



**TICA Poland Sp. z o.o. — official  
representative of NANJING TICAENERGY  
TECHNOLOGY CO., LTD.**





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A photograph of an industrial facility, likely a water treatment plant, featuring large cylindrical tanks, complex piping, and overhead walkways. The scene is set outdoors under a clear blue sky, with some greenery and a fence in the foreground.

# CHAPTER 01

# TICA Introduction

# ABOUT TICA

ESTABLISHED IN 1991, TICA IS A PROFESSIONAL SOLUTION PROVIDER IN CLEAN ENVIRONMENT AND THERMAL UTILIZATION

## TICA GROUP



## Y22 TURNOVER

**10.3 Billion** **21%**  
RMB (1.5billionUSD) Growth rate

## TICA CLIMATE



## TICA ENERGY



# BRANDS

## TICA CLIMATE



**SMARTDT**

## TICA ENERGY



**PureCycle**



## SYSTEM INTEGRATOR



**T&Y 途优**

# VISION AND MISSION



Reliable solution provider for clean environment and thermal utilization.



Innovation for better life. Value maximization with green power for our distinguished customers.

# TICA VALUES

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**CUSTOMER**

Help Our  
Customers  
Succeed

**INTEGRITY**

Keep Our  
Promises

**INNOVATION**

Innovative  
Ideas

**QUALITY**

Striving for  
Perfection

**COLLABORATION**

Cooperation &  
Collaboration

The image shows industrial machinery, likely a power plant component, with a semi-transparent grey overlay containing the text 'CHAPTER 02'. The machinery includes large cylindrical tanks and control panels. The background is a cloudy sky.

## CHAPTER 02

# TICA Energy

# ABOUT TICA ENERGY

- Established in 2015 with a registered capital of 100 million dollars.
- Focused on thermal energy saving solutions and renewable energy development through ORC technology.
- Full-spectrum and high-efficiency advanced ORC products, which can be deployed in geothermal, industrial waste heat, biomass energy, LNG cold energy, and other applications.



# TICA ENERGY ROADMAP

TICA Energy focuses on thermal energy utilization system solutions and renewable energy development to help achieving carbon neutralization.

**2016**

"Nanjing TICA Thermal Technology CO.,LTD" was officially registered and established.

TICA thermal energy base started for construction.

**2015.10**

TICA and UTC signed a strategic joint venture, and TICA began to enter the energy field.

**2015.12**

TICA signed a contract with Pratt & Whitney, a subsidiary of UTC, to complete the acquisition of PureCycle business.

**2017**

Elected as Vice Chairman Company of China Chemical Energy Conservation Technology Association.

**2018**

Awarded the certificate of "Technical Center of Low-medium Temperature Waste Heat Power Generation Solution in Petrochemical Industry".

Won the "BlueSky Award for Global Top Investment Scenarios to Apply New Technologies for Renewable Energy Utilization".

**2019**

Acquisition of Italian EXERGY, the world's second largest ORC manufacturer in geothermal power generation.

**2020**

Acquisition of Italian Biomass Energy Leader SEBIGAS.

Won the first place of "2018-2020 Top 20 Enterprises in Power System Production of China's Geothermal Industry".

**2021**

The new base was commissioned successfully.

ORC technology won the first prize of "Science and Technology Progress of Chinese Association of Refrigeration".

**2022**

Renamed as "Nanjing TICA Energy Technology Co., Ltd."

# GLOBALIZATION OF TICA ENERGY

2015 **PureCycle**

Acquisition of **PureCycle ORC (low to medium) power generation system** of Pratt & Whitney, a subsidiary of UTC.

2019 **EXERGY**

Acquisition of the world 2nd largest ORC system provider in geothermal application, **EXERGY of Italy**.

2020 **SEBIGAS**

Acquisition of the global advanced biomass technology company, **SEBIGAS of Italy**.

America

2015



Italy

2019 | 2020



China

2021



# ACHIEVEMENTS

## Industry Waste Heat Recovery



- Market share of PET industry waste heat recovery power systems

**90%**

## Geothermal

Global installed capacity exceeds 700MW



- First place of "Top 20 Enterprises in Power System Production of China's Geothermal Industry in 2021" ;
- Datong Geothermal demonstration project- the highest Geothermal temperature in Eastern China;
- Purcycle enters Japanese market (Oita, Niigata, Kagoshima).

## Subsidiary EXERGY



- In 2015, Milan Polytechnic University verified that the isentropic efficiency of EXERGY AKCA geothermal project reached 93.65%.
- EXERGY single disk double pressure turbine won European Geothermal Innovation Award in 2016.

# PIONEER OF LOW TEMPERATURE POWER GENERATION AND GREEN RENEWABLE ENERGY

International footprint:

Italy, France, UK, Spain, Turkey,  
United States, Japan, China,  
Philippines, Portugal,  
Morocco, Bulgaria, Thailand,  
Belgium

Installed  
more than  
700MW

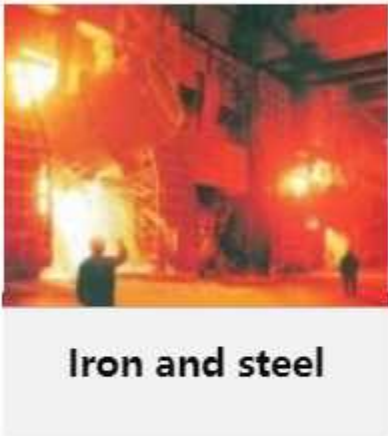


# APPLICATIONS

- Application fields



- Industrial waste heat



■ Existed business

■ Business under developing



## CHAPTER 03

# Technical Experts

# TECHNICAL EXPERTS

## Guy Phuong | Global R&D Director of TICA



- Graduated from the Royal Melbourne Institute of Technology / Michigan State University **Doctor of Aerospace Engineering**
- Won the **World's Highest Efficiency Centrifugal Compressor** design award
- Designed and built **the most advanced** test platform in the world for HVAC compressor
- Developed **the global first** volute design software in centrifugal compressor
- Chief engineer of **the world's first** Patton engine design and development team
- Invited to serve as Technical Chairman of Compressor Technical Committee of **ASME Process Industry Division**
- Awarded one of **the most knowledgeable people in compressor technology**, design, and development in the world

# TECHNICAL EXPERTS

## Stefano Selva | EXERGY CTO



- Graduated from Polytechnic University of Milan, Master of Mechanical Energy Engineering
- Visiting instructor of heat exchange technology at Polytechnic University of Milan. Experts in the field of heat conduction and heat transfer
- Former Technical Director of AMEC Foster Wheeler
- CTO of Exergy



# CHAPTER 04

# Products

# PURECYCLE

## Full-spectrum standard ORC products



Single unit: 65/110/280/700/1000kW  
Multi expander units:  
560/1400/1700/2000/2400/2700/3000kW

The system uses the principle of Organic Rankine Cycle, and the technology was derived from American aerospace engine technology. The unit is famous for its safety, stability and high efficiency.



### Full Spectrum

From small modular units 280kW up to 3MW



### High Reliability

Radial in-flow Turbine (RIT) with high system efficiency and reliability



### High Intelligence

Remote control, one-key start-stop



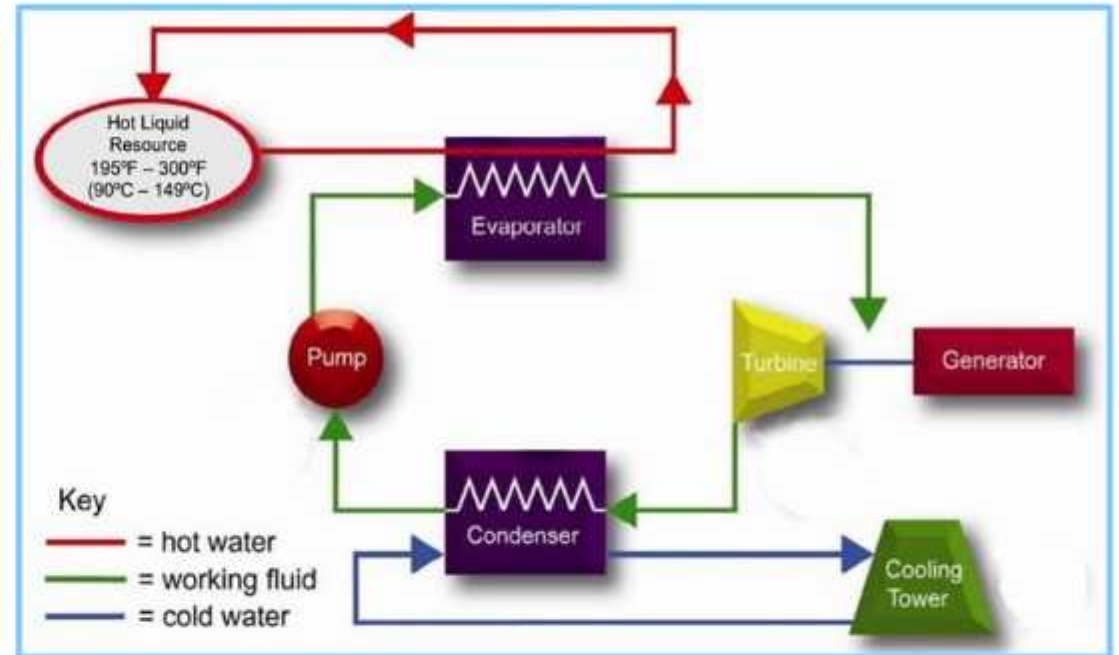
### Integrated Design

Modular design with high level integration, skid-mounted structure, easy installation

# ORC PRINCIPLE

## Organic Rankine Cycle Power Generation

The system uses the low boiling point characteristics of organic working fluid to drive the expander to generate electricity under the conditions of medium and low temperature (90-300°C) heat source, and uses the potential energy of working fluid generated by the temperature difference between cold and heat sources to convert low-grade heat energy into high-grade electric energy.



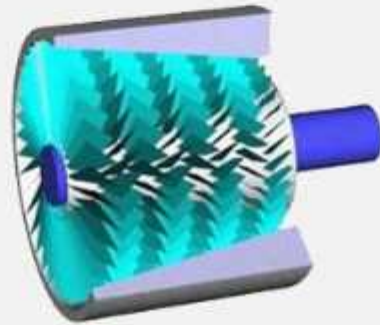
## Principle of ORC System

# TECHNOLOGY

Expander type



**Twin Screw**



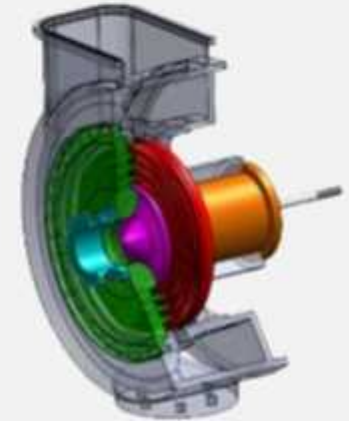
**Axial Flow Turbine**

**TICA Energy**



**Radial Inflow Turbine**

**TICA - Exergy**



**Radial Outflow Turbine**

Reference power range  
of single system

50kW~1MW

1MW~30MW

100kW~3MW

1MW~33MW

Isentropic expansion  
efficiency(%)

65~75

75~85

80~85

85~92

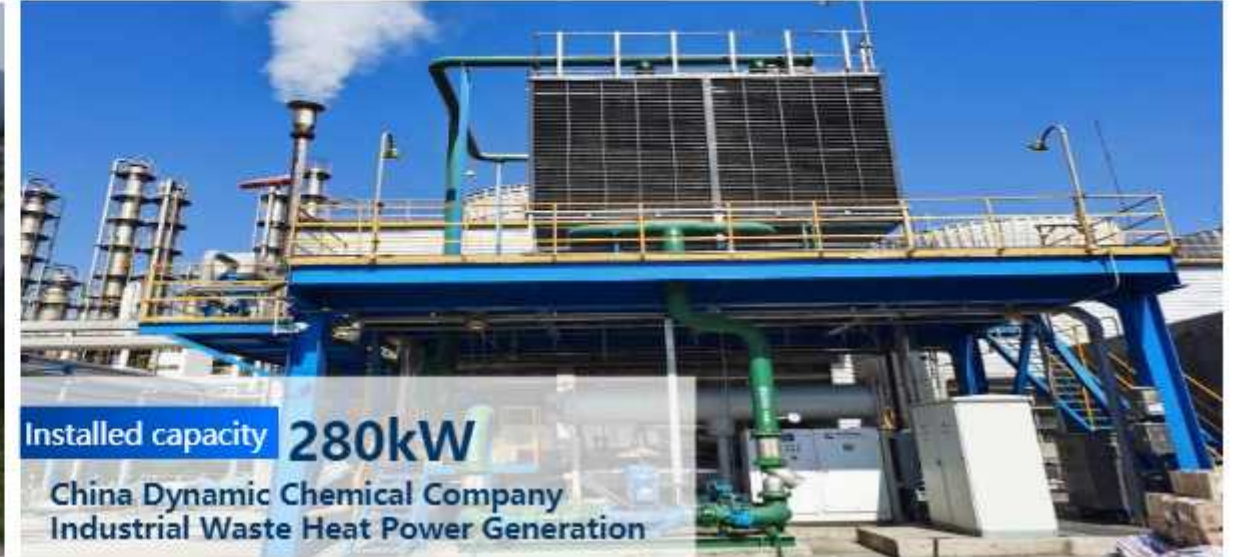
# PURECYCLE PROJECTS



# PURECYCLE REFERENCES



# PURECYCLE REFERENCES



# EXERGY PRODUCT



## Single Disk up to 9 Stages

- Higher isentropic efficiency per stage
- Better off-design performance



## Multi Pressure Inlet

- Enhanced components accessibility
- Possibility for multiple admissions on one disk



## Working Fluid Adaptation

- Optimized efficiency by design flexibility, most efficient working fluid



## Low Speed (Direct Drive)

- No gearbox
- Low noise and vibrations



## Straight Blade With Radial Design

- Minimal 3D turbulence effect.

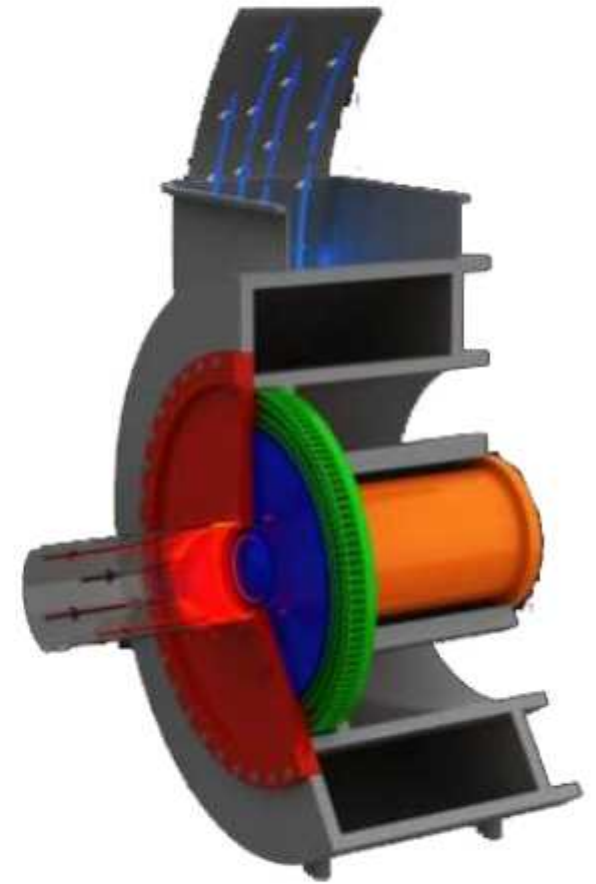
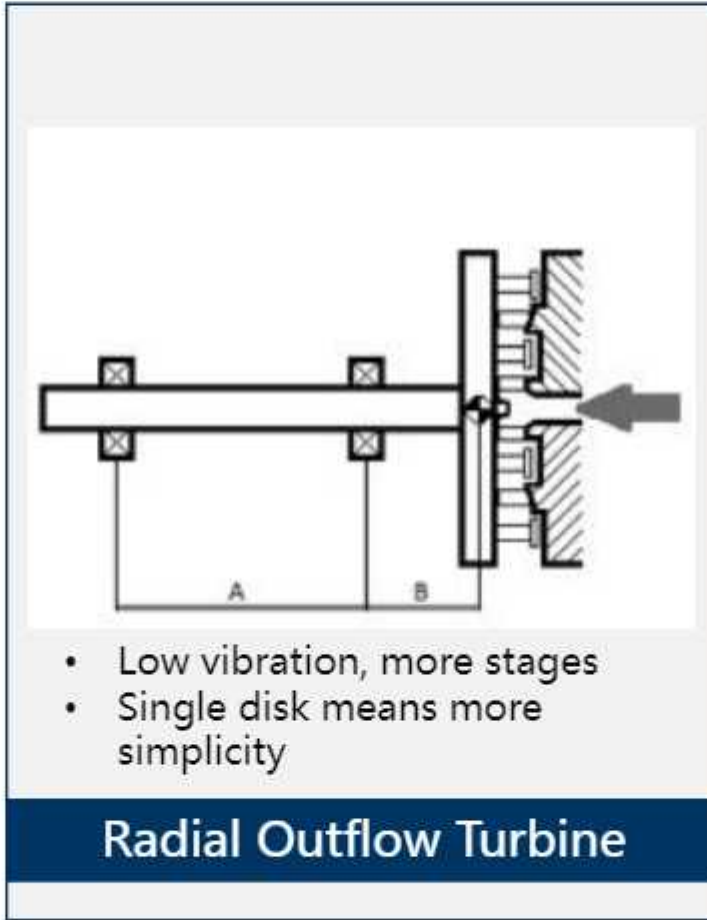
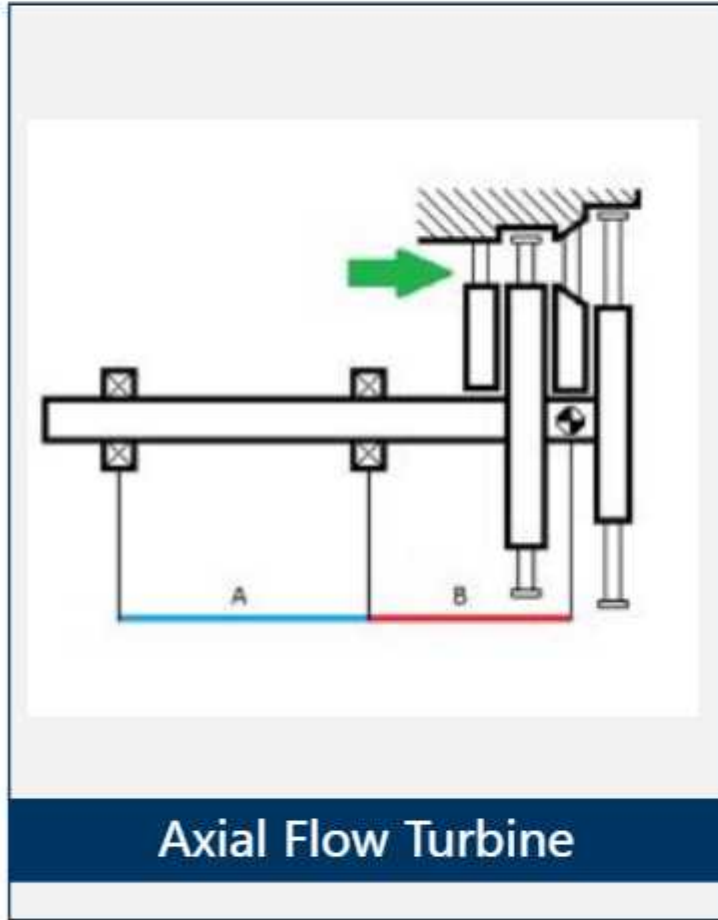


## Built-in Mechanical Group

- Simple and fast maintenance, reduced downtimes

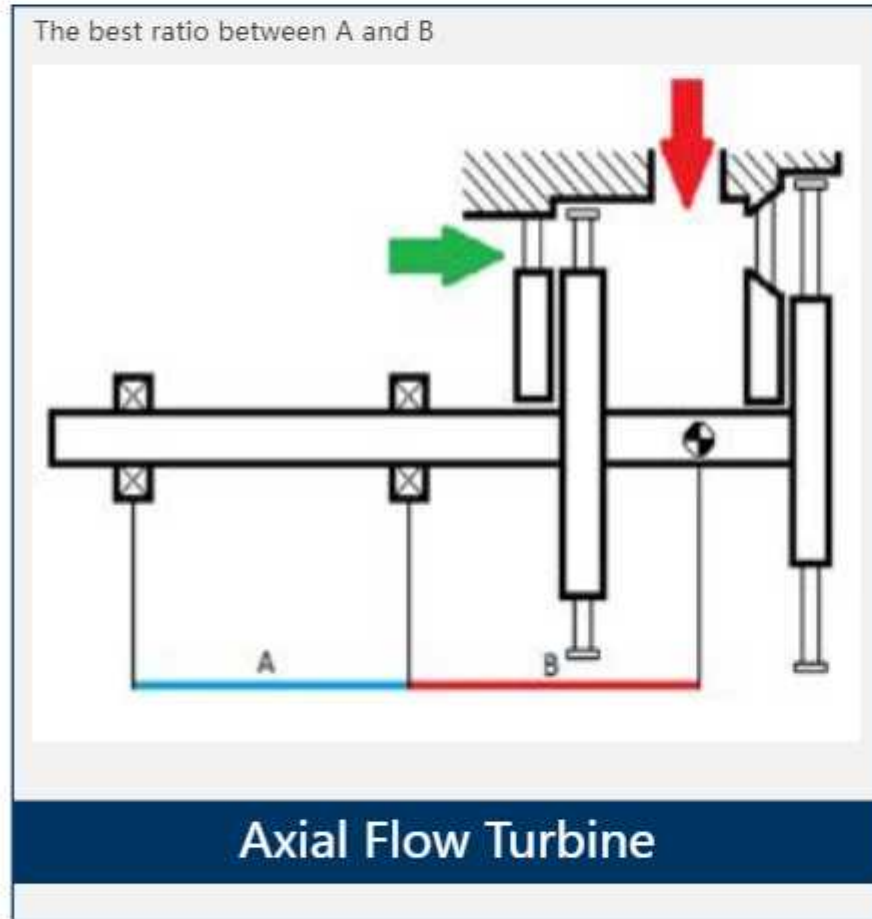
# EXERGY TECHNICAL ADVANTAGES

ROT structure can realize more stages

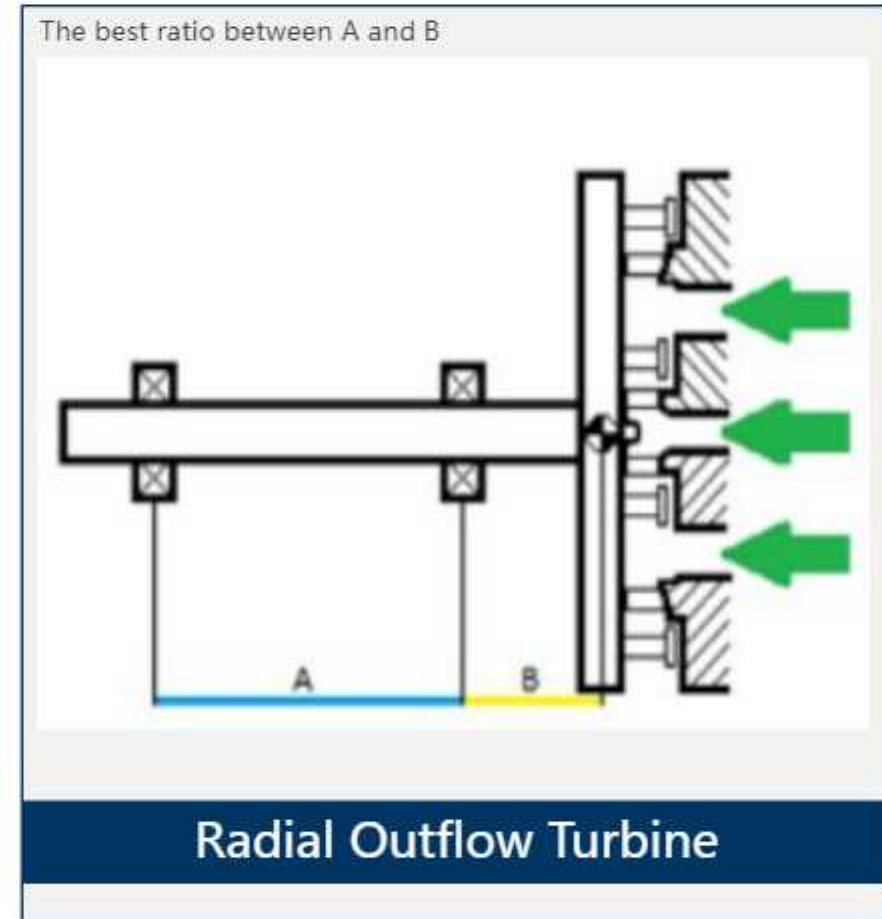


# EXERGY TECHNICAL ADVANTAGES

## Single Turbine Multistage Heat Source Application



VS

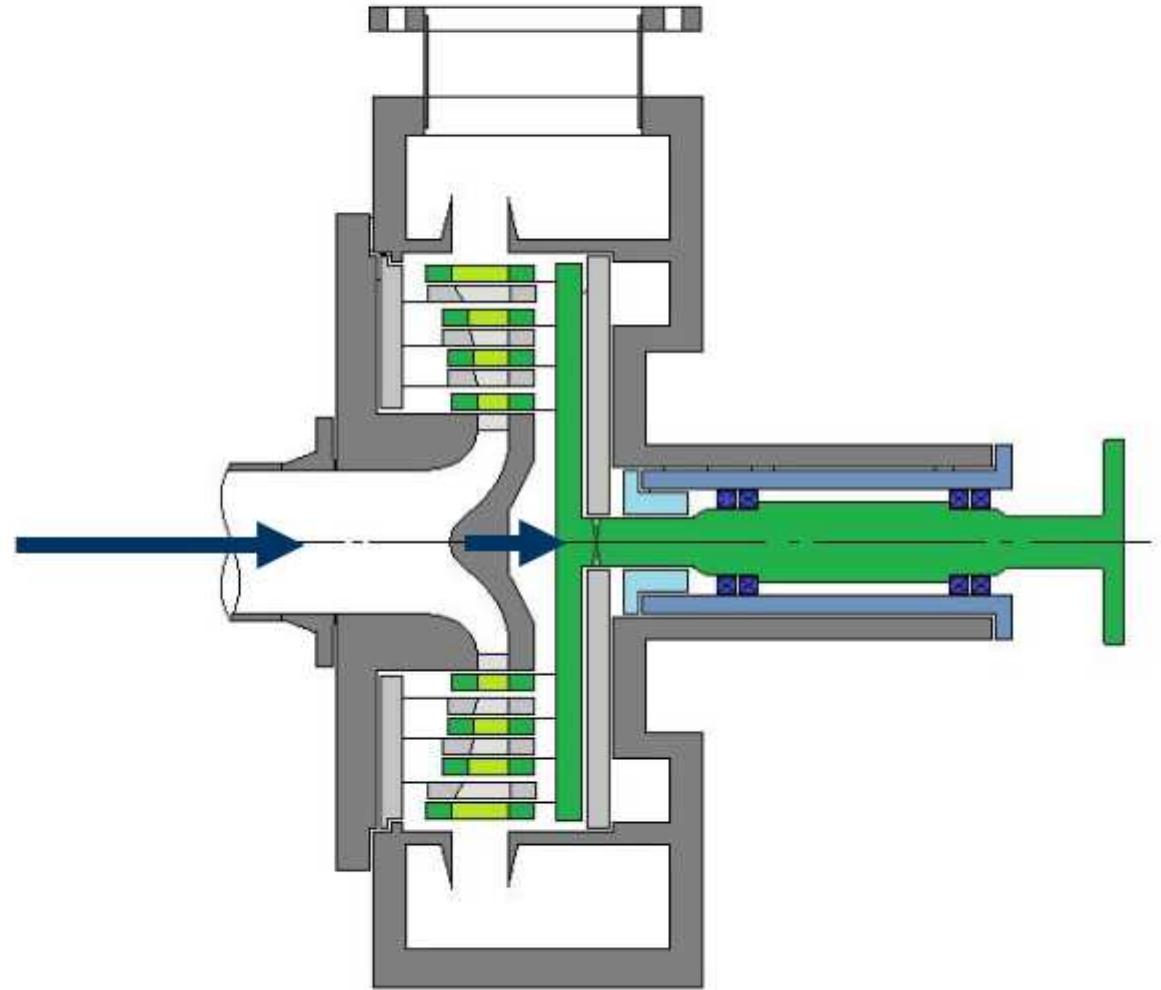


# EXERGY ADVANTAGES

## EXERGY Removable Mechanical Group

### Patented Technology

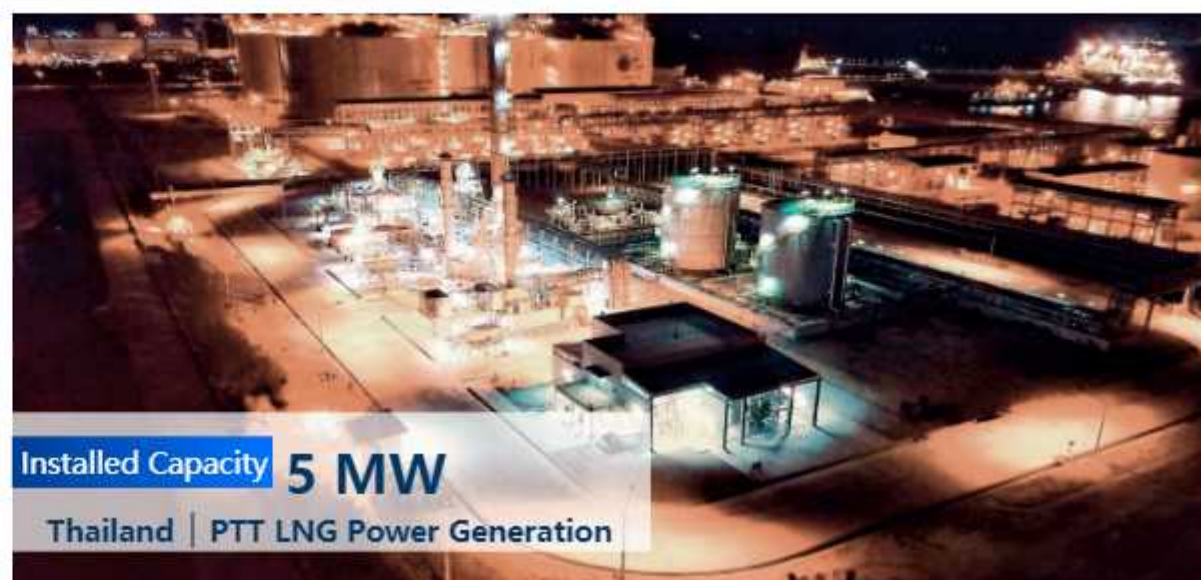
- That allows to remove the mechanical group without any fluid drainage or loss.
- The built-in mechanical group can be extracted to facilitate and maintain a longer life of the bearings.
- The entire operation can be completed with 3~6 hours.



# EXERGY PROJECTS

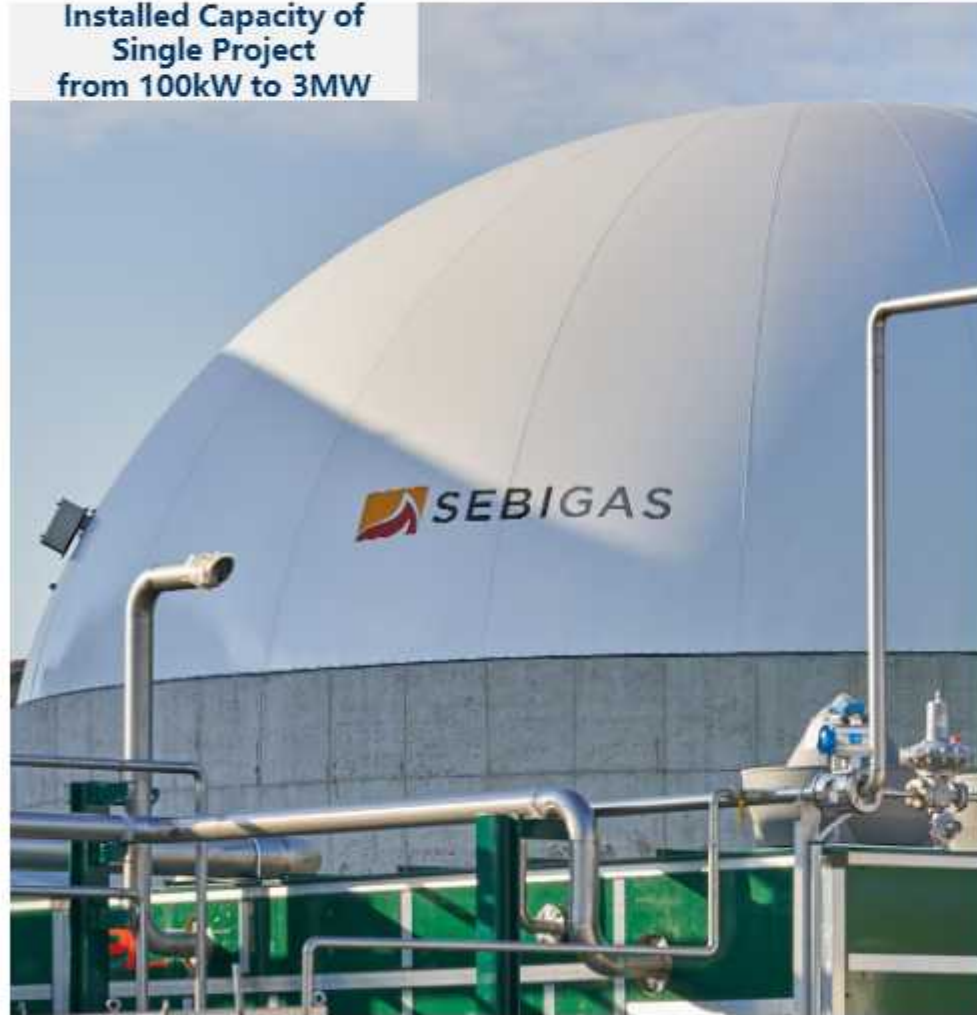


# EXERGY PROJECTS



# SEBIGAS SOLUTIONS

Installed Capacity of  
Single Project  
from 100kW to 3MW



## Wide Spectrum

- More than 80 biomass biogas projects have been designed and completed
- The standard module equivalent capacity is 350kW



## Stability

- More than 80 projects in operation. The fermentation system can be maintained online without stopping
- Average availability of the system is 98.2%



## Wide Operating Range

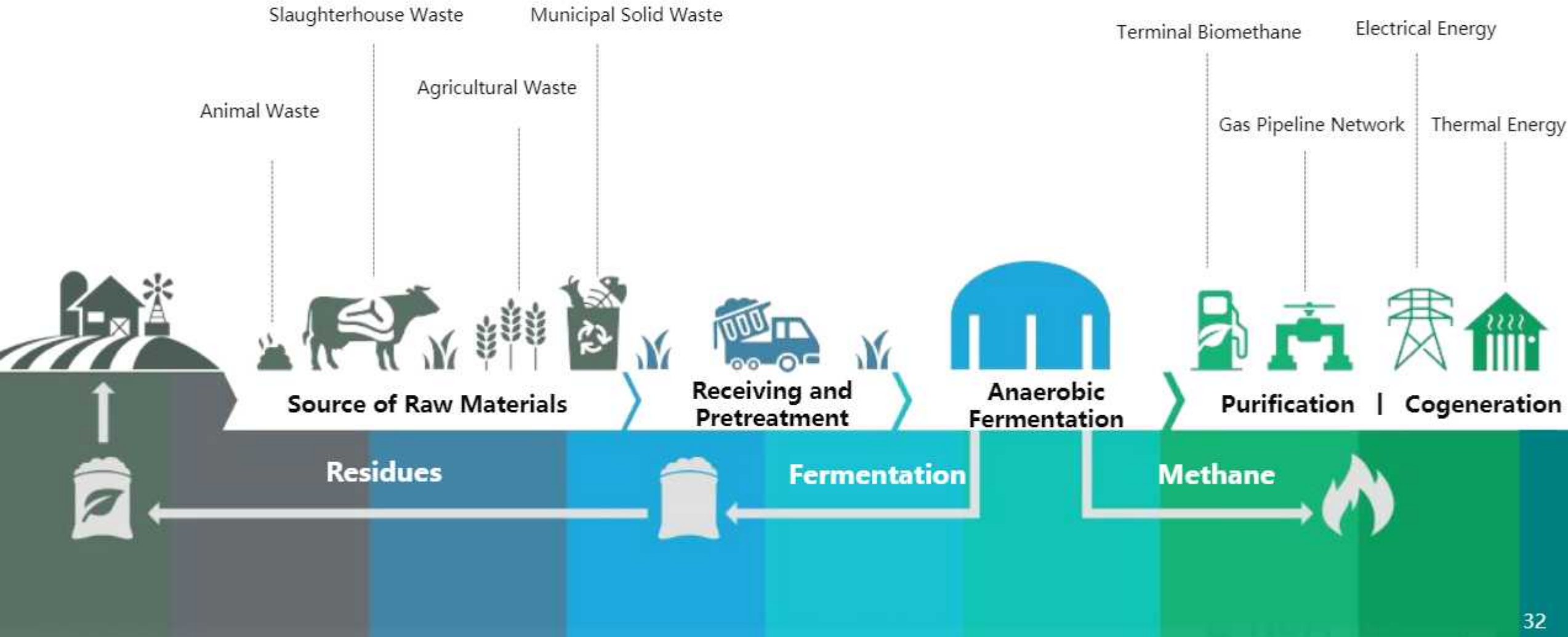
- The minimum ambient temperature of the current operating project is - 30 °C



## Database

- Rich database of biomass organic characteristics
- Customized design according to biomass raw materials with different characteristics in different regions

# SEBIGAS APPLICATION



# SEBIGAS TECHNOLOGY



SEBIBOX



Patented  
Technology

Online Replacement  
and Maintenance



"Submersible + Inclined" Composite Mixing Type



Proprietary  
Technology

The liquid surface does not crust, and the mixture is more uniform. The fermentation efficiency of raw materials can be increased by 20%

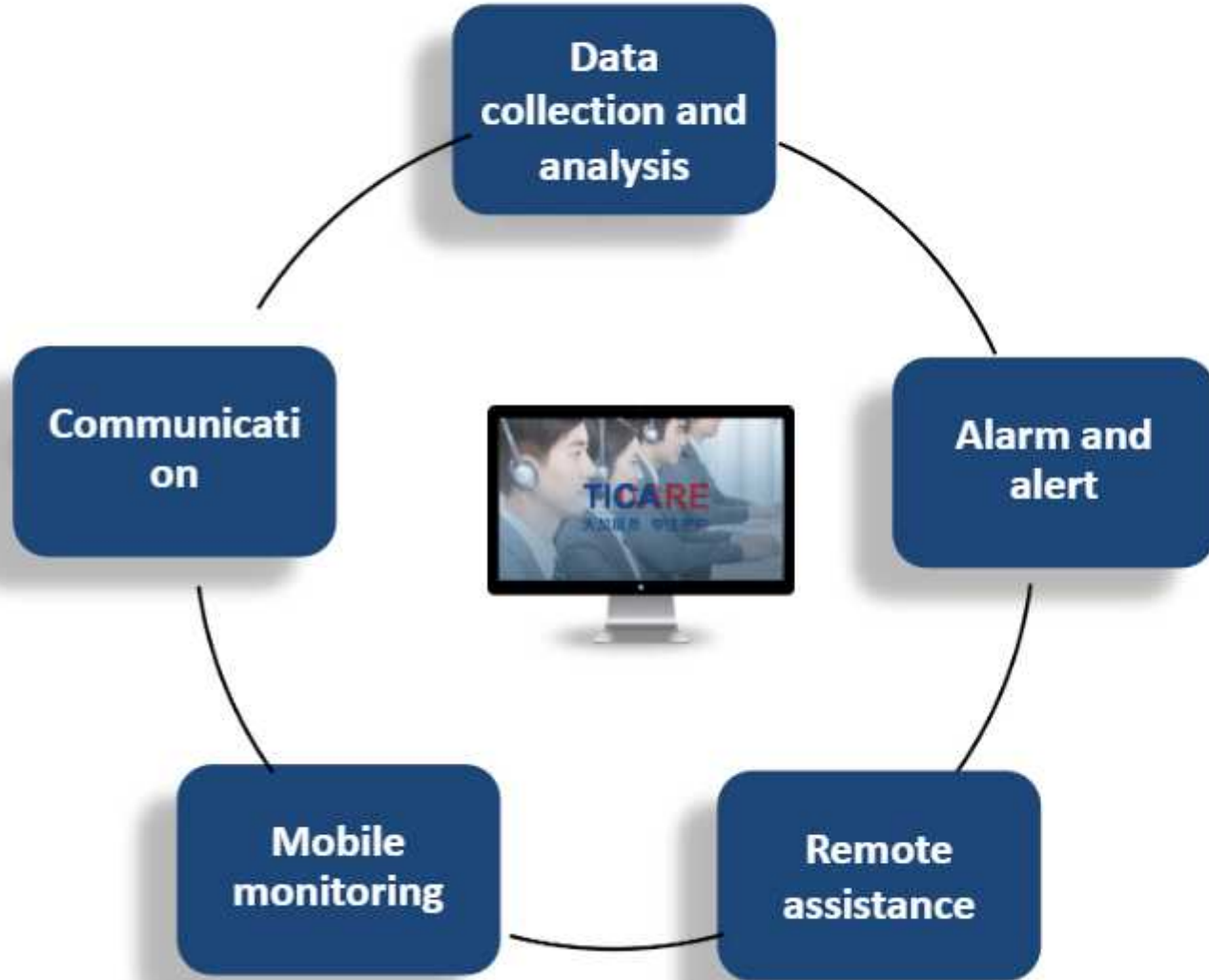
# SEBIGAS PROJECTS





# Intelligent O&M Service

# TICA ENERGY SERVICE



TICA Energy service offer 24/7 support through remote monitoring systems.



# INTELLIGENT REMOTE O&M CENTER

远程监控室  
REMOTE MONITORING ROOM



## ORC Expert diagnostic system (under construction)

- Real-time monitoring
- ORC operation knowledge base
- Early warning according to operation trend
- Analysis and diagnosis of historical problems

TICA ENERGY TECHNOLOGY

 SEBIGAS

EXERGY

 TICA<sup>®</sup>

PureCycle

**TICA POLAND Sp. z o.o.**  
**Committed to Carbon Neutralization**

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