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Nexterra, Taking Over the World One Gasification System at a Time

Vancouver-based Nexterra Systems' groundbreaking technologies lead to big deals and even bigger possibilities.

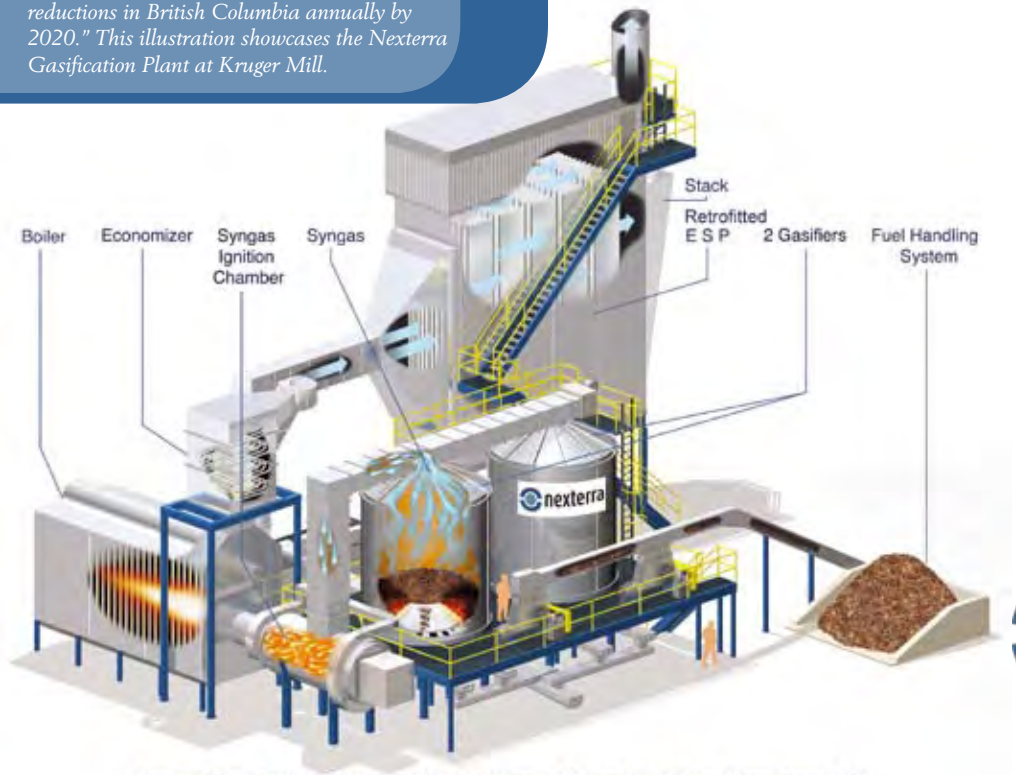
Terms like "breaking new ground" and "changing the landscape" get thrown around loosely sometimes, but in the case of Vancouver-based Nexterra Systems Corp., they can be applied without reservation.

The company, which develops, designs, installs and services gasification systems, has recently announced two landmark deals that are sure to propel Nexterra to the next level, and take the industry along with them.

"The UBC project is a huge milestone for Nexterra because it represents the first commercial application of what we see as a real game-changing technology," Nexterra President Jonathan Rhone says of a deal his company announced with the University of British Columbia February 15. "This is a fantastic opportunity for us."

The university, located in Vancouver, has agreed to install and demonstrate a wood-fuelled combined

According to Jim Dangerfield, VP of FPInnovations, "Nexterra's direct fired gasification system is a platform technology that can be used in many industrial applications. Replicating Nexterra's technology at industrial sites in B.C. could result in an estimated 200,000 tonnes of greenhouse gas emission reductions in British Columbia annually by 2020." This illustration showcases the Nexterra Gasification Plant at Kruger Mill.



Nexterra Gasification System at Kruger Products Tissue Mill in New Westminster B.C.

The Keys to Success

Achieving success in the bioenergy industry requires having your finger on the pulse of the market and knowing how to access some public funding, but according to Nexterra President Jonathan Rhone, it's mostly about people.

That includes the people you work with and the people you partner with, both strategically and financially.

"If I think about the keys to success around our business, building great partnerships with great companies has been a key to getting Nexterra where we've gotten to in the time period that we have," Rhone says. "You can't have 47 partners. You need to pick a partner who's really committed to you. It's never a smooth ride. There are always challenges that come up and you have to have a partner that's willing to weather those ups and downs."

Rhone says the objectives and end-goals of both partners have to line up from the beginning.

"If they don't, it usually shows up at a critical time," he says. "You have to keep communicating in good times and bad. That kind of discipline and honesty on both sides is fundamentally key. It's like a marriage. It starts and ends with trust."

Rhone says those lessons apply to strategic partners, like ones you might team up with to develop a product, and investors alike.

The people on the inside of your business are just as important, if not more so, Rhone says.

"Hire great people. I work with one of the most extraordinary groups of talented individuals," he says. "That is a number one key to success."

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Nexterra's turnkey gasification system at Kruger will convert locally sourced wood residue into clean burning syngas that will be fired directly into a boiler in place of natural gas. The Kruger installation will produce 40,000 lbs/hour of process steam and displace approximately 445,000 gigajoules (GJs) of natural gas annually.

heat and power system on its main campus that will be able to produce two megawatts of electricity and is expected to displace about 12 percent of UBC's natural gas use.

Rhone says it will be the first system in North America to gasify biomass into clean synthetic gas—known as "syngas"—then use it to generate power using a specialized gas engine.

Nexterra, which started in Vancouver in 2003, has worked with General Electric for the past three years to develop a system capable of cleanly burning syngas without residual tars in a GE Jenbacher engine.

"We developed our own proprietary method of removing tars," Rhone says. "We're very, very pleased with the results."

A few months before signing the UBC deal, Nexterra landed another groundbreaking contract with the city of Stamford, Connecticut.

There, Nexterra is working on a three-stage project meant to "close the loop" on biosolids at the city's wastewater plant.

"Wastewater plants are going through a real paradigm shift," Rhone says. "They'll be able to use their biosolids to make both heat and power."

In days gone by, municipal wastewater plants used to spread their residual biosolids—sewage sludge—onto the land. That practice has since been prohibited in many places, so plants now use industrial dryers to dry out their biosolids. The process not only destroys pathogens present in the material, but also produces an end product that can be burned as biomass fuel.

What Nexterra is doing in Stamford involves three phases.

The first is to use a wood-burning gasification system to run the dryer. The plan for the second phase is to convert the system to run on the dried biosolids that the plant produces, instead of using wood. The third and ultimate phase would see the system use biosolids not only run the plant's dryer, but heat and power the entire facility, thus creating a truly closed loop.

"It's all about the theme of lower-cost, renewable energy," Rhone says.

Rhone says Nexterra's systems emit far fewer greenhouse gases and particulates than simple wood-fired combustion and even fewer yet than burning fossil fuels.

They also use fuels—be they wood, or eventually, dried biosolids—that are not only readily available but in many cases would otherwise be considered waste. The woody biomass gasification systems, for example, can run on things like tree trimmings, construction waste and mill debris.

"A lot of it in urban areas would just end up in the landfill," Rhone says.

For renewable energy companies, corporate social responsibility comes easily, but Nexterra is leveraging its green credentials even further. It recently won the 2010 Sustainability Champion Award from the Vancouver 2010 Olympic and Paralympic Organizing Committee (VANOC) for the advice it provided to Games organizers and for its support of VANOC's carbon offset program.

Nexterra, which is largely owned by Calgary-based ARC Financial Group, initially developed its products for facilities in the forestry industry, which had lots of excess wood lying around, but is now working with everyone from universities and municipalities to the U.S. Department of Energy's Oak Ridge National Laboratory in Tennessee.

Rhone says there is also great potential in working with utilities and power companies now that the UBC project has opened the door to commercially viable biomass power generation.

There are also potential opportunities to develop systems that run on different types of biomass fuels, as well as expanding the client base outside of North America.

"We're actually looking at exports to South America and Europe," Rhone says.

Rhone estimates the worldwide market for renewable power systems is well over $100 billion, and maintains that biomass companies are poised to play a major role in that market.

It's a safe bet that as its recent successes and innovations continue, Nexterra will continue to be at the head of the class.

The Evolution of a Biomass Gasification Giant

2003

- Nexterra incorporated.
- Nexterra announces plans to build a gasification pilot plant in Kamloops BC with support from NRC-IRAP, NRCan and Ethanol BC.

2004

- Pilot plant opens and reports promising results from gasifier emissions tests.
- Nexterra raises $5.4 million financing led by ARC Financial.

2005

- 1st Commercial Customer – Tolko Industries, Heffley Creek plywood mill in Kamloops.
- Nexterra launches program to develop direct-fired solution for the pulp and paper industry.
- ARC Financial doubles investment in Nexterra.
- 2nd commercial customer – Johnson Controls Inc. University of South Carolina

2006

- Weyerhaeuser, Nexterra and Paprican team up to tackle skyrocketing fuel costs at Kamloops Cellulose Fibers kraft pulp mill (now owned by Domtar).
- Nexterra and Tolko complete 1st commercial gasification plant.

2007

- 3rd round of $6.8 million financing led by ARC Financial.
- Product Development Centre undergoes multi-million dollar expansion to develop and test new applications for gasification technology.
- Nexterra, Domtar and Paprican receive $2.7 million from SDTC for lime kiln project.
- Pristine Power and Nexterra form strategic alliance to develop $500 million BC BioEnergy Power Network as part of a BC Hydro call for renewable energy.
- Nexterra receives funding to develop new gasification applications: direct-fired syngas for boilers and kilns.
- Johnson Controls and Nexterra Energy form strategic marketing alliance.
- 3rd commercial customer – Dockside Green Power Limited.
- Research begins on use of syngas for reciprocating engines.

2008

- Nexterra wins GLOBE Award for Technology Innovation.
- Nexterra wins CATA Alliance Clean Tech Award.
- Successful completion of testing program to displace fossil fuels with syngas in lime kilns and boilers.

2009

- The University of Northern British Columbia picks Nexterra to supply and install a turnkey biomass gasification system to heat UNBC's Prince George campus and anchor its new Northern Bioenergy Innovation Centre.
- Nexterra receives $7.7M in funding from the BC Bioenergy Network (BCBN), Sustainable Development Technology Canada (SDTC), the National Research Council Canada Industrial Research Assistance Program (NRC-IRAP), and Ethanol BC.
- Nexterra selected by the city of Stamford, Connecticut to develop a biomass gasification system for the Stamford Water Pollution Control Authority.
- Kruger Products' gasification plant becomes operational in December 2009. It is the first of its kind in the pulp and paper industry.

2010

- The University of British Columbia and Nexterra announce that UBC will install and demonstrate a unique, on-site biomass-fuelled combined heat and power solution developed by Nexterra and GE Power & Water's gas engine division.
- Nexterra receives the 2010 Sustainability Champion Award by the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC).

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