

COAL FACTS

CO₂-EOR & CTL

ECONOMICS



HARNESSING COAL'S CARBON CONTENT TO ADVANCE THE ECONOMY, ENVIRONMENT & ECONOMIC SECURITY

U.S. COAL'S ECONOMIC POTENTIAL

Extensive coal development, in combination with rapid expansion of CCUS, CO₂-EOR, CO₂ pipelines, CTL and the associated infrastructure will create a U.S. industrial rebirth and facilitate the creation of new industries, increased industry sales and profits, higher GDP, millions of jobs, and more tax revenues for the federal government and for state and local governments.

ECONOMIC VALUE OF CO₂-EOR & CTL

\$200 Billion

Industry Sales

\$ 60 Billion

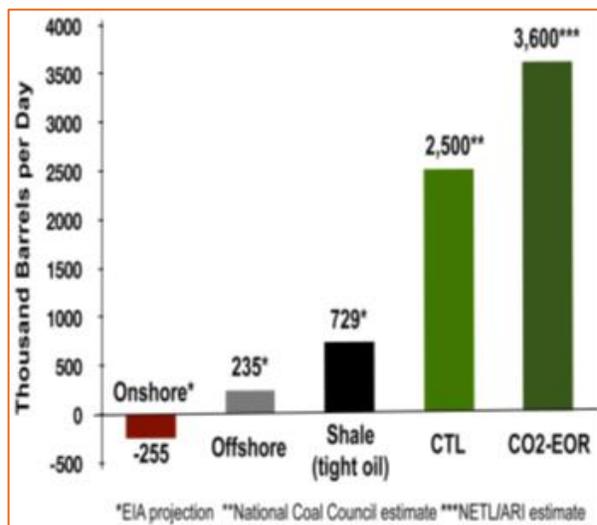
Federal, State & Local Tax Revenues

1 Million

Jobs

6 Million

Barrels per day reduced oil imports

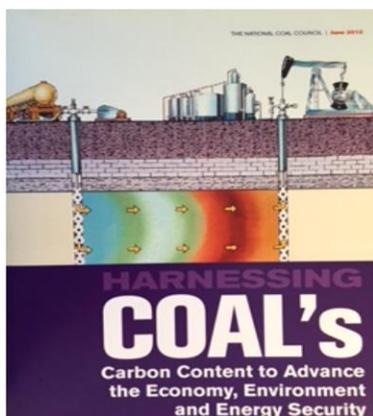


Projected Incremental Crude Oil Production Relative to CTL and CO₂-EOR Potential

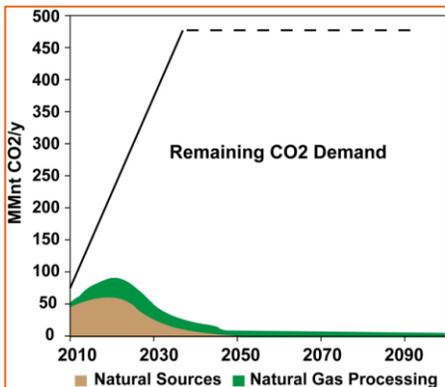
The economic value of CO₂-EOR under NCC's Aspirational Case

In NCC's Aspirational Case Analysis, an incremental 3.7 million billion barrels per day of CO₂-EOR would be produced by 2030 – an average incremental production of 200,000 bbl/d of CO₂-EOR annually over the period 2016-2030. In 2030, production of 4 million bbl/d of CO₂-EOR will require expenditures of \$38 billion, resulting in:

- 355,00 jobs (direct and indirect)
- \$60 billion in industry sales
- \$3.1 billion in industry profits
- \$21.2 billion in tax revenues
((\$13.1 billion federal tax revenues + \$8.1 billion state/local tax revenues))



*NCC Report for
Energy Secretary Chu
June 2012*



CO₂ Supply & Demand

New CO₂-EOR projects are being delayed due to a lack of CO₂.

NCC Aspirational Case

The Aspirational Case Analysis represents a scenario that is ambitious and aggressive but technically feasible. The initial target forecast year is 2030, recognizing that all technologies and applications will have to ramp up between 2012-2030.

The Aspirational Case assumes U.S. CO₂-EOR production in 2030 will reach 4 million bbl/d. Using NETL/Advanced Resources International CO₂-EOR studies, this level of production will require about 550 million tons of CO₂/year in 2030. To produce 550 million tons of CO₂/year will require about 100 GW of coal generation with carbon capture, utilization and storage (CCUS). ARI estimates that using captured CO₂ for EOR oil production would offset the emissions of about 100 GW of coal-based power plants that would consume at least 300 million tons of coal/year.

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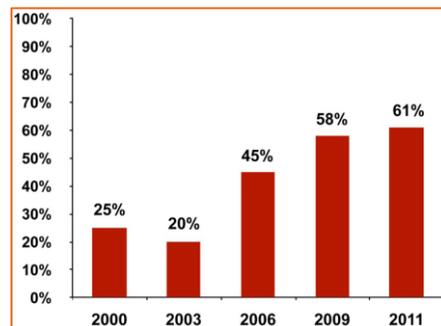
“More than any other nation, America can control its own energy destiny. Coal is the foundation of that control.”

NCC Harnessing Coal’s Carbon Content Report

The economic value of Coal-to-Liquids under NCC’s Aspirational Case

In NCC’s Aspirational Case Analysis, in 2030 about 2.5 million bbl/day of CTL is produced in the U.S. This assumes an annual average incremental CTL production of 165,000 bbl/d annually over the period 2016-2030, requiring total CTL expenditures of \$2.1 billion for O&M. This level of CTL production results in:

- 410,000 jobs
 - \$94 billion in industry sales
 - \$3.8 billion in industry profits
 - \$28.9 billion in tax revenues
- (\$19.1 billion federal tax revenues + \$9.8 billion state/local tax revenues)



PETROLEUM AS A % OF U.S. TRADE DEFICIT

(Bureau of Economic Analysis 2012)

“The only way to increase oil production from EOR is to boost supplies of CO₂ from man-made sources in a manner suitably calibrated to the full potential of EOR.”

National Enhanced Recovery Initiative (NEORI)

TOTAL ECONOMIC & JOBS IMPACTS UNDER ASPIRATIONAL CASE

SUMMARY OF ECONOMIC & JOBS IMPACTS OF NCC ASPIRATIONAL CASE IN 2030

	Sales (billions)	Profits (billions)	Tax Revenues (billions)	Jobs (thousands)
Power Plants	\$27	\$1.2	\$7.8	130
Pipelines	\$7	\$0.4	\$2.1	110
CO ₂ -EOR	\$60	\$3.1	\$21.2	355
CTL	\$94	\$3.8	\$28.9	410
TOTAL	\$188	\$8.5	\$60.0	1,005

(Management Information Services, Inc. 2012)

CCUS and CTL present powerful opportunities for the U.S. to take advantage of the nation’s vast coal resources to affordably meet energy needs, create new businesses, revive established operations, create jobs, enhance national security and achieve environmental goals.