



# hydrogen energy california low carbon power project

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# HECA -- providing low carbon electricity through carbon capture & storage



90% CO<sub>2</sub> capture; 250MW net to grid at steady state CO<sub>2</sub> emissions of 250 lbs/MWh

Over 2 millions tons CO<sub>2</sub> for enhanced oil recovery with storage: additional revenue to state, enhanced energy security

HECA can operate on a range of feedstocks from western bituminous coal to petcoke generated from California refineries

100% brackish water use for plant needs, beneficially impacting groundwater for

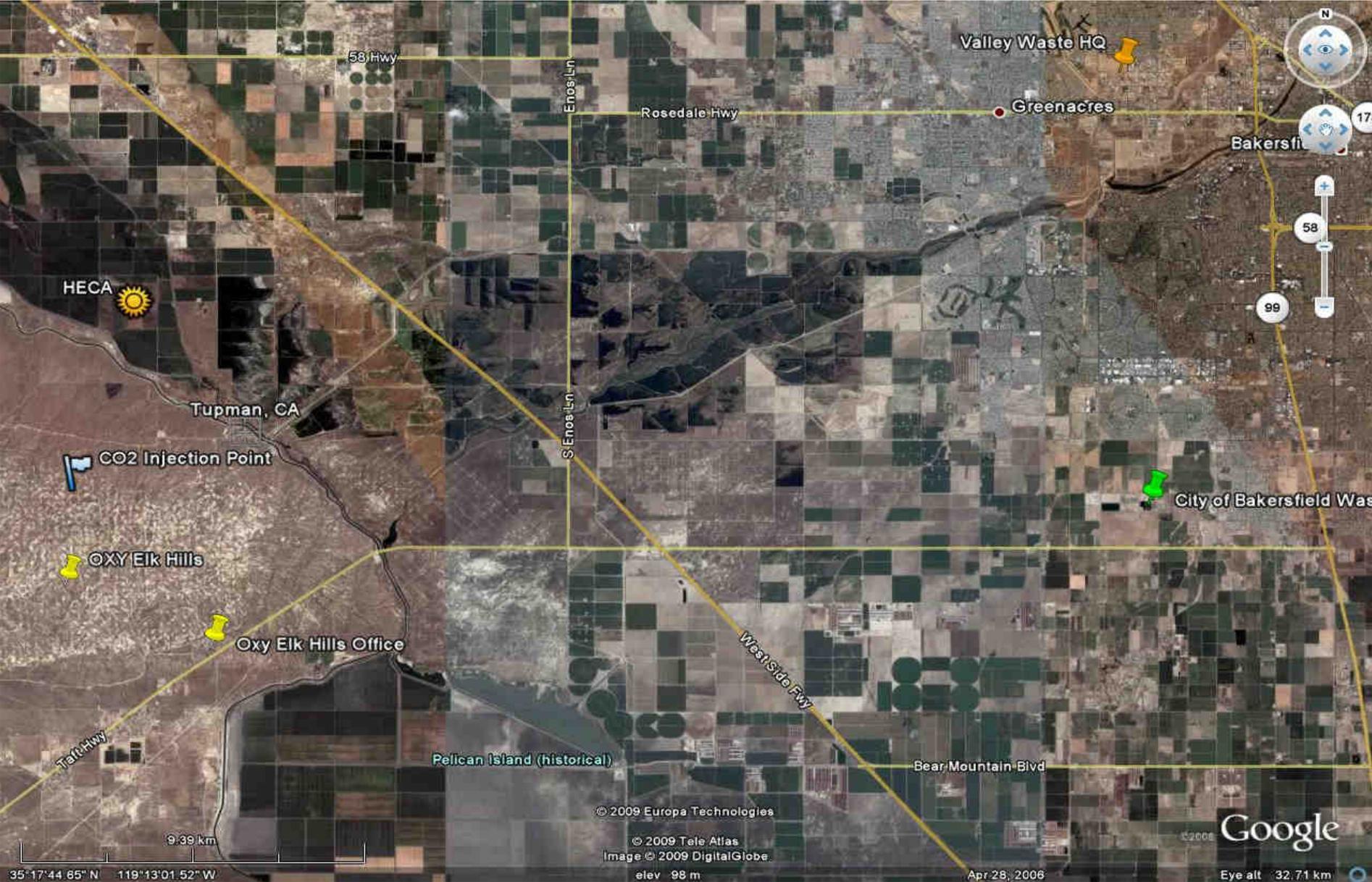
“(We) became increasingly convinced of the value of the HECA Project, and its environmental benefits to California ... it really is a win-win-win-win-win.” President Peevey, Feb 20 2009



**RioTinto**

A joint venture between  
BP Alternative Energy and Rio Tinto

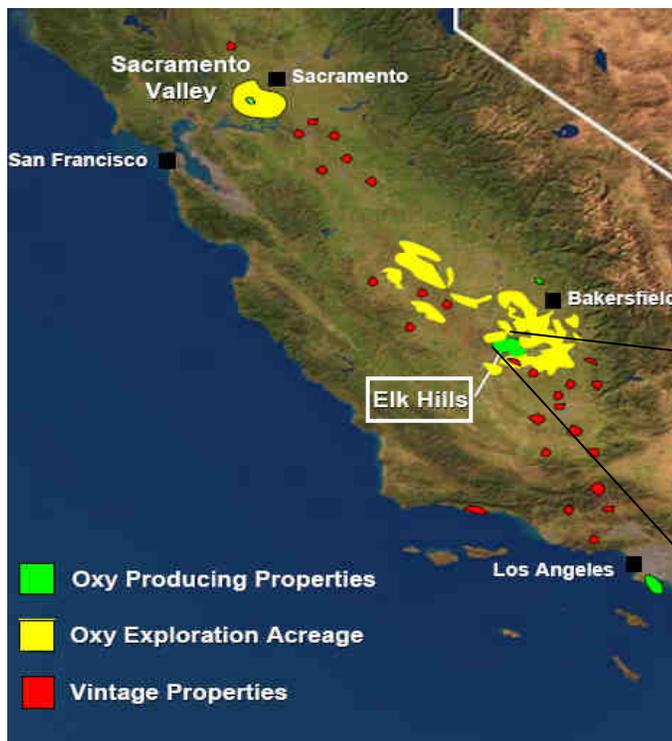
# satellite view of HECA site



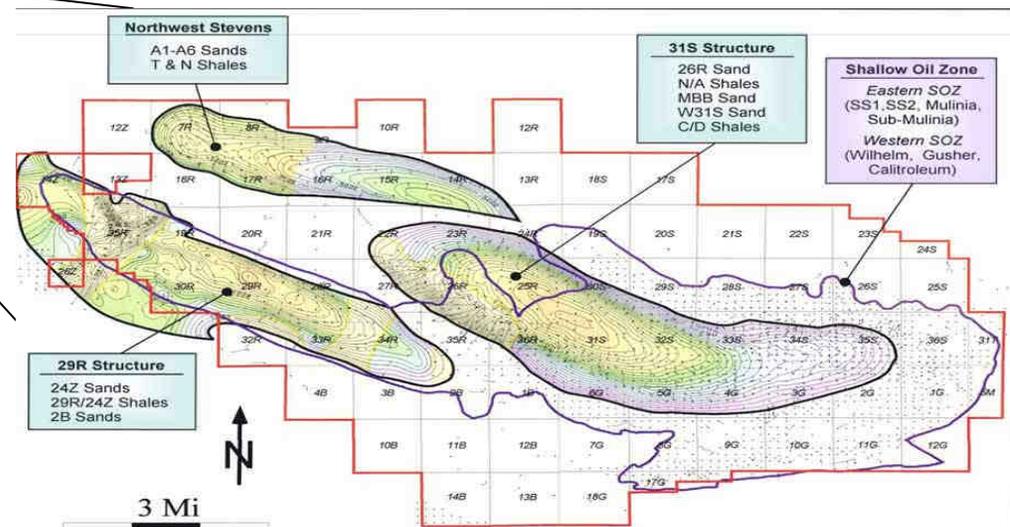
# HECA and Oxy Elk Hills will be a catalyst for CCS development



Over 1 billion tons of CO<sub>2</sub> storage capacity available in local Californian oilfields and approx 57 billion barrels of 'stranded oil resource' (DOE 2005)



- Elk Hills
  - Successful CO<sub>2</sub> pilot
  - Large CO<sub>2</sub> storage potential from multiple potential storage horizons, each with shale seals
  - Evaluating additional reservoirs



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# HECA provides a timely opportunity for California clean energy leadership



- Several years ahead of other projects that have not done CO<sub>2</sub> site characterization and AFC preparation and submittal
- Project participation by industry-leading CO<sub>2</sub> EOR and subsurface experts BP (through HEI) and Oxy
- Essential technical and large complex project integration expertise required to deliver this first-of-a-kind project
- Helps create the technical, cost, regulatory, financial, and commercial framework to accelerate wide-scale deployment of CCS
- HECA's low-carbon, base-load power can charge future electric or plug-in hybrid vehicles likely to be required for significant transportation sector decarbonization

*“We’re eventually going to see need to employ CCS on a large scale California if we are going to be able to meet the 2050 goals of AB32.” -President*



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*Feb*

*20, 2009*

# The Stimulus Bill Invests in CCS



- \$800M of additional funding for Clean Coal Power
- \$1,520 M for industrial carbon capture projects
- \$50 M for site characterization
- \$20 M for CCS training and research grants
- Investment Tax Credits
  - Sec. 48A (Power) and 48B (Industrial) credits
  - Up to 30% of qualified investment
- Sequestration Tax Credits
  - Sec. 45Q, up to \$20/ton of CO<sub>2</sub> stored

**“Carbon capture and storage technology hold enormous potential to reduce our greenhouse gas emissions as we power our economy with domestically produced and secure energy.”**

**-President Obama**

**it's time for real progress...**



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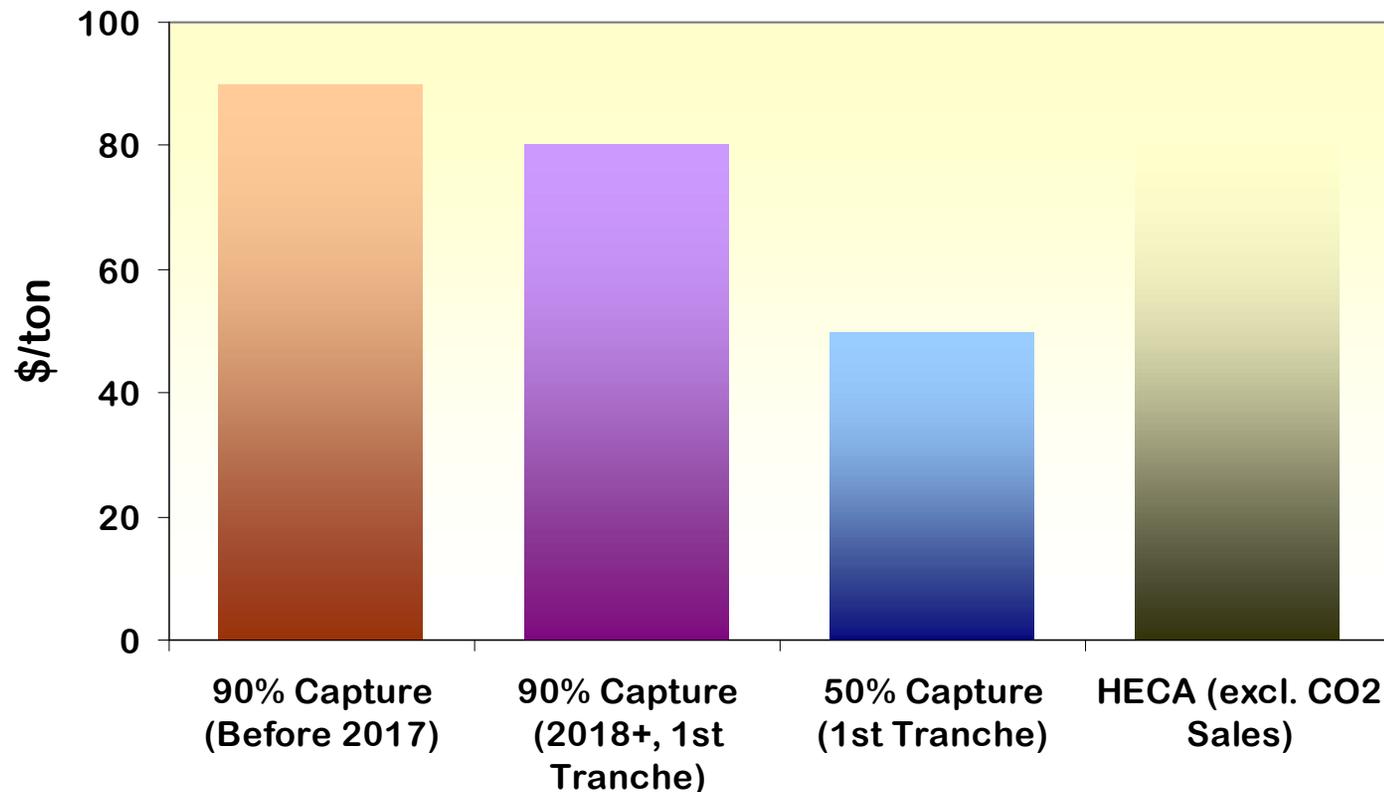
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# Climate Bill incentivizes CCS early movers hydrogen energy

The Waxman-Markey (ACES) climate bill provides up to \$90 a ton for first “tranche” of CCS at 90% capture, with a \$10 bonus for online before 2017

## Payment Per Ton CO2 Stored





# attracting stimulus funding – \$308M DOE award to HECA

- Have the right project
  - Exceed, don't just meet minimum requirements
- Be in the right place
  - California's environmental and energy leadership is an asset
- Show the right partnership
  - Public-private, Federal-state partnerships
- Strong state support is critical
  - Projects succeed or fail "locally"
- Get the \$ out
  - Create jobs quickly and sustainably

## *What can states do to help?*

- **Low carbon power policy**
  - **Loading order**
- **Infrastructure Improvements**
- **Training**
- **Tax Incentives**
- **PIER Funding**



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# Kern County, California



...permit filed and PUC supported



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