

GE Energy
GE能源集团

Power Generation Application of Unconventional Gas with Gas Engines
非传统气体在燃气内燃机的发电应用

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Jenbacher Gas Engines

市场总监

GE颜巴赫燃气内燃机事业部

The Ninth U.S.-China OGIF

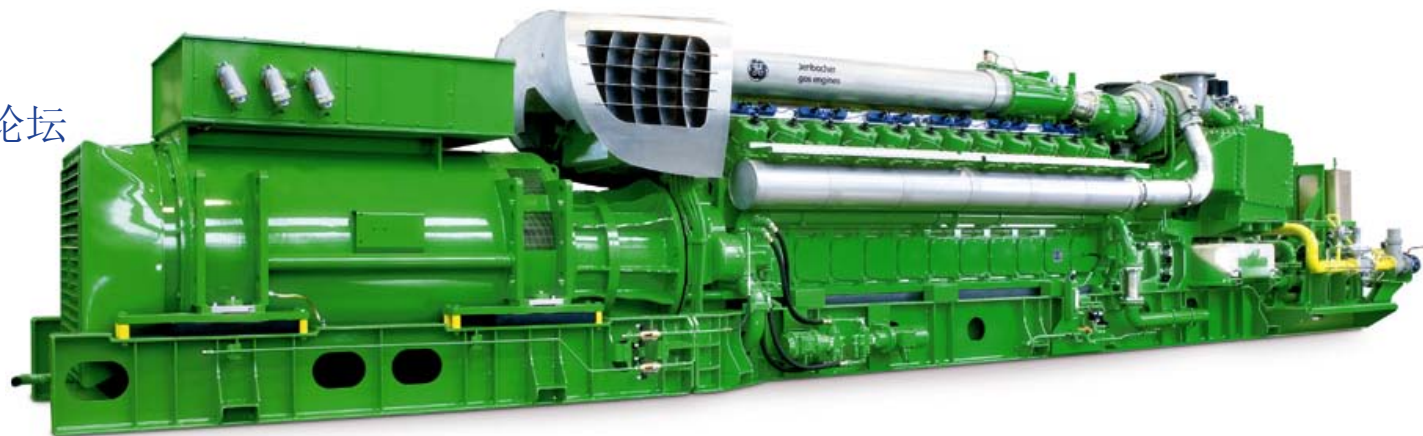
Qingdao

September 27-29, 2009

第九届中美油气产业论坛

青岛

2009年9月27-29日



GE imagination at work

About GE

公司概况

- Founded in 1892 by Thomas Edison
1892年由托马斯·爱迪生创立
- Operations in more than 100 countries
经营范围遍布全球 100 多个国家
- More than 300,000 employees worldwide
85,000 in Europe
全球范围员工人数超过30万，其中欧洲
85,000人

GE Financials 2008

2008年GE财务状况

Sales	\$183B
销售	
Net earnings	\$18.1B
净利润	
Cash flow/Operations	
现金流/运营	\$19.1B



GE Energy Infrastructure GE能源基础设施集团

Employees / 员工: 65,000 • '08 revenue / 08年收入: \$38.6B • Operating in 140 countries / 在全球140个国家经营

Power & Water 发电和水处理



- Power generation
发电
- Renewables
可再生能源
- Gas Engines
燃气内燃机
- Nuclear
核能
- Gasification
煤气化
- Water treatment
水处理
- Process chemicals
工艺药剂

Energy Services 能源服务



- Contractual agreements
合同服务
- Smart Grid
智能电网
- Field services
现场服务
- Parts & repairs
备件和维修
- Optimization technologies
优化技术
- Plant management
工厂管理

Oil & Gas 石油和天然气



- Drilling & completion
钻井和完井
- Subsea, offshore & onshore
海底、近海、陆地
- LNG & Pipelines
液化天然气和管线
- Pipeline integrity
管线完整性检查
- Refining
炼化
- Processing
工艺



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Jenbacher gas engines 颜巴赫燃气内燃机

A leading manufacturer of gas fueled reciprocating engines for power generation
全球领先的以可燃气为发电燃料的活塞往复式内燃机制造商

More than 9,100 delivered engines / 10,800MW

Power range from 0.25MW to 4MW

全球供货量达到**9,100**多台/**10,800**兆瓦

发电功率范围**0.25**至**4**兆瓦

Fuel flexibility:

Natural gas, biogas, flare gas, landfill gas, steel gas, coal mine gas

广泛的燃气适应性:

天然气, 沼气, 火炬气, 垃圾填埋气, 可燃性工业废气, 煤层气

Advanced system solutions:

Generator sets, container modules

cogeneration, trigeneration, CO₂-fertilization

先进的系统性解决方案:

内燃机发电机组, 集装箱模块, 热电联供, 冷热电三联供, 温室二氧化碳养料

Environmental benefits:

Low emissions

ecomagination solutions

利于环保:

污染物排放低

绿色创想的解决方案

Lifecycle services (parts, repair, CSA, upgrades)

1,900 units under CSA

生命周期维护服务 (零部件, 维修, 售后客户服务协议, 系统升级)

1900套机组签定售后客户服务协议



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Type **2**
2系列



- Electrical output: from 250 to 330KW

发电功率范围：
250至330千瓦

- 8 cylinder

8缸

- 1,500 rpm (50Hz) / 1,800 rpm (60Hz)

- Delivered engines: more than 850

已供机组：**850**
多台

- Since 1976 in the product program

投产于**1976年**

Type **3**
3系列

- Electrical output: from 500 to 1,100KW

发电功率范围：
500至1,100千瓦

- V12, V16 and V20 cylinder

V12, V16和V20缸

- 1,500 rpm (50Hz) / 1,800 rpm (60Hz)

- Delivered engines: more than 5,000

已供机组：**5,000**
多台

- Since 1988 in the product program

投产于**1988年**



Type **4**
4系列



- Electrical output: from 800 to 1,500KW

发电功率范围：
800至1,500千瓦

- V12, V16 and V20 cylinder

V12, V16和V20缸

- 1,500 rpm (50Hz) / 1,800 rpm (60Hz)

- Delivered engines: more than 750

已供机组：**750**
多台

- Since 2002 in the product program

投产于**2002年**

Type **6**
6系列

- Electrical output: from 1.5 to 4MW

发电功率范围：
1.5至4兆瓦

- V12, V16, V20 and V24 cylinder

V12, V16和V24缸

- 1,500 rpm (50Hz, 60Hz with gear-box)

- Delivered engines: more than 2,200

已供机组：**2,200**
多台

- Since 1989 in the product program

投产于**1989年**



Advantages of on-site energy supply

电源就近负载发电的优点

Energy supply directly at the load source allows to reduce or avoid transport and distribution losses.

电能直接就近提供负载，减少或避免输配电过程中的线路损耗

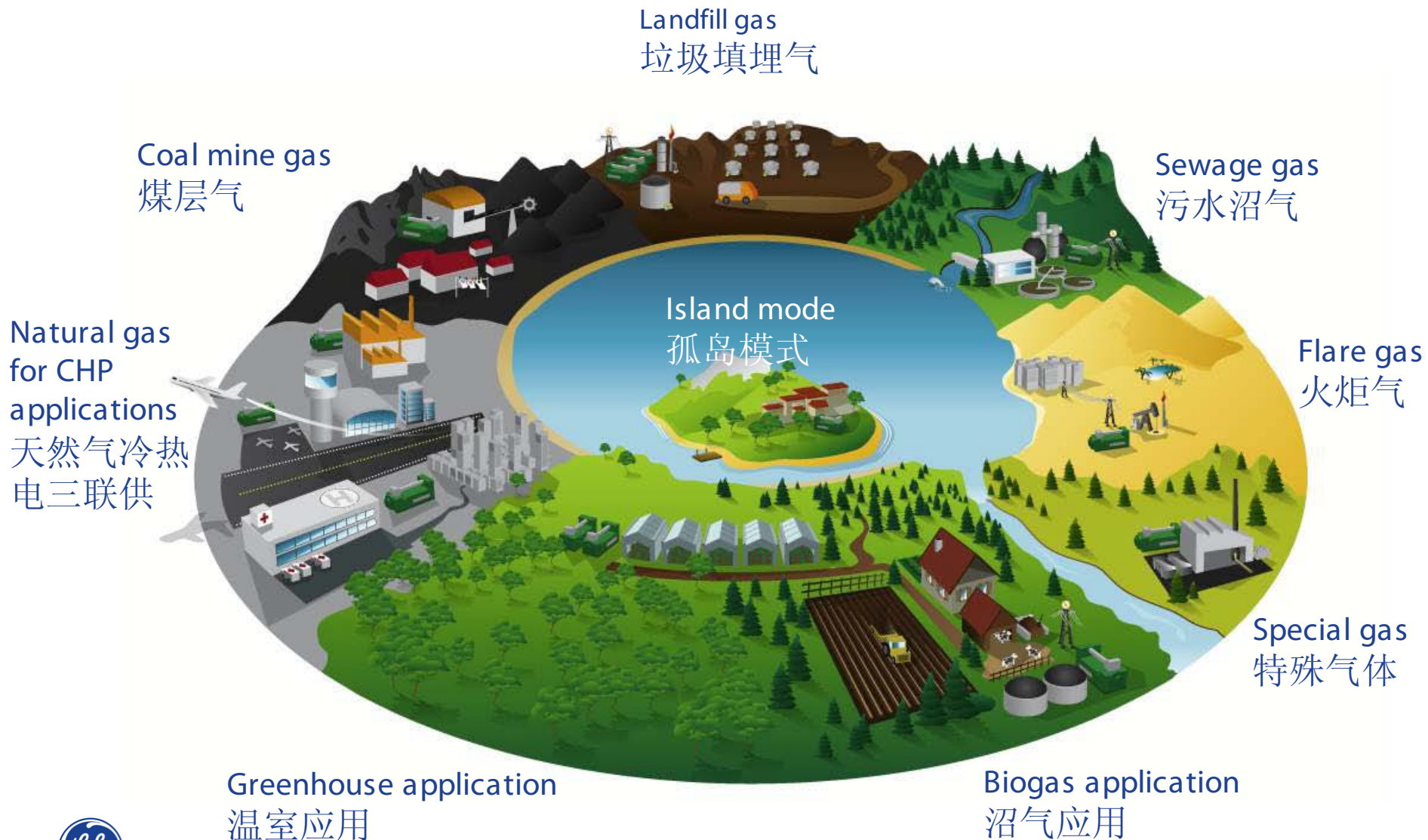
Key features of Jenbacher plants

颜巴赫机组的主要特点

- High electrical efficiencies of up to 44%
发电效率高，可达44%
- Overall efficiencies (electrical and thermal) of over 90%
总效率超过90%（电效率和热效率）
- Minimum emissions
污染物排放最低化
- Specially designed engines for use of alternative, renewable energy sources and special gases
针对可再生能源，特殊气体等各种可替代能源的利用而特殊设计
- Maximum operational safety and availability
安全性和有效性最大化
- High power density
高发电密度



Jenbacher gas engines core applications 颜巴赫燃气内燃机的核心应用



Coal Gas ...types and – attributes 煤层气...类型和 –特性

CSM

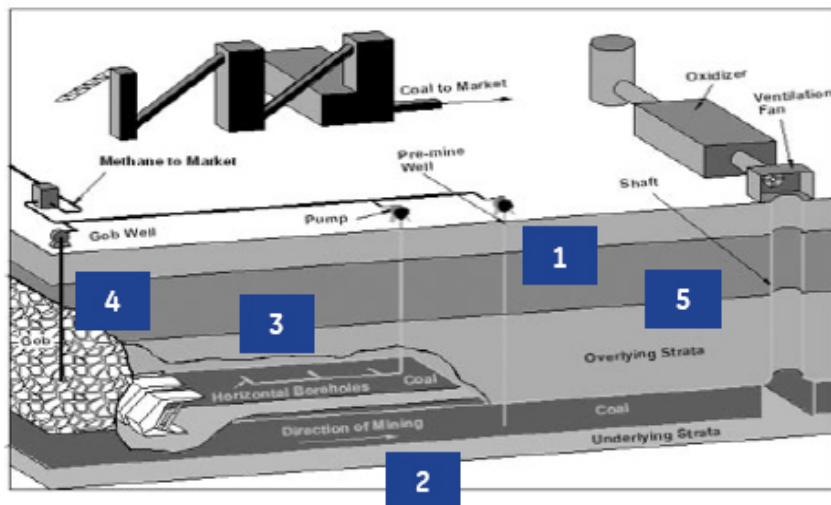
Coal Seam Methane/Coal Related Gas

Gas reserves resulting from the process of coalification locked in the untouched coals seam with 95% CH₄

CBM

Coal Bed Methane

Extracted by pre-mine drainage via virgin CBM wells at minimum 1 year before mining with >90% CH₄



1

2

3

CMM

Coal Mine Methane

Extracted from active mines by drainages up to 1 year before mining with 25 - 60% CH₄

4

AMM

Abandoned Mine Methane

Extracted by under-pressure from sealed, abandoned mines with 60 - 80% CH₄ but no oxygen

5

VAM

Ventilation Air Methane

Vented out of the mining area with big amounts of fresh air to keep the CH₄ under 1.5%



Teralba, Australia

澳大利亚

8 x JGS 320 GS-S.L

8台JGS 320 GS-S.L

Fuel: Coal mine methane

燃料：煤层气

Electrical output: 8,384 kW

发电功率： 8,384千瓦

Commissioning: June 2004

调试时间： 2004年6月

Sasyadko, Ukraine

赛斯亚克项目, 乌克兰

12 x JMS 620 GS-S.LC

12台JMS 620 GS-S.LC

Fuel: Coal mine methane

燃料：煤层气

Electrical output: 36,420 kW

发电功率： 36,420千瓦

Thermal output: 35,040 kW

热功率输出： 35,040千瓦

Commissioning: 2006

调试时间： 2006年

In total: 170 engines; 360 MW

总装机量： 170套机组； 360兆瓦

Associated Petrol Gas ... Flaregas 油田伴生气...火炬气

- GGFR estimates that global flaring is around 150 to 200 bcm a year

GGFR预估全球火炬气每年约有**150至200 bcm**

- Equal to 25% of US gas consumption

相当于美国气体消耗量的**25%**

- Significant contributions to GHG emissions with negative impacts on the environment

减少GHG排放，对GHG所带来的环境负面影响意义重大

- 200bcm > 400 MT CO_2e per year

每年200bcm > 400 MT CO_2e

- Top 20 flared gas countries have 80% of the market share

前20位的火炬气国家拥有**80%**的市场份额

In total: 300 engines; 420 MW

总装机量：300套机组，420兆瓦



Source: Global Gas Flaring Reduction (GGFR) World Bank * GGFR partner



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Ecomagination

绿色创想

Innovative solutions to environmental challenges

不断创新的绿色创想解决方案以应对日益升级的环境挑战

Cost-effective, high output and measurable benefits to the environment ...the following Jenbacher applications have already been certified as GE "ecomagination" products by an independent agency:
出色的成本效益、高输出功率及可量化的环境收益...以下颜巴赫产品应用已被第三方认证为GE“绿色创想产品”：



Biogas

沼气



Landfill gas

垃圾填埋气



Coal mine gas

煤层气



Cogeneration

热电联供



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Service for Jenbacher gas engines 颜巴赫燃气内燃机的服务

We support your business 我们支持您的业务

- Commitment to our customers
给予客户承诺
- Going beyond designing the best available technology
服务不仅仅限于提供最佳的技术和设计

We support our customer's business by providing the right service at the right time throughout the entire operating life of the engine

在机组运转的整个生命周期，我们在合适的时候给客户提供的服务以支持我们顾客的业务





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