

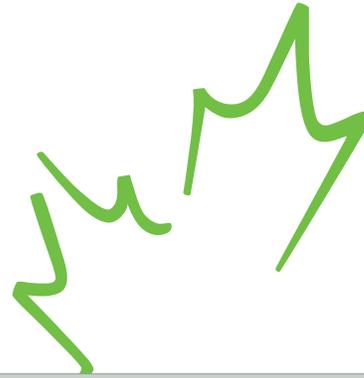
# Energy Efficiency Employment in Canada



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada 



## About ECO Canada

Environmental Careers Organization of Canada (ECO Canada) is a not-for-profit organization that was founded in 1992 to help nurture Canada's growing environmental sector and ensure an adequate supply of qualified workers. For over 25 years, we've offered programs and services to help individuals build meaningful environmental careers; provide employers with resources to find and keep the best environmental practitioners; and keep educators and governments informed on employment trends.

ECO Canada investigates current skills and labour trends within the environmental employment sector and provides up-to-date, timely and relevant insights that can be applied in policy, business, and educational contexts. The complete collection of reports is available at [eco.ca](http://eco.ca).

## Acknowledgements

This study was made possible through funding provided by Natural Resources Canada (NRCan) and the Government of Canada's Sectoral Initiatives Program. Their support is much appreciated.

We gratefully acknowledge funding for the survey and analysis from NRCan as well as the management and operational support provided by the Demand Policy and Analysis Division with the Office of Energy Efficiency. Employment and Social Development Canada, through the Government of Canada's Sectoral Initiatives Program, contributed to report production, translation and dissemination.

We also acknowledge the business establishments and individuals who participated in the survey.

Finally, we acknowledge the depth of background knowledge and the design, field and analysis services brought to the project by BW Research Partnership.



BW Research Partnership is a full-service, economic and workforce research consulting firm with offices in California and Massachusetts. It is a leading provider of accurate, comprehensive energy and clean energy research studies including the United States Energy and Employment Report (USEER), several state-level clean energy U.S. state reports, and research on solar and wind energy.

# Preface

Energy efficiency is a major component of the global movement to combat climate change. Data on the Canadian energy efficiency workforce can be found but is often lacking the level of maturity, consensus and detail.

This in-depth study, which we believe is the first of its kind in Canada, is a statistical analysis of direct and permanent energy efficiency employment within six key industries:

- Construction
- Manufacturing
- Wholesale Trade
- Professional and Business Services
- Utilities
- Other Services

The report is a result of a comprehensive survey conducted in the Fall 2018 with 1,853 business establishments across the country, providing a point-in-time snapshot of the energy efficiency workforce. Of the establishments surveyed, 628 (or 34%) were directly involved in the supply of energy efficiency goods and services. Our research and statistical analysis further revealed three key findings:

1. The energy efficiency workforce in 2018 is significant
2. Job creation within the sector in 2019 is expected to occur at a faster pace than the Canadian economy as a whole
3. Employers generally experienced difficulties hiring energy efficiency workers, mainly due to the lack of qualified workers

In 2018, we estimate the sector directly employed approximately **436,000** workers across **51,000** establishments within the six key industries. Together, these establishments and workers generated **\$82.6 billion** in estimated energy efficiency operating revenues in 2018.

The energy efficiency workforce is positioned to grow rapidly by **8.3%** from 2018 to 2019, creating well over **36,000 jobs**. However, over 70% of employers who participated in the survey reported experiencing difficulties hiring energy efficiency workers. While the occupations most difficult to recruit for varied by industry, the lack of qualified workers was generally cited as a key reason for the hiring challenges.

The energy efficiency sector is critical to the success of transitioning Canada to a low-carbon economy. Efforts to improve energy efficiency are generally expected to reduce greenhouse gas (GHG) emissions — a key element in the [Pan-Canadian Framework on Clean Growth and Climate Change](#). Not only does it help lower our national energy consumption, it also reduces energy cost for businesses and individual consumers.

Consideration of how energy efficiency initiatives impact employment is important to Canadian policy makers and program developers. By conducting and publishing this study, we hope that stakeholders within governments, industries, education and training institutions and individuals play a role in alleviating the sector's labour market challenges today, and those yet to come. Growing the talent pool ensures an adequate, productive and sustainable energy efficiency workforce to help grow the economy while managing the environment and our resources.

This report is made possible by our key funding partners Natural Resources Canada (NRCan) and Employment and Social Development of Canada, research and consulting services provided by BW Research Partnership, Statistics Canada published data, and the valuable time and information contributed by the establishments and individuals who participated in the survey.

Kevin Nilsen, President and CEO,  
ECO Canada  
April 2019

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# Energy Efficiency by the Numbers

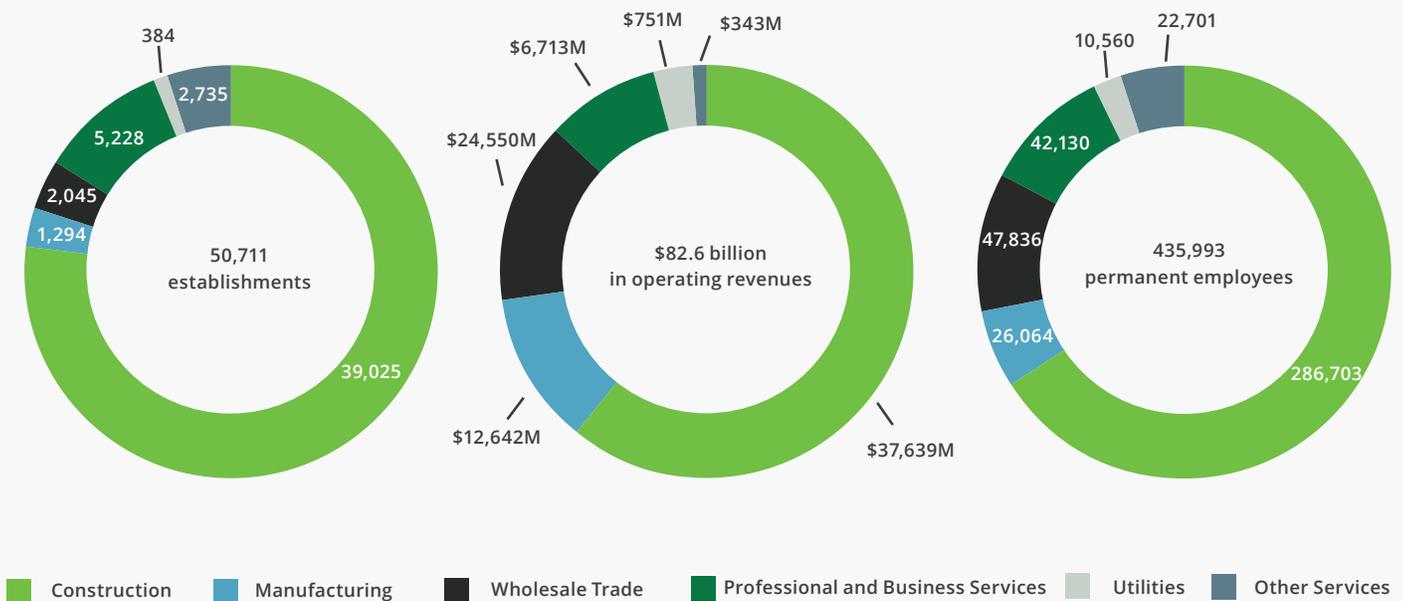
Combating climate change is a key environmental focus of the 21st century. Unfortunately, there's limited data on the workers involved in this space, including those directly involved in energy efficiency, an integral movement in Canada's transition to a low-carbon economy.

In Fall 2018, a survey of 1,853 establishments in Canada was conducted to determine the workforce size of industries directly involved in the supply of energy efficiency goods and services. The survey helped produce estimates of the number of establishments, revenues and direct and permanent employment within the energy efficiency sector in Canada. Estimates are available for the overall sector and within six industries included in the study: Construction, Manufacturing, Wholesale trade, Professional and business services, Utilities and Other services. Here are the results:

In 2018, close to **51,000 establishments** across the six industries generated **\$82.6 billion in estimated operating revenues from the provision of energy efficiency goods and services**. Together, these establishments directly employed **436,000 permanent energy efficiency workers**.

For this study, energy efficiency is defined as the production or installation of energy-saving products and/or provision of services that reduce end-use energy consumption. The services include the manufacture of ENERGY STAR® appliances and other ENERGY STAR® labelled products, but also building design and contracting services that provide insulation, improve natural lighting, and reduce overall energy consumption across homes and businesses.

Figure 1: Establishments, Revenues and Employment in Canada's Energy Efficiency Sector, 2018

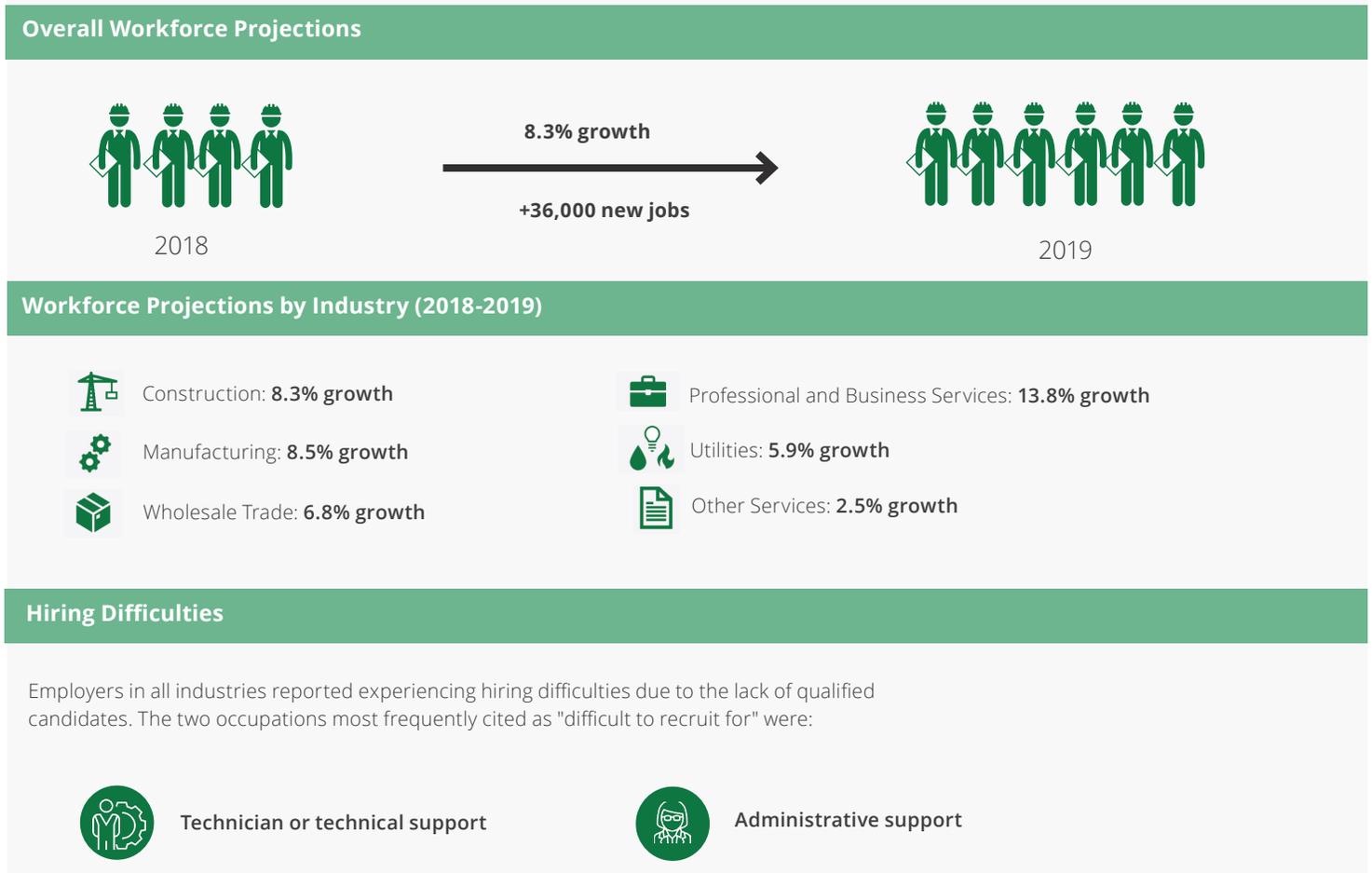


- The largest number of energy efficiency establishments, operating revenues and employment were in the **Construction industry** at 77%, 46% and 66% respectively.
- An estimated **\$14.9 billion (\$2018) in employment income** was generated by all direct and permanent energy efficiency workers across the six industries. Energy efficiency workers in the Construction industry generated 66% of this total employment income.
- Approximately **29%** of energy efficiency workers spent all their time, **27%** spent most of their time while **44%** spent a portion of their time on energy efficiency activities.
- The two sub-technology applications worked in most often by the overall energy efficiency workforce were **light-emitting diode (LED), compact fluorescent lamp (CFL) and other efficiency lighting** (26%) and **traditional heating, ventilation, and air conditioning (HVAC) goods, control systems and services** (26%).
- 43% of the workforce were in installation or repair jobs while 20% were in **management and professional roles**.
- The energy efficiency workforce was generally **less diverse** than the national workforce.

Employers were generally positive about the future net revenues of their firms through 2019 and they expect direct employment to grow by 8.3%, resulting in 36,000 new jobs.

At least 70% of energy efficiency employers in each of the six industry groups reported experiencing hiring difficulties. A lack of qualified workers was frequently cited as a reason for the hiring challenges.

Figure 2: Energy Efficiency Employment Projections and Reported Hiring Difficulties



# 1. Introduction

Canada is among the leaders in the global transition to a low-carbon global economy.<sup>1</sup> Policies at the federal and provincial levels have spurred actions to achieve energy savings through the development and deployment of more efficient goods and services. There has been little data, however, on the jobs created by the energy efficiency sector in Canada. Industrial labour market data is not organized into energy efficiency categories, and neither the National Occupational Classification (NOC) nor the North American Industry Classification System (NAICS) codes sufficiently delineate energy efficiency activity. A finer lens is required to count the employment associated with energy efficiency within these categories.

In 2014, ECO Canada conducted a study for Natural Resources Canada (NRCan) which estimated the size of the Canadian energy efficiency workforce using a methodology based on functional employment competencies and JPA (“job posting analysis”) data.<sup>2</sup>

In Fall 2018, ECO Canada engaged BW Research Partnership to conduct statistical surveying of establishments in Canada to determine the workforce size of industries directly involved in the supply of energy efficiency goods and services. This study was guided by research methodologies conducted on energy employment in the United States, including those within the energy efficiency workforce. BW Research Partnership has been instrumental in the conduct of the annual U. S. Energy and Employment Report (USEER)<sup>3</sup> studies and was well positioned to apply the methodology in Canada.

This survey approach to energy efficiency research had a complementary value: it updated and expanded the 2014 energy efficiency workforce estimates, and it allowed comparison and/or consolidation to energy efficiency employment in the United States (a comparison of the U.S. and Canadian 2018 energy efficiency workforce data can be found in Appendix A). This methodology also allows for consistent, accurate data on energy efficiency jobs in Canada that are replicable over time.

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<sup>1</sup> Based on an evaluation of 25 of the world’s top energy-consuming countries conducted by American Council for An Energy-Efficient Economy (ACEEE), Canada ranks 10<sup>th</sup> on efficiency policies and performance. [The 2018 International Energy Efficiency Scorecard](#). ACEEE. June 2018.

<sup>2</sup> Energy Efficiency: 2014 Supply Study. ECO Canada. March 2014. Available upon request.

<sup>3</sup> U.S. Energy and Employment Report: A report prepared for the Department of Energy (DOE) by BW Research, 2016 and 2017; U.S. Energy and Employment Reports May 2018 and March 2019: NASEO (National Association of State Energy Officials) and Energy Futures Initiative. The USEER reports cover three sectors in addition to Energy Efficiency, namely: Electric Power Generation and Fuels; Electric Power and Fuel Transmission, Distribution and Storage; Motor Vehicles. The Canadian survey addressed only Energy Efficiency.

## Scope and Methodology

For this study, energy efficiency is defined as the production or installation of energy-saving products and/or provision of services that reduce end-use energy consumption. The services include the manufacture of ENERGY STAR® appliances and other ENERGY STAR® labelled products, but also building design and contracting services that provide insulation, improve natural lighting, and reduce overall energy consumption across homes and businesses.

Consistent with the USEER, the energy efficiency workers of interest in this study are those directly employed within the following industries:

- Construction (NAICS 23)
- Manufacturing (31-33)
- Wholesale trade (41)
- Professional and business services (51-56)
- Utilities (22)
- Other services (81)<sup>4</sup>

The study relied on a comprehensive survey, conducted in the Fall of 2018, of 1,853 business establishments across Canada. To accomplish this task, ECO Canada and BW Research Partnership embarked on a representative sampling of businesses within the six industries across the country.

For this survey, a **Qualifying firm** is:

An organization with employees in Canada that is directly involved with researching, developing, producing, manufacturing, distributing, selling, implementing, installing, or repairing components, goods or services related to energy efficiency, including heating, cooling, building envelope or advanced materials, ENERGY STAR® appliances, efficient lighting, building controls or other energy efficiency activities that reduce energy demand pursuant to the ENERGY STAR® standards regulated by NRCAN in Canada or the EPA in the United States<sup>5</sup>, or other standards of NRCAN or the U. S. Department of Energy. This also refers to establishments that are involved with heating, ventilation and air conditioning (HVAC), whether thermal or hot water solar, from renewable energy sources or work that increases the energy efficiency of HVAC systems. This also includes supporting services such as consulting, finance, tax, and legal services related to energy efficiency goods or services.

<sup>4</sup> "Other Services" include maintenance, business and professional organizations, non-profits, etc. but exclude Public administration.

<sup>5</sup> To use the ENERGY STAR® label on products in Canada, manufacturers must join the ENERGY STAR® Program in the U.S. first and have their products certified by the U.S. ENERGY STAR® program. ENERGY STAR® Canada shares the list of certified [products](#) with the U.S. ENERGY STAR®.

Neither the Canadian and USEER studies capture employment related to energy efficient manufacturing processes (as distinct from the manufacture of energy efficient products). As well, USEER occasionally measures some energy efficiency activity in related energy sectors, such as Mining, quarrying, and oil and gas extraction (NAICS 21) which were not included in this study.

As well, results in this study exclude retail employees. Because Retail trade (NAICS 44-45) is a very large industry employer and retail employees mainly engage in distinct and unrelated energy efficiency activities (example, selling energy efficient light bulbs), including retail firms distorts the clarity of energy efficiency workforce data. Secondary statistical data find that retail trade industries that sell and distribute ENERGY STAR appliances and building materials (as well as non-qualifying appliances and building materials) employ approximately 345,150 Canadians across several different sectors<sup>6</sup>. As the retail workforce exceeds the total for Construction and Wholesale trade energy efficiency workforce; including retail would have distorted meaningful characterization of energy efficiency employment.

For this survey, **Qualifying Workers** are:

Permanent employees of a qualifying firm that spend some portion of their time supporting the qualifying energy efficiency portion of the business.<sup>7</sup>

The report provides detail into levels of employment activity that include “a portion of their time (less than 50%)”, “most of their time (50-99%)” and “all their time (100%)” when referencing qualifying workers. This is especially important within the energy efficiency sector where the employing construction or repair firms frequently are engaged in both traditional energy-related construction or installation as well as in high-efficiency activities that qualify for ENERGY STAR designation.

The total energy efficiency workforce size and other data such as demographics and occupational distribution were estimated by applying survey numbers to data gathered by Statistics Canada, particularly 2018 Labour Force Survey employment data.

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<sup>6</sup> These industries include Household appliance stores and electronics stores (4431), Building material and supplies dealers (4441), and Department stores (4421) These are retail establishments that are not defined by their sale of ENERGY STAR® appliances or energy efficient products. Some are defined by their sale of appliances in general but even these are not the sole retailers of energy efficient products – they could be general retailers as well such as big box stores that sell wide varieties of items.

<sup>7</sup> Energy efficiency workers often perform both traditional energy efficiency work and high-efficiency work which qualifies for Energy Star® designation. Where “portion of their time” includes employees whose activities are less than 50% of their time, specific reference will be made of that fact. The numbers of energy efficiency employment quoted in this report are based on headcount, and not full-time equivalent (FTE) numbers as typically presented in other studies.

Survey results were also used to filter and analyze the concentration, intensity, and distribution of various energy efficiency technologies and activities throughout traditional industries. As with the USEER, the data in this report also provide an additional layer of information to track sector-specific growth, obstacles, and opportunities.

The *Energy Efficiency Employment in Canada* report provides data for direct and permanent employment only within the six industry groups and with no attempt to analyze indirect or induced employment. This study therefore excluded the indirect jobs that support this sector, such as iron foundries (raw materials), aluminum production, and extrusion activities for frame manufacturing, or other aspects of the far-upstream value chain. Induced jobs created throughout the economy due to employees of this sector spending their wages were not included either. By way of explanation, input/output modeling has been utilized by many employment studies to generate direct, indirect and induced employment estimates, including those within energy efficiency<sup>8</sup>.

The research is a point-in-time design, measuring the direct energy efficiency workforce at the time of survey which is across the fall months from late September into October 2018. Data is provided at the national level with additional breakdown by industry, sub-technology application, occupational groups, workforce demographics and others. Estimates on number of establishments, operating revenue estimates and employment income involved or derived from energy efficiency are also included. Geographic distribution, such as by province/territory or region are not available but could be considered in future updates.

Refer to Appendix B for an overview of Survey Analysis and Methods. A Glossary of Terms is also available starting on page 53.

### An Overview of Input/Output (I/O) Models

I/O modeling typically begins by defining an activity within a defined industry or activity, such as Leadership in Energy and Environmental Design (LEED) building construction. In the LEED building example, construction firm activity employment would provide the “direct” jobs. “Indirect” employment would include manufacturing jobs related to producing building materials, appliances, and other products for the construction, as well as professional services such as architecture and engineering firms. A third calculation may be “induced” employment, which includes jobs created or supported by wages paid and other benefits provided by employers of direct and indirect employees.



<sup>8</sup> [The Economic Impact of Improved Energy Efficiency in Canada](#). Clean Energy Canada. April 2018.

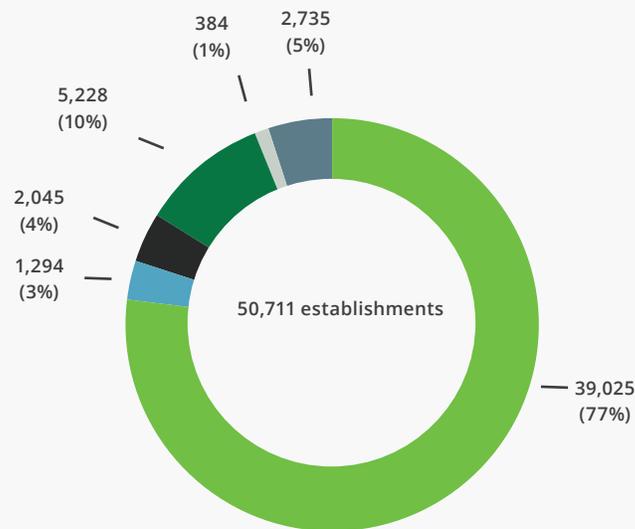
## 2. Overall Findings

The current policy context in Canada and the entire value chain of activities within energy efficiency contribute to growing opportunities for the sector and its establishments and employees.

### Establishments

An energy efficiency establishment in this survey is one which was involved with energy efficiency products and services but not necessarily deriving all its revenue from energy efficiency. Close to 51,000 establishments within the six industry groups were involved in energy efficiency activities across Canada (Figure 1) in 2018. The largest number of energy efficiency establishments were found in the Construction industry (77%).

Figure 3: Energy Efficiency Establishments by Industry, 2018

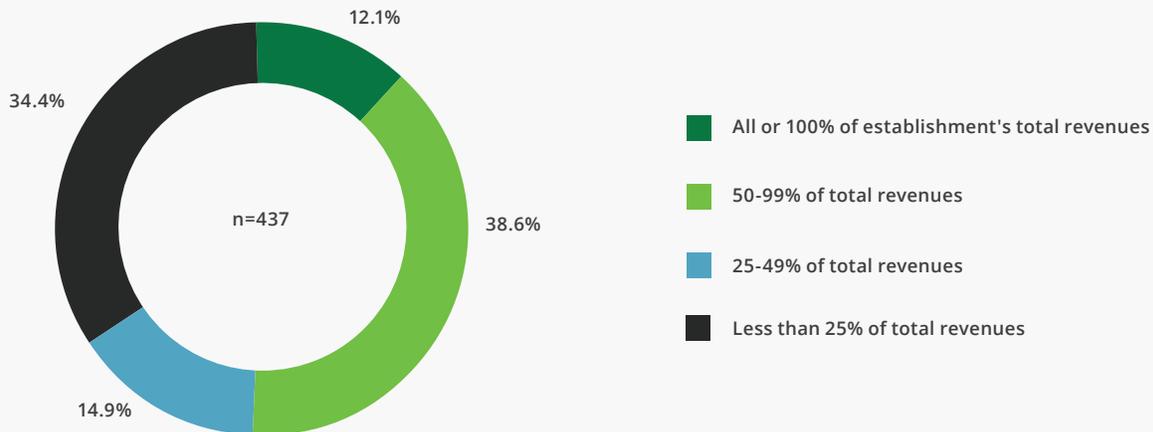


■ Construction
 ■ Manufacturing
 ■ Wholesale Trade
 ■ Professional & Business Services
 ■ Utilities
 ■ Other Services

## Revenue Contribution

More than half of all firms indicate that energy efficiency-related goods and services accounted for at least 50% of their total 2018 revenue.

Figure 4: Portion of Revenues from Energy Efficiency, 2018



The estimated operating revenue from all energy efficiency firms summed to CAD \$82.6 billion, or 2.8% of total operating revenues across the six industries in Canada<sup>9</sup>. The Construction industry was the largest contributor of energy efficiency operating revenues at \$37.6 billion or 46% of total energy efficiency operating revenues in 2018. Wholesale trade came second, accounting for 30% of total energy efficiency operating revenues at \$24.6 billion.

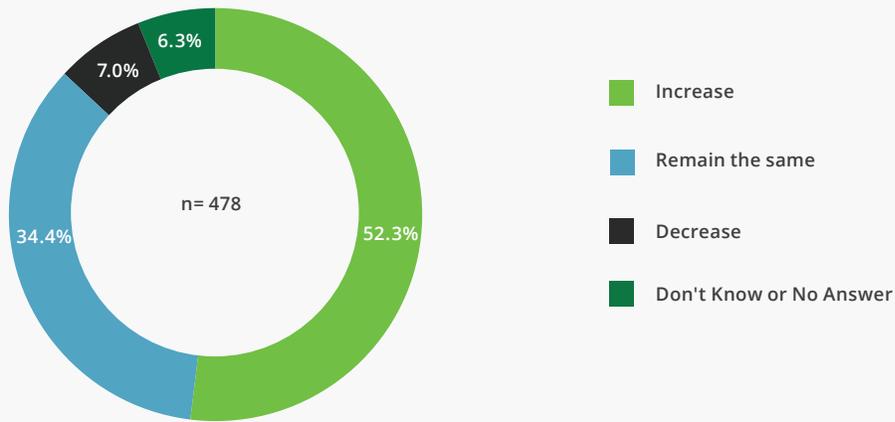
Table 1: Operating Revenue Contribution of Energy Efficiency by Major Industry, 2018

Industry	Industry Operating Revenue (in millions)	% of Industry Revenue Derived from Energy Efficiency	Energy Efficiency Operating Revenue (in millions)
Construction	\$348,584	10.8%	\$37,639
Manufacturing	\$838,911	1.5%	\$12,642
Wholesale Trade	\$707,321	3.5%	\$24,550
Professional & Business Services	\$952,694	0.7%	\$6,713
Utilities	\$39,939	1.9%	\$751
Other Services	\$44,172	0.8%	\$343
<b>TOTAL</b>	<b>\$2,931,621</b>	<b>2.8%</b>	<b>\$82,638</b>

<sup>9</sup> Calculated by multiplying total 2018 operating revenue by industry (Quarterly Survey of Financial Statements - Incorporated companies only. Source: Statistics Canada. Table 33-10-0007-01 Quarterly balance sheet and income statement by industry (x 1,000,000), Q1 to Q4 2018) by share of energy efficiency establishments in an industry and proportion of total gross revenue derived from energy efficiency according to survey responses. Does not include public expenditure on energy efficiency programs.

Energy efficiency employer respondents were generally positive about the future net revenues at their firms through 2019. Less than a tenth (7%) of employers predict that their net energy efficiency revenues are likely to decrease, while over half (52%) are optimistic that their net energy efficiency revenues are likely to increase over the next 12 months. The remaining 41% expect revenues to remain the same, did not know or did not provide a response.

Figure 5: Employers' Outlook on Future Net Revenues from Energy Efficiency



In terms of general opportunities to their business over the next 12 months, energy efficiency employers mentioned increases in the amount and quality of products and services they will offer, increases in energy efficiency demand, and a growing energy efficiency economy. Related to threats to business over the next 12 months, energy efficiency employers cited government or public sector activities (policy, taxes, program lapses, etc.), tariffs, competition, and labour shortages most frequently.

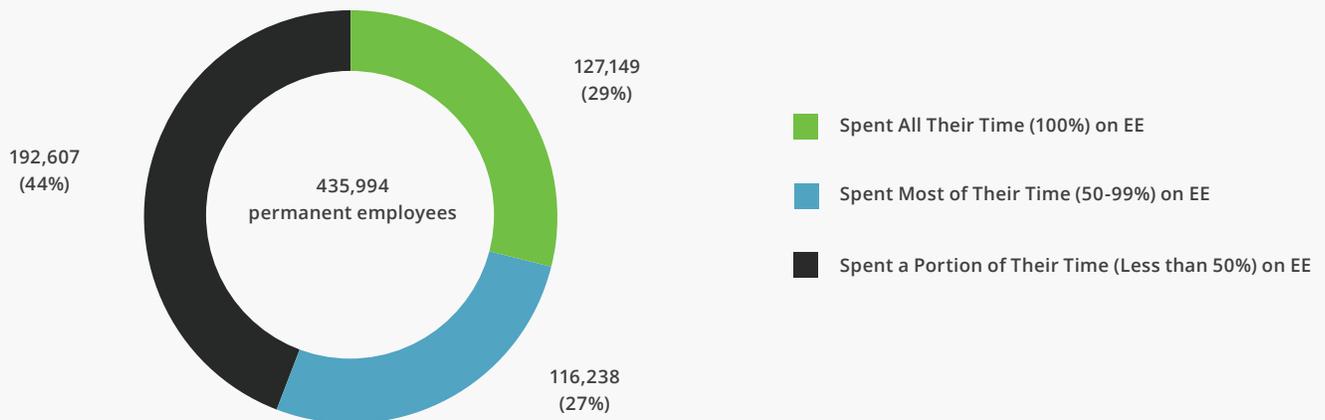


## Employment

All told, this study estimates close to 436,000 permanent workers were directly employed in Canada's energy efficiency sector in 2018, which represented approximately 2.3% of all jobs in Canada<sup>10</sup>.

Among the direct and permanent energy efficiency workforce, approximately 29% spent all their time, 27% spent most of their time, and 44% spent a portion of their time on energy efficiency activities (refer to Appendix C for breakdown per industry).

Figure 6: Energy Efficiency Employment by Work Intensity, 2018

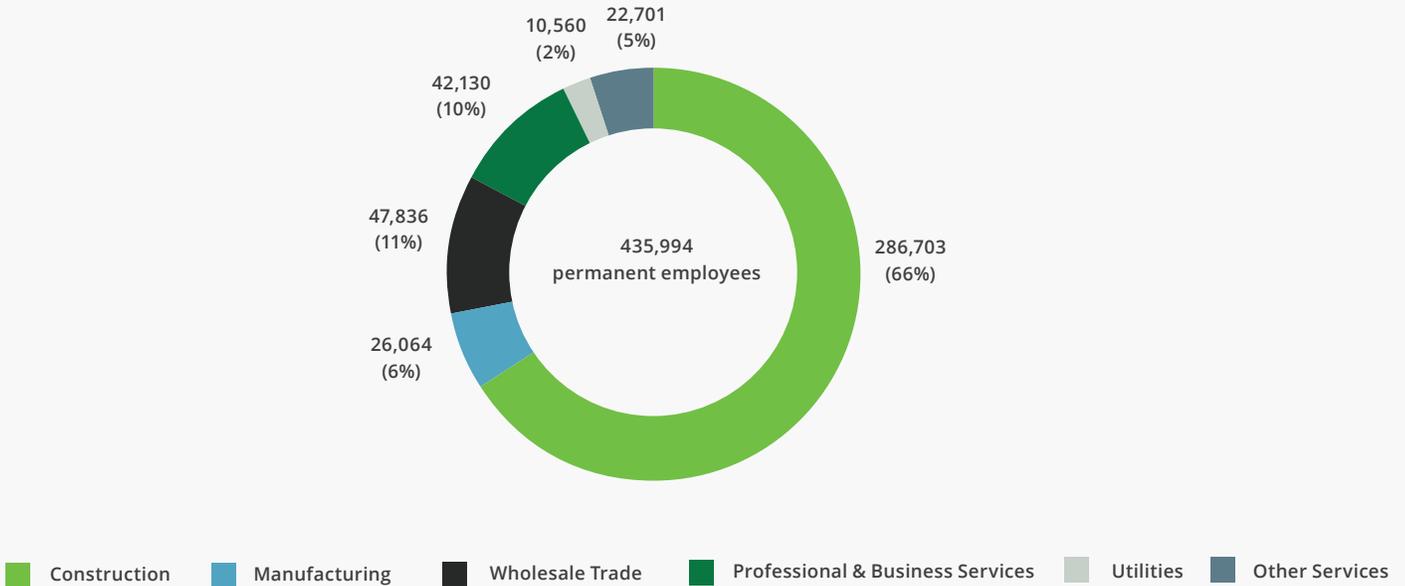


<sup>10</sup> Statistics Canada. [Table 14-10-0023-01 Labour force characteristics by industry, annual \(x 1,000\)](#), Total, all industries, 2017.

## Employment by Industry

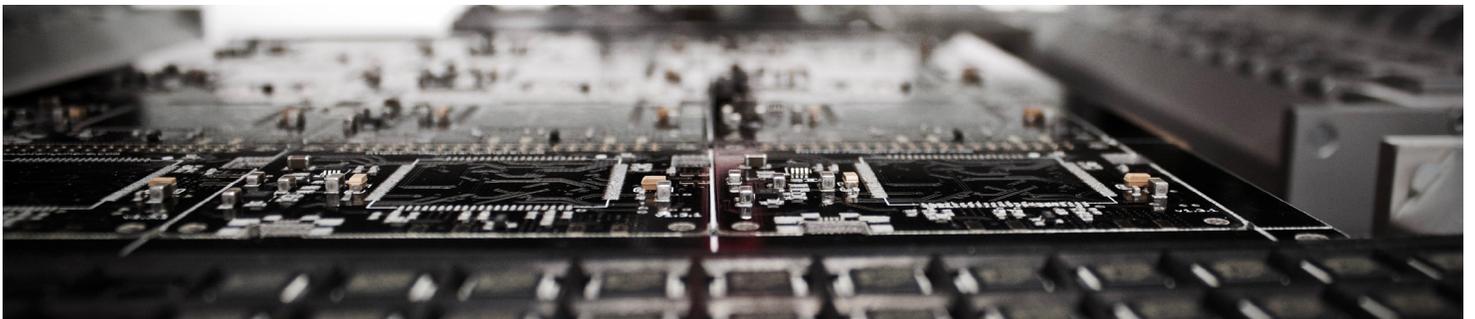
The largest number of energy efficiency workers in 2018 were employed in the Construction industry (66%).

Figure 7: Energy Efficiency Employment by Industry, 2018



The Canadian energy efficiency sector is focused on deployment activity (66% of all Canadian energy efficiency jobs in 2018 were in the Construction industry and 11% were in the Wholesale trade industry), demonstrating that growth is primarily driven by installing or servicing energy efficiency goods or performing energy efficiency related services.

The manufacture of ENERGY STAR® certified products represented just under 6% of the total energy efficiency workforce. However, the number represents a 4% increase from 2017.

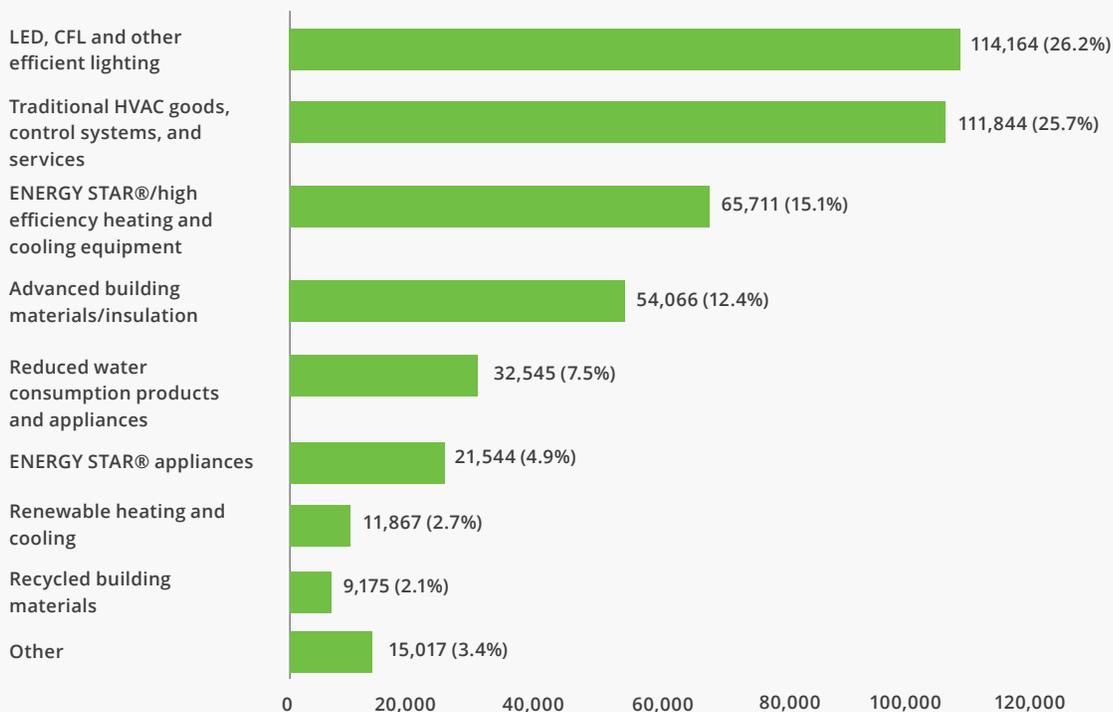


## Employment by Sub-Technology Application

Energy efficiency workers were also classified according to the detailed sub-technology area where they spent the most time.

The two sub-technology applications worked in most often are: LED, CFL and other efficient lighting (26.2% of 2018 employment); and HVAC goods, control systems, and services (25.7%)<sup>11</sup>. The third largest category of employment is ENERGY STAR®/high efficiency heating and cooling, followed by advanced materials.

Figure 8: Energy Efficiency Employment by Detailed Sub-Technology Application, 2018<sup>12</sup>



Note: The data presented are rough estimates and approximations as respondents were asked to specify only the sub-technology application where employees spent the most time and exclude who spent only a fraction of their time.

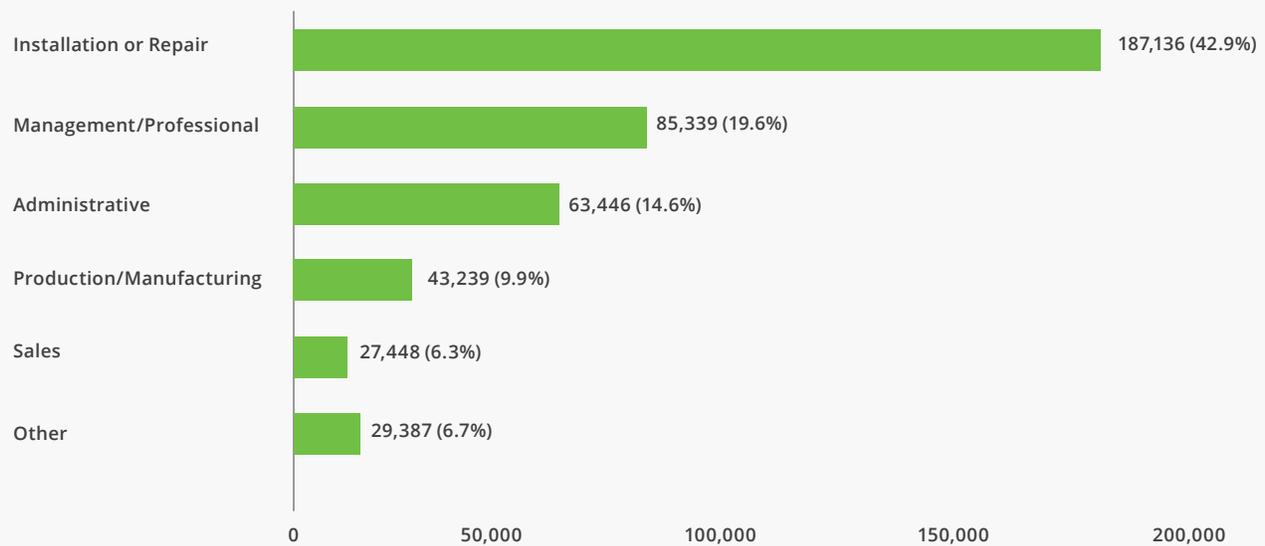
<sup>11</sup> These employees spent most of their time working with traditional HVAC goods and services, but a portion of their time was also dedicated to energy efficient technologies. This is an important distinction, particularly with installers, because most of these employees would also have specific training in high efficiency HVAC systems.

<sup>12</sup> The "other" category for the chart includes reduced water consumption products and appliances.

## Employment by Occupation

Occupational distribution of energy efficiency workers was also examined with nearly 42.9% employed in installation or repair jobs. About 19.6% of energy efficiency workers were in management/professional roles, 14.6% were in administrative positions, 9.9% were in production/manufacturing roles and 6.3% were in sales positions. The remaining 6.7% could not be classified and were therefore labelled as “Other”.

Figure 9: Energy Efficiency Jobs by Occupational Category, 2018



## Workforce Characteristics

The energy efficiency workforce is generally less diverse than the national workforce. Just under one-fifth or 18% of workers were reported to be female, and 2% were reported to be Indigenous, with both figures lower than national workforce averages. The gender proportion is not surprising considering the large number of energy efficiency workforce in the Construction industry which traditionally has low female participation.

Approximately 58% of energy efficiency workers were 35 or older; however, the sector had a higher proportion of younger workers between ages 18 and 34 than the national workforce figures (42% versus 33% respectively).

About a third of sector workers (31%) were identified as holding an associate degree, academic certificate, bachelor's degree or beyond (compared to 2/3 of national workforce averages) with slightly fewer (28%) holding a vocational or technical postsecondary certificate or credential. For each category of credential, the energy efficiency workforce proportions are lower than the national workforce averages.

Table 2: Demographics - Energy Efficiency, 2018<sup>13</sup>

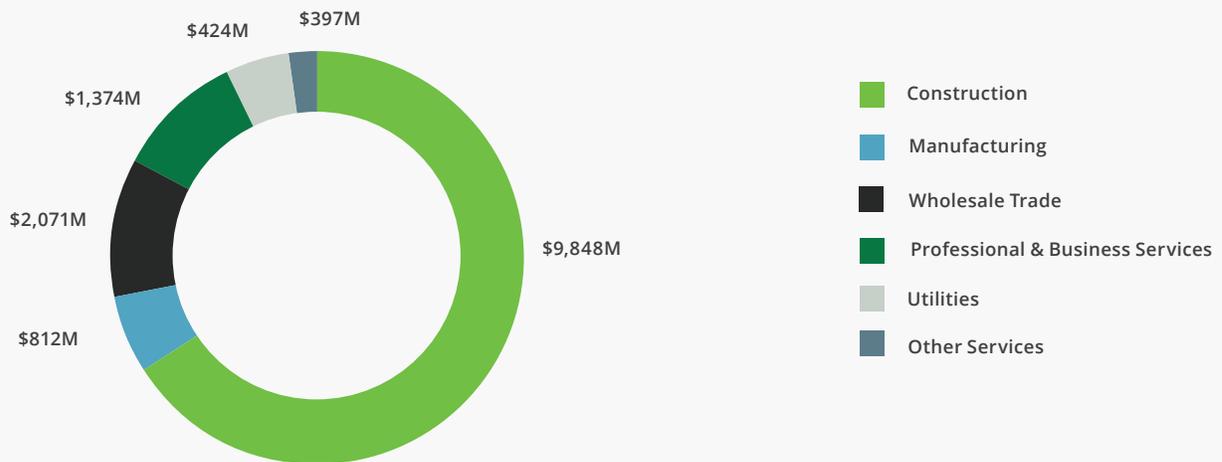
	Demographic	Employees	Percent of Sector	National Workforce Averages	National Population Averages
Gender	Male	358,061	82%	52%	49%
	Female	77,933	18%	48%	51%
Cultural	Indigenous persons	9,847	2%	3%	3%
Age	18-34 years old	183,058	42%	33%	23%
	35-54 years old	192,928	44%	44%	28%
	55 and over	60,008	14%	25%	49%
Education Level	Held at most a bachelor's degree or beyond	61,736	14%	31%	26%
	Held at most an associate degree or academic certificate	73,804	17%	36%	32%
	Held at most a vocational or technical post-secondary certificate or credential	122,453	28%	36%	32%

<sup>13</sup> Workforce and population averages for "associate degree or academic certificate" and "vocational or technical postsecondary certificate or credential" are from the same source due to definitional discrepancies. Reported percentages are for "postsecondary certificate or diploma." Workforce and population averages are ages 15+ and were provided by the Statistics Canada Labour Force Survey, Tables 14-10-0018-01 (Labour force characteristics by sex and detailed age group, annual, 2018), 14-10-0359-01 (Labour force characteristics by Aboriginal group and educational attainment, annual), and 14-10-0019-01 (Labour force characteristics by educational attainment, monthly, unadjusted for seasonality, December 2018).

## Employment Income

Estimated employment income for all energy efficiency workers across the six industries amounted to \$14.9 billion (\$2018).

Figure 10: Energy Efficiency Total Employment Income by Industry (\$2018)<sup>14</sup>

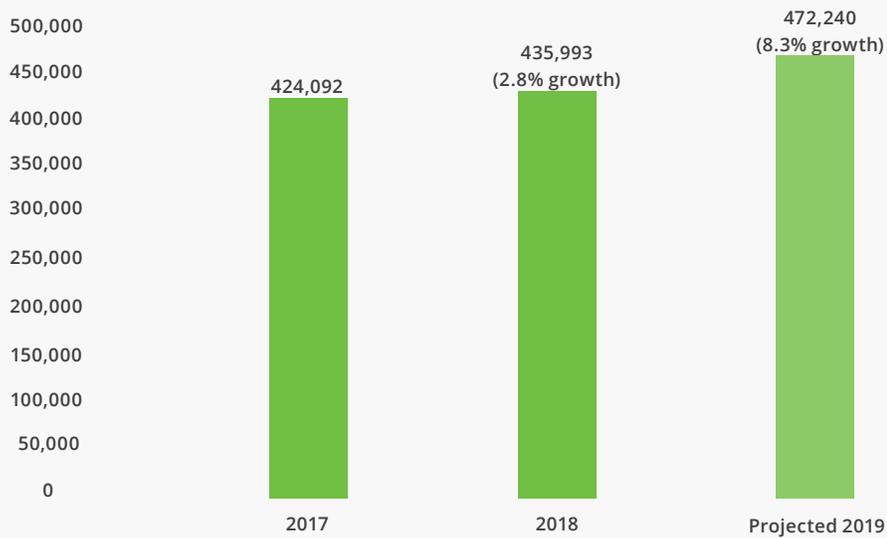


<sup>14</sup> Sources: Average employment income for each industry is from Statistics Canada's 2016 Census (Statistics Canada Table 98-400-X2016300, Income Statistics (17), Occupation - National Occupational Classification (NOC) 2016 (13A), Industry - North American Industry Classification System (NAICS) 2012 (23A) and Work Activity During the Reference Year (9) for the Population Aged 15 Years and Over) and adjusted from 2015 dollars to 2018 dollars using Statistics Canada's Consumer Price Index (Statistics Canada Table 18-10-0005-01, Consumer Price Index, annual average, not seasonally adjusted). Where an industry is comprised of multiple NAICS (e.g., Professional & Business Services - NAICS 51, 52, 53, 54, 55 and 56), a weighted average employment income is calculated using the number of workers with employment income in each NAICS. Estimated full time equivalents (FTE) are calculated using the assumption that energy efficiency workers who spent all their time on energy efficiency engage in energy efficiency activities 100% of the time, those who spent a majority but not all of their time on energy efficiency engage in energy efficiency activities 75% of the time and other energy efficiency workers engage in energy efficiency activities 25% of the time.

## Employment Outlook

Energy efficiency employment grew by almost 2.8% from 2017 to 2018, compared to 1.0% for all jobs nationally<sup>15</sup>. From 2018 to 2019, employment is projected to further increase by over 36,000 new jobs, reflecting an 8.3% growth.

Figure 11: Energy Efficiency Employment, 2017 to 2019

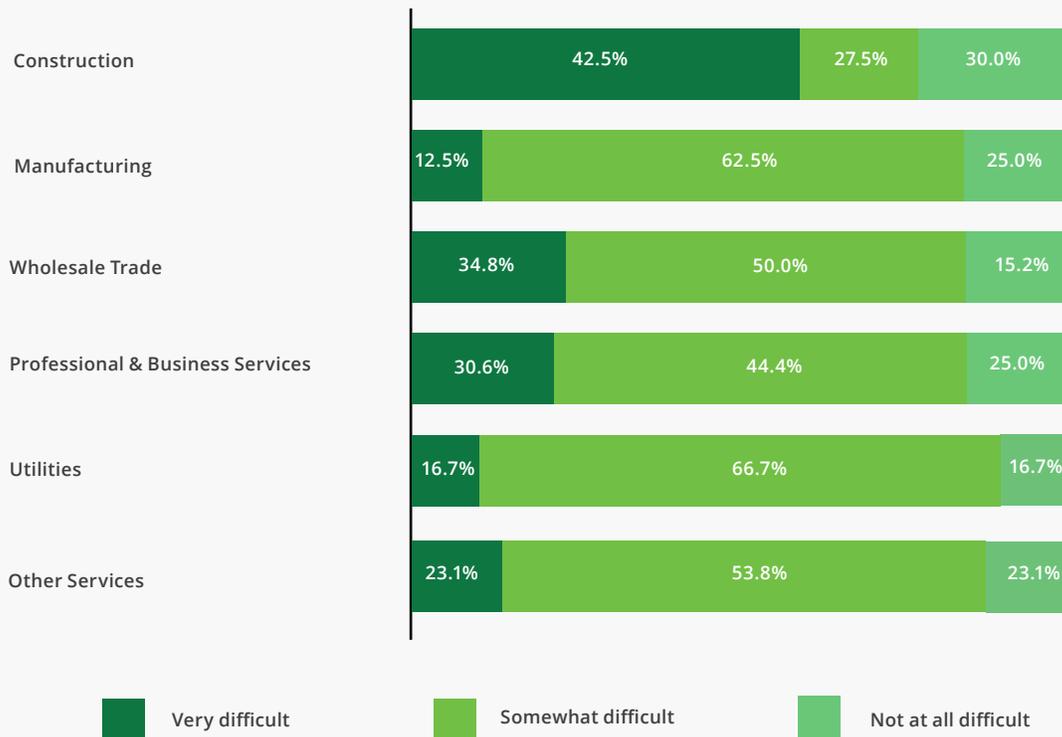


<sup>15</sup> Statistics Canada [Table 14-10-0023-01 Labour force characteristics by industry, annual \(x 1,000\)](#), Total, all industries, 2017.

## Hiring Challenges

At least 70% of energy efficiency employers in each of the industries report at least some difficulty in hiring suitable employees within the past 12 months. The industries which found hiring to be “very difficult” are Construction (almost half at 43%) and Wholesale trade (about one-third at 35%).

Figure 12: Hiring Difficulty by Industry - Energy Efficiency, 2018



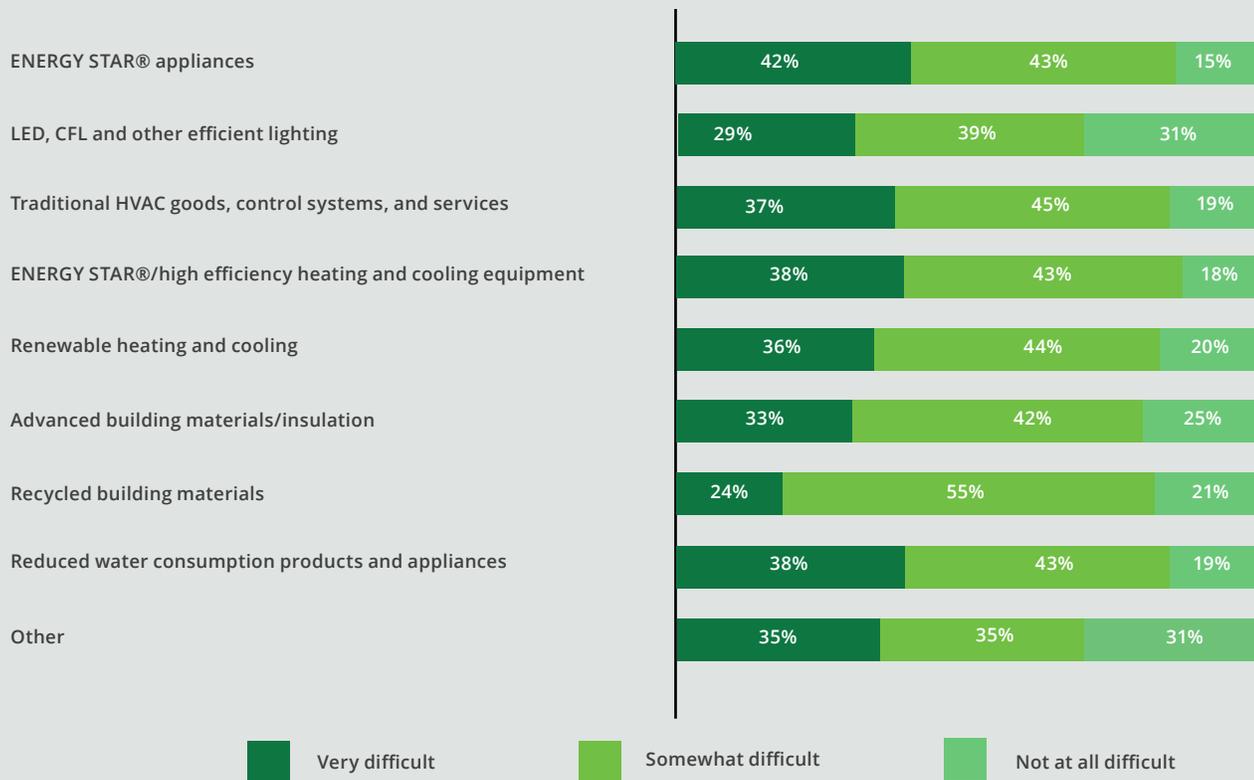
Lack of qualified workers was most frequently cited as a reason for hiring difficulty across the energy efficiency industries. Labour shortages, poor work ethic and job factors such as wages, location and the like were also cited but varied from industry to industry.

The occupations which were difficult to fill varied widely across industry. The variations in responses by industry reflect both the kinds of positions employers needed to fill most often, as well as the difficulty in filling them. An exception however are technicians or technical support roles which were cited as difficult to fill across all industries except in Professional and business services (Refer to Chapter 3. Energy Efficiency by Industry for more details).

## SPOTLIGHT: HIRING DIFFICULTY BY SUB-TECHNOLOGY APPLICATION

A review of hiring challenges by sub-technology application revealed a few noteworthy statistics:

Figure 13: Hiring Difficulty within Energy Efficiency by Sub-Technology Application, 2018



Note: Number in the table should be taken as approximations only. Employers were not asked to classify the degree of hiring difficulty within each sub-technology. If an establishment had multiple technologies, the same "difficulty level" was applied.

Looking within the energy efficiency technology, more than 2/3 overall report it is at least somewhat difficult to hire qualified candidates.

Those that were reportedly "very difficult" or "somewhat difficult" to hire:

- ENERGY STAR® appliances (85%)
- Traditional HVAC goods, control systems and services (82%)
- ENERGY STAR®/high efficiency heating and cooling equipment (81%)
- Reduced water consumption products and appliances (81%)

### 3. Energy Efficiency by Industry

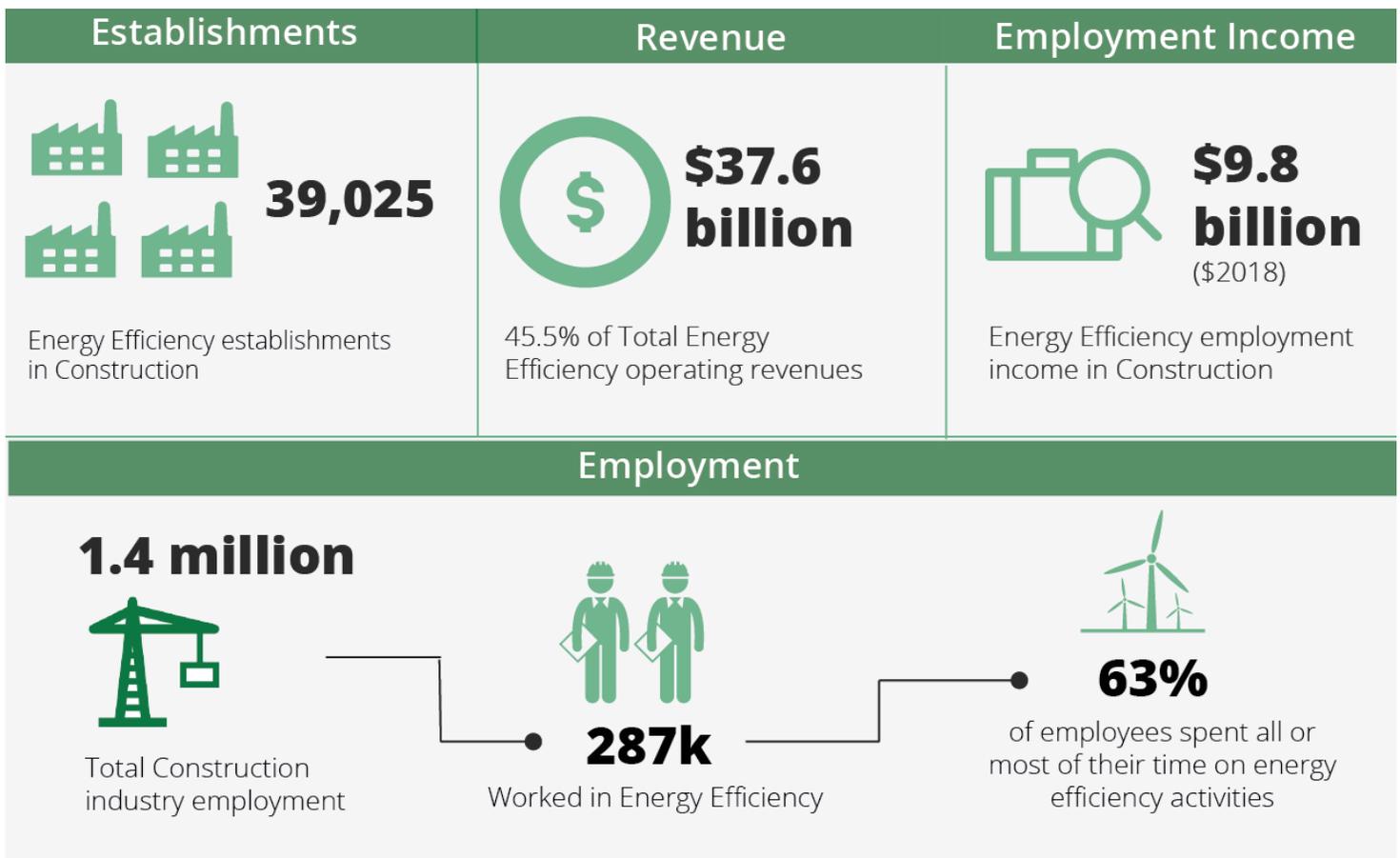
This section details energy efficiency workforce numbers for each industry included in the study with only a limited selection of data shown graphically. Appendix C provides comparative data tables of energy efficiency employment and hiring challenges across the six industries.

#### Construction

##### Establishments, Revenues and Employment

In 2018, there were a little over 39,000 energy efficiency construction establishments<sup>16</sup> in Canada with estimated energy efficiency operating revenues of about \$37.6 billion.

Figure 14: Energy Efficiency Construction Establishments, Revenues and Employment, 2018



<sup>16</sup> Establishments are extrapolated from incidence and applied to total establishment counts provided by Statistics Canada. Table 33-10-0040-01 Canadian Business Counts, with employees, June 2016.

Approximately 286,700 or 2/3 of energy efficiency workers identified were employed in construction firms, representing nearly 20% of all 1.4 million construction jobs nationwide<sup>17</sup>. Of the 286,700 energy efficiency construction workers, 63% or 180,700 spent all or most of their time in energy efficiency activities.

Over \$9.8 billion (\$2018) in estimated energy efficiency employment income were generated by all energy efficiency construction workers in 2018.

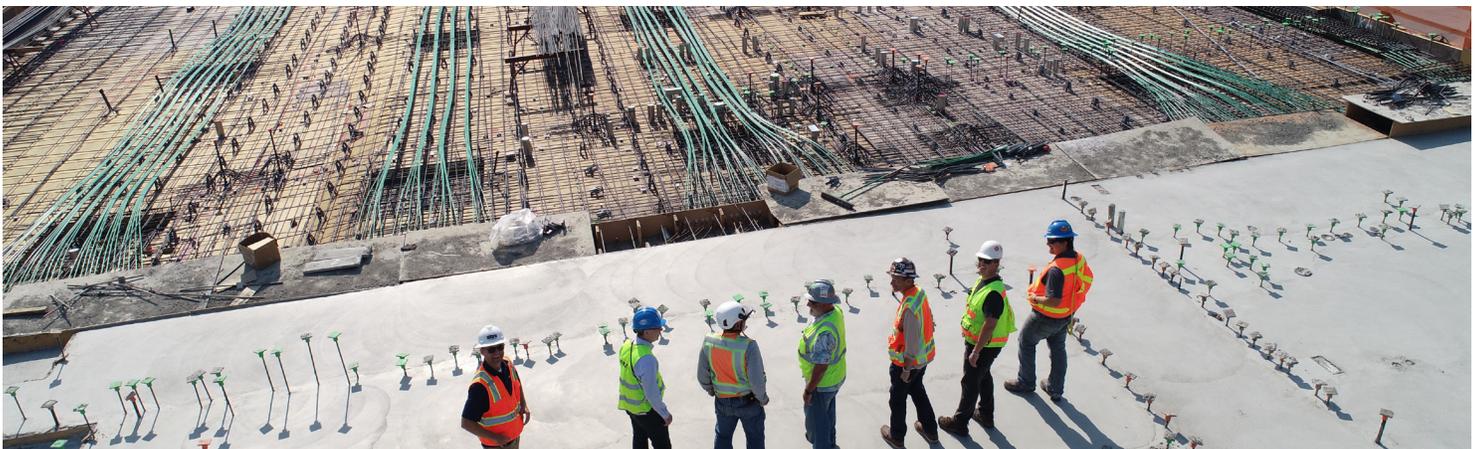
## Employment Breakdown

Construction workers across the energy efficiency sector were primarily engaged in traditional HVAC, high efficiency heating and cooling equipment as well as LED, CFL and other efficient lighting; together, these sub-technology applications accounted for 72% of construction-related work in the energy efficiency sector. Advanced materials also supported a significant amount of construction employment—with over 32,000 jobs in 2018.

Most of the energy efficiency construction workforce were installation or repair workers (58%) with next largest group employed in management/professional roles (17%).

Just 13% of energy efficiency construction jobs were held by women, compared to 48% across all jobs in Canada. 57% of the sector was age 35 or older, but the sector had a higher proportion of workers between ages 18 and 34 than the national workforce average.

A quarter of workers held an associate degree, academic certificate, bachelor's degree or beyond (compared to 2/3 of national workforce averages) and 3% fewer workers than the national workforce averages held a vocational or technical postsecondary certificate or credential. Additionally, over four times the number of employees in energy efficiency construction held a vocational or technical postsecondary certificate or credential than a bachelor's degree or beyond.



<sup>17</sup> Source: Statistics Canada. [Table 14-10-0023-01 Labour force characteristics by industry, annual \(x 1,000\), 2017.](#)

Table 3: Demographics - Energy Efficiency Construction, 2018<sup>18</sup>

	Demographic	Employees	Percent of Sector	National Workforce Averages
Gender	Male	248,814	87%	52%
	Female	37,889	13%	48%
Cultural	Indigenous persons	7,608	3%	3%
Age	18-34 years old	125,122	44%	33%
	35-54 years old	125,288	44%	44%
	55 and over	36,294	13%	25%
Education Level	Held at most a bachelor's degree or beyond	21,831	8%	31%
	Held at most an associate degree or academic certificate	49,816	17%	36%
	Held at most a vocational or technical post-secondary certificate or credential	94,523	33%	36%

<sup>18</sup> Sources: Statistics Canada Labour Force Survey, Tables 14-10-0018-01 (Labour force characteristics by sex and detailed age group, annual, 2018), 14-10-0359-01 (Labour force characteristics by Aboriginal group and educational attainment, annual), and 14-10-0019-01 (Labour force characteristics by educational attainment, monthly, unadjusted for seasonality, December 2018). Refer to footnote #13 for additional details.

## Employment Outlook and Hiring Challenges

The energy efficiency construction workforce is expected to grow by 8.3% from 2018 to 2019, which is in line with the overall growth rate for the energy efficiency sector workforce (also at 8.3%). In comparison, the projected growth rate for the overall Construction industry in Canada is more moderate at 4.1%.

Most (70%) of the energy efficiency construction establishments surveyed indicated hiring difficulties were experienced within the last 12 months from the time of survey. 42.5% reported hiring was “very difficult” while 27.5% indicated it was “somewhat difficult”.

Installers were cited to be the most difficult to hire (45% of respondents).

Table 4: Hiring Difficulties within Energy Efficiency Construction, 2018

Top Three Reasons for Hiring Difficulties	Top Three Occupations with Hiring Difficulties
<ul style="list-style-type: none"> <li>Lack of qualified workers (30%)</li> </ul>	<ul style="list-style-type: none"> <li>Installation workers (45%)</li> </ul>
<ul style="list-style-type: none"> <li>Labour shortage (28%)</li> </ul>	<ul style="list-style-type: none"> <li>Technicians or technical support roles (28%)</li> </ul>
<ul style="list-style-type: none"> <li>Lack of skills (26%)</li> </ul>	<ul style="list-style-type: none"> <li>Trades (plumbing, electrician, etc.) (17%)</li> </ul>

Note: percentages are based on employers saying it as “very difficult” or “somewhat difficult” to find qualified energy efficiency applicants.



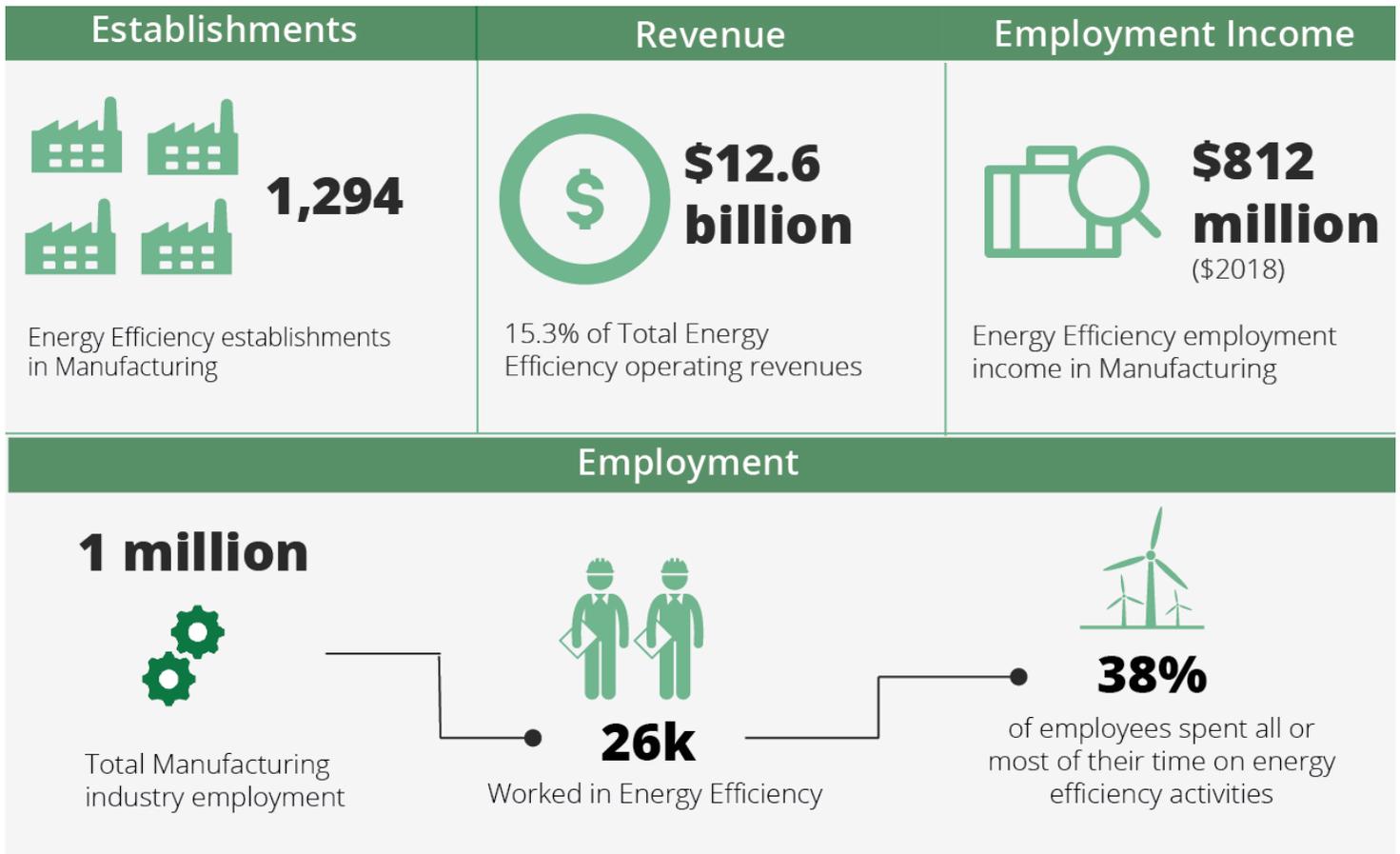
## Manufacturing

### Establishments, Revenues and Employment

In 2018, there were approximately 1,300 energy efficiency manufacturing establishments in Canada which directly employed 26,100 energy efficiency workers. This employment number equates to just under 6% of energy efficiency sector employment and 2.5% of all manufacturing jobs nationwide<sup>19</sup>. About 9,800 (or 38% of the 26,100) workers spent all or most of their time manufacturing energy efficiency products.

These manufacturing establishments generated \$12.6 billion in estimated energy efficiency operating revenues in 2018. Close to \$812 million (\$2018) in energy efficiency employment income were gained by all energy efficiency manufacturing workers.

Figure 15: Energy Efficiency Manufacturing Establishments, Revenues and Employment, 2018



<sup>19</sup> Source: Statistics Canada. Table 14-10-0023-01 Labour force characteristics by industry, annual (x 1,000), 2017.

## Employment Breakdown

Approximately 15,900 manufacturing employees or nearly 61% of efficiency-related manufacturing workers were in LED, CFL, and other efficient lighting — representing a large concentration of jobs in the industry. Over half (55%) of the manufacturing workforce involved in energy efficiency were in production and manufacturing jobs.

Almost a quarter of energy efficiency workers in the Manufacturing industry were women compared to 48% nationwide across all jobs in Canada. About 55% of the sector was over the age of 35, but the sector had a higher proportion of workers aged 18 and 34 than the national average.

Related to education and training, just 28% of sector workers held an associate degree, academic certificate, bachelor's degree or beyond (compared to 2/3 of national workforce averages) and the proportion of workers that held a vocational or technical postsecondary certificate or credential is 23 percentage points below the national average. Unlike other sectors, the proportion of employees in energy efficiency manufacturing who held a vocational or technical postsecondary certificate or credential was roughly equal to those that held a bachelor's degree or beyond.

Table 5: Demographics - Energy Efficiency Manufacturing, 2018<sup>20</sup>

	Demographic	Employees	Percent of Sector	National Workforce Averages
Gender	Male	20,175	77%	52%
	Female	5,889	23%	48%
Cultural	Indigenous persons	386	1%	3%
Age	18-34 years old	11,847	45%	33%
	35-54 years old	10,850	42%	44%
	55 and over	3,367	13%	25%
Education Level	Held at most a bachelor's degree or beyond	3,388	13%	31%
	Held at most an associate degree or academic certificate	4,013	15%	36%
	Held at most a vocational or technical post-secondary certificate or credential	3,483	13%	36%

<sup>20</sup> Sources: Statistics Canada Labour Force Survey, Tables 14-10-0018-01 (Labour force characteristics by sex and detailed age group, annual, 2018), 14-10-0359-01 (Labour force characteristics by Aboriginal group and educational attainment, annual), and 14-10-0019-01 (Labour force characteristics by educational attainment, monthly, unadjusted for seasonality, December 2018). Refer to footnote #13 for additional details.

## Employment Outlook and Hiring Challenges

Energy efficiency manufacturing jobs are expected to increase by 8.5% from 2018 to 2019. Like the Construction industry, this job growth rate is significantly higher than the overall rate for the Manufacturing industry, which is projected to be 4.5%.

While over 3/4 of the survey respondents indicated experiencing hiring difficulties within the last 12 months, the degree of hiring difficulty for manufacturing establishments varied significantly from the Construction industry. Only 12.5% of energy efficiency manufacturing establishments reported hiring was “very difficult” while 62.5% indicated it was “somewhat difficult”.

Not surprisingly, manufacturing and production positions and trades roles were reportedly difficult to hire or fill. Lack of skills, labour shortage and lack of willingness to work were reportedly the main drivers for the hiring challenges.

Table 6: Hiring Difficulties within Energy Efficiency Manufacturing, 2018

Top Three Reasons for Hiring Difficulties	Top Three Occupations with Hiring Difficulties
<ul style="list-style-type: none"> <li>Lack of skills (30%)</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing or production positions (40%)</li> </ul>
<ul style="list-style-type: none"> <li>Labour shortage (20%)</li> </ul>	<ul style="list-style-type: none"> <li>Trades (plumbing, electrician, etc.) (40%)</li> </ul>
<ul style="list-style-type: none"> <li>Lack of willingness to work/work ethic/reliability (20%)</li> </ul>	<ul style="list-style-type: none"> <li>Technicians or technical support roles (20%)</li> </ul>

Note: percentages are based on employers saying it as “very difficult” or “somewhat difficult” to find qualified energy efficiency applicants.



## Wholesale Trade

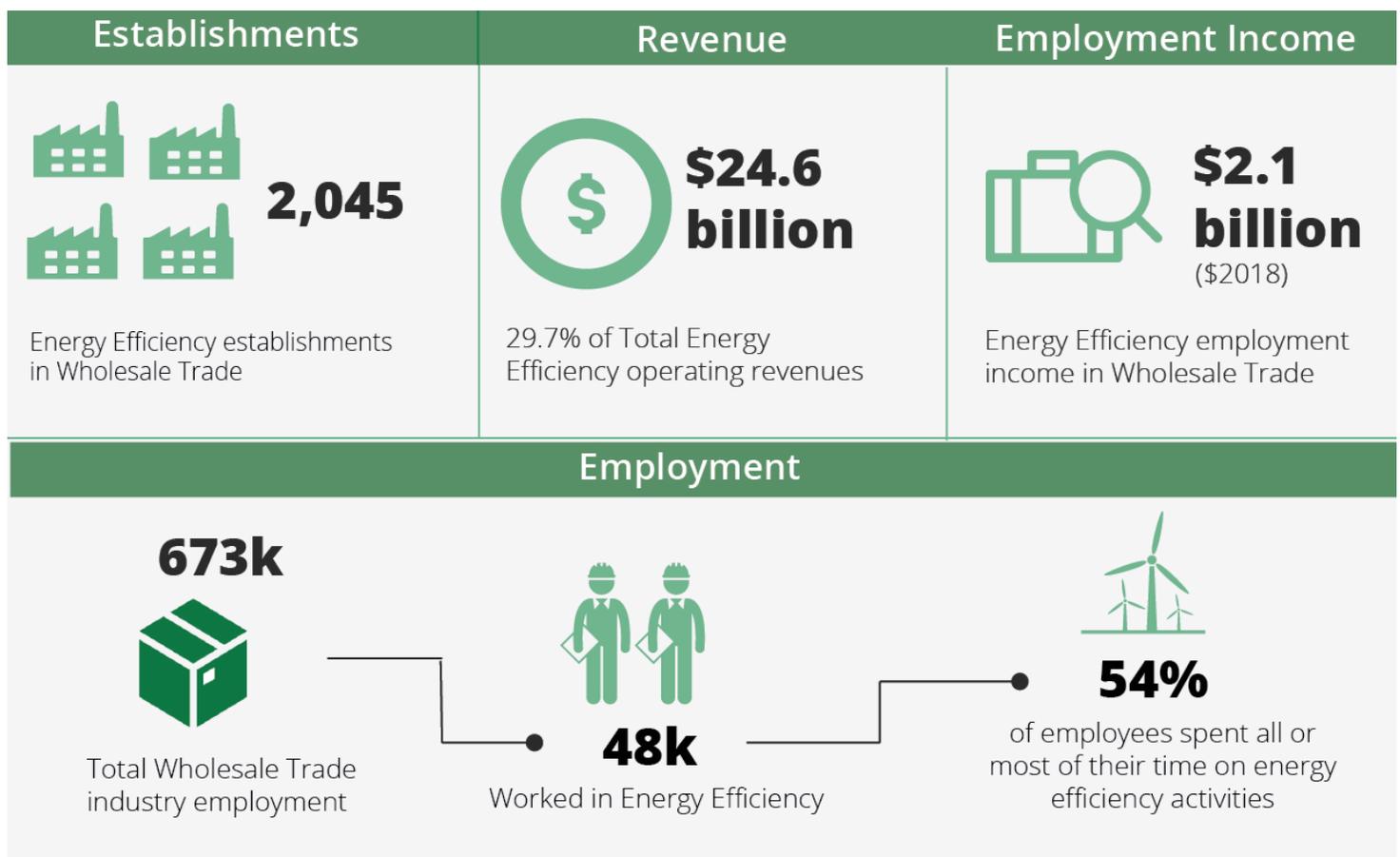
### Establishments, Revenues and Employment

There were more than 2,000 energy efficiency wholesale trade establishments that generated \$24.6 billion in energy efficiency operating revenues in 2018.

About 47,800 workers were involved in the wholesale trade of energy efficiency products, which equated to 7% of the 673,400 total industry workers nationwide<sup>21</sup>. More than half (54%) spent all or most of their time working with energy efficiency products.

All energy efficiency workers in the industry generated \$2.1 billion (\$2018) in estimated employment income from energy efficiency work.

Figure 16: Energy Efficiency Wholesale Trade Establishments, Revenues and Employment, 2018



<sup>21</sup> Source: Statistics Canada. Table 14-10-0023-01 Labour force characteristics by industry, annual (x 1,000), 2017.

## Employment Breakdown

Nearly twice the number of people worked in LED, CFL and other efficient lighting (29%) than any other sub-technology application. However, sector activity within the industry was spread across most categories. Half of the energy efficiency wholesale trade workforce was classified as either in administrative (25%) or sales positions (25%).

More than 20% of energy efficiency wholesale trade workforce were women. A majority (62%) of the sector was over the age of 35, but the sector had a slightly higher proportion of workers aged 18 and 34 than the national averages.

Related to education and training, almost 1/3 of workers held an associate degree, academic certificate, bachelor's degree or beyond (compared to 2/3 of national workforce averages) and the proportion of workers that held a vocational or technical postsecondary certificate or credential was below the national workforce average. That said, the proportion of employees in energy efficiency wholesale trade who held a vocational or technical postsecondary certificate or credential was higher than those that held a bachelor's degree or beyond.

Table 7: Demographics - Energy Efficiency Wholesale Trade, 2018<sup>22</sup>

	Demographic	Employees	Percent of Sector	National Workforce Averages
Gender	Male	37,136	78%	52%
	Female	10,700	22%	48%
Cultural	Indigenous persons	713	1%	3%
Age	18-34 years old	17,972	38%	33%
	35-54 years old	21,201	44%	44%
	55 and over	8,663	18%	25%
Education Level	Held at most a bachelor's degree or beyond	6,851	14%	31%
	Held at most an associate degree or academic certificate	8,675	18%	36%
	Held at most a vocational or technical post-secondary certificate or credential	11,473	24%	36%

<sup>22</sup> Sources: Statistics Canada Labour Force Survey, Tables 14-10-0018-01 (Labour force characteristics by sex and detailed age group, annual, 2018), 14-10-0359-01 (Labour force characteristics by Aboriginal group and educational attainment, annual), and 14-10-0019-01 (Labour force characteristics by educational attainment, monthly, unadjusted for seasonality, December 2018). Refer to footnote #13 for additional details.

## Employment Outlook and Hiring Challenges

Unlike the projected job growth for the previous two industries, wholesale trade establishments expect the workforce to grow by 6.8% from 2018 to 2019, which is not significantly different from the 4.8% overall growth rate for the industry workforce.

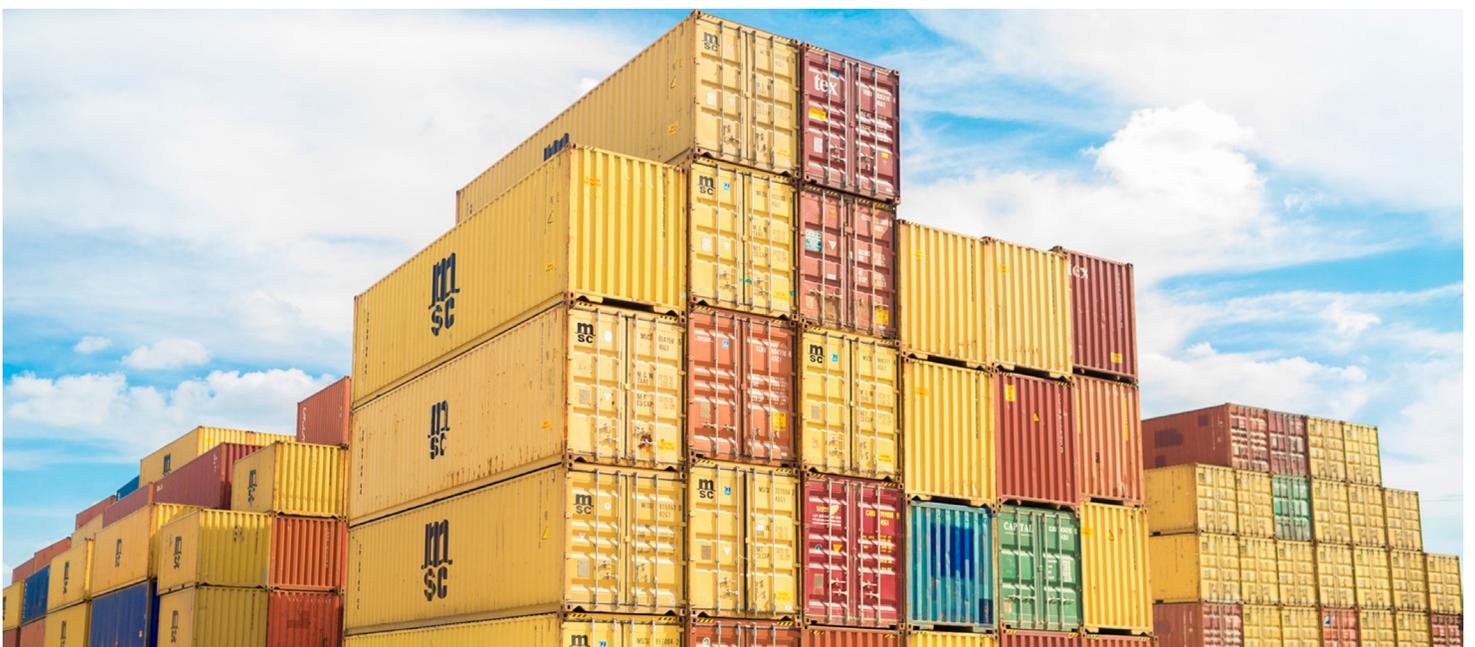
Approximately 85% of the survey respondents indicated experiencing hiring difficulties within the last 12 months. Almost 35% reported hiring was “very difficult” while 50% indicated it was “somewhat difficult”.

Among establishments who experienced hiring difficulties, many cited encountering challenges hiring marketing or customer service representatives. Lack of qualified workers and labour shortage were some of the reported reasons for the hiring difficulties.

Table 8: Hiring Difficulties within Energy Efficiency Wholesale Trade, 2018

Top Three Reasons for Hiring Difficulties	Top Three Occupations with Hiring Difficulties
<ul style="list-style-type: none"> <li>Lack of qualified workers (29%)</li> <li>Labour shortage (29%)</li> <li>Lack of education/certifications/training (29%)</li> </ul>	<ul style="list-style-type: none"> <li>Sales, marketing or customer service representatives (47%)</li> <li>Technicians or technical support roles (19%)</li> <li>Administrative support roles (11%)</li> </ul>

Note: percentages are based on employers saying it as “very difficult” or “somewhat difficult” to find qualified energy efficiency applicants.



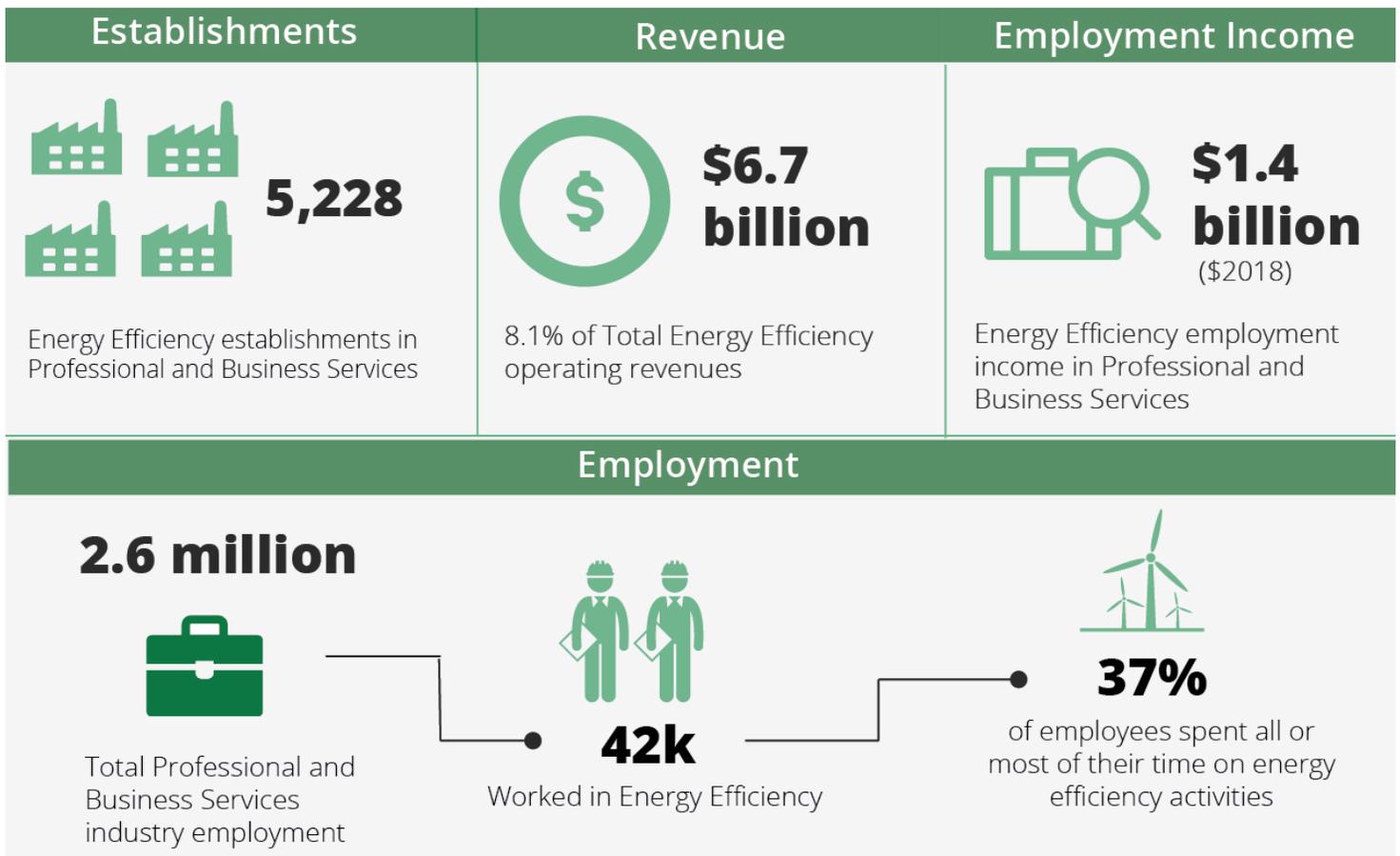
## Professional and Business Services

### Establishments, Revenues and Employment

There were more than 5,200 professional and business service energy efficiency establishments across Canada in 2018. These establishments generated an estimated \$6.7 billion in operating revenues and distributed \$1.4 billion (\$2018) in employment income specific to energy efficiency.

Over 42,100 workers supported energy-efficient goods and services through engineering and design, software development, finance, management, and legal services in 2018 (2% of the more than 2.6 million total professional and business services workers nationwide<sup>23</sup>). Approximately 37%, or 15,800 of these workers, spent all or most of their time on energy efficiency work.

Figure 17: Energy Efficiency Professional and Business Services Establishments, Revenues and Employment, 2018



<sup>23</sup> Source: Statistics Canada. Table 14-10-0023-01 Labour force characteristics by industry, annual (x 1,000), 2017.

## Employment Breakdown

Over 25% of energy efficiency employees in the Professional and business services industry mostly worked with traditional HVAC goods, though 21% worked with advanced building materials/insulation.

Over half of the workforce (54%) were in management/professional roles.

More than 1/3 of energy efficiency professional and business service jobs in 2018 were held by women (compared to 48% in national workforce averages) — the highest across the six industries. A majority (60%) of the sector was aged 35 or older, but the sector had a slightly higher proportion of workers between 18 and 34 than the national workforce averages. Related to education and training, over 2/3 of sector workers held an associate degree, academic certificate, bachelor's degree or beyond (higher than the national workforce average). About 55% of workers held a bachelor's degree or higher (24 percentage points higher than the national average and 36 percentage points higher than the next closest sector), while only 11% of workers held a vocational or technical postsecondary certificate or credential.

Table 9: Demographics - Energy Efficiency Professional and Business Services, 2018<sup>24</sup>

	Demographic	Employees	Percent of Sector	National Workforce Averages
Gender	Male	27,537	65%	52%
	Female	14,593	35%	48%
Cultural	Indigenous persons	270	1%	3%
Age	18-34 years old	16,795	40%	33%
	35-54 years old	19,451	46%	44%
	55 and over	5,884	14%	25%
Education Level	Held at most a bachelor's degree or beyond	23,258	55%	31%
	Held at most an associate degree or academic certificate	6,727	16%	36%
	Held at most a vocational or technical post-secondary certificate or credential	4,821	11%	36%

<sup>24</sup> Sources: Statistics Canada Labour Force Survey, Tables 14-10-0018-01 (Labour force characteristics by sex and detailed age group, annual, 2018), 14-10-0359-01 (Labour force characteristics by Aboriginal group and educational attainment, annual), and 14-10-0019-01 (Labour force characteristics by educational attainment, monthly, unadjusted for seasonality, December 2018). Refer to footnote #13 for additional details.

## Employment Outlook and Hiring Challenges

Although the energy efficiency workforce was relatively small within the Professional and business services industry at large, it's expected to grow by 13.8% from 2018 to 2019 — the highest amongst the six industries included in this study. In comparison, the overall Professional and business service industry in Canada is projected to grow by only 3.5%.

Approximately 3/4 of professional and business services survey respondents indicated experiencing hiring difficulties within the last 12 months. Over 30% reported hiring was “very difficult” while close to 45% indicated it was “somewhat difficult”.

Respondents had trouble hiring for administrative support roles, designers or architects and engineers. Lack of qualified workers, particularly around education/certifications/training requirements was cited as a key reason for the hiring challenges.

Table 10: Hiring Difficulties within Energy Efficiency Professional and Business Services, 2018

Top Three Reasons for Hiring Difficulties	Top Three Occupations with Hiring Difficulties
<ul style="list-style-type: none"> <li>• Lack of education/certifications/training (59%)</li> <li>• Lack of experience (32%)</li> <li>• Lack of skills (26%)</li> </ul>	<ul style="list-style-type: none"> <li>• Administrative support roles (33%)</li> <li>• Designers or architects (28%)</li> <li>• Engineers (28%)</li> </ul>

Note: percentages are based on employers saying it as “very difficult” or “somewhat difficult” to find qualified energy efficiency applicants.

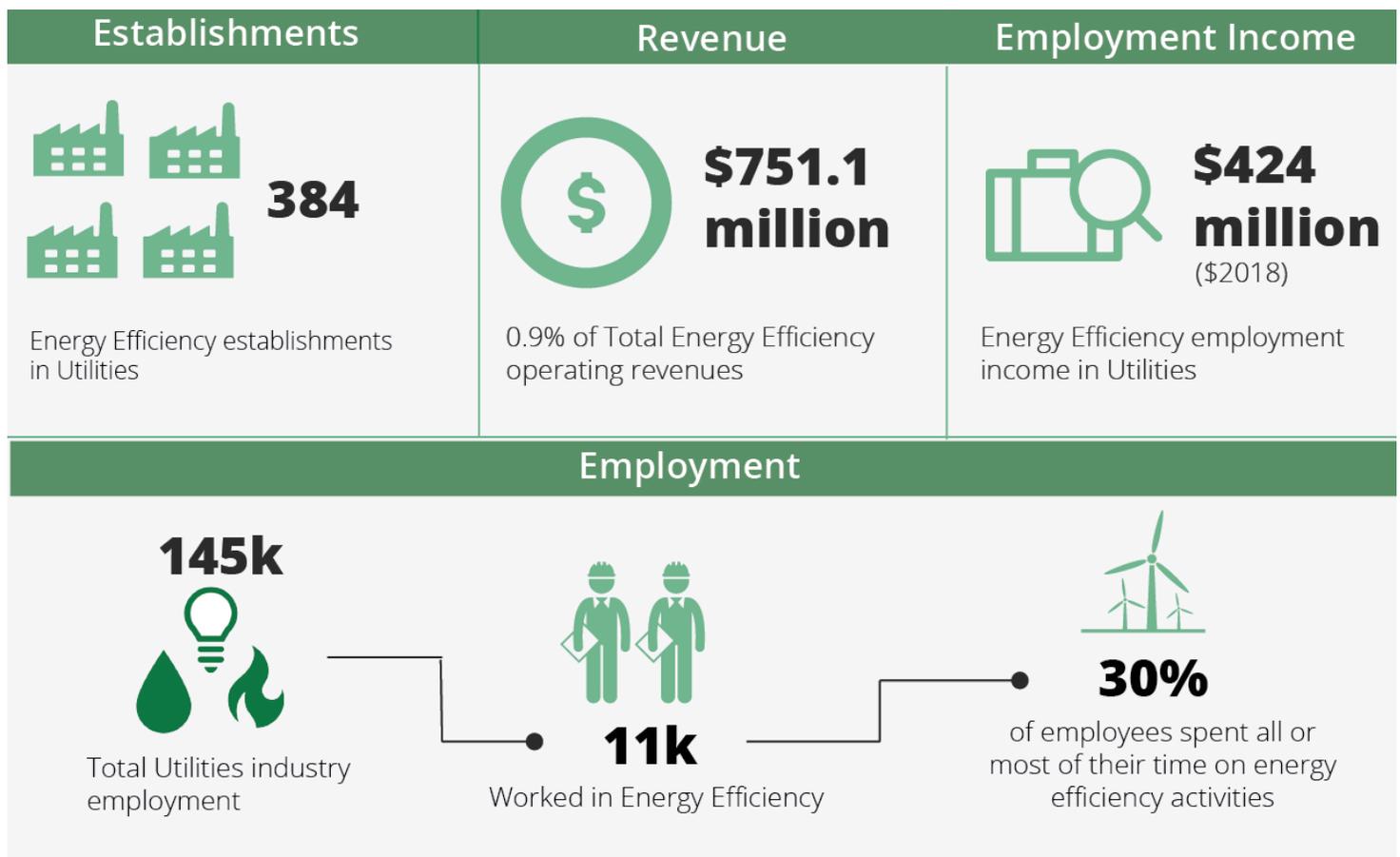


## Utilities

### Establishments, Revenues and Employment

In 2018, approximately 10,600 utilities workers (or 7% of the 145,400 employees in the Utilities industry across Canada<sup>25</sup>) spent some of their time working with energy efficiency products or services at 384 establishments. These establishments generated \$751.1 million in energy efficiency operating revenues, which equated to nearly 1% of total energy efficiency operating revenues in Canada. They also distributed an estimated \$424 million (\$2018) in energy efficiency-related employment income to their energy efficiency employees.

Figure 18: Energy Efficiency Utilities Establishments, Revenues and Employment, 2018



<sup>25</sup> Source: Statistics Canada. Table 14-10-0023-01 Labour force characteristics by industry, annual (x 1,000), 2017.

## Employment Breakdown

Close to half (48%) of the energy efficiency utilities workforce worked on LED, CFL and other efficient lighting sub-technologies and administrative jobs constituted 38% of the total energy efficiency utilities workforce in 2018.

Three quarters of energy efficiency utilities workers were male, significantly higher than the national workforce average of 52%. Employees in the sector tracked closely with national workforce averages in terms of employees aged 35 and over (65% vs. 69% respectively).

In terms of education and training, 37% of sector workers held an associate degree, academic certificate, bachelor's degree or beyond (half the rate of all Canadian workers). Employees in the sector also held, at lower rates than all workers nationally, at most a bachelor's degrees (19% vs. 31% national average) and a vocational or technical postsecondary certificate or credential (23% vs. 36% national average).

Table 11: Demographics - Energy Efficiency Utilities, 2018<sup>26</sup>

	Demographic	Employees	Percent of Sector	National Workforce Averages
Gender	Male	7,828	74%	52%
	Female	2,732	26%	48%
Cultural	Indigenous persons	295	3%	3%
Age	18-34 years old	3,729	35%	33%
	35-54 years old	5,095	48%	44%
	55 and over	1,735	16%	25%
Education Level	Held at most a bachelor's degree or beyond	2,026	19%	31%
	Held at most an associate degree or academic certificate	1,899	18%	36%
	Held at most a vocational or technical post-secondary certificate or credential	2,456	23%	36%

<sup>26</sup> Sources: Statistics Canada Labour Force Survey, Tables 14-10-0018-01 (Labour force characteristics by sex and detailed age group, annual, 2018), 14-10-0359-01 (Labour force characteristics by Aboriginal group and educational attainment, annual), and 14-10-0019-01 (Labour force characteristics by educational attainment, monthly, unadjusted for seasonality, December 2018). Refer to footnote #13 for additional details.

## Employment Outlook and Hiring Challenges

The energy efficiency workforce within the Utilities industry in Canada is expected to grow by 5.9% from 2018 to 2019. In comparison, the overall Utilities industry is expected to decline by 1.3%.

Among the energy efficiency utilities establishments who participated in the study, over 83% reported experiencing hiring difficulties within the 12 months prior to the survey. About 17% indicated hiring was “very difficult” and close to 67% indicated hiring was “somewhat difficult”.

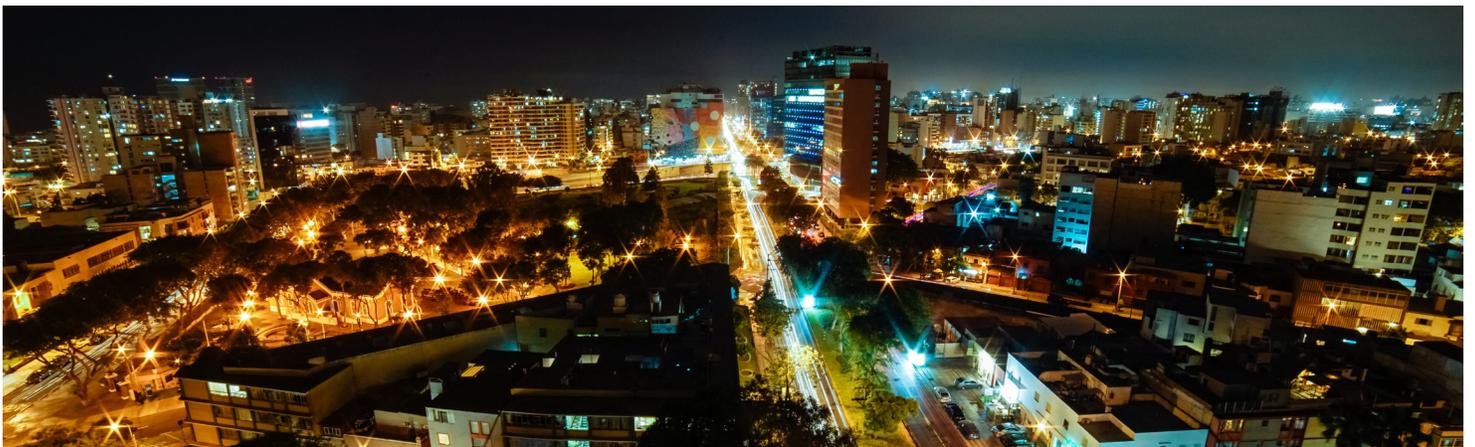
Respondents found difficulty hiring sales, marketing or customer service representatives.

Job-related factors (location, work hours, etc.) and lack of education/certifications/training within applicants were the commonly reported causes for the hiring challenges.

Table 12: Hiring Difficulties within Energy Efficiency Utilities, 2018

Top Three Reasons for Hiring Difficulties	Top Three Occupations with Hiring Difficulties
<ul style="list-style-type: none"> <li>• Job-related factors (location, work, hours, etc.) (50%)</li> <li>• Lack of education/certifications/training (50%)</li> <li>• Lack of experience (25%)</li> </ul>	<ul style="list-style-type: none"> <li>• Sales, marketing or customer service representatives (40%)</li> <li>• Technicians or technical support roles (20%)</li> <li>• Administrative support roles (20%)</li> </ul>

Note: percentages are based on employers saying it as “very difficult” or “somewhat difficult” to find qualified energy efficiency applicants.



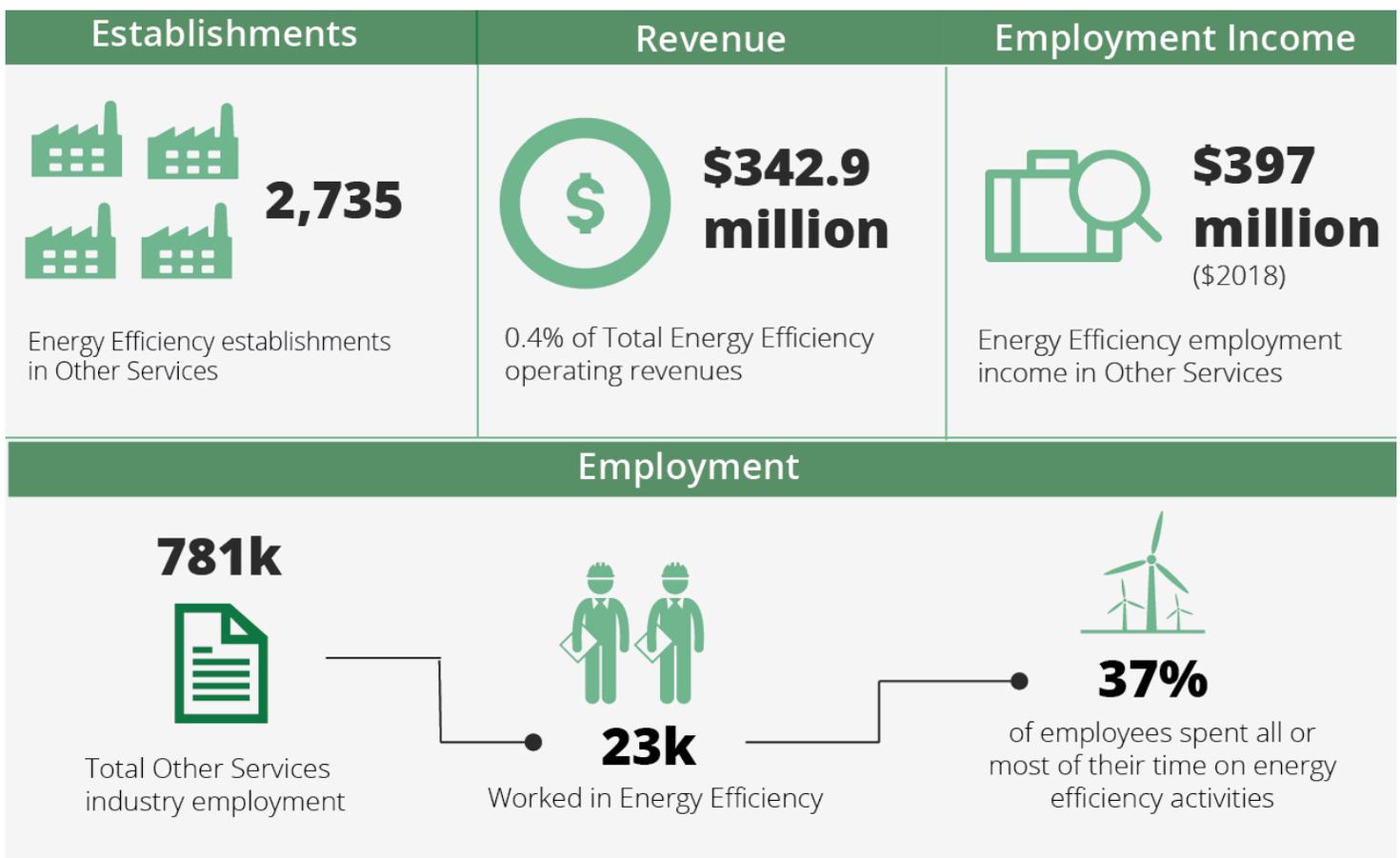
## Other Services

### Establishments, Revenues and Employment

In Canada, approximately 22,700 workers at more than 2,700 establishments within the Other Services industry were involved with energy efficiency activities in 2018<sup>27</sup>. Energy efficiency-related employment represented just under 3% of all Other services industry jobs in Canada<sup>28</sup>. Over 8,200 employees (36.5%) in the sector spent most of their time on energy efficiency activities.

Estimates suggest the energy efficiency other services establishments and its workforce generated close to \$342.9 million in energy efficiency revenues in 2018<sup>29</sup>.

Figure 19: Energy Efficiency Other Services Establishments, Revenues and Employment, 2018



<sup>27</sup> This number included operations and maintenance, repair of ENERGY STAR and efficient appliances, etc.

<sup>28</sup> Source: Statistics Canada. Table 14-10-0023-01 Labour force characteristics by industry, annual (x 1,000), 2017.

<sup>29</sup> Among the six industries included in the study, Other Services might have a large proportion of non-operating revenues contributing to its total revenues, which could explain the higher estimated value for employment income than operating revenue associated with energy efficiency.

## Employment Breakdown

Over half (51%) of the energy efficiency other services workforce worked on LED, CFL and other efficient lighting sub-technologies. Production/manufacturing roles comprised 34% of all energy efficiency jobs within the industry followed by administrative jobs (26%).

More than 25% of energy efficiency other service positions were held by women, compared to 48% in national workforce averages. A majority (67%) of the sector was over the age of 35.

Related to education and training, almost 1/3 of sector workers held an associate degree, academic certificate, bachelor's degree or beyond (compared to 2/3 of national workforce averages) and the share of workers that held a vocational or technical postsecondary certificate or credential is 11 percentage points less than the national average.

Table 13: Demographics - Energy Efficiency Other Services, 2018<sup>30</sup>

	Demographic	Employees	Percent of Sector	National Workforce Averages
Gender	Male	16,571	73%	52%
	Female	6,130	27%	48%
Cultural	Indigenous persons	575	3%	3%
Age	18-34 years old	7,593	33%	33%
	35-54 years old	11,044	49%	44%
	55 and over	4,065	18%	25%
Education Level	Held at most a bachelor's degree or beyond	4,382	19%	31%
	Held at most an associate degree or academic certificate	2,673	12%	36%
	Held at most a vocational or technical post-secondary certificate or credential	5,697	25%	36%

<sup>30</sup> Sources: Statistics Canada Labour Force Survey, Tables 14-10-0018-01 (Labour force characteristics by sex and detailed age group, annual, 2018), 14-10-0359-01 (Labour force characteristics by Aboriginal group and educational attainment, annual), and 14-10-0019-01 (Labour force characteristics by educational attainment, monthly, unadjusted for seasonality, December 2018). Refer to footnote #13 for additional details.

## Employment Outlook and Hiring Challenges

From 2018 to 2019, the energy efficiency workforce within the Other services industry in Canada is expected to grow by 2.5% — in line with the overall industry job growth rate of 2.4% for the industry.

Among the energy efficiency utilities establishments who participated in the study, 77% reported experiencing hiring difficulties within the 12 months prior to the survey. About 23% indicated hiring was “very difficult” and close to 54% indicated hiring was “somewhat difficult”.

Respondents reported difficulties hiring for administrative support roles, technicians or technical support roles and engineers.

Among those who experienced hiring challenges, about half indicated the lack of qualified workers was a key contributor to the hiring challenges.

Table 14: Hiring Difficulties within Energy Efficiency Other Services, 2018

Top Three Reasons for Hiring Difficulties	Top Three Occupations with Hiring Difficulties
<ul style="list-style-type: none"> <li>• Lack of qualified workers (50%)</li> <li>• Labour shortage (40%)</li> <li>• Job-related factors (location, work hours, etc.) (30%)</li> </ul>	<ul style="list-style-type: none"> <li>• Administrative support roles (29%)</li> <li>• Technicians or technical support roles (14%)</li> <li>• Engineers (14%)</li> </ul>

Note: percentages are based on employers saying it as “very difficult” or “somewhat difficult” to find qualified energy efficiency applicants.



## Appendix A: Canada and United States Comparison

The United States has been measuring energy jobs with a consistent methodology since 2016. In March of 2019, the fourth U.S. Energy and Employment Report (USEER) was released by the National Association of State Energy Officials (NASEO) and the Energy Futures Initiative (EFI), which have continued the USEER report since the Department of Energy ceased publication in 2018. The data in this comparative section were collected in the same quarters in each country using a nearly identical methodology.

One of the benefits of adopting the USEER methodology for this *Energy Efficiency Employment in Canada* report is that the data can be compared across the countries. While the United States is considerably larger in population and jobs than Canada and is home to almost six times as many energy efficiency jobs as in Canada, Canadian energy efficiency employment makes up a greater share of Canada's economy, at 2.3% versus 1.9%<sup>31</sup> in the United States.

As referenced earlier in this report, energy efficiency workers often do not spend all, or even a majority of time, working in energy efficiency. For example, a worker installing high efficiency heat pumps one day may spend the next installing traditional boilers. For any comparison, then, it is critical not only look at the total number of workers spending some time working with energy efficiency goods and services, but the intensity of that work. We measure intensity by calculating the proportion of workers that spend less than a majority, a majority but not all, and all their time working with energy efficiency goods and services, and then apply weights to the employment totals based on the same. Even when factoring in the intensity of employment (weighting the data for the number of workers who spend a majority or all their time in energy efficiency), Canada still outpaces the U.S.

Table 15, which shows the breakdown of jobs by value chain in both countries, makes it clear that the work in Canada is more focused on deployment, demonstrated by the higher proportion of jobs in the Construction and Wholesale trade industries. In the U.S., it is more balanced, with more activity in the Professional and Business services and Manufacturing industries. Note that utility data are excluded from the comparisons because utility jobs are counted under different segments in the U.S. (within generation, transmission, and distribution).

The primary differences between the countries within the sub-technology segments, also seen in Table 15, is that Canada has a much greater share of energy efficiency employment in lighting and HVAC but slightly lower employment in renewable heating and cooling and energy star appliances.

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<sup>31</sup> Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. [www.usenergyjobs.org](http://www.usenergyjobs.org). The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented.

Table 15: Energy Efficiency Jobs - Canada and United States<sup>32</sup>

	Total EE Jobs CA <sup>33</sup>	Total EE Jobs US	Total EE Per Total Jobs CA	Total EE Per Total Jobs US
Energy Efficiency (Total)	425,433	2,324,866	2.26%	1.88%
Construction	286,703	1,295,783	1.53%	1.05%
Manufacturing	26,064	321,582	0.14%	0.26%
Wholesale Trade	47,836	180,337	0.25%	0.15%
Professional & Business Services	42,130	484,482	0.22%	0.39%
Other Services	22,701	42,682	0.12%	0.03%
<b>Energy Efficiency Equipment</b>				
LED, CFL and other efficient lighting	109,076	370,562	0.58%	0.30%
Traditional HVAC goods, control, systems, and services	111,414	582,108	0.59%	0.47%
Renewable heating and cooling	11,252	128,896	0.06%	0.10%
ENERGY STAR® appliances	20,376	167,828	0.11%	0.14%
Reduced water consumption products and appliances	32,115	91,555	0.17%	0.07%
Advanced building materials/insulation	53,913	357,765	0.29%	0.29%
ENERGY STAR®/high efficiency heating and cooling equipment	64,926	427,503	0.35%	0.35%
Recycled building materials	8,745	82,423	0.05%	0.07%
Other	13,618	116,225	0.07%	0.09%

<sup>32</sup> Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. [www.usenergyjobs.org](http://www.usenergyjobs.org)

<sup>33</sup> Utility jobs are not included in Table 16 of comparisons as utilities in the United States were not measured as part of the energy efficiency sector. In Canada, the size of the energy efficiency utilities workforce was estimated at 10,560. When the total Canadian energy efficiency jobs in Table 16 above of 425,433 (not including utilities) is added to 10,560 (for utilities), the total is 435,993 which is the number shown throughout the tables of Canadian results.

## Appendix B: Survey and Analysis Methods

The 2018 Energy Efficiency Employment in Canada survey methodology relies on the most recently available detailed data from Statistics Canada (establishment series December 2016, employment series annual 2017),<sup>34</sup> together with a detailed supplemental survey of business establishments across Canada designed and conducted by BW Research Partnership and ECO Canada on behalf of NRCan. During a time of rapid change in energy technology and business employment structure, supplemental surveys in addition to traditional data bases are an important tool to capture developing trends. Taken together, the Statistics Canada and the survey data provide the most comprehensive calculation of energy efficiency-related employment available.

The research methodology for this study closely tracks the USEER (United States Energy and Employment Report), relying on a large and comprehensive survey of businesses in industries throughout the value chain, nationwide. The survey is nearly identical to the USEER survey (slight changes are made to conform to Canadian terminology and standards) and is fielded during approximately the same period which, for findings in this report, was late-September to October 2018. As a result, the data are comparable to the USEER data in nearly all aspects.

The 2018 Energy Efficiency Employment in Canada survey uses a stratified sampling plan that is representative by industry code (NAICS) and establishment size to determine the proportion of establishments that work with specific energy efficiency technologies, as well as the proportion of workers in such establishments that work with the same. These data are then analyzed and applied to existing public data published by Statistics Canada, effectively constraining the potential universe of energy efficiency establishments and employment.

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<sup>34</sup> Statistics Canada. Table 14-10-0202-01 (Employment by industry, annual) and Table 33-10-0040-01 (Canadian Business Counts, with employees, June 2016).

Canadian firms were contacted in order to assess their activity in the Energy Efficiency space. This required firms to provide an answer to the following question at the beginning of the survey:

“

Is your organization involved, in whole or part, with an activity related to energy efficiency, including heating and cooling, building envelope or advanced materials, Energy Star appliances, efficient lighting, building controls or other energy efficiency activities? We define this as being directly involved with researching, developing, producing, manufacturing, distributing, selling, implementing, installing, or repairing components, goods or services that reduce energy demand pursuant to the Energy Star standards regulated by NRCAN in Canada or the EPA in the United States, or other standards of NRCAN or the U. S. Department of Energy or refers to establishments that are involved with heating (thermal or hot water solar), ventilation and air conditioning (HVAC) from renewable energy sources or work that increases the Energy Efficiency of HVAC systems, including heating, cooling and building envelope. This also includes supporting services such as consulting, finance, tax, and legal services related to energy

”

Respondents providing a “yes” answer were filtered as energy efficiency-related and were asked to complete the remainder of the survey. All others were terminated from the survey and their responses were used to develop industry incidence for energy efficiency activity.

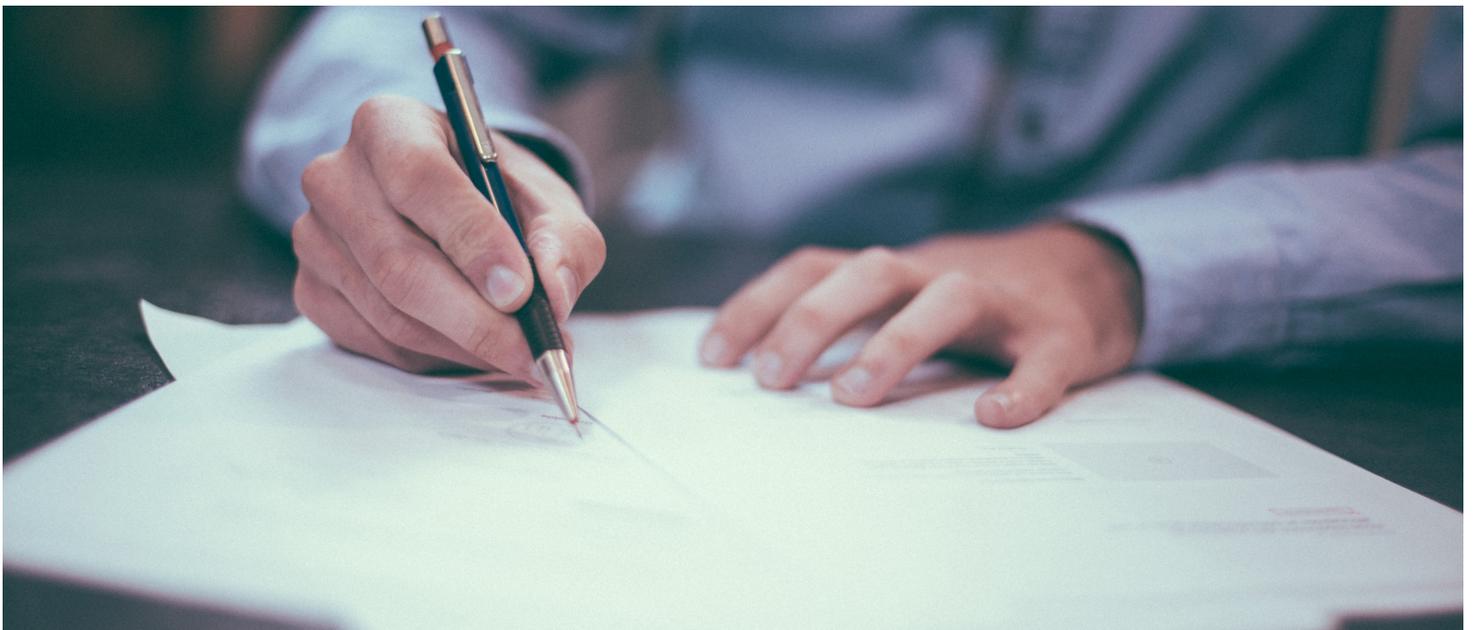
The initial sample included approximately 30,000 firms in potentially energy efficiency-related NAICS codes, across utilities, construction, manufacturing, wholesale trade, professional and business services, and other services, including repair and maintenance. The distribution of firms nationally was carefully analyzed to develop representative clusters by establishment size (employment)<sup>35</sup>. More than 60,000 phone calls were attempted with 1,853 respondents participating in the survey effort. Of those who participated in the survey, 628 establishments confirmed they were engaged in the provision of energy efficiency goods and services. These responses were used to develop incidence rates among industries as well as apportion employment across various industry categories. The margin of error for incidence in the study is +/- 2.27% at the 95% confidence interval.

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<sup>35</sup> Retail firms were excluded due to the combination of large workforces and small participation in Energy Efficiency activity (example, cashiers who sell LED light bulbs) which produces significant distortion based on multiple outliers.

## Risks and Limitations

Survey work inherently carries risks, limitations and possibilities of error; our methods are developed to minimize the risk by careful survey design, field control and statistical weighting to population parameters. For example, because the energy efficiency studies may be replicated for tracking purposes, the initial sample size are kept very large to produce ultimate small margins of error. The major risks are: non-response bias especially from larger firms which are more likely to refuse the survey or are less likely to know the details of energy work at their locations (if energy work is a small part of operations); misidentification of energy efficiency work according to our definitions and/or improper allocation of energy employment by survey respondents. Value chain and sub-technology findings have higher margins of error due to smaller sample sizes.



## Appendix C: Additional Data Tables

Table 16: Energy Efficiency Employment by Work Intensity, 2018

Industry	Total	Spent all their time (100%) in EE	Spent most of their time (50-99%) in EE	Spent a portion of their time (less than 50%) in EE
Construction	286,703	79,359 (28%)	101,347 (35%)	105,997 (37%)
Manufacturing	26,064	8,721 (33%)	1,104 (4%)	16,239 (62%)
Wholesale Trade	47,836	22,213 (46%)	3,430 (7%)	22,193 (46%)
Professional & Business Services	42,130	12,816 (30%)	2,939 (7%)	26,375 (63%)
Utilities	10,560	0 (0%)	3,165 (30%)	7,395 (70%)
Other Services	22,701	4,040 (18%)	4,253 (19%)	14,408 (63%)
<b>Total</b>	<b>435,994</b>	<b>127,149 (29%)</b>	<b>116,238 (27%)</b>	<b>192,607 (44%)</b>

Table 17: Energy Efficiency Employment by Industry and by Detailed Sub-Technology Application 2018

	Total	Construction	Manufacturing	Wholesale Trade	Professional & Business Services	Utilities	Other Services
ENERGY STAR® appliances	21,544	14,261	912	2,714	569	1,168	1,920
LED, CFL and other efficient lighting	114,164	61,208	15,855	13,936	6,558	5,088	11,517
Traditional HVAC goods, control systems and services	111,844	92,506	434	6,370	10,851	430	1,252
ENERGY STAR®/high efficiency heating and cooling equipment	65,711	52,266	174	7,973	3,512	845	1,002
Renewable heating and cooling	11,867	6,437	304	1,047	1,711	615	1,753
Advanced building materials/insulation	54,066	32,891	5,256	5,664	9,016	154	1,085
Recycled building materials	9,175	4,015	130	598	2,750	430	1,252
Reduced water consumption products and appliances	32,545	18,732	1,651	6,113	3,615	430	2,003
Other	15,017	4,387	1,347	3,420	3,546	1,399	918
<b>Total</b>	<b>435,993</b>	<b>286,703</b>	<b>26,064</b>	<b>47,836</b>	<b>42,130</b>	<b>10,560</b>	<b>22,701</b>

Table 18: Energy Efficiency Employment by Industry and by Occupations, 2018

	Total	Construction	Manufacturing	Wholesale Trade	Professional & Business Services	Utilities	Other Services
Installation or Repair	187,136	167,699	3,103	9,438	1,690	1,649	3,557
Management/ Professional	85,339	49,076	2,310	7,203	22,907	1,268	2,574
Administrative	63,446	33,057	3,930	11,971	4,626	3,964	5,898
Production/ Manufacturing	43,239	13,858	14,308	4,818	1,246	1,332	7,676
Sales	27,448	10,298	2,138	11,872	914	634	1,591
Other	29,387	12,714	276	2,533	10,747	1,712	1,404
<b>Total</b>	<b>435,994</b>	<b>286,703</b>	<b>26,064</b>	<b>47,836</b>	<b>42,130</b>	<b>10,560</b>	<b>22,701</b>

Figure 20: Energy Efficiency Employment Growth Rate by Industry, 2018 to 2019

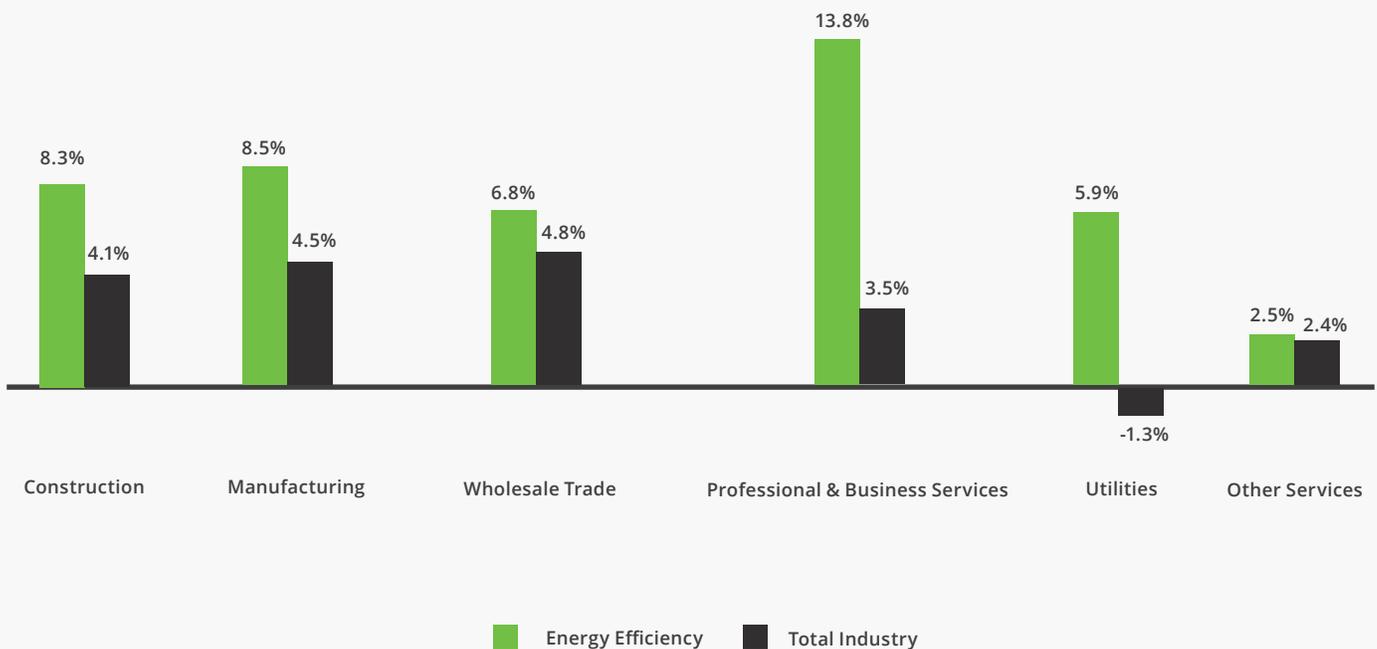


Table 19: Reported Occupations with Hiring Difficulty within Energy Efficiency by Industry, 2018

Construction	Manufacturing	Wholesale Trade	Professional & Business Services	Utilities	Other Services
Installation workers (45%)	Manufacturing or production positions (40%)	Sales, marketing, or customer service representatives (47%)	Administrative support (33%)	Sales, marketing, or customer service representatives (40%)	Administrative support (29%)
Technician or technical support (28%)	Trades (plumbing, electrician, etc.) (40%)	Technician or technical support (19%)	Designers or architects (28%)	Technician or technical support (20%)	Technician or technical support (14%)
Trades (plumbing, electrician, etc.) (17%)	Technician or technical support (20%)	Administrative support (11%)	Engineers (28%)	Administrative support (20%)	Engineers (14%)

Note: percentages are based on employers saying it as "very difficult" or "somewhat difficult" to find qualified energy efficiency applicants.

Table 20: Reasons for Hiring Difficulty within Energy Efficiency by Industry, 2018

Construction	Manufacturing	Wholesale Trade	Professional & Business Services	Utilities	Other Services
Lack of qualified workers (30%)	Lack of skills (30%)	Lack of qualified workers (29%)	Lack of education/certifications/training (59%)	Job related factors (location, work, hours, etc.) (50%)	Lack of qualified workers (50%)
Labour shortage (28%)	Labour shortage (20%)	Labour shortage (29%)	Lack of experience (32%)	Lack of education/certifications/training (50%)	Labour shortage (40%)
Lack of skills (26%)	Lack of willingness to work/work ethic/reliability (20%)	Lack of education/certifications/training (29%)	Lack of skills (26%)	Lack of experience (25%)	Job related factors (location, work hours, etc.) (30%)

## Glossary of Terms

**Activity:** For the purposes of this report, an establishment's activity refers to the primary value-chain industry to which it most associates its work. Activities include research, development and engineering, manufacturing, sales and distribution, installation and maintenance, legal, finance, and other professional services, and other.

**Advanced Building Materials/Insulation:** All materials that represent advances in efficiency over the traditional materials.

**Energy Efficiency Establishment:** For the purposes of this report, an establishment is any establishment that is involved with an activity related to the energy efficiency industry.

**Energy Efficiency Worker:** Full-time and part-time permanent employees who support the energy efficiency (including management) portion of the business, including administrative staff, excluding interns and other temporary workers.

**ENERGY STAR® Appliances:** Appliances that meet the international ENERGY STAR® standard for energy efficient consumer products regulated by NRCAN in Canada or the EPA in the United States.

**ENERGY STAR®/High Efficiency Heating and Cooling Equipment:** Heating, ventilation, and air conditioning (HVAC) that meets the international ENERGY STAR® standard for energy efficient consumer products regulated by NRCAN in Canada or the EPA in the United States or has high Annual Fuel Utilization Efficiency (AFUE) rating of 90 or greater or 15 SEER or greater.

**Establishment:** For the purposes of this report, a business location in Canada with at least one employee.

**Firm:** A business organization, such as a corporation, company, or partnership. A firm can have multiple establishment locations.

**LED, CFL and Other Efficient Lighting:** Energy efficient lighting sources.

**“Other” Energy Efficiency Sub-technologies:** Other energy efficiency sub-technologies include variable speed pumps, other design services not specific to a sub-technology, software services not specific to a sub-technology, energy auditing, rating, monitoring, metering, and leak detection, energy efficiency policy not specific to a sub-technology, LEED certification, consulting not specific to a sub-technology, and phase-change materials.

**Professional Service:** Any sort of finance, legal, architecture, or other mathematical or scientific services that support clean energy technology development and deployment.

**Other Services Industry:** Other services refers to the industry (or value chain) designation (NAICS 81) that includes repair and maintenance, NGOs, etc.

**Recycled building materials:** Building materials sourced from recycled materials.

**Reduced water consumption products and appliances:** High efficiency (HE) washing machines, faucet aerators, low flow shower heads, etc.

**Renewable Heating and Cooling (including Solar Thermal):** Refers to establishments that are involved with HVAC from Renewable Energy sources or work that increases the energy efficiency of HVAC systems (solar thermal - uses the sun's energy to generate thermal energy).

**Sub-technology:** For the purposes of this report, sub-technology refers to splits within a technology. For Energy Efficiency, examples are: LED lighting, Energy Star ® appliances and the like.

**Technology:** For the purposes of this report, technology refers to the primary application or end-use of an establishment's produced goods or services. Examples are: energy efficiency, electric power generation, fuels and the like.

**Traditional HVAC goods, control systems, and services:** HVAC including building retro-commissioning and retrofits connected to heating and cooling.



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