

TAYLORVILLE ENERGY CENTER

The Cost Estimating Process

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Dan Lumma, Kiewit

Gasification Technologies Conference
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Topics

- Tenaska Overview
- Project Overview & History
- FEED Kick-off
- EPC Organization
- EPC Scope of Work
- Estimate Methodology
- Current Status



Tenaska Overview

Ranked 16th largest privately held company by Forbes magazine in 2009

- For over 20 years Tenaska has developed, constructed, and operated electric generation and co-generation plants
- Tenaska has developed 9,000 megawatts (MW) of generating facilities. We operate or oversee 17 power plants in the U.S. totaling more than 12,000 MW that are owned in partnership with other companies
- Headquarters in Omaha, Nebraska
 - Regional offices in Dallas, Texas; Denver, Colorado; and Calgary, Canada
 - Over 700 employees
 - Approximately \$8 billion in gross operating revenues (2009)

“We have old-fashioned ideas: a conservative approach to business that delivers value to customers.”

– Tenaska Chairman Howard Hawks

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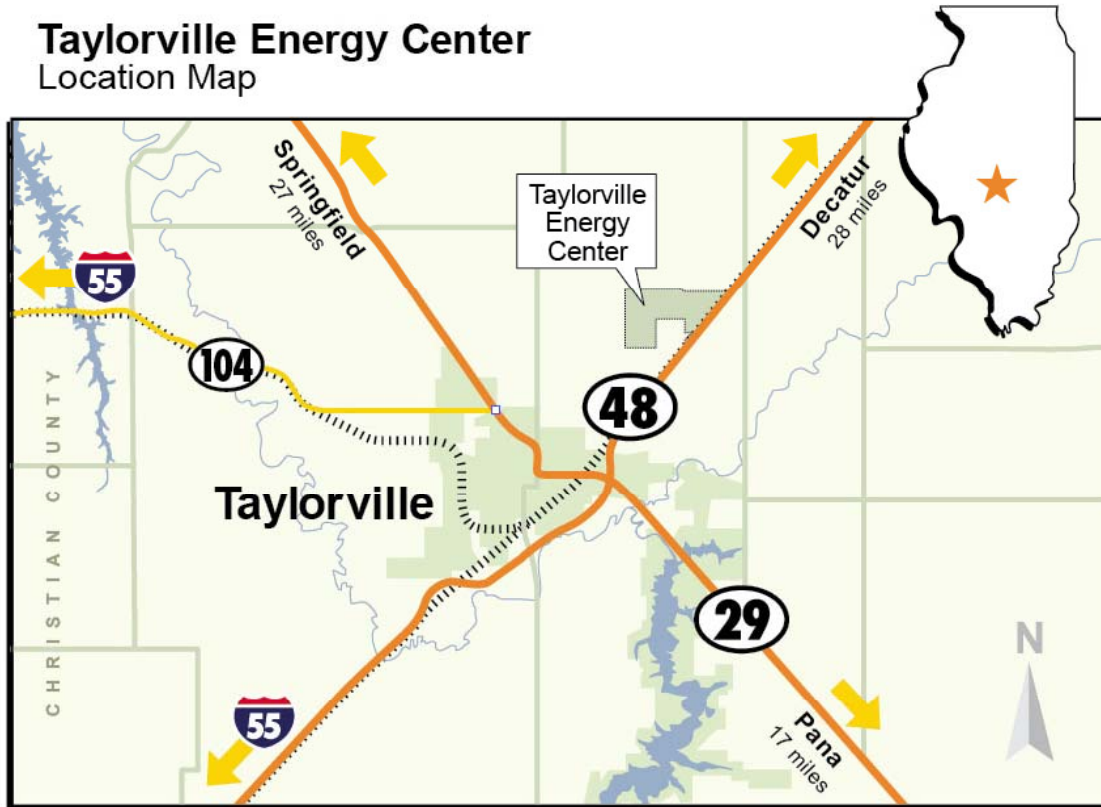
Taylorville Energy Center Overview

- 602 MW (net) Hybrid IGCC electric generation facility
- Located near the coal fields of central Illinois
- Hybrid IGCC technology
 - Illinois coal converted into clean substitute natural gas (SNG)
- 50% Carbon Capture during conversion of coal to SNG
- 2,470 Peak union construction related jobs
- 8,400,000 Construction man-hours (Craft/staff)
- 230 well-paying direct permanent jobs (155 plant jobs and 75 trucking jobs)
- Illinois Coal Consumption of 1.5 to 1.8 million tons per year
 - 175 direct mining jobs
- Carbon Sequestration
 - Deep Saline Aquifer Injection
 - Contract with Denbury to purchase the captured CO₂ for EOR

FACT:
Illinois is home to approximately 20 percent of recoverable U.S. coal reserves.

Project Site

Taylorville Energy Center
Location Map

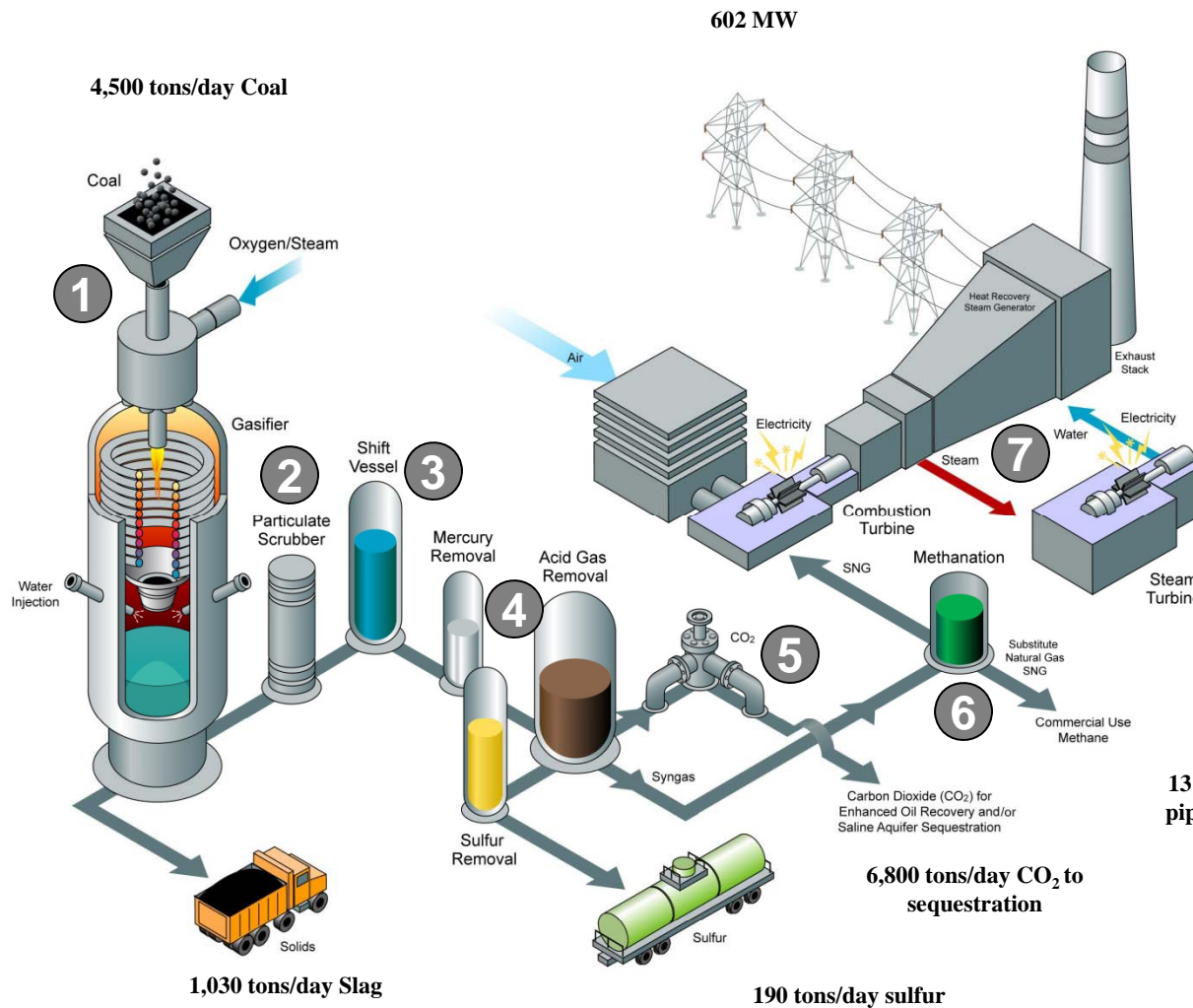


---- Railroad Tracks

- 713-acre site
- Located near Ameren and ComEd transmission lines
- Within 9 miles of Rockies Express and Panhandle Eastern Pipeline
- PJM (ComEd) System Impact Transmission Study completed
- Significant state and local support
- Excellent rail and highway infrastructure

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TEC Process



1. Gasification (coal to syngas)
2. Particulate scrubber
3. Steam Shift
4. Mercury Removal and Acid Gas Removal (Sulfur & CO₂)
5. CO₂ sequestration
6. Methanation (syngas to SNG)
7. Excess steam to boiler and steam turbine

TEC Facility Cost Report Results

- Average projected rate impact is 1.81%, based on 2009 electric rates
- Estimated all-in capital cost \$3.522 billion
- Power plant capacity factor is expected to be approximately 75%
 - Under certain market conditions SNG will be sold rather than using it to produce electricity
- The net reduction of annual CO₂ emissions of 1.9 million metric tons
 - Due to displacement of older, less efficient generation

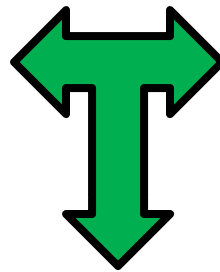
Key Project Participants

- Christian County Generation, L.L.C.
- Kiewit Energy Company / Burns & McDonnell Engineering Company, (KBMD) a Joint Venture
- Kiewit Power Engineers, Kiewit Power Constructors
- WorleyParsons Group, Inc.
- Siemens Energy, Inc.
- General Electric Energy
- Lurgi (subsidiary of Air Liquide)

KBMD Joint Venture



Kiewit



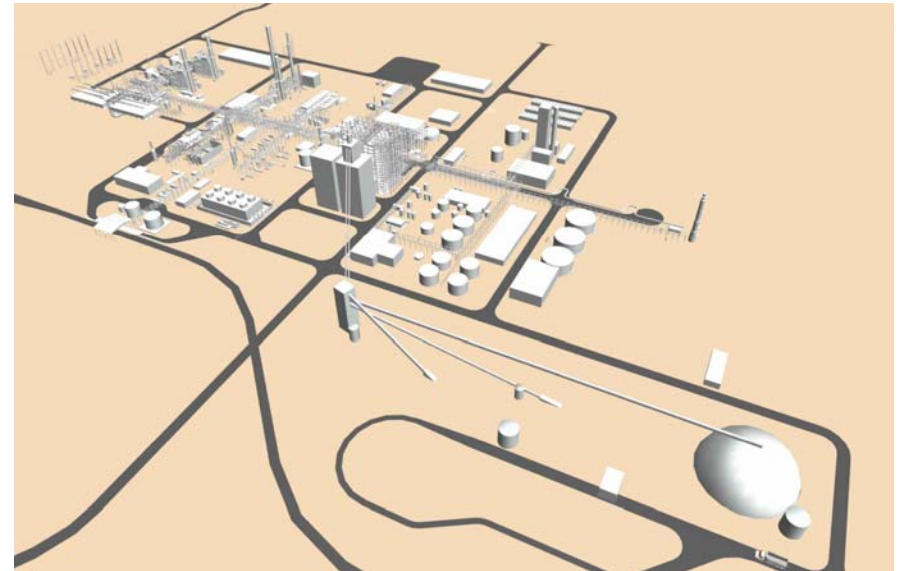
KBMD
Partners

A Joint Venture

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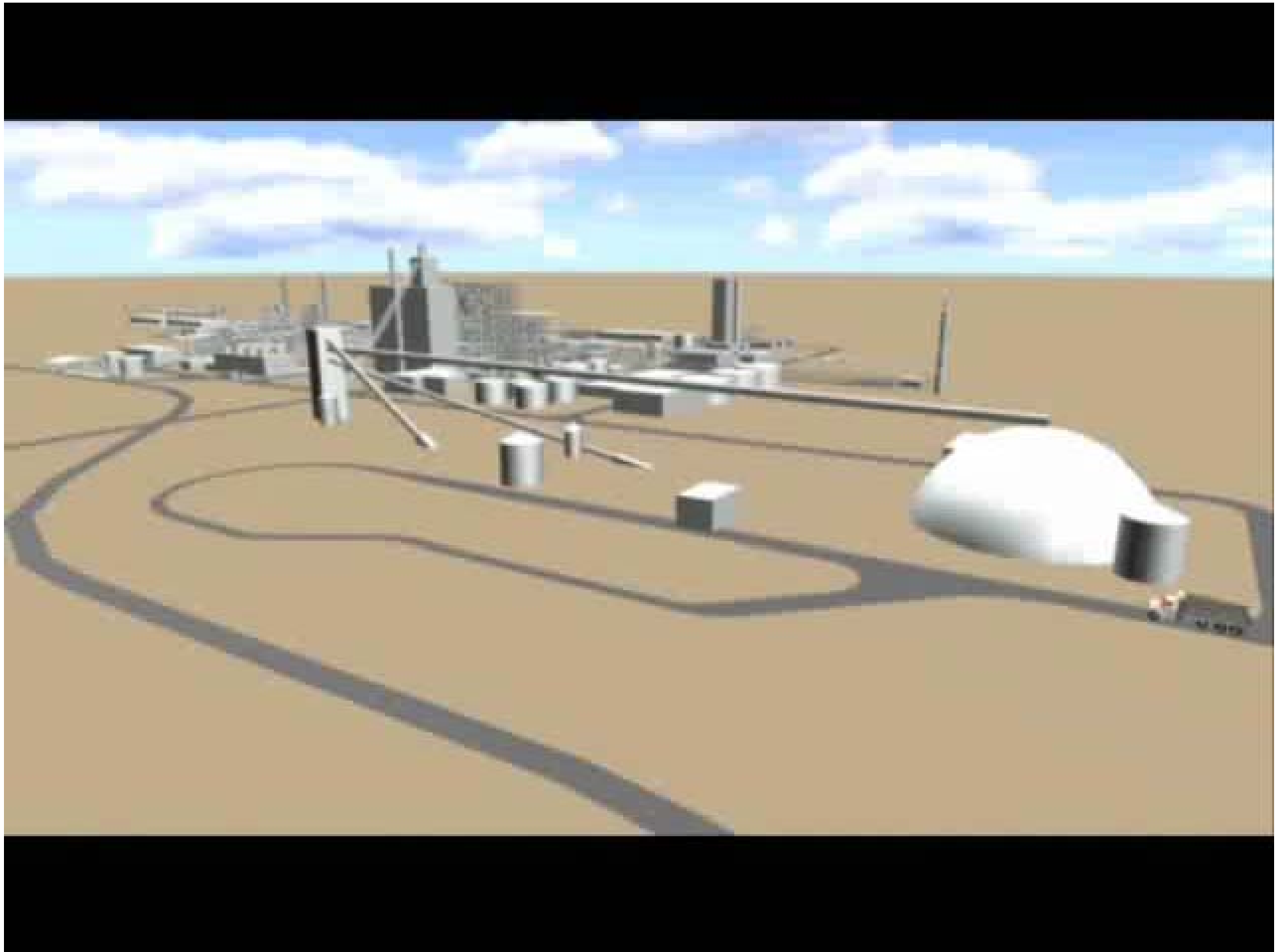
Estimate Organization

- Divided project up by silos
 - Process and physical area, contracting boundaries
- Assigned separate leads and teams for each silo
 - Each team empowered to manage their silo
- Defined common areas
 - Leverage efficiencies



Estimate Strategy

- Robust, quantity-driven estimate
 - Comprehensive 3D model and engineering packages
 - Coordinated estimate/procurement/estimate teams
 - Two independent material take-offs, estimates
 - Productivity rates based on past costs for similar work with local labor
- Accurate Material Pricing
 - 98% of equipment and materials pricing based on multiple real-time supplier quotes

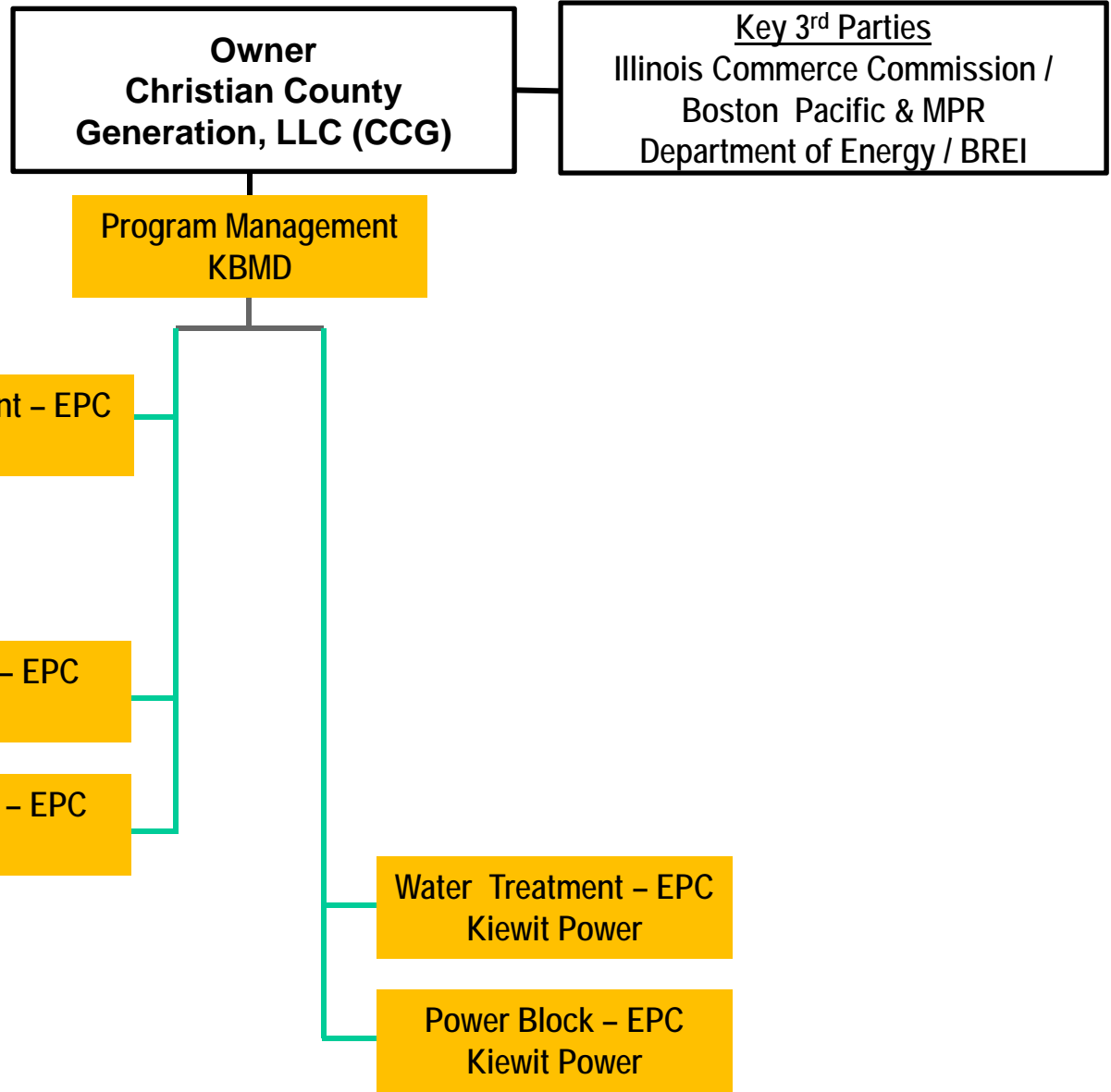


Taylorville Energy Center
Project Estimate
Structure

Owner
Christian County
Generation, LLC (CCG)

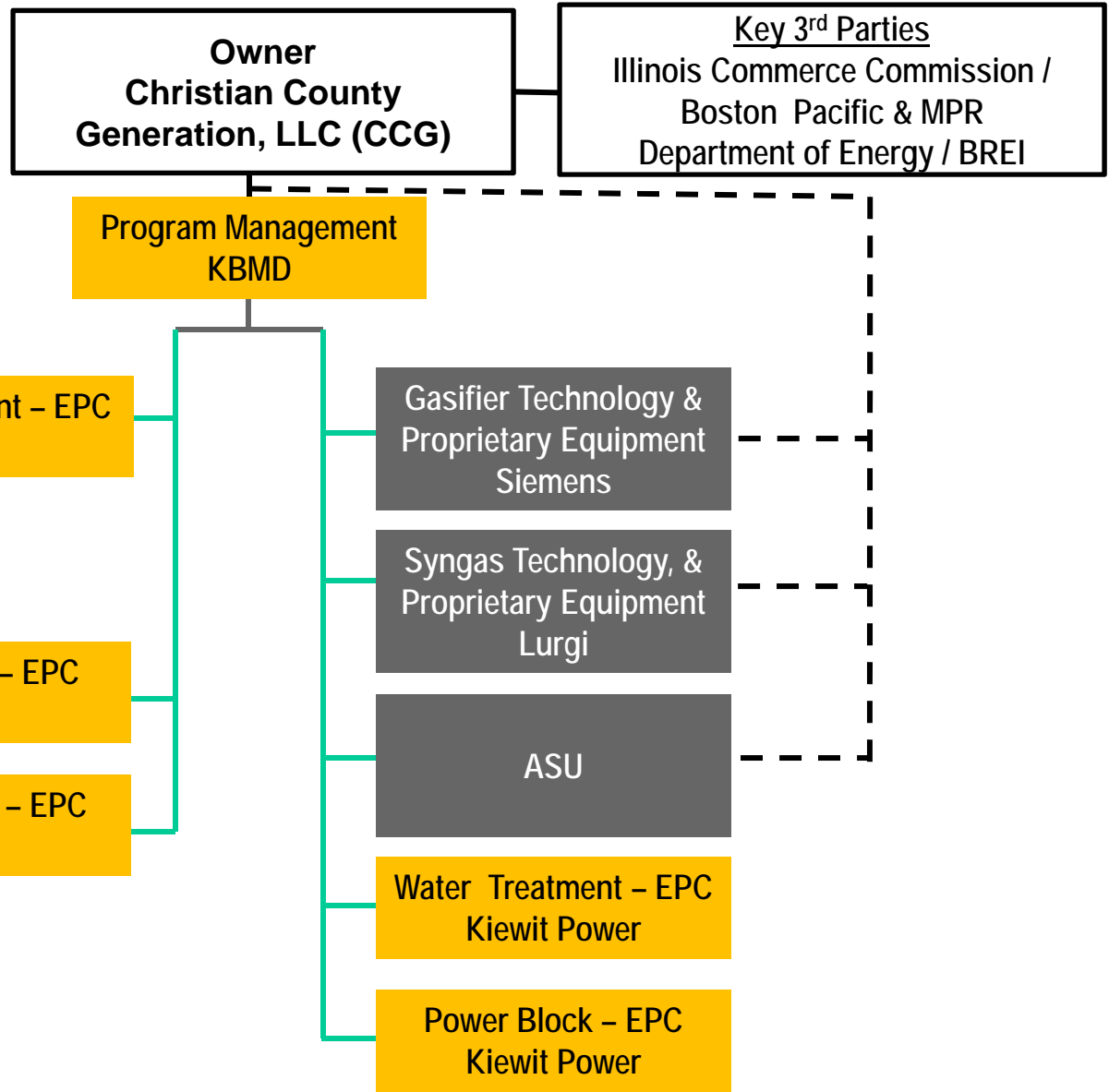
Key 3rd Parties
Illinois Commerce Commission /
Boston Pacific & MPR
Department of Energy / BREI

Taylorville Energy Center
Project Estimate
Structure



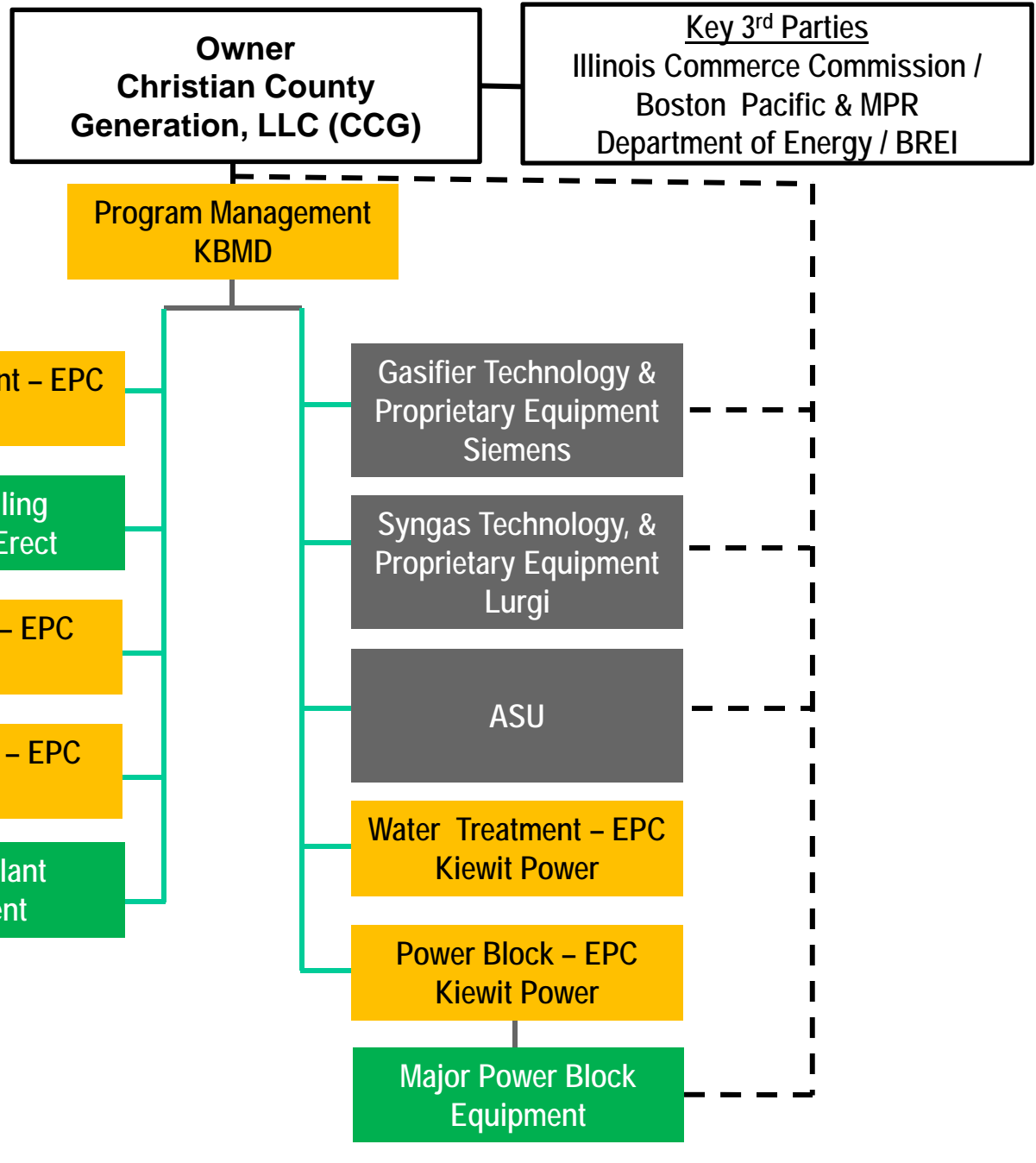
 KBMD and Kiewit

Taylorville Energy Center
Project Estimate
Structure

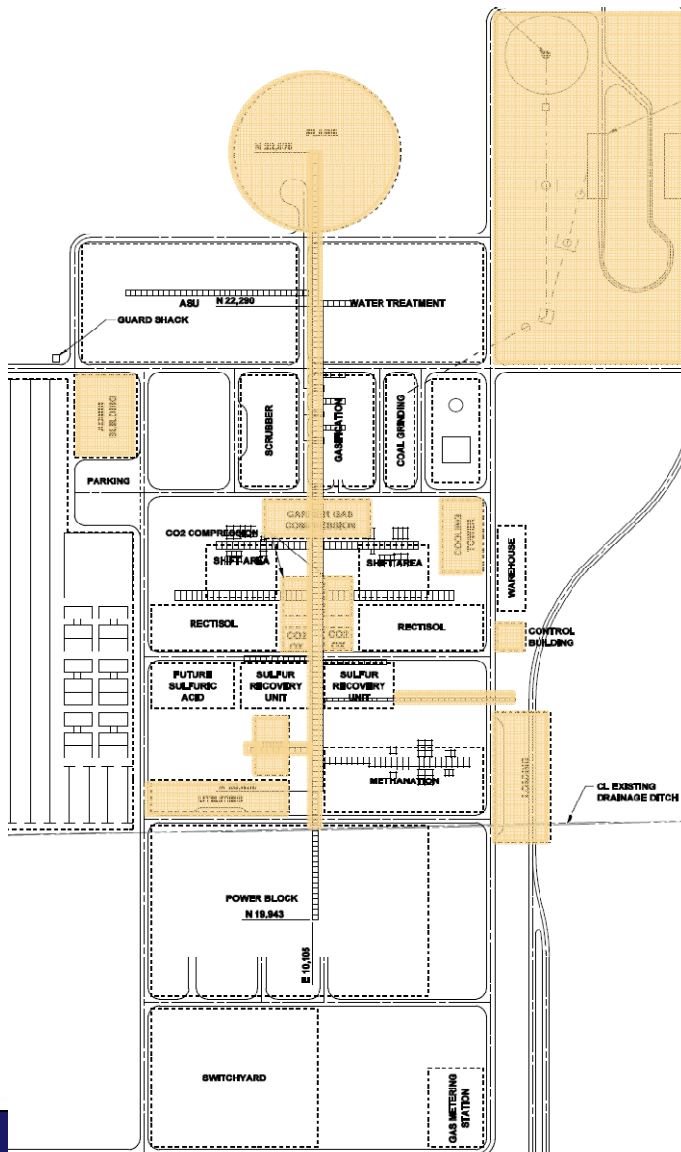


- KBMD and Kiewit**
- Technology & Proprietary Equipment Suppliers**

Taylorville Energy Center
Project Estimate
Structure



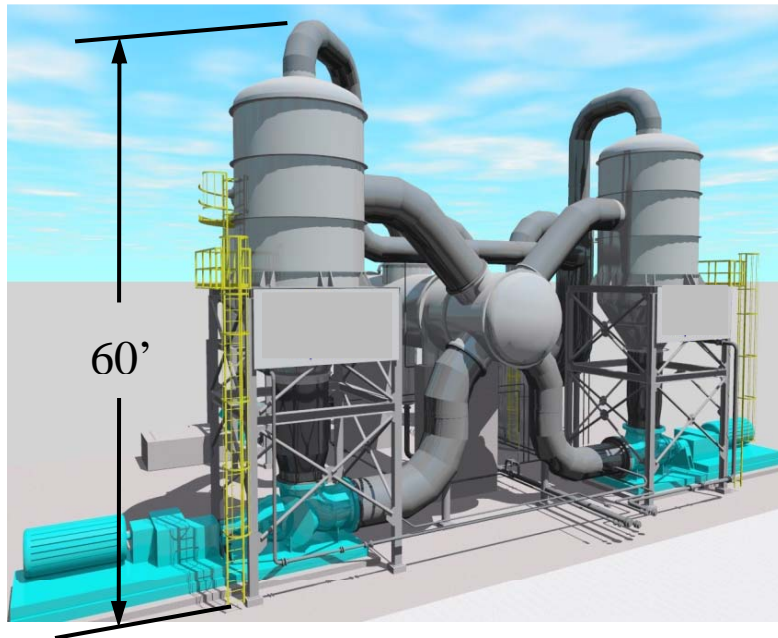
BOP/OSBL Silo Key Components



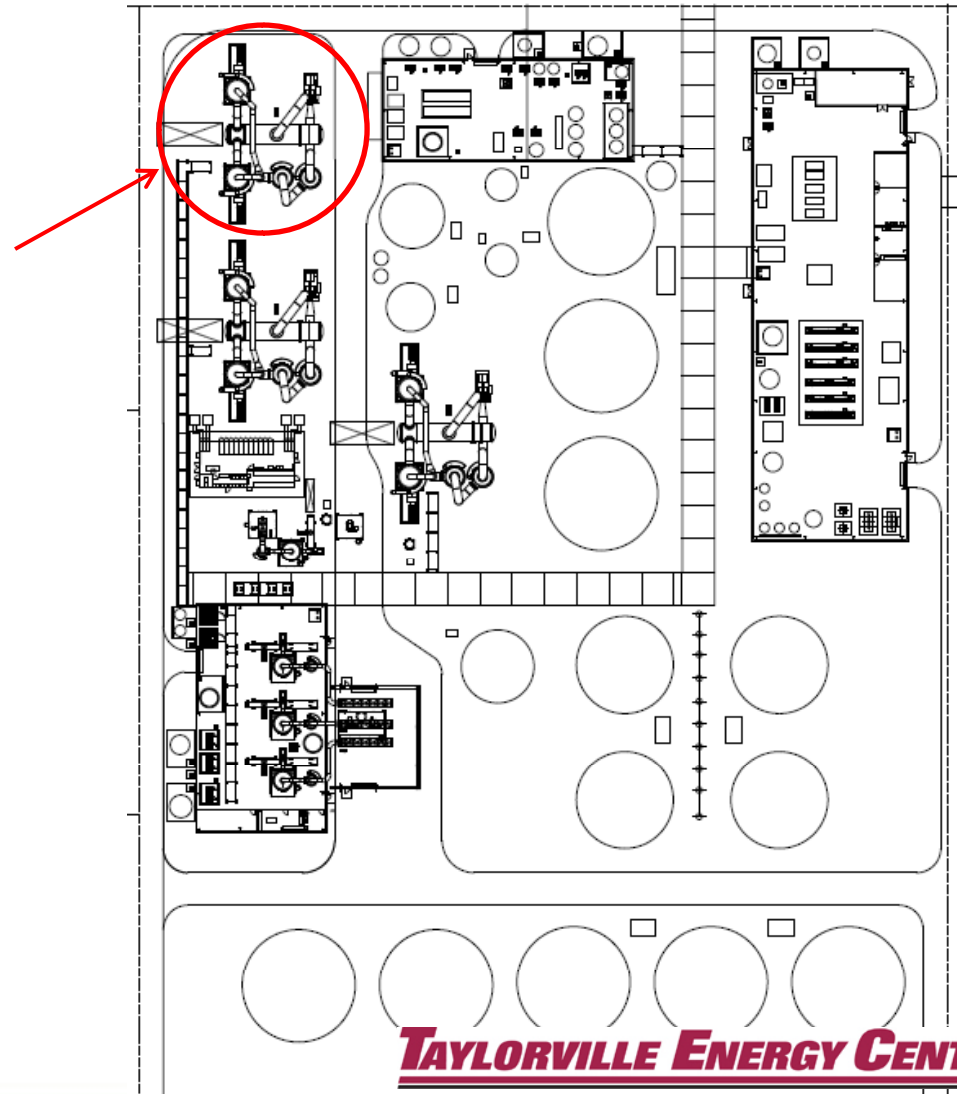
Balance of Plant

- Coal Handling
- Sour Water Stripper
- CO2 Compression and Drying
- CO2 Oxidation
- SNG Compression
- Pre-Engineered Bldgs
- Auxiliary Boiler
- Cooling Water
- Flare (195')
- OSBL (Main Piperack)

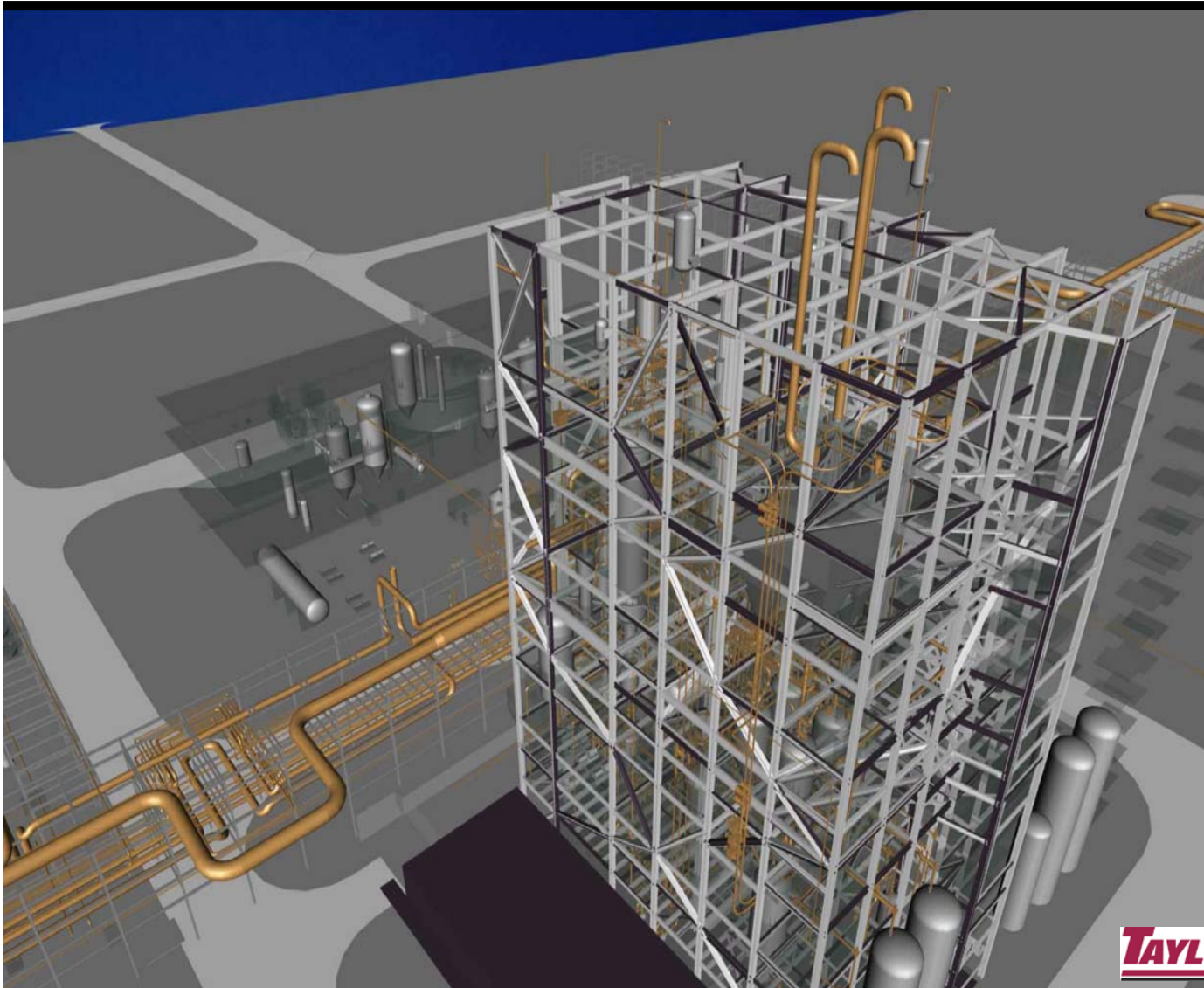
Water Treatment Key Components



- Pre-Concentrators
- Pre-Concentrator Recirc Pumps
- Grey Water Storage Tanks
- Grey Water Building
- Demin Storage Tanks
- Demin Building
- Cooling Tower Blowdown Building
- Dewatering Building

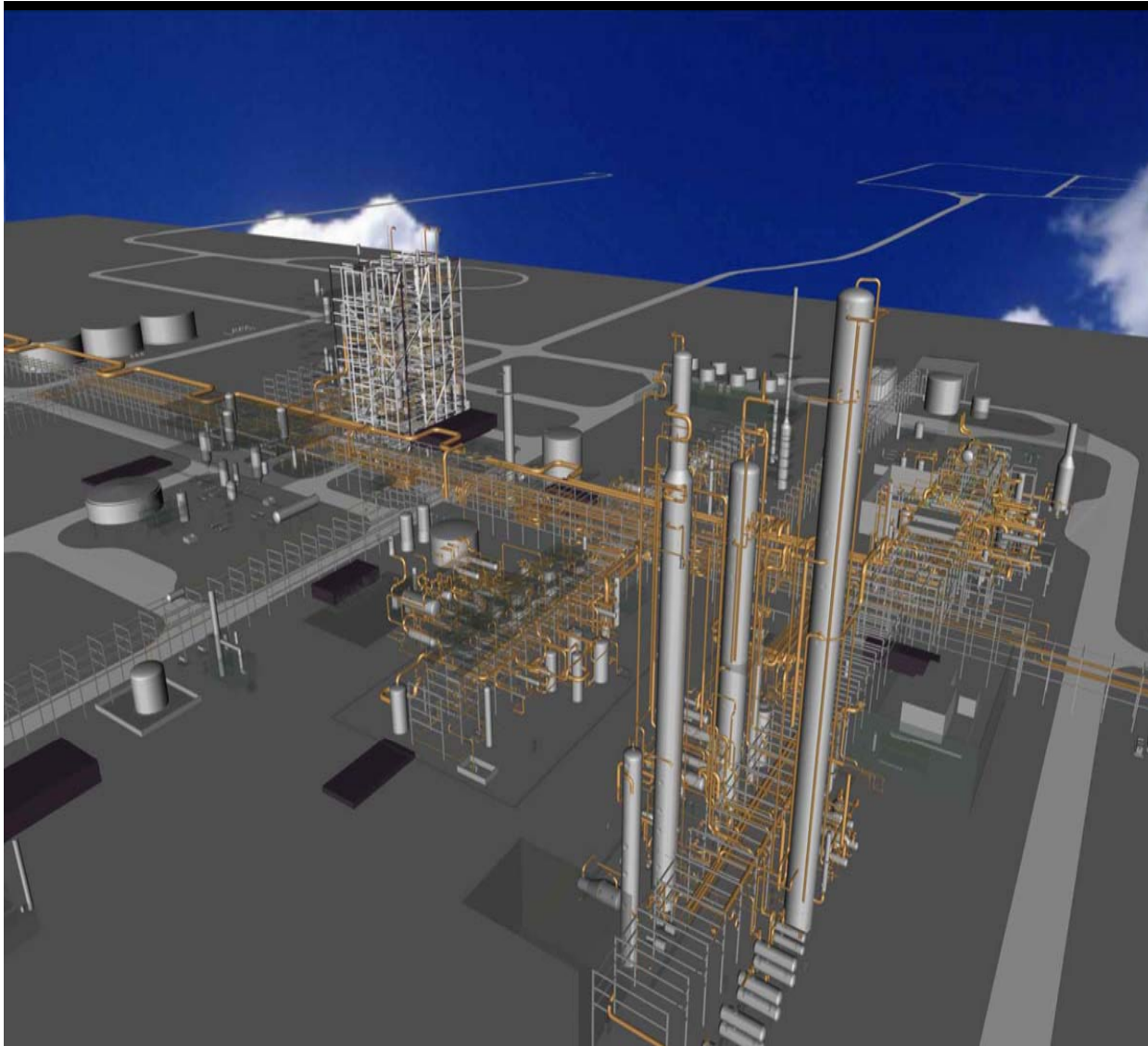


Gasification Silo Key Components



- Dry Coal Feed System
- Gasification
- Slag Discharge
- Raw Gas Treatment
- Flash System
- Black Water Treatment
- Coal Milling and Drying

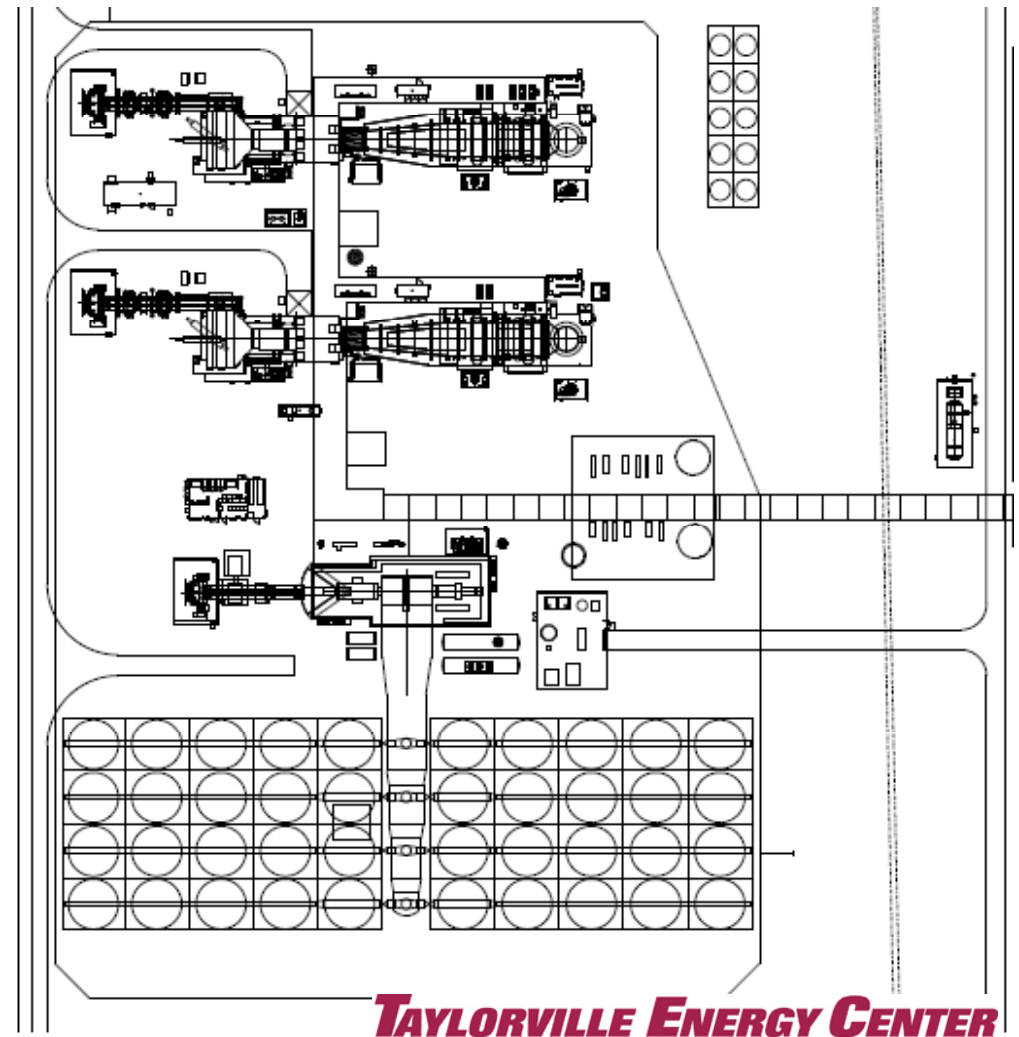
Syngas Silo Key Components



- Shift
- Acid Gas Removal
- Sulfur Recovery
- Tail Gas Treating
- Tail Gas Incineration
- Sulfur Degassing
- Methanation

Power Block Silo Key Components

- Combustion Turbine Generators (CTG)
- Steam Turbine Generator (STG)
- Air Cooled Condensers
- Heat Recovery Steam Generators (HRSG)
- Closed Loop Heat Exchangers
- Auxiliary Transformers
- Air Inlet Filter/ House



TAYLORVILLE ENERGY CENTER

Estimate Process (Performed for each Silo)

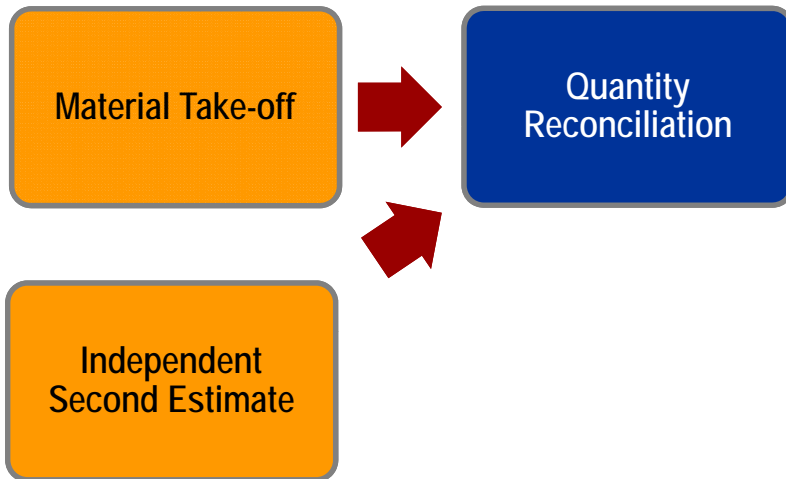
Material Take-off

Independent
Second Estimate

 KBMD Estimating Team

6 Weeks

Estimate Process (Performed for each Silo)



KBMD Estimating Team

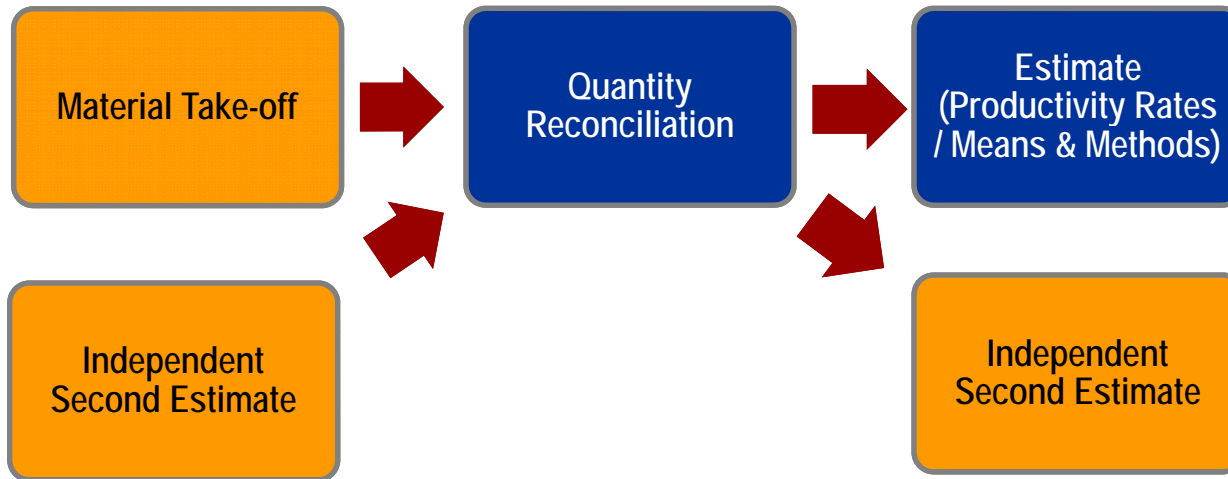


Open review process with CCG and 3rd Parties

6 Weeks

2 Weeks

Estimate Process (Performed for each Silo)



KBMD Estimating Team



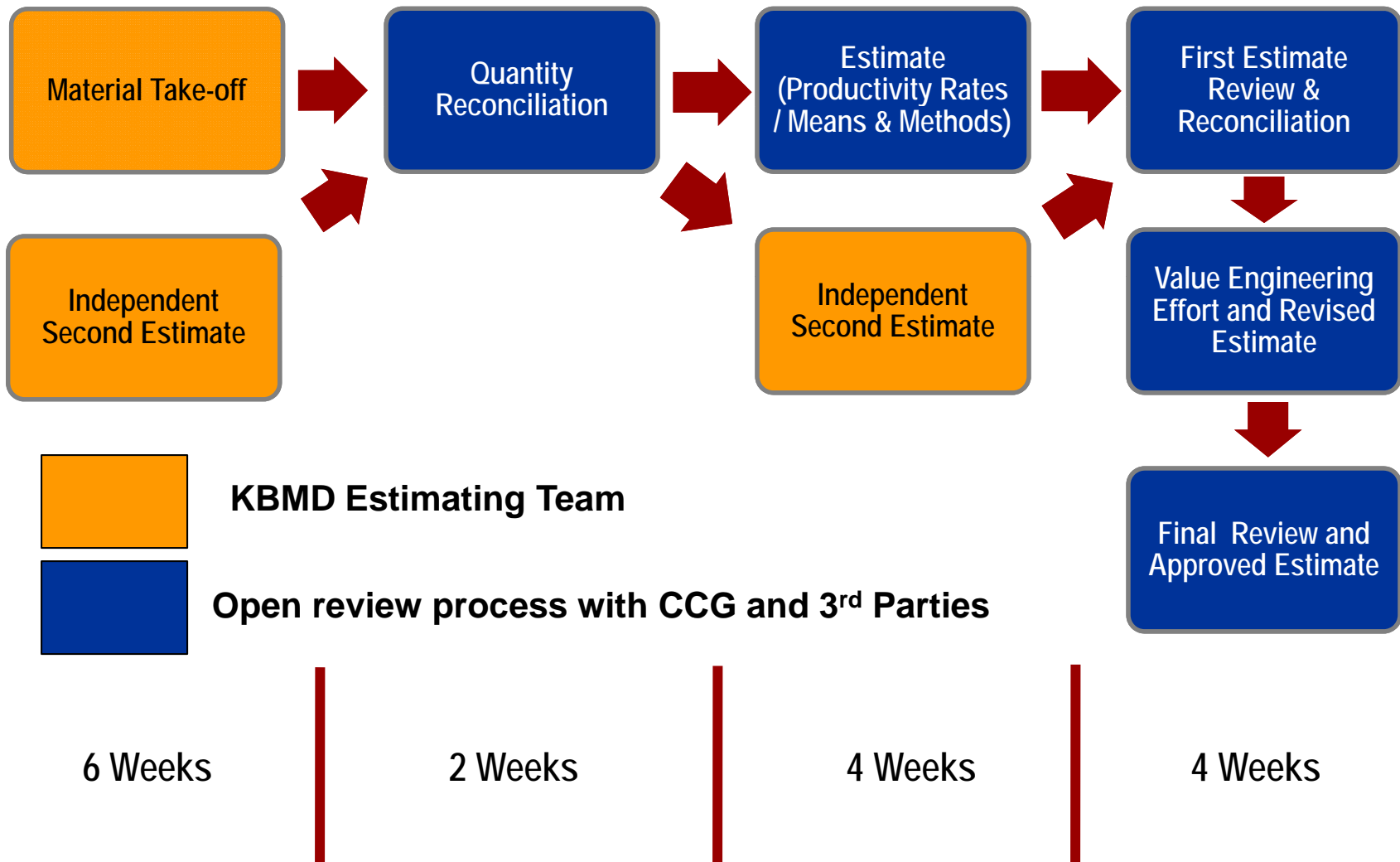
Open review process with CCG and 3rd Parties

6 Weeks

2 Weeks

4 Weeks

Estimate Process (Performed for each Silo)



Quantity Summary

TABLE 2.3.2.b – HIGH LEVEL QUANTITY SUMMARY

Description	Unit	SNG Island	Power Island and Water Treatment	Total
Pilings	EA	9,558	2,680	12,238
Concrete	Cubic Yards	100,185	29,378	129,563
Structural Steel	Tons	15,277	808	16,085
Piping	Linear Feet	522,744	131,080	653,824
Conduit	Linear Feet	892,007	418,064	1,310,071
Cable Tray	Linear Feet	72,076	17,891	89,967
Wire & Cable	Linear Feet	4,714,358	1,353,461	6,067,819

Cost Estimate Summary

TABLE 2.3.2.a – KBMD CORE PLANT ESTIMATE BY COST CENTER

Cost Center	Capital Cost Estimate
Gasification	\$386,376,385
Syngas Processing	392,725,450
Power Island	525,460,945
Water Treatment	187,159,747
Program Management	146,197,796
Other Core Plant*	590,455,593
JANUARY 2010\$ SUBTOTAL	\$2,228,375,916
Core Plant Escalation	179,236,347
TOTAL	\$2,407,612,263

* includes roadways, lighting, administration buildings, warehousing, rail, coal handling and bulk storage systems and certain shared services which include medium voltage electrical distribution, waste collection, fire protection and interconnecting structural, piping and control systems

Project Timeline⁽¹⁾ – Key Dates

- ICCPL Signed Into Law – January 2008
- FEED Complete & Facility Cost Report Issued – March 2010
- Illinois General Assembly Approval of TEC – late November 2010
- NEPA Record of Decision – Q1 2011
- IEPA Approval of Air Permit Updates – Q1 2011
- Close Financing – July 2011
- Construction – 2011 through 2015

(1) Subject to NEPA and Illinois General Assembly approval schedules