A Growing Focus on Unconventional Oil

A major oil company's view of prospects and potential

EIA Midterm Energy Outlook and Modeling Conference

April 12th 2005

Andrew Slaughter

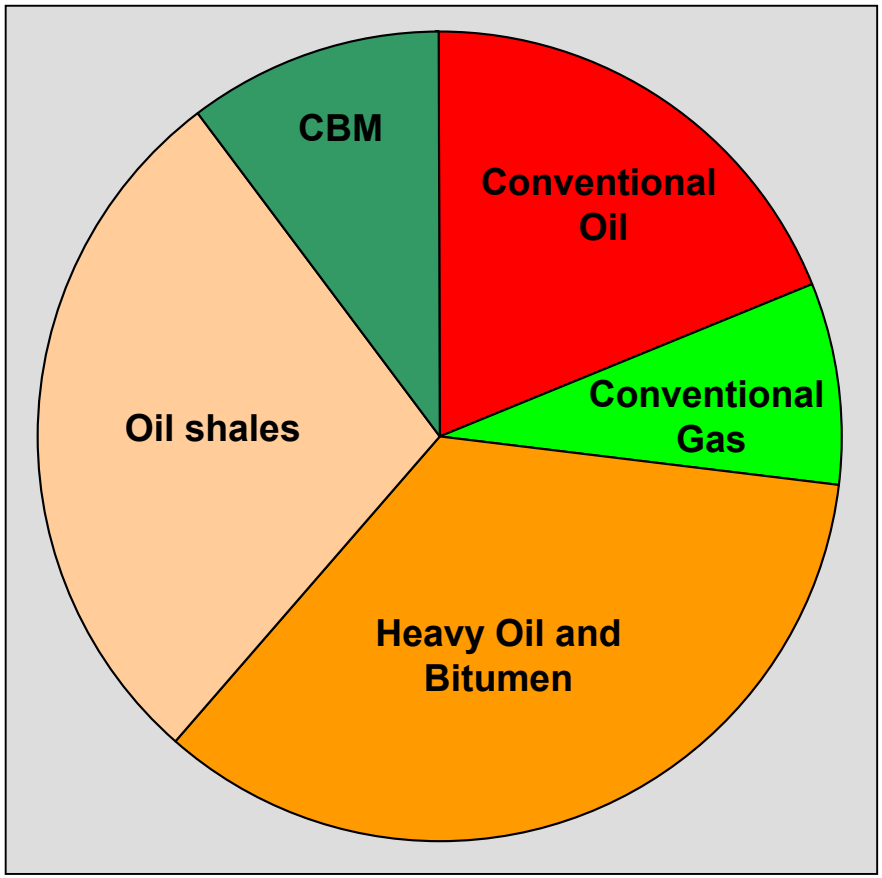
Shell – Global Business Environment

Today's Topics

- Why Unconventional oil
- Oil sands
- Gas to Liquids
- Oil shale
- Conclusions

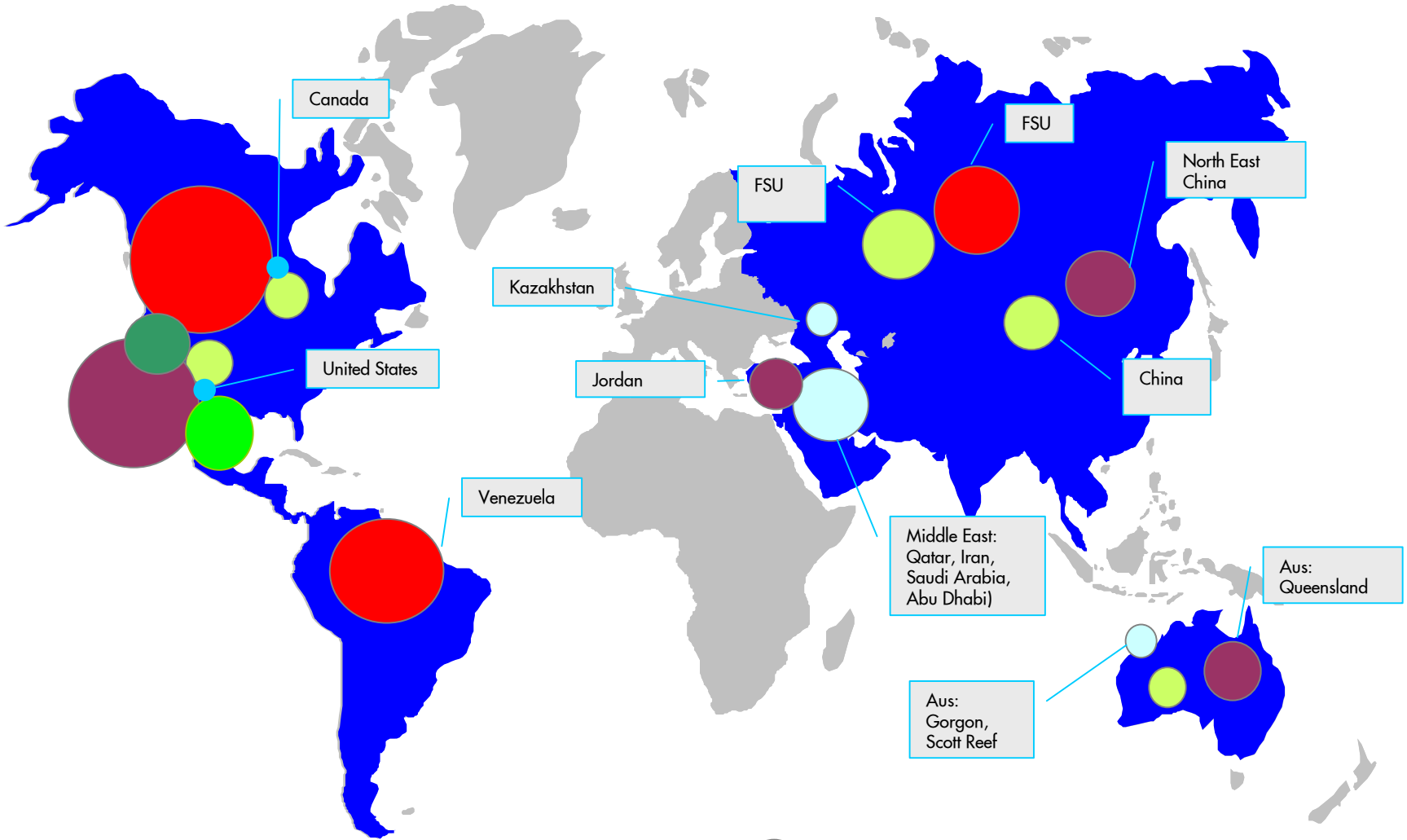
Unconventional Hydrocarbons – a rich resource base to ensure our energy future

Estimated Global Fossil Fuel Resources



- Conventional hydrocarbon resources are dwarfed by unconventional plays
- Growing development of these plays is an important contribution to long-term global energy security
- Economics should continue to improve with technology and scale

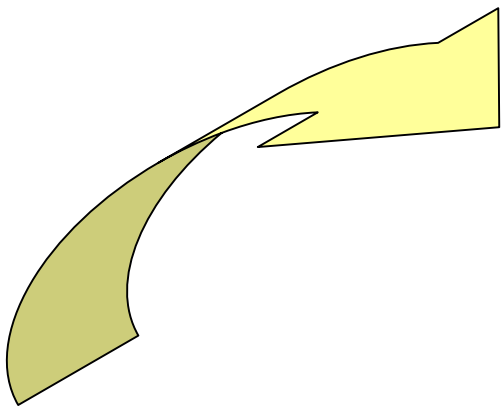
Geographical and resource diversity gives IOCs choice of opportunity



Shell EP strategy

Where we want to be

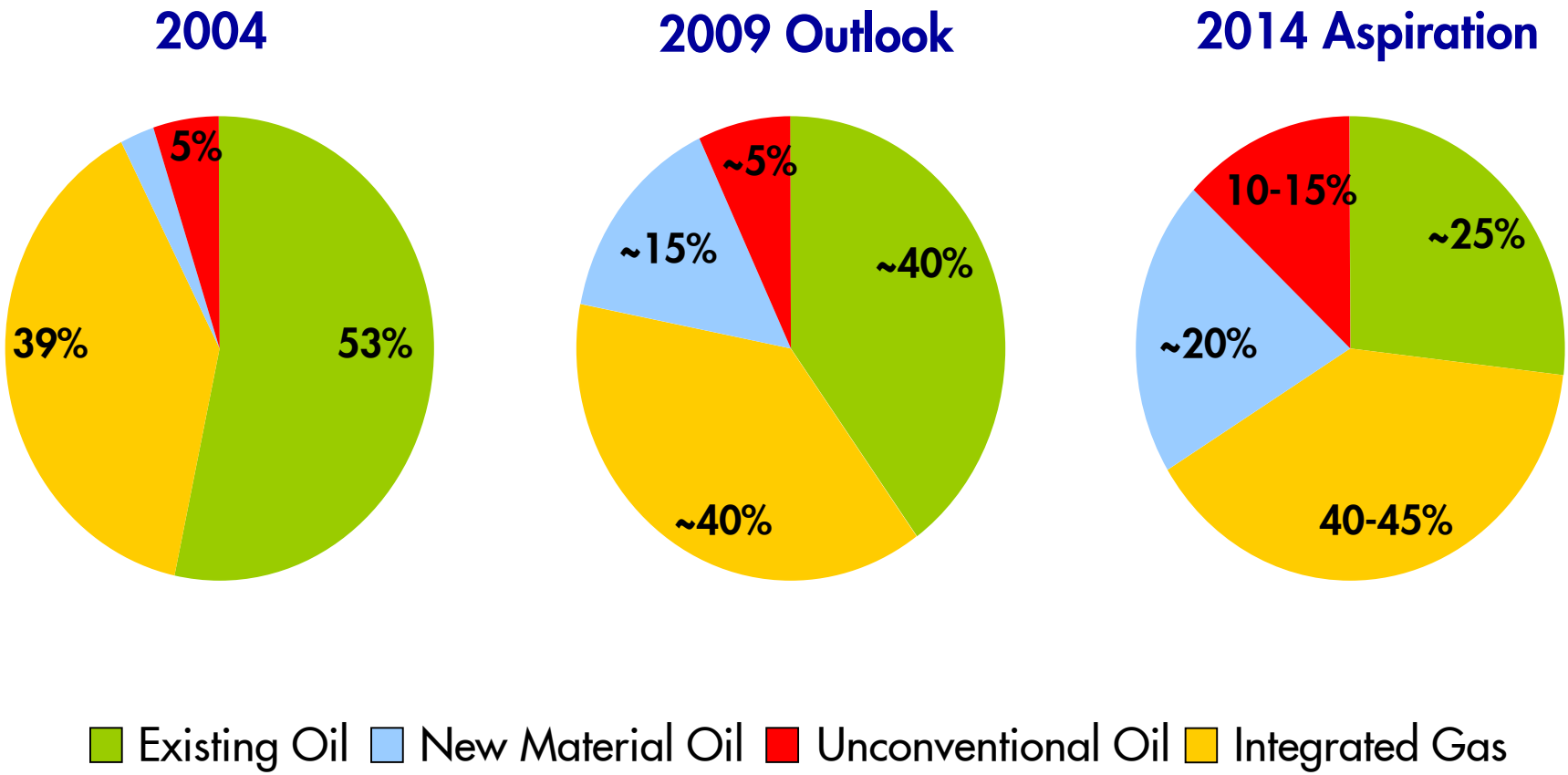
- Higher Upside
- New Material Oil
- More Integrated Gas
- More Unconventional Oil



Portfolio today

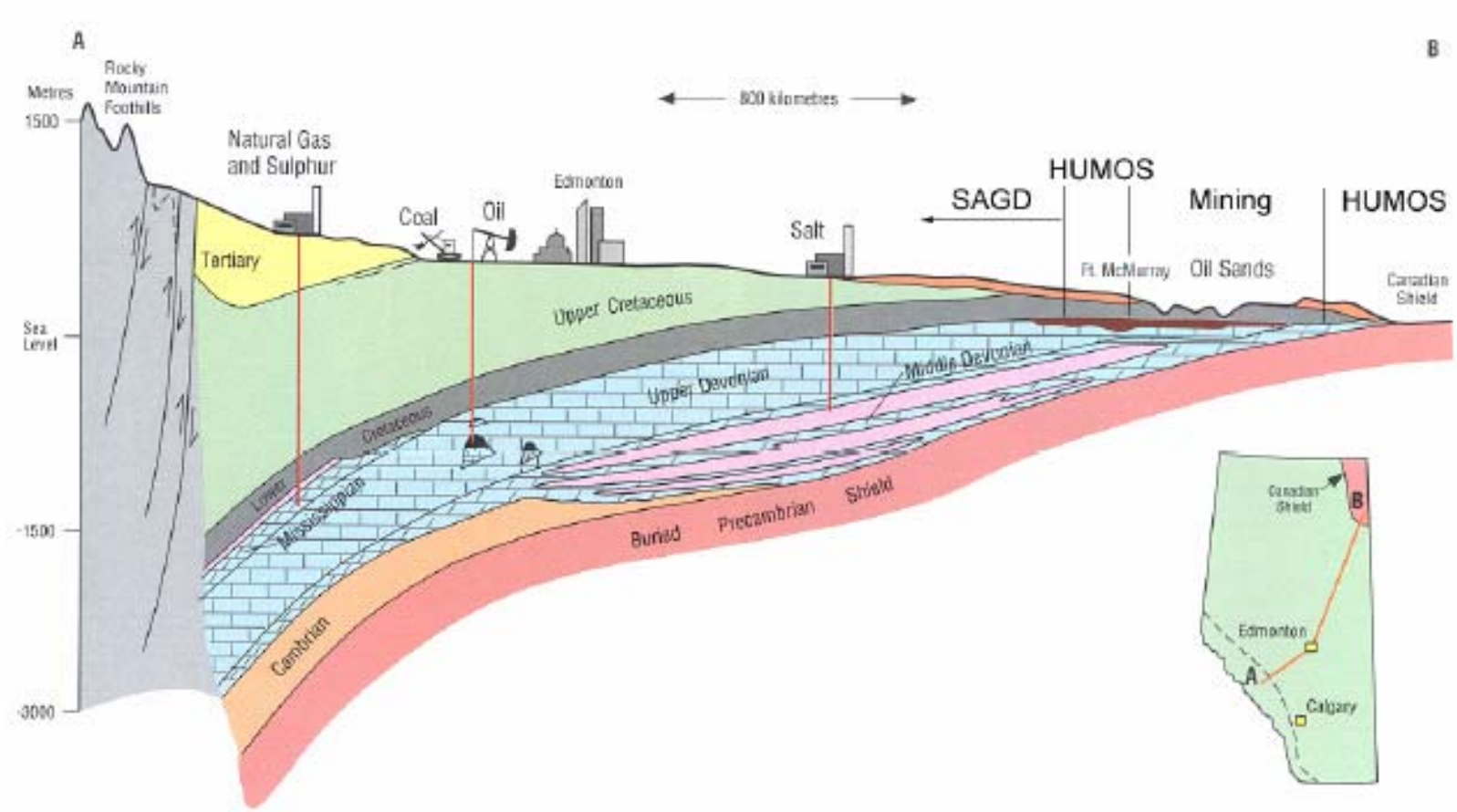
- Strong cash generation
- Leader in Gas
- Lower proved reserve life

Impact on Shell production



Shift to longer life production

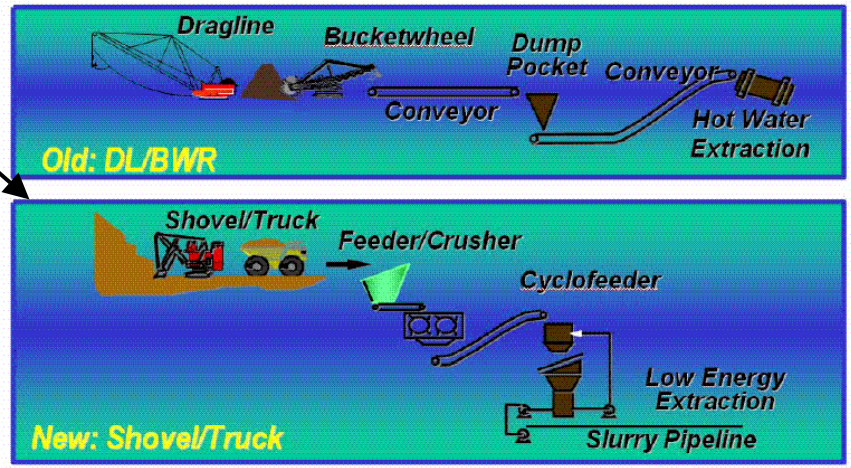
Alberta Oil Sands – technology application is opening up a huge resource



- Bitumen deposits mixed with water and sand
- Proven Reserves assessed at 178 billion barrels

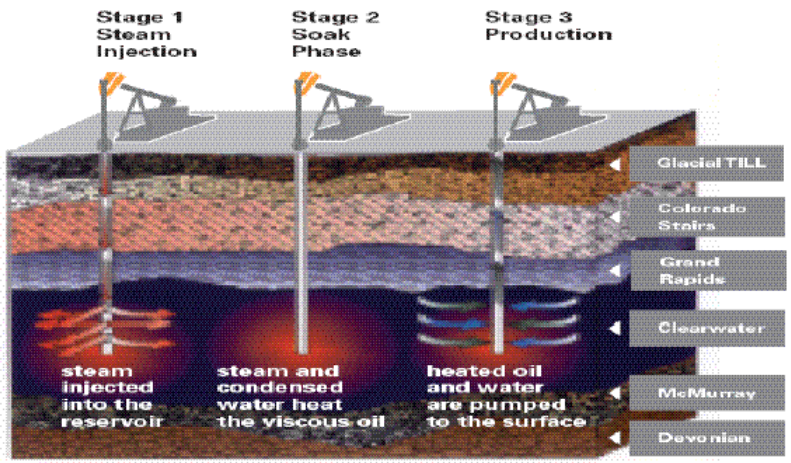
Appropriate technologies have been developed and deployed

Mining/Extraction



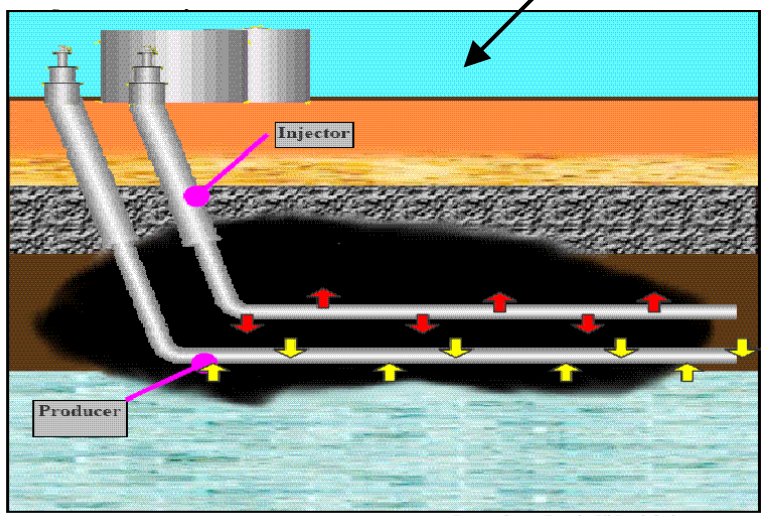
Source: Syncrude Canada Ltd.

In-Situ – Cyclic Steam Stimulation



Source: Encana

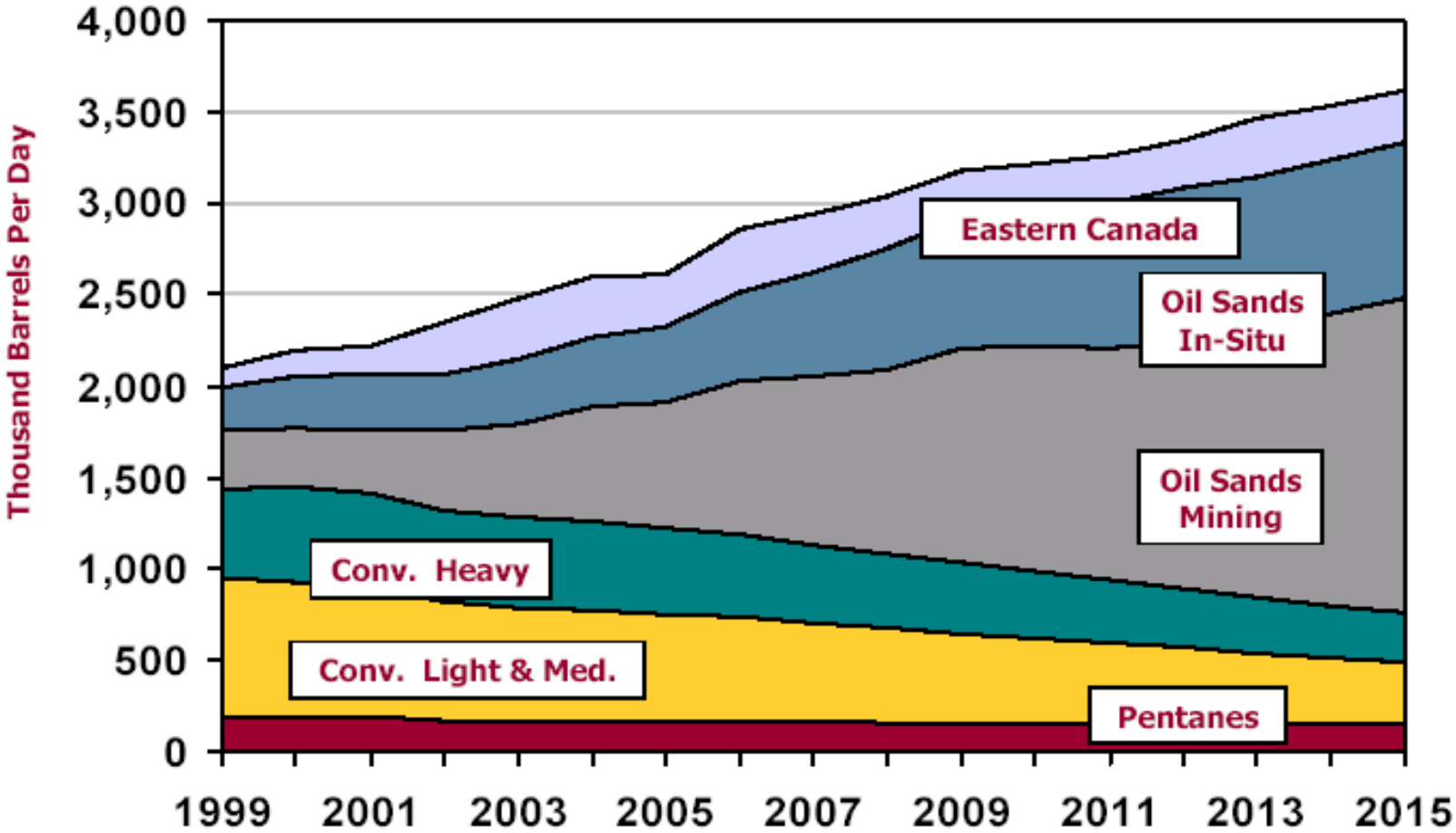
In-Situ – Steam Assisted Gravity Drainage



Source: Japan Canada Oil Sands Ltd.

Oil Sands will increasingly dominate Canadian Oil Production

Canadian Crude Oil Production Outlook



* Actual Production 1999 - 2003

Source: CAPP, 2004

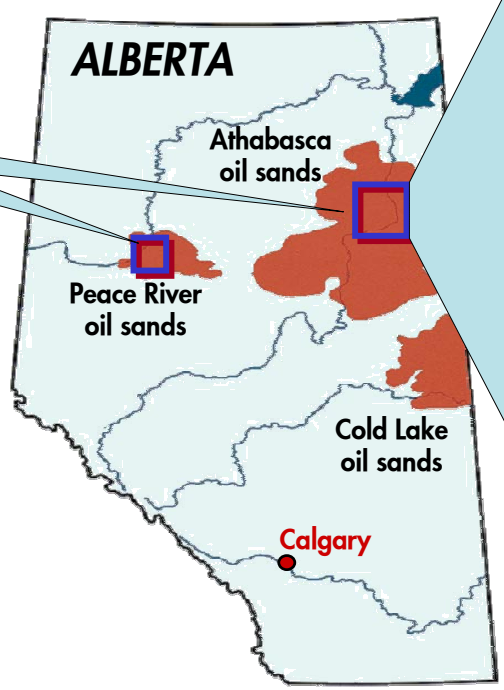
Alberta Oil Sands – Shell sees high potential for growth

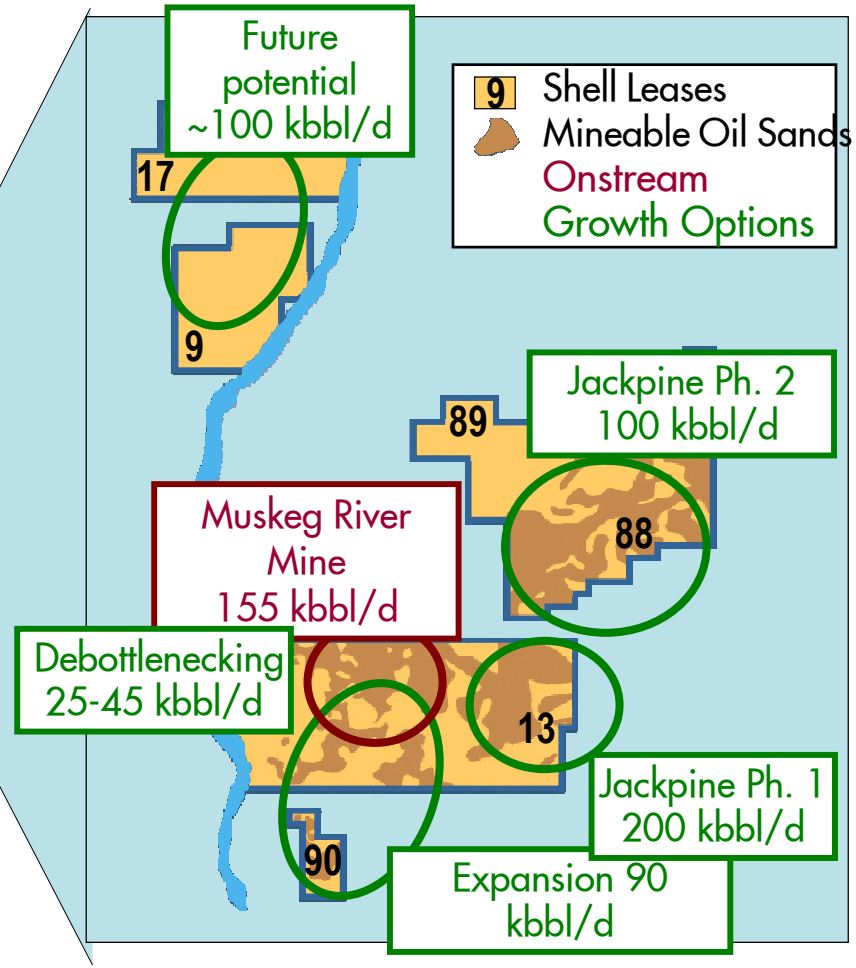
AOSP yielding results

- Production over 150 kbbl/d
- Strong price upside
- Operating cost coming down

Positioning for Growth

Examining Peace River growth options





Longer-term aspiration > 500 kbbl/d

Source: Shell Canada.
Oil sands numbers are 100% (Shell Canada share

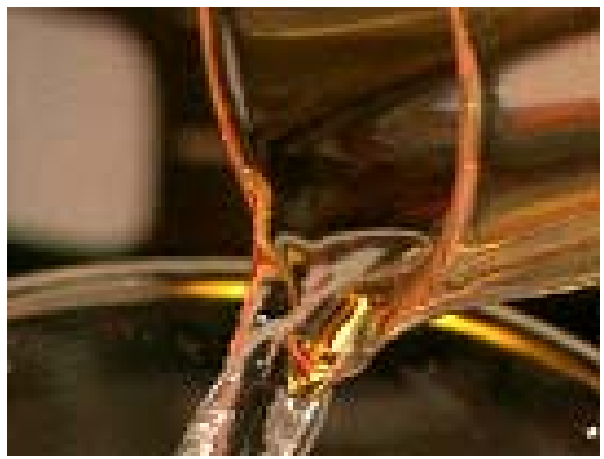
Why Gas to Liquids?

Energy security	> Strategic diversification of energy supply
	> Biomass and Coal to Liquids continuum
Environment	> Trend towards cleaner fuels
Economic development	> Remote gas reserves commercialisation
	> Most cost effective alternative fuel

GTL Fuel has unique properties:

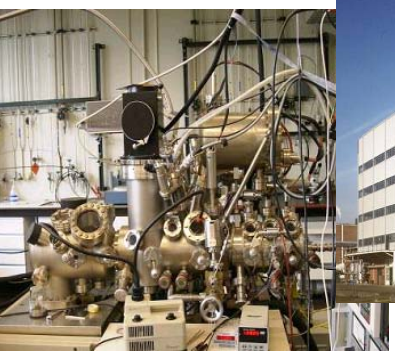
> Virtually free of sulphur and aromatics

> High cetane number



Shell GTL development

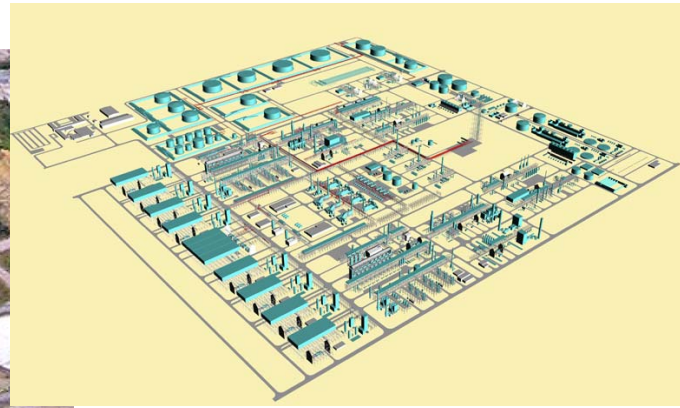
- Integrated world scale Qatar project based on proven technology
- A platform for exciting new industry based on unique new products



Laboratory
1973

Pilot plant
1983

Bintulu Malaysia
14 700 b/d
1993

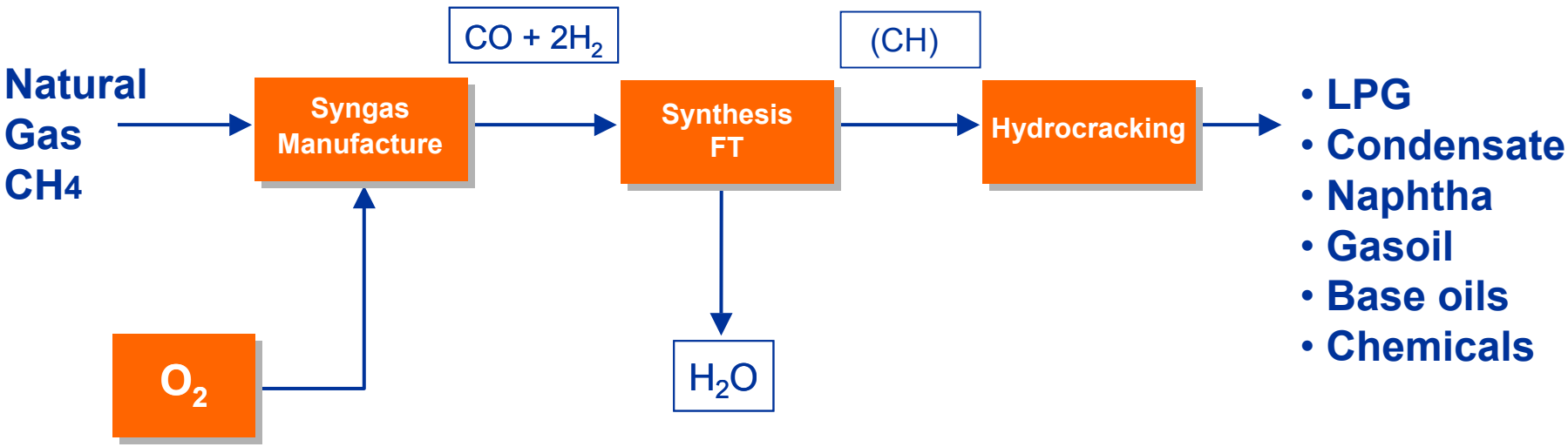


World-scale plant:
Shell Qatar GTL
140 000 b/d
2009

- **Long lead times & entry hurdles characterise GTL development**

Gas to Liquids Process

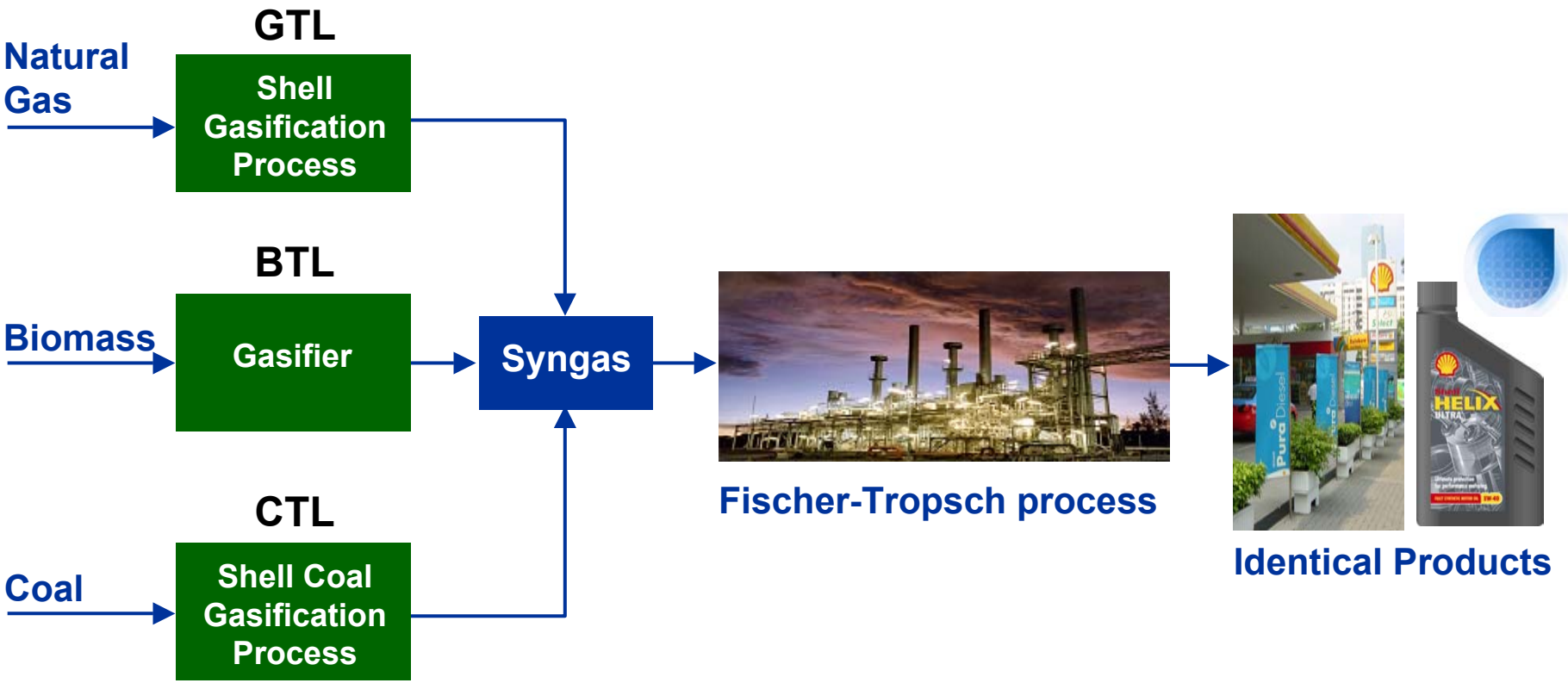
GTL: a process that converts natural gas to high quality products via Fischer-Tropsch process



- **Shell proprietary technology for all process blocks**

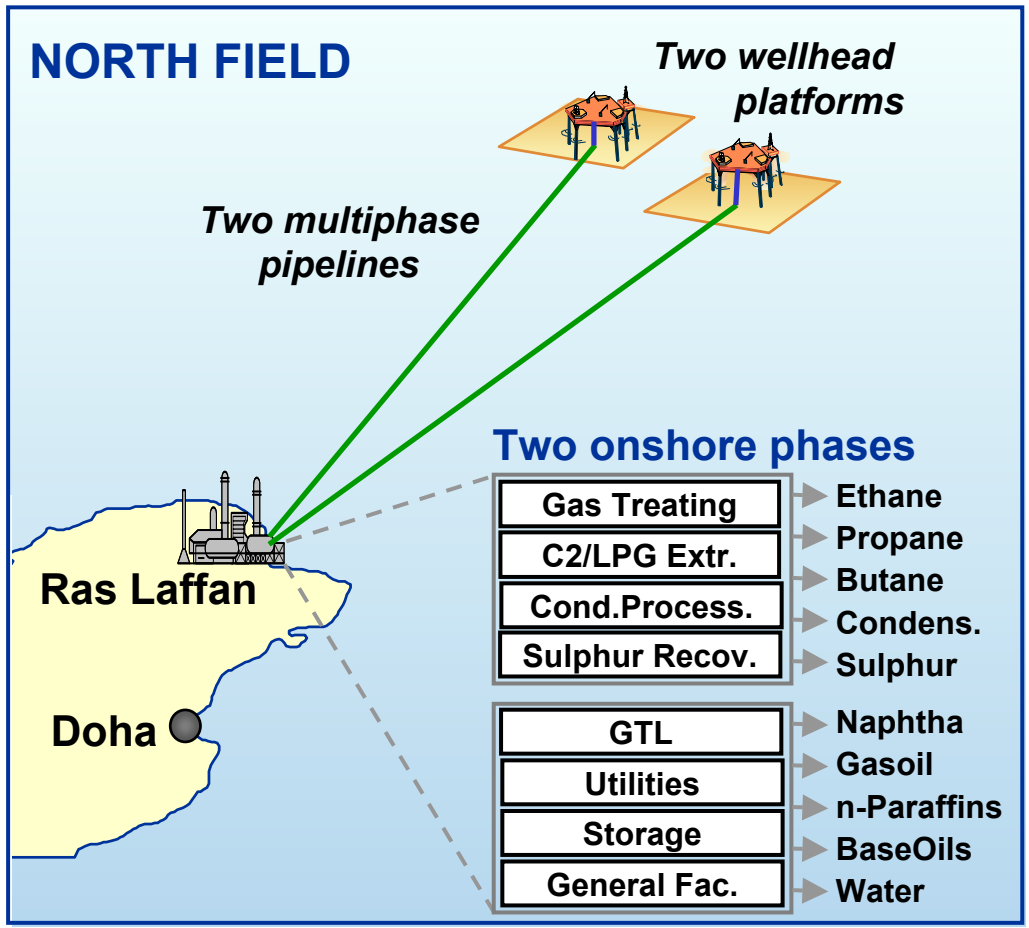
Synthetic Fuels Continuum

- Identical products from gas, coal and biomass
- Flexible feedstock options
- Common development of advanced efficient engines



Qatar Shell GTL Project Overview

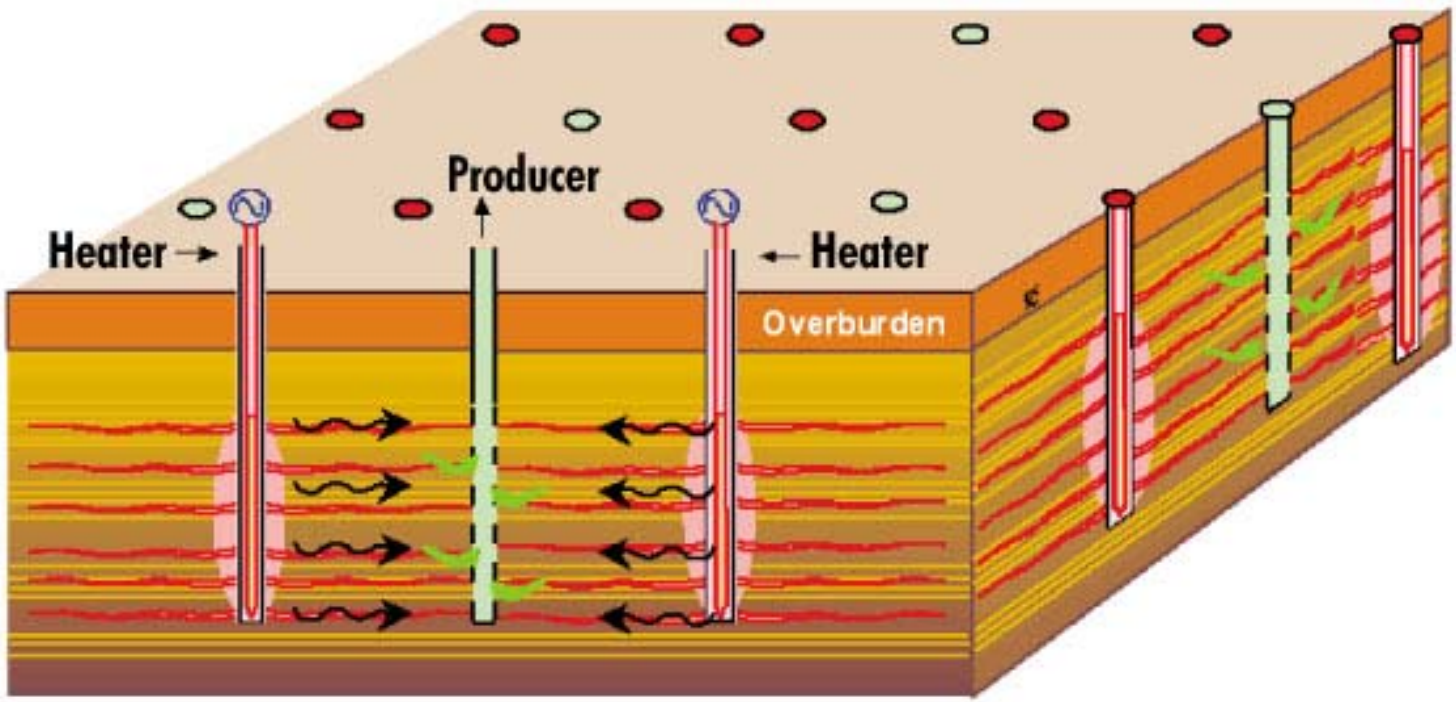
- Fully integrated project
- Development Production Sharing Agreement (DPSA), 100% Shell
- ~1,600 MMscf/d well head gas
- 140,000 b/d GTL products
- Two phases, start-up 2009
- Total investment ~USD 6 bln



Oil Shale
– long-term, high potential, high uncertainty

- **Oil shale deposits are huge, and the U.S. has the largest known resource in Colorado and Utah.**
- **Energy companies have been trying to unlock the resource for decades, with little success**
- **For over 20 years, Shell has been undertaking laboratory and field research in Colorado on a promising new technology which may improve recovery factors and reduce environmental impact**
- **There is still much to learn about the technology before Shell can consider commercial development**
- **Energy markets require a long-term perspective to prepare for the future and Shell is committed to developing new energy sources for future generations**

Shell Technology Research Project – In-Situ Conversion Process (ICP)



Cross section view

- Heaters inserted into drilled holes to gradually heat shale beneath surface
- Heat converts oil shale (kerogen) into oil and gas
- Products are produced to surface

Shell Oil Shale Research Project - Colorado

- **Oil shale is a fine-grained sedimentary rock containing organic material from which oil and gas can be obtained through the application of heat**

Advantages Over Previous Oil Shale Processes

- In-ground process; no open pit mining; no large tailing piles
- Minimizes water use
- Generates more oil & gas from a smaller surface pad area; allows access to deeper oil shale reserves
- Higher quality product; less refining required to produce transportation fuels

Some Conclusions

- **Sources of unconventional oil hold huge promise for our energy future – but this will only be realised if energy companies and stakeholders take a long-term view and commit to a stable investment and regulatory climate**
- **The transition from conventional oil to unconventional oil has started and will continue for many years**
- **Shell's unconventional oil production is responding to the evolution of the global oil market**
  - **Alberta Oil Sands – 2002**
  - **World Scale Gas to Liquids – 2009**
  - **Oil Shale - ?**