

Report on Manitoba's Renewable Energy Industry

Focus: Workforce Development



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Manitoba Environmental Industries Association

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Thank you! Your contributions made the development of this profile of the Manitoba Renewable Energy Industry sector possible, a document which will assist the creation and growth of training and workforce development initiatives in Manitoba.

Legal Disclaimer

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Abbreviations:

ATEC: Atoskiwin Training & Employment
BCIT's: British Columbia Institute of Technology's
CHP: Combined Heat and Power
CIET: Canadian Institute for Sustainable Energy Training
EBITDA: Earnings Before Interest, Tax, Depreciation and Amortization
ECO: Environmental Careers Organization Canada
EM: Efficiency Manitoba
EV: Electric Vehicle
FRCN: Fisher River Cree Nation
GDP: Gross Domestic Product
IAP: Innovation Assistance Program
ICE: Indigenous Clean Energy
iCTI: International Cleantech Institute
Innovation Growth Fund formerly CSBP: Commercialization Support for Business Program
ISC: Indigenous Services Canada
MANSEA: Manitoba Sustainable Energy Association
MEIA: Manitoba Environmental Industries Association
NCN: Nisichawayasihk Cree Nation
NFA: Northern Flood Agreement
NRC – IRAP: National Research Council – Industrial Research Assistance Program
NRCan: Natural Resources Canada
NSERC: Natural Science and Engineering Research Council
RE: Renewable Energy
REI: Renewable Energy Industry (includes Energy Efficiency in this report)
SDFN: Sayisi Dene First Nation
SRED: Scientific Research and Experimental Development Tax Credit Program
TWS: Temporary Wage Subsidy for Employers
WD: Western Economic Diversification
WEM: Workplace Education Manitoba

Executive Summary

Climate change is the challenge of our times. And it is also one of our greatest opportunities. Climate action creates new opportunities for engineers, scientists, farmers, construction workers, tradespeople, resource workers, energy workers, researchers, and more.¹ The renewable energy and energy efficiency industries are at the forefront of our foray into this new era, muted by Covid, yet brimming with innovation and initiative of both what has been done as well as what can be done to build sustainability. The road ahead faces us with “bending the curve” not only for the pandemic, but for GHG emissions. The “**climatic**” is here and growing with a silent, but deafening array of impacts including: CO2 levels 50% above 1950 levels (to 420 ppm); average earth surfaces temperatures over 2 degrees (F) since the late 19th century; growing number of extreme weather events; shrinking ice fields; and global sea levels rising over 20 cm.²

The positive spin on this same scenario is that Canada’s clean energy sector will employ 559,400 Canadians by 2030—in jobs like insulating homes, manufacturing electric buses, or maintaining wind farms. And while 50,000 jobs are likely to be lost in fossil fuels over the next decade, just over 160,000 will be created in clean energy—a net increase of 110,000 new energy jobs in Canada. When it comes to Canada’s energy future, there’s a fast lane called the clean energy sector, and a slow lane, fossil fuels. Jobs in our clean energy sector are set to grow nearly four times faster than the Canadian average between 2020 and 2030, while jobs in our fossil fuel sector will decline half a percent annually over that period. Clean energy’s GDP contribution will also increase 3.4% a year, more than double the national average (1.5%).³

The time for visionary thinking, planning and action is now.

Recognizing the imminency of climate change and its impacts on our lives, and realizing the leading role of renewable energy and energy efficiency in its mitigation, the Manitoba Environmental Industries Association (MEIA) created this study to focus on these two industries, referred together in this report as the **Renewable Energy Industry (REI)**. This report follows up on a 2016 study on Manitoba’s Environmental and Cleantech Industry, with this year’s update focusing specifically on the Training and Workforce Development requirements of the REI sector.

The need to train, develop and expand Manitoba’s REI is clear, given that less than one third (29%)⁴ of the energy we use is generated in Province (hydro) with the remainder (heating and transportation) being fossil fuels.

MEIA, as the Provincial Sector Council for the Natural Resources, Energy and Environment Sector in Manitoba, supports industry growth and workforce development in this portfolio through collaboration, partnerships, and workforce development.

¹ Government of Canada, Report: “Budget 2021: A Healthy Environment for a Healthy Economy”, (2021): 160.

² NASA, Webpage: “Global Climate Change”, (2021): <https://climate.nasa.gov/evidence/>.

³ Clean Energy Canada, Webpage: “Canada’s clean energy sector set to accelerate amid fossil fuel slowdown”, (2019): <https://cleanenergycanada.org/canadas-clean-energy-sector-set-to-accelerate-amid-fossil-fuel-slowdown/>.

⁴ Government of Manitoba, Report: “Manitoba’s Clean Energy Plan”, (2012): 10.

To understand the REI's workforce training and development needs, MEIA engaged DLF Consulting to conduct research into the Renewable Energy Industry in Manitoba. The research included a background literature review as well as a digital survey (created with assistance from Workforce Education Manitoba) completed in March 2021, sent to over 500 Manitoban businesses and organizations engaged in the REI. The survey, garnering 102 responses (not including Manitoba Hydro), was designed to highlight strengths of the REI, and to identify gaps that MEIA can seek to fill through engagement, awareness and education.

Manitoba Renewable Energy Industry

The Manitoba REI as represented by survey respondents can be characterized as: **multi-tasking**, with over half of the respondents working in the REI work as well as other areas of work; **ambitious**, with a majority planning to expand their work in the Renewable Energy Sector in the next three years; **new**, with more than half of the respondents established after 2000, and most of those created after 2010; **talented**, with skills and services reported by over half of the respondents covering a wide range including systems design, feasibility studies, technology installation, and systems maintenance; **technically diverse**, with respondents representing all areas of the REI (energy efficiency, solar, geothermal, hydro, co-gen, biomass, wind and biofuels) with no one technology exceeding 18% of the total; and **small**, with a majority of the companies being less than 10 people.

Furthermore, the REI is: **expanding**, with The REI employment more than doubling in the past 5 years; yet **not very diverse**, with less than a quarter of the workforce being women and less than a tenth Indigenous. However, the REI is **innovative**, with more than half of the respondents reported having recently developed or currently in the process of creating a new or innovative renewable energy product or service; and **mostly profitable** with half of those taking the survey reporting increased revenues over the past three years. Importantly, the REI is **not working only in Manitoba**, with over half of the reported revenues coming from work outside of Manitoba; is generally **not tracking GHGs**; and finally, the majority of the respondents were **aware and appreciative of MEIA**.

In terms of training and specific modes of workforce development, those surveyed were: **keen to learn**, with the survey receiving helpful responses to questions about training needed in the areas management and technical skills; **actively learning**, with one third accessing training and expressing an interest in more training; **experiencing learning barriers**, with many experiencing difficulties finding time or getting to programs, or being too busy at work; and finally **interested in accessing supports**, although over half of those responding had not accessed government supports, but all were interested in further information and assistance.

Next Steps

Based on the findings of this report regarding the workforce development needs of Manitoba's REI, the following recommendations are presented to MEIA including training and workforce development opportunities as well as other initiatives and advocacy.

- **Build an action plan** to follow up on this report, based on the conclusions reached, to ensure that those who provided input continue to be heard, and that appropriate training programs are created and made available to interested companies and organizations.
- **Convene an advisory panel** of Indigenous and non-Indigenous leadership within MEIA/REI to explore new ways of working and developing projects and programs as well as learn from good examples that more effectively build connections and trust.
- **Advocate for government policies** to create long term plans to address climate change, including a framework to reduce greenhouse gases using meaningful targets which carry some degree of consistency across Canada. With these tangible targets in place, industry can make its own plans for growth, marketing, financing, hiring and training to develop its workforce to respond in a profitable and timely fashion.
- **Convene an industry/educational institution/government group** to draw attention to the need for the development of formal technical, engineering and management level degree programs in Energy Efficiency and Renewable Energy.
- **Grow MEIA's ability to be a key facilitator** of renewable energy and energy efficiency initiatives including the NRCan Certified Energy Advisor program as well as convenor of working groups for various related topics such as: building and energy codes; housing energy efficiency inspections; and to explore relevant financing options to actuate these measures such as carbon offsets and trading.

A. Introduction and Methodology

In 2016, Manitoba Environmental Industries Association (MEIA) commissioned Probe Research to complete a report entitled: *The State of the Environmental and Cleantech Industry in Manitoba*. The intent of this document was to develop a profile of the environmental and cleantech industries in Manitoba, provide insights into employers' business and workforce needs and assist MEIA in identifying opportunities and challenges facing the industry.⁵ At the time of its publication, the environmental and cleantech sectors in Manitoba were represented by approximately 450 businesses and organizations, employed nearly 62,000 workers, and garnered roughly \$2.5 billion in revenues.⁶

In follow up to the 2016 Probe Research report, MEIA commissioned this study in 2021 to follow up with a specific focus on the renewable energy and related energy efficiency sectors (referred together to in this study as the **Renewable Energy Industry - REI**). The purpose of the tighter focus on the REI was to identify this particular industry's training and job opportunities and create recommendations to respond appropriately. Future MEIA studies may consider other specific sectors of the wider environmental and cleantech industry in Manitoba.

A.1 About MEIA

Since its establishment in 1991, Manitoba Environmental Industries Association (MEIA) has come to be a trusted information and opportunity hub equipping the environmental industries in Manitoba to stay current on governmental policy and legislation, increase their knowledge of environmental practices, and gain essential business growth and development insight.

MEIA is also the Provincial Sector Council for the Natural Resources, Energy and Environment Sector in Manitoba, supporting industry growth and workforce development in this wide and diverse portfolio. In this role, Manitoba Environmental Industries Association is funded by the department of Economic Development and Jobs to lead collaboration, strengthen partnerships, and enhance workforce development in these sectors through engagement, education, and awareness to support business growth and prosperity.

MEIA members represent diverse portfolios within Manitoba's Natural Resources, Energy and Environment sectors, including firms that provide environmentally-related legal, engineering and consulting services, environmental research companies, environmental technology and service industries, crown corporations and government departments, as well as, environmental-related community organizations.⁷

⁵ Probe Research, Report: "State of the Environmental and Cleantech Industry in Manitoba", (2016): 3.

⁶ Probe Research, Report: "State of the Environmental and Cleantech Industry in Manitoba", (2016): 4.

⁷ Manitoba Environmental Industries Association, Webpage: "About", (2021): <https://www.meia.mb.ca/about-meia/>.

In order to best serve its membership, MEIA utilizes current industry labour market information to develop targeted education and/or training programming, effectively engage with stakeholders, and ensure an ample supply of qualified workers that aligns with the growing industry demand.

A.2 Provincial and Federal Climate Plans

Since the publication of Probe’s Report, the Province issued its *Made-in-Manitoba Climate and Green Plan* and consequent *Climate and Green Plan Implementation Act* issued in 2017 and 2018, respectively. The Province of Manitoba recognizes the immediate need for growing its clean energy production acknowledging that cleaner, more efficient energy use can help Manitobans lower their carbon emissions, lead to real cost savings and new jobs while also promoting a healthier environment.⁸ These Plans aim to guide the development of policy and its sustainable implementation while ensuring that Manitoba is Canada’s greenest and most climate resilient province;⁹ an ambitious goal requiring a strategic and integrated approach balancing climate, jobs, water, and nature.

The Province’s plan called for the establishment of Efficiency Manitoba (EM) – a Crown corporation committed to achieving significant annual energy savings targets by offering cost-effective programs and services to Manitobans.¹⁰ *The Efficiency Manitoba Act* – which establishes the guidelines for the operation of Efficiency Manitoba - is the province’s first legislation to mandate enforceable energy savings targets; net savings that are at least equal to 1.5% of the consumption of energy in the preceding year for electrical energy, and net savings that are at least equal to 0.75% of the consumption of the preceding year for natural gas.¹¹ To reach these energy and emission reduction targets established by the strategic plan, Efficiency Manitoba is leveraging \$32.3 million from Canada’s Low Carbon Economy Leadership Fund for a total \$65 million in incentives for Manitobans.¹² By looking for opportunities to build upon Manitoba’s existing industry skills and expertise, EM and the Province generate new jobs for Manitobans while stimulating innovation that can be marketed globally.¹³

Moreover, in 2020 the Government of Canada introduced *A Healthy Environment and a Healthy Economy* - Canada’s strengthened climate plan. The Plan builds on the efforts that are currently underway through the 2016 *Pan-Canadian Framework on Clean Growth and Climate Change*: reducing pollution, creating jobs, and supporting a healthier economy and environment. This includes the investment of an additional \$964 million over four years to advance smart renewable energy and grid modernization projects to enable a cleaner energy future while minimizing the role of fossil fuel-fired electricity generation.¹⁴

⁸ Province of Manitoba, Report: “Made-in-Manitoba Climate and Green Plan”, (2017): 10.

⁹ Province of Manitoba, Report: “Made-in-Manitoba Climate and Green Plan”, (2017):3.

¹⁰ Efficiency Manitoba, Report: “2020/23 Efficiency Plan”, (2019): 11.

¹¹ Province of Manitoba, “The Efficiency Manitoba Act”, (2017): 7(1).

¹² Province of Manitoba, Report: “Protecting Manitobans Advancing Manitoba, Budget 2021”, (2021): 79.

¹³ Province of Manitoba, Report: “Protecting Manitobans Advancing Manitoba, Budget 2021”, (2021): 81.

¹⁴ Environment and Climate Change Canada, Report: “A Healthy Environment and a Healthy Economy”, (2020): 21.

In the wake of the global COVID-19 pandemic that continues to decimate the lives of billions around the globe, and in alignment with their *Healthy Environment and Healthy Economy Plan*, the Government of Canada continues to stress the importance of creating a resilient, climate-focused economy. The Federal *Budget 2021: A Recovery Plan for Jobs, Growth and Resilience* contains a chapter titled: A Healthy Environment for a Healthy Economy. Mirroring Manitoba's own goals, the Federal budget acknowledges that fighting climate action, including reaching net-zero, will be a cornerstone of Canada's plan to rebuild the economy, create middle class jobs, and ensure Canadian industry remains competitive on the world stage.¹⁵ To accomplish this, *Budget 2021* proposes to make \$1 billion available on a cash basis over five years, to help draw in private sector investment for Clean Tech project implementation. Additionally, it suggests a 50 percent reduction of the general corporate and small business income tax rates for businesses that manufacture zero-emission technologies until 2030.¹⁶

Budget 2021 goes on to propose \$1.94 billion over five years to invest in Canada's Clean Energy future, as well as \$678 million over five years to Growing Canada's Net-zero economy, including: \$250 million for propelling Clean Tech projects, \$46 million for growing Zero-emission technology manufacturing, \$142 million for accelerating investment in clean energy technologies, and \$15 million for the Federal Clean Electricity Fund.¹⁷

A.3 Research Objectives

To better understand the effects of these policy shifts, and to create a picture of the REI's workforce training and development needs, MEIA engaged DLF Consulting to conduct research into the Renewable Energy Industry in Manitoba. The research included a background literature review as well as a digital survey of Manitoban business owners and executives who engage in Renewable Energy activities. The survey was open from February 16 to March 1, and this deadline was extended for an additional ten business days, closing officially on March 12, 2021.

The survey was designed to highlight strengths of Manitoba's existing Renewable Energy industry, and to identify gaps that MEIA can seek to fill through engagement, awareness and education under their Sector Council Mandate. The objectives of the *Manitoba Renewable Energy Industry Study* were to survey the Renewable Energy Industry in Manitoba in order to:

- Provide a profile of the renewable energy business and other entities (including First Nation and Metis Organizations) in Manitoba including information on the kinds of products and/or services they provide, size and revenues;
- Provide information existing and planned renewable energy systems in Manitoba;
- Describe existing business and workforce training best practices and accompanying challenges;

¹⁵ Government of Canada, Report: "Budget 2021: A Recovery Plan for Jobs, Growth and Resilience", (2021): 159.

¹⁶ Government of Canada, Report: "Budget 2021: A Recovery Plan for Jobs, Growth and Resilience", (2021): 161.

¹⁷ Government of Canada, Report: "Budget 2021: A Recovery Plan for Jobs, Growth and Resilience", (2021): 188.

- Provide insight to the intersection of Manitoba’s renewable energy industry and its Indigenous communities/organizations;
- Inquire about workforce development programs both present and future including both management and technical skills;
- Survey interest in expanding awareness of Indigenous perspectives as well as the role of and opportunities for women and new comers in Manitoba’s renewable energy industry;
- Provide perspectives on the impact of COVID-19 on past and future renewable energy activities;
- Explore impact of funding opportunities for Renewable Energy Initiatives in the Federal, Provincial and Private grant sectors; and
- Provide Conclusions and Recommendations.

A.4 Research Methodology

This research began with an in-depth literature review to identify the current state of the renewable energy industry within Manitoba, as well as within other Canadian jurisdictions. To do this, relevant articles, documents, reports and statistics provided by NRCan, Eco Canada, Efficiency Canada, Efficiency Manitoba, and Workplace Education Manitoba (WEM) were reviewed as well as online information to investigate labour market-related issues. In addition, emerging trends affecting the sector and key factors contributing to the successes and challenges of Manitoba’s renewable energy and energy efficiency companies and organizations were identified.

MEIA assembled a database containing the contact information for all individuals, businesses, non-governmental organizations, and government entities currently involved in renewable energy and/or energy efficiency activities. To ensure the accuracy of the database, researchers conducted over 500 telephone calls to confirm the details for each contact.

Various primary research methods were reviewed including online surveys, focus groups and in-person interviews, however given the realities of COVID-19, it was decided that the safest and most effective course of action would be an in-depth digital survey that proponents could fill out online. This survey, developed by DLF Consulting in collaboration with MEIA and WEM, was hosted on MEIA’s website for the duration of four weeks: February 16, 2021 to March 12, 2021. Using the recently established REI database, MEIA disseminated the survey via email to 502 relevant industry contacts, and 102 submissions were received – representing a 20.23% response rate. Participation in the survey was voluntary, and recipients were incentivized to complete the survey by the promise of being entered to win a \$500 cash-prize to be donated to the registered charity of their choice.¹⁸

Finally, the results of the research conducted by DLF Consulting are highlighted in this report which summarizes the findings of the background literature review and interprets and integrates the responses submitted by members of industry through the digital survey. The report provides valuable

¹⁸ Note: this prize was awarded to DNS Geothermal Ltd., who requested the donation to be sent to Steeprock Bay Bible Camp.

conclusions and recommendations to Manitoba’s REI stakeholders, and will be used to influence future programming delivered by MEIA.

B. Renewable Energy Industry Background

B.1 Defining the Renewable Energy Industry

This study defined the size and scope of Manitoba’s REI to include the following renewable energy “activities”: planning, assessing feasibility, consulting, manufacturing, sales, installation, repairs, management, or engagement in the growth of this industry. The survey included any and all companies and organizations (e.g., Indigenous organizations, technology installers or companies proposing new REI projects) whether large or small whose work is captured in the above list of activities which is broad in scope, and focussed in the REI sector.

For the purposes of this report, Manitoba’s Renewable Energy Industry (REI) is defined¹⁹ as follows:

Renewable Energy – Any energy derived from natural processes that are replenished at a rate that is equal to or faster than the rate at which they are consumed. Renewable energy technologies used in Manitoba include: Hydropower, Solar, Wind, Geothermal, Biomass and Waste to Energy.

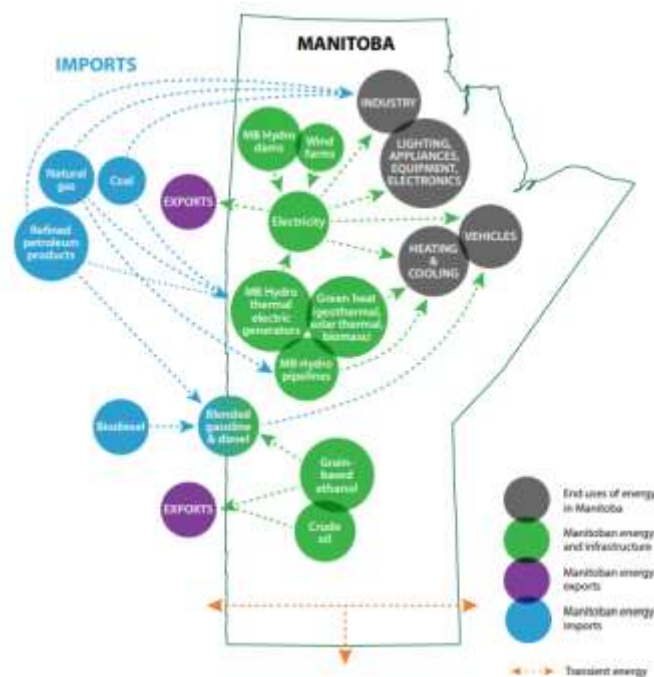
Energy Efficiency - Innovation in the fields of housing, building, communities, industry, and transportation that seek to lower energy costs, cutting emissions, improving operating performance, and increasing asset values.

B.2 Manitoba’s REI in Context

Manitoba’s energy picture includes local production of energy as well as imports of energy to provide for our electricity, heating and transportation needs.

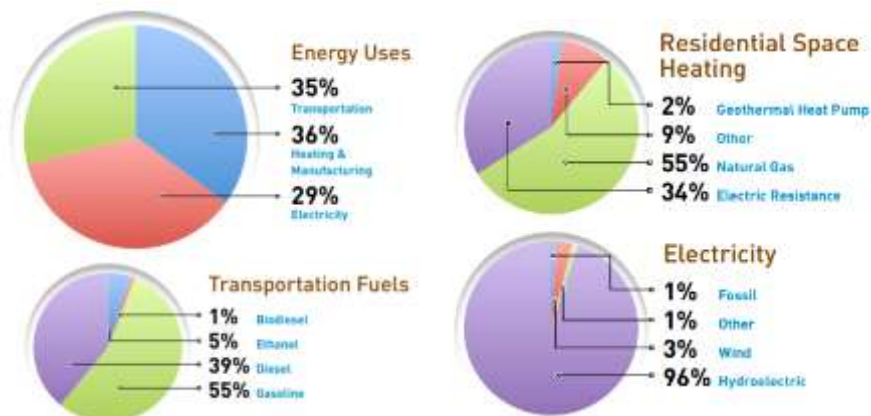
¹⁹ Natural Resources Canada, Webpage: “About Renewable Energy”, (2021): <https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/renewable-energy/about-renewable-energy/7295>.

Figure 1: Manitoba's Energy Sector²⁰



Manitoba’s use of its energy whether domestic or imported, is captured by three relatively equal slices of a pie into: transportation; heating (& manufacturing); and electricity. Although the latter is renewable hydro, the majority of Manitoba’s energy used is non-renewable, with significant challenges to making a transition to a net-zero economy including 94% of our transportation fuels being fossil fuelled (and the rest dependent upon these for usable mixtures) and a majority (55%) of our space heating similarly dependent on non-renewables.

Figure 2: Energy in Manitoba²¹



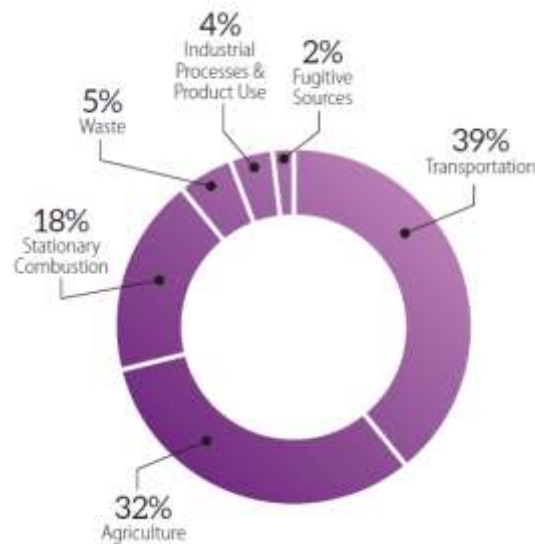
²⁰ Government of Manitoba, Report: "Five-Year Report - Energy in Manitoba", (2015): 6.

²¹ Government of Manitoba, Report: "Manitoba’s Clean Energy Plan", (2012): 10.

Greenhouse Gases

The implications of the present energy paradigm are clear: in order to meet any standard of sustainability, major shifts need to happen in Manitoba’s planning and growth to incent and prioritize the growth of the REI in all areas of our energy use to displace fossil fuels. Use of these energy resources has resulted in Manitoba’s GHG emissions being 20.8 megatonnes CO₂ equivalent with use by transportation (39%) and agriculture (32%) together being nearly three-quarters (71%) of emissions, stationary combustion (heating) at 18%, waste (5%), followed by industrial processes (4%) and fugitive sources (2%).

Figure 3: Manitoba's 2015 GHG Emissions = 20.8 megatonnes CO₂e ²²



While GHG reduction targets are being debated and discussed along with a number of financing concepts, it is clear that regardless of the levels of these targets, the role and size of Manitoba’s REI will grow. Manitoba emissions are increasing each year and addressing this will require clear and agreed-upon emissions reduction targets, reductions in energy use, and will require the growth of the REI.

The REI in Manitoba largely consists of Manitoba Hydro, with around 96% of the electricity being renewable power generated at 15 hydroelectric generating stations on the Nelson, Winnipeg, Saskatchewan, Burntwood and Laurie rivers. The province’s remaining electricity needs are fulfilled by: two thermal generating stations; four remote diesel generating stations; and wind power purchases from independent wind farms in Manitoba.²³ Manitoba Hydro is a large Crown corporation with 5,393 employees, 593,490 customers, 1,002 Indigenous employees, 13,921 km distribution lines, and 289,364

²² Province of Manitoba, Report: “Made-in-Manitoba Climate and Green Plan”, (2017): 23.

²³ Manitoba Hydro, Webpage: “Facilities & operations”, (2021): <https://www.hydro.mb.ca/corporate/facilities/>.

Natural Gas customers.²⁴ Some electricity is being produced with the PV installations in Manitoba which is sold to Manitoba Hydro, and additional information on this (other than the information provided above in the Table 1

B.3 Renewable Energy Economics

In 2019, Canada's clean energy sector employed roughly 298,000 people; and the industry is on track to employ 559 400 Canadians by 2030²⁵ —jobs that will enhance energy efficiency, promote the adoption of cleantech, and bolster green manufacturing across the country. It is expected that 50,000 existing jobs in fossil fuel-driven energy production will be lost during this time, however just over 160,000 will be created in clean energy for a net increase of 110,000 new energy jobs. This labour shift corresponds with the annual 0.4% GDP growth expected from the fossil fuel industry, which is nearly nine times slower than that of the clean energy sector which is on track to grow at an annual rate of 3.4%.²⁶

Domestic sales of environmental and clean technology goods and services account for approximately \$30M;²⁷ nearly four times the revenues from the export of environmental and clean technology goods and services across national borders.²⁸ This is because, across all industries and regardless of enterprise size, Canadian businesses are making an effort to green their operations. 60.3% engaged in innovations pertaining to Renewable fuels (ethanol, biodiesel, biogas, biochar, hydrogen), 48.6% reduced consumption of resources through recycling (water, waste or material), 49.8% improved resource efficiency by replacing material with less greenhouse-gas-intensive alternatives, 51.4% improved resource efficiency through reduced energy use per unit of output, 52.8% improved resource efficiency through reduced material use per unit of output, and 53.5% brought innovations to market that utilize efficiency to garner environmental benefits from their production.²⁹

Based on these positive signs for present and future growth of the renewable energy industry in the greater Canadian context, Manitoba is well situated to expand in multiple areas whether rural or urban, generation (solar, biomass, geothermal, wind and hydro) or conservation with key reductions in demand necessary to achieve long term sustainability.

²⁴ Manitoba Hydro, Webpage: "Corporate highlights", (2021): <https://www.hydro.mb.ca/corporate/ar/>.

²⁵ Clean Energy Canada, Report: "The Fast Lane", (2019): 4.

²⁶ Clean Energy Canada, Report: "The Fast Lane", (2019): 8.

²⁷ Statistics Canada, Webpage: "Revenues from domestic sales of environmental and clean technology goods and services, by type of good and service, Canada and regions (x 1,000)", (2019): <https://doi.org/10.25318/3810008701-eng>.

²⁸ Statistics Canada, Webpage: "Revenues from environmental and clean technology goods and services exports, Canada and regions (x 1,000)", (2019): <https://doi.org/10.25318/3810003101-eng>.

²⁹ Statistics Canada, Webpage: "Product or process innovations that were new to one of the business's markets with environmental benefits, by industry and enterprise size", (2019): <https://doi.org/10.25318/2710036501-eng>.

B.4 Indigenous populations and Manitoba's REI

Energy and its generation and use are critical to the growth of any economy, and as described, the vast majority of Manitoba's renewable energy usage is hydroelectric. Any report on this resource without acknowledging its impact on Indigenous communities would indeed be remiss.

It is ironic that many of the 15 dams which supply Manitoba with billions of dollars in hydroelectric wealth are located near and have significantly impacted Indigenous communities and First Nations who experience the greatest rates of poverty in Canada.³⁰ Historic Hydro development in Manitoba has had negative environmental, cultural, social and economic impacts – contrasting starkly with the reality that hydroelectricity plays a major role in Provincial growth and prosperity. It is up to the governments of Manitoba and Canada, Manitoba Hydro, the customers of Manitoba Hydro and the people of the north together to ensure that the opportunity for a more equitable energy future is realized.

This better future, while a work in progress, has seen important successes over the past decade which have included much improved inclusion and integration of local community needs and aspirations. The following provides examples in which Indigenous communities, First Nations, local organizations and Manitoba Hydro have developed positive pathways of developing renewable energy resources in Manitoba.

Aki Energy – With partners **Fisher River Cree Nation** and **Peguis First Nation**, has installed \$6 million worth of energy efficient geothermal energy systems in 350 homes on four different First Nation's in Canada. In 2015, the Fisher River Cree Nation and the Peguis First Nation in Manitoba signed agreements with Aki Energy and Manitoba Hydro to complete an additional \$14 million worth of geothermal systems.³¹

Atoskiwin Training & Employment Centre (ATEC) – A non-profit, community-based, post-secondary training facility at the Nisichawayasihk Cree Nation (NCN) officially opened in 2006, is the first of its kind to be built on a Manitoba First Nation reserve. It was originally built to provide job training opportunities for work on the Wuskwatim hydroelectric generation project. Several hundred NCN Citizens participated in Wuskwatim-related training programs since ATEC was first announced in April 2003, as part of the agreement NCN negotiated with Manitoba Hydro to build Wuskwatim. After those training programs were completed, the facility has transitioned to other training and employment opportunities. ATEC's long-term focus is to offer a wide range of post-secondary and trades training opportunities to address the skills needed for the First Nation and others in Canada (including solar energy).³²

Revenue Sharing: In addition, NCN developed a new model of revenue sharing with Manitoba Hydro with the Wuskwatim Generating Station which was developed by Wuskwatim Power Limited Partnership (WPLP), a legal entity involving Manitoba Hydro and the Nisichawayasihk Cree Nation (NCN).

³⁰ Canadian Poverty Institute, Webpage: "Poverty in Canada", (2021): <https://www.povertyinstitute.ca/poverty-canada#:~:text=Indigenous%20peoples%20in%20Canada%20experience,Indigenous%20children%20live%20in%20poverty.>

³¹ Aki Energy, Webpage: "Renewable Energy", (2021): <http://www.akienergy.com/>.

³² NCN-ATEC, Webpage: "Atoskiwin Training and Employment Centre", (2021): <https://www.ncncree.com/community-facilities-and-programs/atoskiwin-training-and-employment-centre/>.

Manitoba Hydro provides ongoing management and operations services to WPLP in accordance with the Project Development Agreement (PDA) signed in June 2006. This marked the first time a First Nation and Manitoba Hydro have entered into a formal partnership to develop and operate a hydroelectric project.³³

Northlands Denesuline First Nation – This community is energy dependent upon diesel, and is intently working at becoming independent from this fossil fuel and over the past four years created a comprehensive plan which has implemented the following: 140 kW lake-based geothermal heating and cooling systems; remediation and clean-up of diesel contamination sites in the community; a 1.5 MW biomass district heating system; new and ongoing employment in a logging operation to harvest local fire-kill wood for fuel for the biomass system; and a 282 kW solar PV park.³⁴

Fisher River Solar Farm – This First Nation has launched the biggest solar project in Manitoba consisting of a 1 MW facility with 3,000 solar panels and built entirely by Indigenous employees. The project’s focus is to generate revenue for the community and inspire other First Nations to pursue renewable energy solutions. “This solar project is a source of empowerment and pride for our community,” said Fisher River Cree Nation Chief David Crate. “In addition to generating revenue and training local workers in solar installation, we’re also starting a conversation about large-scale green energy. We want to show both Indigenous and non-Indigenous communities that ambitious renewable energy projects are possible without further harming the environment.”³⁵

Keeyask Hydropower Ltd. – A 695 MW project which went online this year includes the Tataskweyak Cree Nation (CN), War Lake FN, York Factory FN, Fox Lake CN and Manitoba Hydro in a collaborative relationship which included the Joint Keeyask Development Agreement outlining the environmental protocol, roles and responsibilities of all the parties involved.³⁶

Conclusion

Despite the historical challenges, many Indigenous communities are working hard to pursue a future in which renewable energy systems provide greater economic independence and self-reliance. It is essential to build upon this emerging narrative of Indigenous leadership and innovation, and recognize that the future of renewable energy pursuits in Manitoba must be sought after with Indigenous benefit, perspectives and involvement present at every step.

³³ Wuskwatim Power Limited Partnership, Webpage: “Wuskwatim Generating Station”, (2021):

<http://www.wuskwatim.ca/>.

³⁴ Boke Consulting, Webpage: “Northlands Denesuline Renewable Energy & Remediation”, (2021):

<http://bokeconsulting.com/northlands-denesuline-renewable-energy-remediation/>.

³⁵ Fisher River Cree Nation, Webpage: “Fisher River Cree Nation unveils Manitoba’s biggest solar farm, a source of Bullfrog Power’s green energy”, (2021): <https://fisherriver.ca/2020/08/fisher-river-cree-nation-unveils-manitobas-biggest-solar-farm-a-source-of-bullfrog-powers-green-energy/>.

³⁶ Keeyask Generation Project, Executive Summary: <https://keeyask.com/wp-content/uploads/2012/07/Keeyask-EIS-Executive-Summary-PART1.pdf> ; p. 2

B.5 REI Education and Training Opportunities

Education and training opportunities specific to the renewable energy sector in Manitoba are currently limited which is of concern as there is both a shortage of appropriately skilled workers (technical and non-technical) in the renewable energy sector and a growing demand for such as the industry grows.³⁷ Canada's renewable energy sector is expected to employ 464,000 workers by 2024, a growth of 27% from 2018 with 9,300 of those jobs expected to be in Manitoba.³⁸ To keep pace with the expected growth in the industry and fill these new jobs with qualified workers, more opportunities for training specific to the sector will need to be explored.

While there are many existing education and training programs in Manitoba relevant to the REI, there are none with a specific focus on renewable energy. For example, there are many opportunities for project management training but no education available in the province specific to project management in the renewable energy sector. Another barrier to re- and up-skilling employees in the sector is that many of the relevant programs, especially those offered by universities and colleges, do not allow for course-by-course registration.

Manitoba does offer micro-credentials which are a complement to traditional credentials and represent competencies identified by employer/industry sectors to meet employer's needs³⁹ and are being offered by many organizations including Red River College and the Manitoba Institute of Trades and Technology. MEIA is working to develop one such program with RRC and other partners in the area of energy efficiency to create NRCan Certified Energy Advisors.

Manitoba currently has no focused Renewable Energy degree programs – either technical or engineering such as is offered by UBC in Clean Energy Engineering.⁴⁰ Local courses are offered, for example, at University of Manitoba, but a mechanical engineer would not be able to take the Renewable Energy Technologies course without going through a lengthy prior learning assessment process or being enrolled in a degree-program at the University.⁴¹ Courses offered through executive and continuing education programs are typically an exception to this rule.

The majority of environmental industry associations have a mandate to provide professional development opportunities, but these usually come in the form of one-day conferences, or lunch and learns (which of course have value, but perhaps do not provide the robustness required when we talk

³⁷ Malamatenios Charalampos, "Renewable energy sources: Jobs created, skills required (and identified gaps), education and training". *Renewable Energy and Environmental Sustainability* 23, no. 1 (2016): <https://doi.org/10.1051/rees/2016038>.

³⁸ ECO Canada, Webpage: "Essential Not Optional: Skills Needed to Succeed in Canada's Environmental Industry", (2018): <https://www.eco.ca/training/webinar/essential-not-optional-skills-needed-to-succeed-in-canadas-environmental-industry/>.

³⁹ Manitoba Construction Sector Council: <http://mbcsc.com/training/mcsc-micro-courses/>

⁴⁰ University of British Columbia: https://apscpp.ubc.ca/programs/mel/clean-energy-engineering/?gclid=Cj0KCQjw78yFBhCZARIsAOxgSx2-4-w2b-whcTkrV2-OFI4g6iMpsAqWDNrQkN7-wrcEdQRK0kxe1oaAk9GEALw_wcB

⁴¹ University of Manitoba Engineering Society, Handbook: "MECH Handbook 2018-2019", (2018): 27, <https://umes.mb.ca/sites/default/files/MECH%20Department%20Handbook%202018-2019.pdf.pdf>.

about re- and up-skilling our renewable energy workforce). Other Manitoba organizations, such as Okimaw, AMIK and other organizations offer training in cultural awareness that again is relevant, but not specific, to the renewable energy sector.

In some instances, industry associations for other professions will offer renewable energy-focused training, such as the Insurance Institute of Canada's Renewable Energy: Winds of Change. This program seeks to help brokers understand the insurance implications of private alternative energy use.⁴²

There are however, other institutions and organizations across Canada that provide renewable energy sector-specific training that Manitobans can access or that we may learn from. **ECO Canada**, for example, has several on-demand courses and certificate programs that are meant to provide the foundational knowledge required to work in the environmental sector.⁴³ ECO Canada also has an inventory of webinars ranging from technical topics like Sustainable Procurement to soft-skill development topics like Networking Strategies for Environmental Professionals that can be accessed any time for free or a nominal fee based on the webinar selected.⁴⁴

Indigenous Clean Energy (ICE) has created the 20/20 Catalysts Program is an intensive Indigenous clean energy capacity building program unlike any other. The Program provides practical and applied learning about renewable energy projects, community energy planning, energy efficiency and conservation, and advanced energy systems. In addition, participants ('Catalysts') are supported to move clean energy projects forward on-the-ground.⁴⁵

The **Canadian Institute for Sustainable Energy Training (CIET)** offers over 20 instructor-led and hands on energy efficiency training programs.⁴⁶ Training in areas like Heat Integration of Industrial Processes and certifications in energy auditing are available live, through their virtual classroom. The Quebec-based International Cleantech Institute (iCTI) also offers certificate courses and programs through distance learning in areas like Solar PV Project Development and Wind Energy Project Feasibility Analysis.⁴⁷ iCTI also assists universities, colleges, and private sector organizations in developing and adapting curriculum and materials for renewable energy-focused training.

MEIA with Efficiency Manitoba and Red River College are in developing an NRCan Certified Energy Advisor program to be launched in 2021 which will create professionals able to do energy audits leading to implementation of energy conservation measures.

Summary

While there are many different training opportunities available, online or in Manitoba that are relevant to the renewable energy sector, there are few however, that are specific to it nor are there degree

⁴² Insurance Institute of Canada, Webpage: "Renewable Energy: Winds of Change", (2021):

https://www.insuranceinstitute.ca/en/insurance-education/ce-ondemand/Class-Details/?program=CE_ONDEMAND&catalogueId=3&courseId=294.

⁴³ ECO Canada, Webpage: "Online Courses", (2021): <https://www.eco.ca/training/online-courses/>.

⁴⁴ ECO Canada, Webpage: "Webinars", (2021): <https://www.eco.ca/training/webinars/>.

⁴⁵ Indigenous Clean Energy, Catalysts Program: <https://indigenouscleanenergy.com/ice-2020-catalysts/>

⁴⁶ The Canadian Institute for Energy Training, Webpage: "List of Training Programs", (2021): <https://cietcanada.com/energy-efficiency-training-programs/>.

⁴⁷ International Cleantech Institute, Webpage: "Overview" (2021): <https://www.cleanenergyeducation.net/Home##CertificateCoursesandPrograms>.

programs with a specific REI designation. Development of renewable energy-specific training opportunities in Manitoba can look to universities and organizations across Canada, such as UBC, ECO Canada, BCIT, ICE and CIET for guidance and best practices.

C. Renewable Energy Industry Survey Results

The Manitoba Renewable Energy Industry Survey consisted of nine sections, sent as a link to over 500 companies and organizations whose work included involvement in this sector. The survey ([Appendix 1](#)) consisted of the following:

1. Industry Overview
2. Business Activities
3. Workforce size and composition
4. Skills development and training needs
5. Programs and Supports
6. Research and Development
7. Renewable Energy Industry Revenues
8. Greenhouse Gas Emissions
9. MEIA Connections

This portion of the report provides a review of the responses MEIA received within each section; the questions posed to participants, a summary of the responses, and a few concluding remarks. Please note that the words “survey respondents”, “respondents”, “employers” and “companies/organizations” are used interchangeably. *Italicized text indicates information directly extracted from the survey results.*

Despite being a recipient of the survey Manitoba Hydro did not participate. As a major player in the Province’s energy industry, their data (with over 5,000 employees) would have skewed the results significantly.

C.1 Industry Overview

The survey began with a number of introductory questions as to the respondent’s involvement in the REI, and their general perception and expectations regarding industry growth.

- 103 companies and organizations involved in the Renewable Energy Industry responded to the survey from a total of 502 recipients (20% response rate) to whom it was sent.
- Sixty-eight respondents (2/3 of total respondents) reported being actively involved in the REI.
- Twenty-five respondents represent companies and organizations where most of the work (over 50%) pertains to the Renewable Energy Sector.
- Thirteen respondents represent a company or organization where 25-49% or more of their work pertains to the Renewable Energy Sector.
- A majority (84%) of respondents are planning to expand their work in the Renewable Energy Sector, with thirteen respondents reporting interest in engaging in a renewable energy project in the next year or two.
- Fifty-eight businesses have general plans to expand their work in Manitoba’s REI.

Of the companies and organizations who responded, approximately half of them were established before 2010, whereas half were established after - as shown in the table below.

Table 1: Year of Formation

1940's		3%
1950's		3%
1960's		8%
1980's		8%
1990's		13%
2000's		21%
2010's		36%
2020's		10%

Remarks:

- Over half (55%) of those companies and organizations surveyed report more than 25% of their work in the REI, with the rest of respondents being less actively involved.
- Ambitious plans to expand the REI work extends to most of the recipients, indicating healthy growth for the industry over the next few years.
- The recent establishment of many REI businesses and organizations indicates entrepreneurship and a willingness to venture into a new field for many.

C.2 Business Activities

This section of the survey included research on the kinds of business services provided, and what areas of the Renewable Energy Industry were involved in the work of the respondents.

C.2.1 Services and Products Provided

Manitoba Renewable Energy Industry (REI) businesses and organizations participating in the survey were asked to identify the kinds of services and products they provide. As shown in the table below, the top five REI services provided are: *Systems Design & Engineering (60%)*; *Proposal Development (58%)*, *Feasibility Studies (56%)*; *Monitoring & Information Processing (54%)*; and *Education (51%)*. *Consultants, Trainers, Installers and those providing System Maintenance each constituted between 40% and 46% of the respondents*. Representing around a third of respondents were those with involvements in *Product Sales, Funding and Strategic Planning*. Participation in *Indigenous Cultural Awareness* was 25%, followed by *Product Manufacturing (22%)*, *Permitting (22%)*, *Accounting (18%)* and *Laboratory Services (17%)*. A service represented by a small group was *Legal Services (6%)*.

Table 2: Respondents in Various REI Services

System Design, Engineering	60%
Proposal Development	58%
Feasibility Studies	56%
Monitoring & Information Processing	54%
Education	51%
Community Interaction, Consultation	46%
Local Training, Employment	43%
System Installation, Consultation	42%
System Maintenance	40%
Product Sales & Marketing (Retail or Wholesale)	31%
Funding	29%
Strategic Planning (Patents, Copyrights, NDAs)	29%
Indigenous Cultural Awareness	25%
Product Manufacturing	22%
Permitting, Codes	22%
Accounting	18%
Laboratory Analyses & Services	17%
Legal Services	6%

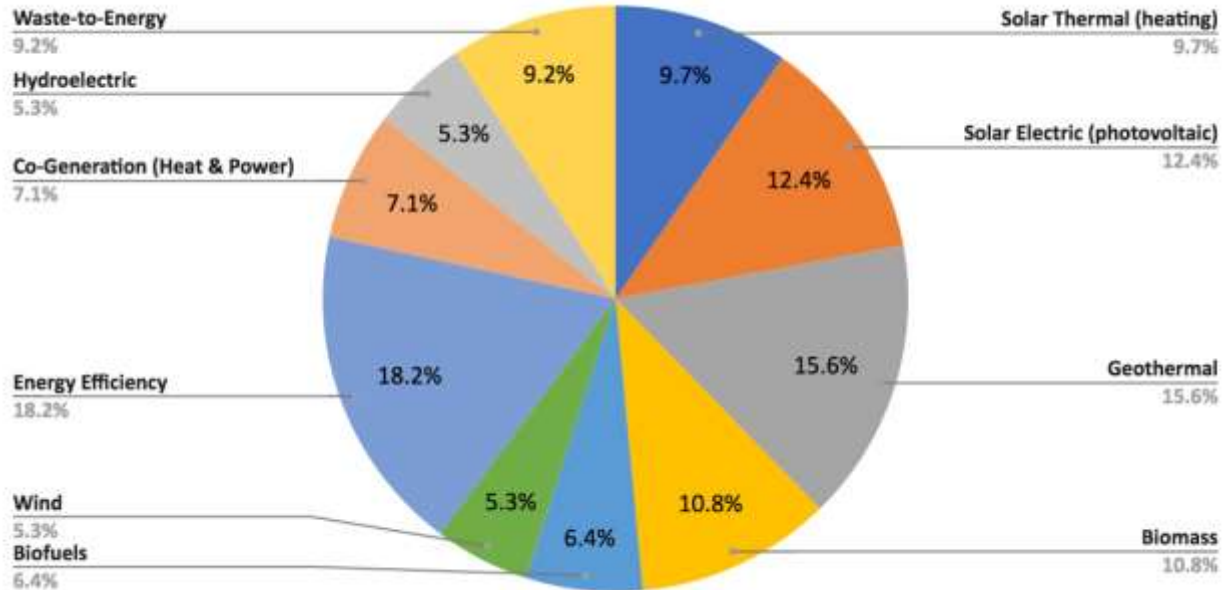
Remarks:

- Recognizing that the data originated from a group of 68 businesses and organizations, this wide level of scope is significant and indicative of a diverse industry.
- The number of system designers and developers is notable and makes sense as much of Manitoba's REI has work outside of the Province (see Section C7).

C.2.2 Renewable Energy Technologies

Companies and organizations participating in the research were asked to identify the types of REI technologies they worked with, and provided the following responses with *Energy Efficiency (18%) and Geothermal (15%) being the top areas of involvement, followed by Solar Electric – Photovoltaic (12%), Biomass (11%), Solar Thermal – Heating (10%) and Waste-to-Energy (9%). Co-Generation - Heat & Power (7%)* often includes the use of biomass as a fuel, but can also involve other types of fuels. Less participant involvement was in *Biofuels (6%), Wind (5%) and Hydroelectricity (5%)*.

Figure 4: Respondent Involvement in the REI



Remarks

- The widespread involvement of the respondents in this diverse gamut of technologies is represented in the chart, showing a significant level of experience and expertise across Manitoba's renewable energy industry.
- Although the various levels of engagement with the survey were not proportional to the types of actual energy generation produced in Manitoba, the overall diversity of the survey participants provided a broader array of perspectives that touched on all aspects of the REI.

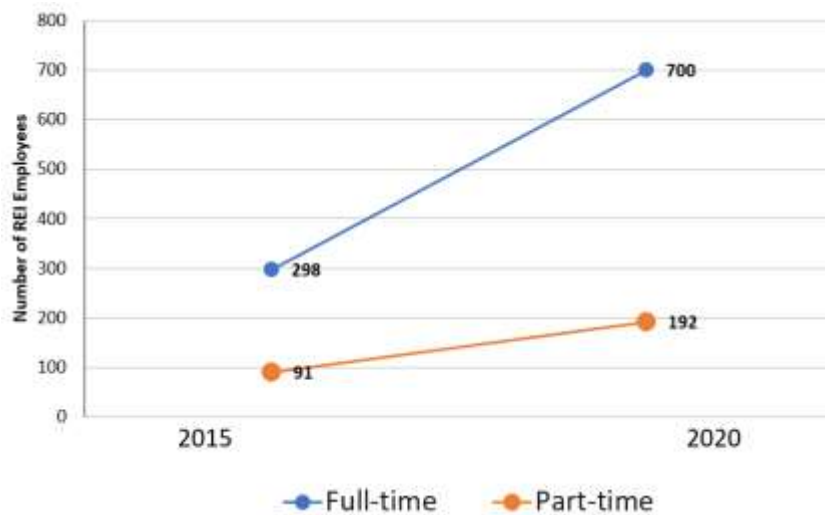
C.3 Workforce Size and Composition

This portion of the survey provided insight into the size of the REI workforce, types and growth patterns of employment as well as composition of the workforce.

C.3.1 Size of Workforce, Types of Employment and Growth Patterns

Manitoba REI employers were asked about the total number of staff they hired both on a full and part time basis. The responses received in this section indicate that employment of both part-time and full-time renewable energy employees have greatly increased in the past five years. For the businesses and organizations surveyed, *full-time workers increased from 298 in 2015 to 700 in 2020* representing a 135% growth for full-time employees in the REI. Between 2015-2020 *part-time workers in the REI grew from 91-192*, a 111% increase. Respondents said on average that *26% of their full-time staff and 21% of their part-time staff work in renewable energy activities*. Of the companies surveyed, 89% employed 10 people and less, indicating a large number of small businesses in the REI.

Figure 5: Manitoba REI Employees



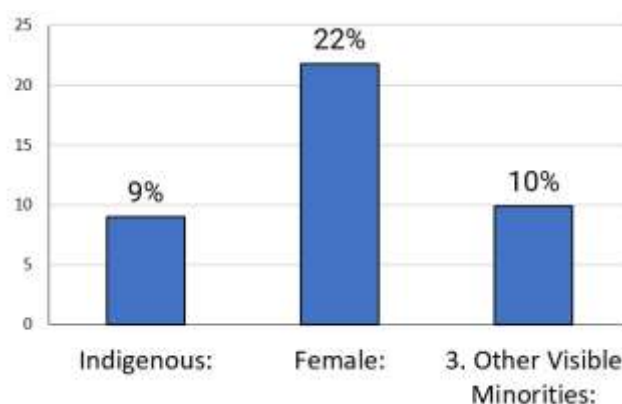
Remarks

- Manitoba's primary REI employer is Manitoba Hydro; while their influence is not reflected in this data it should be noted that they have 4500+ employees, with some recent temporary reductions in staff due to COVID-19.
- The significant growth curves of both modes of employment indicate industry expansion. While the full impact of COVID-19 has yet to be fully realized, it is worth noting that this survey was disseminated in 2021 and therefore does not take into account the full 2020 experience.
- The fact that many employees are not involved in the REI indicates that these businesses need to be nimble enough to provide the RE products and services, but also be involved in other related activities as well.

C.3.2 Workforce Composition

Manitoba's REI was asked to identify three demographics present within their organization – Indigenous, female, or other visible minorities. Responses indicated that the industry currently employs *9% Indigenous people, 22% Female, and 10% other visible minorities*. These numbers are overlapping, and further detail was not requested. The intent was to examine the extent to which the companies and organizations, as an aggregate are involved with the REI were diversifying their workforce.

Figure 6: Indigenous, Female and Visible Minorities Employed by REI

**Remarks:**

- The REI sector's workforce is not currently representative of Manitoba's diverse population, and has room to grow its labour pool to be more representative of the demographics of society as a whole.
- While historical data on this topic is mostly unavailable awareness and equitable training for management to grow the industry's diversity may be helpful.

C.4 Skills Development and Training Needs

In this section employers were asked to identify from a list of management and technical skills which of the areas constituted a priority for training in the next three years, training they had provided, where the training had occurred, and whether additional training would have been helpful.

C.4.1 Management Skills

REI survey respondents were asked to indicate from a list of options the kinds of Management Skills that would be helpful to their employees. The table below provides information on all of the options including number of employers interested as well as how many employees would be involved with the kind of training identified. The data is sorted using the number of employees involved as the primary data set in order to provide a clear picture of interest and demand for training in a wide array of topics.

The top five Management Skill training areas identified by the highest **number of employers** are:

- *Managerial/Planning/Leadership skills (27);*
- *Project Feasibility Analysis (23);*
- *Project Management skills (19);*
- *GHG Impact Assessment (19); and*
- *Regulatory Planning and Approvals (19).*

Other Management Skills identified as important were *Engineering Design (16)*, *Communication Skills (14)*, *Indigenous communication and engagement (13)*, *Information technology or computer skills (11)*, and *Planning skills (11)*. Receiving fewer responses were *Quality Assurance and Control (10)*, *Intellectual*

Property Management (10), Regulatory Planning and Approvals (10), Safety First Aid (10), Cross cultural awareness and HR Skills (9) and Insurance requirements (6).

The top five areas of Management Skills training in terms of **number of individuals needing training**, do overlap the above list, but also have notable differences and are arranged in the chart below:

- Safety/First Aid (181);
- Cross Cultural awareness and HR skills (104);
- Project Feasibility Analysis (90);
- GHG Impact Assessment (87); and
- Project Management skills (81).

Responses for the following had 60 or more employees needing the training: *Indigenous communication and engagement (72); Engineering/Design (70); Managerial/Planning/Leadership skills (68); Insurance requirements (66); and Financial management (64)*. Fewer participants indicated a need for: *Communication skills (56); Regulatory Planning and Approvals (54); Intellectual Property Management (52); Marketing and sales skills (52); Planning skills (51); Information technology or computer skills (48); and Quality Assurance/Control (43)*.

Table 3: Management Skills and Training Interest

Management Skills	Number of Businesses responding to skills that they need to gain/improve upon in the next three years	Number of Staff Needing this type of Training
Safety/First Aid	10	181
Cross cultural awareness and HR skills	9	104
Project Feasibility Analysis	23	90
GHG Impact Assessment	19	87
Project management skills	19	81
Indigenous communication and engagement	13	72
Engineering/Design	16	70
Managerial/Planning/Leadership skills	27	68
Insurance requirements (project, staffing, professional)	6	66
Financial Management (e.g. EBITDA, ROI, NPV)	14	64
Communication skills	14	56
Regulatory Planning and Approvals	10	54
Intellectual Property Management	10	52
Marketing and sales skills	19	52
Planning skills	11	51
Information technology or computer skills	11	48
Quality Assurance/Control	10	43

C.4.2 Technical Skills

In the area of Technical Skills, the responses include the following five priorities (**followed by numbers of interested employers / numbers of individuals needing training**):

- *Mechanical Systems (14/62);*
- *Metals/Welding (5/51);*
- *Controls, Programming (15/48);*
- *Electrical (12/42); and*
- *Plumbing & Pipefitting (7/33).*

The remainder of the technical skill training options involved fewer employers and less than 30 people needing the training: *Drone pilot training and certification (6/21); Other (unspecified and requiring follow-up (5/20); Heavy equipment operation (5/13); Drawing (5/11); Mapping and surveying (4/9); and Carpentry (3/7).*

Table 4: Technical Skills and Training Interest

Technical Skills	Number of Businesses responding to skills that they need to gain/improve upon in the next three years	Number of staff in need of training for the specific skill as reported by the responding businesses
Mechanical systems	14	62
Metals/Welding	5	51
Controls, Programming	15	48
Electrical	12	42
Plumbing/Pipe Fitting	7	33
Drone pilot training and certification	6	21
Other	5	20
Heavy equipment operation	5	13
Drawing	5	11
Mapping and surveying	4	9
Carpentry	3	7

Additional input provided by survey participants included needs for training in the following areas:

- *Carbon accounting/analysis training;*
- *Regulatory and policy awareness;*
- *Energy modelling competency;*
- *Technical writing; and*
- *Proposal development skills training.*

Remarks:

- Responses to this section of the survey indicate that all participants were interested in each suggested area of training.

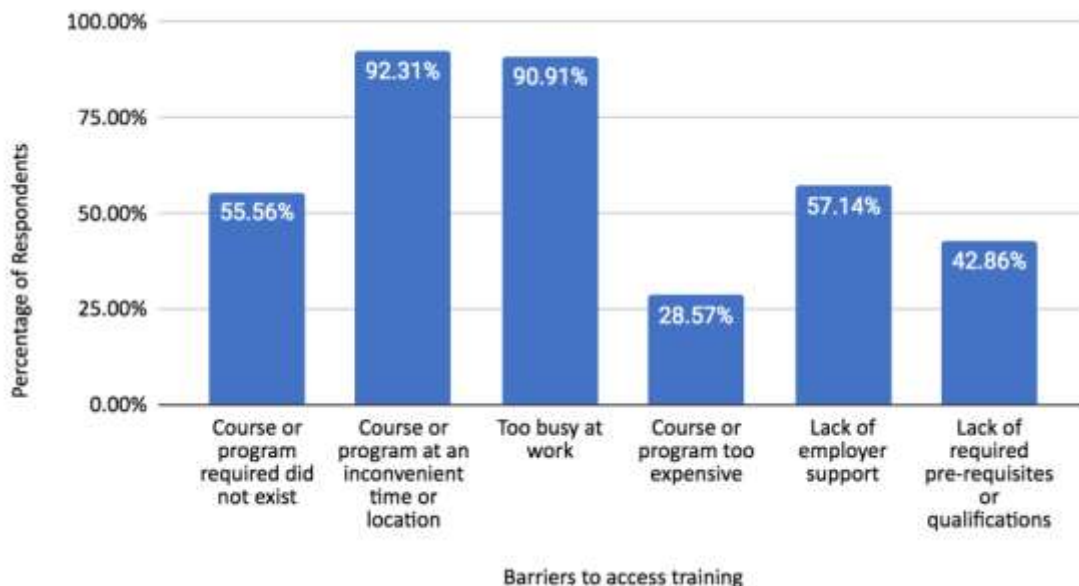
- Broad interest in Managerial training opportunities such as project management and feasibility analysis deserve follow-up.
- Fewer organizations expressed interest or demand for Technical training, however, their heightened personnel needs were expressed in a way which provides MEIA a clear pathway to meaningful follow-up.

C.4.3 Existing Training and Education

The survey asked respondents about the kinds of training and education they had received to date, which would address the priorities mentioned above. In other words, companies and organizations were asked if they had already accessed some sort of training which addressed their internal training and workforce development needs.

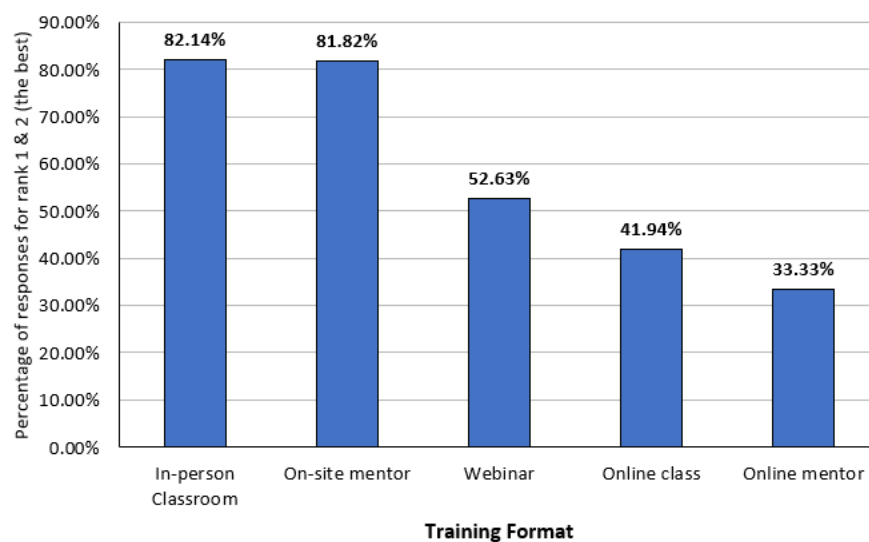
Around one-third (32%) of those responding said they had accessed relevant training from both on- and offline resources, with a third stating they would encourage employees to take a similar kind of training again. Regarding training respondents had wanted to take, but which was not available to them, nearly half of the responses (46%) indicated barriers to accessing the training needed and 43% stated that they were unable to find the kind of training they needed. Barriers to accessing training are summarized in the chart below with the primary barriers being the course at an inconvenient time or location (92%), and the person being too busy at work to accommodate additional training (91%). A significant portion of responses (55%) indicated that the course or program did not exist or that they did not have employer support (57%).

Figure 7: Barriers to Accessing Training



Employers taking the survey were asked to provide input on the kind of training they would prefer, with responses preferring the *in-person classroom* (82%) and *on-site mentors* (82%), followed by *webinars* (53%) and *online classes* (42%), with the least preferred option being an *online mentor* (33%).

Figure 8: Preferred Training Format



Remarks

- Data collected here provides opportunities to follow up this report with specific managerial and technical training on many topics for dozens of companies and organizations.
- Employers wanting to upskill their workforce will need to examine closely the kinds of support they can offer, as well as to understand the clear preference for in-person training – which remains a great challenge given current COVID-19 restrictions.

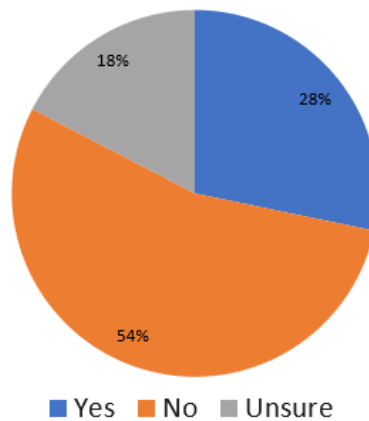
C.5 Support Programs and Business Development

The Programs and Supports section of the survey requested information about financial supports they had received and which kinds of governmental/non-governmental programs they had accessed to do so. This was followed by inquiries into whether they had developed and tried to launch a new product or service, and what hampered or assisted their ability to succeed. Finally, the survey asked what MEIA could provide in terms of meaningful supports.

C.5.1 Support Programs

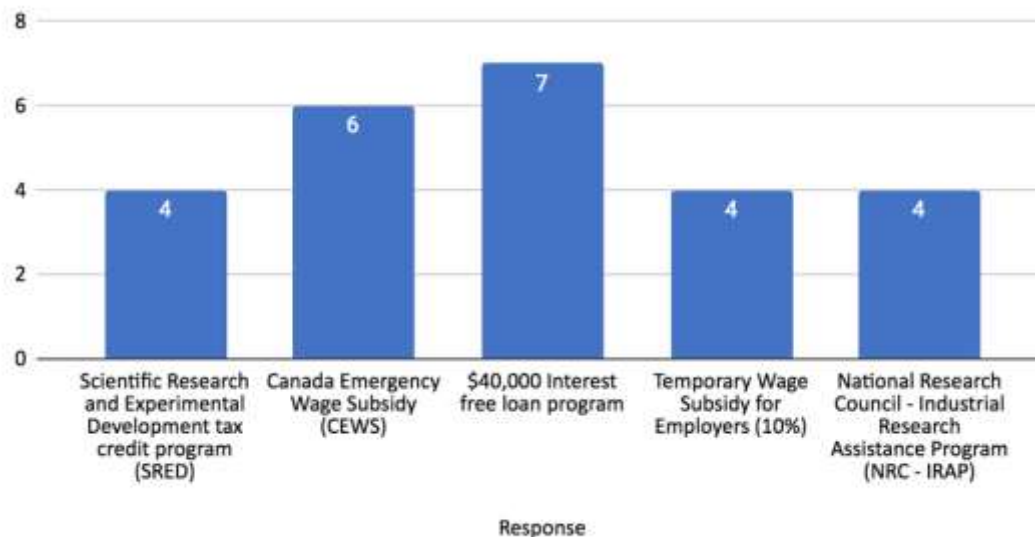
In response as to whether the 52 respondents had received support from government or other support programs, 54% of the organizations and businesses surveyed had not accessed government programs or support for their Renewable Energy (RE) related business activities in the past 5 years. Over a quarter of those surveyed (28%, or 13 respondents) had accessed government programs or support, while 18% were unsure on whether or not programs or support had been accessed.

Figure 9: Respondents Accessing Government Support for RE Activities



For the organizations and businesses who accessed programs in the past five years, the Provincial \$40,000 interest free loan program was the most popular (7), followed by the Canada Emergency Wage Subsidy (CEWS) (6). Three programs tied for third with four businesses accessing each of them: Scientific Research and Experimental Development Tax Credit Program (SRED); National Research Council – Industrial Research Assistance Program (NRC – IRAP); and the Temporary Wage Subsidy for Employers (TWS).

Figure 10: Most Accessed Support Programs and # of Participants



Other less accessed federal and provincial programs for support of RE activities over the past five years included: *Canada -Manitoba Jobs Grant (3), Small Business Venture Capital Tax Credit (2), Manitoba Manufacturing Investment Tax Credit (2); Scientific Research and Experimental Development tax credit program (SRED) (2); and Western Economic Diversification (WD) (2).* Programs accessed by one business or organization were: *Natural Science and Engineering Research Council (NSERC), Workforce*

Development Program (1); Innovation Growth Fund (formerly Commercialization Support for Business Program CSBP) (1); MITACS (1); Protein Industries Canada (PIC) BioTalent (1); NRC-IRAP (IAP) Innovation Assistance Program (1); Provincial Summer Student Recovery Program (1); and Other (1).

Table 5: Other Funding Options

Name of Government Support Program	# Businesses Accessing the Program
Canada -Manitoba Jobs Grant	3
Small Business Venture Capital Tax Credit	2
Manitoba Manufacturing Investment Tax Credit	2
Scientific Research and Experimental Development	2
Western Economic Diversification (WD)	2
Natural Science and Engineering Research Council (NSERC)	2
Workforce Development Program	1
Innovation Growth Fund (formerly	1
MITACS	1
Protein Industries Canada (PIC) BioTalent	1
NRC-IRAP (IAP) Innovation Assistance Program	1
Provincial Summer Student Recovery Program	1
Other	1

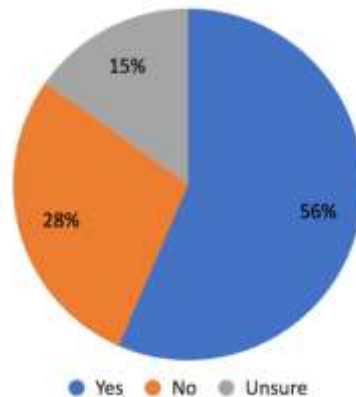
Remarks

- As a representation of the REI industry, less than one third of survey respondents have accessed federal or provincial support programs. Based on responses received in Section C.9 requesting greater assistance in accessing government programs, more work is needed to connect Manitoba's REI with existing support programs.
- The array of programs from which the REI can find support is more than what is listed above, which is limited to those programs actually accessed by the industry. The existence of this number of programs is a significant statement of support of what the various governments are willing to provide to industry – the issue is building better communication of needs and resources between governments and industry.

C.5.2 New or Innovative Renewable Energy Product or Service

Survey respondents were asked if they had recently developed or are currently in the process of developing or selling a new or innovative renewable energy product or service. More than half (56%) of the respondents answered yes to this question, 28% responded no, and 15% were unsure.

Figure 11: Businesses Developing or Selling a New REI Product or Service

**Remarks:**

- The REI, while small, scores high in this section, revealing that exploring new and innovative products and services are essential to the success of those responding to this survey.
- Follow up is key here utilizing the many support options to determine which concepts are marketable and which require additional research and development.

C.5.3 Barriers to New Product/Service Development

Following up on the above inquiry as to whether respondents had or were working on a new RE product or service, the survey asked if there was anything that had or was hampering the success of their products or services. Half of respondents stated that they experienced difficulties successfully developing or selling their new product or service, while 25% reported few major barriers (with the remaining responses being unsure or NA). Issues that hampered efforts to successfully develop a new product or service included a variety of business-related reasons but the primary reason given was **lack of government and funding support for new product/service launch (10 responses)**.

The remainder of barriers listed below received one response each:

- *Customer acceptance;*
- *Manitoba Hydro;*
- *Government regulations (all levels);*
- *Leadership time limitations,*
- *Lack of knowledge about the sector;*
- *Lack of senior management buy-in;*
- *Insurance premium;*
- *Lack of an industry in Manitoba;*
- *Lack of coordination within ISC (Indigenous Services Canada);*
- *Economic viability;*
- *Lack of interest in Wind Power development;*
- *Conflicting market information; and*

- *Cost of marketing.*

Remarks:

- The identification of lack of government supports to bring progress to various R&D ideas is due to many things, and points to the clear need to connect these businesses and the government resources which exist.

C.5.4 Supports for New Product/Service Development

Renewable Energy Industry employers were provided with a list of potential areas of assistance, supports or services that could be offered to help bring their product or service to market or help expand their Renewable Energy-related business. Interest in each was to be indicated on a scale of 1 (very interested) to 7 (not interested), and the results below combined the top three priorities for the respondents.

The most helpful assistance chosen was *Assistance in securing financing for facilities, equipment or other business-related expenses* (32 employers rated this as one of their top three priorities) followed by *Training specific to your industry or area of expertise* (28). The remaining four elicited a similar level of response: *Assistance with expanding into additional markets* (19); *Assistance in developing and/or implementing marketing and sales strategies* (18); *Regulation or licensing-related assistance or supports* (16); and *Recruitment and hiring-related assistance or supports* (15).

Figure 12: Respondent Interest in Assistance



Remarks:

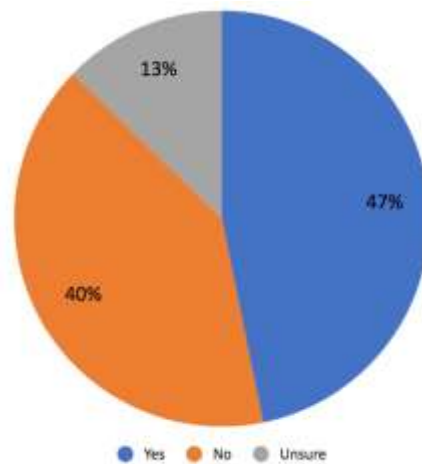
- The focus of input, as was indicated by the responses in other sections of the survey, is on financing.
- The levels of interest for assistance in these various areas provides MEIA with tools to approach various providers of relevant services to equip businesses based on their survey input.
- Next steps for type of assistance will require follow-up conversations with respondents to determine the specific needs for each business.

C.6 Research and Development

Respondents in this section were asked if they conducted research and development in the energy efficiency or renewable energy fields. The results were that 47% of businesses surveyed answered in the affirmative, and many of these provided a brief response regarding the research and development that they are currently involved with.

- **Financing**
 - *Facilitating the development and access to funding for research and implementation of Renewable Energy and Energy Efficiency initiatives with municipal clients*
- **Waste**
 - *Tracking waste streams*
 - *Researching utilization of waste streams for biomass energy*
- **New Products and Design**
 - *Developing several new products including testing*
 - *Developing tools and design methodologies*
 - *Modelling performance measurement for verification and analytics*
 - *Innovative product design for REI*
 - *Technical studies, laboratory analyses, on-site testing*
 - *Monitoring equipment*
- **Biomass:**
 - *Researching biomass-based CHP (Combined Heat and Power) systems in remote communities*
 - *Monitoring of green assets*
 - *Developing and researching fibre and pulp properties of biomass (cattails)*
 - *Designing small biomass systems*
- **Buildings**
 - *Evaluating building performance*
 - *Developing feasibility analyses for net zero buildings*
 - *Working on continuous improvements*
 - *Creating more efficient buildings*

Figure 13: REI Participants Involved in R&D

**Remarks:**

- With responses from nearly half of the participants, this range of R&D activities - given the size of the survey respondent base - is impressive, and indicates that Manitoba's REI is made up of innovative, energetic, and determined organizations and individuals.
- Assisting these businesses to realize success in developing their ideas is critical to the collective future, environmental health and economic growth of Manitoba.

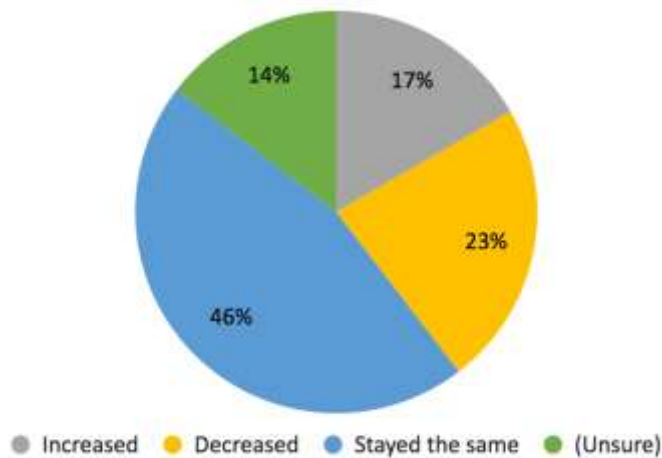
C.7 Industry Revenues

Renewable energy business owners and organizations were asked in this section a series of questions regarding the status, amount, and location of their revenues.

C.7.1 Renewable Energy Industry Revenues

When asked to report on whether the Renewable Energy-related revenues for their Manitoba based operations this past year had increased, decreased or stayed the same, 17% of businesses stated that their revenue increased, 23% reported that their revenue decreased, 46% said that their revenue stayed the same, and 14% said that they were unsure.

Figure 14: Changes in Revenues for REI Businesses from 2019-20



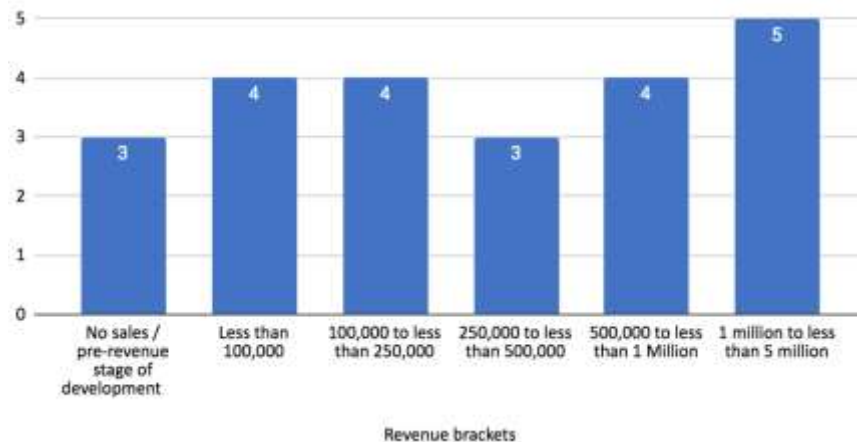
Remarks:

- Despite the many challenges invoked by COVID-19 in 2020, survey responses demonstrate the stability of Manitoba’s REI, with most of the companies having experienced a fiscal year similar to that of 2019, or saw an overall increase in revenues.

C.7.2 Gross Revenues and Trends

In terms of actual dollars, respondents were asked to provide their approximate gross revenues for the last fiscal year using specified income brackets. The results, as expected showed a wide span of results, with *three of the businesses in developmental stages*, meaning they have not started collecting revenue. *Four businesses surveyed made less than \$100,000, four reported earning between \$100,000 and \$250,000, three from \$250,000 to \$500,000, four between \$500,000 and \$1,000,000 and five from \$1,000,000 to \$5,000,000 in their last fiscal year.*

Figure 15: REI Business Revenues Last Year



Following up on this, the survey inquired about net income, measured by EBITDA (earnings before interest, tax, depreciation and amortization) between 2017 and 2019 (pre-pandemic) and whether it had been increasing, decreasing, or staying about the same.

- 12% had significantly increased revenues;
- 40% had somewhat increased revenues;
- 36% had their revenue stay the same;
- 6% had slightly decreased revenues; and
- 6% reported their revenues had significantly decreased.






Remarks:

- Although not all of the participating companies/organizations responded to this question, the responses garnered indicate business activities that range from low-income start-ups to ones with revenues over \$1 million. This finding suggests that multi-disciplinary approach must be adopted in order for MEIA to fulfill its role in assisting these companies/organizations moving forward.
- Overall, this indicates a growing industry, with an expanding future.

C.7.3 Revenue Location

The final question of this section had to do with where revenue had been acquired. Out of the businesses which responded to the survey, most revenues came from within Manitoba (49%) followed by 41% within greater Canada, 6% in the United States, and 4% in the other parts of the world including Europe.

Table 6: Earned Revenues in Various Regions

Manitoba		49%
Rest of Canada		42%
United States		6%
Rest of the World		3%
Europe		1%

Remarks:

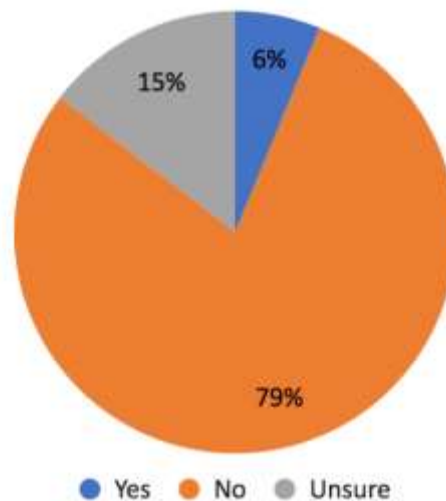
- This chart speaks volumes – the source of revenue patterns reported above are revealed as being as much in Manitoba as out of Province.
- Implications of this finding are many:
 - Manitoba companies look to other regions for growth, meaning that policies and regulations in other areas matter

- The physical location of Manitoba’s REI may have more to do with local homeownership than business opportunity, meaning that the stability of the REI could easily be affected by cultural/societal changes (ex. Housing market, family relocation, etc.)
- Policy makers in Manitoba would be well served to research the business done by Manitoban businesses in other jurisdictions so as to better understand the implications of our own policies, and to understand potential implications for local policies. For instance, if Region X incentivizes district geothermal systems while Manitoba does not, it may be an advantage to understand if, how, and why our own policies should change.

C.8 Greenhouse Gas Emissions

While this section sought to collect quantified information on the annual greenhouse gas emissions produced by Manitoba’s Renewable Energy Industry, only three respondents (5.9%) out of the fifty-one submissions reported having measured their annual emissions in the last three years, 74.5% of respondents stated that they do not measure their organizations’ annual emissions, while another 13.7% were unsure.

Figure 16: Rate of GHG Emissions Tracking



Remarks:

- The findings from this section of MEIA’s 2021 Renewable Industry survey correspond to a survey done by the Chartered Professional Accountants in Canada in 2015,⁴⁸ which revealed that organizations... “appear to be [tracking their GHG emissions] so for the purpose of government compliance reporting—not financial or other stakeholder reporting,” and that “the majority of

⁴⁸ Chartered Professional Accountants Canada, Report: “Are Canadian Businesses Aware of the Need to Manage Greenhouse Emissions”, (2018), 15. PA Canada document (2015): <https://www.cpacanada.ca/-/media/site/operational/rg-research-guidance-and-support/docs/01717-rg-are-canadian-businesses-managing-greenhouse-gas-emissions-june-2018.pdf?la=en&hash=83509DB52453477642C1BACD23CEA44FAAA3A07B>

respondents (63%) are not currently tracking GHG emissions and have no plans to begin tracking them.”

- These findings illustrate that the survey responses on this topic find little awareness and accountability for their environmental performance.
- The topic of GHG reporting and accountability is another opportunity for MEIA to provide education and guidance on.

C.9 MEIA Feedback

The survey concluded with questions regarding MEIA, its performance as an Industry Association and what it can do to assist industry.

The first of questions was whether or not respondents were aware of MEIA before receiving the survey. The response was that over **75% had heard of MEIA, 12% had not, 10% were uncertain** and the remainder did not respond.

The second question asked if the respondents felt that MEIA had performed well as an industry association for the Natural Resources, Energy and Environment sectors, and **41% stated that it had, 18% that it had not, 16% were uncertain** and the remainder did not respond.

C.9.1 How Can MEIA Support the REI?

Renewable Energy Industry employers were provided with a list of ways MEIA itself could offer assistance and their interest was to be indicated on a scale of 1 (very interested) to 7 (not interested), and the results below combined the top three priorities for the respondents.

Participants in the survey were then asked how important is it that MEIA provides the following services and supports and the top three responses combined were: *Promoting REI initiatives and practices (90%); Providing input into government policy and regulations (86%); Assisting businesses to identify and access programs (78%)*. Other prospective MEIA service ideas ranked highly as well: *Facilitates business and networking opportunities (73%); Assisting access to financing (73%); Provides training and professional development (71%); Offering businesses one-on-one technical advice from an expert to address their business needs (53%); Provides assistance with marketing and sales strategies (51%); and Provides Indigenous cultural awareness training (45%)*. The following table provides the level of interest provided for each of these priorities as identified by the respondents as being in their top three priorities.

Table 7: Priorities for MEIA to Assist the REI

Promotes Renewable Energy and industry initiatives and practices	90%
Provides input into government policy and regulations	86%
Assists businesses in identifying and accessing available government programs and supports.	78%
Facilitates business and networking opportunities	73%
Assists businesses in identifying and accessing available sources of financing.	73%
Provides training and professional development.	71%
Offers businesses one-on-one technical advice from an expert to address their business needs.	53%
Provides assistance with marketing and sales strategies.	51%
Provides Indigenous cultural awareness training	45%

Finally, respondents were asked if they would like to be contacted by MEIA for future research or studies **to which over 77% replied positively.**

In addition to the structured response format above as to how MEIA could assist the REI, survey takers were asked in an open response format as to how MEIA can improve its performance. Several answers were provided:

- *More Indigenous inclusion/engagement;*
- *Advocacy to the Province regarding industry interests;*
- *Proactive programming (anticipating need) rather than reactive (responding to demand);*
- *More collaboration with other industry groups/Boards; &*

MEIA practice greater impartiality amongst its membership and contracted consultants

Remarks:

- MEIA's membership is made up of engaged stakeholders who have and are willing to continue providing valuable input as to how the organization can continue to offer environmental leadership to industry through workforce development, education and training.

D. Conclusions and Recommendations

Based on the findings of the REI Survey, the following conclusions and recommendations have been created including input on the following:

- Characteristics of the industry;
- Challenges facing the industry;
- Opportunities available for the industry;
- Policies impacting the industry; and
- Recommendations for the industry.

This information does not include data from Manitoba Hydro.

D.1 Characteristics of the Renewable Energy Industry

The Manitoba Renewable Energy Industry as represented by survey respondents can be characterized by their responses in the following ways:

- **Multi-tasking:** Over half of the respondents who work in the area of Renewable Energy, are also engaged in other areas of work/business;
- **Ambitious:** A majority are planning to expand their work in the Renewable Energy Sector in the next three years;
- **New:** More than half of the respondents were formally established after 2000, with most of those created after 2010;
- **Talented:** The skills and services reported by the over half of the respondents covered a wide range such as: systems design; feasibility studies; technology installation; and systems maintenance.
- **Technically diverse:** Representing the full gamut of renewable energy technologies, respondents work in all areas (energy efficiency, solar, geothermal, hydro, co-gen, biomass, wind and biofuels) with no one technology exceeding 18% of the total.
- **Small:** A majority of the companies are small (less than 10 people).
- **Expanding:** Employment in Manitoba's REI has more than doubled in the past 5 years.
- **Nimble:** Most of the respondents are involved with the REI as a portion of what they do, meaning they are able to make continual adjustment to their activities.
- **Not very diverse:** Members of the REI reported less than a quarter of their workforce being women and less than a tenth Indigenous.
- **Innovative:** More than half of the respondents reported having recently developed or being currently in the process of creating a new or innovative renewable energy product or service.
- **Mostly profitable:** Around half of those taking the survey reported revenues being the same over the past year (as influenced by COVID-19) and in the past three years they reported having had increased revenues. These revenues ranged from pre-sales to over one million dollars, with half of the respondents reporting less than \$250,000 in revenues this past year.
- **Not working only in Manitoba:** Over half of the reported revenues came from work outside of Manitoba.
- **Aware of but not tracking GHGs:** Most of the respondents were not tracking their GHGs.
- **Informed and appreciative of MEIA.**

In terms of training and specific modes of workforce development, those surveyed were:

- **Keen to learn:** The survey received excellent levels response to questions about training needed both Management and Technical skills.
- **Actively learning:** Around one third had accessed training and more were interested.
- **Experiencing learning barriers:** These included difficulties finding time or getting to programs, or being too busy at work.
- **Interested in accessing supports:** Over half of those responding had not accessed government supports, but all were interested in further information.

D.2 Challenges Facing the Renewable Energy Industry

While many of the challenges facing Manitoba's REI are based on financial, technical or human resource/personnel facets of business, the primary obstacle has to do with policy and the lack of clear and visionary environmental targets, including the reduction of GHGs. These policies are fundamental to the growth of the REI and are further elaborated on in the REI Policy Context section below.

Other challenges are outlined below:

- **Markets:** With electrical pricing policies in Manitoba presently not favoring additional new private energy generation, and natural gas prices undermining renewable heating systems production, the REI faces significant challenges in the growth of markets.
- **Indigenous Awareness and Diversity:** Addressing this is multi-faceted and requires an interest to begin or continue in a journey of awareness of what it takes to build Indigenous and gender diversity in the REI.
- **New Product or Service Development:** Accessing financial assistance for R&D takes considerable time and effort as well as help from exterior agencies responsible for the dispensing of these resources.
- **Financing:** Accessing financing for startups and or expansions was often cited as a key challenge for some companies.
- **Cooperation:** Given the size of the REI, and the rise and fall of governmental incentive programs, it is a challenge to build industry strength among competitors.
- **Education:** Manitoba does not currently offer any educational programs that provide multi-year degrees specific to renewable energy now being provided by for example UBC in its Clean Energy Engineering Program. While other initiatives such as the Indigenous Clean Energy's (ICE) "Catalyst" program does provide greater awareness, the Province needs to bolster and incentivize existing engineering and other related technical programs to certify both engineers and technicians specializing in renewable energy.

D.3 Opportunities for the Renewable Energy Industry

Manitoba is home to a plethora of renewable resources, including: more sun than any other part of Canada (same as Saskatchewan); water enough to provide nigh 100% of the electricity; biomass resources enough to heat the whole province; ground heat sufficient to heat (and cool) nearly any structure; and a workforce shown by this survey to have the interest and energy to grow; the opportunities are immense.

- **Diversity:** The opportunity to grow the diversity of the REI workforce to include far more Indigenous, women and other minorities is great, requiring a commitment and willingness to grow awareness and open doors.
- **Out of Manitoba markets:** Already shown by the statistics, the REI relies on revenues from other jurisdictions and promises more opportunity.

- **Federal Policy direction:** As shown by the recent release of the Federal budget with a clear commitment to addressing climate change and the promise of many new opportunities - including for energy efficiency companies interested in expanding their auditing services.
- **Training:** The launch of formal Renewable Energy education programs is a timely topic, and can help Manitoba emerge as a place with degree programs worth marketing to other jurisdictions.

Based on the results of the Manitoba REI survey above, the following training opportunities are identified in terms of both the Management and Technical areas.

D.3.1 Management Training

Topics for managerial training as indicated by the presented to survey respondents included a wide range of 17 topics, with the following top five areas of management identified by the **most employers**:

- *Managerial/Planning/Leadership skills (27);*
- *Project Feasibility Analysis (23);*
- *Project Management skills (19);*
- *GHG Impact Assessment (19); and*
- *Regulatory Planning and Approvals (19).*

The following top five areas of management training were identified as being needed by the **greatest number of employees**:

- *Safety/First Aid (181);*
- *Cross Cultural awareness and HR skills (104);*
- *Project Feasibility Analysis (90);*
- *GHG Impact Assessment (87); and*
- *Project Management skills (81).*

Although survey respondents indicated demand for other types of managerial training, the above ten categories provide MEIA with the opportunity to respond to industry need with appropriate training.

D.3.2 Technical Training

From a list of eleven Technical Skills, the responses identified the following five priorities (**brackets indicate numbers of interested employers / numbers of people who could benefit from the training**):

- *Mechanical Systems (14/62);*
- *Metals/Welding (5/51);*
- *Controls, Programming (15/48);*
- *Electrical (12/42); and*
- *Plumbing & Pipefitting (7/33).*

This list of technical training skills needed provides MEIA with the opportunity to directly connect these companies/organizations with the kinds of training that they require.

D.3.3 Modes of Training

In order to provide the training requested by the REI, the following factors will need to be considered:

- Different learning styles;
- Types of training needed;
- Workplace requirements vs. chosen electives; and
- Impact of wider environment – such as COVID-19, or other health issues.

Consideration of the above factors encourage a variety of training formats⁴⁹ to suit a wide range of situations and needs:

1. Instructor-led training
2. eLearning
3. Simulation employee training
4. Hands-on training
5. Coaching or mentoring
6. Lectures
7. Group discussion and activities
8. Role-playing
9. Management-specific activities
10. Case studies or other required reading

It should be noted that under the current context of COVID-19, eLearning has been embraced as the primary method of workforce development, education and training:

- Web meetings and calls (Zoom, Teams, Meet, others);
- Conference and meeting tools (Gather.town, Airmeeet, Runtheworld, Hopin, Whova, others);
- Video streaming tools (YouTube, others);
- On-line course tools (unique to various educational institution, also Udemy and Coursera); and
- Websites and a host of new tools.

The format of future training will depend on the employer, employee and type of training needed, and MEIA will want to examine the gamut of pathways to learning in order to best serve industry.

D.4 The REI Policy Context

Manitoba's Renewable Energy Industry operates within the Provincial regulatory, financial, business and policy context as well as other national and international frameworks, determining how the Manitoba REI operates inside and outside of the Province. The focus of this report is the training and workforce development needs of the REI, and these needs are directly related to the growth of the industry itself. The following section examines various strategies implemented historically in Manitoba which have influenced the growth of the REI.

⁴⁹ Edgepoint Learning, Webpage: "Types of Employee Training", (2021): <https://www.edgepointlearning.com/blog/top-10-types-of-employee-training/>.

D.4.1 Direct Incentive programs

These provide tax deductions, cash rebates or refunds for climate smart activities such as installing solar, geothermal, biomass or wind systems and energy efficiency measures. Incentives spur the market into action, creating new business, new opportunities and new training requirements. Action is taken because both industry and the customer have a clear idea as to how the new measures will be financially beneficial. Such incentives can but do not have to be tied to wide policy objectives (ex., Federal directive to reach Net Zero by 2050).

In 2016 for example, Manitoba Hydro introduced a solar PV incentive that was available to residential, commercial, and industrial customers. The incentive, based on a minimum 1 kW, maximum 200 kW system size, gave applicants \$1 per watt, equating to approximately 25% of costs. The pilot was anticipated to bring in around 100 applicants, but instead saw over 1500.⁵⁰ As a result of the backlog, the incentive program was ended in 2018 with no return for the foreseeable future.

Similarly, in 2009, Manitoba's Department of Growth, Enterprise and Trade (now Economic, Training and Jobs) launched a geothermal heat-pump incentive program that would give grants and tax credits to qualifying individuals or organizations who installed a geothermal system. From 2009 to 2013, approximately \$3 million was allocated to over 1 000 homes and businesses who took advantage of the program.⁵¹ While the incentive program has gone through many iterations since its initial launch in 2009, property owners who install a qualifying geothermal heat pump system in Manitoba can receive refundable tax credits up to 15% for eligible equipment from the Government of Manitoba. Eligibility criteria does apply; thus, the geothermal heat pump system must be installed in Manitoba by an installer certified by the Manitoba Geothermal Energy Alliance Inc., a listing of which is available on the MGEA website.⁵²

- Comment: Incentives, although helpful often in the short run, jolt the industry and at times may trigger the markets to respond long term, but more often result in short term spikes of activity. This brings many new players in to take advantage of the programs which impact quality and integrity of the industry and when expired is usually followed by a significant downturn in interest and activity – regardless of environmental benefits.

D.4.2 Financing programs and initiatives

Accompanying the above, but separate in many ways, financing programs make available the means to do the work, leaving the options up to customer. These have included such programs as Manitoba Hydro's "Pay as you Save" (no longer existing) which financed energy efficiency measures and paid the loan back with savings realized. Other financing initiatives used by other jurisdictions are Green Bonds

⁵⁰ Froese Ian, "Manitoba's solar panel rebate program sidelined until 2022", *CBC News*, (2019): <https://www.cbc.ca/news/canada/manitoba/manitoba-solar-panel-energy-rebate-program-2022-efficiency-manitoba-1.5338619>.

⁵¹ McNeill Murray, "Warming up to Geothermal", *Winnipeg Free Press*, (2013): https://www.manitoba.ca/sd/environment_and_biodiversity/energy/geothermal/fp_article3.html.

⁵² Province of Manitoba, Webpage: "Green Energy Equipment Tax Credit", (2020), https://www.gov.mb.ca/sd/environment_and_biodiversity/energy/geothermal/geo_incentives.html#:~:text=Property%20owners%20who%20install%20a,from%20the%20Government%20of%20Manitoba.

which as a fixed-income tool raises money for climate smart projects typically by large municipal entities. An example is Vancouver which set up a Green Bond⁵³ to support its GHG policies. Again, such financing opportunities can, but do not have to be tied to wide climate policy objectives. Future financing will include carbon pricing, markets, and offsets.

- Comment: These programs are also helpful and can provide the means for which renewable energy projects can be financed. However, as stated above, without being tied to a wider GHG framework, these policies can have a political shelf-life and without a long-range policy context, expire.

D.4.3 Government GHG policies

As alluded to above, Vancouver set a target of 100% renewable energy, and a reduction of GHG emissions by at least 80% below 2007 levels before 2050.⁵⁴ With clear policy and targets, the industry is able to plan for the long term by simultaneously enhancing regulations, training, financing and capacity.

Manitoba's *Climate and Green Plan Implementation Act* is a significant step forward for climate policy in Canada. The legislation of an accountability framework— complete with formalized governance processes, cumulative emissions reduction targets, and expert advice—is something that could benefit governments across Canada as they seek to reduce emissions and tackle climate change. However, the same Act does not enshrine a long- term emissions reduction target into law, nor does the province have a publicly stated long-term goal. Making a long-term target legally binding through legislation increases government's accountability to act on climate change and provides increased certainty and predictability around the future emission reduction path for businesses, investors, consumers, and policy makers at all levels of government. Without this long-term target, there is also less information to guide the setting of interim milestones.⁵⁵

- Comment: Climate change targets are critical and need to be clear and set for the long term, however, without incentives and financing, targets by themselves cannot result in the kinds of GHG reductions required for sustainability.

D.4.4 Innovative Initiatives

Different in comparison to the direct impact of the above three measures, innovative initiatives into the REI market are foundational. Motivated individuals in Manitoba have set up wind turbines, solar electric and thermal systems, biomass heating and geothermal heating and cooling systems, as well as building many innovative efficient housing units. Motivated organizations such as Habitat for Humanity continue to be the industry construction leaders in energy efficient commercial construction. And motivated students and professors at local universities and colleges guide many innovative ideas in the REI. Together, these innovative initiatives in the REI are what have led to the successes that Manitoba has enjoyed as these ideas and innovations have led to new businesses, research, regulations and policy.

⁵³ City of Vancouver, Report: "Green Bond Framework", (2021): 1.

⁵⁴ City of Vancouver, Report: "Green Bond Framework", (2021): 1.

⁵⁵ Canadian Institute for Climate Choices, Manitoba's Climate and Green Plan Implementation Act 2018: <https://climatechoices.ca/publications/manitobas-climate-and-green-plan-implementation-act-2018/> (2018)

- Comment: Such initiatives are inspiring and interesting, however, unless they function as seeds for vision and planning, will not in themselves create the long-term sustainability required by our planet.

In summary, the future of Manitoba's REI depends upon a foundation of the four aforementioned policy and vision components: incentives, financing, GHG reduction targets and a commitment to encourage continual learning from entrepreneurs and researchers. These together provide the REI with the base upon which future measures and systems can be imagined, designed, planned, purchased or built, installed, maintained and serviced.

D.5 Recommendations

Based on the findings of this report regarding the workforce development needs of Manitoba's Renewable Energy Industry, the following recommendations are presented to MEIA which include both wider advocacy as well as training and workforce development opportunities.

D.5.1 MEIA Renewable Energy Industry Survey Follow-Up

The first clear step to be taken is to build an action plan based on the conclusions reached above with the respondents of the MEIA REI Survey to ensure that all those who provided input are contacted again and that appropriate training programs and workforce development are created and made available to interested companies and organizations. This plan should include specific objectives, managerial and technical skills training courses, targeted stakeholders, timelines and costs. These courses will need to be developed by:

- Identifying the specific training, workforce development, courses and course materials needed;
 - Researching existing providers of both online and in-person programs;
 - Forming strategic partnerships with relevant training institutions and organizations;
 - Exploring the best mode of training;
 - Presenting of training options, costs and timelines to survey respondents;
 - Scheduling and giving the courses; and
 - Following-up with participants to determine the success of each course.
- **Recommended MEIA Action**
- Follow up the REI Survey with a thorough action plan, complete with measures for accountability. This plan, completed with assistance from the REI and related educational stakeholders will set out specific actions which address the responses and provide industry with what it requires to grow and build capacity. In addition, funding and leadership required to make the plan operational will need to be identified.

D.5.2 Indigenous Awareness and Cross-Cultural connections

In addition to courses created and provided on the topic of Indigenous Awareness and Cross-Cultural skill development, MEIA should convene a panel of Indigenous and non-Indigenous leadership within the REI to explore new ways of working and developing projects and programs that more effectively build connections and trust. Historic hydro developments have created both renewable power as well as contributing to strained relationships with Indigenous communities, and while much has been done to

redress these and create new paradigms of planning and resource development, much has yet to be done.

➤ **Recommended MEIA Action**

- Form an MEIA Indigenous awareness advisory panel to assist the organization as it continues to learn, plan and provide training to its members.

D.5.3 Encourage the Development of Long-Term Climate Policy

Industry and those supporting industry need government to create long term plans to address climate change, including a framework to reduce greenhouse gases using specific targets consistent with those set by other jurisdictions across Canada. With tangible targets in place, industry can make its own plans for growth, marketing, financing, hiring and training to develop its workforce to respond in a profitable and timely fashion. Manitoba's Climate and Green Plan⁵⁶ contains a table of "Estimated Cumulative Emissions Reductions 2018-22" which would result in GHG reductions, however, it needs to be expanded to contain specific targets and goals which can (among other things) provide the REI the basis upon which to plan to grow the Province's sustainability.

Manitoba is replete with excellent examples of creative and effective renewable energy and energy efficiency examples: 99.5% renewable electricity; biomass heating units; geothermal heating and cooling systems; wind turbines; and reducing energy demand through effective energy efficiency measures. Manitoba has commercial builders exceeding national building codes with houses among the most efficient in the country, and has the most energy efficient office tower in North America (Manitoba Hydro Place).

There are many clear indicators that **Manitoba has "what it takes"** to achieve sustainability and net zero targets – which must be set in order to be followed. In the absence of tangible climate targets, industry responds to incentives and financing schemes which help the industry grow, but act to create short term growth without long term sustainability.

Manitoba's technical schools, colleges and universities need clear climate and GHG reduction targets in order to create – guided by industry - programs which prepare employees for the future. While the work of energy policy belongs to local and federal governments, advocacy to encourage greater awareness and progress toward environmental sustainability is needed.

➤ **Recommended MEIA Actions**

- Encourage next steps to the Manitoba Climate and Green Plan which include clear GHG reduction targets and goals which can provide the REI the basis upon which to plan to grow the Province's sustainability.
- Work with the Manitoba's Climate Action Team to build awareness of its *Road to Resilience – A Community Action Pathway to a Fossil Fuel Free Future*⁵⁷

⁵⁶ Government of Manitoba, Report: "Manitoba's Clean Energy Plan", (2012): 55.

⁵⁷ Climate Action Manitoba, Webpage: "Manitoba's Road to Resilience", (2021): <https://climateactionmb.ca/road2resilience/>.

D.5.4 Encourage the Growth of Renewable Energy Training and Degree Programs

Due to the projected growth of both Energy Efficiency as well as the Renewable Energy Industry based on the *Federal Budget 2021* and greater national attention to environmental sustainability, the need has grown for the development of formal technical, engineering and management level degree programs. Recent work on the formation of the NRCan Certified Energy Advisor⁵⁸ program at Red River College is one example of MEIA working with industry and an educational institution to put in place structural measures to train and develop workforce opportunities.

➤ **Recommended MEIA Actions**

- Continue its work with the development of the Certified Energy Advisor program
- Create a working group representing Manitoba's educational institutions to build local talent trained in Renewable Energy
- Encourage involvement in the Indigenous Clean Energy training program⁵⁹

D.5.5 Grow MEIA's role in the Renewable Energy and Efficiency sector

MEIA has effectively convened many stakeholder groups in various working groups to brainstorm ideas and determine the feasibility of pursuing ideas raised in these forums. These forums have been able to launch new programs as well as be a place for incubating new ones in addition to simply processing ideas. Topics have included Climate Smart workshops, Building and Energy Codes, Energy Advisors, Housing Inspections, and various financing options to actuate these and other measures.

➤ **Recommend MEIA Actions:** Continue to grow MEIA's role as a key facilitator/collaborator of renewable energy and energy efficiency initiatives including:

- Continuing to facilitate the NRCan Certified Energy Advisor program;
- Reconvene the MEIA Energy and Building Codes working group to build local capacity as these codes change and are adopted by local government;
- Carry on the discussion around First Nation energy efficiency assessment;
- Continue to host Climate Smart⁶⁰ workshops and certification to reduce GHG emissions and related networking to increase awareness of carbon trading and offsets;
- Continue to network and build plans with Red River College, Manitoba Construction Sector Council (and its members), the REI, MANSEA and Sustainable Building Manitoba.

⁵⁸ NRCan, Webpage: "Certified Energy Advisor", (2021): <https://www.nrcan.gc.ca/energy-efficiency/homes/professional-opportunities/become-registered-energuide-rating-system-energy-advisor/20566>.

⁵⁹ Indigenous Clean Energy, Webpage: "Catalyst Program" (2021): <https://indigenouscleanenergy.com/2020-catalysts-program/overview/>.

⁶⁰ MEIA, Webpage: "Climate Smart Training & Certification", (2021): <https://meia.mb.ca/meia-events/climate-smart-training-certification/>.

E. Appendices

E.1 MEIA Renewable Energy Industry Survey Instrument