



New Nuclear in North America: A Canadian Perspective

**K. R. Hedges for R. Van Adel
Pacific Basin Nuclear Conference
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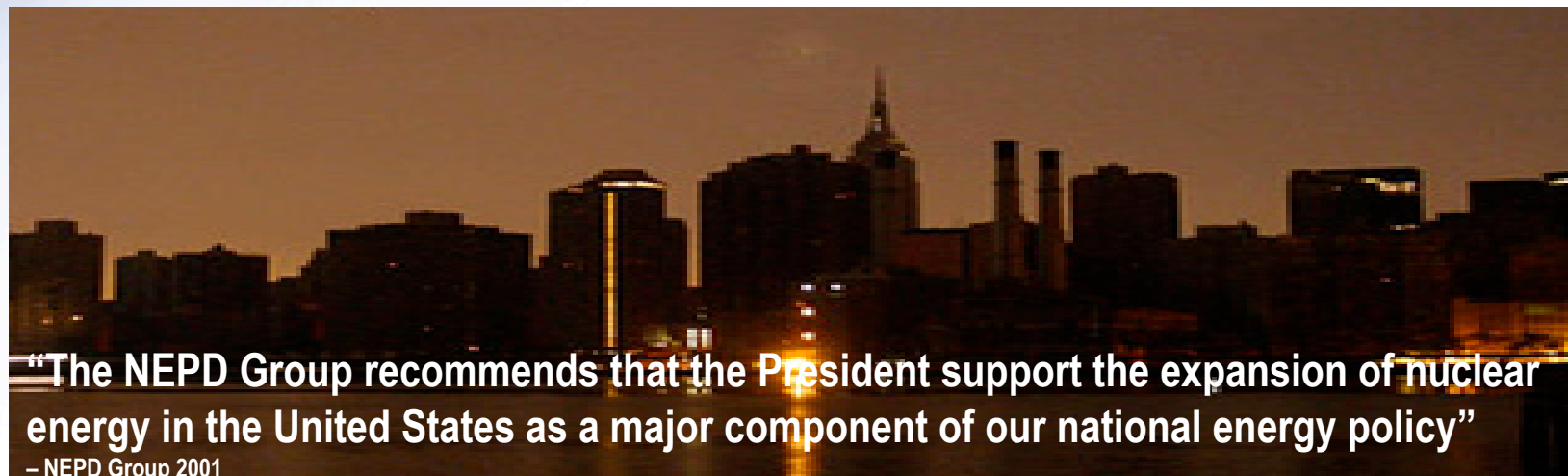
Canada 



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North America Needs New Nuclear...



“The NEPD Group recommends that the President support the expansion of nuclear energy in the United States as a major component of our national energy policy”

– NEPD Group 2001

New York City



“Nuclear generation is an integral part of a responsible, progressive plan to generate electricity in the 21st century.” – Ontario Premier McGuinty, 2003

Toronto



...But Challenges Exist

- **Economic requirements are strenuous**
 - forces innovation
- **Innovations must be seen as “reasonable”**
 - i.e. low technology risk
- **Deregulation drives the need for “new” commercial models**
- **Experienced Vendor partnerships with successful track record**
- **Public will need to fully embrace the need for new nuclear**

Meeting these requirements may not be enough



Things are Happening

- **In the US**
 - DOE cost sharing solicitation issued “for projects that enable a new nuclear power plant to be ordered and licensed for deployment in the United States within the decade” – Nov 2003
 - Incentives passed in House draft energy legislation – Nov 2003
- **In Canada**
 - Ontario Electricity Conservation and Supply Task Force declares, “new base-load nuclear...(is) likely to be part of a competitive energy supply for Ontario” – Jan 2004
 - Bruce Power announces intent to study feasibility for building “one or more” ACR-700 reactors – Jan 2004

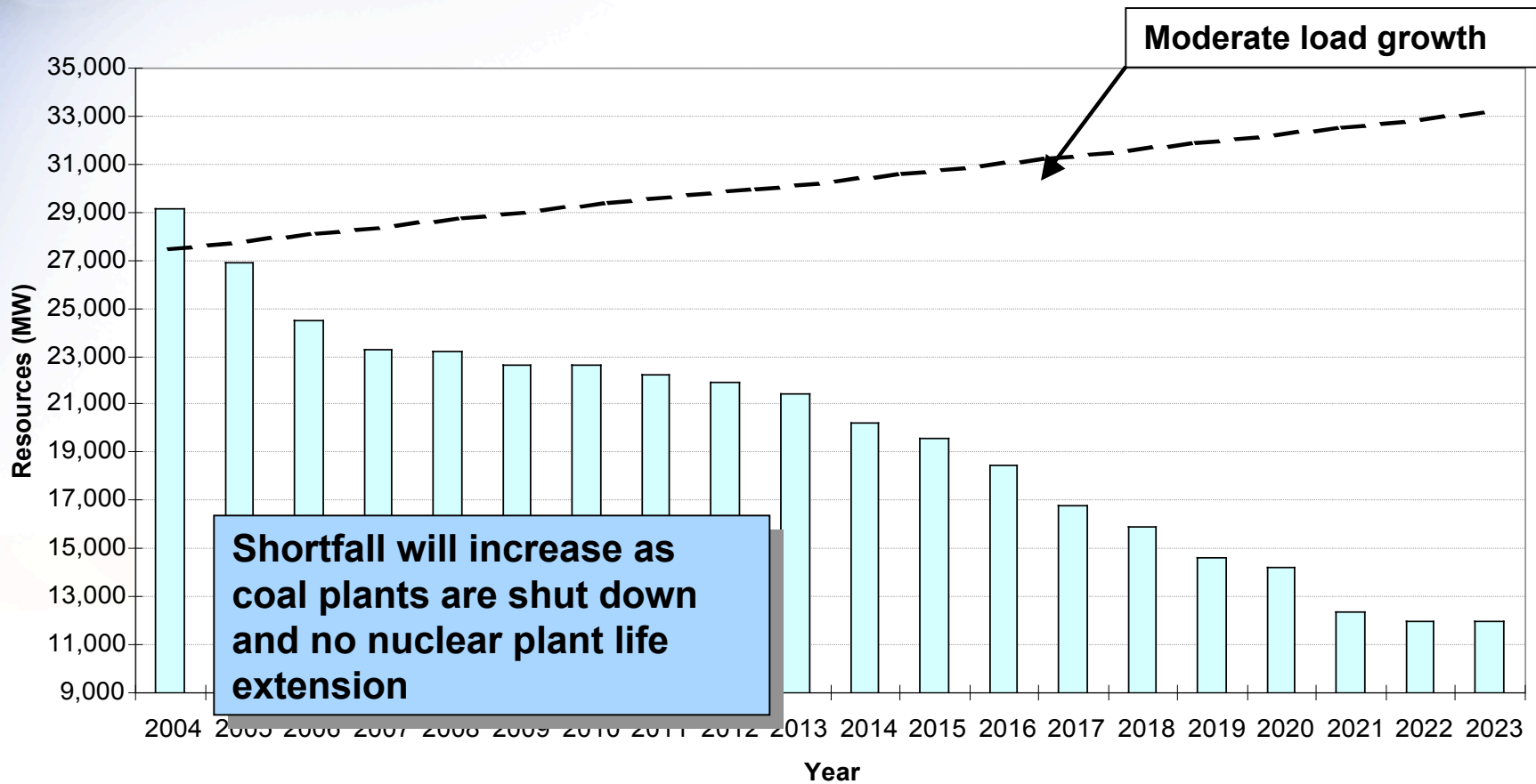


The Canadian Context

- **In Canada, the need for new generation is well understood**
 - **Significant supply shortfall forecasted**
 - **Province of Ontario is shutting down coal generation facilities**
 - **Existing nuclear assets reaching end of planned life**
 - **Economic growth**
 - **Blackout**

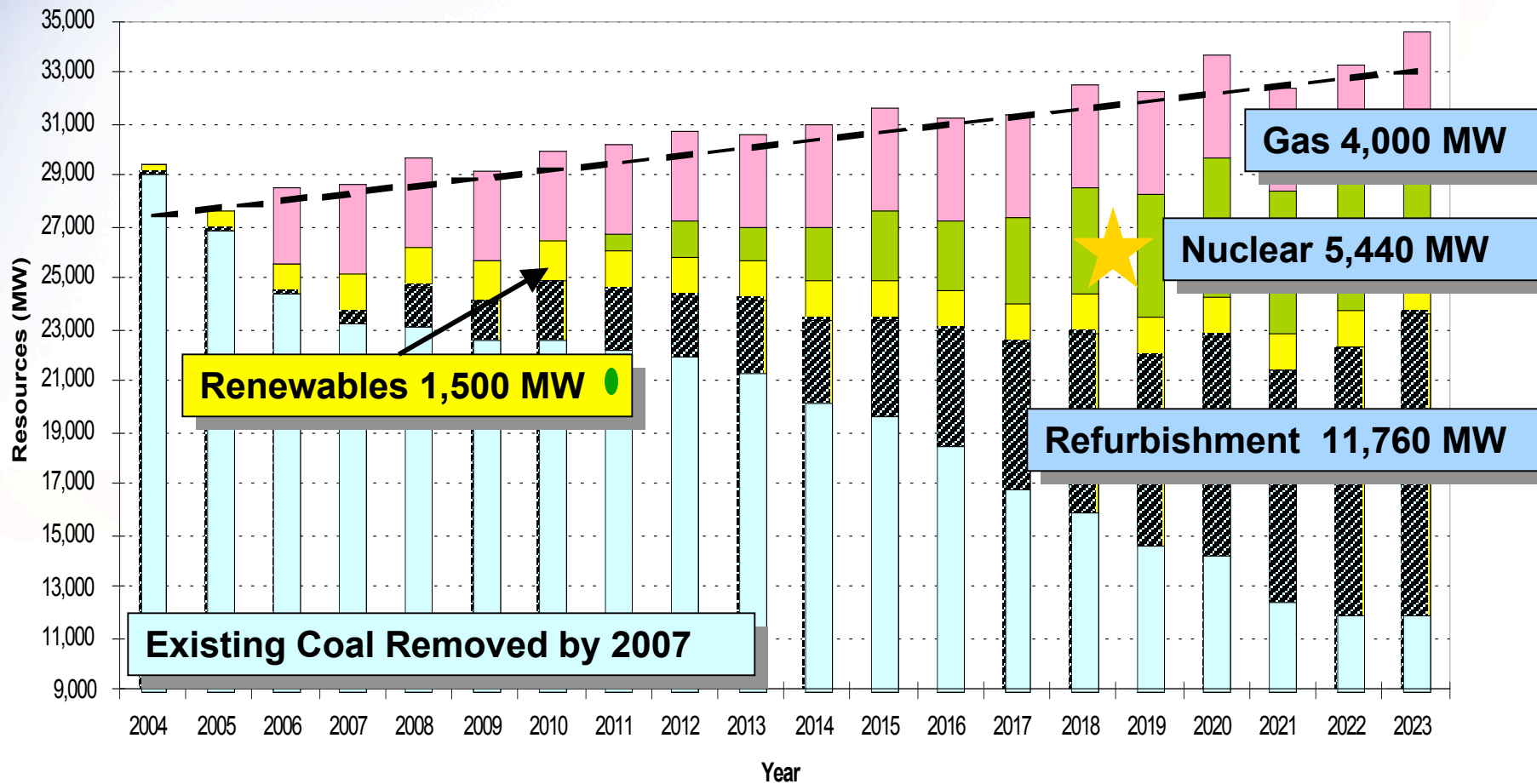


Ontario's Supply Gap - Widening





Filling the Ontario Gap



★ Represents 49% nuclear by 2023



Creating the Winning Conditions

Public Support:

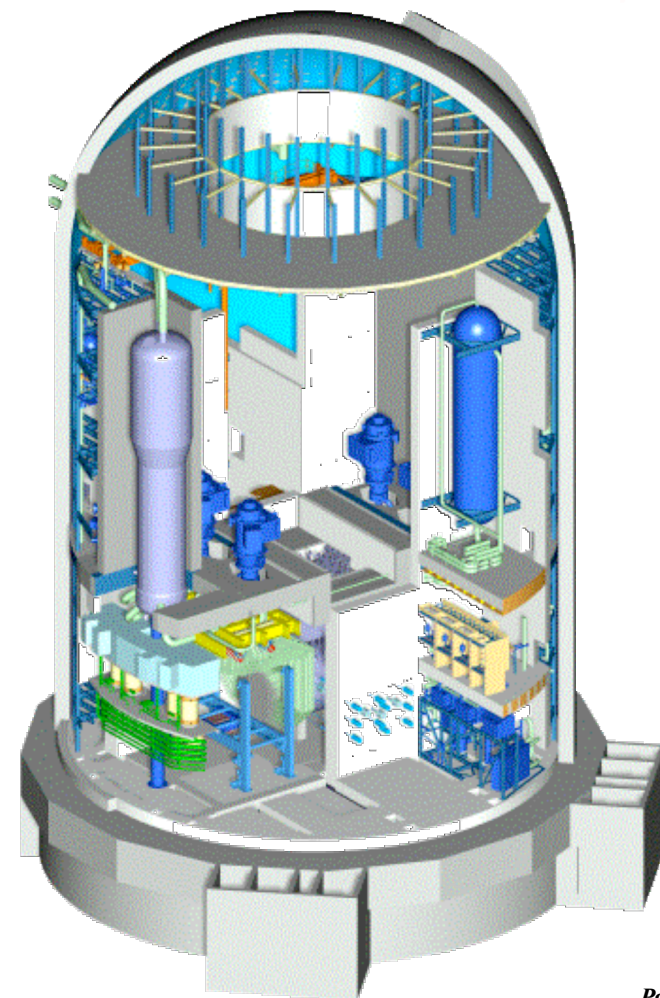
- Public support has increased dramatically
- Concerns over long-term energy security and near-term energy shortages lead to 2/3 of Americans favouring nuclear power (October 2002)
- Majority in Ontario, Canada support new plants and life extension of existing plants (2003)
- Clear, effective communication of benefits needed



Creating the Winning Conditions

Confidence in New Technology:

- Evolutionary new plants are designed to meet market needs
 - Safe, secure, sustainable and economic
 - Short project duration, built on-time and on-budget
 - Low and stable production costs
 - Clear, straightforward licensing





Business Challenges

- **Attractive investment**
- **Minimum project risk & risk sharing**
- **Minimum market risk**



Attractive Investment

- **Predictable project**
- **Attractive capital cost**
- **Regulatory certainty**
- **Confidence in revenue stream**
- **Government incentives for initial units → high rate of return**



Minimise Project Risk – Track Record

In-Service Date	Plant	Status
1996	Cernavoda Unit 1, Romania	On budget, on schedule
1997	Wolsong Unit 2, S. Korea	On budget, on schedule
1998	Wolsong Unit 3, S. Korea	On budget, on schedule
1999	Wolsong Unit 4, S. Korea	On budget, on schedule
2002	Qinshan Phase III, Unit 1, China	On budget, 38 days ahead of schedule
2003	Qinshan Phase III, Unit 2, China	On budget, 4 months ahead of schedule



Risk Sharing – Old Rules No Longer Apply

Risk Element	Historical Model
Project Delivery: Contract Model	Owner as General Contractor
Cost	
Schedule	
Technology	
Plant Performance (Power Output)	
Licensability	
Regulatory Impact not due to Contractor	
Risk in Excess of Contractor's Liability	
Financing - Loan Repayment Risk	
Operation - Plant Operations Cost & Risk	
Market Risk	
Decommissioning, Waste Storage Risk	

- **Historically, Owner assumed all risks**

 Owner



Risk Sharing – New Realities Require New Models

Risk Element	New Build Model
Project Delivery: Contract Model	Turnkey
Cost	
Schedule	
Technology	
Plant Performance (Power Output)	
Licensability	
Regulatory Impact not due to Contractor	
Risk in Excess of Contractor's Liability	
Financing - Loan Repayment Risk	
Operation - Plant Operations Cost & Risk	
Market Risk	
Decommissioning, Waste Storage Risk	

First Unit Requires Government Participation	
	Owner
	AECL & Partners

- Vendors and partners are prepared to step up
- Government has a role to play in mitigating the first unit risks
 - Market
 - Regulatory
 - Financing
 - Costs



Risk Sharing – Turnkey Model

- **Successfully implemented – most recently in China**
- **Successful because of strength of partners**
- **Delivered on-time and under budget**



Qinshan Phase III site – Twin CANDU 6 Units



Market Risk

- **High capital cost facility**
- **Long project schedule**
- **Unpredictability of market prices**
- **Government must take a role:**
 - **Market design creating a level playing field**
 - **Power Purchase Agreement**
 - **Leading to investor confidence**



Path Forward

- **Key is effective risk management and risk sharing**
- **New plants will be built under turnkey contract models**
- **Project teams with successful track records will lead the way**
- **Government has a role in minimizing barriers**
 - **Market risk and incentives**
 - **Licensing certainty**
 - **Loan guarantees**



New Nuclear Will Happen

- Need for new nuclear is recognized
- New designs deliver competitive electricity with low technology risk



Cooperative and coordinated approach will lead to success



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