

The Impact of Burgess BioPower Operations on Berlin, Coos County, and The State of New Hampshire

June 2020

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Executive Summary

This report examines empirical evidence of Burgess BioPower's impacts on the Berlin, Coos County, and State of New Hampshire economies. The report was paid for, but prepared independently of, Burgess BioPower; it takes no position on matters of policy and PolEcon holds no conflicts of interest that prevent it from providing objective analysis to Burgess BioPower, policymakers, or the citizens of New Hampshire. The purpose of the report is to provide an independent analysis of data that will inform elected and appointed officials and members of the public who are interested in the benefits and costs of the annual operation of the facility. All analyses in this study employ standard economic methods and models widely used by economists and extensively reviewed in academic journals. All data used in the construction of models and in calculating impacts (except for facility operating data) is publicly available from state, federal or local government agencies. Burgess BioPower supplied proprietary data on operation and maintenance expenditures, as well as the labor required to operate the facility on an annual basis. Burgess BioPower was given the opportunity to review the findings and to correct errors of fact in the description of the project and its operations, however, the company had no role in calculating economic impacts outlined in the report and was not given an opportunity to edit any of the results of the impact analyses.

The principal finding of this report is that the economic and fiscal benefits of the Burgess BioPower facility to the City of Berlin, the County of Coos, and the State of New Hampshire significantly exceed costs associated with the facility's impact on electricity prices in New Hampshire. The report also finds that a closure of Burgess BioPower would have large negative economic consequences for Coos County while resulting in minimal gains in other regions from the elimination of Burgess' above market price electricity. Other key findings include:

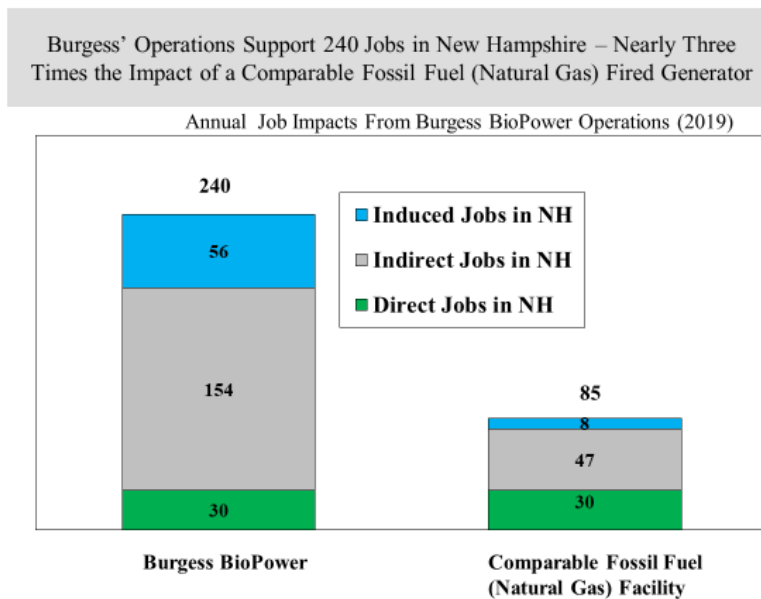
Key Job and Income Impacts

- The annual economic impact of Burgess BioPower throughout the State of New Hampshire in 2019 was 240 jobs, \$14.6 million in labor income, and \$69.1 million in output of goods and services¹.
- The direct annual net economic benefit of just Burgess BioPower to the State of New Hampshire is over \$43 million.

¹ This assumes that 55 percent of the biomass fuel used for electricity generation is from sources in New Hampshire. If more or less biomass is sourced from NH then indirect and induced jobs impacts will respond accordingly.

Annual Impact of Burgess BioPower Operations (2019 Dollars)			
<u>Impact Type</u>	<u>Employment</u>	<u>Labor Income</u>	<u>Output</u>
Direct Effect	30	\$3,142,372	\$40,892,320
Indirect Effect	154	\$8,796,171	\$20,824,182
<u>Induced Effect</u>	56	\$2,701,898	\$7,381,052
Total Effect	240	\$14,640,441	\$69,097,554
Impacts in Coos County Only	208	\$12,112,595	\$57,167,041

- For comparison purposes, job impacts of an equivalently staffed fossil fuel (natural gas) generation facility in Berlin would support just 85 jobs. Job impacts of Burgess are much larger because its fuel (biomass) is primarily sourced locally, while natural gas or coal must be imported. In addition, the biomass that fuels Burgess is trucked by local firms while natural gas is transported via pipelines and coal by trains that require little local labor.



Key Fiscal Impacts

- In 2019 Burgess paid the City of Berlin \$1.158 million in property taxes. In addition, Burgess shares 15 percent of the certain revenues it receives from the sale of renewable energy credits (RECs) with the City. For 2019 that amount will result in a payment of \$523,703 to the city in June of 2020. In the absence of BBP payments the tax rate in Berlin would have risen by 8.2 percent, or \$3.25, to \$42.94.
- In 2019, payments in lieu of taxes by BBP saved Berlin homeowners with a home at the median value approximately \$287 in property tax payments.

- Burgess also paid water and sewer fees of \$954,472 that accounted for approximately 30 percent of all water charges in the city and 10 percent of sewer fees, an indication of how much property owners would see their water and sewer bills increase in the event of a Burgess closure.

Berlin Property Taxes and Rates 2019						
With and Without Burgess BioPower Payments in Lieu of Taxes (PILOT)						
Tax	Total Property Valuation	Tax Rate	Taxes Raised	% of Local Tax Obligation	Required Taxes Without Burgess BioPower	Required Tax Rate Without Burgess
Municipal	\$410,253,868	\$19.33	\$7,933,108	51.4%	\$8,528,355	\$20.79
County	\$410,253,868	\$4.78	\$1,960,607	12.7%	\$2,107,718	\$5.14
Local Education	\$410,253,868	\$13.52	\$5,543,876	35.9%	\$5,959,851	\$14.53
State Education	\$292,397,776	\$2.06	\$602,339		\$629,396	\$2.49
	Total Tax Rate	\$39.69	\$16,039,930		\$17,225,320	\$42.94
		Less War Service Credit	-\$77,125			
		Total Tax Effort	\$15,962,805		Tax Rate Impact	+\$3.25
					% of 2019 Rate	+8.2%
Median Home Value in Berlin						\$88,300
Increase in Property Tax Payment for Home at Median Value						+\$287.22

- In 2019 the economic activity in Berlin, Coos County and the State of New Hampshire from the annual operations at Burgess BioPower produced an estimated \$4.84 million in taxes, fees, and charges paid to the state and its local governments.

Key Demographic Impacts

- Between 2011 and 2018, the City of Berlin experienced encouraging demographic trends. Most significantly, the median age of City residents declined from 44.5 years to 42.3 years, compared to an increase throughout New Hampshire from 42.2 years to 42.7 years. Few communities in New Hampshire experienced a decline in median age during the 2011 to 2018 period.
- The number of residents in their early working years (“millennials” ages 20-34) increased in Berlin between 2011 and 2018 by 3.3 percent, nearly 2 percentage points better than the increase in New Hampshire overall of 1.4 percent.
- Although still well below the educational attainment levels of NH residents overall, the percentage of Berlin residents with an associate’s or bachelor’s degree increased more in Berlin between 2011 and 2018 than it did in NH overall (3.9% to 2.0%).

Impacts of a Burgess Closure

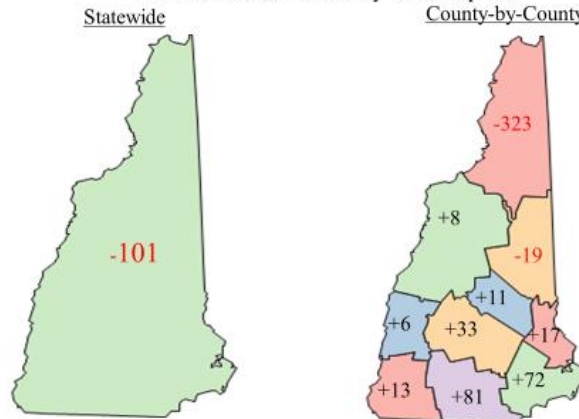
- In a hypothetical scenario where Burgess ceased operating in 2019, employment in Coos County would be about two percent lower by 2021 than if the facility had not closed. If the facility had closed in 2019, the county would not reach the same level of employment as with the facility operating, until 2028.
- By 2030 the population of Coos County would be lower by .7 percent if Burgess closed than if it continued operating. The county’s labor force would decline by 1.2 percent by 2024 compared to a no-closure baseline forecast and would remain 1 percent lower by the end of the forecast in 2030. Gross domestic product of the county would decline by 3.3 percent and remain 2.6 percent below the baseline (no closure scenario) by 2030.

Impact of a 2019 Burgess Closure on Baseline Forecast of the Coos County Economy													
Impact	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Employment	0.0%	-1.4%	-1.8%	-1.9%	-1.9%	-1.8%	-1.7%	-1.6%	-1.5%	-1.4%	-1.3%	-1.2%	-1.2%
Private Non-Farm Employment	0.0%	-1.6%	-1.9%	-2.0%	-2.0%	-1.8%	-1.7%	-1.6%	-1.5%	-1.4%	-1.3%	-1.2%	-1.2%
Population	0.0%	-0.2%	-0.3%	-0.4%	-0.5%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.7%	-0.7%
Labor Force	0.0%	-0.4%	-0.7%	-0.9%	-1.0%	-1.1%	-1.2%	-1.2%	-1.1%	-1.1%	-1.1%	-1.1%	-1.0%
Gross Domestic Product	0.0%	-3.1%	-3.2%	-3.3%	-3.3%	-3.2%	-3.1%	-3.0%	-2.9%	-2.8%	-2.7%	-2.7%	-2.6%
Output	0.0%	-2.6%	-2.8%	-2.8%	-2.8%	-2.7%	-2.6%	-2.5%	-2.4%	-2.3%	-2.3%	-2.2%	-2.2%
Personal Income	0.0%	-0.8%	-1.0%	-1.1%	-1.1%	-1.1%	-1.1%	-1.0%	-1.0%	-1.0%	-0.9%	-0.9%	-0.9%

- Some have argued that closing Burgess would produce economic benefits to the state by lowering electricity prices enough to offset the negative economic impacts in the North Country from its closure. Results also show that if Burgess ceased operating, the impact on electricity rates and expenditures in New Hampshire would not produce job gains across the state sufficient to offset job losses in Coos and other counties.

Peak Job Losses (Gains) Occur in Coos County in 2021 & 2022 but Some Counties Would See Gains – But Not Enough to Offset Losses in Coos and Carroll Counties

Peak Job Impacts On Coos County From Burgess Closure and Associated Electricity Cost Impacts



I. Introduction

It has been eight years since the Burgess BioPower electricity generating facility was approved by the State of New Hampshire. Burgess began generating electricity at near its capacity in 2014. In the Fall of 2017 PolEcon documented significant, beneficial economic and demographic impacts on the City of Berlin and the larger Coos County region, from the ongoing operations of Burgess BioPower. Since that report was produced, timber, logging, and wood products industries have been impacted by public policy changes, combined with record low prices in the energy markets, that have resulted in six biomass-fueled electricity generating facilities to halt their operations. Burgess BioPower is the lone remaining, fully operational, biomass-fueled electricity generating facility in New Hampshire. According to local and regional officials and businesses, since it began operating in 2014, Burgess' has played a critical role in bolstering the economic and fiscal health of the City of Berlin and surrounding region.

In New Hampshire's North Country, the economic impacts of shuttering biomass facilities are being felt at a time when much of the region's tourism and hospitality-based employment base is being devastated by the effects of the COVID-19 pandemic. As of mid-April 2020, the unemployment rate in Coos County was 22.6%, second only to Carroll County's 24.3%. The unemployment rate in the Berlin labor market area was 22.9%.

This report documents the economic impacts of the Burgess BioPower facility on Coos County, the City of Berlin, and the State of New Hampshire. It calculates fiscal impacts on the City of Berlin, and assesses evidence of the impact that the facility is having on important socioeconomic and demographic indicators in the region. Our analysis employs actual Burgess operating data from 2019 and a sophisticated econometric model of the State of New Hampshire and its 10 counties to calculate the annual economic impact of Burgess on Coos County and the State of New Hampshire. Results indicate that Burgess's impact on employment in Coos County in 2019 was 208 jobs (240 overall in New Hampshire) and \$12 million in labor income (\$14 million overall in New Hampshire).

In addition to documenting the annual impacts from Burgess' operations, this report forecasts the longer-term (10 year) impacts on Coos County of a potential closure of the Burgess facility. Results of that analysis show a loss of population, labor force, income, and gross domestic product in Coos County compared to a baseline (Burgess continues operating) scenario, and indicate that the County would not regain the same number of jobs it had with Burgess operating until 2028. Results also show that if Burgess ceased operating, the impact on

electricity rates and expenditures in New Hampshire would not produce job gains across the state sufficient to offset job losses in Coos and other counties.

II. Regional Economic Performance

Evaluating the annual impacts of Burgess BioPower requires not only documenting the economic, fiscal, and socioeconomic impacts of facility operations, but also placing those impacts within the context of the performance of the local and regional economies. The Berlin and Coos County regional economy has been characterized by weaker population, job growth, and income growth compared to other regions in New Hampshire.

Most economic data available for sub-state areas such as Coos County and the City of Berlin are only available through 2018, meaning that the annual operations of Burgess BioPower will have had only four years to influence reported economic and demographic trends in the City and the County. Still, along with the construction phase of the project (during 2012 and 2013), the positive impacts of Burgess BioPower are clearly evident in the data.

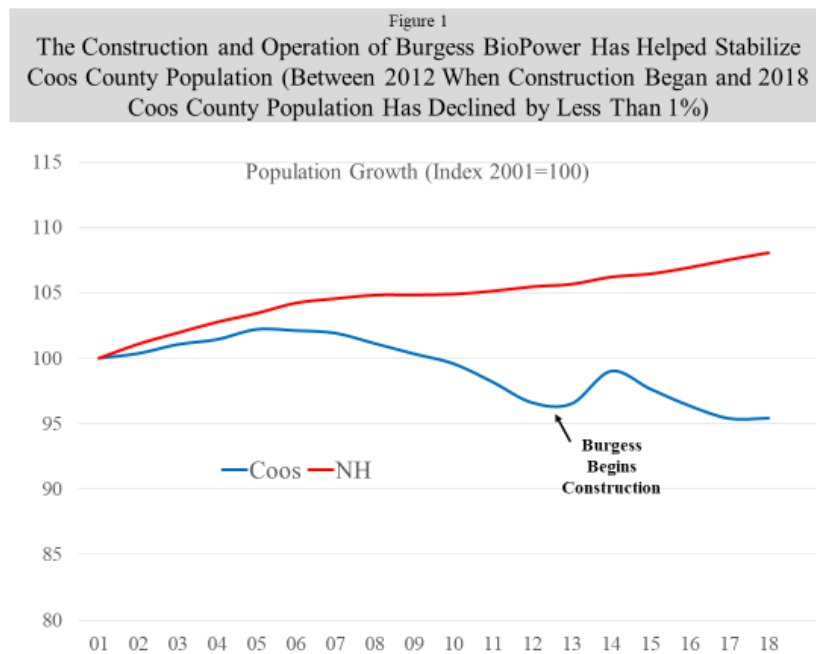
The arrival of Burgess BioPower coincides with improving economic trends and performance relative to other counties in New Hampshire. Although not solely responsible for these trends, interviews with local and regional officials, as well as business leaders and residents, all suggest that Burgess played an important, catalytic role. While lags in reported data limit our ability to assess the impact of Burgess' annual operations in the most recent years, local officials in Berlin and Coos County evaluate Burgess impacts with the benefit of an additional two years (2019 and part of 2020) beyond the most recent officially reported 2018 economic and demographic data.

A. Population Trends

The most difficult regional trends to alter are demographic, especially a declining population. Labor mobility is the principal mechanism of adjustment to changes in regional economic conditions. When regional economic conditions deteriorate, there is a slowing of population growth or a decline via net out-migration of individuals from a region. When economic conditions are stronger, a region can experience net in-migration and more rapid population growth as individuals seeking greater economic opportunities re-locate into the region. Improved economic conditions also reduce out-migration from a region. It can take several years of sustained increases in employment opportunities to change perceptions of employment opportunities in a region that lead to a situation where more individuals are moving into a region than are moving out of a region. In contrast, out-migration from a region typically occurs more

quickly in response to declines in regional employment opportunities as the urgency to find replacement employment prompts movement of individuals to regions with greater opportunities.

Figure 1 shows population growth trends in Coos County and the State of New Hampshire between 2001 and 2018. The chart shows how much slower Coos County’s population growth has been compared to growth in the State of New Hampshire. Since Burgess was permitted and constructed, the population of Coos County has stabilized. After first rising as construction began, population in the county has remained roughly at 2012 levels, having declined by less than one percent over the six years between 2012 and 2018.



Research nationally has examined the impacts of labor demand shocks (typically defined as a minimum of a one percent increase in employment in a short period of time on a region.²) The total employment impact of Burgess BioPower during the construction phase of the project was equal to over two percent of Coos County employment and over 10 percent of employment in the City of Berlin. Construction of Burgess BioPower provided an employment shock to the region that research indicates should influence population trends.³ Later in this report we use an

² Bartik, Timothy J. 2014. "How Effects of Local Labor Demand Shocks Vary with Local Labor Market Conditions." Upjohn Institute Working Paper 14-202. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.
 Notowidigdo, Matthew J. 2013. "The Incidence of Local Labor Demand Shocks." Working paper. Booth School of Business, University of Chicago. Bound, John and Holzer, Harry J. 2000 "Demand Shifts, Population Adjustments, and Labor Market Outcomes during the 1980s," Journal of Labor Economics, 18(1), 20-54. Monte, F., Redding, Stephen J., and Rossi-Hansberg, E. 2016. "Commuting, Migration and Local Employment Elasticities" National Bureau of Economic Research, Working Paper No. 21706.

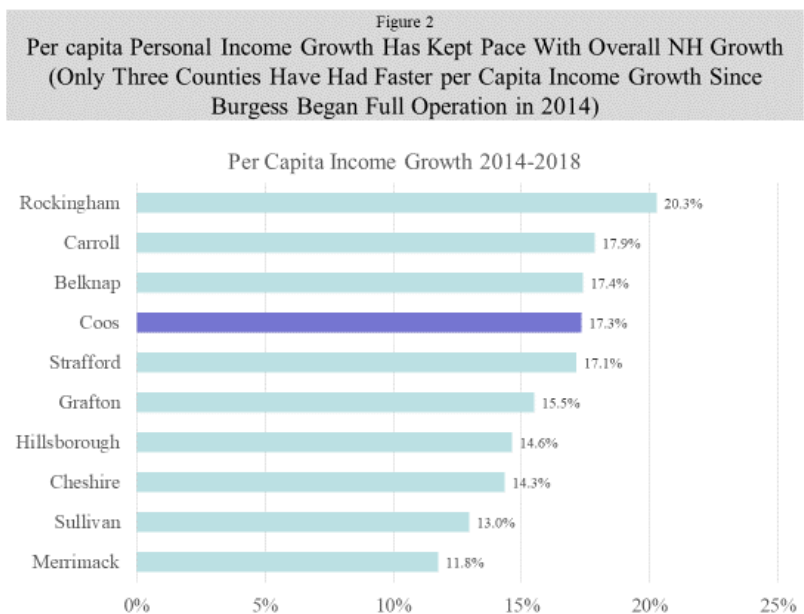
³ PolEcon did not analyze the economic impacts of the construction of Burgess BioPower and did not rely on any

econometric model of the New Hampshire and Coos County economies to demonstrate the population, labor force, and employment impacts on Coos County should Burgess cease operations.

B. Income Trends

Total personal income in the Coos County region grew more slowly than in NH overall between 2011 and 2018. Slower population and employment growth in Coos County than in much of the state primarily accounts for this trend, as stable or stagnant population growth also implies a stagnant labor force and slower growth in total earnings, as well as other components of personal income.

More illustrative of Burgess' impact on income in the region (because it controls for differences in growth of each county's population), is the change in per capita income growth rates in Coos County since Burgess began construction and operation. Per capita income in Coos County is just 70 percent of statewide per capita income in New Hampshire; however, the employment impacts that Burgess' annual operations have had throughout the county (along with all associated impacts), contributed to increasing per capita personal income in Coos County at a faster rate than in New Hampshire overall. After ranking 10th among NH's 10 counties on annual



per capita income growth for the time period between 1991 and 2011, Coos County jumped to having the 4th highest annual growth rate among NH counties between 2014 and 2018. Figure 2

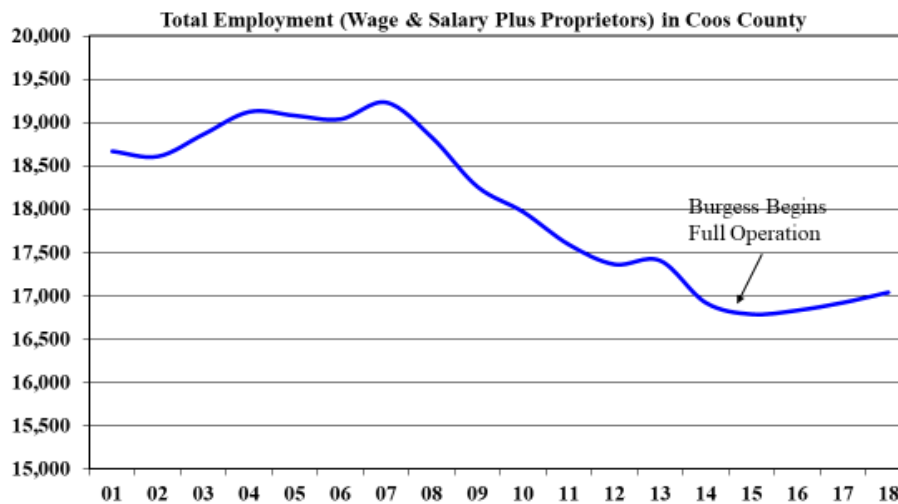
prior studies of Burgess' impacts for any of the analyses in this report.

shows that per capita personal income in Coos County increased by 13.3 percent between 2014, when Burgess began full operations, and 2018 (the most recent year for which per capita income is available), ranking Coos 4th fastest for per capita income growth among all counties.

C. Employment Trends

Except for the period during which the Burgess facility was under construction, total employment in Coos County experienced a precipitous decline until Burgess began full operation in 2014. The impact of Burgess’ construction and annual operations are apparent in employment data for Coos County as both the construction phase of the project and the full operating phase are associated with time periods where the total number of jobs in Coos County did not decline (Figure 3). Details on the annual job impacts from Burgess’ annual operations are presented in the next section of this report.

Figure 3
Burgess BioPower has Been Key to Helping Slow (and Reverse)
the Flow of Jobs From Coos County.



Source: U.S. Bureau of Economic Analysis, "Local Area Personal Income and Employment," file CA25N, PolEcon

III. Economic Impacts of Burgess BioPower’s Annual Operations

Burgess BioPower’s operating data for 2019, including expenditures, revenues, employment, and electricity production was used along with economic models of both Coos County and the State of New Hampshire to estimate the economic impacts of the annual operations of the facility.

A. Output Impacts

This analysis of economic impacts depicts the direct spending effects and “multiplier”

effects associated with annual, ongoing operation and maintenance (O&M) associated with Burgess BioPower. Three types of effects will result from the annual operations of Burgess: 1.) effects resulting from hiring and spending by Burgess BioPower itself (direct effects); 2.) purchases by Burgess of fuel, materials and supplies (business-to-business spending) needed to operate the facility (indirect effects); and 3.) spending resulting from the wages and salaries earned by those working at the facility and by those working at suppliers to the facility (induced effects). Total economic impacts are the combined direct, indirect, and induced effects and are typically stated in terms of dollars of output, dollars of labor income, and employment.

Direct spending effects are identified from Burgess' annual operating expenditures. The indirect and induced effects are estimated using IMPLAN⁴ input-output models of both Coos County and the State of New Hampshire. The models are calibrated to depict region-specific industry-by-industry purchasing patterns (for the indirect effects) and consumer purchasing patterns (for the induced effects). The indirect and induced multipliers for each industry estimate how much additional activity is created through the portion of the direct spending by Burgess BioPower within NH.

It is crucial to this assessment that supplies and labor needed to operate Burgess on an annual basis are distinguished by those that would come directly from the Coos County region, as well as the larger State of New Hampshire economy, and those that "leak" to regions outside of the State of New Hampshire. Burgess' impacts on Coos County are derived from local purchases in the county and the multiplier effects in the Coos regional economy, while the impacts for the State of New Hampshire are derived from the sum of impacts in Coos County and the impacts resulting from purchases in the remainder of New Hampshire. The key to gauging the overall impact of Burgess is to identify how much of expenditures by the facility will be from local sources. A list of suppliers, contractors and expenditures by Burgess was provided to PolEcon to help determine the local percentage of Burgess' expenditures. In addition, where local content is unclear, the IMPLAN model uses historical trade flow data to calculate the percentage of each industry's expenditures that are likely to be supplied by local businesses.

At \$27.4 million dollars in 2019, biomass was the largest expenditure category of Burgess. The actual amount of local content may vary somewhat from year-to-year. For this analysis, we assume that 55 percent of the biomass purchased by Burgess is sourced from NH (from Coos

⁴ IMPLAN is heavily reviewed and extensively used by government agencies and private companies for economic impact modeling. Information about IMPLAN models is available at www.implan.com.

County as well as other regions in the state). This percentage represents the middle range of annual biomass purchases from NH sources, as our review showed a range of 48.5 to 61 percent. To the extent that the percentage varies, annual impacts in Coos County and the region will also vary.

To estimate the annual impact that Burgess BioPower has on the total dollar value of goods and services (output or sales) produced in Coos County and the State of New Hampshire we entered the dollar value of the electricity produced by Burgess BioPower in 2019 into economic models of Coos County and the State of New Hampshire.⁵ To determine Burgess’ impact on other industries in the region and statewide we modeled impacts by modifying the production function (spending pattern) of the economic model’s predetermined electricity generation industry sector to reflect the actual industry and commodity spending pattern of Burgess BioPower.⁶

Table 1 Annual Impact on Output of Burgess BioPower Operations (Millions of 2019 Dollars)	
Coos County	Total
Direct (by Burgess)	\$40.9
Indirect	\$20.8
Induced	\$7.4
Total	\$69.1
Output in Coos County	\$57.17

In 2019 Burgess’ direct sales of approximately \$41 million of electricity resulted in another \$29 million in sales by other businesses in the state, as well as \$7.4 million of induced sales to individuals who earn income directly from Burgess or the workers at businesses who earn income from sales to Burgess. In total, the annual operations of Burgess in 2019 increased output in the State of New Hampshire by \$69.1 million (Table 1).

⁵ Only the value of electricity production was used in calculating economic impacts. Revenues earned by Burgess such as capacity payments and sale of renewable energy credits do not require additional labor or materials and thus do not result in economic impacts beyond the impacts resulting from electricity generation.

⁶The most significant modification reflected the use of biomass as a fuel for generating electricity rather than fossil fuel. Other modifications include adjusting the portion of spending and method of transporting fuel to reflect truck transportation rather than pipeline (for natural gas fuel power plants) or rail (for coal fired generation).

B. Job Impacts

Burgess BioPower provided data on the average number of employees working at the facility in 2019 and these 30 jobs represent the direct employment impacts of Burgess. In addition to the 30 direct jobs at the facility, the expenditures by Burgess on goods and services in the Coos County region support another 154 jobs in the state as well as 56 induced jobs that result from the spending by Burgess workers and the workers in industries that supply goods and services to Burgess. The total annual employment impact of Burgess in New Hampshire was 240 jobs in 2019, of which 208 are in Coos County (Table 2).

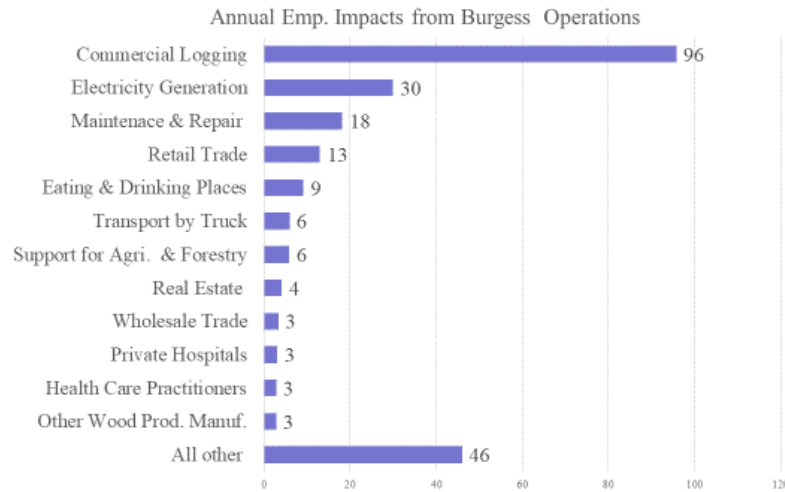
Coos County	Total
Direct (at Burgess)	30
Indirect	154
Induced	56
Total	240
# in Coos County	208

The large indirect employment (much larger than if Burgess burned fossil fuels which are not produced within NH) impacts of Burgess are the result of the approximately one-half of more than \$27 million dollars in biomass purchases that occur in NH (in Coos and other NH counties).

C. Employment Impacts by Industry

Aside from the employees of Burgess BioPower, the largest employment impacts from spending by the facility occur in the commercial logging industry (96 jobs) and maintenance and repair of non-residential facilities industries (18 jobs). Over 20 jobs in retail trade and eating and drinking places are supported by the economic activity generated by Burgess. Many other industries in Coos County and other areas of New Hampshire benefit from the expenditures of Burgess BioPower and the expenditures of its employees and the employees of industries that supply goods and services to Burgess. Figure 4 presents employment impacts in industries with the largest employment gains. The “all other” category represents all industries with less than three jobs supported by Burgess BioPower.

Figure 4
 Logging and Maintenance and Repair Industries Experience the Largest
 Employment Gains From Burgess' Expenditures



D. Labor Income Impacts

The annual labor income impacts of Burgess BioPower (direct, indirect, and induced) account for about two percent (2.0%) of all the labor income earned by wage and salary employees and proprietors in Coos County.

Labor income impacts include wages, salaries, proprietor's income, as well as supplements to wages and salaries (benefits). The total direct, indirect, and induced income impacts (including all non-wage salary and benefits) in New Hampshire are estimated to be \$14.6

million per year, of which \$12.2 million is earned in Coos County in 2019 dollars (Table 3).

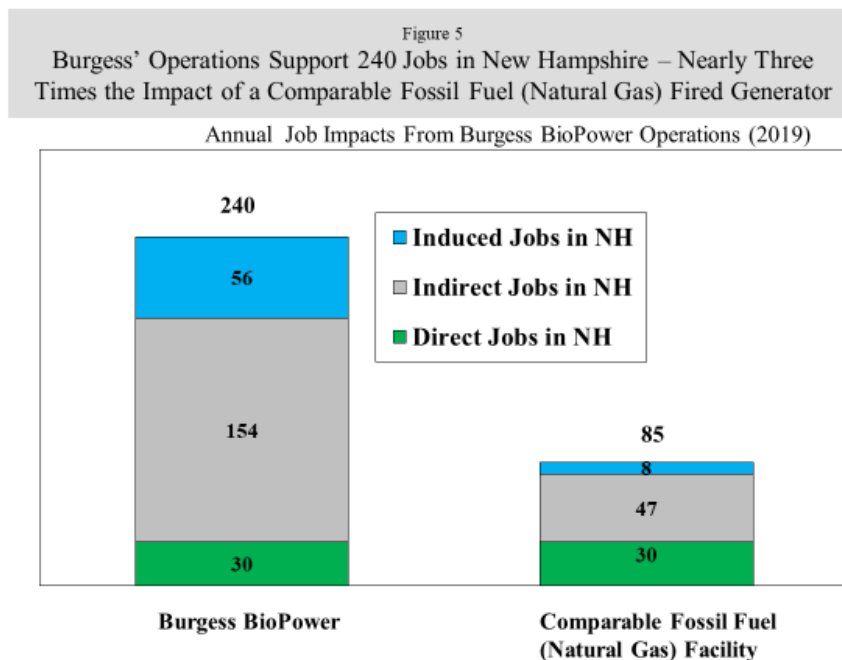
Coos County	Total
Direct	\$3.14
Indirect	\$8.80
Induced	\$2.70
Total	\$14.64
Income in Coos County	\$12.2

IV. Comparison with Fossil Fuel Generation Impacts

Burgess BioPower has an outsized impact on the Coos County and New Hampshire economies compared to electric power generation facilities in the state that burn fossil fuels. This occurs because, unlike fossil fuel generation facilities, the fuel used by Burgess to generate electricity (biomass) is primarily sourced from within the State of New Hampshire. In addition, biomass is transported primarily by in-state trucking companies. In contrast, fossil fuel burning power plants use fuels that are not produced or sourced locally and that are transported primarily by pipelines or rail lines that are not based in New Hampshire and that require little labor content from companies and workers in New Hampshire.

To compare the economic impacts of Burgess BioPower to an equivalent fossil fuel burning power plant we used the IMPLAN economic model of Coos County and entered identical operating expenditures for the gas-fired facility as was used to model Burgess’ impacts. The only changes that were made to the model were to the spending pattern of the electricity generation industry. The spending pattern was changed to reflect expenditures on natural gas rather than on biomass, and changes in the mode of transportation to reflect transportation of natural gas by the pipeline industry rather than the trucking industry that was used in modeling Burgess impacts.

Figure 5 compares the job impacts of Burgess BioPower’s annual operations with the job impacts that would result from an equivalent natural gas-fired power plant. As the figure shows, while direct employment impacts of 30 employees are identical, the greater use of locally sourced fuel (biomass rather than natural gas) and labor, results in a total job impact in New Hampshire of 240 jobs for Burgess and just 85 jobs for an equivalent natural gas facility.



V. Fiscal Impacts

In 2019 the economic activity in Berlin, Coos County, and the State of New Hampshire resulting from the annual operations at Burgess BioPower produced an estimated \$4.84 million taxes, fees, and charges paid to the state and its local governments. In 2019 Burgess BioPower paid the City of Berlin \$1.158 million in property taxes. In addition, Burgess shares 15 percent of the certain revenues it receives from the sale of renewable energy credits (RECs) with the City. For 2019 that amount will result in a payment of \$523,703 to the city in June of 2020. City

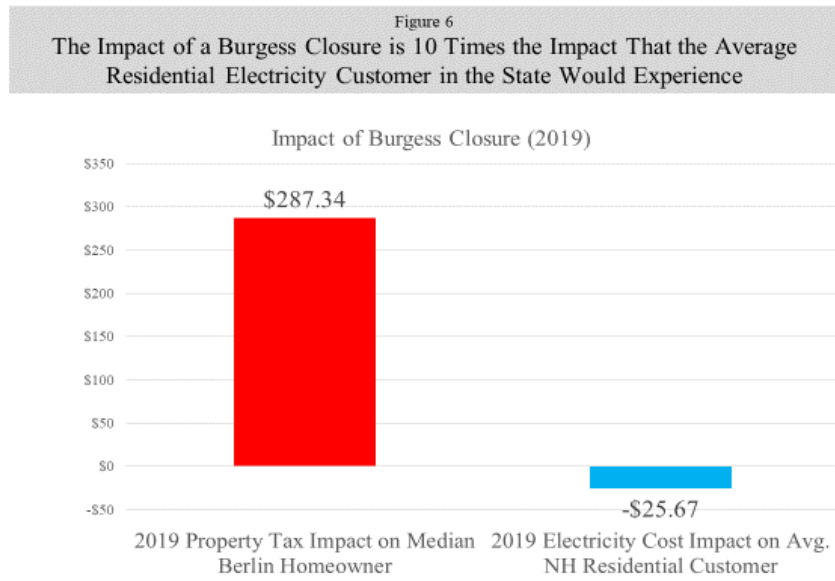
officials note that the \$523,703 is expected to allow bridge repair of “red listed” bridges in the city that are in need of repair but have not made it onto the state’s list of bridges scheduled for repair at a cost-share of 20 percent to the City.

Burgess also paid water and sewer fees of \$954,472 that accounted for approximately 30 percent of all water charges in the city and 10 percent of sewer fees, an indication of how much property owners would see their water and sewer bills increase in the event of a Burgess closure. The dramatic impact of Burgess on the City’s property tax revenue, as well as homeowners is illustrated in Table 4. The table presents the property tax impact that Burgess has on the City and on individuals who own a home at the median value in Berlin. As the table shows, without Burgess’ payment in lieu of taxes, the combined property tax rate in the City would have been 8.2 percent, or \$3.25, higher in 2019. For a homeowner with a home at the median value of \$88,300 in the City, that increase would have resulted in an additional \$287 in property tax payments in 2019.

Table 4						
Berlin Property Taxes and Rates 2019						
With and Without Burgess BioPower Payment in Lieu of Taxes (PILOT)						
Tax	Total Property Valuation	Tax Rate	Taxes Raised	% of Local Tax Obligation	Required Taxes Without Burgess BioPower	Required Tax Rate Without Burgess
Municipal	\$410,253,868	\$19.33	\$7,933,108	51.4%	\$8,528,355	\$20.79
County	\$410,253,868	\$4.78	\$1,960,607	12.7%	\$2,107,718	\$5.14
Local Education	\$410,253,868	\$13.52	\$5,543,876	35.9%	\$5,959,851	\$14.53
State Education	\$292,397,776	\$2.06	\$602,339		\$629,396	\$2.49
	Total Tax Rate	\$39.69	\$16,039,930		\$17,225,320	\$42.94
		Less War Service Credit	-\$77,125			
		Total Tax Effort	\$15,962,805		Tax Rate Impact	+\$3.25
					% of 2019 Rate	+8.2%
Median Home Value in Berlin						\$88,300
Increase in Property Tax Payment for Home at Median Value						+\$287.22

In addition to the impact on city property tax payers, property owners throughout Coos County will see an increase in the county portion of their tax bills in the event of a Burgess closure.

Finally, the negative impact on property tax payers in the City of Berlin must be weighed against the potential gains from eliminating impacts from the impact that Burgess' 1.3 percent contribution to electricity costs in New Hampshire has on residents of the state. Figure 6 compares the differential impacts on City of Berlin homeowners with a median valued home (an increase of \$287 in 2019), with the annual impact on electricity expenditures for the average residential customer of Eversource (a decline of \$26 according to the NH Public Utilities Commission⁷ and discussed more fully in later sections of this report). As the chart indicates, the negative impacts on Berlin homeowners is 10 times the beneficial impacts to residential electricity customers.



VI. Demographic Impacts

The monetary and job impacts of Burgess BioPower documented in this report will have the greatest impact to the extent that they help improve the longer-term performance of the City of Berlin and Coos County on key socioeconomic and demographic metrics. The most recent socioeconomic and demographic data available for the region and the state is from 2018, meaning that Burgess BioPower operations will have had approximately four years to impact the data, and six years when combined with the construction phase of the project. Still, the data show improvements in troubling trends that have plagued Berlin and the larger Coos County region over the last two decades. Burgess BioPower is not solely responsible for the recent encouraging

⁷ NH Public Utilities Commission, Docket No. DE 19-142, Commission Record Request, Exhibit # 3, January 17, 2020

trends but local and regional officials are clear in their belief that Burgess BioPower has played a catalytic role.

Combined, the construction phase of Burgess BioPower (which began in 2012) and the operating phase (which began fully in 2014) appear to have influenced demographic data in the City of Berlin despite having relatively few years to influence trends. Although not long enough to assess the full impacts of Burgess on longer-term demographic trends, several key demographic trends in the City of Berlin have outperformed the State of New Hampshire since Burgess arrived in the City. Specifically:

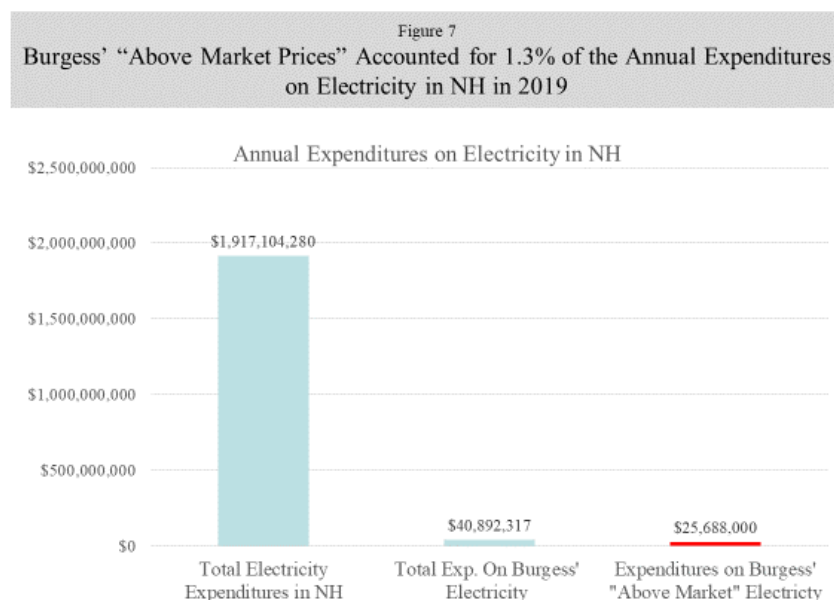
- The median age of City residents declined 2.2 years (from 45.5 years to 42.3 years), compared to an increase in median age throughout New Hampshire from 42.2 years to 42.7 years. Few communities in New Hampshire experienced a decline in median age during the 2011 to 2018 time period.
- The number of residents in their early and prime working years (ages 20-34) increased in Berlin between 2011 and 2018 by 3.3 percent, nearly 2 percentage points higher than the increase throughout New Hampshire of 1.4 percent.
- Although still well below the educational attainment levels of NH residents overall, the percentage of Berlin residents with an associate’s or bachelor’s degree increased more in Berlin between 2011 and 2018 than it did in NH overall (3.9% to 2.0%).

These trends are best evaluated in the context of the historically weak demographic trends in the City of Berlin. Although not an indication of a dramatic turnaround, the data above clearly point to improving demographic trends in the City.

Table 5 Change in Key Demographics 2011-2018		
	Berlin	NH
Change in Median Pop. Age 2011-18	-2.2 yrs.	+.5 yrs.
% of Pop. Ages 20-34	+3.3%	+1.4%
% of Pop. With AA or BA Degree	+3.9%	+2.0%
Sources: U.S. Census Bureau, <i>American Community Survey</i>		

VII. Impact on Electricity Expenditures

The New Hampshire Public Utilities Commission reports that in 2019, the electricity sold by Burgess BioPower was at a rate \$25.68 million above the market price for energy in the New England wholesale electricity market. New Hampshire's total energy expenditures exceed \$1.9 billion annually; Burgess' electricity accounts for just 1.34% of that and establishes the magnitude of impacts of Burgess on the overall electricity market in New Hampshire (Figure 7).



Since Burgess' agreements to sell electricity were signed, sharp and unexpected declines in the price of fuels (primarily natural gas) used to fire the majority of electricity generating facilities in New England have meant significant drops in the wholesale price of electricity in the region. This unprecedented, historical decline in wholesale prices has not, however, resulted in a concomitant decline in retail prices due to significant increases in utility transmission and distribution charges. Since 2008, the region has seen a decline in wholesale prices of more than 50 percent,⁸ while since 2004, transmission and distribution costs have soared 650 percent.⁹ Although today's wholesale electricity prices in New England, at times, may make Burgess BioPower's facility uneconomic with respect to energy pricing, the facility and state also gain from environmental and electricity supply benefits. Based on prices in the natural gas market, low

⁸ https://www.iso-ne.com/static-assets/documents/2019/03/20190312_pr_2018-price-release.pdf; Adjusted to 2018 dollars

⁹ <https://iso-ne.com/static-assets/documents/2020/01/section2-rate-summary.xls>

wholesale electricity prices are likely to remain in the New England region for some time, increasing the possibility of public policies that threaten the continued operation of Burgess. Even when any economic impacts related to increases in electricity prices related to the price of Burgess BioPower's electricity are netted-out from economic benefits associated with the project, the facility remains a critical, positive economic contributor within the state and region;

VIII. Impacts of a Burgess Closure

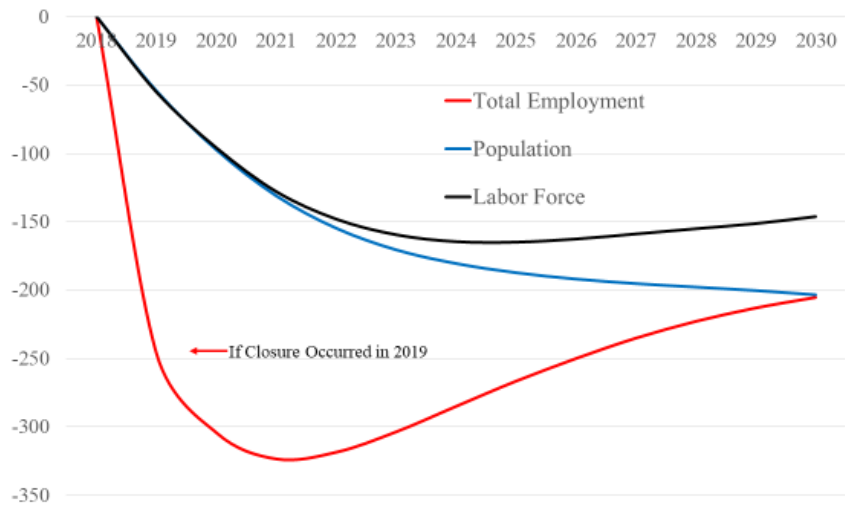
The annual economic impacts of Burgess documented above, as well as some its longer-term demographic impacts, highlight the value of the facility to the City of Berlin and to the larger North Country region. A closure of the Burgess facility would result in the loss of the annual impacts presented in this report, but those impacts will have longer-term ramifications for economic, demographic, and labor force trends in the region. Here we present results of a simulation using an econometric model of New Hampshire and its ten counties to model the longer-term impacts (to 2030) of a scenario where Burgess had ceased operations in 2019. The impacts on Coos County of a Burgess closure are modeled first, and then the statewide impacts are modeled when factoring in the elimination of Burgess' above market price electricity costs on households and businesses in the state. For this analysis, the above market price of electricity sold by Burgess to New Hampshire utilities in 2019, as documented by the New Hampshire Public Utilities Commission¹⁰, was assumed to continue each year of the forecast period.

Key Impacts on Coos County

Figure 8 shows how three key metrics, jobs, labor force, and population in Coos County differ in a scenario where Burgess closes down, compared to a baseline scenario where it continues operating. Job losses in Coos County would peak two years after Burgess ceases operation at -323. The decline in the Coos County labor force would be greatest (at -165) in 2025 compared to the baseline (no Burgess closure) forecast. Importantly, population declines throughout the forecast period, indicating the substantial impact that Burgess has on the broader economy and job opportunities in the region.

¹⁰ NH Public Utilities Commission, Docket No. DE 19-142, Commission Record Request, Exhibit # 3, January 17, 2020

Figure 8
 Difference in Key Coos County Economic and Demographic Variables if
 Burgess BioPower Ceased Operations (Compared to Baseline Forecast)



Job losses are greatest in the forest and wood products industries (100+). The closure of New Hampshire’s other biomass electricity generating facilities has severely limited the market for low-grade wood and wood byproducts. The closure of Burgess could end the market for low grade forestry products. Figure 9 shows how Coos County employment differs from a baseline forecast under a scenario where Burgess BioPower ceased operations in 2019. The chart shows that the jobs lost as a result of a closure of Burgess are not regained until 2028. However, throughout the forecast period the number of jobs remains lower if Burgess closes than if it remains in operation.

Figure 9
It Would Be 2028 Before Coos County Recovered all the Jobs Lost if Burgess Had Closed in 2019

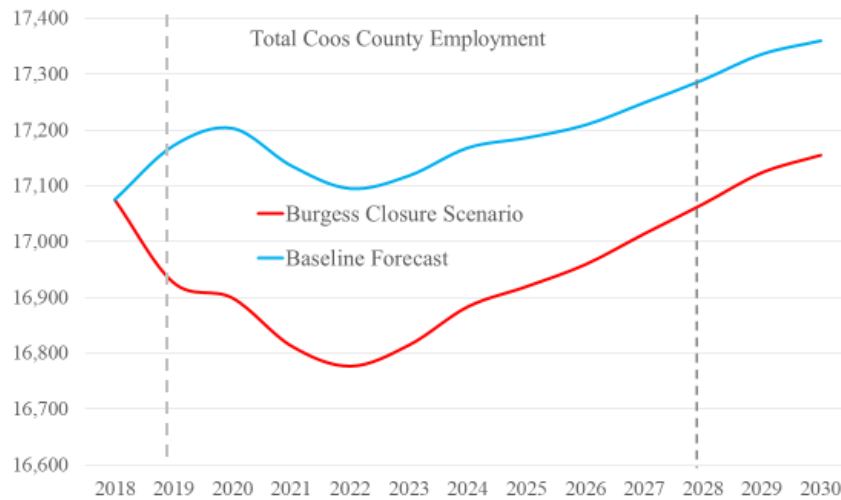


Table 6 shows, on a percentage basis, how the closure of Burgess would affect a number of key economic measures in Coos County, compared to a baseline economic forecast (no Burgess closure). Peak negative total and private employment job impacts, gross product and personal income impacts would occur two-to-three years following a Burgess closure. Negative Population impacts would continue to increase throughout the forecast period, while the maximum negative impact on the Coos County labor force would occur five and six years following a Burgess closure as the decline in job opportunities would both reduce population and labor force participation in the county.

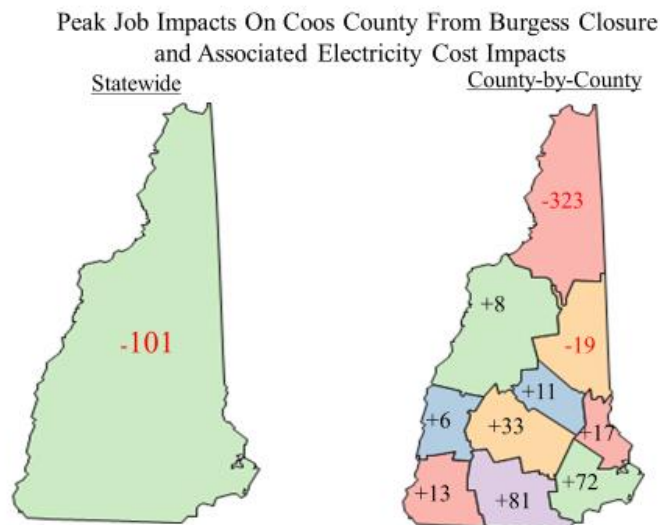
Table 6													
Impact of a 2019 Burgess Closure on Baseline Forecast of the Coos County Economy													
Impact	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Employment	0.0%	-1.4%	-1.8%	-1.9%	-1.9%	-1.8%	-1.7%	-1.6%	-1.5%	-1.4%	-1.3%	-1.2%	-1.2%
Private Non-Farm Employment	0.0%	-1.6%	-1.9%	-2.0%	-2.0%	-1.8%	-1.7%	-1.6%	-1.5%	-1.4%	-1.3%	-1.2%	-1.2%
Population	0.0%	-0.2%	-0.3%	-0.4%	-0.5%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.7%	-0.7%
Labor Force	0.0%	-0.4%	-0.7%	-0.9%	-1.0%	-1.1%	-1.2%	-1.2%	-1.1%	-1.1%	-1.1%	-1.1%	-1.0%
Gross Domestic Product	0.0%	-3.1%	-3.2%	-3.3%	-3.3%	-3.2%	-3.1%	-3.0%	-2.9%	-2.8%	-2.7%	-2.7%	-2.6%
Output	0.0%	-2.6%	-2.8%	-2.8%	-2.8%	-2.7%	-2.6%	-2.5%	-2.4%	-2.3%	-2.3%	-2.2%	-2.2%
Personal Income	0.0%	-0.8%	-1.0%	-1.1%	-1.1%	-1.1%	-1.1%	-1.0%	-1.0%	-1.0%	-0.9%	-0.9%	-0.9%

IX. Impacts of Burgess Electricity Prices

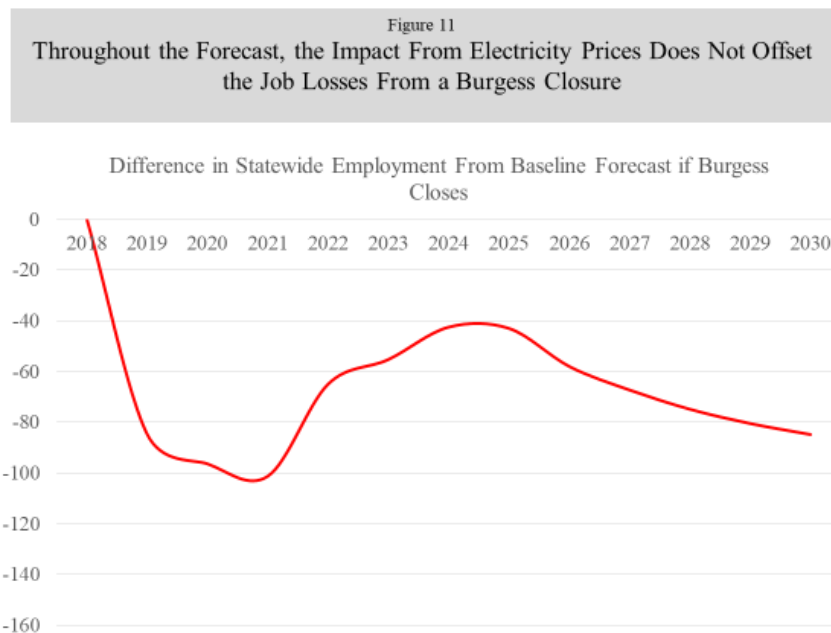
To assess the overall impact on the state of New Hampshire from a potential Burgess closure, any negative economic impacts related to above market electricity prices for Burgess BioPower’s electricity must be netted-out from economic benefits associated with the project, as well as from the impacts on Coos County from a Burgess closure. The statewide impacts of a Burgess closure net of the impacts of Burgess electricity prices (the elimination of above market prices) were modeled using estimated 2019 above market prices of \$25.68 million and applied to each year of the forecast period. The reduction in total prices for electricity that result from the elimination of these above market prices were allocated to residential, industrial, and commercial customers according to the percentage of Eversource’s revenue derived from each group. For residential customers, the removal of above market prices was modeled as an increase in disposable income for households. For industrial and commercial customers, it was modeled as a reduction in business costs.

Figure 10 highlights the regional job impacts of a Burgess closure in 2021, the year in which a scenario of a Burgess closure is forecast to have the maximum impact on jobs in Coos County, when the impacts of reduced electricity expenditures are also considered. As the chart shows, the marginal impact of a Burgess closure would have on electricity rates in the state will result in modest employment gains in eight of 10 New Hampshire counties, but those gains are not enough to offset the combined job losses in Coos and Carroll Counties. Each county

Figure 10
 Peak Job Losses (Gains) Occur in Coos County in 2021 & 2022 but Some Counties Would See Gains – But Not Enough to Offset Losses in Coos and Carroll Counties



experiences a different level of job losses or increases in each year of the forecast period, but in no year do job gains in some counties offset the job losses resulting from a Burgess closure (Figure 11).



It is clear from this analysis that there would be large differences in regional impacts of from a Burgess shutdown. At peak job impact, in 2021 and 2022, Coos County would have lost just under two percent (1.9%) of jobs in the county, while Hillsborough and Rockingham Counties would gain about three-one hundredths of one percent (0.03%).

X. Conclusions

This report examined the economic, fiscal, socioeconomic and demographic impacts of the initial years of annual operations of the Burgess BioPower electricity generating facility.

The report finds evidence that Burgess has helped improve regional socioeconomic and demographic trends, and that a closure of Burgess would quickly reverse those positive regional trends. The principal finding of this report is that the economic benefits of the Burgess BioPower facility to the City of Berlin, Coos County, and the State of New Hampshire, exceed costs associated with the facility's impact on electricity prices in New Hampshire, and that the State of New Hampshire would experience net negative job impacts from a closure of Burgess (jobs would be lower than in a baseline scenario in which Burgess remains open). Net job impacts differ in each year of the forecast but the net negative job impacts remain throughout the forecast period.

The report also highlights the strong differences in regional impacts that a potential Burgess closure would have, with especially negative impacts on one of New Hampshire's least wealthy and prosperous counties. The report documents the small increase in jobs that would occur in some counties (equal to three one-hundredths of one percent in New Hampshire's largest and wealthiest counties), in response to a marginal decline in electricity expenditures, even as Coos County would experience job losses close to two percent of total employment. These disparities also exist in the impacts for individual households and residential electric rate customers under a closure of Burgess scenario.