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How Big (And What Is) the 'Green Economy'? The Challenge of Counting 'Green Jobs' in BC

"Having announced the imminent arrival of the green economy, we're scrambling to define exactly what that means…"[1]

The above quote neatly sums up the current conundrum about what many people now refer to as the "green" or "clean" economy[2]: although the idea is much celebrated, it is hard to pin down in a satisfactory way. Politicians, media commentators, and non-governmental organizations routinely laud the potential to create thousands of new "green jobs." Shortly after taking office, US President Barak Obama proclaimed, "As we recover from this recession, the transition to clean energy has the potential to grow our economy and create millions of jobs - but only if we accelerate that transition." Closer to home, former Premier Gordon Campbell championed the idea of BC as a North American leader in developing and selling clean (carbon-free) energy. British Columbia's pioneering economy-wide carbon tax, the first of its kind in North America, was linked to an expectation of robust growth in "green" industries and related gains in employment. At the municipal level, political leaders in the City of Vancouver are convinced that the green sector is destined to drive the region's economy and foster the development of tens of thousands of new, high-paying jobs.[3]

And there is no doubt that BC does have demonstrated strengths in several sectors closely linked to the green economy, including bio-energy, fuel cells, low-carbon transportation technologies, green buildings and waste management.

Although many governments have been eager to support and occasionally to fund green initiatives, without a framework for identifying and tracking the green sector it is impossible to know how many people are actually employed in the relevant occupations, or if current policies and funding initiatives are effective. In response to this information gap, a number of studies of the "green economy" have been produced in recent years. But with no generally agreed definition of what qualifies as a "green" business or job, the methodologies and resulting estimates of the size of the sector tend to vary widely.

In this short paper we seek to shed some light on the topic of green jobs in British Columbia. Establishing a definitive framework for measuring green employment is beyond the scope of this piece. Instead, the focus is on reviewing existing efforts to quantify green jobs in BC, against the backdrop of similar work done

[1] Kevin Doyle, "How Do We Define the Green Economy?" http://www.grist.org/article/remake-a-living-hire-definition (Feb 2008).

[2] The terms "green" and "clean" economy are used interchangeably in this paper.

[3] Hurrian Peyman, "Vancouver's Green Economy" (July 2010) http://www.vancouvereconomic.com

in other jurisdictions. To move towards a realistic assessment of the sector's size and potential, we review and draw comparisons with analyses published by researchers and leading think tanks in the United States.

Our examination suggests that green industries collectively do have both a substantial presence in BC and considerable upside potential. However, the green sector is modest in overall size and quite limited in its aggregate economic impact. We also find that some existing reports on the green economy in BC are rather generous in their interpretations of what should be counted as a green job. While an expansive view of what qualifies as "green" may be helpful in raising awareness about future economic development opportunities, it does not necessarily serve policy-makers well and can make it hard to track the sector in a sensible manner over time.

Identifying Green Jobs

Deciding what counts as "green" is complicated. Although most definitions include some reference to occupations involved in minimizing the environmental impact of industrial and other human activity, and/or in preserving and restoring the environment, details as to what specific sectors should be included and what qualifies as an environmental benefit differ across published studies. Jobs in industries that are clearly engaged in producing goods or services that improve the environment are often treated as green. But there are also many jobs in which workers are active in reducing inputs, recycling, saving energy and generally making production processes more efficient, and thus environmentally friendly, but where the industries concerned don't produce environmental outputs. The reality is that most green jobs fall into this latter category, and "are not new jobs but rather are based on existing occupations that become, in a sense 'greener' as they build environmental skills and tasks into their everyday duties."[4] Categorizing jobs that are gradually transforming along some green continuum raises a question: at what point do they truly become "green"?

Many of today's green jobs may be relatively clear-cut, but they aren't necessarily new or innovative. Good examples are jobs in mass transit and hydro-electric generation. Reclassifying whole occupations in long-established industries (or other existing jobs) as "green" results in a larger green sector, but may not translate into a net increase in employment – the key goal that most policy-makers are interested in. There are also issues around the differences between temporary and permanent work. For example, many temporary construction jobs are treated as green these days (retrofitting buildings, assembling wind turbines, constructing rapid transit lines). Yet when researchers decide to measure green employment and job creation, distinctions between temporary jobs and permanent ones are not always made. A single incremental person-year of employment is not the same thing as one new permanent job.

[4] Globe Foundation, "Careers for a Sustainable Future: A Reference Guide to Green Jobs in British Columbia," (September 2010), p.9.

Apart from definitional issues, there is the practical matter of actually counting jobs. The starting point for determining how many people work in a given sector is usually the official industry-level data produced by Statistics Canada (and similar statistical agencies in other countries). Unfortunately, the North American Industrial Classification System (NAICS) which Statistics Canada uses does not have categories that directly correspond to "green" industries, nor does it contain a sufficient amount of detail to easily extract the various green segments or sub-sectors from the broader industry classifications. While a handful of NAICS industry categories are clearly aligned with the green economy (e.g., Environmental Consulting Services), most green jobs are lumped into industry classifications which primarily capture activity that most analysts would not judge to be part of the green economy.

The statistical challenge is clearly revealed with the fuel cell industry, which is part of the "All Other Equipment and Component Manufacturing" category under the NAICS. Fuel cells represent only a tiny portion of employment in this industry grouping, which also includes a myriad of (obviously non-green) elements such as manufacturing of electric chimes, electric fence chargers, door opening and closing devices, and so on. To estimate the number of people working in the various green sectors using Statistics Canada data, it is necessary to identify all of the green segments within the economy, establish what NAICS industries they fall within, and then develop a methodology for determining the share of each industry group that should be considered green. This is a complex research undertaking.

The above *production-based* approach seeks to count the number of jobs in industries that produce green-related goods and services. But there are also people who work in what could be viewed as "green occupations" in companies which themselves aren't necessarily part of a green industry or sub-industry. For example, an energy efficiency expert employed by a mining company would fit this description. Counting jobs related to the use of more environmentally friendly production *processes* rather than just employment in industries that produce "green" goods and services is an even more daunting task. For the production-based approach, it is possible to identify and survey establishments and industries that produce green products and services; with a process-based approach, it is necessary to survey organizations across all parts of the economy and then determine which of their employees might arguably be classified as working in "green" occupations.

How Many Green Jobs in BC?

At the national level, ECO Canada (Environmental Careers Organization) has taken a fairly comprehensive look at green jobs. In 2010 ECO Canada published a report entitled, "Profile of Canadian Environmental Employment." The report does not focus on the production aspects of green employment. Instead, it adopts what amounts to a "process" approach, where environmental workers are defined as "individuals who spend 50% or more of their time on activities associated with

environmental protection, resource management, or environmental sustainability."[5]

Based on a Canada-wide survey of 2,204 organizations, ECO estimates there are 682,000 environmental workers in Canada, which adds up to roughly 4% of the employed workforce. The survey results are categorized into the NAICS framework to provide some indication of environment-related employment within different industries. As detailed in Table 1, the industries with the biggest shares of environmental workers nationally are: Agriculture (10.8%), Construction (7.4%), Administration and Support, Waste Management and Remediation (5.8%), and Professional, Scientific and Technical Services (5.1%).

The ECO study also provides estimates of environmental employment for the provinces. It finds that BC had 92,739 environmental employees in 2009. At the time, this equaled 4.1% of all jobs in the province, which means that BC's tilts slightly more towards green jobs than Canada as a whole. (Somewhat surprisingly, the share of environmental jobs is highest in Atlantic Canada, which is tied with Saskatchewan and Manitoba).

Table 1
Canadian Environmental Employees by Industry

Industry	Workers*	% of total workforce
Agriculture, Forestry, Fishing and Hunting	41,878	10.8%
Mining, Quarrying, and Oil & Gas Extraction	11,405	4.5%
Construction	89,020	7.4%
Manufacturing	71,934	4.1%
Wholesale Trade/ Retail Trade	93,265	3.5%
Utilities, Transportation and Warehousing	18,544	2.0%
Information, Finance & Insurance, Real Estate and Mgmt of Companies	7,340	0.5%
Professional, Scientific and Technical Services	65,285	5.1%
Admin. & Support, Waste Management and Remediation	36,124	5.8%
Education, Health and Social Assistance	121,751	3.7%
Arts, Recreation, Accomm. and Food Services	59,252	4.1%
Other Services (except Public Administration)	20,913	2.9%
Public Administration	45,578	4.8%

* spending more than 50% of their time on environmental activities.

Source: ECO Canada, "Profile of Canadian Environmental Employment," (2010), p. 13.

[5] ECO Canada, "A Profile of Canadian Environmental Employment," (2010), p.5. In another study, "Defining the Green Economy," (2010), ECO focuses on production as the basis for identifying the green economy, and defines it as: "(t)he aggregate of all activity operating with the primary intention of reducing conventional levels of resource consumption, harmful emissions, and minimizing all forms of environmental impact. The green economy includes the inputs, activities, outputs and outcomes as they relate to the production of green products and services."

Table 2
Estimates of Environmental Employment by Province

Province	Environmental Employees	Environmental Employees as % of Total Prov Employment
Atlantic Provinces	46,847	4.3%
Quebec	155,504	4.0%
Ontario	253,522	3.8%
Manitoba/ Saskatchewan	48,771	4.3%
Alberta	83,956	4.2%
British Columbia	92,739	4.1%
Canada Total	682,289	4.0%

Source: ECO Canada, "Profile of Canadian Environmental Employment," (2010), p. 17.

A separate examination of green jobs was conducted by the Globe Foundation. This study concludes that as of 2008-09, the green elements of BC's economy were responsible for 117,000 jobs, or 5.1% of the province's employed workforce.[6]

While the Globe report does not explicitly differentiate between production and process workers, it appears to be based on the production of green goods and services. Globe's estimates of green employment were developed by linking income data for corporations from the Canada Revenue Agency and Statistics Canada's Interprovincial Input-Output Model. The study examined detailed NAICS data and, based on further research and consultation, estimated the share of each industry group that is green.[7] Despite taking what appears to be a production-based approach that is narrower in scope, Globe's estimate of green employment in BC is significantly larger than ECO Canada's – a point that underscores the difficulty of measuring a sector that is not explicitly covered in Statistics Canada's official data on industrial output or employment.

Estimates of Green Jobs in the US

The subject of green jobs has garnered significant attention from policy-makers and researchers in the United States. Probably the most comprehensive and credible study on the topic was published last year by the prestigious Brookings Institution. It concludes that about 2% of all US jobs are green, suggesting that what the authors describe as the "clean economy" represents a very small slice of the US economy.[8] They note, however, that compared to many other cross-industry sectors, "the clean economy looks much more significant."[9] The clean/green economy employs an estimated 2.7 million Americans, whereas the fossil fuel industry, including wholesale and retail distribution, employs 2.4 million. The biosciences sector, which is the focus of significant investment interest and government support for

[6] Globe Foundation, "British Columbia's Green Economy: Building a Strong Low-Carbon Future," (February 2010), p.13. Note that these positions are reported as full time equivalent (FTE) jobs. The study also reports 49,000 indirect jobs associated with environmental employment, but in this paper we are concerned with measuring direct green jobs and thus ignore indirect spin-off employment and presumed multiplier effects.

[7] Ibid. A brief explanation of the methodology is provided in the Technical Notes section on p.44.

[8] Mark Munro, Jonathan Rothwell, and Devashree Saha, "Sizing the Clean Economy," Brookings Institution (2011).

[9] Ibid., p.19.

research and commercialization, employs 1.4 million Americans.

The Brookings report also provides estimates of the size of the clean economy for the 50 US states, which reveals a fair amount of variation across the nation. For most states the clean economy comprises around 2% of all jobs, but the shares range from 1.2% in Oklahoma to a high of 4.7% in Alaska. Oregon has the second highest share of green jobs (3.4%). Just five US states have 3% or more of their workforce employed in green jobs.

The Brookings researchers adopted a conservative measurement approach and only include employment in establishments that directly produce goods and services with environmental benefits, or that add value to products with an environmental benefit.[10] Rather than conducting a survey, the authors sought to capture every company in the US clean economy that could reasonably be identified. Their goal was to "make the data as analytically useful as possible."[11] Because their approach is rooted in the type of economic activity undertaken by business establishments, the reported measures of clean economy jobs are akin to the industry data generated by government statistical agencies. In reference to their methodology and their commitment to a rigorous analytical and statistical approach, the authors state that "while many studies of the green or clean economy have often seemed to play out as proxy wars in the larger debate over climate change policy, this work tries to step back from those issues."[12] This academic objectivity is an important strength of the Brookings report.

The study also tracks the clean sector over time. It turns out that, between 2003 and 2010, the US clean economy grew more slowly than the national economy, which may be a surprise to many. Over that period, clean economy employment grew at an average annual rate of 3.4% while economy-wide jobs grew by 4.2%.[13] This finding clashes with the widely-held perception that green employment has been a leading source of net job creation over the past decade. According to the Brookings' research team, this simply isn't the case.

The US Department of Commerce has produced its own report on the green economy, published in April 2010. It canvassed all products and services that could be considered green. To take into account the ongoing debate about the "greenness" of different products, the Commerce study uses both a narrow and a broader definition. It looked at more than 22,000 product and service codes in the 2007 Economic Census to develop an assessment of the scope of the green economy.

The Department of Commerce researchers conclude that green jobs constituted between 1.5% and 2.0% of total US private sector employment in 2007 (the share may have risen a bit since then). The report concludes, "[t]he green economy is in a

[10] Ibid., p. 15.
[11] Ibid., p. 15.
[12] Ibid., p. 17.
[13] Ibid., p. 19.

position to grow quickly, but [its] relatively small size…suggests that a majority of the jobs created during this recovery are likely to come from the production of products and services outside the green economy."[14]

A More Definitive Measure is Forthcoming

In the US, the definitive word on the number and industrial composition of green jobs will soon be published, courtesy of the Bureau of Labor Statistics (BLS), which is part of the US Department of Labor. The BLS is currently collecting a large amount of data and plans to publish a major report on green jobs in the spring of 2012, with annual updates thereafter. This timely data-gathering and analytical initiative is intended to provide information to assist in evaluating policy initiatives and in tracking the labor market dimensions of economic activity related to protecting the environment and conserving natural resources. The BLS report will provide data on: 1) the number of and growth trend for green jobs, 2) the industrial, occupational, and geographic distribution of green employment across the United States, and 3) the wages of workers in these jobs.

The measure of green jobs being developed by the BLS is based on both an output approach (which identifies jobs in establishments that produce green goods and services) and the process approach (which identifies establishments that use environmentally friendly production processes and practices and treats the associated jobs as green). To implement the output/production approach, the BLS will collect data on jobs associated with producing green goods and services through a survey of establishments. To address the problem of green and non-green industries being lumped within a single category, the new Green Goods and Services (GGS) survey will identify whether an establishment is producing any green goods and services and, if so, seek to capture the number of associated jobs in the establishment. This approach is expected to produce an estimate of the number of green jobs for a NAICS industry based on employment at individual establishments; it will not simply designate an entire industry as "green."

For the process approach, the BLS is developing a special employer survey to test the feasibility of collecting data on jobs associated with production processes and practices that reduce the negative impact on the environment (or on natural resources) from the production/sale of any good or service. Some examples include generating solar power for use within a retail establishment, redesigning product packaging to reduce the use of plastics, and collecting and recycling waste created during a manufacturing process.

In the special employer survey, the BLS will identify whether the establishment uses environmentally friendly processes and practices and, if so, whether it employs any workers whose primary duties are related to these processes and practices. Some of these employees may be performing a

[14] US Department of Commerce Economics and Statistics Administration, "Measuring the Green Economy," (April 2010).

variety of activities that extend beyond "green" work.

Conclusion

The two published studies that provide estimates of green jobs in British Columbia find that such employment amounts to between 4.1% and 5.1% of all jobs in the province. The lower estimate is based on a very broad process approach that counts people (using a survey of companies) who spend 50% or more of their time on environmental objectives as "green workers." The higher estimate is derived from a more ground up, production-based approach. Although the latter methodology does not utilize a survey, it still entails determining the proportion of workers deemed to be green within different industries.

The most comprehensive and credible US studies find that around 2% of all payroll jobs are green, with the share varying by state. If the methodology used by Brookings was applied to BC, the province would probably line up close to Washington or Oregon, where green jobs account for 2.8% and 3.4% of all employment, respectively. While it is difficult to say with certainty given the various measurement challenges, we judge it unlikely that British Columbia has a significantly higher proportion of green workers than Washington or Oregon. Thus, our best estimate is that green jobs represent 3.0-3.5% of employment in BC.

It would be unwise to anticipate large-scale green job growth over the next few years. The addition of tens of thousands of green jobs will not quickly transform BC's labor market, since the green sector comprises only a small part of the province's economy. Moreover, it is problematic to posit rapid growth in green employment based on reclassifying existing jobs as green, as distinct from jobs that result from new employment in emerging sectors. While reclassification may make sense for some purposes, it does not equate to net job growth. Dynamic industries that are readily associated with the green economy, such as clean energy, low-carbon transportation, and environmental technologies, account for small but gradually increasing proportions of BC's total employment of 2.3 million. While these and some other green-related sectors may be growing quickly, their small size means they won't have a material impact on the overall composition or trajectory of the labor market in the foreseeable future.

To monitor policy initiatives and train a sufficient number of workers for tomorrow's jobs, steps should be taken to better estimate and track employment in the green sector. Hopefully, the BLS initiative in the United States will provide a foundation that prompts statistical agencies in Canada to devote more resources to analyzing and measuring the green sector.

Finally, the analysis in this paper does not detract from the view that BC has upside potential in the broadly defined green economy. British Columbia boasts a vibrant clean energy sector, which includes hydro power, wind power, fuel cells, fuel-switching technologies for vehicles, and an array of advanced research work in the energy field. The province is also home to a

sizable group of companies that provide environmental services in areas like engineering, green buildings, site remediation, and consulting. There is also a substantial amount of research underway in universities and private sector organizations that aims to improve energy efficiency and aid in the long-term transition to a less carbon-intensive economy. In short, many green industries present in BC have attractive long-term growth prospects and are likely to account for a rising share of employment over time.

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