3rd Annual California Registry Member's Meeting October 7th, 2008 Oil & Gas Panel Discussion

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Air Resources Board

California Environmental Protection Agency

Established Programs

- Methane to Markets (EPA)
  - CH_4 reductions in Oil and Gas systems
- Natural Gas Star (EPA)
  - Operational efficiency and CH_4 reductions
- ETV program (EPA)
  - SRI/GHG Technology Verification Center
- Energy Efficiency and Renewable Energy (DOE)
  - Energy Tips

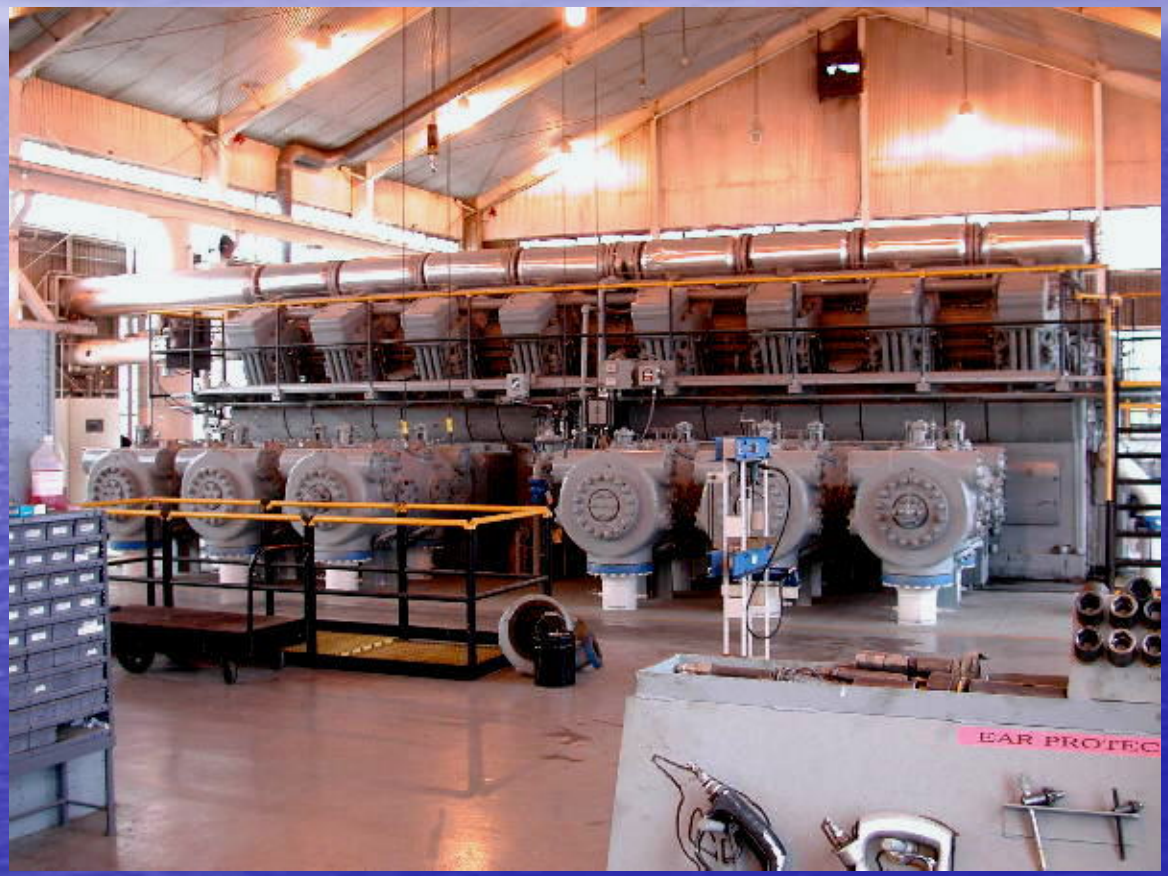
Waste Heat Recovery and Utilization

- Reduce GHG emissions and fossil fuel use
- Increase facility efficiency and profitability
- Uses existing and tested technology
- Payback times can be less than one year
- No alteration in basic processes
- Good for the environment and the bottom line

Waste Heat

- Sources – furnace, boiler, IC engine, kiln, incinerator
- Recovery methods – recuperators, heat pumps, shell and tube heat exchangers, regenerators
- Uses
  - Generate electricity
  - Generate steam
  - Pre-heat combustion air or product to be processed

Example – Heat recovery at a natural Gas Compressor Station



Pros of Waste Heat Recovery

- Pros
  - No GHG emissions
  - Replace a fossil fuel and reduce GHG emissions
  - Utilizes existing and proven technology
  - Short pay-back times
  - Non intrusive to native process
  - Turns waste heat into usable energy

Cons of Waste Heat Recovery

- Regulatory
  - Barriers and disincentives
  - Potentially long project approval process
- Institutional
  - New business model
  - Management investment reluctance

Resources and Recent Developments

- DOE – Energy Efficiency and Renewable Energy (www.eere.energy.gov)
- New Technology – thermoelectric systems
- State of California
  - AB1613: Energy: Waste Heat and Carbon Emissions
- Energy Independence and Security Act of 2007
  - Waste energy inventory program and registry
  - Grant program