

LNG and Employment in BC

SUMMARY

This brief examines the BC government's claim that 100,000 jobs will be created from liquefied natural gas (LNG) projects in this province. We find that this claim is not credible and that potential employment impacts have been grossly overstated.

In fact, based on data provided by the companies that propose to engage in the production and transport of LNG, BC's LNG sector could be expected to support only 2,000 to 3,000 construction jobs per plant over three years and 200 to 300 permanent workers once operational. Real-world experience in Australia supports these numbers.

The BC government claim is based on a study it commissioned from consultancy Grant Thornton. The study's modelling replicates common problems with input-output modelling and also includes a number of assumptions that lead to excessively optimistic job numbers.

As well, the growing use of "fly-in, fly-out" (FIFO) workers is an emerging issue for large resource projects, including LNG development. Using FIFO workers greatly reduces local economic benefits in the areas where development takes place.

INTRODUCTION

The BC government has repeatedly claimed that development of an LNG export industry will create 100,000 jobs in the province. In the 2013 pre-election speech from the throne, the government asserted:

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JULY 2015



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An estimated 39,000 new full time jobs, on average, will be created during a 9 year construction period. Once all facilities reach full production, there could be over 75,000 new annual full time jobs. These jobs can be created in every part of our province, in many different sectors and sustained for generations to come. Construction jobs. Facility jobs. Highly skilled trades jobs. Jobs in the professional services. Jobs for First Nations. Jobs for businesses that support the industry. Technology jobs.¹

Prior to the 2013 throne speech, however, the BC government's expectations for LNG jobs were substantially lower. Its Liquefied Natural Gas Strategy, released February 2012, argued that three LNG plants in BC would create 800 new long-term jobs in the LNG sector, up to 9,000 more jobs during construction and several thousand more indirect jobs.² Later in 2012, government ambitions for LNG had grown to five plants, with internal modelling for the government estimating the plants would create 2,400 new jobs, with 15,000 temporary jobs during the construction period.³

The shift in rhetoric about LNG jobs came from a single study commissioned by the BC government just weeks before its 2013 throne speech.⁴ This brief provides a reality check by reviewing projections from the companies themselves about how many jobs can realistically be expected from LNG (if any plants are actually built). We then look more closely at how LNG job claims were inflated to 100,000 through a series of exaggerations and the misuse of input-output modelling techniques. Finally, we consider some of the challenges for realizing employment benefits in BC due to the use of FIFO workers, which is increasingly commonplace in resource industries.

LNG proponent job estimates

The total number of jobs at new LNG terminals in BC is related to the number of terminals that eventually get built. While many proponents have expressed interest, no party has yet made a final investment decision. A number of employment estimates from BC's LNG proponents have emerged from their BC Environmental Assessment filings:

- Petronas, the LNG frontrunner whose delays in making a final investment decision have become headline news, claims its 12 million tonne (phase one) Pacific NorthWest LNG project would employ 3,500 workers at peak construction. After the terminal opens, there will be permanent jobs for only 200 to 300 operational workers.⁵ In June 2015, Petronas was cited as having made a "conditional" final investment decision, pending legislative changes in BC, environmental assessment approval and support of First Nations.⁶

1 Government of BC 2013. On July 23, 2013, the government stated "more than 75,000 permanent skilled workers" and 60,000 workers during peak construction in 2016 and 2017 ("Action plan released for B.C.'s LNG sector," media release, at: <https://news.gov.bc.ca/stories/action-plan-released-for-bcs-lng-sector>).

2 Government of BC 2012. An infographic accompanying the release claims an even larger number, 40,000 jobs. The government's earlier February 2012 *Natural Gas Strategy* document claims 1,500 plant construction, 1,500 pipeline construction jobs and 125 permanent LNG jobs for one plant, the Kitimat LNG terminal.

3 Personal communication from Deetken Group, September 2012. Numbers taken from modelling done for the BC government. These numbers have not been verified but were reportedly gathered from LNG proponents.

4 The BC government first contacted Grant Thornton (GT) on January 20, 2013, and the throne speech was given on February 12, 2013. This intriguing story emerged from an FOI request from *Focus Magazine*, which uncovered emails between BC government officials, GT and the Deetken Group (see note 3). Deetken provided direct jobs estimates to GT, based on its LNG proponents, but the attributed source in the GT report was changed on February 4, 2013, to be "the Province and its advisors," according to Broadland 2014.

5 Pacific NorthWest LNG 2013.

6 Canada Newswire 2015.

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- Woodfibre LNG’s plan for a facility outside of Squamish calls for 600 person-years of construction work (an average of 200 workers for three years) and 100 permanent jobs for facility staff (“skilled technicians and operators, management and supervision, and unskilled workers”) and office staff (“management, professional engineers, and office support”) once open.⁷ Woodfibre is one of the smaller proponents in terms of planned export volume and plant size. In addition, a FortisBC gas pipeline to the plant would involve 500 to 650 person-years of construction work and “potentially” five operating jobs.⁸
- In Exxon’s plan for a 15 million tonne (Mt) phase-one LNG terminal in Prince Rupert, the company claimed the resulting West Coast Canada LNG project would employ a peak of 1,000 to 6,000 construction workers “depending on the final development plan”—but far fewer permanent jobs when the plant opens, with 250 to 300 facility and office staff, plus 50 to 150 people on contract for services such “tug operators, boat pilots, cleaning and catering services, local transportation services, safety, audit and monitoring services.”⁹
- The LNG Canada consortium, led by Shell, states that phase one of its project would require a peak of 5,500 construction workers, then 200 to 400 operational workers.¹⁰ In construction, Shell has previously commented that it plans to “ship large pre-built modules to Kitimat to reduce number of construction workers needed” for its proposed LNG plant.¹¹
- Aurora LNG, which includes Chinese state-owned company CNOOC, is also eyeing Prince Rupert for a 10–12 Mt facility that would employ up to 5,000 construction workers and 200 to 400 permanent workers.¹²

LNG is a very capital-intensive business—there would be several thousand temporary construction jobs for a given LNG facility but, once complete, only a few hundred jobs to operate the facility.

Experience from Australia’s LNG industry confirms that most of the employment benefit is during the construction stage. In 2014, there were an estimated 13,000 construction workers building three LNG facilities in Gladstone, Australia.¹³ At a project level, Australia Pacific LNG, a development with anticipated startup this year, employed 2,100 workers at peak construction of the LNG terminal, plus 800 on a pipeline and 2,000 upstream in the gas fields. Operations employment is much lower, with an estimated 325 workers at the plant, 20 for the pipeline and 520 in the gas fields.¹⁴

A 2010 study for the Australia National Resources Sector Employment Taskforce was somewhat more optimistic, with estimated operating employment at between 550 and 650 professional and technical staff per LNG facility during operations (estimates for Western Australia, a region similar to Northern BC and also “greenfield” development requiring all-new capital investment).¹⁵ Even these higher estimates demonstrate that LNG is a very capital-intensive business—there would be several thousand temporary construction jobs for a given LNG facility but, once complete, only a few hundred jobs to operate the facility.

From this review, it is clear that the number of direct jobs resulting from an LNG export industry, even a large one, would be much smaller than claimed by the BC government.

7 Woodfibre LNG 2013:12.

8 Eagle Mountain–Woodfibre Gas Pipeline Project 2013.

9 West Coast Canada LNG 2015:40. In construction, also stated as 4,000 to 20,000 person-years.

10 LNG Canada 2013.

11 Jones 2013.

12 Aurora LNG 2015.

13 Marlow and Jang 2014.

14 Australia Pacific LNG 2010. See chart 5.5, p. 33.

15 National Resources Sector Employment Taskforce 2010.

Beyond the LNG plants themselves, a doubling or tripling of production to meet Asian demand would lead to additional employment gains upstream, through extraction (fracking) and processing of gas in the Northeast. BC's natural gas industry in 2014 amounted to about 6,200 direct jobs, up from 4,200 the year before, with another 3,000 in support activities.¹⁶ However, in the capital-intensive natural gas industry, substantial economies of scale are possible—meaning that doubling output will lead to much less than double the number of jobs.

Behind the BC government's claim

To get to the "100,000 jobs" number used in the 2013 pre-election throne speech, in the weeks beforehand the BC government commissioned a consultancy, Grant Thornton (GT), to develop employment estimates.¹⁷ Included in the resulting *Employment Impact Review* was GT's disclaimer that its analysis was based on information provided by the province. Moreover, the analysis itself was created primarily from the government's own input-output model from BC Stats. Thus, there was no practical reason for GT to be hired to use the government's own numbers and model apart from providing the appearance of independent justification for an absurdly large jobs number.

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Review of GT's analysis shows clearly that employment numbers are excessively optimistic at almost every step in the process. Even the headline number of 100,000 jobs conflates permanent jobs with temporary construction jobs (to be clear, the BC government made this misrepresentation, not GT).

The GT report assumes five LNG plants will be built, with a total capacity of 82 Mt of LNG exported per year. This projection of exports from BC is wishful thinking, as that figure is equivalent to one-third of all the LNG exported worldwide in 2012.¹⁸ Australia, which has been growing its LNG industry for more than two decades, had total capacity of 24 Mt as of fall 2014 (although more is in development).¹⁹ In fact, BC may get only one or two plants operational, and even this is not guaranteed given the economics of LNG markets (more on this in the final section).

Those five LNG plants are assumed to employ 2,400 full-time equivalent (FTE) operating jobs annually, a figure from the BC government.²⁰ Yet, even 2,400 jobs appears to be an overstatement. Table 4 of the GT report shows that existing LNG capacity in Australia and in the US state of Maine supports about 21 full-time-equivalent jobs per million tonnes of LNG produced per year, while the BC government assumes 29 FTE jobs.²¹ The GT report fudges this difference, calling it "slightly higher" and "comparable" when in fact the BC estimate is 40 per cent higher than Australia or Maine. Put another way, based on real-world experience from Australia or Maine, BC should expect closer to 1,700 full-time equivalent (FTE) jobs for five terminals, or 340 jobs per terminal.

16 Government of BC, BC Stats. Note that some larger employment estimates of the natural gas industry include current jobs in the domestic utility (e.g. Fortis workers maintaining their gas distribution network). But these domestic utility jobs would not grow if an LNG industry were to take root, as the new production would be exported.

17 Grant Thornton 2013.

18 International Gas Union 2013.

19 Asia Pacific Foundation of Canada 2014.

20 Deetken Group, as per note 3.

21 Grant Thornton 2013. Figures have been rounded. Table 4 cites 21.56 FTE per million tonnes per year for Pacific LNG in Australia and 20.63 for Robbinston in Maine, and it assumes 29.27 for BC calculations.

The GT study then ran the 2,400 direct jobs figure through the BC Stats input-output model to come up with bigger and more impressive-sounding numbers: specifically, an additional 61,700 jobs from “indirect” employment—gains to upstream or supplier industries—and another 11,100 jobs from “induced” employment—gains from new workers spending their incomes in the local economy. Those 2,400 new direct jobs thus would theoretically drive the creation of 72,800 new indirect and induced jobs—a figure that is simply unbelievable and is contrary to the dynamics of any industry anywhere.

Input-output models are often used to justify big projects, from the 2010 Olympics to Enbridge’s Northern Gateway Pipeline.²² The objective of input-output models is to take existing economic relationships (including labour and output from supplier industries) to make estimates about the impact of a new development. To do this, the model is “shocked” with, for example, a 25 per cent increase in the size of a particular sector of interest. This then has ripple effects through the model, with increases in the output and employment of supplier industries.

This leads to the first problem with using input-output modelling in the BC context: the province has no LNG export sector and therefore no LNG sector that can be simulated using the model. The GT text repeatedly mentions “associated multipliers that were adjusted to reflect the LNG sector” but does not explain how this was done. In effect, GT made assumptions to simulate an LNG industry within the model but has not been transparent in defense of those assumptions.

Second, input-output models by their very nature are biased towards overstating the economic impacts of new investment. In particular, the models assume that workers are sitting unemployed on the sidelines. If this were true, worker incomes would add new dollars into the BC economy that then get spent in line with normal consumption patterns. However, if LNG merely leads workers to shift from an already existing job to an LNG job, this benefit is limited to the difference in income received by the worker. If LNG leads workers to move from another jurisdiction to BC, this could be shown to have positive economic impact for BC; however, doing so ignores the offsetting negative impact on the other jurisdiction.

Third, input-output modelling is a linear process, meaning that, for example, a 25 per cent increase in the GDP and employment of the direct (LNG) sector automatically leads to a 25 per cent increase in GDP and employment of upstream (supplier) industries. Put another way, it assumes there are no economies of scale, and that additional output leads to new employment in proportion to the existing industry (again, assuming these workers were previously unemployed). Yet, in very capital-intensive operations like natural gas, increases in production for upstream facilities operating below full capacity lead to miniscule employment effects. Increasing the total flow of gas may be as simple as further opening a tap, with minimal employment impact.

It is, of course, reasonable to expect that a new LNG sector would lead to greater indirect jobs in upstream gas extraction and processing. To meet the demand of a proposed LNG sector producing 82 Mt per year would mean effectively a tripling of output from BC’s northeast. At most this would lead to a tripling of employment, but as noted above, the actual increase in jobs would likely be much lower due to economies of scale in this industry. In this context, GT’s estimates of an additional 5,000 jobs in gas extraction and 3,200 in support activities resulting from LNG seem reasonable enough. However, GT includes an additional 4,100 indirect jobs for “pipeline

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²² Shaffer, Greer and Mauboules 2003; Lee 2012.

transportation,” which seems extremely unrealistic given that other pipelines support only a small number of jobs.²³

The most suspect numbers in the GT report are in the indirect category, which comprises the majority of claimed new jobs, including:

- Alleged gains of 10,900 FTE jobs in “architectural, engineering and related services.” This number is implausibly large, and much of that work may be done outside BC due to the global nature of the industry.
- Another suspiciously large number is 38,500 FTE jobs in vaguely outlined “other supplier industries”; the GT report notes without further comment that these include “utilities, retail, transportation and warehousing, finance, insurance and real estate, construction (repair), other professional services, equipment rentals and accommodation.” Many of these jobs would rightly be considered as induced employment, not indirect, suggesting flaws in the application of the model.

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Finally, the GT report claims there will be 11,000 jobs from induced employment—the impact of new workers spending their incomes on goods and services. Induced employment is particularly difficult to measure accurately and requires further assumptions about consumer expenditures that may result from increased income. For example, a supermarket in Kitimat that doubles its sales due to LNG would not necessarily build a whole new storefront to service this additional demand, with double the cashiers, managers and clerks; instead, it may be able to handle that demand with its existing complement of staff, if previously operating below capacity, or with a few additional hires. An input-output model, by contrast, would assume that doubling sales would be like opening up a second store.

These are the main ways in which input-output models can be highly misleading, although the nature of the results in the GT report suggests additional problems in how the model was applied. Based on data provided by the companies themselves, BC’s LNG sector could be expected to support about 2,000 to 3,000 construction jobs over three years per plant and 200 to 300 permanent workers once operational. Thus, the BC government’s original estimates in the 2012 Natural Gas Strategy—800 permanent jobs and up to 9,000 construction jobs, based on three LNG terminals getting built—are much closer to the mark than the subsequent claim of 100,000 jobs.

FIFO workers and northern economic development

Use of “fly-in, fly-out” workers is becoming commonplace for mining, oil and gas and other resource development projects. This practice enables companies to bring in the labour they need rather than rely on local labour markets, which are typically small and do not have idle workers trained to meet the specific needs of the industry.

In Canada, the Alberta oil sands is a case in point. A study from Statistics Canada found that as many as 133,000 workers (in 2008 at the peak of the business cycle) were inter-provincial workers. These workers lived in a different province and travelled to work in Alberta.²⁴ This dynamic

23 Enbridge, for example, claimed that permanent employment from its proposed Northern Gateway pipeline from Alberta to the BC coast would be 217 jobs. See Lee 2012.

24 Statistics Canada 2013.

affects the induced employment effects cited above—if workers in BC were to send most of their incomes to their real homes and families in a different province, economic activity in BC would be correspondingly diminished.

The rise of temporary migrant workers from other countries has also been widely noted. Numerous cases show that BC is already bringing in temporary foreign workers for projects in the north, including the upgrading of Rio Tinto Alcan’s aluminum smelter in Kitimat, BC Hydro’s Northwest Transmission Line and northern coal mines. A memorandum of understanding between the federal and BC governments acknowledges that temporary workers will be needed to get LNG facilities up and running.²⁵

Australia’s experience with a mature and expanding LNG industry is worth considering for lessons. Its LNG plants are located in relatively remote locations, similar to what is being proposed for BC. Construction is primarily done by migrant workers from other parts of the country and overseas. In Western Australia, 87 per cent of the construction workforce and 60 per cent of the operational workforce in the broader mining sector (including gas) are FIFO workers.²⁶ They are typically accommodated in work camps adjacent to local towns, although the influx also pushes up local housing and other living costs to the detriment of those without a connection to the industry.²⁷ Smaller communities in Australia have been lobbying for “royalties for regions,” a reinvestment of proceeds of resource development for the benefit of the local area.

CONCLUSION: WILL ANY LNG JOBS MATERIALIZE?

The BC government’s focus on LNG exports to Asia offers up a potential new round of economic boom times and benefits in terms of jobs and revenues. However, recent economic developments make getting an LNG export industry off the ground more challenging. The premise of LNG exports was based on exporting gas from North America to Asia, where prices are much higher, but to do that requires expensive and energy-intensive liquefaction terminals plus shipping and re-gasification terminals on the other end. For gas that costs \$4 per million BTUs in North America, the price must be around \$10 in Asia just to break even.²⁸

LNG prices in long-term contracts are generally linked to the price of oil, which has dropped substantially in the past year. Recent data from Asian LNG markets shows that market prices have dropped substantially. Landed prices of LNG were \$7.85 per unit in Japan and Korea and \$7.45 in China as of February 2015.²⁹ Thus, at current prices the export of BC LNG is not a profitable venture, although Asian state-owned companies like Petronas may well be interested in paying a premium to lock up supply for several decades. New global LNG supply coming on-stream in 2015 and beyond, plus a drop in demand in Asian markets, suggests that low prices will persist for some time.

BC’s job-creation choices are not just between LNG and the status quo. The need for action in the face of climate change lays down a fundamental challenge for how BC manages its resources. BC has taken some bold first steps down the path of climate action, including a carbon tax and other

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25 P. O’Neil 2014.

26 Chamber of Minerals and Energy of Western Australia 2014.

27 Asia Pacific Foundation of Canada 2014.

28 Reviewed in Lee 2014.

29 US Federal Energy Regulatory Commission 2015.

initiatives starting in 2008. Reducing BC's carbon emissions to something close to zero within a few decades will require a lot of work to be done, including transportation, building retrofits and clean energy. If BC embraces that possibility, and plans appropriately, a full employment strategy around climate action would represent a pathway towards harmonizing environmental and economic policies—one that would create far more jobs than LNG.

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CLIMATE JUSTICE PROJECT

This paper is part of the Climate Justice Project, a research alliance led by the CCPA–BC. The Climate Justice Project studies the social and economic impacts of climate change, and develops innovative green solutions that are both effective and equitable. Thanks to Vancity for its support of the project, and special thanks to the Vancouver Foundation for its financial support of the LNG Reality Check series.

For more reports from the Climate Justice Project, see www.climatejustice.ca



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ACKNOWLEDGEMENTS

Thanks to Dennis Fan for research assistance and to Paul Bowles, Shannon Daub, Tom Gunton, Seth Klein and Blair Redlin for comments on an earlier version of this paper.

The opinions and recommendations in this report, and any errors, are those of the author, and do not necessarily reflect the views of the publishers or funders of this report.

ISBN: 978-1-77125-224-9

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Copyedit: Maja Grip

Layout: Susan Purtell



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