

Launching a New Investment Initiative:

**The Next Generation Clean Carbon/Coal
and Hydrocarbon Upgrading
Technologies**

**PART A:
PROSPECTUS**

**PART B:
GUIDELINES FOR SUBMISSION
OF EXPRESSIONS OF INTEREST**

November 2006

PART A: PROSPECTUS

FOREWARD

“By 2020 Alberta has a sustainable competitive hydrocarbon industry that expands the market for Alberta’s energy resources and produces higher value products in Alberta with minimum environmental impact”

Alberta’s Value Added Vision

Research and innovation are central to achieving Alberta’s sustainable energy goals and fundamental to Alberta’s continued prosperity. We must begin now to radically transform our energy system to improve the efficiency with which we produce and convert energy resources to value-added products and minimize emissions including CO₂.

The Alberta Department of Energy and Alberta Innovation and Science, through the Alberta Energy Research Institute (AERI), invite expressions of interest from the private sector for a new initiative: **“Next Generation Clean Carbon/Coal and Hydrocarbon Upgrading Projects”**. The Alberta government is prepared to provide **\$100 million over the next 5 years** and is looking for the same level of commitment from the private sector for this initiative.

BACKGROUND

In early 2005, the Hydrocarbon Upgrading Task Force identified next generation clean upgrading technologies and skilled personnel as critical needs for a sustainable energy future. It was also recognized that these needs could be met effectively through a Hydrocarbon Upgrading Demonstration Program (HUDP) with a strong training component. A government-industry working group was formed to develop a vision and phased implementation plan.

The plan was loosely modeled after the Underground Test Facility (UTF), built in the 1980s. As a key part of the Alberta Government’s investment in the development and demonstration of the Steam Assisted Gravity Drainage process, the facility was strategically important for commercial development of Alberta’s vast deep oil sands reserves.

The first phase of the HUDP, completed in mid 2006, screened over 100 processes and identified an initial set of technologies with the best potential for further development and demonstration.

The second phase of the plan is to develop and demonstrate next generation “clean” upgrading technologies as they apply to Alberta hydrocarbons such as oil sands, coal, and petroleum coke. This phase requires bringing together the efforts and investments of both the public and private sectors, and focusing on the key technologies and environmental challenges.

An AERI-Industry Steering Committee has been formed to guide the implementation of the next phase.

PROGRAM VISION and GOALS

During the initial phase, the government-industry group developed the following **vision** for the program:

“Develop a joint industry/government program that will make Alberta a world leader in demonstrating and commercializing radically new integrated technologies that:

- ***Maximize the value of carbon and bitumen as abundant and competitive sources of ultra-clean fuels, specialized chemicals, petrochemicals, and power***
- ***Minimize environmental impacts***
- ***Provide hands-on training for skilled industrial personnel”***

The following **goals** were also developed

- ***Accelerate the pace of the development, demonstration and commercial deployment of next generation upgrading technologies.***
- ***Build capacity in Alberta for the timely adaptation, development and demonstration of the relevant upgrading and environmental technologies to achieve Alberta’s Hydrocarbon Vision.***

ORGANIZATION and GUIDING PRINCIPLES

The program will be managed by AERI under the direction of the AERI Board of Directors as an extension of the current industry R&D program.

Application and review process:

- Interested parties will submit proposals to AERI following the existing pre-application and application procedures.
- Proposals will be reviewed by a panel of evaluators drawn from industry and government.

Cost sharing:

- A government-industry cost sharing formula will be developed for each project.

Intellectual Property Principles:

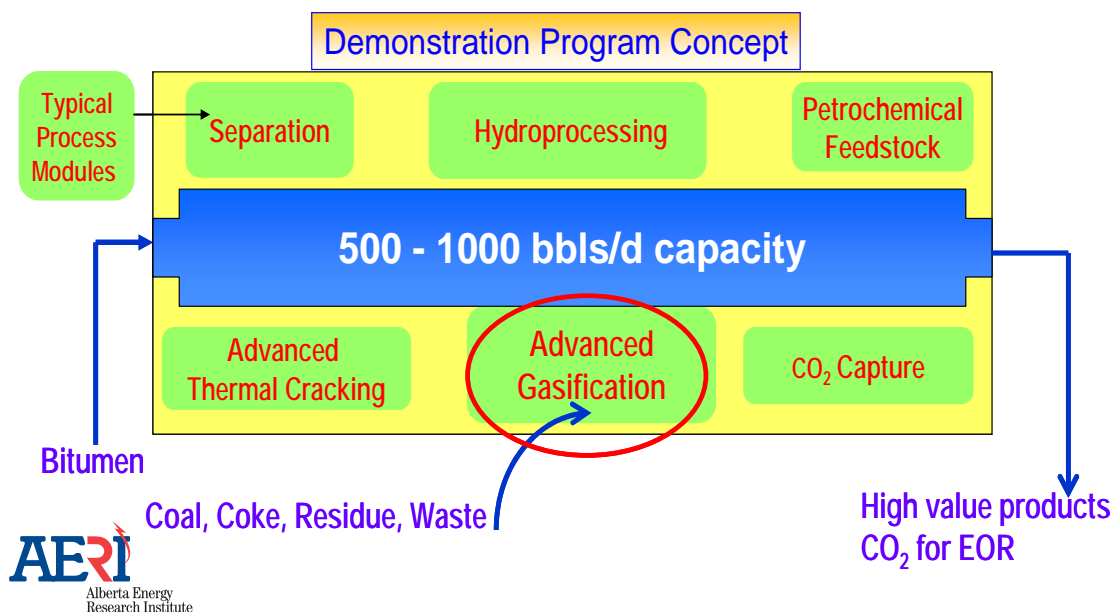
- Background IP remains with the original owner(s) of the IP.
- IP developed as part of co-funded activities is owned by the private sector participants with an obligation to commercialize the technology in Alberta within a specified period.
- If technology is not commercialized after the specified period the IP will be made available to other Alberta users under normal commercial licensing terms.

Confidentiality:

- All intellectual property and privileged project information are kept confidential according to the terms of individual contract agreements

Facilities:

- It is expected that the first projects will consist of building and operating pilot and demonstration plants located at existing operating sites with supporting core infrastructure, personnel and services. Equipment and assets acquired for such project will be owned and operated by the private sector participants. After meeting the specific project goals the facilities may be made available to other users and for training purposes at preferential commercial terms for a specified period.
- Where it is necessary to build a new Greenfield facility, the facility will be owned and operated by separate not-for-profit private sector entities. The concept of an integrated Greenfield facility is shown below.



PART B: GUIDELINES FOR SUBMISSION OF EXPRESSIONS OF INTEREST:

Expressions of interest are invited from operating companies, process developers and licensors and other organizations wishing to share the risk of developing and demonstrating new and improved upgrading technologies with low environmental impacts. The program could be of particular interest to companies planning future expansions and wishing to be early adopters of new technologies.

The following steps and timelines are envisioned:

1. Expressions of Interest: **Deadline 2 February, 2007**
2. Review of expressions of interest and follow up discussions with prospective applicants: **5 February to 26 February, 2007**
3. Request for submission of formal proposals: **March 5, 2007**
4. Submission of formal proposals: **April 30, 2007**
5. Due diligence evaluation process, decision and informing applicants on funding decision: **June 15, 2007**

Guidelines for Submission of Expressions of Interest

Length: There is no length restriction but submissions are generally not expected to exceed 5 pages in length. More details can be provided as appendices if required.

Format: Submissions are to be made electronically as a word document or PDF format using as a guide. AERI will maintain confidential the material submitted.

The following **headings and topics** listed below are presented as a general guideline for the preparation of the project description and represent some of the criteria that will be used to evaluate the submissions.

Title of the proposed project:

Name, Address and Affiliation of the Principle Applicant(s):

Names: Project Leader and key team members

Description of the Technology:

- **Purpose:** What is the main purpose of the technology

- **Features and benefits:** What are key features and benefits of the technology?
- **Innovation:** Is the technology innovative and superior (performance, cost, operability, or other features) to other proven technologies in the same or similar applications?
- **General technical viability:** is the technology fundamentally sound from a technical perspective (chemistry, catalyst, operating conditions, thermodynamics, mass balance, hydrogen balance, etc)
- **General applicability:** Is the technology well suited for upgrading bitumen or bitumen-derived products to high quality finished products and petrochemical feeds?
- **Commercial viability:** Is commercial application of the technology considered viable in the context of bitumen upgrading? Are there any obstacles that will preclude use of the technology in Alberta or restrict its use? Can the technology be successfully scaled-up? Is the technology new and economically competitive with other similar or related technologies?
- **Technical readiness:** What is the current stage of development? How close to being ready for demonstration or commercialization is the technology?
- **Opportunities for integration with other technologies:** Are there any synergies or improvements expected if optimally linked with other technologies?

Environmental Benefits:

- **Energy Efficiency:** What is the potential for increasing the overall energy efficiency of the conversion process over existing technologies?
- **CO₂ Capture:** Does the process lend itself to efficient and cost effective capture of CO₂?
- **Environmental Footprint:** Does the technology reduce the environmental footprint in terms of conservation of land, water and eco-systems and minimization of emissions.

Potential Strategic and Economic Benefits:

- What are the key strategic advantages and potential economic benefits to Alberta?

Partners:

- Are there one or more end users willing to commercialize the technology once it has been demonstrated?
- Are there other companies willing to participate in a demonstration project? If so, what is the nature of such participation?

- What restrictions, if any, are there to the participation of other private or public sector organizations?

Demonstration Site:

- Is there an existing demonstration site with suitable infrastructure and support services or will the project require a new Greenfield site?
- Description of existing site or requirements for a new site

Project Work Plan, Schedule and Budget:

- Outline of anticipated major activities, project stages, duration and estimated costs

Please submit letters of expression of interest to:

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For additional technical discussions please contact:

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