

Optimistic Futures: a Work in Progress

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Thank You

This opportunity to present some of my ideas about Optimistic Futures is greatly appreciated.

Questions?

The legacy we leave for our children

If you plan to face tomorrow do it soon

Gordon Lightfoot - Race Among the
Ruins

Push the envelop - NEB Workshop May 18
2006

My Background

- Pincher Creek
- Farmer and cowboy (Chuck wagons 1992)
- Chemistry (U of C and U of A)
- Theology - one year Cambridge Mass
- Ph D Chemistry Illinois 1970
- DOE, Science Council, U of C 1973
- Board of Nova's R & D Subsidiary
- Consulting, Research and Teaching (LA)
- Tools for Environmental Management

Optimistic Futures - Definition

(see Abstract)

- Plural - descriptive not prescriptive
- Sets of strategies, policies, actions, and EMS (Feedback Systems)
- Application of existing and emerging knowledge
- Interdisciplinary - translation and synthesis
- Realistic and pragmatic

Radical or Bold?

Those focused on aspects of fossil fuels may find the following radical and impractical, it is neither.

NRTEE - Long Term Strategy on Energy and Climate Change, June 20 2006

Within NEB Mandate

- Promote safety and security
 - Environmental protection
 - Economic efficiency - competitive advantages
 - Canadian public interest
 - All aspects of energy supply
-
- NEB Emerging Technologies in Electricity Generation - March 2006

NEB Mandate

- Formed in 1959
- COGLA added in 1992
- Security added post 9/11

- Should be updated

The NEB's Mandate in the 21st Century

- Interdisciplinary problem solving
- Links to other government departments and agencies
- Stronger emphasis on opportunities for renewables and demand management
- Strong, growing interest in public and industry

Three Sets of Problems

- Very rapid growth in some sectors (forestry, agriculture, building standards)
 - Still face significant barriers which must be removed
 - Potential contribution underestimated
- Implementation Gap
 - Not utilizing available strategies, policies and technologies
 - Identify and remove barriers
- Communications failure - reports don't do it

Optimistic Futures and Technologies

- Careful, objective assessments of technologies by experts is essential (not me)
- Careful adaptation to winter conditions
- Optimistic Futures is about strategies and policies, or lack there of
- The Implementation Gap - why aren't we taking advantage of what we already know?

Interdisciplinary, Integrated

- Develop solutions using
 - Systems thinking
 - Integrated resource management
 - Triple bottom line - corporate social responsibility
 - Industrial ecology
 - Root cause analysis
 - Environmental Management Systems

Complement Fossil Fuels

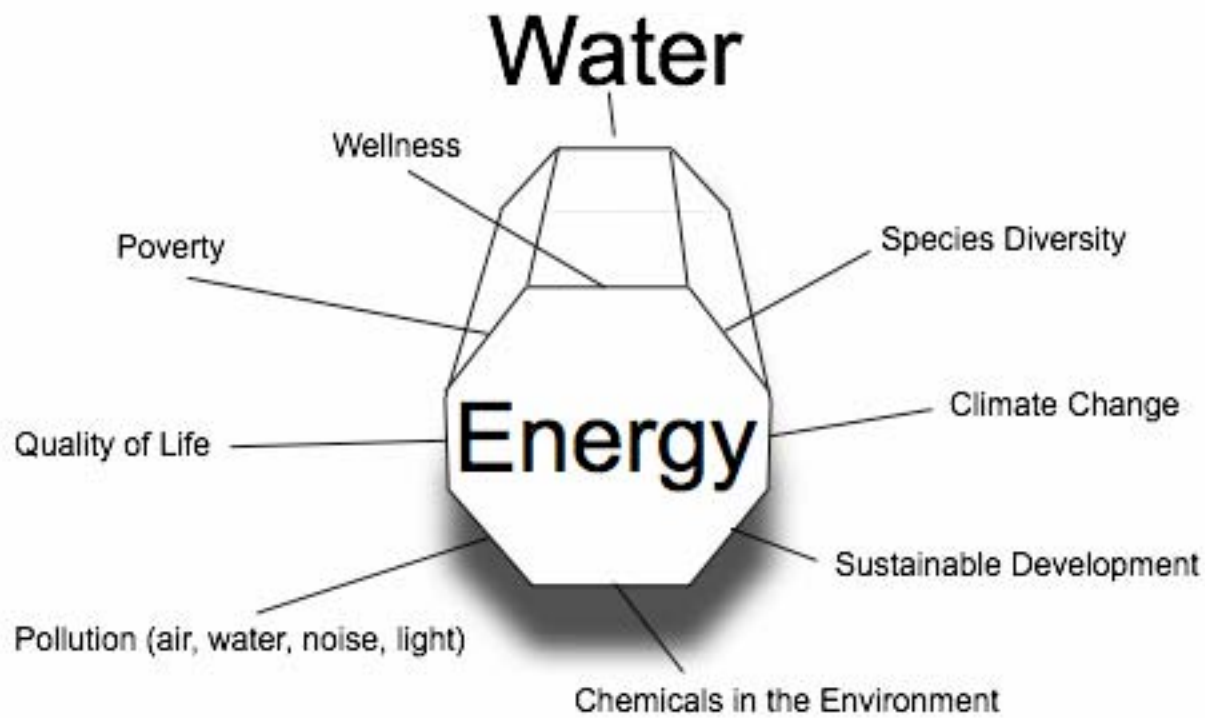
- Agree with Mark Jaccard - some quibbles, some serious errors, too conservative
- Provide a smooth transition to a future less dependent upon fossil fuels
- ISEEE - self fulfilling prophecy
- Bold, not radical - modest changes to social, economic, and political systems

Outline: Interdisciplinary Overview

- Attempt to provide aspects of a work in progress -
Optimistic Futures
- Introduction
- What is the basic problem set? - Root Cause
Analysis
- Examples of the Opportunities
- Where do we go from here?

Interdisciplinary Approach

- Cannot solve problems of sustainable development using academic, mono-disciplinary research
- Interdisciplinary translation and synthesis
 - Universities and journals don't like it
 - Funding very difficult
 - Harder than narrowly focused research



Energy Futures from an interdisciplinary perspective: solutions to problems are different and better from an interdisciplinary perspective than when viewed in isolation.

Different Solutions

- Solutions developed using integrated, interdisciplinary approach are different and better than solutions developed in isolation, in silos

Comparisons of Options

- Life Cycle Assessment and Costing -
boundary conditions
 - Natural gas and CBM
- Marginal costs, not average
- Externalities

(wider set outlined in Matrix below)

Problem Sets

- Research mindset - solve problems - more R & D
 - bridge the implementation gap
- Silos in governments and universities
- Blinkers imposed by education and bureaucracy
- Control of advice to politicians and cabinets
- Failed communications strategies - technical reports
- Compartmentalization - career versus parent

- Too much focus on data

“Imagination is more important than knowledge” - Albert Einstein

- Lack of leadership

“The bland leading the bland” - John Kenneth Galbraith

9 Second Sound Bite

- Ethanol!
- CBM
- Renewables
- Hydrogen
- Nuclear power

Voluntary Measures

- Too much reliance on voluntary measures by corporations and individuals (one tonne challenge)
- Let the Market determine our future

Stop the drift - Alberta on purpose - Jim Dinning

Navigating the New World - Lloyd Axworthy

Interdisciplinary

- Languages
- Teamwork
- Interdisciplinary skills (golf + hockey + soccer + ping pong)
- Linkages between problem sets and solutions - health care costs and air pollution, chemicals in the environment

Communications

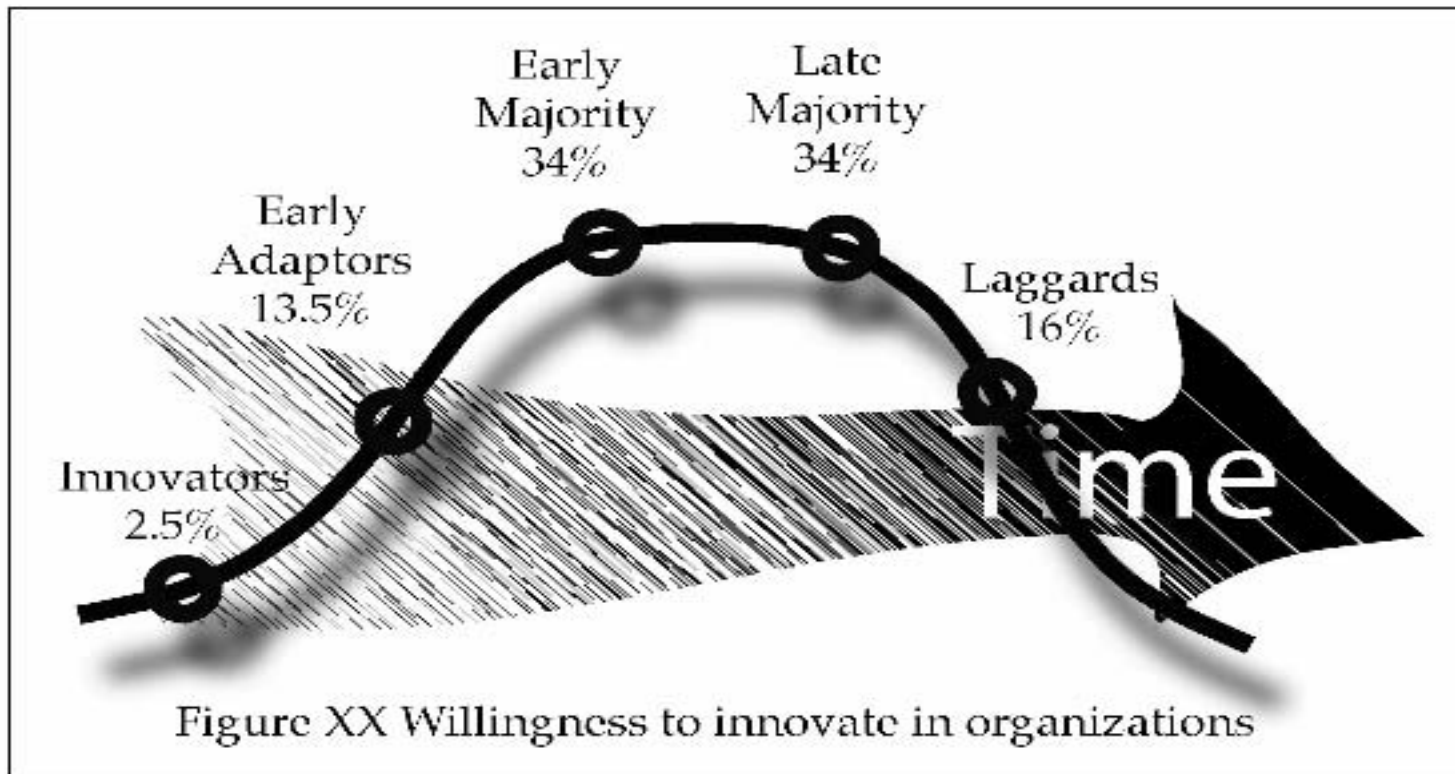
- Very large part of NEB's mandate
- Communications have become more difficult (competing messages), more complex, more controversial

Ashbey's Law of Requisite Variety

- Cybernetics >60 years ago
- The variety (complexity) of the management system must match the variety (complexity) of the systems being managed or necessarily, something important will be left out.
- Can't simplify things by putting problems in separate boxes

Rogers Innovation Curve

- Attitudes to change and applying new technologies and ideas
- Focus on
 - Innovators
 - Early adaptors
 - Early majority
- Forget about
 - Late majority
 - Laggards



Corporate Culture

- CSR/TBL genuine efforts to be good corporate citizen
- SBL - corporate profits in the ext 1/4 only thing that matters

Disconnect Between Strategy and Operations

Operations

Sharp focus on applying yesterday's solutions to yesterday's problems

Corporate Strategy

Today's Opportunities

Canadian Determination and Success with Technology

- Avro Arrows - fighter (CF105) & passenger jet
- Candu - needs some work
- Hybernia
- Heavy oil and oil sands
- Canadarm
- Allouette Satellite
- WWII air force and navy

Canadian Determination and Success with Policy Innovation

- CBC
- Canadian Content 1971- export surplus
- Canadian Health Care System
- Language Policy
- Peace Keeping
- CICA - 1992 - account for environmental liabilities

We Know What the Long Term Problem Is

- Ronald Wright - A Short History of Progress and A Scientific Romance
- Jared Diamond - Collapse
- Tim Flannery - The Weather Makers
- Jane Jacobs - Dark Day Ahead
- Margaret Atwood - Handmaid's Tale
- Oryx and Crake

I have seen the future, brother:

It is murder.

Leonard Cohen - The Future

Information on Technologies

- Lots of data available - probably too much
 - NEB Reports
 - Mark Jaccard - Sustainable Fossil Fuels
 - Boyle, Everett and Ramage - Energy Systems and Sustainability
- Communications strategies - briefing notes and reports
- Are comparisons objective? Level playing field?
 - Comparison of Marginal costs?
 - Life Cycle Assessment - boundary conditions

Matrix: Assessment of Options - Axis A

- Con Coal
- Clean Coal
- Con oil
- Hvy oil and oil sands
- Con Nat Gas
- CBM
- Nuclear
- Hydro - large
- Hydro - small
- Biomass - waste
 - Energy (electricity, heat)
 - Compost and P and N.
- Biomass monoculture
- Solar - heat
- Solar PV (cell & membrane)
- Wind
- Geothermal
- Tidal
- Demand management

Matrix: Assessment of Options

Axis B

- Water
- Wellness
- Chemicals in the environment
- Greenhouse Gases
- Pollution (air water, noise, light)
- Habitat protection
- Species Diversity
- Economic Impacts
- Social impacts
- Public support or objections
- Local/regional versus centralized
- Security of supply
- Decommissioning or recommissioning
- Quality of Life measurements

Rankings for Matrix Assessment

5 - good

4

3

2

1

0

Matrix: Enabling or Constraining Factors - Level Playing Field

- Mono disciplinary versus Interdisciplinary
- Appropriate programs at universities
- Subsidies/funding/financing
- Institutional support - funding and strength of industry associations
- Government Support - funding and strength of government programs

Other Important Factors for Assessment

- Reliability - solar and wind are variable
- Regional versus centralized
- Total available

Natural Gas - a very dirty fuel

- Natural gas is relatively clean at burner tip
- Boundary conditions for LCA difficult but from exploration to burner tip it's very dirty.
- Rehabilitation costs significant
- Growing opposition from farmers and ranchers

Demand Management Opportunities

- Buildings
- Appliances
- Transportation
- Integrated Energy and Water Audits
- LED (White Light Emitting Diodes) - solid state lighting

Demand Management

“Energy efficiency is regarded as ‘a least cost option.’” NEB, Emerging Technologies in Electricity Generation, March 2006.

Demand Management

- Leading edge work by Athena Institute, LEED (Leadership in Energy and Environmental Design), Green Globes, Built Green Canada - Canadian Expertise Wayne Trusty, Jim Dangerfield, David Bengert.
- Energy and water for appliances - phase out least efficient
- LCA Use and education.
- EMS and other tools - improved utilization in business and governments
- Strategy and Policy on high quality, certified energy and water audits for residences and SMEs and trades

Energy From Biomass

- Japan's Strategy - Organic waste a resource opportunity, not a disposal cost
- Work by BIOCAP, Forintek, AIC (Agricultural Institute of Canada), Alberta Agriculture - must place more emphasis on strategies and policies and removal of barriers

LED Lighting

- Very rapid growth
- High efficiency - no heat
- Long life - replacement costs for traffic, parking and street lights - industrial sites
- Low waste disposal
- Durability

Solid Waste

- Takeback legislation - packaging and products returned to manufacturers
- Waste minimization and recycling (imbedded energy)
- Composting
- Incinerations for cogen, IGCC adapted?
 - Practice in Europe, opposition in Canada

Energy and Buildings

- LEED, Green Globe, Built Green
- R 2000 and C 2000
- Provincial and Municipal Policies
 - Alberta - provincially funded buildings LEED Silver
 - 14 municipalities require LEED
- Green Mortgages (CMHC) and Green Taxes
- Certified energy and water audits and retrofits
- Imbedded energy - wood versus steel, concrete
- Smart Pricing (time of use) and smart buildings
- District heating

Communities

- Municipal governments doing well
- Design for Winter and Seasonal Transitions
- Commuting
- Planning and density
- The Natural Step

Water

- Chemicals and energy for water and waste water treatment
- Pumping
- Hot water
- Expansion of treatment and pipes - imbedded energy
- Greenhouse waste treatment option
- Ozone disinfection

Transportation

- LRT and Sky Train - leadership and riders
- Car pools and car coops
- Vehicle inspections (efficiency; health and safety; air, water, noise pollution)
- Canadian hybrid Cars, trucks, busses
- High speed trains
- Community design
- Muscle power commuting

Focus on Strategies and Systems

- Technologies and techniques the focus of reports and discussions
- Focus should be on strategies, systems, principles that facilitate demand management and renewables: EMS, CSR/TBL, IRM, building standards, TNS.

A Practical Introduction and Guide

ANALYSIS OF BARRIERS • EDUCATION AND TRAINING
ENVIRONMENTAL REPORTING • ENVIRONMENTAL
AUDITS • ENVIRONMENTAL INDICATORS • EIA
ECONOMICS • ENVIRONMENTAL SITE ASSESSMENT
LIFE CYCLE ASSESSMENT • THE NATURAL STEP
PURCHASING GUIDELINES • RISK MANAGEMENT

TOOLS FOR ENVIRONMENTAL MANAGEMENT

Dixon Thompson



Where do We Go from Here?

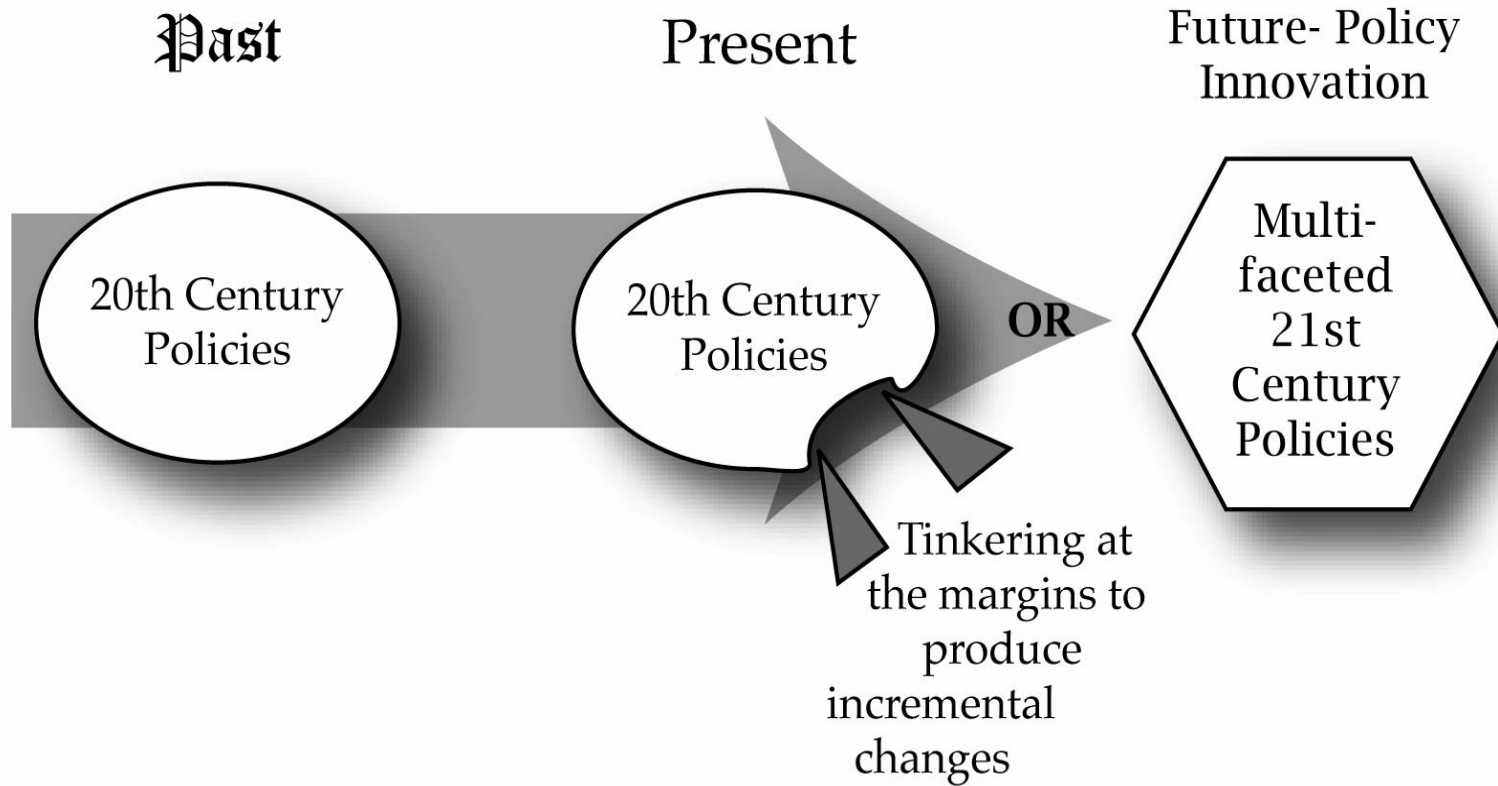
- Emphasis on strategies and policies and systems that lead technologies and bridge implementation gaps
 - CSR/TBL,
 - Environmental Management Systems
 - Integrated Resource Management

You can't always get what you want
but you just might get what you need - Rolling
Stones

Recommendations

- Sustainable Development - Strategies, policies, actions, operations
- EMS and tools (LCA, EIA, Purchasing Guidelines) for Governments and private sector - systematic continual improvement
- Matrix for LCA Comparisons
- Improved Environmental Accounting - making the business case

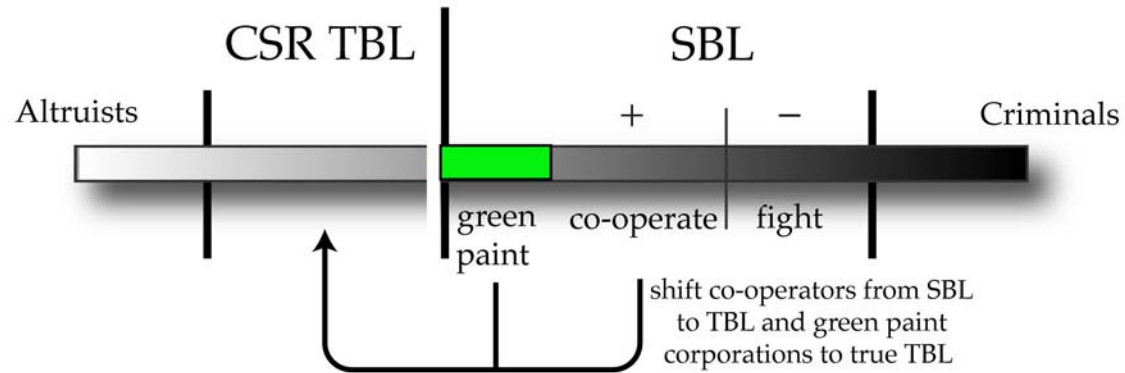
Trying to get from here to there: Incremental change to existing policies or policy innovation?



Recommendations

- Update NEB mandate
- Optimistic NEB Scenario
- Audiences - communications
- Interdisciplinary education and problem solving
- Independent government departments
- Umbrella organization for renewables
- Umbrella organization for demand management

Attitudes to CSR and TBL



Attitudes to Corporate Social Responsibility (CSR), Triple Bottom Line (TBL) and Single Bottom Line (SBL)

Interdisciplinary Approach to Energy

- Positive and negative links to other sectors
- Overlapping interests and mandates (water, agriculture, forestry, building industry, transportation.....)
- Interdisciplinary skills and knowledge
- Information meetings and collaboration
- Formal horizontal structure (Llyod Axworthy - Navigating the New World)

NEBs Reports on Electricity

- Narrow focus
- Different conclusions obtained with broader perspective
 - heat and other by-products
 - better list of and attempts to quantify benefits

Measuring Progress: Quality of Life

How we measure progress or quality of life will facilitate or hinder Optimistic Futures

- Productivity - measuring economic growth alone favours fossil fuels and short term thinking
- UN Human Development Index or Genuine Progress Indicator - favour demand management and renewables and longer term thinking

Underestimating Benefits

- Long list of probable benefits
- Narrow a focus eliminates some benefits
- Direct and indirect subsidies lead to underestimation
- Vested interests in fossil fuels don't want level playing field in estimating benefits
- LCA and reasonable boundary conditions required

Benefits of Optimistic Energy Future

- Transition to more sustainable future
- Cost effectiveness and efficiency
- Productivity and competitive advantage
- Every unit not consumed is available for export or the future
- Security of supply
- Local/regional not centralized

- Safety
- Health and wellness
- Low or positive environmental impacts
- Low or positive social impacts
- No abandonment costs - recommissioning not decommissioning
- Create employment where it's needed
- Job satisfaction

- Made in Canada option
- Model for developing countries
- Contribute to corporate CSR and SD commitments
- Contribute to governments' SD commitments

Ronald Wright: A Short History of Progress

- A surprise best seller - being translated
- Speaking tour - needs answers to audiences questions about what can be done.
- Public is tired of gloom and doom
- Public and politicians want solutions
- Planning to collaborate

Communications

- NEB reports are written for audiences already informed about energy issues
- Different audiences need different messages and languages
- Translation and synthesis
- Briefing notes for non-experts
- Compelling narrative - not pages of numbers

Thank you for the opportunity to present my
thoughts on Optimistic Futures

I would appreciate feedback and will try to
answer questions

You may think that I'm an dreamer
But I'm not the only one

John Lennon

Latest Developments

- Compelling Narrative - required for change, not reports - Lloyd Axworthy
- Al Gore - An Inconvenient Truth
- Ronald Wright - A Short History of Progress

Wave Energy

- New system in Portugal
- Potential for 20% of Britain's energy
- USA 10 - 25 times more energy than wind on the Great Plains

Economist June 10 2006 p 11

Plugin Hybrid

- Prius in Europe have all-electric switch - not in Canada
- Efficiency because short trips give low efficiency
- Plugin in USA 100 miles/US gal
- Toyota changed position from anti to pro
Economist June 10 2006 p30