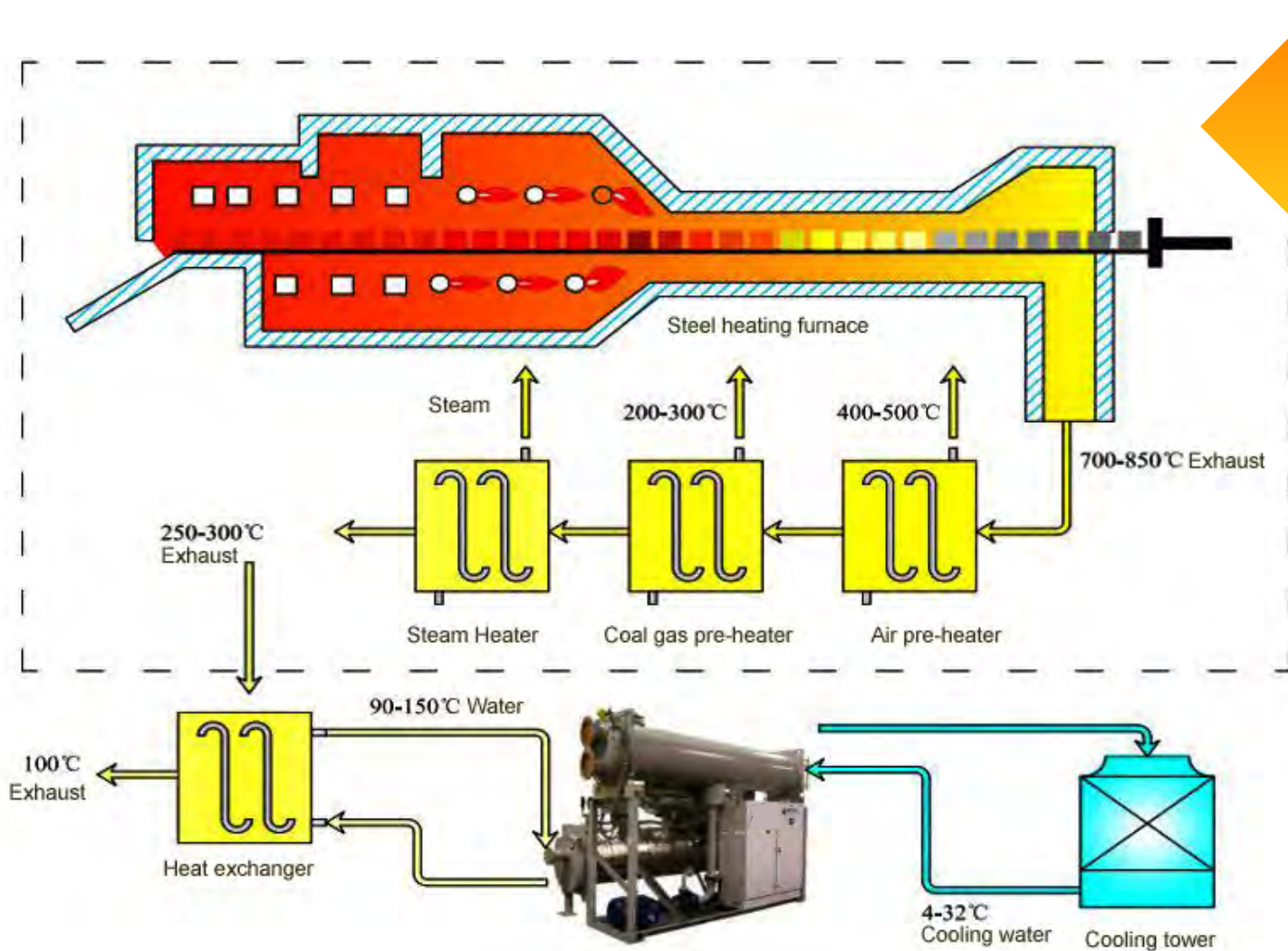


Industry	Exhaust > 180°C	Fluid > 80°C	Steam > 100°C
Cement	★		
Glass	★		
Oil&Gas	★	★	
chemical	★	★	★
Steel	★	★	★
Paper		★	★
Food		★	★
refuse burning	★	★	
Engine	★	★	★
Thermal Power	★	★	★

Geotherm application



- ◆ Turbine + ORC Combined Circle :
Higher Temp. heat ($>160^{\circ}\text{C}$) drives turbine to generate electrical power, hot water after gas-fluid separator ($>90^{\circ}\text{C}$) drives ORC system to generate power.
- ◆ ORC:
Geotherm heat ($90\sim 160^{\circ}\text{C}$) drives ORC system to generate electrical power, hot water ($50\sim 70^{\circ}\text{C}$) at outlet for house heating or filling back into earth.



Steel industry application

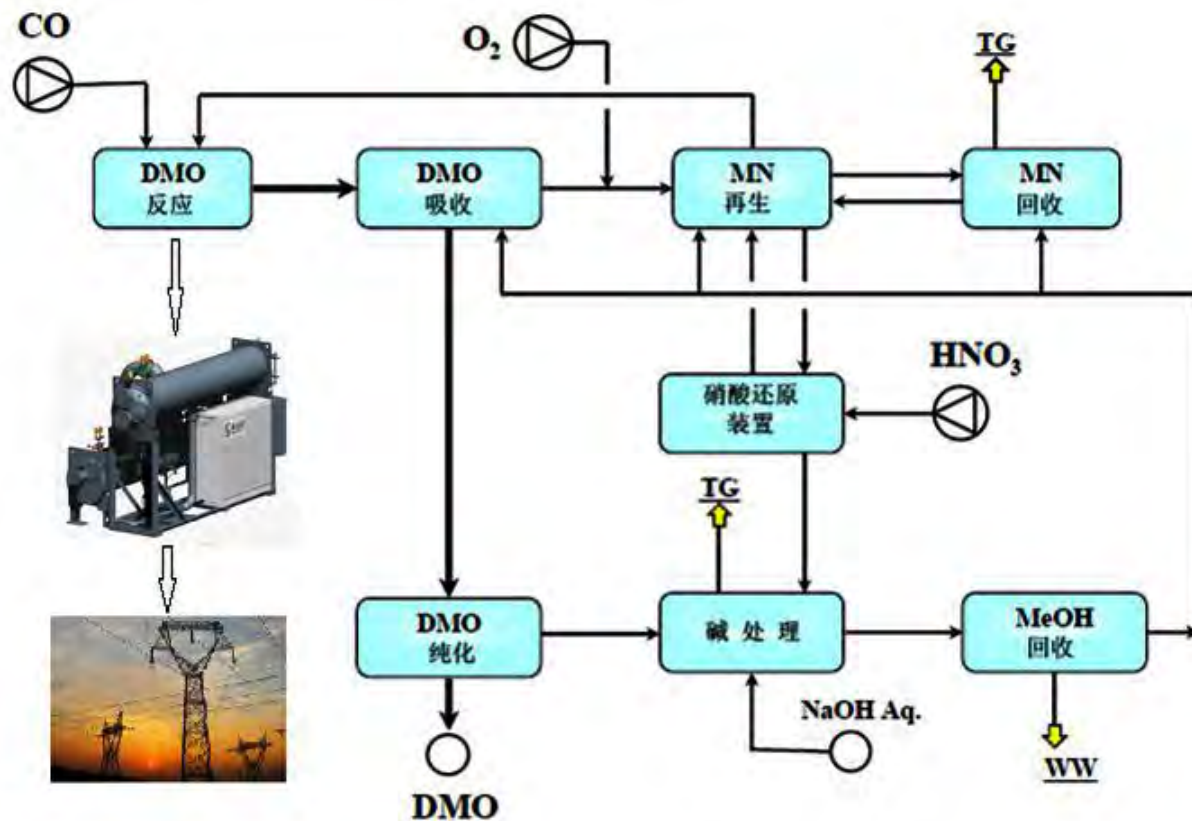
- ◆ Steel(or other metal) plant generates a lot high temperature exhaust, low pressure steam and hot water. For these waste heat below 300°C normally not used at present. Our ORC low temp. waste heat to power can turn these to electric power.

- ◆ There is a large amount of catalytic reaction heat in the process of petrochemicals.

And large amount of cooling water is required to condense and recycle low-pressure steam.



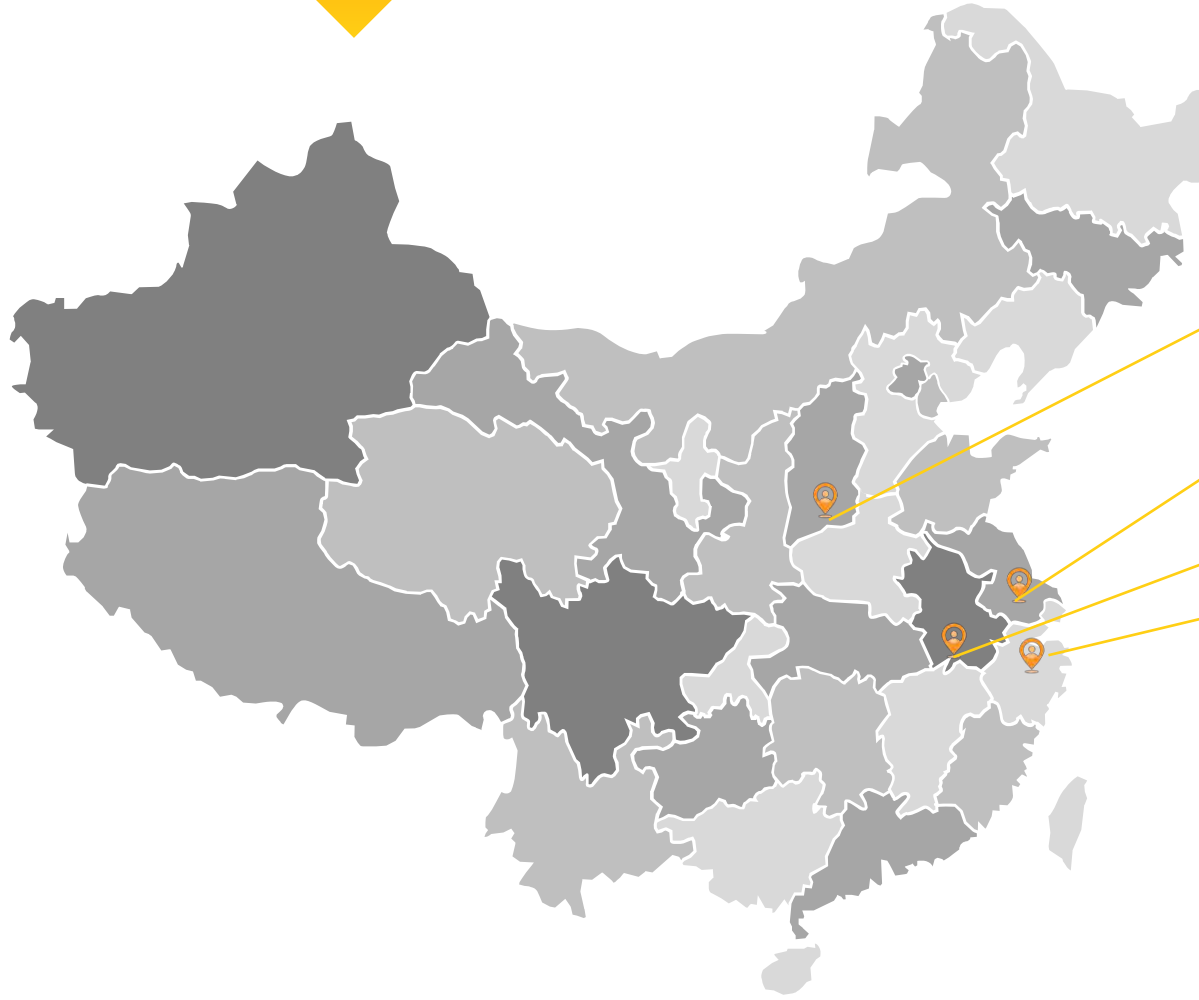
Petrochemical application



Item	Unit	Value	Note
Heat Media	/	Steam	
Flowrate	t/h	55	
Temp.	°C	170	0.8MPa a
Capacity	kW	5000	
Rate power	kW	4360	
Net power	kW	3900	
Annual Elec.	10k kWh	3120	8000h a year
Saving	10k CNY	2028	0.65CNY/kWh
Coal Saved	T/Y	9700	
CO ₂ reduced	T/Y	26000	
CDM profit	10k CNY	156	60CNY/T



Fight for Carbon free future



Plants in operation in China

Hualeisheng Calcium - Shanxi

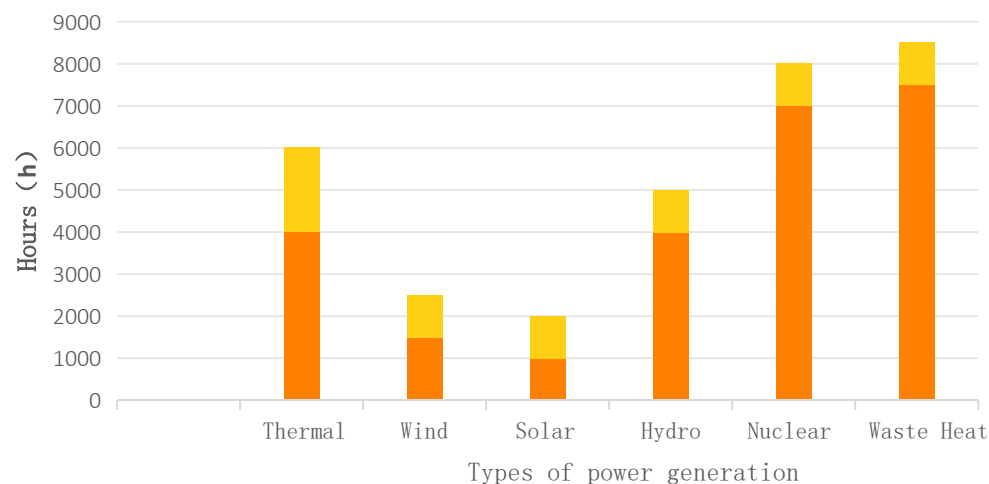
Lixin Chemical Fiber - Jiangsu

Jinxing Calcium - Anhui

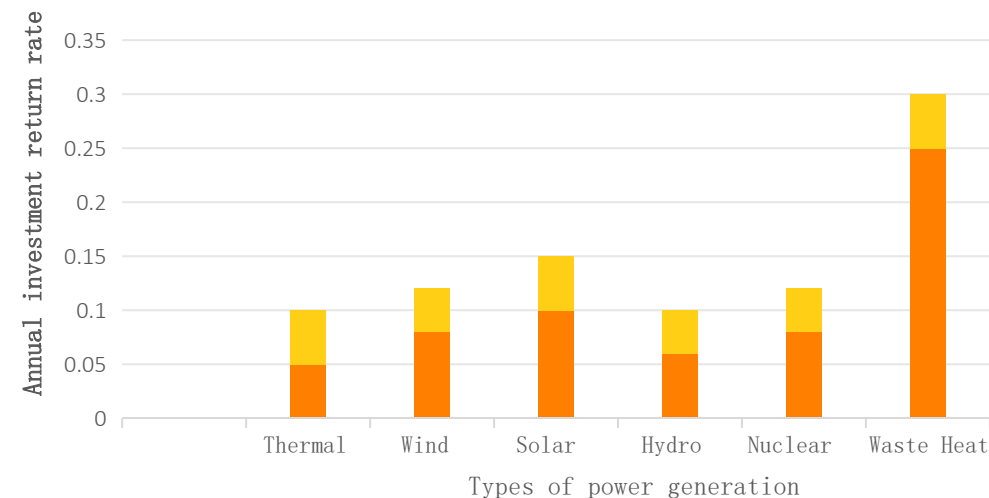
Guxiandao Inc. - Zhejiang

Comparison of power generations

Annual operation hours



Return on Investment (ROI)



Note: The data is from reports by energy research institutions such as Bloomberg New Energy Finance (BNEF) and Wood Mackenzie. The official website of the National Energy Administration releases statistical data on the national power industry. China Energy News, Energy Magazine, etc.



On both power generation utilization and investment return, ORC waste heat power generation has significant advantages.

What We Can Do



EPC

**Contract
Energy
Management**

**Equipment
Provider**

Customer Invest

We design, engineer, produce, purchase, install and commission the plant.

Then handle to customer

Energy Management Contract

(Contract must over 10 years)

We finance&invest, Customer provides stable heat source. Electricity earning pays back the investment first. After pay off, we and customer share the electricity earnings.

Customer buys the equipment
We assist for the plant installation and commissioning

THANKYOU