

# **Alternative Feedstocks for the Canadian Petrochemical Industry**

**CERI 2007 Petrochemical Conference  
Kananaskis, Alberta  
June 4, 2007**

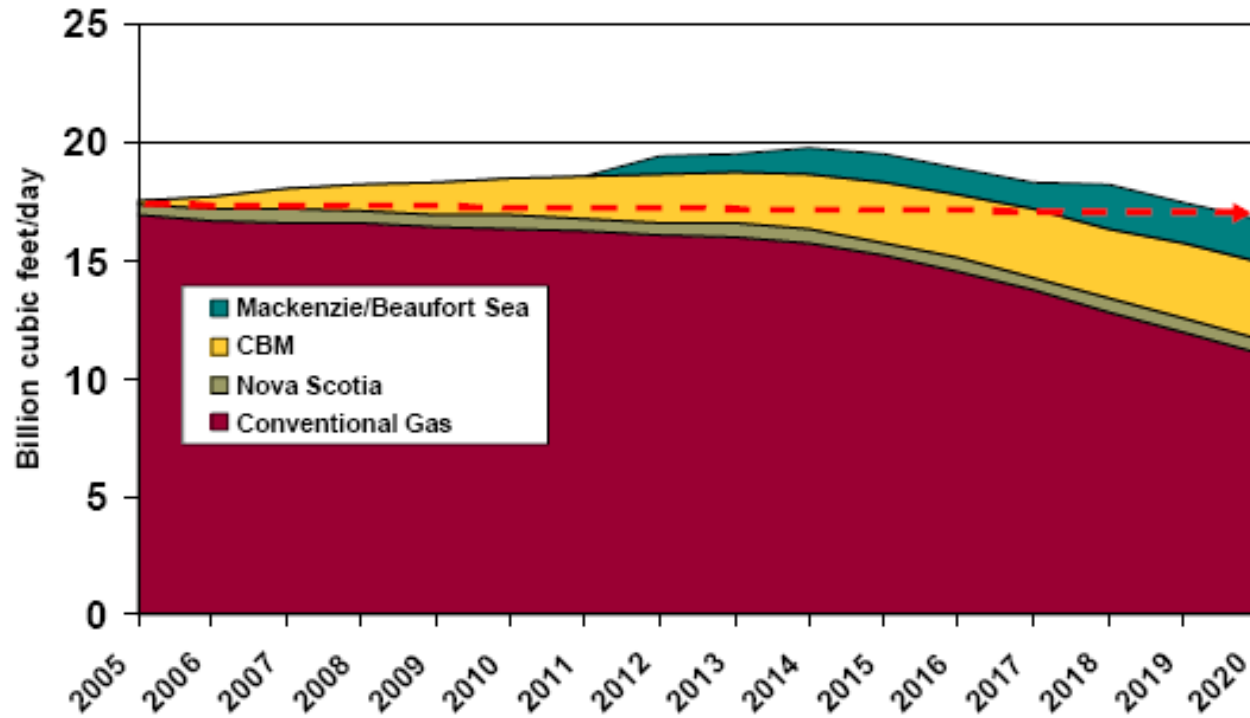
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# Outline

- **Canadian Olefins Feedstock Overview**
- **Industry Environment**
- **Risks/Challenges**
- **Aux Sable Overview**
- **Aux Sable Canada (ASC) Key Projects**
- **Conclusions**

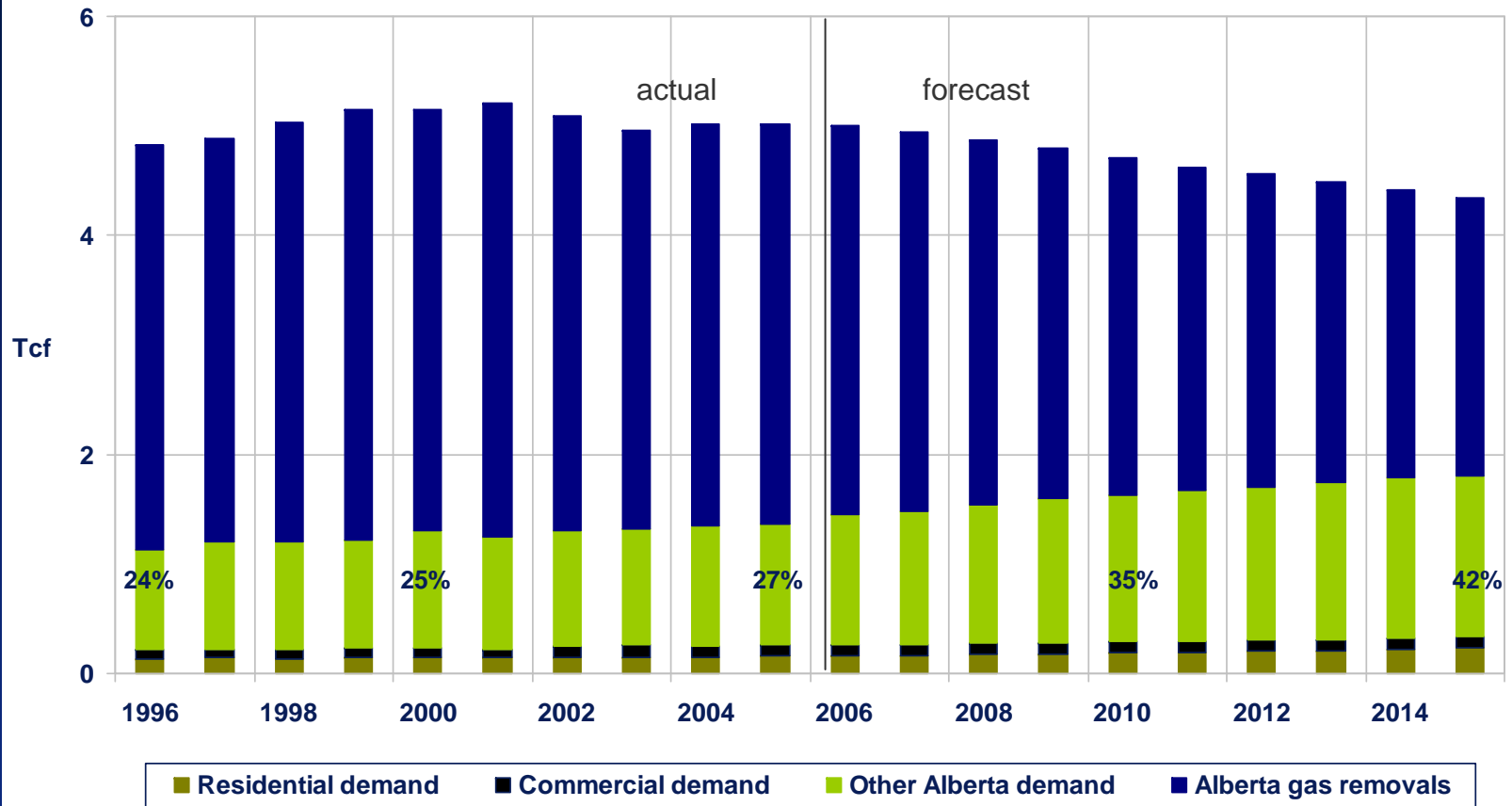


# Industry Environment Canadian Natural Gas Supply



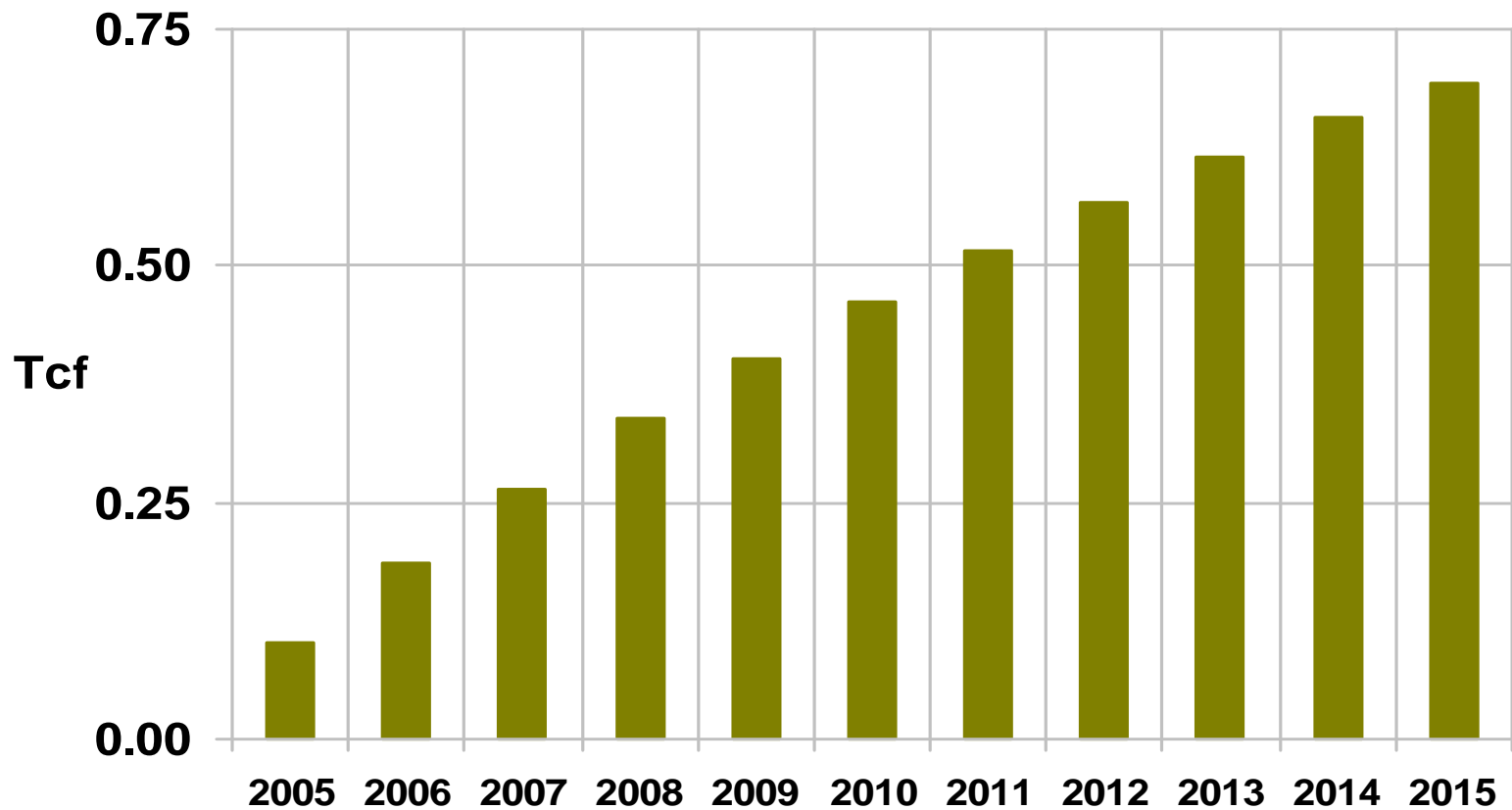
Source: CAPP

# Industry Environment Alberta Natural Gas Supply/Demand



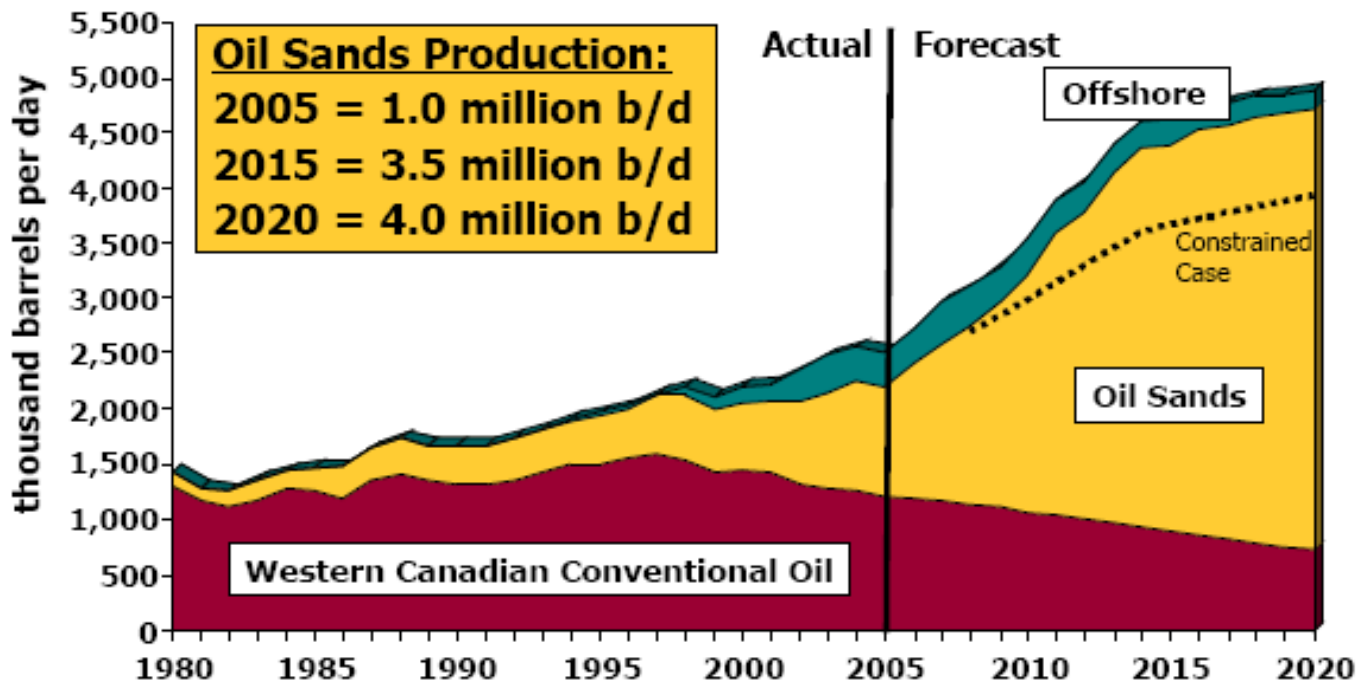
Source: EUB applications and public data

## Industry Environment Alberta Coalbed Methane Supply



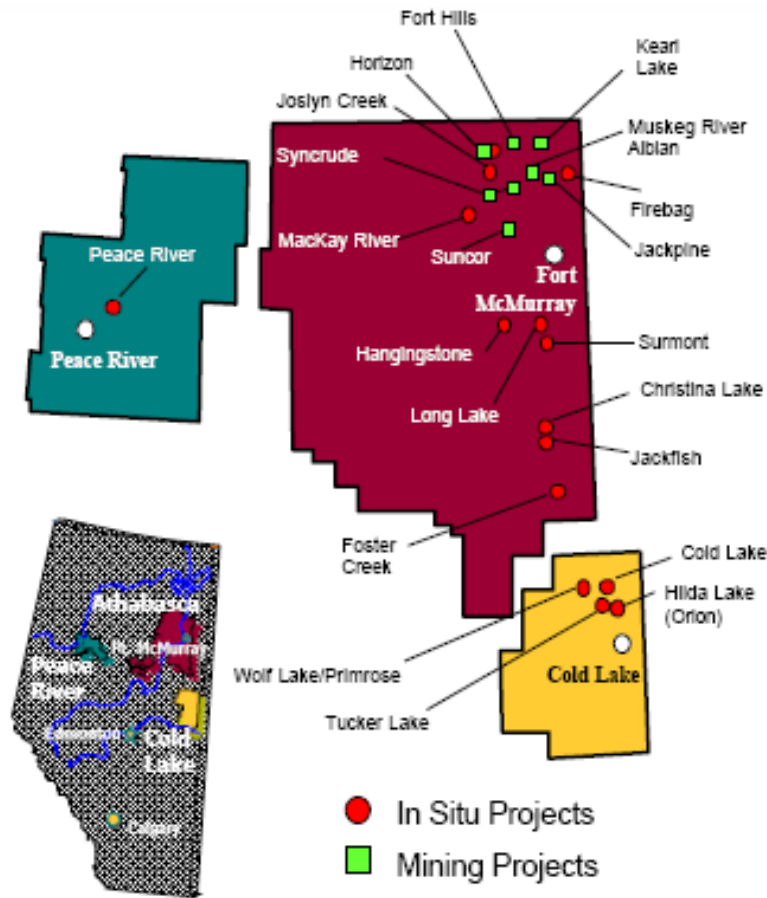
Source: EUB applications and public data

# Industry Environment: Canadian Crude Oil Supply



Source: CAPP

## Industry Environment Oil Sands Projects



Athabasca – Mining		Barrels per day	
Operator	Project	Initial	Potential
Albian/Shell	Muskeg/Jackpine	150,000	500,000
Suncor	Base Plant	280,000	550,000
Syncrude	Base Plant	300,000	600,000
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CNRL	Horizon (2008)	110,000	232,000
Imperial	Kearl (2010)	100,000	300,000
Petro-Canada	Fort Hills (2011)	50,000	190,000
<b>Total E&amp;P</b>	<b>Joslyn Creek Mine (2013)</b>	<b>50,000</b>	<b>200,000</b>
Athabasca – In Situ Thermal			
JACOS	Hangingstone (pilot)	10,000	30,000
Suncor	Firebag	35,000	-----
ConocoPhillips	Surmont (2006)	16,000	110,000
Devon	Jackfish (2008)	35,000	70,000
Encana	Christina/Foster (2006)	30,000	400,000
Husky	Sunrise (2008)	50,000	200,000
OPTI/Nexen	Long Lake (2007)	70,000	140,000
Petro-Canada	MacKay River (2009)	24,000	60,000
Synenco	Northern Lights (2010)	50,000	100,000
<b>Total E&amp;P</b>	<b>Joslyn Creek (2006)</b>	<b>10,000</b>	<b>200,000</b>
Cold Lake – In Situ Thermal			
Blackrock	Orion-Hilda Lake pilot	500	20,000
CNRL	Wolf Lake/Primrose	50,000	120,000
Imperial	Cold Lake	130,000	180,000
Husky	Tucker (2006)	18,000	35,000
Peace River – In Situ Thermal			
Shell	Peace River	12,000	100,000

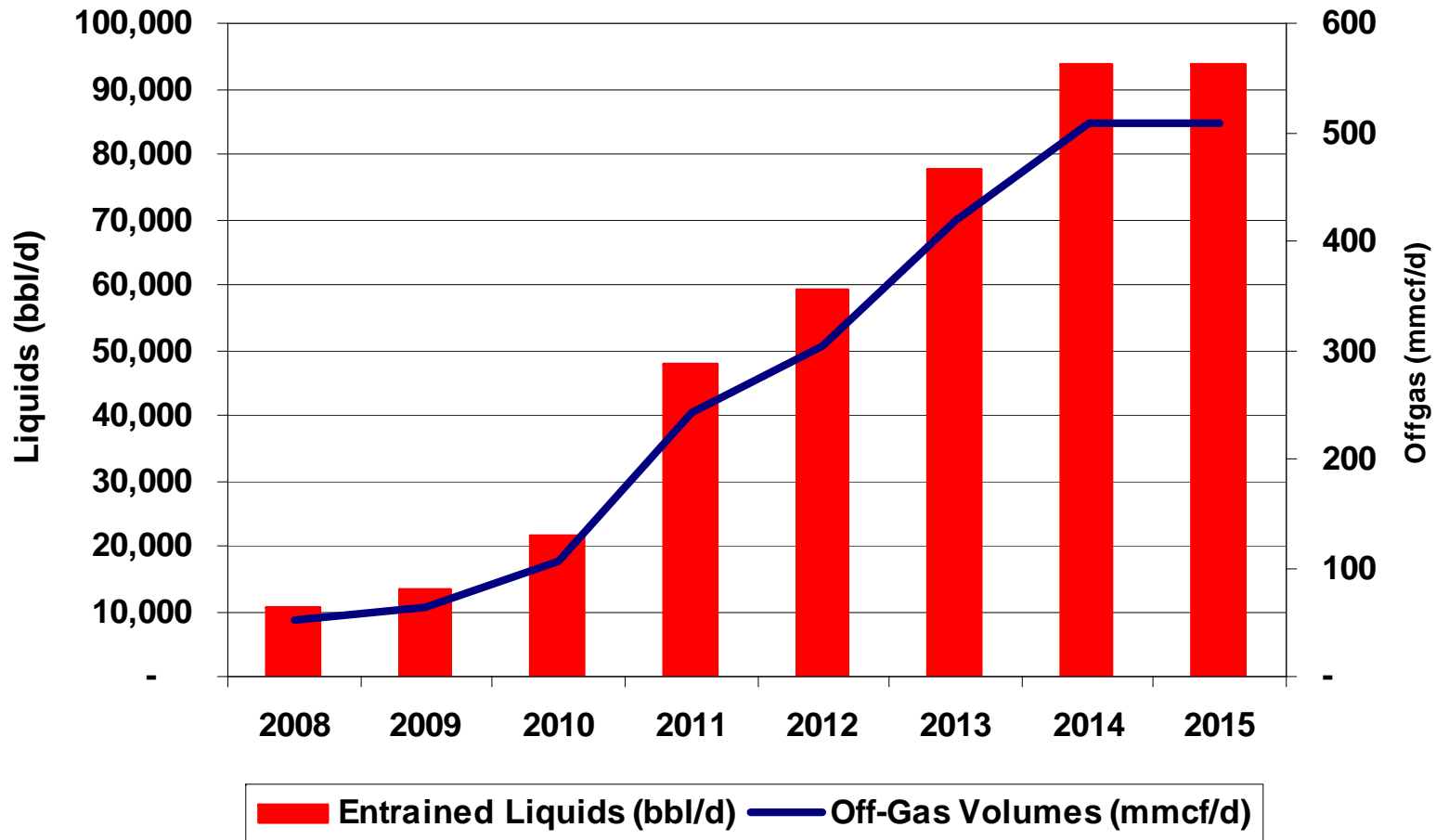
Source: CAPP



## Future Prospects for Olefin Feedstocks

- **Extract more ethane from WCB gas production**
  - Alliance gas (North Sable project)
  - Deeper cuts at straddle plants
  - Ensure C2+ extracted from natural gas used for fuel in Fort McMurray area
  - Implement Incremental Ethane Extraction Program (IEEP)
- **Extract C2+ from Oil Sands Upgrader Off-gases**
  - Fort McMurray area upgraders....extract C2+ from upgrader off-gases and pipeline to Fort Saskatchewan for processing
  - Fort Saskatchewan area upgraders....extract C2+ from upgrader off-gases and process streams depending on their olefinic content
  - Implement Incremental Ethane Extraction Program (IEEP)
- **C2+ from Mackenzie gas and Alaskan gas**
- **Potential exists to aggregate sufficient volumes of propylene in Fort Saskatchewan to support a worldscale polypropylene plant(s)**
- **There does not appear to be a compelling reason to focus on heavy liquids or naphtha cracking in Alberta or other locations in Canada**

## C2+ Potential from Fort Saskatchewan Area Upgraders



Source: EUB applications and public data

## Risks/Challenges

- WCSB gas production decline
- CBM impacts
- Cost environment
- Optimization of existing straddle plants
- Timing of Oil Sands developments
- Income Trust taxation changes
- Development of open access Alberta Hub
- Implementation of IEEP

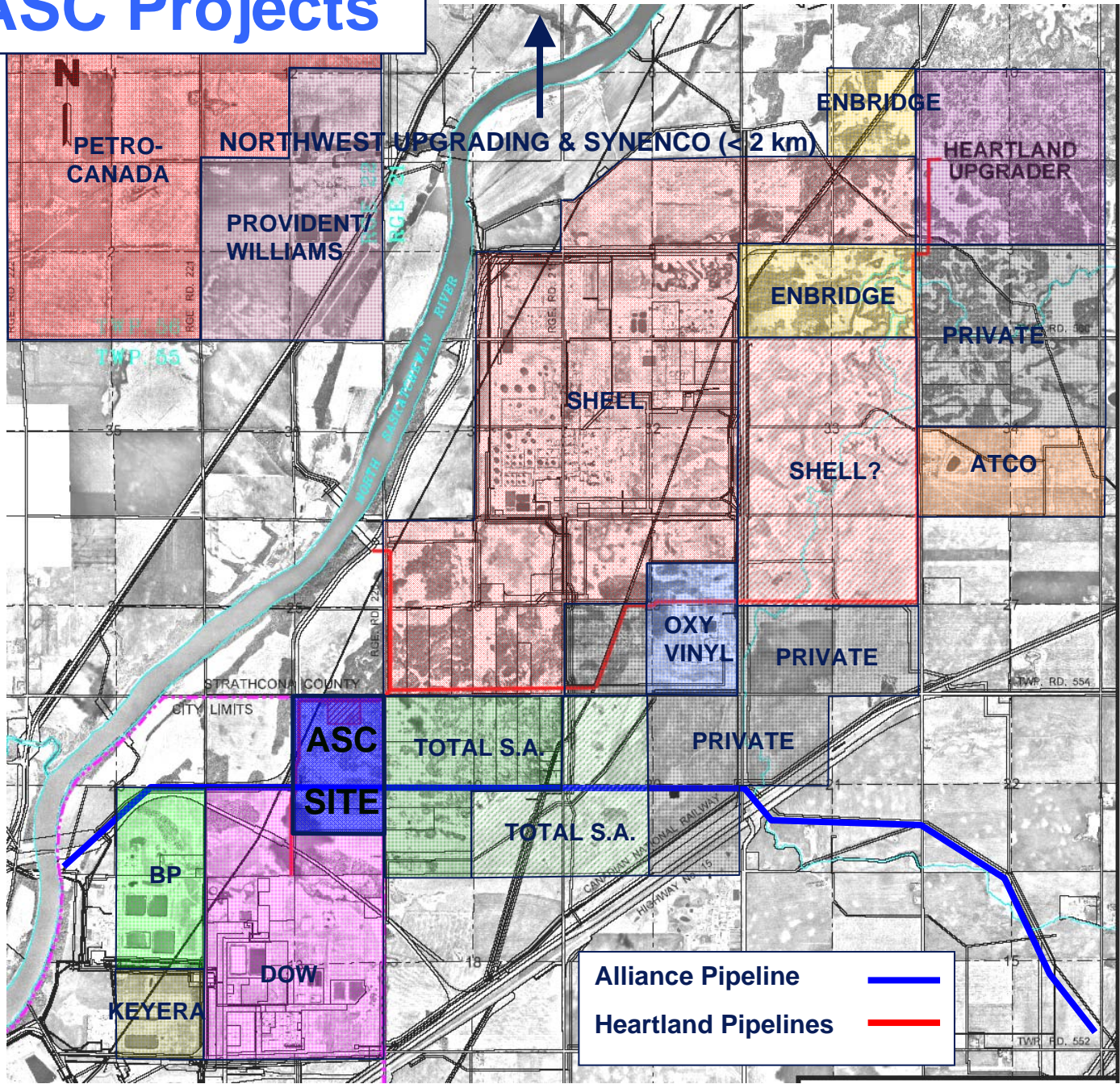
## Aux Sable Overview

- Aux Sable U.S. owns and operates a 2.1 bcf/d world scale extraction/frac plant at terminus of Alliance Pipeline (Channahon, IL)
  - Aux Sable has exclusive rights to extract C2+ from Alliance gas
  - NGL production sold to BP under a long term agreement
- Aux Sable Canada (ASC) performs supply function for Aux Sable U.S. and is developing a fee-based energy processing infrastructure business, primarily in Alberta
  - First off-gas project for BA Heartland Upgrader is under construction
  - Evaluating/developing other Fort Saskatchewan projects
    1. Off-gas processing/fractionation facilities
    2. Fort Saskatchewan ethane extraction plant
  - Gas plants & pipeline connections in NE Alberta and NW B.C. to deliver rich gas into Alliance's gathering system
- Aux Sable companies are both private and are owned by Enbridge, Fort Chicago, and Williams

# Aux Sable U.S. Channahon Plant



## ASC Projects



## Heartland Offgas Project

- Heartland upgrader offgas 15 mmcf/d
  - 2200 bbl/d of C2 (40% ethylene)
  - 2000 bbl/d of C3+
- Startup in Q3/Q4 2008
- C2/C2= to Alberta petchem buyer
- C3+ to export markets
- Residue gas returned to BA
- All regulatory approvals received
- Equipment ordered, construction in spring/summer 2007

## Proposed Fort Saskatchewan Extraction Plant (North Sable Project)

- Process Alliance Pipeline gas at Fort Saskatchewan
- Capacity 1.2 bcf/d
- Ethane recovery
  - ~90% ethane extraction
  - ~40 mb/d of purity ethane
- Reinject C3+ for recovery at Channahon plant
  - Option to recover selective components if economic
- Land on Alliance right of way purchased
  - Located adjacent to Dow and Shell
- Regulatory and preliminary engineering underway



# Conclusions

- **Alberta holds the most promise for growth in olefins based petrochemicals**
  - Based largely on C2 cracking and recovering C2=/C3= from upgrader off-gases
- **First priority is to extract ethane from existing gas streams**
  - May see rationalization of some existing extraction plants to secure sufficient gas commitments to underpin deeper cuts
- **The primary alternative feedstock with sufficient volume and growth potential is C2+ from upgrader off-gases**
  - The required extraction and processing facilities should be developed to ensure cost effectiveness (e.g. centralized processing sites where possible)
- **Alberta's IEEP will play a key role in Alberta petrochemical companies feedstock purchase commitments that underpin new extraction investments**
- **Need to ensure that Alberta is well positioned to capture the potential from northern gas supplies (Mackenzie gas and Alaskan gas) when they are developed**
- **Continued efforts required to initiate a polypropylene industry in Alberta**