

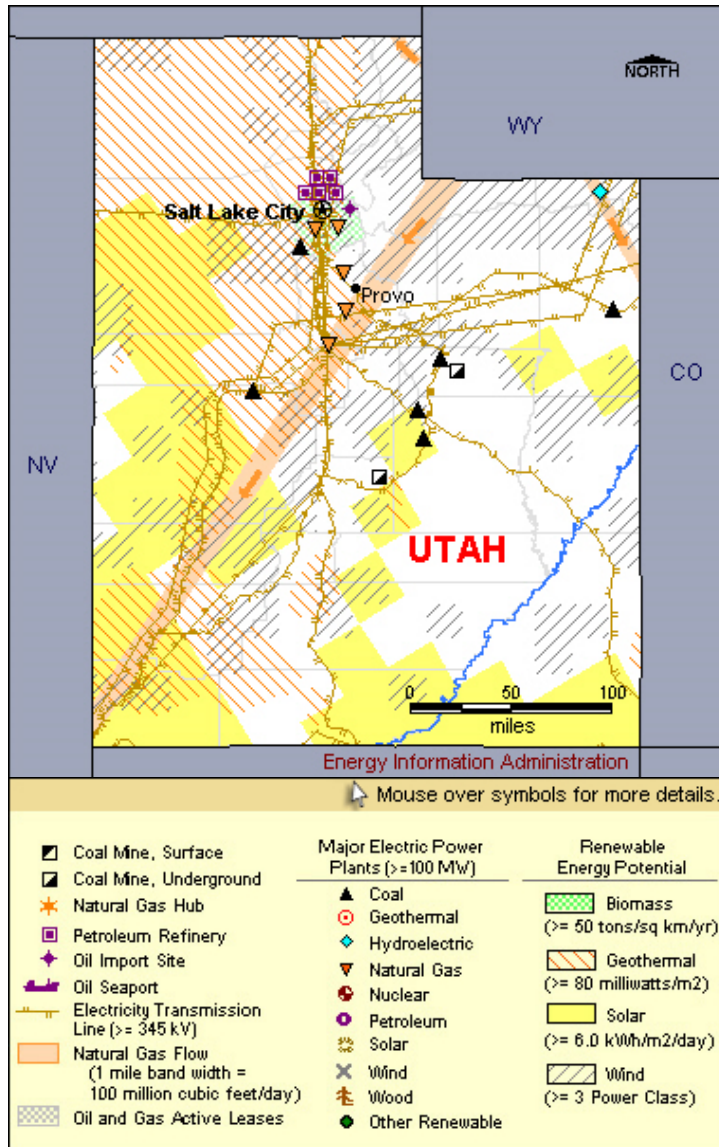
# Black Wax Issues

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# Utah Energy Profile

*From Energy Information Administration*



- Utah produces about 1.2% of the nation's oil
- Contains about 1.5% of the reserves – 286 million barrels
- Natural gas percentages are higher
- Large reserves of coal
- Oil sands
- Oil shale
- Most of the oil production is high pour point paraffinic crude oil – Black Wax

# Black Wax Issues

- Only small amounts are mixed with non-paraffinic crudes and pipelined
- Most black wax is trucked
- Cost and environmental considerations
- Challenges in refining
- Cost differential

**IOGCC Study - 2007**  
**Rocky Mountain Region**  
**Crude Oil Market Dynamics**

*Final Report*

IOGCC Governors' Task Force  
January 2007

- *Investigate the crude oil market dynamics in the Rockies*
- *identify the conditions causing the precipitous price drop, and the expected duration of these conditions*
- *recommend both near and long-term actions that could be taken to correct this situation*

# Report Findings

- Excess supplies are causing significant price differentials.
- Canadian imports will increase. – good for energy security. Canadian imports can overload regional take away capacity and depress local prices.
- The key is to eliminate the bottlenecks that prevent oil in the Rockies from reaching destinations where it can maintain higher values.
- Exporting pipeline capacity is expected to increase.
- There has been no significant change in refinery capacity in the region, although incremental expansions have been executed.
- Refinery processing dynamics have changed due to the increase in production of sour feed.

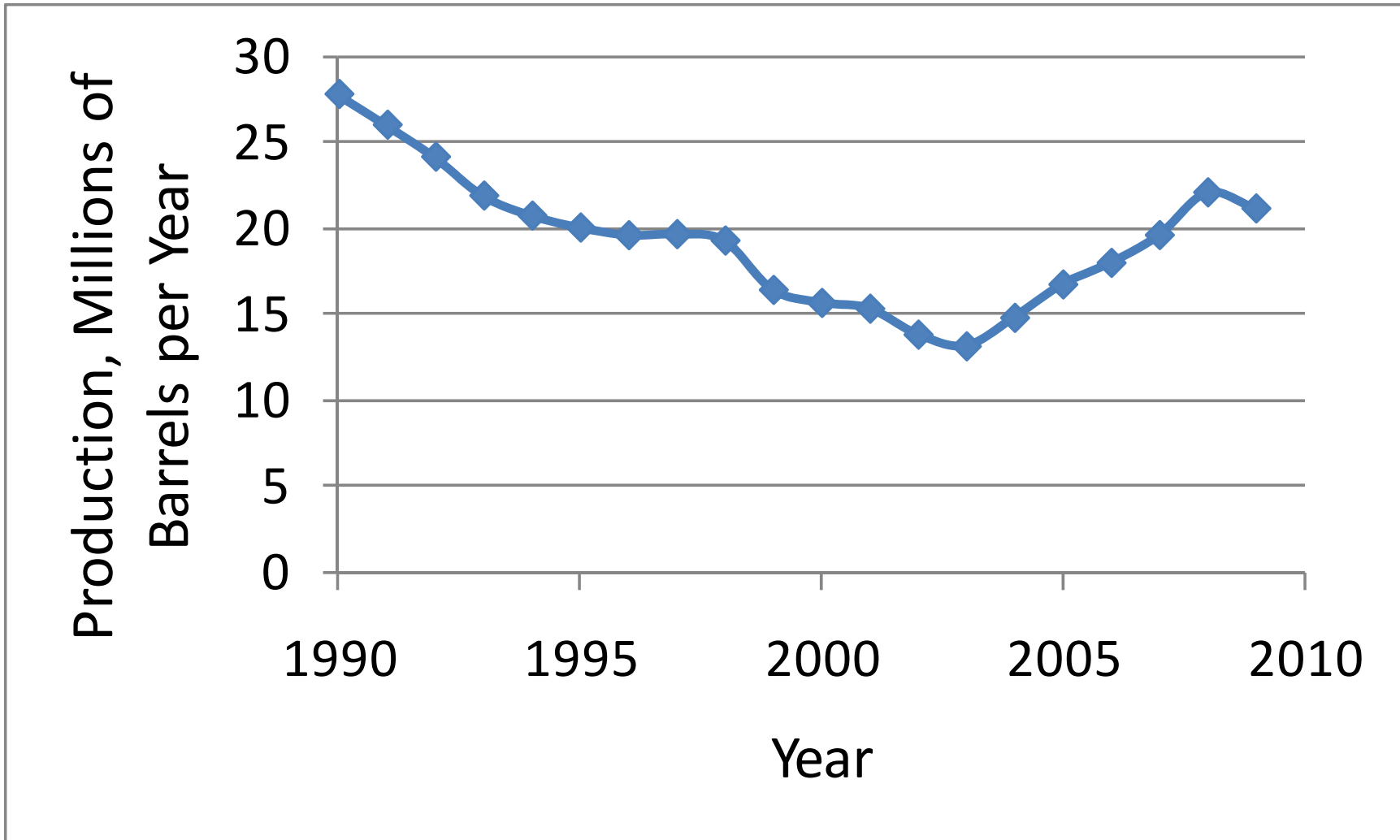
# Recommendations

- Proactively promote pipeline and refinery development
- Infrastructure development
- Better regulatory framework
- Tax policy to incentivize infrastructure development
- Work with Tribal groups
- Market transparency and facilitation

# Some History

- In 1991 three big waterfloods
  - Redwash, Wonsits Valley, Walker Hollow
- A small company – Lomax Exploration
- U.S.DOE Class I Reservoir Program
  - Research partner – University of Utah
- Beginning of the Greater Monument Butte Waterflood program

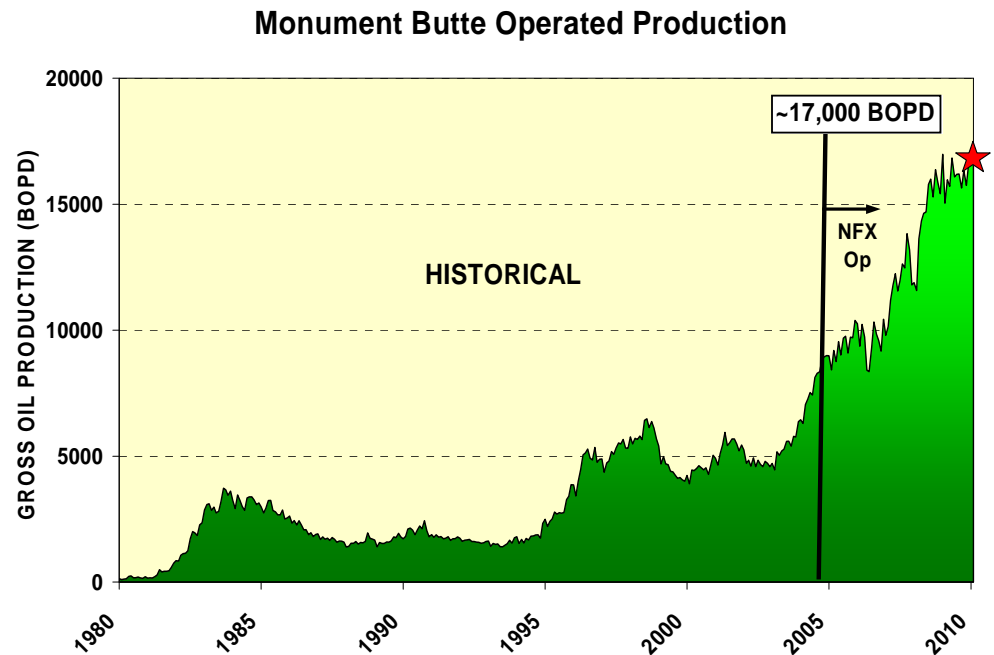
# Oil Production





# Monument Butte

- To date, invested > \$750 million
- 1,340 producing oil wells
- 584 class II water injection wells
- Increased oil production 176% to 17,000 BOPD

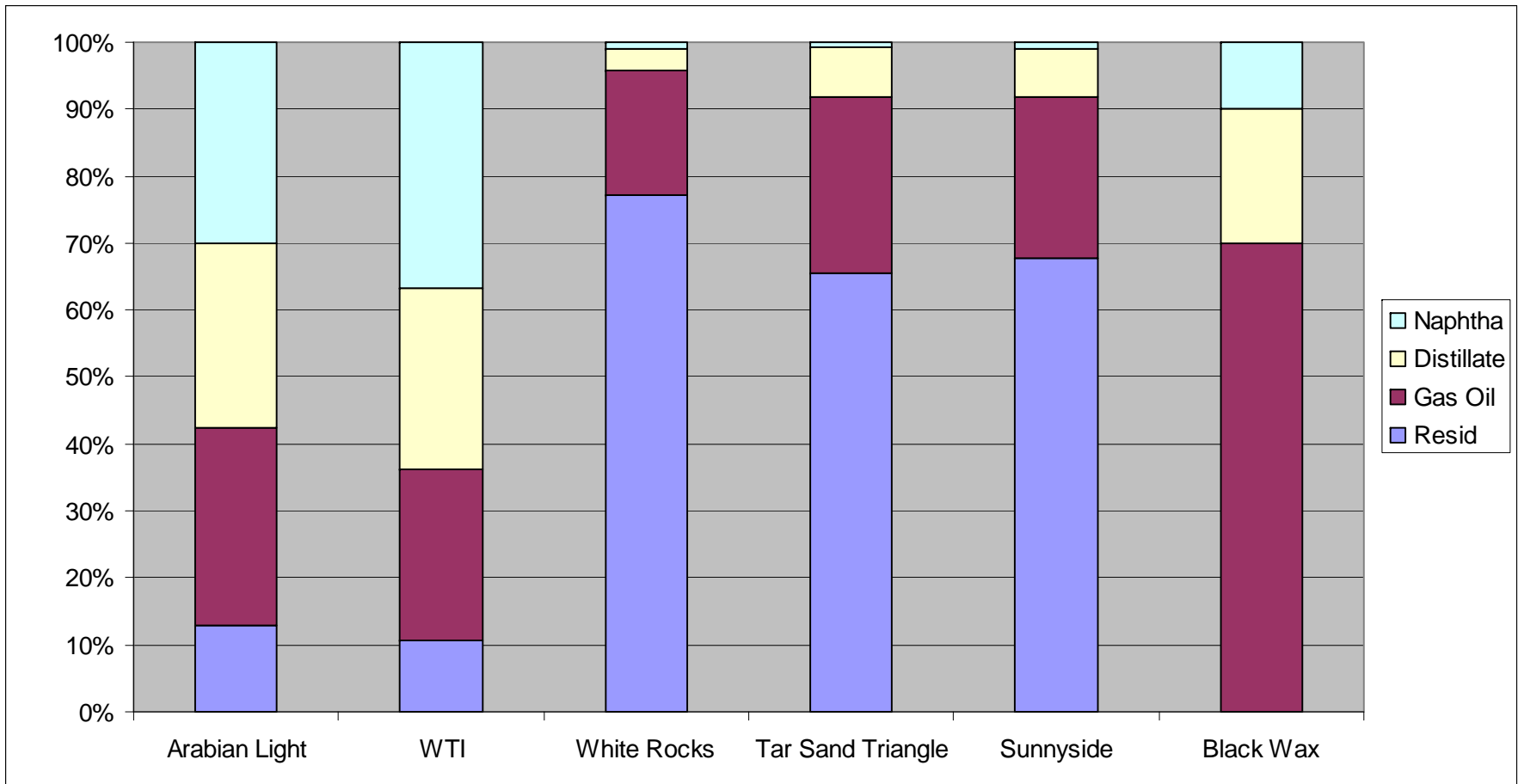


*From Newfield Production*

# Black Wax Characteristics

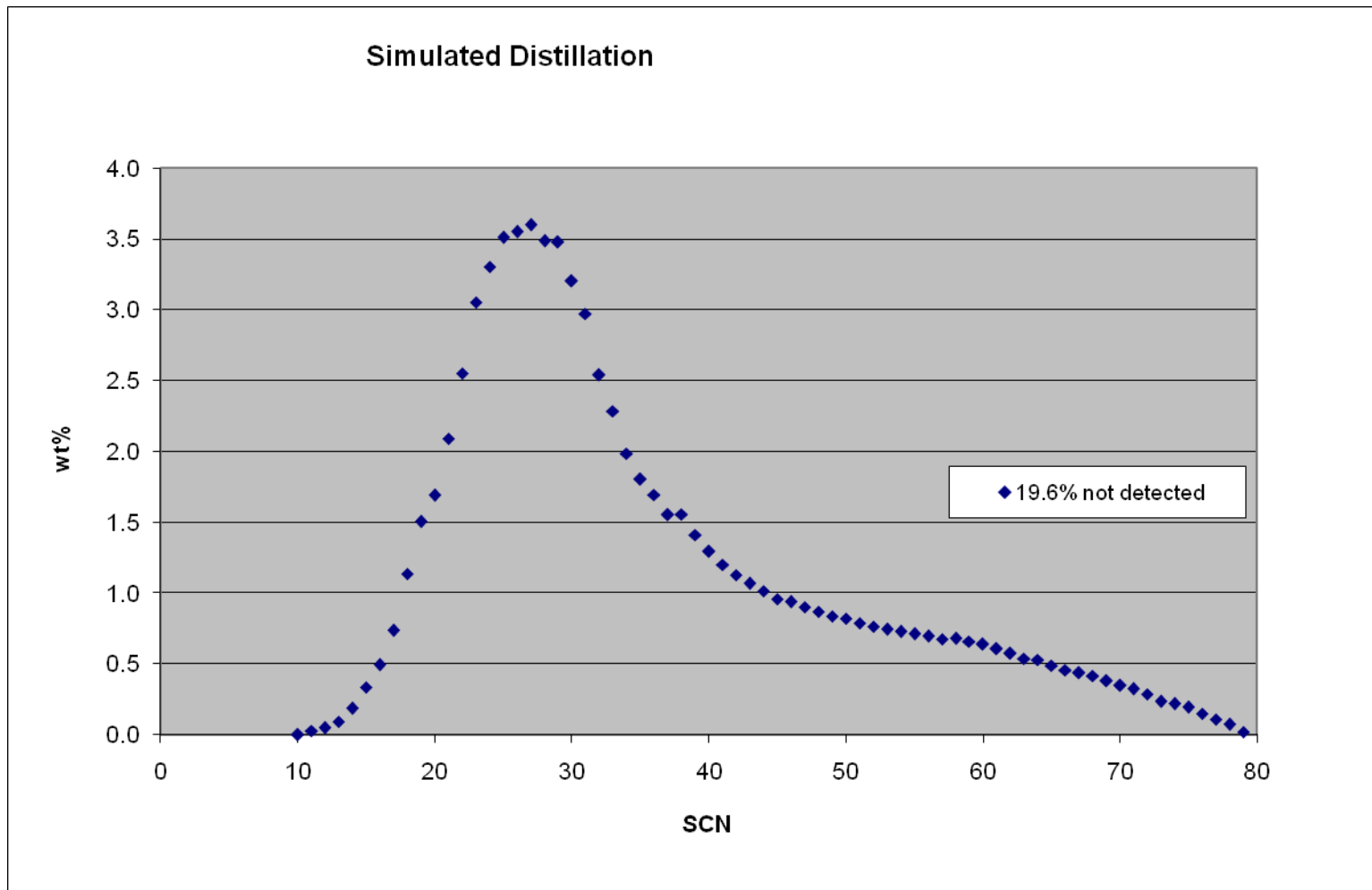
- Good API gravity
- Low viscosity at temperature
- Low sulfur
- High pour point
  - Implications on product distributions
  - Implications on transport and storage within the refinery
- High resid and gas oil fraction

# Black Wax Characteristics



*From Vince Memmott*

# Compositions



# Black Wax is not Bitumen!

- Upgrading technologies
  - Carbon rejection
  - Hydrogen addition
- For rich paraffinic feedstock, nonideal
- Chemical production?
  - Alpha olefins
    - Detergent manufacture
    - Other chemical uses

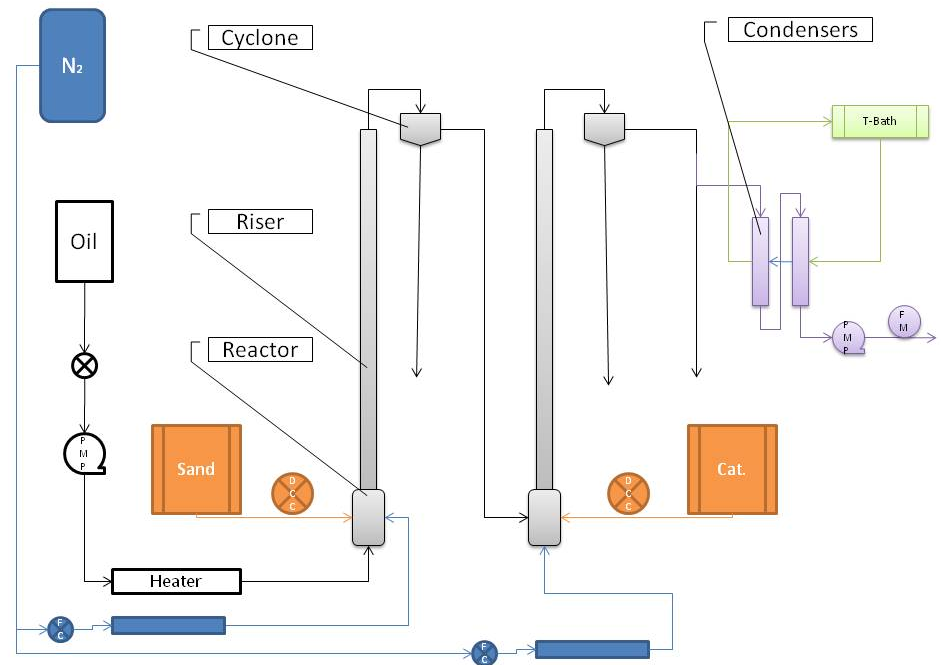
# Refining Considerations

- Mature industry
- Unit coordination
  - Crackers
  - Hydrotreaters, etc.
- Flexibility in adjusting feedstock mix
  - Different oils available
- Maximize specific distillates/products
- Capital expenditures specifically for black wax

# Technological Solutions

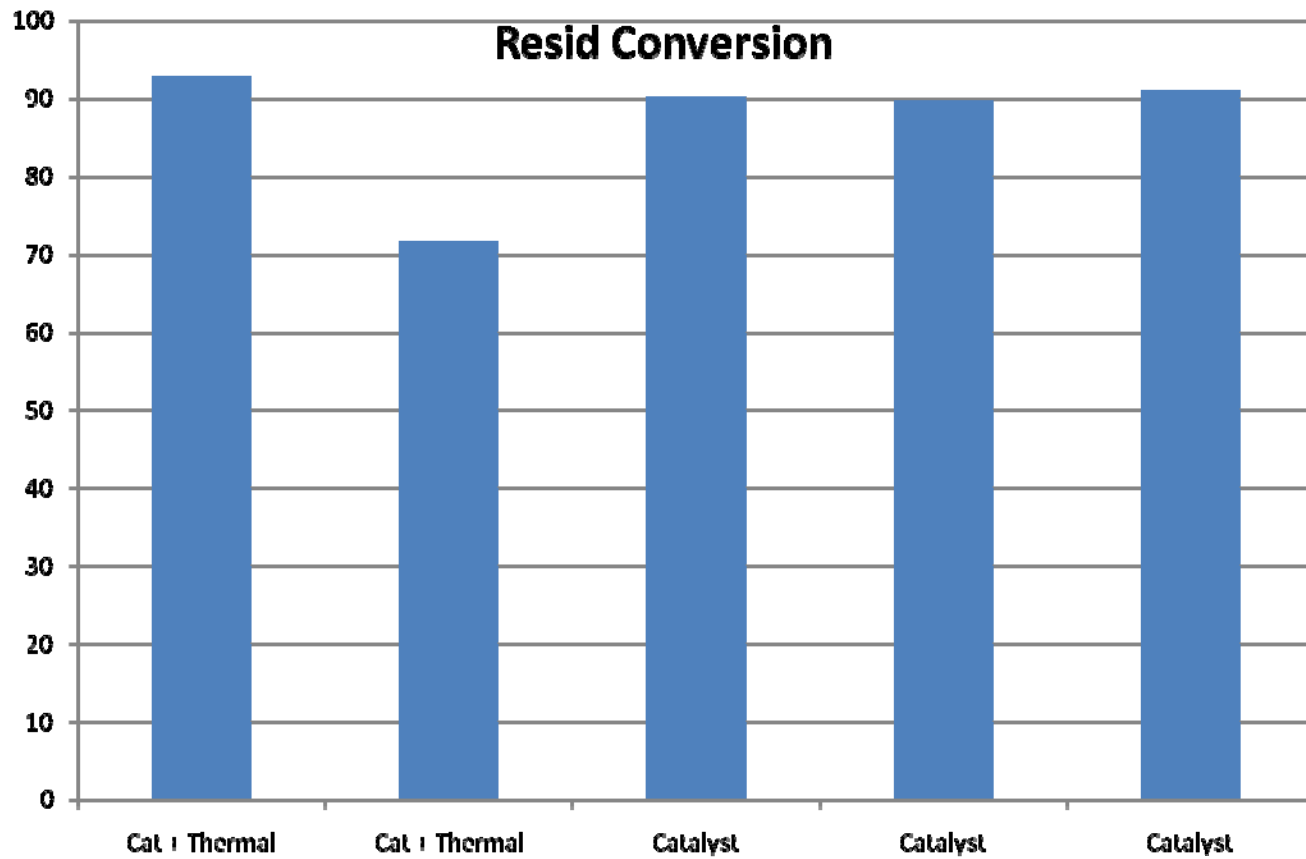
- Pour point depressants
- Mixing and transporting; diluents
- Slurry transport – emulsions
- Partial upgrading – wellhead or central
- Microbial processing
- Refining – A project currently being planned by Uinta Partners
- Other

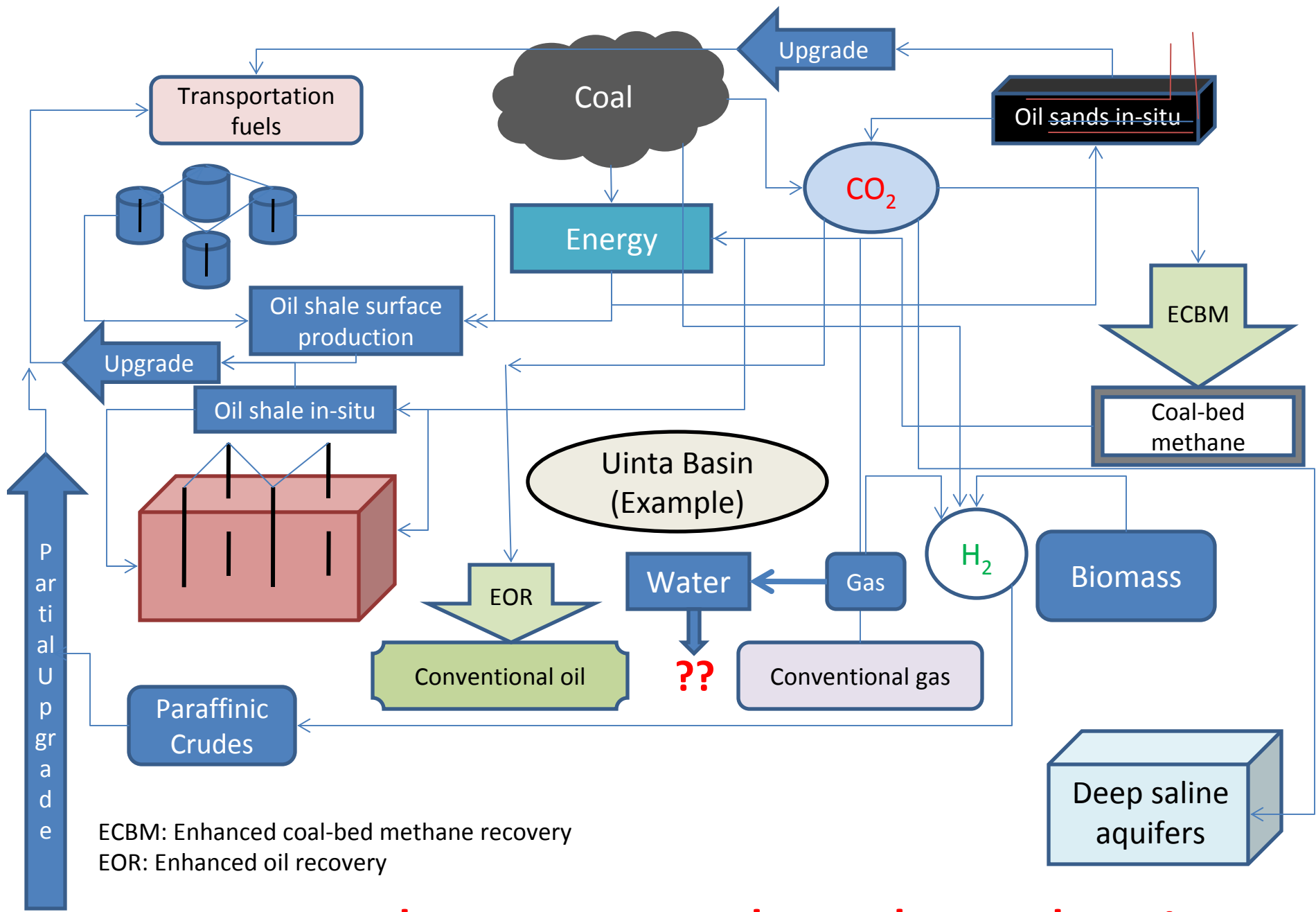
# Combined Thermal/Catalytic





# Resid Conversion





# Integrated Energy and Fuel Production

# Summary

- Transportation is the biggest problem with Black Wax even though the high pour point oil causes production, storage and refining problems
- Solving this problem will result in significant benefits to all stakeholders