

**The Renewable Energy Challenge:
A Report Prepared for SouthGrow Regional Alliance
On Economic Development Opportunities in Southern Alberta
Related to the Alternative Energy Sector**

Submitted by Robert D. Tarleck, M.A., November 25, 2013



"...The transition from coal, oil, and gas to wind, solar, and geothermal energy is well under way. In the old economy, energy was produced by burning something — oil, coal, or natural gas — leading to the carbon emissions that have come to define our economy. The new energy economy harnesses the energy in wind, the energy coming from the sun, and heat from within the earth itself."

Lester R. Brown,

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Introduction

You would not expect the long-time Oil Minister for the Kingdom of Saudi Arabia to be predicting the end of the Oil Age, but that is precisely what Sheikh Zak Yamani has done. "The Stone Age," he notes, did not end for a lack of stone and the Oil Age will end long before the world runs out of oil."

Sheikh Yamani is not alone in this assessment. It was not that long ago that when asked how long Albertans could count on fossil fuels, politicians and executives would provide assurances about long-term reserves of oil, oil sands bitumen, natural gas, shale gas, and of course the old standby, coal. Now they are being more circumspect.

That is not to say that renewable energy sources will replace oil and other carbon fuels in the immediate future. But if you listen carefully, you can detect a shift. Jeff Rubin put it this way:

"Someday, economically-viable alternatives will unseat hydrocarbons from the top of the energy pyramid, freeing our electrical grids and our gas tanks from the clutches of high prices. But that day isn't today."

The opinion that much of our oil, gas, and oil will never be extracted comes from the banking sector. Gwynne Dyer reported on a study prepared by the Grantham Research Institute, London School of Economic and the Carbon Tracker Initiative. The report concluded that and to avoid a two degree increase in global temperature, "at least two-thirds of the currently listed fossil fuel reserves will have to stay in the ground permanently."

This is of interest to the financial sector because leaving these fossil reserves in the ground would necessitate writing down a market evaluation for oil, gas and coal presently assessed at \$4 trillion.

But the strongest pressure to shift towards a renewable energy future is not concern about bank losses but a recognition that we must take steps to preserve an environment that is changing before our eyes.

The Institutional Adaptations to Climate Change *Integration Report on the South Saskatchewan River Basin* speaks to climate variability in southern Alberta in very clear terms:

“The near-term inevitability of climate change has become part of both the scientific consensus and the political mainstream. Climate data and models show that the Canadian Prairies have warmed even more quickly than the rest of the globe, and projections for the future strongly suggest warmer, wetter winters and hotter, drier summers.... The warming climate will cause some extra precipitation in the late winter and spring, but the summers will be drier, with much of the rainfall coming in fewer and more intense storms.”

Another consideration is the global public and political pressure that Alberta is subjected to, even if much of it is unwarranted. The United Nations climate conference, known at the 19th Conference of the Parties or COP 19, criticized Canada for failing to meet its own targets for reducing greenhouse gas emissions. And American celebrities are often in the forefront of protests against the Alberta’s oil sands activity or a pipeline intended to carry the oil sands bitumen to American refineries.

Canadians may point out that the United States and China account for 40% of global emissions, as compared to Canada’s 2%. And Canadians may note the irony the American pop stars turning a blind eye to coal mines and coal-fired plants in their own country. But the fact is publicity creates its own realities, which is why federal and provincial leaders spend so much time addressing environmental issues. And when they speak to global audiences the language they speak is Renewable Energy.

II. Growing interest in Canada and Alberta in the Renewable Energy Sector

These two issues—the growing awareness of the consequences of climate variability and the international pressure on Canada to live up to its commitments to reduce greenhouse emissions—are fuelling a new interest in alternative energy in Canada in general and southern Alberta in particular.

Canadian participation in the renewables sector has shown impressive growth year-after-year. In 2011 alone, Canadians added 6,500 mg of wind energy capacity, making Canada the 9th largest producer of wind energy in the world, with the 6th fastest rate of growth. And much of that capacity comes from Alberta.

But interest in renewable energy on the part Canadian corporations, communities and individuals goes beyond wind systems. There is also strong interest in Alberta in solar, waste-to-energy, geothermal and geoexchange systems, heat recovery systems.

The purpose of this report is to begin a discussion about how communities in the SouthGrow region might draw upon their heritage of respect for the environment, hard work, innovation, and capacity for collaboration to engage in the renewable energy sector in a financially prudent manner.

III. The Wind Energy Sector in Southern Alberta



Since 2000 there has been a global expansion of the wind industry. The State of Iowa presently generates 8% of its energy from wind, Germany 9%, Spain 15% and Denmark 22%. Denmark's goal is to raise the wind portion of its total energy generation to 50% within the next few decades.

Canada has witnessed a dramatic increase in the wind energy sector since 2000, with generating capacity growing from 137 to 7,051 MW as of September of this year. Canada presently ranks 9th globally as a wind producer, with capacity growing at an average of 1,500 MW per year. It is presently powering 1.5 million Canadian homes and businesses.

With our iconic Chinook winds, you would expect a vibrant wind technology in southern Alberta, and indeed there has been a significant expansion of the industry over the last thirteen years. The recent announcement that furniture retailer Ikea had purchased a 46 megawatt wind farm near Pincher Creek was welcome news to those in the wind energy industry.

The Ikea press release quoted company president Kerri Molinaro as saying:

“This wind farm in Alberta, along with existing solar installations at three of our Ontario stores, is a significant step to achieving Ikea’s global ambition to be energy independent by 2020, producing more renewable energy than we consume.”

Despite this impressive growth record, the Pembina Institute suggests that the depressed price for wind-generated power has been an obstacle to growth in this sector.

The March, 2012 decision of Shell Wind to shelve its Wild Steer Butte Project was described this way in the *40-Mile County Communicator*.

Shell Delivers Bad News—Wild Steer Butte Project Put on Hold

14 March, 2012

“You can have the transmission interconnection and you can have the turbines, but you still need to sell the power. We need a power purchase agreement in place and it needs to be a Long-term agreement. The Alberta market is a merchant market where you don’t have these long-term agreements.”

Dick Williams, President, Shell Wind Energy, Cited in *Renewable Energy & Rural Alberta*, Pembina Institute

The following chart, *Wind Power in Alberta: A Discount* shows wind energy priced significantly below competing energy sources. The Pembina Institute's concern is that this pricing disparity could negatively impact growth in the wind energy sector.

Wind Power in Alberta: A Discount



Understanding the Wind Power Discount in Alberta

Mayor Chris Spearman recently provided the Lethbridge Chamber of Commerce with a thumbnail description of Alberta's deregulated electrical energy market which helps the reader to understand why the system doesn't work well for the renewable energy sector. Spearman's description of the system is as follows:

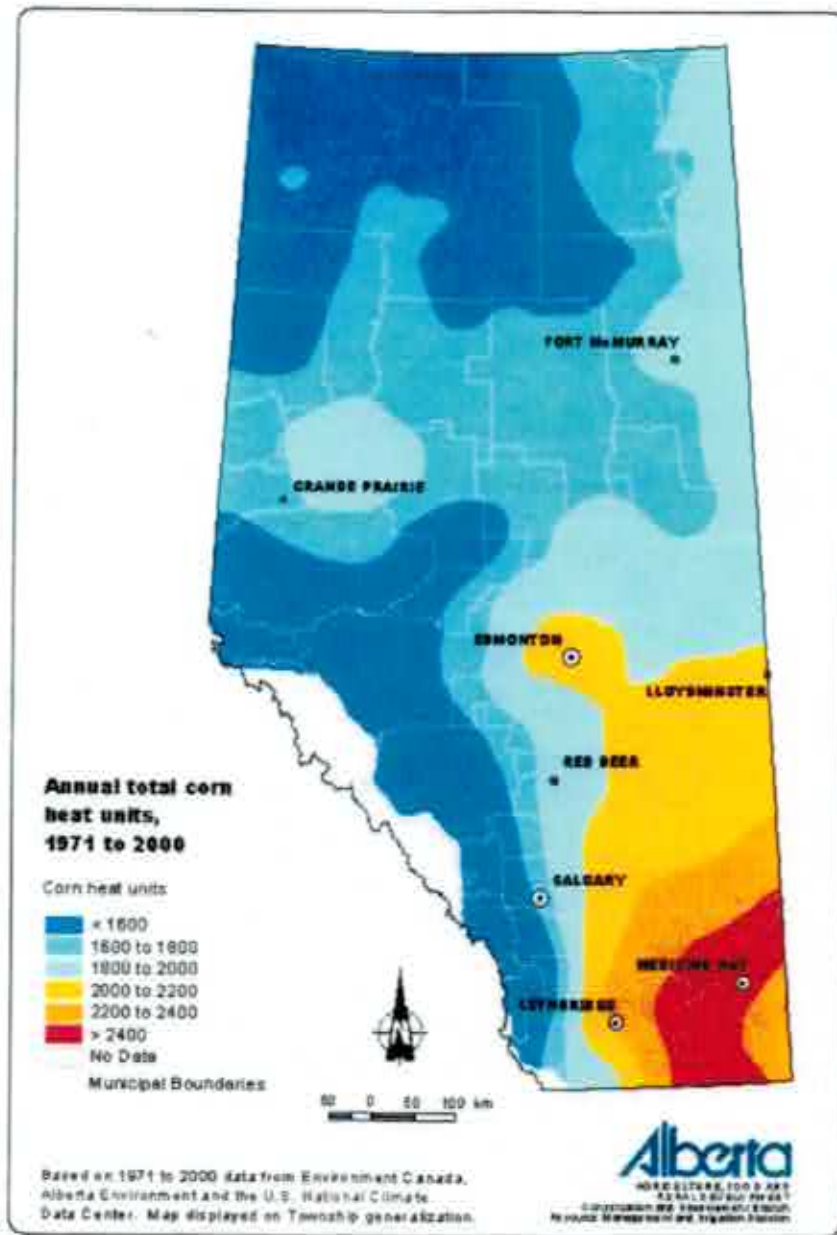
- 1. Electricity suppliers registered with AESO must be able to supply electricity on 15 minutes notice in order to meet market demand.*
- 2. Electricity is bid and priced on an hourly basis.*
- 3. The market price is determined by all bidders.*
- 4. Bids to supply electricity are accepted up to the point where market demand is satisfied, going from the lowest price to the highest.*
- 5. The highest bid price required to satisfy the total electricity demand is the price paid to all suppliers.*

Chris Spearman, email to Lethbridge Chamber of Commerce March 7, 2013

The fifteen minute notice requirement in an unregulated market environment poses a particular difficulty for large wind generators in southern Alberta. From a technical perspective, the unpredictability of wind could be offset by gas-fired power plants that can bring additional turbines onto the grid quickly. But this only partly addresses the larger issue of incorporating a renewable energy system into an unregulated, market-driven system. For wind energy this is likely to be a continuing issue until there is a cost-effective energy storage system in place for wind. There is a global effort to develop such a system.

In summary, despite some challenges, the wind energy sector has considerable potential for southern Alberta. In addition to the natural assets of the region, southern Alberta benefits from the presence of a leading-edge wind energy technical centre at Lethbridge College. That connection may prove increasingly important over time.

IV. The Solar Energy Sector: Heat Unit Map of Alberta



The Solar Energy Opportunities in Southern Alberta, continued

The Heat Units Map printed on the previous page highlights the solar energy potential for southern Alberta. It is a potential we are just beginning to tap into.

In fact, in Alberta and globally, the solar energy sector has been one of the fastest growing of all renewable energy sectors. As prices of photovoltaic cells fall, in Alberta installation of solar systems has been increasing, primarily in the residential sector. Installation in multi-family units and commercial and industrial settings is not yet widespread. A notable exception is the *Heritage Heights* Senior Citizens Home in Medicine Hat designed by Alvin Reinhard Fritz Architect Inc., a company located in the County of Lethbridge. This development integrates solar voltaic cells and geo exchange systems. I have included a description of this project for your interest.

The Heritage Heights facility utilizes some of the most energy efficient design concepts. The majority of the heating and cooling capacity required by the building is accomplished via geoswitching engineering. Geoswitching utilizes the Earth's constant ground temperature to control the building temperature. In addition, the facility also benefits from solar collectors on the roof that assist in minimizing the electrical demand of the building. Not only do these systems promote a more energy efficient and sustainable building, they also provide residents with reduced utility costs.

GARDEN COURTYARD



“The Heritage Heights” facility shown on the previous page utilizes some of the most energy-efficient design concepts. The majority of the heating and cooling capacity required by this building is accomplished via geexchange engineering. Geexchange utilizes the Earth’s constant ground temperature to control building temperature. In addition, the facility also benefits from solar collectors on the roof that assist in minimizing the electrical demand of the building. Not only do these systems promote a more energy- efficient and sustainable building, they also provide residents with reduced utility costs.” Alvin Reinhard Fritz Architect Inc.

With on-going improvements in the efficiency of solar systems, combined with the ever-decreasing reductions in cost and an enviable heat unit profile in southern Alberta, there is room for this sector to grow over time.

There are three possible triggers for further growth in the southern Alberta solar energy sector.

One might be a bold solar project-- undertaken by a municipal government, an institution, or the private sector--that would awaken public interest in the potential benefits of a well-designed solar project.

A second stimulus could be a major builder or developer who integrates cost-effective solar technology into his projects.

And a third could be a municipal government that raises the bar by including renewable energy considerations in the development process.

As electric vehicles move mainstream, expect interest in Solar Charging Stations to increase



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*Available in the U.S. and Canada in early 2012

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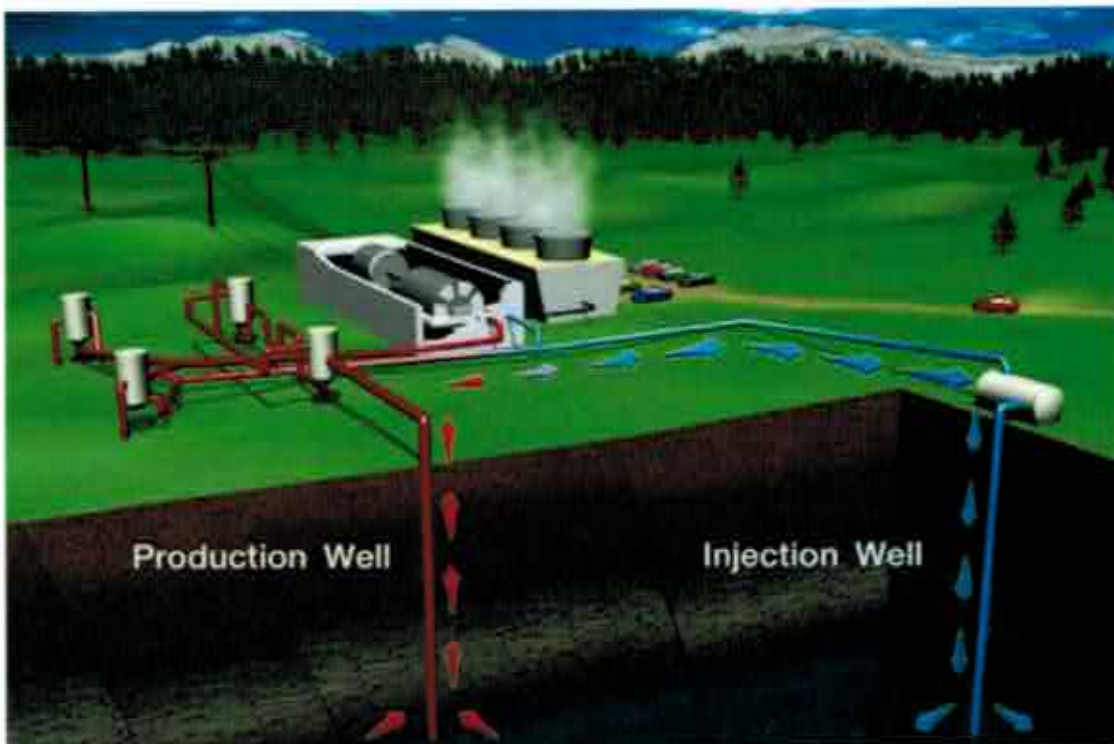


Geothermal Heating and Cooling Systems:

There is renewed interest in geothermal systems throughout North America. But as there is confusion about what *geothermal* means, perhaps we need to seek clarity before addressing the geothermal potential of the SouthGrow region.

While the term "*geothermal*" is often used to describe all ground-based energy systems, it is helpful to distinguish between the *geothermal energy systems* made famous by Iceland and more modest *geo-exchange systems* (also known as *ground source heat systems* or *geothermal heating and cooling systems*).

Geothermal energy is the super star of the renewable energy sector and for good reason. "Geothermal energy's advantage over wind and solar is that it doesn't stop running," says John Carson, CEO of Alterra Power Corp. But suitable sites for geothermal energy plants are scarce. Iceland comes to mind, as geothermal energy production accounts for virtually all of the energy needs of that country.



Geothermal energy systems tap the heat at the earth's core, whereas geo-exchange systems rely on the sun to heat the ground at the earth's surface.

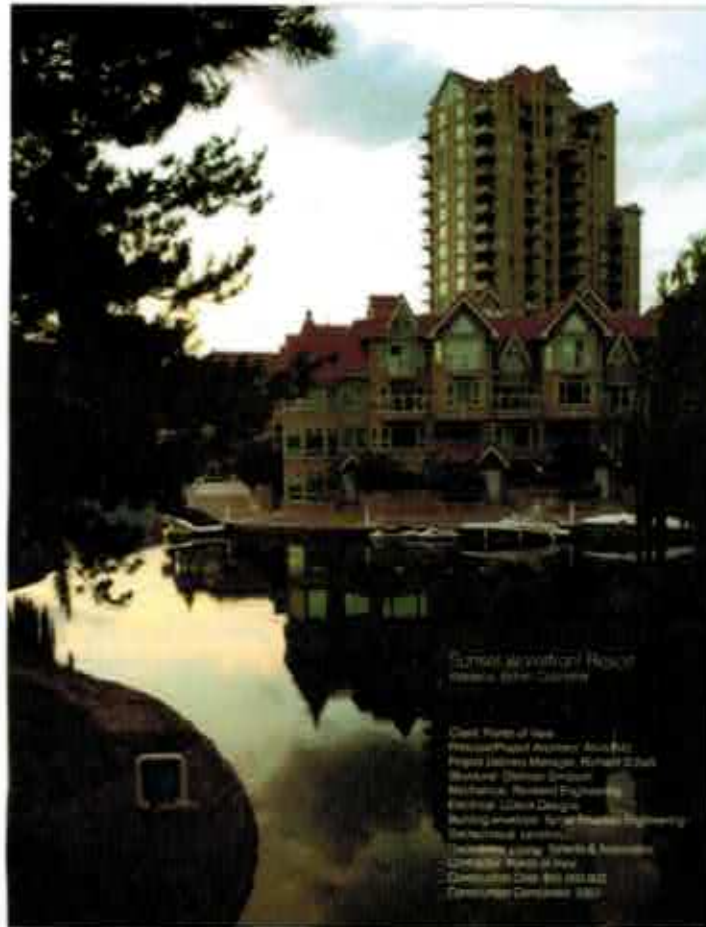
To date there are no geothermal plants in Canada, though a Saskatchewan-based company hopes to establish the first plant near Estevan. The plan is to tap a vast hot aquifer three kilometres beneath the surface and then build a plant that surface and then build a plant that would generate five megawatts of energy, sufficient to meet the energy needs of 5,000 homes.

Unfortunately, there are no identified sites with the SouthGrow community. There are, however, hundreds of homeowners in southern Alberta can attest to the performance of *geo-exchange systems*. Geo-exchange systems in Alberta are typically embedded at a depth of greater than three metres, though there are some less than this.

Unlike *geothermal energy systems*, these systems do not use the heat at the earth's core but instead rely on the sun the heat the ground at the earth's surface. They use heat pumps (sometimes called *ground source heat pumps*) to transfer this ground heat to a building.

As geo-exchange systems prove themselves in the eyes of satisfied residential customers, interest in technology continues to grow. But its potential in southern Alberta is not limited to single family homes.

The Heritage Heights project in Medicine Hat and the Sunset Waterfront Resort and Sunset Waterfront Tower in Kelowna all use geo-exchange technology successfully for heating and cooling.



Sunset Waterfront Resort in the foreground and Sunset Waterfront Tower behind are examples how to meet most of the heating and cooling needs of a building through a well-designed geo-exchange system.

A goal for SouthGrow might be to expand geo-exchange applications throughout the southern Alberta to include multi-family, commercial, institutional, and industrial applications.

VI. Waste-to-Energy or Biomass Opportunities in Alberta

Waste-to-energy or biomass systems are already successfully established in southern Alberta. With the strong agricultural base in southern Alberta, this region is especially well-suited to this technology.



ECB Enviro North America biogas project in the County of Lethbridge

- ECB Enviro North America, a Fort Macleod-based company, is presently operating a biogas project in the Rave Industrial Park in the County of Lethbridge, even before its official opening in December of this year.
 - The plan is based on three generator sets totaling 3.2 MW capacity at 92% efficiency.
 - ECBNA plans to ship to transport agricultural used to produce the biogas to the plant in closed trucks.
 - The process releases biogas comprising approximately 65% methane with carbon dioxide comprising most of the rest. The methane is subsequently used as a fuel to operate a cogeneration plant.
 - Hot water from the plant could be shipped to adjacent industrial sites in the future, though no contracts have been signed as of this date.
 - The post-digestive product can be used as fertilizer.

- The fact that there are over 3000 biogas plants presently operating in Germany indicates the strength of the technology.
- Even before the official opening of the plant in several weeks, a second plant is being planned for southern Alberta.

City of Lethbridge Wastewater Treatment Plant

- In 2001 the City of Lethbridge opened a new waste water treatment plant that captures methane to be used to reduce energy consumption at the plant.
 - In 2011 the plant captured 4,300 KWH.
 - The plant has the capacity to produce either water or electricity.
 - The plant does not contribute to the grid, as all energy is consumed on-site.

the Southern Alberta Energy-From-Waste Association (SAEWA)

Seventy-Two Southern Alberta Communities

Form a Waste Energy Partnership

Nick Kuhl, Lethbridge Herald Feb. 23, 2013

Around 350,000 tonnes of solid waste from southern Alberta will be converted to energy each year if a proposed plan moves forward with its intended timeline.

If everything comes into line with its Projected Development Plan, the Southern Alberta Energy-From-Waste Association (SAEWA) could open a facility by 2018.

The goal is to establish a location that could handle the processing of solid waste from all of SAEWA's 72 municipal entities in the region and implement energy recovery from non-recyclable waste materials to reduce long-term reliance on landfills.

Coaldale Mayor Kim Craig, who is also the chair of the SAEWA, calls it a “forward-thinking project.”

“That mission is predicated on the belief that sending municipal solid waste to a landfill as a primary treatment is not an option as we move forward,” he said.

“Alberta has a growth economy and there’s people migrating to Alberta all the time, so the volume of municipal solid waste will be increasing. A waste energy plan won’t eliminate landfills, but any existing landfills will have a much greater lifespan than what they would.”

SAEWA, which was established in 2009, had a board meeting last week featuring an engineer’s summary report confirming the project’s feasibility.

Craig said the important elements of 2013 include formalizing the SAEWA organization and the beginning of site selection.

This will lead to potential procurement of land next year and the seeking of permits and approvals in 2015. Detailed design and construction will follow, followed by commissioning and start-up in 2018.

In summary, the waste to energy sector is well established in southern Alberta and with resources and experience in successful operations, there is no reason this sector cannot grow.

VII. Heat Recovery Systems:

(Wastewater heat exchange and Co-generation systems)

Heat recovery is a cost-savings practice utilized by many manufacturers in southern Alberta, particularly in the food processing sector. McCain, PepsiCo, and Richardson Seed are among the companies using this energy-saving technology.

The Lethbridge Regional Hospital installed an efficient heat recovery co-generation system in the early 1990's but the system was not maintained once the hospital went first to regional and then provincial control.

Though the technology has been known in the manufacturing community for some years, recently there has been interest in extending the technology to the residential setting. International Wastewater Heat Exchange Systems describes the concept in these words:

“Waste water is a constant inexhaustible energy source and it exists in the waste water streams of residential, commercial, and industrial buildings. It is higher in temperature than most other regenerative energy sources such as geo-exchange, reaching an average temperature of over 25 degrees Centigrade when exiting buildings. In septic drains the average temperature is 15 degrees centigrade.

Traditionally, waste water heat could only be extracted after being purified at the treatment facilities. However, modern heat pump technology allows for the extraction of sufficient energy from raw sewage streams for the space conditioning requirements of most buildings. Wastewater heat recovery can be used in both the winter for space and domestic water heating, as well as in summer for efficient...air conditioning systems.”

Researchers at Singapore's Nanyang Technological University (NTU) have been approaching the problem with a different technology with the goal of turning residential into energy. The team created a new type of toilet system that turns human waste into biogas which can be converted into electricity.

VIII. Biofuels

Biofuels capital of Canada?

KYOTO FUELS CORP. HAS
BEGAN PRODUCTION AND
THE FUTURE HOLDS
PLENTY OF PROMISE

Garrett Simmons
LETHBRIDGE HERALD

gsimmons@heraldnews.com

Lethbridge is about to become a hub for biofuel activity in Canada. Those at the Business of the Year Awards Tuesday learned Kyoto Fuels Corp. just began production a few days ago, after a long process. The company's president and CEO, Kelsey Prenevost, the guest speaker at the Lethbridge Chamber of Commerce and Business Development Bank of Canada event, broke the news as he spoke about Kyoto's roadmap to success.

"It's now operational. It just took us 10 years to get there, but we're finally operational."

What will eventually become a facility capable of producing 66 million litres of biofuel a year, at a rate of just under 200,000 litres a day, Kyoto Fuels Corp. will boast the largest biodiesel plant in Canada. With the Lethbridge Biogas project, Prenevost said that positions the city to hold a very unique designation.

"We are a biotech centre now with both of those projects on the go," he said, as government requirements for companies to include biofuels in their products has created an untapped market here in Canada.

"We need 600 million litres in Canada, and we're nowhere close to that now," he said, as much of it is being imported from the United States.

To get to the point Kyoto is today, Prenevost used his roadmap analogy to compare starting a business owners must know everything there is to know about their car, and having a good team to operate it. Included in that is a vision statement, one of the most important parts of that roadmap, he said, as Prenevost added the next part of the equation is the gas, or the capital requirements needed to push your business forward.

The province contributed \$10 million of that capital, towards the \$40-million project, according to Prenevost, who mentioned that certainly added fuel to the Kyoto fire, which can serve to boost Alberta's reputation was being progressive in the energy industry.

"Alberta has a reputation for producing dirty oil, and here is a chance to produce clean oil. Here is an offset to say, 'Heh, here is something we are doing right.'"

* CONTINUED Please see page A2

It took company president and CEO Kelsey Prenevost ten years to launch Kyoto Fuels Corp., a testament to both his perseverance and strength of vision.

Kyoto Fuels is following in the footsteps of entrepreneurs in the United States and Brazil who created a business case for growing their fuel. In the interests of fuel security, American corn farmers have used government subsidies to build an industry around corn-based ethanol which is a component in gasoline fuelling American cars. In Brazil a significant portion of gasoline used in Brazilian vehicles is derived from processed sugar cane.

If a biofuel industry is going to work anywhere, Alberta would seem to be the place. With our extensive agriculture base and reputation for entrepreneurial inventiveness, we would seem to have everything going for us. But the biofuel industry in Alberta and elsewhere has to combat to issues.

First, it has to be established that the industry can stand on its own feet, without government support in the forms of subsidies or legislation regulating that biofuel make up a prescribed percentage of vehicle fuel, as is the case in the U.S.

Perhaps an even more troublesome issue relates to food displacement. In our efforts to provide food for people around the world, we are facing a two-sided challenge. First, the population of the world continues to increase at an alarming rate. And second, our efforts to grow enough food for this growing population are undermined by climate-induced drought. The criticism frequently levelled against the biofuel industry is that it is taking farmland out of production in order to grow fuel rather than food.

The food/fuel paradox is a complex issue to be sure, but the enterprises most likely to meet acceptance are likely to be those that are not taking calories out of the food chain. This may take the form of using the waste products of a food crop or growing a biofuel constituent on land unsuitable for crop production.

On the basis of these challenges, I would suggest while the biofuel industry in southern Alberta shows opportunities for growth, there are some yet-to-be-resolved issues that will shape its future

IX. Hybrid Renewable Energy Systems

In the interests of resiliency, there has been a growing interest in North America in hybrid systems that integrate two or more technologies in order to get the best of each.

One example of a hybrid technology project in Alberta is the *Heritage Heights* Senior Citizens Home in Medicine Hat designed by Alvin Reinhard Fritz Architect Inc. Heritage Heights depends on geo exchange technology for the majority of its heating and cooling.

The Heritage Heights facility utilizes some of the most energy efficient design concepts. The majority of the heating and cooling capacity required by the building is accomplished via geothermal engineering. Geothermal utilizes the Earth's constant ground temperature to control the building temperature. In addition, the facility also benefits from solar collectors on the roof that assist in minimizing the electrical demand of the building. Not only do these systems promote a more energy efficient and sustainable building, they also provide residents with reduced utility costs.



Fritz points to an additional benefit in that “the facility benefits from solar collectors on the roof to assist in minimizing the electrical the electrical demands of the building. Not only do these systems promote a more energy efficient and sustainable building, they also provide residents with reduced energy costs.”

Hybrid installations have the added advantage of contributing resiliency to the energy network and thereby reducing need for additional transmission capacity.

Business Case for Renewable Energy

At a time when business, institutional, government, and personal budgets are stretched, the case for renewable energy is an easy sell.

The food processing companies in southern Alberta recognize that maximizing energy efficiency helps to meet plant bottom line goals. This can also help the plant team to make a case for an expansion or a new product line.

The chart below illustrates how one company visualizes renewable energy contributing to the firm's financial and environmental goals. But other companies could provide similar pictures. One of SouthGrow's goals might be to help other sectors—commercial, institutional, residential, and government to do the same.

We are building our first Near Net Zero Frito Lay Plant in Casa Grande AZ...



XI. Job-Generation Potential in the Renewable Energy Sector

The renewable energy sector is an important job creator, a fact that may not be sufficiently appreciated in southern Alberta.

Two charts under the single heading, *What Renewable Energy Offers: Jobs*, calculate job creation in the renewable energy sector. The first chart calculates job growth on the basis of gigawatt hour of energy (GWh). The second measures job creation per million dollars. It is noteworthy that wind energy alone is responsible for:

- 90,000 jobs in the United States,
- 80,000 in Germany,
- 60,000 in Spain, and
- 4,500 in Canada.
- The renewable energy sector in Germany is estimated to account for 400,000 jobs.



What Renewable Energy Offers: Jobs per GWh

GWh; gigawatt hour

Energy technology	Total Job-years per GWh	Job creation rank, 1 best
Solar photovoltaic	0.87	1
Landfill gas	0.72	2
Energy efficiency	0.38	3
Small hydro	0.27	4
Geothermal	0.25	5
Solar thermal	0.23	6
Biomass	0.21	7
Carbon Capture & storage	0.18	8
Wind	0.17	9
Nuclear	0.14	10
Coal	0.11	11 (tied)
Natural Gas	0.11	11 (tied)

Source: Pembina Institute

What Renewable Energy Offers: Jobs Per \$million of Investment

Wind	13.3 approx.
Solar	13.66 approx.
Biomass	17.3 approx.
Building Retrofits	16.66 approx.
Oil and Natural Gas	5.1 approx.
Coal	6.65 approx.

Source: Pembina Institute

The renewable energy, globally and within southern Alberta, has clearly demonstrated the ability to be an important source of new jobs and this trend should continue well into the future.

XII. Recommendations for Action

1. SouthGrow communities actively promote renewable energy technologies appropriate for this region.
2. A central part of this interest in renewable energy should relate to job creation. This focus has two constituents:
 - 2.1 Employment opportunities directly related to the renewable energy sector; and
 - 2.2 Jobs in other sectors that are either created or rendered more productive because of the renewable energy sector.
3. SouthGrow should adopt a regional partnership strategy that would allow it to work with all interested players in the renewable energy sector: agriculture, including irrigation; food processing and other manufacturing operations; the commercial sector; the institutional and educational centres interested in modelling renewable energy systems; and government operations.
4. SouthGrow should work closely with relevant provincial government offices in southern Alberta which might provide support and advice and with relevant institutional centres such as the Lethbridge College Wind Energy Institute and any future University of Lethbridge sustainability centre.
5. SouthGrow communities could support the geothermal heating and cooling initiatives by working with the development industry to identify unnecessary regulatory obstacles to the adoption of new energy-efficient technologies in residential, commercial, and industrial developments.

6. SouthGrow communities could further work with the development and construction industries to identify strategies that would encourage present and future adaptation of energy-efficient technology related to solar, geexchange, and others. * Cranbrook, for examples, requires all residential developments to meet code for any future solar panel. The additional construction cost is minimal but will allow the community to meet future needs.
7. SouthGrow should encourage hybrid projects that combine two or more energy technologies in one project in order to build in resiliency.
8. SouthGrow should also encourage projects that combine energy efficiencies with water reuse or stewardship.
9. SouthGrow should support innovative programs in the industrial sector that capture waste heat from the manufacturing process for reuse.
10. SouthGrow communities should consider developing a wind power strategy that considers such factors as environmental sustainability, economic payback to the community, job creation, and neighbourhood impact.
11. A central focus of the wind energy sector should be rural wind farm projects sited at a reasonable distance from residential developments.
12. The wind energy strategy should also allow for installation of wind turbines in industrial districts and in public building districts where such technology is not deemed to be detrimental.
13. From the basis of both cost effectiveness and neighborhood acceptance, small wind turbines for residential sites will likely prove least promising.
14. At the same time as it is focussing its attention on the most cost-effective current technologies, SouthGrow must remain alert to new technologies and opportunities emerging in renewable energy sector.

15. That SouthGrow work with builders, developers, and people in the plumbing trade to encourage the application of innovative wastewater heat recovery systems in residential, commercial, and industrial settings.
16. A further goal for SouthGrow might be to expand geo-exchange applications throughout the southern Alberta to include multi-family, commercial, institutional, and industrial applications.
17. SouthGrow Regional Alliance should make a determined effort to engage the community in shaping goals and strategies related to the renewable energy sector.



