

Sustainable Solutions for Agriculture and Organics Management for the Fraser Valley

The Fraser Valley Organics Conversion Initiative

Background/Impetus:

The Fraser Valley is home to the highest concentrations of animals per acre of any region in Canada. It enjoys some of the best climate, soil and water for agricultural production in the world, and is the most expensive farmland globally by a magnitude. British Columbia farmland is protected by the Agricultural Land Reserve, insuring the land remains for Ag production, but creates a challenging dynamic economically, and while shown beneficial for its express purpose, it is often contentious. It is well-documented that the Fraser Valley has a sensitive airshed that traps and holds much pollution from other areas. A portion of the Fraser valley sits over the unconfined Sumas Aquifer, and much study has been done on the nutrient loading situations, which is currently in high scrutiny ahead of sweeping changes to the Agricultural Waste Control Regulation. Organic Matter Recycling Regulations are also in review with changes imminent.

The B.C. Ministry of Environment has an open call for Expressions of Interest for the Organics Infrastructure Program (OIP) specifically looking to alleviate and mitigate the threats the handling, processing and applications of these materials cause in the environment.

Catalyst Agri-Innovations Society was able to partner with an FVRD member to submit an EOI, creating a placeholder that the FVRD can choose to take.

The majority and highest concentration of agricultural activities in B.C. resides in the Fraser Valley. Because of this, it is reasonable and logical that efforts to address these opportunity/threats be centred here.

The Proposal:

1. That the FVRD pick up the placeholder Expression of Interest submitted November 30th taking its rightful place of leadership of the interactions of the member municipalities for this important group of actions. The submission is for \$15MM contribution towards \$24.95MM worth of projects, as laid out in this document.
2. That a systemic Organics Management strategy be created, focusing on a 5 part program capturing key technologies and solutions, existing or identified for this need. This will be consistent with, and in direct association with recently commissioned work by the FVRD called "Clean Economy in the Fraser Valley".
3. That the FVRD will contribute \$20,000 to engage a specific three member consultant Consortia to draft an official Organics Conversion Strategy for the Fraser Valley communications package, and to create a foundation structure for the FVRD and its member communities to apply for the myriad of funding opportunities open now, and on the near horizon. (separate proposal included with this submission)
4. That a new JV will be formed, that is a [Certified Benefits Corporation](#), proposed that it be called the **Fraser Valley Organics Conversion Assembly**. All facilities and services will be operated as "Living Labs", working in open source to allow the greatest benefits. It will continually invite potential technologies that can increase the regional benefit to work at the campus through a competitive process.

The 5 Components are:

1. A comprehensive Geographic Information System (GIS) Map of the entire Fraser Valley be created, expressly highlighting farms (active or not), farmland (including current status/use), animal units, organic material production and processing sites (composting, AD, other), all available public information on land and land use, topography, proximity to water, (wells, surface and subsurface), highlighting what the Ministry of Environment calls “high risk areas” and “high risk conditions”. This leverages technology developed by an Abbotsford company that currently serve the municipal and pipeline industry extensively with a similar service. This Canadian hosted, Software as a Service solution provides mapping, analysis and predictive tools for clients currently and would be adapted to allow for advanced queries to overlay data layers to output both high risk and optimal placement zones. Some funding and resource support is available for this from the Microsoft [AI for Earth](#) grants should the desire be to grow this into a high level Spatial AI test bed focusing on Environmental and Social betterment.
2. A platform facility for testing/demonstration of organics deconstruction technologies, starting with a pilot scale installation of the [TERAX technology](#) developed by Scion, a New Zealand R&D Crown Corporation. This technology has been identified for its ability to deconstruct all kinds of organics, including biosolids from WWTP operations, into nitrogen, phosphorus and acetic acid. The nitrogen and phosphorus are needed for the fertilizer plant, and the acetic acid for biogas production. All three product streams from this technology are highly beneficial to the overall strategy. Other solutions will be sourced from the global conversion industry community through competitions in full context (environmental/operational/economical) to assess the feasibility and suitability for the Fraser Valley. The purpose of this is to create a buffer/risk mitigation step that will allow digester enhancing products to be created from “waste”. All studies and reports say that on farm digesters in BC will require off farm materials, based on the size/scale of our farms. Accepting random, largely untracked truckloads of wide ranging materials adds multiple layers of complexity to on farm digesters, and much added risk. This proposal seeks to eliminate that threat, and bring surety to the process. From discussion with City of Abbotsford Engineering staff, two agri-processors use up ~half of the throughput capacity of JAMES WWTP. These solutions have the potential to reduce that to zero, freeing up space for other growth. This facility will be built at or near existing composting, landfill or WWTP facilities. Optimal location to be assessed by component 1.
3. A mobile centrifuge service based on the findings of the 2017 BC Ministry of Agriculture report [“Assessment of Phosphorus Extraction from B.C. Dairy Manure Using a Centrifuge”](#). This service will be made available to farmers assessed through the mapping work and consultation with direct stakeholders to be at the greatest risk, and where the greatest potential for overall environmental risk mitigation is found. A Chilliwack based team is well into development of this solution, and with success of this application, the operations base will be moved to Abbotsford.
4. A community scale on farm digester will be built, serving a number of area farms to reach critical mass for viable economies of scale. Design of the plant is based on manure from at least 1000 cows, and up to 1 million chickens. The facility will process ONLY manures, on farm residuals that do not require special permitting, and isolated products from the preprocessing component where variable organic streams will be fractionated. This facility will deliver approximately \$7M/yr of Renewable Natural Gas to the FortisBC Pipeline, with a 20 year contract available. This will

effectively double the farm produced RNG in BC, and will help to fill standing demand for this popular product. Optimal location to be assessed by component 1.

5. A community scale commercial fertilizer plant will be built to process the locally produces organic fertilizer products from program components 1-4 into high value precision agriculture products, that can be exported to the highest value/best opportunity markets. These organic residual nutrients, mainly nitrogen, phosphorus, and potassium, need a place to go all year, all the time. This is a well-known, well documented fact, and a substantive opportunity/threat for the Fraser Valley at an acute level. This will be the first industrial scale commercial fertilizer plant in Canada to use 100% organic nutrients harvested locally from waste streams. It builds on an existing plant in Indiana that does this, based on the overwhelming success of another Abbotsford business success, [Trident Processes](#). In a place called Fair Oaks, Trident is processing digestate from a 16000 cow farm, and the “cake” is upcycled into high value product. Currently this is only possible at scale, and this project will let Canada get there. Optimal location to be assessed by component 1.

This regional initiative will set a new standard for the Province, the country and the world, advancing the economy, while healing the environment. There are many programs active in other areas that want to have a home in BC, and this proposal would make the Fraser Valley the premier location in Canada!

GIS Mapping of ALL organics in the region – a first of its kind product/service for organics management.

An Applied Sciences Centre for Organics Deconstruction Technologies– A first of its kind for North America

A Community Scale On Farm Anaerobic Digestion Facility – A first of its kind for Canada

A Mobile Centrifuge Service for Dairy Farms – A first of its kind for Canada

A Community Scale Fertilizer Plant, using 100% Harvested Nutrients – A first of its kind for Canada

This is the beginning of a new era for world leading environmental management, and responsible, data driven economic growth, working towards [Canada’s Next Big Economic Pitch: to Feed a Hungry World](#), as pointed out by Dominic Barton of McKinsey and Co.

This proposal will all address the goals of the Organic infrastructure Program and insure the maximum impact from the program in the defensibly BEST provincial region for action. It also satisfies the goals for updating the Agricultural Waste Control Regulation (1992) (AWCR, happening now) which are:

- Enhance and improve water and air quality by requiring that good, environmentally protective agricultural practices are followed.
- Ensure watercourses and groundwater are protected through proper storage and use of manure, other nutrient sources and agricultural materials.
- Provide certainty – through clear, unambiguous requirements – focused on desired environmental outcomes.
- Update guidance to facilitate appropriate and beneficial use of manure and other agricultural by-products.

Budgets to build and timelines:

Component 1: This GIS and data collection and analysis will cost approximately \$150,000 and would be delivered in a phased approach with early data ready in the first quarter of 2019 and full delivery by the third quarter of 2019 helping other Components leverage data for decision-making.

Component 2: ~\$3M can be shovel ready by the fall of 2019, and processing by the end of 2020. Biosolids will be considered in this facility with other organics. OIP contributions ask for this is \$2M

Component 3: ~\$1.6M per service unit for CapEx and 5 year OpEx. This will not be funded by the OIP, and offered on a fee for service menu to local farms. Multiple service units can be created to meet market need/demand, based on term contracts. This will allow farms that are not compliant with the new AWCR regulations (coming in January 2019, and yet unknown) instantly, and at a lower cost than any other options because of the larger program. This service can be operational by mid-2019.

Component 4: ~\$10.6M can be shovel ready by the fall of 2020, and producing by the end of 2021. OIP contributions ask for this is \$7M

Component 5: ~\$9.6M can be shovel ready by the fall of 2019, and producing by the end of 2020. OIP contributions ask for this is \$3M. This component will be a commercial operation with economic model TBD.

Total Project Budget with one mobile Centrifuge Service Unit	-	\$24,950,000
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Total OIP Request for funding support	-	\$15,000,000
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The balance of the funding is the responsibility of the management team of Catalyst Agri-Innovations Society, and the solution team assembled for the new, to be formed Certified Benefits Corporation, proposed to be called the “Fraser Valley Organics Conversion Initiative”

References:

- [Current Agricultural Waste Control Regulations Review Intentions Paper](#)
- [From Crisis to Solutions: Towards Better Source Water Protection and Nutrient Management in the Hullcar Valley” \(PDF\)](#)
- [i-Open Technologies](#) (GIS mapping partner)
- [Certified Benefits Corporation website](#)
- [How Canada can become a global food production powerhouse](#)
- [Organics Infrastructure Program funding opportunity](#)
- [B.C. Innovative Clean Energy Program funding opportunity](#)
- [TERAX Organics Deconstruction Technology](#)
- [FortisBC Renewable Natural Gas Program](#)
- [The Bio-innovative Renewables Network \(BiRNet\)](#) (Academic Prime Partner)