



DISTRICT ENERGY SYSTEMS

Hamilton, November 26, 2007



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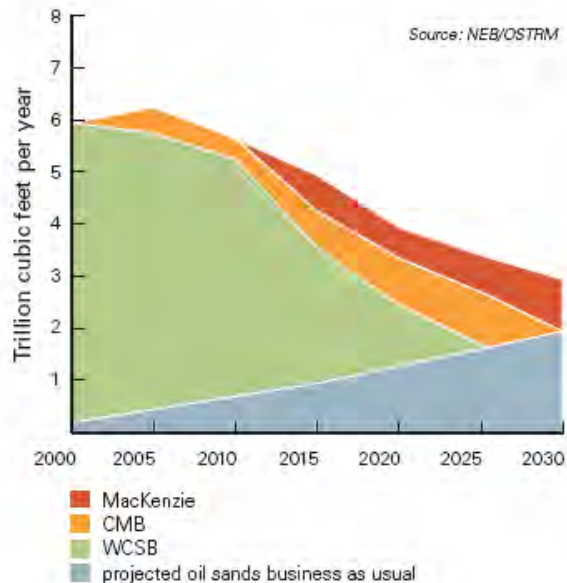


**Providing Flexibility
to
Adapt to the
Changing Energy
Environment**

CHANGING PRESSURES



FIGURE 2.3 NATURAL GAS DEMAND AND SUPPLY



- Natural Gas and Oil Depletion
- GHG Mitigation
- Local waste materials
- Desire for local flexibility
- Nurture the local economy
- Protect the local environment

http://www.acr-alberta.com/Projects/Oil_Sands_Technology_Roadmap/OSTR_report.pdf



TAKING CONTROL!!



LOTS OF LOCAL OPPORTUNITIES!

- DISTRICT ENERGY NETWORKS DELIVER HEAT BUT ARE INDIFFERENT AS TO SOURCE
- STEEL MILL BLAST FURNACE COOLING WATER
- COMBINED HEAT AND POWER PLANTS
 - EXPANDED HAMILTON DISTRICT ENERGY
 - CONNECTION TO INDUSTRIAL PLANTS
- LOCAL SOLID WASTE/INDUSTRIAL RESIDUES



Canada's Energy Flow – 2002 (Exajoules)



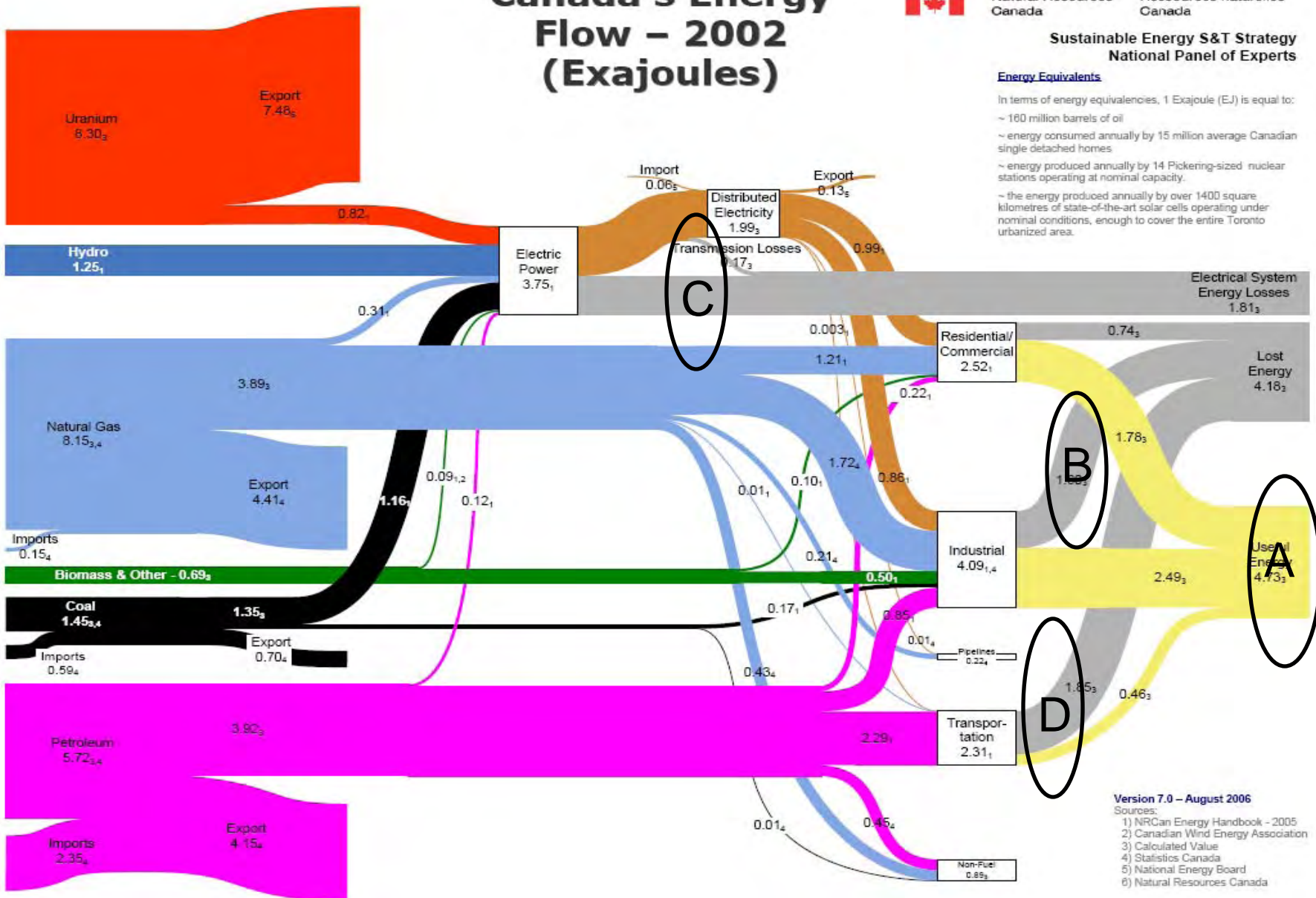
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Sustainable Energy S&T Strategy
National Panel of Experts

Energy Equivalents

In terms of energy equivalencies, 1 Exajoule (EJ) is equal to:
 ~ 160 million barrels of oil
 ~ energy consumed annually by 15 million average Canadian single detached homes
 ~ energy produced annually by 14 Pickering-sized nuclear stations operating at nominal capacity.
 ~ the energy produced annually by over 1400 square kilometres of state-of-the-art solar cells operating under nominal conditions, enough to cover the entire Toronto urbanized area.



Version 7.0 – August 2006

- Sources:
- 1) NRCan Energy Handbook - 2005
 - 2) Canadian Wind Energy Association
 - 3) Calculated Value
 - 4) Statistics Canada
 - 5) National Energy Board
 - 6) Natural Resources Canada



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SYSTEM EFFICIENCIES



- DISTRICT ENERGY IS NOT A SUPPLY TECHNOLOGY BUT A SYSTEM EFFICIENCY TECHNOLOGY
- FLEXIBLE – SOURCES MAY CHANGE OVER TIME WITH COST AND AVAILABILITY
- DISPLACED FOSSIL FUEL MEANS REDIRECTION OF \$ FROM FUEL TO CAPITAL WORKS AND JOBS AND STABLE LONG TERM ENERGY PRICES

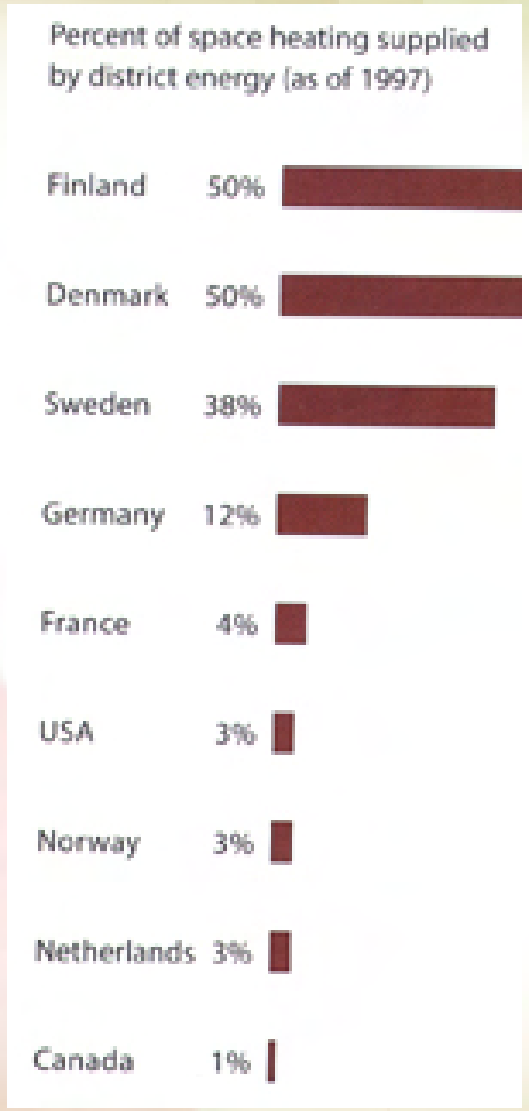




POSSIBLE AT MANY SCALES AND APPLICATIONS



COUNTRIES USING DISTRICT ENERGY?



**HELSINKI,
COPENHAGEN AND
STOCKHOLM
SUPPLY OVER 99%
OF SPACE HEATING
NEEDS THROUGH
DISTRICT ENERGY**



DISTRICT ENERGY ON THE MOVE



RECENT SYSTEMS

- CHARLOTTETOWN
- CORNWALL
- WINDSOR
- SUDBURY
- HAMILTON
- MARKHAM
- REVELSTOKE
- WATSON LAKE
- PANGNIRTUNG

MANY OTHERS UNDER CONSIDERATION

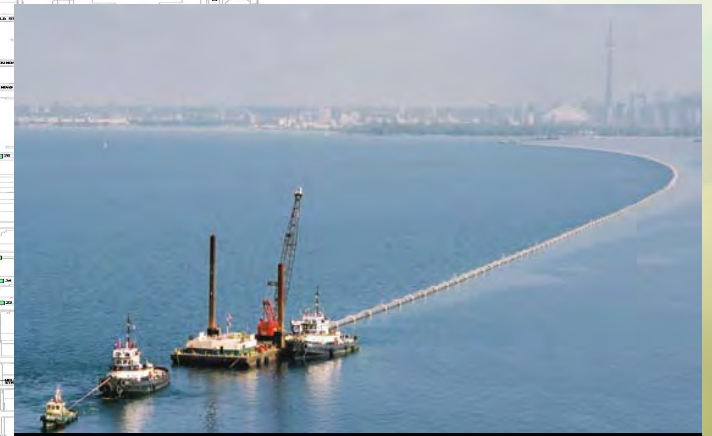
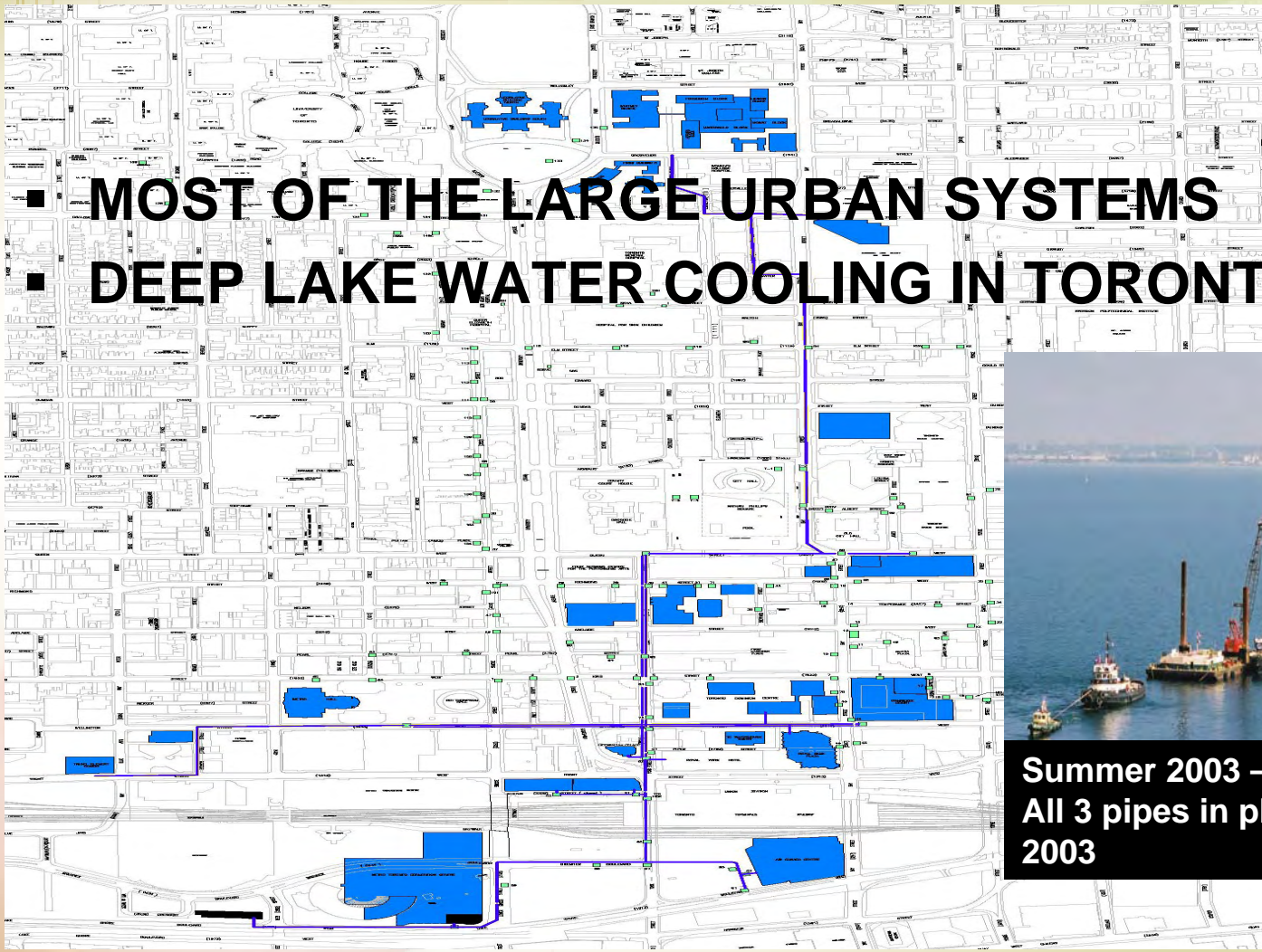
- GRANDE PRAIRIE
- DIESEL BASED COMMUNITIES
- PRINCE GEORGE
- BURNABY
- HALIFAX



COOLING TOO!



- MOST OF THE LARGE URBAN SYSTEMS
- DEEP LAKE WATER COOLING IN TORONTO



Summer 2003 –Deployment
All 3 pipes in place by end of August
2003



CLOSING



THERE IS A HISTORY IN HAMILTON

- 4TH YEAR STUDENT PROJECT RESULTED IN A SYSTEM TIED TO SWARU
- MID-NINETIES DISCUSSION WITH STEEL INDUSTRIES AND THE CITY
 - FIRST CONSIDERED STEEL INDUSTRY
 - MOVED AHEAD WITH CHP PLANT
- BUT POTENTIAL IS THERE TO DO MUCH MORE AND THE CIRCUMSTANCES ARE RIGHT



THANK YOU



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