

Opportunities for Increasing Revenues from State and Federal Lands: Pursuing the “Stranded Oil” Prize



David J. Beecy

Director, Future Oil and Gas Resources
Office of Oil and Natural Gas/Office of Fossil Energy
U.S. Department of Energy

david.beecy@hq.doe.gov

Phone: (202) 586-5600 Fax: (202) 586-6221

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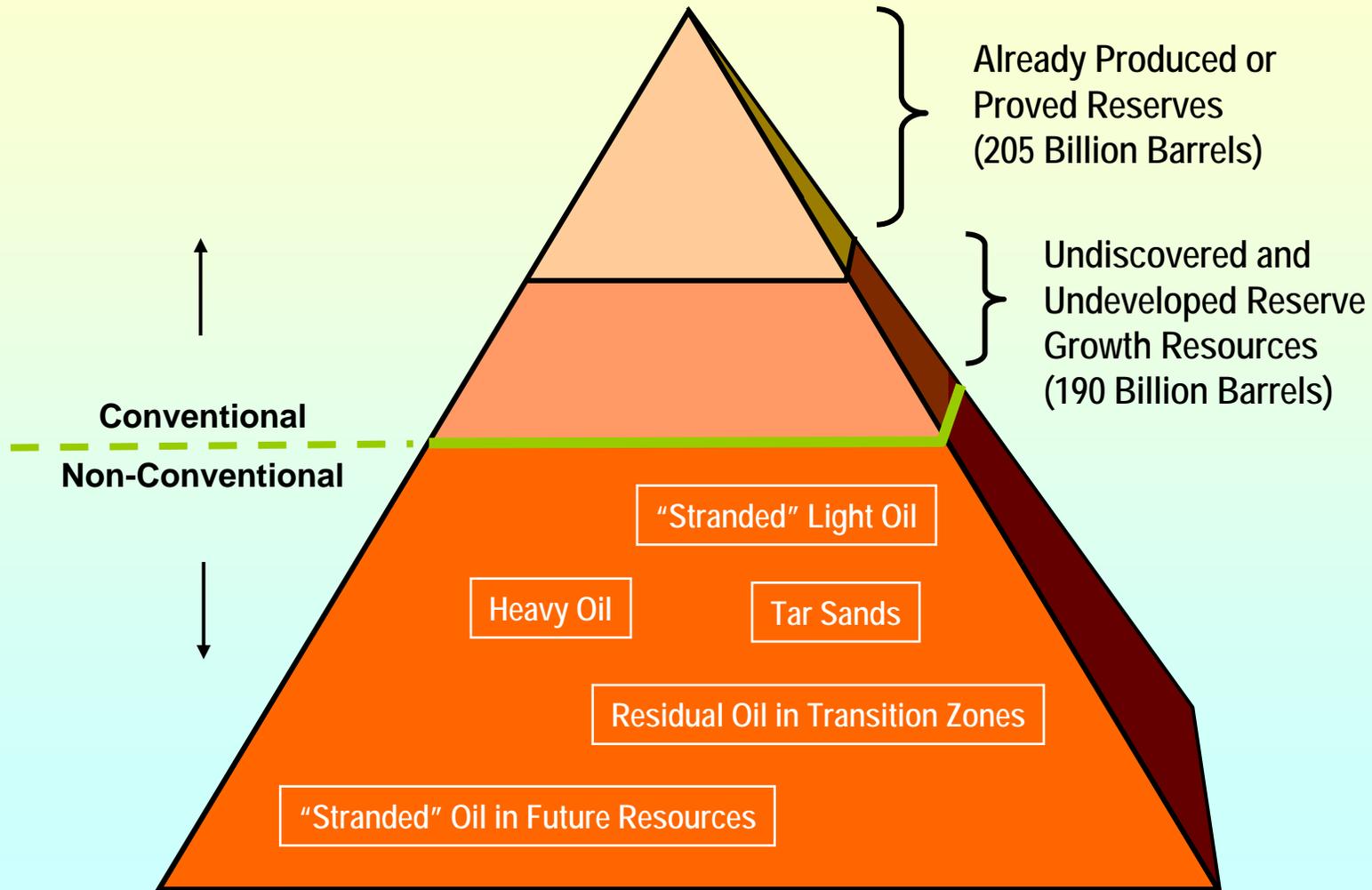
Summary Outline of Presentation

- **Domestic Oil Resources**
- **The “Stranded” Oil Prize/Six Basin Studies**
- **Managing the CO2-EOR Process**
- **Balancing the Risk-Reward Structure and Correcting Market Imperfections**
- **Rationale for Public-Private Partnerships**
- **A Win-Win-Win Strategy**

The Domestic Oil Resource Pyramid

Original Resource in Place: 1,335 Billion Barrels

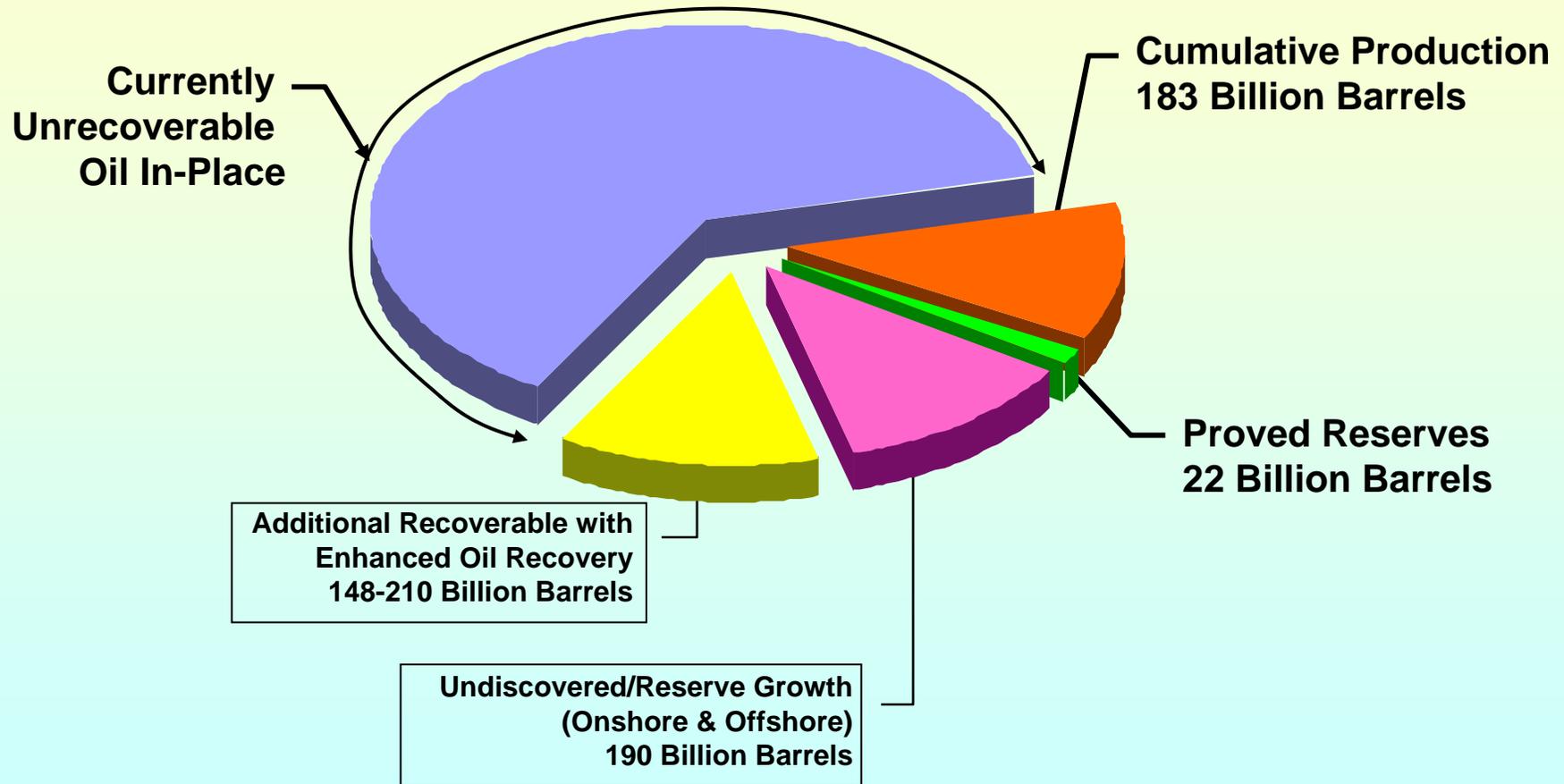
Undeveloped Oil In Place: 1,130 Billion Barrels



Source: Advanced Resources International, Inc. 2005

Domestic Oil Resources

Original Oil In Place: 1,335 Billion Barrels*



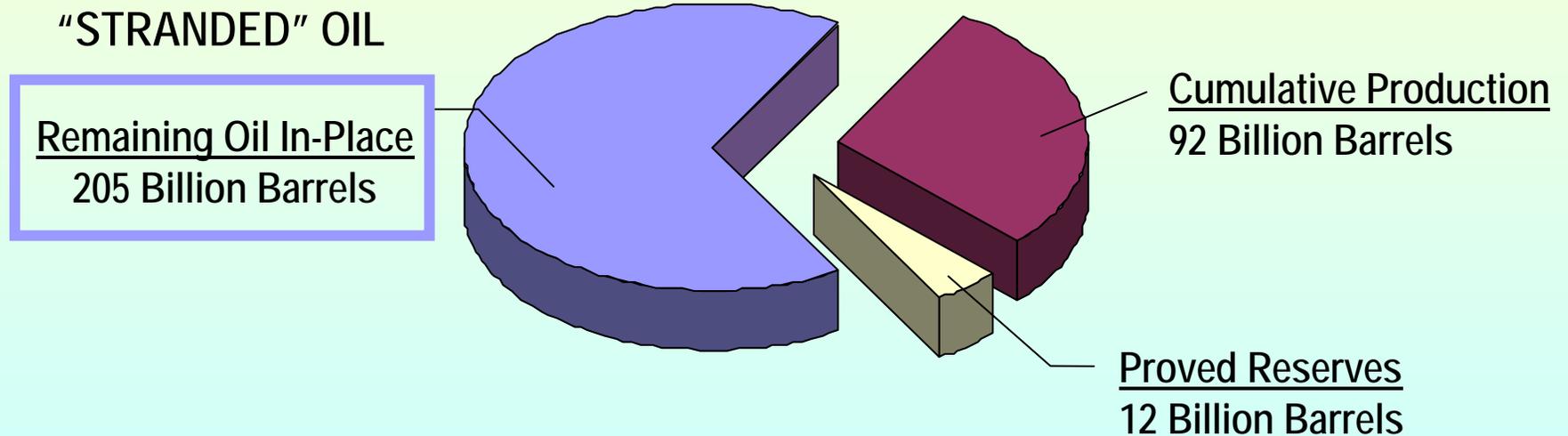
*Includes light oil, heavy oil, tar sands and residual oil in transition zones.

Source: Advanced Resources International, 2004

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Domestic "Stranded" Oil Resources: Six Basins/Areas

Original Oil In Place: 309 Billion Barrels



Source: *Advanced Resources International, 2005*
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Recoverable Oil Can Add 43 Billion Barrels to U.S. Supply

Six Reports Examine Additional Domestic Oil Production

- “State-of-the-art” practices successfully applied today in a few U.S. basins were defined and their feasibility was assessed in the six basins studied.
- Developing these resources would provide significant revenues to state treasuries, provide thousands of additional domestic jobs, and improve the U.S. trade balance by reducing imports.
- Emerging, advanced EOR technologies could double the incremental oil recovery and the associated revenue/economic impacts.

Economic Implications

- **If 43 billion barrels of additional domestic production substituted for oil import at \$40/bbl:**
 - Over \$1.7 trillion reduction of U.S. wealth transfer to oil exporters, through trade deficit reduction;
 - Over 500,000 high-paying domestic jobs from direct and indirect economic effects of increased oil production;
 - Over \$400 billion of state and local revenues generated in lieu of other revenue sources;
 - Broad-based state oil development investments.
- **The robust domestic oil production sector could be producing more oil (and public revenues) in 2025 than at present time.**

CO₂-EOR Technically Recoverable Resource Potential From Favorable Domestic Oil Reservoirs (Six Areas Studied To Date.)

Basin/Area	No. Large Reservoirs Assessed	All Reservoirs		
		OOIP (BBbls)	ROIP (BBbls)	Technically Recoverable (BBbls)
California	88	83.3	57.3	5.2
Gulf Coast	205	60.8	36.4	10.1
Oklahoma	63	60.3	45.1	9.0
Illinois	46	9.4	5.8	0.7
Alaska	32	67.3	45.0	12.4
LA Offshore (Shelf)	99	28.1	15.7	5.9
Total	533	309.2	205.3	43.3

Managing vs. Operating CO2-EOR

“State-of-the-art” CO2-EOR management practices involve:

- Application of horizontal wells for improved reservoir contact
- Use of 4-D seismic to track CO2 flow
- Automated field monitoring systems for “flagging” problems
- Much larger volumes of CO2

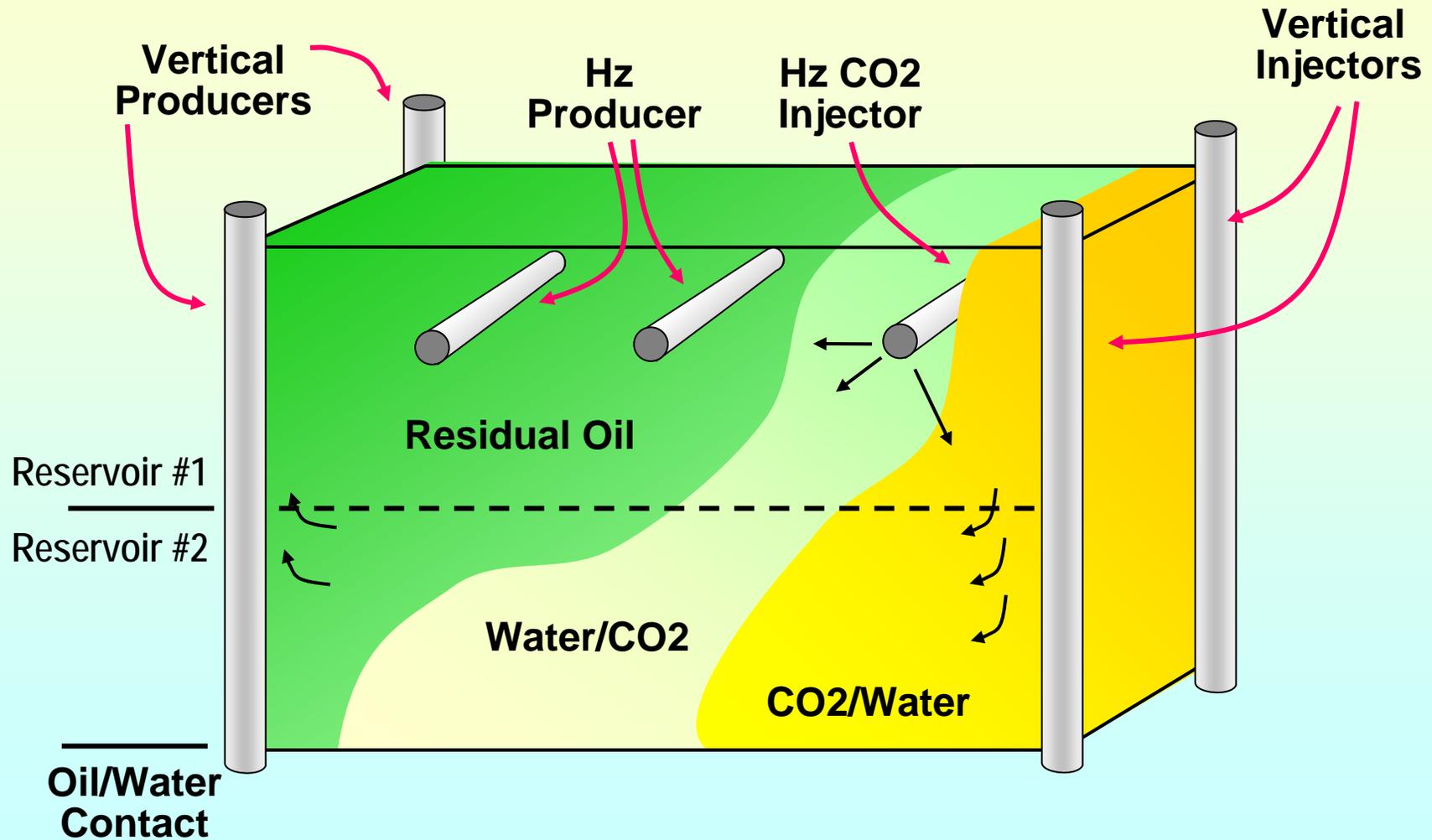
For more information please see the following websites:

- <http://www.spe-pb.org/en/cms/?1>
- <http://fossil.energy.gov/>

“Managing” a CO2 flood gives promise of oil recovery efficiencies of 20% of OOIP, double the results from past practices of “operating” the flood.

Application of advanced CO2-EOR technologies - - gravity-stable flooding, mobility control agents, real-time monitoring and modeling systems, and advanced imaging of the CO2 plume - - would further increase recovery efficiency.

Using Horizontal and Vertical Wells for CO₂-EOR



Balancing the Risk-Reward Structure

Currently, the oil industry assumes most of the investment risk for CO₂-EOR projects, while Federal and State governments capture the bulk of the rewards (see table).

- At a \$25 per barrel of oil (Case A), Federal, State and local governments capture revenues of \$5.00 per barrel from royalties, production and corporate income taxes. The oil company receives \$3.30 per barrel from the CO₂-EOR project; an insufficient return on the \$8.50 per barrel capital investment and purchase cost for CO₂.
- Should oil prices drop to \$15 per barrel (Case B), the CO₂-EOR project becomes uneconomic with losses of \$1.50 per barrel. However, Federal, State and local governments continue to receive \$2.00 per barrel.
- Should the oil price increase to \$35 per barrel (Case C), the CO₂-EOR project provides a reasonable return on investment to the oil company. However, the Federal, State and local governments still capture the majority of the net revenues of \$8.40 per barrel.

FOR CO₂-EOR; THE OIL INDUSTRY ASSUMES THE RISK; FEDERAL/STATE GOVERNMENTS CAPTURE MAJORITY OF PROFITS

(Model of Direct Benefits from CO₂-EOR Production)

		Oil Industry	Private Minerals	Federal/State
1	Net Domestic Oil Price (\$/B)	\$24.00 ⁽¹⁾		
	Less: Royalties	(3.60) ⁽²⁾	\$1.80	\$1.80
2	Operating Revenues	\$20.40		
3	Operating Expenses			
	a. Production Taxes	(1.00) ⁽³⁾	(0.10)	1.10
	b. CO ₂ Purchase/Recycle	(5.00) ⁽⁴⁾		
	c. Other Operating Expenses	(6.00) ⁽⁵⁾		
	d. DD&A (Capital Investment)	(3.50) ⁽⁶⁾		
4	Income, Before Tax	\$4.90	\$1.70	\$2.90
5	Income Taxes	(1.60) ⁽⁷⁾	(0.50)	2.10
Case A	Net Income (\$/B) @ \$25/B	\$3.30	\$1.20	\$5.00
Case B	Net Income (\$/B) @ \$15/B	(\$1.50)	\$0.70	\$2.00
Case C	Net Income (\$/B) @ \$35/B	\$7.60	\$1.70	\$8.40

- (1) Assumes \$25 per barrel w/\$1 per barrel reduction for quality and transportation.
- (2) Royalties are 15% and include 12.5% to 16.7% Federal/State and 15% to 17.5% private.
- (3) Production tax includes ad valorem taxes of 5% from FRS data.
- (4) CO₂ purchase cost of \$0.75/Mcf and recycle O&M cost of \$0.25/Mcf; 5 Mcf purchased and 5 Mcf recycled CO₂ per barrel of oil.
- (5) Production and other expenses based on FRS data.
- (6) Includes costs for wells, well rework and CO₂ recycle plant.
- (7) Federal and State income taxes on domestic production of 32% based on FRS data.

Multiple Possible Pathways to CO2-EOR Correct the Rick-Reward Structure

Today's Conditions

\$25/Bbl

25% IRR (Risk Premium)

CO2 Cost (4% of Oil Price), Current Section 43,
No State Incentives

Preconditions

Lower Risk Premium, Adequate
Volumes "EOR-Ready" CO2

Section 43 (@ 25% ITC) & State Severance Tax
Relief (Private Lands)

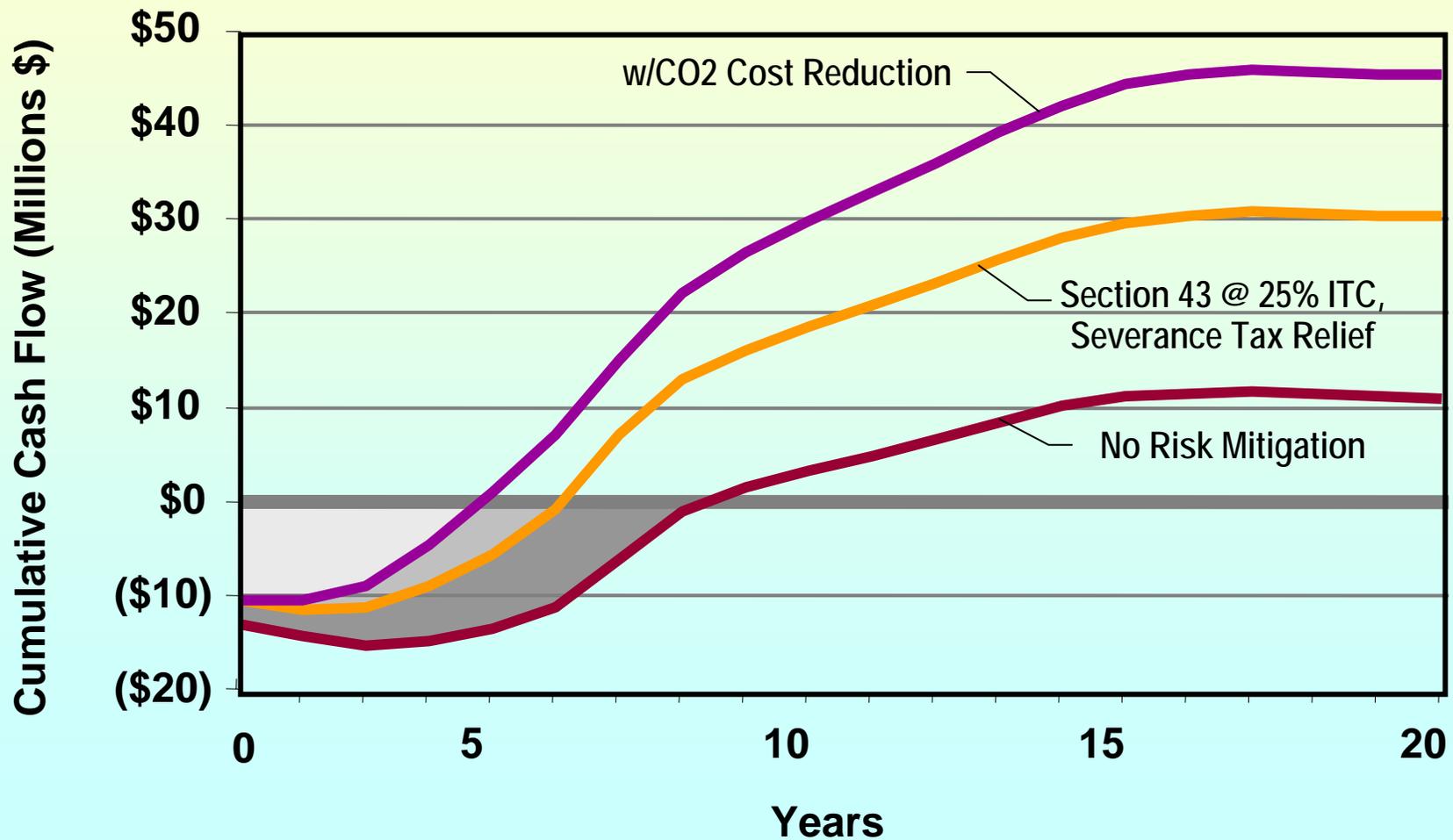
Section 43 (@ 25% ITC) & Royalty Relief
(Public Lands)

Lower Cost and Large Volumes of CO2
(@ 2% of oil price)

**CO2-EOR
Economic
Viability**



Cumulative Cash Flow For Representative Project



Correcting the Market Imperfection

The Risk-Reward market imperfection for potential CO₂-EOR opportunities can be addressed through public/private partnerships:

- A. Stimulating supply availability of affordable “EOR-Ready CO₂” to candidate fields
- B. Stimulating use of CO₂ injection to increase recovery of oil from existing, mature oil fields
- C. Stimulating “basin-entry” field projects in high potential basins
- D. Improving the state-of-the-art technologies through cost-sharing R&D

Correcting the Market Imperfection

- **Addressing A and B would involve cooperation among public entities**
 - Various Federal agencies
 - Administration and Congress
 - States
- **It could also be facilitated by the industrial and financial community through innovative business models and financing approaches**
- **For the public sector to address C and D would require establishing a funding source for research and cost-shared field projects.**

Rationale for Public/Private Partnerships

- **Large Potential Public Benefits – Public Goods**
 - Increased domestic oil production and energy security
 - Significant economic stimulus and increased employment
 - Balance of trade/payments impacts
 - More efficient stewardship of in-place oil and gas resources
- **Existing Section 43 Tax Credits Too Limited**
- **Further “Risk Mitigation” Measures are Needed**
 - Balancing public/private risks and benefits balanced
 - Targeted to achieve “public goods” efficiently
 - Performance–Based rather than Activity–Based
 - Transparent and fair
 - Political acceptability – e.g., “scoring” of revenue impacts

A “Win-Win-Win” Strategy

- **Improvements to Section 43 focused on CO2-EOR could be an important first step, e.g.,**
 - Increase 15% investment tax credit to 25%
 - Exclude from AMT
- **Royalty and state severance tax relief to allow faster recovery of initial capital investment:**
 - Both Federal and state
 - Relief until “payout” of initial investment
- **Aggregated markets for “EOR-Ready CO2” to reduce costs.**
- **Public/Private cost-shared partnerships for “basin-entry” and advanced technology field projects.**

A “Win-Win-Win” Strategy

- **The regional and national economic and energy security impacts far exceed the costs:**
 - Domestic economic stimulus, high value jobs and improved trade balance.
 - Improved domestic energy security from incremental domestic oil production of 2 to 3 million bbl/d (by 2025).
 - Positive public sector (Federal, state, local) revenues.
 - Significant private sector royalty incomes, investor returns and corporate incomes.
- **Advanced technologies could more than double the positive impacts if R&D is pursued aggressively.**
- **Gaining improved financial and tax regimes will require forming public/private partnerships.**
- **This would truly be a “win-win-win”.**