CARES

2.0 Mandate

CARES will operate in keeping with OAC's research mandate "to support the research needs of its traditional clientele, while developing new uses and applications of living things ("bioresources") to improve the quality of our environment, maintain the competitiveness and well-being of Ontario and serve the global community."

CARES will operate under OAC's education mandate to continue to improve the broad educational experience of students in OAC programs, and increase access to learning opportunities through enhanced skills training and lifelong professional education.

CARES also seeks to enhance rural development and contribute to a cleaner environment by developing integrated technologies that produce renewable energy and manage nutrients and waste. CARES will accomplish this by building on, and contributing to, the expertise of the University of Guelph. The activities of CARES have immediate relevance for the public, private, and not-for-profit sectors.

2.1 Objectives

The centre will operate within the framework of agricultural renewable and sustainable energy. Specifically, CARES aims to:

a) *Develop a hub of applied research, teaching and technology transfer of renewable energy*

b) *Integrate farm (biomass, nutrient, water) and energy systems to manage agricultural footprints and add value at the farm gate.*

c) *Produce environmentally responsible and sustainable energy*

d) *Promote long term sustainable rural development*

2.2 Activities Related to the Objectives

2.2.1, Applied research, Teaching, Technology Transfer

The Centre will provide the focus for applied research within the University of Guelph system. CARES will provide linkages and access to a full spectrum of research by acting as a conduit to basic research and by conducting applied and adaptive research on all aspects of renewable and sustainable energy within the agricultural setting. These efforts will lead to the development of linkages between researchers within the University and the regional campuses, as well as other academic and research institutions nationally and globally.

CARES will advise in curriculum development in the area of agricultural renewable energy for certificate, diploma and degree programs at Ridgetown Campus, and in a range of professional and continuing education initiatives. Unique ways to integrate the Centre's activities into experiential learning for undergraduate and graduate students will also be explored.

CARES will be a source of current, comprehensive information on renewable energy for a range of audiences through publications, newsletters, electronic media, demonstrations and conferences as well as collaboration with visiting scholars. Specifically, CARES will transfer

technologies to producers and other stakeholders by completing risk/benefit and economic analyses and by using this benchmark data and other information to create databases and protocols.

2.2.2 Managing agricultural footprints

CARES will integrate rural production systems with renewable energy technologies to foster carbon neutral and/or environmentally responsible energy as well as secondary products. Our efforts will result in the optimization of the biophysical components (i.e. nutrient, water and carbon cycles) in the agricultural setting.

2.2.3 Production of energy

In order to facilitate research and technology transfer goals and to assist in the Centre's long-term self-sufficiency, energy will be produced at Ridgetown Campus. The first proposed energy projects (Appendix A) will include biofuels and biogas production as well as the creation and utilization of bioenergy crops (e.g. hybrid *Miscanthus*).

2.2.4 Sustainable rural development

In order to reduce risk exposure to agricultural producers, CARES will evaluate the many types of renewable energy and closed-loop technologies intended for the agricultural setting. In addition, CARES will work on the development of products, processes and services which will directly lead to increased rural development. These efforts could include:

- Commercialization of farm-level energy production technologies
- Demonstration of integrated farm energy system for revenue generation and sustainability
- Production of value-added co-products from integrated biomass production and processing
- Identification of new business opportunities along the farm-energy value chain
- Evaluation of the socioeconomic impact of on-farm renewable energy production and utilization