

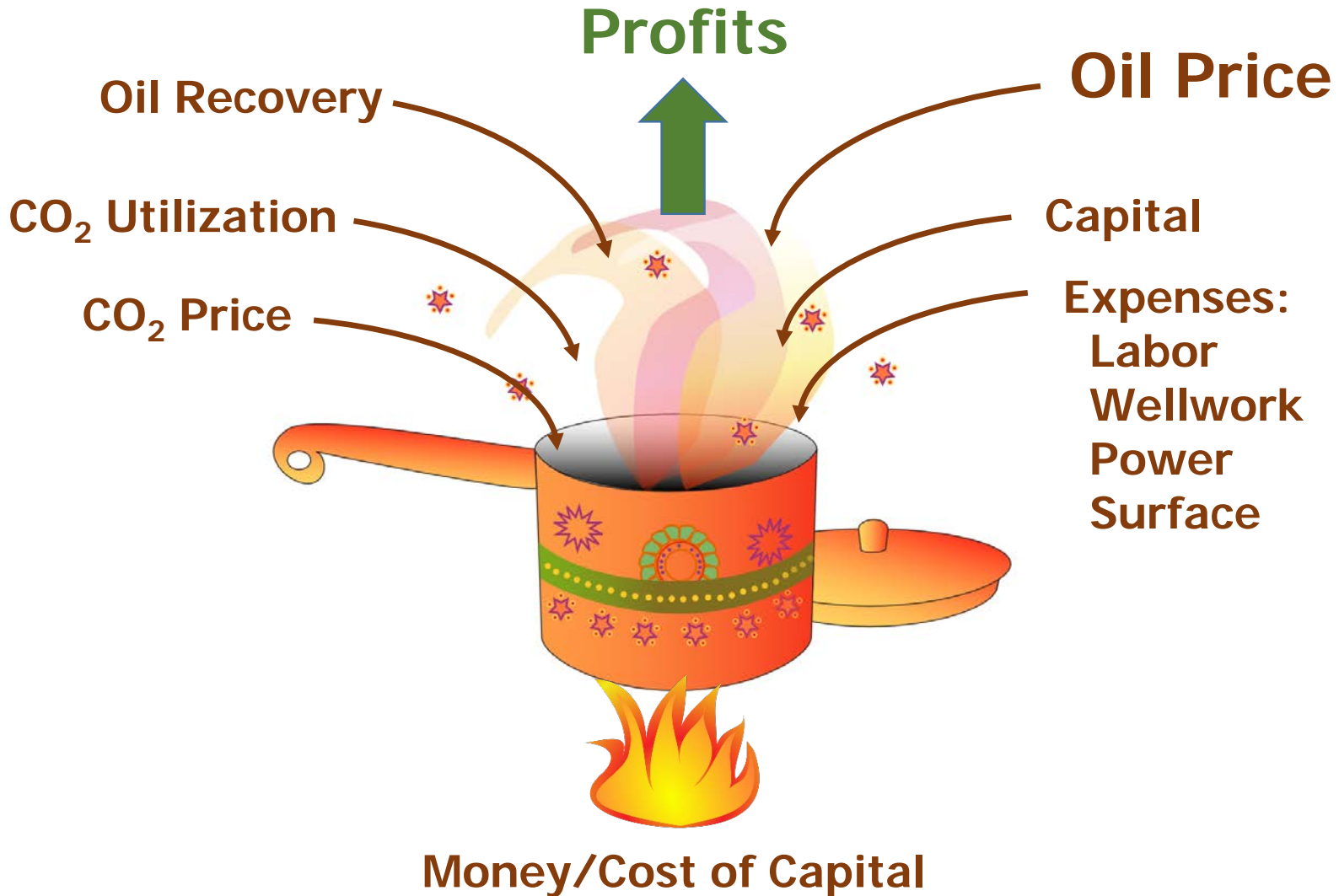


Coping and Prospering with Low Oil Prices – The Future of CO₂ EOR

Chuck Fox
President & CEO

Midland CO₂ Conference
December 11, 2015

Recipe for Profits



Ban the Ratchet



Source: Wikipedia "Socket wrench and sockets" by Kae

We made money at \$20/BO, \$100/BO, \$50/BO and \$100/BO, and we need to make money at \$50/BO again.

Expenses

- **Wellwork**
 - Down 40 – 50%.
 - Focus on efficiency
- **Power**
 - Already reduced in many areas due to gas prices
 - Focus on efficiency
- **Surface/Other**
 - Focus on efficiency
- **Labor**
 - Fewer people
 - Create value: Revenue/Cost



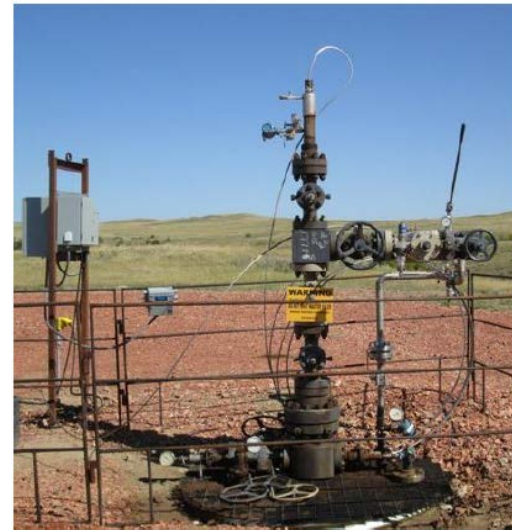
Source: Wikipedia. Jeff McNeill.

Boeing 747-8 wing-fuselage sections during final assembly

Industrial Engineer Wanted

Capital

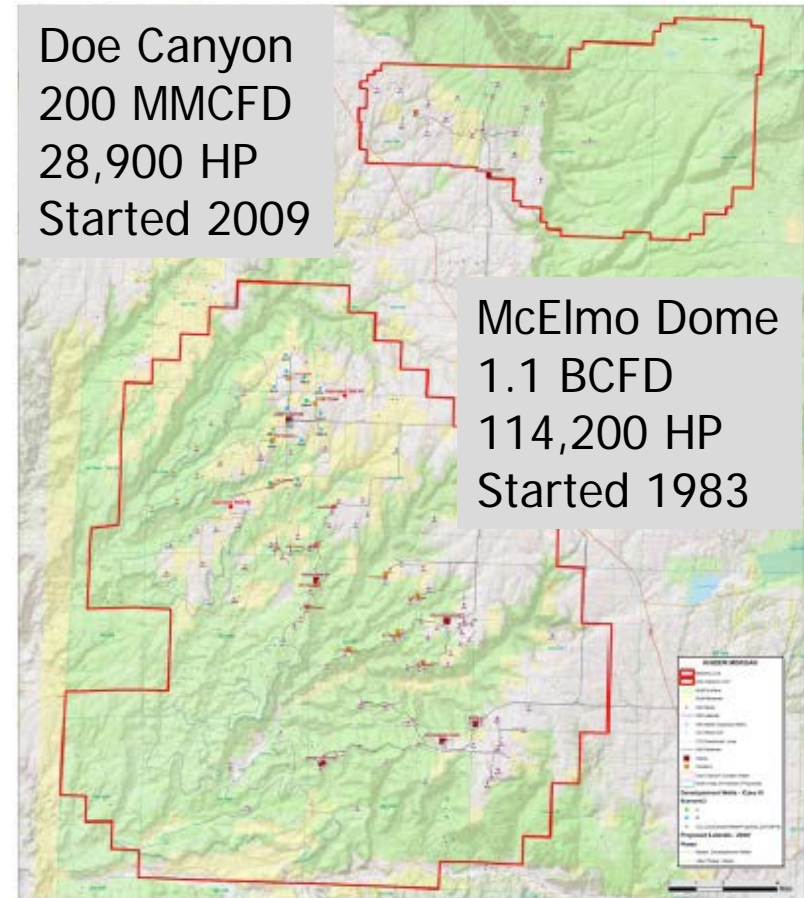
- **Hard capital is split 50/50 downhole and surface**
- **Downhole costs down 40 - 50% from the peak**
- **Compression and electrical equipment only down 5 - 10%**
 - Demand for these products outside oil & gas
 - Imports will be more acceptable
- **These prices will fall too along as will construction costs**



Source: Julie Deese, Denbury
2014 CO₂ Conference

CO₂ Price

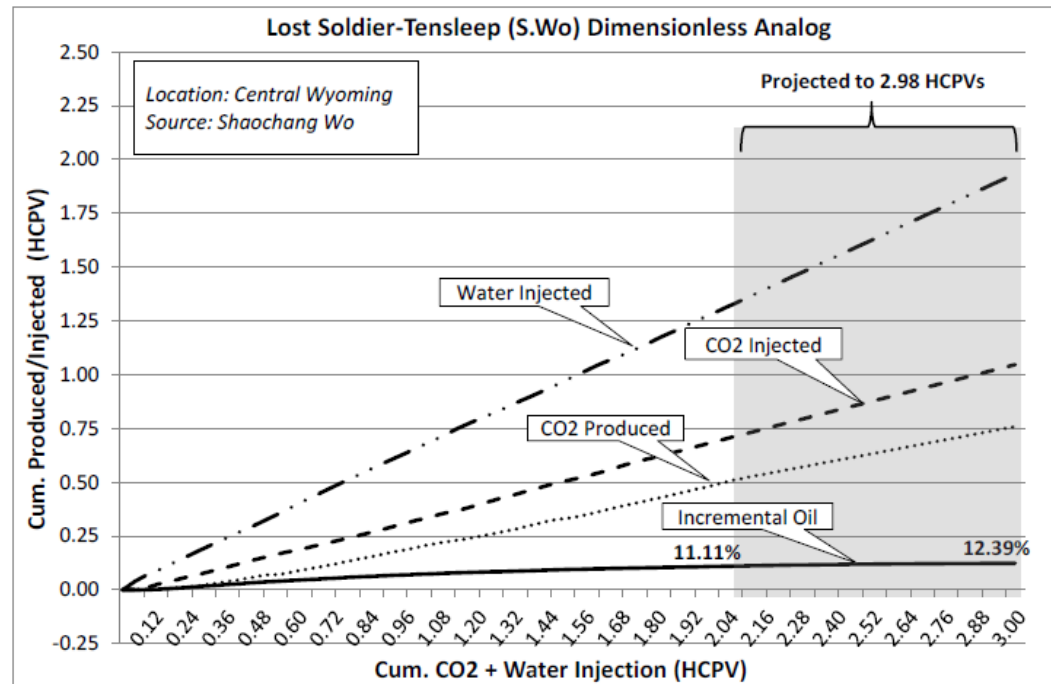
- **Prices will come down**
 - Underground sources index CO₂ to oil price
 - CO₂ suppliers will find efficiencies
 - Issues with floor prices
- **Floor to the floors**
 - McElmo Dome, Bravo Dome and Jackson Dome are getting old
 - Anthropogenic sources will bump against energy costs and thermodynamic limits



Source: Val Brock, Kinder Morgan
2014 CO₂ Conference

Oil Recovery & CO₂ Utilization

- CO₂ flooding is a contact sport
 - More CO₂ contacting more oil yields more recovery
- Past decades:
 - Extended ultimate slug sizes
 - Increased net and gross utilization factors
 - Need something new

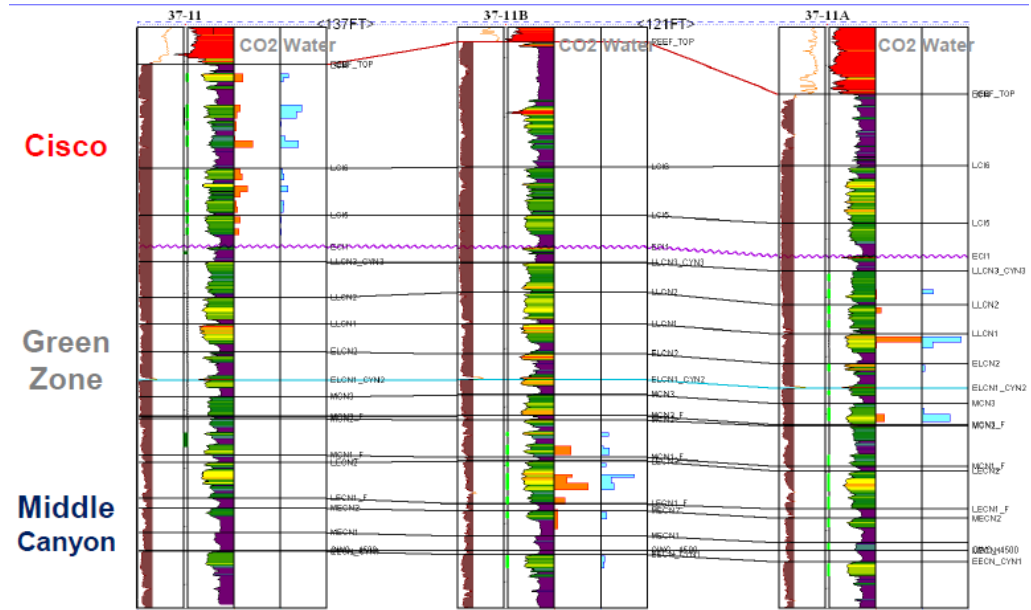


Source: Benjamin Cook. EORI/University of Wyoming.
CO₂ Conference 2013

Oil Recovery & CO₂ Utilization

- **Future:**

- Focus on reducing CO₂ utilization factors
- Increased reservoir characterization CO₂ monitoring efforts from
 - Seismic to
 - Painstaking integration of well logs, injection logs and production data



Source: Steve Pennell. Kinder Morgan.
CO₂ Conference 2013

- Better placement of wells to sweep the reservoir
- Better placement of gels or cement to divert CO₂ to un-swept zones
- More effective use of water to manage CO₂ usage

Money and the Cost of Capital

- **Money is available for capable teams with good ideas**
 - Private equity has raised tens of billions of dollars to invest into oil & gas
 - Additional capital is available from large, investment grade energy companies
- **Cost of capital is unchanged**
- **A lot harder to exceed the hurdles at \$40, \$50 or even \$60 oil**



Source: Wikipedia. Elembis.

Predictions

**We made money at \$20/BO,
\$100/BO, \$50/BO and \$100/BO,
and we will make money at
\$50/BO again.**

**We will have good jobs at good
wages in this industry.**

Our towns will prosper.

Acknowledgement

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