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# **Government Funding Priorities for Battery Technologies in Canada**

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**Presentation to NAATBatt2018, San Antonio, USA**



# Agenda

- Battery industry and R&D in Canada
- Battery and EVs in Canada
- Funding of Battery activities by Federal agencies

## Note

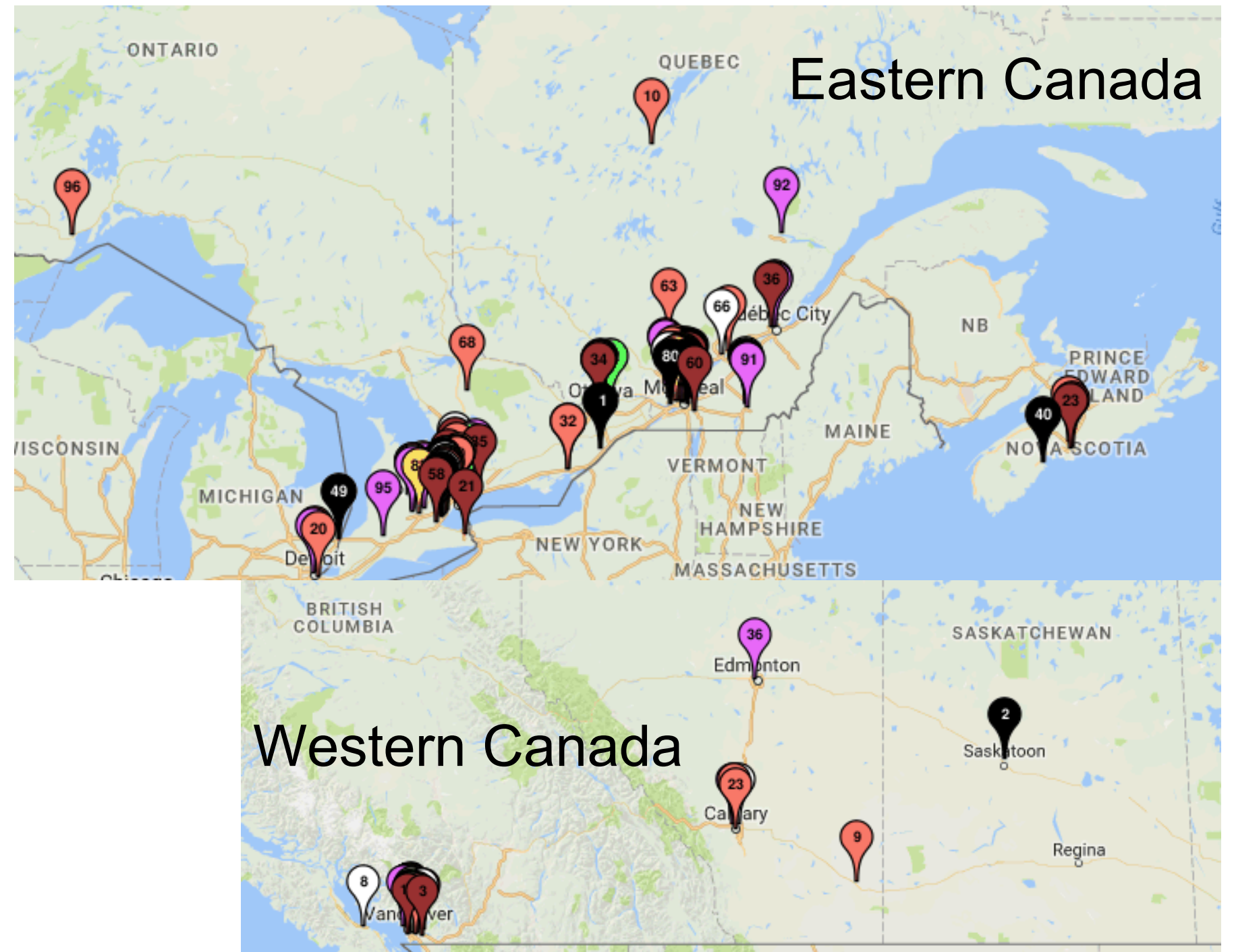
It is a high-level description of Canadian Government funding of battery activities based on public information.

# Battery industry and R&D in Canada

## Before 2000

- Alkaline (Duracell, Energizer)
- Lead acid (production)
- Li-ion (small players)
- Raw materials (Pb, Zn, Ni)
- Battery materials (Zn, Ni)

## 2018 (SME, Startup, and R&D groups)



# Battery and EVs in Canada

- Canadian ZEV strategy is expected in 2018
- National investment in Charging (and alternative fuel) Infrastructure of \$120 million over 4 years
- No National Strategy in battery technologies
- No National incentives for EVs – only provincial incentives
  - 2017: EV sales exceeded 1% of passenger-vehicle sales
  - Total of 50,000 EVs on the road
- Sustained funding of Battery Technology activities by Federal agencies, provincial Gvt, and Industry

# Sustainable Development Technology Canada (SDTC)

- **Funding cleantech projects: \$3.6 billion dollars in total value**
  - 347 projects supported by SDTC
  - \$989 million allocated to cleantech innovation
  - \$2.7 billion of leveraged funding
- 3.6 billion dollars in total portfolio value ([www.sdtc.ca](http://www.sdtc.ca))
- 28 projects in battery-related technologies = \$86 million SDTC
- Top 5 active projects:

Title field	Lead organization	SDTC funding
Pilot Demonstration for the Production of High-Purity LiOH and Li-carbonate	Nemaska Lithium Inc.	\$12,870,000.00
Technology to extend the range of fuel-cell powered vehicles	Loop Energy Inc.	\$7,500,000.00
Development of High Performance Lithium Ion Battery Modules for Electric Buses and Other Heavy Duty Vehicles	Electrovaya Corp.	\$3,800,000.00
Rechargeable Zinc Air Fuel Cell	ZincNyx Energy Solutions	\$2,900,000.00
Scale-up of graphene production for rapid silicon-graphene anode commercialization	Raymor Industries Inc.	\$2,900,000.00

# Natural Resources Canada (NRCan)

- NRCan (<http://www.nrcan.gc.ca>) supports projects, infrastructures and technologies in various areas, namely EVs, batteries, and alternative fuels.
- EV infrastructure (eg \$30 million in 2018)
- Program of Energy Research and Development (PERD)
  - ✓ Funding of four-year NRC projects in battery technologies
- Energy Innovation Program (EIP)
  - ✓ Funding of four-year NRC projects in battery technologies
- Clean Growth Program (\$115 million) – LOI stage
  - ✓ NRC-supported LOI in BEV technologies exceeding 10 millions

# Other Canadian Agencies

- Transport Canada (<https://www.tc.gc.ca>) is responsible for transportation policies and programs. They fund projects in battery technologies (eg safety and abuse testing).
- Environment Canada (<https://www.canada.ca/en/environment-climate-change.html>). They fund projects in BEV and battery technologies (eg low temperature BEV operation).

# Natural Sciences and Engineering Research Council of Canada (NSERC)

- NSERC supports university students in their advanced studies, promotes and supports discovery research, and fosters innovation by encouraging Canadian companies to participate and invest in postsecondary research projects.
- Over \$20 million funding of about 400 battery projects in 2014-17
- Automotive Partnership Canada Project (\$145 million, 2012-17)
- Two Industrial Chairs at Dalhousie Univ (Dahn, Obrovac), and one at McMaster (Habibi, Hybrid/Electric Vehicle Powertrain Diagnostics) dedicated to Li-ion batteries and HEV/BEV

# NRC – R&D programs supporting battery-related activities

- ✓ Energy Storage for Grid Stabilization and Modernization
  - \$3 million activities in various energy storage technologies
- ✓ Vehicle Propulsion Technology (2012-19)
  - \$3.5 million Li-ion battery activities in FY18 ending in March
    - \$1.0 million support from NRCan (PERD, EIP)
    - \$0.4 million support from TC
    - \$0.4 million support from ECCC
    - \$1.7 million support from industry
- ✓ There are a few dispersed activities in other programs (eg aviation and aerospace)

# NRC – Industrial Research Assistance Program (IRAP)

- Support to SME - 50% max investment in R&D projects
- Accelerate Researchg Project (ARP, \$50k max)
- Support to bigger projects can reach up to various limits (\$350k, 500k, \$1 million, and \$10 million).
- Total investment in EV, Battery, and Battery Materials projects exceeded 5 millions over the past 5 years.
  - Lithium, Graphite, Graphene



**Thank you !**

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