

STATE OF NEWHAMPSHIRE
PUBLIC UTILITIES COMMISSION

DE 10-195

In the Matter of:
Public Service Company of New Hampshire
Petition for Approval of Proposed
Power Purchase Agreement with Laidlaw
Berlin Biopower, LLC.

Direct Testimony

of

Thomas C. Frantz
Director, Electric Division

December 17, 2010

1 **Q. Please state your name, occupation and business address.**

2 A. My name is Thomas C. Frantz. I am employed by the New Hampshire Public Utilities
3 Commission as Director of the Electric Division. My business address is 21 S. Fruit St.,
4 Suite 10, Concord, New Hampshire 03301.

5 **Q. Please summarize your education and professional experience.**

6 A. Please see Attachment TCF-1.

7 **Q. What is the purpose of your testimony?**

8 A. The purpose of this testimony is to provide Staff's position on the economic benefits for
9 New Hampshire of the proposed Purchased Power Agreement (PPA) between Public
10 Service Company of New Hampshire (PSNH) and Laidlaw Berlin Biopower , LLC
11 (Laidlaw). The Commission must consider under RSA 362-F:9 as part of its
12 determination as to whether the proposed purchased power agreement is in the public
13 interest.

14 **Q. What is the specific section of RSA 362-F:9 your testimony will address?**

15 A. My testimony addresses RSA 362-F:9, II(e) which lists one of the factors that the
16 Commission must consider in its review of a purchased power agreement pursuant to this
17 statute. That factor addresses the economic development and environmental benefits for
18 New Hampshire.

19

1 **Q. Will your testimony address both the economic development and environmental**
2 **benefits?**

3 A. No, it will not. I will address only the economic impacts of the proposed project. I
4 recommend that the Commission take administrative notice of the Laidlaw proceeding
5 that went before the New Hampshire Site Evaluation Committee as to the environmental
6 impact of the project.

7 **Q. Who will be addressing the four other factors under RSA 362-F:9?**

8 A. Those factors are addressed in the testimony of staff witness, George McCluskey.

9 **Q. The economic benefits attributed to the Laidlaw project are estimated by Dr.**
10 **Shapiro using an input-output model, the RIMS II model. Would you provide a**
11 **general overview of an input-output model?**

12 A. Input-output models are commonly used analytical tools to estimate the effects of a
13 change in one sector of the economy on other economic sectors of the economy. At their
14 core, input-output models or I/O models as they are often referred to, aim to describe the
15 economic relationships and interdependencies that bind and define an economy. Input-
16 output analysis is based on the simple economic fact that a large proportion of economic
17 activity, whether at the national, state or local level, is devoted to the production of
18 intermediate goods and services that are ultimately required to meet the demand for final
19 goods and services.

20 Such inter-industry relationships are described through the use of a matrix, the input-
21 output table that indicates the transactions that occur throughout the defined economic

1 region during a specified time period. The I/O table, which can vary greatly in its level
2 of disaggregation, indicates which industries purchase products, measured in dollars,
3 from other industries in the economy for use as inputs in their processing of final goods
4 and services. The typical transactions of an I/O table are indicated by the flow of dollars
5 from one industry or sector to another. The sub-areas within the table are made up of the
6 processing sector, which indicates the industries that purchase and sell from each other
7 (the producing industries are rows and the purchasing industries are the columns), as well
8 as a section of rows that indicates payments made, either to households or government,
9 for services rendered. The remaining part of an I/O table is referred to as Final Demand.
10 It is this section of columns that “drives” the economy. Final Demand includes Exports
11 from the industries listed in the rows, Purchases by Government from those industries
12 and a Households section that indicates household purchases of finished goods and
13 services from the producing industries and the payments sector listed on the left-hand
14 side of the I/O table. Total gross output from each industry is the sum of the purchases
15 from each sector listed in the column and from the corresponding cell from each
16 component of Final Demand. A simple I/O table is shown in Attachment TCF-2. This
17 hypothetical transaction table indicates that Industry A purchased 11 billion dollars worth
18 of products and services from Industry D during the period of the study. The total output
19 from Industry D sold to the industries listed in the Processing Sector and to the groups
20 listed under Final Demand was 39 billion dollars, assuming the table’s units are in
21 billions of dollars.

22 After the I/O table is created, a technical coefficients table can be created that indicates
23 how much one industry purchases from another industry per dollar of output. It

1 represents the direct purchases required to produce a dollar's worth of output, but does
2 not show the total value. The increased output requires additional rounds of purchases
3 and production from throughout the economy. It is that additional economic activity that
4 leads to the well known "multiplier effect" used in analyzing changes in economic
5 activity. The development of the input-output model won the Russian-born economist,
6 Wassily Leontief, the Nobel Prize in economic science in 1973.

7 **Q. Is the RIMS II model widely used for assessing economic impacts?**

8 A. Yes, it is perhaps the most commonly used I/O model for assessing the effects of small
9 changes on a regional economy. It was developed by the Bureau of Economic Analysis
10 in the 1970s and has been widely used since that time. One of the advantages of using
11 the RIMS II model is the availability of multipliers for many regions throughout the
12 country. The RIMS II model also entails a large amount of detailed data by industry and
13 the multipliers are updated frequently to incorporate changes in local area personal
14 income and wage and salary data.

15 **Q. What economic effects did Dr. Shapiro estimate the Laidlaw project would have on**
16 **New Hampshire?**

17 A. Dr. Shapiro used information Laidlaw provided to the Site Evaluation Committee as the
18 basis for her economic analysis. The affected region for her study was the whole state of
19 New Hampshire. Dr. Shapiro estimates that during the construction phase of the project,
20 the total direct, indirect and induced jobs created throughout New Hampshire will be 470
21 based on Type II RIMS Employment multipliers. Her estimate is based on Laidlaw
22 expending \$70 million into the local economy during the 32 months it expects to build

1 the project. The \$70 million of construction expenditure will add approximately \$57
2 million annually to output and increase earnings annually by \$17.3 million over the 32-
3 month construction period. A data response from PSNH to Concord Steam, Q-CSC-008,
4 estimates the economic effects of the project, including Dr. Shapiro's estimate of the
5 annual economic impact attributed to various expenditures on biomass fuel. The
6 response is attached to my testimony as Attachment TCF-3.

7 **Q. Are there any concerns about using RIMS II or another similar model to estimate**
8 **the economic effects of a project such as the Laidlaw project?**

9 A. Yes. While I/O models can be quite useful tools for assessing changes in economic
10 activity in a region, they do rely on a number of key assumptions. Violation of any one
11 of these key assumptions could adversely affect the results of the model. The smaller the
12 economic region, generally, the more likely the assumptions may be violated.

13 **Q. What are those key I/O modeling assumptions?**

14 A. An important assumption is that the relationship between inputs and outputs is
15 proportional; for example, a doubling of an input by a sector means that the producing
16 sector's output must also double. Traditional I/O analysis does not allow for economies
17 of scale. Another key assumption, especially for local or regional models, is no
18 substitution of production inputs. An example of this problem can occur when a price
19 change results in input substitution, which could result in different inter-relationships
20 after the price change than were in effect before the price change. Of course, new
21 products are invented all the time and technological change can occur over fairly short
22 periods of time. All of these conditions can affect I/O model results.

1 **Q. Do you believe the economic benefits described in Dr. Shapiro's testimony will occur**
2 **if the PPA is approved as filed?**

3 A. No, I do not. The reason is not that Dr.Shapiro's analysis is seriously flawed or that the
4 model is fundamentally flawed, though tests have shown the RIMS II model can
5 overstate results as compared to other models, but rather that Dr. Shapiro makes no
6 provision for the fact that this contract's prices are above market. These above market
7 costs will result in higher energy service costs, which will be passed on to PSNH's
8 Energy Service customers, if approved by the Commission.

9 Based on Mr. McCluskey's testimony, the above market estimates of energy and
10 Renewable Energy Certificates (RECs) over the life of the project will total
11 approximately \$550 million. On a levelized basis, Mr. McCluskey estimates the levelized
12 cost of the Laidlaw project to be \$162 per MWh. Every \$10 per MWh of over-market
13 costs associated with this project increases electric rates by approximately \$4.8 million
14 per year. If the over-market costs attributable to the proposed PPA are on the order of \$55
15 per MWh as claimed by Mr. McCluskey, resulting in an annual above-market cost of
16 about \$26 million, then the perceived economic benefits of the project are not benefits at
17 all, but costs borne by PSNH ratepayers taking Energy Service from PSNH as well as
18 indirectly by New Hampshire's businesses and households based on the inter-
19 dependencies of the economy.

20 Stated another way, creating a subsidy for this project or any other, for that matter,
21 doesn't create wealth for the economy as a whole. It simply transfers wealth. Above
22 market payments for electricity leave the total electricity-using group with less income

1 for businesses to invest in other projects or for households to save or spend on products
2 and services.

3 **Q. Are there other issues that were not addressed in the testimony of Dr. Shapiro that**
4 **could mitigate economic effects she estimates?**

5 A. An important issue left unanswered is what effect this project could have on the other
6 biomass generators currently operating in New Hampshire, especially those located near
7 Berlin. I have not analyzed whether approval of this PPA and the construction and
8 operation of Laidlaw would result in the closing of one or more of those facilities, but if
9 that were to occur, the overall economic benefits of this project would be further reduced.

10 **Q. Do you have an estimate of what the economic effect on New Hampshire would be if**
11 **the PPA between PSNH and Laidlaw results in over-market costs of \$50 - \$60 per**
12 **MWh per year?**

13 A. Yes, based on a data response from Staff to PSNH. Staff Set-06, Q-Staff-009, Dr. Shapiro
14 was asked to estimate a hypothetical increase in electric rates. The question was a
15 follow-up to Staff Set 4, Q-Staff-012. Dr. Shapiro responded by using the results from a
16 recent economic study done in 2008 by Dr. Ross Gittell, titled the "Economic Impact in
17 New Hampshire of the Regional Greenhouse Gas Initiative (RGGI); An Independent
18 Assessment." Dr. Gittell used a different model, the REMI model, to estimate a scenario
19 in which it was assumed that New Hampshire did not join RGGI. REMI was used to
20 estimate the economic effect based on increased electric rate increases only. He reported
21 those effects as changes to Gross State Product and employment. Dr. Gittell's estimate of
22 a \$10 million increase in electric rates decreased Gross State Product by \$4.95 million

1 and reduced employment by 65.5 jobs. Obviously, the greater the above-market cost of
2 the PPA, the more deleterious the economic impact on the State as a whole.

3 **Q. Please provide your recommendation.**

4 A. Based on my review of the economic effects contained in Dr. Shapiro's testimony and the
5 testimony provided by Mr. McCluskey that demonstrates the substantial over-market
6 costs of the PPA, essentially a wealth transfer from ratepayers to Laidlaw and its affiliate,
7 PJPD Holdings, LLC, I cannot recommend that the Commission approve this PPA as
8 filed.

9 **Q. Does this conclude your testimony?**

10 A. Yes it does.

EDUCATION AND WORK EXPERIENCE OF THOMAS C. FRANTZ

I received a B.S. degree from the Pennsylvania State University in Environmental Resource Management and completed all course work and research for a M.S. degree in Resource Economics from the University of New Hampshire. My graduate research involved modeling the structure of the New Hampshire economy using an input-output analysis. I have taught college courses in macroeconomics, microeconomics and managerial economics.

I started work at the Commission in 1989 as a staff economist. My work focused primarily on fuel price forecasting and the analysis of economic forecasts. In 1990, I was promoted to Utility Analyst III. My responsibilities concentrated on electric utility issues including analyzing and advising the Commission on cost of capital, rate design, special contract, and fuel and purchased power adjustment clause filings.

In January 1996, I was promoted to the position of Chief Economist. My new responsibilities included administering the Economics Department's research and analysis of economic and utility matters, as well as providing the Commission with expert testimony and advice on economic, utility and public policy issues. My responsibilities also included testifying before the Legislature on utility matters.

The Commission reorganized in late 2001 and I was named Director of the Electric Division. As Director of the Electric Division, I am responsible for the case management of the electric proceedings before the Commission including the day-to-day work of the Staff of the Electric Division. I also continue to provide the Commission and, when requested, the Legislature with advice on electric utility matters.

TABLE 2-1
Hypothetical Transactions Table*
Industry Purchasing

Industry Producing Payments Sector Processing Sector	Processing Sector						Final Demand						
	Outputs ¹ →	(1)	(2)	(3)	(4)	(5)	(6)	(7) Gross inventory accumula- tion (+)	(8) Exports to foreign countries	(9) Government purchases	(10) Gross private capital formation	(11) Households	(12) Total Gross Output
	Inputs ² ↓	A	B	C	D	E	F						
	(1) Industry A	10	15	1	2	5	6	2	5	1	3	14	64
	(2) Industry B	5	4	7	1	3	8	1	6	3	4	17	59
	(3) Industry C	7	2	8	1	5	3	2	3	1	3	5	40
	(4) Industry D	11	1	2	8	6	4	0	0	1	2	4	39
	(5) Industry E	4	0	1	14	3	2	1	2	1	3	9	40
	(6) Industry F	2	6	7	6	2	6	2	4	2	1	8	46
	(7) Gross inventory depletion (—)	1	2	1	0	2	1	0	1	0	0	0	8
	(8) Imports	2	1	3	0	3	2	0	0	0	0	2	13
	(9) Payments to government	2	3	2	2	1	2	3	2	1	2	12	32
(10) Depreciation allowances	1	2	1	0	1	0	0	0	0	0	0	5	
(11) Households	19	23	7	5	9	12	1	0	8	0	1	85	
(12) Total Gross Outlays	64	59	40	39	40	46	12	23	18	18	72	431	

¹Sales to industries and sectors along the top of the table from the industry listed in each row at the left of the table.

²Purchases from industries and sectors at the left of the table by the industry listed at the top of each column.

* Source: W. Miernyk, THE ELEMENTS OF INPUT-OUTPUT ANALYSIS. (Random House, 1965).

Public Service Company of New
Hampshire
Docket No. DE 10-195

Data Request CSC-01

Dated: 10/14/2010
Q-CSC-008
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Witness: Terrance J. Large
Request from: Concord Steam Corporation

Question:

Provide all studies or analyses relating to the impact of the PPA on the markets for electricity, capacity, fuel or RECs, or other market impacts for jobs, economic output, gross state product, household earnings and tax revenues.

Response:

PSNH has no studies or analyses related to the impact of the PPA on the markets for electricity, capacity, fuel or RECs.

The impact on jobs, economics output, etc. is described in the testimony of Dr. Shapiro. Attached to this response are the RIMS II work papers that support Dr. Lisa Shapiro's economic impact analyses based on utilization of New Hampshire specific multipliers from the federal government's Regional Input-Output Modeling System (RIMS II). The work papers support estimated impacts for jobs, economic output, gross state product and household earnings.

Estimated Economic Impacts Associated with the Laidlaw Project

RIMS II Multipliers for NH (downloaded 4/20/2010)

Industry		Final Demand Multipliers			
		Output (\$'s) ¹	Earnings (\$'s) ²	Employment (jobs) ³	Value-Added (\$'s) ⁴
Aggregated Industry					
	Forestry, fishing and related activities	1.7780	0.3570	11.6073	0.9640
	Construction	2.1796	0.6584	17.7872	1.1303
Detailed Industry					
	Forest nurseries, forest products and timber tracts	1.4760	0.2285	7.1959	0.7339
	Logging	1.7649	0.3339	9.4389	0.9524
	Agriculture and forestry support activities	1.9585	0.6493	27.9280	1.0934
	Construction	2.1785	0.6581	18.0043	1.1348
	Truck transportation	1.9019	0.4824	12.6684	1.0177

Footnotes

1	Each entry in column 1 represents the total dollar change in output that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.
2	Each entry in column 2 represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.
3	Each entry in column 3 represents the total change in number of jobs that occurs in all industries for each additional 1 million dollars of output delivered to final demand by the industry corresponding to the entry. Because the employment multipliers are
4	Each entry in column 4 represents the total dollar change in value added that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

Source: Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis

Estimated Economic Impacts Associated with the Laidlaw Project**ESTIMATES BASED ON CONSTRUCTION EXPENDITURES @****\$70,000,000 Over 32 Months****Final Demand Multipliers - Employment**

		Annual Avg	Total
Direct Expenditures		\$26,250,000	\$70,000,000
Construction Industry Multipliers			
Low	17.7872	467	NA
Average	17.8958	470	NA
High	18.0043	473	NA

Final Demand Multipliers - Output

		Annual Avg	Total
Direct Expenditures		\$26,250,000	\$70,000,000
Construction Industry Multipliers			
Low	2.1785	\$57,185,625	\$152,495,000
Average	2.1791	\$57,200,063	\$152,533,500
High	2.1796	\$57,214,500	\$152,572,000

Final Demand Multipliers - Value-Added

		Annual Avg	Total
Direct Expenditures		\$26,250,000	\$70,000,000
Construction Industry Multipliers			
Low	1.1303	\$29,670,375	\$79,121,000
Average	1.1326	\$29,729,438	\$79,278,500
High	1.1348	\$29,788,500	\$79,436,000

Final Demand Multipliers - Earnings

		Annual Avg	Total
Direct Expenditures		\$26,250,000	\$70,000,000
Construction Industry Multipliers			
Low	0.6581	\$17,275,125	\$46,067,000
Average	0.6583	\$17,279,063	\$46,077,500
High	0.6584	\$17,283,000	\$46,088,000

Estimated Economic Impacts Associated with the Laidlaw Project

	Industry	Final Demand Multipliers			
		Output (\$'s)	Earnings (\$'s)	Employment (jobs)	Value-Added (\$'s)
Aggregated Industry	Forestry, fishing and related activities	1.7780	0.3570	11.6073	0.9640
Detailed Industry	Forest nurseries, forest products and timber tracts	1.4760	0.2285	7.1959	0.7339
Detailed Industry	Logging	1.7649	0.3339	9.4389	0.9524
Detailed Industry	Agriculture and forestry support activities	1.9585	0.6493	27.928	1.0934
Detailed Industry	Truck transportation	1.9019	0.4824	12.6684	1.0177

At \$20 million spent per year on biomass fuel

\$ 20,000,000

	Industry	Impacts Based on Final Demand Multipliers			
		Output (\$'s)	Earnings (\$'s)	Employment (jobs)	Value-Added (\$'s)
Aggregated Industry	Forestry, fishing and related activities	\$35,560,000	\$7,140,000	232	\$19,280,000
Detailed Industry	Forest nurseries, forest products and timber tracts	\$29,520,000	\$4,570,000	144	\$14,678,000
Detailed Industry	Logging	\$35,298,000	\$6,678,000	189	\$19,048,000
Detailed Industry	Agriculture and forestry support activities	\$39,170,000	\$12,986,000	559	\$21,868,000
Detailed Industry	Truck transportation	\$38,038,000	\$9,648,000	253	\$20,354,000

At \$25 million spent per year on biomass fuel

\$ 25,000,000

	Industry	Impacts Based on Final Demand Multipliers			
		Output (\$'s)	Earnings (\$'s)	Employment (jobs)	Value-Added (\$'s)
Aggregated Industry	Forestry, fishing and related activities	\$44,450,000	\$8,925,000	290	\$24,100,000
Detailed Industry	Forest nurseries, forest products and timber tracts	\$36,900,000	\$5,712,500	180	\$18,347,500
Detailed Industry	Logging	\$44,122,500	\$8,347,500	236	\$23,810,000
Detailed Industry	Agriculture and forestry support activities	\$48,962,500	\$16,232,500	698	\$27,335,000
Detailed Industry	Truck transportation	\$47,547,500	\$12,060,000	317	\$25,442,500

At \$17 million spent per year on biomass fuel

\$ 17,000,000

	Industry	Impacts Based on Final Demand Multipliers			
		Output (\$'s)	Earnings (\$'s)	Employment (jobs)	Value-Added (\$'s)
Aggregated Industry	Forestry, fishing and related activities	\$30,226,000	\$6,069,000	197	\$16,388,000
Detailed Industry	Forest nurseries, forest products and timber tracts	\$25,092,000	\$3,884,500	122	\$12,476,300
Detailed Industry	Logging	\$30,003,300	\$5,676,300	160	\$16,190,800
Detailed Industry	Agriculture and forestry support activities	\$33,294,500	\$11,038,100	475	\$18,587,800
Detailed Industry	Truck transportation	\$32,332,300	\$8,200,800	215	\$17,300,900

DE 10-195
Q-CSC-01-008
Attachment