

A New Paradigm for Agriculture "FOOD + BIO-ENERGY PRODUCTION"

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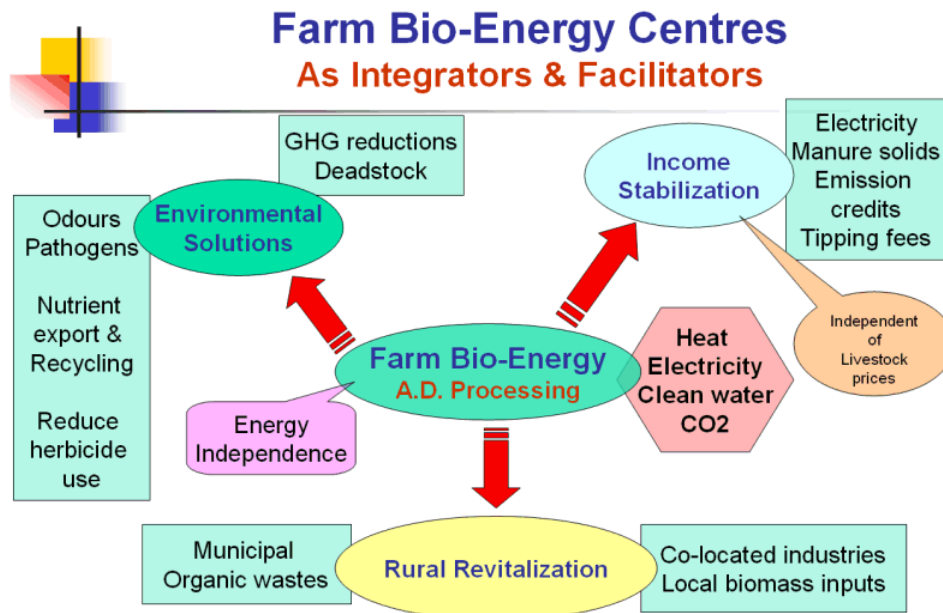
Farm-based renewable energy using anaerobic digestion (A.D.) technology can make a positive contribution to a national renewable energy strategy by providing distributed, electricity baseload capacity (7/24 operation) or peak demand supply, while remediating key environmental problems (odours, pathogens, GHGs). Manure processing, through anaerobic digester co-generation systems, is the key to producing odour- and pathogen-free products that are essential for providing farmers with increased flexibility for managing nutrients on their farms or exporting excess nutrients off-farm, and in doing so, facilitating large-scale livestock nutrient recycling. Furthermore, anaerobic digestion can effectively kill weed seeds during processing and result in substantially reduced herbicide usage on fields using processed manure slurries.

The future of confined livestock farming may well be re-defined around "**farmer-owned co-op energy centres**", which may include small **co-located bio-product industries** (value-added manufacturing) that rely upon large amounts of electrical and/or thermal energy (greenhouses - vegetables/flowers, bio-ethanol plants, animal rendering plants, deadstock processing plants or even fish farms), as well as carbon dioxide (from co-gen exhaust) and clean water. Included in the partnership could be the local municipality, who would benefit by having its organic residuals (food wastes, green wastes, etc) processed at the centralized plant.

There are several sources of revenue for farm energy centres, including:

1. **Sale of green electricity to the grid, (Ontario - Std. Purchase Offer - 11¢/Kwh; 06/03/21).**
2. **Sale of processed manure solids (in excess of on-farm nutrient requirements) as value-added organic fertilizers, or soil amendments.**
3. **Emission trading credits for reduction of greenhouse gas emissions - First payment to US farmers for GHG emission reductions from Environmental Credit Corp (Jan 2006).**
4. **Tipping fees for accepting food-grade organics from the food/beverage industry, that will boost biogas production by as much as 25%, and**
5. **Production of bio-fuels (ethanol, E-85, or bio-diesel).**

These sources of revenue will provide a new level of income stabilization for farmers, long vulnerable to cyclic fluctuations in agricultural commodity prices for livestock.



Farm Bio-energy Centres can provide the following benefits:

1. **Environmental Solutions** for longstanding issues (odour, pathogens, ghg reduction, deadstock processing); ALSO - reducing herbicide usage by killing weed seeds in manure, and recycling processed manure solids for bedding, both benefits reducing input costs for the farmer.
2. **Income stabilization** through new diversified sources of income (**revenue from animal wastes is independent from cyclic livestock commodity values**), and,
3. **Rural revitalization** through increased employment, and increased empowerment of farm-based co-operatives to manage bio-based industries in rural communities. Rather than often being in an adversarial position with their local municipality over zoning and environmental issues, they are now in a position to partner with their municipality to solve mutual environmental problems, and re-vitalize rural communities.

With the emergence of a new era in the competition for (and the uncertainty in) our dwindling fossil fuel reserves, a once-in-a-lifetime opportunity is now confronting Canadian Agriculture – that being the development of a bio-based “carbon” economy in which bio-energy production will revolutionize and re-define the way in which we produce our food, and in particular, livestock production.

Farmers will no longer be held hostage to cyclic livestock commodity prices, but will instead diversify and stabilize their farm incomes through generation of increasingly-valuable green energy (electrical, thermal) from livestock and other biomass sources (e.g. crop and food wastes), leading to energy independence. Besides solving longstanding environmental issues commonly associated with livestock production (odours, pathogens), these new, more holistic approaches to agricultural production will provide opportunities for development of rural, on-farm industries (e.g. bio-ethanol production, greenhouse-produced flowers and vegetable crops, slaughter/ rendering plants), which will revitalize, and empower rural communities (employment, tax base, etc).

The Agriculture sector now has a once-in-a-lifetime opportunity to take ownership of bio-fuel production at the farm level, but this window of opportunity is rather narrow. The sector must quickly take advantage of this opportunity during the transition from fossil to bio-fuels, or else traditional energy companies and large agricultural multi-national corporations will dominate the bio-fuels industry as they have with fossil fuel resources. There are already several large U.S. “manure-powered” alcohol plants under construction at large feedlots, which can be considered as ‘biorefineries”.

There are substantial positive impacts for rural communities using this distributed bio-fuel production approach, if farm-scale production (in the order of 10 M liters/yr/farm) of bio-fuels can become a reality. Biomass for these plants can then be locally sourced, thus reducing transportation costs and associated greenhouse gas (GHG) emissions, while boosting the local economy. On the output side, a distributed network of small refuelling stations would again reduce transportation costs and associated GHG impacts. Increased local employment as well as improved tax base across the landscape will help revitalize rural communities. These farm-based bio-fuel operations might also develop as a cooperative among several nearby farm operations in order to achieve an adequate scale of operation. Of significance, the State of Minnesota already has about 140 bio-fuel refuelling stations across their state.

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