



# Alberta's Industrial Heartland

## The Year in Review The Path Forward

February 5<sup>th</sup>, 2010



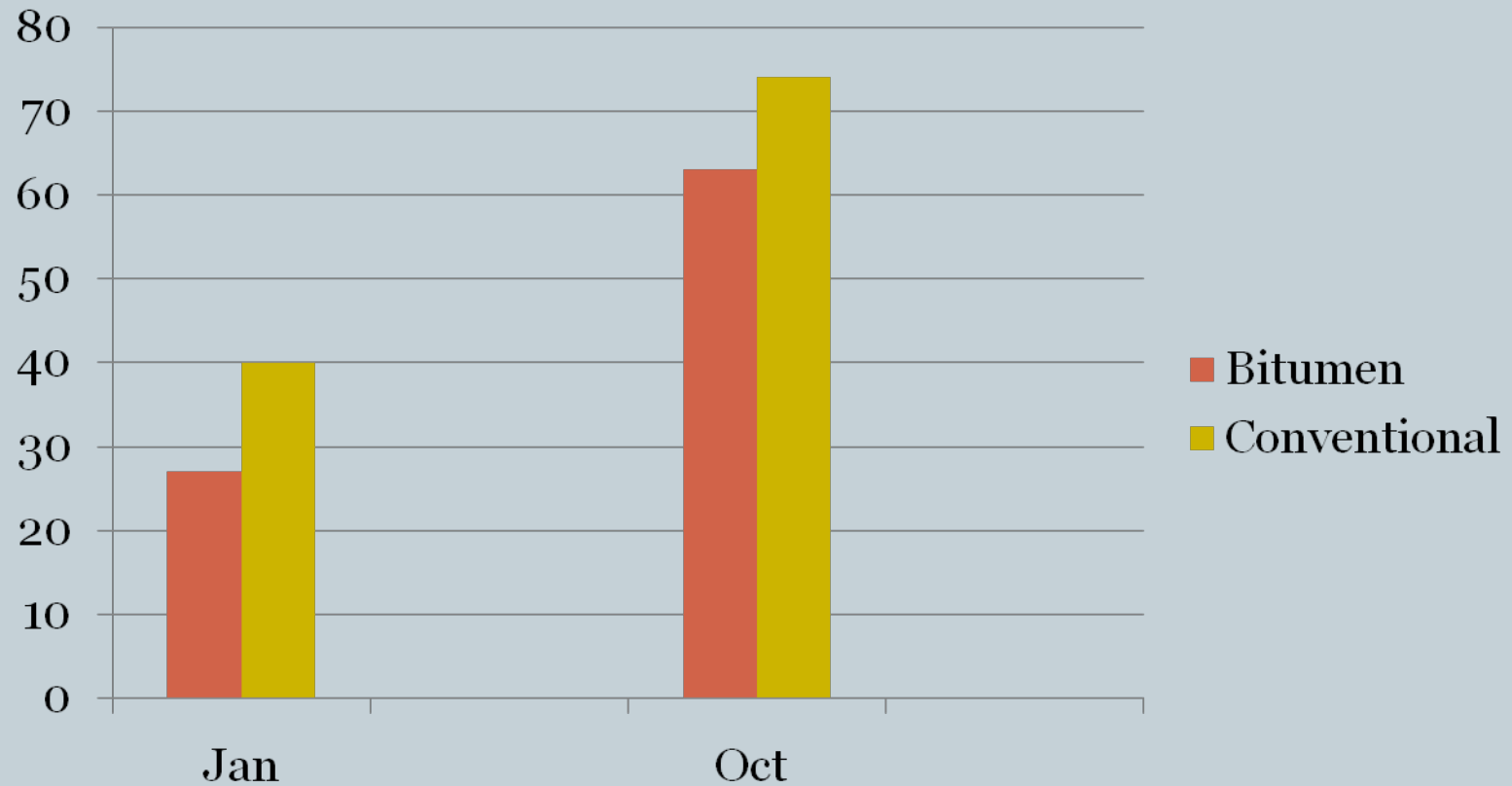
# Green Shoots? Handle With Care



# Up from the Bottom



## 2009 Oil Prices



Source: ERCB Monthly Stats

# A Return to the Oil Sands



<b>Project</b>	<b>Capital Cost</b>	<b>Production</b>
Esso – Kearl Lake	\$8 billion	300,000
Suncor – Fire Bag 3 &4	\$2.9 billion	136,000
Total/Conoco - Surmont	\$3.3 billion	83,000
Husky – Sunrise	\$2.5 billion	200,000
<b>Total</b>	<b>\$16.7 billion</b>	<b>719,000</b>

# Government of Alberta Initiatives

## 1. “Bitumen Royalty In Kind” (BRIK) program launched summer of 2009

- Winner to be announced Spring of 2010

## 2. Carbon Capture and Storage (CCS) funding commitment

- Enhance Energy – Carbon “Trunk Line”
- Shell Quest
- ARC Resources



# Regulatory Certainty? Just Around the Corner



## 1. Water Management Framework

- Baseline science to establish quantity and quality of water in the N. Saskatchewan as well as management options
- Final report late 2010, early 2011

## 2. Air Shed Management

- Implementation plan being worked on for NO<sub>x</sub> and SO<sub>x</sub> emissions

## 3. CRB plan

- Enshrines AIH as industrial development zone

## 4. Copenhagen – Climate Change

- Oops, lets try again next time!!!

# Heartland Projects

## Moving Forward

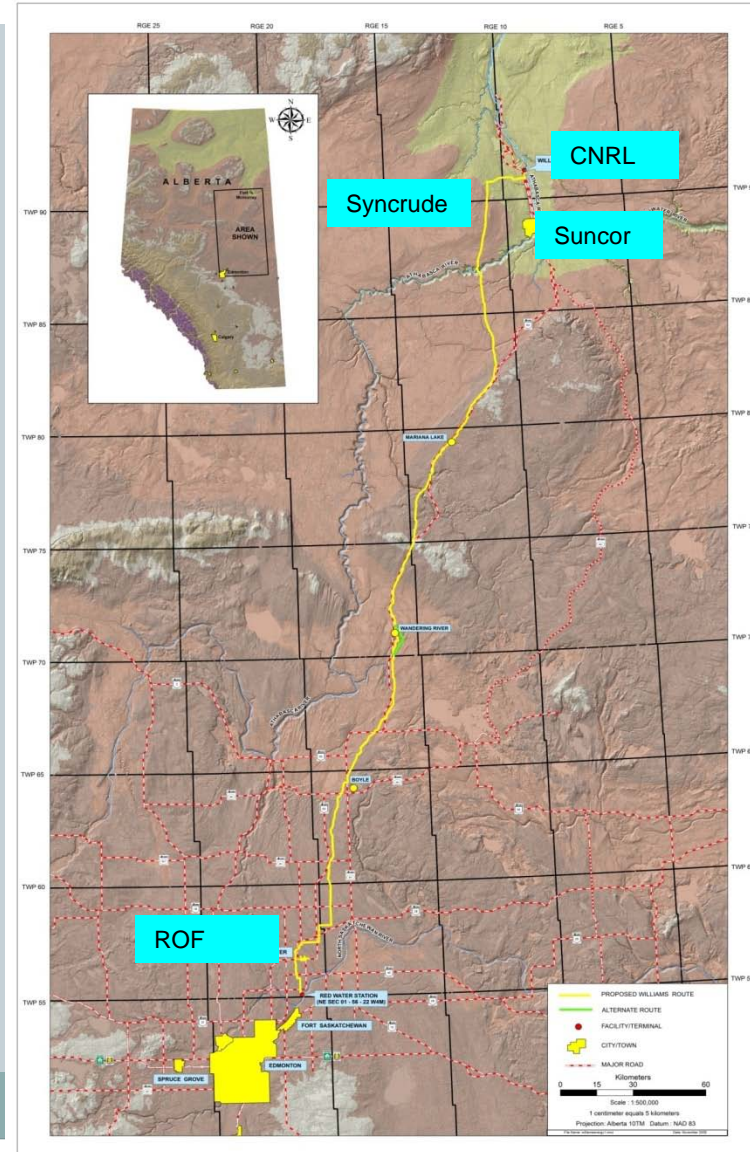


- **Total E&P Upgrader**: ERCB hearing date set for February 2010
- **North West Upgrading**: Awaiting government decision on BRIK program
- **Air Products and Praxair**: Moving forward with hydrogen projects
- **Forts Hill, Northern Lights, BA, Shell (phases 2 to 4), Statoil**: To be addressed in the future.

# Williams Boreal Pipeline and Redwater Olefinic Fractionator



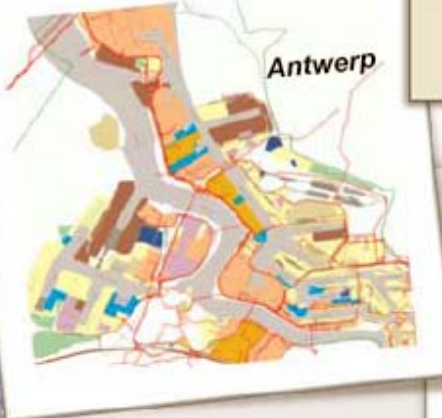
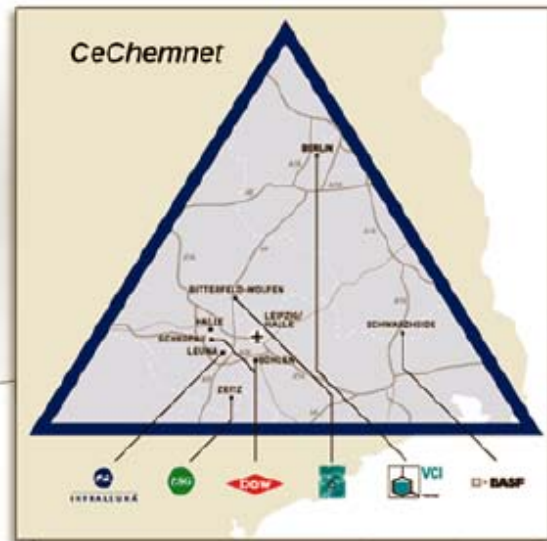
- \$340 million pipeline for NGL and Olefins
- Storage cavern expansion
- Butane/Butylene splitter project awaiting regulatory approval
- Significant new feedstock potential for the petrochemical industry



# Shift in Industrial Development From “Mavericks” to “Cooperation”



# Global Best Practices



# Layout of Shanghai Chemical Industry Park



**Foreign Investors for Utilities Projects**

Industrial Water Works	Suez Group, France
Waste Water Treatment	Suez Group, France
Jetty and Tankfarm	Vopak, Holland
Industrial Gases	AIR LIQUIDE, France
Co-gen	Praxair, Inc., USA
Incinerator	Sembcorp, Singapore
Industrial Packaging	Suez Group, France
	Schutz, Germany

**LEGEND**

- ① China Research Institute of Petrochemical Basic Organic Material State Engineering Research Center
- ② ECUST R&D Center
- ③ Administration Service Area
- ④ Shanghai Shenxing Chemical
- ⑤ Steam Recovery Plant
- ⑥ Fine Chemicals, Maintenance, Testing, Spare parts warehouse Area
- ⑦ Bayer Technology Engineering Service, HuaLin Industrial Gases
- Firefighting Station
- Pump Station
- ⚡ 220KV Substation

Total Planning Area: 29.4 km<sup>2</sup>

# Cluster Attributes



Maximising the combination of these leads to "best in class"

**Feedstock availability and flexibility**

**Market proximity, diversity and critical mass**

**Supply Chain efficiency (feedstocks and products)**

**Cluster critical mass and operational efficiency**

Cluster **"Attributes"**  
– only manageable to a limited extent

Cluster **"Key Performance Criteria"** – mostly manageable

# Bitumen Product Integration

Upstream

Upgraders,  
Integrated  
Gasifiers,  
Refineries

Gasification

Syn Gas

Pipe Rack to Midstream Cluster(s)

Midstream Cluster(s)

Gasification

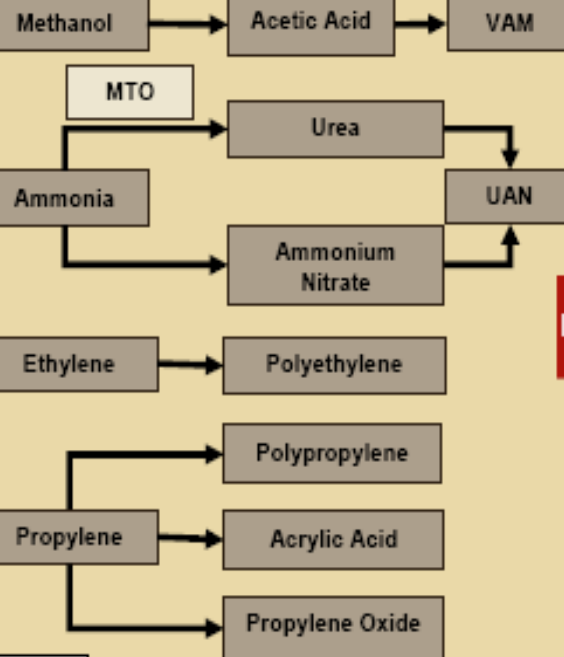
Refinery  
Cracker(s)

Ethane  
Propane

Refinery  
Offgas

C1, C2, C3 Value Chains

C4, C6, C7/8 Value Chains



Intermediates

CoE Downstream

Phase 2 Derivatives  
Fabrication  
Compounding  
R&D / Tech Centres  
New Technologies

Truck & Pipe to Downstream  
Cluster and domestic markets

Rail to US and West Coast

Potentially World Scale Volumes

# Development Schedules

Construction and timing of investments - (not linear)

2015

2018

2020

2025

2030

2035

2040

Upstream Refining

Upstream Refining

Upstream Refining

Off-gases

Polypropylene

Acetic Acid

Polypropylene

Acetic Acid

Legend

Feedstock Process

Product

Third party Feedstocks

36 months construction assumed

Gasification

Methanol

VAM

Gasification

VAM

Steam Cracking

Power Hydrogen Syngas (NH3)

Steam Cracking

Methanol

Polyethylene (s)

MTO/MTP

MTO/MTP

Polypropylene

Polypropylene

Formaldehyde

PP/PO

EO/EG

Power Hydrogen Syngas (NH3)

Polyethylene(s)

Ammonia

PO/PG

MTO/MTP

Polypropylene

Urea

Acrylic Acid

Polypropylene

EO/EG

AN

Benzene

Formaldehyde

PO/PG (option)

UAN

BDO

PP, PO and Acrylic Acid may be based on propylene derived from off-gases, MTP and steam cracking

Toluene

Maleic Anhydride

Others include: Adipic Acid, Adiponitrile, Aniline MDI and Caprolactam

o & p Xylene

Cyclohexane

Ethylene may be used as a replacement feedstock for Polyethylenes and EO/EG (and LAOs) post 2025 rather than new builds

Cumene

PA

Phenol

Cumene

Acetone

BPA

BPA

Others

Steam Cracking

Polyethylene (s)

Polypropylene

PO/PG

Acrylic Acid

Toluene

o & p Xylene

Cumene

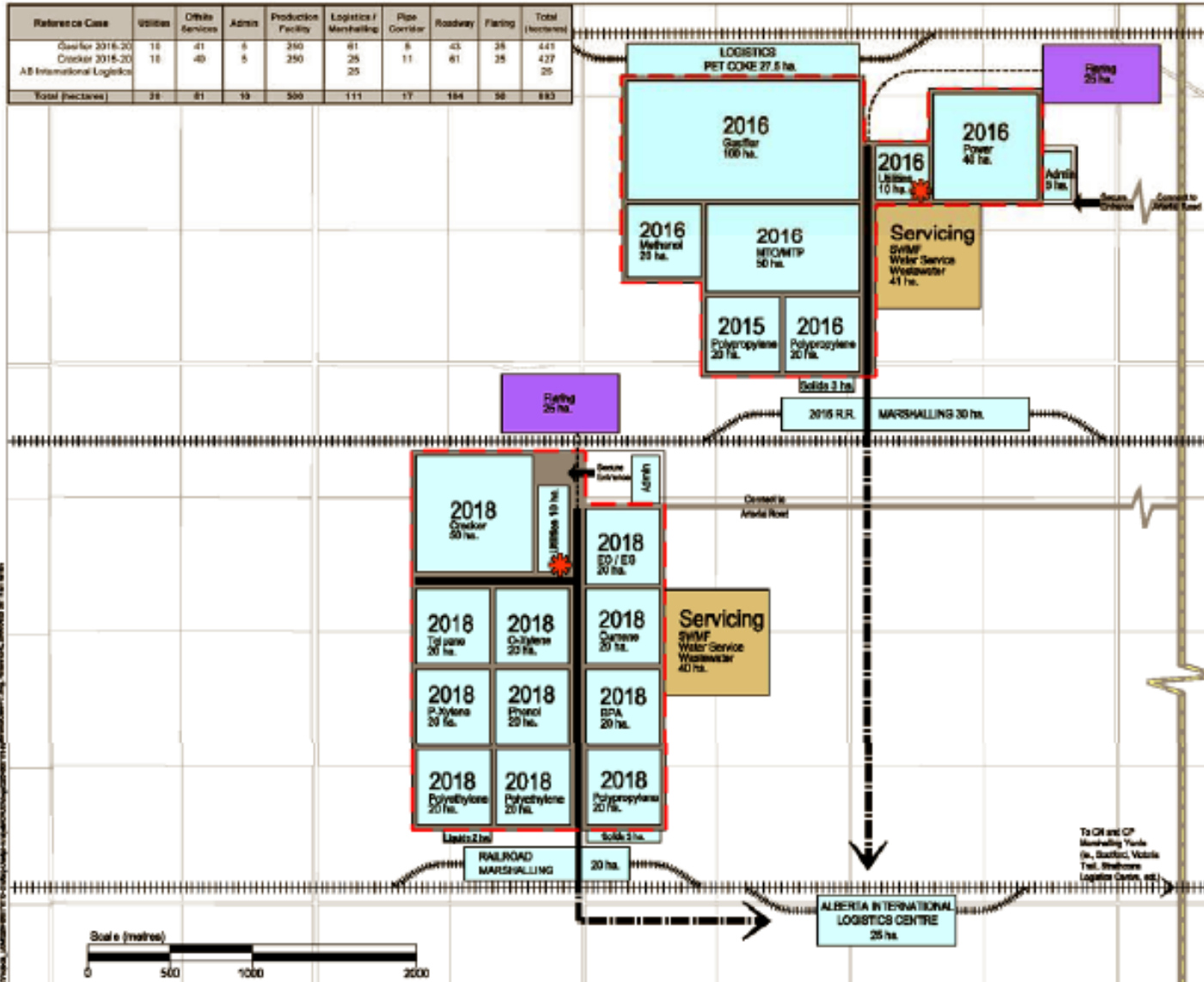
Phenol

Acetone

Others

# Sub-Cluster Layout

Reference Case	Utilities	Offsite Services	Admin	Production Facility	Logistics / Marshalling	Pipe Corridor	Roadway	Flaring	Total (hectares)
Case for 2016-20	18	41	5	250	61	5	43	25	447
Cracker 2016-20	18	40	5	250	25	11	61	25	427
AB International Logistics					25				25
<b>Total (hectares)</b>	<b>36</b>	<b>81</b>	<b>10</b>	<b>500</b>	<b>111</b>	<b>17</b>	<b>104</b>	<b>50</b>	<b>893</b>



**URBANSYSTEMS.**

**Reference Case 2015 - 2020**  
**Cracker complex could be independent from the gasification development**

- - - Secure Area
  - Prime Pipe Corridor (40m)
  - 2015
  - ✱ Emergency Services
  - CN/CP Rail Line
  - Rail Spur
  - SWMF, Water and Wastewater Servicing
  - Flaring
  - Product Pipe
  - Road (30m)
  - Highway System \*
- \*Could include Highways 38, 15, 45, 643, 825, 830, and/or 831



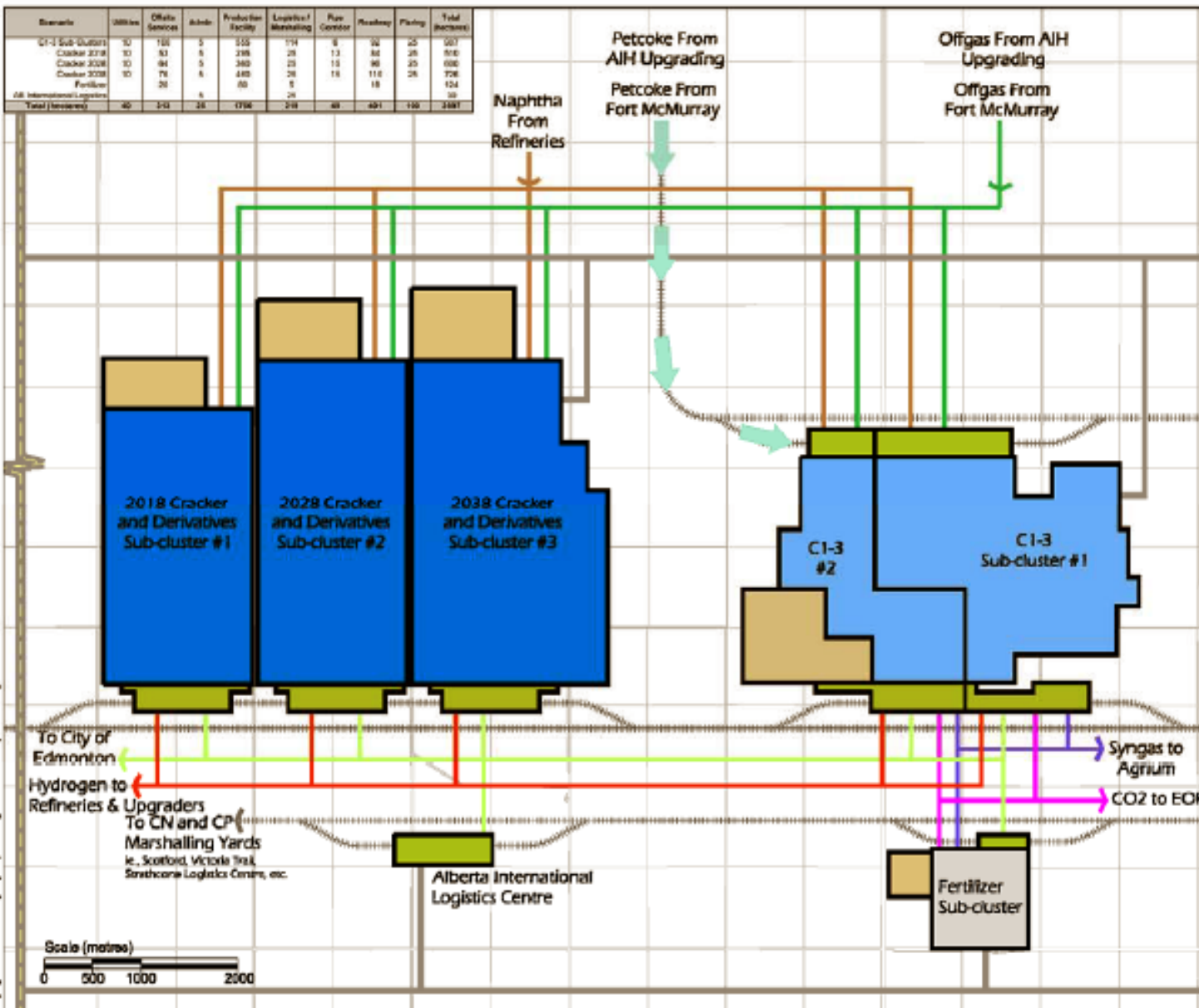
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# Mid Stream Cluster Lay Out

URBANSYSTEMS.

## Key Plan Midstream Cluster Concept 2015 - 2040

- +++++ CN/CP Rail Line
- Road
- Highway System \*
- \*Could include Highways 38, 15, 45, 643, 825, 830, and/or 831
- C1-3 Sub-cluster
- Cracker
- Fertilizer
- Logistics
- SWMF, Water and Wastewater Servicing
- Naptha
- Syngas
- Hydrogen
- Offgas
- CO2
- Products Pipeline
- Petcoke Input



# Size of the Prize



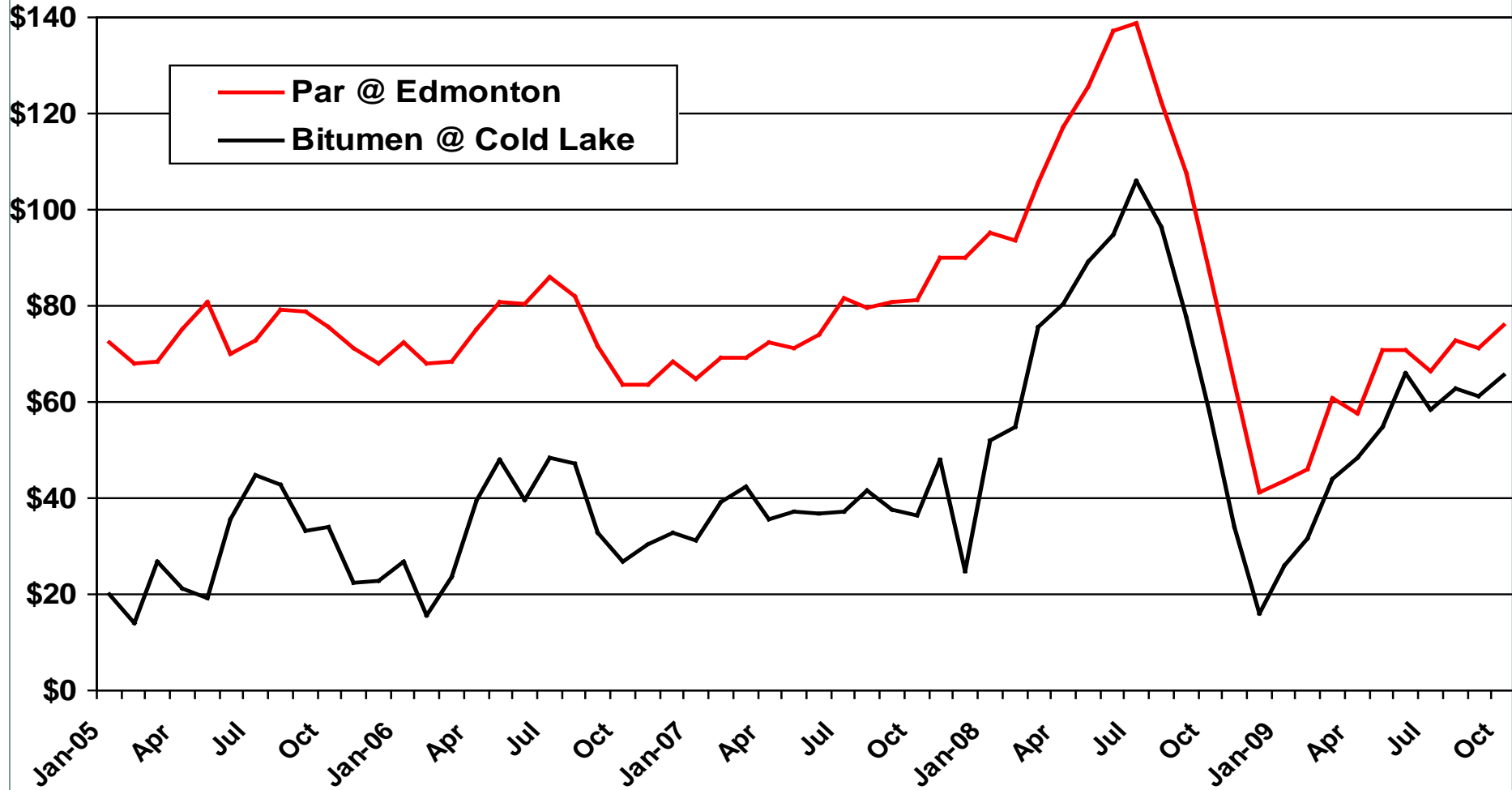
Capital Investment:	<b>\$40 billion</b>
Annual GDP Contribution:	<b>\$18.5 billion</b>
Job Creation:	<b>3,000 Direct</b>
Annual Gov. Tax revenue:	<b>\$1.15 billion</b>

# Future Watch



- A number of key factors are at play that will play a major part in the development of our area.
  - Bitumen Pricing Dynamics
  - GHG Rules and Restrictions
  - Alberta Government Policy Direction

# Heavy – Light Oil Spreads



# GHG Rules and Carbon Intensity Standards



- Jan. 12, 2010 - The California Air Resources Board's ("CARB") Low Carbon Fuel Standard ("LCFS") approved by the state of California.
  - Jan. 6<sup>th</sup>, 2010 - Eleven governors of the New England and mid-Atlantic states agreed last week to develop a common low-carbon fuel standards
- “ Generally, a low-carbon fuel standard could significantly disadvantage fuels produced from oil sands” (American Petroleum Institute)***

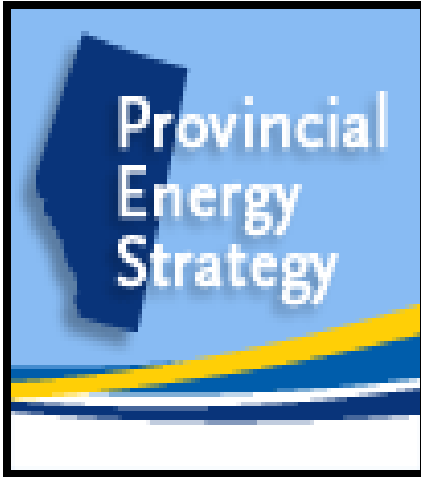
# CCS – Opening Markets for Alberta



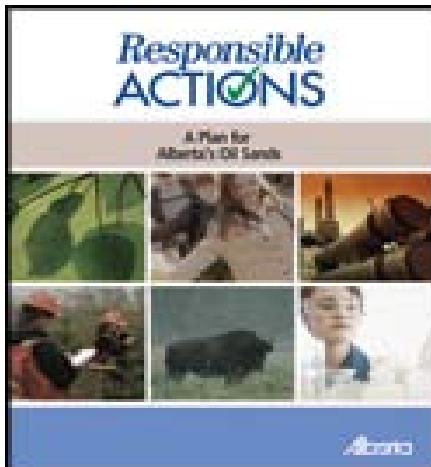
- Recent work completed by AERI examined the life cycle of fuels from Alberta's oilsands.
- Upgrading hooked into a CCS system will help move towards, or even meet, the new standards in place in California

# Government Policies

## Alberta's Strategic Plan



- Identifies “value added” as a critical component of Alberta’s Energy Strategy
- Establishes the concept of “targets” for processing of Alberta’s energy resources
- Concepts of “Chemical Clusters” identified as a key part of achieving our vision.
- Additional policies or programs may be required to realize this vision



# The “Heartland” Advantage



- Pre-zoned and approved heavy industrial lands
- Developing “Carbon Trunk Line”
- Synergies with existing industry
- Clear Environmental expectations
- At the hub of Alberta’s energy logistics system
- Quality of life to attract and retain workers
- Support organizations and services in place

# Handled with Care?

## A Blossoming Opportunity for Alberta



**Inflationary Pressures**

**Labour Availability**

**CCS  
System**



**Gov.  
Policies**

**Bitumen  
Pricing**

**Diluent  
Prices**

**GHG  
Regs.**

**Env.  
Standards**

**Taxation  
Policies**

# Contact Us



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