RESPONSIBLE DEVELOPMENT
OF OIL SHALE

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The opinions voiced during this presentation are those of the author and do not necessarily reflect the opinions of the companies discussed or of individual NOSA’s members. The facts presented resulted from research into each topic.

Piceance Basin - Colorado

Introduction
Progress overview
Times have changes since last U.S. oil shale boom
Oil shale facts and fiction
Challenges for developers
Benefits from development
Wrap up
National Oil Shale Association (NOSA) Info
A wise person recently told me “There needs to be an alignment of the stars – in effect a nexus of technical, economic and political factors for oil shale to be commercialized in the U.S.”

It is my opinion, that today the technical and economic factors are within our grasp.

But, for the nexus to be complete, we still need a consistent political approach and a positive policy toward the development of U.S. fossil energy resources, including oil shale.
AMSO pilot test initiation
Shell freeze wall & 1st Round RDD lease development application
2nd Round RDD lease activities
Enefit buys OSEC
Paraho demo plant makes first oil
TomCo Energy starts Utah project
ExxonMobil & Chevron activities
Congressional field hearings
USGS increases oil shale resource estimates for Utah
Israel, China, Estonia, Morocco, & Jordan activities
THEN

- During the last boom of the 1970-80’s the U.S. government offered monetary incentives to reach unrealistic production goals from technologies not ready for scale-up.

NOW

- Current development approach is deliberate, staged and focused upon finding technical solutions that are economic, environmentally acceptable and sustainable.
- There are no U.S. government financial incentives today. Funding for development is from private investment.
- Since the 1970’s experience has been gained from the production of 100’s of millions of barrels of shale oil.
Worldwide mined oil shale history

Updated data from Pierre Allix and Alan Burnham
“Facts are stubborn things; and whatever may be our wishes, our inclinations, or the dictates of our passions, they cannot alter the state of facts and evidence.” [John Adams – 2nd President of the United States]

“Fiction was invented the day Jonas arrived home and told his wife that he was three days late because he had been swallowed by a whale.” [Gabriel Garcia Marquez, 1982 Nobel Prize for literature]

Today facts about oil shale are often obscured and lead the public and decision makers to believe in erroneous myths about the resource and its potential.
The Facts – Examples

- Oil shale processing produces more energy than it uses.
  - Estimates range from 3:1 to 6:1
  - Higher hydrocarbon content than conventional oil sands

- There is enough water available to support oil shale development in Colorado, Utah and Wyoming.
  - 120,000 AF/yr req’d for 1.55 MMbbl/day – CO study
  - Many developers have water rights
  - Additional storage needed

- There are solutions to dealing with greenhouse gases (GHG)
  - Oil shale emissions comparable to other fossil fuel sources
Most important parameter is mass of CO$_2$ emitted per final fuel energy content

Estimates of this parameter have been made by Adam Brandt (UCB, Stanford) and by industry personnel (e.g. Alan Burnham)

In-situ processes pursued by Shell, AMSO and others are comparable to Canadian oil (tar) sands without CO$_2$ sequestration

CO$_2$ sequestration can reduce emissions to levels comparable or better than conventional crude oil
Challenges

- Technical and economic challenges
  - In-situ technologies in R&D stage
    - 10-15 years to commercialization
  - Ex-situ technologies commercialized outside U.S.
    - Require demonstration on U.S. oil shale
- Political challenges
  - Oil shale resources not available for commercial leasing
  - Uncertain regulatory environment
  - Inconsistent policy for unconventional fuel development
Reversals in policy for 100 years
Placer claiming - 80% US Government ownership
1970’s oil embargo and gasoline lines
  - Syn Fuels Corp., Energy Independence, $80 Billion
1980’s pull-back
Energy Policy Act (EPA) of 2005
  - RDD leasing, PEIS and leasing regulations enacted
Current re-visititation of EPA 2005 initiatives
Dilemma for firms trying to develop oil shale
Benefits

- Secure domestic transportation fuel supply for the future
- Public sector revenues
  - Taxes
  - Lease royalties
- Economic expansion & diversification
- Long term employment opportunities
  - Educational growth and skill development
- Fiscal support for public sector infrastructure

Battlement Mesa, CO built by industry for oil shale population increase postulated in 1970’s
Photo by G. Vawter circa 2010
QUOTE FROM THE PAST

"In the minds of those men who are best informed on the technical and business phases of the oil shale industry, it has passed the experimental stage and "has arrived." [Dr. Victor C. Alderson, President, Colorado School of Mines, 1919.]

BACK TO THE PRESENT

Yes, there have been past predictions of an imminent oil shale industry that have not come to fruition. But times have changed.

As an example, recent shale gas development has created a new industry around the world. The presence of gas and oil in shale rocks has been known for decades, but it is the development of new technologies that has made the resource economic.

Oil shale is on the brink of a similar renaissance to that in the shale gas industry as new technologies are developed and older technologies are optimized for the production of shale oil.
NOSA is a not-for-profit organization that stands for responsible development of oil shale to benefit the long term domestic energy needs of the nation.

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Members include 16 corporations, 2 non-profits and 20+individuals

Please visit our booth and attend our Annual Meeting tomorrow at 7 AM on the 2nd floor in the Green Center