



JUPITER OXYGEN CORPORATION

STORING CARBON DIOXIDE IN ORDER TO MEET THE PARIS AGREEMENT TARGETS

Synergies from Oxy-combustion, Carbon Capture & Enhanced Coal Bed Methane Recovery

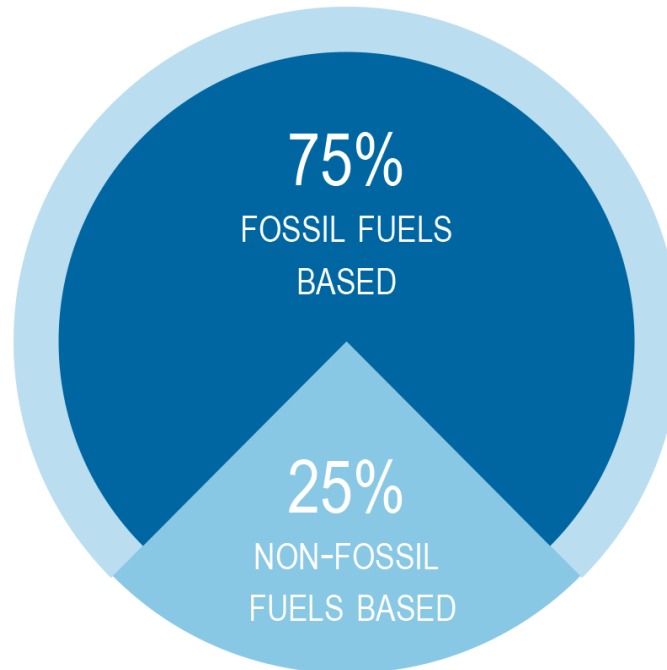
COP 23 Bonn, Germany

November 8, 2017

THE CHALLENGE

Projected Global Energy Use 2040

IEA World Energy Outlook 2015



THE SOLUTION: CCUS

CARBON CAPTURE from large point sources:

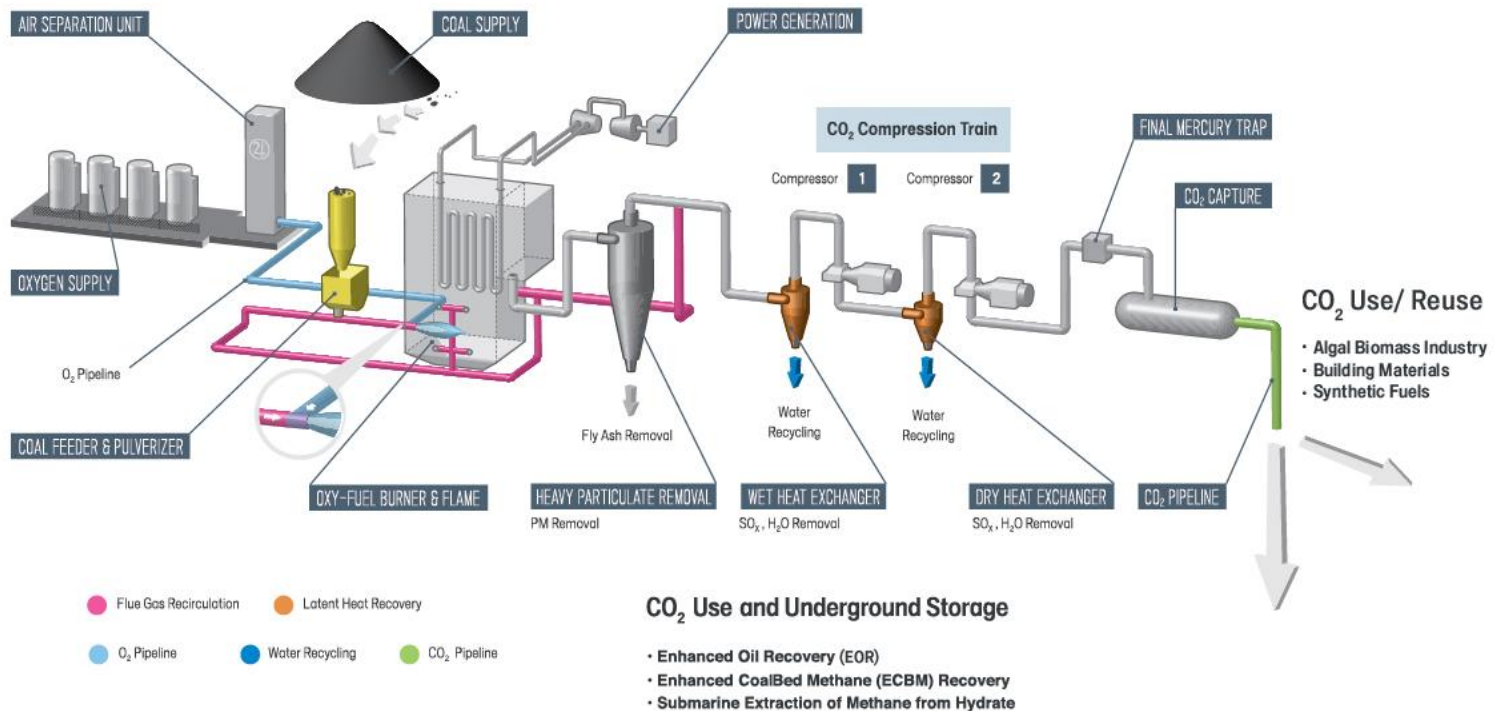
- Coal, oil, and natural gas fired power plants
- Industrial plants

CARBON UTILIZATION for:

- Enhanced Oil Recovery
- Enhanced Coalbed Methane Recovery
- CO₂ based algal biomass industries
- Carbon reuse in building materials
- Others

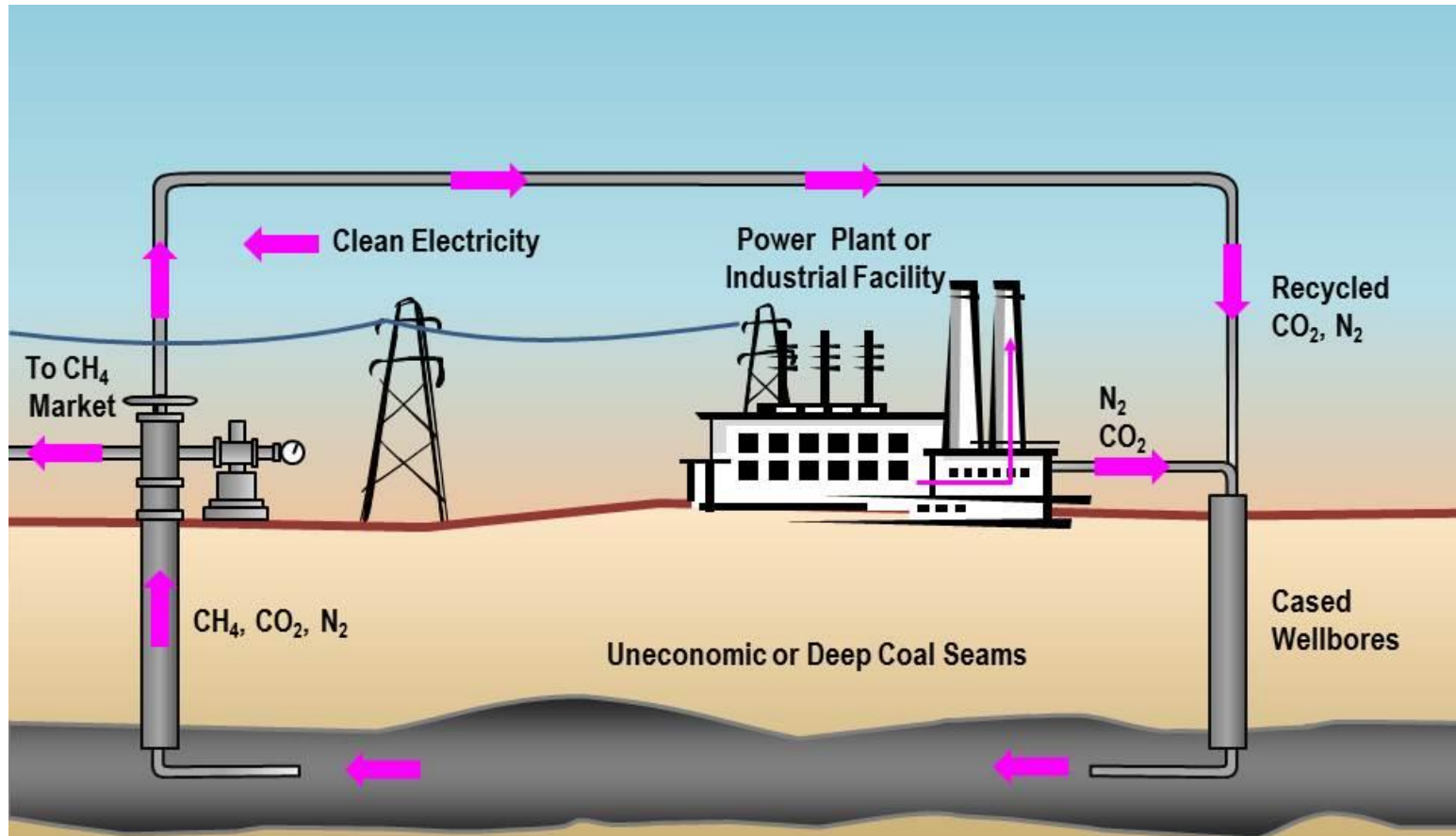
INTEGRATED SYSTEMS ENABLE COST REDUCTION

A COST EFFECTIVE CLEAN-COAL PATHWAY: JOC OXY-COMBUSTION CARBON CAPTURE



Schematic: JOC Carbon capture technology developed in conjunction with National Energy Technology Laboratory of US Department of Energy

SYNERGIES ARISE FROM CO₂ UTILIZATION OPTIONS AT SCALE



Process

- CO₂ adsorption into coal
- CO₂ displaces clean burning methane (ratio varies by coal)
- Flow of CO₂ controlled by permeability of coal seam

JUPITER OXYGEN CCUS DEMONSTRATION INITIATIVES: CHINA

Retrofit of coal-fired power plants in Western China based on Jupiter's Oxy-Combustion & CO₂ - Capture technologies with CO₂ Utilization for Enhanced Coalbed Methane Recovery (ECBM)

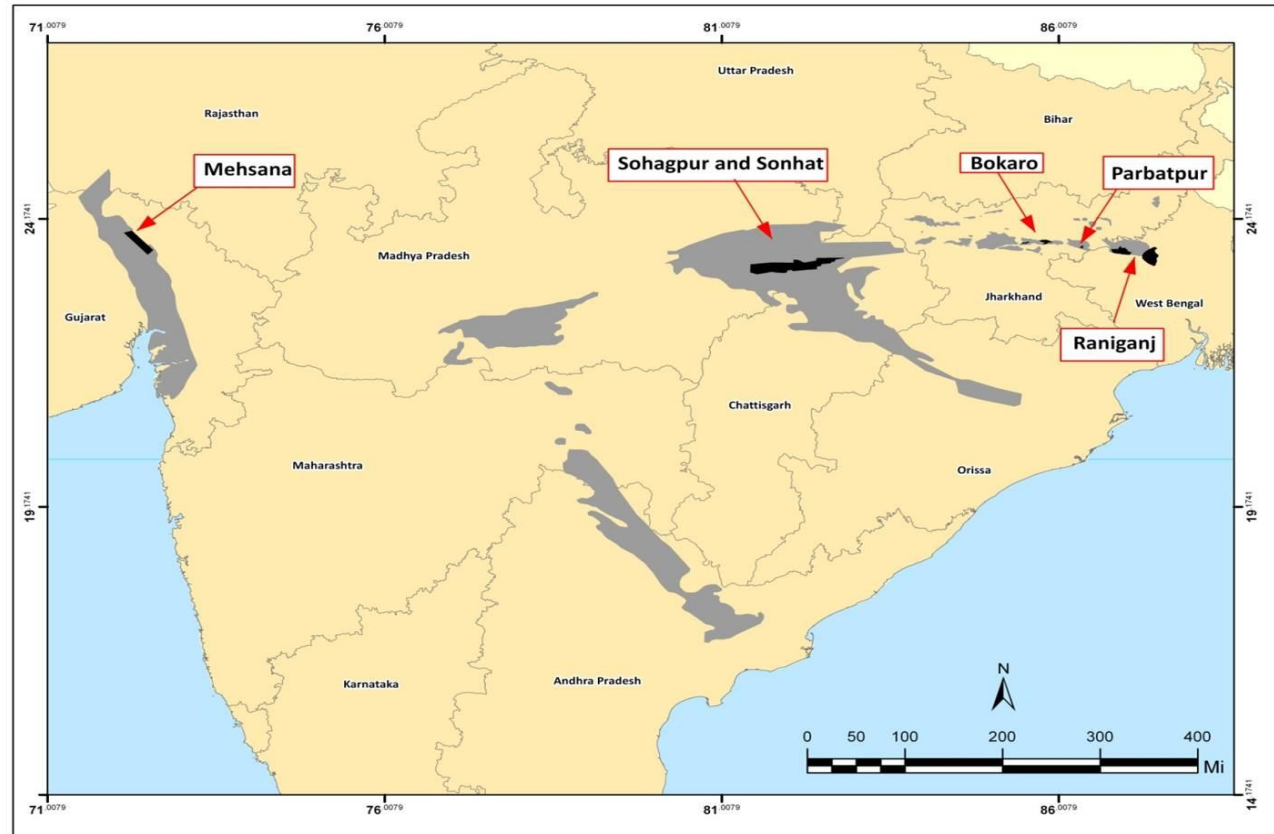


First Commercial Full-Scale ECBM Project in the World

JUPITER OXYGEN CCUS DEMONSTRATION INITIATIVES: INDIA

- **India has significant CO₂ ECBM utilization potential**
- **Substantial CO₂ sources (utility size- / industrial boilers) are in proximity to potential CO₂ ECBM sites**
- **The oil and gas industry is well prepared to provide the necessary infrastructure for CO₂ ECBM operations**
- **Carbon capture with CO₂ ECBM provides an advanced energy strategy and significant business opportunity for India**

ECBM Supply Sites and CO₂ Storage Potential in India



***The Storage potential:
Approx. 824 million tons of CO₂***

BUSINESS OPPORTUNITY INDIA: CCUS - ECBM

- **Create 10,000 MWe of low-emission coal based power to serve initial ECBM market needs with CO₂**
- **Country Opportunity – Enhanced Coal Bed Methane (ECBM)**
Increase domestic gas supply through ECBM
Addresses environmental concerns
- **Diversified power company - supplying more than power**
MW with improved efficiency
Water recovery for plant use
CO₂ for delivery to ECBM fields
Near zero emissions

IN CONCLUSION

CCUS strategies need to be attractive to local businesses & industries to guarantee wider deployment

Location is key for success of CCUS demo

Industry engagement in emerging economies needs recognition and initial financial support!

- **UNFCCC / Green Climate Fund**
- **Multilateral Development Banks**
- **Carbon Markets, etc.**

U.S. based clean energy technology company offers:

- High flame temperature oxy-combustion process *know-how*
- Patents and Licensing
- Consulting Services

Thomas Weber, President
Jupiter Oxygen Corporation
tweber@jupiteroxygen.com

