Gasification Combined Heat and Power From Coal Fines

(DE-FE0031520)

February 8, 2018

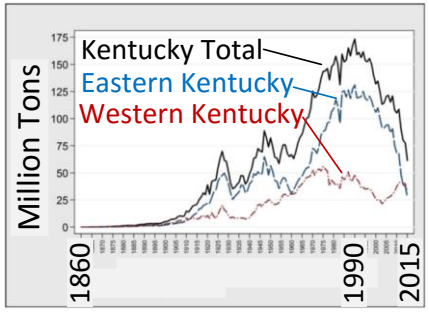
Background

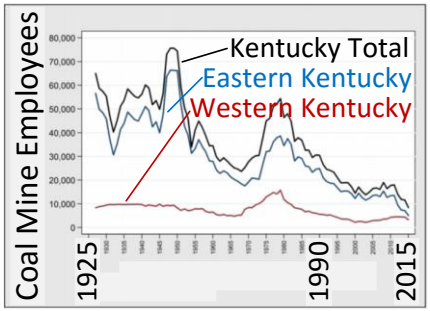
- Eastern, KY is a remote, coal dependent area

Perry County Preparation Plants.				
Company	**Plant**	**Nearest Town**	**Capacity (tph)**	**Fine Coal Recovery Circuit**
Whitaker/Perry Co/ICG	#4 Plant	Hazard	750/950	HM Cyclone, Spirals
KEM/Pads Branch	Plant #25	Hazard	400	HM Cyclone, Spirals
Blue Diamond/ Blackhawk	Leatherwood	Leatherwood	800/1600	Concentrating Tables, Spirals, HM Cyclones
Lost Mountain	Harris Branch	Bulan	900	HM Cyclone
Kodak	Chester	Allock	350	Hydrocyclone
River Processing	Dunraven	Dunraven	350	Concentrating Tables, Hydrocyclone
Sunfire	#2 Plant	Combs	175	None
River Coal	Indian Head	Ned	180	None
Tesora	Wahoo	Bonneyman	420	None

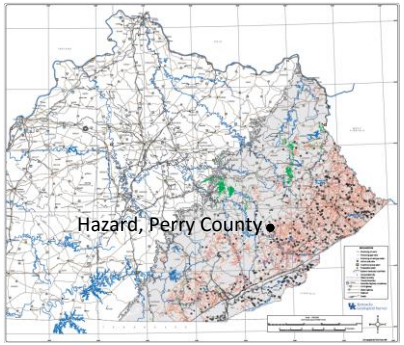
Background

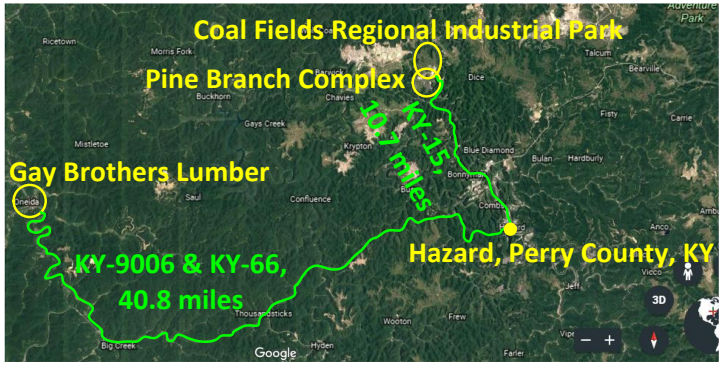
- Suffering from poor economy and job loss



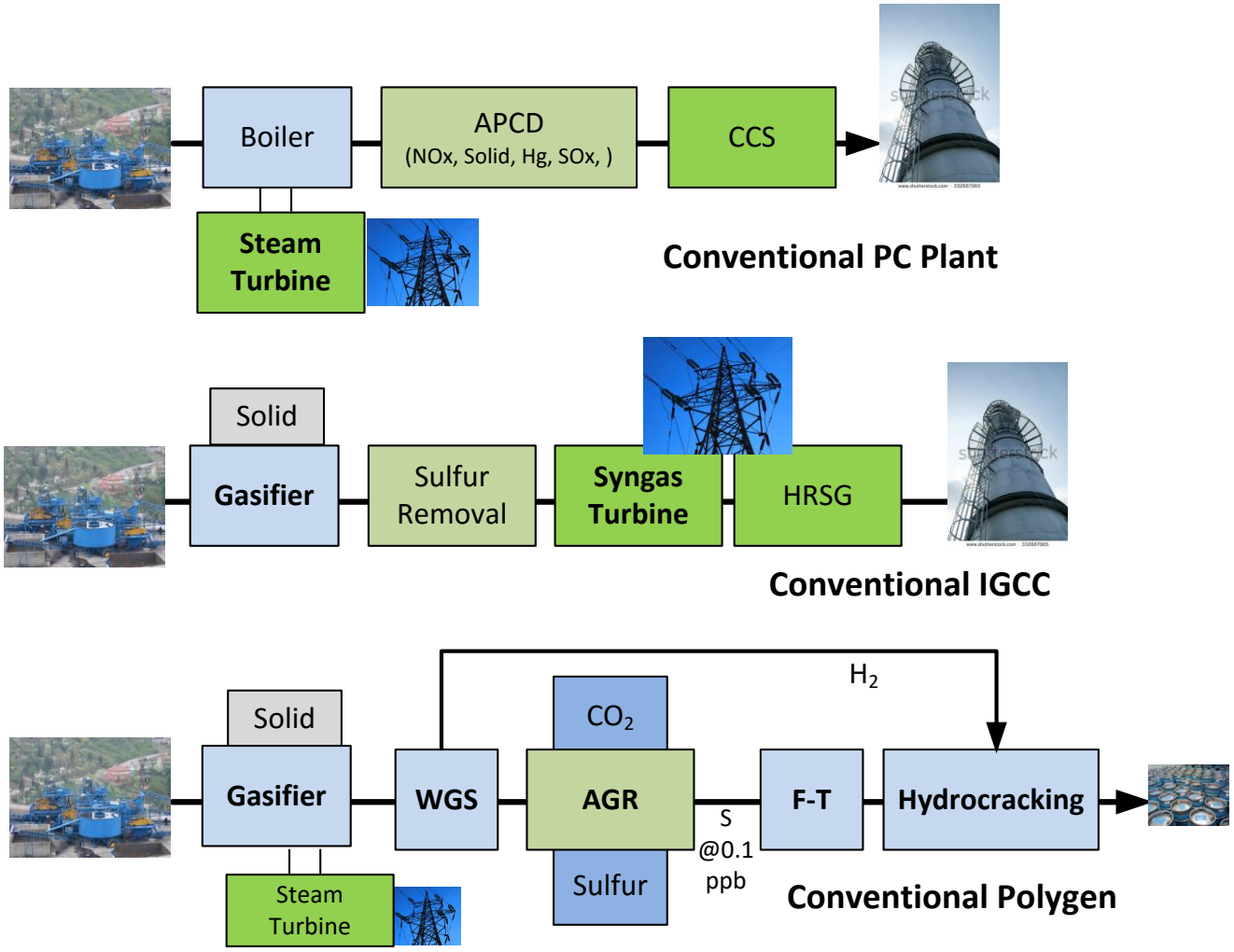


- Would benefit from local polygeneration units
  - Encourage industry location in industrial parks
  - Economic development
  - Secondary environmental benefit of recovering coal fines
- Use local sites in Perry County as representative of sites throughout Eastern, KY and Appalachia





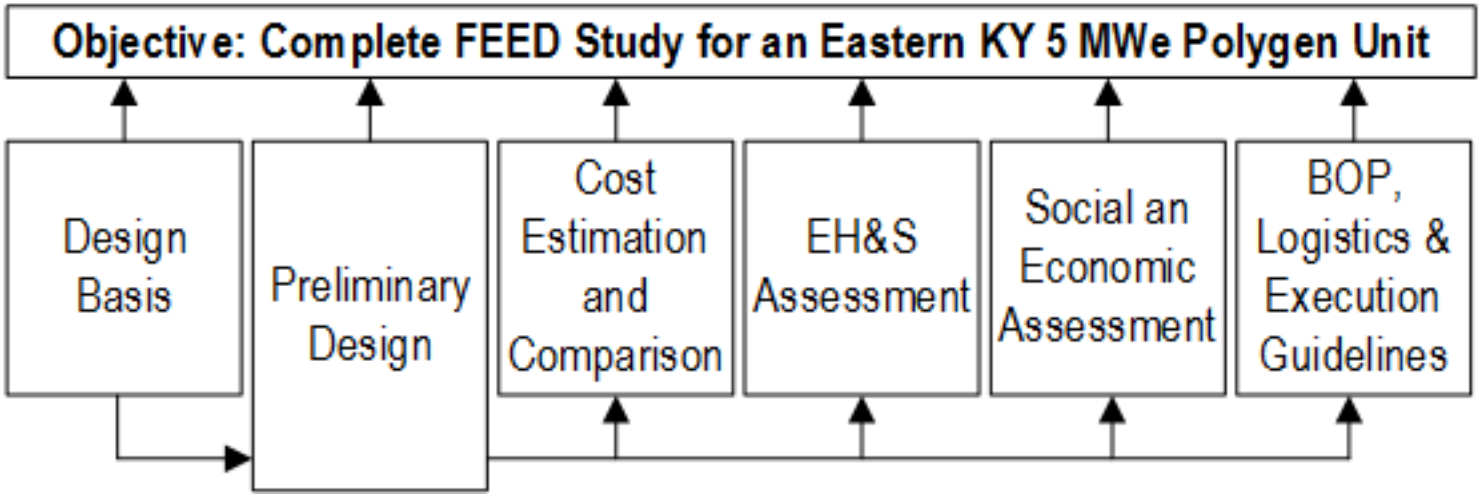
Background – Coal-based Polygeneration



Project Objective

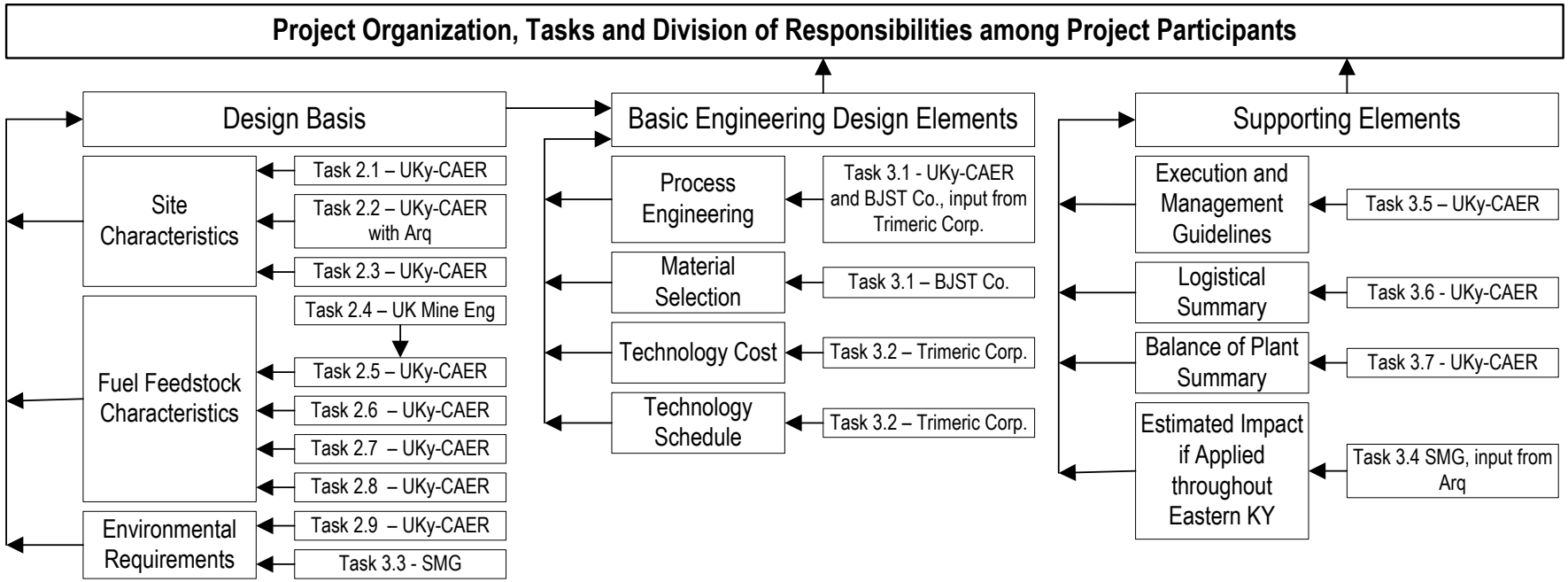
- Complete a FEED study for a 5 MWe equivalent polygenerating unit to be located at an industrial park in Hazard, Eastern KY utilizing nearby waste coal fines and biomass as feedstocks.
- Identify appropriate main components (technology selection and operating conditions)

- Components included in FEED study



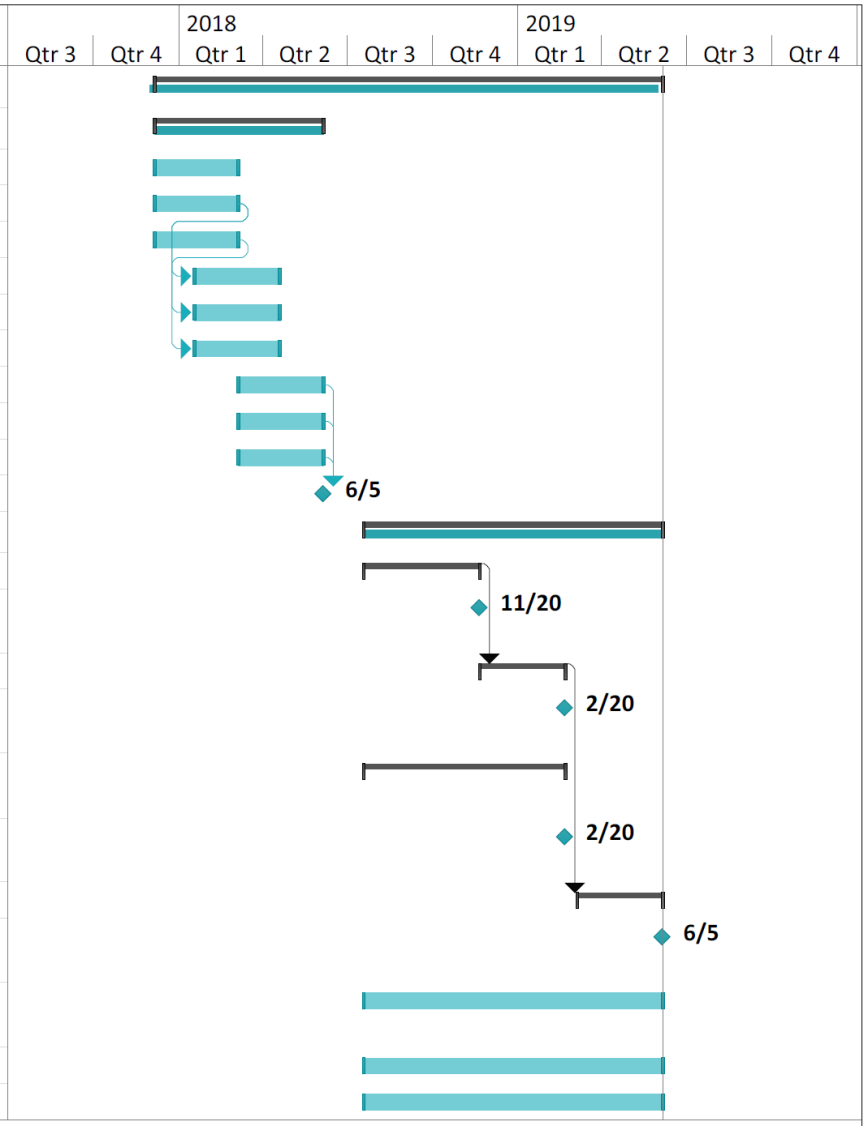
Project Tasks

- Task 1: Project Management, Planning and Reporting
- Task 2: Project Design Basis
- Task 3: Basic Engineering Design Elements



Project Schedule

ID	Task Name	Start	Finish
1	**1 Project Management and Planning**	**12/6/17**	**6/5/19**
6	**2 Project Design Basis**	**12/6/17**	**6/5/18**
7	**2.1 Host Site Visit**	**12/6/17**	**3/5/18**
8	**2.2 Coal Fines Impoundment Site(s) Visit**	**12/6/17**	**3/5/18**
9	**2.3 Biomass Site Visit**	**12/6/17**	**3/5/18**
10	**2.4 Project Management and Planning**	**1/18/18**	**4/19/18**
11	**2.5 Coal Feedstock Characterization**	**1/18/18**	**4/19/18**
12	**2.6 Biomass Feedstock Characterization**	**1/18/18**	**4/19/18**
13	**2.7 Slurry Prep and Characterization**	**3/6/18**	**6/5/18**
14	**2.8 Fuel Mix Optimization**	**3/6/18**	**6/5/18**
15	**2.9 Coal and Biomass Ashing and Leach Testing**	**3/6/18**	**6/5/18**
16	**2.10 Milestone: Project Design Basis Complete**	**6/5/18**	**6/5/18**
17	**3 Basic Engineering Design Elements**	**7/19/18**	**6/5/19**
18	**3.1 Process Engineering**	**7/19/18**	**11/20/18**
19	*3.1.1 Milestone: Polygeneration Process Basic Engineering Design Complete*	*11/20/18*	*11/20/18*
20	**3.2 Technology Cost and Schedule Estimate**	**11/21/18**	**2/20/19**
21	*3.2.1 Milestone: Polygeneration Process Cost Estimation Complete*	*2/20/19*	*2/20/19*
22	**3.3 Initial Environmental, Health and Safety (EH&S) Assessment**	**7/19/18**	**2/20/19**
23	*3.3.1 Milestone: Polygeneration Process EH&S Assessment Complete*	*2/20/19*	*2/20/19*
24	**3.4 Social and Economic Impact Assessment**	**3/6/19**	**6/5/19**
25	*3.4.1 Milestone: Polygeneration Process Social and Economic Impact Assessment Complete*	*6/5/19*	*6/5/19*
26	**3.5 Technology Execution and Management Guidelines and Procedures**	**7/19/18**	**6/5/19**
27	**3.6 Logistical Summary**	**7/19/18**	**6/5/19**
28	**3.7 Balance of Plant Requirements**	**7/19/18**	**6/5/19**



Project Management Plan - Deliverables

Milestone Log.

Budget Period	ID	Task Number	Description	Planned Completion Date	Actual Completion Date	Verification Method
1	1	1	Updated Project Management Plan	1/5/2018	1/31/2018	Project Management Plan Filed
1	2	1	Kickoff Meeting	1/15/2018	2/8/2018	Presentation File
1	3	2	Project Design Basis Complete	6/5/2018		Quarterly Report
1	4	3	Polygeneration Process Basic Engineering Design Complete	11/20/2018		Topical Report
1	5	3	Polygeneration Process Cost Estimation Complete	2/20/2019		Topical Report
1	6	3	Polygeneration Process EH&S Assessment Complete	2/20/2019		Topical Report
1	7	3	Polygeneration Process Social and Economic Impact Assessment Complete	6/5/2019		Topical Report
1	8	3	Final Project Report Complete	6/5/2019		Final Report

Project Management Plan – Success Criteria

Success Criteria.	
Planned Date	**Success Criteria**
6/5/2018	Acceptable feed slurry demonstrated for design basis.
11/20/2018	Completed preliminary design package for polygeneration unit to be located in Eastern KY.
2/20/2019	Demonstration that the polygeneration unit can be modularized.
6/5/2019	Demonstration of economically viable option of CHP with small scale, locally installed polygeneration units throughout Eastern KY.

Project Risk Management

Technical Risks:				
Budget Period	**Description of Risk**	**Probability (Low, Moderate, High)**	**Impact (Low, Moderate, High)**	**Risk Management Mitigation and Response Strategies**
1	Unrecoverable Coal Fines from Impoundment Site due to Poor Coal Quality, Site Geology or Unforeseen Environmental Issue	Moderate	Low	Locate another site. Two nearby impoundment sites have been targeted in the proposed work, with many others throughout Eastern KY, managed by the same mining company.
1	Inadequate Feed Slurry from Available Coal Fines	Low	Moderate	The slurry recipe can be adjusted and stabilization and viscosity lowering components can be added.
1	Inadequate Fuel Heating Value with Inclusion of Biomass	Low	Moderate	The amount of biomass included in the feed can be reduced to increase the heating value.
1	Melting Ash Viscosity too High at Gasification Temperatures	Moderate	Moderate	Alkaline earth metals will be added to the CWS to reduce the melting ash viscosity.

Acknowledgements

- DOE-NETL: Steve Markovich, Dave Lyons
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