



Comments on Municipal Energy Agency of Nebraska (“MEAN”)
Draft Integrated Resource Plan

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I. Introduction and Summary

Thank you for this opportunity to comment on the draft Integrated Resource Plan (“IRP”) for the Municipal Energy Agency of Nebraska¹ with member communities in Colorado, Iowa and Wyoming as well as Nebraska.

We appreciate the work that went into developing the IRP and the progress that MEAN is making in using the abundant renewable resources in its service territory and want to encourage the MEAN Board and Staff to keep moving in this direction.

The primary recommendation that we would like to make is to direct the MEAN Staff to start paying close attention to what is happening in the US coal industry and the implications for MEANs proposed heavy reliance on coal generation into the late 2030s.

There are many indicators that the US coal industry is in structural decline. There is certainly lots of coal left underground, but it is generally buried too deeply to be mined easily and profit margins are slim. Current mines are playing out, significant expansions are unlikely and US coal companies are pivoting away from mining the thermal coal that powers the coal plants that MEAN relies on.

MEAN should start monitoring the situation with the US coal industry closely so that it can adjust accordingly for the potential loss of the coal generation it is proposing to rely on.

¹ The 2022 draft IRP for MEAN can be found at <https://mean.nmppenergy.org/about/means-integrated-resource-plan>

II. Support for MEAN’s Progress on Renewable Generation and Local Resources

It is clear that MEAN is beginning to experiment with stronger reliance on wind, solar and small hydro generation and to support the development of more distributed, locally sited generation and we would like to encourage MEAN to continue in this direction.²

The territory served by MEAN is blessed with strong wind and solar resources and combined with existing and emerging forms of storage and demand management should allow MEAN to transition to low carbon generation relatively quickly in the coming decades.

Given the likely issues with coal supply described below, it will likely be important for MEAN to be prepared to move more quickly to renewable generation than it is currently planning on.

III. Request for Attention to the Large “Blind Spot” of Coal Supplies—Coal “Reserves” Can Vanish Quickly Because They Aren’t Profitable

While a tremendous amount of work went into the MEAN draft IRP, it has a very major “blind spot;” it proposes heavy reliance on coal into the future, but fails to conduct any meaningful analysis³ of future coal supplies to provide this generation.

**To start remedying this “blind spot,”
The MEAN Board should ask Staff to complete a detailed,
mine-by-mine analysis of coal supplies for MEAN coal**

² See for example the MEAN 2050 Vision and discussion of carbon-free generation on page 17 as well as the Distributed Resources Policy and development of community solar discussed on page 15 of the draft IRP.

³ The MEAN draft IRP makes a passing mention at the top of page 75 of possible changes in future coal prices and supply as “mining and transport companies attempt to weather the impacts of the changing domestic market.” The MEAN Board should ask the MEAN Staff to start monitoring these “impacts of changing domestic markets” closely and report to the MEAN Board at least twice a year so that the MEAN Board can start planning appropriately in anticipation of future losses of coal generation that MEAN is counting on.

plants and update it at least twice a year as changes can happen suddenly.

Americans have been blessed with abundant coal supplies but coal, of course, is **not renewable** and we are rapidly coming to the end of coal that can be mined at a profit. While they don't tell their customers this, the coal companies recognize this and they are either leaving the thermal coal business and/or pivoting to other projects, including solar development. We will provide several examples below.

To ensure affordable and reliable electricity, MEAN should begin monitoring this situation carefully. Even if burning coal were completely clean and there were no environmental reasons to reduce reliance on coal, **MEAN should be monitoring the US coal industry carefully to ensure that it meets its members expectations for reliable and affordable electricity.**

The end of the non-renewable era is rapidly approaching and the key to a reliable and affordable system in the 21st century is managing the transition to renewable generation wisely and ensuring that MEAN starts paying attention to its current "blind spot" around coal supply.

**Coal doesn't mine itself and it
can't just be assumed
that coal will show up
for as long as MEAN wants it to.**

Given the short time given for commenting on the draft IRP and the press of other work and commitments, the discussion below is not as complete as it would be under different circumstances, but it will serve as a starting point for MEAN Staff. We are happy to help provide additional information and show MEAN Staff and Board members where to find more of the data that we recommend that MEAN start monitoring to ensure that it has adequate time to plan for the future loss of coal generation.

While page 74 of the draft IRP notes the stability of coal prices compared to natural gas prices, that is not the whole story. Declining demand is keeping coal prices relatively stable or even declining in recent years—**but the key question is who will keep mining coal if they can't make a profit doing so????**

Here are the basic facts with supporting detail following this bullet list.

- **Coal is non-renewable.** The planet is not making any more on any time scale that matters. Once coal is turned into CO₂ then that portion of our “inheritance” of fossil fuels is spent and will never be renewed.
- **The easily accessible coal has already been mined.** The graphs below with red bars and black lines paint the general picture. Depth to coal (aka “overburden”) is increasing, productivity is decreasing and US coal production is falling off quickly, including in the Powder River Basin of Wyoming which supplies most of the coal used by MEAN’s power plants.
- **The remaining coal is generally buried too deeply to be mined at a profit.** This is the part that Americans have been slow to understand and a key point that MEAN Staff should be tracking carefully. Large coal producers large and small filed for bankruptcy in the last decade, some, like Peabody Energy, the largest US coal producer is facing large financial hurdles in this decade. Others, like Arch Coal, the second largest US coal producer, are pulling out of the Powder River Basin. Others are on shaky financial ground as productivity declines, production costs increase, sales price stays generally flat and profit margins are squeezed.
- **Coal mine expansions (or development of large new coal mines) is unlikely given that most of the coal in the western US is owned by the federal government and generally buried too deeply to be mined at a profit.**
- **So called coal “reserves” are not really reserves at all.** What the US has been calling coal reserves have never been well analyzed for profitability so many so called “reserves” are not really reserves at all—and they can disappear quickly as the case of Arch Coal’s Coal Creek mine shows. One

year it had over 90 million tons of “reserves.” The next year it had none and was being closed. (Details below.)

- **The MEAN Board should direct the MEAN Staff to start paying close attention to these indicators of “structural decline in the US coal industry so that it can plan appropriately.**

To illustrate the situation, see the coal mining equipment in the picture below—**coal mining equipment is big and EXPENSIVE and the deeper the coal is buried the more equipment and time and labor and dynamite you need to get to it and the deeper the coal is buried, the more expensive it will be to mine it.** With thinning profit margins and declining productivity for US coal companies, MEAN should not expect coal to just keep showing up.



<https://pixabay.com/photos/industry-dumper-minerals-coal-2023592/>

GIVEN TIME CONSTRAINTS, THE REST OF THESE COMMENTS ARE DONE IN “NOTE” FORMAT FOR WHICH WE APOLOGIZE. WE ARE HAPPY TO ANSWER ANY QUESTIONS OR HELP MEAN STAFF AND OTHERS FIND SUPPORTING DOCUMENTATION AND HELP ADVANCE A MORE THOUGHTFUL UNDERSTANDING OF FUTURE COAL SUPPLY ISSUES FOR MEAN AND ITS MEMBERS.

For US coal reserves not being true reserves (because they weren’t well analyzed for profitability) see the heavily referenced “Warning: Faulty Reporting of US Coal Reserves” (Glustrom 2013)⁴ included with these comments. The US Energy Information Administration (“EIA”) has acknowledged that what it calls coal “reserves” are not really reserves, but it was buried on the EIA website. The “Faulty Reporting” report details all of this.

For a 2009 front page Wall Street Journal article explaining why EIA’s coal “reserves” are not reserves see <https://www.wsj.com/articles/SB124414770220386457>

A good start in understanding the geology of US coal deposits and how much US coal remains that can be mined at a profit can be had by watching Ms. Glustrom’s 2009 YouTube (about 20 min)⁵

For Arch Coal leaving the Powder River Basin see https://www.wyomingnews.com/wyomingbusinessreport/industry_news/economy_and_labor/arch-on-track-to-pull-out-of-powder-river-basin-coal/ or <https://trib.com/news/state-and-regional/major-wyoming-coal-company-suffers-huge-losses-plans-to-divest-from-thermal-coal/article>

MEAN coal plants get a significant amount of coal from Arch Coal’s big “Black Thunder” coal mine. Arch Coal’s profit margins from thermal coal (the kind that is used to power MEAN’s coal plants) have been very small—often under \$3/ton—

⁴ Leslie Glustrom is trained as a chemist and biochemist. She is also a mother and her profound concern about the impacts of climate change on her children and grandchildren (and on down) led her to resign from her job conducting research at the University of Colorado-Boulder to work full time to help address the looming climate crisis. One of the first things she did was to undertake a detailed assessment of US coal costs and supplies. As a result she came to realize that what the United States has been calling coal “reserves” are not really reserves at all. It is like having a faulty fuel gauge—a driver might think they have a full tank, but then they find themselves sputtering out by the side of the road. It is our hope that MEAN does not end up in this unenviable position....

⁵ A 2009 YouTube talk by Ms. Glustrom in Michigan on US coal supply constraints can be found at <https://www.youtube.com/watch?v=t0y3KPmM22g> It is a 20 min video if you want the quick version...Ms. Glustrom gave coal supply talks all over the country, but this one is on YouTube.

and as a result Arch has decided to pull out of mining thermal coal in the Powder River Basin.

For an analysis indicating structural decline of the Powder River Basin coal mines see <https://ieefa.org/ieefa-report-powder-river-basin-coal-industry-is-in-long-term-decline/>

For a look at the large debts looming for Peabody Energy see the excerpt below from Peabody’s recent financial report (This is from 2021 Q3 because I don’t have time to look up the 2021 10-K—but the results are not likely to have changed. **Take a look...please—Peabody is already paying 6-10% for large debts that are due in 2024-2026. Given the financial challenges facing Peabody, it is not clear if Peabody will be able to navigate these looming debt payments.**

(11) Long-term Debt

The Company’s total funded indebtedness (Indebtedness) as of September 30, 2021 and December 31, 2020 consisted of the following:

Debt Instrument (defined below, as applicable)	September 30, 2021	December 31, 2020
	(Dollars in millions)	
6.000% Senior Secured Notes due March 2022 (2022 Notes)	\$ 23.1	\$ 459.0
8.500% Senior Secured Notes due December 2024 (Peabody Notes)	128.8	—
10.000% Senior Secured Notes due December 2024 (Co-Issuer Notes)	193.9	—
6.375% Senior Secured Notes due March 2025 (2025 Notes)	462.4	500.0
Senior Secured Term Loan due 2024 (Co-Issuer Term Loans)	206.0	—
Senior Secured Term Loan due 2025, net of original issue discount (Senior Secured Term Loan)	328.7	388.2
Revolving credit facility	—	216.0
Finance lease obligations	30.4	27.3
Less: Debt issuance costs	(45.1)	(42.7)
	1,328.2	1,547.8
Less: Current portion of long-term debt	59.5	44.9
Long-term debt	\$ 1,268.7	\$ 1,502.9

For Peabody’s financial challenges see their financial reports. An excerpt from 2021 Q3 is below. The numbers in parentheses indicate financial losses...Dollars are in millions. Note the \$1,741 million in losses in as of Q3 2020 (i.e. \$1.7 billion!!). This is attributable in part to writing off “reserves” at the North Antelope Rochelle mine which is Peabody’s largest US coal mine and one of the mines that supplies MEANs coal plants.

Excerpts from Peabody's 2021 Q3 Financial Report

Available from <https://www.peabodyenergy.com/Investor-Info/Financial-Information/SEC-Filings>

PART I - FINANCIAL INFORMATION

Item 1. Financial Statements.

PEABODY ENERGY CORPORATION
UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
	(Dollars in millions, except per share data)			
Revenues	\$ 679.0	\$ 671.0	\$ 2,053.7	\$ 2,143.9
Costs and expenses				
Operating costs and expenses (exclusive of items shown separately below)	649.4	550.9	1,843.4	1,886.7
Depreciation, depletion and amortization	77.9	72.2	223.3	266.5
Asset retirement obligation expenses	14.3	14.3	45.3	46.0
Selling and administrative expenses	21.1	27.2	64.2	77.3
Restructuring charges	1.7	8.1	5.9	31.1
Transaction costs related to joint ventures	—	6.0	—	23.1
Other operating (income) loss:				
Net gain on disposals	(25.8)	(2.5)	(28.2)	(10.4)
Asset impairment	—	—	—	1,418.1
(Income) loss from equity affiliates	(15.8)	10.6	(11.4)	25.7
Operating loss	(43.8)	(15.8)	(88.8)	(1,620.2)
Interest expense	45.5	34.9	143.3	102.3
Net gain on early debt extinguishment	(16.0)	—	(31.3)	—
Interest income	(1.4)	(1.6)	(4.2)	(7.1)
Net periodic benefit (credit) costs, excluding service cost	(8.6)	2.8	(26.0)	8.3
Net mark-to-market adjustment on actuarially determined liabilities	—	13.0	—	13.0
Loss from continuing operations before income taxes	(63.3)	(64.9)	(170.6)	(1,736.7)
Income tax (benefit) provision	(3.7)	(0.1)	(10.3)	2.7
Loss from continuing operations, net of income taxes	(59.6)	(64.8)	(160.3)	(1,739.4)
Income (loss) from discontinued operations, net of income taxes	24.3	(2.3)	20.0	(6.8)
Net loss	(35.3)	(67.1)	(140.3)	(1,746.2)
Less: Net income (loss) attributable to noncontrolling interests	8.9	0.1	12.6	(5.1)
Net loss attributable to common stockholders	\$ (44.2)	\$ (67.2)	\$ (152.9)	\$ (1,741.1)
Loss from continuing operations:				
Basic loss per share	\$ (0.60)	\$ (0.66)	\$ (1.65)	\$ (17.76)
Diluted loss per share	\$ (0.60)	\$ (0.66)	\$ (1.65)	\$ (17.76)
Net loss attributable to common stockholders:				
Basic loss per share	\$ (0.38)	\$ (0.69)	\$ (1.46)	\$ (17.83)
Diluted loss per share	\$ (0.38)	\$ (0.69)	\$ (1.46)	\$ (17.83)

See accompanying notes to unaudited condensed consolidated financial statements.

The following table is not complete, but it gives the MEAN Staff and Board an idea of the kind of spreadsheet that MEAN Staff should be developing and keeping current. We apologize that it is not complete, but it provides the MEAN Board and Staff an indication of how they might get started keeping track of potential MEAN coal supply issues.

MEAN Coal Plants⁶ (EIA 923 Number)	MW for MEAN System	Primary source of coal (MSHA Number)⁷	Primary owner of supplying mines (MSHA Number)⁸	Comments
Whelan Energy Center	80 MW	Rawhide Mine, Wyoming (4800993)	Peabody	Mine likely playing out. Peabody facing serious financial issues as large debts come due in the middle 2020s.
Walter Scott Energy Center Unit 4	59.2 MW	North Antelope Rochelle (NAR,4801353) Black Thunder (BT, 4800977) Antelope 4801337 Belle Ayr (4800732) All in Wyoming	NAR =Peabody BT = Arch Antelope = NTEC Belle Ayr = Contura	All mines playing out. Arch intending to leave the Powder River Basin. Peabody facing serious financial challenges as large debts come due in the middle of the 2020s. Long term financial stability of NTEC is unknown. Belle Ayr mine facing large reclamation obligations. For last two exchanges, seller has paid the buyer for the Belle Ayr mine.
Gerald Gentleman Station (60077)	24 MW	Cordero Mine (4800992) School Creek (4801355) Caballo (4801034) Belle Ayr (4800732)	Cordero = NTEC Caballo and School Creek and Gateway = Peabody Eagle Specialty Minerals	All Wyoming mines playing out. Gateway is in Illinois and produces less than 5 million tons of coal a year.

⁶ See page 11, Draft MEAN IRP

⁷ Coal mine production per year can be obtained from the statistics collected by the US Mine Safety and Health Administration (“MSHA”). <https://www.msha.gov/mine-employment-and-coal-production> The easiest way is to use the MSHA number which is typically provided in the EIA 923 data base, page 5. <https://www.eia.gov/electricity/data/eia923/>

⁸ Coal mines have been changing hands quickly in recent years. Some mines may have changed hands and ownership should be checked.

		Gateway (1102408)		
Laramie River Station	9.9 MW	Rawhide Mine, Wyoming (4800993)	Peabody	Mine likely playing out. Peabody facing serious financial issues as large debts come due in the middle 2020s.
Wygen Unit 1	20 MW	Wyodak (4800083)	Wyodak Resources/Black Hills Corporation	
Neil Simpson Unit 2	8 MW			
Wygen Unit 3	7 MW	Wyodak (4800083)		
Louisa Station	8.2 MW			
Whelan Energy Center Unit 1	5.3 MW			

Excerpt from Page 10, MEAN IRP below. There is a key problem—it is quite likely that the majority owner/operators of the coal plants MEAN relies on will close the coal plants earlier than anticipated—and **if MEAN is not watching out for its own interests, then it is possible that MEAN could be caught short as coal plants close on relatively short notice in the next decade or two.**

MEAN is party to a number of long-term resource commitments. However, MEAN is not a majority owner or operator of any of its resource contracts. As such, many of these resources will remain in MEAN's resource portfolio for the entire service life of the asset, despite MEAN's 2050 Vision for carbon neutrality. Although this poses a challenge in terms of carbon emissions and the required offsets to achieve neutrality, MEAN acknowledges the reliability and resource adequacy offered by such resources. In fact, many of these resources supply the capacity necessary to qualify renewable intermittent resources that generate energy with a low accredited capacity. As market conditions change and continue to favor the economics of renewable resources, fossil fuel plants will likely be dispatched at lower levels, which will decrease the energy generation and therefore the emissions without reducing the capacity contribution.

Table below is from the MEAN IRP—It should be expanded to provide detailed information on coal supply for each of the coal plants in a manner like that shown above.

Resource	MEAN Nameplate Capacity	Primary Energy Source	Market Region ⁽¹⁾	% of Capacity
<i>Total Requirements Committed Facilities (Participant Owned Generation)</i>	124.2 MW	Oil/Gas	MISO (69.5 MW), SPP (48.3 MW), WEST (6.4 MW)	18.9%
WAPA ⁽²⁾	124.7 MW	Hydroelectric	MISO (7.5 MW), SPP (29.1 MW), WEST (88.1 MW)	19.0%
Whelan Energy Center Unit 2	80 MW	Coal	SPP	12.2%
WAPA Displacement Agreement ⁽³⁾	61.9 MW	Hydroelectric	WECC	9.4%
Walter Scott Energy Center Unit 4	59.2 MW	Coal	MISO	9.2%
<i>NPPD Multi-Unit Participation</i>				
Cooper Nuclear Station	26 MW	Nuclear	SPP	4.0%
Gerald Gentleman Station	24 MW	Coal	SPP	3.7%
Kimball Wind LLC	30 MW	Wind	WECC	4.6%
Laramie River Station Unit 1	9.9 MW	Coal	SPP	1.5%
Laramie River Station Unit 2 & Unit 3	18.6 MW	Coal	WECC	2.8%
Wygen Unit I	20 MW	Coal	WECC	3.0%
Neil Simpson Unit 2 ⁽⁴⁾	8 MW	Coal	WECC	1.2%
Wygen Unit III ⁽⁴⁾	7 MW	Coal	WECC	1.1%
Wessington Springs Wind Project	10 MW	Wind	SPP	1.5%
Louisa Generating Station	8.2 MW	Coal	MISO	1.2%
NPPD Elkhorn Ridge Wind Plant	8 MW	Wind	SPP	1.2%
NPPD Laredo Ridge Wind Project	8 MW	Wind	SPP	1.2%
DMEA Shavano Falls/Drop 4 & Drop 6	7.6 MW	Hydroelectric	WECC	1.2%
NPPD Ainsworth Wind Energy Facility	7 MW	Wind	SPP	1.1%
Whelan Energy Center Unit 1	5.3 MW	Coal	SPP	0.8%
Waste Management Landfill Gas Facility	4.8 MW	Landfill Gas	MISO	0.7%
NPPD Crofton Bluffs Wind Project	4.2 MW	Wind	SPP	0.6%
TOTAL	656.6 MW			
<i>(1) Resources located in MISO and SPP are dispatched by MISO and SPP.</i>				
<i>(2) All but approximately 7 MW constitutes North American Tribes' and Total Requirements Participants' WAPA allocations.</i>				
<i>(3) Under the WAPA displacement agreement, MEAN receives hydroelectric energy (excluding renewable energy credits) in WECC from the capacity in the agreement. Operationally, MEAN provides an equal amount of capacity to WAPA's customers in SPP from various MEAN contracted resources. The contracted resources designated for WAPA's customers in SPP may vary throughout the term of the agreement.</i>				
<i>(4) Per contract, the total capacity available to MEAN from Neil Simpson Unit 2 and Wygen Unit III was 20 MW in 2017-2018, is currently 15 MW and reduces to 10 MW in 2023.</i>				

Figure I-5

Here is the link to where you can track coal mine production.
<https://www.msha.gov/mine-employment-and-coal-production>

It is easiest to use the MSHA numbers for the coal mines that you can get from page 5 of the EIA 923 data base at <https://www.eia.gov/electricity/data/eia923/>

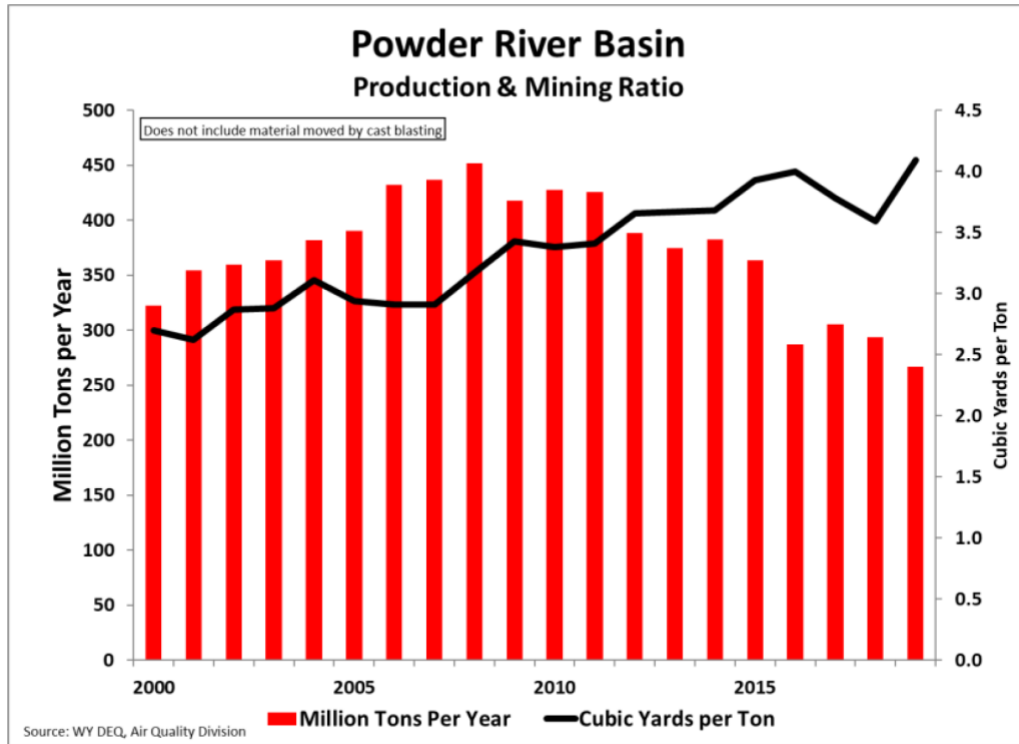
Example: Rawhide Coal Mine (MSHA Number 4800993) Very likely past peak and playing out.

18 million tons 2008

11 million tons 2021

Excerpts from Burnham 2021 Coal Supply Report for Xcel-Colorado (Appendix F, AKJ-2 Proceeding 21A-0141E, included with Ms. Glustrom’s comments.)⁹

Figure 6 – PRB Production and Mining Ratios 2000-2019



Black line in graph above is “mining ratio”—a measure of how hard it is to get to the coal. It is going up (because the coal beds in the Powder River Basin are slanted downwards so as mining continues the coal companies have to remove more “overburden” to get to the coal—and, like digging any hole, this is a

⁹ IMPORTANTLY (!!!), Mr. Burnham’s coal supply report prepared for Xcel-Colorado in 2021 is very good on historical information and data **BUT IS VIRTUALLY CERTAIN TO BE WRONG ABOUT THE FUTURE** as it fails to integrate the very important geologic and financial constraints facing US coal companies.

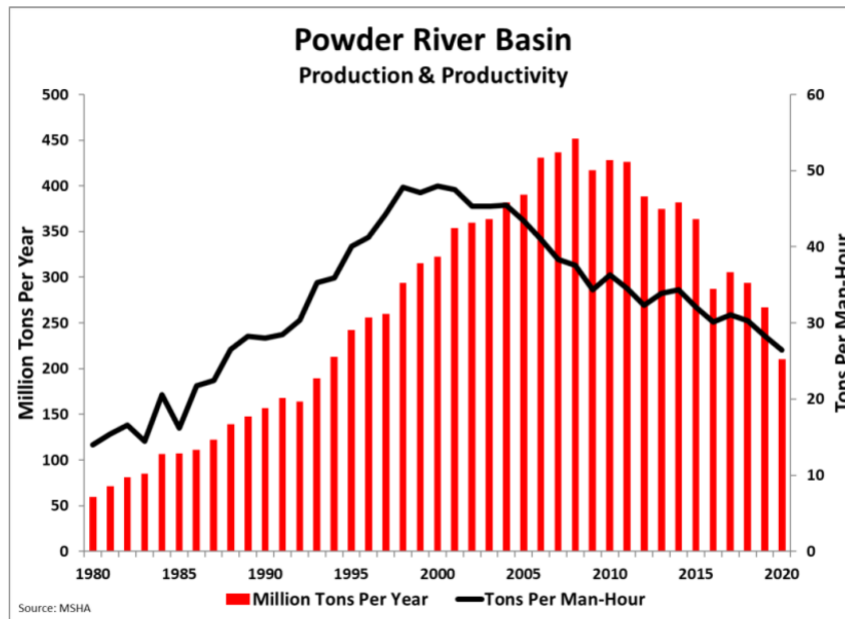
volumetric problem—not a linear one—i.e. you have to take a lot of dirt out of a hole you are digging to plant a tree in order to go down another inch or two—this is the fundamental issue facing US coal miners; the easily accessible coal has already been mined (and turned into carbon dioxide in the atmosphere and oceans) and most of the remaining coal is buried more deeply making production more difficult and expensive. In addition, coal in the possible expansion areas is owned by the federal government and will not be easily or cheaply acquired. Indeed, many coal companies have either cancelled earlier coal “lease” applications or turned them back to the US government.¹⁰

Red bars are coal production from the Powder River Basin, showing significantly decreased production from the peak in 2008.

Powder River Basin Coal Production and Productivity, 1990-2020

*From Hearing Exhibit 101, AKJ-2, Appendix F—Burnham Coal Report
Colorado PUC Proceeding 21A-0141E*

Figure 8 – PRB Labor Productivity 1980-2020



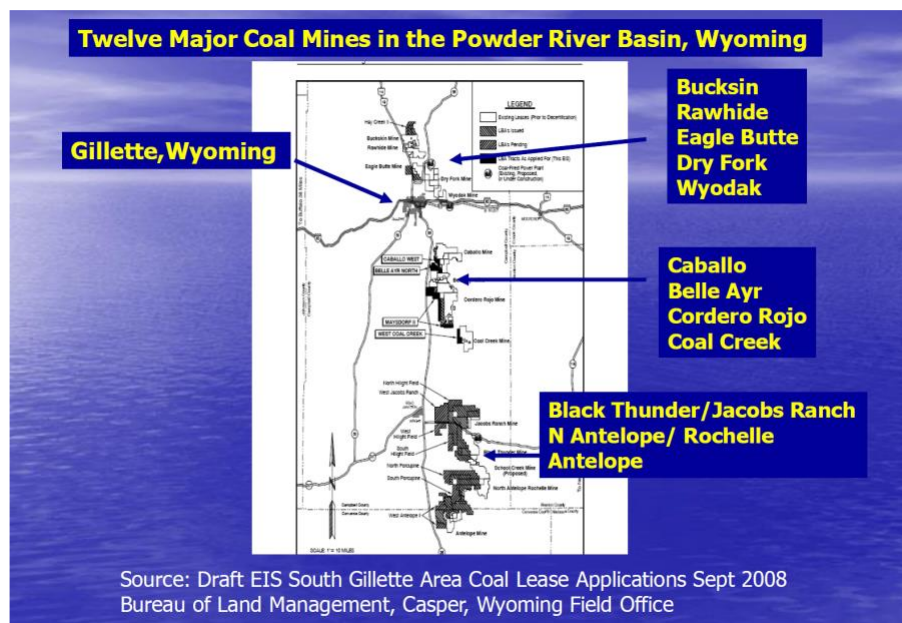
¹⁰ Details on coal leasing in the Powder River Basin, primary source of coal for MEAN can be found on the webpage of the Bureau of Land Management under Powder River Basin LBAs (Lease By Application) <https://www.blm.gov/programs/energy-and-minerals/wyoming/coal>

Black line is productivity—been going down since the later 1990s

Red bars are PRB production—peaked in 2008, going down since then though on a year to year basis there are some increases—but it is clear that the overall trend is downward—and pretty steeply.

For reference, there are twelve mines in the Powder River Basin (until the Coal Creek mine closes in 2022).¹¹ A PPT slide with a map showing these mines is below.

Coal Mines of the Powder River Basin in Wyoming¹²



For an indication that the coal mine reclamation obligations can be bigger than the value of the mine, consider the Belle Ayr and Eagle Butte mines in the

¹¹ See <https://www.wyofile.com/another-blow-to-coal-arch-to-close-coal-creek-mine-in-2022/>

¹² The map showing the PRB coal mines is from a 2008 document, but don't worry, coal mines don't change location....

Powder River Basin of Wyoming (and sometime suppliers of MEAN’s coal plants.) The last two times these mines changed hands, **the seller paid the buyer!!** (Yes—**the seller paid the buyer**....that is because the reclamation obligations are so large that the seller was willing to pay the buyer to take the mines...)

¹³(References available on request or with an internet search.)

A few examples of indications of US coal supply issues below

<https://www.eia.gov/todayinenergy/detail.php?id=52379>

In the electric power sector, natural gas-fired generation units typically compete with coal-fired generation units to provide the lowest-cost wholesale electricity price for power suppliers. Natural gas-fired electric power generation has been higher this past winter than recent winters, in part, because of coal supply constraints and [historically low levels of coal stocks](#) at power plants. Coal stocks for the electric power sector fell to 80 million tons in September 2021, which is 37% lower than the five-year average. Recent wholesale power market consumption of unusually high-priced natural gas indicates that the competition between these two energy sources has changed

<https://www.trains.com/trn/news-reviews/news-wire/delayed-coal-shipments-force-florida-utility-to-limit-coal-fired-generation/>

Please check out this fine print from Arch Coal below—This is what MEAN Staff should be monitoring. It documents that what Arch Coal thought (and reported) were coal “reserves” were not really “reserves” at all.

If MEAN is serious about reliable and affordable energy, it is past time to start paying attention to the fine print in coal company financial statements (like the excerpts below) because it will help the MEAN Board and Staff understand that future reliance on coal for generation is very likely not well placed.

¹³ In 2015, then owner of the Belle Ayr and Eagle Butte mines, Alpha Natural Resources filed for bankruptcy. As a result of the bankruptcy, the Belle Ayr and Eagle Butte mines were transferred to Contura. For Contura paying Black Jewel to take the Belle Ayr and Eagle Butte mines in late 2017, see <https://www.coalage.com/breaking-news/contura-pays-90m-to-blackjewel-spinoff-to-take-prb-mines/>
For Contura paying Eagle Specialty Minerals in 2019 to take the Belle Ayr and Eagle Butte mines, see <https://www.coalage.com/breaking-news/contura-pays-90m-to-blackjewel-spinoff-to-take-prb-mines/>

Arch 2020 10-K page 61

On September 29, 2020, the U.S. District Court ruled against our proposed joint venture with Peabody Energy Corporation that would have combined our Powder River Basin and Colorado mining operations with Peabody's. Following the ruling, we announced the termination of our joint venture efforts due to the significant investment of time and resources that would be required to conduct an appeal. In light of the unfavorable ruling and decision to terminate efforts on the joint venture, we continue to pursue other strategic alternatives for our thermal assets. These alternatives include, among other things, potential divestiture. We also continue to evaluate opportunities to shrink our operational footprint at those mines, reduce their asset retirement obligations, and establish self-funding mechanisms to address those long-term liabilities. In alignment with our desire to shrink our operational footprint and associated liabilities, we have committed to closing our Coal Creek operation in the Powder River Basin once all currently committed sales have been shipped by the end of 2022 or sooner. Operationally we will maintain our focus on aligning our thermal production rates with declining domestic thermal coal demand, adjusting our thermal operating plans in order to minimize future cash requirements, and streamlining our entire organizational structure to reflect our long-term strategic direction as a leading producer of metallurgical products for the steelmaking industry.

Arch 2020 10-K page 64

Asset impairment and restructuring. In the third quarter of 2020, we determined that we had indicators of impairment related to three of our thermal operations, Coal Creek, West Elk, and Viper. Additionally, we determined we had indicators of impairment related to our equity investment in Knight Hawk, Holdings LLC. Our analyses of future expected cash flows from these assets indicated full impairment of our listed thermal operations and partial impairment of our equity investment in Knight Hawk Holdings, LLC. In the fourth quarter of 2020, we determined to close our Coal Creek operation by the end of 2022, or as soon as all current sales obligations have been fulfilled. This resulted in the acceleration of our asset retirement obligation and the write off of repair parts and supplies inventory. Included in asset impairment costs and restructuring for the year ended December 31, 2020 are approximately \$13.4 million of employee severance expense related to voluntary separation plans that were accepted by 254 employees of our thermal operations and corporate staff. For further information on our Asset Impairment costs, see Note 5, "Asset impairment and restructuring" to the Consolidated Financial Statements.

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Powder River Basin — Adjusted EBITDA for the year ended December 31, 2020, declined from the year ended December 31, 2019 due to decreased volume. Pricing increased, and cash cost per ton sold increased, driven by the decrease in volume and the reimposition of a higher Federal Black Lung Excise Tax rate. Pricing in 2020 benefitted from our ability to recoup the reimposition of the higher Federal Black Lung Excise Tax rate under certain of our term supply contracts. The volume decline was primarily due to historically low natural gas pricing, COVID-19 related demand destruction, and the continued growth of subsidized renewable generation sources, particularly wind. Natural gas pricing reached historical lows during the first half of 2020, but pricing of the competing fuel was higher and volatile in the second half of 2020, and exceeded prior year prices at times. Natural gas production levels fell below 2019 levels in the second quarter of 2020, and remained below 2019 production levels for the remainder of the year. However, 2020 natural gas storage levels remained above 2019 levels the entire year, and these opposing market forces led to pricing volatility in the second half of 2020. The continued buildout of subsidized renewable generation sources, particularly wind, significantly increased the market share of renewable generation in the year ended December 31, 2020. During 2020, we also experienced reduced electric generation related to demand destruction due to restrictive responses taken to combat the spread of COVID-19. In alignment with our stated objective of shrinking our thermal operational footprint, we are comfortable operating our Powder River Basin operations at our currently committed volumes in 2021. We have further determined to idle our Coal Creek operation by the end of 2022 or earlier when all remaining sales obligations have been fulfilled, and accelerate reclamation activities at the mine.

Mining Complex	Mines	Mining Equipment	Railroad	Tons Sold ⁽¹⁾			Total Cost of Property, Plant and Equipment at December 31, 2019	Total Assigned Recoverable Reserves
				2017	2018	2019		
							(\$ millions)	(Million tons)
Powder River Basin:								
Black Thunder	S	D, S	UP/BN	70.5	71.1	72.0	\$ 299.4	747.7
Coal Creek	S	D, S	UP/BN	9.0	8.0	2.6	44.5	92.2
Metallurgical:								
Mountain Laurel	U	CM	CSX	1.5	1.9	1.4	32.6	21.4
Beckley	U	CM	CSX	1.0	1.0	1.0	63.5	25.5
Leer South/Sentinel	U	CM	CSX	1.5	1.2	1.1	197.5	43.2
Leer	U	LW, CM	CSX	3.2	3.5	4.1	252.9	48.3
Other Thermal:								
West Elk	U	LW, CM	UP	4.9	4.8	4.1	49.9	50.5
Viper	U	CM	—	1.7	1.8	1.5	35.3	40.4
Totals				93.3	93.3	87.8	\$ 975.6	1,069.2

S = Surface mine
U = Underground mine

D = Dragline
S = Shovel/truck
LW = Longwall
CM = Continuous miner

UP = Union Pacific Railroad
CSX = CSX Transportation
BN = Burlington Northern-Santa Fe Railway

Mining Complex	Mines	Mining Equipment	Railroad	Tons Sold ⁽¹⁾			Total Cost of Property, Plant and Equipment at December 31, 2020	Total Assigned Recoverable Reserves
				2018	2019	2020		
							(\$ millions)	(Million tons)
Powder River Basin:								
Black Thunder	S	D, S	UP/BN	71.1	72.0	50.2	\$ 195.7	699.3
Coal Creek	S	D, S	UP/BN	8.0	2.6	2.1	0.3	—
Metallurgical:								
Leer	U	LW, CM	CSX	3.5	4.1	4.2	263.6	50.3
Leer South/Sentinel	U	CM	CSX	1.2	1.1	0.7	429.5	46.3
Beckley	U	CM	CSX	1.0	1.0	1.0	67.2	24.4
Mountain Laurel	U	CM	CSX	1.9	1.4	0.9	46.1	18.1
Other Thermal:								
West Elk	U	LW, CM	UP	4.8	4.1	2.5	0.3	48.0
Totals				91.5	86.3	61.6	\$ 1,002.7	886.4

S = Surface mine
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The two tables above are very important. In 2019, Arch reported 92.2 million tons of “Recoverable Reserves” from the Coal Creek mine. In 2020, one short year later, all those coal “reserves” just vanished. This is what MEAN Staff should be monitoring because US coal “reserves” can disappear almost literally overnight--Poof!!!

No one knows how the complex forces of supply, demand and public policy will play out in this decade, but there is good reason to believe that coal mining will continue to drop off during the 2020s and the geology won't be changed by any political or financial change and (barring a major planetary catastrophe) the coal remaining in the ground will be buried too deeply to be mined in large quantities.

Importantly, all US the coal companies are facing the same basic problem which is that the coal that is left in the ground is generally buried too deeply to be mined at a profit and the major US coal companies are in seriously bad financial shape just leaving the “bottom feeders” to close out the US coal industry.

The situation with coal can be compared to the situation with milk, bread and peanut butter—they run out—but since milk, bread and peanut butter all come from renewable resources we can usually just go to the grocery store to get more. Not so with coal—we have mined pretty much all of the coal in the US that can be mined at a profit—and there is no “grocery store” to go to to get more coal. There is coal left in the ground, but coal doesn't mine itself. It has to be mined using big, expensive equipment and the deeper it is buried, generally the more expensive it is to mine and the US is rapidly approaching the end of coal that can be mined at a profit.

For an analysis of why the “Burnham Coal Reports” produced for Xcel-Colorado are not to be trusted for future projections see the table below. Note the large discrepancies only two years after the 2018 Burnham projections. Mr. Burnham is NOT likely to provide good information to MEAN on likely future coal production since he can't even make a reasonable projection two years into the future.

**2020 Projections from Xcel’s Coal Reports
Compared to Actual 2020 Production**

	2011 Boyd Projection in 11A-869E for 2020 Production	2018 Burnham Projection (16A- 0396E) for 2020 Production ¹⁴	Actual 2020 Production¹⁵
Black Thunder	125 Million Tons	70.5 Million Tons	50.2 Million Tons
Belle Ayr	25 Million Tons	15.8 Million Tons	11.17 Million Tons
Eagle Butte	20 Million Tons	17.3 Million Tons	12.3 Million Tons
North Antelope Rochelle	100 Million Tons	101.6 Million Tons	66.1 Million Tons

Bottom line: No one knows what the future will bring (shall we say!!), but there is good reason to believe that the US coal industry is in structural decline with significant probabilities that US coal mining will go through serious disruptions in this the decade of the 2020s.

The PUC should monitor this carefully through well-vetted studies so it can best be prepared for possibly serious disruptions of the US coal industry in the next 5-7 years—or less....

¹⁴ Burnham’s 2018 Projections are found in Table 4 at the back of the 2018 Report submitted in Proceeding 16A-0396E

¹⁵ Actual coal mine production by year can be gotten from the Energy Information Administration’s Annual Coal Report, Table 9 found at <https://www.eia.gov/coal/annual/>

IV. Emphasizing Importance of Developing Experience with Higher Levels of Renewable Generation

Given the issues related to coal supply which are likely to become increasingly apparent in this decade and beyond, MEAN and its members are encouraged to accelerate the pace at which they are gaining experience with wind, solar, small hydro and storage (both present and future technologies) so that MEAN can not be “caught short” in its planning for a 21st century system to serve its members.

V. Importance of Demand Management and Flexibility Options

Given the shortness of time to review the MEAN IRP and the press of other work and commitments, we have not had time to do a detailed analysis of the demand side measures being employed by MEAN, but we encourage MEAN to keep working hard on these areas and particularly to pay close attention to evolving, automated demand management and “microgrid” options to ensure that MEAN members will have reliable service even when transmission lines are taken down by extreme weather events.

Thank you for this opportunity to comment on the MEAN IRP.