



Towards a Green Premium Framework for Canada's Film-Based Industries

FINAL REPORT

Prepared for the

Canadian Media Producers Association

Earth Angel LLC

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Executive Summary

In Spring 2022, the Canadian Media Producers Association (“CMPA”) contracted Earth Angel (“EA”) to help develop its understanding of the ‘Green Premium’ (i.e. how much more does it cost?) of greener or more sustainable content production in Canada. The intent of this objective is to acquire and use this information to support the development of strategies, tools and training for members and to help the CMPA focus its time, energy and attention on areas that will have the most impact and benefit.

Approach: Over April to June 2022, and with the support of the CMPA, EA conducted primary and secondary research on the costs and experience with greener options for key production hubs across Canada. The production hubs of focus were Vancouver (British Columbia) Calgary/Edmonton (Alberta), Winnipeg (Manitoba), Toronto (Ontario), Montréal (Québec) and Halifax (Nova Scotia). The greener options of interest spanned electric generator alternatives, greener studio offerings, electric vehicle options, and improved waste management and circularity opportunities.

With the support of the CMPA, EA conducted 25 industry, producer and vendor interviews across Canada along with conducting parallel web research and industry report review. EA also compiled a vendor inventory and sourced over 15 regional and national vendor quotes on available options, along with sourcing utility costs across regions. A number of production resource use and redacted budget estimates were sourced by CMPA with EA. For the purposes of analysis, green premium composites and a theoretical small to medium feature film archetype was developed so as to provide a sense of how greener alternatives compare to business as usual practice, and how these may apply on a production basis.

Results: The regions of interest focus on urban production hubs across six provinces, and represent the most dynamic concentrations of production volume and consequent green infrastructure availability for the various provinces reviewed. In many instances (i.e. Vancouver), these urban hubs naturally benefit from provincial and municipal climate initiatives that have fostered the development of green infrastructure, as well as from clean hydro-based electric grids in provinces like British Columbia, Manitoba and Québec. Two cases in point include Vancouver and Montréal, which have benefited from historical provincial effort to build electric vehicle (EV) infrastructure and availability of consumer purchase incentives that render the availability of these options more feasible than in the other jurisdictions.¹

¹ The use of electric vehicles in these two hubs also makes more environmental sense given their cleaner electric grids; this is less the case for Alberta and Nova Scotia. Extreme cold temperatures were also cited as a potential deterrent to EV/hybrid and electric generator use in some regions where battery performance is not as efficient.

For other production hubs, green production options have been arguably constrained by the relative lack of explicit climate policy on a provincial level (i.e. Alberta and Manitoba). This translates to a relative paucity of green retail options and in particular those that depend on new infrastructure (like EVs), and compromise transition to cleaner economy principles and ultimately net zero goals.² This finding is supported by the perspectives of stakeholders, who cited limited regional support and consequent option availability has constrained the realization of progress in many areas.

Regions also differ in terms of available greening support through initiatives like Reel Green in B.C., Ontario Green Screen, and Rolling Green in Québec, as well as the existence of varied incentives on offer by utilities, provinces and municipalities that can help enable and build the cost argument for greening production. It is of note that there exists limited direct funding support for greening efforts in the industry except in Vancouver, and that the bulk of incentives that are available mainly relate to building stock optimization and are thus primarily applicable to studio owners, not to producers themselves. Similarly, incentives targeted at EVs do not broadly benefit producers *per se* but do affect the availability of EVs in various regions, particularly when such targets and incentives have resulted in the successful translation of EVs and alternative fuel sources into the retail market as noted.

The aggregate results from the green premium exercise are shown in **Table ES.1**. Although the analysis is not definitive nor accounting accurate given the limitations noted throughout this study, a few elements of interest can be drawn out. These are that:

- All four impact areas reviewed exhibit a moderate to a high net green premium compared to business-as-usual (BAU), and these range from 9% to over 40%, and average 23% more across the areas reviewed compared to incumbent practice.
- When accounting for operational resource use, cost savings can be net positive for producers. Some impact areas - namely EVs and electric generators - appear to result in a better return on investment and on greenhouse gas (GHG) savings than for sourcing greener studios and more effective waste management practice. This suggests that the focus for smaller Canadian productions should be in these two areas due to the potential material cost savings and GHG benefit, despite the premium currently exhibited for both categories.³
- For studios and waste management, targeting the supplier ecosystem is likely more beneficial given there is a less direct/financial and emission upside for producers to address these areas,

²We note that the existence of municipal climate and net-zero plans also can make a material difference in the feasibility of sustainable practice in the film industry, though again, enabling the availability of alternative fuels and electricity is largely the purview of provincial authorities. In Ontario for example, decisions on long-term electricity supply fall under the direction of the Minister of Energy, the Ontario Energy Board, the Independent Electrical System Operator, and the electrical generation entity, Ontario Power Generation.

³ Such findings would ideally need to be borne out by in field technical research on energy and emissions outcomes of these options, particularly for electric generators. The electricity profile of the host province must be considered for electrified options like EVs and e-generators as environmental benefit primarily occurs when a cleaner electric grid is in place (e.g. as in B.C., Manitoba and Quebec).

although this finding would benefit from further research particularly on studio building vintage, energy performance and waste management barriers in various regions.

- When assuming a production adopts the full gamut of green opportunity estimated (e.g. EV adoption, electric generator use, reduced utility use in studio and optimized waste management), there is an aggregate \$15.7K in cost savings that mitigates against the premiums expressed. This finding occurs as a result of the operational savings experienced in the archetype calculation, particularly for fuel conserved compared to BAU vehicle and diesel generator use vs. their electrified counterparts.
- For this particular archetype example, the total GHGs estimated from executing activities across impact areas is 118 metric tonnes - this equates to \$20,174.26 in carbon cost equivalent assuming \$170/tonne projected for 2035, as announced in the federal climate plan.

Table ES.1: Green Premium Composite Application,
Production Archetype for a Small - Medium CAD Feature

CAD Production Archetype, Feature film				
Shoot Days	22.5			
Transport	BAU		Greener option	
Transportation Rental Cost	\$262,216.00	Full production period	\$303,674.00	Full production period
Green Premium (avg.)	14.70%			
Fuel Costs	\$51,250.00	Shoot period only	\$5,125.00	Shoot period only, assuming some hybrid fuel use
Net Cost Savings			\$3,542.00	
GHG Savings (tonnes)			60.60	
Studios	BAU		Greener option	
Studio Rental Fee	\$73,125.00	15,000 ft2 space	\$85,500.00	15,000 ft2 space
Green Premium (avg.)	9.95%			
Utility Costs	\$2,567.20	Winter shoot	\$1,452.11	Winter shoot, electricity savings only
Net Cost Savings			-\$10,922.89	
GHG Savings (tonnes)			3.35	
Generators	BAU		Greener option	
Generator Rental Costs	\$35,100.00		\$50,490.00	
Green Premium	44%			
Fuel Costs	\$39,600.36		\$0.00	
Net Costs Savings			\$24,210.36	
GHG Savings (tonnes)			51.0	
Waste	BAU		Greener option	
Waste Processing Costs	\$7,350.00		\$9,265.12	
Green Premium (avg.)	26.06%			
Net Cost Savings			-\$1,915.12	
GHG Savings			1.85	
Total Costs	\$471,208.56		\$455,506.23	
Net Savings			\$15,702.33	
GHG Savings (tonnes)			118.67	
Average Green Premium			23.64%	
<i>\$170 tonne equivalency</i>			\$20,174.26	
<i>Net savings + carbon equivalency</i>			\$35,876.59	

Despite the promise emerging from the costing synthesis, several barriers for both producers and vendors exist when it comes to undertaking effective transformation across areas evaluated, barriers that include cost premiums but also other factors such as technology availability, awareness, and more. The interviews, costing analysis, and accompanying research has uncovered green premium parameters, regional considerations and potential priorities to affect premiums for the CMPA across the four main impact areas, as summarized in the following tables. Further details are available in the **Green Premium Action Tables** included within this report.⁴

E-generators

Considerations	<ul style="list-style-type: none"> At 44%, e-generators exhibit high premiums, but GHG and cost savings will likely only intensify over time as the technology improves and fossil-based costs increase. There is regional variation in electric generator availability, and questions exist around power and particularly cold weather performance. Nonetheless this is an evolving technology that is well aligned with national electrification directions, and one that is complemented by emerging renewable and energy storage development technologies. This area also benefits from the presence of a national vendor supply network that (in theory) can offer these options across Canada.
National Needs	<ul style="list-style-type: none"> It would be beneficial to undertake third party evaluation and demonstration of emissions and energy performance of e-generators across weather conditions and power configurations. Work and engagement with national vendors can help to build greater supply in the rental fleet, particularly across key production hubs. Promotion of awareness and understanding of use of cleaner generators in production, and emphasis on the pairing power with LEDs, is critical to effective and beneficial application.
Priority for CMPA: High	<ul style="list-style-type: none"> E-generators represent a promising new direction with interest from producers across Canada. The technology is applicable to smaller producers and location shoots, particularly as renewable charging options such as solar advance. Engagement with producers and generator operators will be key to understand performance and address concerns through training on how power is used on set, which will enable the transition to electrification. Consideration of partnerships with groups such as FPInnovations and CanmetENERGY is advised to help build a credible technical testing path, as informed by industry needs.

Greener Studios

Considerations	<ul style="list-style-type: none"> At 9%, greener studios exhibit moderate green premiums, some GHG and minor cost savings however emission and savings benefits will accrue over the long term and for multiple productions given buildings are fixed assets. There is significant variation in rental costs across Canada, and these costs vary primarily with the cost of regional real estate as opposed to greener assets in place. Significant incentive support for building retrofits and energy efficiency upgrades is available in all regions and there are many active organizations in this space across Canada.
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⁴ We suggest that these tables offer potential starting points for work to address and seek to reduce green premiums and other barriers, along with data points of interest and suggested metrics that would help evaluate the progressive transformation of the industry in the impact areas reviewed. Clean technology companies of interest are also noted (described further in this report); which suggest the added value of exploring support for industry-technology “challenge” opportunities

	<ul style="list-style-type: none"> This said, the nature of split incentive confounds cost upsides for producers and studio owners to make building retrofit and energy efficiency investments.
National Needs	<ul style="list-style-type: none"> An asset inventory of existing studio and warehouse stock across key production hubs to assess the number, vintage, quality and operational performance of buildings available to productions would be a valuable undertaking. Based on inventory outcomes, engagement with the studio community to develop targets around energy performance of Canadian studio/warehouse building stock would help advance progress, in combination with connecting lagging studio owners with available incentives. Consideration of smaller studios would also be key to ensure progress is applicable to Canadian-based production.
Priority for CMPA: Moderate	<ul style="list-style-type: none"> The nature of the split incentive and low cost savings exhibited for greener studios offer less direct benefit to Canadian producers, however a significant number of incentives 'sweeten the pot' for studio owners to upgrade buildings. Studio engagement and upgrades will provide benefit over the longer term, particularly if these target some of the smaller/older studios and warehouses in use, and especially in those regions that exhibit the highest electricity costs/have more carbon intensive electric grids. Building efficiency targets are increasingly becoming an area of focus for industry. For example, groups like albert have put forward voluntary sustainability standards for studios that have been endorsed by global players such as Sony Pictures.

Electric Vehicles

Considerations	<ul style="list-style-type: none"> At 14%, electric vehicles exhibit moderate premiums and moderate net cost savings, however imply significant GHG reduction impact compared to BAU alternatives. EVs have moderate incentive availability and benefit from a growing number of partner organizations active in their development across Canada. This area is well aligned with federal priorities on electrification and plans to phase out sales of internal combustion engine light duty vehicles by 2035. There is good regional availability based on provincial climate policy and historical EV support, however a lack of vehicle availability has been experienced in some regions. There is also concern around potential performance in colder climates. Fuelling infrastructure is needed, however as noted EV operational savings will continue to increase with fuel prices at the pump.
National Needs	<ul style="list-style-type: none"> Work with national vendors to assess and allocate greater industry-focused supply in the rental fleet is needed, particularly across production hubs with already existing fuelling infrastructure and cleaner host grids. This could take the form of bulk rental agreements for regional productions to draw from as one example. Evaluation of cost savings based on compiling various production use cases would be of benefit. This could result from gaining transport budget operational performance measures from leading productions using EVs and extrapolating what the BAU cost and emissions would have otherwise been (retrospective analysis based on best in class case studies).
Priority for CMPA: Very High	<ul style="list-style-type: none"> EVs represent a promising and beneficial application with interest from producers across Canada. The nexus of EV activity and uptake by industry currently resides in B.C. EV activity is well aligned with federal government direction and respective policy targets, including phase out of internal combustion engine sales by 2035. The technology is applicable to smaller producers and generally available through major production hubs at an affordable price point, with potential cost and significant emissions savings resulting when considering projected operational performance. Engagement with producers and transport operators will be key to build awareness of benefits and further uptake.

Waste & Circularity

Considerations	<ul style="list-style-type: none"> • At 26%, optimized waste management exhibits moderate premiums and minor GHG savings, however the complexity in waste tracking and processing confounds accurate evaluation of this area. • This area has limited incentives available and requires high effort for engagement, yet has been a consistent focus for producers across Canada. • Regional complexity and variation in waste treatment, permitting, management processes and more challenge progress and action in this area. For example, fees for various streams of materials vary vastly from one region to another; availability and accessibility of processing facilities is limited outside of the main urban filming hubs; and regulations and policies around waste management differ from region to region.
National Needs	<ul style="list-style-type: none"> • Acquiring and compiling costs on a comparable basis and over the processing life cycle would enable better and more accurate evaluation of current waste processing alternatives and benefits. • A focus on reduction of upstream resource use and waste diversion would be of overall benefit and impact, regardless of analysis exercises. • Personal Protective Equipment (PPE) recycling is available in all jurisdictions and although poses an additional cost, should be considered.
Priority for CMPA: Low - Moderate	<ul style="list-style-type: none"> • Consultation suggests the need for specific and point source engagement with municipalities and waste processors to enable and effect more optimal waste processing opportunities and outcomes. • The general complexity of evaluating and compiling cost and GHG outcomes for different regions and waste types reduces the value of initial analytics-based evaluation. • However, ongoing producer acceptance of this premium and work associated suggest this impact area is of importance and concern. Producer efforts should continue to be supported and enabled where possible. • Addressing PPE waste may be an area of both opportunity and need; possibly to be considered as a carved out line item in producer COVID budgets.

Recommendations: Overall, several barriers for both producers and vendors exist when it comes to undertaking effective transformation in these key areas, and on a high level, there is no simple or single solution to driving forward green production regionally or even more broadly across Canada. Systemic and multi-pronged action will be required on several fronts and across stakeholders, such as well-designed policies and incentives; dedicated infrastructure expansion; fostering a general crew mindset change with more access to education and resources; and much more.

To execute on these areas of need and opportunity, we recommend that the **CMPA work towards the creation of a “Transition to Net-Zero Fund” in consultation with the federal government**, the provinces and various industry partners. One of the first steps to help structure fund priorities and activities would be undertaking a national industry transformation strategy built upon the full ‘state of the union’ information collected across Canada. In this endeavour the CMPA would be aligned with the recommendations outlined in *A Screen New Deal*, where albert along with the BFI and others, are now currently undertaking an initiative to develop the *Screen New Deal: Transformation Plan*. This initiative will collect and map local data on film and high-end TV related services in Wales given the high concentration of studios and scale of productions scheduled for 2022. Set to publish mid-2023, the *Transformation Plan* aims to

identify service and sustainable infrastructure gaps to inform the development of a local decarbonization plan.⁵

For Canada, undertaking a similar effort would help set and refine industry-wide targets, further refine and identify new pockets of greening priority in support of such targets, and deepen opportunities for support in consideration of regional context, interest and needs as well as national level strategy. Example priorities could include:

- National work supporting/promoting credible research into outcomes, operational and emissions performance of newer technology to industry;
- National work with vendors to accelerate the transformation of the EV and e-generator rental fleet and furthering broad access for the industry across priority regions, for example through building bulk rental agreements for participating studios;
- National work with studios and building owners to set voluntary energy efficiency standards and match studios with available retrofit incentives;
- Regional work supporting technology development “challenges” that can help meet energy needs in area offering remote location shooting like Manitoba;
- Regional work with local entities like Ontario Green Screen and the City of Toronto to highlight and address waste processing and circularity challenges in Ontario; and much more.

In closing, the research undertaken has identified the need and opportunity for supporting sustainable production activity across Canada. In seeking to build its understanding of the green premium experience in Canada, the CMPA has set a leading foundation for next steps to prepare Canadian producers for the transition to net-zero.⁶

⁵ See: <https://www.bafta.org/media-centre/press-releases/bfi-and-albert-announce-wales-to-develop-a-screen-new-deal-production>

⁶ **Note:** One last note has to do with the overarching opportunity to track and accrue net GHG savings over a production period compared to what would have been BAU practice, as explored through the theoretical green premium archetype summary noted (118 tonnes saved for a 22.5 shoot day production, assuming actions across four impact areas are taken). Although this estimate is highly notional, it starts to show the value of initiating a credible national-level tracking framework that productions can use to estimate the environmental and social value of potential sustainability activities, and help drive impetus and rationale for the advance budgetary planning needed to take action.

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I. Introduction and Context for Study

The Canadian Media Producers Association (“CMPA”) is Canada’s trade association for English-language independent producers, representing hundreds of companies engaged in the development, production, and distribution of content for television, film and digital platforms around the world. The CMPA is working to develop and implement strategies for both internal-facing operations, and external-facing member and industry support. This includes the assessment of risks to the organization and its members; including the identification of opportunities for the CMPA and its members to reduce greenhouse gas (GHG) emissions (including targets); and the identification of opportunities for the CMPA to support and promote sustainability in the industry in alignment with applicable United Nations Sustainable Development Goals and Canada’s Sustainable Development Goals.

As a first step, the CMPA has prioritized the objective of understanding the ‘Green Premium’ (i.e. how much more does it cost?) of greener or more sustainable content production in Canada. The intent of this objective is to acquire and use this information to support the development of strategies, tools and training for members and to help the CMPA focus its time, energy and attention on areas that will have the most impact and benefit.

In Spring 2022, the CMPA contracted Earth Angel (EA), a full service sustainability agency specializing in entertainment production, to undertake a study on the Canadian sustainable production landscape in order to examine the current availability of, and experience with, green production and activities services in select production hubs. The scoped work is intended to ascertain the cost or green premium associated with select major impact areas of Canadian production, estimate the aggregate impact on the average production budget of undertaking this activity, and compile regional insights on the status and availability of green options, including but not limited to provincial policy context, municipal considerations and other factors. This research is to serve as the main input to directional recommendations for a green premium framework, structured by region of interest and relative production type.

The document herein describes the research method, analysis approach, information collected and final report findings, in accompaniment of a final presentation to be delivered on June 24, 2022. Directional findings were also presented to the CMPA on April 8th and an interim report was provided on May 20, 2022.

(i) Report Structure

For this final report, primary and secondary information collected has been sourced and synthesized as per the following two thematic areas:

- A. The Cost Landscape for Film Greening in Canada, by Impact Area: This research sought to identify costs, barriers and challenges by impact area of interest (generators, transport, studios and waste management), as ascertained by interviews, producer and industry cost consultation and secondary research. Treatment of the various costs associated with and the estimated budget impact for a production archetype are provided for each impact area, with a sense of how these may vary by greener option and across regions when such information is available.

- B. The Regional Context for Film Greening in Canada,: This research focused on describing the context, barriers to and opportunities for greener options structured by geographic region, as ascertained by interviews, industry consultation and secondary research to document:
 - 1) Context, which provides a review of the provincial climate context and a brief treatment of the primary energy profile for each region.
 - 2) Production Landscape, which provides a cursory sense of market size in terms of annual productions in the region.
 - 3) Green Premium Insights, which summarizes insights from interviewees on greening efforts such as barriers and enablers particular to the region, along with a general sense of the supplier landscape when it comes to green options.
 - 4) Regional Incentives, which compiles available regional and provincial incentives with applicability to greening production.
 - 5) Regional clean technology companies that could have applicability to current or emerging trendings in sustainable production.

The information collected from these two main investigative threads has been synthesized throughout the body of this report so as to provide CMPA with salient information to and directional recommendations for a green premium framework, structured by impact area and noting considerations for each region of interest.

The report concludes with a summary of the research and recommendations for next steps.

II. Study Scope, Research & Analysis Approach, and Project Management

The following describes the study scope in terms of production type, impact category covered and regions of interest described. The research approach in terms of primary and secondary data collected and initial outcomes are also included, along with the approach taken to estimate green premium costs compared to business as usual practice, and the determination of a Canadian production archetype.

(i) Scope

Production Type

The production types of interest were limited to scripted long form Canadian production (feature films or television series). A working classification was developed in consultation with CMPA that combines CMPA data and the Production Environmental Accounting Report, or PEAR,⁷ proposed as follows (**Table 1**). These classifications are applied to the budget categories noted in this report, with a focus on the standard motion picture category (small to medium-sized Canadian feature film).

Table 1: Production Type Classifications

Category	Total Production Budget
Low Budget Motion Pictures (small)	< \$3M
Standard Motion Pictures (medium)	\$3M - \$15M
High Budget Motion Pictures (large)	\$15M and up
Television Series	Up to \$2M per episode
High Budget Television Series	> \$2M per episode

Impact Areas

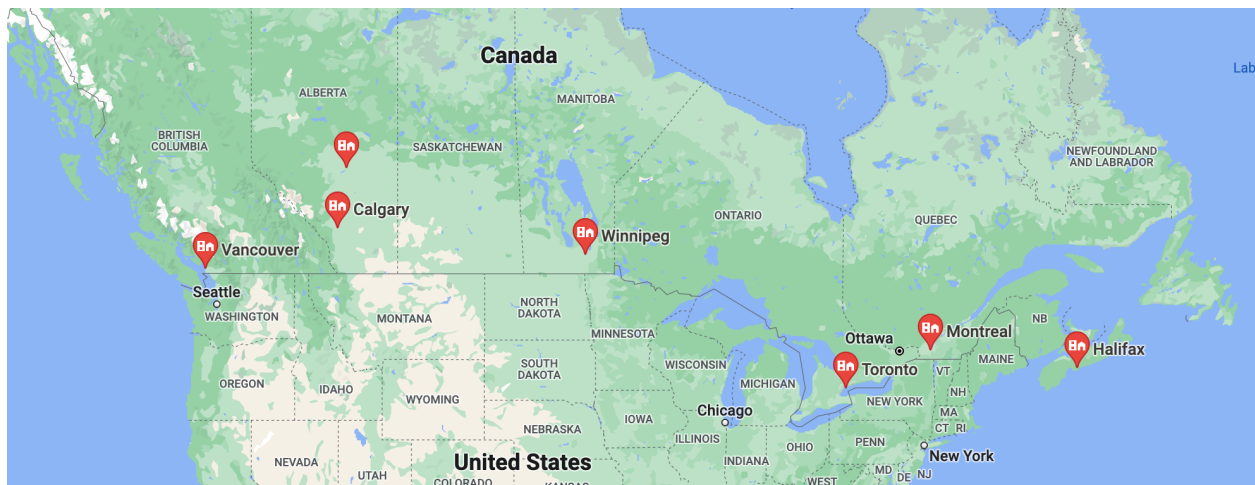
The three main impact areas of study relate primarily to primary energy use, through the use of Studios and Generators, as well as through the demands of the Transportation department. These are of consequence due to the use of fossil-derived natural gas, electricity, and liquid fuels respectively. Waste management and circularity are also of interest as a fourth impact area.

⁷ PEAR (Production Environmental Accounting Report) is a tool developed by the Producers Guild of America Foundation's PGA Green committee and the Sustainable Production Alliance to measure the environmental impact of a production based on the energy used in offices and on stages, the fuel used in vehicles and generators, and the emissions from air travel and accommodations.

Regions

The study focuses on six primary production hubs: Vancouver (British Columbia) Calgary/Edmonton (Alberta), Winnipeg (Manitoba), Toronto (Ontario), Montréal (Québec) and Halifax (Nova Scotia) - see *Figure 1*. These hubs reflect the majority of most feature and television production activity in Canada and thus can act as a reasonable illustration of the national industry.

Figure 1: Regions of Interest



(ii) Research Approach & Outcomes

The research approach includes collection of primary data from industry and expert interviews (with a focus on CMPA members), primary data from vendor research and consultation to acquire cost information, and secondary data resulting from web research, report review and literature research.

Interviews: Building the Regional and Stakeholder Perspective

The interview approach was designed to engage three segments:

1. **Producers**, to gain directional insight on the experience with greener practice producers have had across production types and areas of interest, where possible.
2. **Suppliers (vendors)**, so as to understand the nature, availability and “green” status of available options in particular regions as well as their differing price points, where possible.
3. **Government**, to help inform the broader regional context for each production hub and impact area of interest based on feedback from government or not-for-profit entities active in the film production area.

A detailed interviewee list and individuals indicated to be of high value or interest to the CMPA were identified and outreach prioritized connecting with such individuals, including introductions made by the CMPA in some instances. Tailored email introductions, interview questions, and interview scripts were developed for each segment, in close collaboration with the CMPA. Over the course of the project EA convened the following interviews (n=25):

- Seven “Government” interviews
- 14 Vendor interviews
- Five Producer interviews.⁸

The final spread across regions and segments is shown in the following **Table 2** and interviewees are listed in **Appendix A**. Notably there is a concentration on vendors consulted in British Columbia due to the preponderance of green activity and related support in this region, and this, combined with five national vendor interviews has helped to proxy both availability as well as general insights regarding green option availability in Canada. Government coverage has been specifically achieved in all regions. Producers based in British Columbia, Manitoba, Québec and Nova Scotia and Ontario were also covered through interviewing select producers that have also shot in these regions and were able to comment on their regional experiences.

Table 2: Summary of Regional and Segment Interview Coverage

Segment	BC	AB	MB	ON	QC	NS	National	Total
Producer	proxy	1	1	2	proxy	proxy	1	5
Vendor	5	national	national	2	1	national	5	14
Government	1	1	1	1	1	1	1	7
Total	6	2	2	5	2	1	6	26

Literature Review

In parallel, detailed secondary desk research was performed to gather information on existing green infrastructure, regulations and incentives by region. This required the review of reports, industry information, database and supplier websites to further build insights around market context, production activity, barriers and opportunities/enablers across the regions of interest. Research was also conducted on other factors that may affect premium uptake, such as clean technology trends and emerging provincial and federal climate-focused developments.⁹

⁸ Interviewee names are anonymized.

⁹ The final report documents the publicly available industry statistics reported by provincially-funded film commissions. These statistics are not comparable across all provinces as they are based on claims for provincial-level tax incentives, and follow reporting

Cost Acquisition: Producer Cost Consultation, Vendor List and Vendor Cost Consultation

Based on interview outcomes and in consultation with CMPA, an additional research activity was undertaken to gain specific cost information, through obtaining spec sheets and quotes from vendors, and through soliciting budget cost information from producers. These activities were prioritized mid-project so as to obtain cost estimates for business-as-usual producer services as well as greener options relating to generators, studios, transportation and waste management available in Canada.

In support of this activity, EA researched and developed a green vendor inventory list across Canada for the four impact areas of interest, and consulted with researched vendors via telephone or email (**Table 3**). Salient quantitative quotes and cost estimates were achieved across impact areas, though the availability and consequent cost of such options was not consistent across Canada, nor were vendors always willing or able to provide quotes in part due to competing demands or concerns about sharing data. In the analysis, gaps in categories were treated by the development of composite costs for BAU and greener options, and were noted in these instances.

Table 3: Summary of Regional and Segment Cost Coverage (Vendor Quotes only)

Segment	# Vendor Requests Made	BC	AB	MB	ON	QC	NS	National	# Quotes Received
Generators	5	national	national	national	national	national	national	2	2
Studios	9	1		2*	1	1			5
Transport	10	2		1					3
Waste	8	2			1		1		4
Total	32 requests, multiple attempts	5	proxy	3	2	1	1	2	15

**Includes one producer quote.*

In parallel, and in an attempt to inform, complement and vet impact cost estimates, producer outreach by CMPA with EA's support also occurred to gather producer cost estimates for these impact areas based on their experience. This activity helped to inform the costing estimates and vet the overall potential budget impact of undertaking both standard and greener production practice. Over the project period,

standards that vary by province. There are certain cases where municipal level data are explicitly reported, or can be referred to. We have also briefly documented the varying energy profile (with a focus on grid context) and available programming available in each region, as evidenced through various policies and frameworks that have been publicly announced, legislated and/or regulated.

producer budget feedback on each impact area was acquired (3 - 5 cost estimates were obtained per impact area, for an approximate total of 15 data points).

(iii) Analysis Approach

Drawing from available literature and data collected, a working estimate of a small - medium sized feature film production (~\$10M) was developed to estimate impact area use (e.g., how many vehicles would such a production reasonably rent over what period of time, how much studio space would be leased, how many generators would be used and over what period, etc). These estimates were combined with the composite costs gathered to provide a blueprint of how costs may differ compared to BAU if producers choose to source greener options. Final estimates were also informed by and compared with the cost estimates provided by producers and other stakeholders.

As rental costs of generators, studios, and transport vehicles do not paint the full picture of either net costs or savings for producers,¹⁰ parallel research and analysis was undertaken to estimate the potential savings in terms of operational resource use resulting from greener options. Consequently estimates for operational resource use were developed (e.g. how much and what type of fuel would the archetype production use, for generators or for transport needs? How would this change with the greater use of EVs? How much electricity and natural gas would be consumed while shooting in the studio, and how much could be saved in a greener option? What amount of waste would be generated over the production period? Etc.).

Review of utility and government websites was also performed to gather utility costs across Canada, so as to document the differing price points of commodities like natural gas, electricity, gasoline and diesel across regions. This price information was used to develop composite utility costs and to highlight potential regional differences in operational savings when relevant.

(v) Project Management

A shared work plan, research method and proposed table of contents was developed and shared with CMPA at project outset. Biweekly meetings were convened to review progress against the work plan, review actions needed and inform next steps for all parties. Working agendas and all document links (via the Google cloud platform) were developed and shared *a priori* with the CMPA, with invitation to comment. A directional update was provided to CMPA on April 8th, with feedback provided by CMPA on April 19th. A draft interim report was provided on May 20th, and a draft final report on June 17th.

¹⁰ For example, the rental of an EV offers only a small part of the cost/savings picture as the bulk of savings will occur through the use of electricity over fuel.

III. The Cost Landscape for Film Greening in Canada

The greener trends available for the four impact areas of interest can be assessed by the initial availability of cleaner energy options (such as electric generators in particular as well as other emerging alternatives for providing on location energy), trends in the availability of more efficient “progressive” studios (that, in addition to being more energy efficient, may also offer renewable energy and EV charging options), the availability and use of EVs and renewable fuels in transportation (as well as the initial right sizing and fuel efficiency of the fleet), and alternatives to traditional waste management, including effective reduction, reuse, composting and recycling services.

The current and emerging areas of opportunity for each area as identified by industry interviews, vendor cost acquisition and producer budget consultation are summarized below, along with a sense of common barriers. Treatment of the various costs collected and archetype applications are also provided, with a sense of how these may vary across regions when this information is available, or with other factors.

A. ENERGY ON LOCATION (GENERATORS)

Context

The present day availability of alternate energy for on location services, which refer to the power needed for shoot days held on location (outside of the studio), currently centre around:

- Electric or e-generators (2K-30K), which are electrified versions of traditional fossil fuel-based generators used in industry. There is some increased availability of these options for producers (particularly for Portable Electric’s Volt Stack e-generator, which is carried by a number of suppliers reviewed), though this availability is not consistent across Canada.
- Electric power drops and grid tie-ins. Grid ties can be installed at stages and locations (with the necessary approvals and turn-key installation by a temporary power vendor), and financial savings may be seen for longer term locations. Both B.C. and Ontario have enabled this area through the development of grid tie-in maps, in partnership with regional utilities and the building sector.
- Alternative and renewable fuels, such as biodiesel and renewable diesel, which can be used in diesel-based generators as well as internal combustion engine vehicles without significant or any modification.
- Other emerging options, such as hybrid hydrogen systems. Diesel hybrid options are also currently available in and being used in other regions (e.g. NYC).¹¹

¹¹ <https://zerobaseenergy.com/>

*For the filming of **The Magicians** (Vancouver; production budget unknown), the production team found that renting equipment to upgrade the electric system instead of using generators for one season was paid back in months.¹²*

Costing and Archetype Evaluation

The use of e-generators can enable productions to save money on fuel consumption. The nature of the competitive industry means pricing varies heavily by production and location and package rates are often available. Per vendor feedback, rental rates for e-generators are generally consistent wherever they are available in Canada but costs will vary widely depending on several factors (i.e. size of production, volume rentals, duration of rental, and often there can be discounts for independent or student filmmakers). In many instances and as per major national suppliers consulted, the rental cost of e-generators are relatively competitive with current market prices, though the power consumption equivalency comparison of diesel based vs. electric based generators is not an exact science.¹³

An example business-as-usual diesel-based generators vs. greener electric option is shown in **Table A.1**. For this particular configuration, sourcing for greener options where possible projects a high premium for e-generator rental fees, though (as for other areas) every production requires different levels of power so the estimate cannot be broadly applied, nor a sense of “typical use” even necessarily compiled.¹⁴ Further limitations include the difficulty of exact comparison across generator classes (i.e. the imperfect equivalency between diesel and electric generators) and reliance on limited BAU and greener option generator quotes sourced (though this is somewhat mitigated by the fact the quoted vendor provides generator services on a national basis).

¹² <https://www.vanmag.com/Green-Screens-The-Fight-for-Sustainability-on-Vancouvers-Film-Sets>

¹³ EA Stakeholder Interview.

¹⁴ Per vendor consultation, another approach is to examine usage by department or area on a production shoot. For example, basecamps that power catering and camera trucks use a 750A generator. If hybridized, a 30k electric generator can reduce the run time by 90%. For lighting on set though, it varies widely from 1200A generators to 10kW generators.

Table A.1: Generator Costing (\$ CAD)

Premium Estimate - Vendor Composite							
Specifications	BAU	Spec	Greener	Spec	Delta (\$)	Delta (%) - Rental	Limitations
250 amp	\$180.00	\$/day. Gaffer estimate (plus \$1000-\$1500 in gas a week).					
1200 amp	\$600.00	\$/day. Gaffer estimate.					
5k/6k E-Generator			\$148.00	National vendor. Rental: \$231/2-day week. \$750 - \$1125/week. Sale: \$20K. \$750k/wk, second vendor quote.			
10k E-Generator			\$142.50	National vendor, \$285/2-day week.			
20k E-Generator			\$600.00	\$3000/wk + 5k units offered as backup (for free for demo). National vendor			
26k/30k E-Generator			\$750.00	Top end estimate of \$3750/week. Rental: \$700/2-day week or \$1500 - \$3750/week. \$2,500/week for the 30k - second vendor quote			
Example configuration	\$1,560.00	daily cost for 2 x 1200 amp diesel + 2 x 250 amp diesel	\$2,244.00	daily cost for 3 x 20K e-generators + 3 x 5 K e-generators	\$684.00	44%	"Average" for a production cannot be calibrated and power equivalency is not an exact comparison.

The theoretical cost to an archetype Canadian feature production using the example generator configuration and an estimate of comparative savings, is shown in **Table A.2**. When further accounting for diesel fuel use savings (estimated using [2022 diesel fuel prices](#) averaged across all regions of interest), this e-generator configuration results in robust cost savings as well as material GHG savings of 51 tonnes over a theoretical production period.¹⁵

¹⁵ Using standard figures for operational diesel emissions, assuming e-generators are charged by electric grid, and applying [averaged grid emission factors](#) for all regions of interest.

Table A.2: Generators, Production Archetype Analysis (CAD feature)¹⁶

Generator Archetype Costs				
Medium-sized feature (\$10M)				
	<i>BAU</i>	<i>Detail</i>	<i>Greener</i>	<i>Detail</i>
Shoot days	22.5	From Archetype Tab		
Number/Type of Generators	2	2 x 1200 amp generators plus 2 x 250 amp generators.	3	3 x 20K equivalency, assuming 125 kWh. Plus 2 x 5 K support generators
Support Generators	2		3	
Rental fee	\$35,100.00	over production period	\$50,490.00	over production period
Fuel usage	296	Note City of Vancouver general estimate at 296 litres/day. Use will depend on # of hours over shoot day, power draw, etc.	0	litres/day (assuming e-generator is recharged on grid)
Electricity usage, assuming grid tie in/electric power drop availability	\$0.00	n/a	70.00	avg kWh/day, based on VOLTstack 30kW by 80kWh case study data (Netflix). Use will depend on # of hours over shoot day, power draw, etc.
Estimated Fuel cost	\$39,600.36	National composite for diesel price (April 2022, StatsCan). Assuming 250 amp gennies draw 50% of the fuel estimated for 1200 amps.	\$0.00	n/a
Total costs	\$74,700.36	over production period	\$50,490.00	over production period
Net Savings, Greener Option	\$24,210.36	savings over production period		
GHG Emissions	52.0	tonnes, diesel combustion. Assuming 250 amps use 50% of fuel estimated for 1200 amps.	1.4175	tonnes, accounting for electricity draw of a 20k E-generator based on case study data. Applying average grams/kWh emission factors compiled for the six regions of interest (Canada Energy Regulator).
			1	tonne for all e-generators. Overestimate to account for added 2 x 5k e-generator emissions.
Net GHG Savings, Greener Option	51.0	tonnes over shoot period		

Extending the assumptions to examine impact for larger or longer productions (to 50 shoot days) increases the fuel and GHG savings to \$53.8K and 114 tonnes, respectively (applying the same configuration of generators = 2 x 1200 amp + 2 x 250 amp diesel generators vs. 3 x 20k + 3 x 5k e-generators). All estimates provided should be interpreted with caution nor extended given the difficulty of providing an exact comparison of diesel to electric options, and in comparing projected costs/savings and emissions across different generator types. This suggests the value of and need for an independently verified examination of fossil vs. electric generators usage in practice so as to help best inform and support industry progress in this area.

¹⁶ Estimated at 296/litres a day, per: <https://council.vancouver.ca/20190723/documents/motionb7.pdf>

Per vendor consultation, the VOLTstack 30kW by 80kWh unit was used on a Netflix production from March 16 - 24, 2022. The production used the unit everyday, virtually to full capacity, and recharged the unit for a 3-4 hour period from a diesel generator. The generator operator on site used the 30k on set to power:

- 1x Catering truck 24/7*
- 1x Camera truck 24/7*
- Batteries/misc equipment for film crew on set, overnight*

Based on the energy data and the description from the on site operator, the key takeaways from the first week of operation was a 84% reduction in generator run time by hybridizing with a VOLTstack.

Barriers

The analysis indicates a net favourable cost and emissions savings from electric generator use compared to diesel, however estimates would benefit from added technical rigour and independent third party testing to assess comparable performance. Regardless, considerable barriers to realizing benefits to electric generator use still exist. Although interviewees indicated that effective use of the technology would result in cost savings (as borne out in the archetype analysis), this outcome can be compromised by the following:

- Lack of education on how to use and budget for electric generators - for example, the 5K e-generator can be used on a daily basis, but the bigger units tend to be used for specific applications. As per vendors, this will require education and a shift in thinking, although “the smart gaffer understands this is a new tool in the toolbox”.
- Lack of willingness to try new products and pay for e-generators, or in other cases a growing interest in e-generators, but wariness towards new technologies. Awareness, uptake and vendor supply can be facilitated with buy-ins from production studios;
- Little to no existing requirements for productions to use cleaner energy. Per one interviewee, “as long as it is just a choice, productions will typically choose to stick with what they know - which is diesel.”¹⁷ This said, stakeholders overall expressed that taking energy for granted is a thing of the past.

Regional interview findings were consistent in that there are significant supply chain issues with ordering electric generators and batteries in Canada, although concurrent industry research and outreach has revealed that there appears to be some general availability (in principle) of electric generators in most regions reviewed, particularly by the major national and large regional suppliers. There are also a few

¹⁷ EA Stakeholder Interview. Eg. Doesn't make sense to rent an e-generator for more money if it is not going to be used or if electric doesn't know how to use it to redistribute power throughout the set

emerging options in some regions that offer solar powered generators, including options under development by [Megla](#), a Canadian technology manufacturer based in Québec. Notably, in some colder provinces (such as Alberta, Manitoba, Ontario and Québec) the lower efficiency of battery generators in cold weather can compromise performance from 20% to 30%, depending on the climate.¹⁸

It should also be acknowledged that the generator power capacity is lower for electric generators, though technology proponents are working toward increased availability in the 30K option which also offers opportunities for solar recharging, though this area is in development. Vendors are also working to develop the next generation hybrid hydrogen system, pending in late 2023 for commercial prototypes.

Cleantech Companies

The presence of Vancouver's **Portable Electric** has been a boon to local production as the company is the main developer and purveyor of electric generators in Canada. Portable Electric's VoltStack have been used in major films, such as *No Time to Die*. Using VoltStack on the TV series, *God Friended Me*, resulted in a savings of \$1,500 USD/week and an abatement of 33lbs of carbon emissions per an 8-hour day.¹⁹ Portable Electric also offers a solar power solution called the Sunstack that can boost the recharge speed of VoltStack electric generators.^{20,21}

Portable Electric recently announced a partnership with another Canadian venture, [Li-Cycle](#), to recycle the lithium-ion batteries used in the VoltStack electric generator when it reaches its end-of-life to recover materials in the battery supply chain and minimize its environmental impact.²²

*The TV series, **Buck** (Belgium; production budget unknown) installed a temporary electrical distribution box, and leveraged a mix of energy supply between the electrical box, local grid, and generators which reduced carbon emissions by 93% and saved over €20,000 (approx. \$27,000 CAD).²³*

*The TV show, **God Friended Me** (US; production budget unknown) used an electric generator for its shoot in Times Square, which allowed them to save \$1,500 USD/week and abated 33 lbs of carbon/8-hour day.²⁴*

¹⁸This assertion would be a good candidate for further technical investigation by testing bodies such as FP Innovations PIT Group, which tests technology performance in Canadian climates.

¹⁹<https://portable-electric.com/how-this-cbs-show-used-electric-generators-to-save-production-costs/>

²⁰<https://britishcinematographer.co.uk/green-voltage/>

²¹<https://portable-electric.com/sunstack/>

²²<https://portable-electric.com/portable-electric-partners-with-li-cycle-to-recycle-lithium-ion-batteries-after-they-reach-end-of-life/>

²³<https://www.interregeurope.eu/good-practices/the-grid-project>

²⁴<https://portable-electric.com/how-this-cbs-show-used-electric-generators-to-save-production-costs/>

B. STUDIO ENERGY CONSUMPTION

Context

The main energy use associated with studios in most of the regions reviewed is the electricity consumption associated with major operational power draws such as set lighting and air conditioning in summer, and the natural gas associated with heating in winter and water heating.²⁵ Unlike the other impact areas, studios have a wealth of existing incentives and options available to improve the energy efficiency and reduce the resource consumption associated with their building assets.²⁶

Relevant actions for studios include but are not limited to gaining efficiency in the building envelope and helping optimize any operational draws (e.g. through installing low-e argon filled windows, high-efficiency sensor lighting, instant hot water systems and providing Energy STAR™ equipment), as well as options including solar panels, green roofs, storm water treatment, living walls, and more. Some of the larger studios reviewed are already providing EV charging options, as well as LED Lighting, e-generator, and battery packages, composting and recycling services, and power drops outside stages. Also of note is the emergence of energy storage options in North America, which can apply on a scale ranging from residential to large-scale utility storage. Applied to studios, energy storage (such as options on offer by Port Coquitlam's Momentum Energy) can also enable the increased reliability and usefulness of any renewable options like rooftop and building-integrated photovoltaics.

In addition, smart buildings, or property technology (proptech), is a growing class of technology as digitalization trends accelerate in the real estate and buildings sector in order to address a number of challenges, including the sector's large carbon footprint.²⁷ Broader digitalization trends such as better computing power, cheaper sensors, advanced analytics among others have also helped to accelerate this transition.²⁸ There are opportunities for the film industry to incorporate building information modelling and sensors in existing and new studio buildings and facilities to better understand how to design and plan for more efficient operations. Insights can translate into operational cost savings, energy and emissions reductions, and opportunities to upskill team members.

²⁵ Notably, Québec and Nova Scotia largely heat and cool building facilities using electricity, which poses an exception to the use of natural gas and may imply reduced environmental impact from shooting in studio as a result. See: <https://www.cer-rec.gc.ca/en/data-analysis/energy-commodities/natural-gas/report/canadian-residential-natural-gasbill/index.html>

²⁶ This is in part generally attributable to the longstanding (~30+ year) attention and focus on optimizing the building sector in North America, particularly through the work of the LEED™ certification program since 1993, which has deepened knowledge, activity and emphasized transparency in sector operational performance. Present day certifications include LEED-Platinum, LEED-Gold and LEED-Silver, BOMA certification, PassivHaus, Net Zero and more. Many entities also work to facilitate this area including Efficiency Canada, Canada Green Building Council and Sustainable Buildings Canada, among others.

²⁷ <https://www.weforum.org/agenda/2021/12/think-you-need-a-smart-building-here-are-8-real-business-drivers-for-adopting-real-estate-tech/>

²⁸ https://wearealbert.org/wp-content/uploads/2020/09/200901_FinalDraft.pdf

*The TV series **The Magicians** (Vancouver; production budget unknown) found that by switching studio lights to LED, changing 10 light bulbs not only resulted in reduced energy consumption, but it also saved them \$20,000 USD.²⁹*

Costing and Archetype Evaluation

Research to date has revealed that regardless of green options available or in place, most studios ensure their rental costs are necessarily competitive with others in the region. Consequently, rental “premiums” of any kind are primarily driven by the cost of real estate square footage in a particular region, and secondarily by the space and amenities available (i.e. a new and larger studio will typically cost more). This can be seen by the significant disparity in rental costs for Manitoba, quoted at \$725/day for a 12,000 - 15,000 ft² space, as compared to \$2,700 - \$3,800/day for equivalent studio space in Toronto or Vancouver.

Generally, “green studio” pricing by square footage is competitive to other studios in the area (though if productions choose to use EV charging stations for example, they pay for the electricity used). This said, most Canadian productions cannot afford to shoot in bigger studio spaces on offer in the Metro Vancouver and Greater Toronto areas as these spaces are cost prohibitive, and it tends to be these same larger spaces that have undertaken the majority of environmental initiatives in the region. Generally, productions/studios do not choose to rent a studio space because of sustainable facilities; all decisions are still made because of cost and convenience.

The approximate composite cost to a production for studio rental based on square footage is shown in **Table B.1**. Notably costs range across regions, with Vancouver exhibiting an approximate 30% higher cost than Toronto, the next highest rental cost per square foot.³⁰ Green premiums are also indicated at a range of 3% - 16.9% depending on space, however these costs are possibly overestimated in terms of national application as they are also derived from Vancouver vendors. In some instances estimated studio green premiums are relatively moderate particularly for smaller square foot areas.

²⁹ <https://www.vanmag.com/Green-Screens-The-Fight-for-Sustainability-on-Vancouver-Film-Sets>

³⁰ We also note the exception from Montreal, which exhibits a significantly high rental cost. As the quoted cost includes utilities this vendor quote was not included in the final composite cost analysis.

Table B.1: Studio Costing (\$ CAD)

Premium Estimate - Vendor Composite							
Square footage	BAU cost	Spec	Premium	Spec	Delta (\$)	Delta (%)	Limitations
4,000 - 6,000 sq. ft.	\$1,550.00	CAD\$/day, Avg. of Vancouver + Toronto quotes for 4,500 - 6000 sq. ft. Utilities not included.	\$1,600.00	CAD\$/day, Vancouver only (4,500 sq. ft.). Note Mtrf price at \$4.5K/day for 4,500 sq. ft. studio, which includes utilities.	\$50.00	3.23%	Costs considered neutral for established greener studios (Vancouver), others are not comparable due to inclusion of utility costs (Montreal). Significant range in rental costs across Canada, with the exception of Vancouver and Toronto. Vancouver reflects 30% higher costs. Very low rental costs in Manitoba.
12,000 - 15,000 sq. ft.	\$3,250.00	CAD\$/day, Avg. for Vancouver + Toronto (12,000 sq. ft.). Utilities not included. Vancouver is 30% higher than TO. Note low daily rate for MB (est. at \$725/day).	\$3,800.00	CAD\$/day, Vancouver only (12,000 sq. ft.). Note \$8k/day for Mtrf, which includes utilities (13,500 - 15,000 sq. ft.).	\$550.00	16.92%	
34,000 - 50,000 sq. ft.	\$7,475.00	CAD\$/day, Avg. for Vancouver + Toronto (40,000 - 46,000 sq. ft.). Utilities not included. Vancouver is 30% higher than TO. Note low daily rate for MB (est. at \$16,500 day based on biweekly quote).	\$8,200.00	CAD\$/day, Vancouver only (40,000 sq. ft.). Note \$21k/day for Mtrf., which includes utilities (37,500 sq. ft.).	\$725.00	9.70%	
Average premium	9.95%						

The integration of studio rental information and estimates on utility use and savings were applied to two theoretical Canadian archetypes in **Table B.2**. The analysis indicates a net moderate negative premium and moderate GHG savings for a small Canadian feature film (-\$10.9K and 3.3 tonnes), and for a larger production like a TV-series (-\$27.6K and 19.8 tonnes).³¹ The cost for greener options are likely inflated by the reliance on high rental cost for the region quoted (Vancouver), meaning these estimates are not necessarily applicable across Canada given the wide range in studio rental quotes exhibited (especially given very low costs cited for Winnipeg and extremely high costs cited for Montreal). Utility savings are also conservative as only electricity savings are considered due to the fluctuation in natural gas usage depending on shooting season.³²

³¹ In this instance, the larger feature could be extrapolated on square footage basis (40,000 ft).

³² Studio selection can have a significant impact on electricity footprint. An internal report for a TV series shot over four seasons found that Season 1, which was shot in a new studio, had a much lower electricity consumption intensity compared to other seasons (260 kW per runtime minute compared to 684 - 878 kWh per runtime minute). This is a savings of 61 to 70%. Notably, natural gas was also 36 m² for the newer studio vs. 41 - 120 m³/run time minute for the older studio, but this varied largely due to the season of shooting. Felder & Weinberg (2011). Internal Client Report for Major Studio.

Table B.2: Studios, Production Archetype Analysis

Studio Archetype Analysis				
Small - Medium-Sized Feature Film (\$10M)			TV-Series	
# shoot days	22.5	From Archetype tab, prior study	50	From Archetype tab, prior study
Studio size	15,000	sq. ft.	40,000	sq.ft.
Est. BAU Studio Rental cost	\$73,125.00	For studio space over shooting period, avg of Toronto & Vancouver quotes.	\$373,750.00	For studio space over shooting period, avg of Toronto & Vancouver quotes.
Est. Greener Studio Rental costs	\$85,500.00	Vancouver quote only.	\$410,000.00	Vancouver quote only.
Est. electricity cost, BAU winter shoot	\$2,380.51	Applying average electricity price across regions of interest	\$14,106.73	Applying average electricity price across regions of interest
Est. natural gas cost, BAU winter shoot	\$186.69	Applying average natural price across regions of interest	\$1,106.30	Applying average natural price across regions of interest
Total estimated BAU utility costs	\$2,567.20	over production period	\$15,213.03	over production period
Utility Savings Potential from greener option	\$1,452.11	For electricity over shoot period	\$8,605.11	For electricity over shoot period
Electricity cost	13.00	c/kWh, average across regions of interest (April 2022)		
kWh savings from greener option	11,170.09	kWh	66,193.13	kWh
Net Savings, Greener Option	-\$10,922.89	over production period	-\$27,644.89	t (national)
GHG savings	3.35	t (national)	19.86	t (national)

Although the rental costs estimated fall in line with producer cost estimates also acquired for studio rental, the utility costs estimated by producers are higher than those resulting from the analysis. This query would benefit from further investigation and in particular through evaluating detailed utility cost information, occupancy and other variables. The utility usage, costs and efficiency savings assumptions applied are documented in **Table B.3**.

Table B.3: Studio: Utility Saving Potential (\$ CAD)³³³⁴

Utility Savings Potential		
Electricity use	0.052	kW/ft2/day, Felder et. al
Natural gas use (winter only)	0.005	m3/ft2/day, Felder et al.
Est. electricity cost portion, winter	\$0.01	per ft2. Applying electricity cost data (April 2022), averaged across areas of interest
Est. natural gas cost portion, winter	\$0.00	per ft2. Applying natural gas cost data (April 2022), averaged across areas of interest
Est. total utility cost	\$0.01	cost/ft2/day (winter)
Est. proportion of bill attributable to electricity (winter shoot)	92.73%	
Est. proportion of bill attributable to natural gas (winter shoot)	7.27%	
Est. electricity efficiency savings from greener studio	61%	Based on TV-series historical budget data on studio use over four seasons, where one season shot in a more efficient and newer studio and experienced 10% savings in electricity.

Barriers

In terms of barriers to realizing deeper environmental efficiency in studio, interviewees noted that studios/property owners do not always want to pay the capital costs for providing greener facilities for productions (which in the case of deep retrofits can be prohibitively expensive) and conversely productions do not see it as their responsibility as lessees to pay for capital costs.³⁵ On the producer side, productions/studios 'typically' do not choose to rent a studio space because they happen to have or offer sustainable facilities, as most production decisions are still made on cost and convenience.³⁶

Significantly, for Canadian producers that are interested in greener studio options, the latter are more often found in bigger (and newer) studio spaces that are usually cost prohibitive for domestic producers (as seen in the cost delta of the archetype estimate).³⁷ From the producer perspective, Canadian productions have expressed experiencing difficulty with being priced out of all studios in major production hubs, such as Toronto and Metro Vancouver.

³³ Studio selection can have a significant impact on electricity footprint. An internal report by Felder & Weinberg for a TV series shot over four seasons, found that Season 1 (shot in new studio) had a much lower electricity consumption intensity (260 kW per runtime minute) compared to other seasons (ranging from 684 - 878 kWh per runtime minute). This is a savings of 61 - 70%. Natural gas was also 36 m² for the newer studio vs 41 - 120 m³/per run time minute for the older studio, but this varied largely due to the season of shooting.

³⁴ Costs for electric and natural gas usage estimated correspond well to estimates of total annual consumption in commercial buildings, where small commercial buildings spend [\\$1.44](#) per square foot per year on electricity and \$0.30 per square foot per year on natural gas.

³⁵ This is traditionally referred to as the split incentive (the split incentive is a long-standing barrier in the building sector which refers to the landlord: tenant dynamic)

³⁶ Stakeholder Interview.

³⁷ Stakeholder Interview.

It is also of note that for colder provinces such as Manitoba, Ontario and Nova Scotia, lower winter temperatures and high summer temperatures can mean more power draw (and budget) required to heat or cool a set.³⁸

Enablers

Enabling activity for greening studios include the widespread availability of a significant number of existing incentives across all regions investigated as well as federal and municipal support for building retrofits (and for renewables in some instances). These areas are noted in the respective regional snapshots and incentives listed in the appendices and can make a material difference in the cost to undertake retrofits in particular, but the nature of the split incentive make these typically less of direct interest to studios/producers themselves.³⁹ In many instances the addition of greener features at studios has been largely driven by those select studio owners and managers who are leaders in their industry and prioritize sustainable production, and/or by the market pull of large-scale production companies like Netflix, who through their public efforts to reduce their carbon footprint are also influencing the operations of their suppliers.

The general lack of mandates to green studio facilities means that there has been typically less imperative for studios to unilaterally undertake large-scale and capital intensive retrofits, though it should be noted that the increasing attention to this space - including for deep retrofits such as the recent challenge issued by the City of Toronto - may warrant a more dedicated effort to engage studios more broadly and narrate how industry can rise to the challenge. This may be particularly relevant to those smaller studios which may have the interest but less capacity to explore undertaking facility retrofit and related initiatives.

Emerging Canadian Clean Technology

Based in Montréal, **BrainBox AI** leverages artificial intelligence (AI) to make buildings smarter and greener. The company uses wireless sensors and its advanced AI platform to collect data and control commercial heating, ventilation, and air conditioning (HVAC) systems in real-time. It takes historical HVAC data, building occupancy, and seasonal and room temperatures to power its algorithm to predict and operate HVAC controls in the most efficient way.⁴⁰ As a lower cost retrofit solution, current clients report a savings of 25-29% on their energy bill using BrainBox AI.⁴¹ Results also show that buildings

³⁸ Stakeholder Interview.

³⁹ Some studios, such as several in BC, have chosen to make sustainability a part of their strategic plan and not passing any costs on to the productions. In many instances the addition of greener features at studios has been driven by studio owners and managers who prioritize sustainable production? (eg. VFS, Martini, North Shore Studios)

⁴⁰ <https://www.thestar.com/business/mars/2021/10/05/getting-to-net-zero-how-montreal-tech-company-brainbox-ai-radically-reduces-energy-usage-in-buildings.html>

⁴¹ <https://www.theglobeandmail.com/business/technology/article-how-this-montreal-based-ai-company-is-making-buildings-run-better/>

decrease their carbon footprint by 20-40%, increase occupant comfort by 60%, and operators see up to 50% extension of the equipment's service life.⁴²

The overall building industry (of which studios are a part of, as they may choose new builds over retrofitting existing buildings or warehouses) currently generates almost 40% of annual emissions, of which building materials and construction account for 11%, and is likely to increase with new construction unless additional actions are taken.⁴³ Halifax's **CarbonCure** is a leading carbon removal and utilization solution provider for the global concrete industry. Their technology is retrofitted into concrete plants to inject captured carbon into fresh concrete during mixing. CarbonCure has been recognized as the most scalable carbon utilization technology by Global CO2 Initiative, named Top 100 Global Cleantech companies multiple consecutive years, North America's Company of the Year by the Cleantech Group in 2020, and one of two winners in the USD \$20 million NRG COSIA Carbon XPRIZE.^{44 45 46}

Based out of Calgary, **Clean O2** has developed CarbinX, a small-scale carbon capture solution for commercial buildings that converts carbon captured from heating system exhaust to generate pearl ash, a potassium carbonate used to create products, such as soaps and detergents, fertilizers, water conditioners, etc. The CarbinX solution can enable cost savings through reduced energy consumption, emissions reductions through increased energy efficiency and captured carbon, and the potential to earn income through a revenue-sharing program to upcycle the captured carbon.⁴⁷ It has a unique partnership with Lush Cosmetics to not only help them capture carbon emissions, but to also recycle the carbon into the company's line of fizzy bath bombs.⁴⁸

*The prequel, **Jurassic World: Fallen Kingdom (2018)** received an EMA Green Seal in 2017.⁴⁹ A majority of the movie was filmed at Pinewood Studios, which is fully powered by renewable energy and in turn helped to significantly reduce the production's overall carbon footprint. Where the use of grid-tied energy wasn't possible, the production used renewable diesel to power generators, which is 70% less carbon intensive. As part of pre-production, a detailed environmental accounting report was produced to inform decision making. The accounts team catalogued any item or process that had a carbon footprint, such as flights, fuel used for ground transportation, electricity bills, use of paper and water bottles, etc. to determine the production's overall carbon footprint. This information*

⁴² By being able to predict desired room temperatures up to six hours in advance with 99% accuracy, buildings can avoid wasted energy, enabling more efficient operations.

⁴³ <https://architecture2030.org/why-the-building-sector/>

⁴⁴ <https://www.xprize.org/prizes/carbon/teams/carboncure>

⁴⁵ <https://www.carboncure.com/news/clean-tech-company-carboncure-wins-nrg-cosia-carbon-xprize/>

⁴⁶ As of December 2021, they company has sold over 500 systems and delivered two million truckloads of carbonated concrete to global construction sites. <https://www.globenewswire.com/news-release/2022/03/15/2403662/0/en/CarbonCure-Celebrates-Field-Leading-Carbon-Removal-Partners.html>

⁴⁷ The technology is the size of two mid-sized refrigerators and can sequester 6-8 tonnes of carbon annually. Clean O2 currently sequesters its captured carbon into pearl ash and blends it into their soap and detergent products to enhance their performance. <https://www.cbc.ca/news/business/cleano2-cnrl-soap-carbinx-1.5265780>

⁴⁸ <https://financialpost.com/commodities/energy/how-one-calgary-company-turns-co2-into-soap-with-its-micro-carbon-capture-technology>

⁴⁹ <https://www.green4ema.org/ema-green-seal-recipient>

was used with production, construction, and location teams to make recommendations and inform the procurement of service providers and supply chain vendors.

C. TRANSPORTATION

Context

Available green products or services relating to transportation use in film production include hybrid and electric vehicles, eco-certified trailers, and emission controlled trucks, among other areas.^{50,51} Alternative and renewable fuels, such as ethanol, biodiesel and renewable diesel, can also apply to gasoline and diesel engines with limited to no modification depending on fuel composition, blend volume and ambient temperature. There are also emerging developments in mobile fast charging stations, which can power multiple EVs and be recharged in innovative ways, including solar and bioenergy.⁵² Trailer options on offer by vendors in some regions include roof mounted solar panels, the use of recycled material in exterior skins, flooring and countertops, and the use of LED and low flow faucets.

*For the film, **Gangsta** (Belgium, 2018; production budget unknown), the cast and crew stayed near the set and used a local parking lot for the production vehicles. By reducing the need to drive 19,000 km to and from the set, this decision saved them €10,000 (approx. \$13,566 CAD) and avoided three tons of carbon emissions.*

Costing and Archetype Evaluation

Example business-as-usual transportation (internal combustion engines, or ICEs) vs. greener option cost specifications for EVs are shown in **Table C.1**, which to date indicate an approximate 0% - 23% premium for an electric compared to a similar internal combustion engine option. On average, premiums for EV rentals tend to be ~14.7% higher than the ICE equivalent (based on Vancouver vendor quotes), which is a bit lower than estimates provided by interviewees (~20%).

⁵⁰ Focused on vehicle use. Air travel can also be a significant source of emissions and would fall under Scope 3.

⁵¹ We also note the importance of reduced transportation use overall through avoided transportation, shared mobility and/or prioritizing active transportation. Other areas of importance include initiatives to source locally to avoid shipping-related emissions.

⁵² Initial pilot prototypes hover around \$234K, see: <https://portable-electric.com/canadas-largest-mobile-ev-charger/>

Table C.1: Transport, Vendor Composite Costing (\$ CAD)

Premium Estimate - Vendor Composite							
Specifications	BAU (\$/day)	Spec	Greener	Spec	Delta (\$)	Delta (%) - Rental	Limitations
Light duty							
LDV (mid-size)	\$52.00	Civic	\$63.00	Hybrid	\$11.00	21.15%	Vancouver only
LDV (luxury)	\$120.00	Mercedes	\$120.00	Tesla	\$0.00	0.00%	Vancouver only
Trucks/Vans							
Trucks / Vans - High Roof Cargo	\$99.00	High Roof Cargo	\$119.00	High Roof Cargo EV	\$20.00	20.20%	Vancouver only
Trucks / Vans - Minivans	\$74.00	Minivan	\$90.00	Minivan Hybrid	\$16.00	21.62%	Vancouver only
Trucks / Vans - 1/2 tonne lighting EV			\$99.00	Half Tonne Lighting EV			Vancouver only
Trucks / Vans - 1 tonne cube	\$79.00	1 Tonne Cube Van, GMC Savannah					Manitoba
Trucks / Vans - 1 tonne cube with lift	\$84.00	1 tonne Cube Van with Lift, Ford E350					Manitoba
Trucks / Vans - Location Cube	\$105.00	Location Cube with shelving, Savannah/GMC					Manitoba
Trucks / Vans - Transit/Sprinter	\$77.00	Transit/Sprinter Van					Manitoba
Specialty							
Specialty - Single Room	\$325.00	Single Room	\$400.00	Single Room Black	\$75.00	23.08%	Vancouver only
Specialty - Double Room	\$300.00	Double Room	\$325.00	Double Room Black	\$25.00	8.33%	Vancouver only
Specialty - Triple Room	\$337.50	Average of \$325 - \$350 for Triple Room	\$375.00	Triple Room Black	\$37.50	11.11%	Vancouver only
Specialty - Office/Classroom	\$290.00	Average of \$280 - \$300 for Office/Classroom	\$325.00	Office/Classroom Black	\$35.00	12.07%	Vancouver only
Average premium	14.70%						

The approximate cost for an example Canadian small-medium feature film using either option, and an estimate of comparative savings, is shown in **Table C.2**. In this specific transport vehicle type and rental period configuration, sourcing for greener options where possible results in a 15.8% cost increase in vehicle rental fees (~\$41K). Caveats to this analysis include the lack of costs for comparable EVs available across vehicle types and weight classes which makes the analysis less fully applicable to a standard production, as well as geographic limitations on EV availability outside of the Lower Mainland.

Table C.2: Archetype Transport Costing (\$10M CAD feature)

Transport Archetype Analysis, Feature Film (Small - Medium)						
	<i>Number</i>	<i>Weeks on Avg.</i>	<i>Est. Rental Cost, BAU</i>	<i>Type</i>	<i>Est. Rental Cost, Greener</i>	<i>Type</i>
Light duty vehicles						
Director	1	2	\$1,200.00	Luxury	\$1,200.00	Luxury EV
Production office	2	26.8	\$13,936.00	Basic Civic	\$16,884.00	Hybrid
Support (AD, DOP, LM, etc.)	13	10	\$33,800.00	Basic Civic	\$40,950.00	Hybrid
Props, prep	2	4	\$2,080.00	Basic Civic	\$2,520.00	Hybrid
Trucks/vans						
Cast vans (shoot)	6	34	\$75,480.00	Minivan	\$91,800.00	EV Minivan
Rigging, etc.	4	2	\$3,960.00	High Roof Cargo	\$4,760.00	High Roof Cargo EV
Construction, base camp, etc	6	8	\$23,760.00	High Roof Cargo	\$28,560.00	High Roof Cargo EV
Special Support						
Honeywagon, etc.	9	8	\$108,000.00	Double Room	\$117,000.00	Double Room with EE measures, solar panels
Rental costs	BAU	\$262,216.00		Greener	\$303,674.00	
Producer estimates for larger features (\$30 - \$40M) range from ~\$500,000 to over \$1 million for vehicle rentals only.						
Est Greener Transport, Additional Rental Fees	\$41,458.00	15.81%	premium for configuration modelled			

Mode choice, fuels used, vehicle selection, right-sizing the fleet and optimizing duty cycle/km travelled can have a significant impact on a production's emission footprint, largely due to the conservation of fossil fuel in combustion. The projected fuel savings assumptions from using EVs over a general shoot period is documented in **Table C.3**, based on average producer estimates on fuel use for smaller to medium sized features. Savings have been assumed for 100% gasoline usage in the BAU options only. Material GHG savings over the theoretical production period are also estimated. In this exploration, the assumptions result in +\$41K saved when accounting for fuel savings, and a substantive GHG saving of 60 metric tonnes. Due to the variation in fuel prices across Canada, the explicit fuel savings ranges from \$34.7K in Calgary to \$51.2K in Vancouver.

Limitations to the analysis include the mismatch between the vehicle configuration used and the fuel costs projected (the latter were informed by producer cost consultation), though we note that in actual operation fuel used will vary not only by vehicle type, but also by usage and duty cycle.

Table C.3: Archetype Fuel Savings (22.5 day shoot, small - medium feature film)

Fuel Savings Potential			
Est Greener Transport, Additional Rental Fees	\$41,458.00	EVs & hybrids per example configuration	
Estimated Fuel Cost - gas & diesel. Estimate include generator fuel.	\$45,000.00	over shoot period only	Assuming 22.5 shoot days, \$10K fuel spend a week. Will vary by km travelled, duty cycle and more.
Estimated Fuel Cost - gas & diesel.	\$22,000.00	Over production period	Assuming 110 production days, reduced fuel spend of \$1K a week
% of Fuel Budget for Transport for shoot period	65.0%	<i>Estimate, will vary by production</i>	
Est. Fuel Cost, Transport	\$51,250.00		
Est. Fuel Used, BAU	29,274.56	litres. Assuming gasoline only, composite price across Cda (April 2022)	
% of Fuel Savings from EV fleet	90.00%	Estimate, noting some use of hybrids	
Net Fuel Savings, Greener Option	\$46,125.00	Over production period	
Net Savings. Greener Option	\$3,542.00	Applying green premium rental fees for example configuration.	
GHG savings	60.60	tonnes over production period. 90% reduction in transport fuel used.	

Barriers

Per interviewees, the main barriers to systemic deployment of EVs and hybrids by Canadian producers include a continuing price differential, but most especially a general lack of supply due to high global demand. This latter factor has been particularly exacerbated by the pandemic which has affected the availability of new as well as even used vehicles in Canada (though as noted previously the availability of EVs has been largely “set” by progressive climate policy in provinces like B.C. and QC). When they are available however, EV options are still largely limited to light duty vehicles and are under development for larger scale vehicles (medium duty/trucks).⁵³ For some other regions such as Manitoba, the lack of

⁵³ Notably there are some emerging Canadian clean technology opportunities in the heavier vehicle classes, including by Lion Electric out of Québec and Gardewine in Manitoba.

demand from producers has not spurred vendors to proactively seek out or include such options in available fleets.

Interviewees also indicated that even when EVs are found and employed by production, the lack of “smart” decision-making for EV/hybrid rentals compromises the potential savings. An example of this is when productions rent luxury EVs (e.g. Tesla) at a premium for directors who may never drive themselves so this option is left largely unused. Ideally producers, via their transport coordinators, need to understand vehicle duty cycles, include all fuel costs in the budget and base their EV or hybrid rental decisions on supplying these particular vehicles to crew members that drive the most and often have short duration trips (e.g. set dec buyers, etc.).

Enablers

Any noticeable or sustained demand from producers for either EV options in terms of rental, and/or EV charging options in terms of studios or even in host jurisdictions, will help facilitate the argument for increased supply as well as related technology tailored for the industry. There are a number of incentives available for supporting EV charging infrastructure as well as other areas that have been identified in the majority of regions reviewed. These options would be mostly applicable to those suppliers having operational assets (e.g. studios, though the emergence of mobile charging stations may be a trend to watch). Entities active in this area include Plug N'Drive out of Ontario, Propulsion Quebec, and Clean Nova Scotia, which may be partners of interest in EV-related endeavours.

Emerging Canadian Clean Technology

Québec has some of Canada’s leading low-carbon transportation companies. Some of the most notable include **Lion Electric**, an electric bus and truck manufacturer; **Taiga Motors**, an electric off-road vehicle manufacturer, and **AddÉnergie Technologies**, an operator of electric vehicle charging networks. Other Canadian companies of relevance to transport include EV developments particularly in the heavy duty vehicle space, such as:

- **Gardewine**, a Manitoba-based trucking company that recently launched the first electric truck in the province and plans to add electric vehicles such as forklifts and parcel delivery trucks.
- **New Flyer** out of Winnipeg, a longstanding major manufacturer of public transit buses and motor coaches, that is scaling up production of electric-and hydrogen-powered vehicles and can now manufacture zero-emissions buses at all of its North American facilities.⁵⁴

Based out of Port Coquitlam, **Moment Energy** provides clean, affordable, and reliable energy storage by repurposing retired electric vehicle batteries. Unlike other battery storage companies, Moment Energy’s storage units are two-thirds the price of other lithium-ion batteries by providing a second life to EV

⁵⁴ <https://climateinstitute.ca/wp-content/uploads/2022/05/MB-profile.pdf>

batteries.⁵⁵ End-of-life EV batteries still retain 80% of their energy capacity with seven to 10 years of life to use.⁵⁶ Moment Energy successfully partnered with Nissan North America,⁵⁷ and are participating in a \$2.4M CAD project with Hydro Ottawa and BlueWave-ai to use energy storage and artificial intelligence to manage EV-charging during periods of peak energy demand.

Alternative Fuels

The availability of alternative fuels such as ethanol and biodiesel varies on the market. Base blending amounts vary by provincial jurisdiction, which means some provinces have higher renewable fuels penetration in the provincial supply. In 2021 for example, gasoline biofuel requirements for Alberta and B.C. were 5%, in Manitoba 9.5%, and in Ontario 10%. Current diesel biofuel requirements are generally lower, with Ontario and British Columbia at 4%, and Manitoba at 3.5%.⁵⁸ In Canada overall, ethanol has accounted for over 6% of the gasoline pool volume since 2013; whereas biodiesel and hydrogenation-derived renewable diesel (HDRD, or renewable diesel) have been close to 2 -3% of the diesel pool volume.⁵⁹

Higher blends can be available at a cost and can also be “dropped in” to regular fuels, though the portion of blend possible will be dependent on the ambient temperature. This said, ‘blends’ of B100 have been successfully applied in Canadian municipal fleets in warmer seasons. The pending development of the national *Clean Fuel Regulation* (expected in late June 2022) is also expected to increase the proportion of alternative fuels in supply across Canada. Notably, the use of alternative fuels such as biodiesel are one of the few options currently available to reduce the operational emissions of medium to heavy duty vehicles in Canada (after measures taken to right-size fleets and vehicles, as well as to optimize engine efficiency).

For renewable diesel, availability varies on the market. Per interviewees, the costs for R100 in places like B.C. run 15 - 20% higher than regular diesel after credit (this credit is available in B.C. but not in other provinces). For fuel suppliers, providing supply outside of Vancouver/B.C. is cost prohibitive due to the lack of a credit for purchase and the expense to produce renewable diesel. Renewable diesel is expensive to produce and purchase, and the lack of direct incentive to buy this fuel provides limited

⁵⁵ <https://www.momentenergy.ca/blog-posts/what-are-the-applications-of-energy-storage>

⁵⁶ <https://clean50.com/projects/moment-energy-uses-retired-car-batteries-to-power-canadas-remote-regions/>

⁵⁷ <https://www.momentenergy.ca/news-articles/moment-energy-secures-supply-chain-relationship-with-nissan-north-america>

⁵⁸ Québec has no renewable fuel blending policy in force as of 2021, though the government released a draft regulation on May 12, 2021 which, when finalized, is proposed to take effect in January 2023. The draft regulation would require 10% ethanol by volume and 3% biomass-based diesel by volume beginning in 2023, with additional credit given for cellulosic ethanol. Those blending rates would rise to 15% ethanol and 10% biomass-based diesel by 2030 (Navius, 2021)

⁵⁹ <https://www.naviusresearch.com/wp-content/uploads/2021/11/Biofuels-in-Canada-Final-2021-11-09.pdf>

rationale for uptake currently, despite its ease of use and ability to act as a full replacement for traditional diesel fuel. The action of some major studios like Warner Brothers, which is pushing for Renewable Diesel and interested in R100, will likely eventually change the availability and interest in this option, as will recent announcements such as the [May 9 \\$600M renewable fuels](#) announcement by B.C.'s Parkland.

Canadian developments in alternative fuels, including hydrogen, include **Charbone**, a Montreal-based renewable energy and electrochemical company that has signed a *Memorandum of Understanding* with the City of Selkirk to build Manitoba's first green hydrogen facility.⁶⁰ Notably Shell and Suncor are major investors in **Enerkem's** \$875M biofuels facility in Varennes, which is being constructed to transform waste and wood waste into low-carbon fuels.

D. WASTE & CIRCULARITY

Context

Comprehensive waste management that incorporates circular economy and zero waste principles is continuously encouraged and highlighted as best practice among the leading sustainable production tools and resources.⁶¹ A large portion of hands-on production support centers on waste management practices for studios and locations. Although practices such as using reusable water bottles had become standard, the COVID pandemic overturned a lot of the progress that has been made in this area. In accordance with COVID guidelines to prevent transmission of the virus through surface contact, productions reverted to single-use water bottles, individual meals wrapped in plastics, and ceased food and clothing donations. The increase in the Personal Protective Equipment (PPE) waste stream that includes masks, gloves, and rapid tests has also risen significantly.⁶²

As an alternative, compostable and biodegradable options are often used to minimize plastic waste, and bioplastics have also been suggested for set design and construction as a way to reduce material demand and enable reuse.⁶³ Many productions have also opted for aluminum canned water as an alternative to plastic, despite the increase in cost and have chosen to recycle their PPE waste at an additional cost. Waste management continues to be challenging in many regions where infrastructure to process waste materials is non-existent or limited.

⁶⁰ <https://climateinstitute.ca/we-assessglobal-net-zero-transition-where-does-manitoba-rank/>

⁶¹ Production Environmental Action Checklist (PEACH), www.greenproductionguide.com and Albert Production Handbook, <https://wearealbert.org/production-handbook/production-tools/>

⁶² <https://www.hollywoodreporter.com/lifestyle/style/sustainability-in-hollywood-backslides-amid-covid-its-everything-we-told-everybody-not-to-do-all-these-years-4122175/>

⁶³ https://wearealbert.org/wp-content/uploads/2020/09/200901_FinalDraft.pdf

According to a Green Production Guide study in 2014, replacing plastic water bottles with refillable water tanks and compostable cups would save a crew of 100 more than \$5,000 per 60 days of work.⁶⁴

*Many productions are reducing food waste by donating excess food. For example, **Straight Outta Compton** (LA, 2015; production budget of ~\$28M USD): donated 2,571 lbs of excess food (equivalent of 1,936 meals) from crew catering to local organizations.⁶⁵*

Costing and Archetype Evaluation

In high production areas such as Toronto and Metro Vancouver, waste haulers that offer specialty recycling and compost hauling services have been increasingly utilized by producers and studios. Current available “green” waste management services include direct services such as waste bins/dumpster rentals, recycling and compost hauling from studios as well as from locations, material reuse warehouses, and deconstruction, as well as additional services such as waste diversion reports and carbon tracking.

Example business-as-usual waste management vs. greener alternative costs based on processing vendor quotes and producer cost information are shown in **Table D.1**. The average or composite of the greener premium quotes sourced across regions and waste management activities is +26%. Limitations to the analysis are that in instances costs are averaged across regions, and in others stem from one location. Moreover the volume equivalency between the different costs is difficult to determine with high accuracy.

⁶⁴https://www.greenproductionguide.com/wp-content/uploads/2014/05/FINAL_PGA3142014.pdf

⁶⁵<https://www.mpa-canada.org/what-we-do/going-green/>

Table D.1: Waste Costing (\$ CAD)

Premium Estimate - Vendor Composite							
	BAU cost		Greener option		Delta (\$)	Delta (%)	Limitations
Waste hauling (studio)	\$230.00	Metro Van. Waste hauling - Landfill only (Studio)	\$375.00	Metro Van. Waste hauling to include collection and processing of recyclables and organics (Studio)	\$145.00	63.04%	B.C. costs only
Waste hauling (locations)	\$230.00	Metro Van. Waste hauling - Landfill only (Locations)	\$350.00	Ontario cost. Waste hauling to include collection and processing of recyclables and organics (Locations)	\$120.00	52.17%	Comparing B.C. BAU to ON green, using average quoted for ON (of range quoted).
Tipping fees	\$140.95	\$/tonne, averaged across BC, ON, and NS.	\$112.90	\$/tonne. Averaged for composting & recycling across BC, ON, NS.	-\$28.05	-19.90%	Comparing across jurisdictions and for different waste streams.
Construction & Demolition	\$110.00	Metro Van: \$110/tonne. Note NS cost is lower at \$50 - \$79 depending on pre-processing.	\$119.80	BC \$599 (5-ton)	\$9.80	8.91%	B.C. costs only
Food waste donation			\$0.00	All			
Average premium	26.06%						

The approximate cost to a Canadian small to medium feature film production of using BAU waste management vs. greener practice is shown in **Table D.2**. As the vendor costs acquired for the waste area were much lower than costs producers typically budget for waste management, producer-sourced waste management costs (per bin) were instead applied in the analysis. In this instance, applying a 26% composite premium results in moderate added processing fees and GHG savings (based on a conservative diversion rate of 20%). For a smaller feature film this is roughly \$1.9K in added costs and GHG savings of 1.85 tonnes.

Table D.2: Waste Archetype Analysis

Waste Archetype Costs				
Medium-Sized Feature (\$10M)			TV-Series	
Est Cost, BAU	\$3,756.67	Cost is low. Based on BAU hauling fees x estimated # bins used.	\$7,053.33	Cost is low
<i>Revised Cost BAU</i>	<i>\$7,350.00</i>	Based on \$400 - \$500/bin producer quotes x by # bins used.	\$13,800.00	Based on \$400 - \$500/bin producer quotes by # bins used. Note this corresponds to general estimate from B.C. producer at \$12K, but can run as high as \$27K per another producer quote for TV series waste
Estimated premium	26.06%	Average % delta from vendor quotes from greener waste processing (from studio, location, tipping fees, C&D)		
Est Cost, Greener	\$9,265.12	Higher for green premium	\$17,395.73	Higher for green premium
<i>Net Added Costs</i>	<i>\$1,915.12</i>	Added to revised BAU budget	\$3,595.73	Added to revised BAU budget
Avoided waste to landfill	20.00%	Working estimate (conservative)		
Cu.yd to kg conversion	764.55	kg/cubic yard proxy - will vary depending on composition of waste.		
Estimated diversion	2,497.55	kg diverted over production	4,689.27	kg diverted over production
Avoided emissions factor	0.74	kg CO2e/kg MSW. scenario with enhanced waste-to- energy, reduction at source and recycling has resulted in a high avoided emissions (0.74 kg CO2Eq/kg MSW)	EPA Waste Reduction Model: https://atrium.lib.uoguelph.ca/xmlui/bitstream/handle/10214/17659/A.Mohsen_Riham_201912_phd.pdf?sequence=3	
GHG savings	1.85	tonnes	3.47	tonnes

Table D.3 denotes key assumptions applied in the analysis, based on bin usage estimates from Canadian producer interviews and secondary research.

Table D.3: Waste Estimation Factors

Waste Archetype Analysis				
Medium-Sized Feature (\$10M)			TV-Series	
# shoot days	22.5	From Archetype tab, prior study	50	From Archetype tab, prior study
# of Days in Production Office (ni. Shoot Days)	110	Production office based on 26.8 weeks in office x 5 days, subtracting shoot days. Prior study.	160	<i>Estimated</i>
# of Bins/Shoot day	0.4000	Producer estimates, 1 bin per 2 - 3 shooting days		
# of Bins/Production Office Day	0.07	Estimated at one for every 15 working days/3 weeks		
Total Bins	16.33	Over production period	30.67	Over production period

Barriers

Primary barriers to waste diversion programs include lack of infrastructure and processing facilities as in some regions, recycling and compost services are not available. For example, there is only one sorting facility that accepts organics near Toronto: this facility located in Belleville and nearly two hours from the Greater Toronto Area. In Vancouver, no facilities are able to process PLA (also known as bioplastics), which leads to all PLA ending up in landfill facilities. Another overall barrier is the lack of availability of vendors offering green services in this sector, making comprehensive waste management for productions shooting outside of Canada’s primary production hubs more difficult. However, interest in specialty hauling services is slowly increasing as vendors identify the waste management needs of productions and work to build a feasible business case to service this sector.

Some producers have noted the additional costs associated with “green” waste management, as opposed to using those waste management operations that only offer landfill hauling. Although this experience seems to be borne out by the example analysis, this added cost was not noted as a particularly high barrier for using these services by producers due it being seen as the cost of doing business. This said, material reuse programs have not seen the same level of interest as waste diversion programs, primarily due to lack of storage space and lack of planning and budgeting from productions to incorporate reuse in the early stages of production.

COVID-19 has also had some negative impacts on production environmental performance as it has reintroduced the plastic water bottle to set and additional single use packaging, as well as introduced a significant increase in the use and disposal of Personal Protective Equipment, or PPE (conversely, some environmental benefits of the pandemic included digitization of the work process and fuel use reduction due to decreased travel and remote work).

Enablers

Expansion of recycling and composting infrastructure throughout Canada, as well as education on material reuse programs were cited as among the main enablers cited for this sector. Offered ideas included tax incentives or breaks for productions participating in material reuse programs and better communication within studios to prioritize sharing and reusing set materials. Ideas included:

- More set material reuse among productions through warehouse reuse programs.
- Studio communications within their own productions for sharing and reusing set materials.
- Development of tax breaks or industry-focused incentives for material reuse (or even circularity mandates).
- Education and amplification of the material reuse program to unions and producers/studios.
- Materials exchange pages akin to similar efforts for other sectors like construction. Emerging examples include Ontario's [Materials Marketplace](#) for the Industrial, Commercial and Institutional sectors and the Partners for Project Green [Material Exchange](#).

Unfortunately the incentive scan returned few to no available programs specifically dedicated to encourage reuse and reduction across the regions. In terms of waste reduction and circularity incentives, the scan returned funding and incentives for municipalities, but less for businesses. There are disincentives (charges for excess waste), but in terms of policies/programs that might incentivize commercial building owners to conserve, the research to date indicates that the few wastewater reduction programs highlighted may be the only incentives that could be marginally applicable.

Emerging Canadian Clean Technology

The film industry is increasingly using 3D technology to design and/or create costumes, props, and sets, including stop-motion films and big Hollywood blockbusters like Iron Man's suit, Thor's hammer, or dinosaur skulls in Jurassic World.⁶⁶ Based out of Toronto, **ReDeTec** has developed a filament extruder, ProtoCycler+, that recycles plastics into 3D printer filament.⁶⁷ The system can recycle many types of plastics, including PLA, ABS, PETG, HIPS, Nylon 12, and others. The ProtoCycler+ enables a closed-loop system and can reduce material costs of 3D printing by up to 80%, making 3D printing more sustainable and affordable.⁶⁸ ⁶⁹ The company has worked with industry leaders such as Airbus, Boeing, Ford, and Nike.

⁶⁶<https://www.3dnatives.com/en/top-applications-3d-printing-movie-industry-090720214/#!>

⁶⁷The ProtoCycler+ is a desktop extruder that can ground plastic waste material into pellets and turn pellets into filament by pressurizing and melting the pellets. Its patented technology is 3x more efficient than competitors, produces better quality filament, and their comprehensive software can help with creating new plastics.<https://startupheretoronto.com/toronto/redetecs-protocycler-makes-3d-printers-sustainable/>

⁶⁸<https://redetec.com>

⁶⁹<https://betakit.com/redetec-wants-to-make-the-3d-printing-process-less-wasteful/>

ALT TEX, which stands for alternative textile technology, is a sustainable fashion and biotech start-up based in Toronto which has developed a replacement for polyester fibres using food waste.⁷⁰ This is of interest due to the use of clothing by the industry, given that a typical production has been estimated to use more clothing than the average person uses in their lifetime, and will produce more waste in a week than the average household in a year.⁷¹ ALT TEX's system allows food waste to go through a chemical process to create a biofibre which can plug into the existing supply chain to then create woven and non-woven textiles. By recycling food waste, ALT TEX is able to address two significant environmental issues with one product.^{72,73}

Genecis Bioindustries (Genecis) is a Toronto-based company that programs bacteria to convert food waste into polyhydroxyalkanoates (PHAs), a high-quality bioplastic. Manufacturers are then able to use this bioplastic to create a variety of products, including single-use cutlery and foodware, packaging, and textiles.⁷⁴ Comparable in quality to petroleum plastics, products that use Genecis' plastics can be composted within a month at end of life, and can degrade within a year if the product ends up in the ocean.

*The TV series, **The Magicians** (Vancouver; production budget unknown) found that even though buying a dishwasher and a stack of melamine plates cost \$6,000 USD, reducing single-use catering garbage saved \$8,000 USD.⁷⁵*

*When the TV series **30 Rock** (US; production budget unknown) broke down its set, it donated approximately 10.7 tons of material, saving almost \$20,000 USD in hauling expenses.⁷⁶*

⁷⁰<https://thealttex.com/>

⁷¹<https://wearealbert.org/production-handbook/in-your-role/costume/#:~:text=The%20costume%20industry%20is%20inherently,average%20household%20in%20a%20year.>

⁷²<https://betakit.com/alt-tex-closes-1-5-million-pre-seed-round-to-commercialize-sustainable-polyester-alternative/>

⁷³Recognizing that producing a sustainable end product is not sufficient, the company takes a life cycle approach by taking into consideration the product's inputs and processing through to how it performs and biodegrades at the end of its life.<https://globalnews.ca/video/7477536/toronto-startup-aims-to-turn-food-waste-into-clothing/>

⁷⁴<https://www.theglobeandmail.com/business/article-cleantech-startup-programs-bacteria-to-turn-table-waste-into>

⁷⁵<https://www.vanmag.com/Green-Screens-The-Fight-for-Sustainability-on-Vancouvers-Film-Sets>

⁷⁶<https://www1.nyc.gov/site/mome/news/101816-film-green-nyc.page>

IV. Evaluation for a Green Premium Framework

The following provides a directional sense of BAU vs. green premiums in both CAD\$ and percentages, where appropriate, and estimates the aggregate impact on a hypothetical production budget, structured by impact area reviewed. Contextual insights on the primary production hubs of Toronto and Vancouver, and the regions of Calgary/Edmonton, Winnipeg, Halifax, and Montreal are provided, drawing upon the detail provided in the [Regional Compendium](#).

(i) Evaluating Aggregate Impact and Prioritizing Opportunity

When synthesized on a composite basis, the costs gathered over the research period elicit an informative picture (**Table 1**). Although the analysis is not definitive nor accounting accurate given the limitations noted throughout Section III, a few elements of interest can be drawn out. These are that:

- When assuming a production adopts the full gamut of green opportunity estimated (e.g. EV adoption, e-generator use, reduced utility use in studio and optimized waste management), there is a potential net cost savings that mitigates against the premiums noted in the theoretical example. This finding occurs in part due to the relatively moderate nature of the green premium expressed on average but especially due to the operational savings experienced in the archetype calculation, particularly for fuel conserved compared to BAU ICE vehicle and diesel generator use vs. their electrified counterparts.
- For this archetype example, the total GHGs estimated from executing activities across impact areas is 118 metric tonnes - this equates to \$20,174.76 in carbon cost equivalent assuming \$170/tonne projected for 2035, as announced in the federal climate plan.
- Some impact areas - namely EVs and electric generators - appear to result in a better return on investment and on GHGs savings than for sourcing greener studios and more effective waste management practice. This suggests that the focus for smaller Canadian productions should be in these two areas due to the potential material cost savings and GHG benefit, despite the potential premium exhibited for both categories. Such findings would ideally need to be borne out by in field technical research on energy and emissions outcomes of these options, particularly for electric generators. The electricity profile of the host province must be considered for electrified options like EVs and e-generators as environmental benefit primarily occurs when a cleaner electric grid is in place (e.g. as in B.C., Manitoba and Quebec).
- For studios and waste management, targeting the supplier ecosystem is likely more beneficial given there is a less direct/financial and emission upside for producers to address these areas, although this finding would benefit from further research particularly on studio building vintage and operational performance.

Table 1: Synthesis of Green Premium Application

CAD Production Archetype, Feature film				
Shoot Days	22.5			
Transport	BAU		Greener option	
Transportation Rental Cost	\$262,216.00	Full production period	\$303,674.00	Full production period
Green Premium (avg.)	14.70%			
Fuel Costs	\$51,250.00	Shoot period only	\$5,125.00	Shoot period only, assuming some hybrid fuel use
Net Cost Savings			\$3,542.00	
GHG Savings (tonnes)			60.60	
Studios	BAU		Greener option	
Studio Rental Fee	\$73,125.00	15,000 ft2 space	\$85,500.00	15,000 ft2 space
Green Premium (avg.)	9.95%			
Utility Costs	\$2,567.20	Winter shoot	\$1,452.11	Winter shoot, electricity savings only
Net Cost Savings			-\$10,922.89	
GHG Savings (tonnes)			3.35	
Generators	BAU		Greener option	
Generator Rental Costs	\$35,100.00		\$50,490.00	
Green Premium	44%			
Fuel Costs	\$39,600.36		\$0.00	
Net Costs Savings			\$24,210.36	
GHG Savings (tonnes)			51.0	
Waste	BAU		Greener option	
Waste Processing Costs	\$7,350.00		\$9,265.12	
Green Premium (avg.)	26.06%			
Net Cost Savings			-\$1,915.12	
GHG Savings			1.85	
Total Costs	\$471,208.56		\$455,506.23	
Net Savings			\$15,702.33	
GHG Savings (tonnes)			118.67	
Average Green Premium			23.64%	
<i>\$170 tonne equivalency</i>			\$20,174.26	
<i>Net savings + carbon equivalency</i>			\$35,876.59	

Of all categories, **electric vehicles** appear to offer a clear benefit for producers in terms of the combination of a moderate premium, high operational savings through fuel conservation and high GHG

savings in the particular example explored. Unfortunately this rental opportunity is currently largely limited to productions occurring in the Lower Mainland and to select vehicle classes, although likely there is general EV availability in Montreal and Toronto. Fuel cost savings will also fluctuate with price at the pump, with some regions like Calgary having among the cheapest fuel in Canada and others like Vancouver some of the highest. Cold weather efficiency remains an ongoing consideration particularly in regions like Alberta and Manitoba, although this perception may bear out differently in practice.

In this vein, the promotion and use of EVs in the Vancouver region makes the most near term sense in terms of availability and direct fuel costs savings for regional producers, though effort should be made to help inform and connect producer interest in other regions. Entities like Efficiency Manitoba, Plug N'Drive in Ontario, Propulsion Quebec and Clean Foundation in Nova Scotia represent potential partners of interest in this latter initiative. Effort should also be made to engage the major car rental companies (Budget, Hertz and Enterprise) on a national basis to express industry interest and appetite for greener transport offerings across vehicle weight classes and regions.

Emerging clean technology companies to watch with application in this area include energy storage offering Moment Energy (BC), battery recycler Li-Cycle (ON), and various EV heavy duty and off road vehicle developments by Lion Electric and Taiga Motors (QC), and New Flyer (MB).

Studios exhibit the lowest average premium of all impact areas reviewed, which is in part due to “greener” studios being largely competitive with BAU in the regions where quotes were provided. Utility costs and consequent efficiency savings estimated are also moderate, making this area less attractive for producers in terms of realized benefit. This area is further complicated by the relatively limited influence smaller producers can have on the efficiency or renewable options available within a given studio, and the finding that most Canadian producers simply cannot afford some of the larger or more updated studio spaces particularly in regions like Vancouver, Toronto and Montreal.

Given the significant array of energy efficiency incentives available to building owners across all regions of interest (see Regional Compendium for detail), it would be of value to focus on engaging the studio segment as a separate initiative, for example through evaluating the current age and energy consumption of the current building and warehouse stock and setting targets for improved efficiency. Most recently, and informed by industry stakeholders, albert has put forth a voluntary studio sustainability standard for studio facilities.⁷⁷ The standard assesses six areas: climate, circularity, nature, people, management, and data. Participating studios receive a grade score which they can use to benchmark and compare progress with their peers. The standard has been adopted and endorsed by global players such as Sony Pictures.

⁷⁷<https://wearealbert.org/2022/03/08/studio-sustainability-standard/>

Emerging clean technology companies to watch with application in this area include energy optimization company BrainBox AI (QC), CleanO2 (AB), which enables carbon capture from commercial buildings, and CarbonCure (NS), which enables carbon sequestration in building materials on a life cycle basis. There are a number of emerging Canadian companies with applications in building analytics (proptech), largely concentrated in Ontario.

Electric generators currently exhibit the highest premium of the four impact areas, though this estimate is significantly caveated by nature of the working assumptions made around the power equivalency between fossil and electric generators. This said, the fossil fuel savings associated have the potential to achieve attractive savings, which again will vary with the range in diesel (or natural gas) prices across Canada (along with usage, etc). Although there is increasing opportunity and benefit from evolving e-generator options like Portable Electric's 30K, these are not yet widely available nor are the renewable power options for powering these units yet fully developed.

One attractive aspect to the e-generator that should be noted is that these are carried by national vendors and therefore are or will be available in all regions of interest, though cold weather performance may compromise performance in places like Manitoba. This claim - and the quantification of the net energy and emissions comparison to BAU diesel, gasoline and natural gas options - would benefit from technical testing through agencies such as FPIInnovations' PIT Group or CanmetENERGY. Further education to producers and generator operators on e-generator usage, application and benefit would also be of significant value.⁷⁸

Emerging clean technology companies to watch in this area include energy storage offering Moment Energy (B.C.), Portable Electric (B.C.) and Li-Cycle (ON).

More **effective waste processing and diversion** indicates a fairly high average premium across the quotes acquired, though the degree of accuracy of this finding would benefit from further review and especially volume comparison from region to region. The full greener waste processing costs and GHG savings are also fairly moderate as per this analysis, making prioritization of this impact area as a green premium focus less attractive. Parallel stakeholder feedback has also indicated that the waste ecosystem area can be complex and many systemic barriers to proper processing exist across regions. Given that producers consulted stated their general familiarity and acceptance of the waste premium to date, this may remain an area to move forward to help support efforts and interest exhibited in this impact area, and particularly in Ontario which has placed effort on waste and circularity. A more comprehensive

⁷⁸ Notably, grid and building tie-ins have been finding some success in various regions that have enabled this opportunity; this may pose an area of more immediate benefit and affordability.

investigation along the full product lifecycle, including material sourcing, would provide a better evaluation of the full potential cost and benefit of this impact area.

Emerging clean technology companies to watch in this area include ReDeTEC, ALT TEx and Genecis, all out of Ontario.

(ii) Mapping to Regional Considerations

British Columbia

On a regional basis, green premium activity and engagement in B.C. is strengthened by the province's clean electricity grid, climate policy activity (in particular *CleanBC* and *Stronger BC*) and the long standing carbon tax. Film activity has been a central contributor to the economic and employment profile of the province. According to the Vancouver Film Commission, an average of 65 movies and 55 TV series are filmed in Vancouver each year. In 2016, motion picture and video industries employment for the Vancouver Census Metropolitan area (CMA) was 18,950, the highest of all regions reviewed.

Producers in the Lower Mainland region enjoy a good level of access to greener supply options including both electric vehicles and e-generators in particular, making this a natural area of synergy and attention in terms of driving further uptake across the sector. The number and span of greener vendors identified is more robust than for all other regions reviewed, and includes offerings in greener studios, alternative transportation and electric generators, more sustainable waste management and processing, and other eco-based services (see [Appendix B](#)). The provincial credit for renewable fuels also means greater supplier activity in this space including pending renewable diesel supply. The region harbors an excellent concentration of clean technology companies, including Portable Electric, but also Moment Energy and many other emerging applications including in hydrogen (HTEC) and fuel cells (Ballard).

Notably, B.C. has a significant number of incentives available, including for building-related energy studies, fuel switching and vehicle electrification. Amounts vary but incentives are available up to \$200,000 for applicants. Funds are also available for energy efficiency upgrades, and plans are in the works to establish a retrofit accelerator centre in collaboration with Metro Vancouver Regional Low Carbon Innovation Centre. On the transport side, the province also offers incentives for charger installation (up to \$2K) at workplaces, \$3K for purchase of EVs for the public, specialty uses and for fleets, as well as other infrastructure enablers around EV parking and charging specifically.

The cost and consultation research has uncovered some regional bottlenecks particularly for smaller Canadian producers, one of which is the high cost for premium studio space in the Metro Vancouver region. The wide range of building incentives on offer, in addition to the well-recognized climate

leadership underway by the City of Vancouver, suggest this area as one to explore. For B.C.-based producers, sharing successes and enabling similar activity and green infrastructure outside of the Metro Vancouver region will be increasingly important particularly as the cost of real estate continues to climb and local producers are priced out of the local market.

Alberta

The Province of Alberta has been a major contributor to global energy supply through development of its oil and gas industry and export sector. Although the province has excellent wind and solar resources and a deregulated electricity market that is encouraging innovative energy project developments such as energy storage, the electric grid is still based heavily on coal and natural gas, and there has been limited momentum in climate policy development. The cost for fuel-based commodities like gasoline and diesel are among the lowest in Canada, further compromising the potential benefit for producers in this region looking to undertake sustainability efforts.

To date, the region has limited electric vehicle availability as well as limited interest in/uptake of electric generators based on primary feedback collected. Moreover the positive impact of these activities will be compromised by the coal and natural gas underpinning of the province's electric power grid as noted. Although Calgary in particular is a growing hub of production activity (at over 80% of Alberta's production), this growing dynamism has worked at cross-purposes to sustainability efforts as budgets are tight and the sourcing of even regular services such as internal combustion engine vehicles has become increasingly problematic for regional producers.

On an opportunity basis, regional producers have indicated a willingness to pay extra for waste management and recovery services. The emerging work of Reel Green is also driving further appetite for and awareness of sustainability outside of B.C., particularly through demonstrating the impact of sustainable production on the producer budget. For Alberta-based producers, raising awareness around the green premium benefit and budget impacts will be important, as will working with the municipal governments in Calgary and Edmonton to help support producer efforts and build the supply chain for greener options.

Incentives are available including for energy efficiency and retrofit efforts studio buildings for both Calgary and in Edmonton - amounts range but include grants of up to \$250,000.

Manitoba

Due to its hydropower resources, Manitoba has a fairly clean electric grid along with some of the lowest rates for low-carbon, hydro-generated electricity in North America. Despite its assets, the pace of electrification in Manitoba has been slow compared to other hydro-based provinces and the province has yet to build a comprehensive provincial climate plan to accompany its announced strategy. The dynamism of the film industry in Manitoba is also more limited than for other regions (61 productions in 2020/2021), however the industry employs a number of people in the Winnipeg CMA (1,120 as of 2016).

Areas of interest to Manitoba stakeholders include location management, and in particular developing better green infrastructure for remote shooting locations. Electric generators are considered a great enabler for this priority (which also makes sense given the province's cleaner grid), however availability, feasibility and performance remains a challenge. Priority may be better placed on the development of grid and building tie-in maps, with the support of Manitoba Film & Music and Manitoba Hydro. Notably a good partnership opportunity may exist with Efficiency Manitoba, which currently funds the bulk of building incentive programs available in the province. Efficiency Manitoba's \$250K *Innovation Fund* signifies a program of particular interest to address remote energy needs - this program provides support for pilot projects and partnerships to reduce common adoption barriers to emerging energy-efficient technologies and strategies.

Technical concerns around operational performance in Manitoba's colder climate remain to be assessed and addressed if necessary, ideally through the work of an independent or government testing agency that can credibly evaluate cold weather performance for both EVs and electric generators.

Ontario

In recent years Ontario has made great strides in reducing emissions from its electric grid, largely due to phasing out coal-fired electricity. The prior *Green Energy Act* and associated *Feed In Tariff* led to growth of renewables in the province, however subsequent policy reversals means that natural gas is now expected to make up the 3,500 MW in anticipated peak electric demand shortfall anticipated by 2030, which will reverse the progress that has been made in cleaning the grid.

Toronto has long offered an attractive alternative to New York as a shooting location due to its geographic proximity, tax incentives and growing pool of film studios. Foreign production has grown by 18% per year between 2014 and 2019, and the city is an important cultural player with the Toronto International Film Festival (TIFF).⁷⁹ In 2021, the City of Toronto's Economic Development and Culture division reported over

⁷⁹ http://www.qfrc.ca/uploads/files/PDF/finalversion_qfrc_impactassessment_increasing_infrastructurecapacity_rcgt_en.pdf

\$2.5B for production spending across 1,468 productions in 2021, with \$236 million on feature films and \$1.2B on TV series.⁸⁰ The motion picture and video industries employment for the Toronto CMA was 23,285 in 2016, making this sector a significant employer within the region.

Stakeholders suggested there tends to be more focus on waste diversion and circularity in Ontario than for other regions, though for waste vendors the lack of available infrastructure for processing poses a significant challenge (especially for organics). As in other regions, producers have experienced not enough availability of EVs or e-generators despite interest, as well as limited to no hybrid options. Regional producers indicated that more pressure on vendors to provide alternatives would be helpful, particularly for the large scale rental companies like Enterprise, Hertz and Budget. Per gaffer feedback, the electric generators that are available are not powerful enough yet, and there is concern about power availability on set. This is particularly of relevance in Toronto, which tends to have shooting locations occupied for a longer period of time due to the number of television series shot in the region.

The work of Ontario Green Screen (OGS) has been helping to progress efforts in the industry, in particular the launch of the grid-tie in map which also enables building tie-ins; such solutions on a permanent or temporary basis (through transformers) and which may offer a more optimal solution for on location energy provision particularly for Toronto. OGS is also working toward increasing material reuse for flats and art builds, and overall enabling greater education and resources (including increasing sustainability and budget awareness for productions).

Incentives available include both building and EV opportunities, the latter being offered by Plug N'Drive for ICE scrappage and for purchase of a used EV. There are multiple building grants, low interest loans and energy performance incentives available through the IESO, Enbridge and the City of Toronto which include retrofit funding and support for green roofs, cool roofs, water savings and more. Notably, The Atmospheric Fund is another Toronto-based entity that is working to drive retrofit activity in commercial buildings and heat pump uptake throughout the region and across Canada.

Québec

Due to its hydropower resources, Québec currently has among the most abundant and cheapest low-carbon electricity in Canada. Along with British Columbia, Quebec has led the country with a long-standing, predictable carbon price and long-term targets for local uptake of zero-emission vehicles and low-carbon building technologies. The *2030 Climate Plan for a Green Economy* places continued focus

⁸⁰ In 2021, Ontario Creates reported 394 productions bringing in \$2.88B in production spending: feature films accounted for 10% of this spending and TV series 79%. Commercials are excluded from these figures unlike the Toronto figures cited in the text.

on the electrification of buildings, transportation and industrial activities as well as the expansion of renewable energy sources, including bioenergy, green hydrogen and renewable natural gas.

In 2021, the Québec Film and Television Council reported almost \$2.5 billion in direct spending in Québec's audiovisual industry, which included \$1.07 billion in domestic productions (51% of volume). IMDB-listed productions shot in Montréal, with release dates in 2021 or later (as of March 30, 2022) included 117 Feature Films; 47 TV Series (excluding mini-series). The motion picture and video industries employment for the Montréal CMA included 14,365 individuals in 2016. The Québec Film & TV Council has also launched its own sustainable film program, *Rolling Green*, in order to increase sustainability within the motion picture industry in Québec; the program currently provides tools and guides for producers, as well as certifications for green productions.

According to regional vendors, the primary barrier to providing green services is the cost, availability, and power limitations of electric vehicles and electric generators. For smaller regional productions, the initial cost of EVs and e-generators is considered too high to factor into their budget. This issue is heightened by operator concerns around the ability for electric generators to fully power their sets, as has been noted across other regions. In Montréal specifically, stakeholders indicated the ongoing concern about cost for greening and the more limited nature of domestic production, which in combination constrain the amount of capacity and effort that can be dedicated to sustainability.

There are a variety of incentives in Québec that could be further leveraged by individuals and companies working in or supplying the industry. The majority relate to building incentive opportunities, although opportunities also exist for EV purchase and infrastructure (of up to \$8K for new vehicles, as well as \$5K per charging station). Building incentive opportunities are significant, notably there is up to \$500,000 per applicant available through the *Technology and Business Demonstration* fund offered by Hydro-Québec - this is one of the largest incentives available from the literature reviewed. The City of Montréal also offers a sustainable industry buildings subsidy which specifically notes film, video and recording production and offers an incentive cap of \$100,000.

For Québec, the scale and variety of funds on offer, combined with the efforts of both the provincial and municipal government on EVs in particular, suggest a missed opportunity or a potential disconnect between industry experience, the greening of the supply chain and regional climate policy underway, though this bears further investigation.

Nova Scotia

Nova Scotia is one of the most progressive of the Atlantic provinces in terms of moving forward on net zero opportunities and is home to the most clean technology companies in the region. As the region is still compromised by the high proportion of coal fired power on the electric grid (63%), the Government of Nova Scotia recently announced \$550 million in renewable energy procurement to achieve an 80% renewable energy standard by 2030. This measure is expected to reduce GHG emissions by more than one million tonnes per year.

In 2016 the Halifax CMA employed 1,260 people in the motion picture and video industries, and as of March 30, 2022, IMDB-listed productions shot in Halifax with release dates in 2021 or later included nine features and four TV series, excluding mini-series. Although production activity is moderate compared to the Vancouver, Montreal and Toronto hubs, primary research revealed that sustainable production is of interest in Nova Scotia though the region is behind by nature of being a smaller jurisdiction (and commensurate less access and availability of greener vendor options). A previous provincial decision to cancel the film production tax credit means that the industry is also just starting to regrow in the province.⁸¹

Support from the CMPA and other industry stakeholders will be needed to help initiate and build sustainability strategies on a wider scale. Per stakeholders, a key first step is to establish a strategy for pushing for sustainable production. Replicating *Reel Green's Grid Power Access Map* for Halifax in particular would enable productions to use the grid instead of generators to power their sets. From there, infrastructure can be further built out, information can be shared with producers on how to green their productions, and targeted incentives can be developed.

As for other regions, available regional incentives largely relate to buildings although funding also exists for EVs and for wastewater reduction. A number of these programs are administered through Efficiency Nova Scotia, which is a potential partner of interest for initiatives focused on energy conservation and building retrofits, as is the Clean Foundation with respect to initiatives looking to further develop regional EV supply and infrastructure.

⁸¹ Although signals indicated the government may revisit this decision and further develop the industry as an economic sector.

V. Summary Highlights and Recommendations

The research to date is helping to describe the resource and environmental context for regions of interest, gain insight on different policies and supporting frameworks in place and emerging, and approximate the cost and availability market in different regions of interest in terms of production activity and supporting supplier network. Summary highlights include the following:

- Currently, there are little to no requirements for productions in Canada to use cleaner energy, and its use is thus largely determined by the prevailing clean energy assets of the host province, as well as any related momentum around climate policy. Research to date (and for all the regions of interest) has returned only one set of policies that specifically promote environmental sustainability in film production.⁸² This is the City of Vancouver's Film Industry Generator Use Reduction Strategy.
- There remains a supply chain constraint and consideration particularly outside of Vancouver and Toronto production centres for producers interested in sourcing EVs and electric generators. In some regional instances (Manitoba) vendors have not felt the need to upgrade their services or fleets due to a general lack of demand from producers for such options. In other areas, concern about the energy and cold weather performance of electric options is hampering uptake. The cost premium calculated with electric options is positively offset by operational savings in fuel, and options also appear to offer significant GHG savings opportunities compared to BAU.
- The issue around a split incentive, whereby neither studio owners nor producers directly benefit from building retrofit capital investment, continues to dog progress on the studio side to upgrade facilities and provide cleaner energy sources. Those studios who have made such efforts often operate at a scale inaccessible to the majority of Canadian producers. This said, research on available regional incentives have unveiled a great number of incentives that are available to building owners and asset managers across all regions of interest.
- A waste management strategy is often a starting point for productions that want to implement sustainability, however how a production chooses to carry out their strategy can vary. Successful implementation of waste strategies are dependent on many factors, including available waste services and infrastructure, regulations related to waste management in a given municipality, weather, buy-in from producers and other decision-makers, education and training for crew, as well as cost. Given the myriad of factors, the outcome of waste efforts often falls short. Despite the numerous considerations, productions see prioritizing waste management as a relatively

⁸² Though there are a variety of other incentives that could be leveraged by individuals and companies working in or supplying the industry, despite not being specifically targeted at film and television production..

more straightforward impact to address than other impacts such as energy and fuel reduction, which suggests continued support for this area would be of benefit.⁸³

- Overall stakeholders noted that there is no simple solution to driving forward green production regionally or even more broadly across Canada. Systemic and multi-pronged action will be required on several fronts and across stakeholders, such as well-designed policies and incentives; dedicated infrastructure expansion (such as access to clean energy and green vendors); fostering a general crew mindset change with more access to education and resources; and more.
- It was specifically recommended that a useful tool that can come out of the CMPA's Green Premium initiative is a framework for providing producers with "Mythbuster" answers to their questions, especially in terms of budget and logistics. Resources and education that address the producer perspective can help further expand the sustainable motion picture industry, and naturally transition the industry to cleaner energy principles.⁸⁴

(i) Directions for an Evergreen Premium Framework

The research conducted over the project period has uncovered green premium parameters, considerations, regional experiences and suggested engagement priorities for the CMPA across four main impact areas. The research has indicated several barriers for both producers and vendors when it comes to undertaking effective transformation in these key areas, barriers that include cost premiums but also cover other factors such as availability, awareness, and more. To continue to build on this exploratory work and leverage CMPA's engagement and investment to date, we recommend that the CMPA explore the creation of a "Transition to Net-Zero Fund" in consultation with the federal government, the provinces and various industry partners.

Several steps would help inform the development and structuring of such a fund. One of the primary steps is the development of a national industry transformation strategy built upon the full 'state of the union' information collected across Canada (based on the starting parameters set out in this initial study and more). In such an endeavour CMPA would be aligned with the recommendations outlined in *A Screen New Deal*, where along with the BFI and others, are now currently undertaking an initiative

⁸³ Most waste management practices often focus on improving disposal methods. Reducing consumption is the best approach to saving money on not only sourcing materials but also on disposal costs that will be reduced with fewer materials to manage.

⁸⁴ For example, Green Screen Europe was a five-year €2.66M (approx. \$3.6M CAD) project in 2017-2021 funded by Interreg Europe, a European Union cooperation funding programme to address key social and environmental issues across local and regional governments. ## Results to date have been mixed, but have all been documented for best practices and learnings on the project's website. Sample initiatives as part of the broader project include: [a cost analysis of sustainable vs. conventional catering options](#); [offering funding to productions that undertake sustainable measures](#); [knowledge sharing at industry events](#); [building a digital database of green suppliers](#); among others. A project outcome and learning for example is the cost analysis concluded that replacing tableware and water bottles with sustainable options combined with buying coffee in bulk rather than pods for a 10-week shoot with 60 crew members can result in a savings of €1,870 (approx. \$2,500 CAD).

to develop the *Screen New Deal: Transformation Plan*.⁸⁵ This initiative will collect and map local data on film and high-end TV related services in Wales given the high concentration of studios and scale of productions scheduled for 2022. Set to publish mid-2023, the *Transformation Plan* aims to identify service and sustainable infrastructure gaps to inform the development of a local decarbonization plan.

This initial work would help further refine and identify new pockets of activity, accompanying opportunities for support and targets in consideration of regional context, interest and needs (for example through focus on technology development that can apply for energy needs needed for remote locations in Manitoba, or working with local entities like Ontario Green Screen and the City of Toronto to highlight and address waste processing and circularity challenges), along with national level work (such as working with national vendors to accelerate the transformation of the rental fleet, furthering broad access for the industry and supporting/promoting credible research into outcomes, operational and emissions performance of newer technology to industry).

Work could also account for the technology developments underway by Canadian companies and consider the creation of a parallel “Technology Forward” stream to encourage, explore and support leading-edge partnerships by productions and salient clean technology companies, and to advocate and promote the results of such industry-technology partnerships to industry. There are various models that can be explored to configure such a fund (Emissions Reductions Alberta in particular has an excellent challenge model that matches emerging Canadian technology to industry needs).

One last note has to do with the opportunity to track and accrue net GHG savings over a production period compared to what would have been BAU practice, as explored through the theoretical green premium archetype summary noted in this report (118 tonnes saved for a 22.5 shoot day production, assuming actions across four impacts areas are taken). Although this estimate is highly notional, it starts to show the value of initiating a credible national-level tracking framework that productions can use to estimate the environmental and social value of potential sustainability activities, and that can help drive impetus and rationale for the advance budgetary planning needed to take action.

⁸⁵<https://wearealbert.org/2022/02/01/were-working-with-the-welsh-screen-sector-on-a-screen-new-deal-transformation-plan/>

(ii) Green Premium Action Tables

The following tables summarize the main opportunities identified related to the four impact areas reviewed in this study, and recap the main advocacy and market opportunities to influence and ideally work to reduce the green premiums initially characterized through this report. This summary is accompanied by data points of interest and suggested metrics that would help evaluate the progressive transformation of the industry in the key impact areas reviewed. The various stakeholders identified in this initial research may also represent entry points for activity exploration and fund co-development, particularly on the buildings side but also increasingly for EVs. These include but are not limited to regional entities such as Efficiency Manitoba, but could also include several national-level organizations focused on transition to net-zero, such as but not limited to Efficiency Canada, Electric Mobility Canada, The Atmospheric Fund, and others.

Green Premium Action Table: E-Generators

	Finding	Limitations and Notes
Green Premium	44%	Working estimate. Use with caution, based on one example extrapolation
Regional variation	n.a.	Generator rentals are provided by national vendors.
Operational inputs (BAU)	Gasoline, diesel and natural gas/propane	Input costs vary across Canada. As of April 2022, Calgary has among the lowest fees at the pump and Vancouver: gasoline is 155 c/liter in Calgary to 198.5 c/liter in Vancouver. Diesel is 173 c/liter (Calgary) compared to 211 c/liter (Vancouver).
Greener Cost savings	Likely significant	Depends on baseline BAU in terms of net operational fuel savings that would otherwise be incurred in diesel, gasoline and natural gas, in addition to savings from rigging labour for cabling. ⁸⁶
GHG Savings	Significant	Will vary based on BAU fuel consumption and net of the type of power source used to charge e-generators (e.g. grid power, renewables, diesel generator). Reducing diesel generators, by 1-2 for each production, based on a well planned re-distribution of power where e-generators are powering those things with lower power demands (vs. powering everything off the diesel gennies) can also result in significant GHG savings. Pairing with LEDs is also critical.

⁸⁶ Savings from the rigging labor required for a production can be significant. Larger shows can require 5-6 people to work a full day before and after to lay and remove cable. Day rates for a rigger average \$300-\$350. This is an additional \$3250 in labor costs for each location.

B.C.	E-generator availability is more established than for other provinces, and benefits from the presence of technology vendor Portable Electric. Significant fuel savings are possible due to fossil fuel price at the pump. Parallel grid and building tie-in history, supportive City council for fossil-based generator industry phase-out. Mild climate supports operational performance.
AB	Limited availability, coal presence on grid compromises environmental benefit from grid charging. Very low diesel and gasoline costs reduce potential cost savings for producers. More producer, operator and vendor training awareness and training required.
MB	Limited availability. Cold weather performance questions and need for energy solutions for remote applicability. Clean grid suggests benefit of and need for grid and building tie-in for urban locations. More producer, operator and vendor training awareness and training required.
ON	Some availability, but more availability needed particularly for smaller producers. Grid and building tie-in activity with Ontario Green Screen; this latter opportunity is particularly relevant given the length of production period in Toronto (due to TV series production).
QC	Limited availability. Clean grid suggests benefit of and need for grid and building tie-in for urban locations, in collaboration with the City of Montreal and Hydro-Quebec. Aligns with overall climate policy and electrification direction of the provincial government.
N.S.	Limited availability and market access due to a smaller regional market. Coal presence on grid compromises environmental benefit from grid charging, however the province is looking to develop renewable contributions. Demand for grid tie-in expansion to build on limited success.
National	Third party evaluation and demonstration of emissions and energy performance of e-generators across weather conditions and power configurations needed. Work with national vendors to encourage greater supply in the rental fleet, particularly across production hubs. In parallel promote awareness and understanding of use of cleaner generators (Tier 3 vs. Tier1/2), and emphasis on the pairing power with LEDs to reduce power consumption and execute substantial fuel and GHG savings.
Cleantech	Moment Energy (energy storage), Li-Cycle (battery upcycling), Portable Electric (electric generators).
Priority for CMPA	High, promising application with interest from producers across Canada. Technology is applicable to smaller producers and location shoots, particularly as renewable charging options advance such as solar. Engagement with producers and generator operators will be key to understand performance and address concerns through training on how power is used on set. Parallel priority to be placed on enabling grid and building tie-in opportunities in urban centres, particularly in regions with electrification interest, high levels of production activity and clean grids. Consideration of partnerships with groups such as FPIInnovations and CanmetENERGY for a technical testing path based on industry feedback.
Data of Interest	Generator BAU and greener rental fees, operating data on fuel used, operating data on electric grid draw. Number of grid and building tie-in requests.

Metrics of Success	Number of filled/unfilled requests for e-generators, by province. Change in producer fleet profile over time. Change in rental fleet profile over time. Inclusion of more and varied alternatives to fossil on location energy generation. Tie-in maps % coverage throughout all regions of interest, number of filled/unfilled tie-in requests.
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Green Premium Action Table: Studios

	Finding	Limitations and Notes
Green Premium	9%	“Greener” studio rental fees are largely at par, more influenced by regional real estate prices. Split incentive has affected studio/producer action on and motivation for greening studios. Foreign production has influenced adoption of greening activity in larger studios, particularly in Vancouver.
Regional variation	Significant	Very low rental fees in Manitoba, high rental costs in Montreal. Smaller producers generally priced out of market/urban centres. Vancouver exhibits higher fees (~30%) overall.
Operational inputs (BAU)	Electricity and natural gas	Utility costs vary across Canada, from 9.5 c/kWh (Winnipeg) to 17.1 c/kWh (Halifax). Major centres Vancouver, Toronto and Montreal are roughly equivalent at ~13 c/kWh. QC and N.S. space heating is largely met by electricity.
Greener Cost savings	Moderate	Depends on baseline BAU, season of shoot. Cost savings from installation of LEDs in terms of electricity costs including using less power to heat/cool spaces, as well as myriad of other efficiency, retrofit and renewable options depending on behavior, building vintage and characteristics. Further data needed, particularly for natural gas usage across summer/winter seasons. Information needed on building asset stock and vintage in all regions.
GHG Savings	Moderate	Will vary based on consumption and host electric grid, further data needed, particularly for natural gas usage across seasons. Information needed on building asset stock and vintage in all regions.

B.C.	More established, best in class availability of greener/more efficient studio options. Significant traction with green practice in studio in part due to demands of larger/foreign production houses with in-house climate mandates. High rental fees (30% more than other urban centres) make these options inaccessible to smaller Canadian producers.
AB	Limited information available. Some energy efficiency and retrofit incentive availability. Coal on grid suggests the added environmental value of action targeted to reduce electricity use in building stock. Given that Alberta exhibits the second highest electricity price of all regions reviewed (16.6 c/kWh) this region would be a good area of focus for both emission and cost savings from building electricity use reduction.
MB	Limited information available, low rental fees and lowest electricity rates of all regions reviewed (9.5 c/kWh). Good incentive availability largely through potential partner Efficiency Manitoba, excellent technology program opportunity (\$250K) with Manitoba Hydro.
ON	Some studio availability, though a significant number of TV productions mean space is rented for longer duration. Studio modernization effort needed particularly for older buildings and warehouse stock in Toronto. Excellent incentive availability and City of Toronto retrofit challenge suggest this would be a good area of focus.
QC	Very high rental costs for Montreal studio consulted which has a number of green options in place. Significant incentive opportunities, among the highest reviewed (\$500K per applicant available for Hydro-Quebec). Need for more information to understand costs and opportunities for regional producers.
N.S.	Limited information available; some incentive availability. Potential partnership with Efficiency Nova Scotia. Highest electricity cost (17.1 c/kWh) of all regions suggests the value of addressing this area.
National	Need for asset inventory of existing studio and warehouse stock across six production hubs to assess the number, vintage, quality and operational performance of current buildings available to productions. Significant potential exists to engage with the studio community to develop targets around Canadian studio/warehouse building stock based on inventory outcomes. This suggests setting in motion a stakeholder consultation and partner engagement process to set industry standard targets and to connect lagging studio owners with available incentives.
Cleantech	BrainboxAI (building energy optimization through AI), CarbonCure (building materials carbon sequestration), Clean O2 (offset of carbon from building operation).
Priority for CMPA	Moderate. Nature of split incentive and low savings exhibited offer less direct benefit to Canadian producers, though studio engagement and upgrades will provide benefit over the longer term particularly if these target some of the smaller/olders studios and warehouses in use, as well as regions that tend to exhibit the highest electricity costs/more carbon intensive electric grids. Consider national partnerships with The Atmospheric Fund, Efficiency Canada, Sustainable Buildings Canada, Canada Green Building Council and more.
Data of Interest	Number of studios/warehouses in place, building vintage, rental/occupancy rate and occupant profile, and historical utility consumption (categorized or compiled by size/budget/characteristics of occupying production).

Metrics of Success	Type and number of retrofits undertaken and estimated utility efficiency savings achieved in consequence. Increase in studio interest and uptake of other beneficial options such as green roofs, cool roofs, renewable options, greywater and stormwater management. Uptake and interest in new building technologies to manage and optimize utility use, lower carbon inputs in new builds and use of potential building offsets.
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Green Premium Action Table: Electric Vehicles

	Finding	Limitations and Notes
Green Premium	14.7%	EV rental fees range from 0% - 23% more than their BAU equivalent, depending on the vehicle type and vintage.
Regional variation	n.a.	Stakeholders indicated general EV rental availability within Vancouver, and some limited availability in Montreal and Toronto though these options have been difficult for Canadian producers to source and there seems to be limited vendor availability. Heavier duty electric and hybrid options not yet fully available in the market.
Operational inputs (BAU)	Gasoline and diesel	Gasoline costs vary across Canada, from 155 c/litre in Calgary to 198.5 c/litre in Vancouver (April 2022). Diesel prices range from 173 c/litre (Calgary) to 211 c/litre (Vancouver) for this same period.
Greener Cost savings	Possibly significant	Depends on baseline BAU regional fuel prices, and comparable operational fuel savings in diesel and gasoline achieved through electrification.
GHG Savings	Significant and on par with electric generators	Will vary based on fuel consumption of the comparable BAU option incumbent (in addition to mode shift activity, fleet size, duty cycle and km travelled).
B.C.	More established EV fleet, EV rental availability for industry is purportedly higher than for other provinces. Significant fuel savings due to Vancouver having the highest price at pump for both gasoline and diesel of regions reviewed. Aligned provincial and municipal policy and EV targets, general support for EV infrastructure (including some studio locations). Vancouver has 483 public charging station ports within 15km.	
AB	Limited EV rental availability, moreover coal presence on grid reduces environmental benefit gained from grid charging. Lower (comparatively) diesel and gas costs reduce potential cost savings for producers. 175 public charging stations are available in Calgary.	
MB	Limited EV rental availability. Although stakeholders have cold weather performance questions, the performance of EVs in Montreal and Toronto and Manitoba's clean grid suggests the benefit of greater adoption and deployment of electrification solutions. Block heater usage offer an added opportunity for recharging. Some emerging regional prowess in the development of HDV EVs. Winnipeg has 68 public charging station ports within 15km.	
ON	More rental availability needed particularly for smaller producers. Presence of not for profit PlugN'Drive can help act as a catalyst for this area through providing available incentives and programmatic support. Toronto has 864 public charging station ports within 15km.	

QC	Availability should be good as QC has the highest proportion of EVs in Canada next to B.C., and significant existing charging infrastructure. Montréal has 1,258 public charging station ports within 15km of each other, the highest of all regions. All these aspects in addition to a clean grid suggests a good opportunity for deep industry adoption, in collaboration with the City of Montréal and Hydro-Quebec.
N.S.	Limited EV availability and vendor market access due to the small regional market. Coal presence on grid compromises environmental benefit from grid charging, however the province is looking to develop renewable contributions. Halifax has 57 public charging stations within 15 km.
National	Work with national vendors to assess and allocate greater industry-focused supply in the rental fleet, particularly across production hubs with existing infrastructure and cleaner host grids (possibly through bulk rental agreements for regional producers). Work to promote understanding of cost savings based on documenting and compiling various production use cases, through gaining transport budget operational performance measures from productions using EVs and extrapolating what the BAU cost and emissions would have been (retrospective analysis).
Cleantech	Lion Electric (heavy duty EV options), AddÉnergie Technologies (charging optimization), Gardewine (heavy duty EV options), Moment Energy (energy storage for charging).
Priority for CMPA	Very high, promising and beneficial application with interest from producers across Canada. Activity is well aligned with federal government direction and respective policy targets, including announced phase out of light duty internal combustion engine sales by 2035. Technology is applicable to smaller producers and available through major production hubs at an affordable price point, with significant cost and emissions savings resulting when considering projected operational performance. Engagement with producers and transport operators will be key to build awareness of benefits and further appetite.
Data of Interest	Vehicle BAU and EV rental fees, number, type and age of vehicles, operating data on fuel used in BAU fleet, operating data on electric grid draw, kilometres travelled.
Metrics of Success	Number of filled/unfilled requests for EVs, by province or region. Number of public charging stations and % coverage. Change in producer fleet composition over time, rental fleet and fuelling infrastructure over time. Expansion of HDV EV options. Inclusion of more and varied alternatives to fossil generation (hydrogen-fuelled vehicles, etc).

Green Premium Action Table: Waste Management

	Finding	Limitations and Notes
Green Premium	26.6%	Estimate accuracy is complicated by variation in waste volumes, types of materials handled and differences in the quoting process and volumes handled across vendors and regions.
Regional variation	n.a.	Waste management fees for various streams of materials vary vastly from one region to another; availability and accessibility of processing facilities is limited outside of the main urban filming hubs; regulations and policies around waste management are also different from region to region, and even municipalities that border one another within a particular area.

Operational inputs (BAU)	n.a.	
Greener Cost savings	Moderate	Sorting and processing the different waste streams (recycling/compost/landfill) can result in additional costs in some areas; though tipping fees to process non-landfill materials tend to be less and there can be some cost savings observed.
GHG Savings	Moderate	Proper waste management that results in larger amounts of materials being kept out of landfills can have a moderate reduction in avoided emissions, particularly in terms of methane avoidance. Though significantly higher amounts of GHG emissions come from fuel use and energy use required, waste management continues to be a high priority for productions that want to go green.
B.C.	With established waste management services in the film industry for both studios and locations, productions in B.C. have more options for diverting their waste. Outside of Metro Vancouver, services are less accessible and lower budgeted productions are often left with fewer options for waste diversion.	
AB	Waste management services in more remote areas, such as mountain landscapes, are often not available to productions. However, the recently published Alberta Sustainability Guide highlights several waste vendors that are able to dispose of various waste streams.	
MB	Multi stream waste systems are a regular occurrence on film productions in Manitoba. Reuse options for used set materials are also available.	
ON	There is a provincial focus on waste and circularity in Ontario. Waste services for recycling and compost have recently been improved through the efforts of select new vendors in the Greater Toronto Area. However, limited infrastructure for composting has resulted in higher disposal costs for productions. Until recently waste from locations was generally landfilled, but this has changed in recent years as more productions are choosing to sort and dispose of the different waste streams.	
QC	Waste management choices are often left up to individual productions at studios which do not often provide waste management services as part of rental fees.	
N.S.	Businesses are required to have sorting programs and commercial containers for disposal of blue bag recyclables, paper and cardboard, organic materials, and garbage. Failure to provide these programs can result in a Summary offense ticket of Bylaw S-600. Procurement of required receptacles and collection of solid waste is the responsibility of the generator.	
National	On the data side, acquiring and compiling costs on a per bin basis and over the processing life cycle (e.g. from bin to landfill or other) would enable better evaluation of current waste processing alternatives, however this would require detailed study of how waste is handled across each jurisdiction. A focus on reduction of upstream resource use and waste diversion would be of benefit and impact. Also, Personal Protective Equipment (PPE) recycling is	

	available in all jurisdictions. ⁸⁷ PPE waste management is an additional cost, however, available disposal services should be considered, given the massive increase of this particular and problematic waste stream during the pandemic.
Cleantech	ReDeTec (recycles plastics into 3D printer filament), ALT TEX (provides replacement for polyester fibres using food waste), Genecis (the use of bacteria to convert food waste into bioplastic).
Priority for CMPA	Low. The waste area suggests the need for specific and point source engagement with municipalities and waste processors to enable and effect more optimal systemic processing opportunities. The complexity of evaluating and compiling cost and GHG outcomes for different regions and waste types reduce the value of this exercise. Nonetheless ongoing producer acceptance of this premium and work associated suggest this impact area is of importance and concern, and producer efforts should continue to be supported and enabled where possible. Addressing PPE waste may be an area of both opportunity and need and could possibly be considered as a mandatory line item in producer COVID budgets.
Data of Note	Number and volume of yard bin waste, volume sent to landfill, compost or recycling. Reuse or rental volumes. Avoided material consumption at outset, proportion of recycled content. Processing of PPE.
Metrics of Success	In many regions, productions can request waste diversion reports from their waste vendors, ideally at or before the start of principal photography as requests that are made after principal photography ends are often unfulfilled. Tracking a production's diversion rate and using these metrics to improve performance is a fairly simple practice however high diversion rates are ultimately dependent on proper sorting and low contamination rates.

⁸⁷ Choosing waste to energy or recycling options can greatly reduce the vast amounts of PPE that is now being used on all productions across Canada.

A note on foreign service production...

Given that the majority of the greenhouse gas emissions originate from the higher number of foreign service productions in the various regions, there is an impetus for foreign corporations that are financing these projects to provide more funding toward developing the infrastructure to reduce their own carbon impacts. As observed from stakeholders in every region, both foreign and domestic productions would benefit from more developed infrastructure. As Canadian productions do not have nearly the budgets that foreign service productions have, Canadian producers and production companies cannot afford to pay the development costs and are prohibited from taking advantage of the green options and technologies available in their respective locations. If the infrastructure is financed by the backers of the larger foreign service productions and the regional studios that cater primarily to these foreign productions, this would provide greater opportunities for Canadian producers to access these green options and make serious strides to reduce their own carbon footprint. Foreign service productions operate in Canada largely to take advantage of the beautiful landscapes, expertise and infrastructure from established film communities as well as significant labor incentives. This does not, however, convey the right to negatively impact the Canadian environment and foreign service productions should do their part to mitigate these impacts through infrastructure development and alignment with climate goals of every region where they make their films.

Regional Compendium

The national landscape for film greening in Canada is complex and varies regionally, but there are some barriers and enablers emerging that are nationally consistent, as identified by the interviews and secondary research undertaken. This section provides a compilation of information for each production hub of interest (Vancouver, Calgary/Edmonton, Winnipeg, Toronto, Montreal and Halifax), per the following structure:

- **Regional Context**, which briefly reviews the climate policy context and the primary energy profile for the host province.
- **Production Landscape**, which provides an initial market sizing in terms of annual productions in the region.
- **Green Premium Insights**, which provides insights from interviewees on greening efforts such as barriers and enablers particular to the region. Greener suppliers in the region are also noted.
- **Regional Incentives**, which compiles available regional and provincial incentives with applicability to greening production.
- Emerging **Clean Technology Companies** of interest, that are either headquartered within or have operations in the region of interest.

A. BRITISH COLUMBIA (Vancouver)

Regional Context

British Columbia has long benefited from a relatively clean electric grid, which has been pivotal to the province’s drive for greater electrification in buildings and transportation, along with the potential for green hydrogen production for decarbonizing hard-to-abate sectors. Battery storage, grid management and grid edge technologies are developing apace. In particular the province’s ambitious *CleanBC Strategy* and recent 2022 Budget (the *StrongerBC Economic Plan*) lay the groundwork for environmental ambition, as this framework provides both investors and businesses with much needed clarity on the direction of future climate policy. Industry within B.C. benefits from the low emissions electricity grid and a [carbon tax](#) that has been in place since 2008, though is still heavily reliant on natural gas for space heating and cooling (**Table A.1**). At ~40% of the total, the transportation sector is the largest contributor to provincial emissions (24.9 megatonnes in 2018).⁸⁸

Table A.1: Electricity Grid and Energy Use

Region	Electricity Generation by Fuel Type in 2018	Secondary Energy Use by Source in 2018 Information and Cultural Industries (NAICS 51)	Secondary Energy Use by End Use in 2018 Information and Cultural Industries (NAICS 51)
British Columbia	91% Hydroelectricity	53% Electricity 40% Natural Gas	50% Space Heating 18% Lighting 16% Auxiliary Equipment

Production Landscape

The screen-based industries are an important part of British Columbia’s economy: [CMPA](#)’s 2021 Economic Report on the Screen-Based Media Production Industry in Canada reports \$3,254 million in film and television production spending in British Columbia in 2020/21. In 2019, [Motion Picture and Video Production](#) Operating Expenses for British Columbia were estimated at \$3,279 million.

According to the [Vancouver Film Commission](#), an average of 65 movies and 55 TV series are filmed in Vancouver each year. The [Motion Picture and Video Industries Employment](#) for the Vancouver CMA in

⁸⁸ <https://www.env.gov.bc.ca/soe/indicators/sustainability/ghg-emissions.html>

2016 was 18,950, and [Destination Vancouver](#) reports that more than 80% of direct and indirect jobs generated by film and TV in B.C. are in Metro Vancouver.⁸⁹

More than 44,000 people work in the industry across B.C., and it is estimated that the workforce will not keep up with the growing needs, which will vary between 5% and 10% over the next ten years.⁹⁰

Green Premium Insights

As Vancouver is a major hub for the film and television industry, production is taken seriously as an economic sector and driver for the region. Per interviewees, sustainable production has been a topic in the province for many years, but was formalized with the creation of Reel Green™ in 2006, which provided a natural roundtable for all stakeholders interested in sustainable production to come together and share ideas. Reel Green™ today is under the umbrella of Creative BC and provides tools and resources for B.C.-based productions to integrate sustainable best practices and reduce the negative environmental impacts of filmmaking.

Other enablers in place include the support of the provincial utility B.C. Hydro, which is aware of production energy needs and helping with meeting related goals around energy transition, and a general converging of expectations around greener and cleaner sets by B.C.-based productions (in part due to the increased sustainability priorities of larger networks and production companies shooting in B.C.). Progress has also been made with municipal film officers to support sustainable practices for the film industry, such as through Climate and Sustainable Production training to municipalities, reassessment of municipal guidelines to incorporate sustainable production practices, and overall working to foster general alignment with municipal climate action plans. This activity and interest benefits from the good availability of greener options in the region relative to the other regions reviewed. In particular, B.C.-based productions benefit from the expansion of EVs and alternate fuel sources into the retail market as enabled by progressive provincial transportation policy, with the result that producers are increasingly able to request these options and gain familiarity with their use.

One broader challenge is that available infrastructure, support, and investment for greener production activity declines with distance from Metro Vancouver. This makes it difficult for suppliers and government programs (like Reel Green, which is largely funded by industry partners) to expand offerings to other regions where the motion picture industry is not as heavily established. Green infrastructure investment by vendors is also not as feasible in those regions with smaller production volume, particularly when wide scale infrastructure deployment is also required to enable uptake.

⁸⁹ including employed and unemployed workers, self-employed workers and employees, and full and part-time employment

⁹⁰ finalversion_qftc_impactassessment_increasing_infrastructurecapacity_rcgt_en

In B.C., as in other provinces, costs are still at times higher to rent e-generators and supply chain issues still exist with ordering electric generators and batteries. Regional vendors cited that for EVs, a general lack of infrastructure, lack of supply due to high global development and the technology advancements still needed for heavier duty vehicles is hindering deep uptake of EVs in vendor fleets. Prices for EV rentals still remain relatively high for interested producers, and when EVs are sourced, cost savings can be compromised by a general lack of “smart” decision-making (i.e. based on prioritizing their use in short and frequent vehicle duty cycles) for EV/hybrid rentals on the part of productions (as noted previously in this report). Demand from producers will help to show increased interest in these options and enable vendors to prioritize such options in their available fleets, when possible. Understanding of usage is paramount to realize cost savings, with interviewees indicating that: “it doesn’t make sense to rent an e-generator for more money if it is not going to be used or if electric doesn’t know how to use it to redistribute power throughout the set”.

Regional vendors interviewed suggested that product users do not always know how to integrate new technologies to increase efficiency and cost savings and that despite growing interest, there is a degree of wariness towards new technologies. Put another way, given limited requirements for productions to use cleaner energy, productions will typically just choose to stick with what they know. This said, the confluence of increased gas prices, potential for cost savings, and increase in the use of LED options all point to a general trend favouring greater penetration of options such as e-generators in the regional market. Interviewees expressed that the following measures would add impetus in this regard:

- Education and training on budgeting for and using electric generators.
- Studio mandates banning generators (example: Martini Studios), or even overarching requirements that studios run on grid or renewable energy.

On the positive side, interviewees suggested B.C. studios seem to be making sustainability a part of their strategic plan and not passing any costs on to the productions, activity in part supported through activating utility rebates such as the *B.C. Hydro for EV Charging* installation, among others. Useful measures to help drive further change for studio greening and by proxy help mitigate the impact of Canadian production in the region would include:

- Banning the use of generator or diesel power on studio sites, encouraging increased renewable generation.
- Earlier conversations about sustainability and mandating more greener initiatives through studio programs.
- Funding of infrastructure that is accessible to all Canadian productions, for example through the evaluation and potential development of efficiency/renewables incentive programs deliberately targeted at smaller studios.
- Sustaining and increasing the carbon tax over time and maintaining incentives for clean fuel.

In Vancouver, the lack of or cost of warehouse space for storage of sets in particular was felt to impede effective reuse practices. Costs for deconstruction and transport of deconstructed materials can also make effective reuse strategies less attractive to consider. In Metro Vancouver, the lack of options for processing PLA means that all bioplastics currently go directly to landfill. Interviewees indicated that for this region, the following areas of activity would help with enabling further progress toward waste circularity:

- More set material reuse among productions through the warehouse reuse program.
- Studio communications within their own productions for sharing and reusing set materials.
- Development of tax breaks or industry-focused incentives for material reuse (or even circularity mandates).
- Education and amplification of the material reuse program to unions and for producers/studios.
- Materials exchange pages, akin to similar efforts for other sectors like construction.

On the producer side, quality data acquisition and tracking remains a challenge, as it continues to be difficult to transparently convey what is being done on an industry level. One producer noted the direct impact of climate change on British Columbia, especially pertaining to the more intense fires and lower air quality expected over time. These events have already affected filming in Vancouver, with the heightened costs associated with pursuing production. As the impacts of climate inaction are already being witnessed by and directly negatively affecting Vancouver productions, there is an even clearer incentive for producers and the film industry to reduce carbon emissions and enact more sustainability initiatives on set.

Greener Suppliers

CreativeBC's Reel Green initiative maintains a [Green Vendors](#) list, which features organizations that provide sustainable solutions for British Columbia's motion picture industry. The list is categorized using a three-level system, where Level 1 represents sustainable businesses that have established a consistent level of sustainability in their business operations and practices, Level 2 represents businesses that have an integrated sustainability strategy, and Level 3 represents businesses who have demonstrated a full sustainability approach to all business operations and practices. Vendors are invited to apply to be added to the list. Greener supplies available in the Vancouver region are listed in **Appendix B**, and cover a range of areas from offering EV rental options, electric generators, more efficient studios, waste circularity opportunities, eco-consulting, and more. Of the regions reviewed, Metro Vancouver has the highest number and greatest spread of greener supplier options available to local producers.

Regional Incentives

Research to date across all the regions of interest has returned only one set of policies that specifically promote environmental sustainability in film production.⁹¹ This is the City of Vancouver's [Film Industry Generator Use Reduction Strategy](#), which includes:

- 1) Having a [purpose built power kiosk](#) within ten minutes' drive of the most common film locations in Vancouver.⁹²
- 2) Creating a [Clean Energy Incentive](#) that reduces permit fees by 50% per day for film companies that demonstrate a reduction in their use of diesel generators (where purpose built kiosks are not available).
- 3) The proposed development of by-laws and policies that encourage owners of commonly used private property film locations to make their own capital investments into providing clean energy power connections.⁹³

In B.C. there are a variety of other incentives that could be leveraged by individuals and companies working in or supplying the industry. The majority of incentives reviewed relate to building incentive opportunities, although a number of opportunities also exist for EV infrastructure and EV purchase. Support is provided largely through the provincial and municipal governments. These examples are listed in **Appendix C**.

Table A.2: Regional Incentives, British Columbia

Impact Area	Incentive
Studio Buildings	<ul style="list-style-type: none"> ● CleanBC Better Buildings program ● Clean buildings tax credit - Corporate income tax credit on 5% of qualifying expenditures for energy efficiency improvements to commercial and multi-unit residential buildings. ● CleanBC Custom Program - Energy study and capital funding for fuel switching and other electrification measures in large buildings. Provides up to 50% of energy study cost up to \$20,000 and capital funding incentives based on a rate of \$40/tCO₂e of lifetime GHG savings up to \$200,000 per

⁹¹ Though there are a variety of other incentives that could be leveraged by individuals and companies working in or supplying the industry, despite not being specifically targeted at film and television production (TBD).

⁹² Currently, there are 25 power drops in the Lower Mainland that range from 50 to 600 amp. When a production uses one (1) power drop or battery generator alternative, there is a fifty percent (50%) reduction in daily permit fees and late surcharge.

⁹³ See also - <http://www.metrovancouver.org/services/Permits-regulations-enforcement/non-road-diesel/NRDE-emission-regulation/Pages/default.aspx>

and <https://parkboardmeetings.vancouver.ca/2019/20190624/MOTION-GasDieselGeneratorPollutionEliminationStrategy-20190624.pdf>

	<p>customer. The rate for heat pump rooftop units is \$60/tCO₂e.⁹⁴</p> <ul style="list-style-type: none"> ● CleanBC Custom-Lite Program - Incentives for smaller scale electrification opportunities across the commercial and institutional building sector. Energy Study funding for 50% of the study cost up to \$2,000. Incentives of \$60/tCO₂ of lifetime GHG savings for heat pump rooftop units up to \$72,000 and \$40,tCO₂e for all other qualifying measures up to \$48,000 per customer. ● BC Hydro’s Business Energy Saving Incentives - Funding for approximately 25% of the upfront costs of energy-efficient equipment upgrades including lighting, HVAC, refrigeration and mechanical technologies. ● Continuous Optimization Program - Assistance to improve operations in large commercial buildings with simple, low-cost solutions. ● Support for early owner action among green large commercial and multi-family buildings - The City plans to partner with industry associations, senior government and utility companies to establish a retrofit accelerator centre. It will collaborate with Metro Vancouver Regional Low Carbon Innovation Centre to create new financial tools and incentives for low carbon retrofits.⁹⁵
<p>Transportation Fleets</p>	<ul style="list-style-type: none"> ● CleanBC Go Electric Home and Workplace Charger incentive - Up to 50% (up to \$2,000) per station at a workplace. ● CleanBC Go Electric Passenger Vehicle incentive - \$3,000 for the purchase of a new battery electric, hydrogen fuel cell, or long-range plug-in hybrid electric vehicle \$3,000; \$1,500 for short-range PHEV. ● CleanBC Go Electric Specialty-Use Vehicle incentive - Incentive for purchasers or lessees of battery electric, hydrogen fuel cell, and PHEV (in certain cases) vehicles in specific categories. ● CleanBC Go Electric Fleets incentive. ● Provincial sales tax credit on used electric vehicles. ● ZEV decal benefits for Vancouver - 174 dedicated zero emission vehicle parking stalls across 18 EasyPark lots and HOV lane access, regardless of the number of passengers in the car.

⁹⁴ The building must have a BC Hydro Key Account Manager, be in BC Hydro service territory and demonstrate the potential for a lifetime savings of at least 1,200 tCO₂e for a single facility.

⁹⁵ This program will be informed by stakeholder engagement that are slated to end in Spring 2022.

Cleantech Companies

The presence of Vancouver's **Portable Electric** has been a boon to local production as the company is the main developer and purveyor of electric generators in Canada. Portable Electric's VoltStacks have been used in major films, such as *No Time to Die*. Using VoltStack on the TV series, *God Friended Me*, resulted in a savings of \$1,500 USD/week and an abatement of 33lbs of carbon emissions per an 8-hour day.⁹⁶ Portable Electric also offers a solar power solution called the Sunstack, that can boost the recharge speed of VoltStack electric generators.⁹⁷ ⁹⁸ More recently, Portable Electric announced a partnership with another Canadian venture, [Li-Cycle](#), to recycle the lithium-ion batteries used in the VoltStack electric generator when it reaches its end-of-life to recover materials in the battery supply chain and minimize its environmental impact.⁹⁹

Based out of Port Coquitlam, **Moment Energy** is another company of interest as it provides clean, affordable, and reliable energy storage by repurposing retired electric vehicle batteries. Unlike other battery storage companies, Moment Energy's storage units are two-thirds the price of other lithium-ion batteries by providing a second life to EV batteries.¹⁰⁰ End-of-life EV batteries still retain 80% of their energy capacity with seven to 10 years of life to use.¹⁰¹ Moment Energy successfully partnered with Nissan North America¹⁰², and are participating in a \$2.4M CAD project with Hydro Ottawa and BlueWave-ai to use energy storage and artificial intelligence to manage EV-charging during periods of peak energy demand.

B. ALBERTA (Calgary + Edmonton)

Regional Context

Alberta is a major energy powerhouse for Canada, with an abundant supply of coal, oil, natural gas and increasingly wind and potential geothermal resources. The province is unique in terms of its fully deregulated electricity market which allows independent producers to bid into the market and gain longer term power purchase agreements. This has enabled rapid development of renewables as well as some of

⁹⁶<https://portable-electric.com/how-this-cbs-show-used-electric-generators-to-save-production-costs/>

⁹⁷<https://britishcinematographer.co.uk/green-voltage/>

⁹⁸<https://portable-electric.com/sunstack/>

⁹⁹<https://portable-electric.com/portable-electric-partners-with-li-cycle-to-recycle-lithium-ion-batteries-after-they-reach-end-of-life/>

¹⁰⁰<https://www.momentenergy.ca/blog-posts/what-are-the-applications-of-energy-storage>

¹⁰¹<https://clean50.com/projects/moment-energy-uses-retired-car-batteries-to-power-canadas-remote-regions/>

¹⁰²<https://www.momentenergy.ca/news-articles/moment-energy-secures-supply-chain-relationship-with-nissan-north-america>

the first large scale energy storage projects in the country using Tesla Megapacks. This said, the province is still heavily reliant on fossil energy for domestic uses and particularly for export. Though the province has phased out coal, the current fossil profile of the provincial electric grid still has significant implications for the pollutant impact of domestic industries using electricity in this region (**Table B.1**).

Table B.1: Electricity Grid and Energy Use

Region	Electricity Generation by Fuel Type in 2018	Secondary Energy Use by Source in 2018 Information and Cultural Industries (NAICS 51)	Secondary Energy Use by End Use in 2018 Information and Cultural Industries (NAICS 51)
Alberta	49% Natural Gas 43% Coal and Coke	66% Natural Gas 32% Electricity	62% Space Heating 16% Lighting 10% Auxiliary Equipment

Production Landscape

According to [Calgary Economic Development](#) the Calgary Region is the location for over 80% of Alberta’s film, TV and commercial production. [Motion Picture and Video Production Operating Expenses in Alberta for 2019](#) was \$204M, and employment as reported by the [Motion Picture and Video Industries Employment in 2016](#) was 1,905 for the Calgary region, and 1,395 for the Edmonton CMA.¹⁰³

[IMDB](#)-listed productions shot in Calgary and Edmonton, with release dates in 2021 or later (as of March 30, 2022) include:

- Calgary: 27 Feature Films; 13 TV Series (excluding mini-series).
- Edmonton: 22 Feature Films; five TV Series (excluding mini-series).

For Alberta, [CBC](#) reported that between January 1, 2020 and July 31, 2021, 50 productions with anticipated spending totalling \$482 million had used the Alberta Film and Television Tax Credit. This credit is a labour cost tax credit for films, television series and other eligible screen-based productions in Alberta.¹⁰⁴

Green Premium Insights

¹⁰³ These estimates include employed and unemployed workers, self-employed workers and employees, and full and part-time employment.

¹⁰⁴ Corporations applying must be incorporated in Alberta under the Business Corporations Act, registered as an extra-provincial company in Alberta and/or continued as an Alberta company through a Certificate of Continuance.

In Alberta, climate, and consequent greening activity for various sectors including film, has not been a traditional focus of the province. Per interviewees, a significant amount of activity in this space is municipally based, and particularly for Calgary and Edmonton, which often work in tandem on shared initiatives. For the film sector in general, greening activity has been at times driven by the leadership of the service industry.

In general, regional producers expressed a lack of awareness of e-generators as well as alternative fuel options, and had experienced cost premiums when it came to optimizing waste management (for example through using compostables vs. styrofoam, as well as for waste sorting). Sentiments indicated that tight budgets do not allow for the perceived “extras” associated with sustainability, which are further compromised by the booming nature of the industry particularly in Calgary, as this has made sourcing even regular services such as ICE vehicles difficult. Typically there is no “green budget” line, which means that initiatives are evaluated on a one-off basis. In addition, budgets are also tight which compromises effort to plan a fully thought out sustainability strategy. Ideally producers consulted felt they would benefit from a degree of budgeting assistance or proof that they would save money on related green expenditures.

(This said, producers indicated that the premium that has been experienced for waste and compostables in particular is not insurmountable in their experience. Some regional producers already regularly source compostable serveware for catering and spend extra for dedicated waste sorting. Unfortunately one of the ramifications of COVID is that reusable and water dispensers are no longer allowed, which means that single use plastic water bottles are now again a significant contributor to the packaging waste stream.)

Interviewees noted that there is a heavy reliance on fossil fuels in Alberta and the provincial government has made limited effort to initiate, support or develop policies or programs related to greening various sectors. Most efforts tend to be overshadowed by the focus on driving development and efficiencies in the oil and gas sector. The Alberta Film Commission, the Edmonton Screen Industries Office and the Calgary Economic Development Agency recently developed the [Alberta Sustainable Production Guide](#). This guide includes a vetted vendor list for catering, electric power, and waste management companies, and notes select additional resources such as albert’s Carbon Calculator and PGA’s Green Production Guide. With the Alberta Sustainable Production Guide and other programs currently in development, the goal is to encourage Producers to incorporate sustainability into the budget early on, and demystify the cost of sustainable production in Calgary.

Although there is interest and support from producers, vendors, and other green film programs and organizations DGC Green to continue to build on these efforts, government representatives indicated that the primary regional barriers for facilitating green production are not having the capacity and resources to

invest in all the research and development programs necessary for further implementing sustainable production. A dedicated focus on greening film production and Alberta overall is still needed.

Greener Suppliers

The Alberta Sustainable Production Guide lists a few suppliers in its [Vendor Phonebook](#), although the site does not indicate how vendors are selected for this list. Examples of local suppliers with green practices and/or offerings identified include:

- [Portable Power Solutions](#) in Calgary, which carries Portable Electric’s battery-powered generators. As noted previously (see B.C. profile) these generators can be recharged by plugging into the grid, using Portable Electric’s solar panel charging kit, or using other renewable energy sources as available.
- [BluPlanet Recycling](#), which is a waste services company that focuses on diverting waste from landfills. It offers services to residential and commercial customers, with Film Productions listed explicitly as a use case for its Organics service.

Alberta-based production also has access to greener options provided by national suppliers, including but not limited to William F. Whites International and MBSE.

Regional Incentives

Although the research did not indicate dedicated support for enabling reduced pollutant impact of the industry nor for producers specifically, there are some incentives that could be leveraged by individuals and companies working in or supplying the industry. As in other regions reviewed, the majority of incentives reviewed relate to building incentive opportunities and thus apply largely to studio owners. These examples are listed in **Table B.2** and describe potential support for studios largely through realizing energy savings, clean energy and retrofit programs.

Table B.2: Regional Incentives, Alberta

Impact Area	Incentive
Studio Buildings	<ul style="list-style-type: none"> • Energy Savings for Business - Up to \$250,000 for the purchase and installation of alternative energy and energy efficiency products. All businesses and nonprofits serviced by an Alberta electric utility are eligible except residences, new construction projects, government-owned buildings, publicly funded institutions and Large Emitters.

	<ul style="list-style-type: none"> • The non-residential Clean Energy Improvement Program is available in Edmonton in 2022. The City of Calgary is exploring the program but will begin with residential buildings. • Edmonton's Building Energy Retrofit Accelerator program - Rebates on purchase and installation of energy-efficient equipment (lighting fixtures, controls, HVAC, building envelope) for large commercial, light industrial and institutional buildings over 5,000 square feet that have been operational for at least 1 year and have electricity consumption below 15 GWH. The maximum rebate per project per program year is \$75,000 (\$125,000 if a heat pump is installed). Maximum rebate per company per program year: \$150,000. • Partial exemption from sewer utility charges- Water not released into the wastewater system may be exempt from wastewater charges and surcharges if metered water is supplied to the premises and if the amount of water not released into the wastewater system can be measured to the satisfaction of the Director, Water Services.¹⁰⁵ (City of Calgary)
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Cleantech Companies of Interest

Based out of Calgary, **Denvr Datawork**'s data centres use liquid immersion cooling technology coupled with other clean technologies to reduce energy consumption and overall emissions. The film industry is increasingly moving to cloud-based production,^{106 107} which requires the operation of large data centres that house servers to maintain many terabytes of data. Using liquid cooling technology, Denvr's data centres are 1,200 times more effective than traditional air-cooled data centres, and require less power, money, and real estate to build and operate.

Also out of Calgary, **Clean O2** has developed CarbinX, a small-scale carbon capture solution for commercial buildings that converts carbon captured from heating system exhaust to generate pearl ash, a potassium carbonate used to create products, such as soaps and detergents, fertilizers, water conditioners, etc. The CarbinX solution can enable cost savings through reduced energy consumption, emissions reductions through increased energy efficiency and captured carbon, and the potential to earn

¹⁰⁵ The City of Calgary is also exploring the implementation of the Clean Energy Improvement Program, but starting with residential buildings

¹⁰⁶ <https://www.ibc.org/trends/studios-make-move-to-the-cloud/6124.article>

¹⁰⁷ <https://cbc.radio-canada.ca/en/impact-and-accountability/environment/environment-reports/environmental-report-2020-2021>

income through a revenue-sharing program to upcycle the captured carbon.¹⁰⁸ It has a unique partnership with Lush Cosmetics to not only help them capture carbon emissions, but to also recycle the carbon into the company's line of fizzy bath bombs.¹⁰⁹

C. MANITOBA (Winnipeg)

Regional Context

Due to its hydropower resources, Manitoba has a fairly clean electric grid along with some of the lowest rates for low-carbon, hydro-generated electricity in North America (**Table C.1**). Despite its assets, the pace of electrification in Manitoba has been slow compared to other hydro provinces and the province has yet to build a comprehensive provincial climate plan to accompany its announced strategy.¹¹⁰ As per the Canadian Climate Institute, Manitoba has been falling behind other provinces in aggressively pursuing growth in low-carbon electricity, batteries and storage, and clean fuels.¹¹¹ For example, the *Conservation and Climate Fund* is Manitoba's limited and only significant funding program for climate-focused technology companies, offering a total of \$1 million in 2021.

Table C.1: Electricity Grid and Energy Use

Region	<u>Electricity Generation by Fuel Type in 2018</u>	<u>Secondary Energy Use by Source in 2018</u> <u>Information and Cultural Industries (NAICS 51)</u>	<u>Secondary Energy Use by End Use in 2018</u> <u>Information and Cultural Industries (NAICS 51)</u>
Manitoba	97% Hydro	57% Electricity 40% Natural Gas	55% Space Heating 16% Lighting 13% Auxiliary Equipment

¹⁰⁸The technology is the size of two mid-sized refrigerators and can sequester 6-8 tonnes of carbon annually. Clean O2 currently sequesters its captured carbon into pearl ash and blends it into their soap and detergent products to enhance their performance. <https://www.cbc.ca/news/business/cleano2-cnrl-soap-carbinx-1.5265780>

¹⁰⁹<https://financialpost.com/commodities/energy/how-one-calgary-company-turns-co2-into-soap-with-its-micro-carbon-capture-technology>

¹¹⁰ In 2020, for example, only 0.5% of vehicles registered in Manitoba were electric vehicles, compared to 4.5% in Québec and 6.7% in B.C. ([Statistics Canada, 2022](#)). Manitoba also falls below the national average for heat pump adoption in buildings ([NRCAN 2022](#)).

¹¹¹ <https://climateinstitute.ca/wp-content/uploads/2022/05/MB-profile.pdf>

Production Landscape

In 2020/21, [Manitoba Film and Music](#) reported that 61 screen-based productions were shot with a total production volume of \$171.9 million. A production type breakdown of 2020/21 claims for the provincial Cost-of-Salaries and Cost-of-Production tax credits is noted in **Table C.2**.¹¹²

Table C.2: Production Type Breakdown, Manitoba

Type of Production	Number of Productions	Total Project Budgets
Feature Films	16	\$54.2M
TV Series/Miniseries	74	\$250M
One-Offs	19	\$6M
Other	19	\$46.3M

[Motion Picture and Video Production](#) Operating Expenses reported in 2019 for Manitoba was \$195 million. The [Motion Picture and Video Industries Employment](#) for the Winnipeg CMA was 1,210 in 2016.¹¹³

As of March 30, 2022, [IMDB](#)-listed productions shot in Winnipeg, with release dates in 2021 or later were estimated at 22 Feature Films and four TV Series, excluding mini-series.

Green Premium Insights

Manitoba Film and Music partnered with Reel Green to explore sustainable production shortly before COVID-19 shut down most filming operations. Despite COVID-19 shutdowns, interviewees suggested that interest in greening production in Manitoba has maintained positive through the activity of major stakeholders like Production Unions (IATSE, DGM, Cinematographer’s Guild), third party stakeholders like On Screen Manitoba and the National Screen Institute, and partners like Reel Green.

Manitoba has offered producers training and resources, and interest from producers and union members has been high. The major enablers are producer interest, stakeholder support, and current filming philosophies like location management. In filming, it is important to treat a location well, and sustainability

¹¹² Note that the total production volume of these claims is higher than estimated value of production in 2020/21 because eligible projects have 30 months to submit applications following the end of the taxation year in which principal photography began.

¹¹³ Including employed and unemployed workers, self-employed workers and employees, and full and part-time employment.

initiatives are considered to only improve on this point. This directly translates to better waste management, treatment of spaces occupied, and noise reduction through the use of e-generators.

From the government perspective, the major barriers faced in facilitating greening within Manitoba have been loss of momentum due to COVID-19 restrictions, and infrastructure challenges existing for more remote shooting locations. Per stakeholders, one of the best ways to enable green production in Manitoba would be to facilitate the wider availability of large e-generators, especially for remote locations (though paradoxically other stakeholders suggested these options were not applicable for remote locations). Nonetheless options that could help reduce carbon emissions on location and reduce noise and air pollution in the surrounding area would be of benefit. Although any measures that would make better use of Manitoba's green grid through enhanced electrification would offer benefit to a production's net environmental impact (e.g. through increased use of e-generators, EVs, etc.), producers expressed that the primary barriers existing to use of these technologies is their applicability in colder weather.¹¹⁴ Major enablers cited would include greater availability of grid-tie maps, which could be done *via* Manitoba Film & Music for example (and ideally with Manitoba Hydro, who is both the producer and distributor of Winnipeg's electricity and which authored an updated climate change technical report in 2020).¹¹⁵

(It is of interest to note that despite producers' professed interest in greener options, fleet vendors in Manitoba indicated that - although they are aware of EV options - the general lack of demand from regional producers has led to simply maintaining the *status quo* when it comes to the fleet profile.) Additional net benefits include switching to LEDs over time as per producer experience, on set generators burnt 40% less diesel fuel resulting from a deep switch to LEDs. Greater focus on material reuse, for example through raising awareness of existing material reuse programs through Talent Production Services, were felt to be areas of opportunity. In general producers felt an overall focus on educating and raising awareness would be of benefit - EMA's Green Seal program was cited as a good example of a simple yet motivating checklist that can precipitate crew participation and behaviour change.

Manitoba-based producers, like other producers interviewed, suggested that there will eventually be an expectation and mandate for significant change in the industry, as has unfolded for a multitude of other sectors. Getting ahead of these trends now would be prudent and ultimately helpful to the industry. Overall, more support is needed within Manitoba to continue to incentivise and facilitate green production, especially from an infrastructure and staffing perspective.

Greener Suppliers

¹¹⁴ Which may or may not be an issue and would benefit from verification, such as cold weather testing through entities such as PIT Group. FPInnovations' PIT Group offers cold weather and performance testing for a wide variety of transportation technology applications.

¹¹⁵ https://www.hydro.mb.ca/environment/pdf/climate_change_report_2020.pdf

Manitoba Film & Music points to the [Green Vendors](#) list by the U.S.-based Green Production Guide initiative as a resource for identifying local, environmentally responsible suppliers. Examples of suppliers with green practices and/or offerings are largely national; these include, for example:

- [William F. White International \('Whites'\)](#), a production services company with equipment rental offices in Vancouver, Calgary, Winnipeg, Toronto, Sudbury and Halifax, as well as studios in Vancouver, Calgary and Toronto. Whites has an extensive inventory of production equipment which includes battery powered generators, equipment, generators and vehicles approved for biodiesel and renewable diesel, and LED set lighting.
- [Hilton Hotels](#), which has achieved ISO 5001 Energy Management System Standard across all of its buildings and is used as an example on the Natural Resources Canada ISO 50001 Energy Management Systems Incentive program website. The Hilton has locations across Canada including Vancouver, Calgary, Edmonton, Winnipeg, Toronto, Montréal and Halifax.

Regional Incentives

Although the research did not indicate dedicated support for improving the environmental footprint of the film industry or producers, there are some incentives that could be leveraged by suppliers. As for other regions, the majority of incentives reviewed relate to building incentive opportunities. These examples are listed in **Appendix E** and describe potential support for studios through existing energy savings, clean energy and retrofit programs (with the exception of one waste focused program).

Notably all except one of the programs listed are designed and delivered by the funding agency Efficiency Manitoba, which represents a stakeholder of interest with respect to efforts in this area. In particular, Efficiency Manitoba's \$250K *Innovation Fund* provides support for pilot projects and partnerships to reduce common adoption barriers to emerging energy efficient technologies and strategies. The Fund's Market Capacity Stream is targeted to product distributors, trade allies, customer groups and market support services and seeks to reduce market barriers and improve understanding of energy efficiency technologies, which may be of interest to CMPA and its members.

Table C.3: Regional Incentives, Manitoba

Provider	Incentive
Studio Buildings	<ul style="list-style-type: none"> • Manitoba's Green Energy Equipment Tax Credit - Tax credits for property owners who install geothermal heat pump systems (7%-15% income tax credit, incl. corporate income), solar thermal energy systems (10%), biomass

fuel energy equipment (15%)

- [Small Business Program](#) - Free basic energy efficiency upgrades for small businesses and covers 70% of costs associated with the material and installation of other upgrades including LED linear lamps, specialty LED bulbs, LED exit signs, smart thermostats, lighting controls and pitched roof insulation.
- [Business Lighting Program](#) - Financial incentives businesses to purchase and install LED lamps, LED fixtures, LED backlit signs and lighting controls.
- [Building Envelope](#) - Financial incentives for commercial, industrial, agricultural or multi-unit residential buildings toward energy-efficient upgrades including roof and wall insulation, windows and doors, and curtain wall systems. Roof and wall incentives cover up to 100% of the cost of insulation materials. Window incentives cover up to 100% of the incremental cost of the window replacement. Door incentives cover up to 100% of the incremental cost of the glazing.
- [Heat Pump Program](#) - Incentives to upgrade an existing heating system to a ground source heat pump. The incentive is the lesser of 1) \$2.50 per square foot heated by the GSHP system, 2) \$120 per MBH of installed heating capacity, or 3) \$120 per MBH of the building's eligible base transmission and infiltration heating load.
- [Enhanced Building Operations](#) - Incentives for achieving energy efficiency by optimizing daily operations of large commercial and institutional buildings.
- [Variable Flow Pump and Fan Systems](#) - Rebates for variable flow pump and fan systems with commercial or agricultural HVAC application. For variable frequency drives used with inverter duty induction motors, the rebates are: \$50 per horsepower for fans up to 100 horsepower and \$70 per horsepower for pumps of to100 horsepower. For variable speed permanent magnet motors, the rebates are: \$70 per horsepower for fans up to 100 horsepower and \$100 per horsepower for pumps up to 100 horsepower.
- [Custom Energy Solutions](#) - Incentives for custom energy efficiency studies and projects for industrial, commercial or agricultural facilities. Feasibility study incentives of 50% of the cost of a system upgrade feasibility study, up to \$20,000. Performance-based incentives of \$0.15Kwh and \$.30m3 of annual energy saved up to \$250,000 per project per fuel type with incentives capped at 50% of the incremental project cost or the amount needed to reduce the payback period on the incremental cost to one year.
- [Innovation Fund](#) - Funding for pilot projects and partnerships to reduce

	<p>common adoption barriers to emerging energy efficient technologies and strategies. Up to 75% of project cost to a maximum of \$250,000. The Market Capacity Stream of funding is for product distributors, trade allies, customer groups and market support services to reduce market barriers and improve understanding of energy efficiency technologies</p> <ul style="list-style-type: none"> ● Waste Reduction and Recycling Support - In 2021/2022, this grant program provided \$8.7 million to municipalities and organizations. The program is currently being reviewed to modernize programming and set stronger targets for waste diversion and prevention practices in Manitoba (delivered by Manitoba Environment, Climate Change and Parks).
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Cleantech Companies of Interest

Select companies of interest in Manitoba include hydrogen applications, and notably some EV developments particularly in the heavy duty vehicle space, such as:

- **Charbone**, a Montreal-based renewable energy and electrochemical company that has signed a *Memorandum of Understanding* with the City of Selkirk to build Manitoba’s first green hydrogen facility.¹¹⁶
- **Gardewine**, which is a Manitoba-based trucking company that recently launched the first electric truck in the province and plans to add electric vehicles such as forklifts and parcel delivery trucks.
- **New Flyer**, a longstanding major manufacturer of public transit buses and motor coaches, which is scaling up production of electric-and hydrogen-powered vehicles and can now manufacture zero-emissions buses at all of its North American facilities.¹¹⁷

D. ONTARIO (Toronto)

Regional Context

In recent years Ontario has made great strides in reducing emissions from its electric grid, based largely on phasing out coal-fired electricity. Ontario’s last coal-fired generation plant, the 950 MW Lambton Generating Station, was decommissioned on February 12, 2022. The prior *Green Energy Act* and associated *Feed In Tariff* led to growth of renewables in the province, however policy reversals associated with the current administration and the expected use of natural gas to make up the 3,500 MW in anticipated peak demand shortfall have significant implications for the ultimate emissions profile of the

¹¹⁶ <https://climateinstitute.ca/we-assessglobal-net-zero-transition-where-does-manitoba-rank/>

¹¹⁷ <https://climateinstitute.ca/wp-content/uploads/2022/05/MB-profile.pdf>

electric grid.¹¹⁸ Although the current administration has made some recent and large investments in steel decarbonization (\$500 million to the \$1.7B ArcelorMittal Dofasco plant in Hamilton) and to bolster EV manufacturing (collectively \$6B with GM, Ford, Fiat and Unifor), the opportunity and need for net zero grid emissions has yet to be fully realized.¹¹⁹

Table D.1: Electricity Grid and Energy Use

Region	Electricity Generation by Fuel Type in 2018	Secondary Energy Use by Source in 2018 Information and Cultural Industries (NAICS 51)	Secondary Energy Use by End Use in 2018 Information and Cultural Industries (NAICS 51)
Ontario	60% Nuclear 26% Hydro	57% Natural Gas 40% Electricity	57% Space Heating 14% Lighting 11% Auxiliary Equipment

Production Landscape

Toronto has long offered an attractive alternative to New York as a shooting location due to its geographic proximity, tax incentives and growing pool of film studios. Foreign production has grown by 18% per year between 2014 and 2019, and Toronto is an important cultural player with the Toronto International Film Festival (TIFF).¹²⁰

In 2021, [Ontario Creates](#) reported 394 productions bringing in \$2.88B in production spending: feature films accounted for 10% of this spending (72 productions) and TV series for 79% (192 productions). [Motion Picture and Video Production](#) Operating Expenses reported for 2019 in Ontario were \$2,936.7 million.

In 2021, the City of Toronto's [Economic Development and Culture](#) division reported over \$2.5B for production spending across 1,468 productions in 2021 (including commercials which are excluded from the Ontario figures above), with \$236 million on feature films and \$1.2B on TV series. The 2016 [Motion Picture and Video Industries Employment](#) for the Toronto CMA was 23,285.¹²¹

¹¹⁸ In 2018, Ontario ended the policy of guaranteed rates for new renewable electricity capacity under the *Feed In Tariff* (FIT) policy, including the cancellation of ~758 related renewable energy contracts

¹¹⁹ <https://www.theglobeandmail.com/business/commentary/article-doug-fords-victory-is-a-setback-for-canadian-climate-policy-its-also/>

¹²⁰ http://www.qftc.ca/uploads/files/PDF/finalversion_qftc_impactassessment_increasing_infrastructurecapacity_rcgt_en.pdf

¹²¹ including employed and unemployed workers, self-employed workers and employees, and full and part-time employment.

[IMDB](#)-listed productions shot in Toronto, with release dates in 2021 or later (as of March 30, 2022) included 201 features and 65 TV series (excluding mini-series).

Green Premium Insights

Per interviews, there has been renewed major interest and support for greening production in Ontario, in part due to and also the reason for the creation of Ontario Green Screen. Ontario Green Screen launched in 2020, just over a decade from when green production was first raised as a topic of interest in Ontario, based on the original efforts of Green Screen Toronto in 2008.¹²²

Stakeholders suggested there tends to be more focus on waste diversion and circularity in Ontario than for other regions, though for waste vendors, the lack of infrastructure poses a significant challenge. This includes but is not limited to the lack of processing facilities for organics. The only facility is in Belleville which is two hours outside of the GTA. Different waste regulations between the municipalities also makes it difficult to transport/ process waste, which is further compromised by nascent and largely undeveloped waste pick up services for locations. The general lack of recycling infrastructure/services in Ontario complicates progress and action intended for this area, and moreover, the transition times between productions is too short to properly deal with leftover set materials.

On the positive side, the producer experience in Ontario has been that vendors that sort waste and provide diversion reports have a slight premium, but producers have not experienced a visible premium for compostable serveware over plastic serveware.

Other barriers experienced by stakeholders consulted include that:

- Not enough EVs and electric generators in stock for filming in Toronto, and limited to no hybrid van options.
- The electric generators that are available are not powerful enough yet, and gaffers worry about power availability on set. In general there are a number of television series that are shot in Toronto, which means that shooting locations are also occupied for a longer period of time.¹²³
- There is an extra cost for additional labor and service associated with sustainability (i.e. waste sorting, Eco PA labor).
- An overarching comment and one common to all regions is that many studios do not encourage, build or account for sustainability costs in their budgets.

¹²² At the time the Green Screen Toronto initiative resulted in an industry level environmental audit, best practices guide and cost savings, and certification framework, activity that occurred more than a decade before other jurisdictions.

¹²³ http://www.qftc.ca/uploads/files/PDF/finalversion_qftc_impactassessment_increasing_infrastructurecapacity_rcgt_en.pdf

Enablers experienced include:

- Power tie-ins, which can save money vs. generator use. One of the major programs Ontario Green Screen has launched is the Grid Tie-in map. Productions can use this map to submit basecamp requests and tie in to nearby buildings within Ontario, and the buildings then decide what to charge the production (generally based on energy use).¹²⁴ This program eliminates the cost of generators and diesel gas for the generators.
- Industry communication and more time to properly dispose of materials at wrap (i.e. a show wrapping communicating with a show starting for material recovery).
- Studio support for including sustainability in the budget (i.e. Netflix encourages adding sustainability coordinators to shows) and budgeting early in the process.
- Fuel savings experienced when EVs and hybrids are available.

In general Ontario-based producers recommended that the following actions would help foster and deepen greening efforts:

- Considering sustainability in the early financing stages and baking these costs into the budget.
- Deciding on parameters and sticking to them (i.e. only hiring local cast, only using LED, only using EVs).
- Mandating sustainability as necessary (similar to the approach taken to COVID protocols).

Notably, Ontario Green Screen (OGS) has developed a two-year strategic plan for greening productions within Ontario, and the next strategic plan will start in April 2023. A key area of focus for OGS will be education and resources, which will likely include effort and support around:

1. Creating a pathway to connect the interest in sustainable production with the tools and vendors to actually green a production;
2. Hiring Environmental Stewards for every big production; and,
3. Demystifying the cost of green production and increasing budget awareness for productions.

Another incoming OGS project is the *Partners in Project Green* program, which connects productions in order to increase material reuse for flats and art builds. This program is anticipated to decrease the cost of construction builds and decrease production waste.

Greener Suppliers

[Ontario Creates](#) provides the [Ontario Production Guide](#), which allows users to search companies that offer green services. It also references Green Production Guide's [Green Vendors](#) list as a source of information for environmentally responsible suppliers. Examples of regional suppliers with green practices and/or offerings include:

¹²⁴ Ontario Green Screen is working towards pricing model suggestions

- [Phase 3 AV](#), a production company that also rents audio visual equipment, including Portable Electric's VOLTstack generators.
- [Herc Rentals](#), a rental equipment and vehicle provider for many industries, including film and television production. The company offers portable battery-powered generators.
- [Mimico Foods](#), which is a catering company that serves the film industry, among other industries. Per the Ontario Production Guide, Mimico uses clean diesel powered vehicles, provides organic, sustainable and renewable products and biodegradable packaging, and offers a water bottle free option.
- [Emterra](#) provides waste and recycling services using compressed natural gas-fueled trucks. It also offers waste stream audits for businesses to divert recyclable and organic materials away from landfills.

Notably, Ontario Green Screen has also partnered with the University of Toronto Climate Science Masters Program to conduct a survey of how to classify green vendors within Ontario (not yet publicly available).

Regional Incentives

In Ontario, there are a variety of incentives that could be leveraged by individuals and companies working in or supplying the industry, despite not being specifically targeted at film and television production. The majority of incentives reviewed relate to building incentive opportunities, although opportunities also exist for vehicle scrappage, EV infrastructure and EV purchase, as well as for water savings. Support is provided largely through the provincial and municipal governments. Salient examples are listed in **Table D.2**. Organizations of interest and salience as potential future regional partners include Plug N'Drive (particularly on EV related infrastructure), the existing electric and natural gas utilities (Toronto Hydro and Enbridge Gas), and the City of Toronto.

Table D.2: Regional Context, Ontario

Provider	Incentive
Transport	
Plug N' Drive	Used Electric Vehicle Incentive - \$1,000 toward the purchase of a used fully electric car.
Plug N' Drive	Scrappage Incentive - \$1,000 to recycle a gas car when purchasing an electric

	car. This incentive can be stacked with the <i>Used EV Vehicle Incentive</i> .
Studio Buildings	
Ontario's Independent Energy Systems Operator	Retrofit program - Pay-for-performance for three years, for projects approved by Dec 31, 2024. Rate of \$0.04/kWh savings plus \$50/kW for peak demand over the summer months. Building owners and lessees can apply.
Ontario's Independent Energy Systems Operator	Small Business Lighting Program - Up to \$2,000 in incentives towards energy-efficient lighting upgrades for businesses with 50 or fewer employees on site at any time.
Ontario's Independent Energy Systems Operator	Energy Performance Program - Three years of annual pay-for-performance for large single-site facilities or multi-site facilities (minimum annual consumption of 1,500,000 kWh). Participants receive \$0.04/kWh of energy saved, with a maximum of 20% of the facility's baseline energy use. Participants can also receive \$50/kW for summer peak demand savings, capped 20% of the facility's baseline summer peak demand.
Enbridge	Commercial Retrofit - One-time incentive of \$0.10 per m3 of natural gas saved up, with up to \$100,000 on the implementation of energy-saving measures.
Enbridge	Equipment Upgrade Incentives - Fixed incentives for upgrading boilers, condensing make-up air units, air curtains and dock door seals, destratification fans, demand control kitchen ventilation, demand control ventilation, heat and energy recovery ventilators, and ozone laundry systems.
Enbridge	Steam Trap Audit Incentive - The lesser of \$10 per trap audited or 50% of the eligible audit costs up to \$5,000 (steam traps are found in steam-based heating systems. They reduce heat energy loss by preventing steam from escaping). ¹²⁵
City of Toronto	Capacity Buyback Program - Up to \$.30/litre of water saved per day for implementing permanent water savings measures. Industrial, commercial and institutional buildings are eligible.
City of Toronto	Sewer Surcharge Rebate Program - Rebate on water that is used on-site for industrial or commercial processes. Minimum water savings are determined based

¹²⁵ This program is listed under 'Commercial Custom Audits & Studies,' and doesn't explicitly say whether this program is equally applicable to commercial and industrial buildings. Initial evaluation indicates these types of audits/surveys can be useful for energy conservation in large commercial buildings, including possibly studios.

	on total water usage. Businesses using less than 1500m ³ per year must demonstrate a minimum of 20% of water diverted.
City of Toronto	Energy Retrofit Loans - Low interest loans (providing up to 100% of project costs at the city's cost of borrowing) for Toronto building owners to improve the energy efficiency of their buildings. Eligible buildings include commercial, retail and industrial buildings, among others.
City of Toronto	Eco-Roof Incentive Program - \$100 per m ² of green roof installed on Toronto buildings and up to \$1,000 for a structural assessment. This equates to \$5 per m ² for a cool roof with a new membrane and \$2 per m ² for a cool roof coating over an existing roof. Eco roofs include green roofs and cool roofs, where green roofs are vegetated roofs and cool roofs are designed to reflect the sun's rays. Existing residential, industrial, commercial & institutional buildings are eligible.

Cleantech Companies

Toronto is one of Canada's most active innovation hubs in part due to a longstanding history with telecom, the presence of various academic and research centres, and access to the largest financial market in the country. The province has the greatest number of clean technology companies in Canada; these technologies span a multitude of impact areas and include relevant offerings to industry such as those by Extract Energy, ReDeTec, ALTEX and Genecis.

Extract Energy has developed a novel approach to generate clean electricity. It uses its parent company's (Smarter Alloys) proprietary shape memory alloy technology to uniquely capture and convert low-grade waste heat into electricity.¹²⁶ This is valuable given it is estimated up to 65% of the world's energy consumption is lost in the form of low-grade waste heat (e.g., heat that comes off of appliances, such as laptops and refrigerators) with few ways to reuse it.¹²⁷ Data centres are a particularly compelling application of this type of technology given the amount of waste heat that they expel, and given they also require a significant amount of energy to keep servers cooled. Notably, Extract Energy has partnered with Calgary-based venture, Denvr Dataworks (previously mentioned) to uniquely address this problem and further reduce emissions. The waste heat expelled from Denvr Dataworks' data centres power Extract

¹²⁶ The SMA is a unique blend of alloys, including nickel and titanium, which can bend and return to its original shape when heated. Extract Energy uses laser pulses to program the expansion and contraction of springs of these SMAs, which can then be used to convert waste heat into kinetic energy to power a heat engine or generator. <https://www.washingtonpost.com/technology/2021/11/06/cop26-innovations-climate-action/>

¹²⁷ <https://www.thestar.com/business/mars/2021/10/12/getting-to-net-zero-how-cambridge-company-extract-energy-pioneered-a-way-to-transform-waste-heat-into-clean-electricity.html>

Energy's heat engine, while the electricity generated from the heat engine is then used as a clean energy source for the data centres.¹²⁸

The film industry is increasingly using 3D technology to design and/or create costumes, props, and sets, including stop-motion films and big Hollywood blockbusters like Iron Man's suit, Thor's hammer, or dinosaur skulls in Jurassic World.¹²⁹ Based out of Toronto, **ReDeTec** has developed a filament extruder, ProtoCycler+, that recycles plastics into 3D printer filament.¹³⁰ The system can recycle many types of plastics, including PLA, ABS, PETG, HIPS, Nylon 12, and others. The ProtoCycler+ enables a closed-loop system and can reduce material costs of 3D printing by up to 80%, making 3D printing more sustainable and affordable.¹³¹ ¹³² The company has worked with industry leaders such as Airbus, Boeing, Ford, and Nike.

ALT TEX, which stands for alternative textile technology, is a sustainable fashion and biotech start-up based in Toronto which has developed a replacement for polyester fibres using food waste.¹³³ This is of interest due to the use of clothing by the industry, given that a typical production has been estimated to use more clothing than the average person uses in their lifetime, and will produce more waste in a week than the average household in a year.¹³⁴ ALT TEX's system allows food waste to go through a chemical process to create a biofibre which can plug into the existing supply chain to then create woven and non-woven textiles. By recycling food waste, ALT TEX is able to address two significant environmental issues with one product.¹³⁵ Recognizing that producing a sustainable end product is not sufficient, the company takes a life cycle approach by taking into consideration the product's inputs and processing through to how it performs and biodegrades at the end of its life.¹³⁶

Genecis Bioindustries (Genecis) is a Toronto-based company that programs bacteria to convert food waste into polyhydroxyalkanoates (PHAs), a high-quality bioplastic. Manufacturers are then able to use this bioplastic to create a variety of products, including single-use cutlery and foodware, packaging, and

¹²⁸<https://www.thestar.com/business/mars/2021/10/12/getting-to-net-zero-how-cambridge-company-extract-energy-pioneered-a-way-to-transform-waste-heat-into-clean-electricity.html>

¹²⁹<https://www.3dnatives.com/en/top-applications-3d-printing-movie-industry-090720214/#!>

¹³⁰The ProtoCycler+ is a desktop extruder that can ground plastic waste material into pellets and turn pellets into filament by pressurizing and melting the pellets. Its patented technology is 3x more efficient than competitors, produces better quality filament, and their comprehensive software can help with creating new plastics.<https://startuppheretoronto.com/toronto/redetecs-protocycler-makes-3d-printers-sustainable/>

¹³¹<https://redetec.com>

¹³²<https://betakit.com/redetec-wants-to-make-the-3d-printing-process-less-wasteful/>

¹³³<https://thealttex.com/>

¹³⁴<https://wearealbert.org/production-handbook/in-your-role/costume/#:~:text=The%20costume%20industry%20is%20inherently,average%20household%20in%20a%20year.>

¹³⁵<https://betakit.com/alt-tex-closes-1-5-million-pre-seed-round-to-commercialize-sustainable-polyester-alternative/>

¹³⁶<https://globalnews.ca/video/7477536/toronto-startup-aims-to-turn-food-waste-into-clothing/>

textiles.¹³⁷ Comparable in quality to petroleum plastics, products that use Genecis' plastics can be composted within a month at end of life, and can degrade within a year if the product ends up in the ocean.

E. QUEBEC (Montréal)

Regional Context

Québec, along with British Columbia, currently leads the country in planning for and generating new opportunities in support of a net-zero transition. In both of these provinces, a long-standing, predictable carbon price and long-term targets for local uptake of zero-emission vehicles and low-carbon building technologies, have been helping to de-risk innovation and attract investment.¹³⁸ Due to its hydropower resources, Québec currently has among the most abundant and cheapest low-carbon electricity in Canada (**Table E.1**). This systemic asset offers emissions- and electricity-intensive industries a multitude of cost-effective opportunities to decarbonize. The province also benefits from a strong clean technology sector with strengths in biofuels, waste/recycling, electric mobility and off road/heavy duty vehicles. The structuring presence of Hydro-Quebec has also led to a significant amount of innovation in the energy sector.¹³⁹

In 2020, the province announced its goal to reach carbon neutrality by 2050. *The 2030 Climate Plan for a Green Economy* places continued focus on the electrification of buildings, transportation and industrial activities as well as the expansion of renewable energy sources, including bioenergy, green hydrogen and renewable natural gas.¹⁴⁰ The Québec government has also signaled its intention to invest up to \$1.4B to set up an electrification industry centering on the lithium battery industry and has banned the sale of new gasoline-powered cars by 2035. Notably, the formation of industry association Propulsion Québec in 2017 seeks to position Québec “among the world leaders in developing and implementing smart and electric modes of ground transportation”.

¹³⁷ <https://www.theglobeandmail.com/business/article-cleantech-startup-programs-bacteria-to-turn-table-waste-into>

¹³⁸ <https://climateinstitute.ca/wp-content/uploads/2022/05/QC-profile.pdf>

¹³⁹ Relaunch Montréal Initiative (2021): Enhanced Action Plan to Strengthen the Cleantech Sector. Co-developed by the Chamber of Commerce of Metropolitan Montréal and Écotech Québec, with content partner KPMG.

¹⁴⁰ \$6.2 billion has been set aside for the implementation of the electrification and climate change framework policy by March 2026. 69% of this amount will be for the transportation sector. For 2020-2021 the plan includes:

- \$220 million for the Drive Green program (subsidies for EVs and charging stations)
- \$183.2 million for the EcoPerformance program (subsidies for conversion and energy efficiency projects)
- \$129.4 million for public transit
- \$30.2 million for the Residual Forest Biomass program

Table E.1: Electricity Grid and Energy Use

Region	Electricity Generation by Fuel Type in 2018	Secondary Energy Use by Source in 2018 Information and Cultural Industries (NAICS 51)	Secondary Energy Use by End Use in 2018 Information and Cultural Industries (NAICS 51)
Québec	95% Hydro	56% Electricity 36% Natural Gas	48% Space Heating 20% Auxiliary Equipment 16% Lighting

Production Landscape

The [Québec Film and Television Council](#) reported almost \$2.5 billion in direct spending in Québec’s audiovisual industry in 2021. This includes \$1.07 billion in domestic productions (51% of volume),¹⁴¹ \$470 million in foreign productions and \$951 million in visual effects and animation. Spending on foreign production included eight foreign TV series and 13 foreign films. The 2019/20 audiovisual industry report from the [government of Québec](#) reported that productions in Montréal and Laval accounted for 80% of the province’s production value in that year.

In 2019, [Motion Picture and Video Production](#) Operating Expenses for Québec totalled \$1,889.5 million and in 2016, [Motion Picture and Video Industries Employment](#) for the Montréal CMA included 14,365 including employed and unemployed workers, self-employed workers and employees, and full and part-time employment. [IMDB](#)-listed productions shot in Montréal, with release dates in 2021 or later (as of March 30, 2022) included 117 Feature Films; 47 TV Series (excluding mini-series).

Green Premium Insights

Per interviewees, Québec at large is making an effort to be more sustainable as a province, and many programs are collaborating to enable such outcomes. For example, there is the Québec *Council of Eco Sustainable Events* that works with Rolling Green as part of a City-wide strategy. Québec Film & TV Council has launched its own sustainable film program, *Rolling Green*, in order to increase sustainability within the motion picture industry in Québec. This program provides tools and guides for producers interested in sustainable production, as well as certifications for green productions (so far, there are no financial incentives for certifying a production, only positive reinforcement, but producers are still taking the initiative to certify their productions).

¹⁴¹ http://www.qftc.ca/uploads/files/PDF/finalversion_qftc_impactassessment_increasing_infrastructurecapacity_rcgt_en.pdf

Per stakeholders, Quebec represents a great example of a collaboration between the associations and regional producers, including the launch of greening programs followed by an industry calculator. Budgets, due to smaller crews and smaller sets, tend to be lower which also affect the purchase and use of new materials (approximately 1/3 of equivalent English language production budgets). This also trickles down to impact the shoot approach, including shorter days.

According to interviewees, the primary barriers for regional vendors in providing green services is the cost, availability, and power limitations of electric vehicles and electric generators. For smaller productions, the initial cost of EVs and e-generators is considered too high to factor into their budget. This issue is heightened by concerns of the ability for electric generators to fully power their sets. In Montreal specifically, stakeholders indicated the ongoing concern about the cost for greening and the nature of smaller productions in the area, which combine to limit the amount of capacity that can be dedicated to the sustainability area.

Stakeholders suggested they would like to see Québec invest in more electric charging stations and see productions fully electrify their fleets, more support for sets be recycled and reused, as well as tax credits for productions that implement sustainable initiatives. Further education on how to implement sustainability without increasing the budget, and tax incentives for certifying a production will help capitalize on the moment and push more productions to go green.

Interviewees suggested that, in order to enable and promote green initiatives on set and the use of green vendors by productions, cross collaboration and communication is key. Partnerships between studios providing productions with green services and greener vendors, can increase interest in green initiatives on set. For example, stakeholders suggested studio vendors could partner with waste haulers focused on waste diversion as an included offer to productions when they rent the studio. This could similarly be applied with e-generator rentals, and material rentals (i.e. providing reused props, wardrobe for rent) for productions.

Greener Suppliers

The Rolling Green Toolkit provides a sourcebook of green vendors within Quebec, and has been a useful tool for smaller productions that do not already have defined sustainability programs. This toolkit has been noted as simple to use without a defined sustainability budget, and points productions towards vendors that can save them money through programs such as material reuse (i.e. “thrifting” for materials like props and wardrobe pieces).

Examples of suppliers with green practices and/or offerings include:

- [Mels](#) is a film studio and equipment provider with multiple facilities in Montréal. It sources eco-friendly paper, and includes environmental conditions in procurement. It has also installed EV charging stations at two of its studios, has acquired two portable electric generators, eliminated bottled water in its offices and is planting 200 trees at two of its studios.
- [GreenCube](#) by Audace Technologies is a suite of battery-powered generators for remote and connected locations and that can be charged using wind and solar power. The company is located in Rimouski.
- [Lekla](#) offers mobile solar powered generators. The company is located in Magog.
- [Courant Plus](#) is a delivery service that uses a fleet of electric vehicles, including trucks.
- [Taxelco/Téo Taxi](#) is a Montréal-based taxi service for electric taxis. Users can order their taxi using the Téo App.
- [Louélec](#) is an electric car rental company that provides short-medium term rentals for business (for three months, six months, or 12 months).
- [Alex & Milène](#) is a catering company that uses reusable or compostable dishes and cutlery, and also provides a composting bin that they pick up.
- [Croogloo](#) is a production management application that includes green content such as a carbon calculator, a green vendor list, an inventory of green practices in production, information on tax credits to promote environmental sustainability that can be leveraged in production.

Regional Incentives

In Québec, there are a variety of incentives that could be leveraged by individuals and companies working in or supplying the industry. The majority of incentives reviewed relate to building incentive opportunities, although opportunities also exist for EV infrastructure and EV purchase. Support is provided largely through the provincial and municipal governments. Salient examples are listed in **Table E.2**; notably these incentives are provided by a wide variety of stakeholders, from the province, the utility and the municipality, among other groups.

Table E.2: Regional Incentives, Ontario

Provider	Incentive
Transport Fleets	
Ministry of Energy and Natural	New vehicle rebate of up to \$8,000 for individuals, businesses, organizations and municipalities on the purchase or lease of all-electric, plug-in hybrid and

Resources, Québec	hydrogen-powered vehicles, as well as electric motorcycles. As of July 2022, the maximum rebate for all-electric vehicles will drop to \$7,000 and plug-in hybrid electric vehicles will be eligible for a maximum of \$5,000.
Ministry of Energy and Natural Resources, Québec	Used vehicle rebate \$3,500 rebated for a used all-electric vehicle. Individuals, businesses, organizations and municipalities are eligible.
Ministry of Energy and Natural Resources, Québec	Charging station at work refund for EV charging stations for businesses, municipalities and organizations. Up to 50% of eligible expenses up to \$5,000 per station. If the charging station is being rented, the incentive covers \$500 per station and 50% of eligible installation fees, and the total cannot exceed \$5,000.
Ministry of Energy and Natural Resources, Québec	Direct current fast charging station program for operators of light or heavy-duty road vehicle fleets. Financing of up to 50% of eligible expenses with a maximum of \$15,000 for stations between 20 and 49.9kW and up to \$60,000 for stations of 50+ kW.
City of Montréal	The City offers reduced residents-only parking permits rates for hybrid and electric vehicles.
Studio Buildings	
Ministry of Energy and Natural Resources, Québec	ÉcoPerformance - 75% of eligible expenses up to \$100,000 for businesses, institutions and municipalities reducing greenhouse gas emissions.
Hydro-Québec	Efficient Solutions Program - Up to 75% of eligible costs for energy savings investments for institutional, commercial or industrial buildings.
Hydro-Québec	Technology and Business Demonstration - Up to 75% of eligible costs with a maximum of \$500,000 for customers who want to test the technical or commercial viability of innovative energy-saving or power demand optimization measures
Énergir	Several grants for business adopting energy efficient solutions, including: hot water condensing boilers, infrared heating, smart thermostats, solar air preheating systems, efficient natural gas unit heaters and efficient natural gas water heaters. Énergir also offers grants for more customized activities that improve energy efficiency, including: recommissioning existing mechanical systems, adopting

	technologies that leverage innovations in natural gas efficiency, conducting feasibility studies and undertaking renovations to improve efficiency.
Société de financement et d'accompagnement en performance énergétique (SOFIAC)	Financing model to support energy efficiency and GHG emissions reduction for Québec businesses, to 'eliminate all barriers linked to the implementation of feasible energy efficiency projects.'
City of Montréal	Sustainable Industrial Buildings Subsidy - Subsidy equivalent to the increase in property tax for a business that carries out construction or renovation work while adhering to sustainable development principles. Buildings must obtain one of the following green building standards: LEED, Living Building Challenge, BREEAM, HQE, Passive House, Zero Carbon Building, BOMA BEST (not sufficient for new builds), or meet the building code requirements for wood-frame structures. The annual incentive cap is \$100,000. 'Film, video and recording production' is on the list of targeted economic activities for this incentive.
Waste & Circularity	
City of Montréal	Montréal's Zero Waste strategy indicates an intention to introduce incentives for waste reduction. Programs do not appear to be in place yet.

Cleantech Companies

Based in Montréal, **BrainBox AI** leverages artificial intelligence (AI) to make buildings smarter and greener. The company uses wireless sensors and its advanced AI platform to collect data and control commercial heating, ventilation, and air conditioning (HVAC) systems in real-time. It takes historical HVAC data, building occupancy, and seasonal and room temperatures to power its algorithm to predict and operate HVAC controls in the most efficient way.¹⁴² As a lower cost retrofit solution, current clients report a savings of 25-29% on their energy bill using BrainBox AI.¹⁴³ Results also show that buildings

¹⁴²<https://www.thestar.com/business/mars/2021/10/05/getting-to-net-zero-how-montreal-tech-company-brainbox-ai-radically-reduces-energy-usage-in-buildings.html>

¹⁴³<https://www.theglobeandmail.com/business/technology/article-how-this-montreal-based-ai-company-is-making-buildings-run-better>

decrease their carbon footprint by 20-40%, increase occupant comfort by 60%, and operators see up to 50% extension of the equipment's service life.¹⁴⁴

Québec also has some of Canada's leading low-carbon transportation companies that are attracting significant investment. Some of the most notable include **Lion Electric**, an electric bus and truck manufacturer; **Taiga Motors**, an electric off-road vehicle manufacturer, and **AddÉnergie Technologies**, an operator of electric vehicle charging networks, raised US\$32M in 2021 in late-stage growth capital.

Notably Shell and Suncor are major investors in **Enerkem's** \$875M biofuels facility in Varennes, which is being constructed to transform waste and wood waste into low-carbon fuels.

F. NOVA SCOTIA (Halifax)

Regional Context

Of the Atlantic provinces, Nova Scotia is one of the most progressive in terms of moving forward on net zero goals and opportunities and is home to the most clean technology companies in the region.¹⁴⁵ The Government of Nova Scotia announced \$550 million in renewable energy procurement to achieve an 80% renewable energy standard by 2030, which will reduce GHG emissions by more than one million tonnes per year.¹⁴⁶ In mid-2022, this is to be followed by an updated *Green Choice* program for large loads (up to 250MW) through government procurement of wind and solar.¹⁴⁷

Innovation on the municipal level, as well as clean technology trends and developments all signify the province's interest and appetite for the net zero transition. Notably there are also a number of battery companies are focused on the region (i.e. Tesla research lab in Dartmouth); homegrown cleantech include Stash Energy (heat pump storage), Salient Energy (zinc batteries) and Novonix (battery testing).¹⁴⁸

The region and province is still compromised however by the high proportion of coal fired power on the electric grid (**Table F.1**). Although there is interest in development of a larger inter-regional transmission

¹⁴⁴ By being able to predict desired room temperatures up to six hours in advance with 99% accuracy, buildings can avoid wasted energy, enabling more efficient operations.

¹⁴⁵ The Atlantic Region has 55 companies active and attracting investment in several transition-opportunity areas. Nearly two thirds of these companies are located in Nova Scotia. <https://climateinstitute.ca/wp-content/uploads/2022/05/Atlantic-profile.pdf>

¹⁴⁶ Bergman, F., M. Cassidy, D. Moore (2021). "Accelerating Clean Technology Adoption in Atlantic Canada" APEC Research Report, on behalf of econext.

¹⁴⁷ See: <https://novascotiagcp.com/>

¹⁴⁸ Felder, M. With support from S. Adiga, S. Poirier, S Deery. *Global Affairs Canada Cleantech Training (2021)* Delivered to the International Trade Commissioner Service, on behalf of MaRS Discovery.

grid (the Atlantic Loop and the Atlantic Link) to reduce grid emissions, these major infrastructure projects will be years in the making.

Table F.1: Electricity Grid and Energy Use

Region	Electricity Generation by Fuel Type in 2018	Secondary Energy Use by Source in 2018 Information and Cultural Industries (NAICS 51)	Secondary Energy Use by End Use in 2018 Information and Cultural Industries (NAICS 51)
Nova Scotia	63% Coal and Coke 12% Wind	71% Electricity 18% Natural Gas	42% Space Heating 18% Lighting 18% Auxiliary Equipment

Production Landscape

The [Government of Nova Scotia](#) reported that Nova Scotia’s film industry contributed nearly \$181 million to the province’s economy in 2021-22, and in 2019, [Motion Picture and Video Production](#) Operating Expenses reported for Nova Scotia were \$103.4 million.

As per the [Motion Picture and Video Industries Employment](#), in 2016 the Halifax CMA employed 1,260 employed and unemployed workers, self-employed workers and employees, and full and part-time employment. As of March 30, 2022, [IMDB](#)-listed productions shot in Halifax, with release dates in 2021 or later included nine features and four TV series (excluding mini-series).

Green Premium Insights

As per interviewees, sustainable production is of interest in Nova Scotia and has been implemented through actions such as CSP Training programs for producers and crew; a CBC pilot program focusing on greening the art department from sourcing to reusing or donating; and smaller, domestic productions working to be sustainable without a full strategy or program. Screen Nova Scotia has also signaled it would like to take on a leadership role in rolling out green strategy within the motion picture industry. The entity joined the National Reel Green Committee a year ago and is working towards an agreement to co-license tools.

Stakeholders consulted indicated that, similar to Alberta and Manitoba, Nova Scotia is a bit more behind by nature of being a smaller jurisdiction, with less access and availability of greener vendor options. For example, the province canceled its tax credit and opted to reduce its investment (although signals indicated the government may revisit this decision and further develop the industry as an economic

sector). Notably, in early 2022, the Government of Nova Scotia announced an [\\$8 million investment to build a Sound Stage](#) to support Nova Scotia's film industry. The planned facility will be 50,000 square feet and will be located in the Halifax Regional Municipality.

Examples of sustainability success in Halifax included a producer's ability to work with NS Power to tie into the grid while filming in remote locations. In this particular instance, the choice was made for practical reasons, however the cost savings experienced, along with the sustainability aspect were both extra enablers. Additionally, the integration of waste circularity in the Halifax community helped facilitate the productions' waste sorting initiatives.

The primary barrier holding Nova Scotia back from deepening industry sustainability is capacity. The industry is still just starting to regrow in the province, which means they will need support from the CMPA and industry stakeholders to help develop sustainability strategies on a wider scale. Stakeholders suggested that a combination of education, expansion, and overall support will be needed to develop and push for the infrastructure needed to create a sustainable motion picture industry in Nova Scotia.

According to stakeholders, a key first step is to establish a strategy for pushing for sustainable production, ideally based upon existing strategies, and identify the top priorities for moving forward. A grid power access map for Halifax would also enable additional success stories for productions using the grid instead of generators to power their sets. From there, infrastructure can be further built out, information can be shared with producers on how to green their productions, and targeted incentives can be developed.

Greener Suppliers

[Film Nova Scotia](#) provides a list of preferred suppliers, including:

- [CBC Halifax Production Facility](#), which has Studio 60, a 2,500 square foot production studio that comes fully equipped with cameras, lighting, audio and other support equipment.
- [Atlantic Filmmakers Cooperative](#) which offers cameras, lighting, sound equipment and more. AFSCOOP is a non-profit, community organization that supports independent filmmaking.
- [Panavision Halifax](#) a global equipment rental company cameras, cranes, gear, grip and more.
- [Rolling Production Rentals](#) rents actor and office trailers, a truck and a coach.
- [Budget Car and Truck Rentals](#) and [Hertz Canada](#), which are global car rental companies and listed as some of Screen Nova Scotia's preferred vehicle suppliers.

Regional Incentives

Incentives that could be leveraged by individuals and companies working in or supplying the industry in Nova Scotia are listed in **Table F.2**. As in other regions reviewed, these largely relate to building incentive opportunities, although opportunities also exist for EV infrastructure and EV purchase, as well as

wastewater. Notably, a number of programs are provided through *Efficiency Nova Scotia*, which would represent a partner of interest with respect to initiatives focused on energy conservation and building retrofits, as well as the Clean Foundation with respect to incentives around EV rebates.

Table F.2: Regional Incentives, Nova Scotia

Provider	Incentive
Studio Buildings	
Efficiency Nova Scotia	Business Energy Rebate program provides application-based rebates for eligible energy efficiency products and in store rebates for specified lighting and heat pumps from participating distributors.
Efficiency Nova Scotia	Small Business Energy Solutions provides rebates of up to 80% of project cost for energy efficiency upgrades, a free energy assessment, and 24-months interest free financing on the Nova Scotia Power bill for small businesses.
Efficiency Nova Scotia	Retrofit Program - Feasibility study incentive for up to 100% of study cost, up to \$15,000 (pre-approval for study is required) and implementation incentives of up to \$0.10/kWh of first-year energy savings for businesses.
Halifax Water	Wastewater Rebate for customers who use more than 1,000m ³ of water in one year upon demonstration that the volume of wastewater discharged into the wastewater system is less than the volume of water used.
Transport Fleets	
Clean Foundation	Electric Vehicle Rebates provides rebates for new and used battery electric vehicles and plug-in hybrid electric vehicles, as well as e-bikes. Teslas ordered after November 23, 2021 are not eligible.

Cleantech Companies

The overall building industry (of which studios are a part of, as they may choose new builds over retrofitting existing buildings or warehouses) currently generates almost 40% of annual emissions, of which building materials and construction account for 11%, and is likely to increase with new construction unless additional actions are taken.¹⁴⁹ Halifax’s **CarbonCure** is a leading carbon removal and utilization solution provider for the global concrete industry. Their technology is retrofitted into concrete plants to

¹⁴⁹<https://architecture2030.org/why-the-building-sector/>

inject captured carbon into fresh concrete during mixing. CarbonCure has been recognized as the most scalable carbon utilization technology by Global CO2 Initiative, named Top 100 Global Cleantech companies multiple consecutive years, North America's Company of the Year by the Cleantech Group in 2020, and one of two winners in the USD \$20 million NRG COSIA Carbon XPRIZE.^{150 151 152}

Based in Dartmouth, **Planetary Technologies** (Planetary) has developed a carbon removal solution that stores carbon in the ocean, while restoring ocean health and creating green hydrogen. They purify waste from mine tailings into a non-toxic antacid, which is released into the ocean through monitored storm and wastewater outfalls. When mixed with seawater, the antacid is able to reduce the acidity in the ocean and accelerate the ocean's natural process of removing and storing carbon from the atmosphere. This process also helps to reverse damage caused by ocean acidification as a result of climate change.^{153 154}
¹⁵⁵ The purification process also results in clean hydrogen as a byproduct and extracts metals (nickel and cobalt) that can be used in batteries. Planetary is one of 15 recipients of the XPRIZE Carbon Removal Milestone Award, as part of the four-year \$100 million USD XPRIZE Carbon Removal Challenge funded by Elon Musk and the Musk Foundation.¹⁵⁶ The company will be using their \$1 million USD prize to build a full-scale demonstration site to remove 1,000 tonnes of carbon annually.

¹⁵⁰<https://www.xprize.org/prizes/carbon/teams/carboncure>

¹⁵¹<https://www.carboncure.com/news/clean-tech-company-carboncure-wins-nrg-cosia-carbon-xprize/>

¹⁵²As of December 2021, they company has sold over 500 systems and delivered two million truckloads of carbonated concrete to global construction sites.<https://www.globenewswire.com/news-release/2022/03/15/2403662/0/en/CarbonCure-Celebrates-Field-Leading-Carbon-Removal-Partners.html>

¹⁵³<https://www.planetarytech.com/2022/04/22/xprize-milestone/>

¹⁵⁴<https://financialpost.com/pmn/press-releases-pmn/business-wire-news-releases-pmn/carbon-removal-startup-planetary-technologies-announces-7-8m-in-funding-offer-of-3000-carbon-credits>

¹⁵⁵<https://www.cbc.ca/news/canada/nova-scotia/elon-musk-foundation-awards-1m-prize-to-n-s-company-1.6428100>

¹⁵⁶<https://www.thestar.com/news/canada/2022/04/21/why-elon-musks-xprize-is-backing-this-nova-scotia-companys-plan-to-basically-dose-the-ocean-with-antacid.html>

APPENDIX A: Convened Interviews

Perspective Category	Region	Date Convened
Government	Vancouver, BC	Monday, April 4, 2022
Government	Nova Scotia	Tuesday, April 12, 2022
Vendor	Vancouver, BC	Wednesday, April 13, 2022
Vendor	Vancouver, BC	Wednesday, April 13, 2022
Government	Quebec	Thursday, April 14, 2022
Vendor	National	Tuesday, April 19, 2022
Vendor	National	Thursday, April 21, 2022
Vendor	National	Monday, April 25, 2022
Government	Ontario	Monday, April 25, 2022
Vendor	Vancouver, BC	Tuesday, April 26, 2022
Vendor	Vancouver, BC	Wednesday, April 27, 2022
Government	National	Thursday, April 28th, 2022
Vendor	National	Friday, April 29, 2022
Producer	Ontario	Wednesday, May 4, 2022
Vendor	Ontario	Friday, May 6, 2022
Government	Manitoba	Monday, May 9, 2022
Producer	Ontario	Wednesday, May 11, 2022
Vendor	National	Wednesday, May 11, 2022
Vendor	Vancouver, BC	Wednesday, May 11, 2022
Producer	Calgary, Alberta	Thursday, May 12, 2022
Government	Calgary, Alberta	Tuesday, May 17, 2022
Vendor	Toronto, Ontario	Wednesday, June 1, 2022
Vendor	Quebec	Thursday, June 2, 2022
Producer	Vancouver, BC	Friday, June 3, 2022
Producer	Manitoba	Monday, June 6th, 2022
Producer	National	Thursday, June 9th, 2022

APPENDIX B: Greener Vendors, British Columbia

Studios

British Columbia has been the main production hub in Canada for several decades now, with close to 100 production studios located in and around downtown Vancouver, particularly in Burnaby. According to a 2017 study published by Colliers and Creative BC, nearly half of the 118 stages are in industrial warehouses converted into studios and filming locations. Specific initiatives undertaken by regional studios include supporting local initiatives (like Stream Keepers - Still Creek, Keep Vancouver Beautiful, and Collingwood Neighborhood House), embarking on Reel Green Partnerships, achieving B.C. Climate Smart certification, and increasingly seeking to meet Net-Zero targets. Vancouver-based studios are offering EV charging, LED Lighting, e-generator, and battery packages, composting & recycling services through Keep it Green, and power drops outside stages.

Examples of regional studios with greener practices and/or offerings include the following, notably however, most Canadian-based productions do not operate at the budget level required to make use of these offerings.

- [Vancouver Film Studios](#) is a carbon-neutral production centre. It is a participant in Nature Conservancy of Canada's Darkwoods carbon offset program, and has implemented carbon literacy training for employees, employee-led community gardens, EV charging stations, solar panels (on new sound stage in 2021), LED lighting, automatic flushers in washrooms, waste-reduction policies which include mandatory composting and mandatory recycling, energy conservation policies, and providing bike rooms and showers to encourage bicycle commuting. It is categorized as Reel Green Level 3.
- [Martini Film Studios](#) offers studio space, production services and resources. It sources equipment from MBS, which offers battery powered generators. The studio spaces use energy saving technologies such as action sensitive LED lighting, energy saving heating and cooling zones and paperless hand dryers, and their operations provide options for recycling, compost and food waste mitigation. It is categorized as Reel Green Level 2.

Transportation

- [Driving Force](#) rents, sells and leases vehicles for film and other industries across various regions in Canada. The company has hybrid and electric options and is categorized as Reel Green Vendor Level 2.
- [Tahoe Industries Canada](#) is a Vancouver-based supplier of cast and crew trailers. Its newer trailers are built with recycled materials, energy efficient appliances and solar panels. It is also retrofitting its existing fleet with solar panels; categorized as Reel Green Level 2. For 2022, Tahoe is working to develop a Sustainability Action Plan, including measuring its carbon footprint

and environmental impacts from energy consumption from day to day operations to waste reduction. This will include tracking and measuring the levels of usage for the fleet with a focus on energy efficiency and emissions.

- [Vancouver Mobile Dressing Room](#) offers trucks and trailers for film production. Its cast trailers are equipped with LED lighting, solar panels, energy efficient appliances, energy efficient furnace and AC technology among other sustainable features. It is categorized as Reel Green Vendor Level 2.

Generators & Equipment

- [Portable Electric](#) is a Vancouver-based supplier of portable, battery-powered generators that can be recharged by plugging into the grid, using Portable Electric's solar panel charging kit, or using other renewable energy sources as available. The company is categorized as Reel Green Vendor Level 2. More recently, Portable Electric announced a partnership with another Canadian venture, [Li-Cycle](#), to recycle the lithium-ion batteries used in the VoltStack electric generator when it reaches its end-of-life to recover materials in the battery supply chain and minimize its environmental impact.¹⁵⁷
- [Valid Manufacturing](#) provides a wide range of engineered products to a variety of industries, including portable battery powered generators for the film industry. It is categorized as Reel Green Vendor Level 1.

Waste & Circularity

- [Keep it Green Recycling](#) provides recycling services for film production and other sectors. In addition to its services, the company has a 2,600 Material Reuse Warehouse to divert reusable materials away from landfills. It is categorized as Reel Green Vendor Level 3. In terms of regional vendors, Keep it Green has been cited to be the preferred waste hauler for productions in Vancouver and pricing is never an issue or complaint from producers.
- [FABCYCLE](#) collects textile waste for resale. It is categorized as Reel Green Level 2.
- [Great Northern Way Scene Shop](#) provides custom scenic wood working, metal fabrication and scenic painting for sets and displays. It is categorized as Reel Green Vendor Level 2, and is [Climate Smart](#) certified, which means the company has had training on GHG emissions and carbon accounting and has completed an emissions inventory and carbon reduction plan.

Other services

- [Location Fixer](#) provides location management and supervision services for unique filming sites. The company has implemented sustainable practices across its locations and tracks and publishes its carbon reduction achievement through [Ecologi](#). Location Fixer leverages grid tie-ins

¹⁵⁷ <https://portable-electric.com/portable-electric-partners-with-li-cycle-to-recycle-lithium-ion-batteries-after-they-reach-end-of-life/>

at several locations, and focuses on being paperless and eliminating plastic water bottle use. It is categorized as Reel Green Vendor Level 2.

- [Green Spark Group](#) is a sustainable consulting agency for motion picture production. It is categorized as Reel Green Vendor Level 3.

APPENDIX C: Federal Incentives

Provider	Incentive
Natural Resources Canada	<p>Industrial Energy Management Project Incentives - Incentives for improving energy efficiency in commercial and industrial buildings. This program was extended through Budget 2022, but the NRCan website has not yet updated the program information (as of April 28, 2022). Funding includes support for commercial and institutional buildings implementing the ISO 50001 Energy Management Systems Standard. In 2021-22 incentives were for up to 60% of eligible costs for for-profit organizations and up to 75% of eligible costs for not-for-profit organizations to a maximum of \$40,000 per facility. The maximum contribution to an organization or group of affiliates is \$200,000 per fiscal year.</p>
Canada Revenue Agency	<p>Classes 43.1 and 43.2 Accelerated Capital Cost Allowances (CCA) for specified clean energy generation and energy conservation equipment under the <i>Income Tax Act</i>. Accelerated CCA allows businesses to reduce their taxable income in the early years of an asset's operation by claiming a larger than usual depreciation. The accelerated rates are 30% under class 43.1 and 50% under class 43.2, on a declining basis. Class 43.1 includes EV charging stations set up to supply 10-90 kilowatts of power and geothermal heat recovery equipment. Class 43.2 includes EV charging stations set up to supply 90 kilowatts of power.</p>
Canada Revenue Agency	<p>Corporate income tax credit for 100% of the value of zero-emissions passenger vehicles purchases up to \$55,000. If capital costs exceed \$55,000 the credit will be limited to \$55,000 plus the federal and provincial sales tax. The credit will phase out between January 2024 and January 2028.</p>
Transport Canada	<p>Incentives for Zero-Emissions Vehicles - \$2,500 to \$5,000 rebate for individuals and businesses on the purchase of eligible zero-emissions vehicles. The incentive is in place until March 31, 2025 or until available funding is exhausted.</p>