NRC·CNRC

Resources, Resilience and Sustainability: NRC Innovation Supporting Canada's Energy Future

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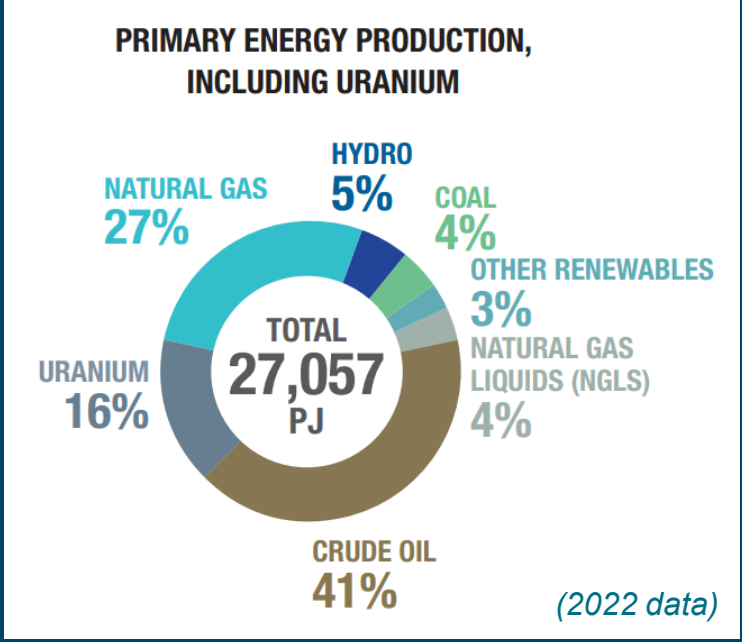
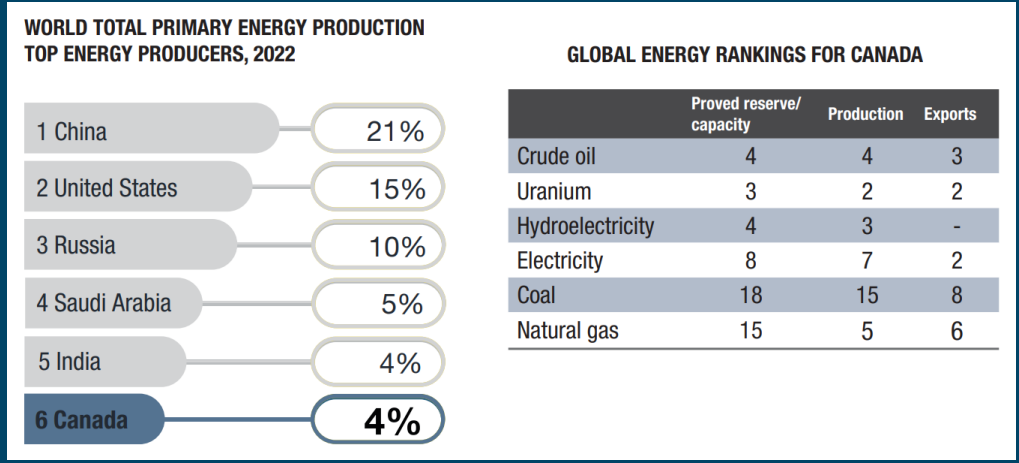
Content

1. Canada’s Energy Landscape
2. Policy Context and Challenges
3. NRC’s Role in Innovation
4. Focus on Sustainability and Clean Energy
5. Looking Ahead

CANADA'S ENERGY LANDSCAPE

Canada's Energy Production



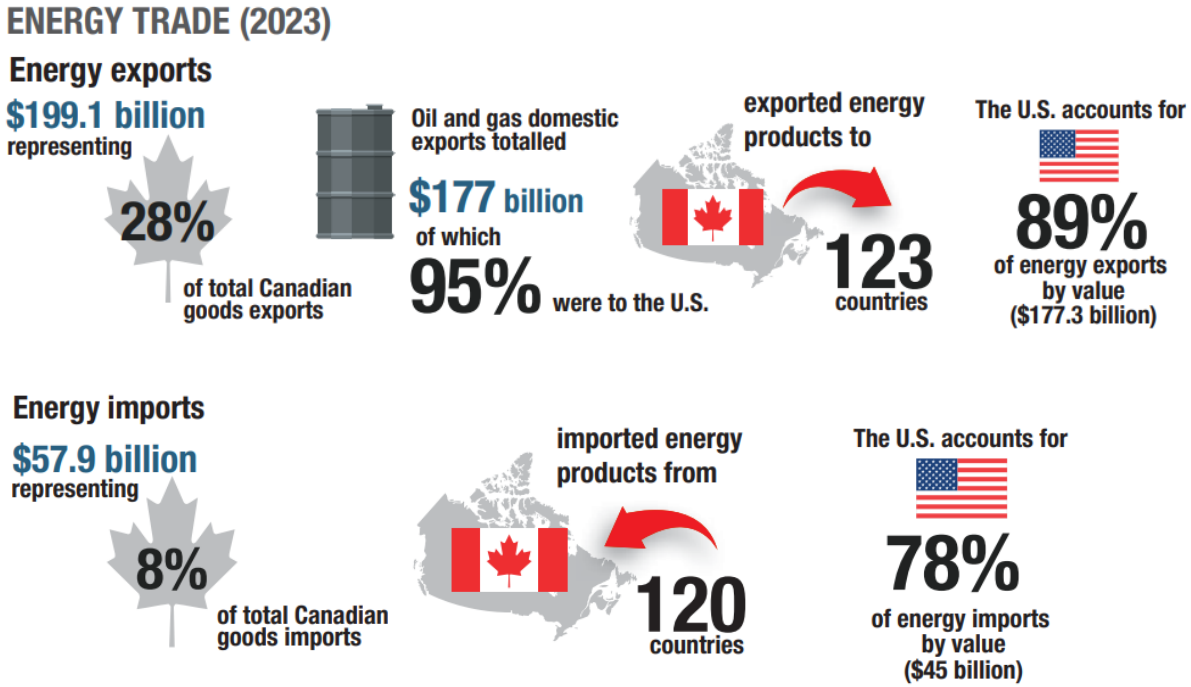


GLOBAL ENERGY RANKINGS FOR CANADA

	Proved reserve/ capacity	Production	Exports
Crude oil	4	4	3
Uranium	3	2	2
Hydroelectricity	4	3	-
Electricity	8	7	2
Coal	18	15	8
Natural gas	15	5	6

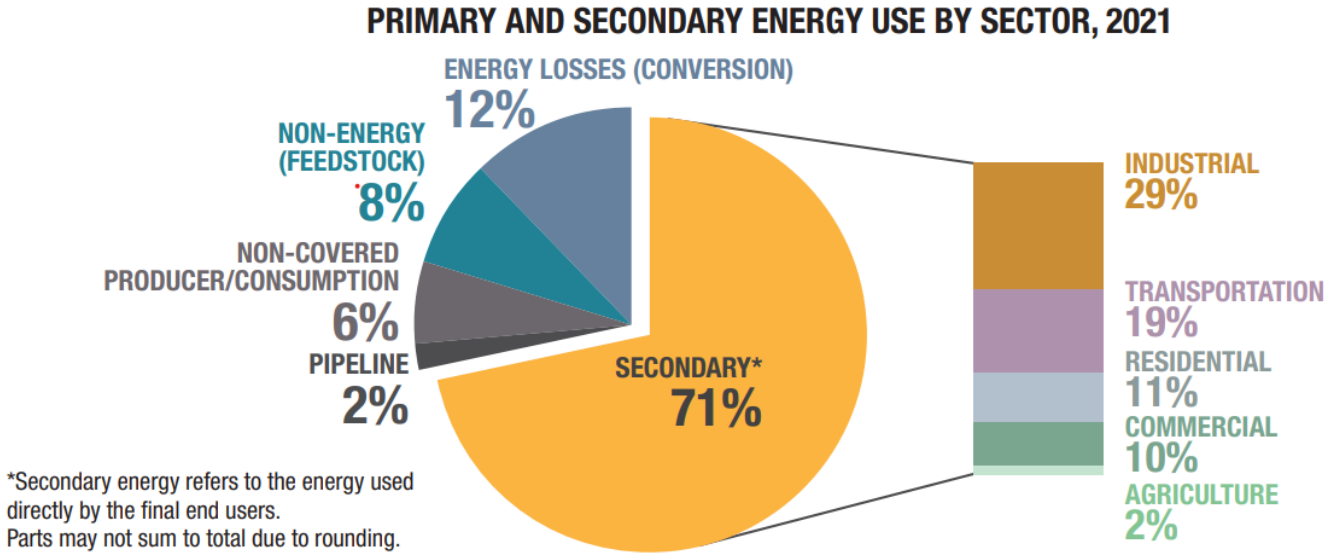
Source: NRCan Energy Fact Book 2024-2025

Energy Trade



Source: NRCan Energy Fact Book 2024-2025

Canada's Energy Consumption



Total primary energy use estimated at **12,419PJ**

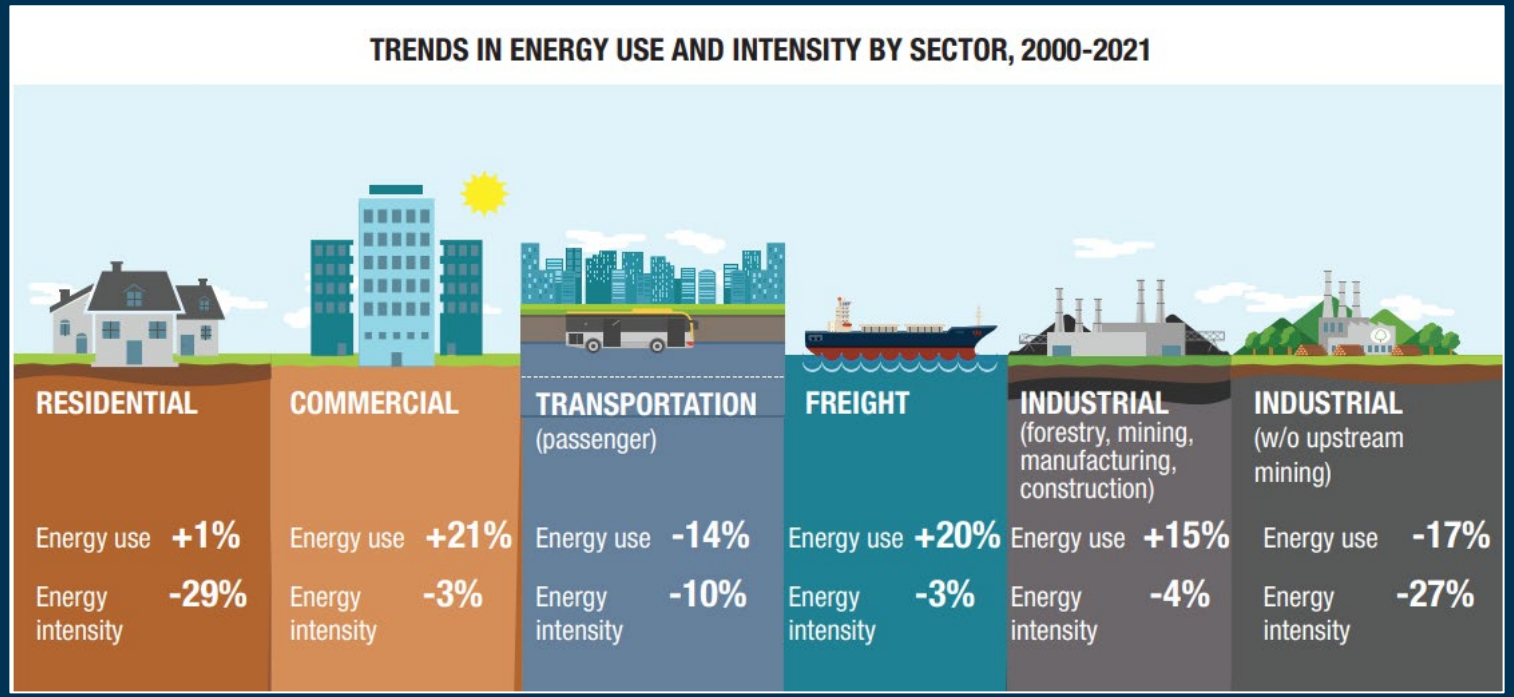
Source: NRCan Energy Fact Book 2024-2025

A Canadian Challenge

In Canada, about 82% of emissions come from energy. Canadians use more energy because of our extreme temperatures, vast landscape and dispersed population.

Similar to the rest of the world, energy consumption in Canada is increasing.

The good news: Although energy use is increasing, energy efficiency is improving.

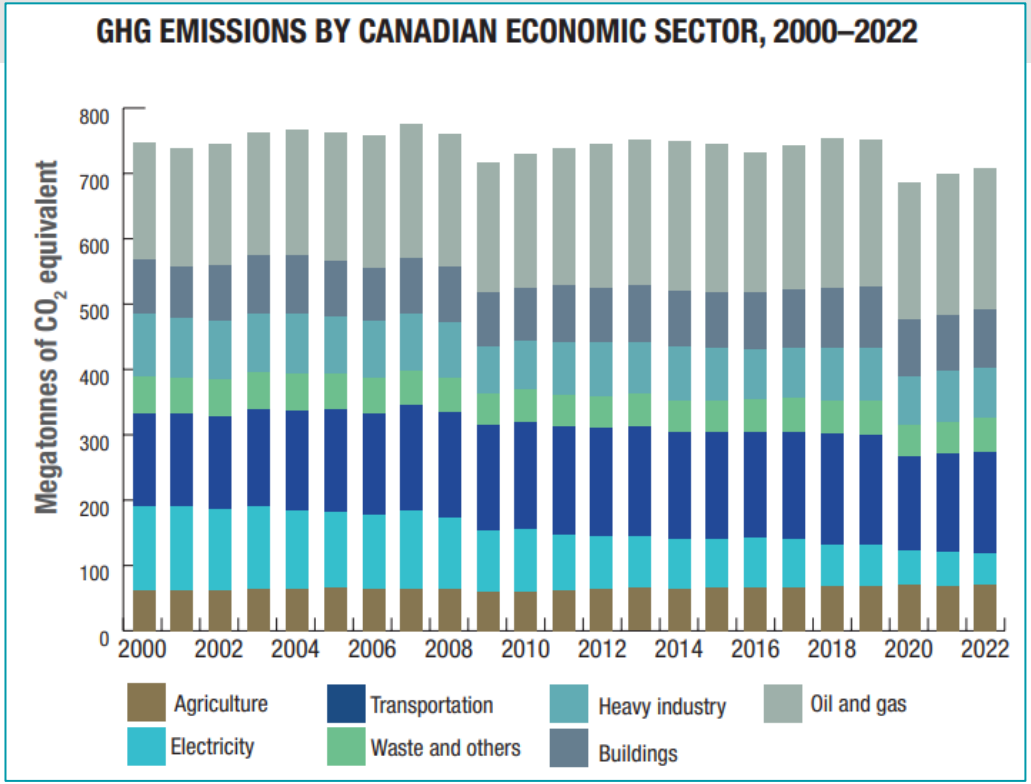


Source: NRCan Energy Fact Book 2024-2025

POLICY CONTEXT

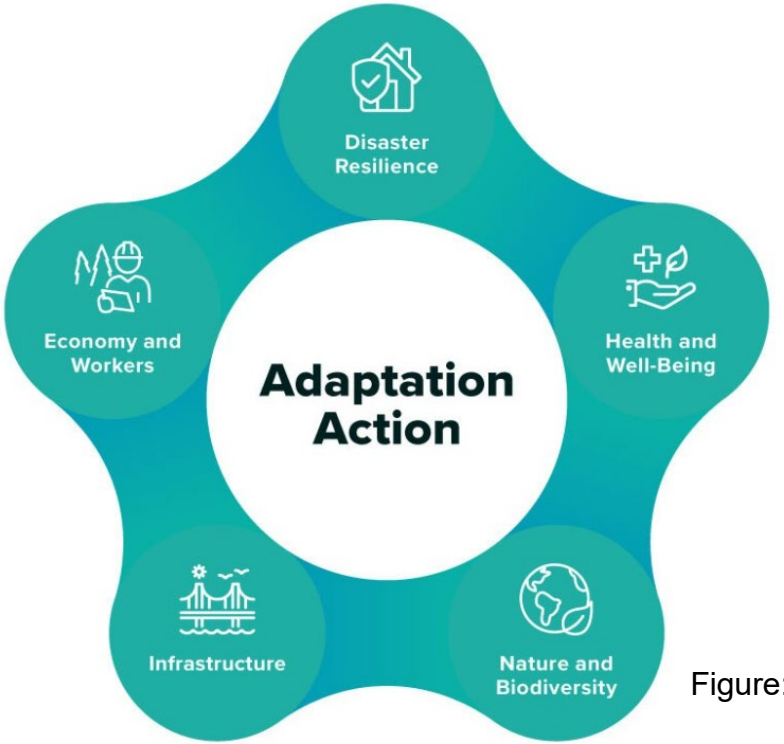
Climate Action

- 2035 emissions reduction target – to reduce greenhouse gas emissions by 45-50% below 2005 levels by 2035
- Net-zero emissions by 2050
- Adaptation strategy
- Investing in Clean Electricity generation and Clean Fuels



Source: NRCan Energy Fact Book 2024-2025

National Adaptation Strategy



Canada's National Adaptation Strategy sets an overarching direction to work on increasing resilience to the effects of climate change.

Figure: The five systems of the National Adaptation Strategy

Energy Initiatives for Indigenous Communities

The Government of Canada supports Indigenous communities in advancing clean energy projects, particularly in rural and remote communities.

These are Indigenous-led or partnerships with Indigenous organizations to build capacity in the clean energy sector

Federal Government Investments in Energy Research

Natural Resources Canada, Office of Energy Research and Development
~ 440M in 2022-23

Natural Sciences and Engineering Research Council of Canada
~ 130M in 2022-23 for energy-related R&D in Academia

Other Federal Programs
~ 180M in 2022-23

Breakdown by Technology Area:

- Clean electricity and renewables ~ 38%
- Fossil energy (including emissions reduction) ~ 25%
- Nuclear energy ~ 15%
- Cross-cutting and enabling technologies ~ 12%
- Energy efficiency ~ 10%

THE NATIONAL RESEARCH COUNCIL AND CANADIAN INNOVATION

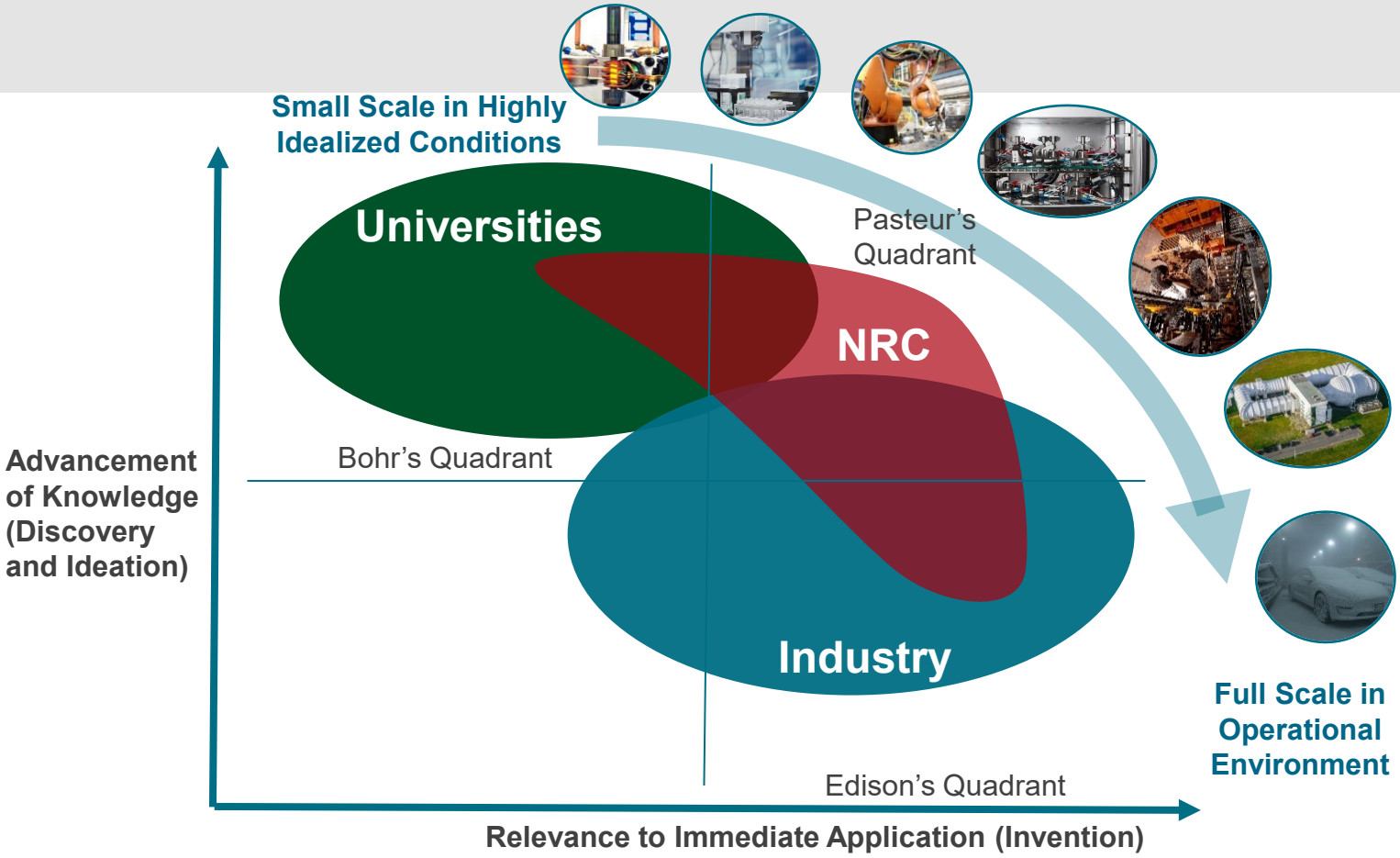
The **National Research Council of Canada** delivers value in 3 ways

We support business innovation

We support Canadian government policy objectives

We advance scientific and technical knowledge

NRC in the Canadian Innovation Ecosystem



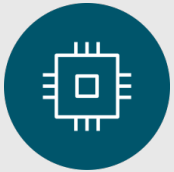
NRC Research Goals

Transportation and construction decarbonization

Climate resilient buildings, infrastructure and communities

Vaccines, therapeutics and other bio-products

Next-generation precision tools/devices



Advanced quantum-enabled technologies

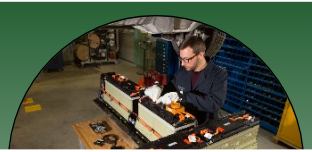
Digital research and innovation leadership

Fulfilled role in national astronomy assets and measurement standards

NRC's Climate Change and Sustainability Strategy

Mission Support Canada's industries in transitioning to a new climate economy through technology development and adoption
Support federal, provincial and territorial governments in developing effective, evidence-based climate policies

Approach Expand work with industry to develop, validate and deploy climate technologies and innovations
Include industry partners, collaborators and end-users in work with government to develop climate policies



Clean Energy Production & Storage

Expand the range of low-carbon energy sources available to industry

- Advanced Clean Energy
- Materials for Clean Fuels
- Critical Battery Minerals Initiative

Industrial Decarbonization

Technologies, processes and designs to reduce industrial GHG emissions

- Industrial Carbon Management
- Low-Carbon Built Environment
- Construction Digitalization & Productivity
- National Model Construction Codes

Low-Carbon Transportation

Electrification and fuel switching to reducing vehicle GHG emissions

- Low-Emission Aviation
- Clean & Energy-Efficient Transportation
- E-AUTO*

Adaptation & Resilience

Protecting communities and infrastructure from climate change & extreme weather

- Climate-Resilient Built Environment
- National Model Construction Codes
- Ocean
- Arctic and Northern

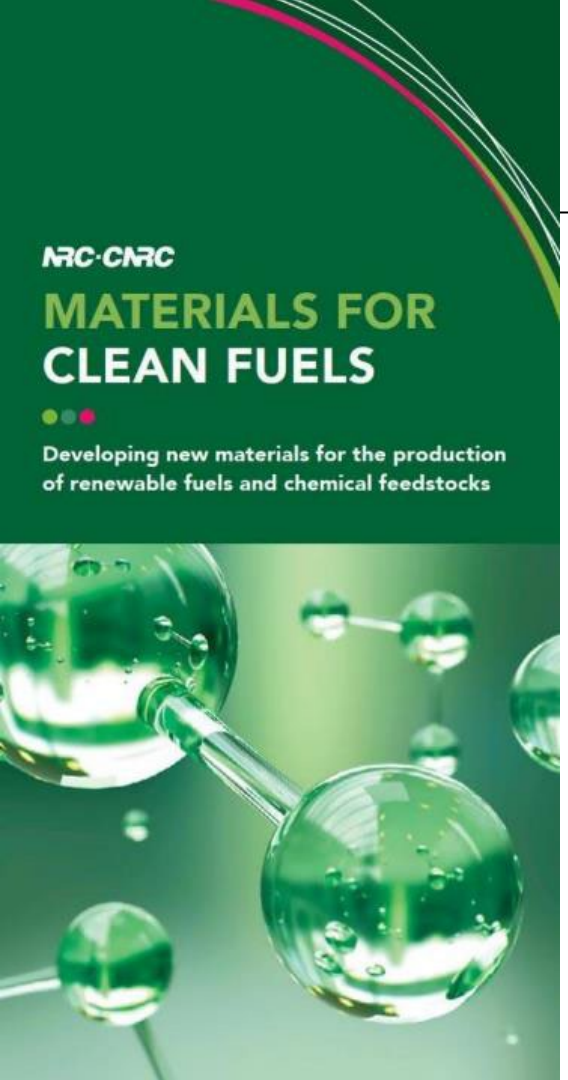
SUSTAINABLE AND CLEAN ENERGY

Advanced Clean Energy (ACE) Program

- 8-year strategic research program (2021 start)
- Focus on mid to high TRL clean energy technologies that can be moved into multiple sectors
- Designed to support priorities of the Government of Canada to meet 2050 targets and fill R&D gaps for industry
- Program' Structure:
  - Thrust 1 - Battery Energy Storage – Including the Battery Critical Materials Initiative
  - Thrust 2 - Low Carbon Fuel Switching
  - Thrust 3 - Hydrogen
  - Thrust 4 - Grid Integration

Critical Battery Materials Initiative

The Critical Battery Materials Initiative is a 4 year strategic initiative, launched in 2023, to accelerate the discovery of new processes and materials to unlock a clean, efficient and competitive battery supply chain in Canada for increased electrification



Materials for Clean Fuels (MCF) Challenge Program

- 7-year collaborative research program (2019 start)
- $57M CAD Grants and Contributions program
- Transformative high-risk, high-reward technologies at a low technology readiness level (TRL 1-4)
- Develop innovative materials for renewable fuels & chemical feedstocks
- Program' Structure:
  - Thrust 1 – CO2 Conversion
  - Thrust 2 – H2 Production
  - Thrust 3 – Accelerated Materials Discovery

LOOKING AHEAD

The NRC’s International Collaboration Model

NRC programs and researchers work with international collaborators to take research from the lab to the marketplace, where it can enhance people's lives and address some of the world’s most pressing challenges.

Vision for Canada's Energy Future

Stewardship for future generations

Thank you

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