







## Green Power in Alberta & BC



January 2004



## Clean, Simple & Sound<sup>®</sup>



- Canadian Hydro (TSX:KHD) is passionate about building a sustainable future
- Producer of Green Power for 14 years that meets both the goals of investors and the needs of the environment
- Own and operate 13 EcoLogo<sup>M</sup> certified plants, currently with 104 MW of operating capacity, expanding to 136 MW by end of 2004
- Over 85% of power output is under long term contract, with balance of production exposed to the spot market

These materials contain forward looking statements based on current expectations, but which involve risks and uncertainties. Actual results may differ.



## Investments & Job Creation



- Canadian Hydro currently owns and operates 3 wind and 6 hydro plants in Alberta & BC
- 1 biomass plant is under construction and 1 wind plant is in planning for completion in 2004
- Total investment of \$168 million in Alberta & BC by Canadian Hydro to the end of 2004
- 47 permanent, full time jobs created by Canadian Hydro (35 in operations plus 12 at Calgary head office)



## What is Green Power?



- Electricity generated from renewable resources in an environmentally friendly, low-impact manner
- Provides future generations with reliable, efficient and affordable electricity supplies
- Promotes and protects human health and environmental quality
- Certification is based on Environment Canada's EcoLogo<sup>M</sup> standard





## Criteria for Green Power Facilities



- Limit emissions of air pollutants, such as sulphur, nitrogen, hydrocarbons & particulates, greenhouse gases and production of hazardous or solid wastes
- Maintain water quality and watershed integrity
- Mitigate impacts on plants and animals
- Ensure sustainability of feedstock / fuel and minimal water consumption
- Public consultation is required by BC Hydro




## Green Power Potential




- Annual contribution of major sources of Green Power in Canada, with estimate of minimum potential

Resource	Current GWh/yr	Min Potential GWh/yr
Onshore Wind	1,000	12,300
Run-of River Hydro	4,000	15,000
Biomass	1,900	49,000
Ocean Waves & Tides	100	45,000

Source: Vision for a Low-Impact Renewable Energy Future for Canada  
Clean Air Renewable Energy Coalition, November 2003




## Average # of Households per Resource




- An average household uses 7200 kWh/year
- Depending on the resource capacity factor, a 1000 kW facility will produce power for the following:

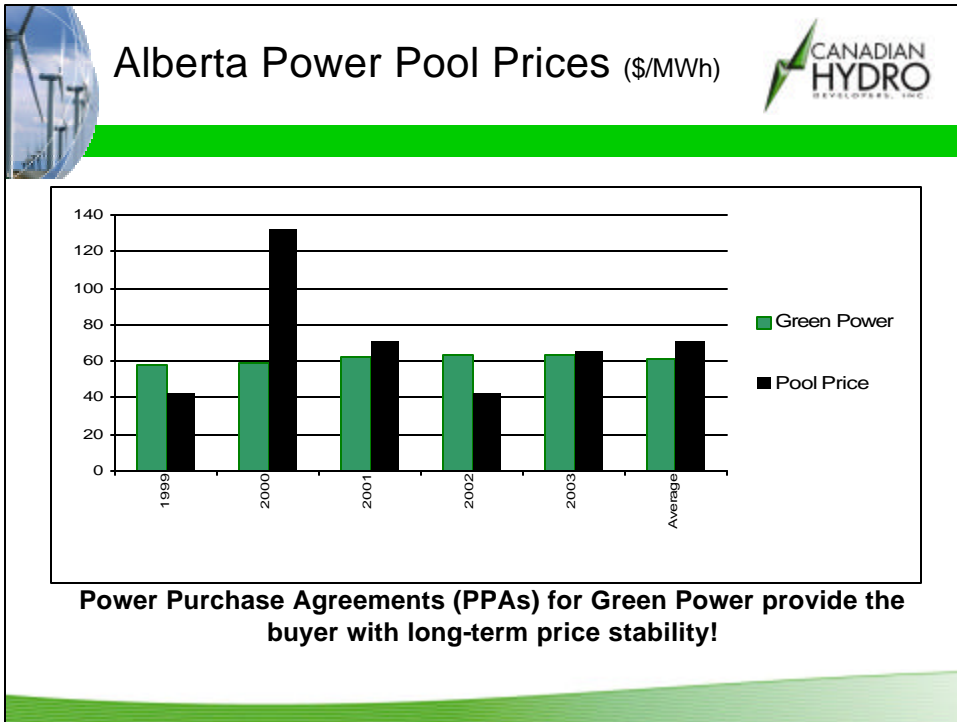
Wind (31% cap factor)	380 households
Hydro (AB - 48% cap factor)	580 households
Hydro (BC - 55% cap factor)	670 households
Biomass (80% cap factor)	970 households



## Benefits of Green Power



- Creates new capital investment and jobs
- Reduces fossil fuel dependence through diversity of Canada's energy supply
- Supports new industrial development
- Sustains regional economic development
- Promotes clean air and reduces GHG emissions
- Increases competitiveness through stable pricing
- Generates investment in innovative and sustainable renewable energy technologies



**Competitiveness of Green Power**

- The biggest financial challenge to Green Power is the magnitude of up-front capital
- Wind, hydro and biomass are within the competitive range of conventional resources
- Range of production costs, depending on the resource capacity factor and location are:
  - Wind \$59-\$95/MWh 25-40% cap factor
  - Hydro \$56-\$67/MWh 50-60% cap factor
  - Biomass \$60-\$73/MWh 60-70% cap factor
  - Gas \$57-\$66/MWh 60-70% cap factor
  - Coal \$47-\$63/MWh 60-80% cap factor



## Market Support Mechanisms



- Long-term Power Purchase Agreements (PPAs) are the key to financing construction of Green Power facilities
- The open Alberta wholesale market has created opportunities for Contracts for Differences, which are straightforward contracts for both parties
- Federal Wind Power Production Incentive (WPPI) is a factor in the development of 175 MW of new wind projects



## Wind Power



- Easy and fast permitting
- Minimal civil infrastructure and land disturbance
- Scaleable plant size
- Zero air emissions
- Excellent southern Alberta and west coast resource
- Strong public acceptance




## Cowley North Wind Plant






Plant capacity is 19.5 MW, generating 138 GWh/yr



## Cowley North Wind Plant



- Construction of \$27M, 19.5 MW facility completed in 2001
- Facility features 15 Nordex wind turbines located on grazing land
- Power production is optimized by wind accelerating over the ridge and by ridge orientation at right angles to prevailing wind
- Operations staff extensively involved in project construction





## Run-of-River Hydro



- Technology is well understood
- Assets operate for many generations
- No fuel risk and minimal labour
- Significant potential throughout BC and in northern Alberta
- No air emissions
- Integrated into irrigation drop structures in southern Alberta
- Approval process is longer than wind



## Pingston Creek Hydro Plant



Plant capacity will be 45 MW, generating 216 GWh/yr





## Pingston Creek Hydro Plant




- Construction of \$65M, 30 MW facility from 2001 to 2003
- Project features a 4km tunnel with 590 meter drop from the intake to the powerhouse
- \$8.6 M, 15 MW expansion in 2004
- Facility is 50% owned by Canadian Hydro
- Fish spawning channels and rearing habitat incorporated in project
- Head pond supports fish over-wintering




## Wood Waste Biomass




- Viable thermal technology with no fossil fuel cost
- Generates steam and power
- Base-load generator, makes customer load following possible
- Community air-shed benefits include significant reduction in particulate emissions from existing incinerators
- Significant resource in northern Alberta and throughout BC




## Grande Prairie EcoPower<sup>®</sup> Centre






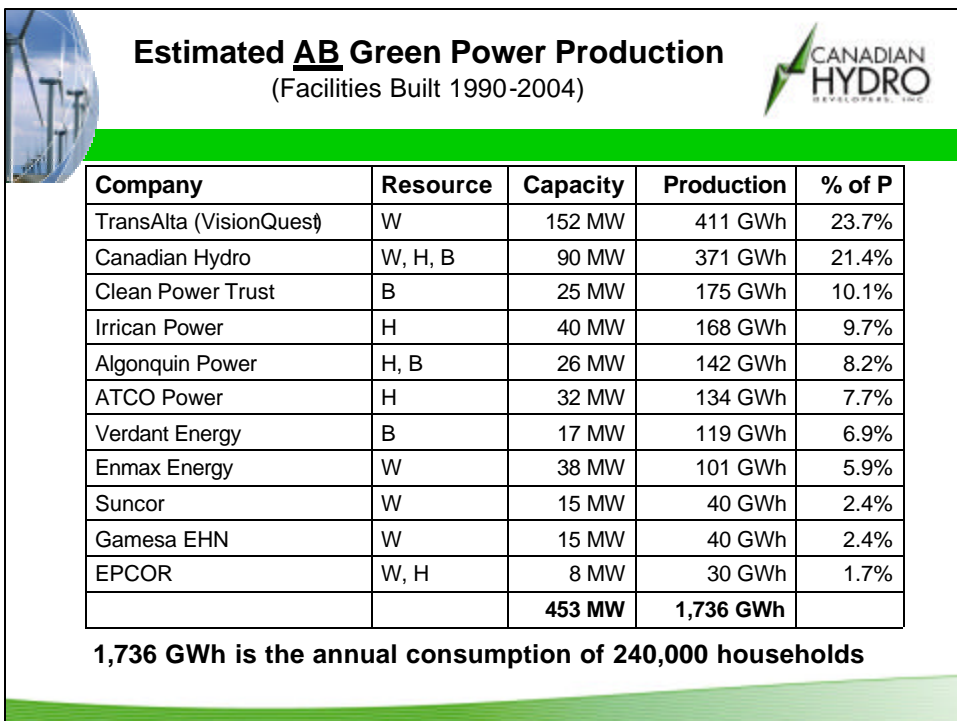
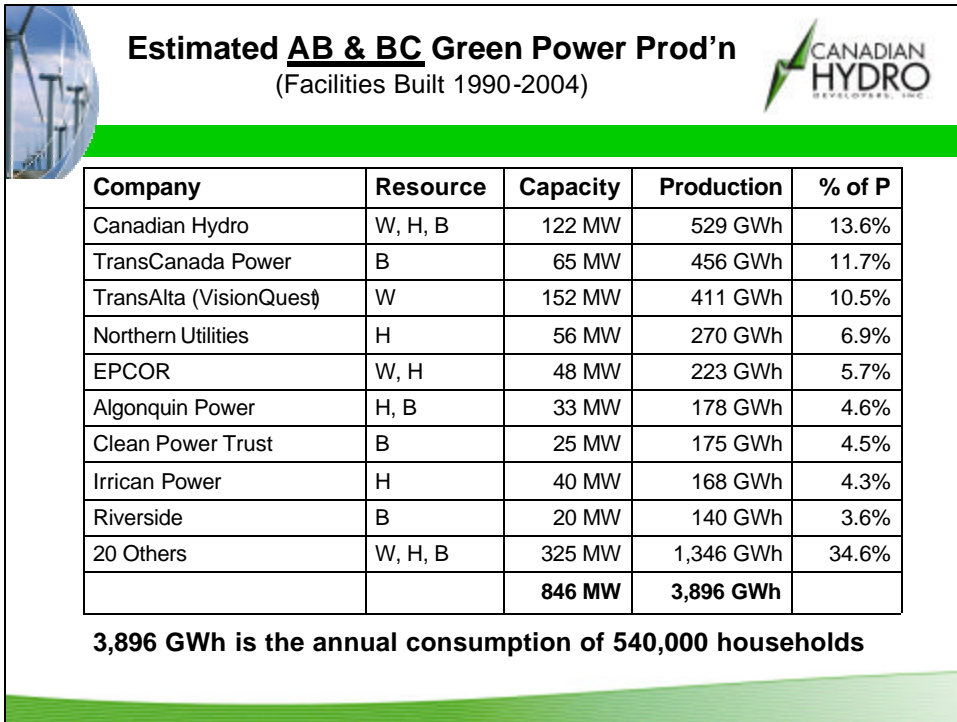
Plant capacity will be 25 MW, generating 175 GWh/yr

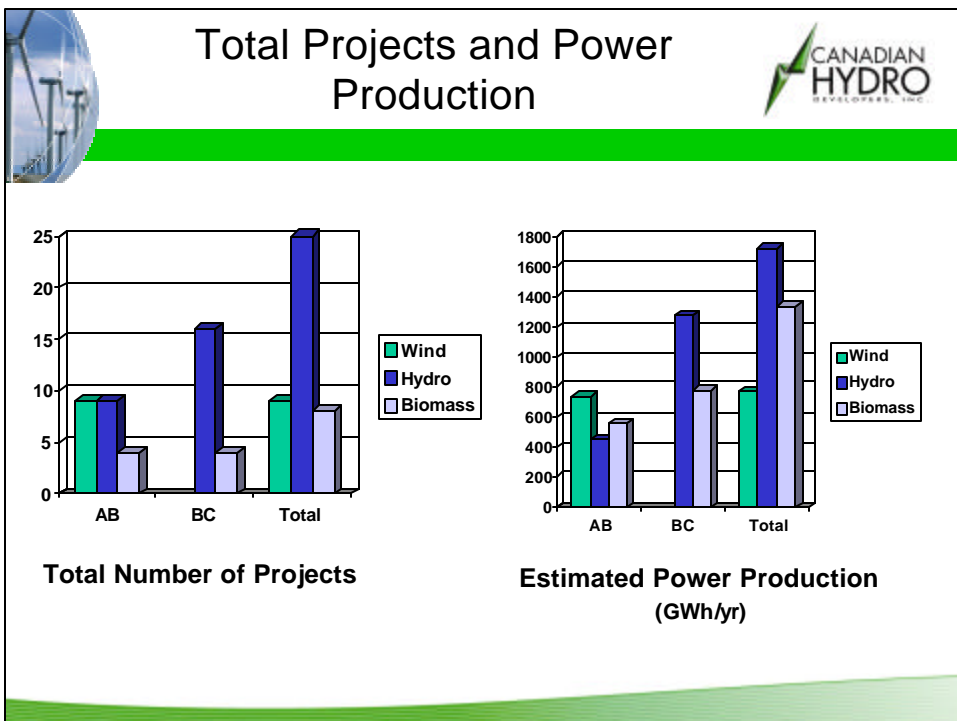
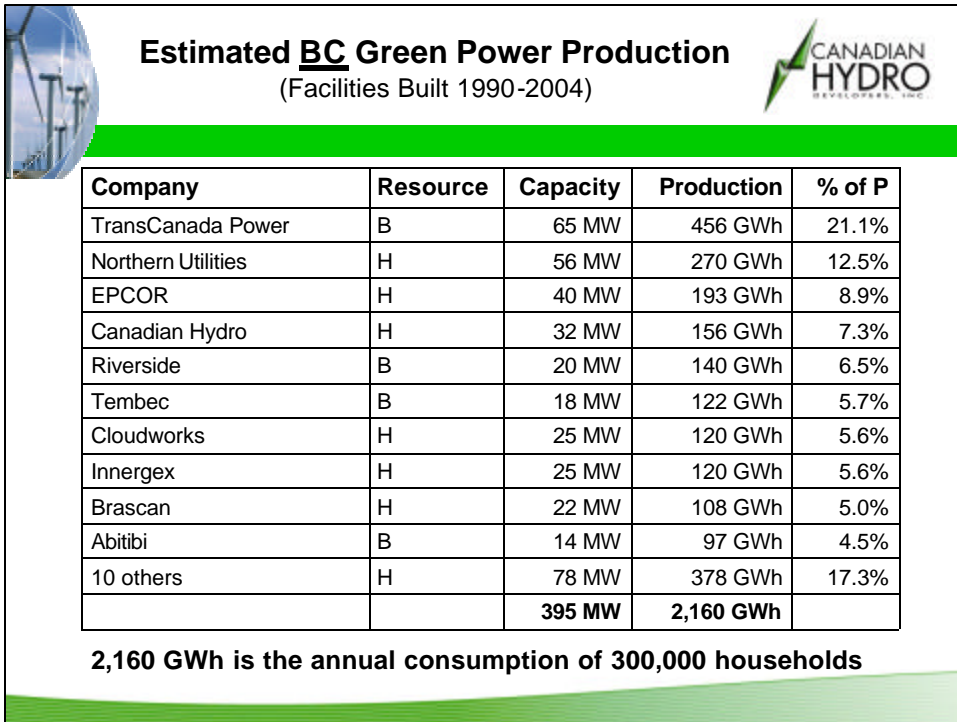


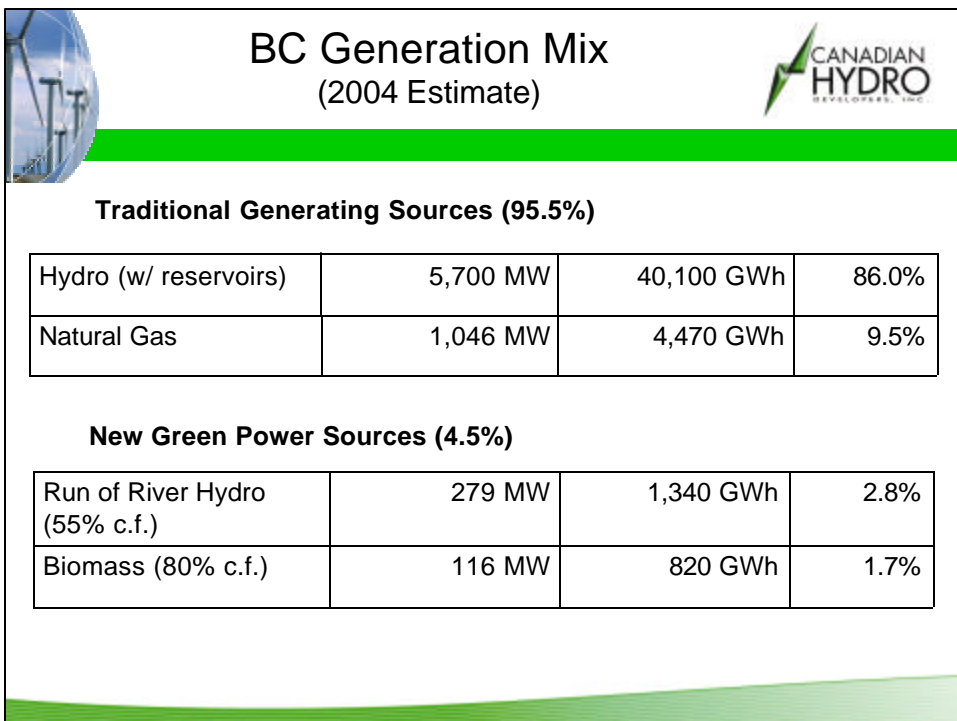
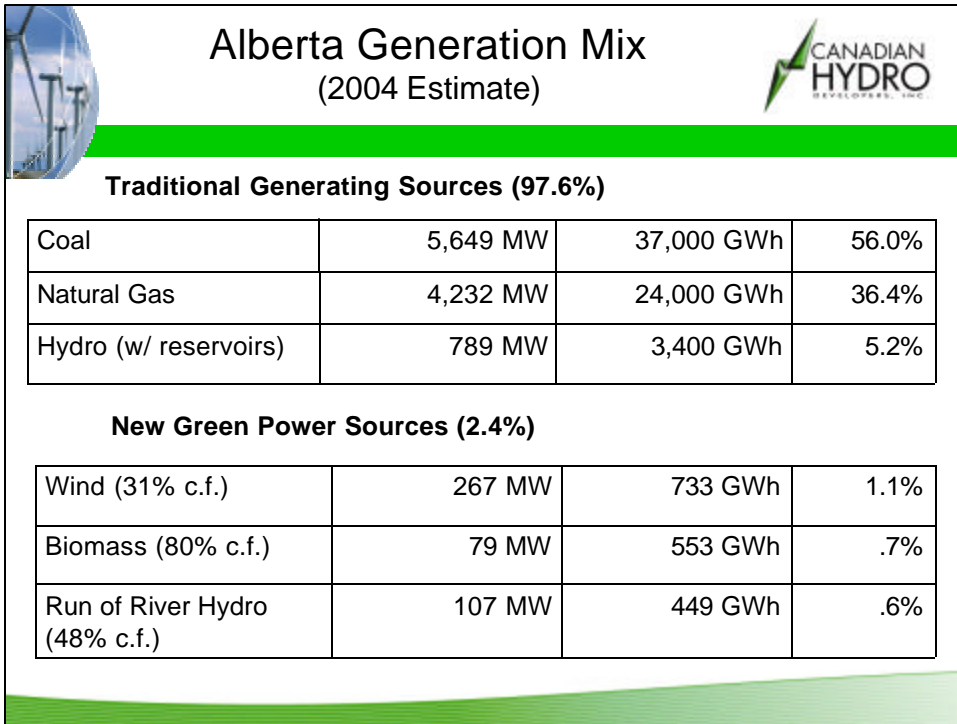
## Grande Prairie EcoPower<sup>®</sup> Centre




- Construction of \$56 million, 25MW facility in 2003/4
- Forestry wood waste from Canfor saw mills
- Heat and power are supplied to Canfor mill
- Provision for future district heating
- Over 80% reduction in particulate emissions from existing incinerators
- 17,000 tonnes/yr of carbon emissions natural gas consumption will be eliminated













## Renewable Energy Certificates




- Green credits are created from low-impact renewable energy facilities
- A Renewable Energy Certificate (REC) represents the “Green” in Green Power




## Renewable Energy Certificates




- RECs are accumulated, accounted for and transferred separately from electrical supply
- RECs are created when Green Power is supplied to the electrical grid
- The purchase of RECs creates demand for additional Green Power production
- RECs have been available in Europe & U.S. for several years
- They are also known as Green Tags




## Benefits of Buying RECs



- Align behavior with organizational values (walk the talk)
- Enhance public image
- Display leadership
- Promote civic responsibility
- Increase employee morale
- Gain competitive advantage - customers & investors are supportive of organizations with solid environmental objectives & performance
- Reduce environmental footprint



## Criteria for Selecting RECs



- Assess the quality of the RECs and the integrity of the producer
- Facilities should be EcoLogo<sup>M</sup> certified as low-impact renewable energy and built after 1990
- Buyer should receive legal and beneficial ownership of the environmental benefits
- Producer should be substantially free of carbon emissions and capable of educating staff and customers about green power





## Summary



- Green Power has many social, economic and environmental benefits
- The main sources in Alberta & BC are wind, run-of-river hydro and forestry biomass
- Production in Alberta and BC can supply the annual electrical needs of over 500,000 households
- RECs transfer ownership of green credits and encourage demand for additional Green Power production

## Clean, Simple & Sound®

**Canadian Hydro Developers, Inc.  
has adopted these three  
well chosen words, to represent  
a commitment to the environment  
and a vision for the future.**

**Three simple words.  
One powerful company.**

