

# BUILDING THE RENEWABLE ENERGY MARKET IN NORTH AMERICA

Presentation to the Commission for  
Environmental Cooperation

October 28<sup>th</sup>, 2004

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Executive Director



POLLUTION PROBE  
CLEAN AIR. CLEAN WATER.

# POLLUTION PROBE

## History:

- Founded in 1969
- At the University of Toronto
- A non-profit, charitable organization
- Supported by 6,000 donors

# POLLUTION PROBE

## Programmes:

- Mandate: environmental policy development
- Main programme areas:
  - Climate change
  - Air
  - Water
  - Energy
- Other areas of activity:
  - Mercury, Toxics, Children's Health, Environmental Management

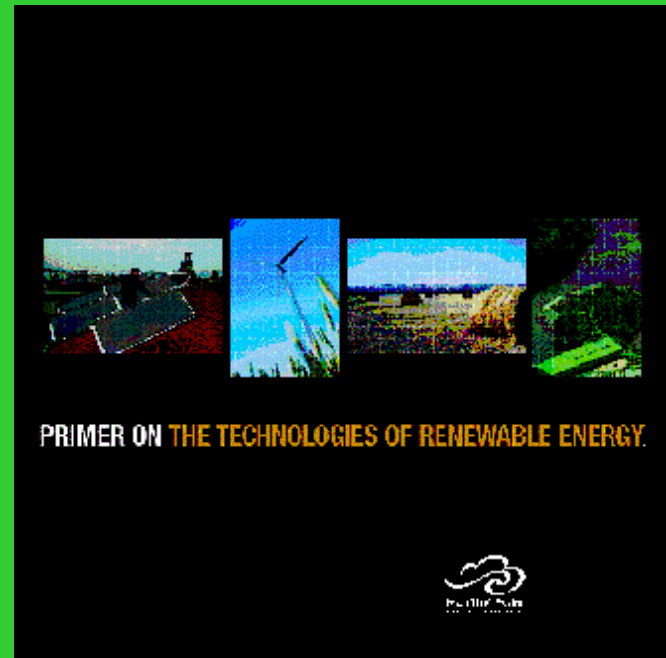
# GREEN POWER ACTIVITIES



## Promoting Green Power in Canada

Green Power Policies: A Look Across Borders

November 2002



# GREEN POWER WORKSHOP SERIES

## Report of the Green Power in Canada Workshop Series



August 2004

A Pollution Probe and Summerhill Group project

Report prepared by: Martin Tampier, Environmental Intelligence, Chilliwack, BC  
Workshop series coordinated by: Melissa Faldut, Summerhill Group, Toronto, ON



Summerhill Group  
TRANSFORMING MARKETS TO SUSTAINABILITY

## A Green Power Vision and Strategy for Canada

towards a sustainable  
electricity future for Canada

# **GREEN POWER WORKSHOP SERIES**

<b>HALIFAX:</b>	<b>Current Status and Challenges</b>
<b>MONTREAL:</b>	<b>Technology Development and Resource Potential</b>
<b>TORONTO:</b>	<b>Investments and Markets for Green Power</b>
<b>CALGARY:</b>	<b>Policies and Incentives for Green Power Development</b>
<b>VANCOUVER:</b>	<b>A Vision and Strategy for Green Power in Canada</b>

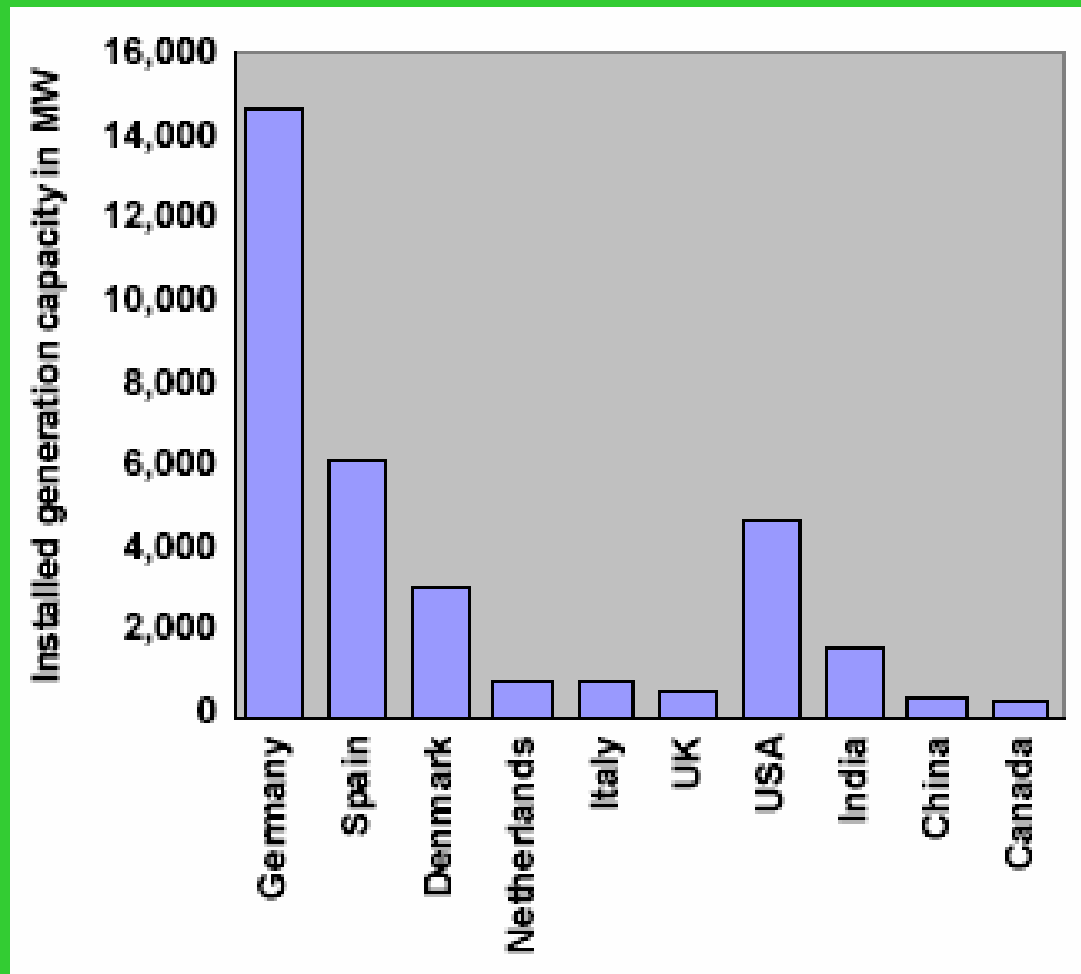
# DEFINITION OF GREEN POWER

- Low-impact renewable energy that meets the criteria set by the Environmental Choice Program for EcoLogo certification.
- Chosen because it is currently the most commonly used definition in Canada.

The Environmental Choice Program gives EcoLogo recognition to:

- Alternative Source Electricity Generation from naturally occurring sources (such as the wind and sun).
- Alternative Source Electricity Generation from sources and technologies that have small environmental impacts (such as less intrusive hydro and certain biomass combustion).

# WIND POWER GENERATION CAPACITY BY COUNTRY (2003)





# GREEN POWER: STATUS IN CANADA

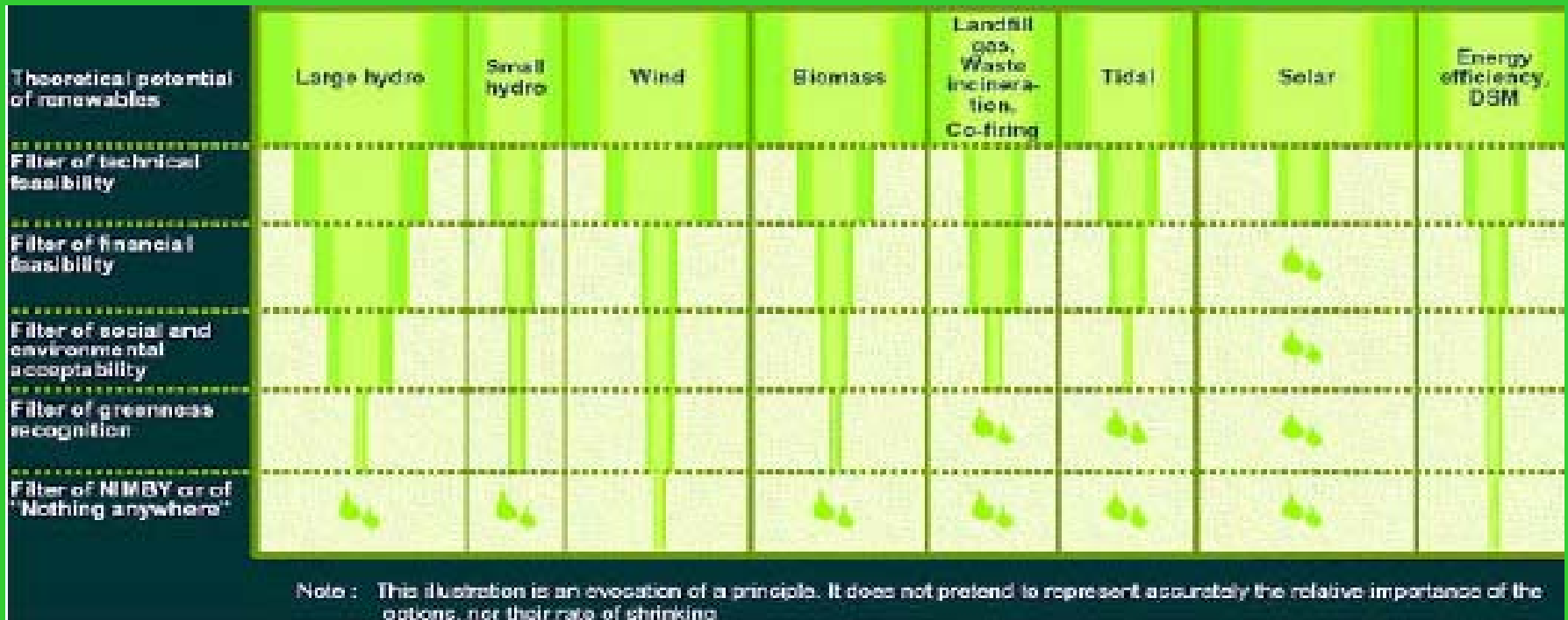
Technology	Installed Capacity (MW)	Technical Potential (MW)
Small hydro	1,800	9,000
Biomass	1,628 + 85	7,000
Onshore wind	313	40,000
Tidal energy	20	3,000
Solar PV	10	70,000
Offshore wind	0	2,500
Geothermal	0	3,000
Wave energy	0	10,000

# READINESS OF GREEN POWER TECHNOLOGIES IN CANADA

Technology	Readiness	Canadian Products	Cost Effective Without Incentives
Small Hydro	Yes	Yes	Now
Wind	Yes	Blades and Electronics Only	By 2010
Photovoltaics	No (2010)	No (2005)	By 2025
Biomass (Forest Waste)	Yes	Yes	Now (CHP)
Biodiesel	Yes	Yes	No
Landfill Gas	Yes	Yes	Site Dependent
Fuel Cells	No	Yes	No
Power Electronics	Yes	Yes	Costs are falling

Modified from Filion. 2003.

# BARRIERS TO RENEWABLE ENERGY DEVELOPMENT



Source: Y. Guerard. Hydro-Quebec. November 2003.

# GREEN POWER ACTIVITY

## (~ 30 TWh by 2010)

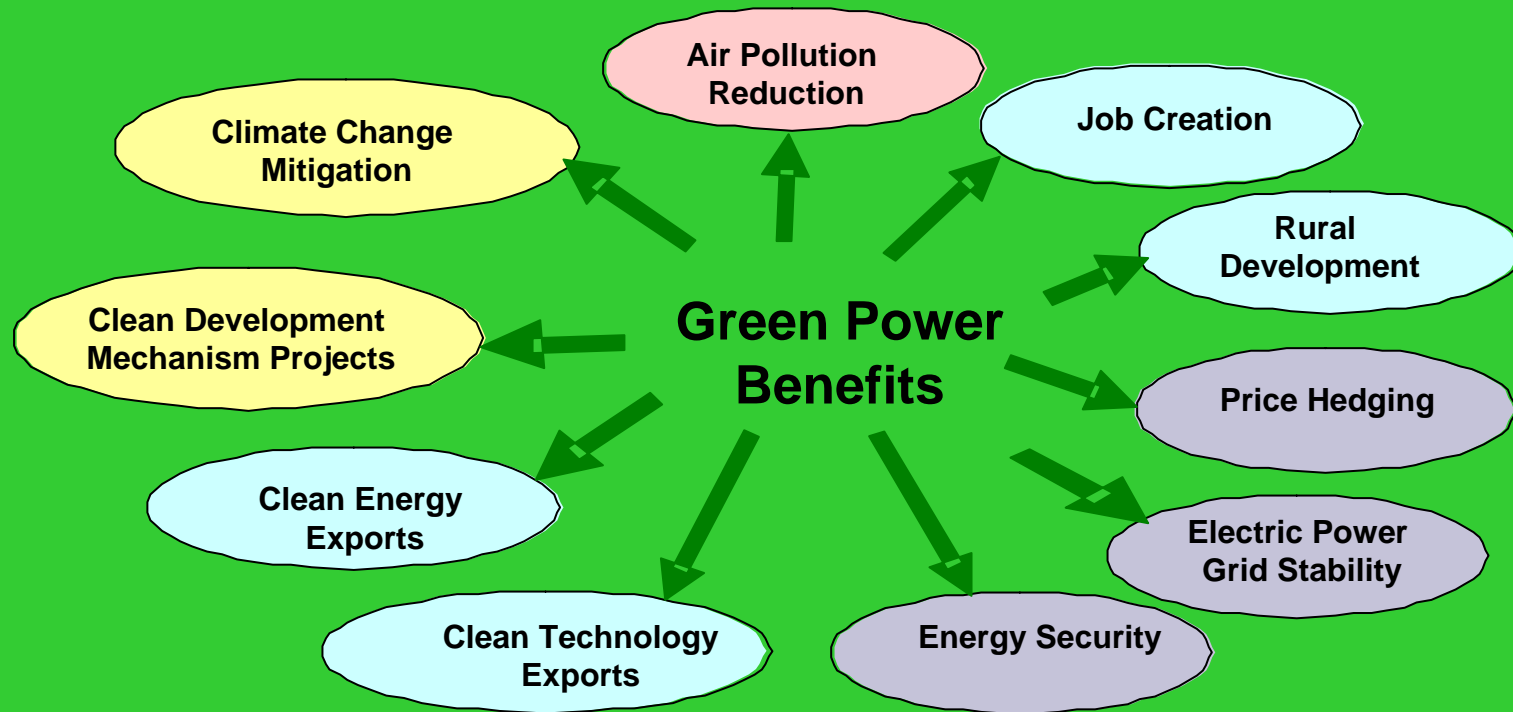
- BC – 50% new generation 2003-2013 (includes cogen)
- AB – 3.5% renewables by 2008
- SK – 150 MW of wind by 2007
- MB – 250 MW of wind by 2010
- ON – 10% renewables by 2010
- QC – 1000 MW of wind, 100 MW of biomass by 2010
- NB – RPS planned. 100 MW of wind by 2010.
- NS – 5% renewables by 2011
- PEI – 15% renewables by 2010 (30-40 MW wind)
- YT – 2 MW of wind
- NWT – 10% renewables by 2010

# INSTALLED WIND POWER GENERATION CAPACITY BY PROVINCE

Province	Installed Capacity (MW)
Newfoundland	0
PEI	13.6
Nova Scotia	4.8
New Brunswick	0
Québec	113.3
Ontario	14.6
Manitoba	0
Saskatchewan	21.8
Alberta	170.7
British Columbia	0
Yukon	0.8
Northern Territory	0
Nunavut	0
<b>Total</b>	<b>339.6</b>

Source: CANWEA. 2003.

# GREEN POWER BENEFITS



# GREEN POWER VISION & STRATEGY

## Sustainable Electricity Future Priorities

- Energy efficiency and conservation;
- Green Power that meets the criteria for EcoLogo certification;
- Ecologically sustainable larger-scale hydro and other renewables;
- Combined heat and power using natural gas; and
- The cleanest and safest technologies among the remaining options.

# GREEN POWER VISION & STRATEGY

## Potential Green Power Portfolio for 2025

TECHNOLOGY	CAPACITY (MW)	CAPACITY FACTOR (PER CENT)	ELECTRICITY GENERATION (TWh)
Wind – onshore	21,000	30	55
Wind – offshore	3,400	40	12
Small hydro	10,000	50	44
Biomass	4,500	80	32
Geothermal	500	95	4
Solar	1,000	14	1
Wave	500	30	1
Tidal	500	30	1
<b>TOTAL</b>	<b>41,400</b>		<b>150</b>



# GREEN POWER VISION & STRATEGY

## Green Power Targets for Canada

45-60 TWh of green power by 2010.

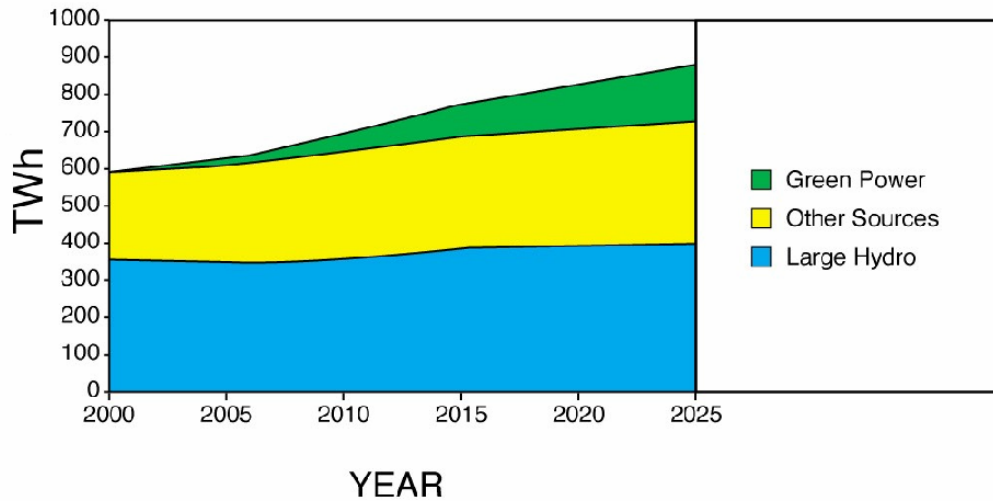
90 TWh of green power by 2015.

120 TWh of green power by 2020.

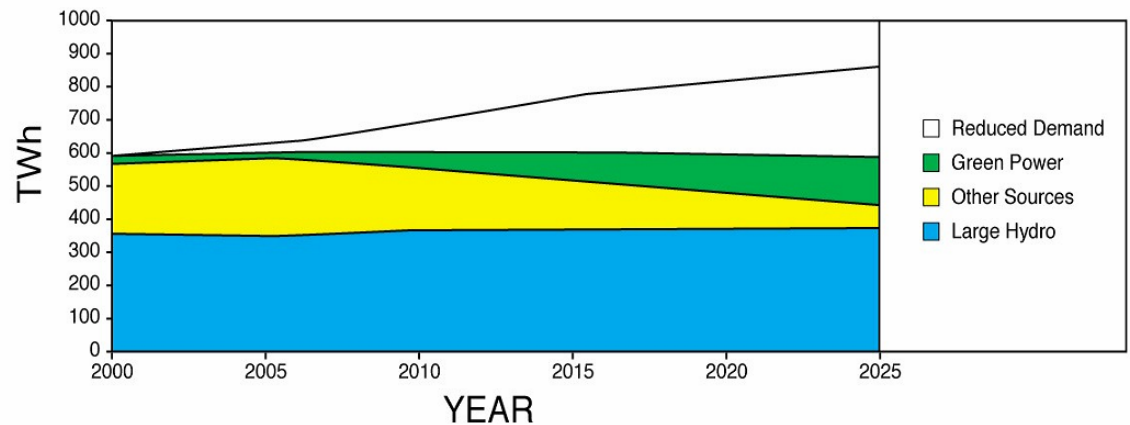
150 TWh of green power by 2025.

# GREEN POWER VISION & STRATEGY

Business-as-Usual SCENARIO



STABLE DEMAND SCENARIO



# PRIORITIES FOR ACTION

## 1. Leveling the Playing Field

- Renewable Portfolio Standards or Equivalent Policy Commitments
- Green Power Production Incentive
- Green Power Procurement
- Renewable Energy Certificate System
- System Benefits Charge

# PRIORITIES FOR ACTION

## 2. Supporting Innovative Technologies

- Comprehensive Strategy for Research, Development, Demonstration & Commercialization
- Centres of Excellence
- Sustainable Development Technology Canada
- Technology Road Maps

# PRIORITIES FOR ACTION

## 3. Engaging Canadians

- Community Engagement
- Community-based Projects
- Market Incentive Program - Increased and Extended
- Comprehensive Public Education and Outreach Strategy

# ADDITIONAL ACTIONS

- Accessing the Power Grid
- Mapping Green Power Resources
- Establishing Mechanisms for Distributed Generation
- Streamlining Zoning, Planning and Permit Requirements
- Developing Standards to Ensure Quality and Safety
- Preparing the Labour Force
- Setting Up Green Power Coordinating Bodies

# ONTARIO'S GREEN POWER POTENTIAL

# CURRENT ELECTRICITY GENERATION IN ONTARIO

	MW installed (peak capacity)	GWh generated in 2003	%	Source
Coal	7,285	35,098	22.2	[1]
Power source	10,774	61,040	38.6	[3]
Large Hydro	7,665	33,572	21.3	[1]
Oil & Gas	4,645	12,208	7.7	[1]
Imports	-	10,682	6.8	[1]
Wind*	15	39	0.02	[2]
Solar PV*	3	4	0.00	Canadian total estimated to be 10 MW
Small hydro*	491	2,150	1.4	20 MW and smaller [5]
Biomass*	455	3,189	2.0	incl. biogas [4]
<b>Total non-large hydro renewables</b>	<b>1,016</b>	<b>5,382</b>	<b>3.4</b>	
<b>Total</b>	<b>31,378</b>	<b>157,982</b>	<b>100</b>	

\* Generation estimated based on known plant sizes and capacity factors for each technology.



# ONTARIO ELECTRICITY DEMAND FORECASTS IN TWh

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>
<b>Ontario IMO [1]</b>	<b>153</b>	<b>164</b>	<b>172</b>	<b>180</b>	<b>-</b>
<b>National Energy Board [6]</b>	<b>163</b>	<b>178</b>	<b>192</b>	<b>207</b>	<b>219</b>
<b>Pembina CIMS Model [1]</b>	<b>139</b>	<b>148</b>	<b>163</b>	<b>181</b>	<b>-</b>

# COMPARISON OF GREEN POWER TARGETS PROPOSED FOR ONTARIO IN TWh

	2010	2015	2020	2025
<i>Pollution Probe (national) [12]</i>	45–60	90	120	150
<b>Pollution Probe (Ontario)*</b>	12–16	24	32	40
<b>ON Energy Task Force [7]</b>	16	28	36	-
<b>Pembina Institute [1]</b>	17	26	35	-
<b>Torrie Smith [9]</b>	-	-	8	-
<b>National Energy Board [6]</b>	6	12	17	21
<b>Current Government Target</b>	9	-	-	-

\* Interpolated from national target based on Ontario's relative share of total current electricity generation.

Green Power in Canada documents  
are downloadable at:

<http://www.pollutionprobe.org/whatwedo/greenpower/index.html>

**THANK YOU!**

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