



BUSINESS
COUNCIL OF
TORONTO

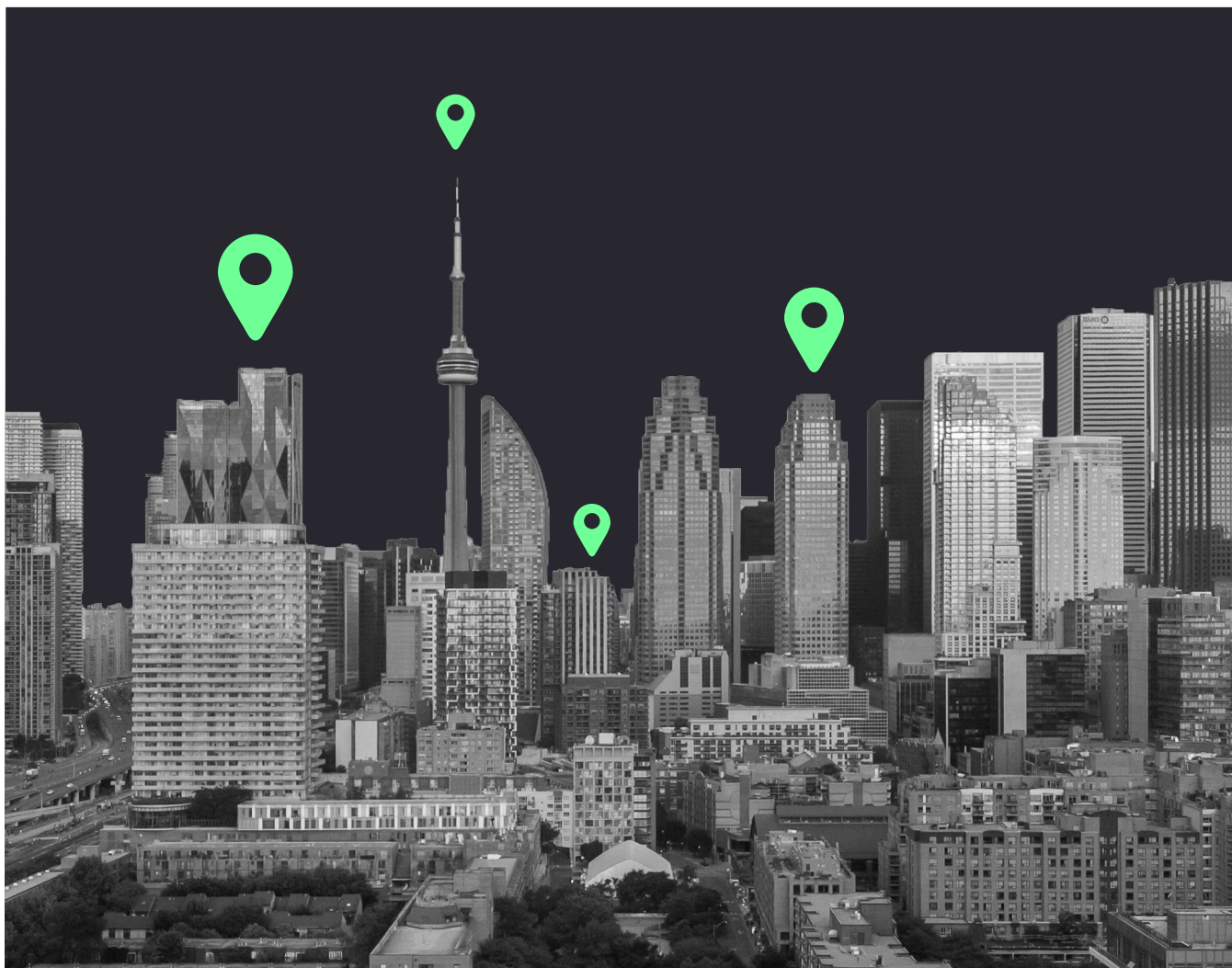
STRONGER
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A stylized line-art illustration of a city skyline with several skyscrapers. Two wind turbines are superimposed on the skyline, one in the center and one to the right, both rendered in a light green color. The background is a solid blue at the top, transitioning into a dark grey area where the skyline is located.

**POWER PLAY:
TURNING CLEAN
ENERGY INTO
ONTARIO'S ADVANTAGE**

Sector Analysis

FEBRUARY 2026



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About this Report

Economic competitiveness in the decades ahead will be shaped by how effectively regions build and invest in their energy systems. For the Toronto region, the transition to clean, reliable, and affordable energy is not optional. It is fundamental to enhanced productivity and competitiveness, investment attraction, and long-term economic growth.

The Business Council of Toronto, convened by the Toronto Region Board of Trade, established the Climate and Energy Transition Partnership Council to provide business-led leadership to address this challenge. Composed of senior executives from across the region, the Council is focused on closing Ontario's productivity gap, accelerating the transition to net zero, and positioning Toronto as a global hub for climate and energy solutions. This report is a direct outcome of that mandate, reflecting the perspectives of industry leaders across the energy, infrastructure, manufacturing, capital markets, and technology sectors.

Energy demand in the region is expected to more than double by 2050 as transportation, buildings, data centres, and industry electrify. Without decisive action, limits on energy supply, infrastructure, regulatory coordination, permitting timelines and workforce capacity will increasingly constrain growth. Left unaddressed, these pressures will drive up costs, delay critical projects, and weaken the region's ability to compete in a highly contested global market.

Yet the opportunity is equally compelling. The Toronto region has world-class capabilities across renewable energy, electric vehicles, green buildings, carbon solutions, and advanced manufacturing. Canada ranks among the global leaders in clean technology innovation, and Ontario sits at the centre of one of North America's most significant energy markets. With a focused strategy, the region can build an energy system that powers domestic growth, strengthens energy security and economic resilience, and enables the export of technology, expertise, and solutions worldwide.



ABOUT THIS REPORT

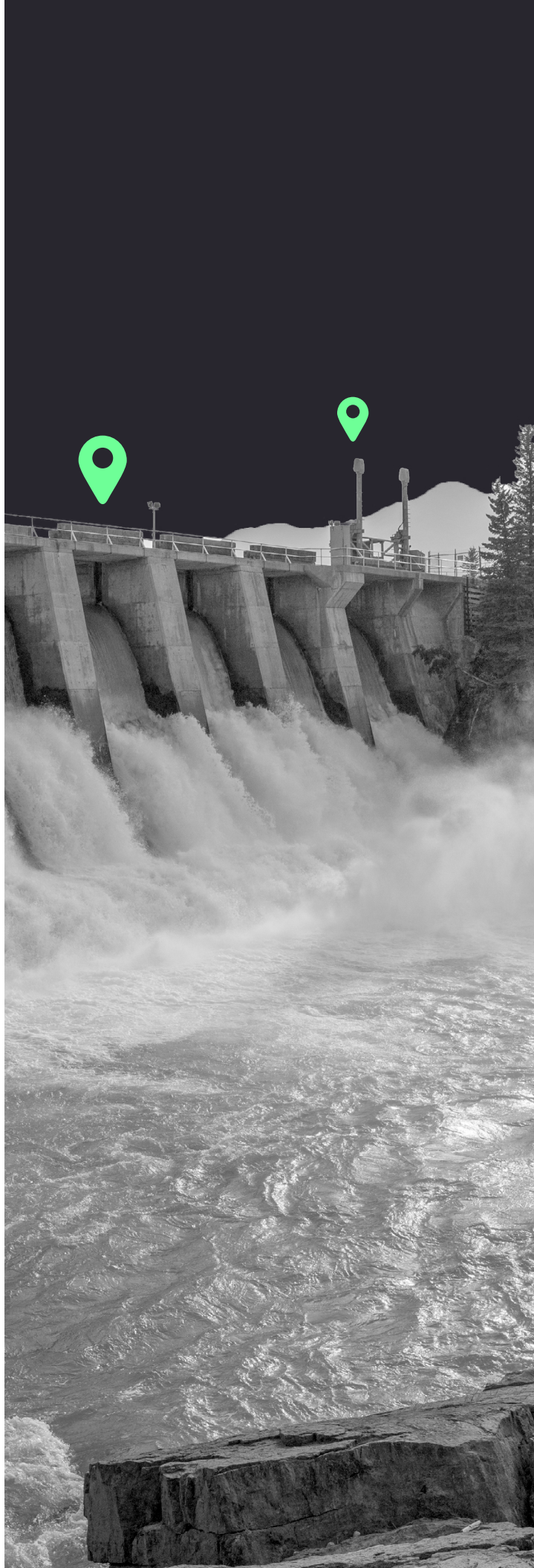
This report, researched and prepared by EY Canada, presents a cleantech sector analysis undertaken to support that ambition. The findings are intended to inform decision-making by business and government, and to reinforce the leadership role of the Toronto Region. The report provides a current state assessment of the Toronto region's cleantech ecosystem, identifies where the region already leads, and where structural barriers remain. It identifies the actions needed to unlock investment, scale innovation, accelerate commercialization, and modernize regulatory and procurement frameworks.

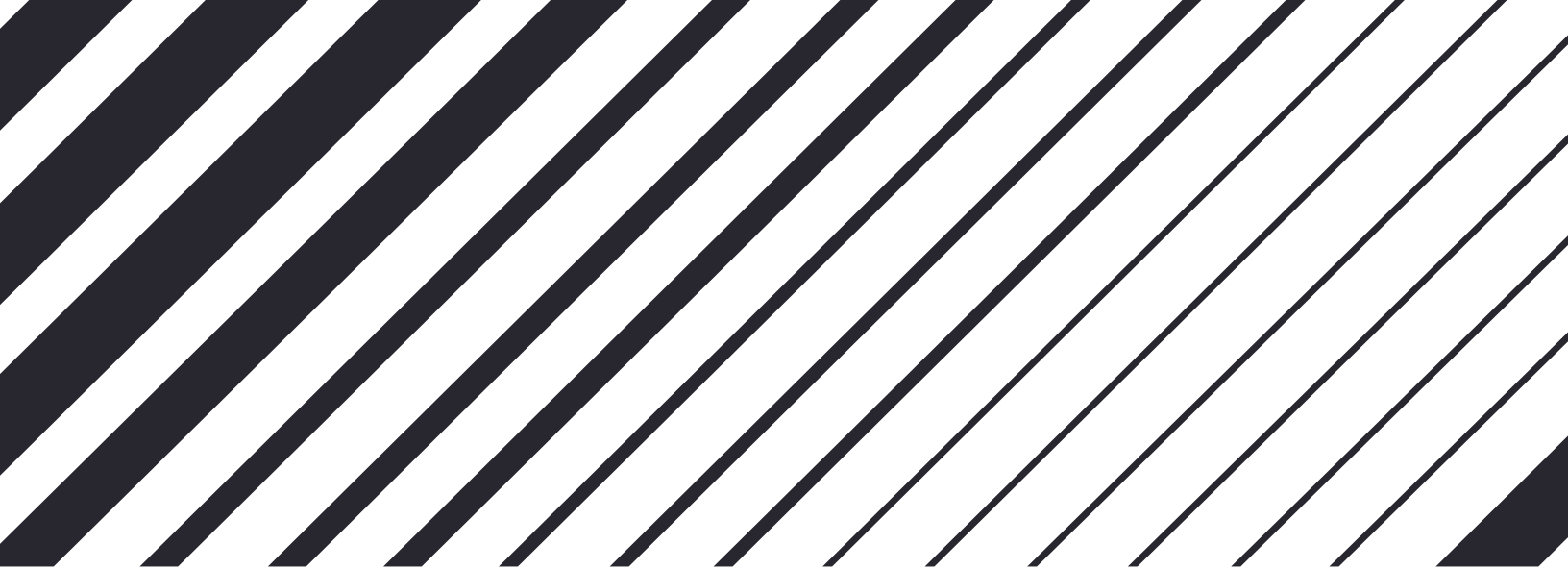
The Toronto Region Board of Trade is grateful for the invaluable insights, inputs, and resources shared by the BCT Climate and Energy Transition Partnership Council members:



ABOUT THE BUSINESS COUNCIL OF TORONTO

The Toronto Region Board of Trade brought together the region's top business leaders to deliver practical impactful solutions and advocacy that make Canada's economic engine more prosperous and a better place to live, work, invest, and do business. The Business Council of Toronto is structured around an Executive Table and three partnership councils: Advanced Manufacturing, Climate & Energy Transition, and the GTA West Economic Gateway, with a foundational Financial Services Competitiveness Coalition.





Executive Summary

The global race to build the clean economy is accelerating, and the Toronto region is already a central player in Ontario's cleantech landscape. In 2023, cleantech activity generated an estimated \$24.65 billion in GDP across Ontario, with more than half, \$12.9 billion, produced in the Toronto region. Employment follows the same pattern.¹ Of the province's 177,570 cleantech jobs, nearly 100,000, more than 56 percent, are in the region. The figures underscore the Toronto region's role as the engine of Ontario's clean economy and a critical anchor for future growth.

This strength is supported by a diverse and increasingly interconnected cleantech ecosystem spanning low-emission energy, sustainable transportation, grid modernization and energy storage, building decarbonization, and a broad range of supporting services. The region demonstrates clear specialization in sectors that will define the next phase of the energy transition, including electric vehicle manufacturing and supply chains, energy-efficient electronics and semiconductors, and management, scientific, and consulting services that support deployment at scale. These industries are more concentrated in the Toronto region than across Canada as a whole, signaling a sustained competitive advantage that coordinated action can further amplify.

Many cleantech subsectors are labour-intensive and deeply linked to applied research, engineering, and innovation resulting in made in Ontario IP. This creates a strong platform for growth but also

exposes a critical risk. Without clearer pathways to commercialization, access to late-stage capital, market-shaping demand signals, and coordinated market demand, the region risks losing high-growth firms and skilled talent to jurisdictions that are moving faster to scale clean technologies and convert innovation into enhanced productivity and economic competitiveness.

Competing regions in North America are aligning climate policy with economic development, mobilizing public investment, modernizing regulatory frameworks, and using procurement to create early market receptivity for cleantech solutions. While the Toronto region has world-class assets, including leading universities, innovation hubs, and a strong private sector, these strengths are not yet fully aligned into a cohesive regional strategy capable of accelerating and scaling solutions.

The region demonstrates clear specialization in sectors that will define the next phase of the energy transition, including electric vehicle manufacturing and supply chains, energy-efficient electronics and semiconductors, and management, scientific, and consulting services that support deployment at scale.



Cleantech Sector Recommendations

Based on our review of the region's cleantech sector, we've identified several key recommendations to help strengthen collaboration, boost innovation, and attract investment:

1 DEVELOP A REGIONAL CLEANTECH STRATEGY: Create a task force of municipal governments leaders, economic development agencies, and industry representatives to develop a regional cleantech strategy. This approach will align climate and economic goals, strengthen collaboration, and improve investment mobilization

2 TRANSLATE R&D STRENGTH INTO PRODUCTION-READY INFRASTRUCTURE: Develop a cleantech cluster that connects researchers, startups, and public sector partners to support technology demonstration, scale-up funding, and alignment with climate policy, accelerating the commercialization of cleantech innovations.

3 INVEST IN EV AND RENEWABLE INFRASTRUCTURE: Invest in EV charging networks, renewable energy systems, and energy storage to drive demand for local

cleantech solutions. These investments support net-zero goals and create predictable markets for local firms.

4 ADVANCE GREEN PUBLIC PROCUREMENT AS A CLEANTECH MARKET DRIVER: Develop a regional green procurement framework that encourages municipalities to prioritize locally developed cleantech products and services, accelerating market adoption and reducing commercialization risks for local innovators.

5 MAXIMIZE REGIONAL COLLABORATION IN THE TORONTO REGION: Establish formal collaboration mechanisms across the region's innovation hubs to improve coordination and maximize the potential of the innovation corridor. This should include investments in cleantech initiatives led by diverse and equity-seeking groups to promote inclusive growth and tackle unique climate challenges.

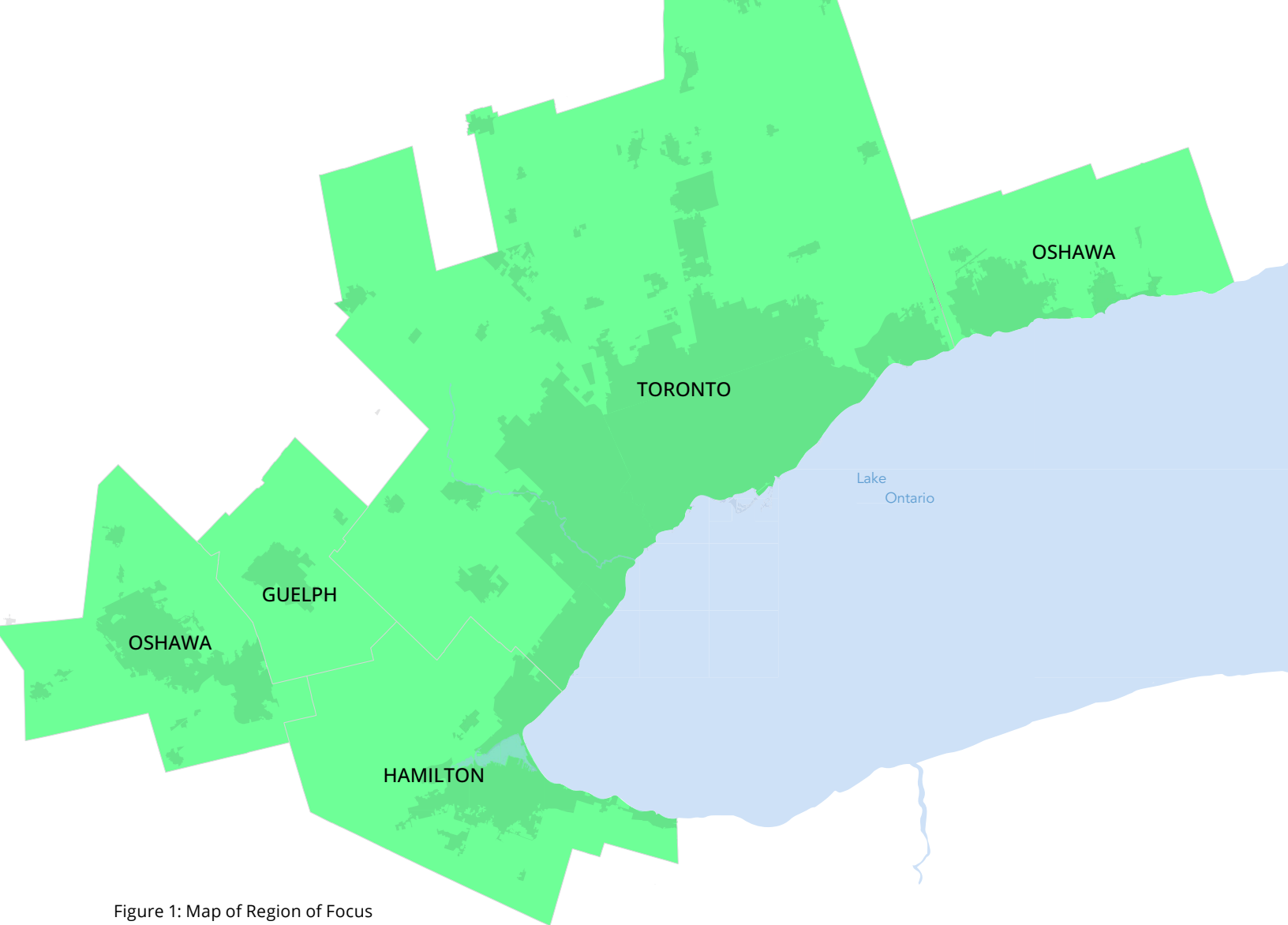


Figure 1: Map of Region of Focus

Cleantech Sector Analysis

Methodology

Defining the Cleantech Sector

To provide a reliable assessment of the cleantech ecosystem in the region—including the Census Metropolitan Areas of Toronto, Guelph, Kitchener-Waterloo, Hamilton, and Oshawa—we first defined the cleantech sector and identified its key subsectors and industries. To do this, we reviewed previous studies, reports, and strategies from across Canada to develop a tailored definition for this study. Based on this research and consultation with the Toronto Region Board of Trade, we define the cleantech sector as encompassing economic activity associated with certain products or services that are specifically designed to reduce or prevent environmental impact.² It includes:

- Technologies and practices that facilitate renewable energy generation, enhance energy efficiency, and support the transition to low-carbon transportation solutions.
- Products and services characterized by a lower environmental footprint, resource efficiency, and ability to provide comparable or improved utility compared to traditional alternatives.

The following provides an overview of the cleantech subsectors:

Table 1. Cleantech Subsectors

	LOW-EMISSION RELATED ENERGY Businesses and organizations developing and implementing energy sources and technologies that significantly reduce greenhouse gas emissions, including renewable energy generation and advanced biofuel production. Traditional fossil fuel energy sources are excluded.
	SUSTAINABLE TRANSPORTATION Businesses and organizations that develop and promote environmentally sustainable transportation solutions, including public transit systems, non-motorized transport infrastructure, and services that reduce transportation-related carbon emissions. Internal combustion engine (ICE) vehicles are excluded from this definition.
	GRID MODERNIZATION AND ENERGY STORAGE Businesses and organizations that enhance electrical grid infrastructure and the integration of energy storage solutions with the aim of improving the efficiency, reliability, and resilience of energy distribution. Businesses involved in traditional energy distribution without modernization efforts are excluded.
	BUILDING DECARBONIZATION AND ENERGY EFFICIENCY Businesses and organizations focused on reducing carbon emissions in buildings through innovative practices and technologies, improving energy efficiency across the entire building lifecycle—from design to demolition. Companies that do not prioritize decarbonization or energy efficiency are excluded.
	OTHER This category includes businesses and organizations engaged in cleantech activities outside the specified subsectors, such as waste management, water systems, and chemical manufacturing. These entities support environmental sustainability and the broader cleantech ecosystem.

Note: Please refer to *Appendix A.1* for a detailed list of industries captured within each subsector. Any activities not listed in *Appendix A.1* are not considered for the purpose of this study.

The total GDP attributable to the cleantech sector in Ontario was estimated at \$24.65B in 2023, with over half - \$12.9B - generated in the region.

The Cleantech Sector in the Region

With the cleantech sector clearly defined, we estimated its size in the region in terms of GDP and employment. The total size of the sector provides an overview of the current state and capabilities of the region.

GDP Estimation

To evaluate the size of the Region's cleantech sector GDP, a tailored methodology based on the following steps was developed:

- Define the cleantech sector, which encompasses Low-emission energy, Building Decarbonization and Energy Efficiency, Sustainable Transportation, Grid Modernization and Energy Storage, and Other Cleantech and Supporting Services.³
- Map all industries in Canada using Statistics Canada's North American Industry Classification System (NAICS) to the Cleantech subsectors defined in the first step. Please refer to Appendix 1 for the detailed mapping of industries.

- Due to limited data at the CMA level, we used national and provincial cleantech benchmarks to estimate the share of activity in each NAICS code attributable to the cleantech sector as defined (e.g., 20% of activity in construction, which is a NAICS code mapping to building decarbonization and energy efficiency, is attributable to the cleantech sector).
- Estimate the Cleantech GDP for each NAICS code across all CMAs in the region to produce subsector estimates. This was done by applying provincial benchmarks of labour productivity by NAICS code to the corresponding labour force within each CMA. This number was then adjusted based on the overall level of cleantech sector activity within the corresponding NAICS code, as well as the proportion of activity attributable to resource extraction.

Based on this methodology, we estimate that the total GDP attributable to the cleantech sector in Ontario was \$24.65B in 2023, with over half - \$12.9B - generated in the region.⁴ The subsector breakdown is shown below:

Table 2. Cleantech GDP estimate by Subsector, 2023⁵

Subsector	Ontario	Region	Region Share
Grid Modernization and Energy Storage	\$4,640M	\$2,402M	51.76%
Sustainable Transportation	\$1,471M	\$845M	57.48%
Building Decarbonization and Energy Efficiency	\$2,670M	\$1,589M	59.51%
Low-Emission Related Energy	\$10,415M	\$4,719M	45.31%
Other Cleantech and Supporting Services	\$5,461M	\$3,341M	61.18%
Total	\$24,656M	\$12,896M	52.30%

The total employment attributable to the cleantech sector in Ontario was estimated at 177,570 in 2023, of which over 56%, or 99,642 is located in the region.

Given its unique industrial profile, the region accounts for a significant share of Ontario's Cleantech sector:

- The 'Other Cleantech and Supporting Services' subsector represents over 61% of the provincial activity followed by 'Building Decarbonization and Energy Efficiency' at over 59%.
- The region's strength in the sustainable transportation subsector is partly driven by its concentration of electric vehicle (EV) manufacturing and transportation activities, including rail and freight.
- The lowest share is in 'Low-Emission Related Energy' at 45% as much of Ontario's electricity generation capacity - particularly wind, biofuel, and solar – is located outside the region. For example, as of 2022 all five of Ontario's biofuel powered electricity generation facilities with over 20MW capacity are in Northern Ontario.⁶

Employment Estimation

Similarly, to evaluate cleantech employment in the region, we applied NAICS code cleantech shares and employment levels established in the GDP estimation methodology to each subsector.

In 2023, Ontario's cleantech sector employed an estimated 177,570 people in 2023 with over 56%, or 99,642, located in the region.⁷ The subsector breakdown is:

Table 3. Cleantech employment estimate by Subsector, 2023⁸

Subsector	Ontario	Region	Region Share
Grid Modernization and Energy Storage	45,030	23,309	51.76%
Sustainable Transportation	14,104	8,421	59.71%
Building Decarbonization and Energy Efficiency	34,138	20,726	60.71%
Low-Emission Related Energy	42,697	20,919	48.99%
Other Cleantech and Supporting Services	41,601	26,266	63.14%
Total	177,570	99,642	56.11%

Employment in the region is more concentrated than GDP at 56% versus 52%. This is largely due to higher employment in 'Sustainable Transportation' and 'Building Decarbonization and Energy Efficiency', suggesting that these sectors are more labour intensive in the region than elsewhere in Ontario. Higher labour intensity may also reflect a greater reliance on research and development relative to capital.

Sector Competitiveness

From a regional competitiveness standpoint, the region has revealed specialization in certain sectors, meaning its cleantech GDP in these industries exceeds the national average. We identify the specializations using location quotients (LQs) for a range of industries, calculated as the ratio of the regional share of GDP in an industry to the national share. An LQ above 1 indicated a revealed specialization. Table 4 illustrates industries where the region is most specialized, most prominently Sustainable Transportation such as motor vehicle parts and vehicle manufacturing, and Other Cleantech and Supporting Services.

These sectors offer a foundation for exploring interventions, policies, and incentives to increase competitiveness. However, this analysis reflects only current capabilities and does not capture emerging innovative activities which may have limited GDP impact today but could provide a future competitive edge. As such, sector prioritization should consider qualitative factors and international comparisons.

Appendix A.2 offers a value chain mapping of each subsector highlighting key players in the cleantech space in the Region.

Table 4. Top 10 Cleantech LQs by Industry, 2023

Industry	Cleantech Subsector	Cleantech Application Example	LQ
Motor vehicle parts manufacturing	Sustainable Transportation	Production of electric vehicles components and batteries	2.54
Securities and commodity contracts intermediation and brokerage	Other	Financing for renewable energy projects and green bonds	1.94
Motor vehicle manufacturing	Sustainable Transportation	Manufacturing of electric and hybrid vehicles	1.90
Semiconductor and other electronic component manufacturing	Low-Emission Related Energy	Development of energy efficient electronic devices	1.78
Management, scientific, and consulting services	Other	Consulting for cleantech projects and sustainability	1.75
Computer systems design and related services	Other	Software solutions for energy management, efficiency, or other cleantech applications	1.73
Specialized design services	Other	Design of sustainable products or provision of specialized cleantech-design services	1.69
Urban transit systems	Sustainable Transportation	Development of electric and hybrid public transit solutions	1.59
Warehousing and storage	Building Decarbonization and Energy Efficiency	Implementation of energy efficient storage solutions	1.45
Facilities support services	Building Decarbonization and Energy Efficiency	Maintenance of energy efficient building systems	1.28



Jurisdictional Benchmarking

As cities across North America pursue climate and decarbonization goals, a key challenge is scaling cleantech companies and growing sector activity. This is partly due to the large capital requirements for emerging decarbonization technologies which require longer and more expensive investment periods compared to other investments.⁹

In this competitive environment, the region is one of many cleantech hubs across North America. Understanding its performance, opportunities available, and growth potential requires benchmarking against peer cleantech hubs.

We selected five peer cleantech hubs based on demographic and economic comparability to Toronto, the maturity of their cleantech innovation ecosystem, and validation from the Toronto Region Board of Trade. These jurisdictions are:

- Vancouver
- Calgary
- Montreal
- New York City
- Los Angeles

The benchmarking assessment highlights trends and actions that peer jurisdictions are taking to overcome challenges in scaling and growing the cleantech sector. The key findings, are organized into three themes:

ACCESS TO CAPITAL

Public Sector Investment in Infrastructure and Major Projects:

Cities are using public funding to strengthen Cleantech ecosystems. For example, Calgary's Climate Implementation Plan allocates approximately \$207.8 million for capital investments, supporting renewable energy and electric vehicle (EV) charging infrastructure.¹⁰ Similarly, New York City's Offshore Wind NYC initiative is investing US\$191 million to develop 12 gigawatts of offshore wind capacity by 2040.¹¹

Support for Startups:

Dedicated support programs for startups, such as Calgary's Energy Transition Centre and the Los Angeles Cleantech Incubator, provide essential resources and mentorship for entrepreneurs.^{12,13} These initiatives facilitate access to capital and market opportunities for early stage companies, driving innovation and economic growth. Venture capital (VC) funds provide funding for early-stage and growth-stage companies in the Cleantech sector, enabling technology development and scaling operations.

Private Investment:

In 2024, Quebec's Cleantech sector recorded the third largest VC activity with ten deals spanning fuel cell technology, recycling, alternative energy equipment, and advanced materials.¹⁴ Private

In 2023, Montreal International secured eight major Cleantech projects totaling \$643 million, demonstrating the impact of a coordinated investment strategy.

sector investment can be boosted through targeted investment attraction. In 2023, Montreal International secured eight major Cleantech projects totaling \$643 million, demonstrating the impact of a coordinated investment strategy.¹⁵

Employment support:

New York City provides funding to help cleantech startups hire and onboard talent, including salaries for new hires, paid internships, and fellowships for individuals from underserved communities.¹⁶ These programs de-risk hiring decisions including financial considerations, promote workforce diversity, and bring new talent into the cleantech sector.

REGULATION

Streamlining Processes:

Cities are simplifying regulatory procedures to accelerate cleantech implementation. For instance, Los Angeles is advancing its Zero-Emission Vehicle Master Plan by streamlining permitting processes for EV infrastructure,¹⁷ speeding the rollout of charging stations, which is crucial for supporting the adoption of electric vehicles and other clean technologies.

Policy Alignment:

Local policies are increasingly aligned with provincial and state cleantech objectives, creating a cohesive regulatory environment. For example, Calgary's commitment to achieving net-zero greenhouse gas emissions by 2050 provides clear guidelines for businesses and strengthens the impact of cleantech initiatives¹⁸ by aligning all stakeholders toward common goals.

TECHNOLOGY ADOPTION

Incentives and Subsidies:

Financial incentives help lower the barriers to adopting clean technologies. Montreal's EV Charging Station Subsidy Program provides up to \$100,000 per company for EV charger installations, stimulating demand for low-emission technologies.¹⁹ Targeted subsidies encourage businesses to invest in clean energy solutions, contributing to greenhouse gas emission reductions and supporting the city's climate goals.

Educational Initiatives:

Education and awareness are key to overcoming technology adoption gaps in the Cleantech sector. Cities are launching educational initiatives to inform stakeholders about the benefits and use of new technologies. For example, Calgary's Green Fleet Strategy educates fleet operators on the advantages of low-carbon vehicles.²⁰

Outreach and Engagement:

Effective outreach and community engagement are essential for building public support and participation in sustainability efforts. Cities are increasingly involving residents, businesses, and academic institutions in cleantech initiatives. For example, Montreal's Circular Economy Roadmap aims to double its circularity index by 2030 by increasing community participation in recycling and sustainable resource use, supporting greater cleantech adoption and implementation.²¹

Detailed profiles for each jurisdiction and their cleantech ecosystems can be found in Appendix 2.

Barriers to Growth

While Toronto and the region possess research, innovation, and climate planning assets, several systemic barriers are limiting cleantech sector competitiveness. The following analysis outlines key structural and strategic challenges that would impact Toronto's competitiveness, investment readiness, and long-term sector development. This analysis draws on a review of programs and initiatives in peer cleantech hubs and Toronto's existing programs and initiatives, detailed in Appendix 2.

The following provides an overview of key barriers to growth for the Region:

1 **FRAGMENTED GOVERNANCE AND LIMITED ALIGNMENT ACROSS GOVERNMENT LEVELS**

Toronto's cleantech ecosystem faces a complex policy environment and varying degrees of coordination across municipal, provincial, and federal governments. This complexity can hinder the development of a cohesive sector strategy and limit access to comprehensive support.

Distributed Responsibilities:

Cleantech-related activities in Toronto, including energy, infrastructure, transportation, and innovation, are managed by multiple City departments. While structures like the Net Zero Climate Leadership Table and the Joint TransformTO Implementation Committee aim to improve coordination, the absence of a cleantech-focused entity may lead to fragmented efforts.

Alignment with Provincial and Federal Programs:

Provincial and federal programs may not fully align with Toronto's sectoral strengths or local deployment needs. This misalignment can create challenges in accessing funding, forming partnerships, obtaining regulatory support, and developing competitive advantages in key sectors.

Comparative Initiatives in Other Cities:

Cities like Vancouver and Calgary have launched programs like CleanBC and Calgary's Climate

Implementation Plan to drive co-investment and cross-jurisdictional collaboration. Toronto's TransformTO Net Zero Strategy has more limited levels of intergovernmental alignment and mobilization of resources.

Without stronger vertical integration and intergovernmental collaboration, Toronto and the region may continue to face policy fragmentation, missed investment opportunities, and reduced influence in shaping the broader cleantech policy landscape.

2 **RISK-AVERSE REGULATORY AND PROCUREMENT SYSTEMS MAY LIMIT INNOVATION**

Toronto's regulatory, permitting, and procurement systems are primarily designed to ensure compliance and mitigate risk. While effective for traditional projects, they can pose challenges for adopting and scaling innovative cleantech solutions.

Procurement Practices:

Toronto's standard public procurement processes prioritize cost efficiency and risk mitigation, which can hinder emerging or unproven cleantech solutions. Currently, the City does not appear to have dedicated innovation procurement pathways for cleantech-specific public procurement pilots that explicitly support technology demonstration or market entry.²²

Without further modernization of regulatory and procurement systems to explicitly support innovation, Toronto and the region's cleantech firms may face challenges moving from pilot to scale.

Regulatory Inflexibility:

Toronto's permitting and regulatory frameworks may not keep pace with rapidly evolving cleantech technologies, including distributed energy resources, grid-scale storage, or circular economy solutions. While tools like SolarTO help guide residents and businesses through existing processes, systemic regulatory flexibility, such as adaptive permitting or sandbox environments, remains limited.

Jurisdictional Comparisons:

Other cities have introduced tools to encourage cleantech innovation within regulatory and permitting systems. For example, New York City has piloted innovation partnerships to test emerging solutions in controlled environments, and Los Angeles has streamlined permitting for specific zero-emission infrastructure to accelerate deployment. These approaches help reduce time-to-market and offer clearer pathways for innovators.

Without modernized regulatory and procurement systems that explicitly support innovation, Toronto and the region's cleantech firms may face challenges moving from pilot to scale, limiting the ability to stimulate local demand and retain high-growth firms seeking deployment opportunities.

3 INSUFFICIENT LATE-STAGE CAPITAL, INFRASTRUCTURE, AND ECOSYSTEM COORDINATION

Toronto's cleantech ecosystem benefits from a strong foundation in early-stage innovation, supported by institutions such as MaRS and the University of Toronto. However, scaling these innovations to commercial success remains challenging, particularly in accessing late-stage capital, specialized infrastructure, and coordinated ecosystem support.

Infrastructure Gaps:

While programs like Ontario's TargetGHG have funded demonstration projects, Toronto has a limited number of dedicated demonstration-scale facilities, green industrial zones, and cleantech-ready real estate, particularly in transit-accessible or employment-heavy areas.²³

Capital Access Challenges:

Toronto-based cleantech firms may struggle to obtain growth-stage capital. Although some investment entities have raised substantial infrastructure-focused funds, these are often not cleantech-specific, limiting the availability of consistent, sector-specific financing needed to support firms through commercialization.

Ecosystem Coordination:

Coordination among cleantech ecosystem actors in Toronto may be uneven, with limited mechanisms to align efforts across accelerators, public agencies, and private investors. This can lead to duplicated initiatives and fragmented support, making it more difficult for firms to navigate the transition from pilot to full-scale deployment.

Jurisdictional Comparisons:

Cities like Montreal and Calgary have made targeted investments in late-stage infrastructure, such as Montreal's Technoparc and Calgary's Energy Transition Centre, while also fostering public-private platforms to support scale-ups.

Without deliberate investment in capital pathways, infrastructure, and cross-sector coordination, Toronto and the region may risk losing promising cleantech ventures to jurisdictions with stronger commercialization ecosystems, funding, and resources.



"Think Montréal" campaign stills.

4 LOW INTERNATIONAL VISIBILITY AND WEAK SECTOR BRANDING

Despite Toronto's strong climate targets and robust R&D assets, the city may not be widely recognized as a global cleantech leader. This visibility gap stems from limited participation in international networks, a lack of coordinated branding, and few globally recognized firms.

International Engagement:

Toronto has begun building its global cleantech presence. For instance, the Toronto Clean Energy Partnership supports a consortium of more than 30 Toronto clean technology companies in developing and bidding on international green infrastructure projects in Central and Eastern Europe.²⁴ However, compared to peers like Los Angeles and Montreal, which have established dedicated cleantech corridors and launched targeted international promotional campaigns, Toronto's initiatives are modest, and would benefit from further intraregional coordination, visibility, and clearer value proposition.

Unified Value Proposition:

Other jurisdictions have used specific themes to promote their cleantech sectors internationally. For example, Montreal's "Think Montréal" campaign highlights its strengths in electrifying transportation networks and sustainable aviation, while Los Angeles has developed a

Cleantech Corridor to drive the growth of its green economy.²⁵ Toronto lacks a similarly unified value proposition, such as a focus on "clean mobility" or "green buildings," which could enhance its international appeal and investment attraction.

Other jurisdictions have used specific themes to promote their cleantech sectors internationally. For example, Montreal's "Think Montréal" campaign highlights its strengths in electrifying transportation networks and sustainable aviation.

Global Brand Recognition:

While Toronto is home to innovative companies, few have achieved global recognition. In contrast, Vancouver firms like Ballard Power Systems have a strong international presence in fuel cell technology. Raising the global profile of Toronto-based cleantech firms could attract more investor interest and international partnerships.



Export Development and Investment Attraction:

Toronto's export development programs and investment attraction efforts focus on general climate initiatives without a specific cleantech industry emphasis. Tailoring these efforts to highlight cleantech strengths and encouraging investment could improve the city's competitiveness in attracting global partnerships and investments.

Without a cohesive international branding strategy and targeted global engagement, Toronto and the region's cleantech sector may struggle to expand exports, attract international investment, and establish the global partnerships necessary for growth.

5 UNEVEN SECTOR DEVELOPMENT AND GAPS IN INDUSTRY SPECIALIZATION

Toronto's cleantech sector covers a wide array of technologies and applications, reflecting the city's broad innovation base. However, there is limited clustering or specialization in high-impact areas such as hydrogen, energy storage, or advanced electrification, as seen in other jurisdictions. This may hinder scaling efforts and limit Toronto's ability to emerge as a global leader in specific sectors where it has competitive advantages.

Fragmented Ecosystem:

Unlike cities with clear cleantech identities—such as Calgary's focus on energy transition technologies, Montreal's specialization in

electrification and battery innovation, or New York's leadership in grid modernization and energy resilience—Toronto's cleantech activity appears more diffuse. While Toronto has strengths in building efficiency, waste valorization, and mobility, no single subsector currently anchors ecosystem growth or global reputation.

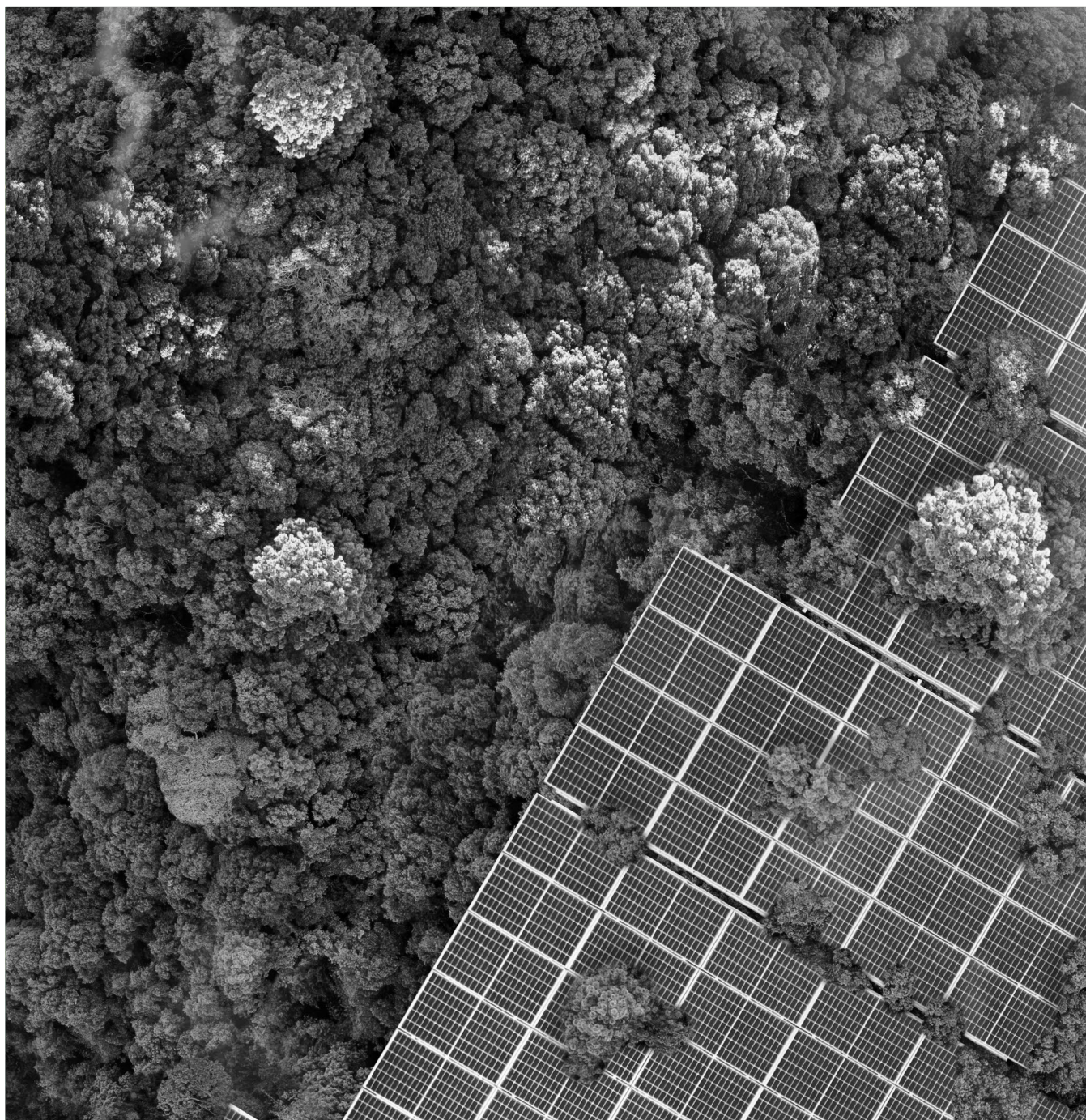
Workforce and Investment Alignment:

This potential lack of specialization can reduce the impact of workforce development, investment attraction, and incentive programs. Without a clearly defined industrial focus, governments, post-secondary institutions, and private investors struggle to coordinate and align efforts around shared strategic priorities.

Emerging Clusters:

Early-stage efforts to cluster activities around areas like net-zero buildings (e.g., Green Building Learning Zone at the Better Living Centre) and urban mobility (e.g., emerging innovation around EVs and smart transportation) are promising. However, these initiatives may still lack the scale, strategic coordination, or sustained investment seen in peer cities.

Without a focused industry development strategy to cultivate and promote subsector strengths, Toronto and the region struggle to build critical mass, attract specialized capital, or achieve international recognition in cleantech.



Regional Opportunities

We have identified five key opportunities for the region based on a review of the region's cleantech sector, jurisdictional benchmarking, and barriers in the ecosystem. Stakeholder feedback from the region's cleantech and energy sectors helped validate and refine these opportunities. Below is an overview of the key opportunities:



Establish a Regional Cleantech Strategy

THE CHALLENGE

Lack of Regional Alignment on Cleantech Priorities

The Region hosts a dense network of cleantech innovators, research institutions, and climate-focused programs. While Toronto's TransformTO is a strong municipal climate plan, the region lacks a shared regional cleantech strategy to align efforts across jurisdictions. As a result, cleantech-related economic development, investment attraction, and ecosystem-building activities remain fragmented, reducing the region's ability to compete cohesively at the national and global level.

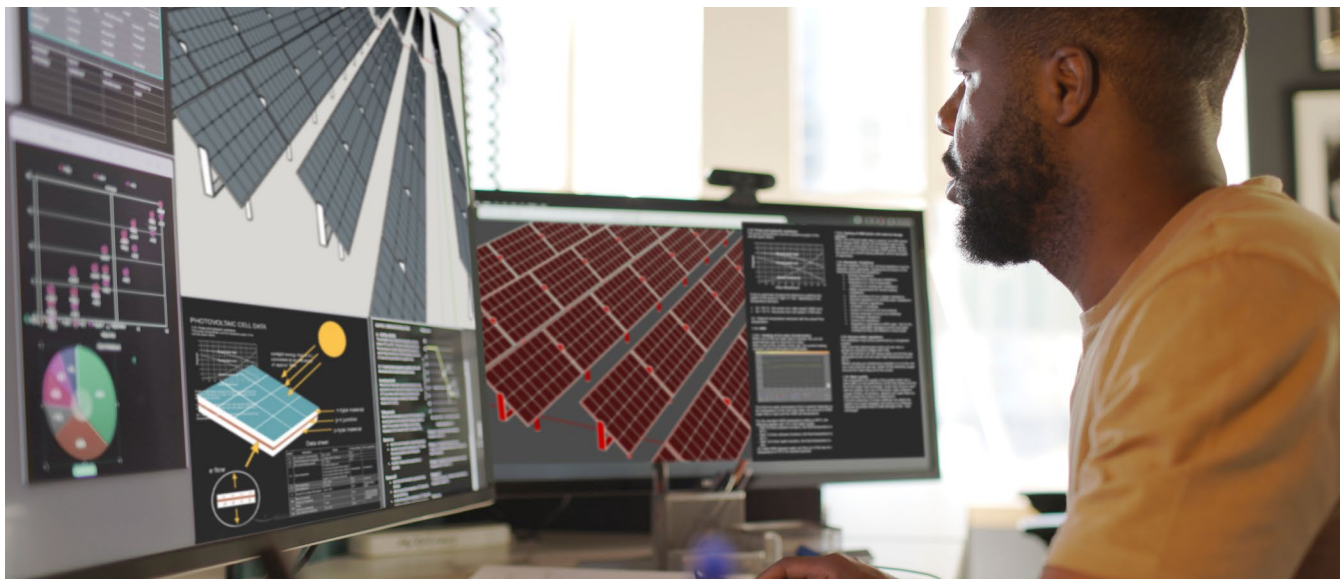
THE OPPORTUNITY

Build a Regional Strategy in Collaboration with Stakeholders

Developing a regional cleantech strategy would help align municipal climate and economic goals, strengthen inter-city collaboration, and provide a unified voice to senior governments and investors. This coordinated approach can improve the region's ability to mobilize investment, scale innovation, and deploy cleantech solutions more effectively.

KEY ACTIONS

- Bring together representatives from municipal governments, economic development agencies, academic institutions, and industry leaders to establish a regional cleantech strategy task force outreach.
- Ensure regional alignment between climate policy (e.g., TransformTO, municipal net-zero targets), innovation priorities, and economic development tools such as procurement, incentives, and infrastructure investments.
- Identify and prioritize initiatives to grow competitiveness in the cleantech sector.



Translate R&D Strength into Production-Ready Infrastructure

THE CHALLENGE

Lack of Scale-Up Infrastructure for Cleantech Commercialization

The region has a strong foundation in early-stage cleantech innovation, supported by top-tier academic institutions, incubators, and public-private research partnerships. However, it lacks a dedicated regional hub or infrastructure to support later-stage commercialization, scale-up, and deployment. This gap limits the ability of cleantech ventures to grow from promising prototypes into market-ready solutions and globally competitive firms. While assets like MaRS, Velocity, and Communitech exist, they are not directly connected to cleantech commercialization pathways, leading to a fragmented ecosystem.

THE OPPORTUNITY

Anchor a Regional Cleantech Cluster

The region can boost its global competitiveness by establishing a flagship cleantech cluster, both physically and organizationally, that brings together researchers, startups, industry, and public sector partners. This cluster would support technology demonstration, cross-sector collaboration, scale-up funding, and alignment with climate policy objectives. Examples like New York's Urban Future Lab and Canadian hubs such as Calgary's CRIN and Platform Calgary illustrate how dedicated cleantech centres can scale local innovation and attract global attention. By connecting the region's innovation assets with commercialization infrastructure and support, the cleantech ecosystem can mature and expand its economic and environmental impact.

KEY ACTIONS

- Build structured partnerships linking incubators, accelerators, and academic institutions with municipal governments and regional economic development organizations.
- Invest in demonstration projects and testbeds that de-risk new technologies and support their validation in real-world environments.
- Create commercialization programs that help cleantech firms access anchor customers and navigate regulatory pathways.
- Designate and resource a regional flagship cleantech cluster, potentially within hubs such as MaRS, Downsview, Communitech, or Hamilton's Innovation Park, to serve as the anchor for collaboration, scale-up support, and international engagement.



Expand EV and Renewable Infrastructure Through Strategic Investment

THE CHALLENGE

Insufficient Investment in EV and Renewable Infrastructure

Toronto has launched several EV infrastructure initiatives, including EV-ready guidelines for new developments and a public charging strategy. While other municipalities across the region have also made progress in expanding EV infrastructure, investments across the region remain incremental and must increase significantly to meet net-zero goals and remain competitive with peer jurisdictions. Similarly, renewable energy integration and distributed generation are still limited in scope relative to the region's climate ambitions.

THE OPPORTUNITY

Accelerate Regional Cleantech Deployment

By strategically investing in EV charging networks, renewable energy systems, energy storage, and building retrofits, the region can drive demand for local cleantech solutions and advance climate goals. Coordinated actions can create predictable markets for local firms and accelerate emissions reductions. For example, Los Angeles has implemented city-owned EV chargers and set aggressive transition targets to support clean vehicle adoption.

KEY ACTIONS

- Invest in renewable energy generation and storage on city assets to provide local demonstration and procurement channels.
- Scale up deployment of public and private EV infrastructure, supported by streamlined permitting and funding.
- Encourage the integration of smart grid technologies through partnerships with local utilities like Toronto Hydro and provincial entities.
- Align retrofit programs, such as the Home Energy Loan Program (HELP), with cleantech innovation outcomes and workforce development initiatives.



Advance Green Public Procurement as a Cleantech Market Driver

THE CHALLENGE

The Region's Untapped Demand-Side Levers

Among the peer jurisdictions, Toronto is the only city to explicitly identify green procurement as a cleantech enabler through its Net Zero Existing Buildings Strategy. The absence of similar action in the broader region presents an opportunity to build scale, consistency, and faster market access for local innovators.

THE OPPORTUNITY

Establish a Regional Green Procurement Framework

By developing a coordinated regional approach and capitalizing on Toronto's leadership in green public procurement, the region can expand procurement commitments and advocate for harmonized standards. A well-designed procurement framework can create predictable demand for local cleantech firms, accelerating market adoption and reducing commercialization risks.

KEY ACTIONS

- Encourage municipalities to set procurement standards and goals that prioritize locally developed cleantech products, services, and sustainable construction materials.
- Create a centralized database of vetted cleantech suppliers to facilitate connections between public purchasers and local innovators.
- Use city-led infrastructure and retrofit projects as demonstration sites for emerging cleantech solutions.



Maximize Regional Collaboration in the Toronto Region

THE CHALLENGE

Fragmented Ecosystem Limits Regional Advantage

The region is at the heart of Canada's densest and most dynamic innovation corridor, anchored by hubs in Waterloo and Toronto. Despite this, cleantech initiatives and actors remain fragmented across municipalities and sectors, limiting opportunities to leverage the corridor's full innovation and market potential. The region's diversity and innovation capacity present unique opportunities to lead on inclusive and equitable cleantech innovation, but this potential remains underutilized.

THE OPPORTUNITY

Build a Coordinated, Inclusive Regional Cleantech Ecosystem

By improving coordination across the region's key innovation hubs and embedding equity and climate resilience in cleantech strategies, the region can position itself as a global leader for inclusive cleantech growth. This approach can scale innovation, foster cross-sector partnerships, and meet rising demand for solutions addressing both environmental and social resilience. Examples such as Montreal's Innovation Zones and Calgary's CRIN illustrate the value of coordinated regional approaches that accelerate cleantech development and deployment.

KEY ACTIONS

- Establish formal collaboration mechanisms across the region's innovation hubs to align research, manufacturing, and deployment resources strategically.
- Engage existing economic development agencies (e.g., Toronto Global and MaRS) to collaboratively shape cleantech strategy development, programming, and investment
- Invest in cleantech initiatives led by Indigenous, community-based, and equity-seeking groups to advance inclusive innovation, particularly in energy access and urban resilience.
- Leverage regional organizations such as The Atmospheric Fund (TAF) and the Centre for Social Innovation to support community-driven cleantech projects and workforce development.



By embracing these key opportunities, the region can transform its fragmented ecosystem into a cohesive and robust cleantech hub. Formal collaboration mechanisms, strategies, and targeted support will align the region's significant research, manufacturing, and deployment assets with governmental priorities and make it possible to harness the corridor's innovation potential. Investments in projects led by Indigenous, community-based, and equity-seeking groups will ensure that the growth of cleantech is inclusive, reflecting the region's diversity and addressing its unique climate challenges. This approach will scale innovation, foster cross-sector partnerships and meet growing demand for solutions that enhance both environmental and social resilience.

Montreal's Innovation Zones and Calgary's CRIN illustrate the value of coordinated regional approaches that accelerate cleantech development and deployment.



Cleantech Sector Recommendations

Based on the analysis of the region's cleantech sector, several key opportunities have been identified to enhance collaboration, innovation, and investment in the cleantech ecosystem. These recommendations are summarized below:

1 DEVELOP A REGIONAL CLEANTECH STRATEGY: Create a task force of municipal governments leaders, economic development agencies, and industry representatives to develop a regional cleantech strategy. This approach will align climate and economic goals, strengthen collaboration, and improve investment mobilization.

2 TRANSLATE R&D STRENGTH INTO PRODUCTION-READY INFRASTRUCTURE: Develop a cleantech cluster that connects researchers, startups, and public sector partners to support technology demonstration, scale-up funding, and alignment with climate policy, accelerating the commercialization of cleantech innovations.

3 INVEST IN EV AND RENEWABLE INFRASTRUCTURE: Invest in EV charging networks, renewable energy systems, and energy storage to drive demand for local cleantech solutions. These investments support net-zero goals and create predictable markets for local firms.

4 ADVANCE GREEN PUBLIC PROCUREMENT AS A CLEANTECH MARKET DRIVER: Develop a regional green procurement framework that encourages municipalities to prioritize locally developed cleantech products and services, accelerating market adoption and reducing commercialization risks for local innovators.

5 MAXIMIZE REGIONAL COLLABORATION IN THE TORONTO REGION: Establish formal collaboration mechanisms across the region's innovation hubs to improve coordination and maximize the potential of the Innovation Corridor. This should include investments in cleantech initiatives led by diverse and equity-seeking groups to promote inclusive growth and tackle unique climate challenges and leverage the full potential of the innovation corridor. Invest in cleantech initiatives led by diverse and equity-seeking groups to ensure inclusive growth and address unique climate challenges.

APPENDIX

A. Methodology

A.1 Cleantech Sector Definition

The following provides an overview of how cleantech sector definition maps to Statistics Canada's North American Industry Classification System (NAICS). In many cases, the total economic activity in each NAICS code (as reported by statistical agencies) may include non-cleantech related activities. To this end, we conducted additional analysis on the proportion of relevant activities by NAICS codes, based on provincial and national benchmarks.

SUBSECTOR MAPPING

Subsector	NAICS Mapping
Low-Emission Related Energy	3251 Basic chemical manufacturing 3259 Other chemical product manufacturing 2211 Electric power generation, transmission and distribution 3344 Semiconductor and other electronic component manufacturing 3359 Other electrical equipment and component manufacturing 4179 Other machinery, equipment and supplies merchant wholesalers 8112 Electronic and precision equipment repair and maintenance 3336 Engine, turbine and power transmission equipment manufacturing 3353 Electrical equipment manufacturing 8113 Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance
Grid Modernization and Energy Storage	2211 Electric power generation, transmission and distribution 2371 Utility system construction 3344 Semiconductor and other electronic component manufacturing 3359 Other electrical equipment and component manufacturing 8112 Electronic and precision equipment repair and maintenance 3336 Engine, turbine and power transmission equipment manufacturing 3353 Electrical equipment manufacturing 2362 Non-residential building construction 2379 Other heavy and civil engineering construction

Subsector	NAICS Mapping
Sustainable Transportation	2373 Highway, street and bridge construction 4842 Specialized freight trucking 3361 Motor vehicle manufacturing 3362 Motor vehicle body and trailer manufacturing 3363 Motor vehicle parts manufacturing 3364 Aerospace product and parts manufacturing 3365 Railroad rolling stock manufacturing 3366 Ship and boat building 3369 Other transportation equipment manufacturing 4821 Rail transportation 4831 Deep sea, coastal and Great Lakes water transportation 4832 Inland water transportation 4851 Urban transit systems 4852 Interurban and rural bus transportation 4854 School and employee bus transportation 4859 Other transit and ground passenger transportation 4885 Freight transportation arrangement 4889 Other support activities for transportation 4855 Charter bus industry 4884 Support activities for road transportation 4922 Local messengers and local delivery 4882 Support activities for rail transportation
Building Decarbonization and Energy Efficiency	4163 Lumber, millwork, hardware, and other building supplies merchant wholesalers 2382 Building equipment contractors 2383 Building finishing contractors 2389 Other specialty trade contractors 3261 Plastic product manufacturing 4441 Building material and supplies dealers 3334 Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing 4161 Electrical, plumbing, heating, and air-conditioning equipment and supplies merchant wholesalers 236 Construction of buildings 2361 Residential building construction 2362 Non-residential building construction 2379 Other heavy and civil engineering construction 2381 Foundation, structure, and building exterior contractors 3323 Architectural and structural metals manufacturing 4931 Warehousing and storage 3352 Household appliance manufacturing 5612 Facilities support services

Subsector	NAICS Mapping
Other	3251 Basic chemical manufacturing 3259 Other chemical product manufacturing 4181 Recyclable material merchant wholesalers 5621 Waste collection 5622 Waste treatment and disposal 5629 Remediation and other waste management services 2213 Water, sewage and other systems 3339 Other general-purpose machinery manufacturing 3364 Aerospace product and parts manufacturing 5231 Securities and commodity contracts intermediation and brokerage 5413 Architectural, engineering and related services 5414 Specialized design services 5415 Computer systems design and related services 5416 Management, scientific and technical consulting services 5419 Other professional, scientific, and technical services 6112 Community colleges and C.E.G.E.P.s 6113 Universities 6114 Business schools and computer and management training 6115 Technical and trade schools 6116 Other schools and instruction 8113 Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance



A.2 Ecosystem Mapping

LOW-EMISSION RELATED ENERGY

Following is a list of key insights on the low-emission related energy subsector and its value chain.

SECTOR OVERVIEW

Low-Emission Related Energy encompasses energy sources and technologies designed to minimize greenhouse gas emissions.

Key activities in this subsector include:

- Renewable energy sources such as solar, wind, and hydroelectric power.
- It also includes the production of advanced biofuels, such as ethanol and biodiesel, derived from organic materials, as well as hydrogen.
- Additionally, this subsector includes nuclear energy, which provides a low-carbon alternative

to fossil fuels through advanced technologies like Small Modular Reactors (SMRs).

- The focus of this subsector is on advancing technologies and practices that contribute to a sustainable energy future while reducing the overall carbon footprint of energy systems.

SAMPLE CASE STUDIES²⁶

- Launch of Nuclear Engineering Facility: Westinghouse has launched its fifth global engineering center in Kitchener, Ontario, aimed at enhancing nuclear energy technologies.
- Support for Clean Energy Initiatives: The new Kitchener facility aligns with Ontario’s nuclear capacity goal of clean electricity, aiming to incorporate 18GW of additional nuclear power by 2050.

Value Chain

Value Chain Phases		Key Activities
1	R&D	• Innovation in renewable energy technologies (solar, wind, geothermal, hydro-electric) • Development of biofuels and biomass energy solutions • Research on nuclear technologies and Small Modular Reactors (SMRs) • Research on sustainable aviation fuels and technologies to improve fuel efficiency • Exploring the use of hydrogen (green/gray hydrogen) in energy systems and its integration with renewable sources • Innovation in low-carbon aviation fuels and fuel efficiency improvements
2	Manufacturing and Deployment	• Solar photovoltaic and concentrated solar power installations • Wind turbine installations and offshore wind farms • Hydroelectric power generation • Geothermal energy production • Production of biofuels (e.g., ethanol, biodiesel) from organic materials • Use of biomass for energy generation • Operation and maintenance of nuclear power plants • Development and deployment of Small Modular Reactors (SMRs) • Production of green/gray hydrogen
3	Distribution	• Transmission of renewable energy • Distribution of renewable energy
4	Consumption	• Utilization of low-emission energy sources and solutions in residential, commercial, and industrial applications
5	Recycling and Waste Management	• End-of-life management of energy technologies and fuels

ECOSYSTEM MAPPING

Following is the ecosystem mapping of the low-emission related energy subsector.

KEY OBSERVATIONS

- The **R&D landscape** of the low-emission energy subsector is rapidly evolving, with companies such as SiRem, Canadian Solar, and Current Water Technologies in the Guelph CMA leading the way in developing innovative sustainable energy solutions.
- Initiatives such as the **Brilliant Energy Institute at Ontario Tech University** strengthens Durham region's (Oshawa CMA) focus on sustainability and promotes R&D aimed at achieving net zero emissions by 2050.²⁷
- **Waterloo CMA** is emerging as a hub for nuclear R&D. With the support of nuclear engineering programs at the University of Waterloo, the community is at the forefront of innovations in SMR and microreactor technologies.²⁸
- **Ontario Power Generation (OPG)** plans to add three SMRs at the Darlington site, with a potential output of 1,200 megawatts for 1.2 million homes. The first plant is expected to be operational by late 2028 or early 2029.^{29,30}

ECOSYSTEM MAPPING

R&D	Manufacturing & Deployment	Distribution	Consumption	Recycling & Waste Management
Toronto & Oshawa				
Hamilton & Guelph				
Kitchener-Cambridge-Waterloo				

GRID MODERNIZATION AND ENERGY STORAGE

Following is a list of key insights on the grid modernization and energy storage subsector and its value chain.

SECTOR OVERVIEW

Grid Modernization and Energy Storage focuses on upgrading electrical grid infrastructure and integrating energy storage solutions to enhance efficiency, reliability, and resilience in energy distribution.

Key activities in this subsector include:

- The integration of smart grid technologies and energy storage solutions (such as batteries and pumped-storage hydroelectricity).
- The goal is to facilitate the use of renewable energy sources and optimize energy distribution.

SAMPLE CASE STUDIES

- **Integration of Flywheel Energy Storage:** Guelph Hydro is incorporating a Flywheel Energy Storage System (FESS) at the Arlen Transformer Station. This technology improves grid reliability and highlights advancements in energy storage solutions.³¹
- **Assessment of Battery Storage Viability:** Stantec performed a feasibility assessment for connecting a two-megawatt battery storage system to an Ontario utility's distribution network. This project aligns with broader efforts to enhance grid modernization and facilitate the growth of renewable energy.³²

Value Chain

Value Chain Phases		Key Activities
1	R&D	• Development of smart grid technologies • Research on advanced energy storage solutions
2	Manufacturing	• Production of smart grid components (smart meters, sensors, etc.) • Manufacturing of battery storage systems (lithium-ion, lead-based, etc.) • Production of pumped-storage hydroelectricity systems • Manufacturing of mechanical storage systems (flywheels, compressed air, etc.)
3	Installation	• Installation of energy storage systems
4	Operation & Maintenance	• Incorporation of renewable energy sources into the grid • Operation of energy storage facilities • Management and maintenance of smart grid systems

ECOSYSTEM MAPPING

Following is the ecosystem mapping of the grid modernization and energy storage subsector.

KEY OBSERVATIONS

- **Battery Energy Storage Systems (BESS)** are pivotal in enhancing the reliability and efficiency of Canada's electric grid, particularly in urban centres.
- Key developments of BESS projects in an urban centre such as Toronto include the Mississaugas of the Credit Business Corporation (MCBC) NRStor Toronto Battery Project, which plans to develop a

200 MW, 800 MWh BESS in Toronto's Portlands to enhance energy flexibility and support the City's sustainable energy transition.³³

- Several companies, including CIMA+, Agentis Electric Ltd., and Alectra Energy Solutions, are contributing to the growth and innovation of the subsector.
- The **Schneider Electric Smart Grid Lab** at Toronto Metropolitan University offers a facility for testing and showcasing smart grid solutions that improve electricity delivery and facilitate the integration of renewable energy sources and energy storage systems.³⁴

ECOSYSTEM MAPPING

R&D	Manufacturing	Installation	Operation & Maintenance
Toronto & Oshawa			
       	 	     	       
Hamilton & Guelph			
   		    	 
Kitchener-Cambridge-Waterloo			
      	   	        	      

SUSTAINABLE TRANSPORTATION

Following is a list of key insights on the sustainable transportation subsector and its value chain.

SECTOR OVERVIEW

Sustainable transportation encompasses the following:

- Promoting environmentally friendly transportation options, including public transit systems and infrastructure for non-motorized transport (such as bicycles).
- The development and deployment of vehicles that utilize clean and alternative fuels, such as EVs, hybrid EVs, hydrogen fuel cell vehicles, and plug-in hybrid vehicles.

The aim is to reduce reliance on fossil fuels and lower emissions associated with transportation.

Key activities in this subsector include:

- The innovation and manufacturing of plug-in hybrid vehicles, EVs, fuel cell vehicles.
- The use of bicycles, buses, and other public transit options.

SAMPLE CASE STUDIES³⁵

- **Collaboration for Innovation:** The partnership between Betterfrost and DENSO exemplifies the collaborative efforts to advance automotive technologies in Ontario, specifically focusing on low energy defrost solutions for EVs.
- **Industry and Government Support for R&D:** The initiative secured nearly \$500,000 from the Ontario Vehicle Innovation Network R&D Partnership Fund and \$1.25 million from industry contributions as of February 2024.

VALUE CHAIN

Value Chain Phases		Key Activities
1	R&D	• Innovation in plug-in hybrid vehicles and EVs • Development of hydrogen fuel cell technologies • Research on alternative fuels vehicles
2	Production	• Production of plug-in hybrid vehicles • Production of EVs • Production of hybrid EVs • Production of hydrogen fuel cell vehicles • Manufacturing of vehicle components (e.g., EV batteries)
3	Infrastructure Development	• Construction of EV charging stations • Development of hydrogen refueling stations • Implementation of bicycle infrastructure
4	Mobility Solutions	• Public transit and shared mobility solutions • Vehicle distribution and fleet management
5	Operation, Maintenance (O&M) and Lifecycle Management	• Predictive maintenance, diagnostics, and energy management • Lifecycle optimization • Recycling and disposal of vehicles and components

ECOSYSTEM MAPPING

Following is the ecosystem mapping of the sustainable transportation subsector.

KEY OBSERVATIONS

- The **Automotive Centre of Excellence (ACE)** at **Ontario Tech University** advances R&D by developing technologies for hybrid, electric, and hydrogen vehicles to reduce fossil fuels dependence and greenhouse gas emissions.³⁶
- **General Motors' Canadian Technical Centre** in Oshawa focuses on automotive software development, EVs, and autonomous driving technologies.³⁷
- **PowerON Energy Solutions** develops and manages the charging infrastructure for over 2,200 transit buses in the Toronto Transit Commission (TTC)'s eBus program, targeting a zero-emission fleet by 2040.³⁸
- Fleet management companies like **Geotab** and **Enterprise Fleet Management**, along with car-sharing and bike-sharing services such as **Bike Share Toronto** and **Communauto**, support the cleantech sector by optimizing vehicle use and reducing greenhouse gas emissions.

ECOSYSTEM MAPPING

R&D	Manufacturing	Infrastructure Development	Mobility Solutions	O&M and Lifecycle Management
Toronto & Oshawa				
Hamilton & Guelph				
Kitchener-Cambridge-Waterloo				

BUILDING DECARBONIZATION AND ENERGY EFFICIENCY

Following is a list of key insights on the building decarbonization and energy efficiency subsector and its value chain.

SECTOR OVERVIEW

Building Decarbonization and Energy Efficiency encompasses practices and technologies aimed at reducing carbon emissions in buildings and improving energy efficiency.

Key activities in this subsector include:

- The innovation and manufacturing of high-efficiency heating, ventilation, and air conditioning (HVAC) systems, ENERGY STAR® certified appliances, advanced insulation materials, and energy-efficient lighting solutions.
- The aim is to create sustainable and energy-efficient buildings.

SAMPLE CASE STUDIES

- **Net-Positive Energy Building:** The evol1 office building in Waterloo maintained a zero carbon balance over a 12-month operational period. It is the first project to receive the Zero Carbon Building – Design certification from the Canada Green Building Council.³⁹
- **Comprehensive Climate Action Plan:** The “Shift: Neutral” plan outlines a strategic approach for the University of Waterloo to achieve carbon neutrality by 2050, featuring specific emissions reduction targets and a collaborative framework to enhance energy efficiency and coordinate sustainability efforts across the campus and the broader community.⁴⁰

Value Chain

Value Chain Phases		Key Activities
1	R&D	• Development of high-efficiency HVAC systems • Innovation in renewable heating and cooling technologies • Research on advanced building materials and insulation
2	Manufacturing	• Production of ENERGY STAR certified appliances and electronics • Manufacturing of advanced insulation materials • Production of efficient lighting solutions (LED, CFL)
3	Design and Planning	• Architectural design for energy-efficient buildings • Planning for the implementation of energy-efficient systems
4	Construction and Renovation	• Installation of high-efficiency HVAC systems • Implementation of renewable heating and cooling systems • Green building construction • Retrofitting existing buildings for energy efficiency
5	Operation and Maintenance	• Management of building energy systems • Regular maintenance of energy-efficient appliances and systems

ECOSYSTEM MAPPING

Following is the ecosystem mapping of the sustainable transportation subsector.

KEY OBSERVATIONS

- Across Ontario, cities are making significant strides in sustainable architecture and energy efficiency, showcasing a collective commitment to reducing carbon emissions and promoting green building practices.
- The City of Toronto** boasts more than 5,500 LEED-certified buildings and extensive green roofs. The Egale Centre project incorporates renewable energy solutions for energy savings.⁴¹
- On Earth Day, April 22, 2022, the City of Mississauga (Toronto CMA) became the first Canadian municipality to achieve ISO 50001:2018 certification for its Energy Management Systems, highlighting its commitment to energy conservation and sustainability in the pursuit of becoming a zero-carbon city.⁴²
- The City of Waterloo** is home to the evolvl building, recognized as Canada's first zero-carbon structure certified by the Canadian Green Building Council, achieving nearly US\$90,000 in annual savings through solar energy systems.⁴³

ECOSYSTEM MAPPING

R&D	Manufacturing	Design & Planning	Construction & Renovation	Operation & Maintenance
Toronto & Oshawa				
    		    	   	
Hamilton & Guelph				
 		 		
Kitchener-Cambridge-Waterloo				
 		   	    	 

B. Jurisdictional Benchmarking

Toronto

Homes and buildings account for the largest share of Toronto's GHG emissions (56%), primarily from natural gas used for space and water heating. Transportation contributes 35%, mainly from gasoline used in personal vehicles, while waste accounts for 9%, largely from methane emissions from landfills.

Cleantech Strategy and Targets

TRANSFORMTO NET ZERO STRATEGY⁴⁴

- Toronto is committed to achieving net-zero greenhouse gas (GHG) emissions city-wide by 2040, one of the most ambitious climate targets in North America. The strategy prioritizes five key transformation areas: carbon accountability, building performance, natural gas reduction, low-carbon transportation, and local renewable energy generation.
- By 2030, Toronto aims for all new homes and buildings to be near-zero emissions, a 50% reduction in emissions from existing buildings (from 2008 levels), 30% of registered vehicles to be electric, and 50% of community-wide energy is to come from renewable or low-carbon sources.
- The City of Toronto has set corporate targets to reduce GHG emissions from its own operations by 65% by 2030 and achieve net-zero for all City-owned buildings by 2040.

NET ZERO EXISTING BUILDINGS STRATEGY⁴⁵

- Toronto's Net Zero Existing Buildings Strategy outlines 47 actions across three pillars: performance requirements, financial and permitting support, and market transformation.
- Key measures include: mandatory energy audits, retrofit financing programs, building performance disclosure, and workforce development initiatives to support a net-zero building retrofit market.

SUSTAINABLE FLEETS & TRANSIT ELECTRIFICATION⁴⁶

- Through its Sustainable Fleets Plan, Toronto aims to transition 50% of the City-owned fleet to zero-

emission vehicles by 2030, and reach net-zero fleet emissions by 2040.

- The Toronto Transit Commission's Green Bus Program is transitioning to an entirely zero-emissions bus fleet by 2040, with zero-emission bus procurement beginning in 2025.

Public Investment & Initiatives

CLIMATE ACTION AND RESILIENCY RESEARCH FUND (CARRF)⁴⁷

- Toronto launched CARRF (2023–2025) to support academic and applied research that advances the TransformTO strategy and civic innovation. The initiative strengthens City-academic collaboration and creates hands-on learning opportunities for students.

ELECTRIC VEHICLE CHARGING INFRASTRUCTURE⁴⁸

- By the end of 2024, Toronto had 2,810 public EV charging ports at 801 locations. The City aims to support 30% EV adoption by 2030 through zoning rules, bylaws, and expanded on-street and public lot charging infrastructure.
- A \$33.9 million investment (2024–2026) through the Toronto Parking Authority is supporting the expansion of the City's off-street EV charging network.

GREEN DEBENTURE PROGRAM⁴⁹

- Toronto's Green Debenture Program, launched in 2018, finances environmentally sustainable capital projects aligned with the City's climate goals. To date, projects include clean transit, green buildings, and stormwater management systems.

ZERO EMISSIONS VEHICLE-FOR-HIRE POLICY⁵⁰

- As of January 1, 2031, all vehicles-for-hire in Toronto must be zero-emission. A \$10 million Zero Emissions Grant Program (2024–2029) supports this transition by offsetting licensing fees and compensating rideshare drivers using ZEVs.



Industry & Innovation

MARS DISCOVERY DISTRICT^{51,52}

- MaRS is one of North America's largest urban cleantech hubs, home to over 200 companies across sectors like renewable energy, energy storage, sustainable transportation, and smart grids. Since 2008, its venture services program has helped cleantech startups raise over \$1.5 billion in capital.

ENVIRONMENTAL AND RELATED TECHNOLOGIES HUB (EARTH DISTRICT)⁵³

- A collaborative cleantech innovation and training hub, the EaRTH District brings together five GTA institutions, including the University of Toronto Scarborough and Centennial College. It includes Canada's first net-zero vertical farm and serves as a platform for cleantech workforce development.

CLEAN ENERGY ZONE AT TORONTO METROPOLITAN UNIVERSITY⁵⁴

- This incubator supports innovation in EVs, smart grids, and sustainable urban energy systems. It connects researchers and entrepreneurs to fast-track clean energy solutions to market.

HONDA EV SUPPLY CHAIN INVESTMENT (2024)⁵⁵

- Honda Canada is investing \$15 billion to create Canada's first end-to-end EV supply chain in Ontario, including a battery manufacturing plant, an EV assembly plant, and processing facilities. Once operational in 2028, the project will produce up to 240,000 EVs annually.

UNIVERSITY OF TORONTO AND SIEMENS PARTNERSHIP⁵⁶

- U of T and Siemens are collaborating to modernize Canada's electricity grid, integrating AI and cybersecurity with smart grid innovations to help achieve net-zero emissions.

TORONTO-WATERLOO CLEANTECH CORRIDOR⁵⁷

- Recognized as Canada's top cleantech ecosystem, this corridor ranks 6th in North America and 12th globally, with \$2.3 billion in early-stage funding — four times the global average.

INSTITUTE FOR SUSTAINABLE ENERGY (ISE)⁵⁸

- This inclusive, multidisciplinary center at U of T unites researchers, students, and industry partners to enhance energy efficiency and minimize the environmental impact of energy use.

LAWSON CLIMATE INSTITUTE⁵⁹

- Aiming for net-zero emissions by 2050, this institute leverages U of T's expertise to develop sustainability technologies and equitable climate policies while engaging students through innovative programs and campus initiatives.

CLIMATE POSITIVE ENERGY INITIATIVE⁶⁰

- This interdisciplinary center at U of T focuses on transforming energy systems by integrating research across science, engineering, economics, and policy, fostering impactful training and initiatives like CanStore and the Grid Modernization Centre. CANSTOREEnergy develops seasonal storage technologies for renewable energy and converts carbon emissions into useful products. The Grid Modernization Centre is a test facility that provides real-time grid model simulations to support the transition to a decarbonized, decentralized, and digitalized power system.

Vancouver

Approximately 70% of British Columbia's 200+ Cleantech companies are based in Metro Vancouver, employing over 3,500 people. The region hosts the world's largest hydrogen and fuel cell industry, holding a 16% global market share supported by a robust hydrogen strategy and the promotion of innovation and investment in clean energy.⁶¹

Cleantech Strategy and Targets

VANCOUVER'S CLIMATE EMERGENCY ACTION PLAN⁶²

- Vancouver is committed to achieving carbon neutrality before 2050, with a target of reducing building-related carbon emissions by 50% from 2007 levels and cutting embodied emissions from new buildings by 40% by 2030.
- The city aims for ZEVs to account for 50% of kilometers driven and for two-thirds of trips to be made via active transportation or transit by 2030.
- Vancouver is actively expanding its EV charging infrastructure for both passenger fleets and residential properties.

CLEANBC⁶³

- The plan mandates that all new light-duty cars and trucks sold in the province be ZEVs by 2035. CleanBC invests in charging infrastructure and offers incentives through programs like the Go Electric Passenger Vehicle Rebate Program, which has issued over 84,000 rebates totaling \$274M since 2015, and Go Electric Fleets, which helps businesses transition to ZEVs and install charging infrastructure.⁶⁴
- The BC Hydrogen Strategy, part of CleanBC, supports the low-carbon economy by promoting hydrogen production, use in hard-to-decarbonize sectors, and infrastructure development. Key actions include financial support for fuel cell vehicles, regional hydrogen hubs, and discounted electricity rates for hydrogen producers under the Clean Industry and Innovation Rate introduced in 2021.⁶⁵

BC HYDROGEN OFFICE⁶⁶

- Launched by the Government of British Columbia, the BC Hydrogen Office acts as a one-stop shop to accelerate hydrogen project

development in the province. It coordinates across ministries and regulatory bodies to streamline approvals, connect investors and developers, and support the deployment of low-carbon hydrogen.

Public Investment & Initiatives

EV CHARGING INFRASTRUCTURE⁶⁷

- Vancouver aims to allow third parties to install public EV charging infrastructure at City-approved locations, expanding investment opportunities and supporting Climate Emergency targets.

PUBLIC TRANSPORTATION INVESTMENT⁶⁸

- Vancouver is investing in transit infrastructure and technology to improve efficiency and reduce traffic congestion, aiming for 33% of trips to be made by transit by 2040. The city is enhancing transit services, increasing accessibility, and addressing funding challenges while supporting key projects like the Broadway Corridor subway line.

GREEN RAINWATER INFRASTRUCTURE PROJECTS⁶⁹

- As of March 2025, there are over 300 green rainwater infrastructure projects that collect and clean rainwater, reducing the burden on city drainage systems

Industry & Innovation

FORESIGHT CLEANTECH ADOPTION ACCELERATOR⁷⁰

- Based in Vancouver, Foresight is dedicated to accelerating the adoption of sustainable technologies through various programs that support acceleration, capital, and ecosystem development.

VC ACTIVITY⁷¹

- In 2024, British Columbia's Cleantech sector recorded 15 deals across subsectors such as fuel cell technology, recycling, alternative energy equipment, and advanced materials. The Cleantech sector was the second sector in the province with the most VC activity.



BIOFUEL PRODUCTION⁷²

- Parkland Fuels, located in Burnaby, BC, produces low carbon fuels, such as renewable diesel, biodiesel, biojet fuel, and renewable gasoline under BC's Low Carbon Fuel Standard (LCFS).

HYDROGEN PRODUCTION⁷³

- HTEC, with partnership with the Government of Canada, is building a hydrogen liquefaction facility in North Vancouver, to produce approximately 48,000 kg of hydrogen.

UNIVERSITY OF BRITISH COLUMBIA HYDROGEN INNOVATION HUB⁷⁴

- In June 2024, the University of British Columbia launched the \$23-million Smart Hydrogen Energy District (SHED) at its Vancouver campus. SHED integrates solar power, water electrolysis, and hydrogen storage to fuel vehicles and serve as a real-world testbed for clean energy technologies, advancing hydrogen innovation through research and demonstration.

INTEGRATED MARKETPLACE INITIATIVE⁷⁵

- Backed by \$21.4M from PacifiCan and the BC government, Innovate BC's Integrated Marketplace helps local Cleantech firms pilot solutions in real-world testbeds like ports and airports, addressing decarbonization, safety, and productivity challenges. The program co-

funds projects with industry to de-risk adoption, generate performance data, and support commercialization and export of BC-made technologies.

BC CENTRE FOR INNOVATION AND CLEAN ENERGY (CICE)

- CICE supports the commercialization of clean energy technologies with non-dilutive funding for projects between Technology Readiness Levels (TRL) 4–9, backed by \$105M in public and private partnerships.⁷⁶
- In 2025, CICE partnered with university entrepreneurship programs across BC to fund early-stage climate ventures with up to \$100,000 in support per project.⁷⁷
- CICE launched Canada's first carbon dioxide removal (CDR) funding call, investing \$3M in early-stage innovations to position Vancouver as a leader in carbon removal solutions.⁷⁸

VERITREE TECHNOLOGIES - NATURE-BASED CLEANTECH INNOVATION⁷⁹

- Vancouver-based Veritree uses LiDAR, drones, AI, and blockchain to power global reforestation and track ecosystem restoration. The platform connects 20,000+ businesses to verified tree-planting projects and has helped plant 65 million trees, aiming for 1 billion by 2030. Veritree won the 2023 Davos Innovation Start-Up Award and is a 2025 BC Cleantech Awards finalist.

Calgary

Calgary is rapidly emerging as a key hub for Cleantech innovation in Canada. The city is building a strong, distributed startup ecosystem rather than concentrating activity in a single hub. With a population of over 1.6 million and a deep talent base rooted in the energy sector, Calgary is leveraging its strengths to support ventures across the Cleantech spectrum—from energy transition and emissions reduction to sustainable infrastructure and innovation.

Cleantech Strategy and Targets

CALGARY CLIMATE STRATEGY – PATHWAYS TO 2050⁸⁰

- Calgary is committed to achieving net-zero greenhouse gas (GHG) emissions by 2050, with a target of achieving net zero standards for all new buildings by 2030 and all buildings by 2050,
- The city aims to generate 40% of total electricity within city boundaries from renewable sources, and ensuring 100% of vehicles registered in Calgary are zero-emission by 2050.

CLIMATE IMPLEMENTATION PLAN (2023-2026)⁸¹

- Calgary is advancing these goals through its Climate Implementation Plan (2023–2026), which includes approximately \$3.8 million in new base operating funds, \$44.1 million in one-time operating funds, and \$207.8 million in capital investment.
- The city plans to pursue partnership opportunities with academic institutions, non-profit organizations, and private businesses through marketing campaigns and outreach programs

GREEN FLEET STRATEGY⁸²

- Calgary's Green Fleet Strategy supports the shift to low-carbon vehicles by piloting electric, hybrid, and alternative fuel technologies across city operations, including waste trucks and street sweepers, to reduce corporate GHG emissions. The strategy aims to educate fleet users on the benefits of renewable fuels and green operator driving.

Public Investment & Initiatives

CLEANTECH INVESTMENT WITH PRAIRIESCAN⁸³

- The federal government invested \$2 million to expand Calgary's Energy Transition Centre, a downtown hub that supports cleantech startups, fosters collaborations, and accelerates the commercialization of clean energy technologies.
- An investment of \$1.5 million is allocated to establish the Calgary Region Hydrogen Hub, aiming to position Calgary as a leader in the hydrogen economy and connect with existing hubs in Edmonton and Vancouver.

OPPORTUNITY CALGARY INVESTMENT FUND (OCIF)⁸⁴

- OCIF will invest \$996,000 over three years into the Southern Alberta Institute of Technology's (SAIT) Alternative Construction Technologies (ACT) Hub to advance innovative construction materials and processes, including robotic prefabrication and 3D printing.

ELECTRIC VEHICLE CHARGING INFRASTRUCTURE⁸⁵

- Calgary introduced ChargeYYC, offering grants of up to \$4,000 or 50% of costs (whichever is lower) to support residents in multi-unit residential buildings to develop EV Charging Road Maps, facilitating the installation of home EV charging infrastructure.

SOLAR PROJECTS AT CITY FACILITIES⁸⁶

- Calgary has installed over 24 solar photovoltaic systems on city buildings, collectively capable of producing over 7 megawatts of power, demonstrating a commitment to renewable energy investments.

Industry & Innovation

DEEP GEOTHERMAL ENERGY⁸⁷

- Eavor Technologies, a Calgary-based Cleantech company, developed a closed-loop geothermal system called the "Eavor-Loop," enabling scalable, dispatchable, zero-emission energy. The company has received international recognition and significant investment, including support from the federal government and corporate partners such as BP and Chevron.

SOLAR PRODUCTION⁸⁸

- SolarSteam Inc. is a Calgary-based Cleantech company specializing in solar thermal technology to generate industrial heat and power using concentrated solar energy.

CLEANTECH ACCELERATION⁸⁹

- Alberta Innovates is a provincial innovation agency that funds clean technology research, development, and commercialization to support the energy transition. It focuses on

decarbonization through programs such as Energy Storage & Minerals, Renewable & Alternative Energy, and CCUS & Hydrogen.

CALGARY REGION HYDROGEN HUB⁹⁰

- The Calgary Region Hydrogen Hub fosters collaboration between hydrogen producers and end-users to accelerate adoption of hydrogen technologies. It supports innovation through research coordination, open-access insights, and industry engagement, positioning Calgary as a leader in the clean hydrogen economy.

Montreal

Montreal was the first Canadian city to join the Global Destination Sustainability Index and has emerged as a Cleantech leader with strong government backing, global AI expertise, and a collaborative network of over 200 research groups, universities, startups, and investors. The city is advancing innovation in battery technology, hydrogen, water tech, agricultural technology, and green transportation.

Cleantech Strategy and Targets

MONTREAL CLIMATE PLAN⁹¹

- Montréal aims to achieve carbon neutrality by 2050 and reduce greenhouse gas emissions by 55% by 2030 through 46 targeted measures.
- The plan includes promoting public transit, walking and cycling, reducing fossil fuel use in buildings, and increasing green spaces.
- Montréal is targeting 47% of vehicles registered to be electric and seeks to significantly reduce citywide fossil fuel consumption.

CIRCULAR ECONOMY ROADMAP⁹²

- Montréal aims to double its circularity index from 3% to 6% by 2030 and to 17% by 2050.
- The roadmap focuses on reducing material consumption, enhancing recycling, and promoting sustainable resource use.

DIVESTMENT FROM FOSSIL FUELS⁹³

- In December 2023, McGill University announced it would divest from all direct holdings in fossil fuel companies listed in the Carbon Underground 200, to be fully implemented by 2025.

Public Investment & Initiatives

EV CHARGING STATION SUBSIDY PROGRAM⁹⁴

- With only 38% of households in Montréal expected to have access to private home charging by 2030, this program offers subsidies up to \$100,000 per company for installing EV chargers, covering 50% of eligible project costs.

PUBLIC TRANSPORTATION INFRASTRUCTURE⁹⁵

- Montreal in its Transportation Electrification Strategy (2021–2023) committed \$885 million to electrify public transportation, adding 30 long-range electric buses, 250 electric taxis, 600 charging stations, and expanding Bixi e-bikes by 2,100.
- Upgrades include electrifying municipal fleets and supporting charging access in businesses and multi-unit residential buildings.

MONTREAL INTERNATIONAL'S CLEANTECH INVESTMENTS⁹⁶

- In 2023, Montreal International supported eight major Cleantech projects totaling \$643M, representing 24% of all investment it facilitated — helping global firms expand and localize cleantech innovation.
- Notable projects include DHL launching its Canadian electric truck rollout from Montréal, TOMRA expanding its Québec recycling operations, and Schneider Electric opening an AI lab focused on building decarbonization.

Industry & Innovation

CLEANTECH HUBS⁹⁷

- Écotech Quebec, located in Montreal, is Quebec's leading Cleantech hub, drives R&D, commercialization, and cross-sector collaboration in energy, mobility, and water. It connects startups, researchers, investors, and government partners.
- Key focus areas include renewable energy, energy efficiency, sustainable transportation, waste management, and water treatment.

RENEWABLE FUEL PRODUCTION⁹⁸

- Enerkem, based in Montreal, converts non-recyclable waste into biofuels and chemicals. Backed by Écotech Québec, it has scaled globally and secured major investments.

VC ACTIVITY⁹⁹

- In 2024, Quebec's Cleantech sector had 10 deals across subsectors such as fuel cell technology, recycling, alternative energy equipment, and advanced materials, marking the third highest sector in VC activity in the province.

VC FUNDING¹⁰⁰

- Cycle Capital Management, a Montreal-based venture capital firm, funds Cleantech startups and supports their market growth, working closely with Écotech Quebec to identify and grow high-impact technologies.

POWER TRANSFORMER PRODUCTION¹⁰¹

- Hitachi Energy is upgrading and modernizing its power transformer factory and other facilities in the Montreal region, to address growing consumer demand for sustainable energy. The upgrades are expected to cost \$140 million and will include funding from the Government of Quebec through Investissement Quebec.

BUILDING DECARBONIZATION¹⁰²

- In 2023, Schneider Electric invested \$4 million to launch a new 4,500ft² R&D lab in Montreal to support the global digital buildings sector with advanced equipment including 3D printing, 3D laser scanner, an electromechanical lab, and a wet lab to advance electric infrastructure in buildings.

Los Angeles

Los Angeles is positioning itself as a clean technology leader with a goal of 100% renewable energy by 2045 and significant investments in EV infrastructure. The city is fostering innovation through initiatives like the Los Angeles Cleantech Incubator and advancing renewable hydrogen projects, solidifying its role as a global hub for sustainability.

Cleantech Strategy and Targets

CLEAN ENERGY 2028 ROADMAP¹⁰³

- Los Angeles aims to accelerate the reduction of greenhouse gas emissions by an additional 15% across electricity, building, and transportation sectors by the 2028 Olympic and Paralympic Games.
- The roadmap sets targets for creating a virtual power plant, installing heat pumps, implementing vehicle-to-grid charging, supporting green jobs, providing equitable access to solar, among other initiatives to advance building electrification, clean distributed generation, energy-transportation nexus, and grid efficiency and resiliency.

LA100 STUDY OVERVIEW¹⁰⁴

- The city is committed to achieving a 100% renewable energy power system by 2045, promoting innovation in renewable energy technologies and supporting the Cleantech sector through the electrification of buildings and the transportation sector.

ZERO-EMISSION VEHICLE MASTER PLAN¹⁰⁵

- Los Angeles plans to expand EV charger infrastructure and transition the county's fleet to fully zero-emissions by 2035, directly supporting clean mobility solutions and related technologies.

Public Investment & Initiatives

EV CHARGING ROADWAY¹⁰⁶

- California's first electric-vehicle-charging roadway is expected to debut by the 2028 Olympics after a multimillion-dollar grant to UCLA, with nearly \$20 million going to electrify the university's BruinBus fleet and install underground charging.

EV CHARGERS ON STREETLIGHT POLES¹⁰⁷

- The city of Los Angeles is installing 10,000 EV chargers on streetlight poles, with over 750 already installed, making it easier for EV drivers to find a charger.

FUNDING FOR PUBLIC TRANSPORTATION¹⁰⁸

- In July 2024, nearly \$80 million was announced to electrify Metro buses to reduce air pollution, following nearly \$900 million in federal funding for critical infrastructure and the Metro Rail system.

SHARED SOLAR PROGRAM¹⁰⁹

- Enables residential customers living in multifamily dwellings (apartments, condominiums, duplexes) to fix a portion of their electric bill against rising utility costs for 10 years by subscribing to 50-100 kWh energy on a monthly basis supplied by new solar power plants in the LA basin.

Industry & Innovation**LOS ANGELES CLEANTECH INCUBATOR¹¹⁰**

- A non-profit that incubates green tech companies, providing workspace, CEO mentoring, and access to experts and capital, aiming to make Los Angeles the Silicon Valley of clean technology.

CITY CLIMATE INNOVATION CHALLENGE¹¹¹

- Launched by LACI, this initiative focuses on reducing congestion and pollution from e-commerce and goods movement sectors, supported by a \$500,000 grant from The Rockefeller Foundation.

SOCALGAS, ANGELES LINK^{112,113}

- A proposed pipeline would transport clean renewable hydrogen across Central and Southern California, aiming to drive deep decarbonization of dispatchable electric generation, hard-to-electrify industries, and heavy-duty transportation in the LA Basin. The project could displace up to 3 million gallons of diesel per day and support the conversion of four natural gas plants to green hydrogen plants.

New York City

In New York City, buildings account for nearly 70% of emissions, making energy efficiency and electrification key priorities. Transportation, the next largest source at around 30%, underscores the need to advance clean mobility. In response, the city is investing up to \$100 million in a Climate Innovation Hub and has committed to a 100% renewable electricity grid by 2040, with a broader goal of reaching net-zero carbon emissions by 2050. Together, these efforts reinforce New York City's role as a global leader in climate action.

Cleantech Strategy and Targets**POWERUP NYC¹¹⁴**

- New York City's first-ever Long-Term Energy Plan (LTEP) outlines 29 clean energy initiatives across Energy Grid, Transportation, and Buildings, centered on Equity, Affordability, and Health. The plan aims to accelerate the city's commitment to clean energy and greenhouse gas reduction goals while promoting environmental and climate justice.

ROADMAP TO 80X50¹¹⁵

- This roadmap describes a realistic plan for New York City to reach its climate goals by expanding renewable energy sources and developing community-shared solar programs. The city aims to reduce greenhouse gas emissions by 40% by 2030.

DRIVE CLEAN REBATE¹¹⁶

- This program offers EV buyers up to \$2,000 off the purchase or lease of new EV models, providing additional savings through federal tax credits.

Investment & Infrastructure**EV CHARGING EXPANSION¹¹⁷**

- The New York City Department of Transportation is expanding EV charging citywide, with the installation of 28 DC fast charging plugs at municipal garages. This initiative is part of the city's effort to create one of the largest municipal EV charging networks in the country, contributing to the goal of carbon neutrality by 2050.

ELECTRIFICATION OF PUBLIC TRANSIT¹¹⁸

- The New York City Metropolitan Transit Authority (MTA) is strategically committed to achieving a fully clean-emission bus fleet by 2040, reflecting its dedication to sustainability and environmental responsibility. This ambitious initiative includes a significant investment in 500 electric buses, positioning the MTA as a frontrunner in transit electrification.

OFFSHORE WIND INVESTMENT¹¹⁹

- With a \$191 million investment through the Offshore Wind NYC initiative, the city aims to develop offshore wind infrastructure for 12 GW of energy to reach clean initiatives by 2040.

HIRING AND TRAINING PROGRAMS FOR CLEANTECH STARTUPS¹²⁰

- Offers funding to support hiring and onboarding for Cleantech startups, including salaries for new hires, paid internships, and fellowships for individuals from underserved communities. These programs aim to reduce the financial risk of hiring, promote workforce diversity, and bring new talent into the clean energy sector.
- The Entrepreneur-in-Residence program connects startups with executive-level mentors to support business growth, providing expertise in staffing, strategic planning, board management, and more.

Industry & Innovation**URBAN FUTURE LAB¹²¹**

- Urban Future Lab is a non-profit established in 2009 that offers customized support to market-ready climatetech startups with less than \$5 million in funding. Leveraging its extensive network, its program Accelerator for a Clean and Resilient Economy (ACRE) connects these companies with

key real estate groups, utilities, and government bodies to foster growth in New York and beyond.

NINEDOT ENERGY¹²²

- NineDot Energy is focused on developing battery storage sites in New York to improve grid efficiency by storing clean energy for peak demand. This initiative significantly reduces reliance on polluting “peaker” plants, which are major contributors to greenhouse gas emissions, thereby supporting the state’s clean energy goals.

GE VERNOVA¹²³

- GE Vernova, the energy spinoff from General Electric Co., announced a \$96 million expansion at its research center in Niskayuna. This investment aims to develop new technologies that will reduce carbon emissions and enhance the efficiency of the electrical grid, reinforcing the state’s commitment to clean energy innovation.

SCALE FOR CLIMATETECH¹²⁴

- A cohort-based program helping early-stage, hardware-focused Cleantech startups grow by scaling manufacturing, developing supply chain relationships, and expanding their teams. Operating in NYC and Upstate New York, it supports startups in transitioning from prototype to production and preparing for broader market adoption.

CLEAN CONSTRUCTION INNOVATION PILOT¹²⁵

- New York City launched this pilot in February 2025 to test and evaluate low-emission and electric construction technologies on public projects, aiming to reduce greenhouse gas emissions and air pollution from construction activities.



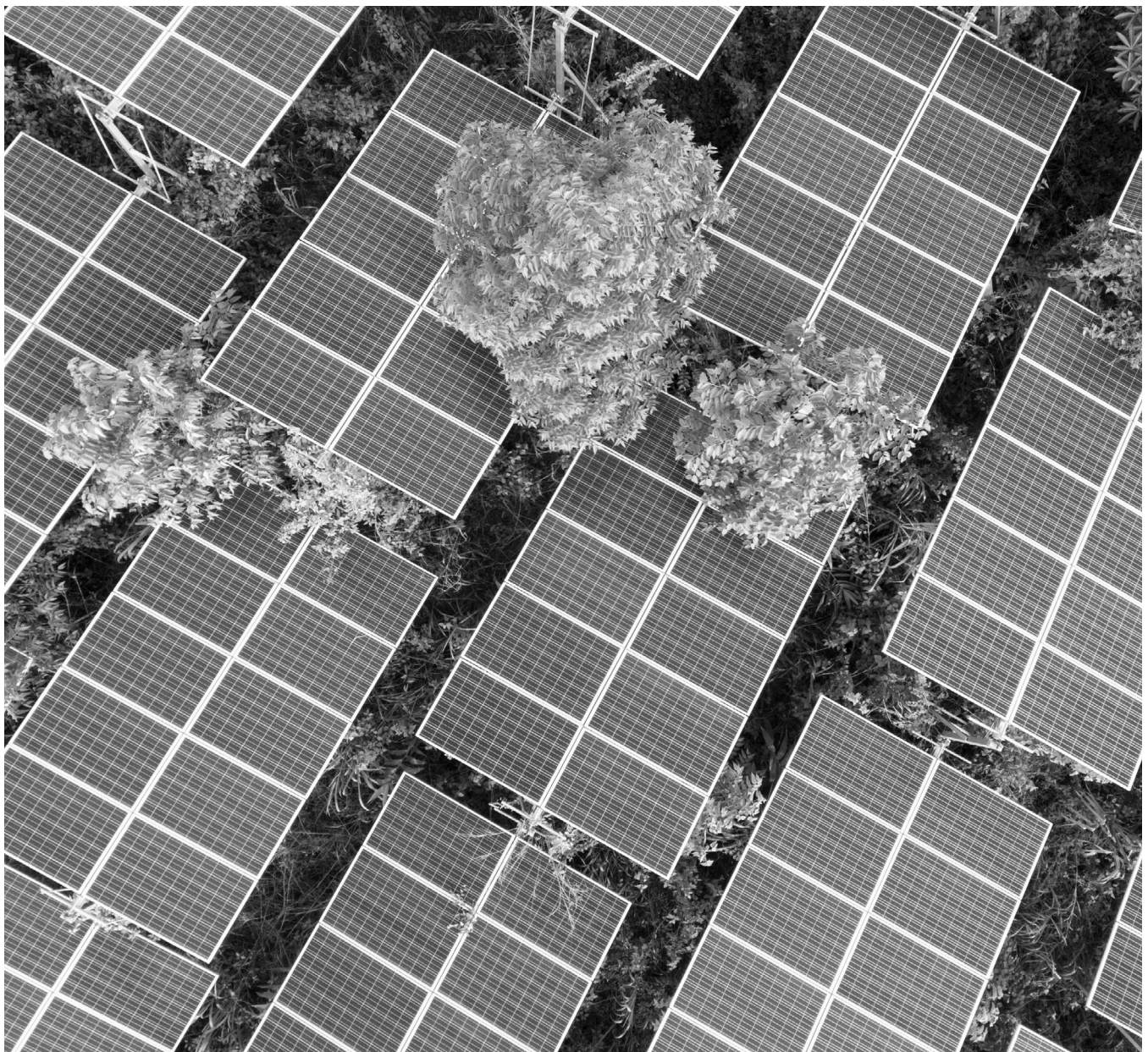
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- 125 City of New York, NYC Smart City Testbed, Clean Construction Innovation Pilot



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