

A GUIDE TO DEVELOPING RENEWABLE RENEWABLE AND ALTERNATIVE ENERGY PROJECTS

August 2, 2007

BY

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Introduction

There is great concern around the supply of energy in Ontario. Many farmers and food processors are considering developing or participating in some form of renewable energy project.

Motivation is provided by a number of issues: a desire to extract increasing value from the resources in hand, government incentives to reduce reliance on depleting fossil fuel sources and environmental considerations, including concern about global warming and a desire to conserve our depleting natural resources through energy conservation and alternatives.

The key to cost efficient projects is effective management of proposals and selecting the right experts to assist with any project.

A proliferation of media hype, inventions and experts/consultants in the renewable energy field has made it quite easy to make poor choices. To achieve all the desired objectives of a project, considerable knowledge and experience is required, usually best achieved by hiring a qualified expert/consultant. This guide will provide advice and assist with avoiding many of the common pitfalls, which often side track those new to the field of project management applied to renewable energy.

Drivers of Renewable Renewable and alternative energy projects

Understanding the common drivers of renewable and alternative energy projects is important to determine if it is appropriate to participate.

Profit; Increasing profit through increased revenues and/or reduced costs is typically the number one influencer. Taking a survey of the potential energy resources available on the farm or food processing facility, including waste streams, it is possible to identify opportunities for increasing revenues and controlling ever-increasing energy cost inputs.

Reliability of Power; Obvious but not to be understated is the importance of consistent and available energy to power machinery and processes. Even without cost considerations, reliable energy is essential for producers and food processors to function. Producing power on your own site provides a good measure of confidence that energy will be available when required for your process.

Independence; On-farm producers enjoy the ability to control their own destiny. Producing your own power supply is one significant means to this end. Managing the inputs and process allows for both cost and production control. Reliance on external suppliers is substantially reduced.

Innovation; A significant influencer is the desire to create, innovate and be the “first of”. Historically, success in developing and applying new technologies and inventions has improved Canadian society in general. The Agri-food sector has many shining examples. This in itself should not be sole driver for participating in an energy project. One or more of the previously mentioned drivers should also be present.

Self-Assessment

It is strongly recommended that all those considering developing a renewable energy project perform a self-assessment. In addition to recognizing the key drivers applicable to a project, several areas should be initially examined and readiness to proceed assessed.

Knowledge of the technology; As with any project, increasing your knowledge of the subject matter will improve the likelihood of success. Information in the form of facts and good data will assist with an analysis of the pros and cons of each technology, good decision making and the selection of a consultant. Any approach should include literature reviews, technical sessions or workshops offered by various agencies and the use of internet resources.

There are substantial and varied complexities and risks associated with the different renewable energy technologies. For example, the day to day operation of a wind energy farm requires much less effort compared to operating a bio-digester. However, the complex preventative maintenance program for a wind turbine involves expertise you will most likely have to source externally at a substantial cost.

The technology required to utilize existing energy transportation infrastructure if applicable to the project is critical to understand. For example, supplying power into the electrical power grid is very costly and complicated, with details of connectivity including components required, supply contract and any restrictions identified.

Renewable energy alternatives include;

- Digesters
- Wind
- Solar
- Biomass
- Other

Preliminary Analysis; High level calculations using estimated or relative values should be developed for all project inputs (fixed and working capital) and outputs required for the technology selected. These will assist with making a decision to proceed. Included are construction and equipment costs, energy resources if present i.e. purchase of additional biomass materials other than those produced on-farm, operation and maintenance costs and inventories. The use of decision making tools and spreadsheets such as RetScreen (Renewable Energy Technology screening) project analysis software are of great value (available for Wind and Solar technologies).

<http://www.retscreen.net/ang/home.php>

Business knowledge of the technology; Understanding all other aspects towards sustaining a long term business is required. This includes strategic planning, market information, taxation implications, competitive technologies, financing, risks involved (process technology and market), investment horizon, life of the business, ownership, day to day management of the company and government regulations and codes.

Self Awareness; There will be many personal and business demands, expectations and needs associated with any project. These include;

- Personal and business objectives clearly identified.
- Understanding of all stakeholders involved
- Understanding of the life of the project
- Impact on existing on-farm or processing business i.e. required outputs from other processes, crop residue etc.
- Impact on the community and environment
- Impact on and willingness of family members to participate
- The role required to lead or participate in the project and associated responsibilities (time, effort, travel requirements). Active versus silent partner.
- Operational and maintenance skill level requirements. Including training, staffing and external support requirements

Summary; Once consideration is given to all the above Self Assessment areas listed, the next step is an assessment of the readiness to proceed with the project. If an in-depth of understanding and associate readiness lacking in any of these, it is suggested that an effort be made to improve the deficient area before proceeding.

Steps to Project Implementation

A number of sequential steps are required to begin implementation of the project.

1. Decision to Investigate; The farmer or food processor determines it is feasible to continue with further data collection and analysis.
2. In-depth review for accuracy of the preliminary input and output numbers and further calculations to support the business case. Ideally the farmer or business owner is able to perform this exercise based on the investigation performed and data gathered up to this point in the project. Alternatively, a consultant can be engaged to assist.

At this point, the decision is made to go or not go. Based on a positive self- assessment, a decision is made by the on-farm producer or food processor to proceed with the project and proceed to step 3.

3. Hiring a Consultant; A critical decision is the selection of a Consultant... An RFI (Request for Information) is a good start to assist with the decision. A Consultant may be utilized for various stages of a project. The RFI is a pre-qualification to determine the suitability of any consultant; The RFI document is essential to obtain an “apple to apple” comparison between consultants. It is suggested that at least two interviews be performed. Often pre-qualification of consultants is performed for each stage of the project.
 - a) Contents of an RFI will include;
 - i. Detailed inquiry into the Consultant’s capabilities, knowledge base and experience of personnel which will participate in the RFP (Request for Proposal)
 - ii. Demonstrated projects or work related to the RFP; comments on successes and failures (yes, these are valuable)
 - iii. References and possibly financial information

Various tasks may be performed by the Consultant, including the following;

- b) RFP (Request for Proposal): The selected consultant will develop the RFP on behalf of the client. The RFP is detailed to the point that the designer or design/builder quoting will have enough information to provide a good design if they are awarded the contract. Two common approaches to the scope of work to be performed include;
 - i. Design: provide detailed drawings and specifications (others to construct, in a separate RFP)

- ii. Design/Build: provide detailed drawings, specifications and supply and install the entire system
- c) Feasibility Study; Sets the stage for:
 - i. Decision to proceed to design stage
 - ii. Terms of Reference for design
 - iii. Economic and cost analysis
 - iv. Risk Analysis
 - v. Critical Specifications and Design issues and barriers
- d) Technical Design and Project Implementation

Note: Feasibility consultant may not necessarily used for or even be qualified as the designer.

- 4. Financial Documents are developed, which include:
 - a) Grants to assist: design/investigation implementation
 - b) Standard Offer Contract
 - c) Other revenues
 - d) Design and specifications phase
 - e) Quote/bid process
 - f) Implementation
 - g) Commissioning, start up and SOP's

- 5. Design and Project Management
 - a) New RFP developed, may be part of Feasibility study
 - b) Chosen based on requirements from Feasibility study
 - c) Acting on behalf of owner
 - d) Sample of main activities:
 - e) Project Definition
 - f) Permitting
 - g) Site planning
 - h) Design and Specifications
 - i) Quote and bid review
 - j) Contractor selection
 - k) Procurement of equipment and components
 - l) Contract management

- 6. Project Execution/Site Supervision
 - a) Control: (complete process)
 - b) Construction
 - c) Post Construction:
 - d) Commissioning
 - e) Calibration
 - f) SOP's

- g) Operation Personnel Selection
- h) Training
- i) Maintenance/Operations
- j) Stabilize Process

Conclusions

A well thought out, planned and managed renewable energy project has a much improved chance for success.

An emphasis should be maintained on;

1. People and the right expertise:
 - a. Multiple ways to work with and use consultants
 - b. Critical to understand their contribution and qualifications
 - c. Consultants will save many headaches and project cost
 - d. Available to deal with complex issues as they arise; farm or processors
2. Understanding and utilize existing technology, information and tools
3. Your own self assessment and readiness for the project

Appendix 1: Anaerobic Digester Incentive Program

Ontario Biogas Systems Financial Assistance Program

Author: OMAFRA Staff

Creation Date: 26 July 2007

Last Reviewed: 26 July 2007

The Ontario Biogas Systems Financial Assistance Program is a \$9-million investment that will help farmers and agri-food businesses develop and build generating systems that produce clean energy, reduce electricity costs and contribute to local economies.

There are two phases to the program. Phase 1 funding will cover up to 70 per cent of the eligible costs of carrying out a feasibility study, to a maximum of \$35,000. Phase 2 funding will cover up to 40 per cent of eligible construction and implementation costs. The maximum total feasibility and construction cost funding is \$400,000 for each anaerobic digester system.

The program funding is focussed on agriculture and agri-food operations to develop anaerobic digesters that meet certain requirements:

- The digester must use at least 75% agricultural products, agricultural by-products, food-based products or food-based by-products;
- The digester must produce biogas for use in the production of electricity or heat or for fossil fuel replacement; and
- The by-product or digestate must not be disposed of in a sanitary landfill or through sewage disposal; it must be land-applied as a crop nutrient or soil enhancement, or must create a value-added nutrient product, or be usable as livestock bedding material.

The Ontario Biogas System Financial Assistance Program is an integral part of Ontario's climate change initiative. Application forms and guidelines will be available from the Ontario Ministry of Agriculture, Food and Rural Affairs in by September 2007.

For more information on biogas systems, please visit the [Energy Opportunities](#) web page.

For more information on this program, please contact the Agriculture Information Contact Centre at 1-877-424-1300 or email: ag.info.omafra@ontario.ca. You can request that the AICC adds your name and contact information to a list if you would like to receive program updates.

Related Links

- [News release and backgrounder](#)
- [Energy Opportunities](#)
- [Anaerobic Digestion Basics](#) (Order No. 04-097)

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For more information:
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