Executive Summary

This “think piece” discusses the opportunities available to the NW Capital Region Economic Development Initiative (NWCREDI) established by Perry Kincaid to grow a sustainable economic zone similar to that developed in the east side of the region.

The discussion will initially focus on the economic unifier of Energy & Environment. This “think piece” will take a longer term view of the opportunities by using 2030 as its target date. The paper also takes a position that this initiative needs to take a global rather than local or regional approach to economic growth.

The initial ideas focus on the development of a cleantech cluster aimed at attracting research and development activities to the region as well as eco-tourism and conferencing opportunities created by becoming a world leader in sustainable technologies.

Finally this “think piece” explores the feasibility of attracting worldwide media attention by becoming the first large economic region to become a carbon neutral zone. This can be achieved by creating a policy framework that creates a home-grown demand for cleantech products, help cleantech companies obtain critical growth funding, facilitating partnerships between investors, entrepreneurs, and customers, and smart public policy that can plant the seeds and allow the clusters to grow.

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INTRODUCTION

If the NW Capital Region Economic Development Initiative (NWCREDI) is to be successful it is important that we take a global approach rather than a local initiative focused on how to split up the pie created by the current boom. The NWCREDI must focus on investing the windfall from the boom into the economy of the future.

The concept of using **Energy & Environment** as a potential economic unifier for the region as well as a focus on knowledge rather than heavy industry is a good one and should be explored further. The purpose of this "think piece" is to start the discussion.

What if the NWCEDI declared a goal to become a carbon neutral zone by say 2030? This would certainly attract global interest, which in turn would attract investment. It could be achieved using the concepts put forward by the emerging cleantech industry, research and sustainable approach to the design and operations of new and existing buildings and industry. Highway 16, which is the gateway to Jasper can become a carbon neutral highway and a hydrogen highway by encouraging hydrogen fill stations and alternative gas stations along the route. Cars and trucks using the highway between Edmonton and Jasper would be encouraged to fill up with ethanol or biodiesel. Experimental hydrogen vehicles could be tested along the highway because it has the fill stations to support it. Car rentals would start with hybrids and then move to biofuels and then to hydrogen.

As a carbon neutral zone investments from "offsetter" funds would be attracted. Clean power sold to oil sand operations would clean-up the "dirty" oil from the sands and reduce the risk of the fuel not being accepted by states such as California.

CLEANTECH CLUSTER

Cleantech is an exiting new industry which offers the promise of economic expansion, a healthier environment, and a less resource-intensive future[1]. Total US and European venture capital investment in Cleantech reached a record 3.6 billion in 2006, representing a 45% increase over 2005. Approximately 72% of this investment was energy-related[2].

In Canada the SDTC (Sustainable Development Technology Canada) has a fund of over $600 million specifically aimed at "bridging the gap" between lab an commercialization by targeting cleantech start-ups whose technologies are entering the development and demonstration phase, a period at which private investment is often hard to come by[3].

NWCREDI can explore commercializing sustainable products coming out of the lab. The categories below were defined by Cleantech Venture Network and are provided here as a place to start our discussions. The italicized text comes from CVN and the regular text articulates how this may be applied to NWCREDI. By adopting industry recognized categories it will be easier to benchmark against other clusters and communicate ideas with investors.

The information below is only meant as a discussion starter so that other ideas can be collected and analyzed so that the most promising ideas can be prioritized without losing any good ideas for future development.

Agriculture & Nutrition

Bio-based materials, farm efficiency technologies, micro-irrigation systems, bio-remediation, non-toxic cleaners and natural pesticides.

Agriculture is a major industry in Alberta therefore cleantech research in this sector offers great opportunities to attract researchers, startup companies and venture capital. This can be connected with the rail infrastructure and port facilities in Prince Rupert.

Air Quality

Air purification products, energy efficient HVAC, universal gas detectors, multi-pollutant controls, fuel additives to increase efficiency and reduce toxic emissions

The most obvious element here is the coal fired power plants in the region. Coal burned in power plants accounts for more than 50% of Alberta's CO_2 emissions. Therefore clean power would be a natural and world leading economic driver. Because there is so much coal in the area, research into and application of clean coal and carbon storage (sequestration) would gather attention from around the world. It may need government funding to get it started but once in place it would be self sustaining due to energy costs and the effect of carbon taxes and/or carbon trading that will change the economics of power plants.

Enabling Technologies

Optical components, reactor technologies, catalysts and membranes, technologies enabling the manufacture of nano-scale compositions, distributed sensor network technologies

There is talk about the possibility of a Laser Fusion laboratory to be located somewhere in Alberta. This would be a perfect facility for the NWCREDI with an energy and environment economic unifier.

Energy Generation and Distribution

Energy Generation *– renewable energy generation including fuel cells, geothermal, wind, solar/photovoltaic, gasification technologies for bio-mass, flywheel power*

Energy Infrastructure *– wireless networks to utilities for advancing metering, power quality monitoring, integrated electronic systems for management of distributed power, demand response and energy management software*

Energy Storage *– Batteries including thin film, rechargeable, power quality regulation, flywheels, electro-textiles*

Energy Efficiency *– Energy management systems, systems that improve output of power generating plants, intelligent metering, solid-state micro-refrigeration, control technology for HVAC systems, automated energy conservation networks*

There are synergies to the existing and planned power plants by adding wind farms on the same sites as the power plants as well as photovoltaic of the south walls of these huge power plants combined with fuel cell storage would further add to the sustainable power sources available to the region. It could also use the same distribution lines. Further research would look into making these power plants even more efficient through co-generation.

Beyond electrical power generation there is biofuels and biomass that generate fuel from plant. There are already a number of ethanol and biodiesel plants planned for Alberta. Attracting these plants and research to this area fits in well with the energy theme.

Environmental Information Technologies

Online exchanges for buying and selling resources, web-based resources for Environmental Health & Safety management, online environmental record keeping, operations management software for utility companies, software-enabled control systems for light emitting devices, wind source analysis and weather forecasting services

We are rapidly moving toward a knowledge based economy. This means that the NWCREDI needs to attract knowledge workers – people that make their living by thinking. These high value jobs are termed the “creative class” by Richard Florida and may make up about a third of the workforce – the manufacturing and service industries making up the other two thirds. Attracting knowledge workers means providing challenging work and healthy balanced lifestyles. By attracting research and design companies to locate in the NW Capital Region and combining this with an environmentally sustainable environment that includes a carbon neutral approach and recreational opportunities that include hiking, skiing, biking, etc. through natural areas will make this area competitive. Add to that the urban amenities offered by Edmonton and the region could well become a world leader.

Data Centers – with the advent of Web 2.0 the trend is away from company owned servers protected behind firewalls. Instead companies such as IBM, BELL, TELUS, Intel, etc. are constructing huge data centers that host their client’s data. These data centers are huge users of power and produce a lot of waste heat. By locating these centers near the power plants, especially clean power plants where the waste heat can be recovered, makes a lot of sense. These data center clusters will also attract workers with a high skill sets.

Further more access to processing power will attract organizations that use large amounts of data for their business. This includes modelers, animators, video game producers, designers, banks, universities, etc.

Materials & Nanotechnology

Biodegradable materials derived from seed proteins, micro-fluidics technology for conducting biochemical reactions, nano-materials, composite materials, thermal regulating fibers and fabrics, environmentally-friendly solvents, nanotechnology components for electronics, sensor applications, energy storage, elctrochromic glass, thermoelectric materials

This research cluster can bridge the gap between the pure research being done at the U of A and other institutions and the cleantech manufacturing clusters that will depend on new materials to keep their innovative edge.

Materials Technology & Recycling

Recycling technologies, waste treatment, internet marketplace for materials, hazardous waste remediation, bio-mimetic technology for advanced metals separation and extraction

Research into the design and manufacture of environment friendly products (i.e. cradle-to-cradle products designed for recycling from the beginning or products using less harmful materials or fewer material) or products from recycled materials (i.e titanium from oils sands, plastic furniture from bottles, etc.)

Manufacturing / Industrial

Advanced packaging, natural chemistry, sensors, smart construction materials,business process and data flow mapping tools, precision manufacturing instruments & fault detectors, chemical management services

Photovoltaic Cells - can be added to buildings to reduce their carbon footprint by generating electricity

Solar Panels - can reduce a building's carbon footprint by generating heat

Geothermal heating systems - use the ground to heat and cool buildings thus reducing their carbon footprint

Fuel cells - used to store energy for use in emergency end non peak power requirements

Wind Turbines - building scale or commercial scale (wind farms)

These are all products that can be manufactured locally and shipped all over the world. Refer to Intra-modal section below. Economics can be improved through carbon trading initiatives. Innovation and improvement in performance can be achieved by partnering with basic research facilities such as the Nanotechnology centre at the U of A.

Building Materials - Concrete using Fly Ash (a by product of coal fired power plants), Certified Wood (there is a strong forestry industry in this part of Alberta), low VOC recyclable carpets, products made from recycled plastic, etc. This can all be done at a scale conducive to this area.

Fuel Cells - research and application into fuel cells would add to the energy utilities.

Transportation & Logistics

Hybrid vehicle technology, lighter materials for cars, smart logistics software, car-sharing, temperature pressure sensors to improve transportation fuel efficiency, telecommuting

With the new deep water port currently under construction at Prince Rupert and the associated rail infrastructure including the intra-modal facility the Edmonton Capital region is well positioned to take advantage of handling goods from Asia. Using this route into North America the shipping distance is reduced by more than a thousand miles. Once in operation this link will provide parts for the manufacturing/industrial cluster as well as a way of distributing the cleantech products designed and manufactured in the region.

The Yellowhead highway offers further opportunities for clean transportation such as running all trucks and buses on biodiesel or other clean fuel. This would save costs and provide both transportation companies and the companies shipping their goods to claim emission reductions and potentially credits.

Although we can't directly influence the environmental footprint of airplanes we can affect the footprint and emissions of the support infrastructure by providing clean electricity and biofuels for support vehicles. Research into biojetfuels may have a future. Other initiatives can include the design and operations of the buildings and effective public transportation system that gets people in and out of the airport. As the greenest airport the Edmonton International would attract numerous extra flights from carriers keen to soften their environmental image.

There may be opportunities to naturalize the land at the airport itself. Some emerging research is showing that prairie plant communities are several hundred time more efficient at producing biofuels than single species food crops such as corn.

Pavement – research into quiet pavement, porous pavement that filters and drains stormwater, cool pavement that reduces heat island effects, and recycled pavement.

Water Purification & Management

Water recycling and ultra-filtration systems including UV membrane & ion exchange systems, sensors and automation systems, water utility sub-metering technology, desalination equipment

Water resources technologies such as water treatment, wastewater treatment, water productivity products are also a natural to both investors and tourists. Alberta is a leader in Water and Wastewater treatment especially in Edmonton and Calgary where biological Nutrient

Removal and UV technologies lead the world. Further water productivity improvement can be gained through rainwater harvesting and eliminating lawn irrigation by replacing lawns with native grasses. If St. Albert, a bedroom community known for its wealth and green lawns were to convert to native plant landscaping for their homes and businesses, not only would they save billions of liters of potable water but they would also draw worldwide media attention. This would in turn attract more knowledge workers looking for a healthy lifestyle.

TOURISM SECTOR

As the gateway to the Rockies through Jasper, tourism is a natural industry unifier to attract both eco-tourists and people seeking knowledge about how to reduce their environmental footprint.

Eco-tourism

A carbon neutral zone would also attract eco-tourism. People could travel guilt-free to Edmonton and Jasper. It would become a global destination for both tourists and scientists wanting to work in the field or wanting to learn how its done. It would be a carbon neutral convention destination. Tourist would be encouraged to check into green hotels, use hydrogen tour buses, biodiesel fueled trains, or rent biodiesel or hydrogen cars. As well they would be encouraged to partake in activities such as hiking and biking rather than touring with a vehicle. There would be a real opportunity to partner with the First Nations here.

Conferences

One of the best ways of attracting knowledge workers and investors is to host conferences where local experts meet with global experts to discuss the latest innovations and concepts in their field. By offering both high tech research facilities and high touch eco related recreational opportunities the NWCREDI would be well positioned to host numerous conferences and symposiums that attract industry leading experts as well as their families.

REFERENCES AND END NOTES

1. Burtis, P & Epstein, B & Parker, N (2006) Creating Cleantech Clusters: 2006 Update, How Innovation and Investment can promote Job Growth and a Healthy Environment p.61

2. The Futurist, July-August 2007 p.14

3. Burtis, P & Epstein, B & Parker, N (2006) Creating Cleantech Clusters: 2006 Update, How Innovation and Investment can promote Job Growth and a Healthy Environment p.57