Sundance Fuels: Project Overview

Blue Fuel Energy Corporation (BFE) and Canadian Methanol Corporation (CMC) are concurrently developing and will operate world-scale production facilities at a 1055-acre site near Chetwynd in northeastern BC called Sundance Fuels. The two companies will share infrastructure and BFE can leverage synergies uniquely available through CMC. All technology to be used is commercially proven. Both BFE and CMC are in the permitting stage, with construction expected to begin as early as late 2015 and initial production as soon as three years after construction commences.

blue fuel energy

Blue Fuel Energy Corporation (BFE)
Established: 2008 (privately-held)
Head office: Victoria, BC
Sundance products: Renewable hydrogen and renewable and reduced-carbon gasoline

CANADIAN METHANOL

Canadian Methanol Corporation (CMC)
Established: 2013 (privately-held)
Head office: Victoria, BC
Sundance products: Methanol

Project fundamentals

BFE will use natural gas and renewable energy (wind, hydro) to:

a) Produce renewable and reduced-carbon gasoline for jurisdictions in North America with a low-carbon fuel standard (such as BC and California);

b) Produce renewable hydrogen for emerging fuel cell vehicle (FCEVs) markets in North America and Japan. (Renewable hydrogen can be embedded in gasoline and other BFE products.)

CMC will use natural gas to:

- Produce methanol for the production of olefins (used in plastics, resins, fibers, elastomers, lubricants, gels, and more) in China (offtaker agreements in place).

YouTube video: Methanex plant constructed in Egypt (click to play video in your browser; Internet connection required)

Project benefits

Fuels production at Sundance will:

- Generate waste heat that BFE and CMC will provide to on-site greenhouse and fish ponds operations called Sundance Foods that will be owned and operated by First Nations and various small businesses/organizations in the region; these operations will provide organic produce and fish for the region and beyond (BC interior, central and northern Alberta);
- Generate billions of dollars in investment in BC (Sundance Fuels capital cost: currently estimated to be CAD $3–4 billion);
- Create thousands of well-paying jobs during construction, and hundreds during operation;
- Transform the Peace economy from one based on the export of raw materials to one based on the export of value-added products (gasoline, methanol, organic foods);
- Diversify the use of BC natural gas;
- Help BC meet its low-carbon fuel standard with a BC-made, drop-in fuel (renewable and reduced-carbon gasoline);
- Help BC maintain its climate change leadership and showcase BC as a producer of fuels that bridge to the upcoming low-carbon era.

Project highlights

- Given the vast renewable energy resources in northeastern BC, BFE's production of renewable fuels is eminently scalable.
- All Sundance products can be shipped to market using existing rail and/or pipeline infrastructure.
- BFE's integration of renewables and natural gas on a project of this scale is unprecedented in the world.
- BFE's electrolyzer array will be the largest in the world by far.
- The organic greenhouse and fish pond operations will be amongst the largest in Canada.
- Signed MOU with West Moberly First Nations allowing "both parties to explore additional opportunities and commercial benefiffits arising from the prospective production of renewable hydrogen and gas-derived liquid fuels on WFN's traditional territory"; broad-based support among other Treaty 8 FN in the region for fuels production at Sundance.
- Environmental Assessment has been initiated.

Sundance Fuels: FAQs

What will the facility look like?

The BFE and CMC facilities at Sundance will each be similar to the Statoil methanol plant in Norway shown in the photo to the right.

What will be the footprint of fuels production operations?

BFE and CMC combined will have a footprint of about 200 acres.

What will be the footprint of the produce and fish operations?

This will depend on numerous factors, including the entrepreneurial spirit of people in the region and market demand; the availability of waste heat or water is unlikely to be the limiting factor. At this time it is expected that the footprint will be at least 100 acres, and possibly much more.

What will be the capital cost of the Sundance Fuels facilities?

Approximately CAD $3–4 billion.

How many jobs will Sundance create?

At the peak of construction, the project will employ 1,500–2,000 people, not all of whom will be working at the Sundance site. For example, project management and engineering, as well as the fabrication of many major pieces of equipment, will be done off-site.

During operation, the BFE and CMC plants will employ 250–300 people on-site.

How much methanol and gasoline will be produced?

BFE will produce about 800 thousand tonnes of gasoline per year and CMC will produce about 1.8 million tonnes of methanol per year.

How much rail traffic will fuels production generate?

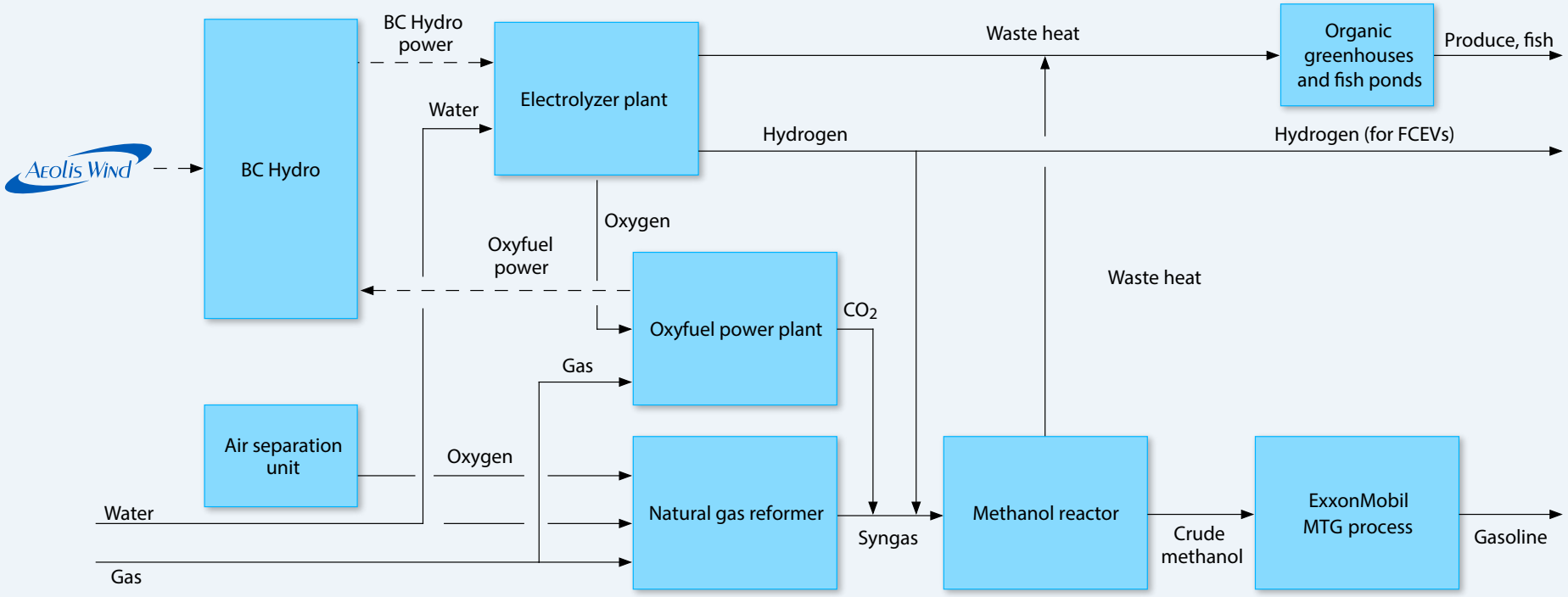
CMC will produce 60 railcars of methanol every day, which will be shipped along existing CN rail lines between Sundance and an export facility in Kitimat. The cars will move in a combination of 60- and 120-car cuts between origin and destination.

BFE has not yet determined its preferred mode of product transport. In making that decision, BFE will prioritize safety and environmental considerations and commit to transparency in all its operations.

What feedstocks will BFE use to produce gasoline?

The key feedstocks are natural gas, renewable electricity, and water. As illustrated in the flowchart below, the BFE process starts by using the renewable electricity to electrolyze water, converting it into renewable hydrogen and oxygen. The renewable oxygen is then combusted with natural gas in an oxyfuel power plant to produce carbon dioxide and electricity (returned to the grid). Carbon dioxide is then combined with syngas (from the reforming of natural gas) and renewable hydrogen and converted to crude methanol. The key takeaway with respect to BFE feedstocks is large-scale integration

Blue Fuel Production Process at Sundance



of northeastern BC's exceptional renewable energy (wind, hydro) and gas resources to produce reduced-carbon gasoline, a fuel that bridges to the upcoming low-carbon era.

What feedstocks will CMC use to produce methanol?

Basically, CMC will produce methanol from natural gas, the primary feedstock for methanol production almost everywhere in the world (except China, which uses coal).

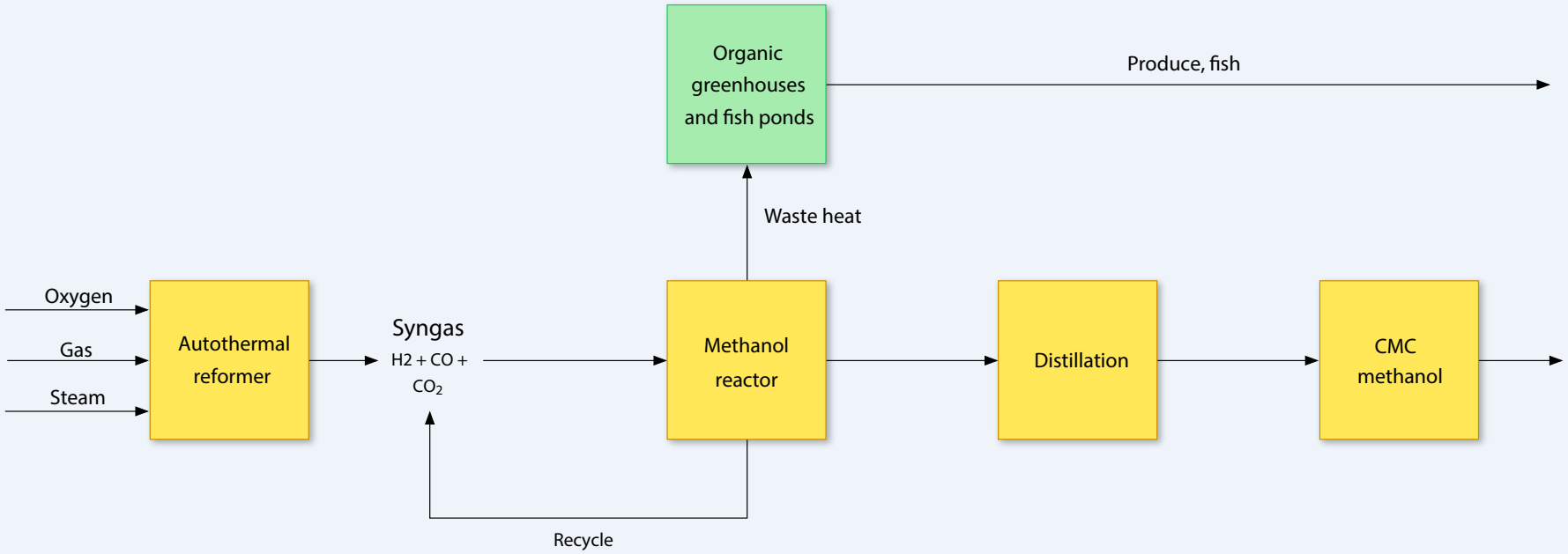
How much water will the facility use?

Sundance will use raw water drawn directly from the Pine River, just downstream of its confluence with the Murray. At this point, 800 million cubic metres of water per year is available for industry or agriculture, which is about 10% of the flow. Sundance will use 2–3% of this 10% and thus have negligible impact on the river.

How will solid waste be dealt with?

The methanol production process includes use of catalysts to separate the natural gas into oxygen, carbon and hydrogen and to synthesize or reform these elements into methanol. After a few years, these catalysts become spent and have to be replaced. The principal catalysts used in the reforming process are based on nickel and for the methanol process, copper. When these catalysts are spent, they are normally sent to a specialized recycling facility that processes them to recover the valuable metals. Zinc

CMC Methanol Production at Sundance



oxide is used to remove sulfur from the natural gas. This desulfurization process produces zinc sulfide as a byproduct. Zinc sulfide is also recycled.

How will wastewater be dealt with?

The plant will include a modern wastewater purification plant. Most of the hydrocarbons in wastewater are recycled to the reforming section of the plant, but the small amounts that remain will be disposed of using conventional water treatment processes found at a municipal sewage treatment plant, but without the odor. Purified water will either be recycled back into plant processes or returned to the river.

How much electricity will be used?

The amount of electricity consumed will depend on the technology adopted, about which a final decision is pending. This decision is predicated on the source, and thus, characteristics of the gas used. Consumption could thus range from 100 MW to 200 MW. Wind farms are expected to be an important source of energy for the project.

What pollutants will be released into the air?

The plant will comply with all environmental and air pollution regulations of the Province of BC. There will be no detectable levels of CO or sulphur oxides. Plant furnaces will be operated with excess air to ensure complete combustion, and the flue gas will be desulphurized to ppb levels.

What subsidies will BFE and CMC receive?

No subsidies are anticipated—or required.

What is the project timeline?

It is anticipated that an Environmental Assessment certificate will be granted in mid- to late 2015. Construction is estimated to take 2.5 years, followed by a 6-month shakedown period. Initial production is projected to start in late 2018.

For more information visit Blue Fuel Energy at bluefuelenergy.com and Canadian Methanol Corporation at www.canadianmethanol.com
Questions? Please contact Alan Bryce at abryce@bluefuelenergy.com