



Request for Proposal Technical Conference: Integrated Gasification Combined Cycle

March 21, 2006



Agenda

- WorleyParsons IGCC Study (completed March 2005)
- WorleyParsons Expanded IGCC Study (to be complete in April 2006)
- Energy Policy Act of 2005 & 3P Covenant Financing
- Challenges to IGCC Development
- IGCC Working Group & PacifiCorp Support Efforts
- Next Steps & Schedule

Overview

- PacifiCorp continues to examine and evaluate IGCC as a potential generation option.
- Company is a participant in EPRI's "CoalFleet for Tomorrow" initiative
 - Purpose: to accelerate R&D, demonstration, & deployment of IGCC
 - Major activities: Development of standards for IGCC reference plant & IGCC Permitting Guidelines
- 2005 WorleyParsons Study; objective – develop cost & performance (capacity, efficiency, availability, emissions) estimates.
 - Hunter Plant site (Utah bituminous coal)
 - Conoco-Philips 'E-Gas & GE Gasification technologies
 - Impact of elevation Hunter is @5,644'); also 1,000' lower
 - Impact of spare gasifier & natural gas backup
 - Selective Catalytic Reduction & wet cooling assumed
 - GE 7FB gas turbine
 - Impact of CO₂ capture provisions on plant design and cost
 - Results reviewed by EPRI
- Study results were adjusted to include Owner's costs & contracting assumptions which were not included in the consultant analysis.
- Results were included in the 2004 IRP Update.

WorleyParsons Expanded (2006) Study

- WorleyParsons Expanded IGCC Study – started Oct 2005, to be completed in next few weeks
- Objective: Update and do additional cost & performance (capacity, efficiency, availability, emissions) estimates. Revised scope of work has some similar and some changed components:
 - Update Hunter IGCC Study to reflect current construction & other costs (elev: 5,644') [Utah, SW Wyoming, & PRB coals]
 - Add an analysis of a Jim Bridger IGCC (elev: 6,670') (SW Wyoming & PRB coals)
 - As in 2005 study,
 - evaluate Conoco-Philips “E-Gas” & Shell Gasification technologies
 - Selective Catalytic Reduction (SCR) & wet cooling assumed
 - Impact of carbon capture provisions on plant design and cost
 - Results reviewed by EPRI
 - As in 2005 study, assume GE 7FB gas turbines, but update syngas performance as determined by GE
 - All costs to reflect current market conditions
- Study results are being adjusted to include Owner's costs & contracting assumptions which were not included in the consultant analysis.
- Results will be used in 2006 IRP process

Energy Policy Act Clean Coal Incentives Guidelines

- Investment Tax Credit Guidelines (ITC) issued February 21, 2006
- 20% ITC available on qualified investment
- Federal government funded \$800 million for IGCC ITCs:
 - \$267 million for each type of coal (bituminous, sub-bituminous, lignite)
 - \$133.5 million maximum per project
- DOE to prioritize qualified projects on basis of EPACT goals
 - fuel & geographical diversity
 - technology
 - CO₂ capture
 - project economics
 - by-product utilization
- Three separate application periods (2006, 2007, & 2008)
 - ITCs available however, they will likely diminish with time.

Energy Policy Act Guidelines (cont'd)

- Two applications must be filed
 1. Application for Department of Energy (DOE) Certification
 - Must be filed by June 30 of calendar year
 - Application contains complete technical, commercial, economic, & development overview of project
 2. Application 48A Certification (to IRS)
 - Must be filed by Oct 1 of calendar year (w/ DOE certification)
- 2006 filing deadlines may be too early for PacifiCorp to respond
- According to DOE, 19 IGCC Projects have been announced by various companies
- All of them are expected to be competing for ITCs

Update on 2005 Energy Policy Act (cont'd)

- Other Details of the ITC process:
 - IRS to inform applicant by Nov 30 of calendar year the amount of ITC allocated (“IRS 48A Acceptance”)
 - Within 2 Years of “IRS 48A Acceptance”, applicant must:
 - Obtain all federal & state environmental authorizations
 - Enter into binding contract for steam turbine or turbines
 - IRS then provides an “Issuance of Certification”
 - Project must be placed in service within 5 years of “Issuance of Certification”

3-Party 80:20 Covenant Financing DOE Financing

- Published guidelines on the application process for loan guarantees have not been issued.
 - Loan guarantee program will likely require posting an insurance premium – adversely impacting project economics.
 - Project debt will be consolidated on Company books by rating agencies.
 - Debt consolidation impact could be mitigated if Public Utility Commissions and legislative action is provided to assure revenue stream
 - All states would required to guarantee rate recovery to sell debt offering
 - There is a potential conflict between the Loan Guarantee & ITC.
 - IRS interpretation of subsidized financing may disqualify part/all of the available ITC.
 - Further research needed on this issue.

Challenges to IGCC Development

- Regulatory recovery
 - Obligation to supply resources deemed to be in public interest that results in the lowest reasonable cost taking account long & short term impacts, risk, reliability, financial impacts, and other factors determined to be relevant by the Commission
 - Market exposure due to availability risk associated with a developing technology
 - Approval of resource
 - IGCC cost estimate uncertainty is substantially higher without detailed engineering study

Challenges (cont'd)

- Cost
 - Preliminary results to date still indicate that the Cost of Energy from an IGCC plant is 10-15+% higher compared to a super critical pulverized coal plant.
 - this evaluation is based on order-of-magnitude cost estimates for IGCC.
 - this cost differential does not include costs for CO₂ capture or sequestration.
 - criteria pollutant emissions from an IGCC plant are slightly better than a super critical pulverized plant.
 - Incentives help reduce the differential.
 - Development Costs
 - Studies done to date are based on Engineering Estimates (with significant uncertainty). It is costly and time consuming process to develop EPC costs and terms.
 - Indicative Prices (higher quality estimates) are obtained from Technology Suppliers through Feasibility Studies, \$750k - \$1 million
 - EPC Prices require Front End Engineering Design (FEED) studies, \$5 - \$15 million (usually after one Technology Supplier has been selected from the Feasibility Study Phase.

Challenges (cont'd)

- Technology & Performance Risk
 - Syn-gas availability on next generation gasifiers
 - Integration issues (scale-up, air separation unit integration, multiple gasifier operation with a spare, sulfur removal, SCR performance)
 - Reliability of reference-plant gas turbines on syn-gas.
 - Long term operability of reference-plant gas turbines using high hydrogen content syn-gas (syn-gas product after CO₂ capture)
 - Specific provisions of supplier performance “wraps” are an unknown

Challenges (cont'd)

- Carbon Capture Capability & Sequestration
 - Carbon cost “adder” and the timing to implement carbon sequestration influences gasifier technology selection
 - Level of carbon capture with existing gas turbines
 - Long Term Sequestration Concerns – what qualifies as long term, liability risks, etc.
- Development & Procurement - Process
 - “Feasibility Study” Phase – Technology/Consortium Selection (~10-12 months)
 - Regulatory Process – Determine requirements for a resource RFP and the basis for further development of IGCC
 - FEED Phase - Needed to develop EPC scope, cost, & terms (~12 months)
 - Regulatory Approvals for IGCC plant construction
 - IGCC Plant Construction & Commissioning (~42-48 months)

IGCC Working Group & PacifiCorp Support Efforts

MidAmerican IGCC Working Group Commitment:

- MEHC and PacifiCorp form a working group sponsored by PacifiCorp to discuss various policy issues
 - Representatives from major stakeholder & regulatory groups, and others
 - Status of carbon sequestration policy and methods
 - Information sharing to develop shared understanding
 - Develop a shared terminology
 - Technology and permitting of IGCC environmental aspects
 - Commercial terms and conditions
 - Implications of RFP process

IGCC Working Group

- **PacifiCorp Support Efforts**

- PacifiCorp has started to gather information and do some initial research for the IGCC Working Group to use if desired when it first meets to frame the issues it wants to discuss. Aspects in which information is being gathered include:

- **Financial Incentives, Financing, & Tax**

- Accelerated depreciation
- 3-Party Covenant Financing
- 2005 EPACT Federal Incentives

- **Strategy & Public Policy**

- Stakeholder support

- **Procurement, Technology, and RFP**

- Technology Evaluation
- Consortium Selection Process

- **Carbon Strategy**

- Carbon Tax
- Sequestration & Enhanced Oil Recovery Opportunities

- **Permitting**

- Technology Selection, “Reference” Plant & Permit Levels

Next Steps & Schedule

- IRP Meetings on March 31st: 1) IGCC, & 2) Carbon “adder” determination methodology
- Meeting on April 3:
 - Provide “straw man” IGCC development timelines
 - Provide preliminary results of WorleyParsons Expanded study
 - IGCC alternatives
- Establish IGCC Working Group & Working Group process and time line – to be defined shortly after the PacifiCorp sale is completed