

**STATE OF VERMONT
PUBLIC UTILITY COMMISSION**

Case No. _____

Petition of Green Mountain Power Corporation and)
GLOBALFOUNDRIES U.S. 2 LLC re: approval of)
term contract)

PREFILED DIRECT TESTIMONY OF ARTHUR WOOLF, Ph.D.
ON BEHALF OF GLOBALFOUNDRIES U.S. 2 LLC

September 11, 2018

Summary: Economist Arthur Woolf describes the economic impact of GLOBALFOUNDRIES' presence in the State of Vermont and the benefits that would be lost if GLOBALFOUNDRIES were to move its operations out of the State.

1 **Q1. Please state your name, occupation, and business address.**

2 A1. My name is Arthur Woolf. I am an economist with Arthur Woolf Economic Consulting,
3 with a business address at 557 Cambridge Road, Westford, Vermont 05494.

4 **Q2. On whose behalf are you submitting testimony?**

5 A2. I am testifying on behalf of GLOBALFOUNDRIES U.S. 2 LLC
6 (“GLOBALFOUNDRIES”).

7 **Q3. What is the purpose of your testimony?**

8 A3. I offer testimony in support of the proposed term contract between Green Mountain
9 Power (“GMP”) and GLOBALFOUNDRIES, which I understand is intended to help
10 GLOBALFOUNDRIES maintain its operations and ongoing investments in the State of
11 Vermont. My testimony analyzes and describes the economic impact
12 GLOBALFOUNDRIES has on the State of Vermont and, by implication, the benefits that
13 would be lost if GLOBALFOUNDRIES were to shift its operations to other plants
14 outside of the State.

15 **Q4. Please summarize your educational background and work experience.**

16 A4. I received a B.A. in History from Cornell University in 1973, an M.S. in Economics from
17 University of Wisconsin-Madison in 1979, and a Ph.D. in Economics, also from
18 University of Wisconsin-Madison, in 1980. In 1980, I began teaching in the Economics
19 Department at the University of Vermont and have been employed there since, apart from
20 a leave of absence in 1988 when I was the State Economist for Governor Madeleine

1 Kunin. I returned to UVM as an Associate Professor in the Economics Department in
2 1991.

3 From 1985 through 2015 I was President of Northern Economic Consulting, a
4 firm I co-founded with Richard Heaps. I was also the editor of the monthly *The Vermont*
5 *Economy Newsletter* published by our firm from 1991 to 2015. We disbanded the firm
6 when Mr. Heaps retired. I continue to do economic consulting on my own and teach in
7 UVM's Economics Department. Since 2011, I have also written a weekly column on the
8 state economy for *The Burlington Free Press*.

9 **Q5. What are your responsibilities as an economic consultant?**

10 A5. I provide consultation and analysis to a variety of clients—including businesses,
11 developers, attorneys, and others—on economic issues in Vermont and particularly in
12 Northwest Vermont, an area that has been a major focus of my work for decades.

13 **Q6. Please describe the impact that GLOBALFOUNDRIES has on Vermont's economy.**

14 A6. GLOBALFOUNDRIES is a major Vermont employer and the state's largest
15 manufacturer. It is the largest for-profit employer in Chittenden County, accounting for
16 2.5% of total Chittenden County employment, and, with 2,536 employees in 2017, it is
17 the largest for-profit employer in the State of Vermont. The only larger employers in the
18 state are the University of Vermont Medical Center, the University of Vermont, and the
19 State of Vermont. In 2017, GLOBALFOUNDRIES employed 0.7% of the 309,000
20 people on the payrolls of all state employers.¹ In comparison, the largest private sector

¹ Vermont Department of Labor at <http://www.vtlmi.info/public/cesVtnsa.xlsx>.

1 employer in the United States is Walmart, which employs one percent of all workers in
2 the nation—and, as described below, GLOBALFOUNDRIES’ average wages far exceed
3 those of a retailer².

4 GLOBALFOUNDRIES’ Vermont workers earned \$195.5 million in wages in
5 2017, with an average of \$77,100 per worker at the site. By contrast, the average annual
6 wage in Chittenden County was \$52,400 and the average for the state was \$46,200 in
7 2017.³ GLOBALFOUNDRIES’ average wage is therefore 47 percent higher than the
8 county average and 67 percent above the state average. In other words, unlike the
9 nation’s largest private sector employer, the state’s largest private employer pays a wage
10 significantly above the statewide average.

11 GLOBALFOUNDRIES also provides a significant amount of benefits to its
12 employees, including payments for health insurance, retirement, vacation, employee
13 incentive plans, as well as legally required benefits such as Social Security, Medicare,
14 and state unemployment insurance. These average \$34,400 per worker, for a total of
15 \$87.1 million. The total compensation package per worker, which includes wages and
16 fringe benefits, is \$111,400, for a total of \$282.6 million for all Vermont workers.

17 **Q7. How much tax revenue does GLOBALFOUNDRIES’ presence in Vermont**
18 **contribute to the State?**

19 A7. The Vermont Department of Taxes reports that taxpayers earning between \$75,000 and
20 \$100,000 pay an average of 2.83% of their income to Vermont for income taxes. For the

² Walmart employment from Company Facts at <https://corporate.walmart.com/newsroom/company-facts>. U.S. employment from <https://fred.stlouisfed.org/series/PAYEMS/>

³ Vermont Department of Labor, Quarterly Census of Employment and Wages at <http://www.vtلمي.info/indnaics.htm>

1 average GLOBALFOUNDRIES employee, that would translate into \$2,183 per worker,
2 suggesting a total of \$5.5 million in state income taxes. However, this understates the
3 amount of income taxes GLOBALFOUNDRIES' employees pay, because it assumes that
4 each worker is a single taxpayer. Many, if not most, workers probably are part of
5 families that file taxes jointly with their spouses. If the spouse also works, that means the
6 employee is in a higher state tax bracket and pays taxes at a higher state marginal tax rate.

7 This is confirmed by GLOBALFOUNDRIES' data, which reflects that its
8 employees had \$8.2 million withheld from their paychecks for state income taxes. The
9 actual amount of taxes GLOBALFOUNDRIES' employees paid could be more or less
10 than that, but only the Vermont Department of Taxes can measure the actual amount.
11 Most people file W-4 withholding forms based on what they think their total taxes will
12 be, so the \$8.2 million could be higher, if the family owed more than was withheld, or
13 less, if they received a refund. Regardless, \$8.2 million is likely to be closer to the total
14 amount of state income taxes paid than \$5.5 million implied by aggregate tax statistics—
15 and that is most likely the largest amount of income taxes paid by the employees of any
16 private sector firm in Vermont.

17 GLOBALFOUNDRIES also pays local property taxes to Williston and Essex, the
18 two towns in which it has a physical presence. The bulk of taxes, \$1.9 million, is paid to
19 Essex, with roughly \$450,000 going to the Town of Williston, for a total of \$2.35 million
20 in property taxes to the two towns. These taxes include municipal and school taxes. The
21 company's employees also pay an undetermined amount of property taxes to the towns in
22 which they live.

1 **Q8. What other contributions does GLOBALFOUNDRIES make to Vermont's**
2 **economy?**

3 A8. GLOBALFOUNDRIES has an impact on many Vermont companies through its
4 purchases and use of local vendors and suppliers. Over the past twelve months
5 GLOBALFOUNDRIES has spent \$70.2 million for goods and services provided by
6 Vermont vendors. Of this amount, GLOBALFOUNDRIES paid \$39.1 million to Green
7 Mountain Power for electricity. These payments represent over six percent of GMP's
8 revenues. Because GLOBALFOUNDRIES needs to constantly improve and maintain its
9 physical capital to remain competitive in its markets, since 2015 it has spent an average
10 \$92.8 million annually on capital improvements, using local contractors as well as
11 equipment purchased locally, nationally, and internationally.

12 These local expenditures, together with expenditures by GLOBALFOUNDRIES'
13 workers on locally provided goods and services, lead to the creation of jobs in other parts
14 of the Vermont economy. This process is known as the multiplier effect. Firms such as
15 GLOBALFOUNDRIES that pay high wages have high productivity levels and have
16 larger multipliers than other organizations. A reasonable multiplier effect for a capital-
17 intensive manufacturing firm is 2.5,⁴ which means the 2,536 jobs at
18 GLOBALFOUNDRIES lead to another 6,340 jobs elsewhere in the economy, for a total
19 of 8,876 jobs. The bottom line is that GLOBALFOUNDRIES has a very significant total
20 employment effect, which exceeds the number of individuals it directly employs and
21 ripples through other parts of Vermont's economy.

⁴ Enrico Moretti, *Local Multipliers*, American Economic Review, May 2010, pp1-7.

1 GLOBALFOUNDRIES is also a major contributor to Vermont's exports. In 2017
2 Vermont firms exported \$2.776 billion worth of goods to firms and individuals in other
3 countries, giving Vermont one of the highest ratios of exports to state GDP in the nation.
4 The U.S. Commerce Department reports that \$906 million of that was 'Processors and
5 Controllers, Electronic Integrated Circuits' and \$569 million was other types of
6 Electronic Integrated Circuits. These are the two largest categories of Vermont exports.
7 Combined they total \$1.475 billion and account for 53% of the state's total exports. (The
8 importance and magnitude of those exports is evidenced by the fact that the next largest
9 export category totals \$70 million.) Over \$900 million of the exports in those categories
10 are attributable to exports from GLOBALFOUNDRIES. Some of the goods counted in
11 these export numbers are manufactured in New York and consolidated in Vermont for
12 export, but the majority of the goods exported by GLOBALFOUNDRIES in Vermont are
13 manufactured in the state. The bottom line is that GLOBALFOUNDRIES is the largest
14 single exporter in Vermont.

15 According to Dartmouth College economist Matthew Slaughter, companies that
16 participate in the global economy pay higher wages than companies that do not have an
17 international exposure, and this is certainly true for GLOBALFOUNDRIES.⁵ Exports
18 are an important part of any locality's economy because they bring in dollars that are
19 used to pay for imports in that economy, thereby raising the standard of living.
20 Moreover, exports may bring to the state additional value, particularly in high-tech

⁵ Matthew Slaughter, "High-Trade' Jobs Pay Higher Wages", Wall Street Journal, January 20, 2014 at <https://www.wsj.com/articles/8216hightrade8217-jobs-pay-higher-wages8216hightrade8217-jobs-pay-higher-wages-1390239754>

1 industries, in the form of intellectual property, education, and work force development
2 potential that would not exist if the exported products were manufactured elsewhere.

3 Additionally, another benefit that accrues to the local and state economy from the
4 presence of technologically sophisticated firms with highly educated and skilled workers
5 such as GLOBALFOUNDRIES is the potential for other firms to arise and prosper
6 because of the activities of the parent firm. A company like GLOBALFOUNDRIES
7 supports local suppliers, and can lead to the development of other technologically
8 sophisticated firms that supply the original firm. In addition, skilled employees can leave
9 the firm and create their own businesses. The best local example of this is IDX (later
10 bought by GE Healthcare), which was started by two IBM employees and grew to be a
11 large firm paying high wages.

12 **Q9. If GLOBALFOUNDRIES no longer had a presence in Vermont, what impact would**
13 **that have on the Vermont economy?**

14 A9. It would have a significant impact in Vermont. GLOBALFOUNDRIES is the largest
15 private employer and manufacturer in the state and pays its workers well above the
16 average wage and total compensation package earned by most Vermont employees.

17 As there are few precedents for a decline in employment of this magnitude, it is
18 difficult to precisely measure the exact degree of the impact on a regional or state
19 economy without GLOBALFOUNDRIES and its 2,536 employees. That the loss would
20 be unprecedented in its size and scope and would have a negative impact on the economy
21 is beyond doubt. As just one point of comparison, after Entergy's Vermont Yankee plant
22 (another higher wage employer with significant employment relative to its county) exited

1 Windham County, wages in that county lagged the statewide average significantly,
2 increasing only 1.5% compared to 9.1% wage increase statewide from 2014 to 2017.
3 During the same period, the number of jobs in Windham County has declined by 1.0%
4 while jobs have increased by 1.5% statewide.

5 **Q10. Are there any more specific consequences you would expect from the departure of**
6 **GLOBALFOUNDRIES?**

7 A10. The most immediate and certain impact of a closure by GLOBALFOUNDRIES is that
8 2,536 workers would be out of work. Some would no doubt retire, and others might start
9 their own businesses. The majority would probably either leave Vermont to find other
10 jobs or take jobs at other businesses in the state. Given the high wages
11 GLOBALFOUNDRIES pays, those jobs would probably be at a lower salary. The net
12 effect would be fewer instate wage dollars overall and more houses for sale, which would
13 put downward pressure on housing prices.

14 Spending by GLOBALFOUNDRIES' former employees would be reduced, as
15 some would no longer live in the area and others would have reduced incomes.
16 Presently, GLOBALFOUNDRIES' employees support the local economy through their
17 purchases of goods and services—buying, maintaining, and furnishing their houses,
18 purchasing and maintaining cars, eating at local restaurants, buying food, clothing and a
19 variety of other goods at local stores, purchasing a variety of services from lawyers,
20 accountants, doctors, dentists, and other medical personnel, and from a variety of other
21 providers of goods and services. Given their high wages, GLOBALFOUNDRIES'
22 employees spend more than lower paid workers and therefore have a larger overall effect

1 on the economy. In the event of a departure by GLOBALFOUNDRIES, local businesses
2 would thus have lower revenues and need fewer workers, reducing jobs, wages, and
3 income, and further reducing spending in the economy. GLOBALFOUNDRIES'
4 suppliers would also be negatively affected, impacting their employees and other
5 customers. For example, as some of the company's payments to Green Mountain Power
6 cover GMP's fixed costs, those fixed costs would have to be allocated to its remaining
7 customers, raising their electricity costs.

8 Finally, the loss of GLOBALFOUNDRIES would mean that the State and the two
9 municipalities in which it has a presence, Essex and Williston, would have to make up
10 lost tax revenues. If the taxing authorities made up the difference by raising income and
11 property taxes, Vermont taxpayers would see an increase in their tax obligations.

12 **Q11. Does this conclude your testimony?**

13 A11. Yes.