

# **Industry Perspectives on Oil and Gas Development in Canada's Arctic: Opportunities and Challenges**

**Paul Barnes, Manager - Atlantic Canada & Arctic  
Presentation to Nunavut Oil and Gas Summit**

**Iqaluit, Nunavut  
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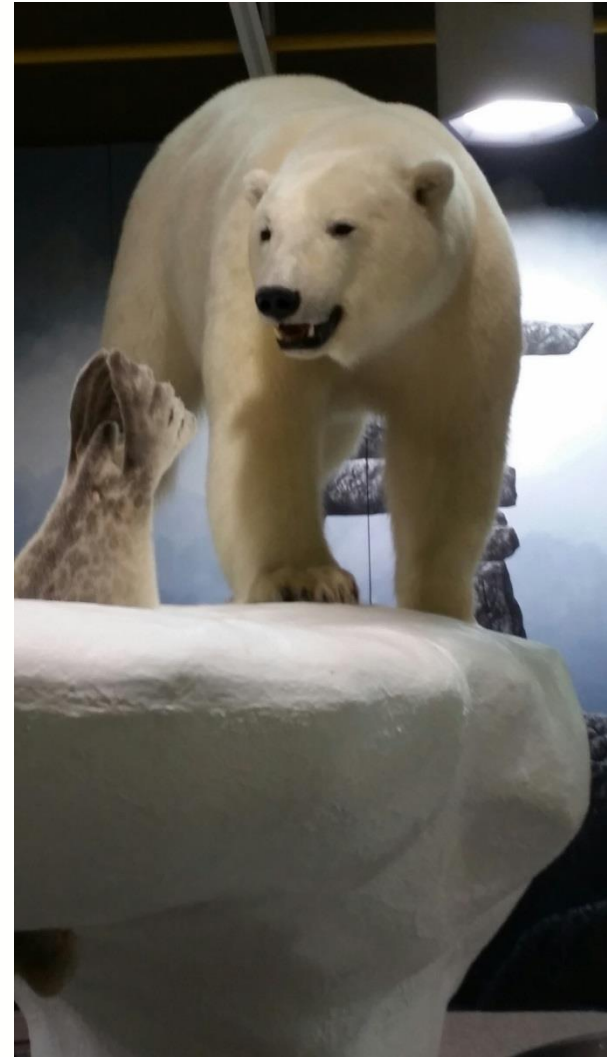


**CANADIAN ASSOCIATION  
OF PETROLEUM PRODUCERS**

**Canada's Oil and Natural Gas Producers**

# Presentation Outline

- **Context**
  - Energy demand
  - Industry benefits and capital spending
- **Overview of offshore oil and gas activity in Canada's Arctic**
- **Overcoming challenges through R&D and engagement**
- **Way forward for responsible development – trust and understanding**



# Global Primary Energy Demand

## Energy Demand Growth

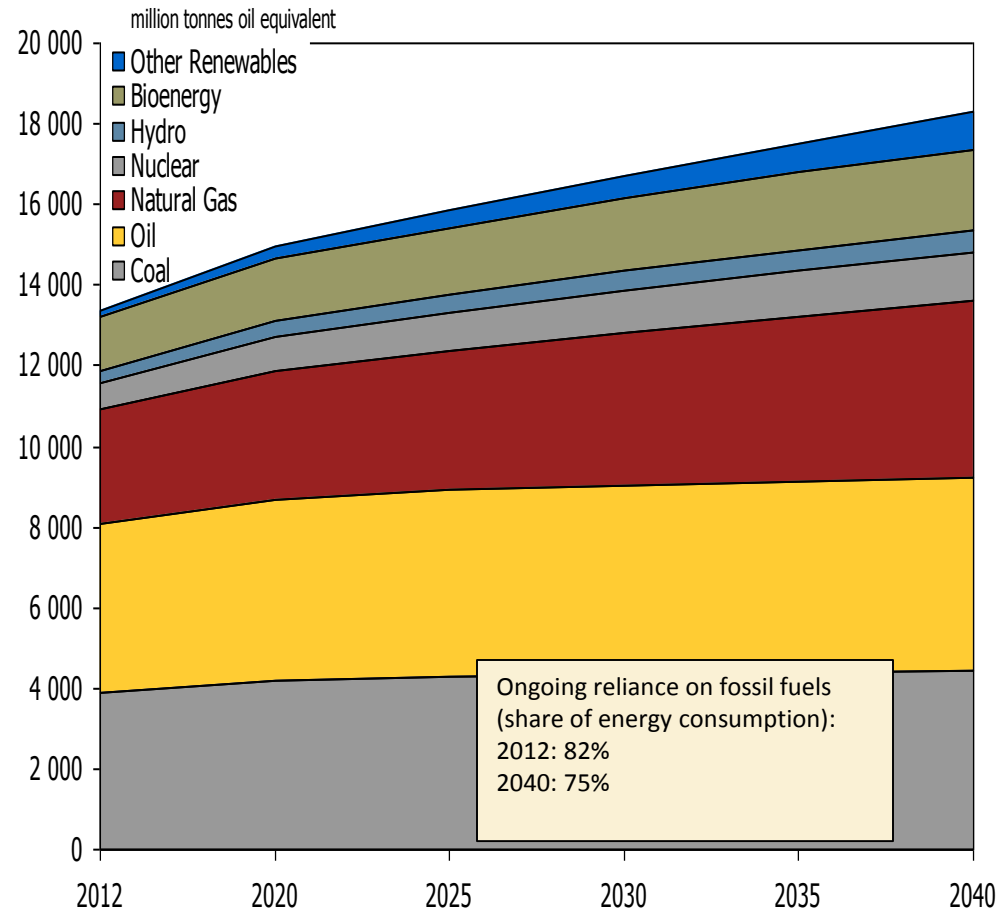
- Population growth
- Standard of living

## All Forms of Energy, Developed Responsibly

- Ongoing high reliance on hydrocarbons
- Increasing role for renewables
- Shift to non-conv. oil & natural gas

## Technology - Key Lever for Sustainable Growth

- Production
- Cost competitiveness
- Environmental performance



Source: International Energy Agency World Energy Outlook 2014

# A Decade Makes a Difference - North American Perspective

## Then

- 60-year supply and falling
- Shale known but uneconomic to develop
- Underground gas storage primarily traditional reservoir, operationally not very flexible
- Pipeline capacity growing incrementally
- Rising prices with several spikes

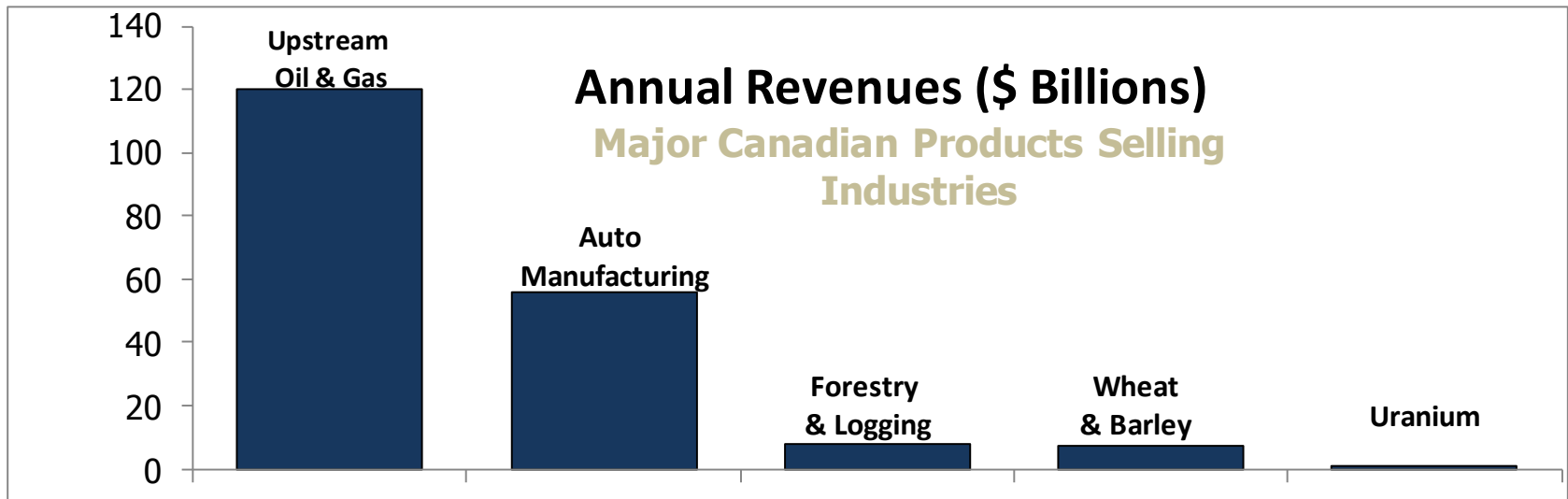
## Now

- 100+ years supply and growing
- Flourishing production, vast shale resources now accessible
- Storage boom with more flexible salt-cavern facilities and additional market area storage
- 16,000+ miles of pipeline added since 2000
- Plentiful supplies moderate prices and provide supply diversity

# The Oil and Natural Gas Industry

## A Key Driving Force in the Canadian Economy

- Invested \$74 billion in Canada in 2013
  - Largest private sector investor in Canada
- Payments to governments average about \$18 billion per year
- Approximately 20% of Canada's exports
- Employs more than 550,000 in Canada (direct & indirect)



Source: ARC Financial & CAPP

# Industry Capital Spending Cdn \$billions

Northern Canada  
2013 2014E  
\$0.7 \$0.5

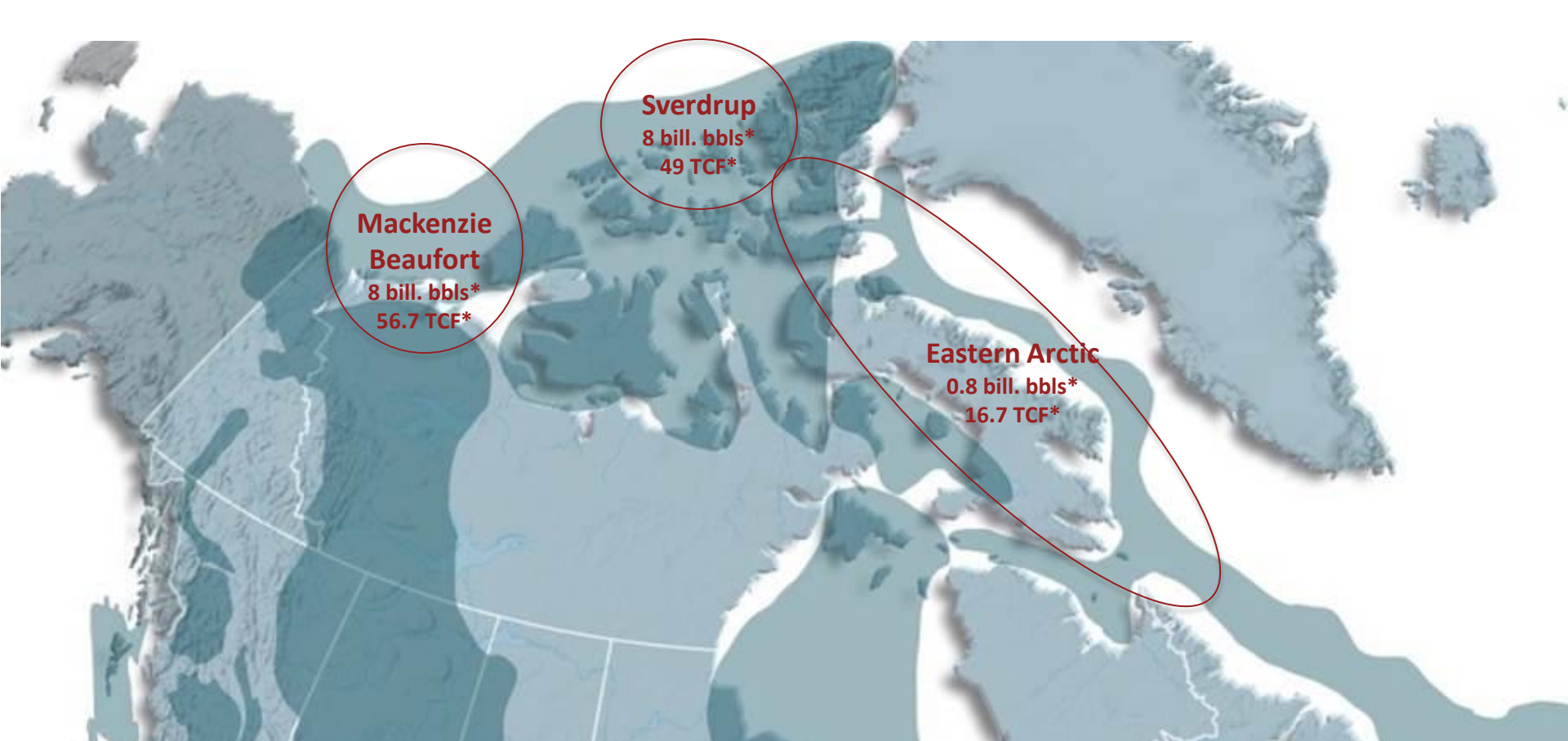
Oil Sands  
2013 2014E  
\$31 \$33

Western Canada  
2013 2014E  
\$39 \$36

Oil & Gas Investment Spending:  
2013: \$74 billion  
2014E: \$73 billion

East Coast Offshore  
2013 2014E  
\$3.9 \$3.5

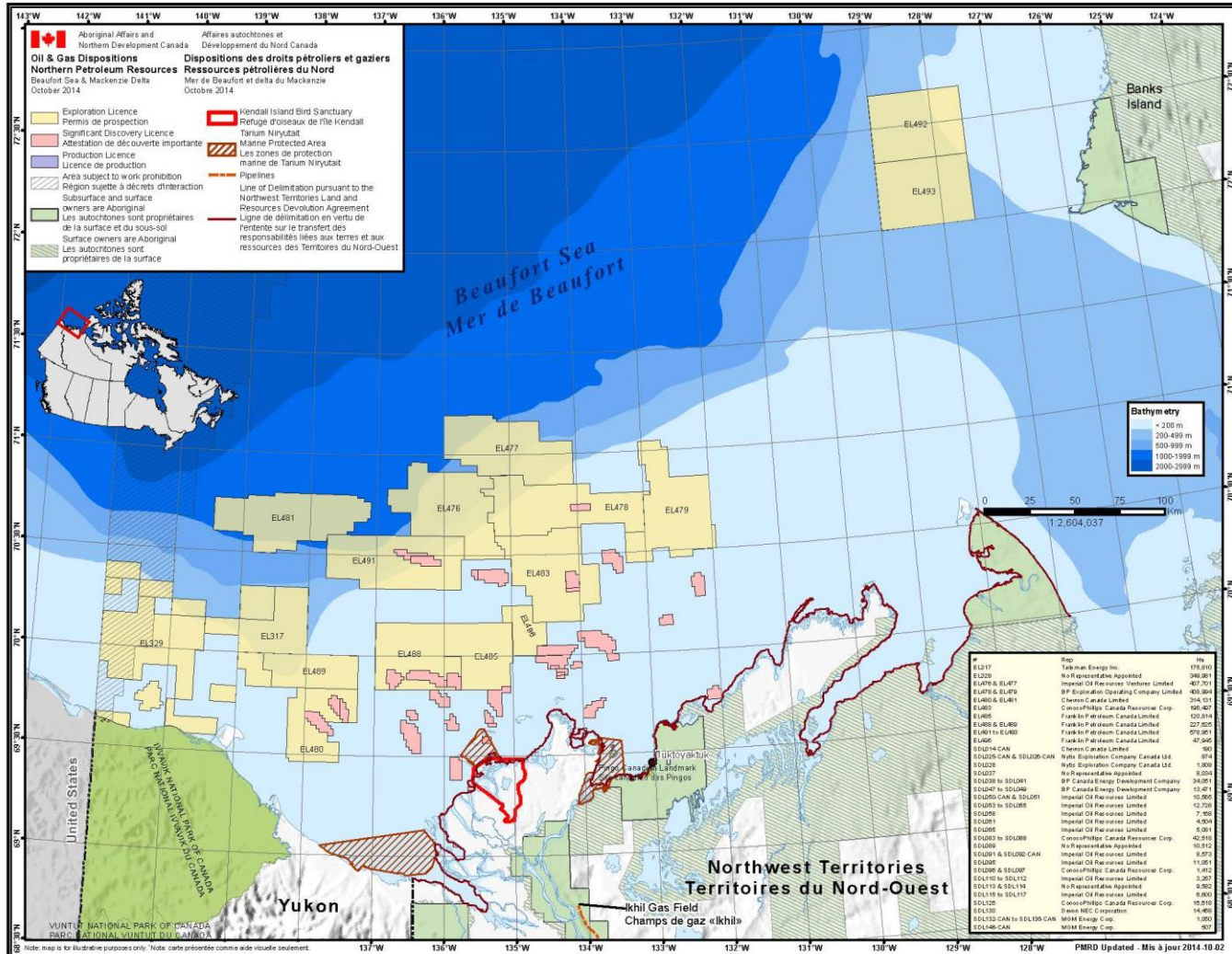
Note: Excludes spending on mergers & acquisitions



## Canada's Arctic Offshore Basins

*\*Ultimate recoverable oil and ultimate initial marketable gas  
Source: Drummond Consulting report prepared for Indian and Northern Affairs Canada*

# NWT - Beaufort Sea

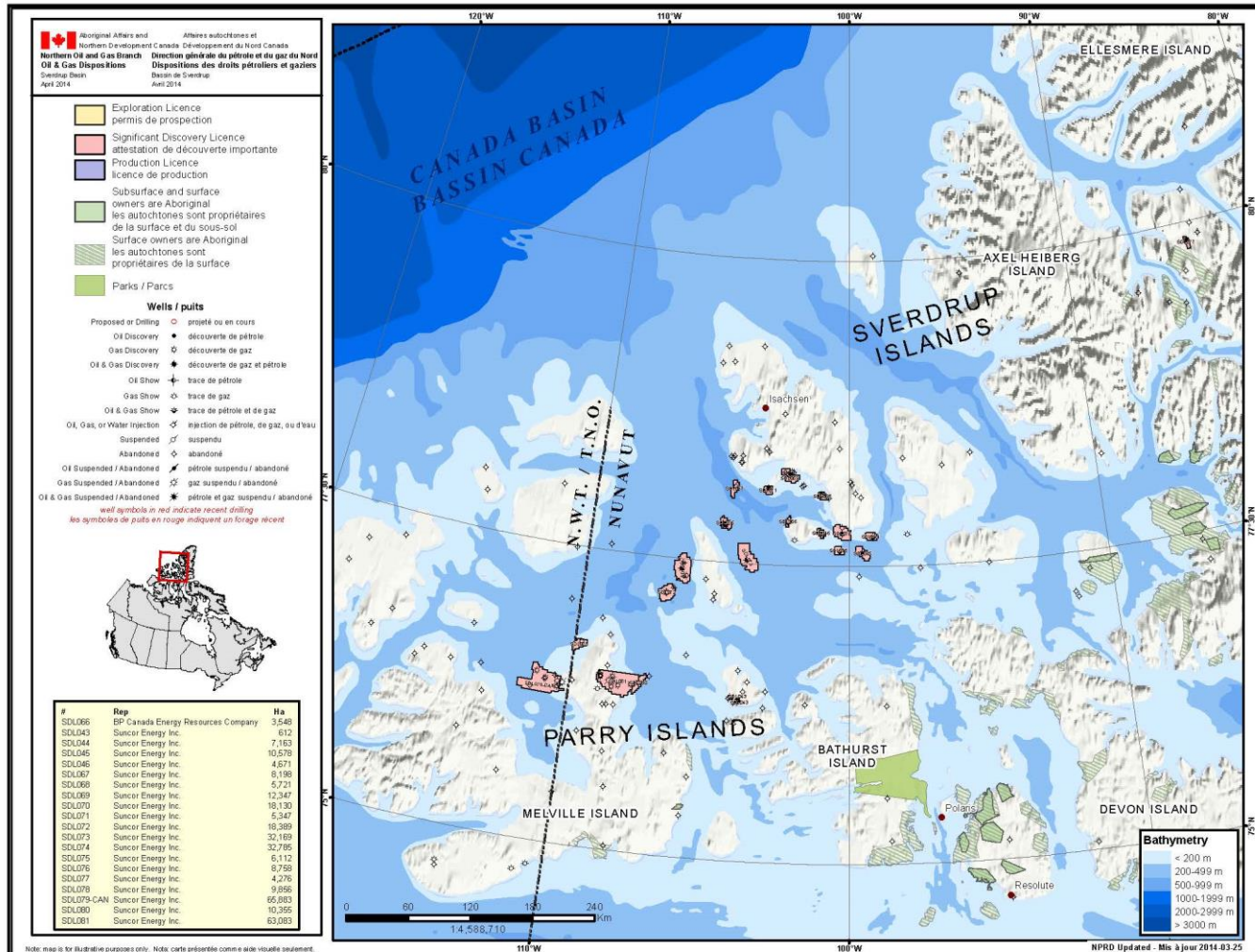




## NWT - Beaufort Sea (cont'd)

- **Drilling began in the Canadian Beaufort Sea in 1973**
- **About 100 wells have been drilled, with only one well drilled within the past 20 years**
  - Drilling has largely been in shallow waters but seismic exploration has continued and there is potential for further drilling activity
- **Two offshore seismic programs were conducted in 2012**
- **Sixteen offshore exploration licences are currently active, totaling roughly \$2 billion dollars in work commitments**
- **No applications for operations authorizations have been submitted to the National Energy Board for Arctic offshore drilling**
- **One proposed project being examined**

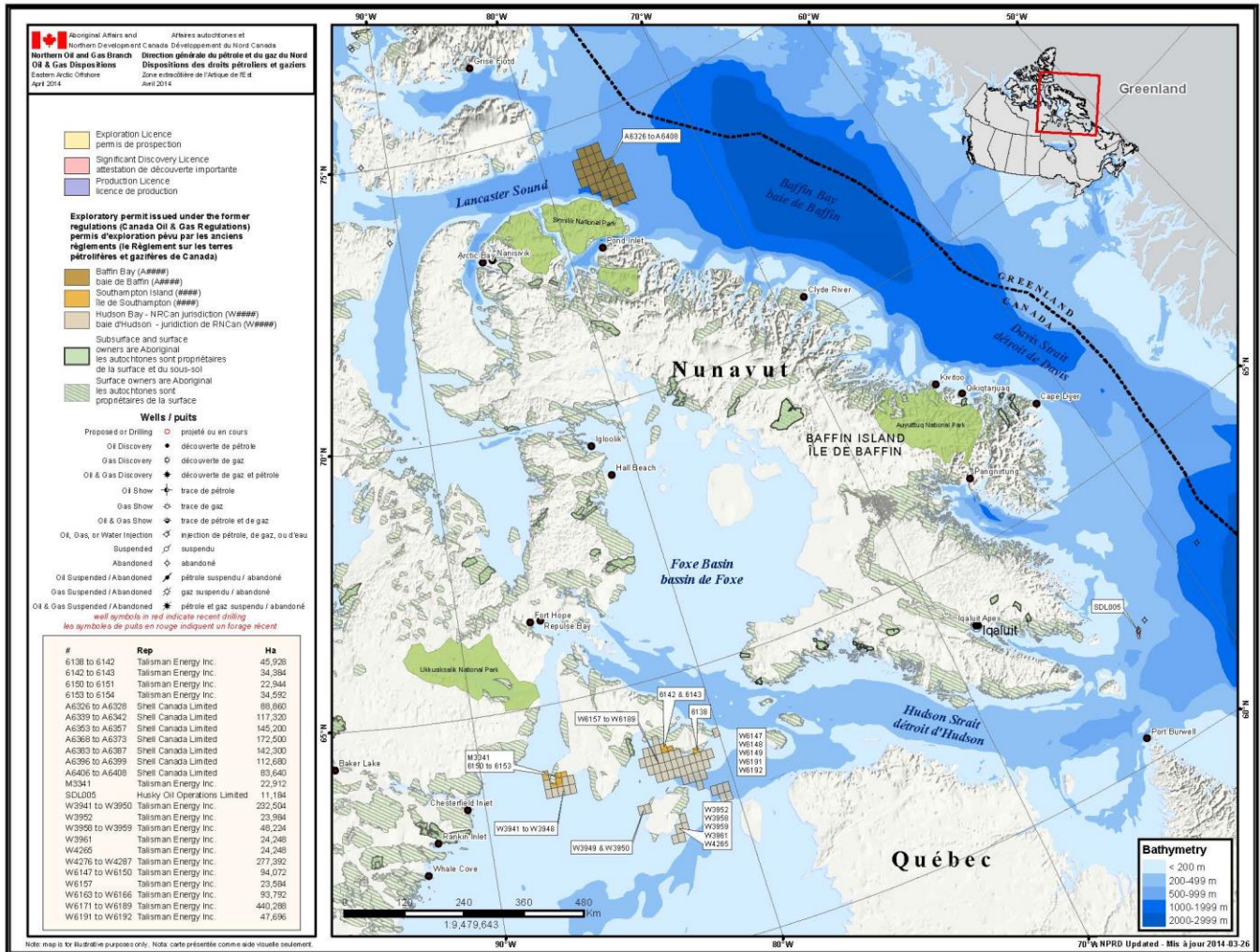
# Nunavut - Sverdrup Basin



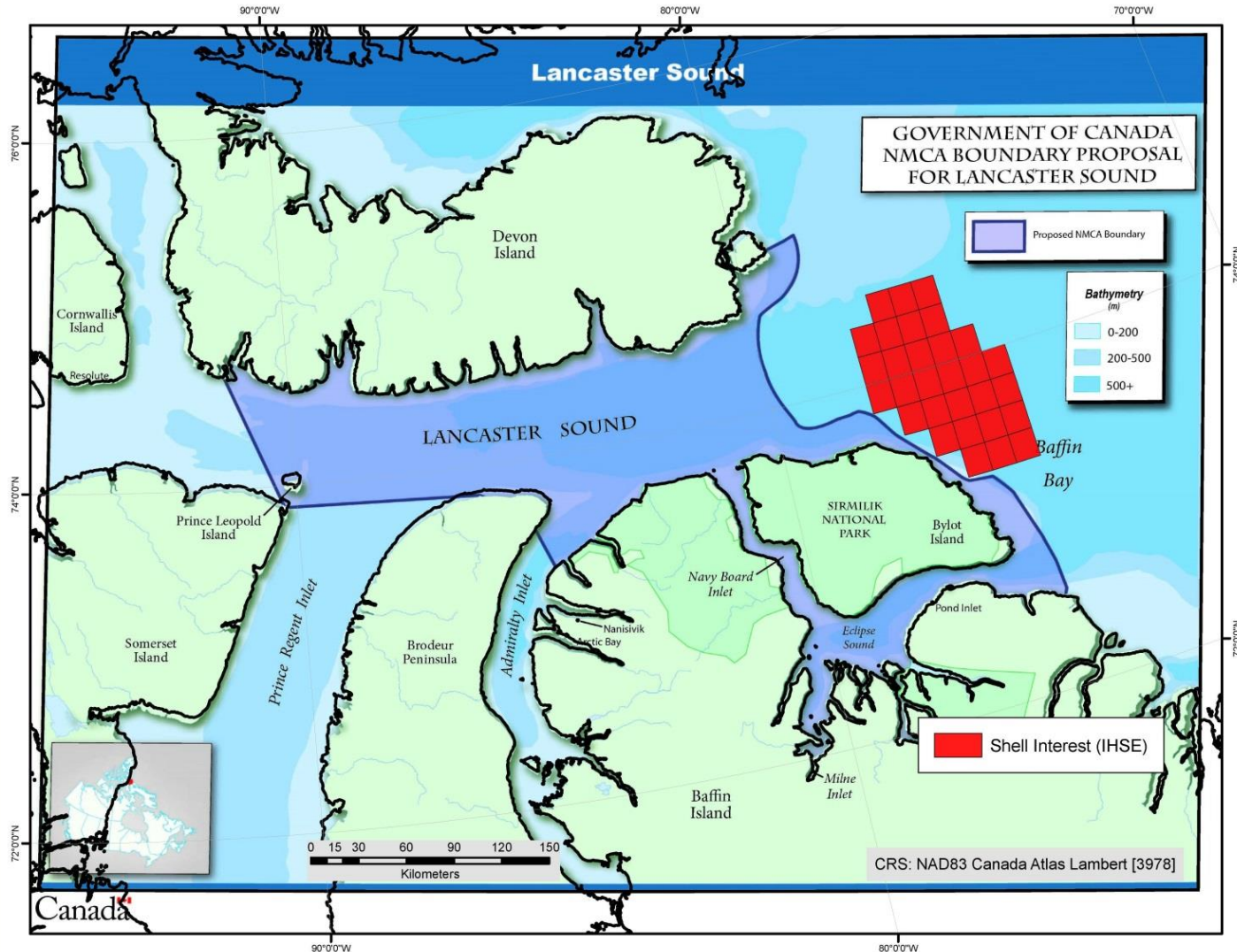
## Nunavut - Sverdrup Basin (cont'd)

- **140 Exploration wells have been drilled in the Sverdrup basin since the 1970's**
- **20 significant oil and gas discoveries and 1 commercial oil discovery**
- **Ultimate Initial Marketable Gas estimated at 49 Tcf;  
Ultimate Recoverable Oil estimated at 8 billion barrels**
- **Is thought that extended reach drilling from land could tap into a number of the offshore discoveries**
- **No industry activity is currently planned**

# Nunavut - Eastern Arctic



# Nunavut - Eastern Arctic (Lancaster Sound)



# Nunavut - Eastern Arctic (cont'd)

- **Area of high potential hydrocarbon resources**
  - Ultimate Initial Marketable Gas estimated at 16.7 Tcf
  - Ultimate Recoverable Oil estimated at 0.8 billion barrels
- **Recently a consortium of Norwegian companies wanted to conduct a 5 year series of seismic programs off the east coast of Baffin Island**
- **NEB approved but decision being legally challenged. Several communities, Inuit groups and the Nunavut ERB have concerns**
- **Government of Canada plans to conduct a SEA in the area**
- **Industry has expressed concerns of a proposed NMCA in Lancaster sound**
  - NMCA would remove more than 44,000 square kilometres of offshore hydrocarbon potential from Nunavut's exploration portfolio
  - Industry proposing an MPA which would allow for regulated protection of certain marine species while still allowing for oil and gas and other industrial related activities, with appropriate measures to protect marine life and its habitat

# Challenges to Arctic Offshore Oil and Gas Activity

- **Physical**

- Low temperatures
- Sea ice (including extreme ice features up to 30M thick)
- Icebergs and / or ice islands
- Ice scour of the seabed
- Permafrost and / or icing
- Seabed hazards, including gas hydrates and shallow gas
- Winter darkness (particularly for high latitudes)
- Weak soil and seabed conditions
- Distance to facilities / markets

- **Holistic**

- Economic
- Technical
- Human factors
- Regulatory
- Socio-economic
- Environment
- Geopolitical

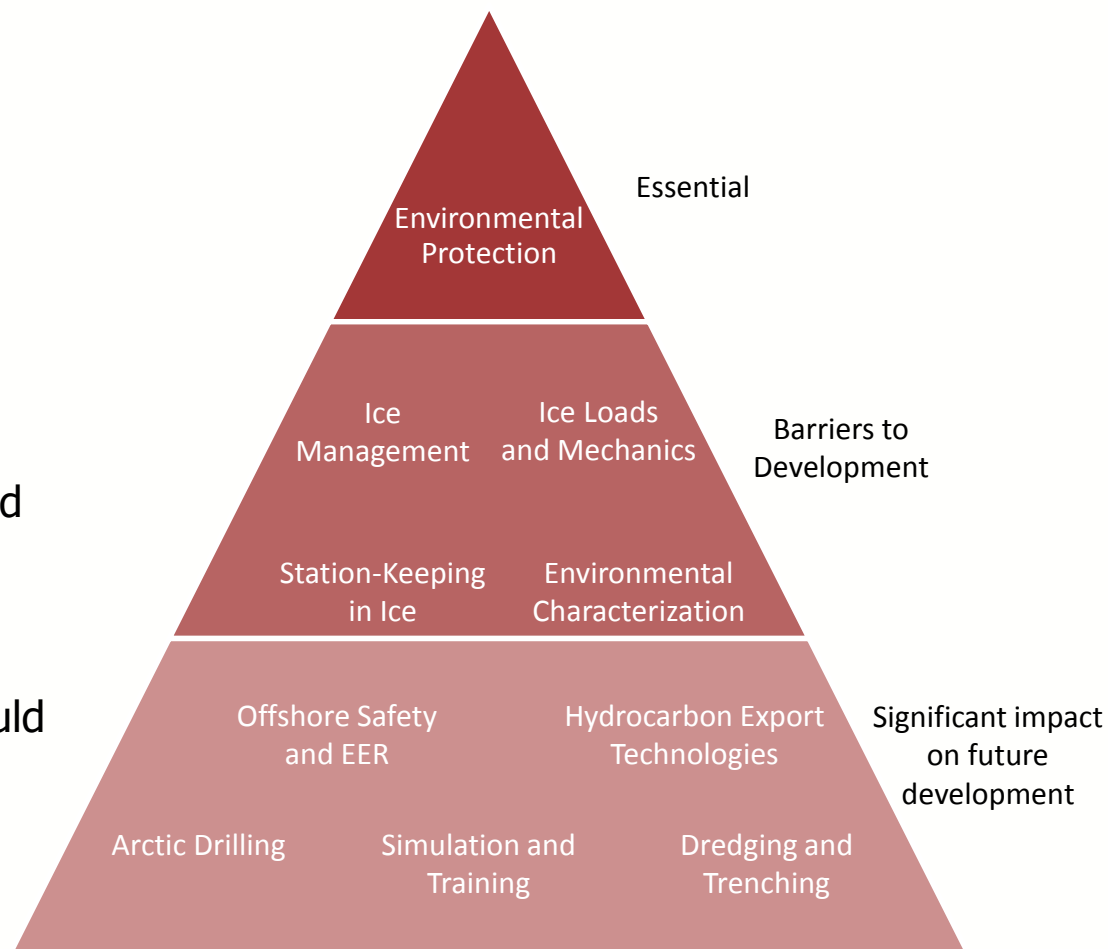
# R&D Plays a Vital Role in Overcoming Challenges

- **Fills gaps in knowledge and understanding, technology & methodology and training requirements**
- **Researchers need to consider this multi-dimensional (physical & holistic) environment**
- **Solutions that focus on multiple-dimensional facets are most favored**
- **BREA, CHARS, ESRF, PERD all focused on northern energy R&D for the benefit of Northerners**



# Top Priority Issues – Arctic Offshore Oil and Gas R&D

- **Highest priority issues identified; organized into three tiers:**
  - Top tier – Essential issues that must be addressed for development to proceed
  - Middle tier - highly important issues where R&D can reduce substantial fundamental gaps and uncertainties
  - Bottom tier - highly important issues for which technological solutions exist; advancement could significantly influence future development



Source: C-CORE

# Building Understanding and Trust



- **Performance:**

- Continuous ***environmental & social performance improvement*** (across the value chain).....including monitoring, timely & transparent reporting
- Clear line of sight to ***economic and social benefits*** to the public
- World class ***policy & regulatory system***
- ***Solutions-oriented advocacy*** for balanced policy and regulation

- **Communications & Outreach:**

- Sustained communications grounded in performance improvement
- Strong focus on outreach & engagement

- **Requires leadership & collaboration**

# Communication Outreach: Processes, Practices & Responsibility

## HYDRAULIC FRACTURING HOW IT WORKS

FRACTURING STAGE SURFACE ACTIVITY

**1 DRILLING THE WELL**  
Unconventional natural gas reserves are typically located between two and three kilometers below the earth's surface and hundreds of meters deeper than the deepest drinkable groundwater.

**2 SURFACE CASING**  
Steel casing is inserted and cemented in place along the well, creating a seal barrier between the well and any underground water sources.

**3 CEMENTING**  
Cement is pumped into the wellbore where it surrounds the casing. This creates a solid barrier around the well.

HYDRAULIC IS A SAFE, GOVERNED TECHNOLOGY WHICH HAS BEEN USED FOR HUNDREDS OF YEARS.

## Overview for Landowners

# What to Expect When You're Expecting a Well

If there's an unconventional oil or gas well in your future, you probably have questions. This brochure is designed to give you general information – and an overview of the life cycle of a typical well. Your well might be in production for 10 to 40 years. However, most of the activity on your land will occur in the very early stages.

## Upstream Dialogue

THE FACTS ON: **NATURAL GAS**

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## RESPONSIBLE CANADIAN ENERGY

2012 ATLANTIC CANADA OFFSHORE SUPPLEMENTAL REPORT

View the full report online at [www.capp.ca/eca](http://www.capp.ca/eca)

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RESPONSIBLE CANADIAN ENERGY

## SAFETY TRAINING in Atlantic Canada's Offshore Oil and Gas Industry

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## DISPERSANTS: Improving Offshore Oil Spill Response

Offshore operators are developing resources safety and responsibly, and working to continuously improve offshore oil spill prevention and response. The companies operating in Atlantic Canada's offshore may or exceed all environmental protection regulations and adhere to global best practices related to spill prevention.

Although preventing spills is the primary focus, it is also important to be prepared in the event of a spill. Operators have extensive emergency response plans, including oil spill response plans and equipment, to respond quickly and effectively. For effective spill response, it is important to have a variety of response options available so that response efforts can be tailored depending on the size and nature of a spill, weather conditions and other factors.

One of the most important spill response strategies is the use of dispersants, which are chemical agents specifically designed for use in marine environments to speed up natural oil dispersion. They are comprised of a type of molecule called surfactants, which break down the surface tension of the oil, allowing it to be dispersed into smaller droplets that are more easily broken down by natural processes.

What are dispersants and how do they work?

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Emergency response teams are trained to respond to a variety of offshore emergency situations. A designated emergency action team receives initial training in refresher training and onboard emergency drills to keep skills and training up-to-date. Emergency response teams include:

- Helicopter teams
- Boat teams
- Onshore teams

## Even in a banner year for exploration, we never lose sight of safety.

A MESSAGE FROM ALL OFFSHORE PRODUCERS & EXPLORERS

CAPP CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS

"Everyone's really excited about what's on the horizon."

Chelsea Davis  
Drilling Engineer, Scotford

In the oil and gas industry, safety is always the benchmark for what's possible.

2012 will be the busiest year for new oil and gas exploration off Newfoundland and Labrador in 25 years. Locations like the Orphan and Flemish Pass Basins are receiving serious focus. Research being done right here is at the forefront of extending existing fields and looking for the next opportunity.

Offshore and onshore, the way forward always starts with safety.

To learn more, visit [CAPP.ca](http://CAPP.ca).

# The Way Forward: Opportunity, Collaboration & Responsible Development

## ● Seizing the Opportunity

- Developing a competitive and reliable supply to meet market demands
- Capture economic benefits and opportunities
- Market growth and diversification

## ● Building Public Trust and Understanding

- Industry performance, transparency and communication
- Solid performance plus continuous improvement/ technological advances, and strong regulatory framework
- Collaborating within sector, with government, stakeholders, and aboriginal communities

## ● Responsible Development is in everyone's best interests

