

U of A – Houston Presentation

Nuclear Energy in the Oilsands: Part of the Solution, or the Problem?

University of Alberta
School of Business

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Agenda

Today's Discussion will focus on:

- Overview of the Nuclear power industry in Canada
- Review of the Alberta Oil Sands energy requirements
- Benefits of Nuclear as a potential energy source
- Barriers to the use of Nuclear energy
- Our recommendations
- Q&A

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Canada's Nuclear Background

- 1945 Canada enters Nuclear age
- Industry responsible for:
 - 31,000 jobs
 - 150 companies
 - \$5B in revenue
- World leader in Uranium production
 - 2004 production: ~13,500 tonnes
 - 1/3 of world demand
- World Class CANDU reactors
 - 18/22 active
 - Generates 12,500 MW power a year
 - Reactors used world wide

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Oil Sands Energy Requirements

- 1.2M bbl oil equivalent produced per day
- Current per barrel gas consumption
 - Surface mining: 250 cf
 - In-situ: 1000 cf
 - Upgrading: 500 cf
- Operational Gas Costs
 - 15% for mining
 - 60% for in-situ
- Need power for infrastructure and development
- Oil Sands production forecasted to be 3.8M bbl per day by 2020
- Canadian gas reserves in decline
- Environmental Concerns
 - Oil sands largest contributor of GHG in Canada

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A Nuclear Solution

A “Natural” choice

- Location
 - On the door step of Saskatchewan
 - We have the expertise
- Economical
 - Nuclear: \$0.03/kWh
 - Gas fired: \$0.045/kWh
- Reduce reliance on natural gas
 - Eliminate up to 6Mcf per day
- GHG reduction
 - Reduction in CO₂ by 1-2 Mt at a 30-60K bbl/day in-situ site

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Nuclear Concerns

Not without some barriers

- Radiation Exposure
 - Accidents
 - Terrorism
 - Radioactive release
- Impact on the water system
 - Oils sands operations are heavy consumers of water
 - Tailing pond reclamation unknown at this time
 - Uranium processing very toxic
 - Net impact is increase water consumption

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Nuclear Concerns

Barriers cont...

- Waste Management
 - the “Achilles heel” of Nuclear energy
 - What to do with “High-level” waste
 - High public concern
- Regulatory Constraints
 - 36 months pre project approval
 - 105 months for construction

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Conclusions

- Nuclear represents a great opportunity to solve some of the oil sands future energy needs
- Not without justifiable concern
- To move forward we need to better understand the impact Nuclear will have on the water system and how we can dispose of waste. With these issues solved we should be able to streamline production in order to meet the growing demands of the Alberta Oil Sands.

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Questions

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For more information

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