Applied Technology and Best Practices in CEE

Waste gas utilization in Szank gas plant

Péter Takáts

MOL Plc.

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Society of Petroleum Engineers

Sub-projects of energy rationalization project

- **Heat system reconstruction, change steam for hot oil, waste heat recovery units at compressor gas engines and power plant**
- **Replace the gas engine for e-motor of CO_2 compressors**
- **New condensate stabilizer installation, stoppage the condensate transport to Algyő**
- **Power plant installation with waste gas utilization as fuel gas, power production for own purpose only**

Power plant installation philosophy

To utilize as much waste gas as possible in the plant

- Disposed CO_2 reach gases
- Save compressor power
- Low LHV gases (8-13MJ/Sm^3)
- New cond. stabilizer overhead gas

Waste gases which are available in the plant for free

- No charge, save opex (re-injection compressor)

Power producing to replace and reduce the power purchase

- To save electric power cost
- Before the project avg. ~1,2-1,5 MW
- After the project avg. ~0,8-1,0 MW (new e-motors)

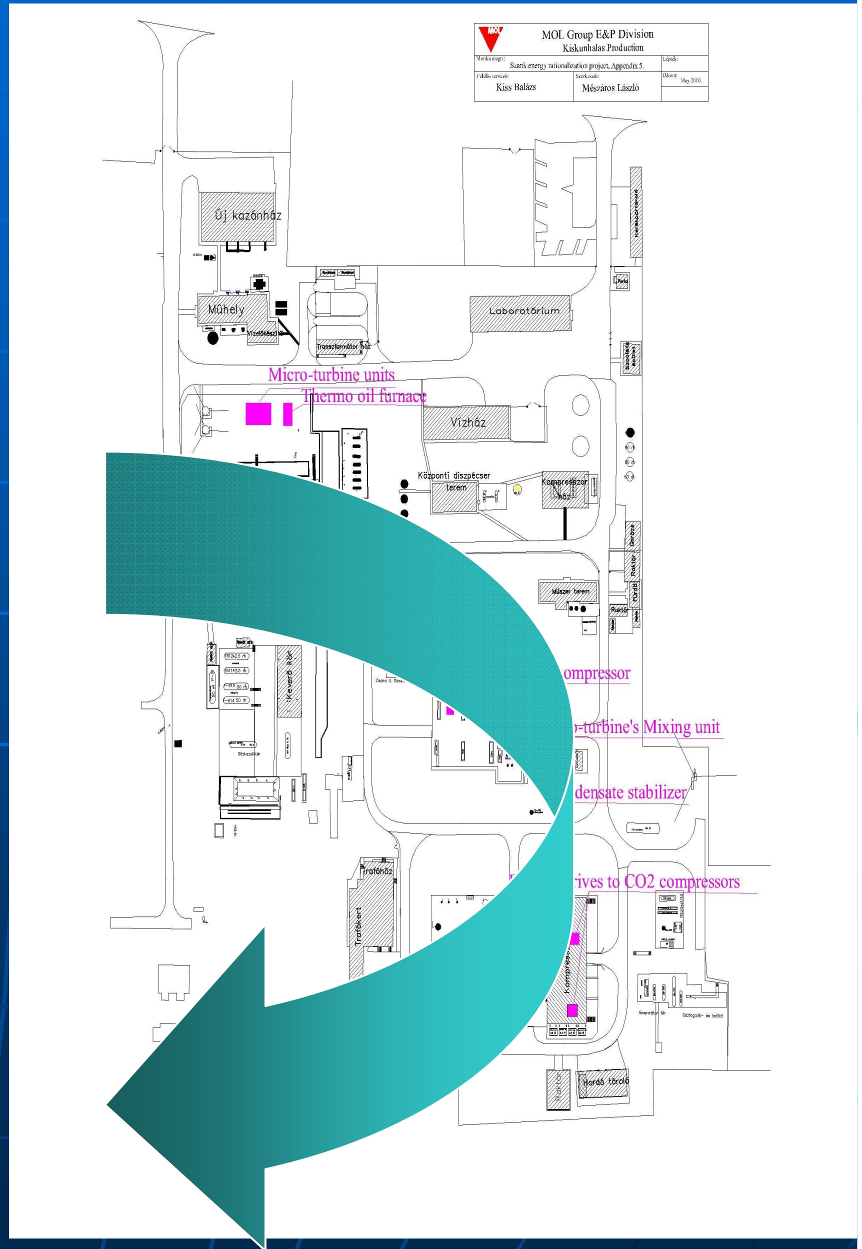
Efficiency power production (co-generation)

- Waste heat recovery (hot oil)
- Total energy efficiency is 62-65%
- Low opex

High level of reliability in power production

- availability, flexibility (less sensitivity for fuel quality, lowest power 10% of nominal!)

<ins>**2x1 MW(e) capacity power plant was choosen**</ins>



Available fuel gases of power plant

- **Overhead gas of condensate stabilizer**
  5 to 5.5 barg, 70 to 100 Sm3/h. Consumption of the total flow is needed
- **Szank EOR production oil associated gas**
  7 to 8 barg, approx. 80% CO_2, max. 3000 Sm3/h (saturated with water) Shall be used as much as possible

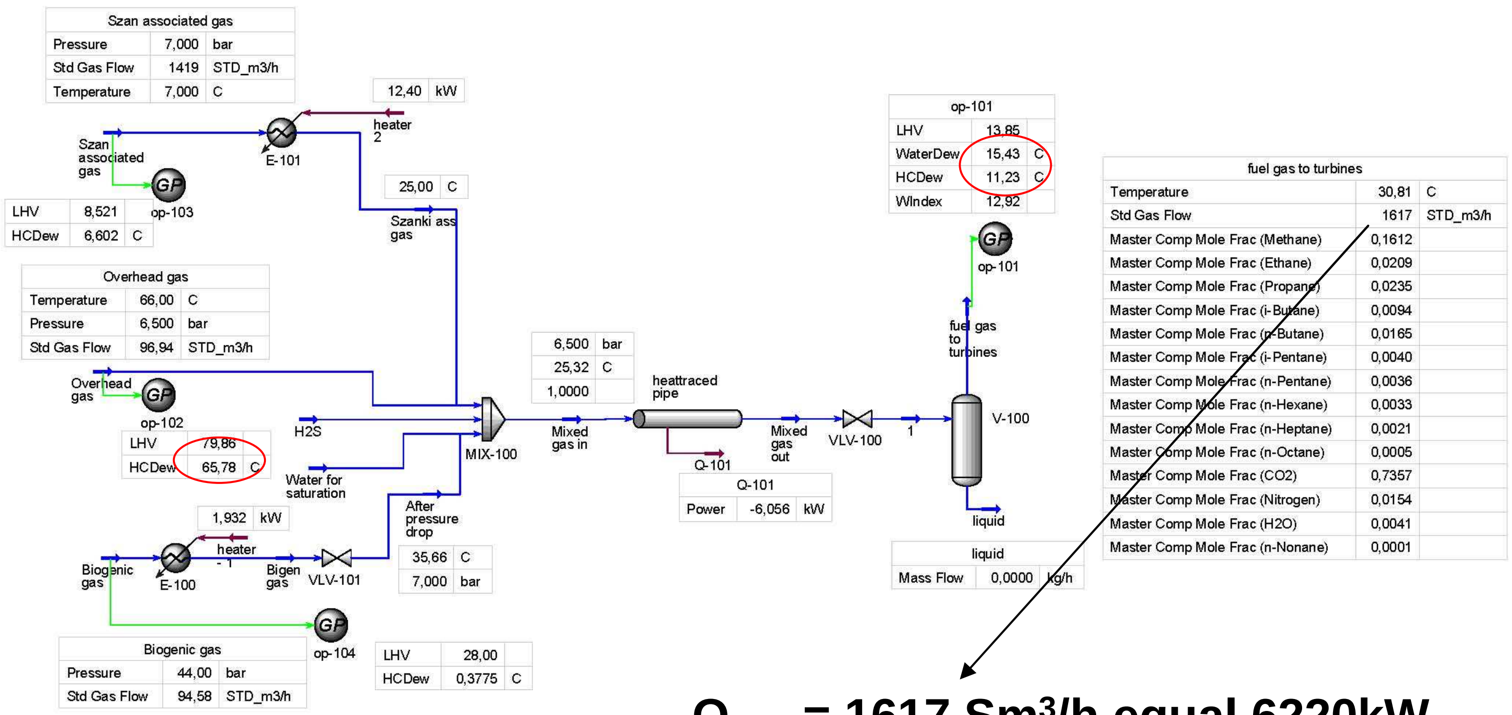
In case LHV 13MJ/Sm^3 enough for ~1800 kW only

- **Biogenic gases *(additional)***
  42 to 43 barg, 25 to 30% N_2, 5500 to 6000 Sm3/h (conditioned gas, dew point max. 4^{o}C at 40 barg). Shall be used as low as possible

Need ~100 Sm^3/h for 2000 kW electric power

Fuel gas requirements and flow diagram

- ►LHV: 13 – 22,4 MJ/m³
- ►Temperature: 10 degC above HC dew point max. 50 degC
- ►Pressure: 7 barg



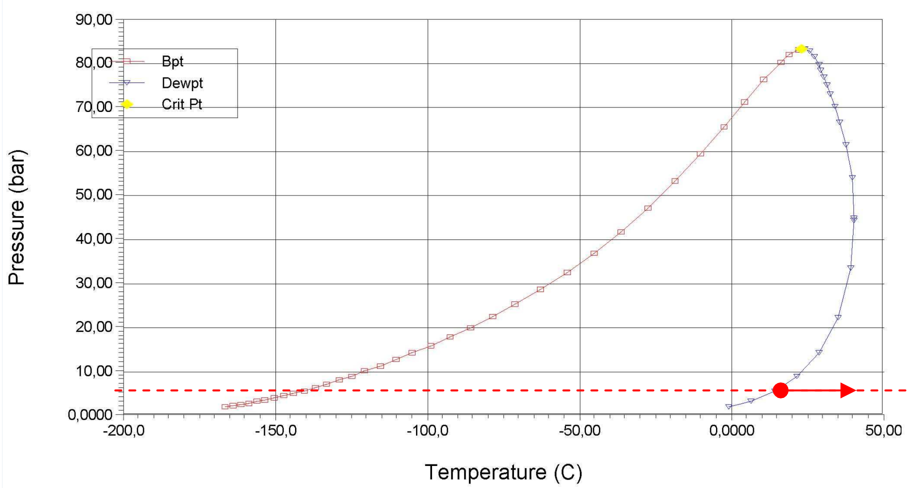
Q_{flow} = 1617 Sm³/h equal 6220kW

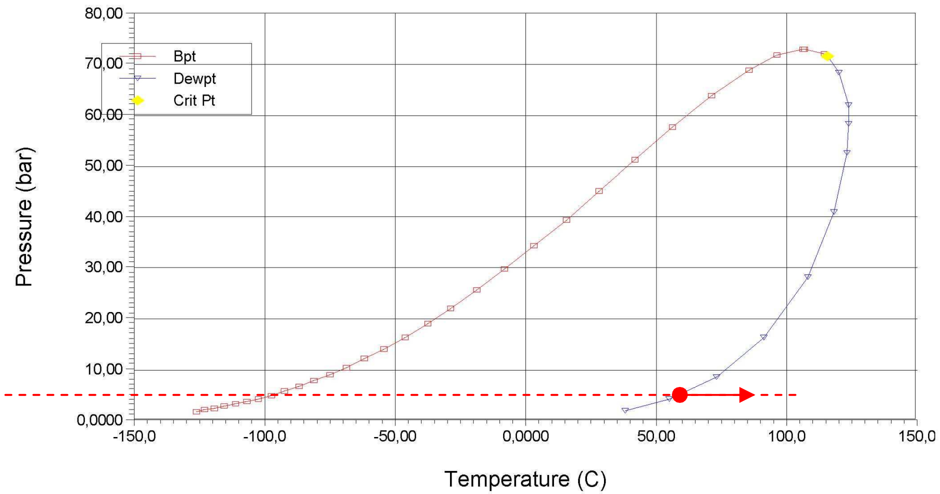
P_e = 2000 kW

Q_{heat} = 1900 kW

Wed May 11 16:45:53 2011 Case: d:\Documents and Settings\petakats\Desktop\SZANKI ERÕMÛ TÁPGÁZ 24.HSC Flowsheet: Case (Main)

HC dew points

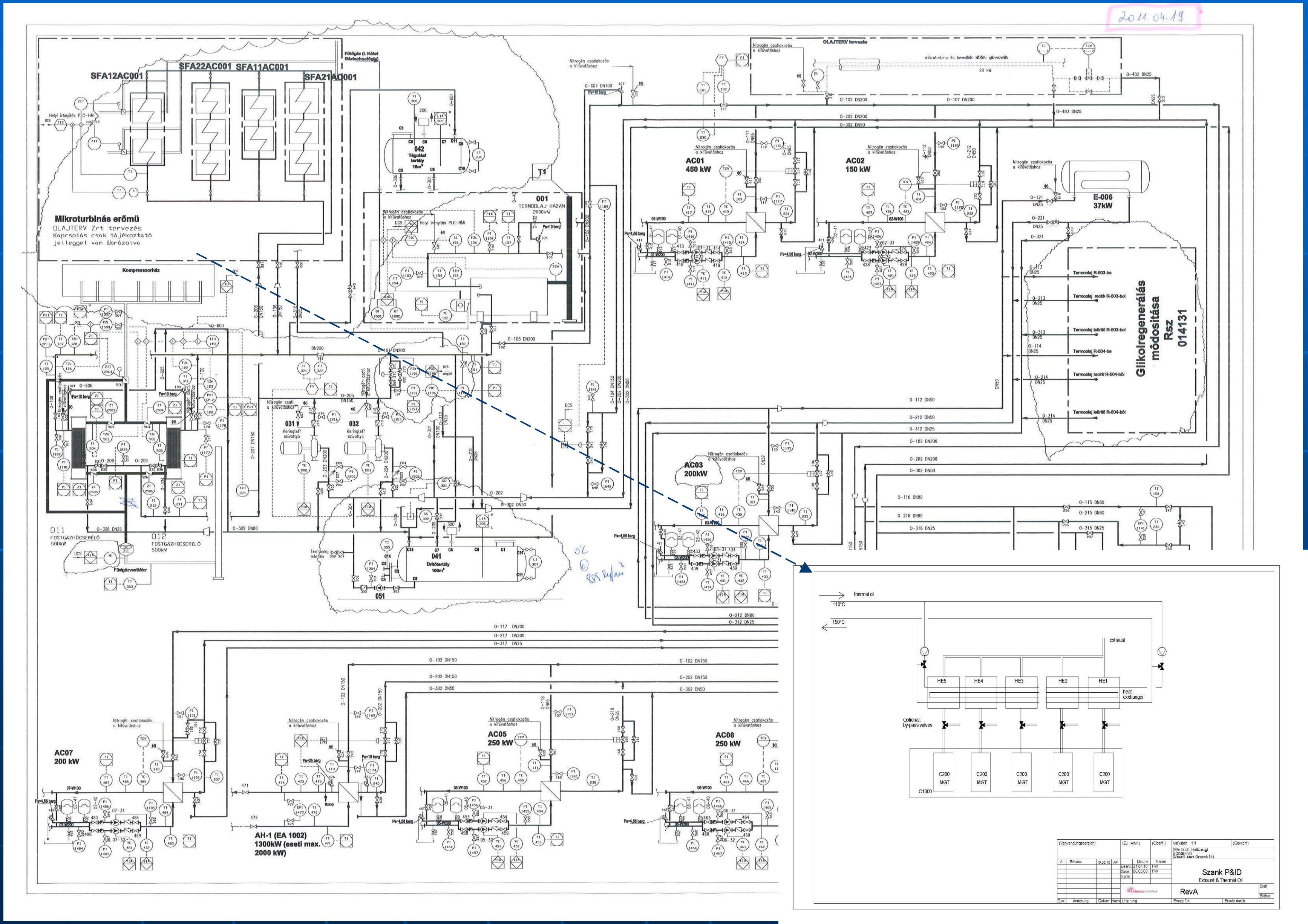




Fuel gas for turbines

Cond. stabilizer overhead gas

Hot oil system connection for power plant



Microturbine (Capestone) Why?

-No MN problem

-No auxiliary system (air bearing)

-At low LHV good efficiency (33-31%)

-Syncronizer is included (RPM=90 000)

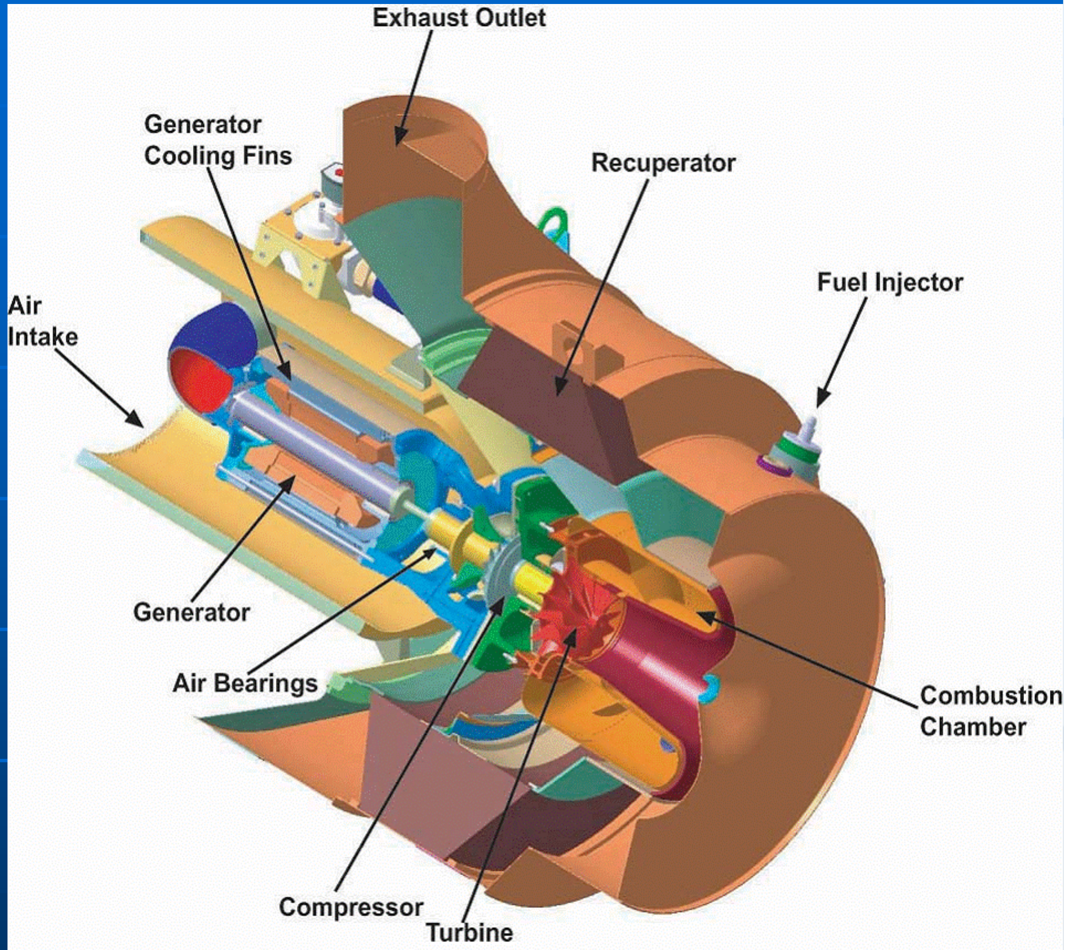
-Max. power 200kW

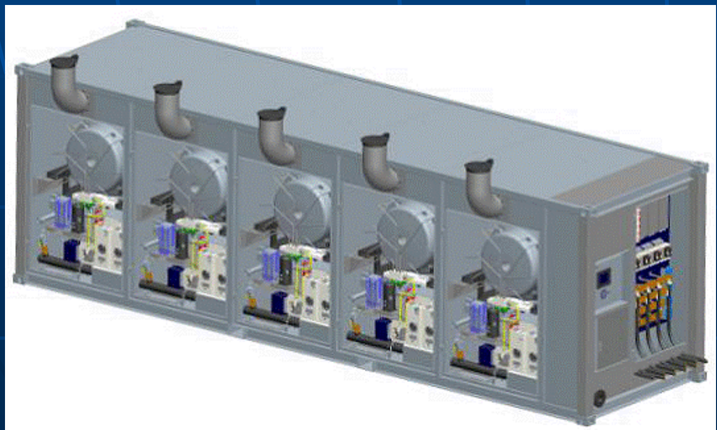
-Heat recovery is available

(relative low temp. ~280degC)

-Good efficiency at turn down

(very flexible)





MOL C1000 unit on manufacturer test

Thank you for your Kind Attention!