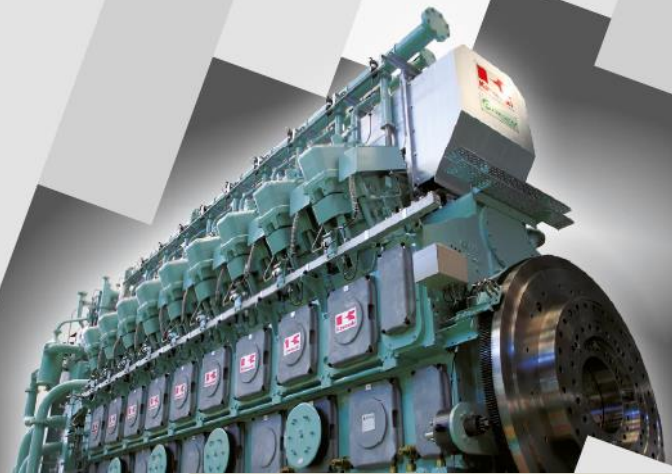
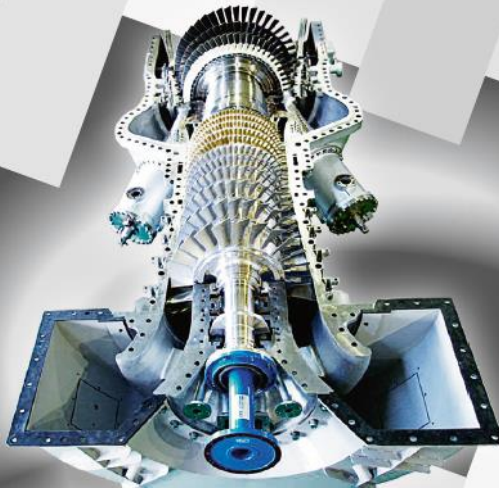


# Two Specialists

## No Compromise



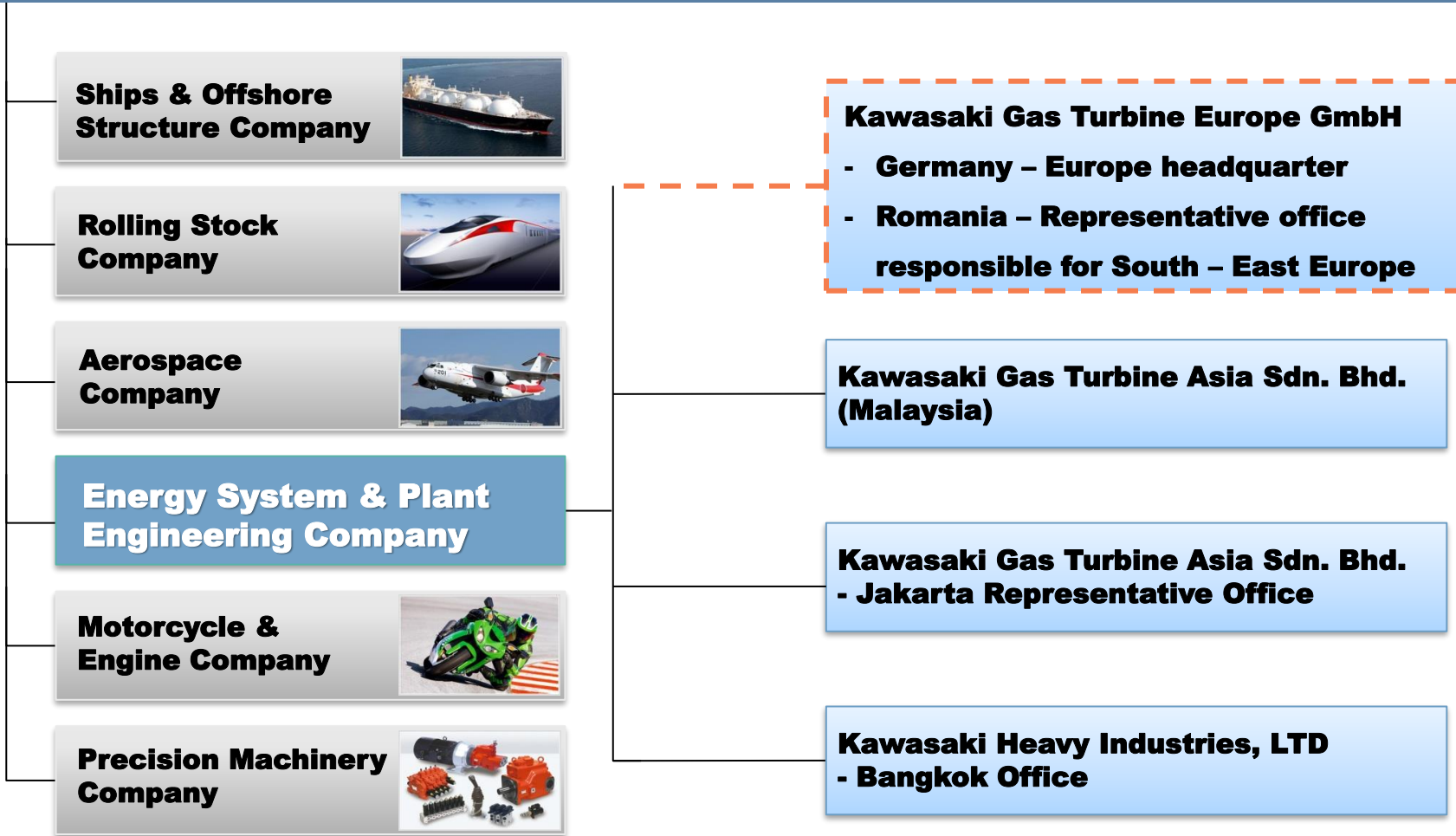
## **KAWASAKI Gas Turbine Europe GmbH**

**Energynomics – 28<sup>th</sup> September 2022**

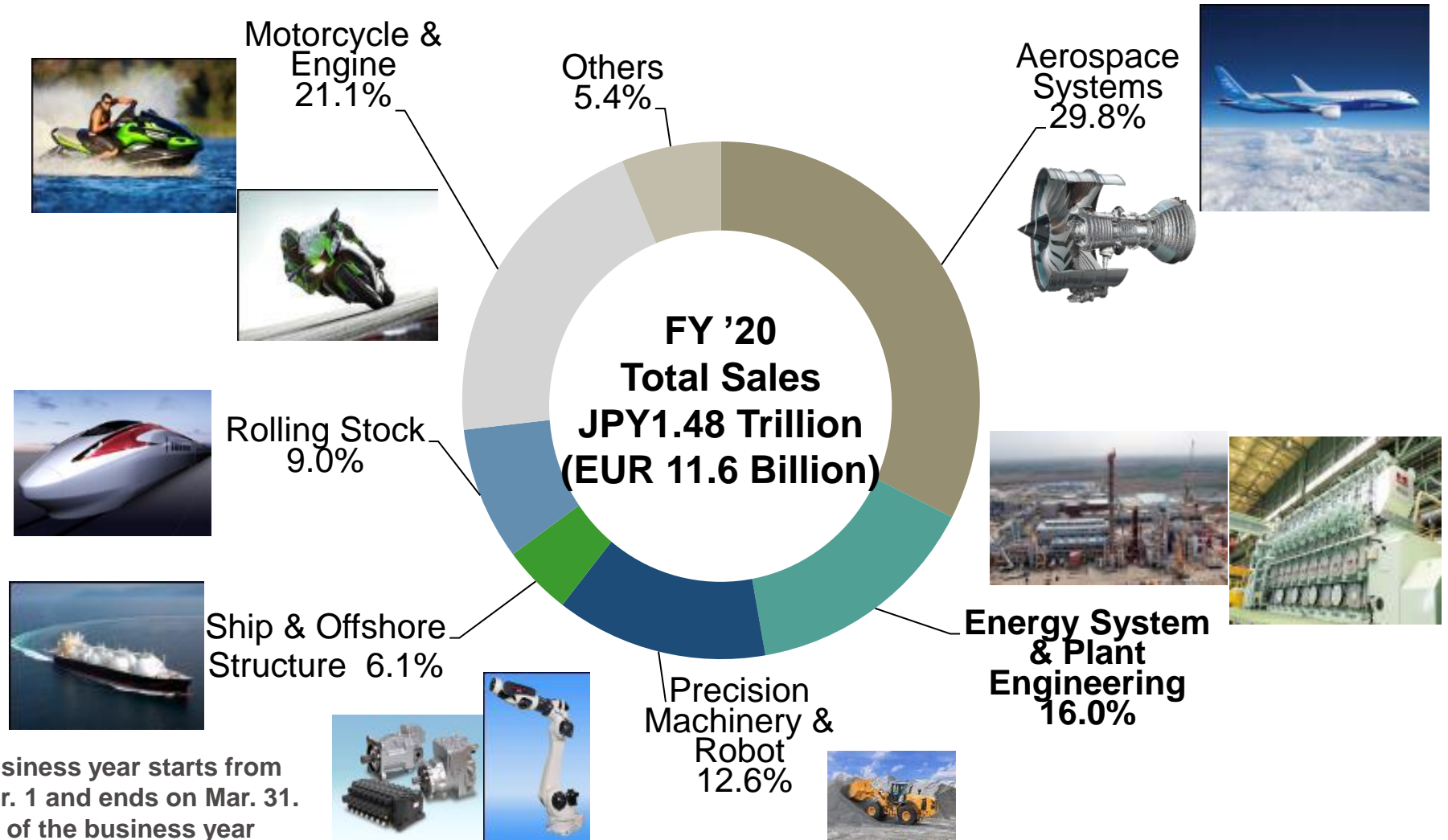
 **Kawasaki**  
Powering your potential

# Kawasaki Heavy Industries – Sections

## Kawasaki Heavy Industries, Ltd.



# Kawasaki Heavy Industries – Sections



# Kawasaki Gas Turbine Europe (KGE) – History

## 1975 License Agreement with Deutz AG

- *Deutz, Cologne starts the Sales and Service of the M1A Gas Turbine*
- *MWM Diesel & Gastechnik, Mannheim takes over the business from Deutz*

## 1998 Establishment of KAWASAKI Gas Turbine Europe GmbH

- *Headquarter for the entire European Market*
- *Sales, Packaging and Service of Gas Turbine Generator Sets*
- *10 Employees*

## 2003 Expansion of Production Facilities

- *Relocation to Bad Homburg (close to Frankfurt City)*
- *Establishment of the Production Site and Service Centre Europe*
- *Start of in-house packaging of GPB17D*
- *25 Employees*

## 2013 Introduction of the Gas Engines into the product portfolio

- *Start of Promotion and Sales of KG-12/V and KG-18/V*
- *40 Employees*

## 2018 Establishment of Romanian Office in Bucharest

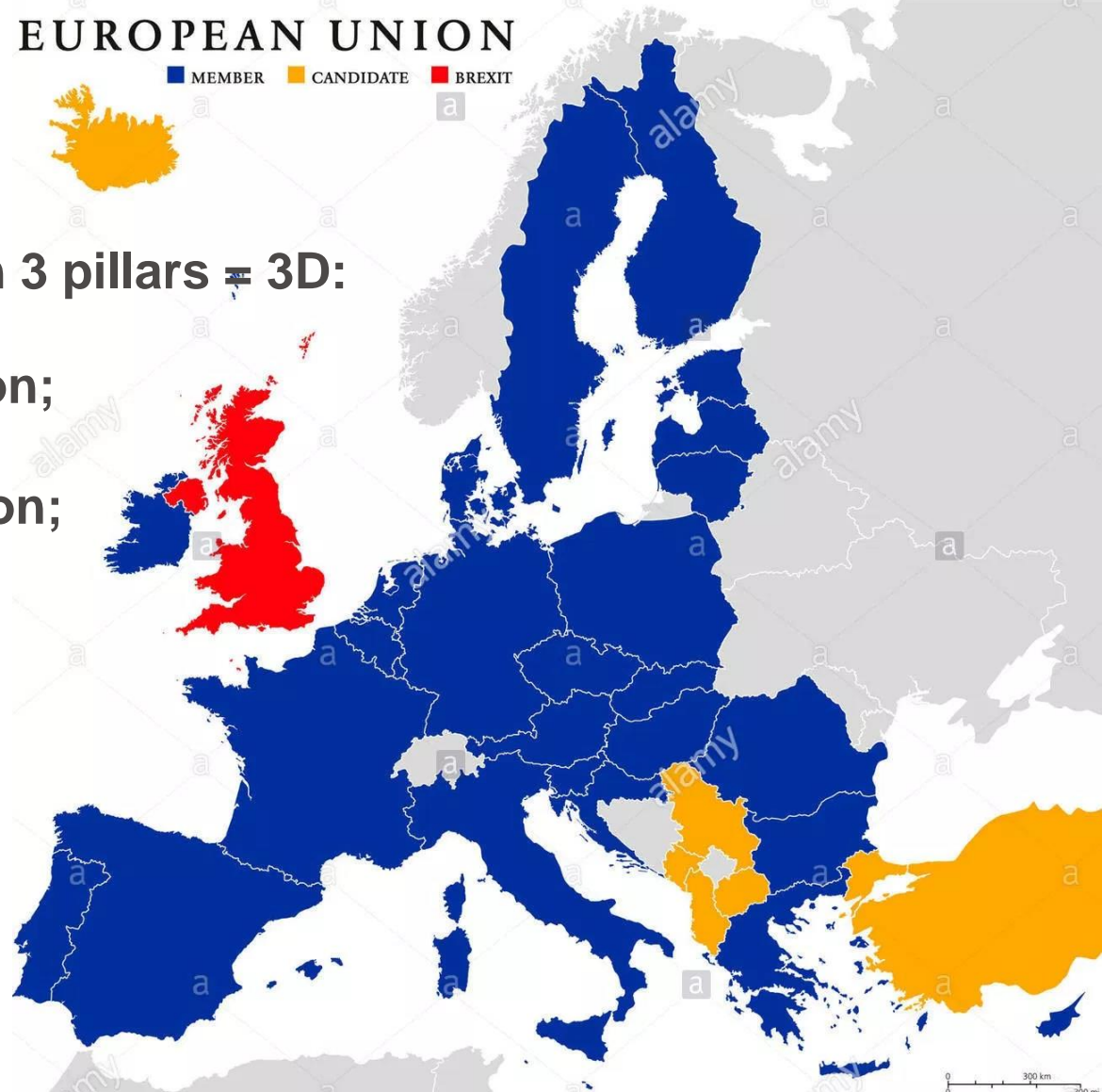
- *Promotion & Sales Activities started, responsible for South-East Europe*
- *Currently: 67 Employees*



# European Union - Energy Approach based on 3D

## EUROPEAN UNION

MEMBER CANDIDATE BREXIT



Energy approach based on 3 pillars = 3D:

- 1<sup>st</sup> D = Decarbonization;
- 2<sup>nd</sup> D = Decentralization;
- 3<sup>rd</sup> D = Digitalization;

# Kawasaki Products & Services

## Kawasaki Gas Turbine Europe



### Products



### Services

#### Gas Turbines

#### Gas Engines

#### Engineering

#### Implementation

#### Maintenance

**M1A-17D**  
1,816 kWel  
 $\eta = 28.1 \%$

**KG12**  
5,200 kWel  
 $\eta = 49 \%$

**Concept Engineering**

**Project Planning**

**Spare Parts  
Consumables**

**M5A-01D**  
4,720 kWel  
 $\eta = 32.6 \%$

**KG18**  
7,800 kWel  
 $\eta = 49.0 \%$

**Detailed Engineering**

**Customized Packaging**

**Full Maintenance**

**M7A-03D**  
7,810 kWel  
 $\eta = 33.6 \%$

**KG18-V**  
7,800 kWel  
 $\eta = 49.5 \%$

**Erection  
Commissioning**

**Remote Monitoring**

**L20A-01D**  
18,500 kWel  
 $\eta = 34.3 \%$

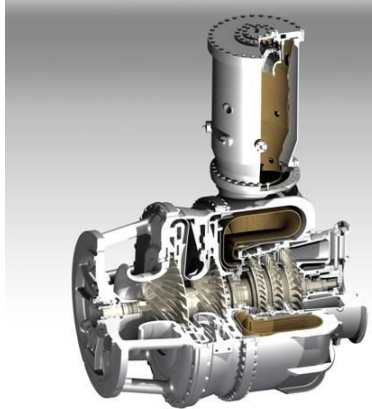
**KG18-T**  
7,800 kWel  
 $\eta = 51 \%$

**Other Services**

**L30A-01D**  
34,300 kWel  
 $\eta = 40.3 \%$

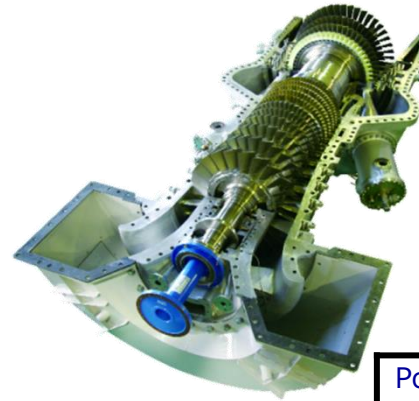
# Kawasaki Gas Turbine Engine Models

**M1A-17D**



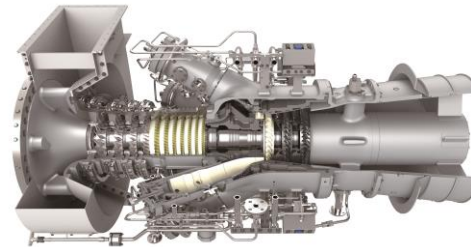
Power Output [kWe]	1,816
Ele. Efficiency [%]	28.1
Sat. steam 8 barg [t/h]	5
Exhaust Gas Temperature [°C]	522
NO <sub>x</sub> @ O <sub>2</sub> = 15% [ppm]	< 9
CO @ O <sub>2</sub> = 15% [ppm]	50

**M7A-03D**



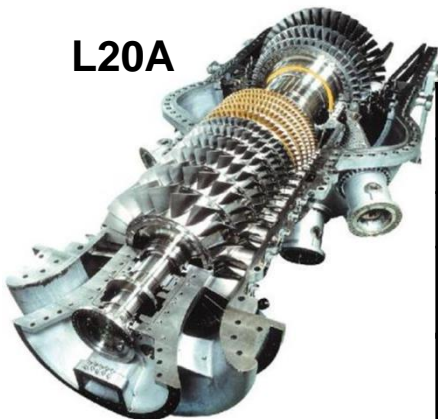
Power Output [kWe]	7,810
Ele. Efficiency [%]	33.6
Sat. steam 8 barg [t/h]	16.4
Exhaust Gas Temperature [°C]	523
NO <sub>x</sub> @ O <sub>2</sub> = 15% [ppm]	< 9
CO @ O <sub>2</sub> = 15% [ppm]	10

**M5A-01D**



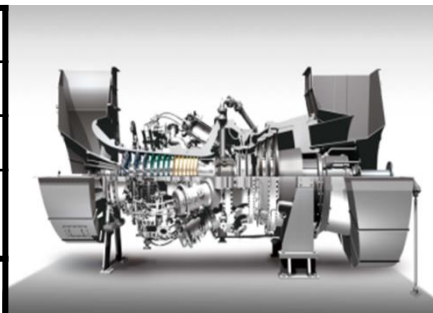
Power Output [kWe]	4,720
Ele. Efficiency [%]	32.6
Sat. steam 8 barg [t/h]	11
Exhaust Gas Temperature [°C]	511
NO <sub>x</sub> @ O <sub>2</sub> = 15% [ppm]	15
CO @ O <sub>2</sub> = 15% [ppm]	15

**L20A**



Power Output [kWe]	18,500
Ele. Efficiency [%]	34.3
Sat. steam 8 barg [t/h]	37
Exhaust Gas Temperature [°C]	542
NO <sub>x</sub> @ O <sub>2</sub> = 15% [ppm]	15
CO @ O <sub>2</sub> = 15% [ppm]	25

**L30A**



Power Output [kWe]	34,380
Ele. Efficiency [%]	40.3
Sat. steam 8 barg [t/h]	55
Exhaust Gas Temperature [°C]	502
NO <sub>x</sub> @ O <sub>2</sub> = 15% [ppm]	15 / 9
CO @ O <sub>2</sub> = 15% [ppm]	25

# Kawasaki Gas Engine Models

**KG 18V**



**KG 12**



**KG 18T**



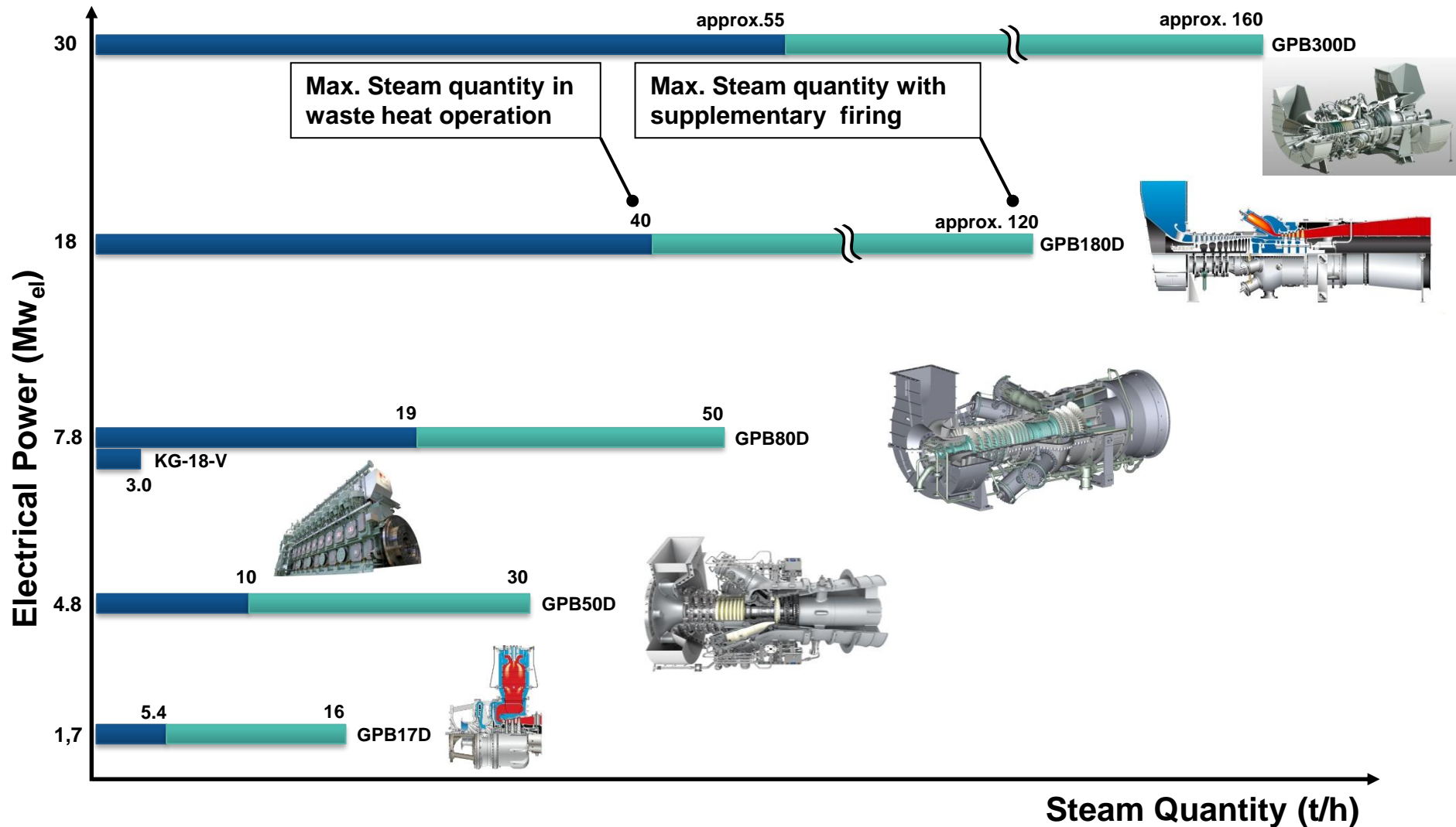
Power Output [kWe]	7,800
Ele. Efficiency [%]	49.5
Total Engine Heat [kWth]	5,000
Exhaust Gas Temperature [°C]	320
NOx @ O <sub>2</sub> = 0% [ppm]	200
CO @ O <sub>2</sub> = 0% [ppm]	50
Methane number	> 65

Power Output [kWe]	5,200
Ele. Efficiency [%]	49
Total Engine Heat [kWth]	3,000
Exhaust Gas Temperature [°C]	320
NOx @ O <sub>2</sub> = 0% [ppm]	200
CO @ O <sub>2</sub> = 0% [ppm]	50
Methane number	> 65

Power Output [kWe]	7,800
Ele. Efficiency [%]	51
Total Engine Heat [kWth]	3,500
Exhaust Gas Temperature [°C]	285
NOx @ O <sub>2</sub> = 0% [ppm]	250
CO @ O <sub>2</sub> = 0% [ppm]	50
Methane number	> 65



# Performances in CHP



# KGE market – request of electricity and steam / hot water / chilled water

## Typical applications:

Pulp and paper



Medicines / cosmetics



Refinery / Chemistry



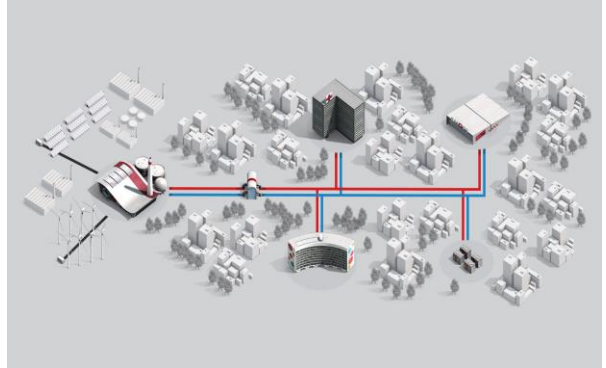
Food and Beverage



Automotive / Tires



District Heating



Universities  
Hotels

Hospitals  
Airports

## Working as one for the good of the planet!

Highly Focusing on Environmental Protection  
and Energy Savings

- **Reduction of emissions**
  - ❖ Global warming gas CO<sub>2</sub>
  - ❖ Harmful gas NO<sub>x</sub>, SO<sub>x</sub>
- **Energy Saving**

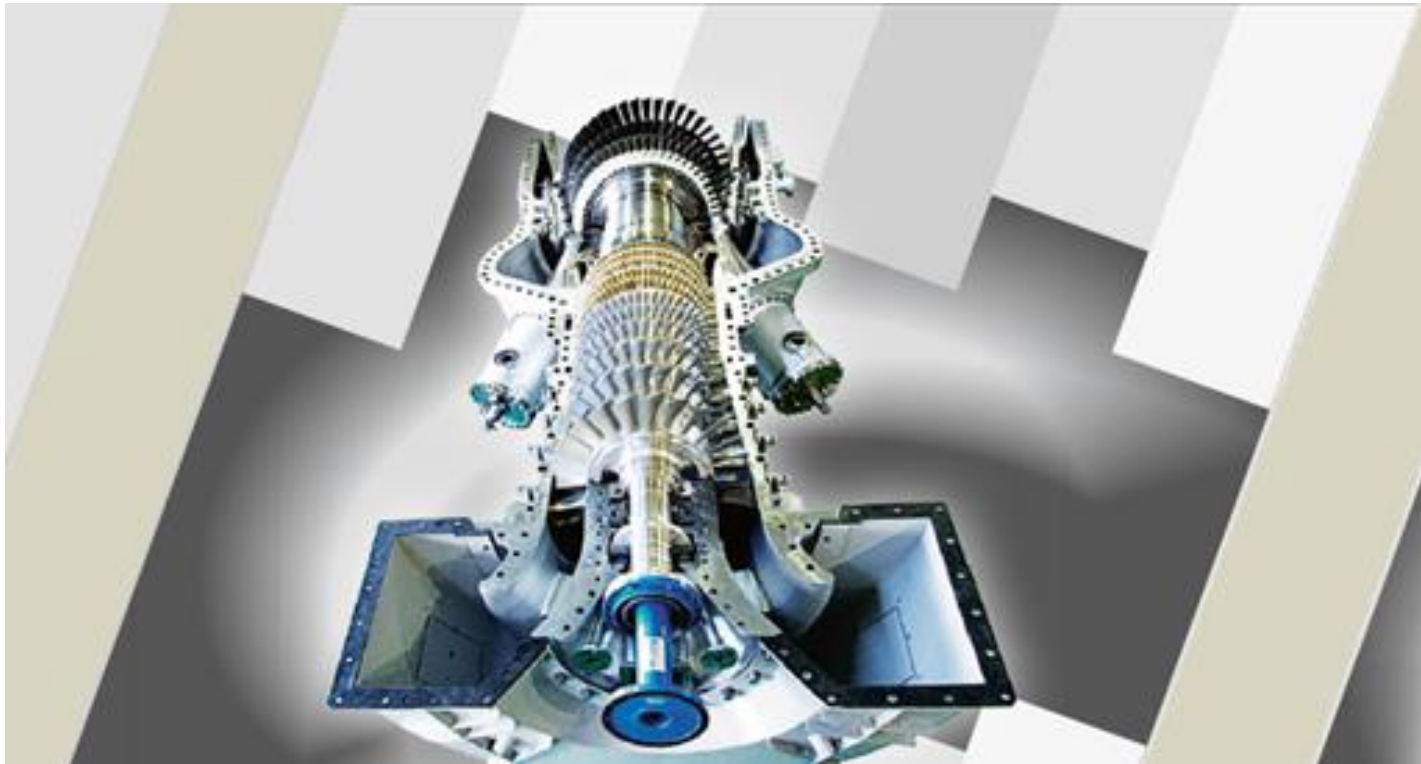
Hydrogen – future fuel for  
energy production

**Distributed Generator System**

- **Provide highly efficient energy use**
- **Flexible and reliable**  
**to complement unstable renewable energy**

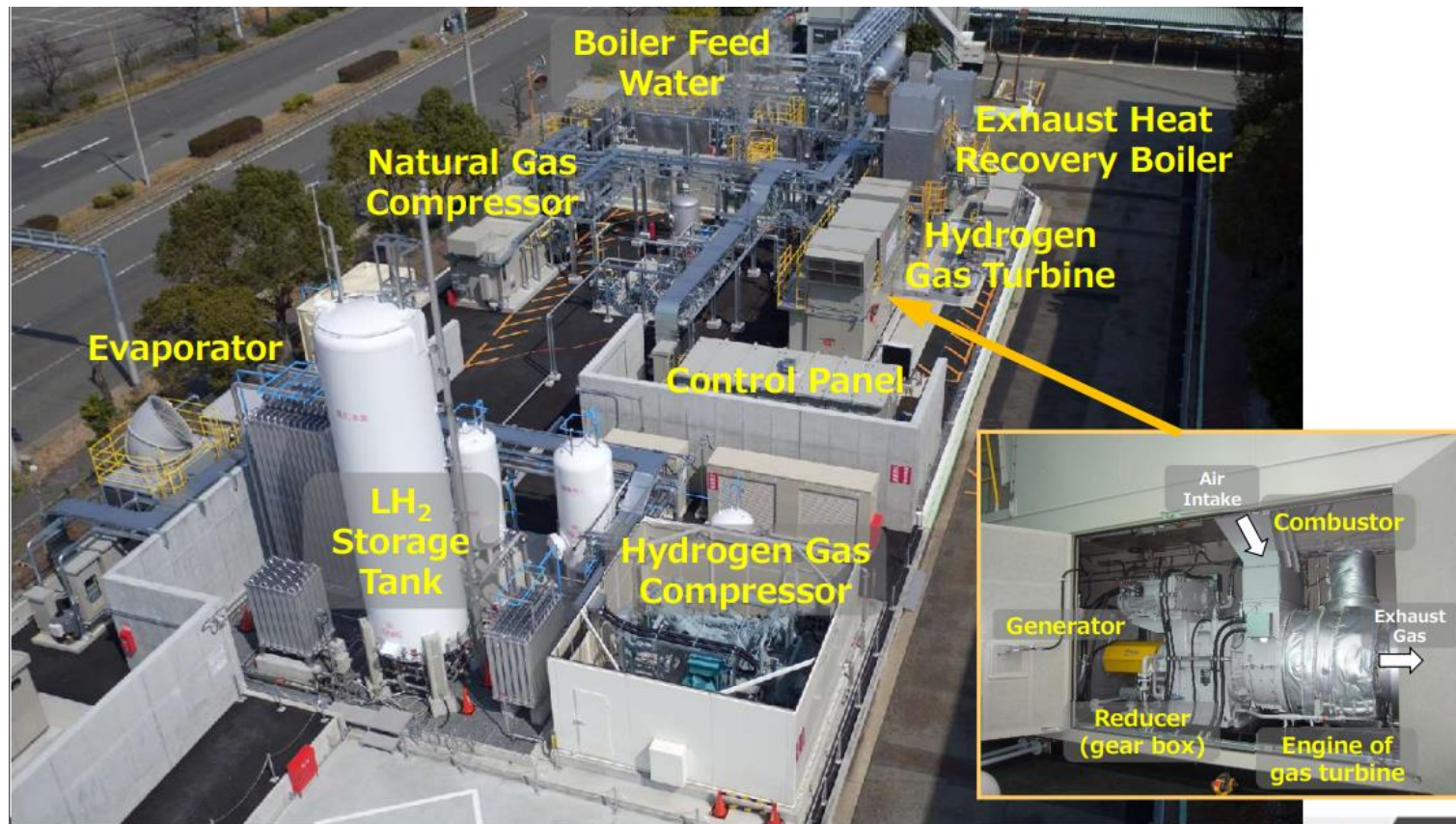
# H2 – future fuel as alternative to classic fuel

## Kawasaki Heavy Industries Hydrogen Road Map



# H2 – future fuel as alternative to classic fuel

## World's First 100% H<sub>2</sub>-CHP Plant at Kobe Harbor



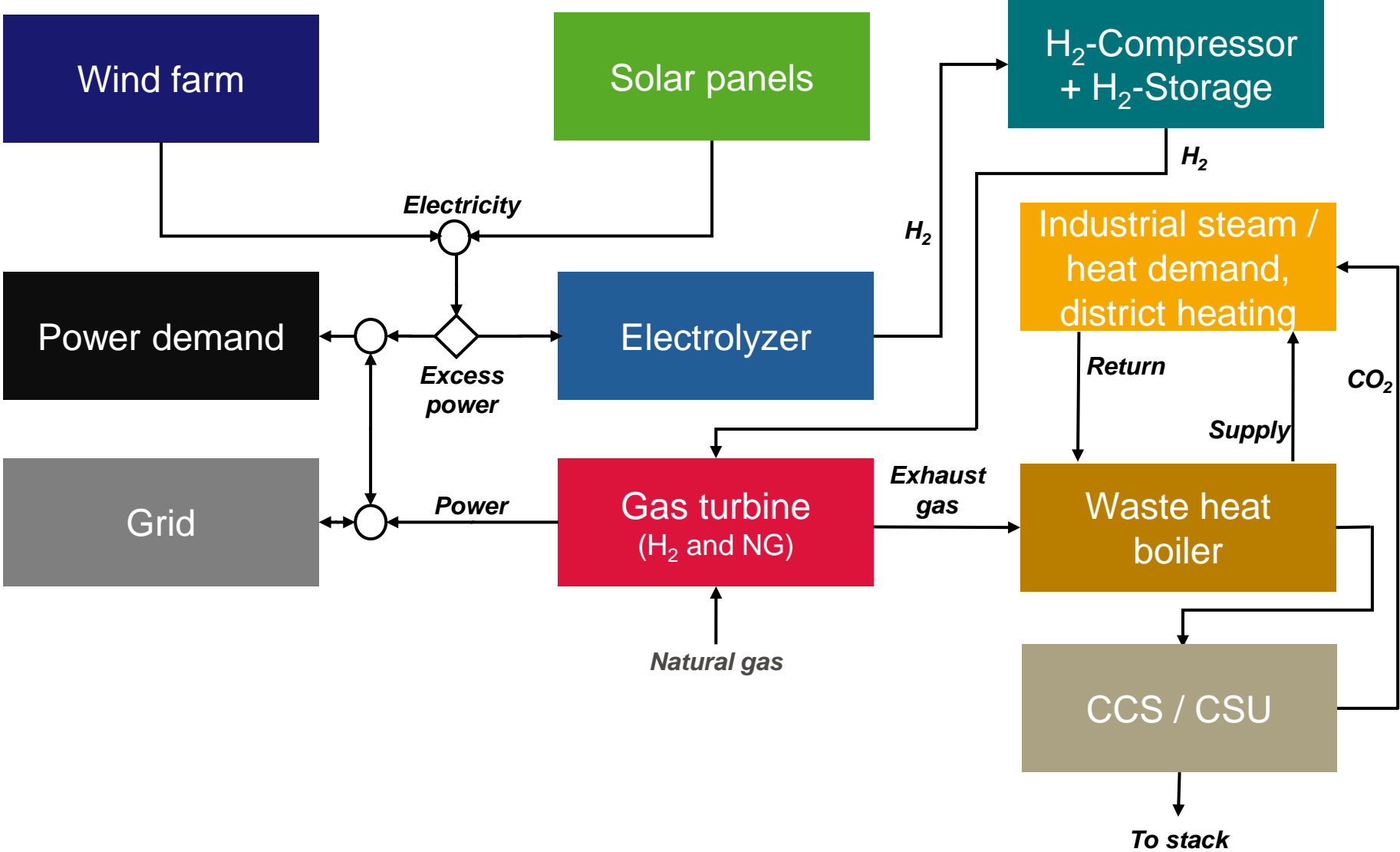
# H2 – future fuel as alternative to classic fuel

**RWE** and **Kawasaki** plan to build one of the world's first 100% hydrogen-capable gas turbines on industrial scale in Lingen, Germany



The project is one of the first worldwide to use a gas turbine to convert 100% hydrogen into electricity on an industrial scale. The plant, with an output of 34 megawatts (MW), could become operational in mid-2024

# Future Cogeneration Plants



Kawasaki will pursue "manufacturing that makes the Earth smile."

# “Global Kawasaki”