

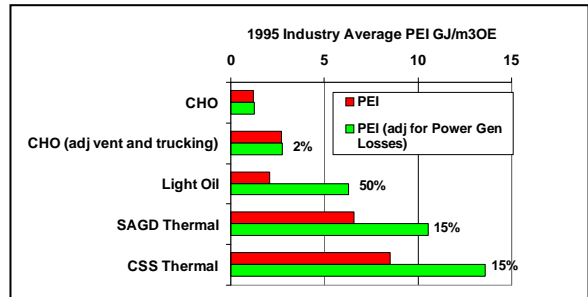
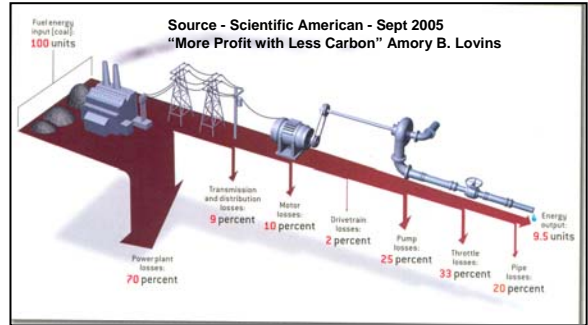


**PTAC Knowledge Centre
Upstream Oil and Gas Energy Efficiency**

Electrical Power Use = Reduce Energy Costs & Increase Efficiency

1. Quick Facts:

- Most electrical power in WCSB Upstream is used for pumping water. Artificial lift to surface or disposal.
- Conventional Oil Industry moves over 17 m³ of water for every 1 m³ of oil produced.
- Cost Comparison
 - Grid Power = \$0.05/kw-hr = \$14/GJ
 - Natural Gas = \$6.00/GJ (at source)
 - Natural Gas = \$7.50/GJ (Purchased)
 - Oil = \$50/bbl = \$8.30/GJ
 - Gasoline = \$0.80/l = \$23/GJ
- Over 75% of the energy input at a power plant is lost before it gets to the pump.
- Suggested order for addressing electrical power use:



- a. Check Production Wells – Power factors and billing errors
- b. Review Water Disposal Wells – Open more injection zone to reduce horsepower needed
- c. Disposal Pumps – Minimize recycle; Match pumps to injection wells
- d. Water Treating Energy – Minimize heating water; Identify heat energy needs
- e. Consider CoGen Options – Match power and heating needs
- f. Power Displacement – Generate your own power with low value, on-site gas
- g. Sell Power – Longest payout option

2. Key General Documents on Electrical Power Use Issues

- a. **“Distributed Generation Forum”** – PTAC October, 2005. Presentations on upstream oil and gas opportunities and information from NewERA on distributed generation case studies, health issues and regulation changes required to improve distributed generation power sales. These presentations may be viewed on the PTAC website: <http://www.ptac.org/techeef.html>

3. Information on New Energy Options for Electrical Power Use Management

- a. **Stantec Results of Field Power Audits** – Stantec has conducted a large number of audits of artificial lift operations. Presentation on audit results can be viewed on the PTAC website: <http://www.ptac.org/eea/dl/eeat0402p01.pdf>
- b. **Water management Equal Energy Management** – PTAC Water and Energy Forum, Edmonton June 2005. This presentation may be viewed on the PTAC website <http://www.ptac.org/eea/dl/eeaf0502p02.pdf>

- c. **“Generation of Electric Power from Waste Heat in the Western Canadian Oil and Gas Industry”** PTAC RFP EETR-0603 – This RFP is developing basic information needed to assess oil and gas power options in the WCSB for waste heat sources from operations, such as compressor exhausts and sour gas plants. Check out the RFP at <http://www.ptac.org/techeetr.html>
- d. **Geothermal Power and Heating** – Warm water in the WCSB is a larger energy resource than conventional oil. As part of a current study on Bitumen in Carbonates and Conventional Heavy Oil, PTAC is gathering information on the amount of geothermal energy already being produced from oil wells and developing potential scenarios for its use for extending conventional oil production. Report will be available on the PTAC website in April, 2007.
- e. **Distributed Power Systems** – Check out NewERA’s 2006 president’s report. http://www.newera-energy.ca/activities/resources/NewERA_PresReport06.pdf

4. Financial Support for Change

a. Federal

- i. Financial Assistance for Industry <http://oee.nrcan.gc.ca/industrial/financial-assistance.cfm?attr=24> .

5. Case Studies

- a. Stantec – The Value of Energy Audits In Oil & Gas Operations, Brian Tyers, Saskatchewan Energy Efficiency Forum, June 2004. View this presentation on the PTAC website at: <http://www.ptac.org/eea/dl/eeat0402p01.pdf>

6. Regulations and Electrical Power Use Sources

- a. Alberta - AEUB – www.eub.gov.ab.ca
- b. Alberta Brochure for New Power Generation if you want to sell power <http://www.energy.gov.ab.ca/docs/electricity/pdfs/newgenbrochure2004.pdf>
- c. Alberta Distributed Generation Interconnection Guide 2002 - http://www.energy.gov.ab.ca/docs/electricity/pdfs/alberta_dg_finalguide_july2002.pdf
- d. NewERA (New Energy Resources Alliance) is a group working to further improve regulations and processes for encouraging distributed power generation. – www.newera-energy.ca

7. Key Reports on Volumes, Trends and Environmental Impacts

- a. **“Alberta Electric Industry – Annual Statistics for 2002”** EUB Statistical Series 2003-28 <http://www.eub.ca/docs/products/STs/st28-2002.pdf> (This publication has since been discontinued by the EUB.)
- b. Clean Air Strategic Alliance (CASA) “An Emissions Management Framework for the Alberta Electricity Sector Report to Stakeholders November 2003. http://www.casahome.org/wp-content/uploads/2006/10/Emissions_Mgmt_Framework.pdf