Energy Management in Upstream O&G Operations

Geothermal Energy and Waste Heat to Power: Utilizing Oil and Gas Plays

SMU, Dallas, TX
March 14, 2013

Trevor Demayo
Energy Management Coordinator, Chevron San Joaquin Valley Business Unit

Pete Schrimpf
Director of Chevron Support Operations, Chevron Energy Solutions

Key Messages

In Oil and Gas fields,

- There are competing, often more economic uses of waste heat than generating power
- Energy efficiency and power generation projects must compete on equal basis with larger, higher impact projects

Chevron’s Upstream Operations

Energy Management Challenges in Upstream

Focus Has Been on Downstream, Not Upstream

- Strong energy efficiency efforts in

Energy Management Challenges in Upstream (cont'd)

Energy Efficiency Projects Must Compete on an Equal Basis

- Traditional economic benchmarks undervalue long term, low risk savings
- Even with favorable economics, other projects may yield larger absolute

Challenges for Waste Heat to Power in Oil and Gas Fields

- More economic uses for waste heat
- Limited high quality waste heat sources
- On-site incremental power needs often limited
-

Increasing Energy Efficiency Focus in Upstream

Key Drivers

- Higher cost of power
- Increasing energy intensity in Upstream operations
- Growing power demand to support Upstream asset expansions
- Remote operations, challenging physical environments
- Growing demand for clean energy, baseload power (emerging markets)
- Legislation and regulations on greenhouse gas and criteria pollutant emissions and energy efficiency
- Stringent environmental life cycle concerns
- Social responsibility

Energy Management Opportunities for Existing Operations

Thermal Applications

- Optimizing steam distribution for thermal enhanced oil recovery
- Minimizing energy losses in production flow systems
- Re-using waste heat
- Increasing steam generation efficiency
- Improving water quality
- Converting flare gas to power or steam
- Optimizing subsurface (reservoir) heat management
- Renewable heat or steam: solar, biomass/biogas, EGS, heat pumps

Energy Management Opportunities for Existing Operations

Electro-Mechanical Applications

- Rotating equipment optimization (pumps, compressors, fans, motors)
- Ensuring system reliability
- Load-shifting, energy storage, power quality enhancement
- LED lighting
- Renewables: solar PV, solar pumping units, bioenergy, wind
- Energy Management References (e.g., IPIECA: ISO 50001, Saving Energy)

Upstream Opportunities for Waste Heat Reuse

- Use waste heat to meet process heating (or cooling) demands, instead of power generation
- Replace electric loads with waste heat (e.g., absorption chilling, space heating)
- Find special opportunities where drivers align
- Develop lower (installed) cost, higher efficiency ORC systems
- Subsea ORCs for offshore operations

Questions Welcomed!

Trevor Demayo
Energy Management Coordinator,
San Joaquin Valley Business Unit

Chevron North American Exploration & Production
Bakersfield, California
Tel: 661-392-2333
tdemayo@chevron.com

Pete Schrimpf
Director of Operations
Chevron Support Business Unit

Chevron Energy Solutions
San Francisco, California
Tel: 281-398-3257
pschrimpf@chevron.com