Exhibit 1

A BLEAK FUTURE FOR
COLSTRIP UNITS 1 AND 2

Institute for Energy Economics
and Financial Analysis
IEEFA.org

June 2015

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Executive Summary

The future of Colstrip Units 1 and 2 looks bleak. Significantly changed circumstances (that is, lower natural gas prices and rising production costs) have already meant that the units' revenues, and PPL Montana's profits, from the sale of the units' energy have plummeted in recent years.[1] The prospect for higher generating costs and low natural gas and power market prices in the coming years also create great uncertainty about the units' continuing financial viability for Talen Montana, the new owner of the 50% share of Colstrip 1 and 2 formerly owned by PPL Montana, or for any subsequent merchant owner. In fact, it is not unreasonable to anticipate that Talen Montana, or whatever company owns the units, will earn relatively small profits from Colstrip 1 and 2 during the coming decade. What's more likely is that the units will experience significant financial losses. As a result, it is not surprising that PPL Montana was unable to find a purchaser for its 50% share of Colstrip 1 and 2, or that NorthWestern Energy decided that buying PPL Montana's share of the units was a losing proposition.

Our analysis also strongly suggests that continued ownership of Colstrip 1 and 2 is not cost effective for customers of Puget Sound Energy, which owns the other 50% of the units. The results of the utility's 2013 Integrated Resource Plan support this finding, especially when allowance is made for the substantial reductions in forecasts of future natural gas prices and Mid-Columbia Hub power prices since 2013. For these reasons, before making any additional investments in Colstrip 1 and 2, Puget Sound Energy should be required to demonstrate to the Washington Utilities and Transportation Commission that such investments are more economic than other options such as investing in a portfolio of purchasing energy from the Mid-Columbia Hub, energy efficiency, renewable resources, and, where needed, economic investments in natural-gas-fired capacity.

Given these conclusions, it would be prudent for Talen Montana, Puget Sound Energy, and the States of Washington and Montana to begin to prepare for the units' retirement in the not-too-distant future and for an orderly and just transition to other resources.

[1] As will be explained below, Talen Montana became the owner of PPL Montana's share of Colstrip in early June of this year.

Introduction

The purpose of this report is to inform policymakers and stakeholders on the future of Colstrip Generating Facility's Units 1 and 2 in Rosebud, Mont. Colstrip has four units. This report focuses on the older Units 1 and 2. The analyses presented in the report are based on plant filings with the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy's Energy Information Administration, PPL's quarterly earnings presentations, Puget Sound Energy filings with the Federal Energy Regulatory Commission (FERC), and published industry information and analyses from SNL Financial L.L.C. and UBS Investment Research.

Colstrip Units 1 and 2 are each rated at a nominal 358 megawatts (MW) of nameplate capacity, with 307 MW of net capacity.[2]. Unit 1 will be 40 years old in November 2015. Unit 2 will be 39 years old in August 2015.

Colstrip Units 1 and 2 are now jointly owned by Puget Sound Energy and Talen Montana, each of which owns 50% of each unit. Until May 31, Talen's share of Colstrip 1 and 2 was owned by PPL Montana, a subsidiary of PPL Corporation. However, on June 1, PPL Corporation spun off its merchant power business (that is, PPL Energy Supply) in a merger with the merchant assets of Riverstone Holding LLC to form Talen Energy Corporation.

PPL Montana operated, and Talen Montana will continue to operate, as a merchant company selling the power from Colstrip 1 and 2 either through bilateral contracts or the Mid-Columbia Hub energy market. Puget Sound Energy is a regulated utility in the State of Washington. Although there are important differences between merchant energy companies and regulated utilities, the results of our analyses are significant for both of the owners of Colstrip 1 and 2.

PPL Montana attempted to sell its Colstrip assets (which include a share of Unit 3 as well as 50% of Units 1 and 2) for several years. However, these efforts were unsuccessful even when they were packaged with PPL Montana's profitable hydro assets. For example, NorthWestern Energy, a prospective buyer, announced that the value of the entire package of PPL Montana's Colstrip and hydro assets was worth less than the value of the hydro assets alone. This meant that NorthWestern Energy believed that Colstrip had a long-term negative value.

National Trends in Coal-Fired Power Costs and Generation

The factors that have adversely affected revenues and earnings from Colstrip 1 and 2 in recent years are consistent with broader trends affecting coal plants around the U.S. Nationally, the decline in the financial viability of coal plants is driven by a number of factors: very low natural gas prices; rising production costs; flat or declining electricity demands due to

[2] The difference between each Unit's gross and net capacity represents its "parasitic" loads, that is, the power that is used to operate on-site equipment

the recent economic downturn and increasing investments in energy efficiency and demand response; and increased generation from renewable resources.

As shown in Figure 5 later in this report natural gas prices collapsed in late 2008 and early 2009, with prices at the Sumas Hub in the Northwest falling by 65% between 2008 and 2012. Although gas prices rebounded a bit in 2013 and 2014, they are once again declining.

The collapse of natural gas prices has driven down wholesale electricity prices in markets like that at the Mid-Columbia Hub in the northwest. Low natural gas prices have allowed natural gas units to reduce their operating costs and displace coal as the marginal fuel during much of the year. As we will discuss, below, natural gas prices are not expected to rebound significantly at any time in the foreseeable future.

At the same time that coal plant owners have seen the prices that they can obtain from selling their generation plummet due to lower market prices, the cost of generating power at many coal plants around the nation has increased in recent years due, in part, to rising coal production costs. These rising production costs also have made coal-fired units less competitive against natural-gas-fired plants.

Increased generation from renewable resources is also putting pressure on coal-fired units. Because renewable sources like wind and solar have no operating costs, they are dispatched ahead of fossil-fired plants and, displacing the generation from and reducing the revenues of coal-fired units. By reducing the demand for power, energy efficiency investments have also increased the pressure on coal plant earnings.

These fundamentals drove the retirement of more than 22,000 MW of the country's aging coal fleet from 2009-2014. They have also driven coal-fired power generation to record lows: in 2014 coal provided 39% of the total generation in the U.S., down from 48% in 2008.[3] Given the expectation that natural gas prices will remain low and that the surge in wind and solar capacity will continue, coal cannot realistically be expected to regain the share of national power generation it enjoyed prior to the collapse of natural gas prices in late 2008.

These economic factors have led to serious financial troubles for regulated and deregulated coal-fired plants, including:

- The Hatfield's Ferry Power Station in Pennsylvania. FirstEnergy closed the s plant in October 2013.[4] Placed into service from 1969-1971, the plant was retired at a significantly younger age than the average age at which coal plants have been retired in recent years.
- The Harrison Power Station in West Virginia, FirstEnergy received approval in October 2013 to transfer 80% of the plant from its deregulated subsidiary, Allegheny Energy Supply, to its West Virginia regulated subsidiary, Monongahela Power. In a quarterly call to investors in November 2013, FirstEnergy CEO Anthony Alexander explained that the transfer was part

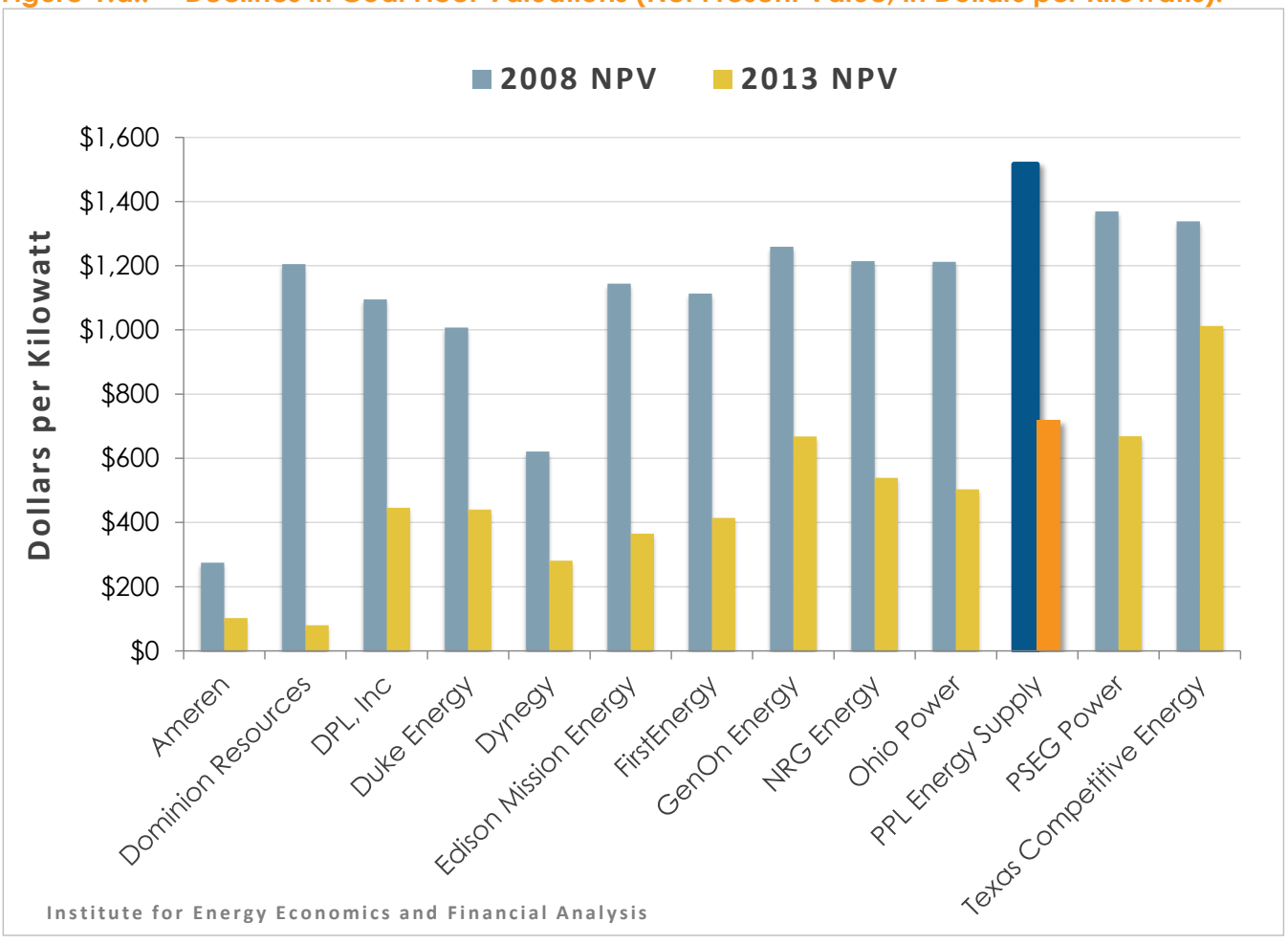
[3] Electric Power Monthly, with Data for February 2015, available at http://www.eia.gov/electricity/monthly/pdf/epm.pdf.
[4] http://www.heraldstandard.com/new_today/hatfield-s-ferry-power-station-quietly-closes-for-good/article_cd0133e1-9adb-58c2-8f8d-66769de34835.html.

of FirstEnergy's efforts to "reposition" its merchant generation business in expectation of continued low power prices.[5]

- The Brayton Point Station in Southeastern Massachusetts. Immediately after finishing investments of more than $1 billion in pollution-control equipment, Dominion Resources sold the 1,580 MW Brayton Point Station for what has been estimated to be approximately $55 million, representing a substantial financial loss. Moreover, within a month of closing on this transaction, the new owner gave notice of its intent to retire Brayton Point in 2017.

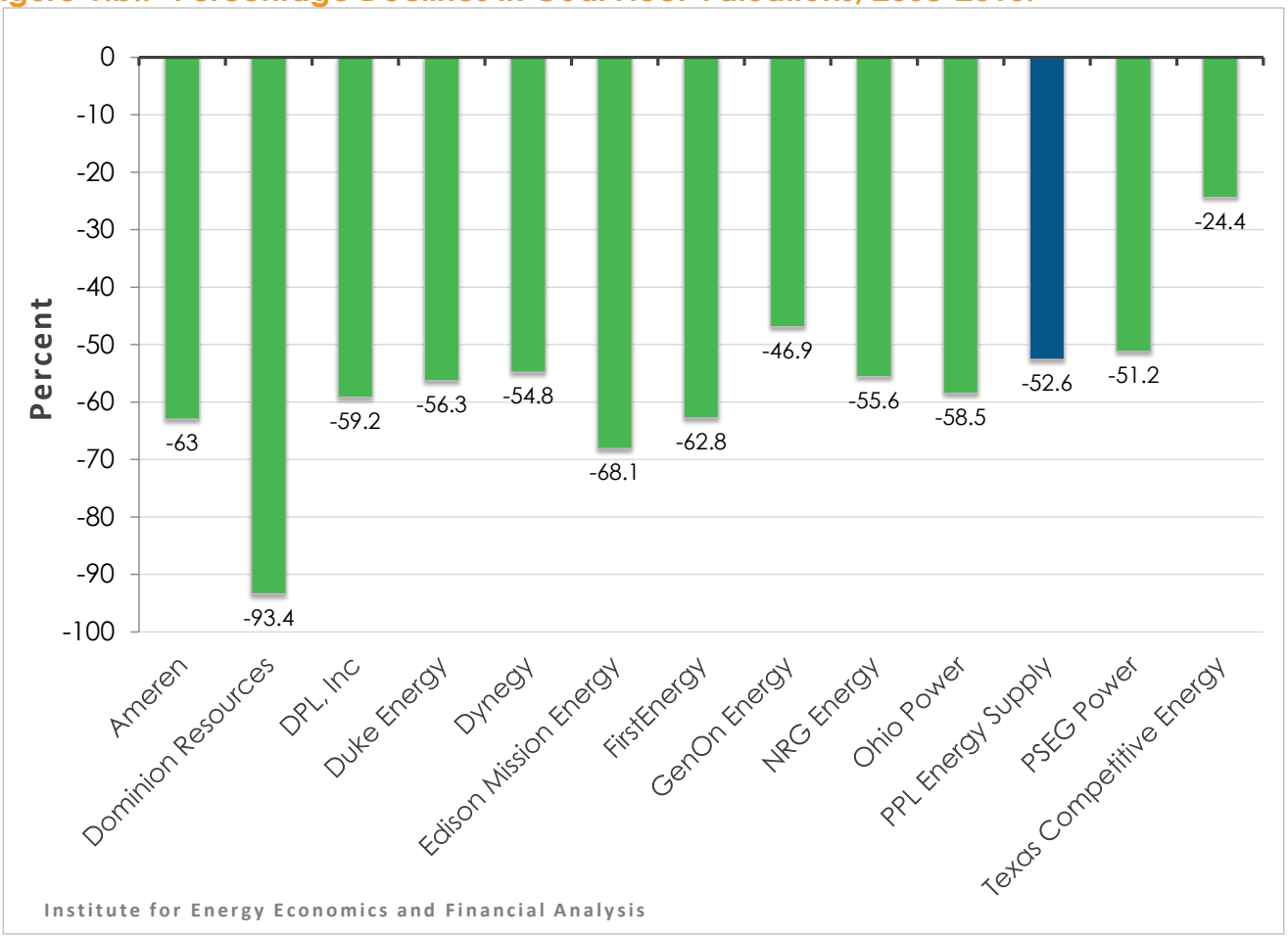
According to an analysis by Fitch Ratings, the values of many coal fleets declined dramatically between 2008 and 2013, as shown in Figures 1.a. and 1.b., below.[6]

Figure 1.a.: Declines in Coal Fleet Valuations (Net Present Value, in Dollars per Kilowatts).



5 http://seekingalpha.com/article/1808342-firstenergy-management-discusses-q3-2013-results-earnings-call-transcript.
6 *The Erosion in Power Plant Valuations*, September 25, 2013, available at www.fitchratings.com.

Figure 1.b.: Percentage Declines in Coal Fleet Valuations, 2008-2013.



As can be seen in Figures 1.a. and 1.b., the overall value of PPL Energy Supply's coal plants (including Colstrip), declined by 52.6% in just five years, from $2,248 per kilowatt in 2008 to $719 per kilowatt in 2013.

National trends toward lower natural gas prices and lower wholesale market prices, leading to plummeting coal plant earnings and valuations, are also playing out in Montana. They have already hurt, and are likely to continue to hurt, the financial viability of Colstrip 1 and 2.

TALEN MONTANA

PPL Montana's Earnings from Colstrip 1 and 2 Declined Sharply in Recent Years Due to Significantly Changed Circumstances

As with other coal plants around the nation, the recent profitability of Colstrip 1 and 2 has been hurt by a decline in the prices at which PPL Montana sold the power produced by the units and by rising plant-generating costs. These factors combined to reduce PPL Montana's pre-tax earnings (also called EBITDA – Earnings Before Interest Taxes Depreciation and Amortization) from Colstrip 1 and 2 by 50% just between 2010 and 2014. As we discuss later in this report, these same factors will continue to hurt Colstrip 1 and 2 in coming years.

Although natural gas prices and Mid-Columbia Hub prices declined sharply beginning in 2009, PPL Montana had protected itself against such adverse market changes by hedging its power sales. These hedges took the form of a number of power purchase agreements (PPAs) that set prices for power from PPL's Montana hydro and coal assets that turned out to be significantly higher than market prices at the Mid-Columbia Hub.

This has meant that the customers of the various utilities buying power from PPL Montana have been paying more (and significantly more in some years) than they would have paid to buy the same amounts of power from the wholesale energy market at the Mid-Columbia Hub.

For example, an analysis by staff of the Montana Public Service Commission has shown that NorthWestern Energy paid an average of $54 for each MWh of power it purchased from PPL Montana during the period January 2009 through June 2013.[7] The average cost of producing power at Colstrip 1 and 2 during this period was less than $30 per MWh. Therefore, to the extent that the power being purchased by NorthWestern Energy pursuant to the PPA came from Colstrip 1 and 2, PPL Montana made a substantial profit on these transactions. Even if the contracts were for firm power and PPL Montana had to provide energy even if its power plants were unavailable, PPL almost certainly still made a profit on the transaction. That's because the prices that PPL was being paid for the power under the hedging PPAs appear to have been substantially higher than the cost of purchasing power from the wholesale Mid-Columbia Hub energy market.

In this way, PPL Montana's PPAs not only helped the company hedge its risks, they have ensured that the customers of some northwest utilities were unwittingly subsidizing Colstrip 1 and 2 and PPL Montana's other coal assets.

Nevertheless, by 2012, the overall decline in natural gas and wholesale market prices began to reduce the "hedged" prices at which PPL Montana was able to sell the power generated at its Montana coal and hydro assets, as these prices dropped by 30% in just two years, from an average of $56 per MWh in 2012 to an average of $40 per MWh in 2014.

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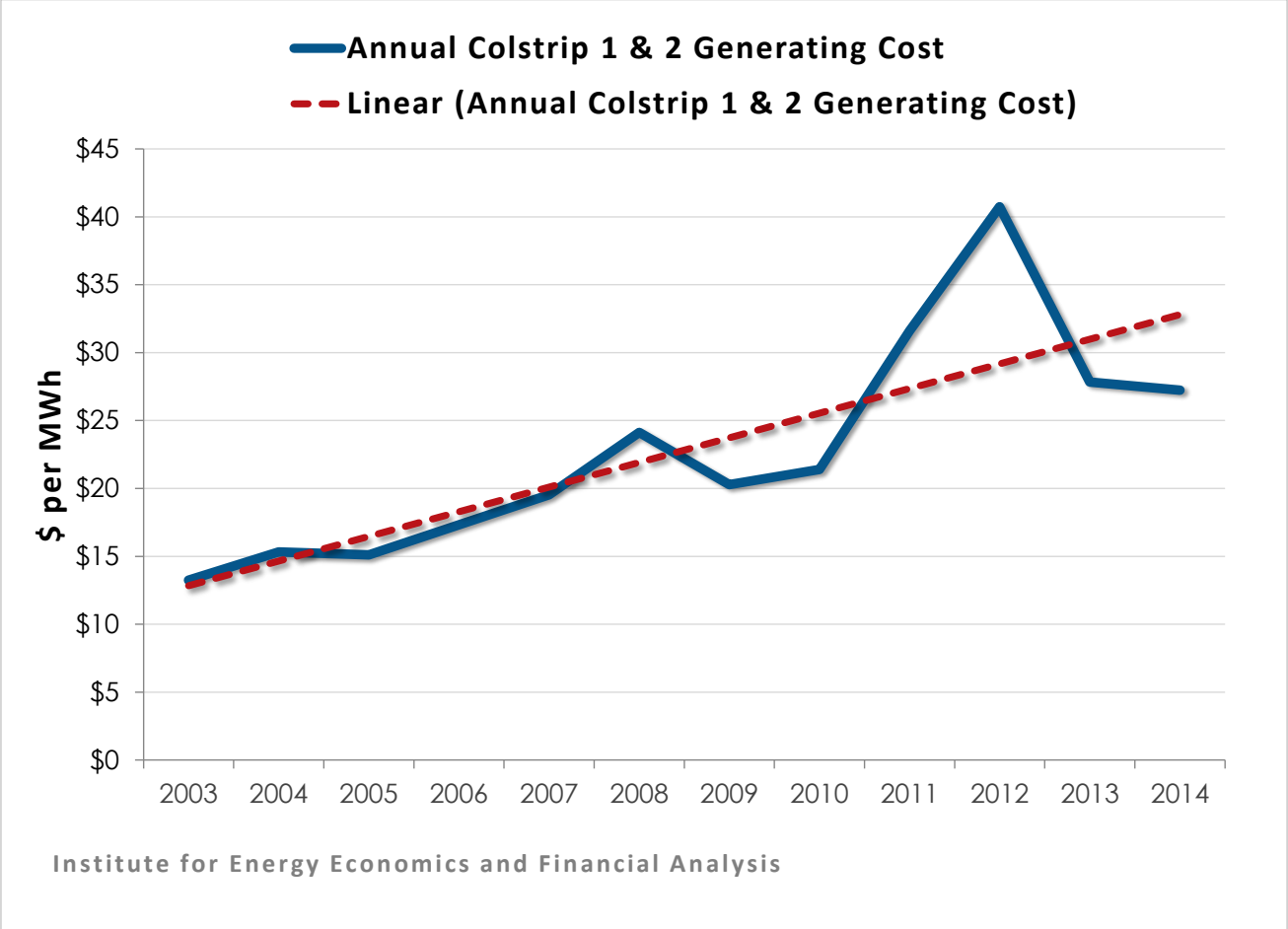
7 *NorthWestern Energy Residential Electric Rates and Electric Supply (Through June 2013)*, Jason T. Brown, Montana Public Service Commission.

At the same time that the revenue that PPL Montana has earned from selling the power from Colstrip 1 and 2 has been declining, the cost of generating that power has been increasing significantly, as shown in Figure 2, below:

Figure 2: Rising Cost of Generating Power at Colstrip 1 and 2, 2003-2014.



In fact, the annual cost of generating power at Colstrip 1 and 2, on a dollar per megawatt hour ($/MWh) basis, more than doubled from 2003 to 2014, a compound increase of almost 7% per year.

The metric Gross Energy Margin represents the difference between the average annual price at which power is sold and the cost of generating power. As shown in Figure 3, below, the declining hedge prices at which the power from Colstrip 1 and 2 has been sold since 2012 and the plant's rising generating costs combined to substantially reduce the gross energy margins earned by PPL Montana from Colstrip 1 and 2.

The gross energy margins presented in Figure 3, include only the annual total production costs for Colstrip 1 and 2 from plant operating and maintenance (O&M) expenses. In addition to the annual expenses of generating power at Colstrip 1 and 2, each owner must make capital investments each year to replace aging and degraded equipment, as part of capital improvement projects, or for minor environmental upgrades. They also must pay property taxes. When these capital investments and property taxes are included, it is clear that PPL Montana's pre-tax EBITDA dropped precipitously after 2010.

Although PPL Montana probably still made some after-tax profits in 2014 from selling the power from Colstrip 1 and 2, as shown in Figure 4, these profits were undoubtedly significantly lower than it had been earning as recently as 2010. As we will discuss in the next section of this report, the financial future for Colstrip 1 and 2 can reasonably be expected to be even darker than this recent history has been. Thus, it is no surprise that PPL spun off its share of the units.

Figure 3: Estimated Gross Energy Margins Earned by PPL Montana in the Years 2009-2014 from Selling Power from Colstrip 1 & 2.

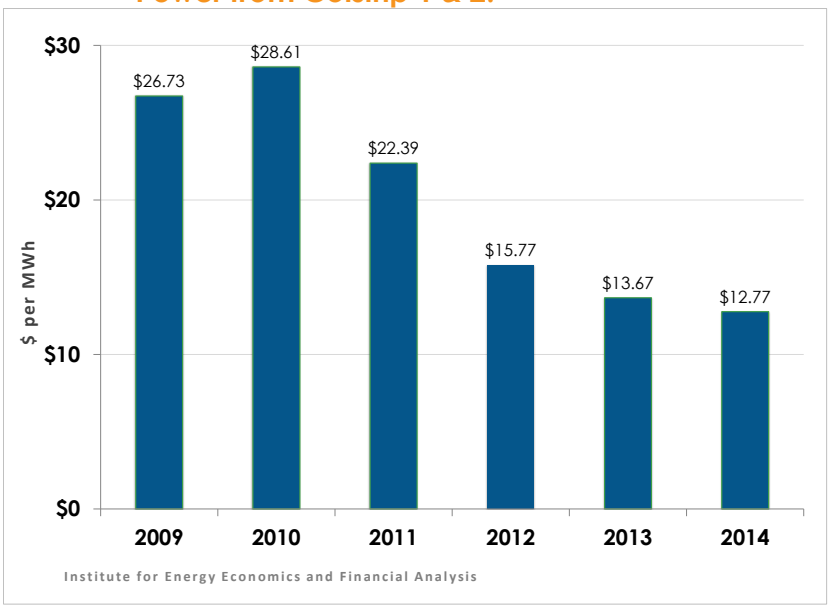
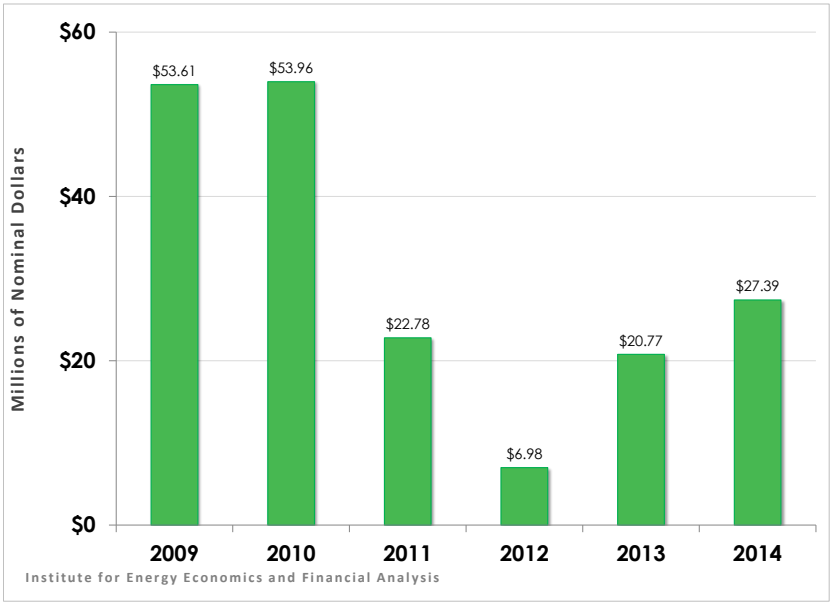


Figure 4: Estimated PPL Montana's Pre-Tax EBITDA Earnings (in Millions of Dollars) in the Years 2009-2014 from the Sale of Power Generated at Colstrip 1 & 2.



Talen Montana's Future Earnings from Colstrip 1 and 2

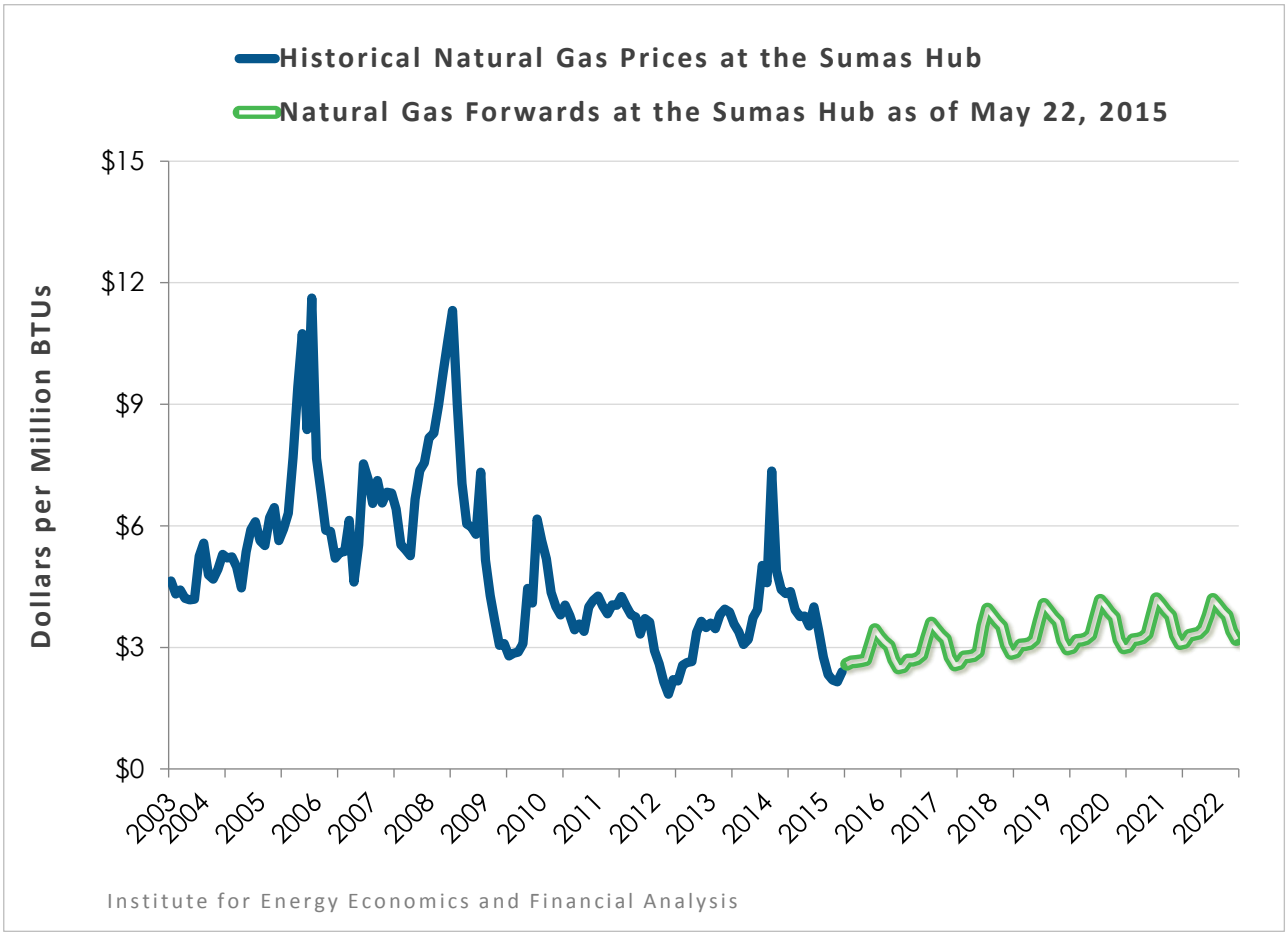
In order to significantly increase the earnings from owning and operating Colstrip 1& 2, and to be able to pay the interest and profits on invested funds, Talen Montana will need some combination of higher power prices and lower production costs. However, it appears extremely unlikely that future power prices will increase so substantially, and/or that plant generating costs will decrease so significantly, that Talen Montana, or any other merchant plant owner, will once again earn the levels of profits from Colstrip 1 and 2 that the units earned through 2010. Instead, there are a number of circumstances that together can be expected to lead to even lower pre-tax EBITDA earnings from the units. These circumstances include:

- Natural gas prices and Mid-Columbia Hub power prices remaining low for the foreseeable future.
- Increasing penetration of renewables and energy efficiency in the Northwest, meaning more low-cost competition for Colstrip 1 and 2—as will any new natural gas-fired combined cycle plants built to replace the expected retirements of the Boardman and Centralia 1 coal plants in 2020 and the Centralia 2 coal plant in 2025.
- Substantial investments required to maintain Colstrip 1 and 2 and to upgrade the units to satisfy new environmental mandates.
- Federal action on climate change, meaning costs will be imposed on carbon dioxide emissions, perhaps as early as the end of this decade.

Future Natural Gas Prices

Natural gas prices are expected to remain low for the foreseeable future, as can be seen in Figure 5, below, which shows the current forward (future) gas prices at the Sumas Hub in the Northwest. Forwards prices are the prices at which natural gas can be purchased today for delivery in future years. Therefore, they represent the market's expectation as to future natural gas prices.

Figure 5: Actual and Projected Future Natural Gas Prices at the Sumas Hub in the Northwest.



Fuel-industry and financial analysts also forecast very slow growth in natural gas prices over the next decade or so. For example, a Wood Mackenzie analyst has projected that the potential supply of natural gas and the ability of producers to turn profits at lower prices are likely to keep natural gas below $4 per million cubic foot for the foreseeable future.[8]

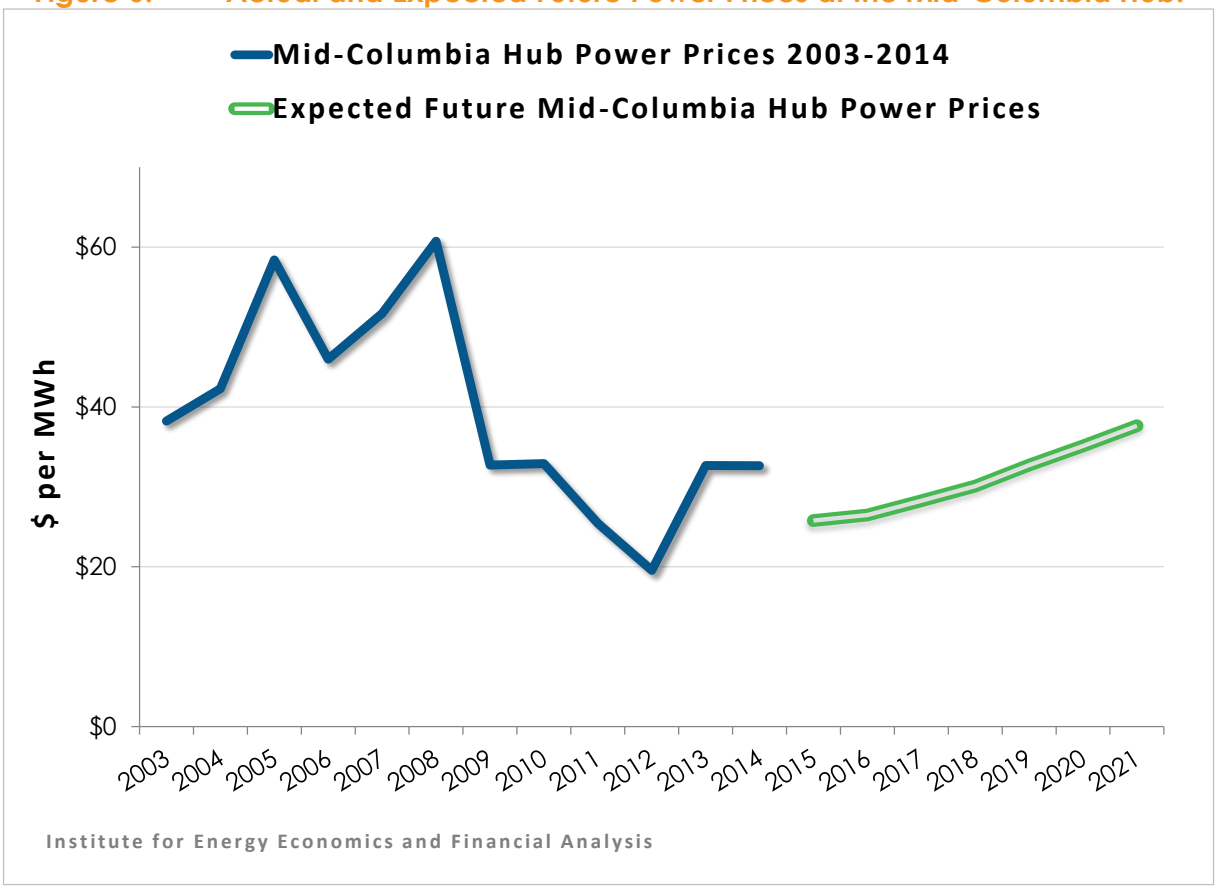
Future Power Prices

PPL's first-quarter 2015 earnings presentation indicated that the company has hedges in place to sell 93-95% of the power from its Montana assets in 2015 for $39-41 per MWh and to sell 48-50% of the power for the same price in 2016. These are essentially the same prices at which PPL Montana sold power in 2014.

[8] *Tough to get beyond $4': Wood Mackenzie analyst sees little gas-price upside*, SNL Financial, May 20, 2015.

We have not seen any further public information on whether the new owner, Talen Montana, will be able to sell more power from Colstrip at these prices during 2016 or in future years or if the company will be forced to sell the units' power in the wholesale market at the Mid-Columbia Hub. However, it is clear that Talen Montana is likely to earn much less than $40 per MWh if it has to sell the power from Colstrip 1 and 2 at the Mid-Columbia Hub, as shown in Figure 6, below.

Figure 6: Actual and Expected Future Power Prices at the Mid-Columbia Hub.



Even if Talen Montana is able to continue to hedge its risks by selling the power from Colstrip 1 and 2 through PPAs, it is reasonable to expect that the prices it obtains through those PPAs will be lower in future years as natural gas prices and Mid-Columbia Hub power prices remain low.

Future Earnings from Colstrip 1 and 2

We have investigated the likely future pre-tax EBITDA for Talen Montana, or for any future merchant owner of Colstrip 1 and 2, in two scenarios reflecting different views of future power prices, plant annual generating costs and output.

The High Scenario reflects a number of very optimistic, but nevertheless possible, circumstances:

1. Despite low wholesale market prices, Talen Montana being able to sell the power from Colstrip 1 and 2 at $40 per MWh through 2020, after which its "hedged" price of power will increase at 5% per year.

2. The cost of generating power at Colstrip 1 and 2 being, $27.53 per megawatt hour in 2015, the average of the units' generating costs in 2013 and 2014. We also have assumed that the cost of producing power at Colstrip 1 and 2 will increase after 2015 at only 3.5% per year, or less than half of the 7% that the production costs increased, on average, each year between 2003 and 2014.

3. Colstrip 1 and 2 operating at an annual 81% capacity factor[9] that reflects the units' actual generation, on average, in 2013 and 2014.

4. In addition to the annual expenses of generating power at Colstrip 1 and 2, each owner continuing to make $8 million per year in capital investments to replace aging and degraded equipment and as part of capital improvement projects. This is a conservative assumption, as NorthWestern Energy assumed higher capital investments in its 2013 assessment of purchasing PPL Montana's coal and hydro assets.

5. Basing the future environmental compliance capital and operating costs for Colstrip 1 and 2 on Puget Sound Energy's "Low" Case for future environmental costs in its 2013 Integrated Resource Plan analyses. This is a conservative assumption as it is possible that the environmental compliance costs for Colstrip 1 and 2 will be much higher in order to satisfy the EPA's Mercury and Air Toxics Standards (MATS) rule and the Best Available Retrofit Technology (BART) requirement of the Regional Haze Rule, as well as the possibility that Unit 1 will be subject to a Best Available Control Technology requirement for PSD violations.

6. To be conservative, we did not include any carbon costs even though we believe it is reasonable to assume that generators will have to pay such costs in the not-too-distant future.

Thus, the High Scenario represents what we believe is a reasonable best case for the financial future of Colstrip 1 and 2.

In our Moderate Scenario, we include a number of more reasonable and less optimistic assumptions as to future power prices and Colstrip 1 and 2 generating costs and output:

1. Talen Montana selling the generation from Colstrip 1 and 2 at the current forwards (futures) prices for power in the wholesale market at the Mid-Columbia Hub beginning in 2016.

[9] A power plant's 'capacity factor' compares the plant's actual generation during a year with the generation that the plant would have produced if it had operated at 100% power for all of the hours in the year. The higher the capacity factor, the more power has been produced by the plant.

2. Colstrip 1 and 2 operating at the average annual 71% capacity factor at which the units operated, on average, in 2012, 2013 and 2014. This three-year period included an extended outage of Colstrip 1.

3. The cost of generating power at Colstrip 1 and 2 being $31.93 per megawatt hour in 2015, the average of the units' production costs in 2012, 2013 and 2014. As in the High Scenario, we have assumed that the cost of generating power at Colstrip 1 and 2 will increase after 2015 at only 3.5% per year, or less than half of the 7% that the generating costs increased, on average, from 2003 to 2014.

4. The same annual capital investments as in the High Scenario.

5. As in the High Scenario, including only low investment and operating costs for future environmental upgrades based on Puget Sound Energy's "Low" Case for future environmental costs in its 2013 Integrated Resource Plan analyses. As noted, above, this is a conservative assumption.

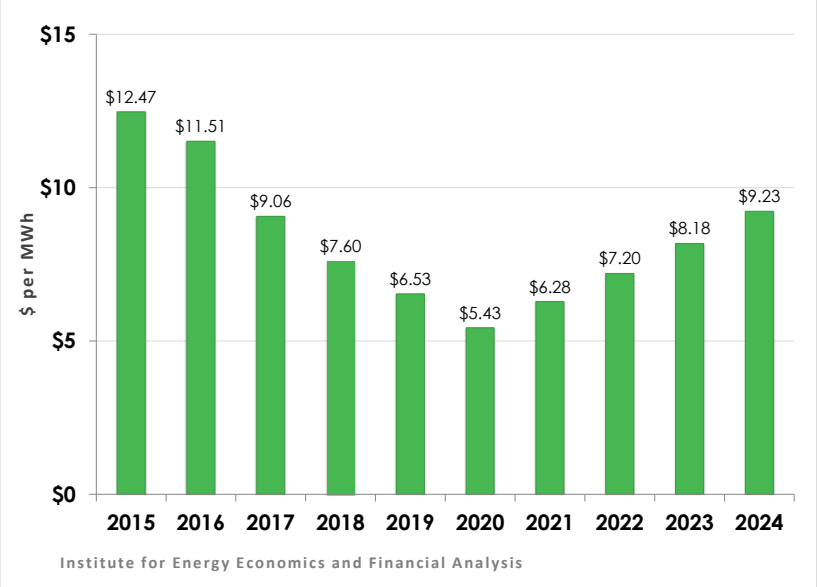
6. Again, to be conservative, we did not include any carbon costs in the Moderate Scenario.

It is important to emphasize that this Moderate Scenario should not in any way be considered a worst-case scenario, as the units' future production and environmental costs could be significantly higher or their output could be lower.

Results in the High Scenario

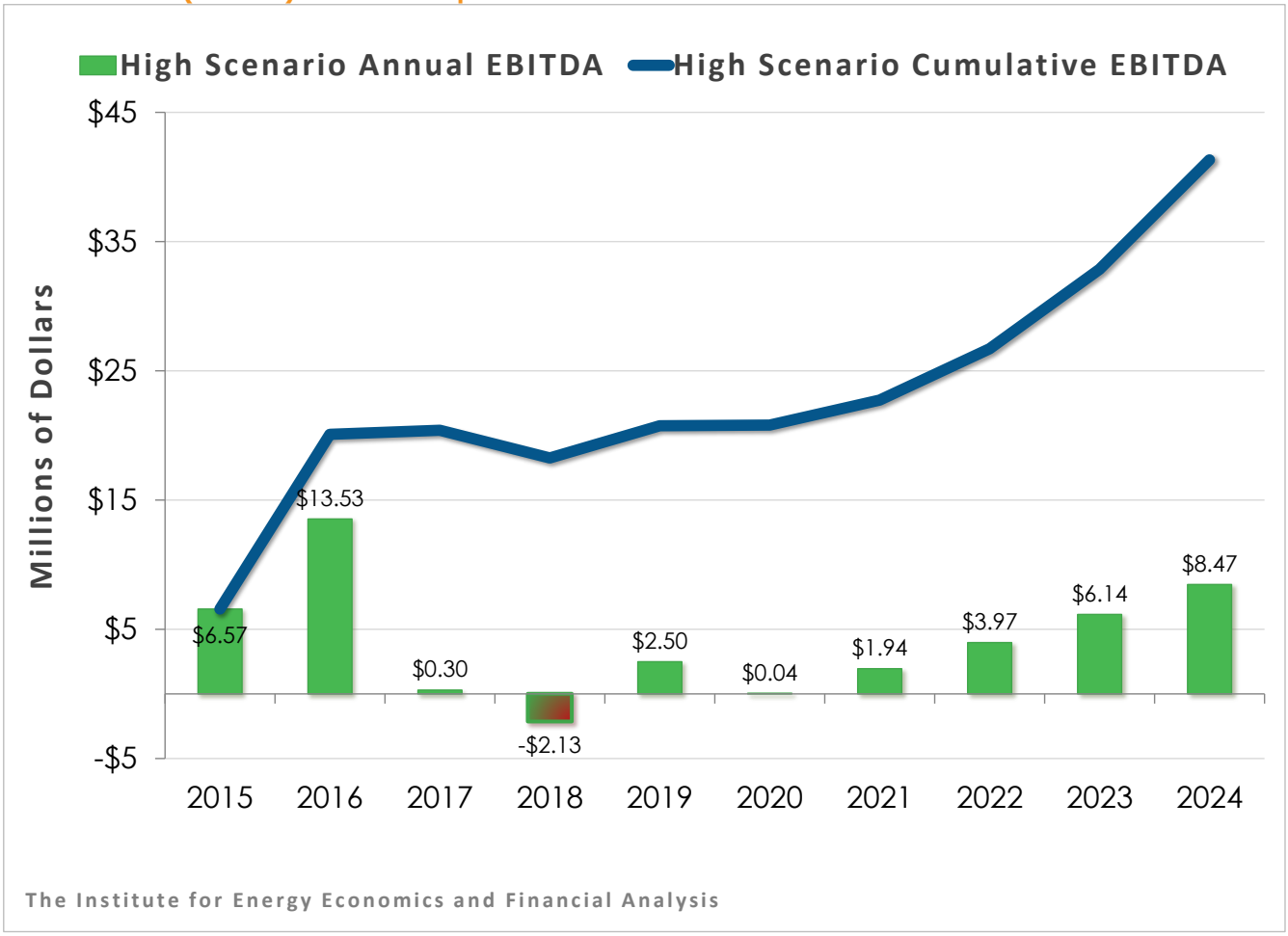
Because the assumed price at which Talen Montana could sell the power from Colstrip 1 and 2 is so high in the High scenario ($40 per MWh) and because generating costs are low, the company, or any subsequent owner, would be able to earn positive gross energy margins in each year from 2015-2024.

Figure 7: Projected High Scenario Gross Energy Margins.



However, when annual capital and environmental compliance investments and property taxes are included, Talen Montana's EBITDA will likely be either relatively small or negative through 2024, even in the High Scenario, leading to a cumulative EBITDA of only $41 million for the entire 10-year period, or just $4 million per year.

Figure 8: High Scenario Projected Talen Montana Annual and Cumulative Pre-Tax Earnings (EBITDA) from Colstrip 1 and 2.



The relatively small annual EBITDA that Talen Montana would earn in most years in this scenario does not appear anywhere near adequate to enable the company to pay interest, taxes, depreciation and amortization while earning any significant after-tax profits for its owner(s).

In summary, even in an optimistic High Scenario, ownership of 50% of Colstrip 1 and 2 is not likely to lead to any significant after-tax profits for Talen Montana or any subsequent owner at any time in the foreseeable future.

Results in the Moderate Scenario

As can be expected, the financial results in the Moderate Scenario are more negative for any merchant owner of Colstrip 1 and 2. In this scenario, Talen Montana's annual gross energy margins would be negative each year beginning in 2017. In other words, because it is assumed that Talen Montana would be selling power into the wholesale market at the Mid-Columbia Hub, the cost of generating power at Colstrip 1 and 2 would be higher than the market price at which the power could be sold.

When capital investments and property taxes are included, Talen Montana's annual pre-tax EBITDA earnings in the Moderate Scenario would be negative in every year with no sign of any rebound or recovery after 2024.

As can be seen in Figure 10, ten-years of negative annual EBITDA would place Talen Montana, or any merchant owner of Colstrip 1 and 2, in an extremely deep financial

Figure 9: Moderate Scenario Projected Gross Energy Margins.

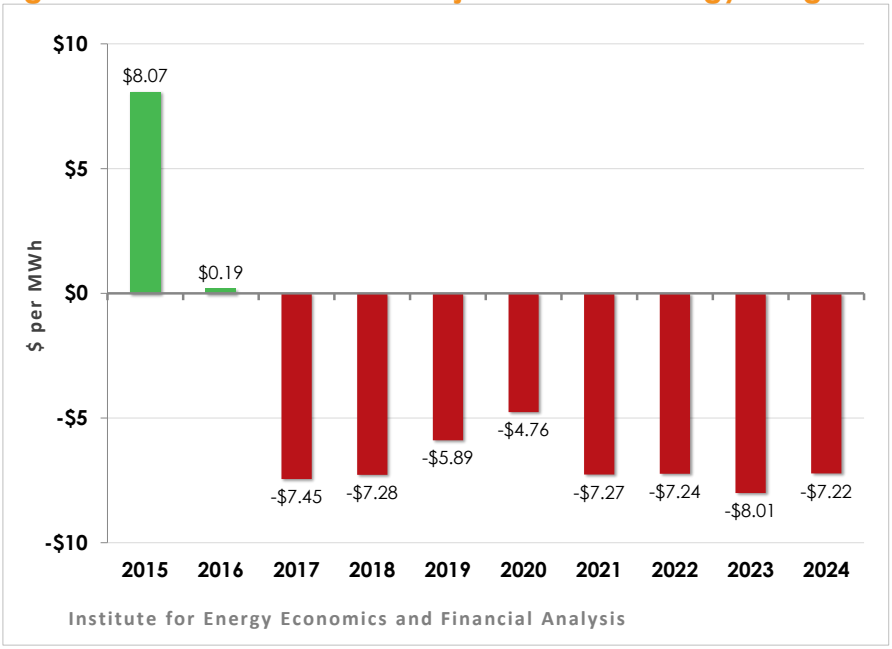
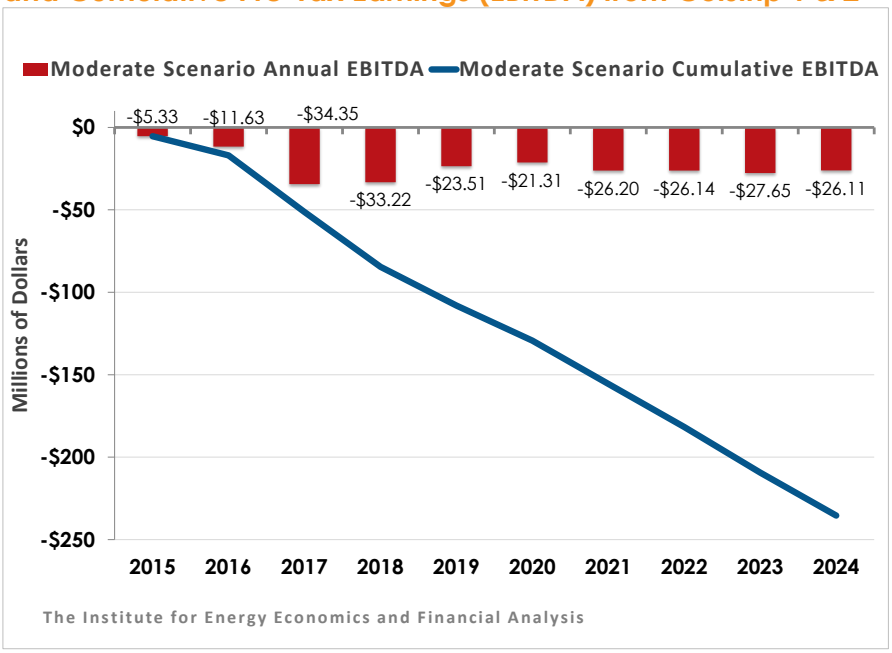


Figure 10: Moderate Scenario Projected Talen Montana Annual and Cumulative Pre-Tax Earnings (EBITDA) from Colstrip 1 & 2



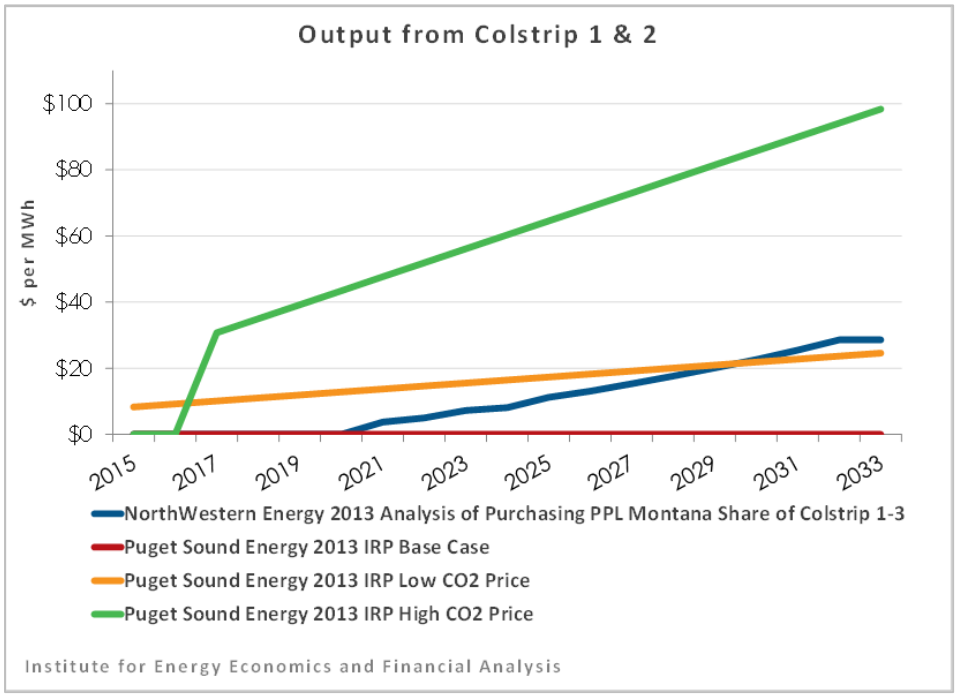
hole from which it would be extremely unlikely to recover.

As shown in Figures 7 through 10, in neither the High Scenario nor the Moderate Scenario, could Talen Montana, or any subsequent merchant owner, expect to obtain earnings either in the short-term or over the long term sufficient to cover operating expenses, debt, taxes, amortization of investments while providing a significant after-tax profit from Colstrip 1 and 2. In fact, there are a number of other possible risks that could make ownership of Colstrip 1 and 2 an even worse financial proposition for investors (or for the ratepayers of a regulated utility).

Additional Risks of Continued Ownership of Colstrip 1 and 2

Inherent in our analysis are a number of conservative assumptions that lead the results to understate (perhaps significantly) the potential financial risks associated with continued ownership of 50%, or all, of Colstrip 1 and 2.

Figure 11: Carbon Dioxide Prices Used in 2013 NorthWestern Energy and Puget Sound Energy Resource Analyses.[10]



1. **Future Carbon costs.** To be conservative, we have not assumed any future carbon costs in either our High or Moderate scenarios. However, we do believe that it would not be unreasonable to do so. In fact, although there is great uncertainty about the timing and stringency of any carbon-pricing regime, many utilities assume carbon dioxide prices in their resource planning analyses. For example, in its 2013 evaluation of whether to purchase PPL Montana's hydro and coal assets, NorthWestern Energy assumed a carbon dioxide price that began at $3.70 per MWh in 2021 and rose to

[10] The CO_2 prices in Puget Sound Energy's 2013 IRP were presented in nominal dollars per ton. We have converted those figures to dollars per MWh to reflect the fact that Colstrip 1 and 2 emit, on average, 1.23 tons of CO_2 for each MWh they generate.

$28.58 per MWh in 2032, after which the price remained flat for several years. Similarly, although Puget Sound Energy assumed no carbon dioxide prices in the Base Case analyses in its 2013 Integrated Resource Plan, it included "Low," "High" and "Very High," carbon dioxide price sensitivities.
The key point to keep in mind is that because coal is the most carbon-intensive fuel, the use of any assumed carbon dioxide price adversely impacts the financial viability of the continued operation of any coal-fired power plant, including Colstrip 1 and 2.

2. **Environmental Compliance Costs**. To be conservative we have used Puget Sound Energy's "Low" 2013 IRP estimate of future environmental compliance costs for its 50% ownership share of Colstrip 1 and 2. Continued ownership of Colstrip 1 and 2 would have been even less financially viable for Talen Montana, or any subsequent merchant owner, if we had used the "Mid," "High" or "Very High" estimates of environmental compliance costs in Puget Sound Energy's 2013 IRP.

3. **Higher Production Costs**. As noted earlier, total Colstrip 1 and 2 generating costs (fuel & non-fuel) rose at a compound annual rate of 7% from 2003 to 2014. However, to be conservative, our analyses project only a 3.5% annual increase from 2015 to 2024. Of course, higher generating costs would make the power from Colstrip 1 and 2 even less competitive with buying power from the market at the Mid-Columbia Hub.

Including carbon dioxide costs, higher production costs and/or higher environmental costs would make Colstrip 1 and 2 increasingly less competitive with investments in new renewable resources and energy efficiency.

NorthWestern Energy's 2013 Evaluation of Purchasing PPL Montana's Ownership Shares of Colstrip 1, 2 and 3

PPL Montana for years had not been able to sell its share of Colstrip. In 2013, PPL Montana offered to sell both its hydro facilities and its coal-fired plants (Colstrip and Corette) to NorthWestern Energy. NorthWestern's analysis of the proposed transaction concluded that the hydro assets were worth more alone than in conjunction with the coal plants. More particularly, NorthWestern (which already owns 30% of Colstrip 4) found that Colstrip 1 and 2 had a negative $127.479 million valuation (worse than no value at all) and that PPL's total 529 MW share of Colstrip Units 1-3 had a negative valuation, as well.

PUGET SOUND ENERGY

Important differences exist between a merchant plant owner like Talen Montana, which sells power into a wholesale market or through bilateral PPAs, and a regulated utility like Puget Sound Energy:

1. The investors in a merchant company bear the risks of uneconomic capital investments and situations where the cost of generating power are above the market prices at which that power can be sold. With regulated utilities, those risks are borne by ratepayers.

2. Regulated utilities and their investors benefit from capital investments in plants like Colstrip 1 and 2 by earning a return on the investments included in their rate base even if those investments are uneconomic for ratepayers.

3. Unlike merchant companies, regulated utilities have a responsibility to ensure that they have enough capacity to meet peak system demands and an adequate level of reserves.

Recent Power Costs

The cost of purchasing power at the Mid-Columbia Hub was the significantly more expensive option before natural gas prices collapsed in 2009 (see Figure 5, above) and the cost of generating power at Colstrip 1 and 2 began to increase (see Figure 2, above). Ultimately, the margin between the costs of purchasing power versus generating it at Colstrip 1 and 2 decreased by more than 85%, from $36.62 per MWh in 2008 to only $4.85 per MWh in 2013 and $5.43 per MWh in 2014.

Moreover, generating power at Colstrip 1 and 2 has actually become the more expensive option when other costs are considered.

1. The approximately $92 million in capital investments Puget Sound Energy made between 2003 and 2014 to replace aging and degraded equipment, as part of capital improvement projects, or for minor environmental upgrades.

2. The $40 million we estimate the utility paid as its share of property taxes on Colstrip 1 and 2.

3. Any incremental costs that might have been necessary to transmit Colstrip 1 and 2 power nearly 1,000 miles from southeastern Montana to the utility's service territory.

If these additional costs are included, producing and transmitting power from Colstrip 1 and 2 has almost certainly become the more expensive option for Puget Sound Energy in recent years.

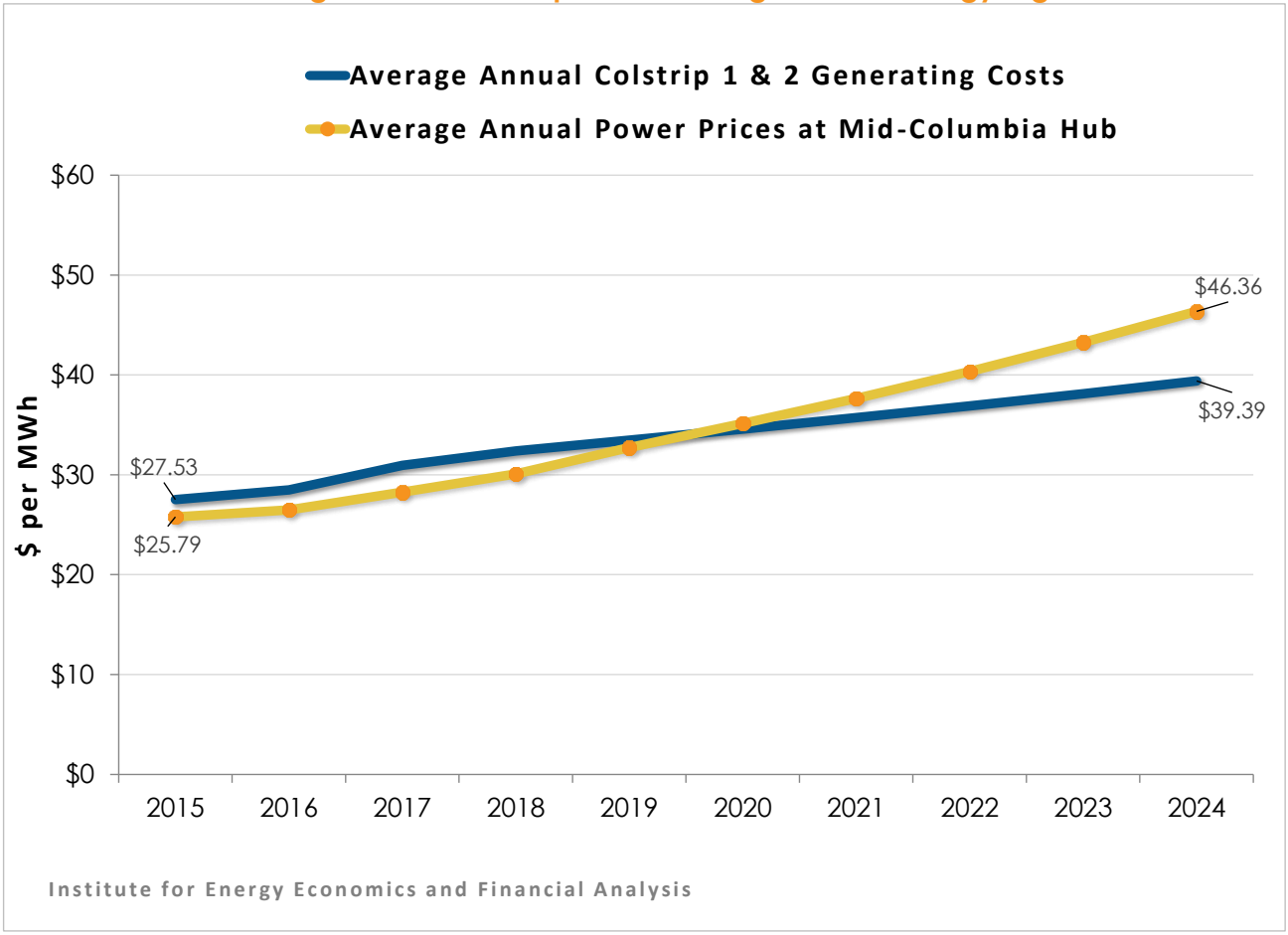
Future Costs

We have examined the relative costs for Puget Sound Energy of generating power at Colstrip 1 and 2 versus purchasing power at the Mid-Columbia Hub during the years 2015 through 2024 in two different cases.

In a High Case we used the same projected annual generating costs as we used in the High Scenario for Talen Montana. These annual generating costs begin at $27.53 per MWh and include the utility's "low" estimate of new annual environmental compliance O&M expenses.

In our Moderate Case for Puget Sound Energy, we used the same projected annual generating costs as we used in the Moderate Scenario for Talen Montana. These annual generating costs begin at $31.93 per MWh and also include Puget Sound Energy's "low" estimate of future annual environmental compliance O&M expenses.

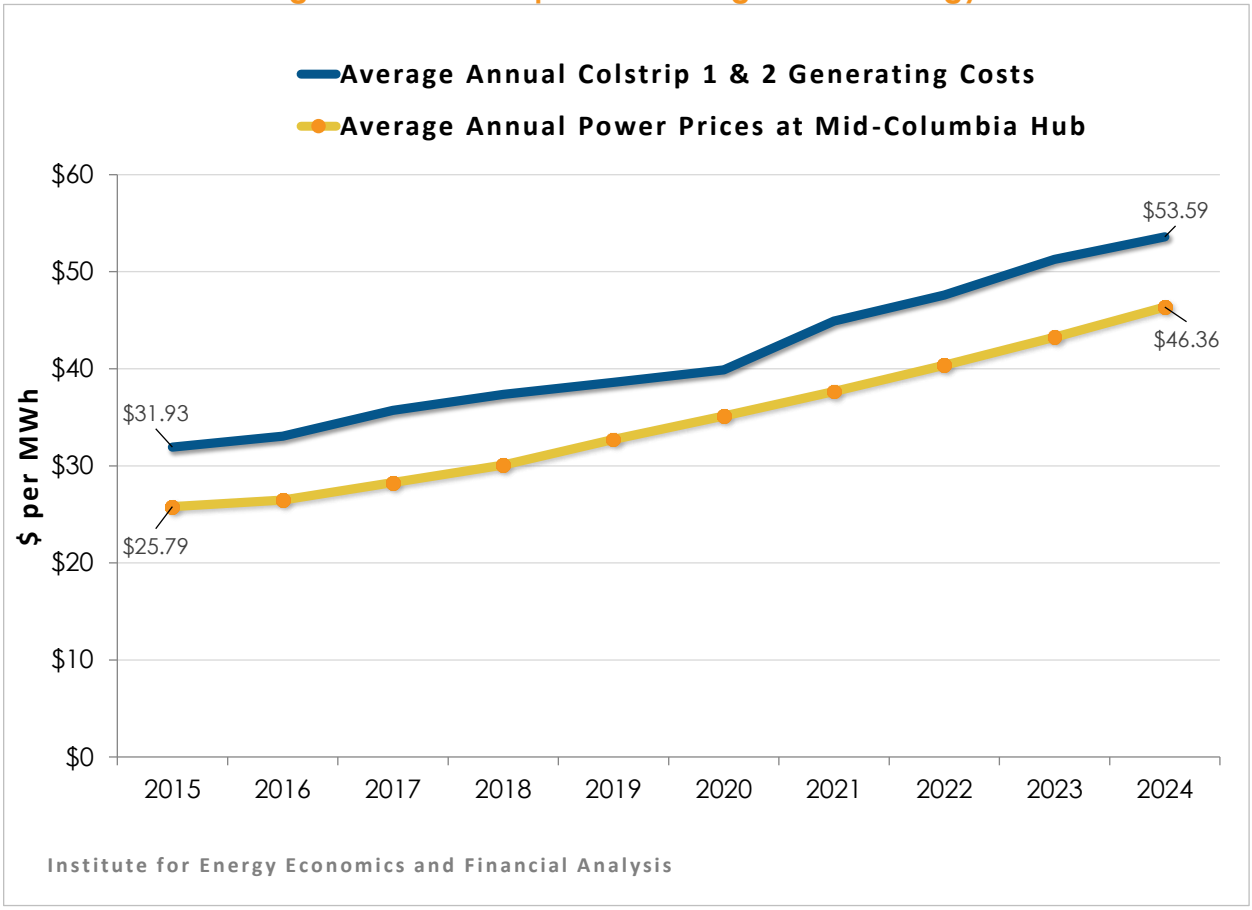
Figure 12: Projected Mid-Columbia Hub Power Prices versus Puget Sound Energy's Cost of Generating Power at Colstrip 1 and 2 - Puget Sound Energy High Case.



In this High Case, Puget Sound Energy's average annual generating cost for Colstrip 1 and 2 remains above the market price of power at the Mid-Columbia Hub through 2019. However, as noted above, this does not include any annual capital investments during this period, any property taxes, or any incremental transmission costs.

Then in the Moderate Case, as shown in Figure 13, below, Puget Sound Energy's average annual generating cost for power from Colstrip 1 and 2 remains above the market price of power throughout the entire ten-year period, 2015-2024, and probably for significantly more years, as well. As in the Puget Sound Energy "Optimistic" Case, the comparison in Figure 13 does not include annual capital investments, property taxes or incremental transmission costs.

Figure 13: Projected Mid-Columbia Hub Power Prices versus Puget Sound Energy's Cost of Generating Power at Colstrip 1 and 2 - Puget Sound Energy Moderate Case.



In the High Case, focusing only on annual O&M expenses, generating power at Colstrip 1 and 2 would be a total of $19 million less expensive for Puget Sound Energy during the years 2015 through 2024 than purchasing the same amounts of power at the Mid-Columbia Hub. In the Moderate Case, again focusing only on annual O&M expenses, the cost of generating power at Colstrip 1 and 2 can be expected to be $133 million more expensive than purchasing the

same amounts of power at the Mid-Columbia Hub during the years 2015-2024. Neither of these comparisons include the approximately $144 million that we estimate Puget Sound Energy would have to pay during these years for capital investments ($104 million) and property taxes ($40 million). Moreover, power from Colstrip 1 and 2 would be even more expensive if any of the additional risks we identified above (carbon dioxide costs, higher environmental compliance costs and/or higher generating costs) actually come to pass.

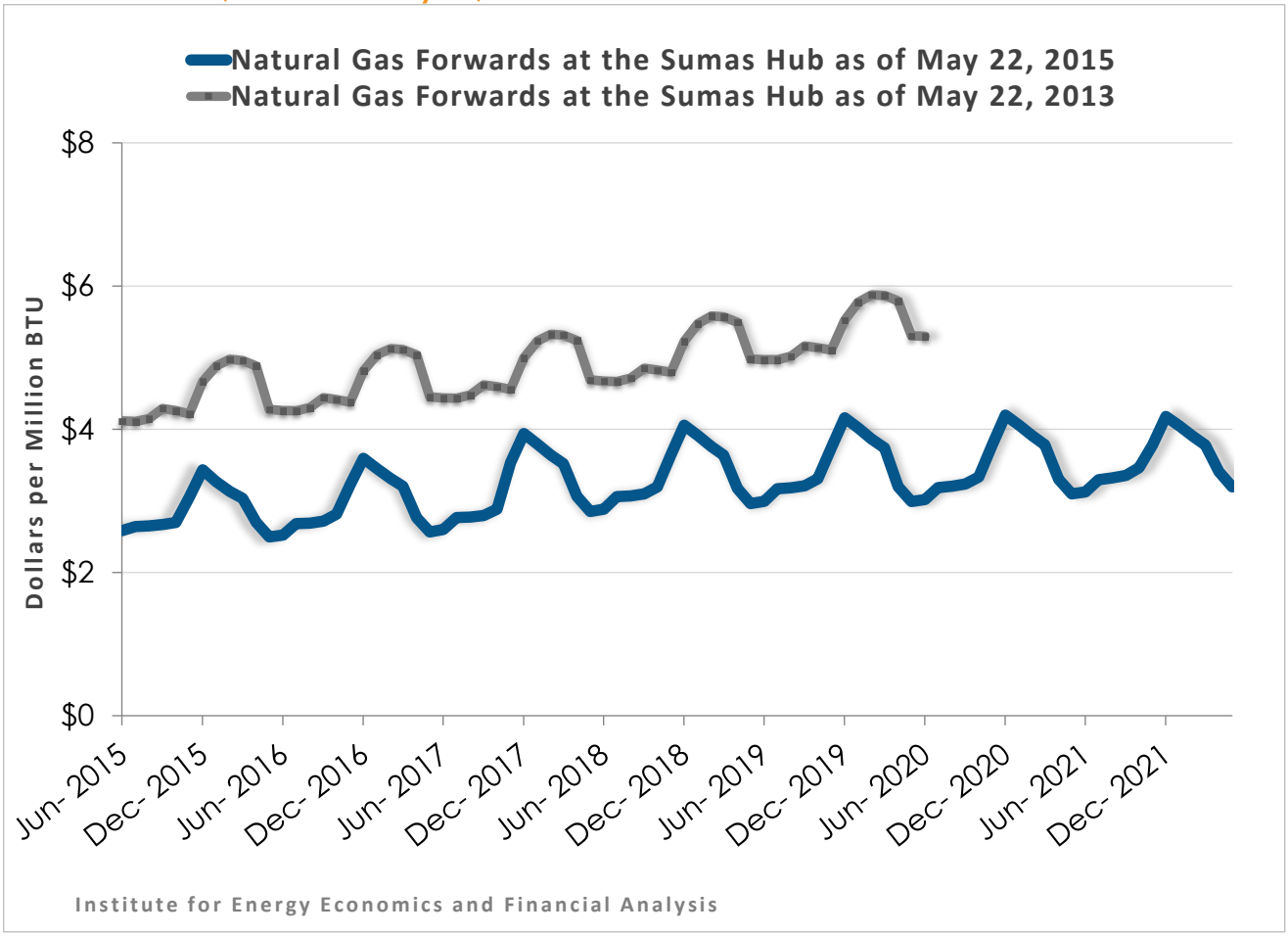
Clearly, continuing ownership and operation of Colstrip 1 and 2 does not appear to be an economic option for Puget Sound Energy and its ratepayers.

Puget Sound Energy's 2013 Integrated Resource Plan

Puget Sound Energy's 2013 Integrated Resource Plan (IRP) did examine the economics of continued operation of Colstrip but, unfortunately, did not fully segregate out Colstrip 1 and 2 from Units 3 & 4. Nevertheless, the IRP results suggested that Colstrip 1 and 2 were economically marginal and could be retired in 2017 in 15 of the 31 different scenarios studied.

Most important, Colstrip 1 and 2 were retired in what Puget Sound Energy presented as a low gas price scenario that used a $4.20 per MMBTU 20-year levelized price of natural gas. Although we might take issue with the assumption that this should be the "low" rather than the "base" gas price forecast in 2013, it is clear that future natural gas prices are now expected to be much lower than they were projected to be back in 2013. This can be seen from Figure 14, below, that compares the forecasts from May 2013 and May 2015 of future ("forwards") natural gas prices at the Sumas Hub in the Northwest.

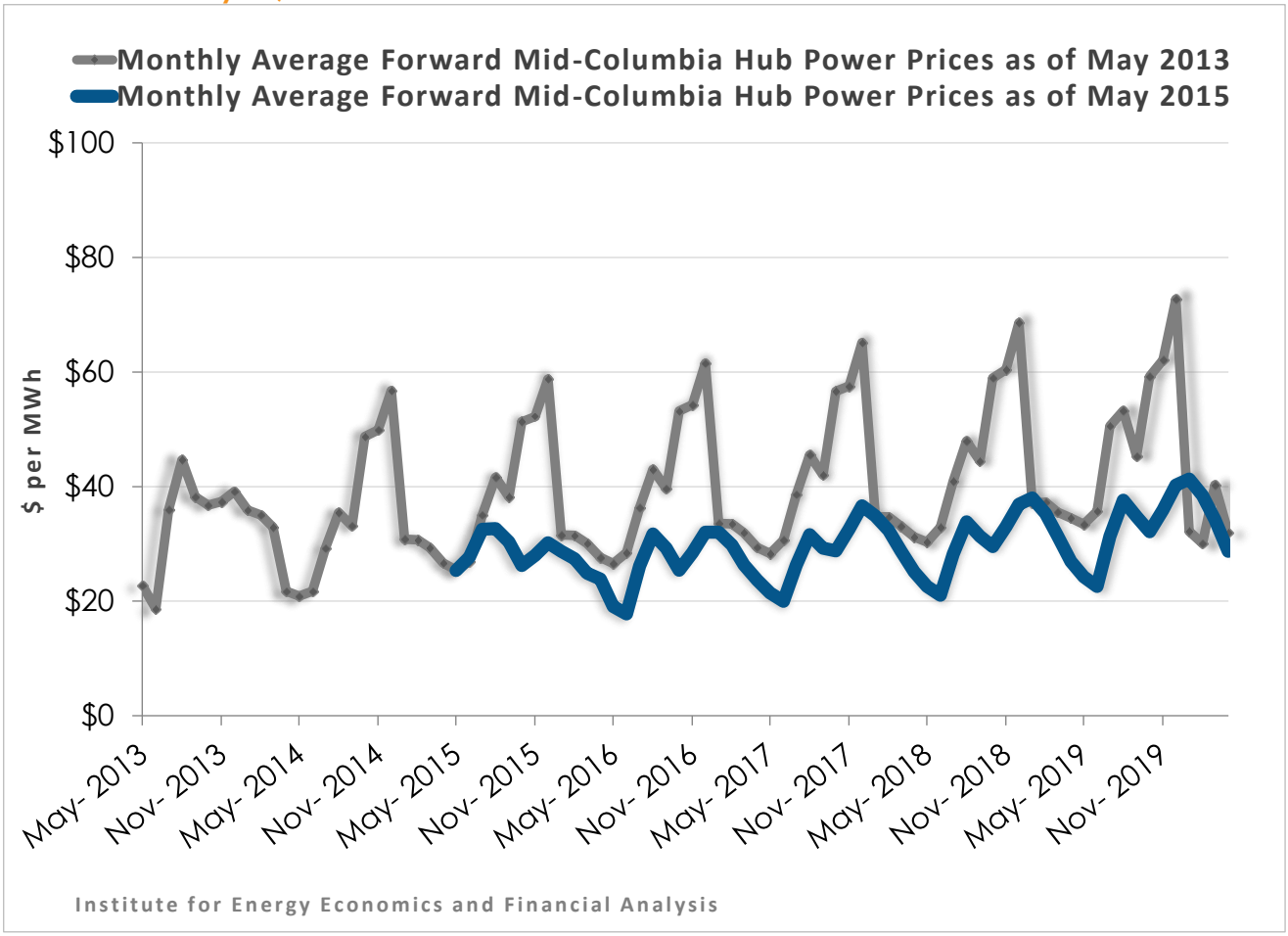
Figure 14: Forward (Future) Natural Gas Prices at the Sumas Hub in the Northwest as of May 21, 2013 and May 22, 2015.



Given these short-term forwards prices, a 20-year levelized price of $4.20 per MMBTU in nominal dollars (as Puget Sound Energy assumed in its "low" gas price case in 2013) should be used as the base case for natural gas prices in any new analysis of Colstrip 1 and 2.

Future power prices at the Mid-Columbia Hub also are now expected to be dramatically lower than they were expected to be back in May 2013, as can be seen in Figure 15, below. These lower power market prices will adversely affect the financial viability of continued operation of Colstrip 1 and 2.

Figure 15: Mid-Columbia Hub Forward (Future) Power Market Prices as of May 21, 2013 and May 22, 2015.



Conclusion

Our analyses and Puget Sound Energy's 2013 Integrated Resource Plan strongly suggest that continued ownership of Colstrip 1 and 2 is not cost effective for the utility's customers. For this reason, before making any additional investments in Colstrip 1 and 2, Puget Sound Energy should be required to demonstrate to the Washington Utilities and Transportation Commission that such investments are more economic than other options such as investing in a portfolio of purchasing energy from the Mid-Columbia Hub, energy efficiency, renewable resources, and, where needed, investments in natural-gas-fired capacity.

Authors

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