CONCEPT SUMMARY AND ACTION PLAN

Urban Renewable Bioenergy and Compost Production

Fraser Richmond Soil & Fibre Ltd.,
a HARVEST company

April 2010

PWT - 21

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PARTNERS IN THE ZERO WASTE SOLUTION

The Province of British Columbia leads North America in promoting goals of environmental management and sustainability. In pursuing these goals with respect to waste management, the Metro Vancouver region faces five interlocking issues:

1. Landfilling has been identified as an unsustainable practices. This is due to their far distances from populated centres, the high and steadily increasing costs associated with their operation, their limited fill capacity and the generation of methane gases from organic waste that future generations will have to manage.
2. The Zero Waste Challenge has set landfill diversion goals that cannot be met using only current recycling and diversion strategies
3. Communities are seeking sustainable alternatives to fossil fuels
4. Farms, gardens, nurseries and stormwater control projects demand high-quality, nutrient-rich soil and compost products
5. The Province of British Columbia, Metro Vancouver and many local municipalities have set aggressive targets for reducing greenhouse gas emissions

Fraser Richmond Soil & Fibre Ltd. (FRSF) sits at the intersection of these issues with an organics recycling solution. FRSF is working in partnership with the Metro Vancouver region to help address all five of these issues.

The federal government supports our renewable energy vision as evidenced by the designation of FRSF to receive significant funding under Natural Resources Canada's (NR-Can) Clean Energy Fund. NR-Can recognizes FRSF's proposal as the innovative, sustainable, community-oriented, clean-energy project that Canadian communities desire.

This document defines our vision for ushering in the next generation of organic waste management in North America. It describes how we are both catalysts and leaders in renewable energy, and how we are part of the sustainability solution.

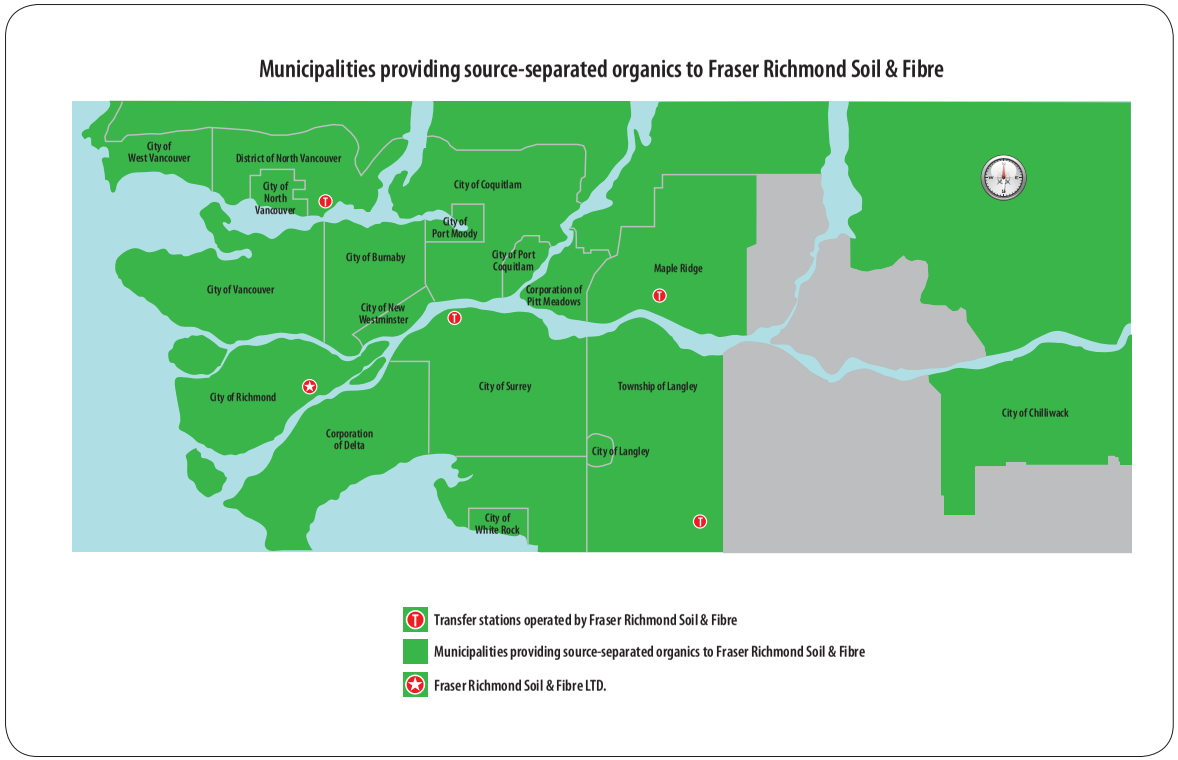
ABOUT US

BACKGROUND

FRSF began operations in 1993, and has since become the leader in composting and selling manufactured soil products in Western Canada. As FRSF management sought to grow the business and contribute to the emerging B.C. sustainable economy, it decided to partner with Harvest Power Canada Ltd. (Harvest) to explore energy production. These discussions led to a collaborative business arrangement and in October 2009, FRSF became a wholly owned subsidiary of Harvest.

OPERATIONS

FRSF operates one of the largest and most successful Covered Aerated Static Pile (ASP) systems in Canada, enabling it to compost a wide spectrum of source separated urban organics (SSO) including food, yard and wood waste. The Richmond facility is located on Port Metro Vancouver leasehold lands just north of the intersection of No. 8 Road and Blundell Road.



OUR FACILITY MAKES YOUR SOIL

Top (l-r): adding yard waste at FRSF's composting facility; high speed screening system unique to FRSF
Bottom (l-r): negative aeration captures exhaust from the covered aerated static piles; local residents at FRSF's green/yard waste depot in North Vancouver pick up a bag of top-quality compost for their garden.

MISSION

We envision a world where valuable resources are harvested rather than wasted. Our business is to help society live in balance with nature by providing products and services that harness the energy and nutrients of organic materials, creating a path that transforms wastes into valuable resources that enable communities, businesses, and individuals to thrive sustainably.

VALUES

Safety
We design, build and operate our facilities; offer products and services; and conduct all our activities in a manner that ensures the highest degree of safety and well-being of our employees, neighbors, customers and the environment.

Ethics and Integrity
We govern our business interactions and relationships, both internally and externally, with honest, integrity and respect. We believe that adherence to these principals is essential to developing loyalty amongst our business partners, host communities and investors on which our success depends.

Sustainability
The focus and direction of our business operation is premised on a long-term commitment to responsibly promote and achieve environmental, economic and social sustainability.

Results
Our ability to realize our vision and fulfill our values depends on delivering on-the-ground results. We establish and pursue ambitious goals, measure our success by our achievements and learn from our failures.

Passion
We believe passionately in our mission and values, and bring energy and enthusiasm to all our endeavors. Our passion inspires others to work with us to achieve our mission.

CORPORATE SOCIAL RESPONSIBILITY

ECONOMIC BENEFITS TO THE PROVINCE

Our High Solids Anaerobic Digestion (HSAD) and gasification facilities will provide economic benefits to B.C. by providing an efficient, reliable and environmentally sound source of electricity and heat. By extracting energy and producing compost from the municipal solid waste stream, our facility converts a costly "waste" to economically valuable resources. Our project will also provide waste managers with less expensive, local and sustainable ways for disposing organic waste.

EMPLOYMENT BENEFITS TO THE PROVINCE

At our Richmond site, it is anticipated that approximately 50 green jobs will be created during the construction phase of our HSAD and gasification facilities, almost all of which will be filled locally. A total of 15 permanent green jobs will be created in Richmond to manage, operate and maintain the facility (e.g. material handling; product quality control; marketing and sales; running the Visitors' Centre; etc.). More jobs will be created with the implementation of additional decentralized facilities.

COMMUNITY OUTREACH

Our outreach and education program brings opportunities for learning and research in many synergistic areas: climate change, waste diversion, energy yields, energy policy, emission reduction, recycling, community-supported agriculture, brownfield remediation, horticulture, displacement of fossil-fuel-based agrichemicals, carbon credit delivery, renewable energy credit delivery, dristributed power production, CNG vehicle fueling, water conservation, soil carbon dynamics and overall carbon balance modeling.

BENEFITTING THE REGION

"We proudly serve the Metro Vancouver region by recycling organic waste materials (food and yard waste) into valued resources (compost, soil blends and renewable energy)."

-Steve Aujla
Executive Vice President, FRSF

SOCIAL AND ENVIRONMENTAL BENEFITS

The additional benefits that stem from our operations include: sustaining clean-tech jobs; reducing greenhouse gas (GHG) emissions; providing a source of carbon offset (sequestration in soils and renewable energy); promoting urban trees, parks and landscapes; and improving stormwater management methods.

LOCAL BENEFICIARIES

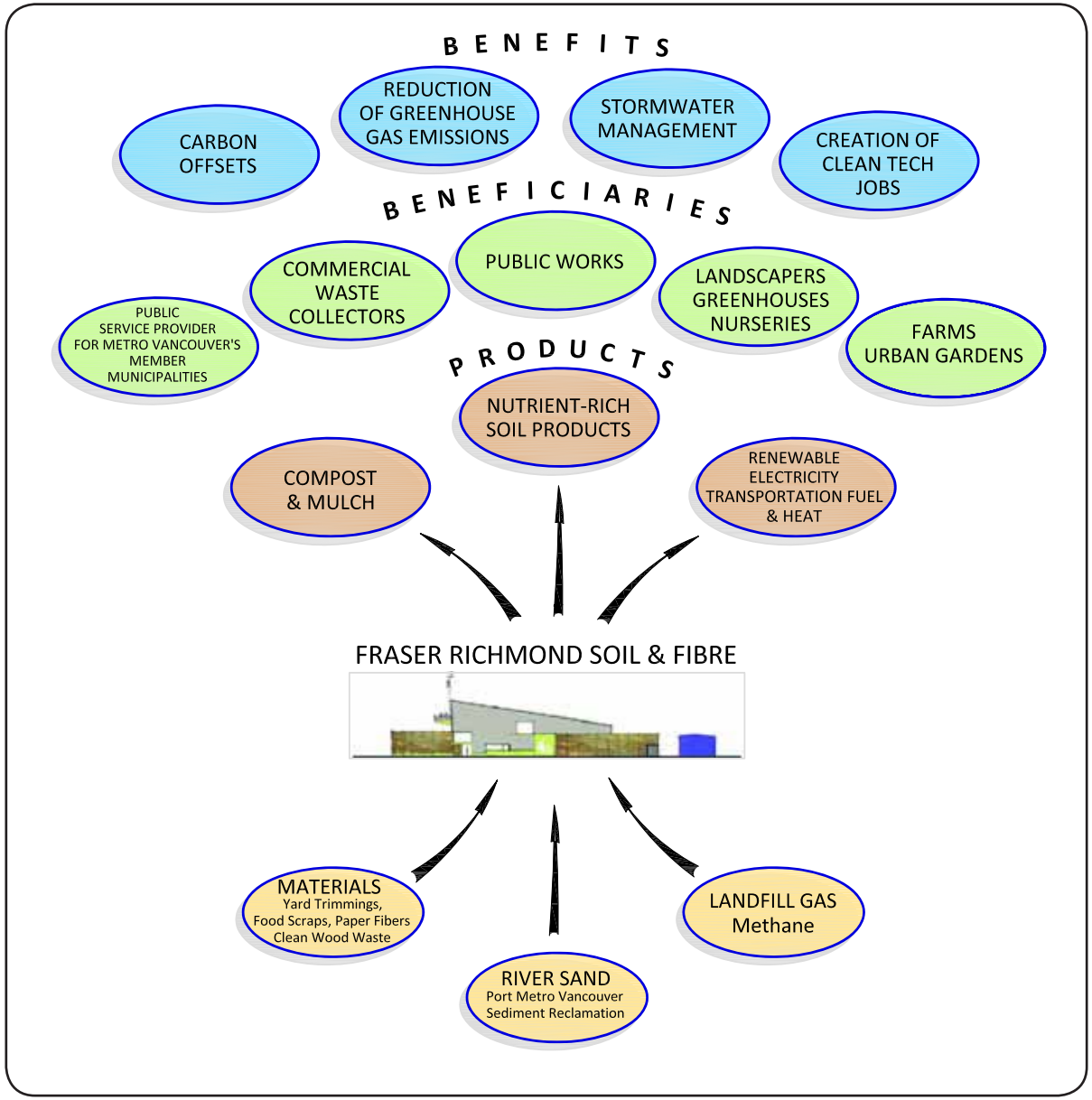
We take a local and responsible approach towards managing our organic materials–yard trimmings, food scraps, paper fibres and clean wood waste–within our community. Our products and services benefit many members of the community including: Metro Vancouver member municipalities, commercial waste collectors, landscapers, organic waste generators, greenhouses, nurseries, farms, urban gardens and public works projects. In addition, we operate green/yard waste depots in Langley, Maple Ridge, Chilliwack and the North Shore.

MANUFACTURED OUTPUTS

With our decentralized bioenergy facility, which deploys HSAD technology, we will serve as a local provider of renewable electricity, heat and transportation fuel. We also provide recycled compost, mulch and nutrient-rich soil products that enrich local farms and gardens.

MATERIAL INPUTS

Our facility turns organic feedstock (yard trimmings, food scraps, paper fibres and clean wood waste) into compost. Also, we incorporate tens of thousands of cubic metres per year of sand from Port Metro Vancouver's Fraser River sediment reclamation operations into our soil products. Finally, we use landfill gas (methane) from an adjacent closed landfill to operate equipment.


BENEFITS
CARBON OFFSETS
REDUCTION OF GREENHOUSE GAS EMISSIONS
STORMWATER MANAGEMENT
CREATION OF CLEAN TECH JOBS
BENEFICIARIES
PUBLIC SERVICE PROVIDER FOR METRO VANCOUVER'S MEMBER MUNICIPALITIES
COMMERCIAL WASTE COLLECTORS
PUBLIC WORKS
LANDSCAPERS GREENHOUSES NURSERIES
FARMS URBAN GARDENS
PRODUCTS
NUTRIENT-RICH SOIL PRODUCTS
COMPOST & MULCH
RENEWABLE ELECTRICITY TRANSPORTATION FUEL & HEAT
FRASER RICHMOND SOIL & FIBRE
MATERIALS
Yard Trimmings, Food Scraps, Paper Fibers Clean Wood Waste
RIVER SAND
Port Metro Vancouver Sediment Reclamation
LANDFILL GAS
Methane

EXPANDING ON OUR ENVIRONMENTAL SUCCESSES

We divert increasing amounts of urban materials.

As a key participant in the Zero Waste Challenge we view ourselves as a manufacturer, not a disposal or waste facility. We are designing a specific program and technology for multifamily and commercial organic materials so we can produce renewable energy from these local resources. Half of the Metro region's population lives in multifamily housing. Most of the region's businesses are just beginning to separate and recycle compostable materials. These two facts are the drivers for our opportunity to make increased recycling and bioenergy a reality for the region.

We contribute to achieving sustainability goals for our partners.

We operate on Port Metro Vancouver land in Richmond, B.C., and help Port Metro Vancouver achieve both social and environmental goals. Sand removed to ensure safe passage in the Fraser River is transformed at our facility into hundreds of thousands of tonnes of nutrient-rich soil products that local community members use to grow food. Also, we ensure that Port Metro Vancouver's land is not contributing to greenhouse gases by collecting landfill gas (methane) from an adjacent closed landfill. Finally, we reduce our greenhouse gas emissions by replacing fossil fuels needed to operate equipment with landfill gas.

Our business model is to decentralize the bioenergy infrastructure.

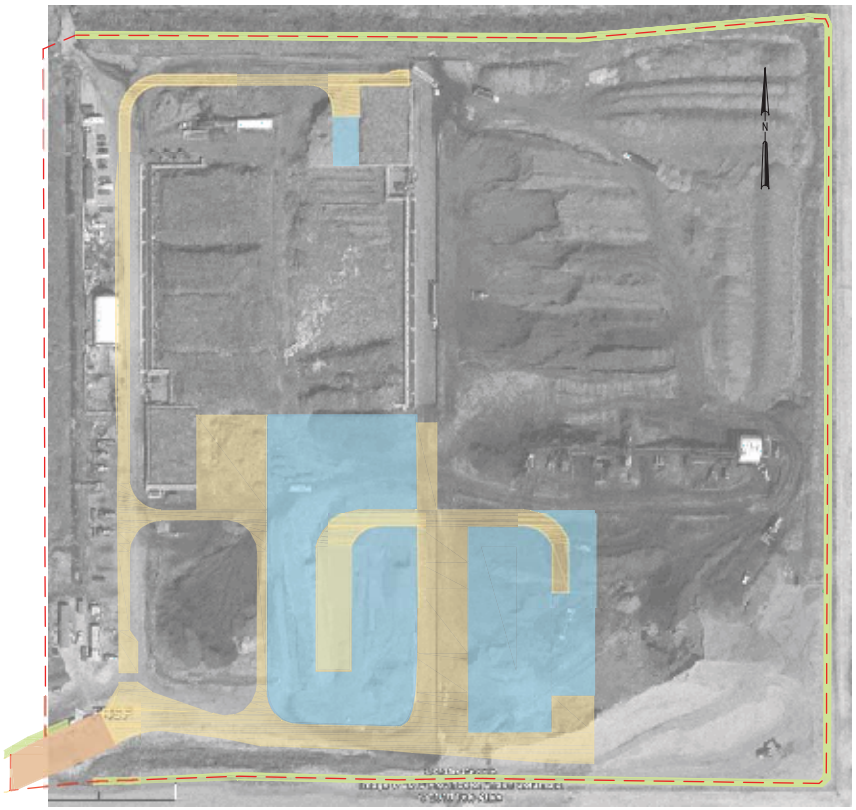
A decentralized approach is a wise strategy when considering environmental and social issues like traffic congestion, fuel use, education and product marketing. We are building multiple receiving facilities that would not only accept SSO materials but also produce energy and sell compost, mulch and soil products back to the community. This minimizes the collection time and transport distance for curbside and commercial collection, and it returns the renewable and recycled products to the local community. These decentralized facilities will be fully or largely enclosed and will have architectural and environmental elements that make sense for each specific community. These receiving and sales facilities will then operate in concert with our composting, screening and soil manufacturing facility in Richmond.

MEASURABLE RESULTS

"Our energy projects, which will begin construction in 2010, will generate 1.5 MW of electricity, enough to power 750 homes per year, plus another 1.5 MW of heat energy. In addition, our facility provides an alternative for landfilling of food scraps, and is the leading and largest producer of high quality, nutrient-rich soil products for the Metro Vancouver region."

-Jan Allen, P.E.
Lead Engineer and Technologist, HARVEST

SITE PLAN - RICHMOND FACILITY



PROPOSED IMPROVEMENTS

- Entrance Road & Site Pavement
- Scalehouse
- Landscaping and Tree Planting
- Security Fence (2 metres)
- High Solids Anaerobic Digestion (HSAD)
- Biomas Gasification
- Power Production from Biogas and Syngas

TECHNOLOGIES

COVERED AERATED STATIC PILE

We specialize in a novel and unique form of aerobic composting. Our ASP technology increases our operational efficiency and creates top quality compost. Unique features include:

- Reduced Energy Costs: 38% less energy consumption per tonne through improved grinding and aeration technology
- High Throughput: 36% more processing capacity due to greater space efficiency in comparison to other composting systems
- Year-Round Production: more tolerant of seasonal differences in volume and moisture levels compared to membrane systems
- High-Quality, High-Value Compost: our products sell as fast as we can manufacture them, indicating demand is greater than supply

We also acknowledge that the viability of any composting facility is highly dependent on the quality and performance of its odour control system. Our system incorporates exceptional odour control performance resulting from:

- Pile Construction: smaller surface area to decrease the amount of material exposed to the air
- Continuous Aeration: reduces the odour by forcing air through the pile, without turning it
- Cover: organic pile cover acts as a natural biofilter to treat peripheral odours
- Biofiltration: captures exhaust air and treats it, removing odour before it is ever released to the atmosphere

BIOMASS GASIFICATION

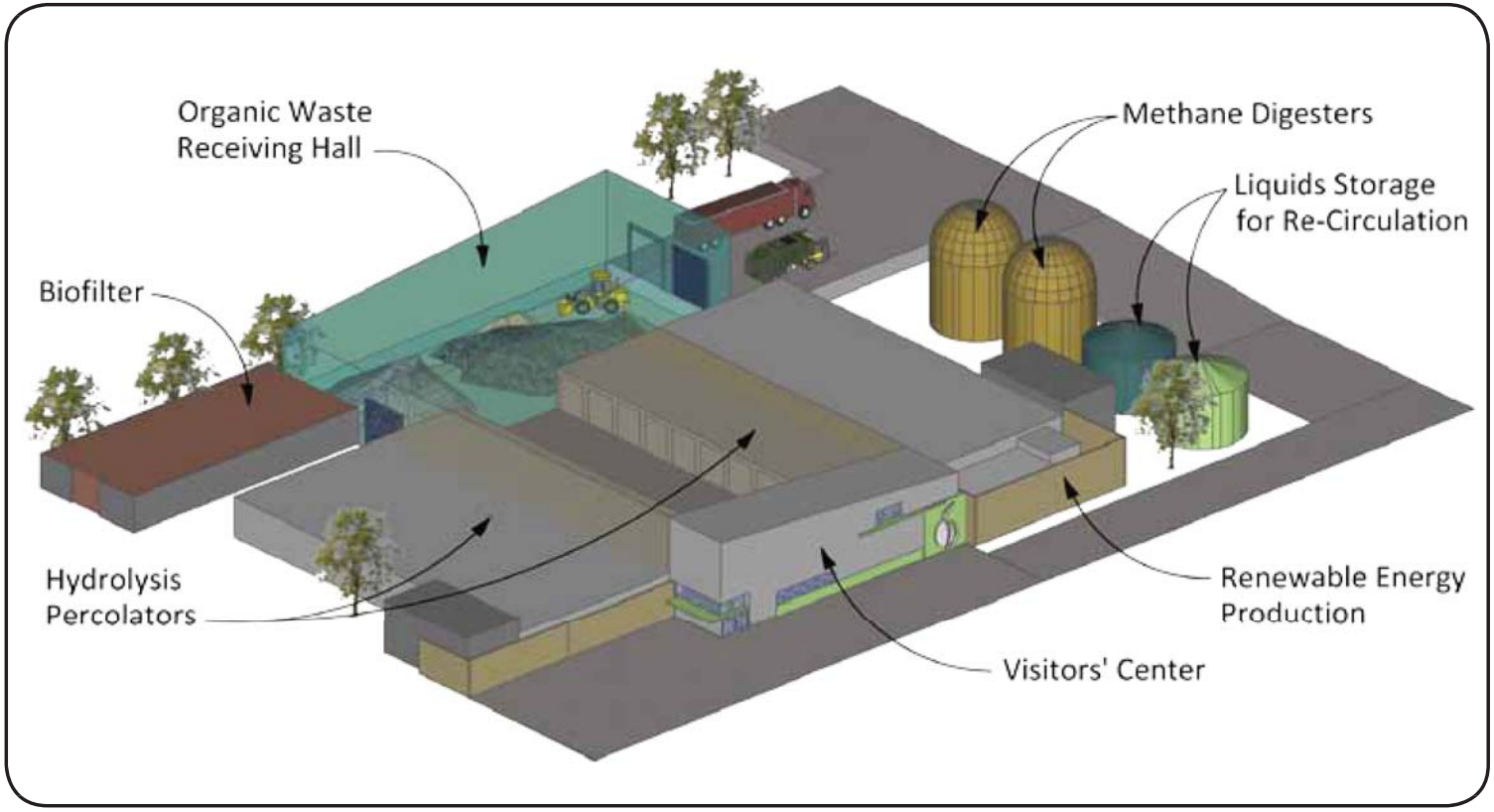
We are designing a revolutionary small-scale gasification technology to convert urban wood into renewable hydrogen-rich syngas. Approximately 22% of the solid waste going to landfills in the Vancouver region is comprised of wood. Our technology is a dual-chamber (allothermal) gasification column. Benefits include:

- Production of pure syngas as compared to single-chamber gasifiers because no combustion air dilutes the syngas
- Pure syngas has a higher heating value, and more readily reforms into other high-value products like renewable natural gas
- It enables smaller, minimum plant sizes with higher energy output

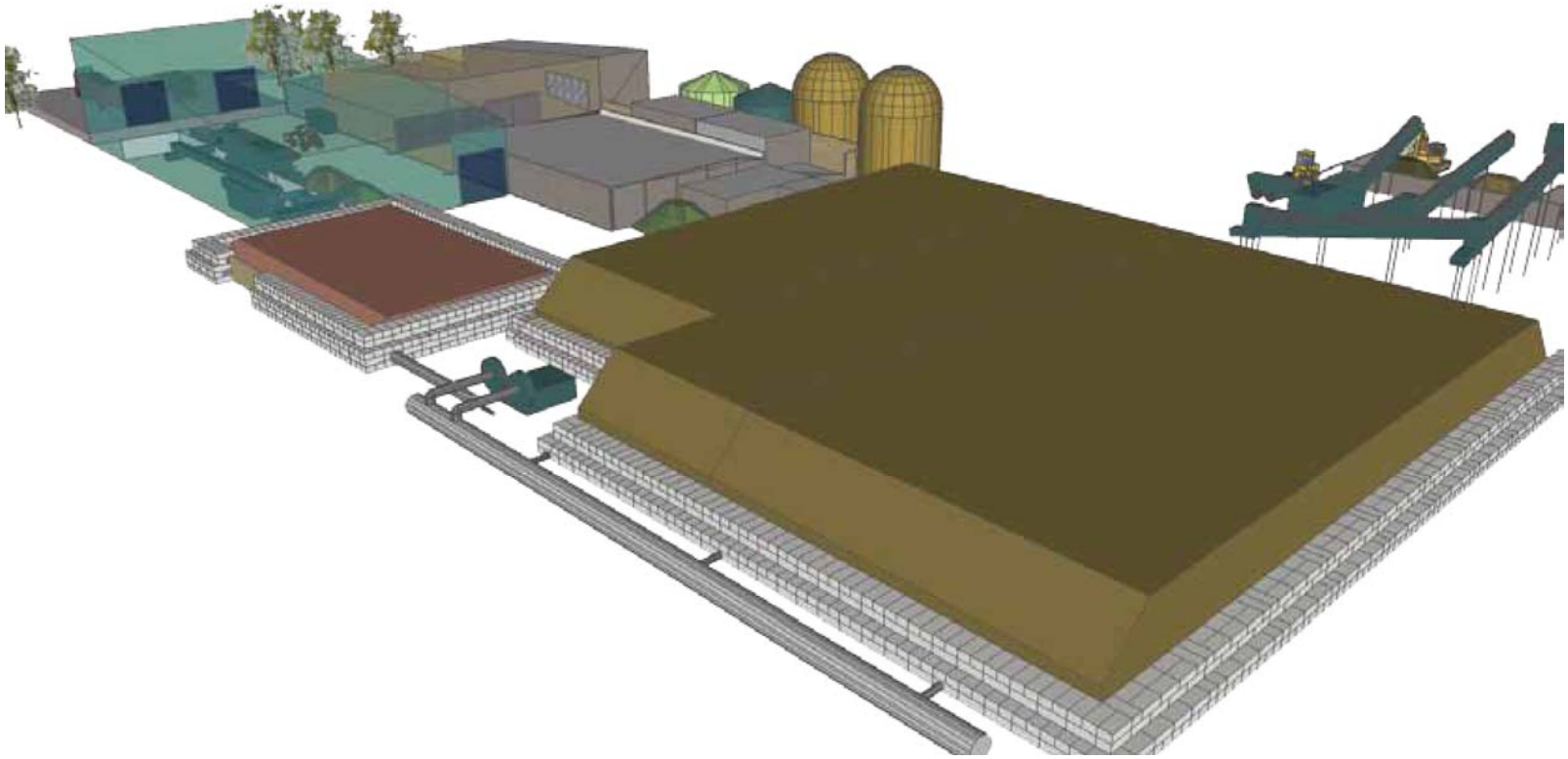
Our technology increases the rate of heat transfer and enables smaller, minimum plant sizes with higher energy output.

HIGH SOLIDS ANAEROBIC DIGESTION

Our HSAD facility is the first of its kind in North America to implement biogas energy production (operations to commence in 2011). The HSAD process uses a two-stage batch-feed operation. The technology is remarkably simple yet simultaneously sophisticated, and has been proven in more than 100 facilities in Europe. The process: naturally occurring microorganisms break down the waste into methane and carbon dioxide–also known as "biogas"–which is captured in gas-tight enclosures. The biogas can be used as fuel to produce renewable electricity, cleaned to biomethane which is pipeline natural gas or further processed into compressed natural gas (CNG).



OUR HIGH SOLIDS ANAEROBIC DIGESTER AND COMPOSTING OPERATION



This perspective shows how our HSAD fits into our Richmond composting operation.

ENVIRONMENTAL PERFORMANCE

ENVIRONMENTAL MANAGEMENT SYSTEM

Our Environmental Management System (EMS) prescribes an ongoing and proactive approach to insure odour, dust, stormwater runoff, and waste minimization controls are both effective and at an acceptable standard of performance. The EMS is based on ISO 14001 principles and relies on a continuous improvement philosophy.

OUTSTANDING RECORD OF ENVIRONMENTAL PERFORMANCE

In 2006, a Provincial Environmental Audit awarded us a 100 percent compliance rating under BC regulation 321/2000. This award confirms our outstanding record of simultaneously producing quality products and controlling environmental impacts.

ENVIRONMENTAL BENEFITS FROM HSAD

Some of the environmental benefits that we will bring to the province as a result of our HSAD facility in Richmond include:

- The production of clean, renewable, non-intermittent energy in the form of 6,750,000 kWhrs of electricity and 56,000 MMBtu of thermal energy each year
- Greenhouse gas emissions reductions of 22,500 metric tonnes of CO2 equivalent each year
- A new method for diverting and extracting energy from a portion of the Municipal Solid Waste stream
- The return of carbon-rich soil to the agricultural sector through the production of high-quality, chemical-free, water-conserving compost and soil products

ENVIRONMENTAL BENEFITS FROM GASIFICATION

Our biomass gasification system produces biochar and/or wood ash. Biochar is used to sequester carbon back into the soil. Wood ash is used for odour control in the composting system. In sum, the gasification plant at our Richmond facility will produce 4,000,000 kWhrs of electricity each year; 33,500 MMBTU of thermal energy each year; and greenhouse gas emissions reductions of 13,700 metric tonnes of CO2 equivalent each year.

TEAM

STEVE AUJLA is the Executive Vice President of FRSF. He has been instrumental in responding to market demands for new recycling services by providing cost effective solutions through more than twenty organic waste recycling service agreements to municipalities and collection companies. He also is the Product Quality and Marketing Manager for Soil Quality Control and Specifications. He has 20 years of experience in selling recycling services and recycled products. Contact: SAujla@FraserRichmond.ca

BRIAN H. SHUM, CMA, is the Chief Financial Officer of FRSF. Brian has held senior management positions in the Forestry, Pharmaceutical, Aerospace, Tourism, and for the past thirteen years in the Building Supply sector as CFO for Dick's Lumber, a large lumber and hardware company serving the contractor market. Brian has a degree from British Columbia Institute of Technology and CMA designation from the Society of Management Accountants of Canada. Contact: BShum@FraserRichmond.ca

THOMAS KRAEMER, P.E. is Harvest's Vice President for Project Delivery. Tom was a Vice President for waste management services in the western U.S. for CH2M HILL, Inc., where he managed engineering and construction projects for over 20 years. Tom's background is in engineering of solid waste management and biogas energy facilities. He holds an MS degree in civil and environmental engineering from the University of Wisconsin-Madison. Contact:TKraemer@HarvestPower.com

PAUL SELLEW is CEO of Harvest Power, Inc. and leads the Vancouver management team. Paul has been a leader in the organics industry for more than 25 years. In 1982, he founded Earthgro, Inc., which grew to be the second largest producer of compost-based lawn and garden products in North America. Paul also founded and led International Process Systems, Inc. (composting technology provider), Allgro, Inc. (biosolids compost marketing firm), Environmental Credit Corp. (carbon credit creation and trading), and Backyard Farms (hydroponic greenhouse tomato producer). Paul graduated from Cornell University. Contact: PSellew@HarvestPower.com

NATHAN GILLILAND oversees financial performance for the enterprise. Nathan was an Executive Vice President at Bain Capital, managing $2 billion in investments in utilities, power generation and consumer products. Prior to Bain, Nathan co-founded MyCounsel.com and managed strategic planning and acquisitions for Nutraceutical Corporation. Nathan earned his degree with Highest Honors from the University of California-Berkeley. Contact: NGilliland@HarvestPower.com

JAN ALLEN, P.E. is the Lead Engineer and Technologist for the enterprise. Jan was a Principal Technologist at CH2M Hill's Environmental Services Global Business Group and is recognized as an industry leader in organic conversion technologies and research. As a consulting engineer to FRSF since 1999, he helped the firm build its outstanding operating and compliance record. He is the registered inventor on four patents for composting systems and biofiltration. He graduated with distinction from Purdue University. Contact: JAllen@HarvestPower.com

DEFINITION OF TERMS

BATCH FEED

A process by which an anaerobic digester is filled and emptied in sequence, resulting in individual batches of compost. A number of batch digesters are assembled to create a continuous energy supply.

BIOGAS

A mixture of methane (which is renewable natural gas) and carbon dioxide produced by bacterial degradation of organic matter and used as a fuel.

COVERED AERATED STATIC PILE (ASP)

A composting system best defined by breaking down each word: covered (with bark, compost or wood ash), aerated (oxygen added), static (not moved), pile (deep cross section).

HIGH SOLIDS ANAEROBIC DIGESTION (HSAD)

The degradation and stabilization of organic materials with a solids content between 25% and 50%. Wet anaerobic digestion, by comparison, processes material with a solids content between 2% and 15%.

MUNICIPAL SOLID WASTE (MSW)

Garbage or refuse including durable goods, non-durable goods, containers and packaging, food wastes and yard trimmings, and miscellaneous inorganic wastes. Municipalities use this metric to monitor their waste generation rates, diversion rates and disposal rates.

ORGANIC FEEDSTOCK

Compostable materials (e.g. yard trimmings; food scraps; food-soiled paper and cardboard; non-treated & non-painted wood).

SOURCE SEPARATED ORGANICS (SSO)

The system by which waste generators (homes and businesses) segregate compostable materials from other waste streams at the source for separate collection.

CLOSING THOUGHTS

Fraser Richmond Soil & Fibre Ltd., a division of Harvest Power Canada Ltd., is emerging as a leading proponent of locally managed renewable energy and sustainable soil products. We are a part of the B.C. green economy, creating sustainable jobs in the Lower Mainland and helping reach Zero Waste Challenge goals. We see the Metro Vancouver region as both a participant and beneficiary of our investments in bioenergy production at our Richmond facility. We are advancing environmental, social and economic sustainability initiatives in a way that brings good news to the region.

Harvest and Fraser Richmond Soil & Fibre Ltd. are proud to help benefit the community and the province by helping to sustainably manage organic waste through recycling, support local agriculture, create energy for homes and businesses and help manage air quality to create a better quality of life in B.C.'s Lower Mainland.

NOTES

Steve Aujla, Executive Vice President, Business Development

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