

## **BACKGROUNDER – NEXTERRA AND ANDRITZ STRATEGIC ALLIANCE**

### **A New Generation of Renewable Energy Solutions for Wastewater Treatment Facilities**

#### **The Opportunity**

According to the U.S. Environmental Protection Agency (EPA), there are more than 16,000 wastewater treatment facilities in the United States owned and operated by municipalities. Biological sludge or “biosolids” is a residual product of the wastewater treatment process. Traditional biosolids management methods include land application or trucking to landfills. Many municipalities would like to discontinue these practices due to health concerns, rising fuel and management costs, greenhouse gas emissions from transportation, and diminishing landfill capacity. Consequently, municipalities across North America are looking for sustainable solutions for biosolids management that will enable them to reduce energy costs and overall carbon emissions.

#### **Nexterra - Andritz Strategic Alliance**

Nexterra Systems and Andritz have formed a strategic alliance to develop and market drying and heating solutions fuelled by renewable biomass energy. Combining Nexterra gasification technologies with Andritz biosolids dryers will enable customers at municipal wastewater treatment facilities to reduce fuel costs, eliminate dependence on fossil fuels, lower greenhouse gas emissions and provide a clean, sustainable solution for biosolids management.

#### **Renewable Energy Solutions for Wastewater Treatment Plants**

Collaborating with Andritz, Nexterra plans to introduce a suite of renewable energy applications for wastewater treatment plants. The companies will immediately target opportunities where new or existing biosolids dryers can be combined with Nexterra’s biomass gasification technology operating on wood fuels instead of natural gas. This will be followed by a “closed loop” renewable energy solution that will allow treatment plants to use dried biosolids as a fuel source for Nexterra’s gasification technology. This closed loop option will remove the need for an external fuel source and will significantly reduce fuel costs and greenhouse gas emissions.

Nexterra is also developing a unique biomass to combined heat and power solution (CHP) with General Electric. This new CHP system will be sized at 2 – 10 MW and will combine Nexterra’s gasification technology and gas conditioning equipment with high efficiency gas engines. This solution will enable municipalities to self-generate renewable heat and power on-site.

#### **Benefits for Municipalities**

These biosolids gasification solutions will provide municipalities with the following benefits:

- Greater energy independence
- Reduced fossil fuel consumption and fuel costs
- Reduced greenhouse gas emissions
- Lower trucking costs associated with transporting biosolids off-site
- Increased local employment, leveraging local energy fuel resources
- Improved and upgraded physical plant infrastructure
- Leadership on climate action, green energy innovation and GHG reduction

## **What is Biomass Gasification?**

Gasification is a thermo-chemical process that uses heat to convert carbon-containing fuel into a clean burning gas commonly referred to as syngas. Gasification differs from combustion because it uses just 20% to 30% of the air or oxygen needed for complete fuel combustion. During gasification, the amount of air supplied to the gasifier is carefully controlled so that only a small portion of the fuel burns completely. This “starved air” combustion process provides sufficient heat to pyrolyze and chemically break down the balance of the fuel into syngas.

Syngas is a clean burning fuel that can be used as a substitute for natural gas, fuel oil or propane to produce process heat, steam, hot water and/or electricity using conventional energy recovery equipment. Syngas is composed primarily of carbon monoxide, hydrogen and methane, as well as vapourized pyrolysis liquids and hydrocarbons.

## **About Nexterra Systems Corp.**

Nexterra Systems Corp is a leading developer and supplier of advanced gasification systems that convert biomass fuels into clean burning “syngas”. Nexterra’s industrial and institutional customers can reduce energy costs and become more energy self-efficient, while simultaneously significantly lowering greenhouse gas emissions. In addition to Andritz, Nexterra has alliances with Johnson Controls and General Electric.

Nexterra gasification systems offer outstanding reliability, high efficiency and low lifecycle costs vs. conventional combustion systems. Nexterra’s systems also produce substantially lower emissions levels for particulate matter (PM), NOx, VOC and CO compared to conventional biomass solutions and they can operate on a wide range of fuels including woody biomass and biosolids. Moreover, the technology has an inherent flexibility that enables syngas to be directly fired into a variety of heat recovery equipment as well as high efficiency internal combustion engines.

Since Nexterra was established in 2003, the company has focused on commercializing its proprietary gasification technology for thermal and cogeneration applications. Projects include:

- US DOE, Oak Ridge National Laboratory (ORNL), TN – Nexterra’s biomass gasification system is the cornerstone of an \$89 million contract for Johnson Controls to undertake a wide range of building management and energy conservation measures at ORNL.
- Dockside Green, Victoria, BC – Dockside is the world’s highest ranked LEED Platinum commercial development. Nexterra’s gasification system converts urban wood waste into heat and hot water for the entire development.
- University of South Carolina, Columbia, SC – The gasification plant converts wood fuel into 60,000 lbs/hr of steam to heat the campus as well as generate 1.5 MW of electricity.
- University of Northern BC, Prince George, BC – Nexterra’s gasification system at UNBC will displace up to 95% of the natural gas currently used to heat the campus. It will also anchor a bioenergy innovation center.
- Tolko Industries Heffley Creek Plywood Mill, Kamloops, BC – The 38 MMBtu/hr gasification system converts wood residue into thermal energy to displace natural gas for a plywood mill.
- Kruger Products, New Westminster, BC – Nexterra’s system at Kruger’s paper mill will directly fire a boiler to displace natural gas used to generate 40,000 lbs of steam used in the paper making process.

Nexterra has successfully completed testing biosolids as a new fuel source at its Product Development Centre, in Kamloops, B.C. Tests were conducted using wet biosolids supplied by Metro Vancouver and dried biosolids supplied by the City of Stamford, Connecticut. Nexterra's gasification technology produced significant high quality thermal energy from the biosolids without requiring any major equipment modifications. In addition, third-party commissioned field tests confirmed emission results that were well below the guidelines set by British Columbia's Ministry of Environment.

Nexterra Systems Corp. is a private company majority-owned by ARC Financial Corporation.

### **About Andritz**

Based in Austria, the Andritz Group is a global market leader for customized plant, systems and services for hydropower, pulp and paper, steel and other specialized industries (solid/liquid separation, feed and biofuel) with 13,600 employees and 2008 sales of approximately USD \$5 billion. Andritz Separation, a wholly-owned subsidiary of the Andritz Group, is a leading global supplier of biosolids dryers and separation equipment utilized extensively in the wastewater treatment market.