



# RENTAL COMPANY BUSINESS STREAMS

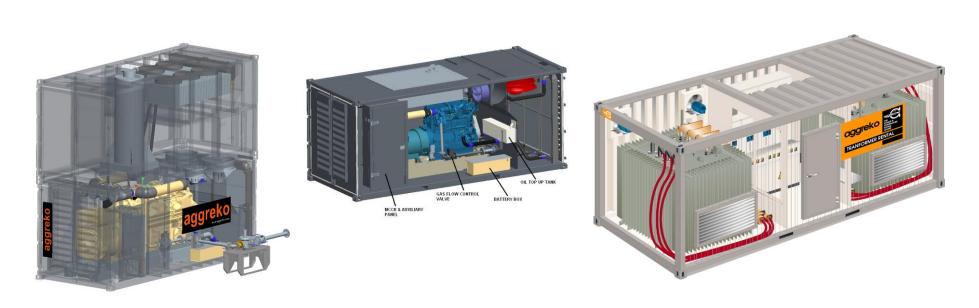
POWER GENERATION

> TEMPERATURE CONTROL

## **POWER GENERATION**







## **TEMPERATURE CONTROL**



























#### AGGREKO PROCESS SERVICES

#### COOLING SOLUTIONS TARGETING PROCESS INDUSTRY

- Process Efficiency Enhancement: VDU vacuum recovery
- Mitigation of Seasonal impact on Utilities conditions:
   FCC Dense Air application
- Temporary Revamps to cope with short term market opportunities: Isomerization de-butanizer
- Recovery Projects: Enhancing Heat transfer in fouled Heat Exchangers
- Risk Management: Engineered recovery plan for aged capital assets
- Turnarounds
  - Scope Reduction
  - Improved Time Schedule

## **Process Enhancement:**

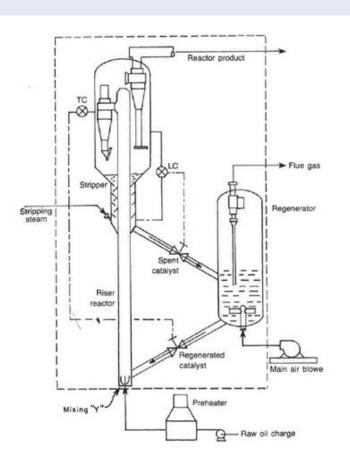
- VDU Vacuum Improvement
- □ FCC Dense Air Injection
- **UOP HF Alkylation**
- WGC Pre-Condensation
- □ Increasing Amine system H<sub>2</sub>S and CO<sub>2</sub> recovery efficiency



#### FCC MAB DENSE AIR INJECTION

Case presented at the MERTC 2018, Kingdom of Bahrein





Summer time problems in sustaining target capacity of the reactor

- > Regeneration problems
- ➤ Air too hot, low density
- > Air mass flow rate insufficient
  - > Oxygen injection at the blower suction

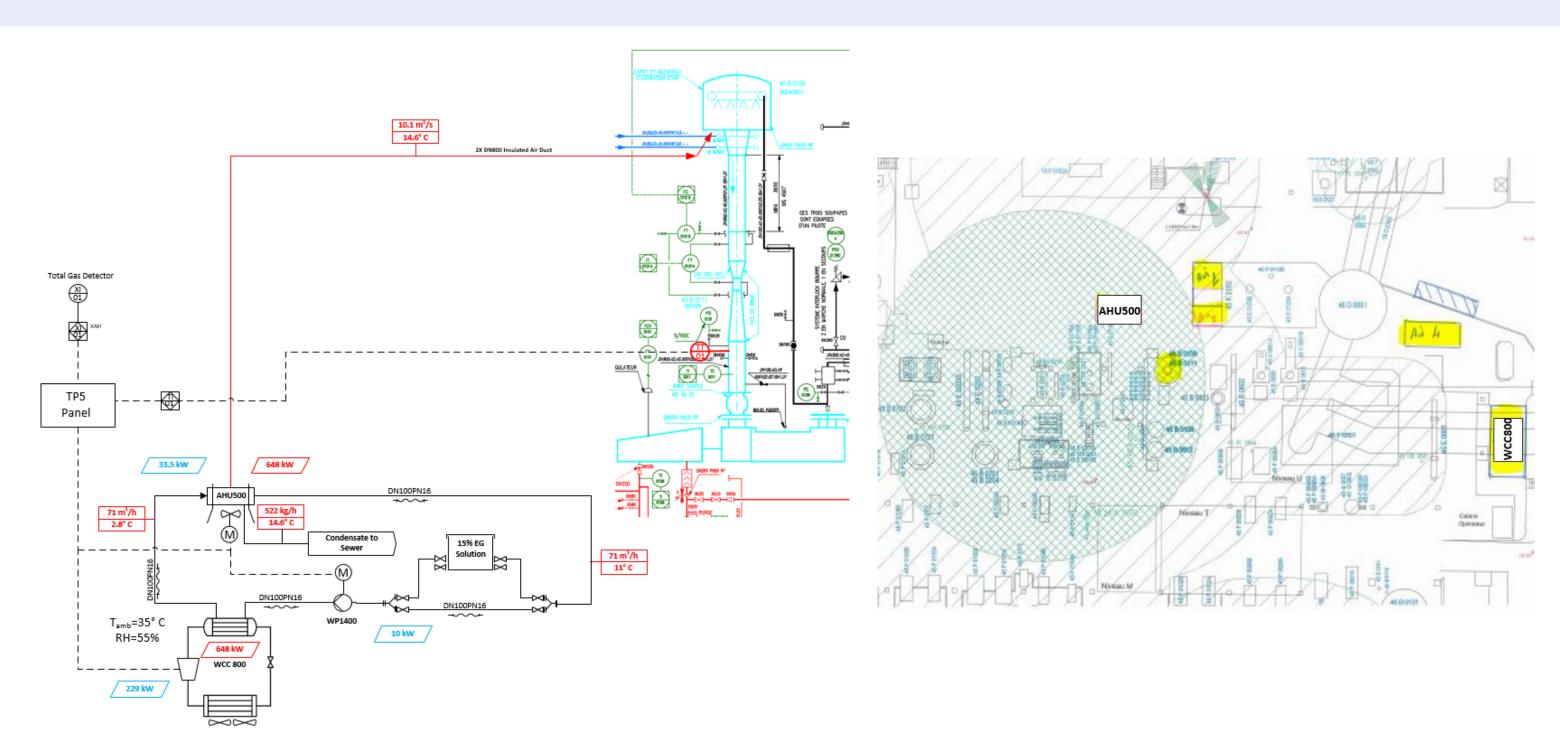
Dense air production at the blower suction can increase regeneration capacity up 10%



Air flow rate [m <sup>3</sup> /s]	10.12	10.12	20.24
Temperature [°C/RH]	35/55	14.6/100	24.5
Density [kg/m <sup>3</sup> ]	1.132	1.219	1.176
Enthalpy [kJ/kg]	85.5	40.9	62.3
T <sub>wb</sub> [°C]	27.1	14.6	21.4
Mass flow rate [kg/s]	11.45	12.33	23.78
Mass flow rate [t/h]			85.61
Gain vs Summer conditions [%]			3.88

#### FCC MAB DENSE AIR INJECTION



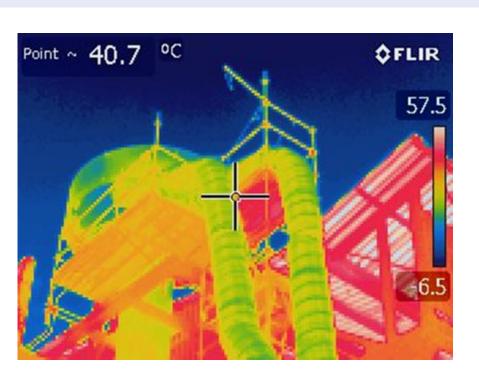


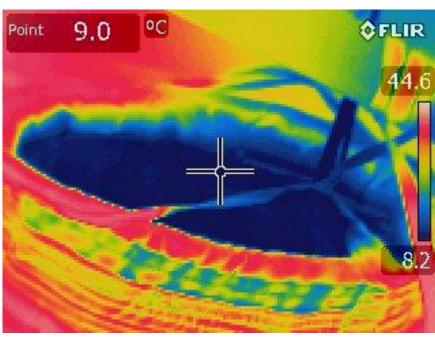
#### FCC MAB DENSE AIR INJECTION











# FCC MAB DENSE AIR INJECTION: GENERAL CONSIDERATIONS



#### 20,000 BPSD / 2,900 t/d FCC

#### FCC yields

HVGO	1 bbl	78.3 \$/bbl
<b>C2</b>	0.09 bbl	60 \$/bbl
Olefins	0.13 bbl	93 \$/bbl
LPG	0.13 bbl	41.8 \$/bbl
FCC Naphtha	0.61 bbl	85.15 \$/bbl
LCO	0.19 bbl	75.5 \$/bbl
<b>HCO+Slurry</b>	0.09 bbl	60.8 \$/bbl

- > FCC generates a gross margin of 16.4 \$/bbl of feed
- ➤ Dense Air Injection Improved Capacity 3.88% resulting in increase profitability of 0.636 \$/bbl of feed
- > For a 100 days project 0.636\*20,000\*100=1,272,000 \$

## **Controls of Solutions**



#### **CONTROLS OF SOLUTIONS**











