Development of the Natural Gas Industry

The Canadian Experience

Eng. James E. Hale

Canadian Pipeline Regulation

Outline

- Canadian regulatory bodies
- Alberta statistics
- National Energy Board
- Lifecycle facility approach
- Goal based regulation
- Management systems
- Recommendations for Peru

Government Institutions

Federal Government

National Energy Board

- management of interprovincial and international pipelines
- management of resources (Territories, off-shore)

Natural Resources Canada

- energy markets and energy policy
- Geological Survey of Canada

Provincial Governments

Energy and Utilities Board

- management of resources (drilling, production, reclamation)
- management of intra-provincial pipelines

Department of Energy

- ownership of resources
  - tenure
  - royalty
- energy policy


BAFFIN SEA
BEAUFORT SEA
NUNAVUT TERRITORY
YUKON TERRITORY
NORTHWEST TERRITORIES
Yellowknife
Iqaluit
Whitehorse
Hudson Bay
Labrador Sea
Gulf of Alaska
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
Edmonton
ONTARIO
QUEBEC
NEWFOUNDLAND
Regina
Winnipeg
Victoria
PACIFIC OCEAN
PRINCE EDWARD ISLAND
St-John's
Charlottetown
Quebec
OTTAWA
Fredericton
Halifax
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UNITED STATES
ATLANTIC OCEAN
CANADA Political Map
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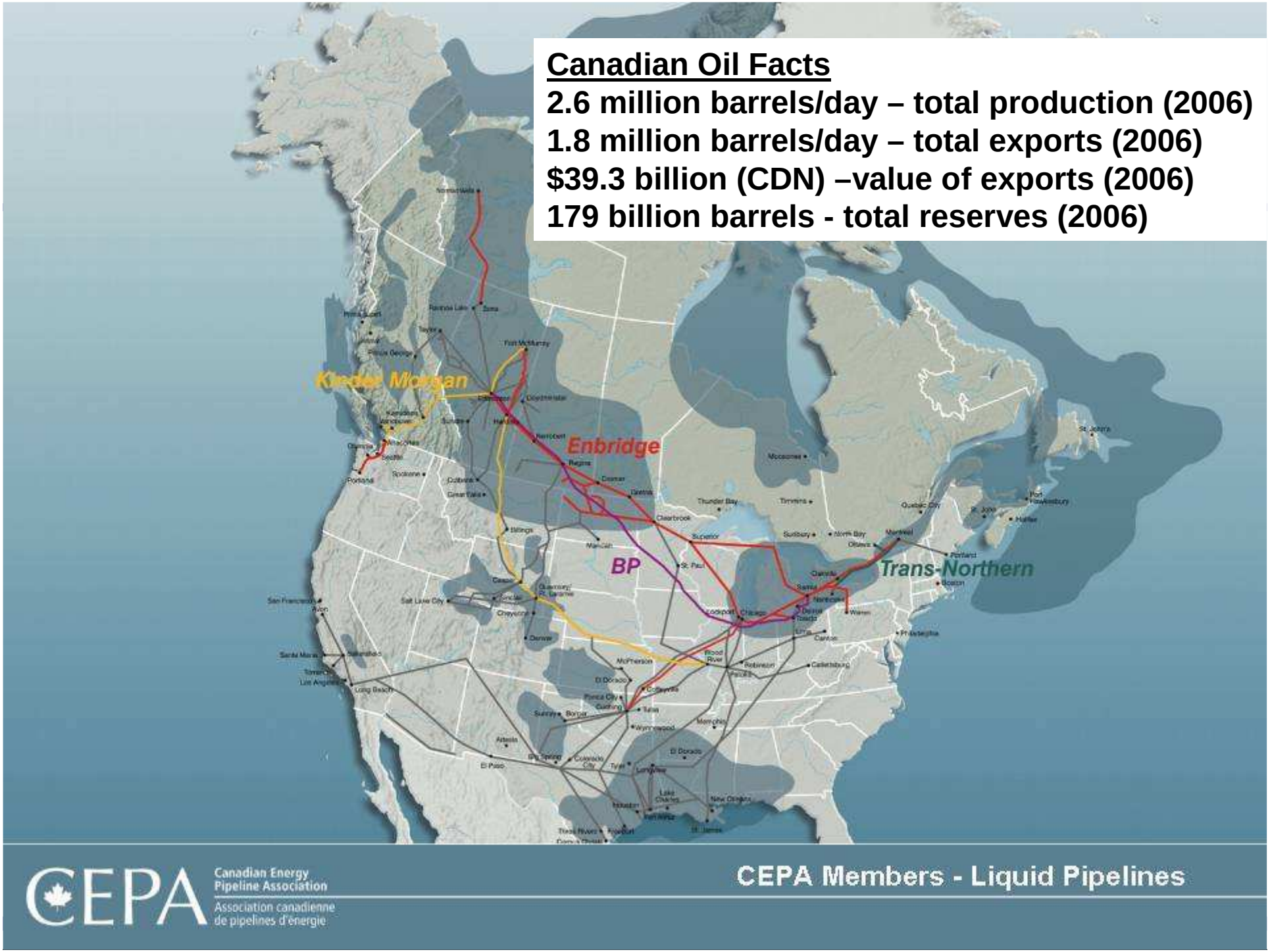
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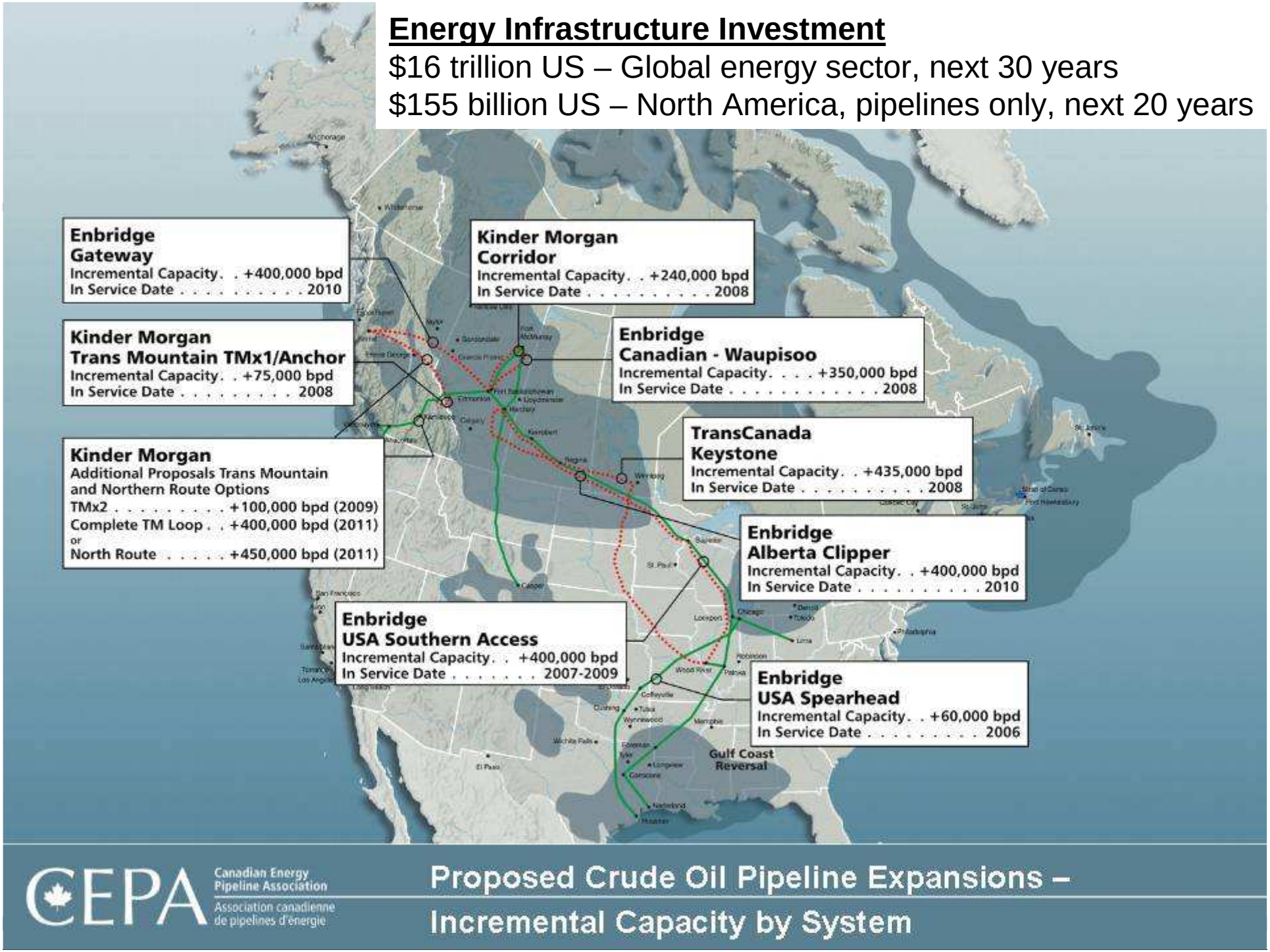
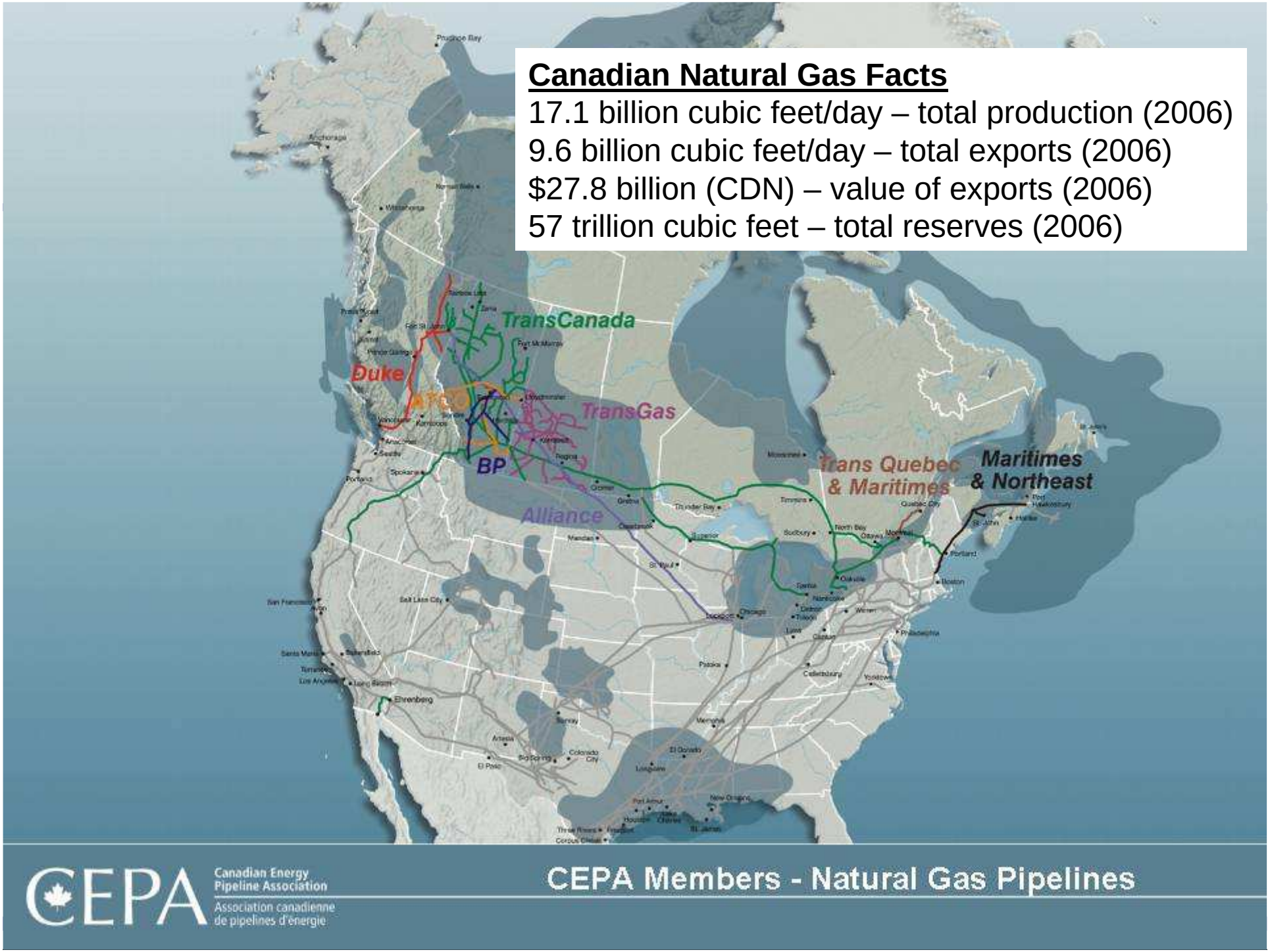
CEPA Members - Liquid Pipelines

Energy Infrastructure Investment

$16 trillion US – Global energy sector, next 30 years

$155 billion US – North America, pipelines only, next 20 years

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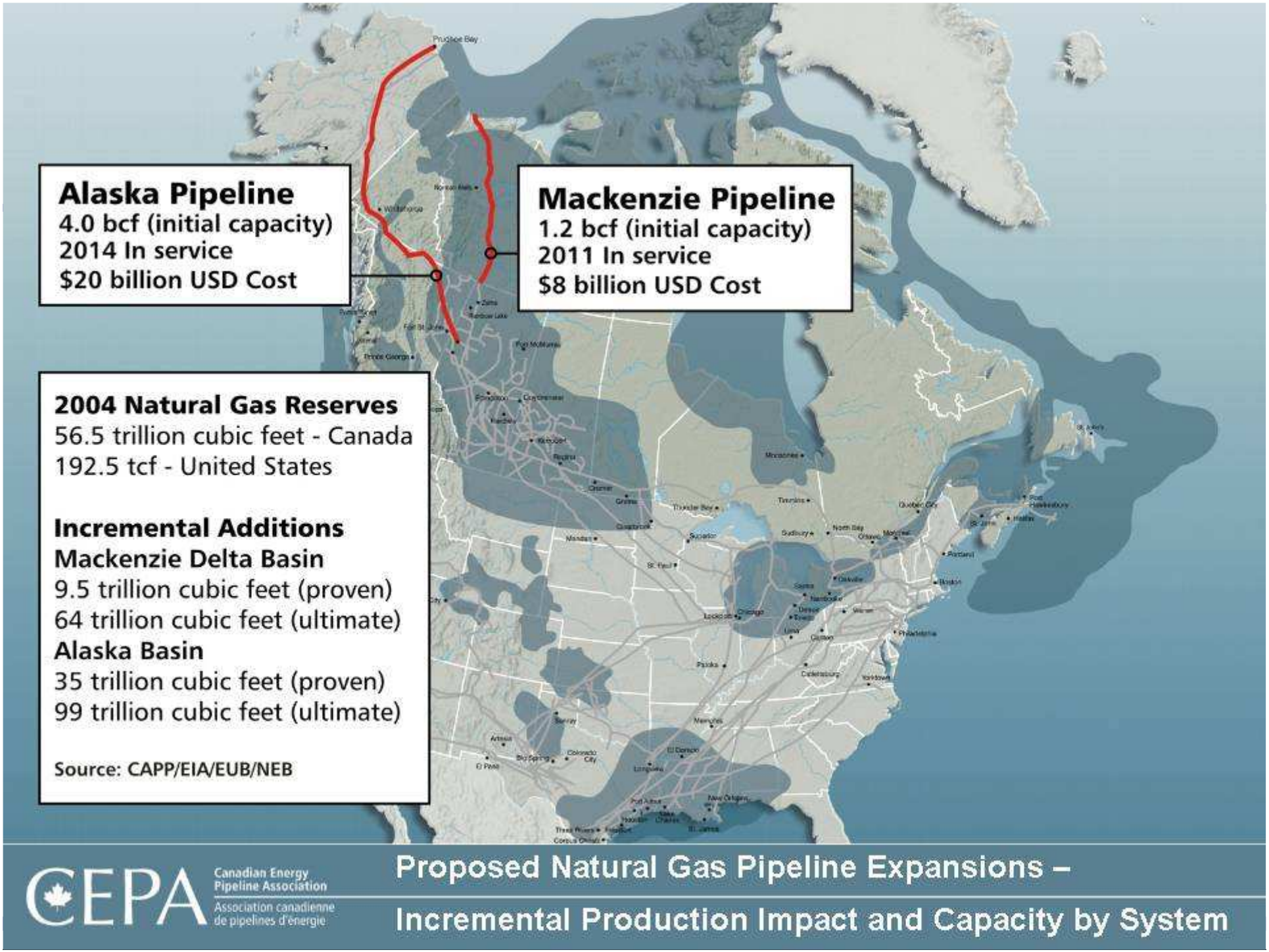
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1.2 bcf (initial capacity)
2011 In service
$8 billion USD Cost
2004 Natural Gas Reserves
56.5 trillion cubic feet - Canada
192.5 tcf - United States
Incremental Additions
Mackenzie Delta Basin
9.5 trillion cubic feet (proven)
64 trillion cubic feet (ultimate)
Alaska Basin
35 trillion cubic feet (proven)
99 trillion cubic feet (ultimate)
Source: CAPP/EIA/EUB/NEB
CEPA
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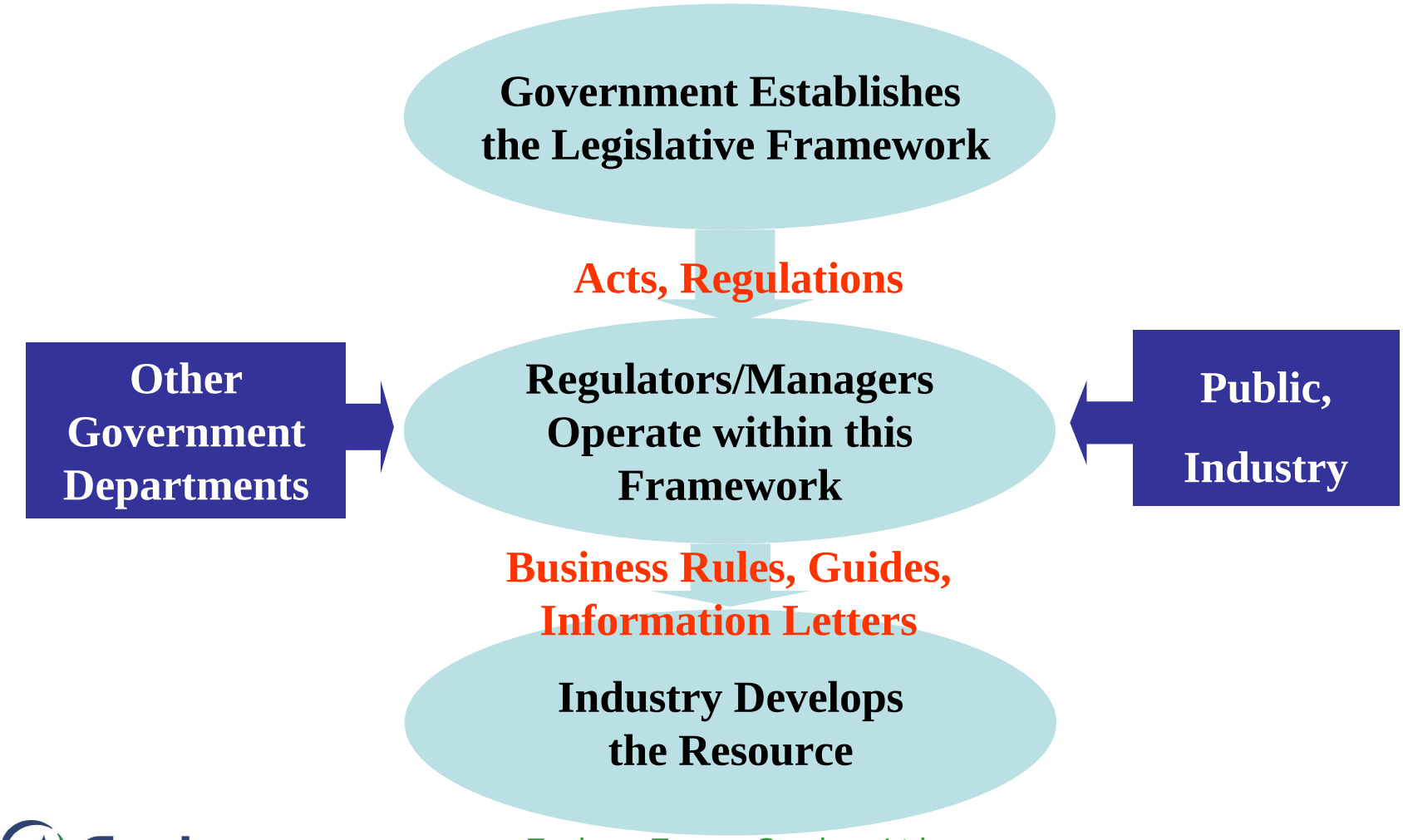
Proposed Natural Gas Pipeline Expansions –
Incremental Production Impact and Capacity by System

Regulatory Framework



CSA Z662 Standard, "Oil and Gas Pipeline Systems"

- CSA Z662 written by volunteer experts from operating companies, regulators, manufacturers, eng. firms
- Revised every 2-3 years, new edition in 2007
- Covers design, materials, installation, welding, testing, corrosion control, operating, maintenance, repair
- Includes gas distribution, offshore, steam system pipelines, sour service material, and polymetric and aluminum materials
- Uses combination of prescriptive and goal-based requirements

Alberta Facts

- Area…….. 661 190 km²
- Population…... 3.4 million (Jan. 2007)
- GDP*…… $ 152.7 billion (2006)
- Exports…… $90.1 billion (2006)
- Major Cities…….. Edmonton (capital)
  Calgary

Note: Alberta total GDP $152.7 billion (2006), energy sector approx 289. Source- Highlights of the Alberta Economy, February 2007 Alberta Economic Development

Alberta Facts-2006

- Produces 74% of Canada's energy
- Holds about 35% of Canada's conventional oil reserves, 70% of natural gas reserves and 100% of synthetic crude oil
- Holds 46% of coal resources in Canada

Alberta Reserves 2006

Remaining Established Oil reserves

- Conventional crude oil…… 1.6 million barrels (11 863)
- Bitumen……. in situ reserves 142 billion barrels
  surface-mineable 5.0 billion m^3

Remaining Established Gas Reserves….. 40.5 tcf (42 071)

Remaining Established Natural Gas Liquids…….. 1.9 billion barrels

Remaining Established Coal Reserves…….. 37 billion tons

2006 EUB Applications

- Wells…….. 25 399
- Production facilities…….. 3 540
- Pipelines…….. 16 410
- Oil sands
  - In situ……..242
  - Mineable……..3
- Coal…….. 11
- Reservoir development…….. 5164
- Environmental Review……... 451
- Utilities…… 779

Energy Facilities in Alberta - 2006

- Producing Oil and Gas Wells 159 546
- Pipelines 392 232 km
- Gas processing……. 573 sweet gas plants 244 sour gas plants
- Oil sands…….. 38 commercials plants (31 in situ, 7 surface miners) 113 primary recovery (in situ) 10 experimental projects
- Oil refineries…... 5 facilities (75 500 m^3 per day capacity)

Energy Facilities in Alberta – 2006 cont'd

- Batteries and Compressor Stations

  21 618 oil
  12 243 gas

- Coal mines

  9 open/strip pits
  2 small open pits
  1 underground
  1 not producing

- Electric generating plants

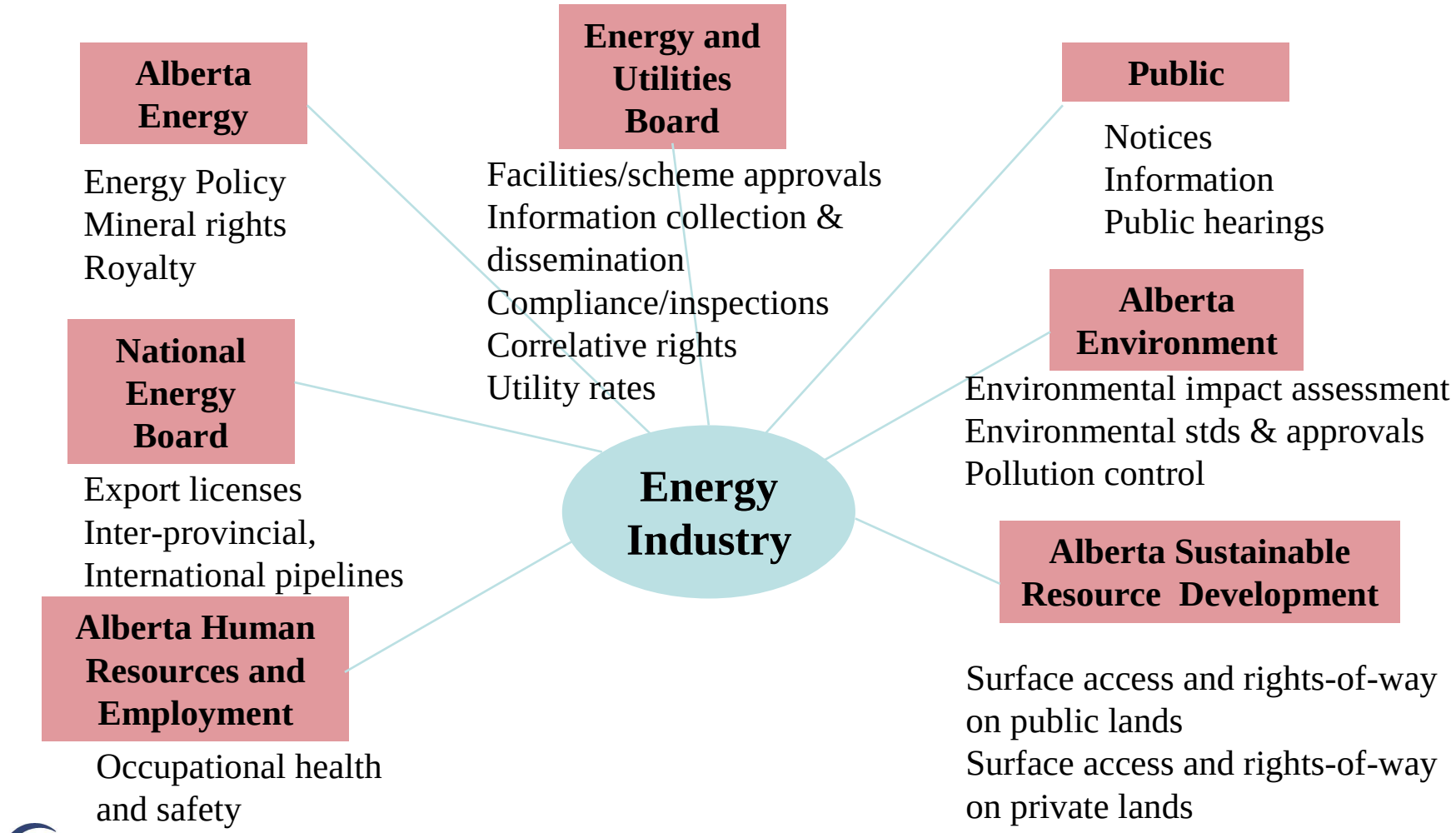
7 coal fired	5840 MW
35 gas fired	4258 MW
14 hydro	869 MW
Wind and other	442 MW
Total production	11 409 MW

Markets for Alberta Energy- Natural Gas

Alberta deliveries in 2006: 138 billion m^3/ y

- 49% to United States
- 23% to other provinces in Canada
- 28% in Alberta

Government/Industry Interfaces in Alberta

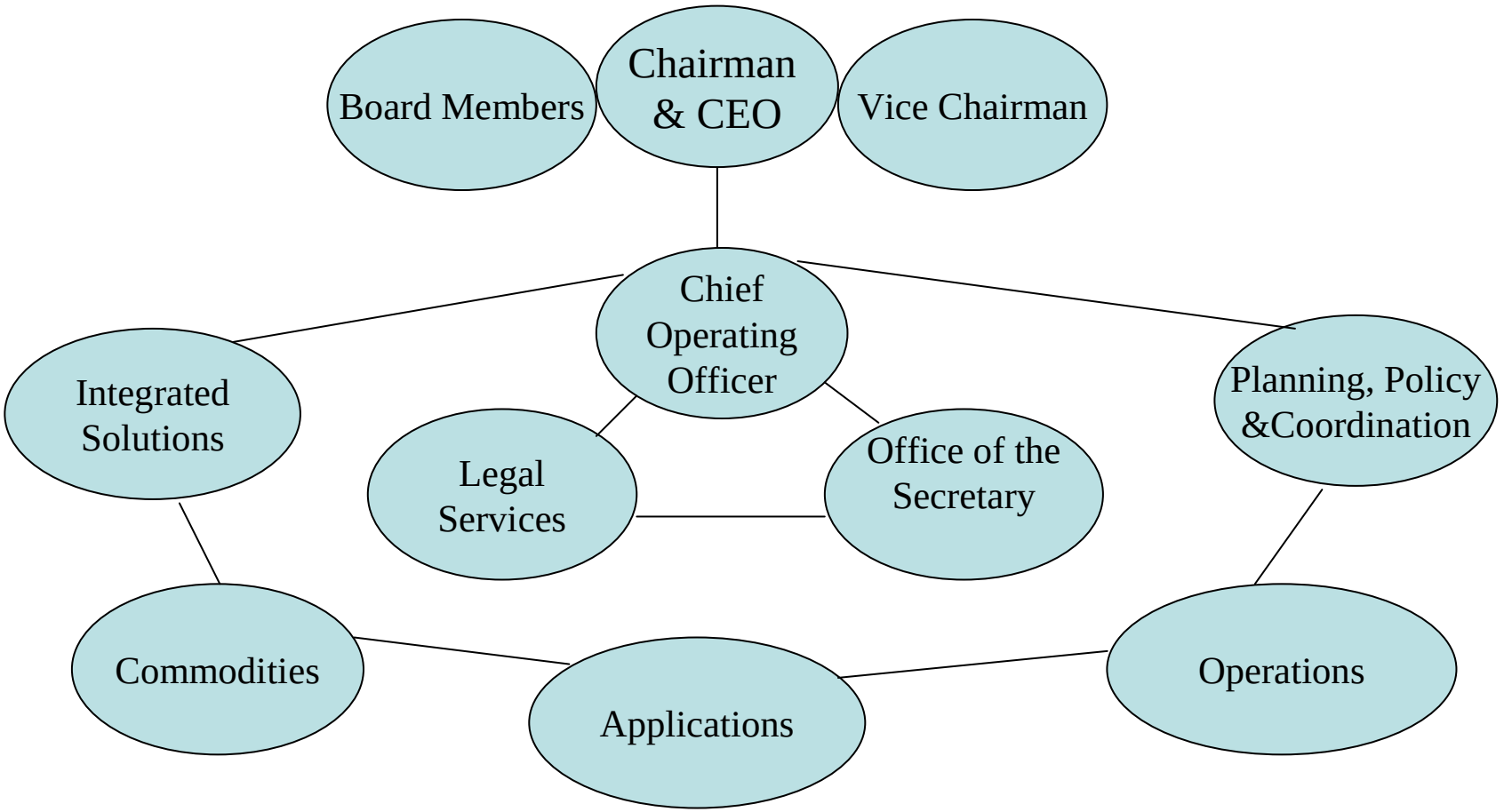


National Energy Board

Introduction to the NEB

- Independent quasi-judicial regulatory tribunal, established in 1959
- Reports to Parliament through the Minister of Natural Resources
- Staff complement of 300, organized into 5 business units, budget of $34 million
- 90% of our costs recovered from industry

NEB Structure



Mandate and Purpose

- The NEB's mandate is expressed in the NEB Act and Acts such as:
  - Canada Oil and Gas Operations Act
  - Canada Petroleum Resources Act
- Purpose is to promote safety and security, environmental protection and efficient energy infrastructure and markets in the Canadian public interest within the mandate set by parliament in the regulation of pipelines, energy development and trade.

NEB Goals

1. NEB-regulated facilities and activities are safe and secure, and are perceived to be so
2. NEB-regulated facilities are built and operated in a manner that protects the environment and respects the rights of those affected
3. Canadians benefit from efficient energy infrastructure and markets
4. The NEB fulfills its mandate with the benefits of effective public engagement
5. The NEB delivers quality outcomes through innovative leadership and effective processes

Areas of Responsibility

- Regulatory
  - Construction, operation and abandonment of inter-provincial and international pipelines and certain international power lines
  - Transportation, tolls and tariffs
  - International trade in oil, gas and electricity
  - Exploration and production of oil and gas in Frontier areas
- Advisory
  - Monitor functioning of energy markets
  - Provides advice to federal government
  - Issues public reports (e.g., Energy Market Assessment and Energy Supply and Demand reports)

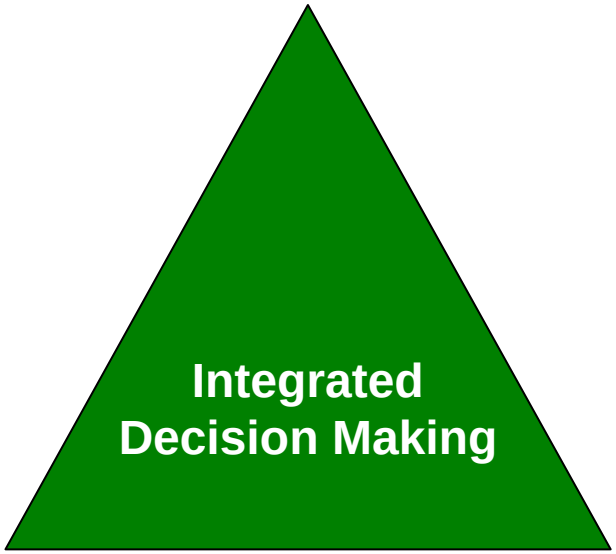
Decision Making

- The board makes over 750 decisions each year
- Decision are final
  - Only export licenses and certificates for major new facilities must be approved by Cabinet
  - Parties unhappy with a decision may ask the board to review a decision or for leave appeal a decision to the Federal Court system
- There are a variety of processes used to make decisions
  - Walkaround
  - Board Meetings
- The most complex issues are dealt with through a hearing

Decisions in the "Public Interest"

How do Regulatory Agencies decide in the Canadian Public Interest?

Considerations
- Engineering (safety, security)
- Environment and Social-Economic matters
- Supply, Markets, Economic Feasibility
- Capital and Operating Costs
- Pipeline tolls and tariffs
- Route Selection and landowner concerns
- Other matters of the public interest



Public Engagement
- Public information
- Public consultation
- Range of views from affected Canadians

Regulatory Process
- Public hearings
- Environmental Assessment
- Goal-oriented regulations

Hearings

- As a court of record, the Board can swear and examine witnesses, and take in evidence
- Hearings can be written or oral
- Oral hearings will often take place in areas in Canada most affected by the issues being decided
- The hearing process will include
  - Filling of an application and evidence by an applicant
  - Publication of the hearing
  - Registration of intervenors and interested parties
  - Written information requests by the Board and other parties
  - Examination of witnesses by the Board and intervenors (in an oral hearing)
  - Argument
  - Written decision

The NEB is a Quasi-Judicial Body

- Independent from Parliament
- Exercises court-like functions
- Makes decisions that affect the rights of parties
- Operates according to principles of natural justice
- All decisions based on evidence on the public record

What does the NEB consider?

- Safety of design and operation
- Environmental and socio-economic matters
- Supply, markets, economic feasibility
- Pipeline tolls and tariffs (methodology)
- Public consultation
- Route selection and landowner matters
- Other matters of ‘public interest’
- **“Decisions made in the Public Interest”**

Assessing Applications

- Expert Staff
- Compliance with codes and standards
- Technical meetings
- Life cycle/risk based approach
- Integrated Compliance
- Input from other parties
- Input from other government departments
- Staff recommendations to the Board

Regulatory Decisions

- Permit, certificate, or order issued if project approved
- Conditions usually attached
- Follow-up programs under the CEAA
- Construction and post-construction monitoring
- Enforcement

“SMART” Conditions

Specific (condition has an objective)

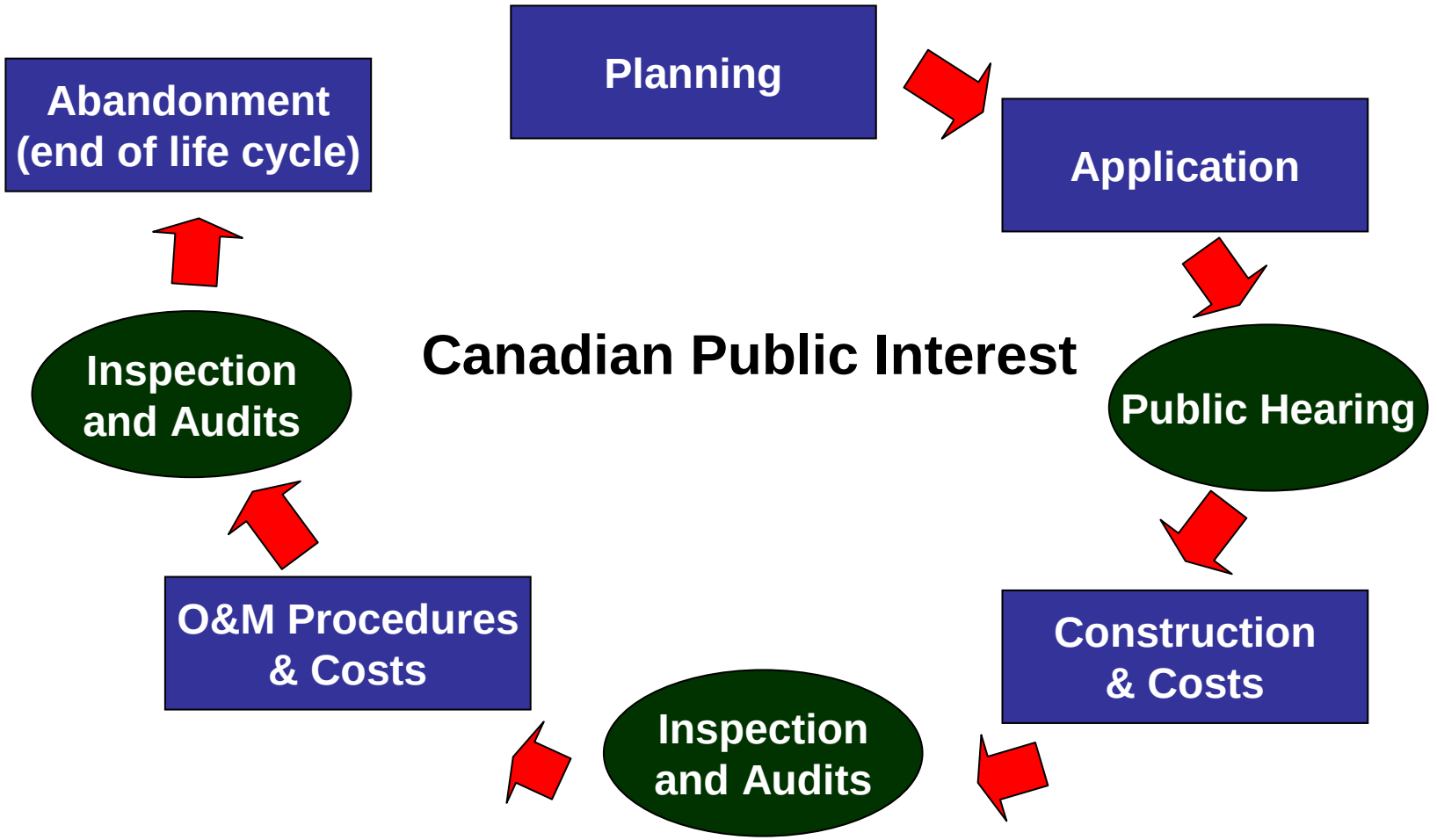
Measurable (a way to determine the requirement is met)

Attainable (Requirements are feasible and reasonable

Relevant (requirements should be related to the issue)

Track able (you want to be able to say it was done)

Life Cycle Approach



Operations Overview

- Goal Orientated Regulation
- Management System Focus
- Integrated Compliance Initiatives
- Risk
- Risk Prioritization

Goal Orientated Regulations

- The federal government has recognized that burden that can be placed on Canadian industry by regulations. In 1996 the Treasury Board of Canada Secretariat "Federal Regulatory Process Management Standards Compliance Guide" November 1996 provided direction that:

  "[regulators] need to be creative when looking for the least disruptive and least expensive way to get the result you seek, and you should not assume that regulations are the only solution. Generally, [regulators] should focus instead on desired results or performance requirements and give regulated parties flexibility in achieving them."

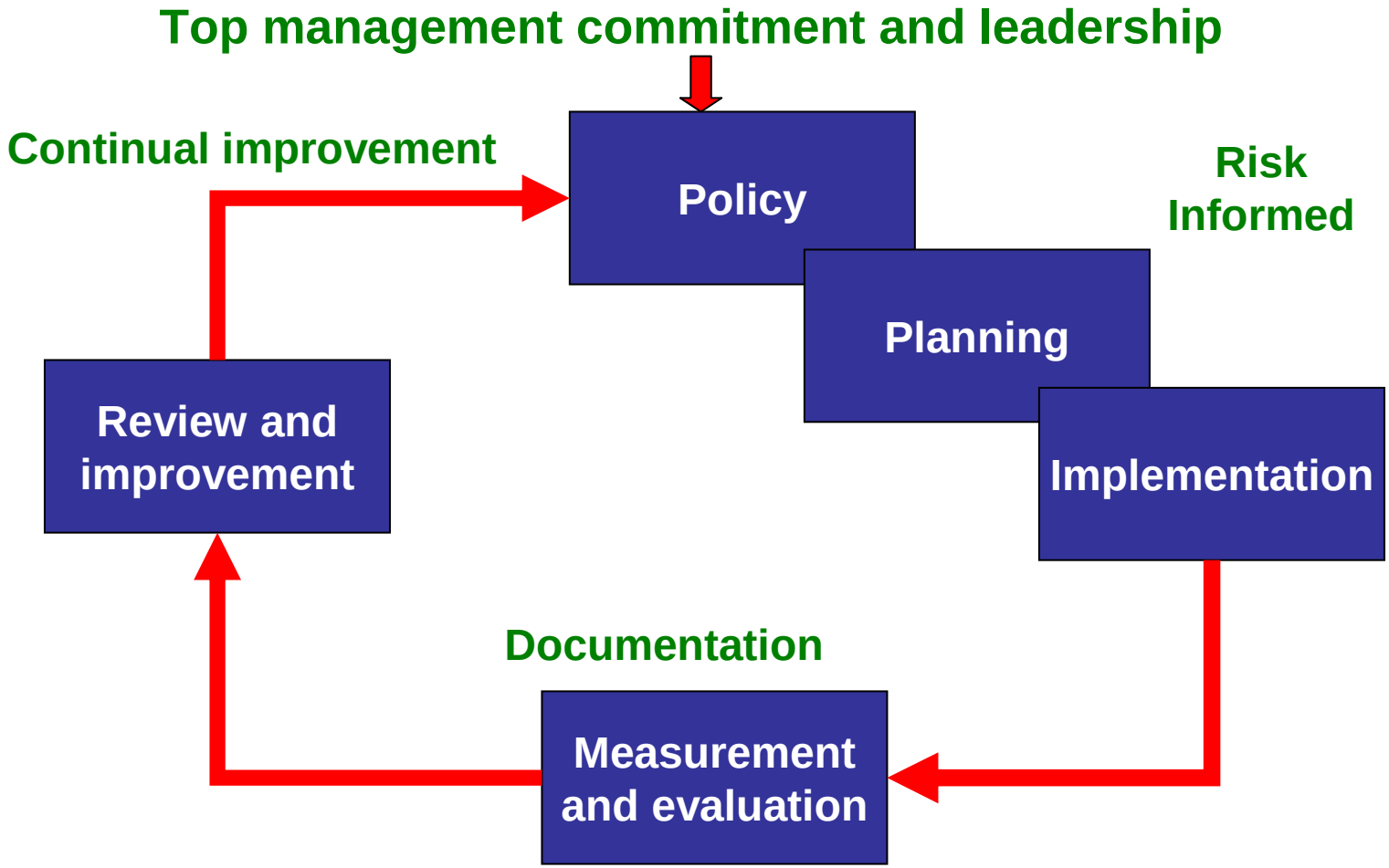
Goal Oriented Regulations

Style	Defines	Risk Approach	Compliance
Prescriptive	Means	Deterministic	Check list
Goal-based	Goals	Risk informed	Professional judgment
Performance based	Measures	Risk based	Objective criteria
Self Regulation	Outcomes	Company determined	Self assessment

Management System Focus

- The Board's regulations incorporate the requirements that companies adopt a management system approach to identify, manage and demonstrate due diligence in meeting regulatory requirements and goals
- Incorporates Plan – DO – Check – Act approach

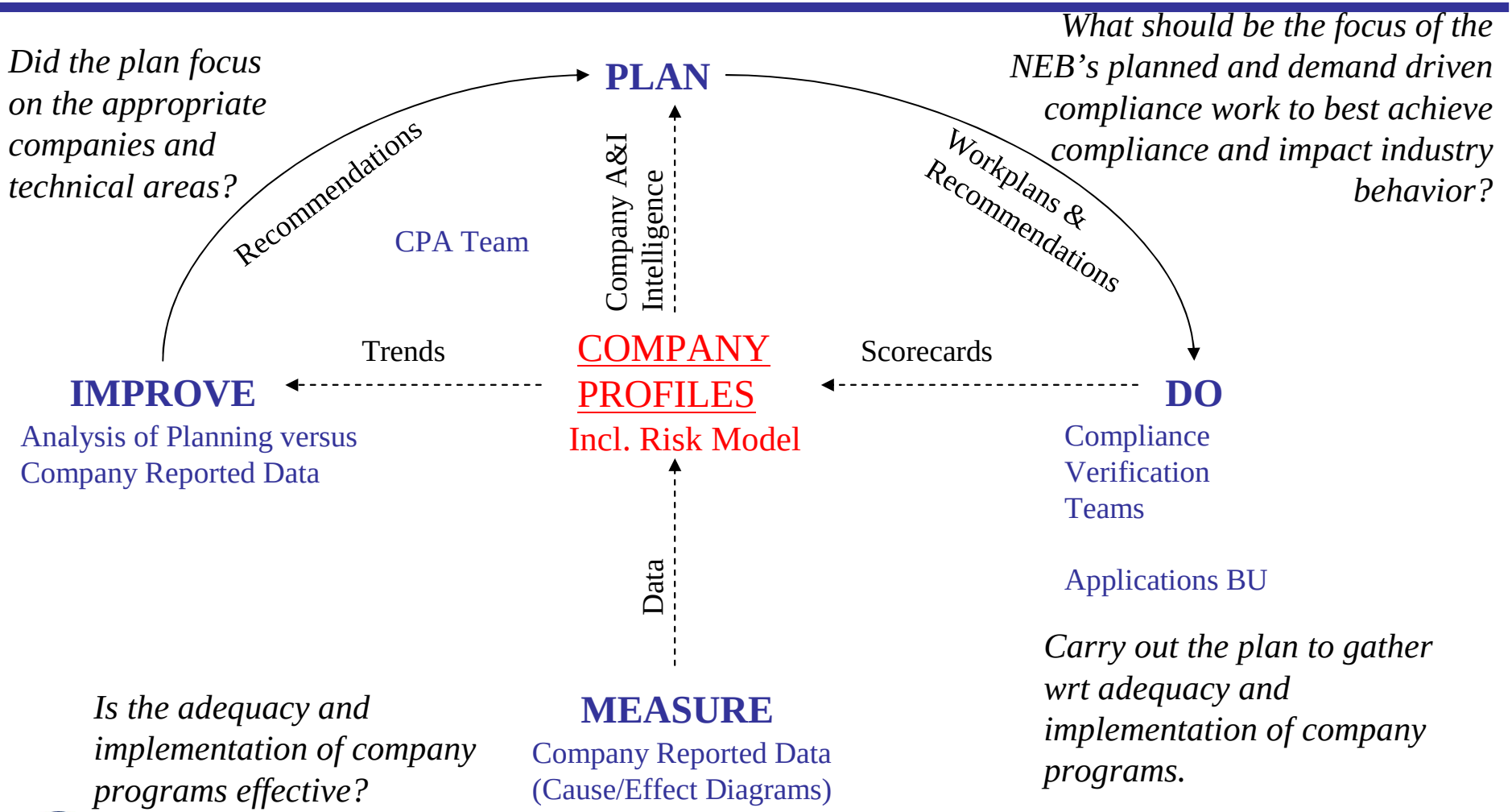
Management System Model



Integrated Compliance Initiatives

- The Board has undertaken an Integrated Compliance Program to:
  - Focus our regulatory requirements (management system approach) across its processes (Applications and Operations);
  - Utilize knowledge gained throughout the regulatory lifecycle to better manage its processes

Integrated Compliance Program



Risk

- Two Types of Risk
  - Risk internal to Board (Thresholds of Tolerance)
  - Risk associated with non-performance (Probability X Consequence)

Risk Prioritization

- NEB evaluated the “Risk” of company in regard to non-compliance and plans frequency and compliance verification activities based on scores for each technical area (Environment, Safety, Integrity, Security, Emergency Management)
- Annual Prioritization of each company
- Prioritization List developed
- Annual Resources Plans developed based on prioritization list

Company Prioritization Model

- Prioritization = Risk to the Board
  - Risk = Probability x Consequence
- Probability = f (Adequacy, Implementation & Effectiveness) of MS
  - Adequacy measured through audits
  - Implementation measured through inspections, investigations and meetings
  - Effectiveness measured through leading and lagging indicators
- Consequence = flmpact (Safety, Environment & Security)
- Use 1-9 scale to facilitate dashboard view
  - Priority = (Adequacy + Implementation + Effective)*Consequence

Company Prioritization Model

- Adequacy
  - 14 management System elements tracked over time
  - Average Final score
- Scoring
  - No finding, 1
  - Board verified CAP, 1 Company completed CAP, 3
  - Needs improvement w/ CAP, 1
  - Needs improvement no CAP, 5
  - Major finding w/ CAP, 7
  - Major finding, 9
  - No information, 9

Company Prioritization Model

- Implementation
  - Inspections 1 of 3 scorecards for measuring implementation of management system
    - » Non-compliance pre-scored 1, 10, 100
    - » Escalation for multiple occurrences and repeated offences
    - » Scorecards range from 0 to >800; scale 1-9
    - » Ability to weight by measure, type or year
  - Inspection activities include construction, post-construction, damage prevention, landowner, facilities and emergency exercises

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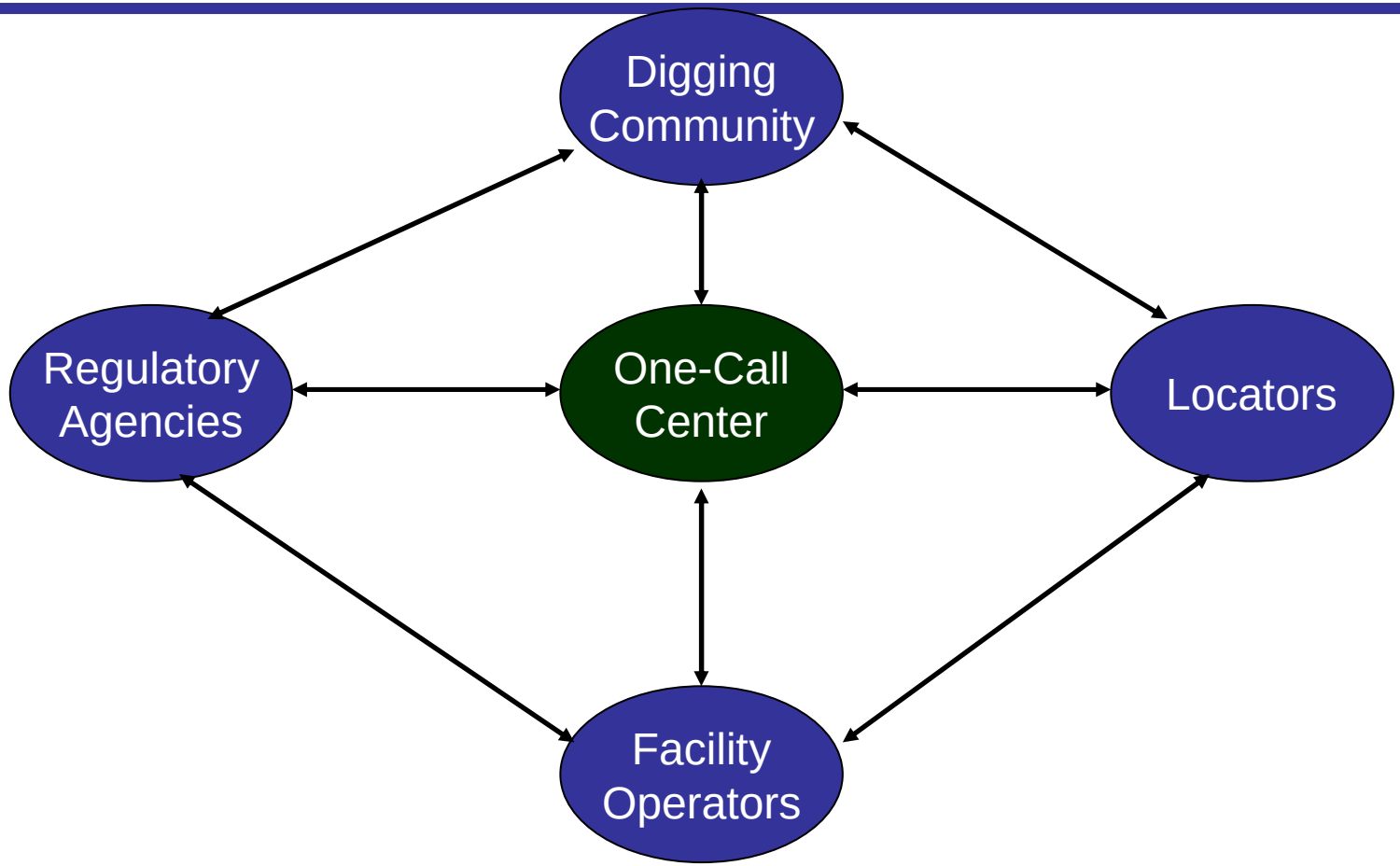
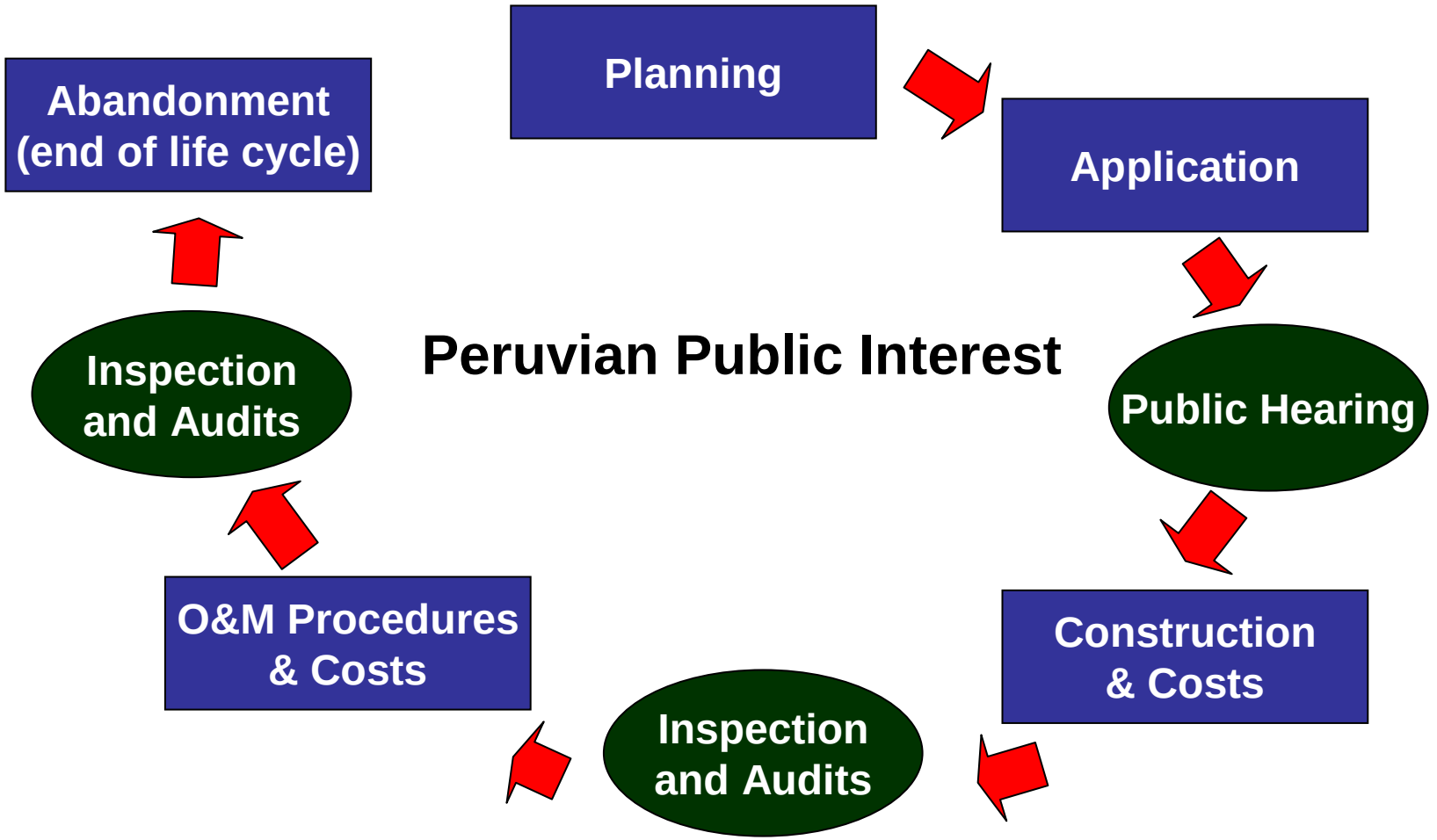
Damage Prevention Process



Recommendations for Peru

- Life cycle approach
- Goal based regulation
- One Call system

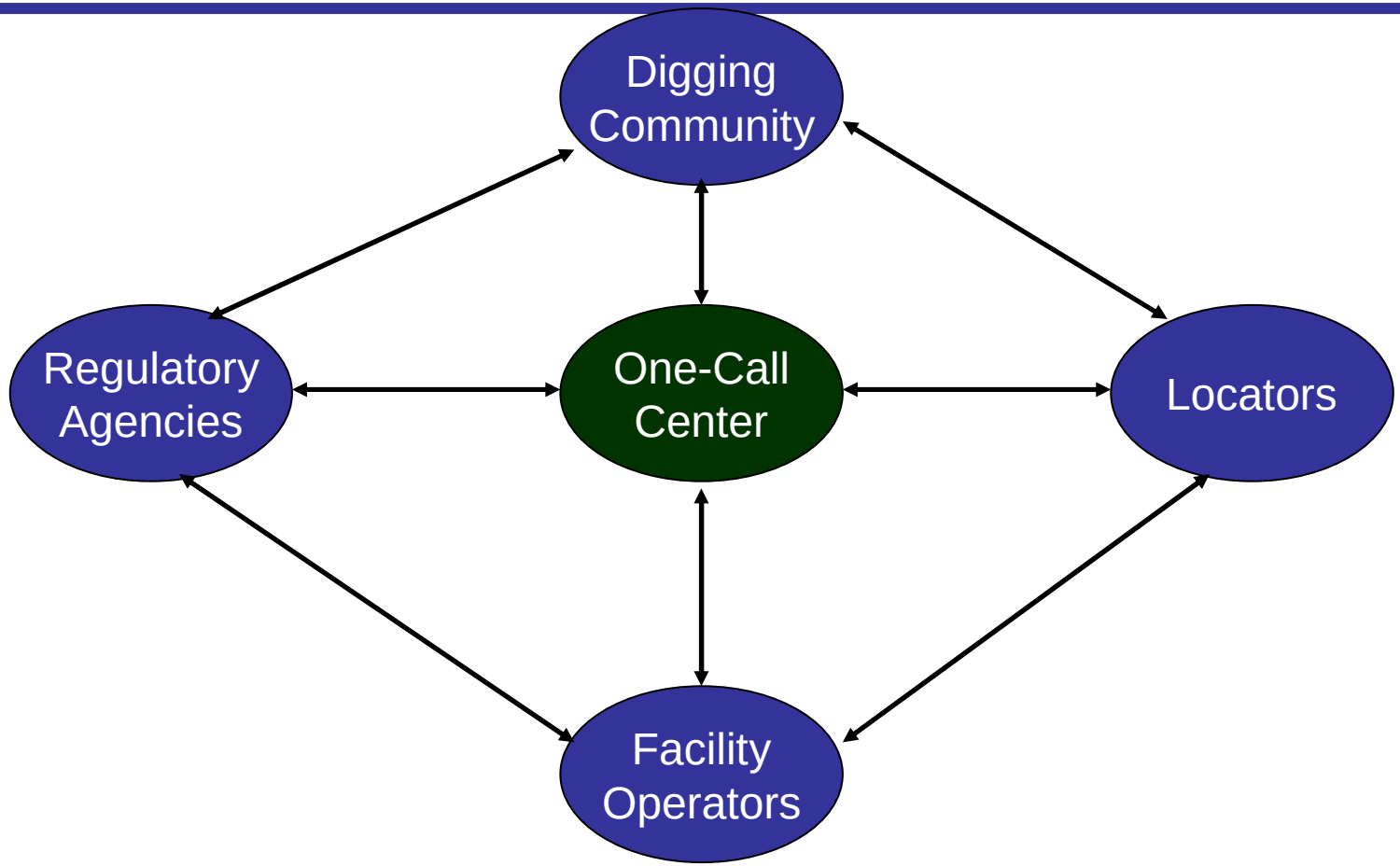
Evolve to a Life Cycle Approach



Evolve to a Goal Based Approach

- Need to be creative
- Least expensive and least disruptive way to get results
- Not assume that regulations are the only solution
- Focus on desired results or performance requirements
- Give regulated parties flexibility in achieving results

Damage Prevention Process



Appendices

Overview of Alberta Pipeline Regulation

Introduction

- EUB regulates all intra-provincial pipelines greater than 700 kPa (7 bar)
- Low pressure gas distribution network under other jurisdiction
- About 390 000 km under EUB jurisdiction
- 87% are 219 mm (8“) diameter and smaller, typical for Alberta's production fields
- Also includes >25 000 km of transmission pipeline
- 90% are steel, usually bare internal
- Largest problem is internal corrosion, followed by external corrosion

Standards and Regulations

- EUB adopt Canadian Standards Associations (CSA) standards Z662, “Oil and Gas Pipeline Systems”
- Also adopts CSA Z245 series standards on linepipe, flanges, valves, and fittings
- Uses additional Alberta legislation, “Pipeline Act” and “Pipeline Regulation”
- Pressure vessels regulated By Alberta’s Boilers Safety Association designed to ASME B31 Codes
- Processing Equipment, wellhead equipment designed to ASME B31 Codes and API Standards

EUB pipeline Act and Regulations

- Provincial Act provides legal enabling authority
- Regulation under the Act provides technical requirements specific to Alberta service conditions, environment and experience
- EUB also issues numerous minor directives and guides providing direction on specific issues, i.e., process for license application, pneumatic testing, service conservation, non metallic materials etc.

Compliance

- When applying for a routine license the operator confirms it has complied with all requirements
- Applications that may vary from unusual standard are reviewed for technical suitability
- Audits of routine applications are done selectively
- Field surveillances group conducts selectively inspections of constructions and operations
- Pipelines Inspection Directive (Directive 66) details enforcement for non-compliance
- Enforcement requires remedial action and may escalate to facility suspension

EUB Technical Tools

- EUB Technical Documents applicable to pipelines:
- Sour Service Conservation requirements
- Minimum Technical Requirements for Applications
- Use Of Bimodal High Density Polyethylene PE100
- Jurisdictional Division between CSA and ASME design
- Best Practices for Corrosion Control (with CAPP)
- Pressure Control and Overpressure Protection
- Surface Pipeline Technical Requirements

EUB 2006 Surveillance and Compliance

March 2008

Definitions

- Compliance – a licensee is found in compliance with all regulations/requirements
- Low Risk noncompliance – using the Risk Assessment Matrix, the assessment of the qualitative measures of consequences is minimal. A contravention of regulations/ requirements is found that does not result in a direct threat to the public and/or the environment and does not adversely affect oil and gas operations

Definitions

- High Risk noncompliance – using the Risk Assessment Matrix, the assessment of the qualitative measures of consequences is more significant. A contravention of regulations/requirements is found that the licensee has failed to address and/or that has the potential to cause a significant impact on the public and/or the environment.

EUB Enforcement Principles

- Public safety and environmental protection will not be compromised
- Enforcement will be timely, effective, and appropriate
- The licensee is responsible for compliance with the EUB requirements and processes

Pipelines

- The EUB regulates all pipelines that operate at a pressure greater than 100 psi (7 Bar)
- Low pressure natural gas distribution is regulated by Gas Alberta

Key Inspection Areas

- Pipeline Failures – Licensees must report any pipeline failure regardless of the cause, magnitude or consequence.
- Construction and Pressure Testing – New pipeline installations are inspected to ensure compliance with regulations and standards
- Operations Inspections – On existing pipelines to ensure operation and maintenance activities are in accordance with requirements
- Contact Damage – Sites where pipeline contact damage has occurred is inspected

Pipelines 2006

	KM
Crude Oil	18,142
Natural Gas*	248,638
Sour Gas	21,016
Water	21,753
Multiphase	52,300
Others	30,383
Total	**392,232**

***Does not include natural gas distribution operating under 7 Bar.**

Pipeline Failure/hits

- Hit – striking a buried pipeline during a ground disturbance activity resulting in the pipeline or pipeline coating being damaged; a release of product does not necessarily result
- Leak – an opening, crack, or hole in a pipeline causing some product to be released, but not immediately impairing the operation of the pipeline
- Rupture – The instantaneous tearing or fracturing of the pipeline material, immediately impairing the operation of the pipeline

Reported Failures/Hits
January 1 – December 31, 2006

Cause	Incidents		Leaks		Ruptures	
	#	%	#	Insp.	#	Insp.
Construction Damage	68	7.6	65	41	3	2
Damage by others (hits with release)	26	3.0	19	15	7	7
Damage by others (hits, no release)	80	8.9	0	55	0	0
Earth Movement	13	1.4	13	6	0	0
External Corrosion	110	12.3	107	51	3	2
Internal Corrosion	343	38.3	343	163	0	0
Fittings/Valve Failure	53	6.0	53	18	0	0
Other (Girth weld, Overpressure, etc.)	202	22.5	202	88	3	3
Total	895	100	802	437	16	14

Minimizing Release Effects

- Leak detection systems
- Training and awareness programs
- Automated shut-in equipment
- Pipeline patrols

When Failure Occurs

Licensee must:

- Confirm the integrity of the entire pipeline segment
- Perform an engineering assessment on the entire pipeline system it operates
- Outline measures to prevent further occurrences
- If failure cannot be identified, perform a failure analysis

Failures Compared to Total Pipeline Length

Year	Length of Pipe (1000s of Km)	Ratio (failures/1000 km)
2002	317	2.5
2003	332	2.4
2004	354	2.4
2005	373	2.3
2006	392	2.2

Pipelines: Delivering Benefit

Canadian Energy Pipeline Association

Mission

- Represent the views of its member companies, with the intent of ensuring that Canadians benefit from an energy transportation infrastructure which is operated safely and is financially sound and environmentally sustainable, by:

- Working with governments and other stakeholders in the formulation of policy and regulation
- Promoting best practice sharing
- Conducting research to support appropriate public policy development

CEPA Members

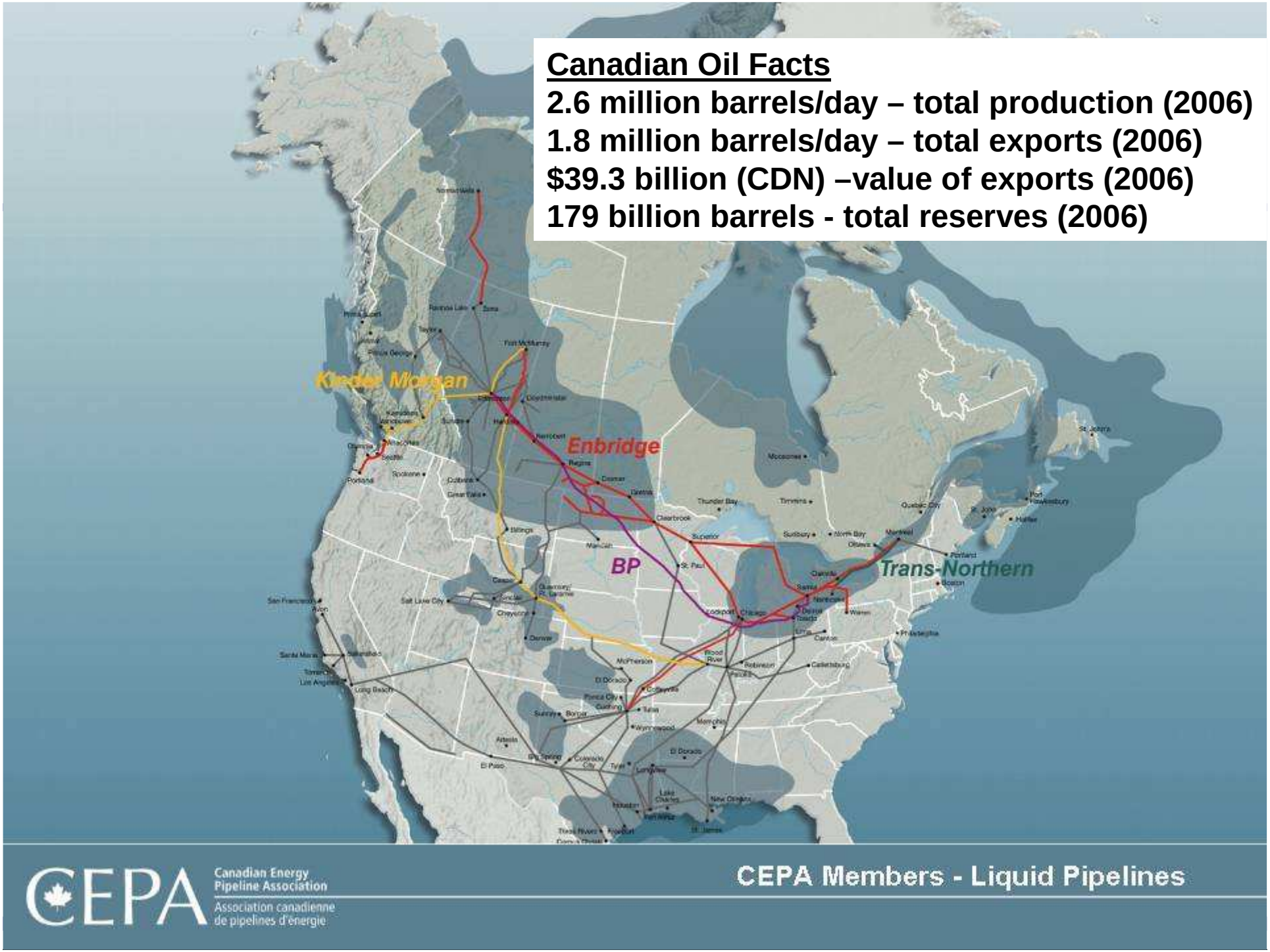
- Transport 97% of the crude oil and natural gas produced in Canada
- Oil pipeline system near capacity
- New natural gas supply needs to be connected to existing pipeline systems
- Collective assets must double in next 15 years

Full

- TransCanada
- Enbridge
- Spectra
- Alliance
- Kinder Morgan Canada
- TransGas
- ATCO
- Trans-Northern
- Foothills
- Trans Quebec & Maritimes

Technical

- Pembina Pipelines
- BP Canada Energy Company
- Maritimes & Northeast Pipeline
- Access Pipeline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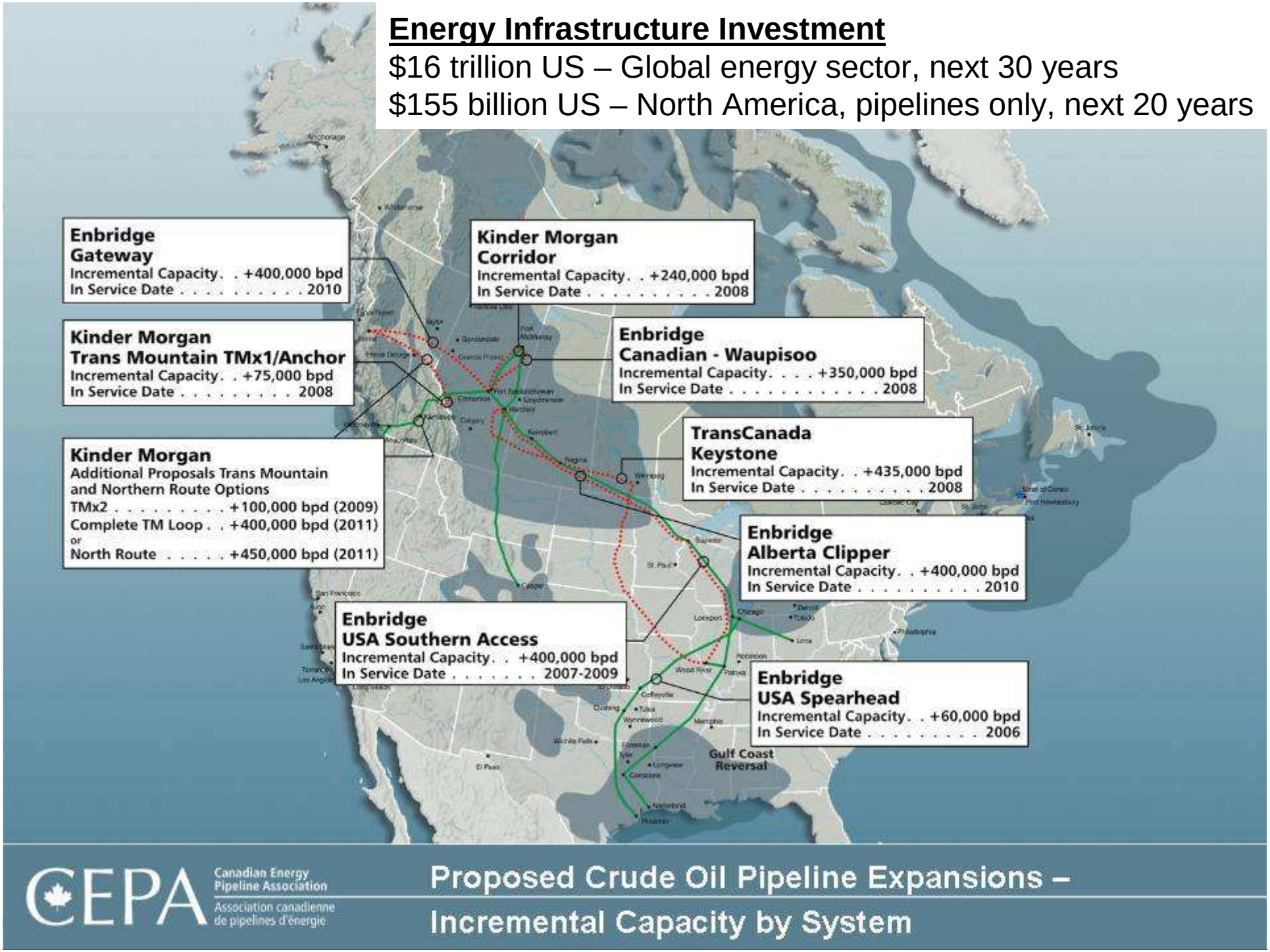

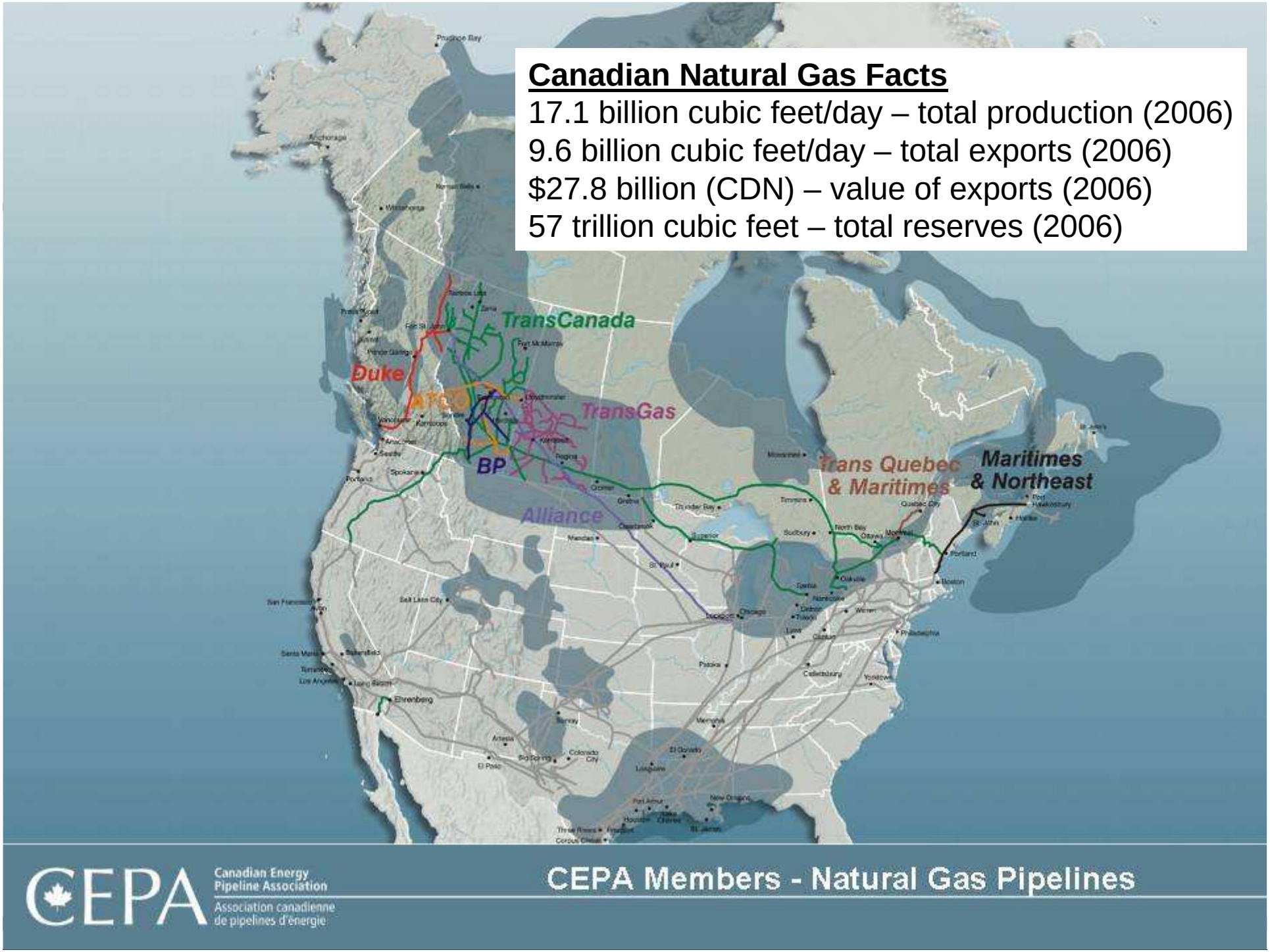
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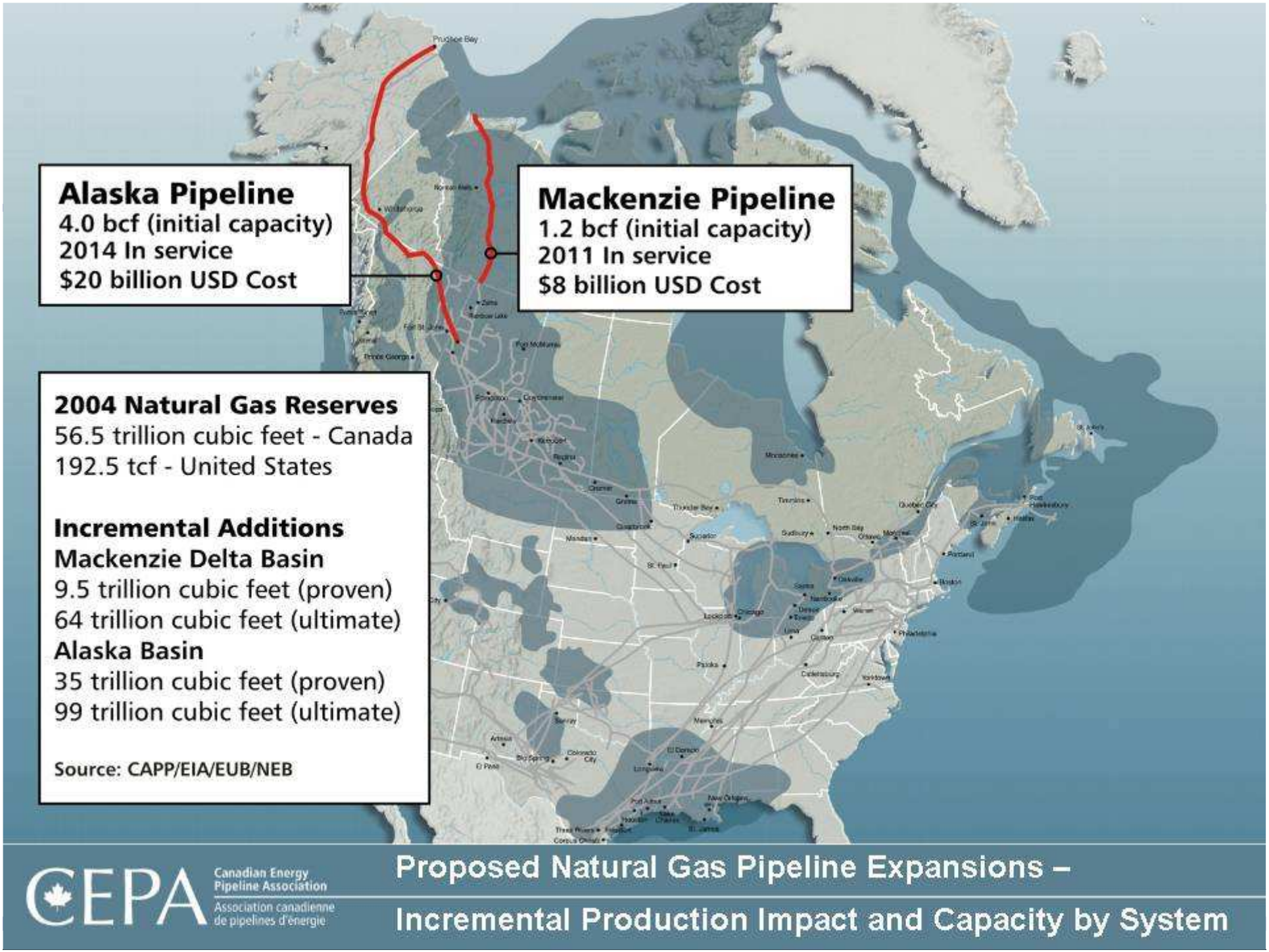
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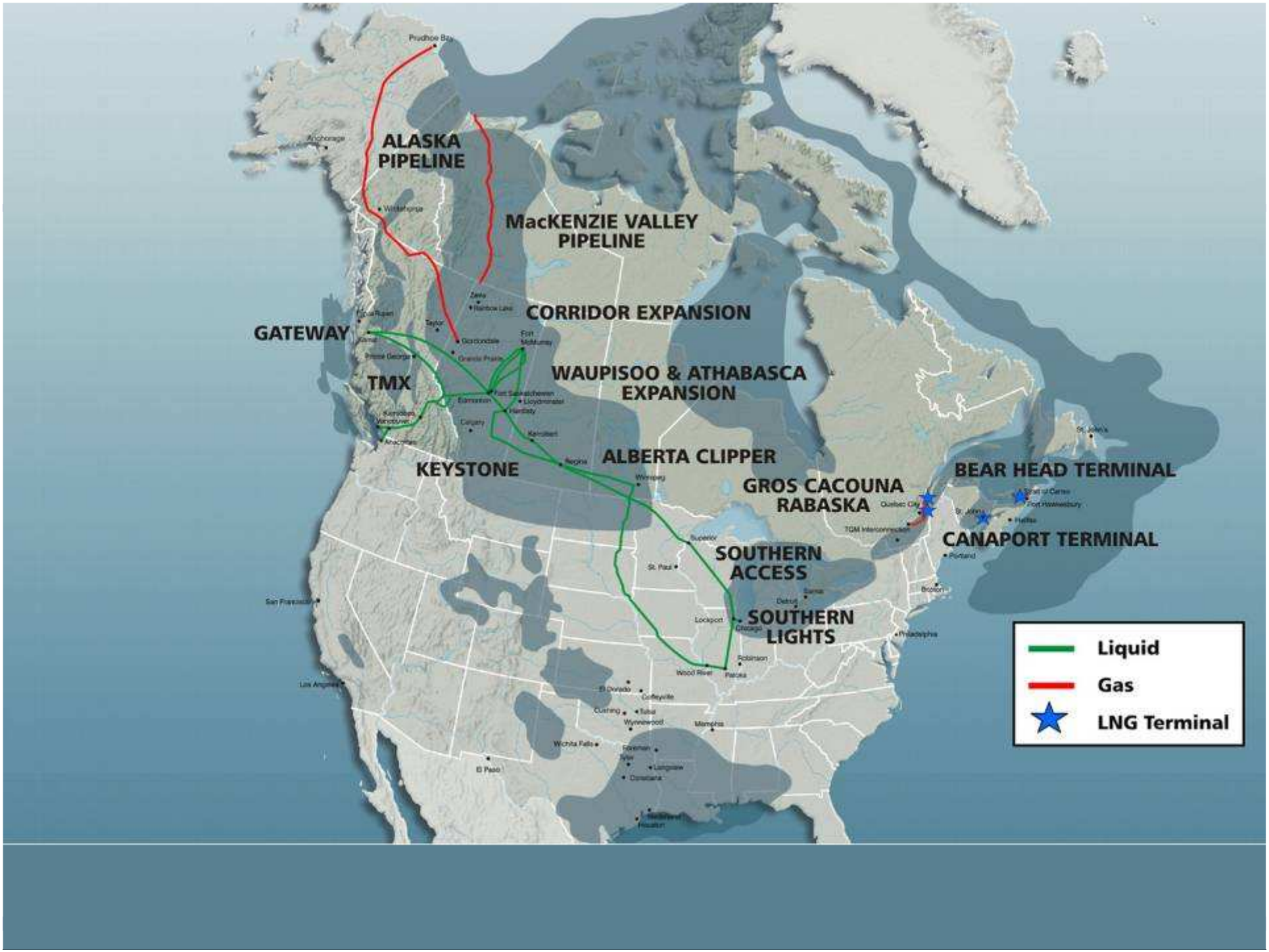
9.5 trillion cubic feet (proven)
64 trillion cubic feet (ultimate)
Alaska Basin
35 trillion cubic feet (proven)
99 trillion cubic feet (ultimate)
Source: CAPP/EIA/EUB/NEB
CEPA
Canadian Energy Pipeline Association
Association canadienne de pipelines d'énergie
Proposed Natural Gas Pipeline Expansions –
Incremental Production Impact and Capacity by System


ALASKA PIPELINE
MacKENZIE VALLEY PIPELINE
CORRIDOR EXPANSION
GATEWAY
TMX
WAUPISOO & ATHABASCA EXPANSION
KEYSTONE
ALBERTA CLIPPER
GROS CACOUNA
RABASKA
BEAR HEAD TERMINAL
CANAPORT TERMINAL
SOUTHERN ACCESS
SOUTHERN LIGHTS
Liquid
Gas
LNG Terminal

Pipelines: Delivering Benefit Contributing to Quality of Life

- A typical 1,000 kilometer pipeline project will benefit all Canadians
  - Creates 12,000+ person years of work
  - Adds almost (CDN) $1 billion to Canada's GDP
- Demonstrated commitment to health, safety and environment
  - No ruptures or leaks on member transmission pipeline systems under NEB regulation (2003 -2005)
- Pipeline companies invest locally through employment, taxes and goods and services purchases
- Two-thirds of the energy used by Canadians is carried by CEPA member pipelines

Pipelines: Delivering Benefit
Career & Business Opportunities

- Engineers
- Accountants
- Process and field operators
- Electricians
- Instrumentation specialists
- Welders
- Equipment operators
- Building trades
- Information systems
- Geotechnical
- Wildlife monitoring
- Traditional knowledge specialists
- Land owner relations specialists
- Equipment supply/maintenance \
- Charter air services
- Catering and accommodation
- Camp and site security services

Pipelines: Delivering Benefit
Project Decision Delays Costly

- Energy infrastructure development delays increase natural gas prices by $57.7 billion between 2006 – 2025

  - 56.4% of the increase paid by industrial gas consumers

  - 27.1% of the increase paid by residential gas consumers

  - 16.5% of the increase paid by commercial gas consumers

Pipelines: Delivering Benefit Development Environment Changing

Context

- **Health, Safety & Environmental**
  - Air, water and soil quality
  - Climate change
  - Multiple land-use demands
- **"Fair-Share" Issues**
  - Community infrastructure
  - Access fatigue
  - F/P/T revenue sharing
- **Prosperity Infrastructure**
  - Refining, upgrading and pipelines
  - Labour availability
  - Social needs

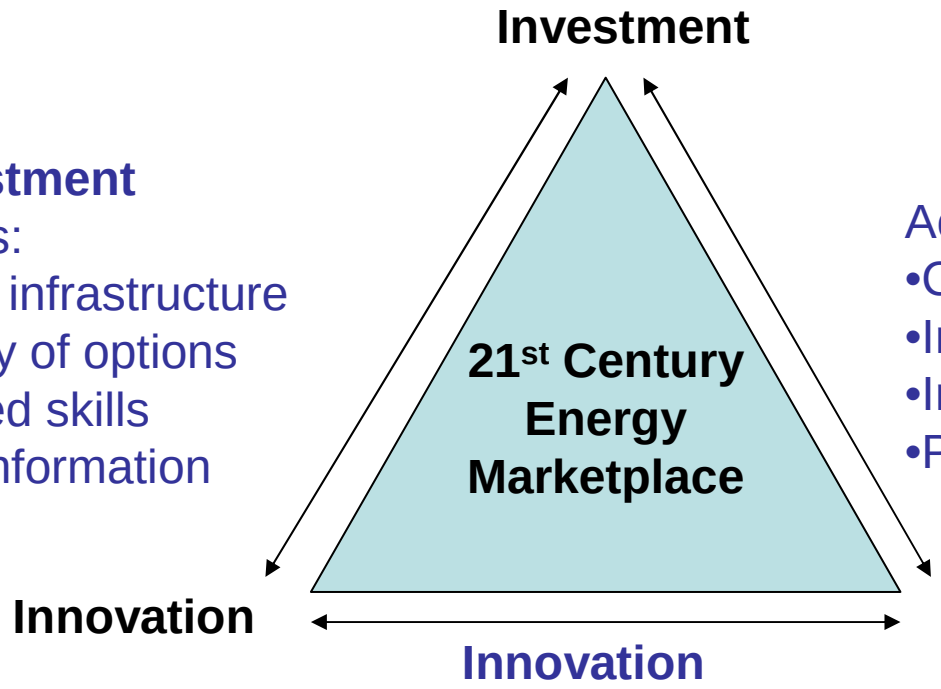
Public Policy Issues

- **Land Access**
  - Aboriginal land claims, consultation and capacity
  - Land-use guidelines
  - Development benefits information
- **Regulatory & Policy**
  - Effective and efficient
  - F/P/T overlap and duplication
  - Agency/Department capacity
- **Investment & Innovation**
  - Skills and HR development
  - R, D&D
  - Foreign and domestic direct investment

Pipelines: Delivering Benefit
Regulatory Effectiveness and Efficiency

- Focus must be on both effectiveness and efficiency
- Policy must be risk-management based and establish accountability and performance measures
- Canadians, government and industry must benefit
  - Enhanced environmental, public health & safety protection
  - Improved investor certainty
  - Timely infrastructure development
  - Cost-effective delivery of government services
- Ensure adequate agency/department capacity
  - The right people with the right skills
  - Establish a major project management process

Policy Framework Enables Opportunities



Investment

Achieves:

- Modern infrastructure
- Diversity of options
- Improved skills
- Better information

Good Governance

Achieves:

- Clear priorities
- Improved approval processes
- Intergovernmental cooperation
- Protection of physical integrity

Innovation

Achieves:

- Environmental performance
- New technologies
- Energy productivity
- Customer choice

Regulation Areas

- Oil
- Gas
- Oil sands
- Pipelines
- Coal
- Power plants
  - Transmission lines
- Rates for gas and electric utilities

Goal Orientated Regulation

- NEB Onshore Pipeline Regulation (OPR-99) reflect goal orientation by:
  - Providing simplified requirements with broad goals, broad application and clear guidance outlining the goal of the section and interpretation guidance

Goal Orientated Regulation

- Environmental Protection Program
  - 48. A company shall develop and implement an environmental protection program to anticipate, prevent, mitigate and manage conditions which have a potential to adversely affect the environment.

Goal Orientated Regulation

- Goal (s. 48): To ensure that protection of the environment is achieved through the development and implementation of a systematic environmental protection program.

Goal Orientated Regulation

Guidance

- An environmental protection program assists a company in proactively managing environmental issues and systematically tracking its environmental performance. Program components should be developed to anticipate, prevent, and mitigate conditions that have the potential to adversely affect the environment, thereby managing environmental risk throughout the lifecycle of the pipeline.
- An environmental protection program should define the responsibilities, practices, procedures, processes, and resources for achieving, reviewing, and maintaining the company's environmental performance.

Goal Orientated Regulation

- For guidance in developing an environmental protection program, companies may use the applicable provisions of the ISO 14000 series of Standards as a reference. Consistent with ISO 14000 principles, an environmental protection program should be embraced by employee and driven by senior management.
- The components of an environmental protection program could include:
- (a) an environmental policy and committee statement

Goal Orientated Regulation

- (b) a planning process that takes into account legislative and other requirements and incorporates relevant environmental procedures that may include details on the management of:
- Materials Storage and Waste (including communication and handling of MSDS, segregation, signage, containment, labeling, etc.);
- Vegetation (including baseline information and control plots where appropriate);
- Soils;
- Air Quality (including provisions for modeling and monitoring when appropriate);
- Noise (including provisions for monitoring when appropriate);
- Wildlife and wildlife habitat (including baseline data and ongoing monitoring programs;

Goal Orientated Regulation

- Aquatic resources and water quality (Including baseline data and ongoing monitoring programs);
- Heritage Resources; and
- Traditional Uses;
- (c) an implementation process which could involve:
- Implementing relevant environmental procedures;
- Applying defined roles and responsibilities;

Goal Orientated Regulation

- Environmental training, awareness and competency (including contractors); and
- Consultation and communication procedures;
- (d) a process for review and corrective action which could involve:
- monitoring and measurement procedures;
- non-conformance, corrective and preventive action procedures;
- documentation and records procedures; and
- Internal program audits to determine if the system or program has been implemented and maintained as planned; and
- (e) a management review to determine program suitability and continual improvement.

Goal Orientated Regulation

- In closing, section 48 should not to be viewed as stand alone, in that an environmental protection program embraces many other aspect of the OPR-99.

Traffic, Tolls and Tariffs

March 2008

Part IV of the NEB Act

- The Board may make orders with respect to all matters relating to traffic, tolls and tariffs (section 59 of the NEB Act)

Definitions

- Traffic – the commodity being transported and the activity of transportation and other associated dealings with that commodity.
- Toll – the price charged by a pipeline company for the use of its facilities.
- Tariff – The terms and conditions under which the services of a pipeline are offered or provided, including the list of tolls, the rules and regulations, and the practices relating to specific services.

Mandate Under Part IV of NEB Act

- "all tolls shall be just and reasonable, and shall always, under substantially similar circumstances and conditions with respect to all traffic of the same description carried over the same route, be charged equally to all persons at the same rate"
- A company shall not make any unjust discrimination in tolls, service or facilities…"

Economic Regulation Objectives

- Ensure adequate pipeline capacity is in place
- Ensure that pipeline system provides shippers with desired services at reasonable cost
- Ensure that pipelines are financially viable (are able to raise adequate capital to maintain system and finance expansion)

Forms of Toll Regulation

- Group 1 – Larger pipelines which typically have many shippers and require ongoing financial regulatory oversight (12)
- Group 2 – Smaller pipelines regulated on a complaint basis (Approximately 100)

Types of Toll Regulation

Group 1

- Cost of Service
- Negotiated Settlements

Group 2

- Complaints based regulation

Cost of Service

Advantages

- Forecast costs recovered from customers
- Regulator sets allowable return on equity
- Easy to understand

Disadvantages

- Little incentive to reduce costs
- Regulatory burden
- Potential adversarial relationship with customer

Negotiated Settlement

Advantages

- Reduce regulatory burden
- Improve customer relations
- Focus on results not process
- Sharing of efficiency gains
- Quality of service increase

Disadvantages

- Higher risk as earnings not set by regulator
- May increase complexity of agreements

Cost of Service Regulation

- Traditional method of regulating major pipelines under Board jurisdiction (focus is on cost control)
- The pipeline forecasts its total cost of providing service for a forward test period
- COS = Revenue Requirement

Cost of Capital

- Generic hearing held in 1995 to address cost of capital for 10 pipelines
- Board approved:
  - Appropriate equity ratios
  - Uniform rate of return on common equity
  - Established a procedure for annual adjustments to rate of return on equity

Fair Return Standard

Comparable Investment Standard

- Is the return comparable to the return available to other enterprises of similar risk?

Financial Integrity Standard

- Can the financial integrity of the company be maintained?

Capital Attraction Standard

- Can incremental capital be attracted to the enterprise on reasonable terms and conditions?

Negotiated Tolls Settlements

- All interested parties have a fair opportunity to participate
- Must not fetter the Board's ability to reflect public interest
- Must not contain provisions which are illegal or contrary to the Act
- Must produce adequate information for Board to assess reasonableness

Items Addressed in Settlements

- Revenue Requirements
- Rate of Return
- Performance Incentives
- Toll Design
- Reporting Requirements

Negotiated Settlements

Contested

Uncontested

Tolls Settlement Process

- Settlement or Application filed
- Regulatory panel appointed
- Board solicits comments from interested parties
- Staff analysis, information requests
- Hearing ?
- Decision

Contested Tolls Settlement

If an interested party opposes it shall provide:

- Grounds for opposition
- Statement of facts to support opposition
- Nature of prejudice or damage if settlement is approved
- Nature of relief sought

Benefits of Negotiated Settlements

- Eliminates adversarial process
- Saves times and cost of hearing
- Provides for sharing of savings
- Fosters better working relationships between pipelines and shippers
- Can offer service innovations
- Effective multi-year process

Complaint Based Regulation

- Lighter degree of toll and tariff regulation
- Pipeline is responsible for providing sufficient information to enable them to determine whether the tolls are just and reasonable
- If a complaint, Board establishes procedure to examine tolls
- Distinction applies to economic regulation but not to safety, etc.
- Few complaints

Pipeline Access

- Oil Pipelines are generally common carriers (30 day commitment)
- Gas pipelines are contract carriers (contracts for one year or more)
- Pipelines have access criteria listed in Board approved tariff
- Board can direct pipeline to provide service under section 71 of NEB Act

Toll Design

- Toll design is the process of deriving tolls for different services from the cost of service and throughput or contracted volumes
- Tolls should generate sufficient revenue to recover approved costs, and at the same time fairly allocate charges to users in relation to the costs and benefits of different services

Toll Design Principles

- Just and Reasonable
- No Unjust Discrimination
- Cost-based
- User Pay/Cost Causation
- Fairness and Equity
- No Acquired Rights to Facilities
- Simplicity, Stability, Predictability
- Economic Efficiency
- Innovation
- Open Access and Transparency

Gas Pipeline Toll Design

- Gas pipes typically have a two-part toll
- Straight Fixed Variable (SFV) – All fixed costs are assigned to the demand toll, all variable costs are assigned to the commodity toll
- This method virtually assures 100% recovery of the pipeline's fixed costs
- 100% Load Factor tolls

Gas Pipeline Toll Design

- Total fixed allocated costs are divided by contracted volumes and then by 12 to arrive at the monthly demand toll
- Total variable allocated costs are divided by throughput volumes to arrive at the commodity toll

Firm Transportation (FT) Service

- A non-interruptible transportation service which provides for the delivery of gas up to a specific maximum daily quantity
- Shipper must pay a monthly demand charge regardless of the volumes transported, a commodity charge for the volumes actually transported and provide fuel gas

Interruptible Transportation Service

- A transportation service provided on an interruptible basis (lower priority)
- Shipper only pays a toll for the volumes actually transported
- The toll is usually expressed as a percentage of the FT toll
- Some pipelines have biddable IT tolls

Toll Design Methodologies

- Different toll design methodologies are used in Canada
  - Postage Stamp (e.g. M&NP)
  - Zonal (e.g. TCPL domestic, Westcoast)
  - Point-to-Point (e.g. TCPL exports and short haul)
- Each method has merit depending on the circumstances

Rolled-in vs. Incremental

- Rolled-in: Expansion costs are pooled with existing costs and charged to all users equally
- Incremental: Expansion costs are charged only to expansion shippers
- Stand alone: Tolls paid by only those shippers utilizing specific facilities that are physically distinguishable form existing facilities

Reasons for Rolled-in

- No acquired rights (the payment of tolls in the past confers no benefit on toll payers beyond the provision of service)
- No vintage tolling (No discrimination among shippers on basis of when they commenced service)
- Operation integration (New facilities will become an integral part of the system and will not be dedicated to any individual shipper's gas)
- Cost Causation (Aggregate demand of all shippers caused the need for additional capacity)

Example of Incremental Tolling

- Delivery Pressure tolls on TCPL
- Pressure higher than 4000 kPa at certain export points
- Separate and distinct service required by limited number of shippers
- Facilities can be separately identified
- Principles of cost causation and user pay