Calgary Chamber of Commerce
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2008 ALBERTA CHAMBERS OF COMMERCE RESOLUTION

Solid carbon fuels - Building a future through technology

Solid carbon fuels such as coal, petroleum coke and ashphaltine offer a cost-effective fuel source for Alberta, and Canada as a whole. Coal is used in five provinces to generate 19 per cent of Canada's electricity generation, accounting for nearly 70 per cent of generation in Alberta. Coal accounts for the majority of Canada's hydrocarbon reserves at 66 per cent. In comparison, bitumen constitutes 24 per cent of hydrocarbon reserves with conventional natural gas and oil making up the remainder.

Solid carbon fuels have strong economic advantages over competing fuels because of their low cost and stable domestic prices and large proven reserves. Alberta, which has one of the highest concentrations of hydrocarbons of any location in the world, has hundreds of years of economically recoverable coal reserves, both metallurgical and thermal, that hold the potential to create major economic value for Albertans and Canadians.

Coal currently supplies over 43 per cent of the world's electricity and 26 per cent of global primary energy needs, and coal exports play a vital role in other global industries including cement manufacturing, chemicals and liquid fuels and virtually all of the world's steel production. In the case of petroleum coke and ashphaltine, these byproducts of the bitumen mining and upgrading process are being buried rather than utilized as a clean fuel option as this is viewed as new, and thus risky, technology. However, coke is presently used at one oilsands plant to produce both steam and electrical power.

While solid carbon fuels are relatively inexpensive and their use is expected to grow, they have environmental challenges to be addressed. The combustion of solid carbon fuels releases significant amounts of carbon dioxide (CO2), sulphur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM), and other pollutants and greenhouse gases.

The key is to successfully develop and deploy technology to harness the energy content of solid carbon fuels while minimizing harmful emissions. Solid-fuel gasification offers a route to a low emissions future that allows the continued use of solid carbon fuels – Alberta's most abundant and affordable of all fuels.

Clean coal technologies

Clean solid carbon fuels technologies refer to technologies (both existing and future) designed to enhance both the efficiency and the environmental acceptability of solid carbon fuels extraction, preparation and use. These technologies reduce emissions, reduce waste, and increase the amount of energy gained from each tonne of solid carbon fuels. Clean solid carbon fuels technologies can also include the capture of

carbon dioxide emissions and efforts are now also turning to advances for new markets and optimized use of coal by-products.

There are many promising projects underway. Genesee 3 (G3), the third unit at the Genesee Generating Station southwest of Edmonton, is the first of its kind anywhere in Canada. Built and operated by EPCOR, and owned jointly with TransAlta Corporation, G3 is equipped with $90 million in clean air technologies and features a supercritical boiler to produce electricity more efficiently than traditional coal-fired generation. G3 sets a new standard for efficiency and environmental performance.

The Canadian Clean Power Coalition (CCPC), an organization representing many of the country's largest coal-fired electricity generators, is planning a demonstration coal-fired generation plant that will have lower airborne and carbon dioxide emissions than the world's best-combined cycle gas turbine. The CCPC, in conjunction with EPCOR, is leading the development and commercialization of power generation through technologies that would turn sub-bituminous coal, or any other solid carbon fuels, into synthesis gas and hydrogen for a variety of uses, in addition to eliminating and sequestering emissions.

Their proposed Integrated Gasification Combined Cycle (IGCC) plant at Genesee has the potential to lower nitrogen oxides by 96 per cent, particulate matter by 98 per cent, and sulphur oxides by 99 per cent. The IGCC is a demonstration of industry and government working together. It is equally funded by EPCOR, the federal government, and the Alberta government through the Alberta Energy Research Institute (AERI). Completion of the plant is expected by early 2015.

One of the most promising options for the future is carbon capture and storage (CCS). Carbon capture and storage technologies allow emissions of carbon dioxide to be removed from the exhaust stream from coal combustion or gasification and sequestered in such a way that they do not enter the atmosphere. There are a number of storage options for CO2 with geological storage offering the most potential.

Geological features considered for CO2 storage include deep saline aquifers, unminable coal seams and depleted oil and gas fields. Combined, these options are estimated to offer a total capacity of over 11,000 gigatonnes of CO2. Storage of CO2 can also have an economic benefit in the form of enhanced oil recovery (EOR). This process essentially will "push" oil out of underground strata. A good example of this is the Weyburn Enhanced Oil Recovery project in Weyburn, Saskatchewan, injecting around 5,000 tonnes of CO2 per day which would otherwise have been released into the atmosphere.

Such technology can lead to a critical mass of jobs and intellectual capital with tremendous export potential. This will help preserve natural gas resources for higher value uses and unlock the full energy potential of solid carbon fuels.

In its Strategic Research Plan, the Alberta Energy Research Institute envisions a clean-coal value chain. This multi-feedstock, multi-product, integrated energy process would produce valuable products such as synthetic gas, hydrogen, methanol, ammonia and

methane, which can be utilized both as fuels and petrochemical feedstocks. The major research thrusts are aimed at adapting clean coal technology to Alberta's resources for generating electricity and other products such as hydrogen, chemicals and steam.

The importance of a competitive supply of energy to Alberta's and Canada's economies cannot be overstated. Canadian energy demand, including electricity, is projected to grow significantly in the years to come as our country and economy grows. In order to competitively meet this demand, the Alberta Chambers of Commerce submits that Canadians need all economically viable and environmentally acceptable energy sources available, including solid carbon fuels.

The Alberta Chambers of Commerce recommends the Government of Alberta:

1. Advocate and support research and innovation that yield ways of using solid carbon fuels both for new power generation as well as a viable feedstock for high value-added products.

2. Provide industry with predictability on the rules of operation to facilitate risk management of advanced solid carbon fuels technologies and attract capital investments.

3. Encourage new projects through partnerships and supportive regulation / legislation and interdepartmental coordination of government policy.

4. Publicly support the optimization of value of Alberta's coal resources with actions that are consistent with prudent management and conservation of our energy resources so that they are put to effective and efficient environmentally sustainable use for Albertans.

5. Encourage substitution of low-cost, clean solid carbon fuels-based feedstocks to release oil and gas resources to higher value domestic and export markets.

6. Continue to support the innovation programs and initiatives being taken by such groups as the Alberta Energy Research Institute (AERI) and the Canadian Clean Power Coalition.

7. Continue to support research and development to minimize the environmental impact of solid carbon fuels use, with particular emphasis on carbon capture and storage. Provide regulatory and policy certainty with respect to greenhouse gas emissions and air pollutants to allow the next generation of solid carbon fuels-fired technologies.