Coal Refuse to Energy
As of February 2017

1. Background

In October 2016, ARIPPA released a report prepared by Econsult Solutions, a Philadelphia-based economic consulting firm, that analyzed the economic and environmental benefits of the 14 plants comprising the Pennsylvania coal refuse to energy industry. **(See attachment #1)***

2. Summary of Findings

- Our industry plays a pivotal role in environmental remediation by removing coal refuse piles from the landscape, cleaning-up the underlying land, and restoring impacted water resources without shifting costs to public sources.
- Since its inception, the industry has removed and burned as fuel more than 200 million tons of coal refuse.
- Improved or restored more than 1,200 miles of streams.
- Reclaimed more than 7,000 acres of abandoned mine lands (AML).
- The Econsult report found that at historic operating levels, the industry removes 10 million tons of coal refuse and reclaims 200 acres of land per year.
- Environmentally, our worth to Pennsylvania as documented in the Econsult study is more than $520 million over a 20-year period, averaging about $26 million per year. **(See attachment #2)**
- The quantifiable economics benefits of the industry to the Commonwealth – according to Econsult Solutions is $736 million per year, including 3,600 jobs and a yearly payroll of $223 million. **(See attachment #3)**
  (Average annual salary of these jobs exceed $70,000.)
- Additional $20 million per year in taxes and fees.

3. Challenges

- The volume of remaining coal refuse across the Commonwealth is daunting.
- According to DEP's inventory, 840 coal refuse piles (52 of which are currently burning) are located in the Commonwealth on nearly 10,000 acres of AML containing at least 300 million tons of coal refuse.
- These piles are more than eyesores. The culm banks or gob piles are unstable, prone to subsidence, erosion or even fires. They impair the environment by leaching acid mine drainage (AMD), reducing wildlife habitat, and creating public hazards.
- Frankly, if these piles are not removed through the coal refuse generation process, in all likelihood they'll remain in place (cost issues and public funding constraints) and continue to pollute the landscape.
- There are a number of factors impeding our ability to clean up these piles and generate electricity:
  - Restrictive and energy transforming regulatory requirements
  - Stagnant demand for electricity
  - Glut of and abnormally low price for natural gas
- As a result:
  - Wholesale electricity prices in the PJM are down dramatically over the past 2 years.
  - Prices per MWh fell from $64 in 2014 to $43 in 2015.
  - In 2016, Q1 and Q2 prices have fallen further to $32, half the level of 2014. (**See attachment #4)**

*All attachments hereto are tables or figures from the full Econsult study.

- Consequently, the cost to produce our commodity exceeds its selling price. Total production cost estimate is $39/MWh, versus market revenue of $34 – can't sustain a business with those numbers. **(See attachment #5)**
- As the industry's capacity is reduced by economics, so too does the amount of environmental remediation being accomplished. This decline in output production is readily apparent in aggregated production data from recent years. **(See attachment #6)**

4. Call to Action

- There are 18 coal refuse to energy plants located in the U.S. – 14 in Pennsylvania, 2 in West Virginia, and one each in Montana and Utah.
- The Econsult study documents the multiple economic, environmental, and societal benefits that this industry provides to Pennsylvania alone.
- To preserve its continued viability, the industry seeks to form partnerships with the state and federal government in which the latter helps manage the industry's fuel cycle costs in return for industry restoring environmental problems caused by past mining, problems that this industry neither created nor is liable for.

ATTACHMENT #1

TABLE 4.1 – ARIPPA MEMBER PLANT ENERGY GENERATION AT BASE LOAD AND IN 2015

Plant	Capacity (MW)	Energy Generation at base load (Mwh)	Energy Generation 2015 (Mwh)	% Change
Seward	525	3,724,944	1,600,000	-57%
Northampton Generating Co	107	926,535	452,512	-51%
Colver Power Project	102	829,280	829,280	0%
Cambria Cogen Company	85	748,615	602,336	-20%
Panther Creek Energy	83	579,413	479,531	-17%
Scrubgrass Generating	83	696,692	615,627	-12%
Schuylkill Energy Resources Inc.	80	706,609	686,034	-3%
Gilberton Power Company	80	585,516	584,648	0%
Kimberly Clark Chester Plant	60	302,863	167,557	-45%
Northeastern Power Company	52	401,455	188,753	-53%
Ebensburg Power	50	429,747	196,979	-54%
Wheelabrator Frackville Energy Company	42	350,000	350,000	0%
Mt. Carmel Cogen	40	285,052	285,052	0%
Westwood Generation	30	219,873	202,844	-8%
Total	**1,419**	**10,786,594**	**7,241,154**	**-33%**

Source: ARIPPA (2015), ARIPPA member survey (2016)

ATTACHMENT #2

TABLE 6.1 – QUANTIFICATION OF ENVIRONMENTAL AND PUBLIC USE BENEFITS OVER 20 YEAR TIME SPAN ($M)

Category	Benefit Type	Year 1	Year 10	Year 20	Total	20 Year Avg
Water	Cumulative	$1.5	$14.6	$29.2	$306.2	$15.3
Fire/Air	Cumulative	$0.1	$0.5	$1.0	$10.0	$0.5
Public Safety	Cumulative	$0.6	$6.4	$12.8	$133.9	$6.7
Land Reclamation	One-Time	$2.0	$2.0	$2.0	$40.4	$2.0
Nearby Property Value	One-Time	$1.6	$1.6	$1.6	$32.6	$1.6
Total		**$5.8**	**$25.1**	**$46.5**	**$523.1**	**$26.2**

Source: ESI Calculations

ATTACHMENT #3

Table 4.4 – Annual Economic Impact of the Coal Refuse Industry in Pennsylvania

	Base load	2015	% Change
Direct Jobs (FTE)	1,820	1,450	-26%
Direct Output ($M)	$432	$347	-20%
Indirect & Induced Output ($M)	$304	$241	-21%
Total Output ($M)	**$736**	**$589**	**-20%**
Total Employment (FTE)	**3,600**	**2,800**	**-20%**
Total Earnings ($M)	**$223**	**$186**	**-17%**

Source: ARIPPA (2016), ESI (2016), IMPLAN (2013)

ATTACHMENT #4

TABLE 1.1 – PJM QUARTERLY WEIGHTED AVERAGE WHOLESALE ELECTRICITY PRICE $ / MWH, 2014-2016[1]

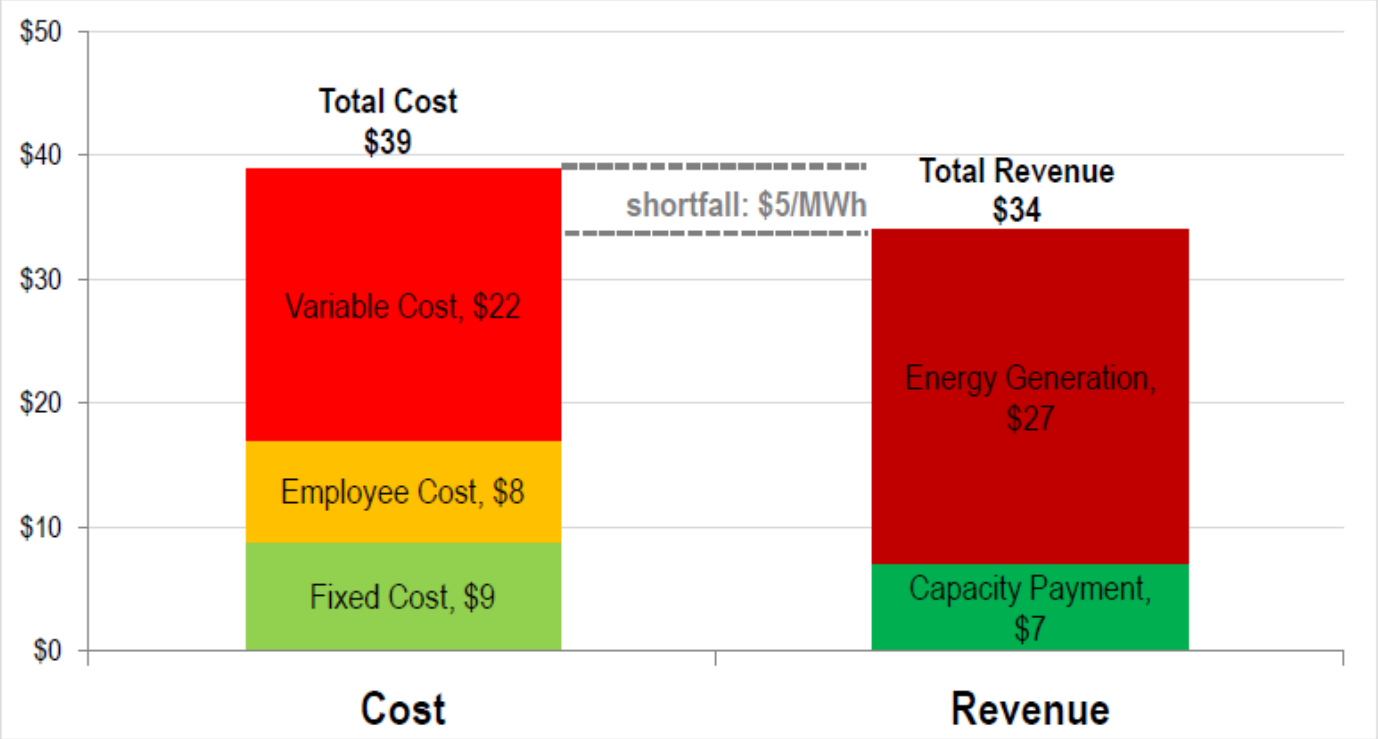
	2014	2015	2016	2016 % of 2014 Price
Q1 (January – March)	$114.87	$60.18	$31.20	27%
Q2 (April – June)	$52.54	$41.58	$32.25	61%
Q3 (July – September)	$43.86	$38.82	-	
Q4 (October – December)	$42.90	$32.61	-	
Annual	**$63.85**	**$43.31**	**$31.62**	**50%**

Source: U.S. Energy Information Administration, Wholesale Electricity Data.

[1] U.S. Energy Information Administration, "Wholesale Electricity and Natural Gas Market Data," www.eia.gov.

ATTACHMENT #5

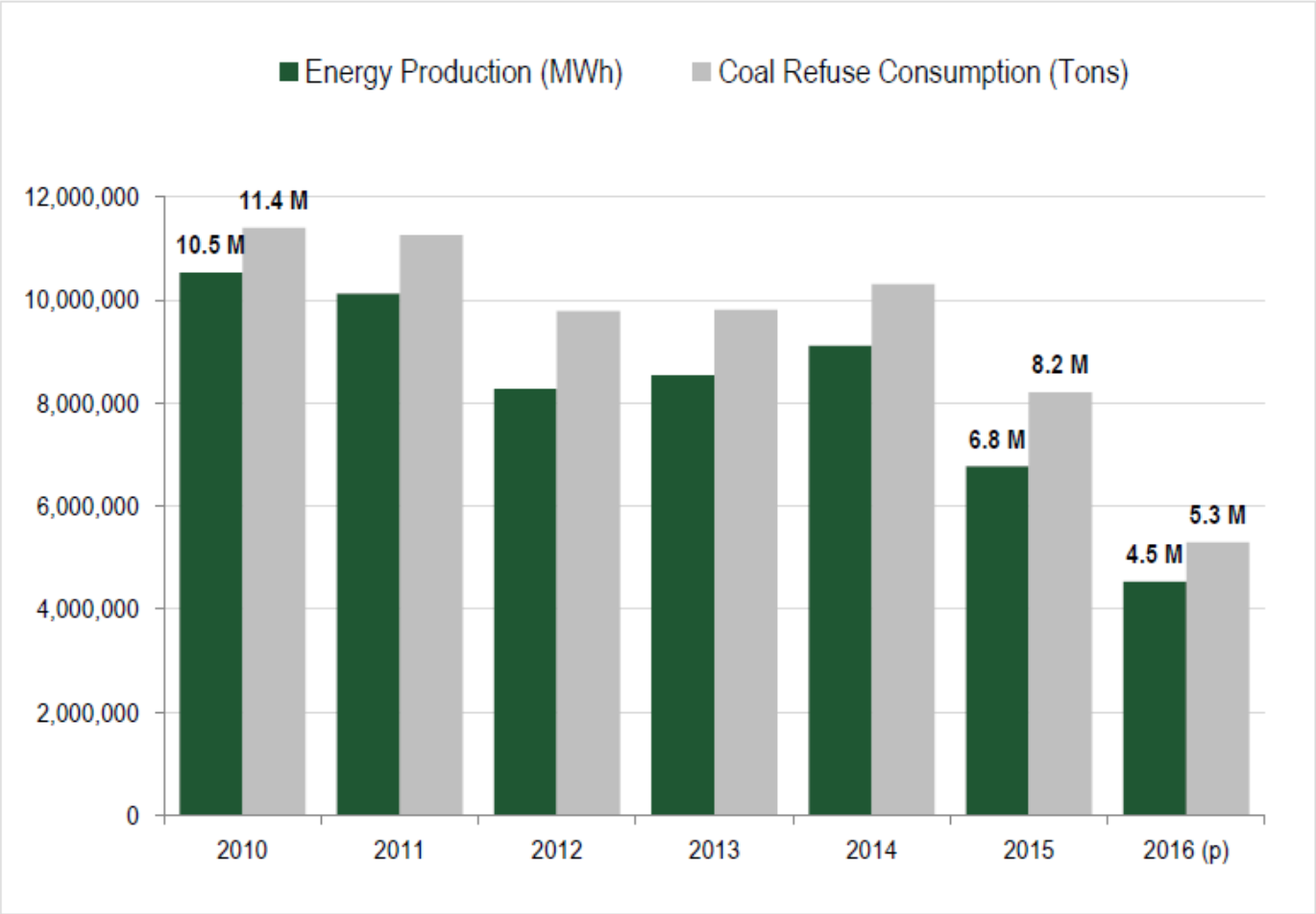
FIGURE 1.4 – TOTAL ENERGY GENERATION COSTS AND REVENUES PER MWH



Source: ESI Analysis of ARIPPA Member and U.S. Energy Information Administration Data (2016)

ATTACHMENT #6

FIGURE 1.5 – ANNUAL INDUSTRY ENERGY GENERATION AND COAL REFUSE CONSUMPTION TRENDS, 2010 – 2016(P)



Source: ESI analysis of ARIPPA member reported data (2016)