

Alberta Energy Research Institute

Annual Report 2005-06 A Year in Review

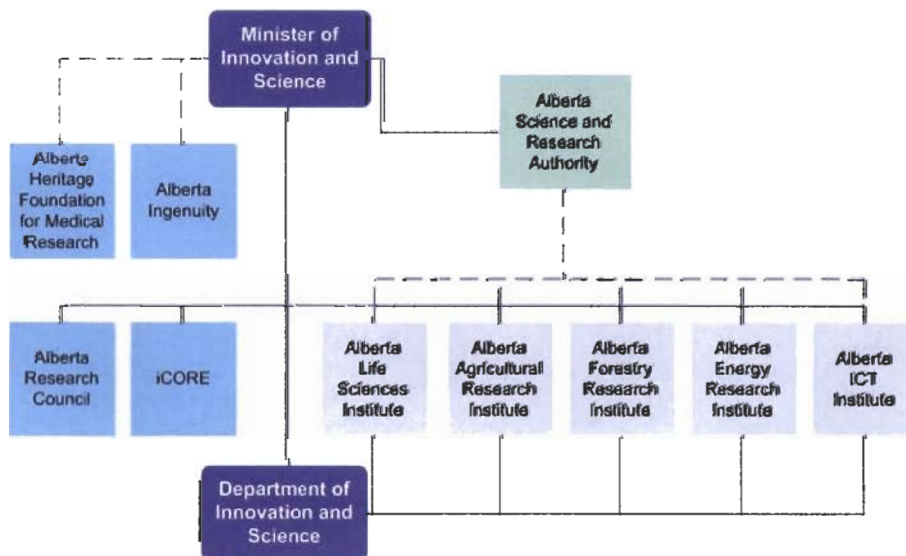
Overview

The Alberta Energy Research Institute (AERI) is an unincorporated board established under the *Alberta Science and Research Authority Act (ASRA)*. Its mandate covers research, technology development and demonstration in all forms of energy of importance to Alberta. AERI works closely with other government of Alberta departments to accomplish its mandate and goals and to ensure alignment with other strategies of government. AERI works closely with other Research Institutes and business areas within Innovation and Science, as well as key stakeholder departments of Energy, Environment and Economic Development.

The Alberta Energy Innovation Strategy and AERI's yearly business plans are designed to position Alberta for the future in energy and environment, so as to create value and build a strong Alberta economy. A major thrust of the strategy is to overcome the limitations of the present technology in improving access to resources. Alberta has a unique combination of resources that allows an integration strategy that maximizes synergies, protects the environment and aids in developing coal, oil sands, heavy oil, refining, petrochemicals and alternate energy resources.

The AERI research strategy is intended to initially lead and support the transformation of separate sectors (oil and gas, coal, power and petrochemical) of the economy into an integrated energy industry focused on the utilization of Alberta's resources to their fullest potential while ensuring clean air, water and land.

Organization Chart



AERI Board

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AERI Staff

Dr. Eddy Isaacs, Executive Director
Dr. Ted Cyr, Special Advisor, Energy Projects
Dr. Duke du Plessis, Sr. Research Manager, Clean Carbon/Coal
Alice Hedges, Planning and Operations
Douglas Komery, Sr. Research Manager, Oil Sands
Dr. Catherine Lareshen, Sr. Research Manager, Upgrading
Les Little, Sr. Research Manager, Recovery
Richard Nelson, Sr. Research Manager, Alternate & Renewable Energy
Dr. Surindar Singh, Sr. Manager, Planning and Evaluations
Marta Bor, Administrative Support, Edmonton
Susan Emilsson, Administrative Support, Calgary
Donna Kostuik, Administrative Support, Calgary

Message from the Board

The 2005-06 Strategic Business Plan was intended to advance the implementation of the Alberta Energy Innovation Strategy and to address the technical, economic, and environmental challenges faced by the energy industry with the following key principles:

- Overcome the limitations of current technology in improving access to resources
- Secure maximum value for Albertans from all energy resources
- Stimulate economic development in Alberta
- Increase access and effectiveness of energy markets
- Increase development of clean energy
- Reduce the environmental impacts of energy development

Substantial new investments in research and technology were made to capitalize on the contributions that achieving the goals of the strategy will bring to the Alberta and Canadian economies in future years. Execution of the strategy is undertaken by the AERI staff. One of the key initiatives this year was to finalize the incorporation of EnergyNet Inc. and have it operate as a national entity to coordinate research and technology deployment in the energy sector.

AERI continues to build and use tools that will help us achieve our targets. The staff works closely with industry and researchers to develop plans and processes that will put Alberta at the forefront of energy innovation. As we move into 2006-07, many of the feasibility studies, business cases and road maps that have been developed in this past year will be advancing to pilot plant and demonstration phases to fully realize the potential commercial opportunities identified in the studies.

This Annual Report demonstrates advances that have been made in reaching our 2012 and 2020 goals in energy innovation. We want to acknowledge that we only make these advances and achieve success with the help of our many partners in research – other government departments, researchers and most importantly industry, who guide the work.

Together, we will share resources and expertise, lower the risks and provide the technological capacity for Alberta to become a global leader in clean energy innovation.

Sincerely



Mel Knight, MLA
Co-Chair
June 2006



Len Bolger
Co-Chair

Key Activities – Highlights

EnergyINet was incorporated as a not-for-profit corporation under the Canada Corporations Act, Part 2 on August 5, 2005. It now operates as a fully independent company with its own Board of Directors and is establishing itself as a nation-wide vehicle for collaborative research.

AERI worked together with EnergyINet to support Western Canadian Fuel Cell Initiative to investigate, evaluate and develop 'impure hydrogen' fuel cell technology and to establish a CO₂ Management Program. Research activities focused on the geological sequestration of carbon dioxide included measurement, monitoring and verification of CO₂ storage in a pre-commercial field pilot project using CO₂ for enhanced recovery.

Based on identified technical and economic gaps, AERI has funded 10 multi-year projects leading to the adaptation of clean coal technology to Alberta's needs and feedstock. This work involves the University of Alberta, the federal government, the major coal and electricity companies in Canada, EnergyINet and the Electric Power Research Institute in the United States. AERI has also actively participated in the development of Canada's Coal Technology Roadmap and the closely related Carbon Dioxide Capture and Storage Roadmaps.

AERI is working with 7 industrial partners to promote a Hydrocarbon Upgrading Demonstration and Training Facility. Studies are being conducted to assess technologies with breakthrough potential for upgrading bitumen to high value synthetic oil and refined products.

AERI is working with Nova Chemicals, the University of Calgary and Universities in Germany and China on the "Conversion of Oil Sands Derived Heavy Oils into Petrochemical Feedstocks". In previous work a new family of catalysts was developed for the heavy oil cracking technology. The major deliverable in the current phase is the design of a pilot plant and a process design package. The work will be integrated into the Hydrocarbon Upgrading Demonstration & Training Facility (HUDTF).

AERI and its partners completed a feasibility study and bench scale testing on the use of municipal waste to generate electricity at the Edmonton landfill. It is expected that a pilot project will be developed in 2006-07 that will demonstrate the world-class development of alternate energy from municipal landfill waste.

AERI provided support for the University of Alberta's Oil Sands Engineering Research Chair, leveraged with industry, the federal government and the University. The program will enhance the industry's ability to meet the challenges associated with today's mined oil sands technologies, as well as exploring technologies to reduce fresh water use and manage the oil sands tailings.

AERI continued its support in 2005-06 for the National Centre for Upgrading Technology (NCUT), which is funded jointly by the Government of Alberta and Natural Resources

Canada (NRCan) to develop and maintain a world-class centre of excellence for bitumen upgrading in Alberta.

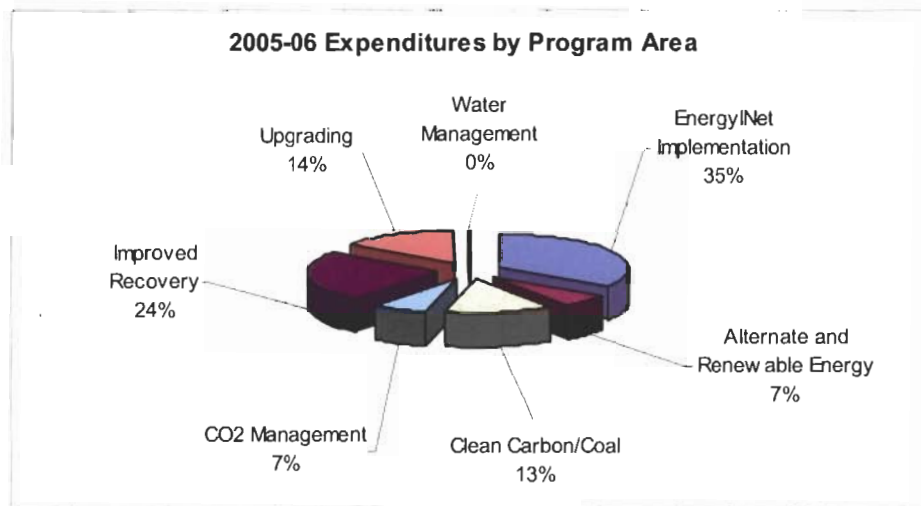
AERI continues to partner with the Alberta Research Council (ARC) and twelve energy companies in the AERI/ARC Core Industry (AACI) program to develop and improve heavy oil and bitumen recovery technologies.

AERI provided technical analysis in the review of initiatives submitted to the Alberta Department of Energy's Innovative Energy Technologies Program (IETP) which resulted in 13 projects being announced for funding in November 2005.

<http://www.gov.ab.ca/acn/200511/190255CE640C5-F833-1CD3-0BE714C3FD7FC08F.html>

Program Expenditures

In 2005-06, actual research expenditures in AERI's programs were \$13.7 million.



Conclusion

AERI's plans for 2006-07 will build upon the advances made in 2005-06. We will continue to work with our partners and expand our network and influence. A number of smaller projects are coming to fruition this year and will be expanded in pilot and demonstration plants that will start to prove out the economic value of AERI's work to the overall economy in Alberta. Examples of this include substantial investments in a clean coal gasification plant and a municipal waste to energy pilot.