



# ***Petrochemicals from Oil Sands - Sustaining the Alberta Advantage***

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***CERI Petrochemicals Conference***

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***Petrochemicals from Oil Sands  
Vision 2007 and Beyond***

***Paul Clark***

**Industry-Government Initiative**

**Shell Chemicals Canada, Nova Chemicals,**

**Suncor Energy**

**Alberta Energy Research Institute, Alberta Economic  
Development, Alberta Energy**







# *Visioning Process*

- Analyzes current state
- Aims at a desired future state
- Develops objectives to bridge the gaps



# *Current State- There is a Threat*

- 
- Competing for capital
  - There needs to be a new advantage.....Either
    - Value added businesses building on skilled labour and stable country environment, or
    - More resource based investment relying on some new advantage e.g. development of oil sands hydrocarbons
    - OR BOTH
- 



# *Challenges- continued*


- Alberta Advantage is eroding
- Ethane: supply and cost uncertainties are impeding future growth
- Requires vision and strategy with industry and government commitment



# *There is an Opportunity*



## **Vision Elements**

- Maintain and improve the Alberta Advantage
  - Use broad range of feedstocks including oil sands
  - Integrate petrochemical plants with oil sands, upgrading and refining operations
  - Provide competitive transportation networks to move products to markets
  - Encourage new technologies and innovation for low cost conversion of resources to value-added products – with best in class emissions standards
  - Be the best in the world at developing hydrocarbon resources in environmentally friendly ways
- 




## *No one player can do it alone*

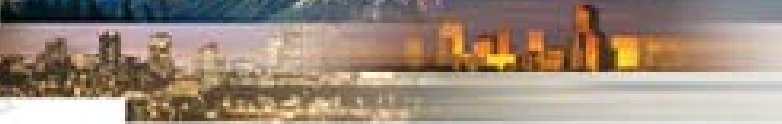
- Success depends on co-operative effort among industry players and government
- Build on past collaboration and successes of petrochemicals and oil sands/upgrading expansions





# *The Role of Industry*

- Cooperative development and integration of large complexes :
    - economies of scale
    - Trading of feedstocks, products and intermediate streams
  - Share utilities, infrastructure & process streams to minimize capital & operating costs
  - Create hubs at strategic locations making optimum use of available infrastructure
- 



# ***The Role of Government***

- Facilitate the creation of hubs
- Accelerate predictable and competitive regulatory and permitting processes
- Facilitate production of petrochemicals and petrochemical feedstock from oil sands that will be highly competitive with the US Gulf Coast
- The fiscal approach that resulted in the successful development of the oil sands resources can serve as a model



# *The Role of Technology*

- Utilize the current industry base
- Seek and create breakthrough to support and advance development
- Create ways to minimize environmental footprint
- Reduce costs: novel processing methods; bring value added products to markets
- Transform Alberta to a prime center for oil sands and petrochemicals processing technologies





# *Expanded Infrastructure Base is Critical*

- Hubs
- Transportation and pipeline systems





## ***It is imperative to act now***

- Oil sands: Abundant new and alternative feeds for sustainable growth of Alberta's petrochemical industry
- New oil sands development provide an opportunity for effective planning and co-development of integrated oil sands-petrochemical clusters
- Strengthen Alberta's competitiveness over other locations for new upgraders, refineries and petrochemical plants
- Environmental advantages of integrated plants: smaller footprints; fewer point sources of emissions





***Vision Process developed objectives  
that bridge the gap between the  
current and future states***

- Bitumen production and transportation
- Oil sands-petrochemicals integration
- Technology
- Business Issues
- Environmental Issues
- Infrastructure



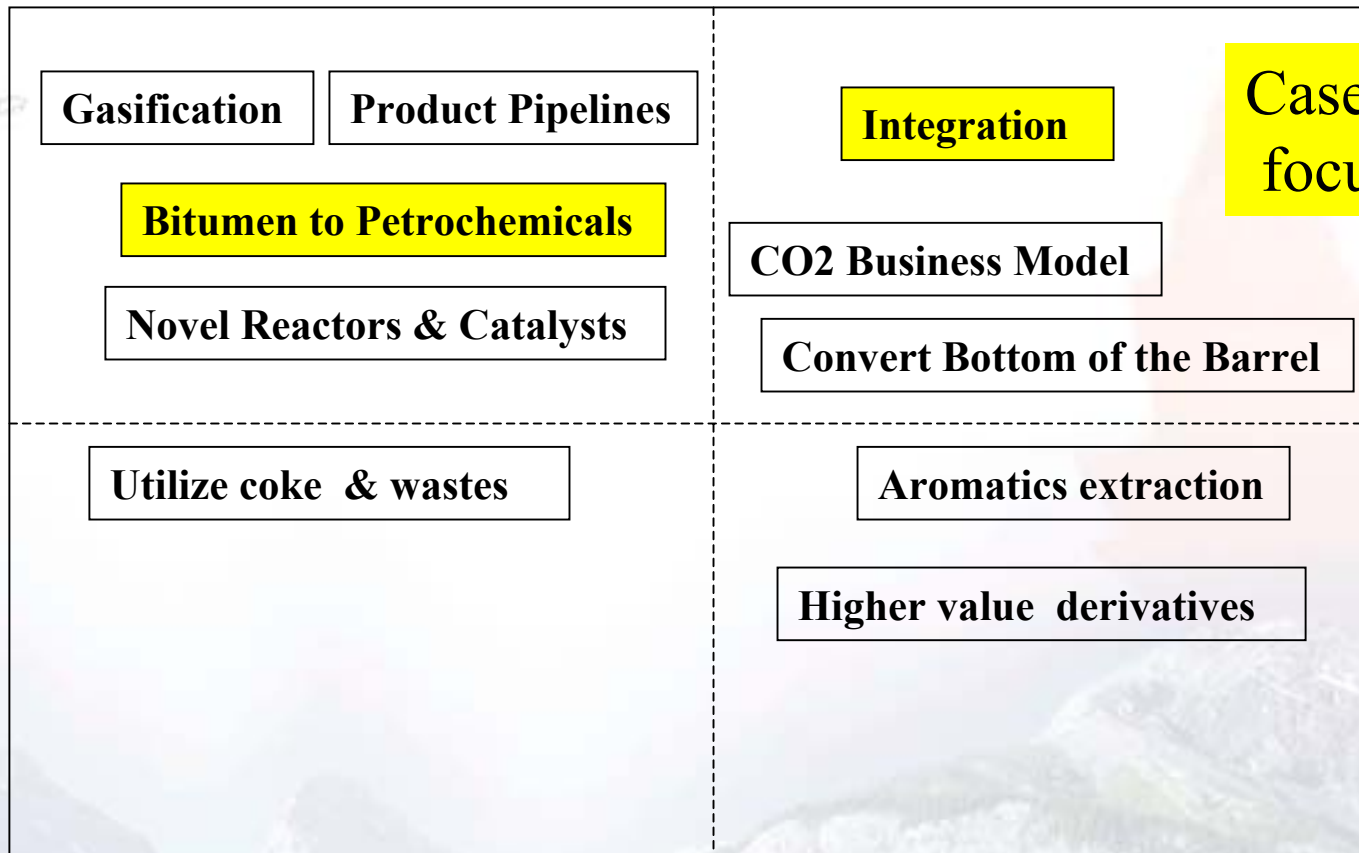
# High Level Objectives - Examples

Impact

High

Med

Low



Low

Med

High

Achievability




# *Case Study- Petrochemicals from Oil Sands*

*Duke du Plessis*

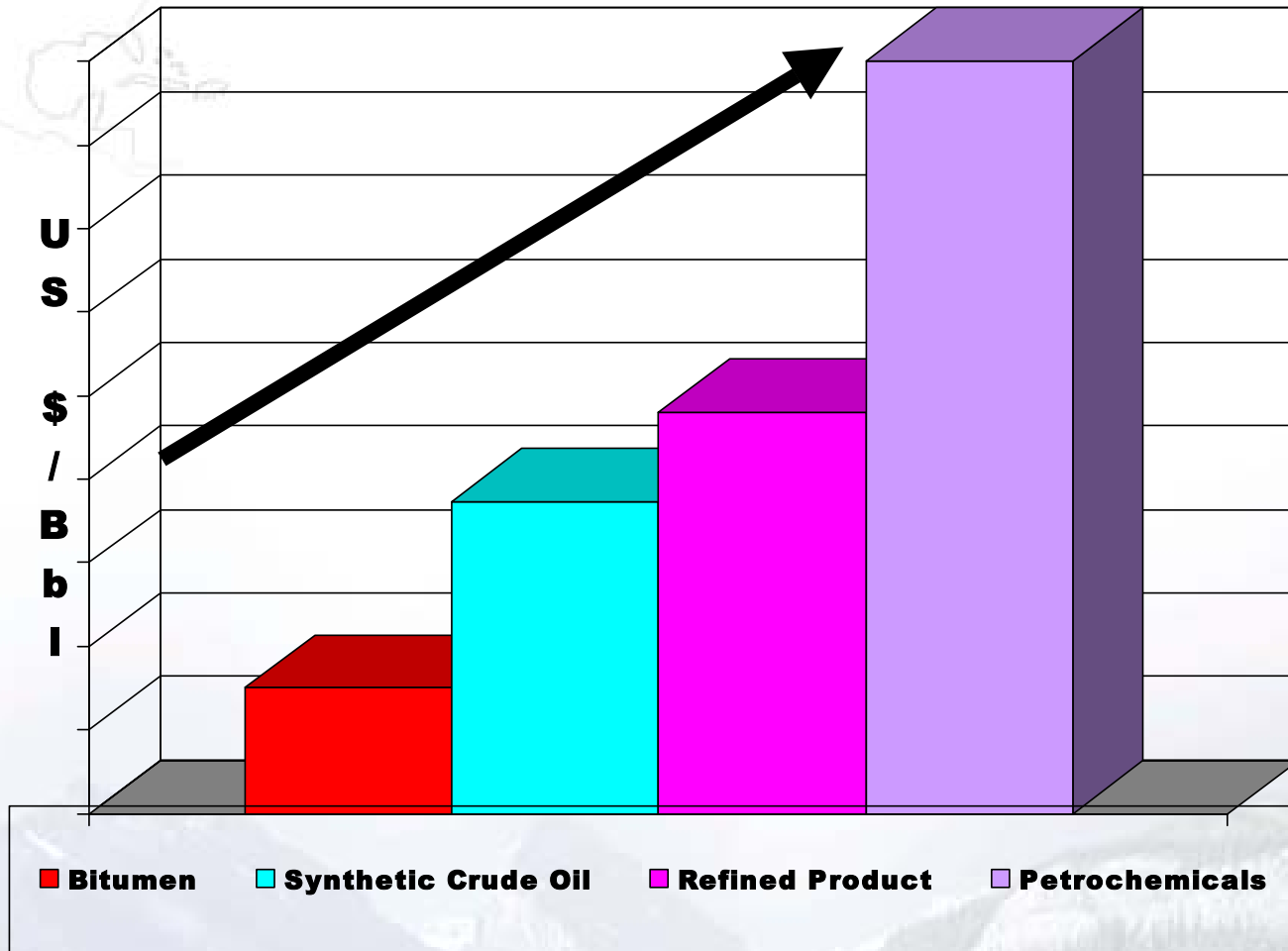




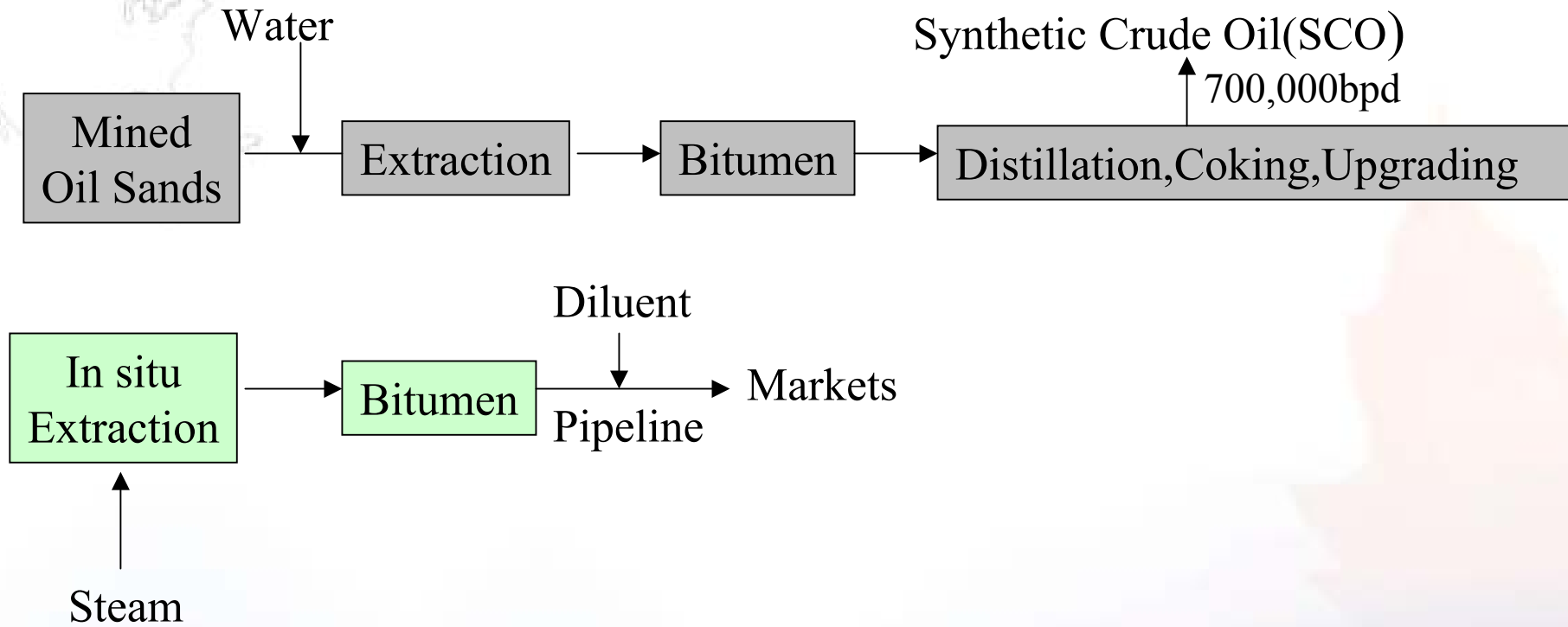
## *The Opportunity*

- Recoverable reserves second only to Saudi Arabia
  - World-scale oil sands investments and expansions
  - Opportunity for co-producing fuels and petrochemicals
  - Integration synergies: Upgrading-refining-petrochemicals
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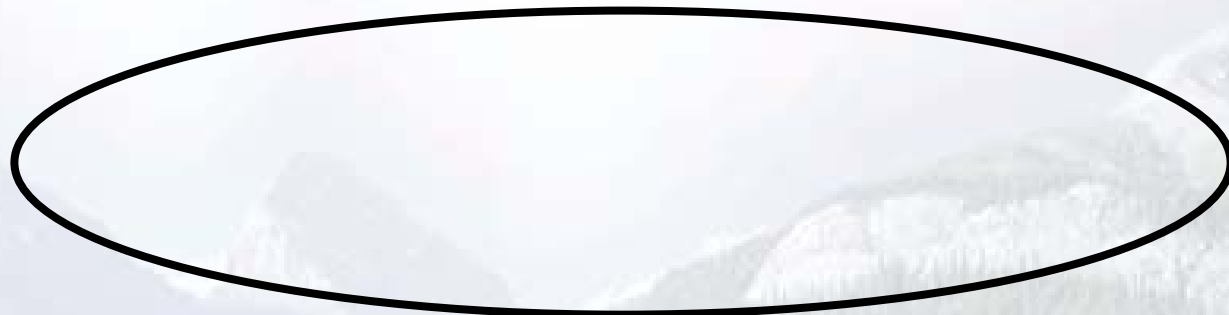
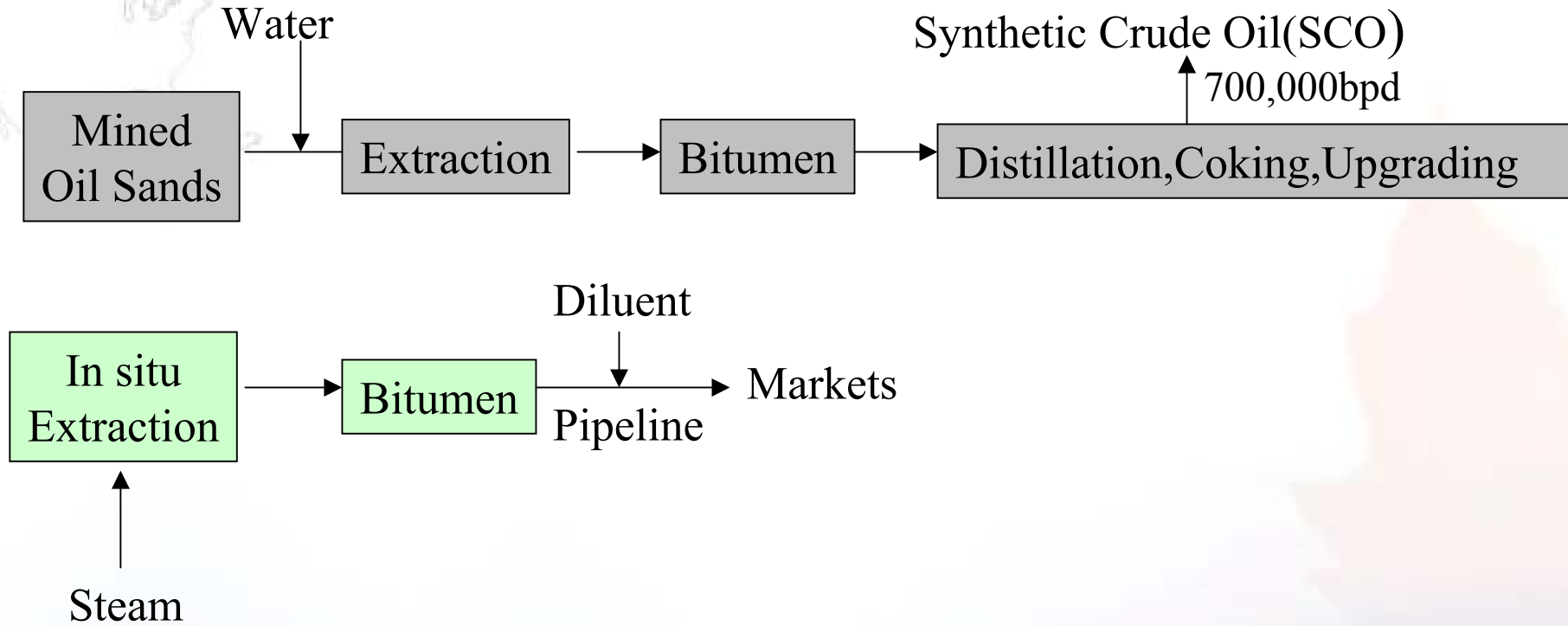
# SCO, Refined Products and Petrochemicals Increase Value and Market Options



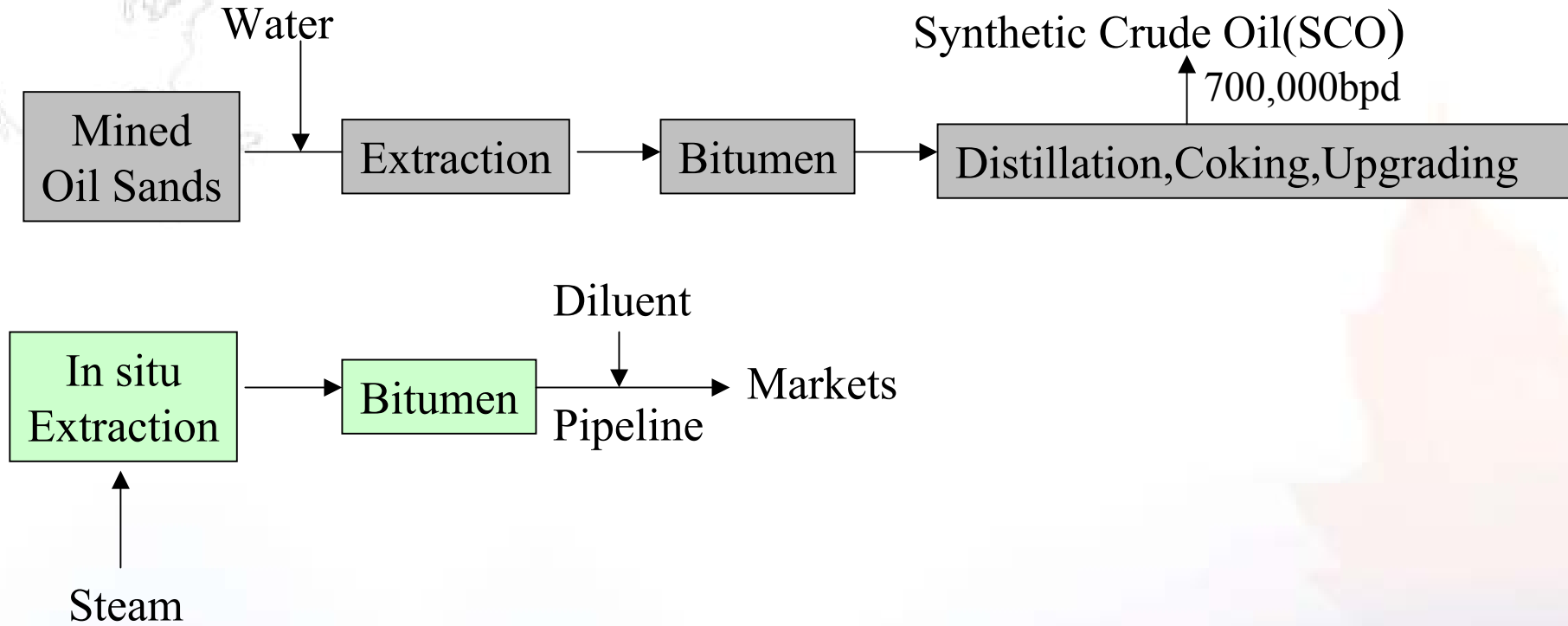
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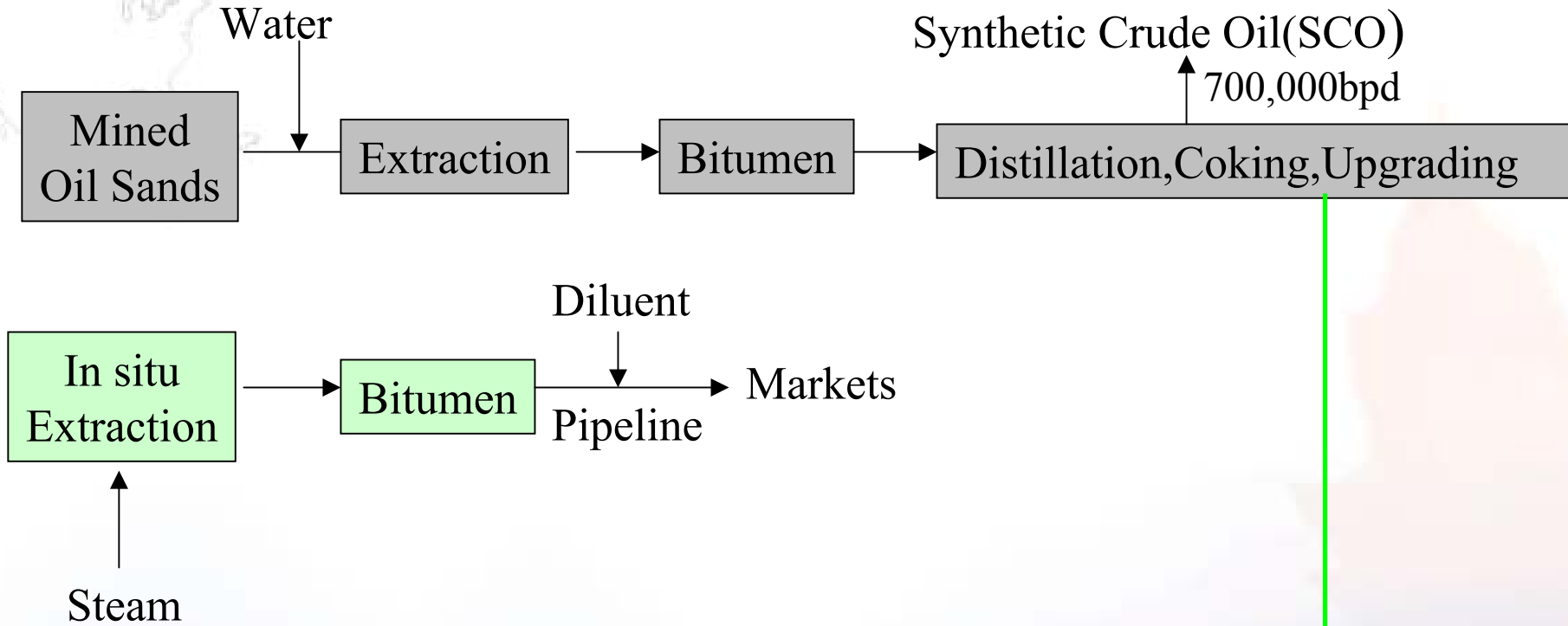


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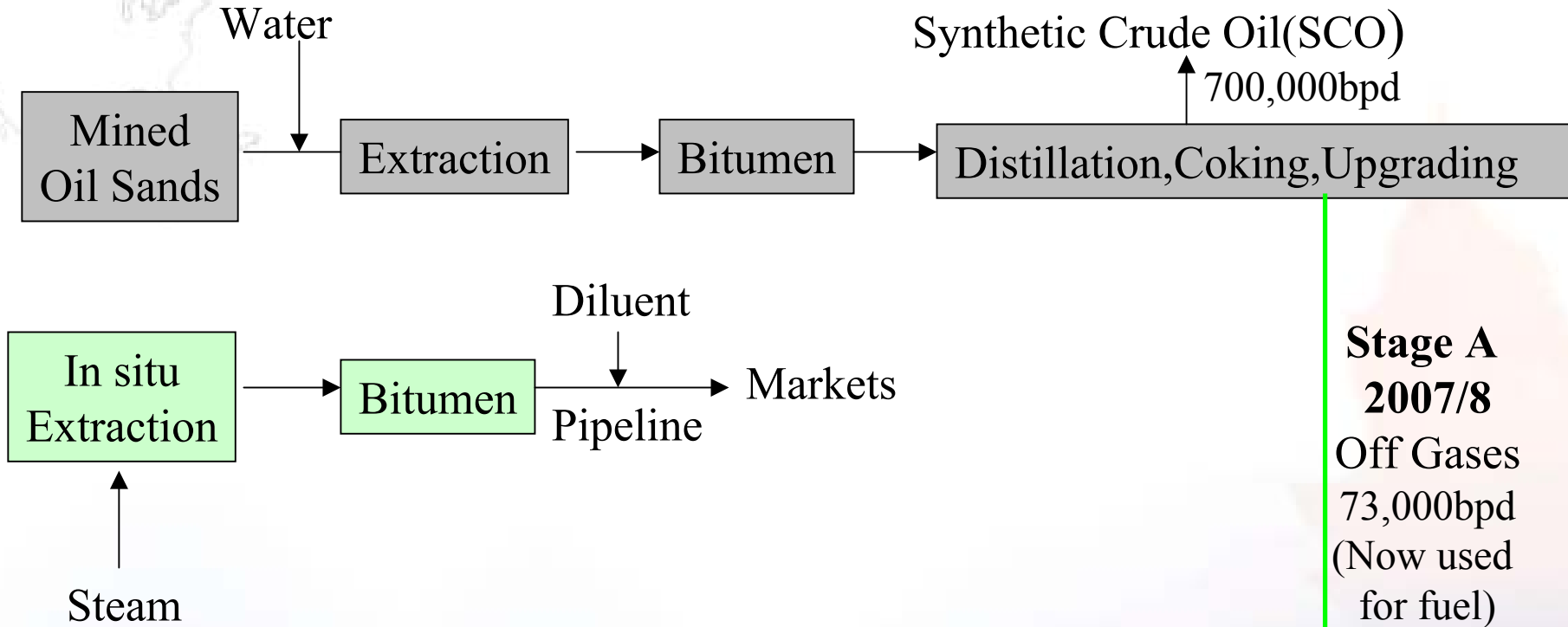
***Integrated Cluster for new world scale petrochemical production in Alberta's Industrial Heartland Region***

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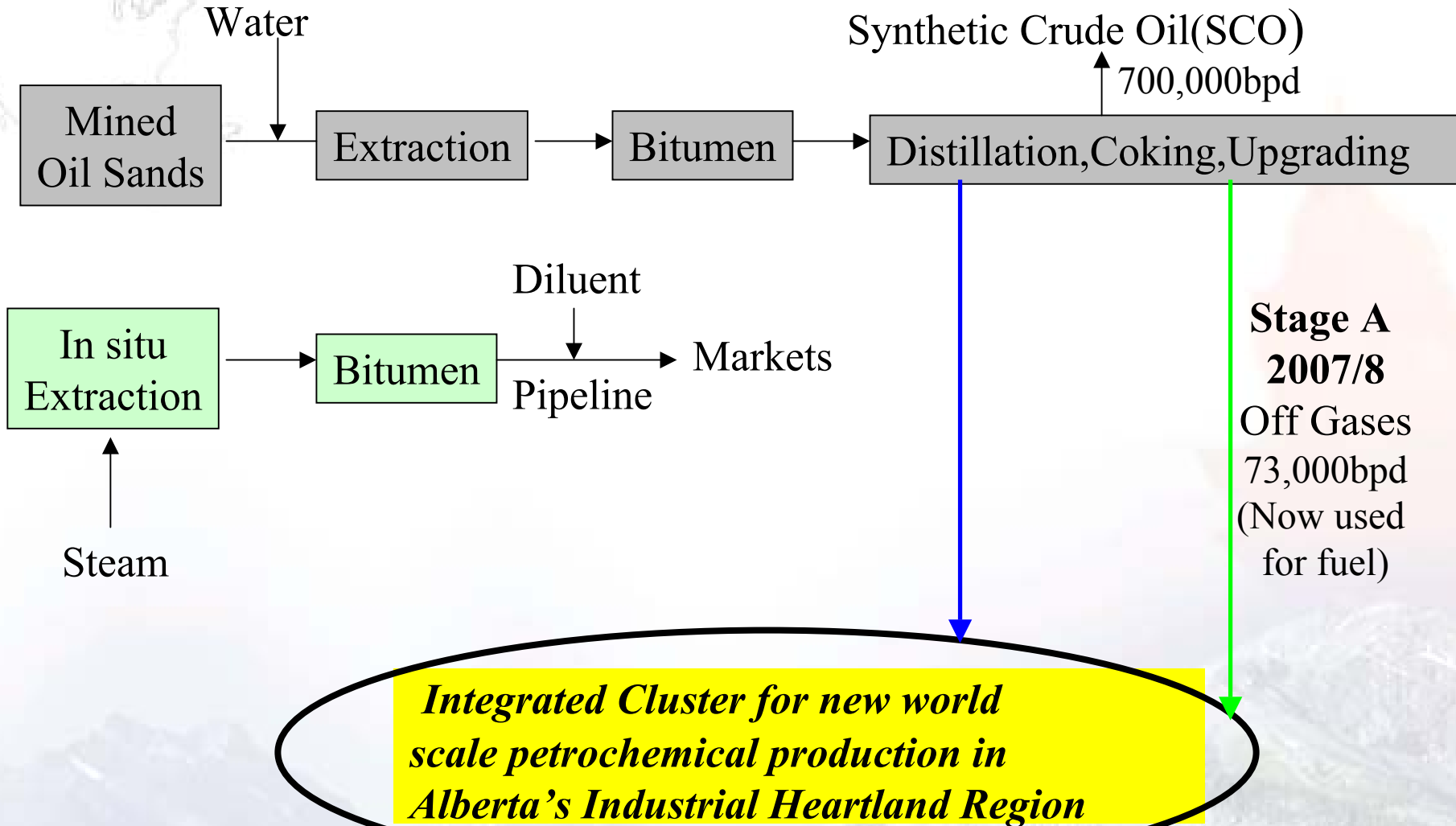
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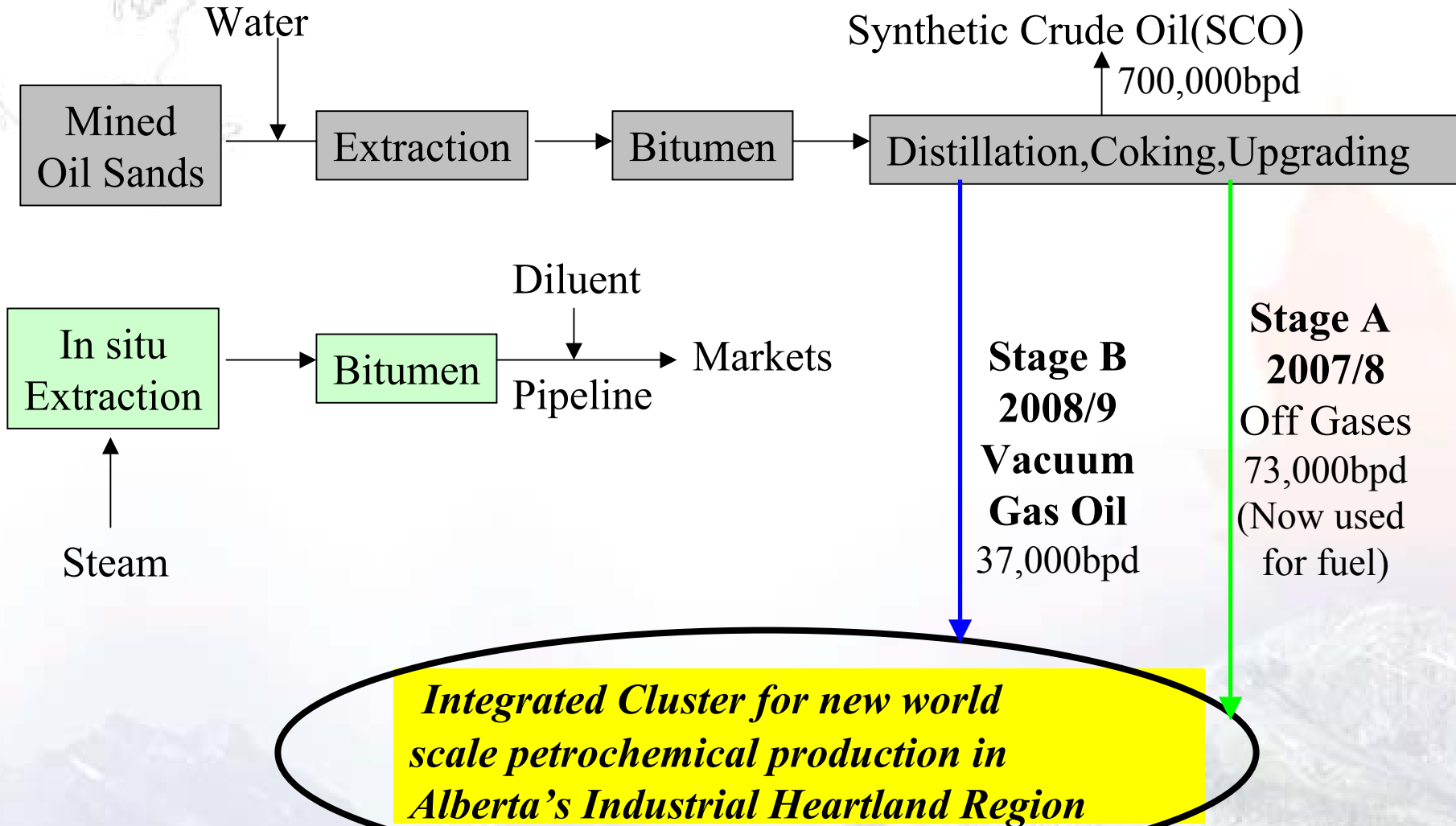


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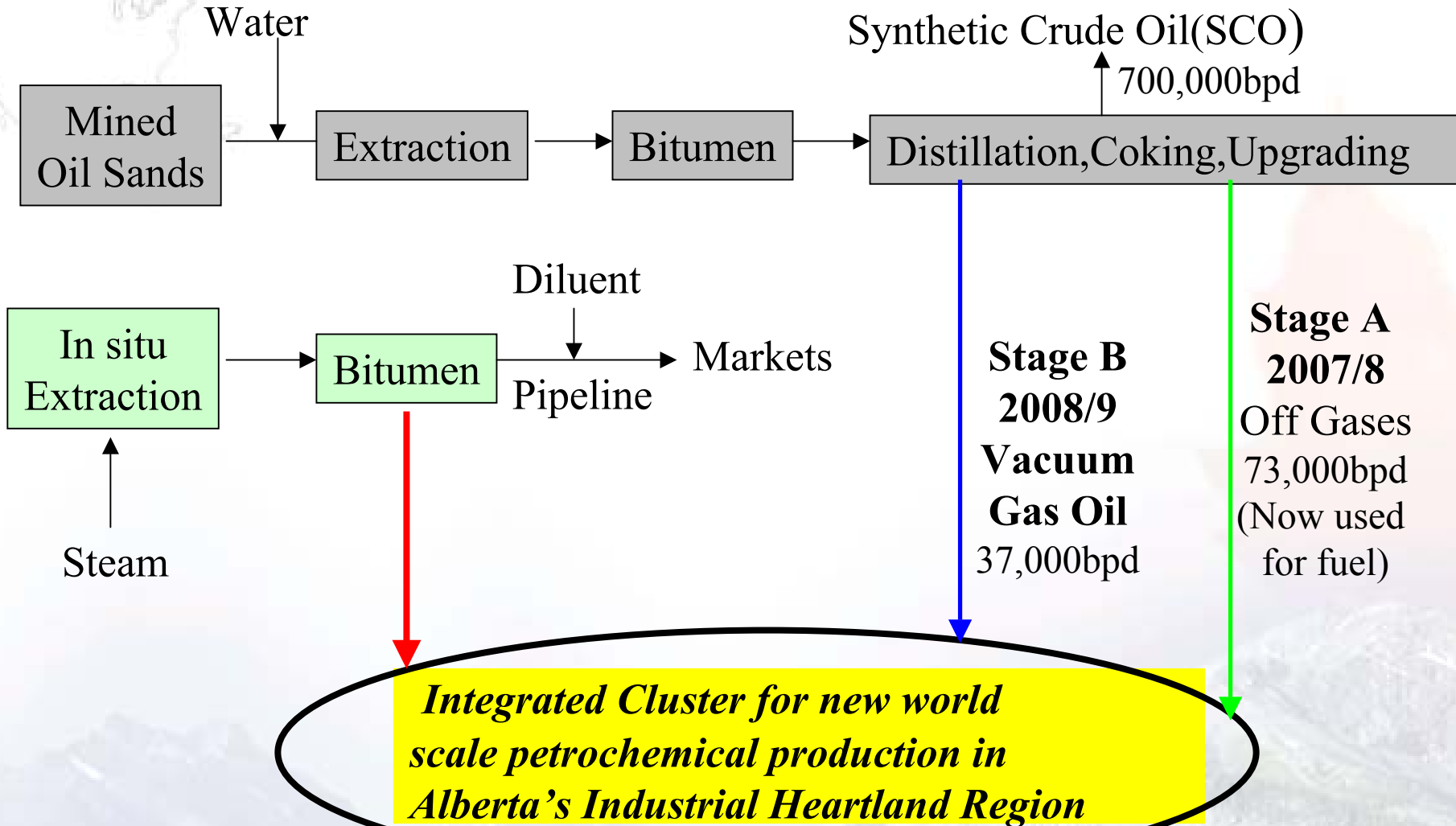
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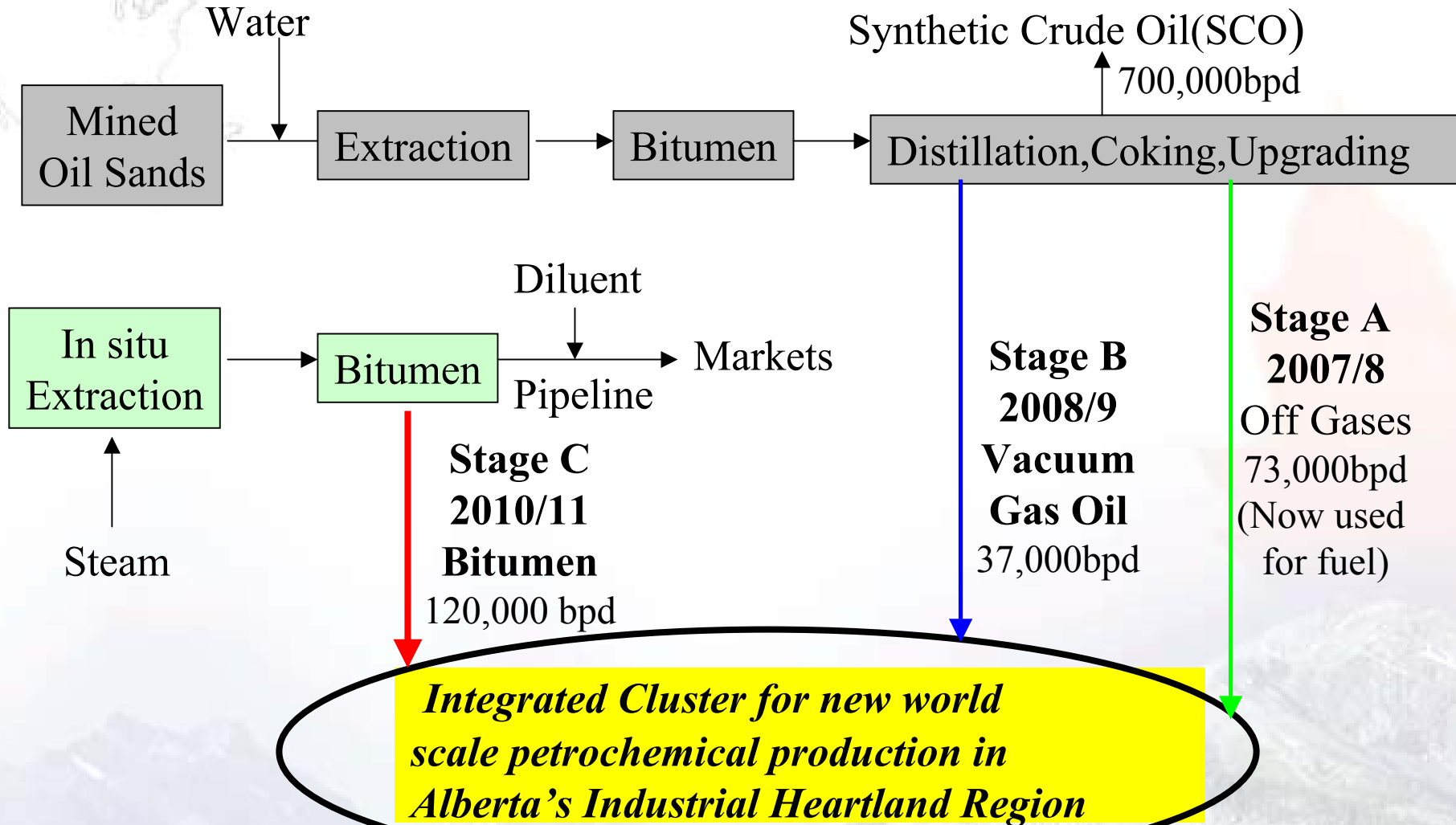
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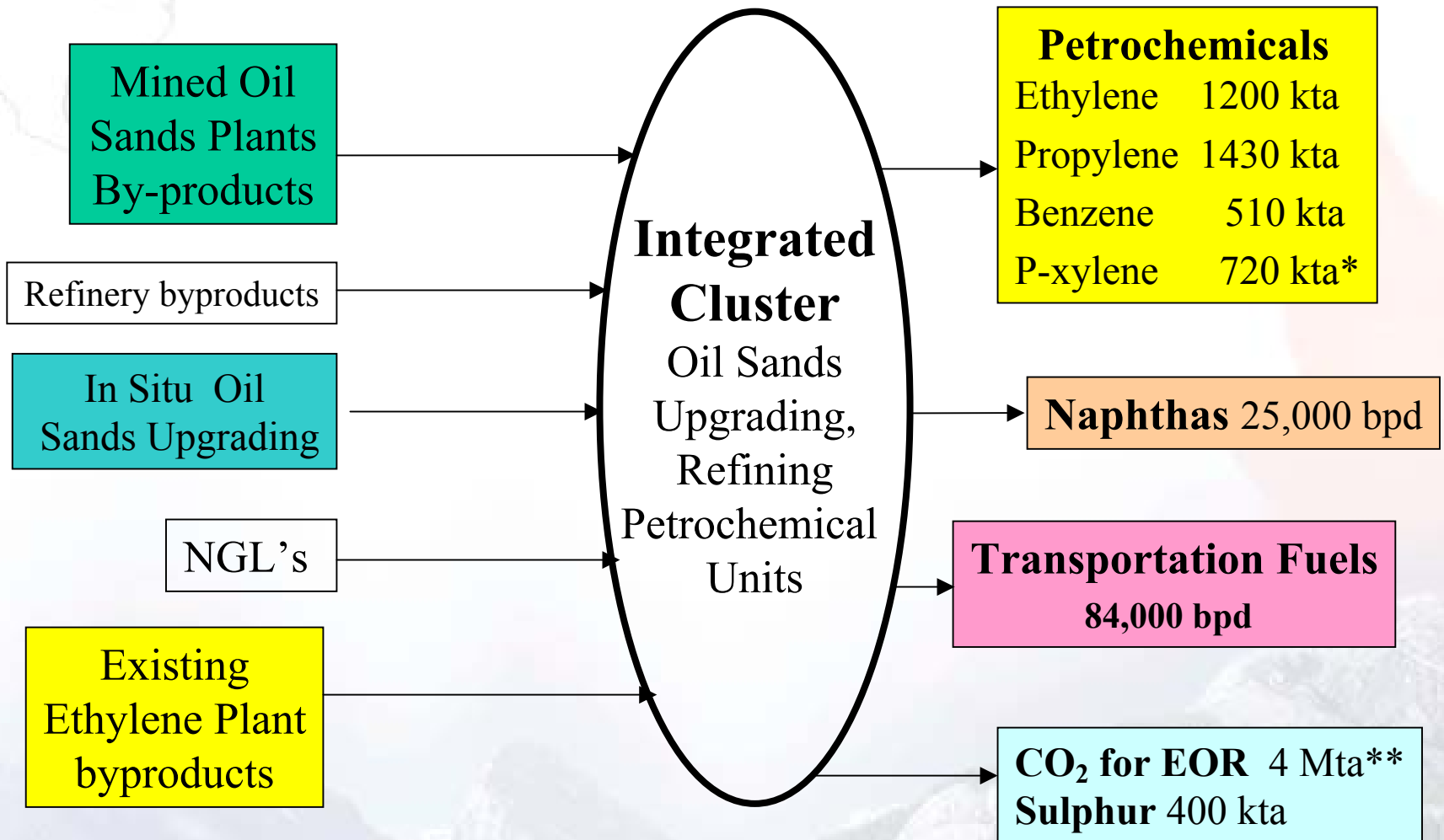
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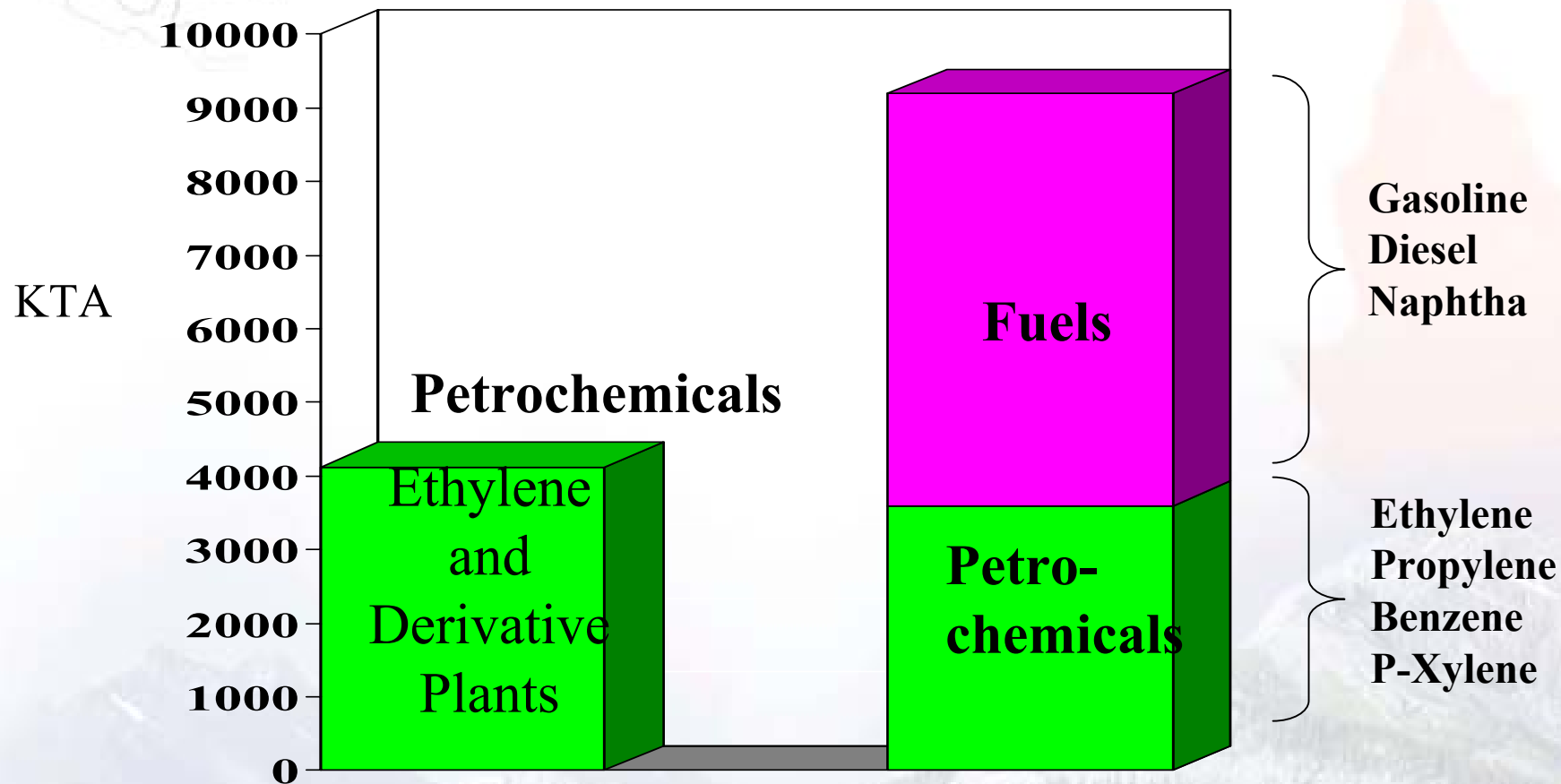


# Summary-Cluster Inputs and Products





# *World-scale petrochemical capacity based on diversified feedstocks and value-added products*





# *Economic Analysis*

**IRR = 15 %**

- Based on one integrated model
- Many other possibilities
- Requires new pipeline infrastructure



# *Summary*

- Alberta has a unique opportunity for synergistic growth of its oil sands and petrochemical industries
- One integrated model shows that co-production of petrochemicals and high grade fuels is technically and economically feasible
- Alberta's Industrial Heartland has the potential for being developed into a world-scale energy & petrochemical cluster
- Other integration schemes and regional models are possible

# **Critical Success Factors**

Andy Kinmonth, President  
Shell Chemicals Canada Ltd.

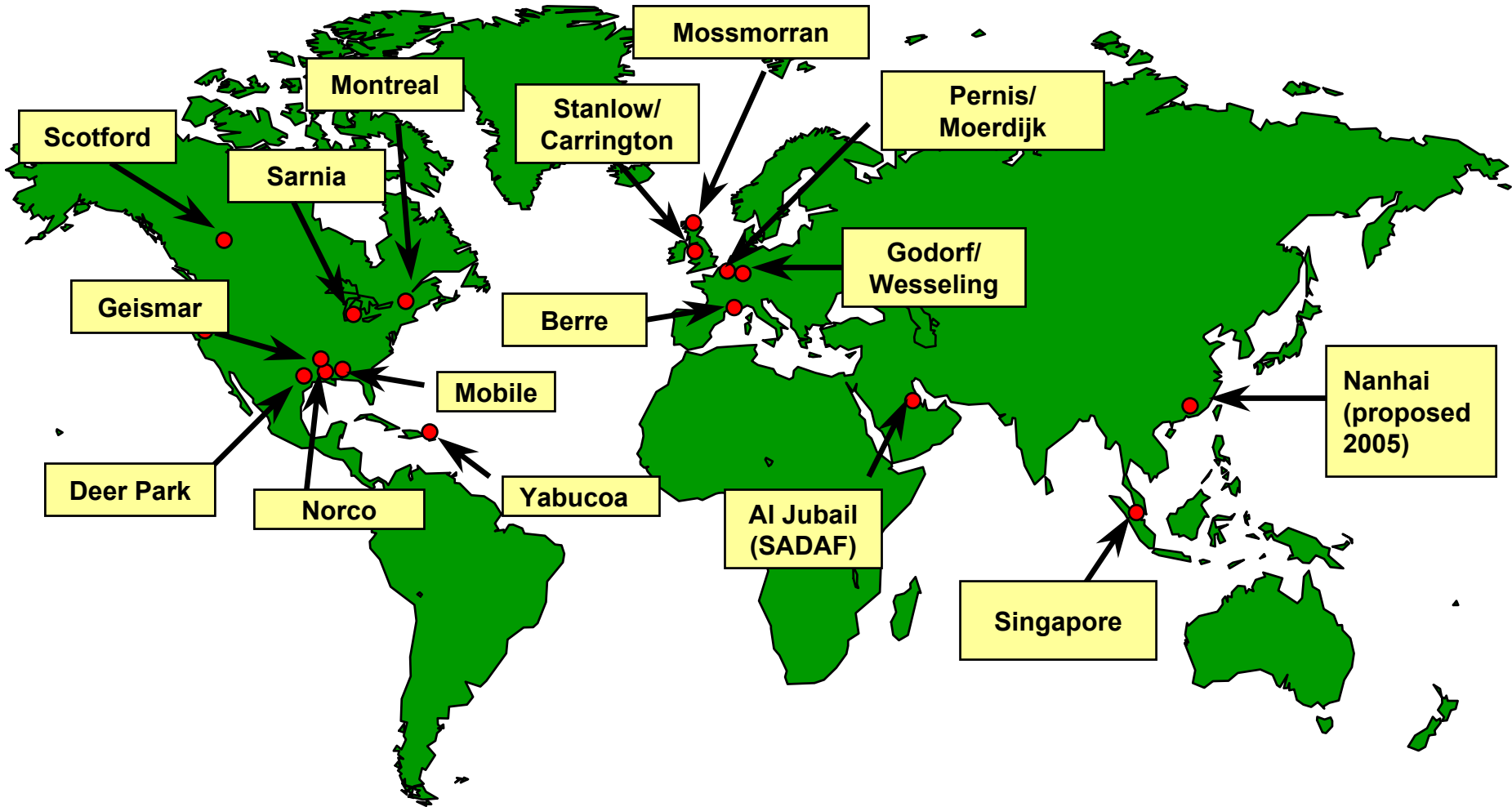
# Topics

- Summary of Critical Success Factors
- Scotford: An Alberta Example
- Examples of Success Elsewhere
  - Montreal
  - Middle East
  - Singapore
  - China
  - Australia
- Competitive Landscape
- So what do we do?

# Summary of Critical Success Factors

- Leverage Technology
- Co-operation among Industry
- Co-operation among government
- Industry and government co-operation
- Infrastructure synergies
- Responsible Care
- Champions

# Shell Chemicals Manufacturing Locations



# Evolution of Canadian Petrochemical Investments

Montreal



Sarnia



Alberta

# Scotford Success Factors

- Styrene plant built in 1984
  - Integration of Upgrading, Refining and Petrochemical Operations
- MEG plant built in 2000
  - Last of the “Old Alberta Advantage”

# Montreal - PTT Poly Canada

- World's first commercial-scale PTT – Montreal
- JV between Shell and SGF – an arm of PQ government
- Takes Shell PDO and PTA from another SGF cooperative investment
- New competitor to nylon, with many advantages
- CORTERRA<sup>(R)</sup> first significant new material in the textile and carpet industry for some time

# Right Combination for New Investment

- Availability of raw materials at competitive prices
- Advanced technology
- Skilled labour
- Markets nearby
- Government to share risk

# Middle East

- Three major drivers:

# Middle East

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# Major Recommendations from Singapore Study

- **Review regulations to encourage more efficient methods of power generation, including co-generation.**
- **Ensure supply of feedstock by deepening integration and harnessing the potential of new developments in process technology.**
- **Investigate feasibility of common waste treatment facilities.**
- **Encourage environment regulations based on sound science for sustained development.**
- **Establish a tripartite body (government – industry – academic) to steer the direction of R&D work.**
- **Build well-connected hub.**

# China

- Joint development & Co-operative Approach
- 4 Foreign J/V petrochemical complexes
- Serving Large Local Demand

# Australia

- Government invited interested parties
- Infrastructure commitment
- Industry J/V encouraged
- Sound economic basis
- Dow, Methanex, Agrium

# Competitive Landscape

- NA overcapacity with no exports
- ME is price taker in AP
- No expansion for 5(?) years
- Debottleneck for 10(?) years
- So how do we attract new \$\$\$\$\$?

# Remember

Canada has some real strengths:

- Stable politics
- Reliable fiscal regime
- Skilled labour
- Access to large US market
- Resources



# So What Do We Do in Alberta?

- A new Alberta Advantage can be created starting with Oil Sands
- The whole is the sum of the parts
- Start now
- A compelling case is required
- Understand your own sphere of influence
- Make it known a new Alberta Alberta advantage will not happen on its own
- The joint Industry-Government Group has taken a first step: Vision and Case Study





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