

Practical Foundations for Energy Policy

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Nuclear Power in Society – Finding the Balance

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Energy, Electricity and Society

- energy is core to way of life in modern societies
- industrial revolution was all about harnessing energy resources to replace human and animal muscle power
 - increased economic surpluses widely available
 - enabled social progress in education and the arts
- use of energy resources underlies not just our day-to-day lives but the framework of broad participation that is the essence of the modern democratic society that we all enjoy
- electricity intermediates between many different energy resources and many different energy end uses
 - electricity is an energy currency
 - man-made exchange medium
- involved in virtually everything we do or don't do every moment of every day of our lives

Context for Electricity Policy

- policies on electricity will have effects which are far reaching and fundamental
 - should be made with great care
- arm's length central bank ensures sustainability in monetary policy
 - ensures long-run rationality in presence of short-term public pressures
- electricity policy moving in the opposite direction
 - governments and civil society increasingly involved in ever greater levels of detail
- consequences cannot be good because of the dislocations that are inevitable when what is popular clashes with what is necessary
 - rationality essential for a sustainable long term is sacrificed to the immediacy of public passion

Economic Rationality

- choosing generation technologies requires economic rationale rather than picking winners and losers as a policy choice
 - impacts of choice are widespread and fundamental
 - only by layering in the various generation technologies in a logical and dispassionate way can we build up an electricity supply that will sustainably meet society's needs
- for existing system, each investment decision has been made on the basis of meeting customers' requirements while minimizing the life-cycle costs
- non-economic objectives incorporated by either:
 - monetize them e.g. pricing carbon to reduce carbon footprint, or
 - regulating them e.g. prescribing emission or land use limits
- policies which explicitly choose technologies result in higher costs than necessary
 - choice did not benefit from rational economic decision-making
 - cost premium rises with level of detail prescribed due to the reduced impact of economics
- example - introducing renewable energy into the electricity mix
 - lowest cost – price or regulate carbon use
 - higher cost – establish quota for renewable and non-renewable
 - highest cost – define quota for each technology

Nuclear Power Policy

- Canada has a unique and unusually complex set of policy decisions to make with respect to nuclear power
 - technology is owned by federal government
 - potential plant owners are dominantly owned by provincial governments
 - electricity supply policy is a provincial matter
- significant industrial and economic policy implications at both federal and provincial levels
- discuss two aspects:
 - CANDU technology and its implications
 - corporate structure of AECL and its implications

Essence of CANDU

- only commercially viable nuclear power technology that does not rely on enriched uranium as fuel
- advantages in the global nuclear power market
 - Canada the supplier of choice for countries not wanting to align themselves with one of the major nuclear powers who alone can supply enriched fuel
 - positions Canada as a valuable part of the waste management process since CANDU reactors can use the spent fuel from the other types of reactors
 - puts Canada in a favoured position for moving beyond uranium to thorium as a fuel
 - thorium is more plentiful and more evenly distributed throughout the world than uranium

Implications of Technology Policy

- geopolitical objectives fit closely with Canadians' view of their nation as a contributor to keeping the peace and advancing the wellbeing of the global community
 - reducing international tensions by removing trading and political constraints
 - unenriched uranium and thorium
 - reducing environmental concerns by reusing otherwise waste fuel
- economic impacts
 - \$6.6 billion/year including \$1.5 billion in taxes paid and \$1.2 billion in exports
 - 150 companies employing 30,000 people
- policy similarities to Avro Arrow program of 1950s
 - long run economic opportunities versus immediate costs

Corporate Structure of AECL

- a commercial corporation with non-commercial responsibilities financed like a government department
 - power reactor business is commercial and makes money
 - isotopes and laboratory are public-good activities and require subsidy
 - government funds difference and provides financing
- government has announced plans to disentangle AECL from government and reorganize
 - power reactor business to be privatized
 - balance to be run as a public amenity by a contracted manager
- will put CANDU technology on a business footing
 - commercially motivated capital
 - diplomatic and trade support from government internationally
- Catch 22
 - value of AECL depends on order book which depends on provincial decisions
 - provincial decisions depend on cost-effective risk sharing with AECL
 - economic opportunity for Canada not registering due to difficult politics
 - nuclear is nobody's favourite but is the focus of negative campaigns for some

Breaking the Logjam

- political decisions will be expedited if the public context allows
- nuclear industry disadvantaged in public debate due to vested interest
- anti-nuclear campaigners have less to lose and can use fear rather than facts if advantageous
 - this asymmetry challenges most stakeholder interactions between businesses and the general public but is particularly acute in the case of nuclear power
- 1. main concerns are invisible and complex so are easy subjects for fear campaigns
 - safety, waste management, cost
- 2. industry has an image of being remote and not relevant to electricity customers
 - true for electricity industry at large but particularly acute for nuclear
 - perverse result of the regulatory processes that have been put in place to ensure public safety and accountability
- public still largely in the dark as to why Ontario Hydro laid up a large part of its nuclear fleet
 - easily portrayed as either safety problems or mismanagement
- limited understanding of budget and schedule issues with Darlington – Canada's most recent nuclear project
- facts are sprinkled among the fictions but apparently not sufficiently to allow governments to make important public policy decisions

Today's Conference

- objective: enhance the public understanding of nuclear energy such that there is a rational political environment in which governments can make important policy decisions
- explore a number of areas objectively and through the lens of public interest which is:
 - nuclear power is a necessary evil – something that we would rather do without but recognize as a necessity to sustain our way of life and our economies
- 1. safety
 - health science of radiation and the corresponding regulatory and management provisions that govern the design and operation of nuclear facilities
- 2. waste management
 - status, progress and plans for waste management – Canada and US
- 3. cost
 - Darlington and best practices for managing the construction and financing of such major projects
- 4. broad context for nuclear policy
 - future prospects, economic ramifications, geopolitical balances and political realities

We will be documenting the highlights of today's discussions and our intent is to make that widely available to policy makers and other interested parties anticipating that this may be a worthwhile contribution to ensure that we as Canadians adopt policies toward nuclear power that are based on reason rather than passion and public interest rather than self interest.