Texas Clean Energy Project

Coal Gasification with 90% Carbon Capture & Sequestration

Pittsburgh Coal Conference

Sept. 14th, 2011

Snapshot of TCEP

- 400 MWe gross “polygen” IGCC project with 90% carbon capture
- Siemens: 2 gasifiers & 1 high-H_2 CT + 1 ST in combined cycle

Snapshot of TCEP

- Located at FutureGen “finalist” site directly atop Permian Basin; nearby opportunities for CO_2 enhanced oil recovery (EOR)
- U.S. Department of Energy announced $350MM award to TCEP in December 2009 ($211MM in Recovery Act funds); additional $100MM awarded in August 2010
- Front End Engineering and Design (FEED) launched June 30, 2010 by Summit, Siemens, Linde, and Fluor /Completed in August 2011
- Commercial components proven; “integration” of “IGCC” with carbon capture and storage (CCS) is new -- a reference plant
- Siemens and Linde to warrant long-term performance & availability
- 90% carbon capture rate yields ≈ 2.9M tons of CO2/year

Summit Power Group

- Founded by Donald Paul Hodel & Earl Gjelde 20 years ago
- Summit's traditional business = develop plants for others
- Principal business lines currently:
  - Wind power projects (including White Creek & its financial model)
  - Solar power (our utility-scale PV solar JV w/ REC: NorthLight, including 75MW solar project in California with PG&E)
  - Natural gas-fired power plants, principally Siemens CCCTs
  - Gasification with carbon capture (TCEP, others)
- These projects are clean, low- or no-carbon, & aid security

Why Texas?

- Environmental groups sought IGCC alternative to conventional coal-fired power plants in Texas & asked Summit to take a look
- Texas has excellent market for captured CO_2
- Project would not depend on (1) climate legislation, or (2) new long CO2 pipeline
- Suitable sites can also be found for “stacked storage” of CO_2
- Ex-FutureGen site has prior review & local support
- Midland-Odessa officials sought private-sector replacement project for FutureGen, offering same tax abatements and job grants

Project Site

Located 15 miles west of Odessa, 0.5 miles north of I-20, at FM 1601, which borders the property

- 600 acres in Section 43, Block 44, T-2-S, T&P Railway Co. Survey, in Ector County and the town of Penwell, on north side of I-20, at the Penwell exit (exit 101) just north of intersection of Avenue G and Ranch Road 1601 and 0.25 miles NW of Rhodes Operating Inc., located at 317 E. Interstate Hwy. 20, Penwell, Texas 79776.
- Electricity transmission in vicinity of project is adequate
- Multiple water supply alternatives -- focus on effluent and desal
- Natural gas: 2 nearby mainlines; 1 onsite small line
- CO_2 pipelines & EOR infrastructure exist nearby
- Railroad bordering site


Odessa
GCWA WWT
Moss Substation
Alt. Power Transmission Line #1A
Alt. Power Transmission Line #1B
Alt. Access Rd #1B
Project Site
CO2 Pipeline
Alt. Access
Proposed GCA to Summit Reuse Line Alt. Water Supply Pipeline #1A
Oneok Westex 24" Pipeline

Design Basis

- "Polygen" IGCC design for multiple products: 400MW gross capability on syn gas or NG, 2.5 M tpy CO_2, 700k tpy urea (fertilizer), 58 tpd sulfuric acid, with additional sales of Argon

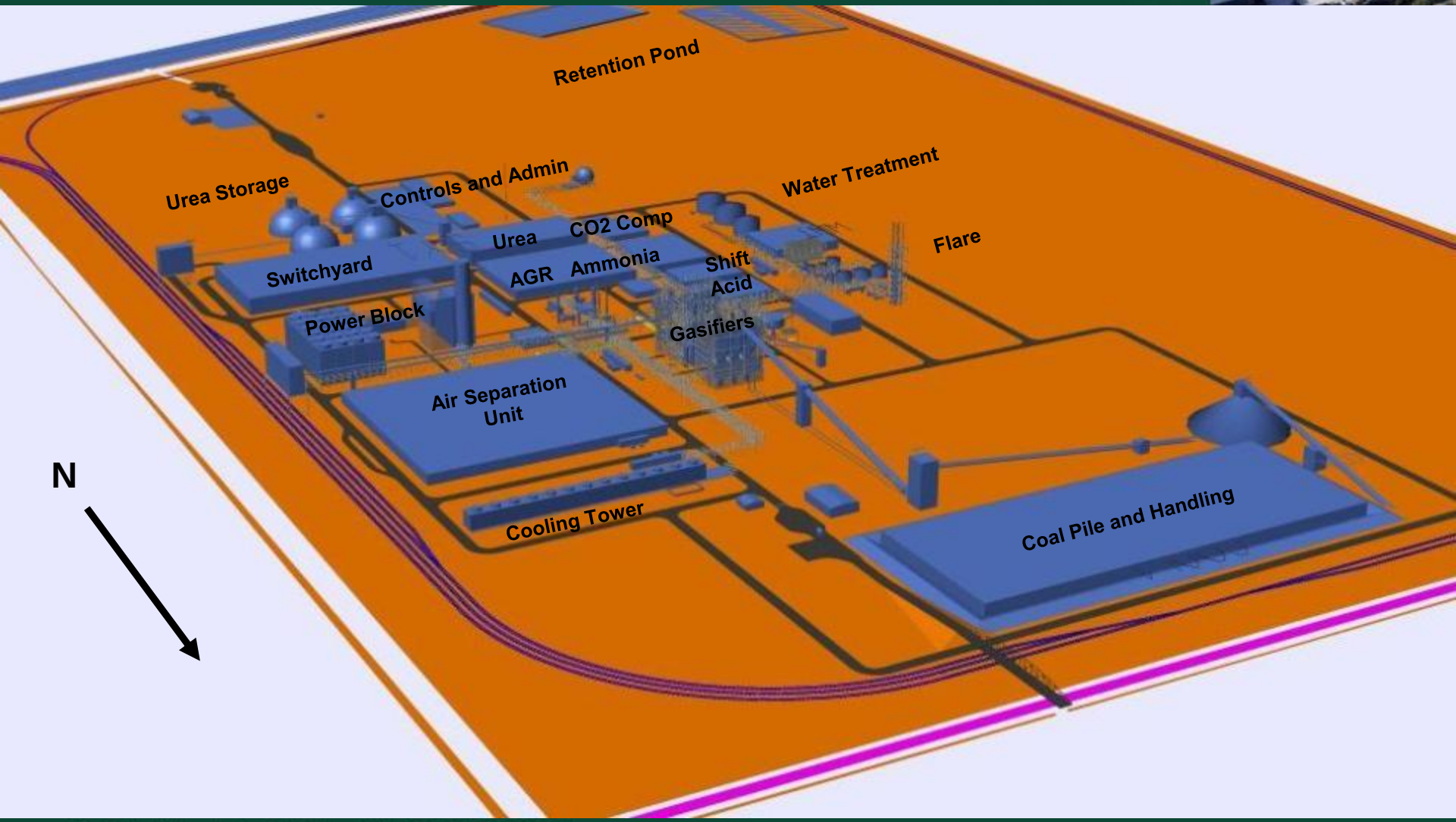
- Powder River Basin low-sulfur coal 5700 tpd

- Natural gas for startup, backup & during maintenance

- Base load operation; includes duct burning and some turn-down capability

- Warranted high availability of power block & gasifiers

Plant Rendering



Low Air Emissions

- Texas Commission on Environmental Quality (TCEQ) issued final air quality permit for TCEP on Dec. 28, 2010; draft permit had no environmental opposition or requests for hearing
- EIS draft in the public review period, ROD expected Sept.
- NOx, SOx & PM far below lowest-yet limits permitted in Texas for fossil fuel power plants
- Sulfur removal is 99% despite using low sulfur coal
- Mercury removal greater than 95% from syngas
- CO2 capture rate of 90%

CO_2 Management

- **Blue Source will manage most CO_2 matters**
  - Sale of CO2 for EOR, arranging pipeline transport, and certification of verifiable emissions reduction (VER) credits
- **TX Bureau of Econ Geology will approve the MVA**
  - New state law contains comprehensive requirements for MVA (monitoring, verification and accounting of CO2)
  - Texas has the most progressive clean coal policies in U.S.; could be model for the nation
- **Carbon Management Advisory Board will be created**
  - CCS scientists, policy-makers, environmentalists
  - To advise re: capture, sequestration, MVA, policy, etc.

TCEP Water Usage

- **TCEP will use dry cooling – using air to cool equipment, instead of water – on the power block, resulting in a significant decrease in water consumption**
- **Total water usage for power and chemical blocks (cooling tower for gasification, urea and sulfuric acid production and CO2 compression) is just over 4 million gallons/day average**
  - Negotiations underway with Cities of Midland and Odessa to purchase effluent – city storm water and sewage – for treatment at Gulf Coast Waste Disposal Authority in Odessa and transport to TCEP
  - Backup water options being reviewed include desalination of Capitan Reef water and oil production wastewater; and purchase of ranch water

United States Government Support

- TCEP's $450 million grant from the Department of Energy was the largest single award under President Obama & U.S. Energy Secretary Steven Chu
- TCEP is the only IGCC project & "new start" in this round of the DOE's Clean Coal Power Initiative
- TCEP also benefits from three separate Federal tax incentives, the combined benefit of which is worth approximately $1.37 Billion:
  - » $313 Million Advanced Coal Program investment tax credit ("ITC")
  - » $218 Million Carbon Sequestration tax credits in first ten years
  - » $840 Million MACRS accelerated depreciation tax benefits1
  - » Total: $1.371 Billion

- Investors that have significant U.S. taxable income can use these benefits directly. Those without such taxable income would assign the benefits to others at Commercial Operation Date in return for a cash payment.

Local Financial Support

- Local financial incentives include:
  - $5 million jobs grant from Odessa Development Corporation (approved 1/25/10)
  - Donation of 600-acre site in Penwell by ODC (3/31/10)
  - 100 percent tax abatement for 10 years (beginning when plant goes operational in late 2014-early 2015)
    - Ector County (approved 5/23/11)
    - Ector ISD (per Texas Tax Code, Chapter 313.025; briefing 6/2/11 or 6/7/11)
    - Ector County Hospital District (briefing 6/7/11)
    - Odessa Junior College District (briefing June 2011)

FEED Study Update

- FEED was complete at the end of August, Fluor has since left the team and has been replaced by SK Engineering. Price recasting with design changes due by the end of August.
- Linde has the larger scope with the ASU, chemical blocks, and balance of plant. Siemens will have the power block and supply the two gasifiers. SK will have balance of plant work as a subcontract to Linde.

Plant Construction, Warranties and Damages

- Plant configuration, components, design & commercial structure are all designed to make the plant financeable
  - Respected construction counterparties (Siemens, Linde)
  - Integration of proven technologies with a Siemens/Linde long-term warranties
  - The first IGCC project with long-term performance and availability guarantees
  - Single O&M contract structured to include Siemens and Linde

- Warranties at Commercial Operation
  - Capital cost under Managed EPC (w/ exceptions)
  - Completion (i.e., no "dry hole risk")
  - Schedule (provisional acceptance & tuning period)

Plant Construction, Warranties and Damages

  - Capacity (power output, CO2 capture, other)
  - Heat rate (fuel conversion efficiency)
  - Emissions - satisfy new low permit requirements

- One Stop Shopping with Siemens for both commercially-tested gasifiers and a CCGT specifically warranted and tested to run on syngas with 90% of carbon removed
- O&M Agreement warranties
  - Cost and performance (excludes some variable costs)
  - Annual availability & reliability of entire project and the outputs from project

Fuel/Water Supply

- Coal Procurement
  - Plant designed for Powder River Basin (“PRB”) coal with annual demand of ~2 million tons
  - Powder River Basin is estimated to have ~640 billion tons or 100 years of reserves at current production levels.
  - Commercial negotiations with PRB mining companies (Peabody, Arch, Cloud Peak, Alpha Natural Resources) have occurred
  - Low risk: mine mouth coal price is approximately 10% of total revenue

- Coal Transportation / Handling
  - Served by Union Pacific on the site’s southern border – will utilize tariff rates
  - Engaged Western Fuels Association to support coal negotiations.

Fuel/Water Supply

  - At full load, TCEP would consume ~5,800 tons per day of PRB
  - Single coal receiving, storage and handling system would feed both coal gasification trains

- Natural Gas (startup, backup & during maintenance)
  - ONEOK's West Texas line is less than 4 miles away
  - Facilities Agreement with ONEOK (under which ONEOK will build, own, operate, and maintain a gas lateral) is currently under negotiation. Definitive pricing has been established.

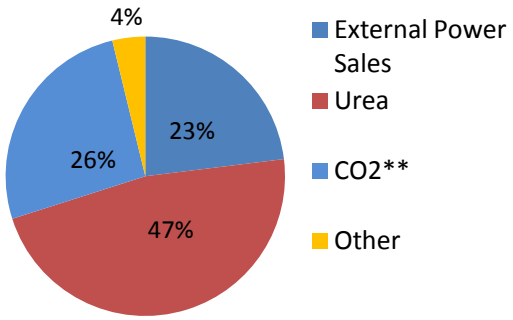
- Water Supply
  - Ample high quality options for water supply including City of Midland, City of Odessa, Occidental Petroleum, all of which are capable of supplying TCEP's needs

Revenue Components and Contracts

- **Project will yield three major revenue streams (power, CO_2 and urea sales)**
- Power off-take agreement with CPS Energy (San Antonio) announced and contract negotiations underway:
  - 25- year power purchase agreement as baseload generation to an ERCOT market participant
- CO_2 contracted sales will be 15-30 year contracts:
  - First contract signed and two others with draft contracts and term sheets
  - Revenue from CO_2 sales is not carbon legislation dependent
  - CO_2 contracts are expected to cover all volumes with prices linked to WTI
- 15-year urea contract executed with major market participant for full production

Power	• **400 MW gross output** • **~160-200 MW net to external buyers** • **ERCOT peak demand 63,594 MWs**
CO2	• **2.7 M tons/year** • **90% capture rate** • **33 M tons annual demand** • **Will be qualified as Carbon Credits**
Urea	• **720k tons/year** • **US demand 8.5 M tons/year** • **US imports 5 M tons/year**

Gross Revenues



** Gross revenues from third parties (does not include "inside the fence" transfer pricing*

Project updates

- EPC and O&M agreements scheduled to be executed by the end of August. Separate EPC agreements with Siemens and Linde. O&M agreement with Siemens initially with a joint venture planned between to two to be the operating entity sharing the operating expertise of the two companies

Contact information

- Barry Cunningham:
  - bcunningham@summitpower.com
  - (801) 859-2718
- See also:
  - www.summitpower.com
  - www.texascleanenergyproject.com