TRANSPORTATION FUTURES

ZERO EMISSION TRANSPORTATION & INFRASTRUCTURE

British Columbia is a global leader in research and development for low-carbon mobility. Nevertheless, the transportation sector continues to be the single largest source of greenhouse gas (GHG) emissions in the province. Moreover, the local leadership has not been fully exploited to produce jobs, develop new markets, and build a local supply chain.

The University of British Columbia (UBC) is leading a future of transportation initiative. One of the key areas is zero emission transportation and infrastructure. UBC already has a fleet of electric and liquefied natural gas (LNG) vehicles. Hydrogen is another one of the potential candidates that UBC is exploring. UBC will use the leverage of its research and training capacity, its human, financial and infrastructure capital, and its reputation as a catalyst for regional development.

NATURAL GAS

The natural gas sector has emerged as an important industrial and economic factor for Western Canada. This industry has grown significantly in the past two decades, and Canada is now the world's fifth largest producer of natural gas and accounts for around five per cent of global production.

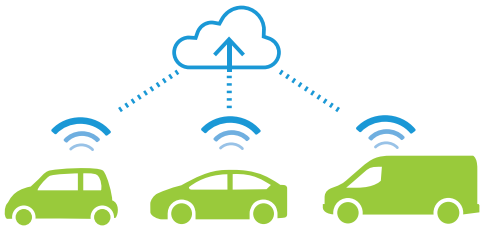
Canada goes beyond the extraction and production of liquefied natural gas (LNG). It is uniquely positioned to become a global provider of clean energy technologies and services, while simultaneously reducing domestic carbon emissions. LNG Innovation in Canada is current and could be pushed and led by the Clean Energy Research Centre (CERC), the consortium and the consortium members.

AUTOMATED and CONNECTED ELECTRIC VEHICLES

Automated and Connected Electric (ACE) Vehicles are a convergence point for a variety of cutting edge technologies and functionalities:

SENSOR TECHNOLOGIES

Sensor technologies allow a vehicle to determine its position and detect nearby objects and obstacles.



COMMUNICATION TECHNOLOGIES

Communication technologies allow a vehicle to share information about its surroundings, hazards and opportunities with nearby vehicles, roadside infrastructure and traffic management systems.

COMPUTER TECHNOLOGIES

Computing technologies allow a vehicle to process the incoming data and take appropriate actions to ensure safety, achieve efficiency and achieve desired goals.

HUMAN INTERFACE TECHNOLOGIES

Human Interface technologies allow operators to react to prompts and indications in a speedy and efficient manner.

CLEAN, CONNECTED, SAFE TRANSPORTATION

Renewables
to transportation

Low-carbon fuels
and technology

Autonomous,
connected vehicles

EXPECTED BREAKTHROUGHS

Programmable solar infrastructure, new power converters, power to gas

New materials and devices. Fuel from water and sunlight, CO2 recycling

New digital protocols for safe, reliable and private connected vehicles

The research program aims to transform the energy chain for transportation. The expected research outcomes include not only scientific and technological breakthroughs (new materials and devices for energy conversion, digital communication protocols, control algorithms, etc.), but also new business models and policy instruments. Makinglow-carbon infrastructure competitive is a national challenge for conventional refueling. However, new business models become possible when renewable sources (solar, wind, etc.) are linked to fuel production, energy storage, and electrical and civil infrastructures (smart grids and roads). Connected and autonomous vehicles enable new, disruptive ownership models, and new technologies will be required to ensure safety, privacy, and reliability. Zero-fatality transportation is only possible when vehicle and communications technologies are embedded into smart city design and local, regional, and national policy instruments (modelling tools, incentives, taxes, fuel standards, etc.).

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Safe & connected infastructure

Smart city design

Zero fatality roads & infrastructure, goods movement, cross-border efficiency

New ownership models, multimodal infrastructure use, just-in-time transport

The Transportation Futures initiative benefits from international partnerships with Germany, South Korea, Italy, and South Africa, a national consortium on urban transit (CUTRIC), and three industrial consortia in Western Canada (for electric vehicles, hydrogen, and natural gas). Several research initiatives are currently underway in collaboration with these consortia. In the last six months, CERC has developed effective communication channels with the provincial ministry of energy and mines, and the municipalities of Surrey and Squamish.

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