Hydrogen Energy California - new directions for a low carbon power project

Fall 2011

Hydrogen Energy California LLC

- SCS Energy acquired the HECA Project from BP and Rio Tinto in September, 2011

- Unchanged Features
  - Creating hydrogen from fossil fuels, 90% carbon capture and sequestration
  - Preserve fresh water for agriculture, community, economic and jobs benefits
  - Site, water supply, interconnection location
  - Permitting process

- Enhancements
  - Low carbon footprint agricultural fertilizer manufacturing
  - Lower truck traffic
• Working to permit and build an alternative energy power plant that supplies low carbon electricity to 150,000 homes

• Complementary with other forms of alternative energy, the transformation of fossil fuels into hydrogen provides clean and reliable electricity

• Enabling production of more Domestic Oil via Enhanced Oil Recovery (EOR) with Carbon Capture & Storage

• Enabling California to meet its regulatory target to reduce Green House Gas emissions from the power sector and to build new in-state power generation

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**Putting Carbon back underground**

- CO2 injected 6000ft beneath several layers of impervious rock
- CO2 trapping:
  - Cap Rock
  - Pore Spaces
  - Mineralization

The closed-loop process enables the re-introduction of carbon back underground

Clean power generation: Gasification and Carbon Capture
Land Use

Site selection based on:
• Excellent Storage Geology
• EOR opportunity
• Non-potable water supply
• Transmission lines nearby
• Rural and industrial area

Economic Benefits

• World Class clean energy investment for Kern County
• New direct jobs and millions in tax revenues for Kern County
  • 2000 jobs during construction & 140 during operations
• Indirect economic benefit: CO2 injection will extend life of Elk Hills
• Preserves fresh water for agriculture by using 100% brackish water
• Reduces electricity imports from out of State
• Smart land use: 470 acres process area surrounded by 500 acre farmland buffer
• Voluntary Community Benefits investments: projects that improve quality of life above and beyond project benefits.
**Environmental Benefits**

- CCS removes over 2 million tons per year of GHGs
  - Equivalent to taking >400,000 cars off the road
- Facility meets or exceeds SJV Air District requirements:
  - Best Available Control Technology air quality standards
  - Emission Reduction Credits
  - Investing >$700K into Valley air improvement projects
- Eliminates traditional emissions related to fossil fuel use
- Produces low carbon domestic urea
- Enables Buena Vista Water Storage District brackish water remediation plan
- Discharges no waste water or storm water (Zero Liquid Discharge)

**Project Schedule**

- Permitting and Engineering: Through 1st Quarter 2013
- Construction & Startup: Spring 2013 to Fall 2017

Next Step Milestones:

- Completion of State and Federal permitting
- Power Purchase Arrangements with California regulated utilities
Conclusion

- World Class high-tech investment for Kern County
- Extensive Economic & Environmental Benefits
  - Locally: New jobs, taxes, oil sector growth, water and air impacts minimized
  - State: Reduce imports, increase investment, improve energy mix, meet GHG regulatory targets

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