# OPRA Turbines CHP Case Studies 2015

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# Outline of today’s presentation

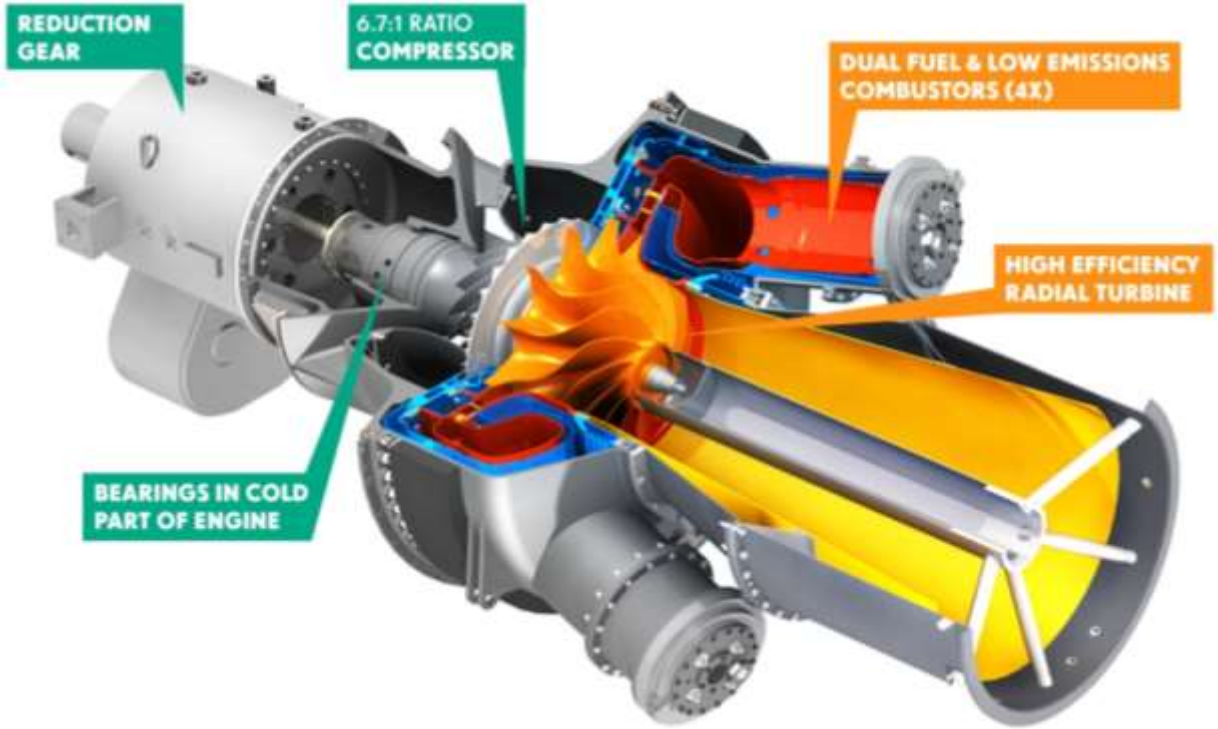
- Case study 1 : Tobacco producer in Germany
- Case study 2 : Starch producer in Germany

# OP16 case study one: British American Tobacco

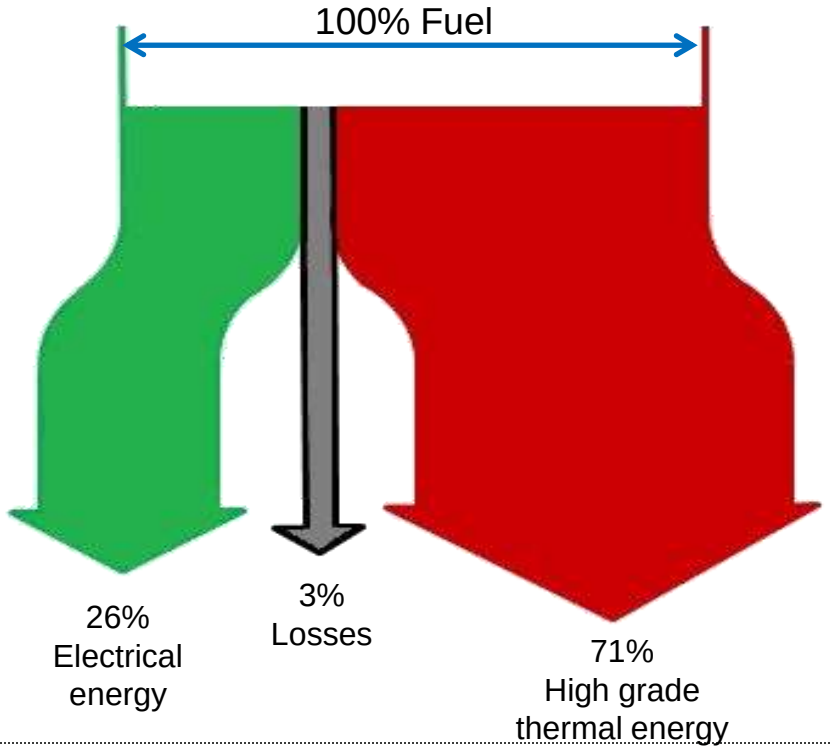
# Case study 1: British American Tobacco relies on OP16 heat and power

- One of five largest tobacco companies with more than 200 brands in around 180 markets
- 2013 turnover exceeds $24 billion;
- Manufacturing facility in Bayreuth is the largest factory within the BAT group
- BAT operates 1 OP16-3B combined with a parallel fired boiler

# The 1.85 MW OP16 gas turbine engine combines the best of simplicity and high performance



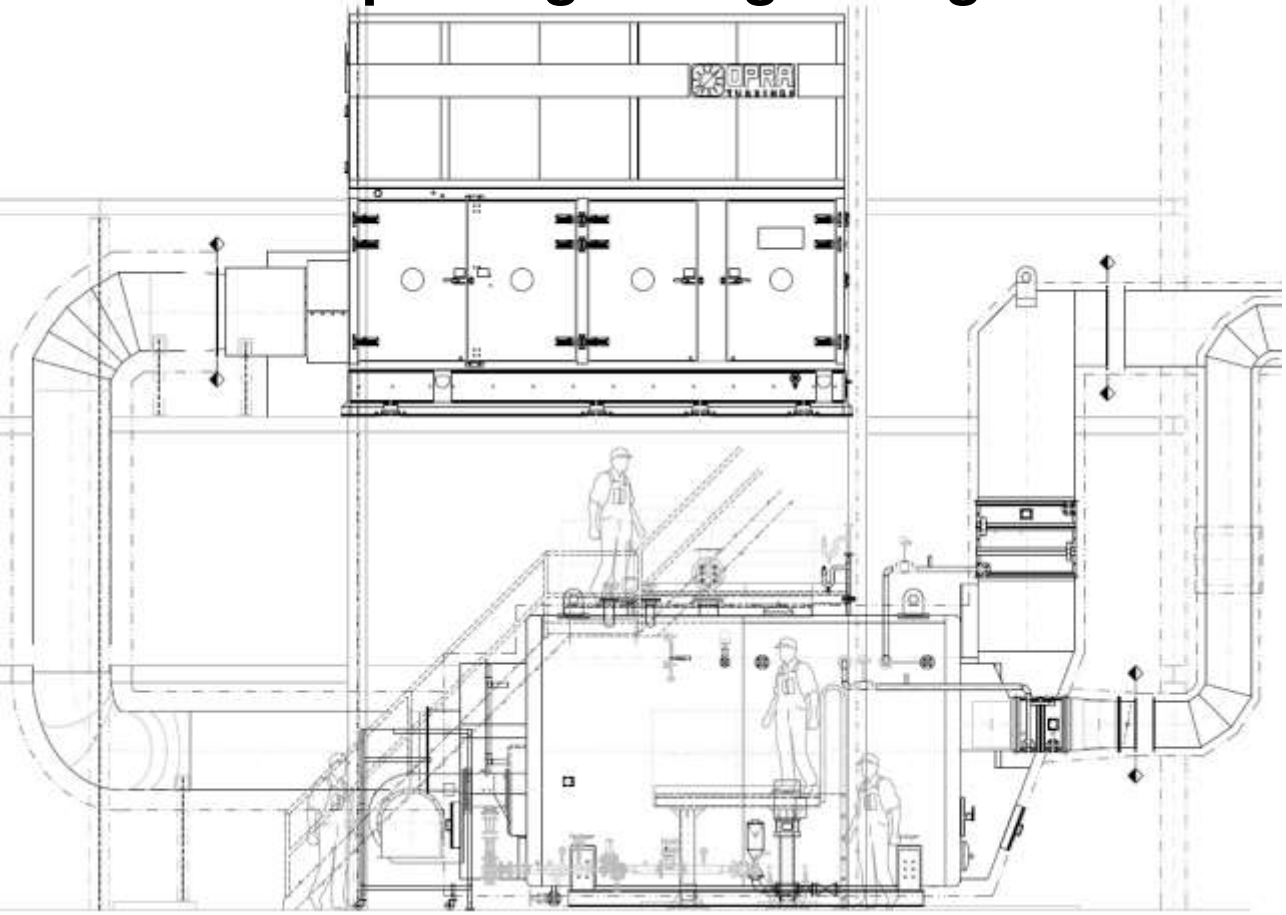
# OP16 is highly suitable for BAT needs with a large quantity of high grade thermal energy available



# The OP16 is a reliable and highly efficient source of heat and power


- OPRA complies to the strictest EU emission limits
- OP16 performance at site:
  - 1764kWe @ 25% electrical efficiency (13,650 BTU/kWh)
  - Steam production 30,850 lb/h
  - Total CHP efficiency 88,3% (PES = 16,5% (TÜV))
- Turbine follows load signal from grid operator
- Installed in multi-level boiler house

# The OP16 package is lightweight and vibrations free



# OP16 case study two: Crespel & Deiters

# Case study 2: OP16 powered drying of wheat starch at Crespel & Deiters

- C&D is leading German manufacturer of wheat starch in western Europe
- Focus on the corrugated board and paper industries
- More than 150 years in business employing more than 165 employees
- C&D operates 1 OP16-3B (DLE)

# The OP16 provides clean exhaust gasses for direct drying applications

- Exhaust gasses are used for the modification process of wheat starch
- Indoor installation
- OP16 performance at site:
  - 1788kWe @ 24,7% electrical efficiency
- Suction fan at the end of the process line reduces backpressure losses
- OP16 is connected to C&D SCADA system to operate together with a second turbine

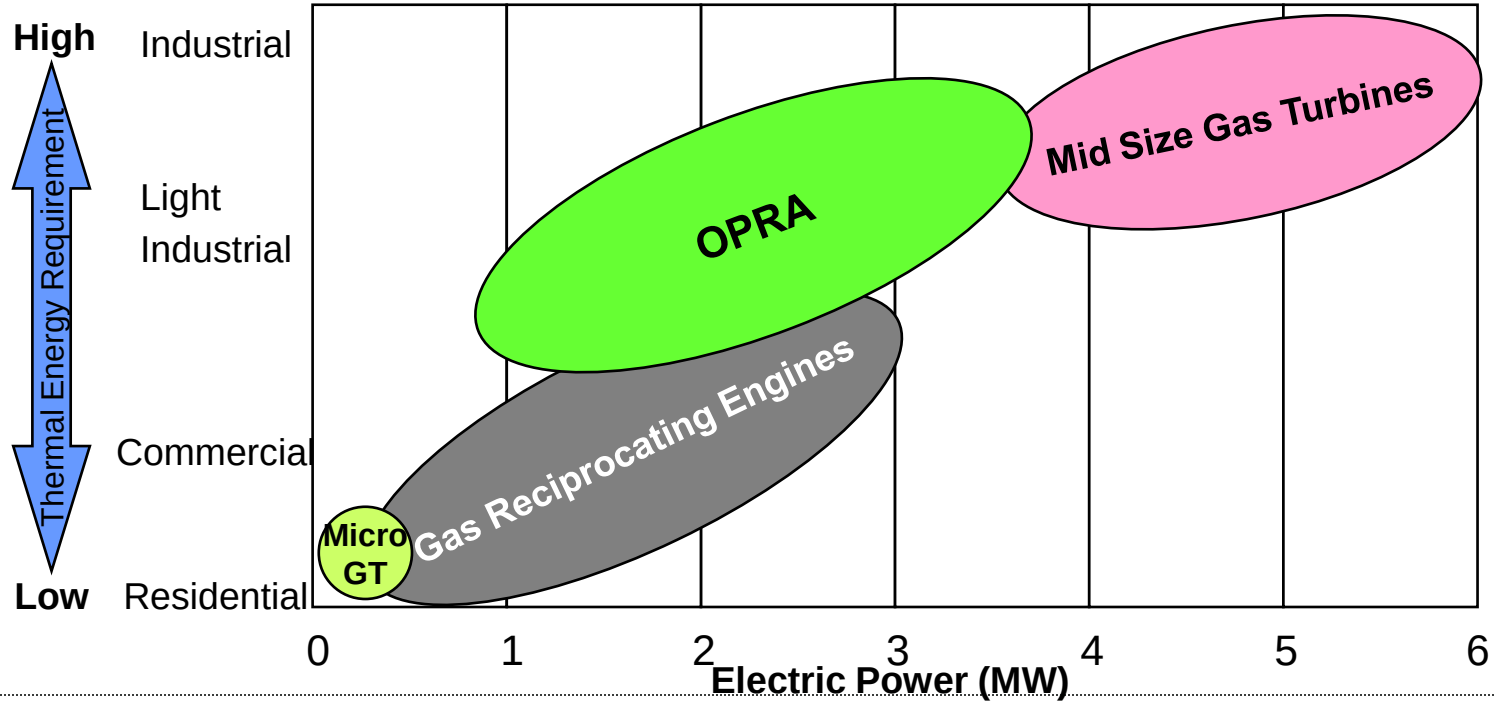
C&D Crespel & Deiters


OPRA TURBINES

# The high temperature and quality OP16 exhaust gases are utilized in the entire factory

# A small gas turbine is uniquely competitive where a high degree of thermal energy is required

**Competitive landscape, CHP market**



# Thank you