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Snapshots of Success: Environmental Technology Investments through the Go Green Fund



**Geoffrey Waters
Ministry of Environment**

SWRC – October 28, 2013



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Go Green Fund Mission Statement

*Stimulate Saskatchewan private sector firms, provincial Crown corporations, local government entities, non-governmental organizations (NGOs), local community groups and individuals to **adopt measures** aimed at mitigating or avoiding the negative impact of Saskatchewan's most important environmental problems. This is to be achieved through the application of practical, **cost-effective** solutions delivered with **innovative environmental technologies**, processes, **improved public understanding** and greater community involvement.*



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Go Green Fund : Objectives & Outcomes



Reduction of Greenhouse Gas Emissions
(tonnes CO_{2e} avoided)



Waste Management
(tonnes diverted)



Water Conservation
(m³ conserved)



Education & Awareness
(Number of students)



Biodiversity Protection
(Ha conserved)

**\$70M commitment
over 4 years to
2011/12**

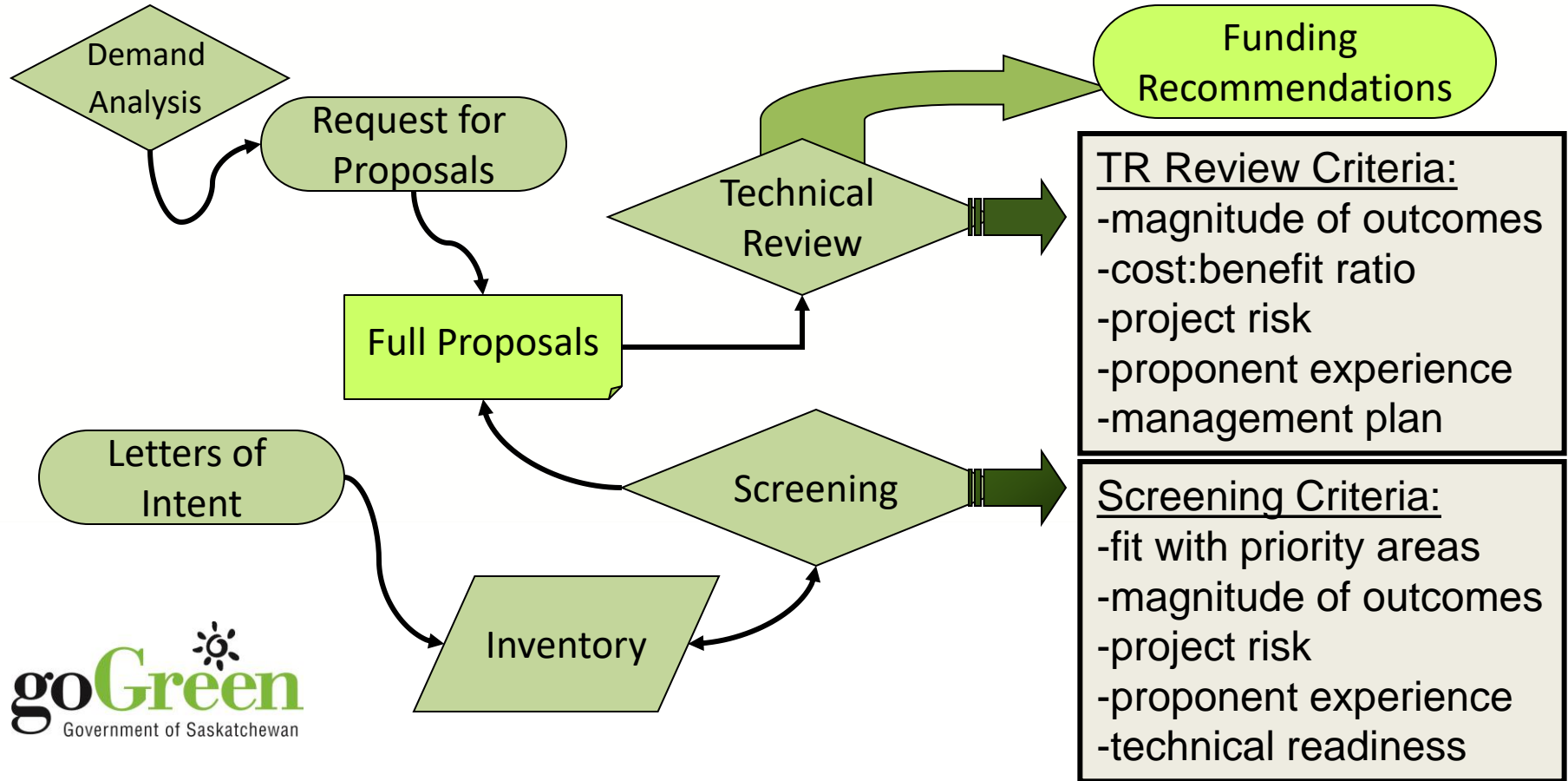


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Go Green Fund Allocations

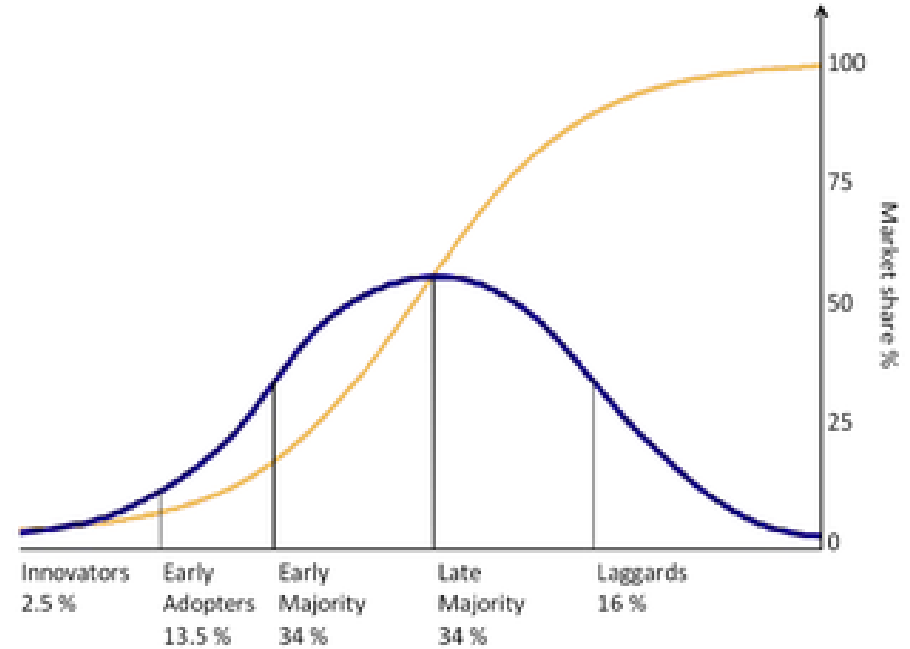
Priority Area	% Allocation (Actuals)	# Projects	Contribution (\$ millions)
GHG Reduction	45% (56%)	34	31.2
Water Conservation	25% (12%)	10	6.6
Biodiversity Protection	10% (7%)	2	3.6
Waste Reduction	15% (25%)	14	13.7
Education	5% (1%)	3	0.3
Administration / Outreach			4.2
Total		63	59.6

Go Green Procurement Processes



Cost:Outcome Analysis

1. Parameterization of Rogers' curve as cumulative distribution function of time
 - Time to 25%, 50% and 75% adoption
 - Number of units adopted at full market share
 - Yields units adopted as a function of time
2. Environmental outcome = $f(\text{units adopted})$
3. Future outcome flows discounted using NPV, $r = 2\%$



$$\frac{\$ \text{ invested by Fund}}{\text{NPV}(\text{outcomes})}$$



Risk Assessment

Risk Type	Unmitigated Impact	Probability	Rating
Schedule/Milestone	3	0.1	0.3
Budget	5	0.4	2.0
Business Plan	1	0.6	0.6
Sub-Contractor/Supplier	1	0.4	0.4
Resources	1	0.2	0.2
Technical & Engineering	8	0.4	3.2
Adoption	4	0.5	2.0
Project Management	6	0.3	1.8
Total			10.5 / 80

Project Management

- Organization of project into work packages (WPs)
- Project deliverables coupled to WPs
 - Usually technical reports / drawings
- Payment coupled to WP completion
- Leveraged funding



Examples of Incentive and R&D Projects Funded



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NET METERING

- Reimbursement of 35 per cent of eligible costs up to \$100,000 for projects < 100kW
- Wind, low-impact hydro, biomass, heat reclamation, flare gas, and photovoltaic (solar) generation are eligible
- Fund has invested over \$4.9M

- 377 installations
- 2851kW generation capacity
- Annual GHG reductions of 1,700 tonnes CO_{2e} per year

Partners:

- SaskPower
- Saskatchewan Research Council



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HLA GARBAGE TRUCK

- In a year, the average garbage truck makes 247,000 stop-start cycles consuming 12,250+ L of diesel fuel and producing 32,462 kg of CO_{2e}
- 25% increase in fuel efficiency, 8.1 tonnes of GHG emissions avoided per year for the lifetime of the truck
- Did not see increases in fuel efficiency due to the operational environment

Funding Partner: City of Regina



PROVINCIAL TOILET REPLACEMENT

- Approximately 30% of all the water used in the home is used for flushing
 - Offered a rebate of \$50 for each 13 L toilet replaced with a 6 L or dual-flush toilet
- Replacement of 65,425 toilets in 47,841 households
 - 4.5 billion litres of water saved and 13,000 tonnes of CO_{2e} avoided



Partners: Water Security Agency



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Landscape Connectivity Model and Focused Habitat Securement

Partners:

- Nature Conservancy of Canada
- Saskatchewan Wildlife Federation
- Environmental Systems Assessment Canada



- Habitat fragmentation of natural landscapes into small and isolated patches is one of the greatest threats to biodiversity in Saskatchewan
- Developed a landscape connectivity model to identify movement corridors and then purchase new conservation lands within them

3,200 hectares of new
conservation land secured



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ElectroPure Technology

- The industrial sector is the 3 largest user of potable water in the province.
- New technology to treat wastewater for industrial reuse, ultimately leading to the reduction in the amount of fresh water used by industry

1270 m³ of water was treated at Evraz. Capacity for the unit is 200 m³/day.



Partners:

Ground Effects Environmental
EVRAZ

NRCan - IRAP

Communities of Tomorrow



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Native Plants in the Classroom

- Only 4 per cent of the original 24 million hectares of prairie ecosystems remain in good condition
- NPSS has produce free educational materials and a teacher resource kit



Partners:

- EcoAction (Government of Canada)
- Environment Canada SaskEnergy
- SaskPower
- Little Green Thumbs Saskatchewan
- Saskatchewan Ministry of Agriculture
- Saskatchewan Watershed Authority
- Prairie Conservation Action Plan

Use of resource materials by at least 500 students, 50 teachers, and 50 schools



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WOOD PELLET HEATING

Partners: Meadow Lake Tribal Council, SRC



- Many northern communities rely on propane or heating oil as their sole heat source
- Sawmill wood waste is formed into pellets and used to heat four demonstration sites
- Examines cost effectiveness and potential for expansion

Pellet heating systems used on average 50% less propane and electricity during with winter months



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HIGH WIND & STORAGE

Partners:

- Cowessess First Nation, NRCan Clean Energy Fund
- Saskatchewan Research Council, Indian & Northern Affairs Canada

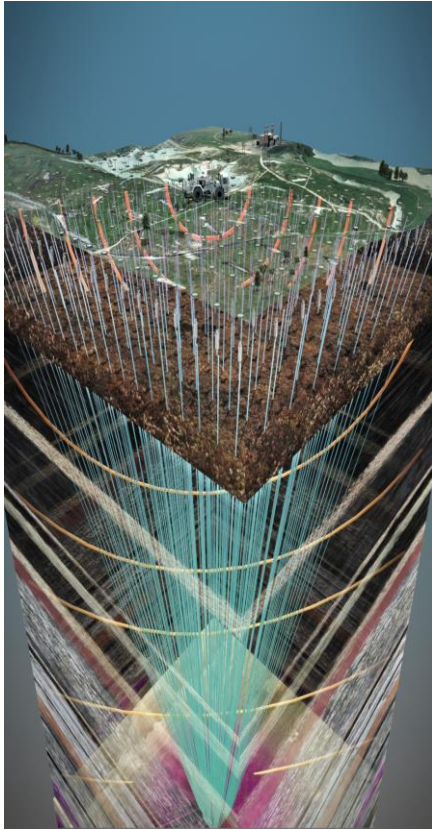
- Install and test a 73m turbine
- 800 kW capacity
- 160 kW battery storage system



1,800 tonnes CO_{2e} / yr



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Aquistore is the storage site for the world's first commercial post-combustion CO₂ capture, transportation, utilization, and storage project from a coal-fired electrical generating station.



The storage reservoir is designed to reduce 2,000 tonnes of CO_{2e} per day.

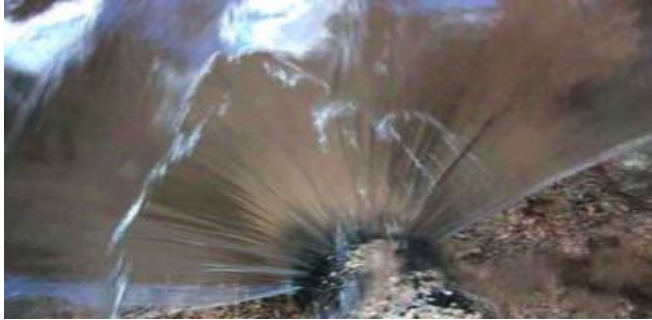
Funding Partners:

- Petroleum Technology Research Centre
- Enbridge Inc.
- SaskEnergy and SaskPower
- Consumers' Co-operative Refineries Ltd.
- Schlumberger Carbon Services
- Sustainable Development Technology Canada



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WATER LEAK DETECTION



Funding Partners: EcoTech Research Ltd. Agriculture and Agri-Food Canada Saskatchewan Ministry of Agriculture City of Regina

- tests the application of electromagnetic techniques / conductivity signatures for the cost effective detection of water pipeline leaks

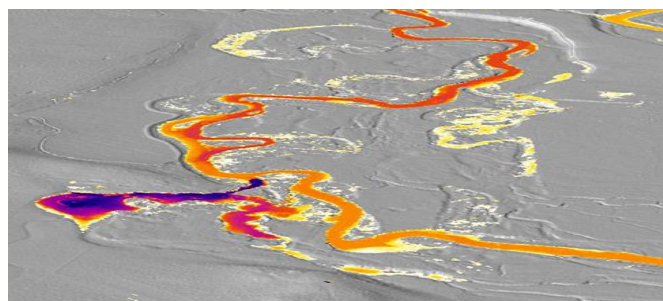
Conserve approximately 32,000,000m³ to 74,000,000m³ of water annually depending on the user



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RIVER ECOSYSTEM ASSESSMENT

Partners: University of Saskatchewan
Saskatchewan Watershed Authority,
Saskatchewan Research Council



- User-friendly, geospatial, application-based software that integrates publicly available, multi-jurisdictional and multi-sector data on aquatic health as well as man-made developments on the landscape.
- Accessible and integrated aquatics data, both biophysical (such as water and sediment quality) and human impact (such as industrial and municipal point source quality)



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ENERGY EFFICIENT FREEZERS USING SEASONALLY COLD AIR

Partners: Eat Healthy Foods



- Grocery and convenience stores use large amounts of electricity to operate refrigerators and freezers
- The study will determine the cost effectiveness of using outside cold air for cooling, and the potential for the technology to be expanded into other facilities using refrigerators and freezers for food and beverage storage.



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Thank You

Questions or Comments?



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