



Acceleration plan to
make Québec the world
leader in electric and
smart transportation

EXECUTIVE SUMMARY



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a projet of

propulsion
Québec



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ABOUT THIS REPORT

Propulsion Québec commissioned Deloitte to help develop a roadmap for Quebec's electric and smart transportation (EST) ecosystem.

The project mapped and strategically analyzed the market, not just in North America but globally. The resulting roadmap is an acceleration plan to make Quebec a global EST leader by 2030. It has 8 strategic themes with 225 specific initiatives carried out by the cluster and various Quebec ecosystem stakeholders. You can view the progress of each initiative through a tool on the Propulsion Québec website.

ACKNOWLEDGEMENTS

This project was completed with support from our partners: the **Government of Quebec (Ministère de l'Économie et de l'Innovation and Ministère de l'Environnement et de la Lutte contre les changements climatiques)**, **Desjardins Group**, **Hydro-Québec**, **IVEY Foundation**, **Communauté métropolitaine de Montréal**, **Deloitte**, and **Pôle d'excellence de l'industrie des systèmes électroniques du Québec (ISEQ)**.





MESSAGE FROM THE CEO OF PROPULSION QUÉBEC

"Ambition 2030 EST will accelerate the push to carbon neutrality and play a central role in the effort to reduce transportation-related greenhouse gases in Quebec"



The fight against climate change and greenhouse gas (GHG) emission reductions—these are things we read and hear about every day. According to Quebec's greenhouse gas emission inventory¹, transportation alone accounted for 43.3% of GHG emissions in 2019. As a result, Propulsion Québec (the province's cluster for electric and smart transportation) along with its members and partners have stepped up efforts to promote a vital energy transition in this key sector of Quebec's economy.

To make progress in this regard, transportation stakeholders face significant challenges:



Electrify freight fleets as well as special purpose vehicles and RVs



Make Quebec a global innovation and research hub to attract investment and emerging EST talent²



Offer Quebecers a wide array of enhanced public transit solutions through innovative infrastructure and optimal data management

Propulsion Québec and its 250 members have noted the clear need for an industrial strategy for this sector and for sustainable mobility in general. As Quebec's cluster for electric and smart transportation, Propulsion Québec has made it its mission to take action. Over the past year, the cluster conducted a major engagement exercise to create Ambition EST 2030, a roadmap with 8 strategic themes and 225 initiatives designed to make Quebec a world leader in electric and smart transportation (EST). The roadmap provides our industry with a basic structure for developing local networks and identifies the most promising sectors for electric and smart transportation in Quebec. The goal is to use the roadmap to position Quebec as a

¹ Source: Quebec GHG emissions inventory, 2019: <https://www.quebec.ca/nouvelles/actualites/details/publication-de-linventaire-quebecois-des-emissions-de-gaz-a-effet-de-serre-pour-lannee-2019-37086>

² EST: Electric and smart transportation



model for innovation by improving our sector's economic, social, and environmental impact while helping the Quebec government achieve these aims.

To help ensure the roadmap serves as a genuine instrument for advancing our industry, we've developed an interactive data visualization tool to track implementation of the 225 initiatives. This platform is available online so that stakeholders can share their progress, and everyone can see how this key action plan is being carried out.

Ambition 2030 EST will help a wide range of stakeholders, private companies, public and government organizations, and research and innovation centers that have worked alongside us to complete these initiatives and play a key role in mobility and the more sustainable, green, and prosperous economy of tomorrow.

Propulsion Québec will continue this process and carry out the 225 initiatives with key partners (Government of Quebec [Ministère de l'Économie et de l'Innovation], Caisse de dépôt et placement du Québec [CDPQ], Desjardins Group, Hydro-Québec, IVEY Foundation, Communauté métropolitaine de Montréal, Deloitte, and ISEQ), all of whom I wish to thank personally.

Together we are proud to make Quebec a world leader in electric and smart transportation.

SARAH HOUDE
CEO, Propulsion Québec



A UNIQUE INDUSTRIAL ROADMAP IN CANADA THAT AIMS TO POSITION QUEBEC AS A WORLD LEADER IN A STRATEGIC ZERO EMISSION INDUSTRY

QUEBEC'S UNDISPUTED ASSETS

Quebec has everything it needs to successfully transition to electric and smart ground transportation and position itself as a global leader in this industry:

			
Natural resources: cobalt, nickel etc	Technology and innovation	Public Policy	Experimentation

Our region is known for its expertise in the subsectors of rail transportation, recreational vehicles (RVs), special purpose vehicles, and medium and heavy vehicles.

To maintain and improve this lead, Propulsion Québec, the cluster for electric and smart transportation, worked with Deloitte on *Ambition 2030 EST: An acceleration plan and a true roadmap to develop this promising sector to the fullest, make Quebec a world leader in electric and smart transportation by 2030, and help fight climate change.*

A SOUND METHODOLOGY ENDORSED BY EXPERTS

To prepare the roadmap, Propulsion Québec began with a strategic assessment (including extensive consultations with members, stakeholders from Quebec's EST industry, and Deloitte's network of global experts) before creating a map of the industry.



More than 200 participants involved in a collaborative and unifying reflexion process!



3 Ideation Workshops



Priorization Survey



6 Thematic Workshops



Presentation of the roadmap to our members



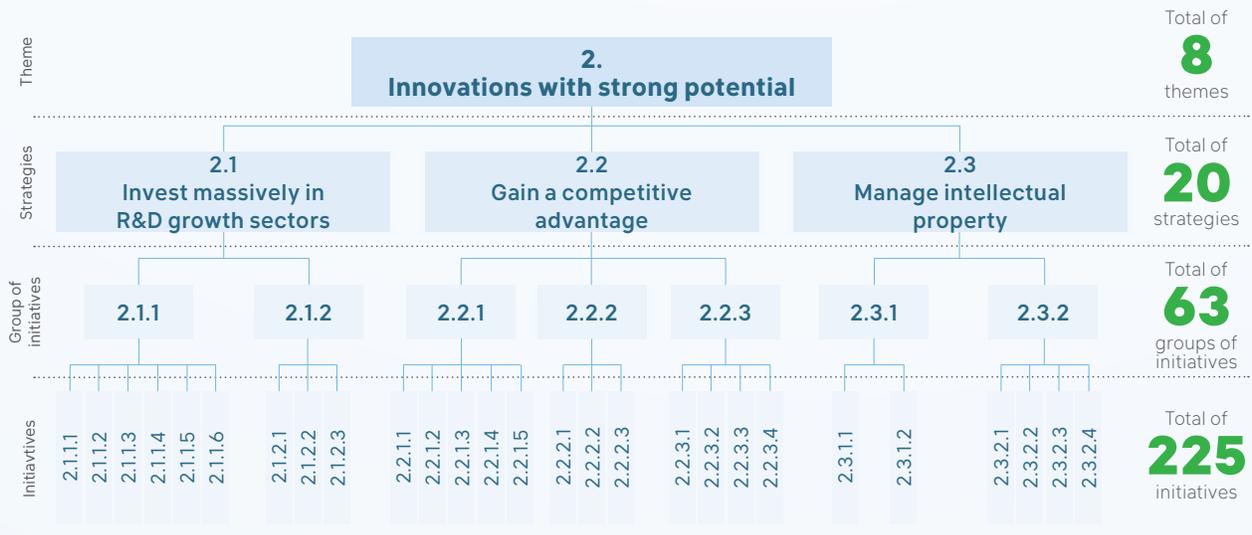
Mobilisation sessions with dozens of partners

Propulsion Québec drew on analyses of:

- Global trends in mobility and transportation
- Quebec's strengths and weaknesses: Interviews with experts in Quebec's electric and smart transportation industry
- Government targets (Canada, Quebec, Montreal, U.S.)

The roadmap has not only allowed us to identify our industry's most promising sectors and high-growth-potential subsectors, but it has also enabled us to draw up a list of actions to be taken in Quebec by 2030 to develop electric and smart transportation to the fullest.

We identified eight main strategic themes for key priority areas in our industry and then listed 225 initiatives on an interactive dashboard.





A LARGE-SCALE MOBILIZATION

To unite Quebec’s EST industry around the roadmap, our team identified key EST players based on their activities and missions and secured their formal commitment to coordinate initiatives in their own areas of expertise throughout the roadmap duration. We met with many of them in October 2021 to engage them in this joint effort to reduce GHG emissions and develop our industry.

Given the enthusiasm generated by this process among organizations and their eagerness to make Quebec an EST leader, Propulsion Québec is planning other engagement initiatives and phases. Organizations are invited to signal their interest in getting involved via the online form on the [Ambition 2030 EST page](#).

ONLINE INTERACTIVE DASHBOARD



To keep up engagement for the next 8 years and develop the 225 initiatives at a steady pace, Propulsion Québec has created an online dashboard, available in English and French, for anyone interested in tracking the steps being made to advance electric and smart transportation. The dashboard lets roadmap stakeholders post updates on their initiatives and tell the world how proud they are to help achieve this important collective goal.



Propulsion Québec provides this tool on its website



AMBITION 2030 EST: A COMMITMENT TO QUEBEC'S FUTURE

The EST ecosystem roadmap will be a chance for Quebec to reduce GHG emissions, improve mobility for Quebecers, make Quebec businesses more competitive, and boost a key sector of the economy.



Autonomy

Meet our huge local need for electric and smart transportation by 2030 by improving our trade balance with locally produced strategic infrastructure and vehicles.



EST leaders

Help our neighbors meet their needs and allow Quebec to benefit economically. Exporting EST goods and services world renowned for their quality and innovation will help secure Quebec's place as an industry leader.



GHG reduction

Play a key role in approaching North American climate targets so we can improve our environmental record and position Quebec as a trailblazer.



EIGHT THEMES FOR A PROSPEROUS, SUSTAINABLE QUEBEC

By looking at growth and trends in our ecosystem, observing what other industries and countries have done right, and consulting with experts, our members have identified eight key themes to successfully develop EST and the Quebec economy



DEVELOPING A WORLD-CLASS TALENT POOL

With its [Horizon 2050](#) study, published in 2020, and its [En Route! La destination carrières en transports électriques et intelligents project](#), Propulsion Québec has been sounding the alarm for several years now about current and future labor shortages in the EST sector.

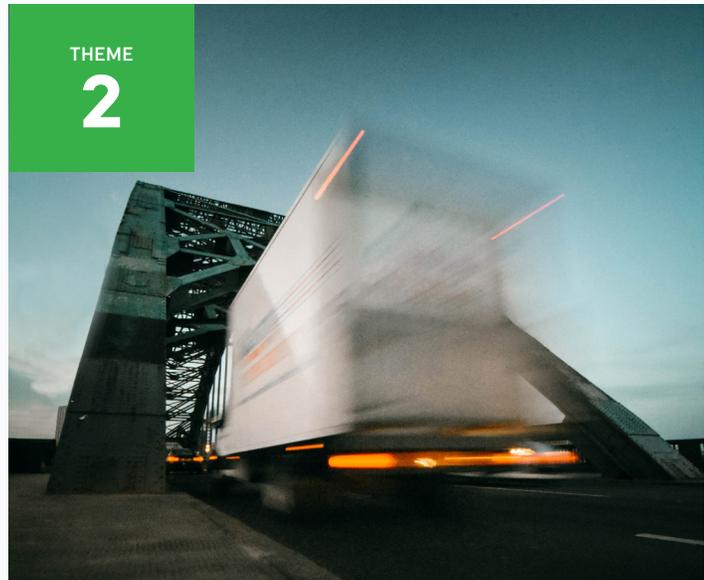
Among other things, we propose to:

- Develop training programs, specialized education, and distinguished research chairs
- Run a targeted campaign to recruit international researchers
- Implement Cité de la mobilité durable, which will provide a space to promote and grow the number of innovative research projects so we can attract the best talent



STIMULATE THE DEVELOPMENT OF INNOVATIONS WITH STRONG COMMERCIAL POTENTIAL

Quebec needs to define its R&D strategy for our sector. Ambition EST 2030 has helped identify and prioritize markets with strong commercial potential in certain key sectors and recommends over-investing in R&D in these sectors to maintain and improve our competitive advantage:



Focus on promising niches and markets

- Zero-emission vehicle and parts manufacturing
- Quebec battery industry
- Charging infrastructure
- Connected and autonomous vehicles, parts, systems, software, and solutions
- Mobility logistics solutions
- Simulations and tests
- Smart infrastructure

Among other things, we propose to:

- Set up an annual R&D forum for the EST sector and develop support tools to help organize R&D consortiums
- Build strategic partnerships for promising niches in Canada and abroad
- Position Quebec as the champion of intellectual property management and ensure EST innovation spinoffs stay in Quebec



LEAD THE EV TRANSITION EFFORT IN NORTH AMERICA

Quebec leads the rest of North America in public policy in this area and is known for its electric transition expertise for trains, RVs, special purpose vehicles, and medium and heavy vehicles.

Among other things, we propose to:

- Over-invest in our ecosystem to boost production capacity, identify vital and strategic parts of our value chain, and, where possible, develop local alternatives, new alliances, or new products to help limit our dependence
- Develop tools to track fleet electrification
- Accelerate and support the large-scale electric transition of Quebec's private and public sector fleets, and aggressively promote it to North American stakeholders to boost industry sales.



ACCELERATE INFRASTRUCTURE DEPLOYMENT

Electric and smart vehicles are invariably rolled out in tandem with infrastructure. We cannot reach our economic and environmental targets if we don't have enough EST charging infrastructure.

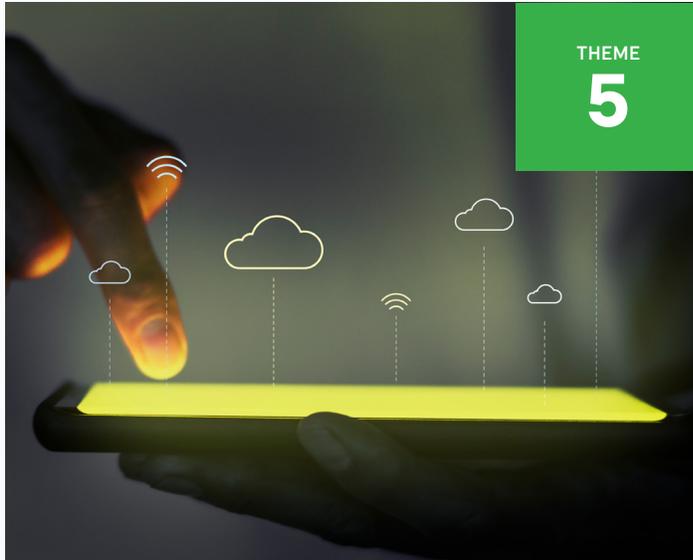
THEME

4



Among other things, we propose to:

- Track new charging infrastructure technology on an ongoing basis and promote and support this high-value knowledge in our region
- Help Quebec municipalities by drawing up infrastructure rollout plans and developing planning tools for different types of municipalities
- Promote a comprehensive, safe, smart infrastructure rollout in Quebec and around the world and actively promote visionary urban planning for new mobility solutions



FOSTER COLLABORATIVE AND SECURE DATA MANAGEMENT

Montreal is a renowned global hub for data management, and Quebec's expertise in AI is an invaluable asset the EST sector should make the most of.

Among other things, we propose to:

- Identify data monetization models that align with the transportation sector, and conduct business model case studies
- Bring the first integrated mobility projects to various Quebec cities
- Set standards and create data management models with fair, transparent, and secure governance to manage mobility data



BOOST SIMULATION, EXPERIMENTATION, AND TESTING CAPABILITIES TO BECOME A GLOBAL LEADER

Quebec's vast geography and unique climate have given rise to organizations with testing expertise and helped make Quebec the perfect terrain to develop EST for every type of environment.



Among other things, we propose to:

- Increase the number of experimental and testing spaces and solutions throughout Quebec and offer comprehensive support services for simulation, experimentation, and testing through Cité de la mobilité durable
- Identify existing skills, equipment, and capabilities at Quebec's testing centers
- Make the most of Quebec's virtual simulation strengths and use them for EST



cité DE LA MOBILITÉ DURABLE

INNOVER POUR AVANCER

propulsion
Québec

CARGOM
GROUPE METROPOLITAIN
DE LA MOBILITÉ ET TRANSPORT
DU QUÉBEC



THEME
7



FACILITATE ACCESS TO CAPITAL AND FUNDING OPPORTUNITIES

Organizations in the EST ecosystem operate in a competitive environment. Quebec stakeholders are at a disadvantage in relation to their U.S. counterparts when it comes to financing since Quebec financing rounds often last longer and raise less money.

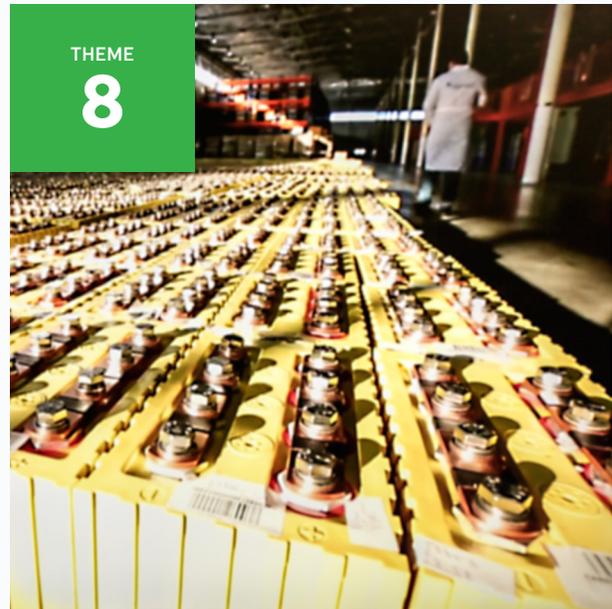
Among other things, we propose to:

- Attract local and foreign businesses and investors with an improved Quebec funding chain at each growth stage. One way to do this is by creating an investment fund to support start-ups and maximize their chance of becoming champions.
- Educate local investors on opportunities, business models, and innovative valuation methods in the EST sector
- Update and promote the EST business case to engage potential foreign co-investors



LEVERAGE THE BATTERY INDUSTRY TO SUPPORT EST GROWTH

A battery represents 50% of an electric vehicle's cost. The raw materials used to make batteries are currently exported from Quebec, so we miss out on the added value generated from processing them. Quebec's ability to compete across the chain will have a key impact on the whole EST ecosystem.



Among other things, we propose to:

- Promote the value proposition of Quebec batteries abroad Organize annual events and conferences for the local and global automotive industry
- Conduct a study on the strategic advantages Quebec could bring to the European and American supply chain so it can become part of their value chains
- Expand the Quebec ecosystem's reach into Ontario, the rest of Canada, the U.S., and Europe to help cement the reputation of our ecosystem stakeholders as green, reliable, secure suppliers of battery materials and components



CONCLUSION

The Quebec's ecosystem needed this roadmap. Ambition 2030 EST consists of a series of initiatives, currently being rolled out or ready to be rolled out in sequence, to establish Quebec as a world leader in EST. Engagement by all stakeholders will help Quebec reach its full potential in this key sector, achieve GHG reduction targets, and be recognized as a global model and benchmark for EST.

In pursuing its ongoing green economic recovery, Quebec can now count on Ambition 2030 EST as an industry strategy until 2030. This roadmap invites us to take action to promote and accelerate the creation of Quebec EST industry that are of great value and benefit to Quebec and Quebecers, but whose environmental footprint is increasingly smaller.

The eight Ambition 2030 EST themes are key to the EST industry's success. Quebec is also fortunate to have plentiful resources, know-how, and renowned expertise in EST.

It's time to act to ensure a prosperous, innovative, inspiring, eco-friendly Quebec that will benefit generations to come.



APPENDICES



APPENDIX 1

MAPPING OUR ECOSYSTEM

The map of Quebec’s EST ecosystem is based on organizations in Propulsion Québec’s databases, with additional research carried out by the Deloitte team.

493 organizations identified including 308 private companies

RÉPARTITION DU NOMBRE D’ORGANISMES IMPLIQUÉS DANS CHAQUE SECTEUR ET SOUS-SECTEUR DE L’ÉCOSYSTÈME DES TEI DU QUÉBEC

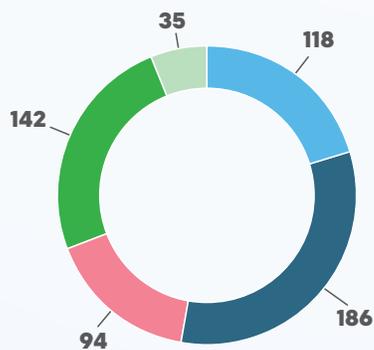
 <p>Connected and Autonomous Vehicles</p>	<ul style="list-style-type: none"> • Hardware • Software • Integrated solution • Manufacturing and conversion • Infotainment system 	<ul style="list-style-type: none"> • Other analytical solutions for intelligent vehicles • Télématics • V2X Communication
 <p>Zero-Emission Vehicles</p>	<ul style="list-style-type: none"> • Raw materials and specific material for zero-emission vehicles • Components and batteries manufacturing and assembling • Battery life cycle management services • ZEV manufacturing or conversion 	<ul style="list-style-type: none"> • ZEV equipment and component manufacturing • Other energy storage solutions manufacturing
 <p>Infrastructures</p>	<ul style="list-style-type: none"> • HD Mapping • Intelligent infrastructures manufacturing • Energy operations and distribution • Energy production • Charging equipment manufacturing 	<ul style="list-style-type: none"> • Charging infrastructure operations • Charging network management solution • Other equipment and electrical component manufacturing
 <p>Mobility Services</p>	<ul style="list-style-type: none"> • Multimodal and integrated mobility hub (MaaS) • Vehicle rental services • Vehicle pooling or public taxi services • Vehicle sharing services • Smart parking services • First and last mile delivery services • Micro-mobility services • Logistics solutions 	<ul style="list-style-type: none"> • Ride-hailing services • Mobility consulting services (incl. sustainability assessment and transition) • Movement of people services • Fleet management solutions
 <p>Support Services</p>	<ul style="list-style-type: none"> • Cybersecurity solutions • Payment services • Simulation and testing 	<ul style="list-style-type: none"> • ZEV maintenance services • CAV maintenance services • Insurance services



RÉPARTITION GÉOGRAPHIQUE

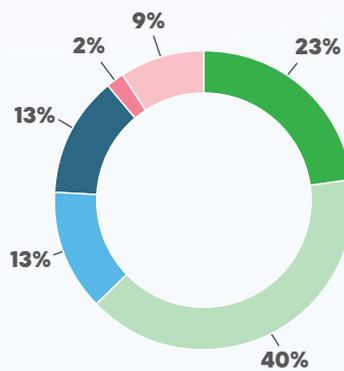


Distribution by mobility sector



- Connected and Autonomous Vehicles (CAV)
- Zero-Emission Vehicles (ZEV)
- Infrastructures
- Mobility Services
- Support Services

Distribution of the number of employees in private organizations



- 1 to 9 employees
- 10 to 49 employees
- 50 to 99 employees
- 100 to 249 employees
- 250 to 499 employees
- 500+ employees



APPENDIX 2

ANALYSE INTERNATIONALE D'ÉCOSYSTÈMES TEI INSPIRANTS

Plusieurs pays ont mis en place des réglementations, politiques de recherche, d'expérimentation ou se sont distingués par une expertise particulière. Nous avons regroupé ces éléments remarquables afin d'en reconnaître les bonnes pratiques adaptables au territoire québécois :



ONTARIO, CANADA

MULTI-CLIMATE CAV¹ TESTING AND R&D² HUB

- North America's fastest growing tech market with most VC investments going to the ICT sector
- First level-5 autonomous vehicle testing facilities in extreme weather environment
- The province's proximity with Michigan facilitates collaboration and supply chain integration
- Talent pool attracted by the strong start-up scene fueled by regional innovation centers and public funding support



UNITED KINGDOM

CAM GLOBAL DEVELOPMENT CENTER

- Ambition to become the central hub for end-to-end CAM development
- Agile regulations to rapidly enable and facilitate CAM testing for industry players
- Excellent capacity to foster collaboration between academia, government and private sectors
- High level of coordination and structure in the deployment of future mobility initiatives

¹ CAV : Connected and Autonomous Vehicles

² R&D : Research and Development

³ CAM : Connected and automated Mobility



TEL-AVIV, ISRAEL

START-UP NATION AND CYBER POWERHOUSE

- Skilled talent pool with an entrepreneurial mindset emerging from the mandatory military service
- High density of key success factors (start-ups, RC⁴ investments and engineers per capita, and R&D Investments in GDP percentage)
- Increased focus on existing cybersecurity expertise
- Taping into their digital capabilities to lead the mobility transition



SINGAPORE, SINGAPORE

SMART CITY FOR THE LONG VIEW

- Government-driven ecosystem benefited from a long-term view, and strong focus on attracting multinational corporations to establish headquarters
- Growing start-up scene with active venture capital and global export scope given limited local market
- Active academic and R&D capabilities enabled by partnership with world-renowned research institutes
- Access to funding through strong business establishments



MICHIGAN, US

FROM THE MOTOR TO THE MOBILITY CITY

- The multi-stakeholder involvement in the ecosystem ensures vitality through collaboration
- Leading CAV testing centers including Mcity, American Center for Mobility and GM Mobility Research Center
- Skills development for support services led by the Michigan Mobility Institute
- Detroit, for CAV, and Ann Arbor, for smart mobility, are hubs for the testing and deployment of the future of mobility



CALIFORNIA, US

WORLD'S TECH & INNOVATION CAPITAL

- San Francisco Bay Area and Los Angeles are the innovation centers attracting the highest number of start-ups and VC investments in the US
- Risk reward culture contributes to the pace of deployment of new mobility solutions
- Plans until 2050 to improve the mobility infrastructure for public and active transportation
- World-renowned universities collaborate with the industry on R&D and prepare a highly qualified mobile workforce

⁴ RC : Risk Capital