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Short-listed project descriptions

TITLE	PROJECT
HTC Purenergy/Graymont CO_2 Capture Project	Graymont's Exshaw limestone plant emits 800-900 tons/day of CO_2. HTC/Graymont/Partners are planning a CO_2 capture facility for the Graymont Exshaw, AB site. The proposed plant will demonstrate how Graymont can cost effectively reduce its CO_2 footprint from their 20 existing lime manufacturing plants. Several oil companies have approached HTC regarding the supply of CO_2 for (EOR). A partnership is planned with the Turner Valley oil field producers to compress and pipeline CO_2 for EOR and storage.
Alberta Oil Sands Energy Efficiency & GHG Mitigation Roadmap Program	This project will quantify potential GHG emission reductions from energy efficiency opportunities at Suncor's bitumen mining, SAGD, upgrading and refining facilities. The impact & cost-effectiveness of these improvements will be compared to other GHG mitigation opportunities. Outputs include a roadmap for staged GHG emissions reduction, metrics and methods to assess and improve other similar facilities, update to AERI's GHG life cycle model, and identification of future technology needs.
CO_2 Storage in a Depleted Gas Reservoir in Alberta	CCS-enabled enhanced oil recovery is a priority for Albertans because of the environmental and economic benefits it provides. Once oil-bearing opportunities have been exhausted, CO_2-injection into depleted gas reservoirs is likely the next best option for CCS. Alberta's CCS Development Council estimates that more than 1,500 megatonnes of CO_2 could be stored in depleted gas reservoirs. Enhance Energy Inc. proposes a CO_2 storage project in a depleted gas pool in central Alberta.
Ceramic membrane-based technology for H_2 production with CO_2 capture and sequestration	GE, the University of Alberta (UA), and Alberta Research Council (ARC) propose to develop and demonstrate a ceramic membrane-based technology for the capture of sequestration-quality CO_2 from syngas streams. The project will address the materials and manufacturability challenges, and culminate in a slipstream demonstration at an end-user site. CO_2 emissions reductions of 10M tons per year by 2020 are possible with widespread adoption, along with spin-off benefits in the area of water reuse.
Clean Power by Waste Heat Recovery from Reciprocating Engines	Great Northern Power Corp. (GNP) has developed a new & proprietary (patent pending) technology to recover waste heat from reciprocating engines. The waste heat recovery system is branded as the EXPANDER. It is clean technology and will reduce CO_2 emissions in Alberta by approximately 1,000 Tonnes/year/unit and create approximately 10 man-years of work/unit. Alberta's market is ~5000 units and GNP has partnered with 3 major operators to demonstrate the technology.

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Solvent Co-injection (SCI-SAGD)	The solvent co-injection technology proposes to simultaneously inject a solvent and steam mixture to create a unique method that reduces energy and water requirements over conventional SAGD operations. Properly selected hot vapour solvents carried by steam can penetrate deeper into the warm bitumen zone than steam. This result in a thicker mobilization layer and a larger bitumen flow along the SAGD chamber wall and increased production.
EM SAGD (Electro Magnetic SAGD)	This technology combines SAGD with inductive electromagnetic heating. The concept is to place additional EM-well's, equipped with an electrical cable. The EM-well heats up the reservoir by applying an alternating current to the cable, which creates an alternating magnetic field, which in turn induces eddy currents in the electrically conductive parts of the reservoir.
Saleski Solvent Cyclic SAGD Pilot Project	An 1800 bbl/d pilot project within the Athabasca Grosmont formation is proposed by Laricina Energy Ltd. (LEL) to evaluate the commercial potential of solvent SAGD within a karsted carbonate reservoir. While SAGD has been demonstrated as a successful exploitation strategy within the McMurray clastics, the application of solvent assisted SAGD within a carbonate environment will significantly improve energy efficiency.
Energy Foot-Print Reduction for Ethylene Manufacturing Process	The project aims to enhance ethylene separation processes based on the application of hydrocarbon selective micro porous molecular sieves, which will improve the energy efficiency of existing distillation columns. Development of these nano materials will be achieved in collaboration with the University of Alberta, as part of NSERC Industrial Research Chair in New Molecular Sieves. A Thermodynamically Guided Optimization model, developed by CANMET, will be used to evaluate the technology.
Membrane Separation of Hydrogen from Cracked Gas	This project will demonstrate, on a commercial scale, the effectiveness of a new membrane separation design in removing Hydrogen from cracked gas, reducing the energy required to refrigerate the cracked gas to the low temperatures necessary to separate the cracked gas into individual product streams that meet specifications and thereby reducing CO_2 emissions from Joffre plant site.
Production of Electricity Using Waste Heat Produced During In-Situ Heavy Oil Extraction	In-situ heavy oil extraction, SAGD and CSS projects have residual waste heat that is a potential source of energy. The excess waste heat from the glycol loop can be used to generate clean electricity. The Applicant is applying for funds to use a patented technology (variable phase turbine) to convert the presently released waste heat into green electric power on a pilot scale without additional greenhouse gas emissions thus increasing the overall energy efficiency of in-situ oil extraction.

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Hangingstone Experimental In Situ Combustion Project	Excelsior proposes to develop an experimental bitumen recovery scheme on its Hangingstone asset. The scheme will use innovative Combustion Overhead Gravity Drainage (COGD) technology to recover bitumen at a rate of 1000 bopd. COGD employs a well pattern based on air injectors, observation wells and vent wells positioned with respect to a horizontal drain. The well pattern provides for gravity segregation of gas and melted bitumen and control of combustion chamber growth and conformance.
Green Building Technologies Lab: Net Zero Applied Research & Innovation	A key goal of the GBT applied research program is to develop a Net Zero energy standard (NZEH) & certification for Western Canada. Net Zero homes produce as much energy as they consume while optimizing waste consumption, indoor air quality & improved envelope durability. The GBT program has been divided into 4 key areas of research: 1.Net Zero Envelope & Systems Monitoring 2.Architectural Ecology 3.Building Integrated Renewable Energy/ Alternative Energy 4.Education, Industry Transformation
Binary Fluid Compression: A Platform Technology	This project will build and test prototype Binary Fluid Compressors (BFC). A BFC is a highly efficient, thermally driven, fluidic heat pump, that will address our province's biggest challenges by: • converting waste water from oil sands tailings or coal bed methane production into potable water, • reducing oil sands GHG production by using ground source heat for hot water and steam, • reducing energy consumption of residential and commercial buildings and associated GHG production by 42%.
Parsons Creek Community District Heating	Parsons Creek is a community that is in development in Fort MacMurray and will include over 8,000 residences, commercial developments, schools, and recreation facilities. This project will capture heat from Suncor's facility, and build a pipeline and district heating network to direct this heat energy to the community, and make Suncor more energy efficient generate tens of thousands of CO_2 credits; and be major commitment to reducing the environmental footprint of its Oilsands operations.
Power Pod	Evergreen's Power Pod technology addresses a major oil and gas industry problem: the use of gas-venting devices results in lost revenue and high GHG emissions. Power Pod replaces pneumatics with hybrid Direct Methanol Fuel Cell/Solar power generation. A prototype was built and has operated successfully. Next steps (the subject of this application): **Field Testing:** Operate units in a variety of locations and conditions. **Market Evaluation:** Survey potential industry users.

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Effective Solvent Extraction Incorporating Electromagnetic Heating (ESEIEH)	ESEIEH constitutes a field demonstration pilot to evaluate the combination of electromagnetic heating for rapid horizontal well pair startup and sustained formation heating with concurrent injection of a solvent. The project incorporates staged yard-scale testing, numerical modeling studies and a small scale field trial. Greenhouse gas reductions potentially exceeding 80% over SAGD are projected, with cost efficiencies providing economic benefits capable of doubling Alberta's bitumen reserves.
Waste Heat Power Production from Amine Stream	Genalta Power and Husky Energy propose a joint venture to produce clean electricity from the heat semi-lean amine solution found at Husky's Ram River sour gas plant to generate electricity. The opportunity outlined will validate technological advancements and increase site efficiency. Averaging 13,680 m3/day at 950C, the amine stream provides enough heat to produce 1.02 MW. An additional reduction in power is achieved by reducing the fan load, otherwise required to cool the amine stream.
OTSG Oxy-fuel Demonstration Project	Suncor, as a member of the CO2 Capture Project, along with Praxair, Devon Canada, Encana and StatoilHydro Canada (the "Participants") are proposing to prove and validate process designs for oxyfuel combustion on once-through steam generator (OTSG) boilers used for in-situ bitumen extraction by constructing and operating a pilot plant. The goal of project is to develop a reliable, lower cost solution for capturing CO2 from OTSG boilers that can be deployed at a commercial scale.
TCE/Cancarb Limited Solar Power Demonstration Project	Cancarb Limited, a subsidiary of TransCanada Energy, intends to design, construct and operate a 1 MW utility-scale solar PV demonstration plant in Medicine Hat. The project will demonstrate currently available solar PV technologies in Canada's sunniest city, and provide significant education and experience to its stakeholders in the areas of design, equipment, supply chain logistics, installation, performance, regulations, policy and economics.
Medicine Hat Solar Thermal Energy Demonstration Project	The City of Medicine Hat is proposing to develop Canada's first utility scale solar thermal combined cycle power plant. This one-megawatt demonstration project will result in the integration of a solar-powered steam generation system with the existing City of Medicine Hat's power plant, increasing the power output of the plant without requiring extra fuel or increasing air emissions. The project will establish the performance and costs of solar thermal energy systems in Alberta.

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Swan Hills Waste Heat Recovery Power Project	Free Energy Power Corp has reached agreement with Devon Canada to produce 2.0 MW of electricity for their Swan Hills site whereby waste heat from production water is used to create power using advanced technology Organic Rankine Cycle (ORC) units to drive a turbine. Recent technology advances allow the conversion of waste heat into green electric power without generating additional GHG emission in this demonstration project.
Landfill Gas Capture and Alternative Energy Demonstration Project	The Town of Redcliff and Cypress County and Versus Goliath Project Solutions Inc. wish to develop a biogas capture and beneficial use technology demonstration project at the waste disposal facility in the Town of Redcliff, Alberta.
Field Test of ET-DSP(TM) in the Mineable Athabasca Oil Sands	E-T Energy's ET-DSP(TM) patented bitumen extraction process provides an environmentally friendly alternative for oil sands production for bitumen deposits within the depth range of 6 - 250 m below surface. The high thermal efficiency of the ET-DSP(TM) process results in dramatically lower GHG emissions per barrel of bitumen produced, when compared to established production methods such as mining and SAGD.
Bio-coal in Alberta	Canadian Bioenergy Corporation is working to manufacture a biomass-based, densified energy product that is fully fungible with coal. This 'bio-coal' will be produced from Alberta's forestry and agricultural residues for direct co-firing in Alberta's power generation and coal-based thermal facilities. Co-firing bio-coal offers one of the least cost, most efficient, and near term opportunities to abate substantial amounts of CO2e emissions.
Plasco Alberta (1) Inc. Renewable Energy and Waste Conversion Project	Plasco Alberta (1) Inc. ("Plasco Alberta") will build, own and operate a Plasco Waste Conversion and Renewable Energy Facility in Red Deer County. This facility will receive, process and convert approximately 307 tonnes per day of municipal solid waste, annually create 107,570 MW of renewable baseload power transmitted directly into the local distribution network, and reduce 2.1 tonnes of CO2e per tonne of MSW processed.
Residential Renewable Energy	The program will provide Renewable Energy Systems to Alberta residences using solar and micro-wind technologies commencing in 2010. ENMAX plans to offer an equipment rental program to remove the capital cost hurdle allowing customers to reduce their household environmental footprint today. The program will be made available to all Alberta home-owners and will form the core of our renewable energy initiative. ENMAX will be responsible for all system development and delivery.

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Lethbridge Biogas/ Cogeneration Project	ECB & StormFisher have partnered to build a 3.2MW biogas facility in Lethbridge. On top of producing green, renewable electricity, the facility will provide a safe & sustainable disposal alternative to the agricultural & food processing industries, by processing up to 150,000t of livestock manure, food processing waste & animal by-products annually. Lastly, the facility's throughput will be dried & pelletized & sold to the agricultural & commercial organic fertilizer markets.
Emerging Technologies for Emerging Times - Solar Electric Buildings and the Smart Grid	The project will integrate Photovoltaic (PV) into existing campus facilities and the monitoring and controlling of this electricity and the loads in the buildings on which it is located through the application of Smart-Grid concepts. The anticipated installed PV capacity will be 1 MW, generating approximately 1,200 MWh/year. The PV arrays will be installed and distributed on multiple building structures and tied in to the U of A electrical distribution system. Annual GHG reduction will be 800 MTeCO2.
Reduction of GHG emissions through green biofuel production and CO2 utilization: From pilot plant to commercialization.	The proposed project will leverage the biorefinery capabilities of the Advanced Energy Research Facility (AERF) to evaluate several biomass feedstocks for the production of synthetic biofuels utilizing the Enerkem synthetic gas (syngas) to alcohols process. In addition to establishing a performance baseline, the AERF team will evaluate an optimization technology, known as dry reforming, which converts CO2 to useable syngas and evaluate direct incorporation of CO2 into biofuel intermediates.