

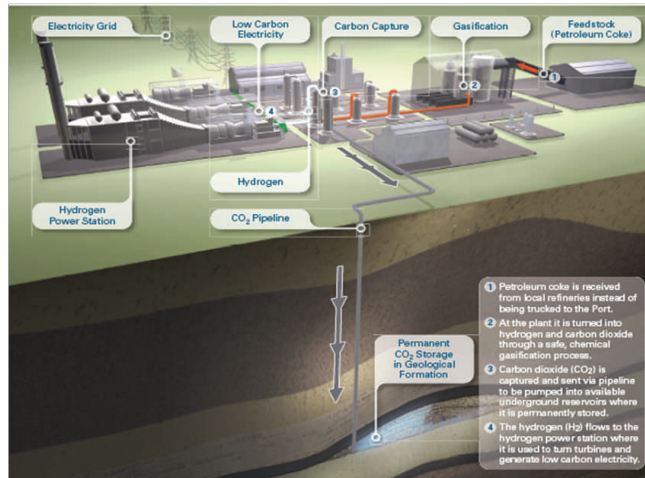
# Hydrogen Energy California



hydrogen energy



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When completed the Hydrogen Energy California project (HECA) would produce enough low-carbon electricity for 150,000 family homes helping meet California's increasing power demand.

At the heart of the project is a gasification unit and carbon capture facility where the carbon in an oil refining product, and coal, are transformed into hydrogen and CO<sub>2</sub>. This process would capture 90% of the CO<sub>2</sub> from the fuel source. The captured CO<sub>2</sub> would be transported by pipeline and used to both facilitate enhanced oil recovery in local oil fields, and be stored permanently and securely in the same deep geological formations that have held California's oil for millions of years.

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## Hydrogen Energy California

The Hydrogen Energy California project (HECA) would be a new hydrogen fueled electric generating facility with carbon capture and storage technology to address the global climate change challenge.

The project would be a new 390 gross megawatt hydrogen power plant to be sited in Kern County, California.

Designed to assist California in reducing greenhouse gas emissions, the new power plant would capture 90% of its carbon dioxide (CO<sub>2</sub>) emissions.



**RioTinto**

A joint venture between  
BP Alternative Energy and Rio Tinto

# Hydrogen Energy California

## Key Goals

To generate low-carbon hydrogen power to meet California's increasing power demand while capturing carbon dioxide (CO<sub>2</sub>). The CO<sub>2</sub> will be stored permanently in nearby oil fields, enhancing US energy security, boosting domestic oil production and addressing climate change concerns.

The Hydrogen Energy California project (HECA) would be an Integrated Gasification Combined Cycle (IGCC) power plant that takes petroleum coke (petcoke), a by-product of the refining process (or blends of petcoke and coal, as needed) and non-potable water and converts them into hydrogen, a clean-burning gas, and CO<sub>2</sub>.

The hydrogen gas would be used to fuel a power station and the CO<sub>2</sub> would be transported by pipeline to nearby oil reservoirs and be utilized for enhanced oil recovery.

# Hydrogen Energy California

## Project Overview

- The Hydrogen Energy California project (HECA) would be an industrial scale installation of an integrated hydrogen power generation and Carbon Capture and Storage (CCS) project.
- The HECA project would take petcoke, a by-product of the refining process, (or blends of petcoke and coal, as needed) from California refineries, along with coal and non-potable water, and convert (gasify) them to hydrogen and CO<sub>2</sub>.
- The hydrogen would be used to fuel a 390 MW power plant providing low-carbon electricity, enough to power up to 150,000 homes<sup>1</sup> in southern California.
- More than 2 million tons of CO<sub>2</sub> per year would be captured from the gasification process and transported by pipeline to be injected permanently and securely into local oil fields where it would act to increase the proportion of oil recovered—a process known as Enhanced Oil Recovery (EOR).
- The stored CO<sub>2</sub> is equivalent to taking 350,000 cars<sup>2</sup> off the road every year.
- The HECA project would boost the local economy by creating 1,500 construction jobs and 100 permanent operational positions.

## Timeline

- Initial engineering studies are complete and the appropriate oil fields for CO<sub>2</sub> storage have been identified.
- The project will go before the California Energy Commission (CEC) for public review and consideration in 2008.
- It is anticipated the plant would be operational by December 2014.

## Economic Benefits

- The HECA project would generate tax revenues for local communities.
- The proximity of the power station to the depleting oil fields means that the CO<sub>2</sub> can be used for EOR, creating an economic value for CO<sub>2</sub>.
- The additional oil recovery would generate new revenues for the State and contribute to US security of energy supply.

## Project Owner

- Plans for the HECA project are being worked on by Hydrogen Energy (a company owned by BP Alternative Energy and Rio Tinto). The company has been established to focus on industrial scale, base-load, hydrogen fueled, low-carbon power generation using fossil fuels and carbon capture and storage.

# Hydrogen Energy California

## Why Kern County?

- Kern County is an area with oil production facilities and necessary infrastructure, including electrical transmission lines.
- It has feedstock fuel available.
- The site is near oil reservoirs which are sufficiently depleted with the right geological requirements to serve as storage sites for CO<sub>2</sub>.
- Injecting CO<sub>2</sub> would revitalize these oil fields slowing their decline and increasing their useful production lifetime.
- There is a local supply of non-potable water.
- Throughout California there is a growing demand for electrical power.
- California has identified the need for sources of hydrogen to meet the demands of the future hydrogen economy.

## Technology

- Gasification technologies have been in use in the US and the world for decades.
- Integrated Gasification Combined Cycle (IGCC) technology is currently used in natural gas power generation.
- CO<sub>2</sub> pipelines and injection of CO<sub>2</sub> into geological formations for EOR purposes have been in use, particularly in the US for several decades.

## Health, Safety and Environmental Benefits

- The HECA project would be designed, constructed and operated to high environmental, safety and health standards including California and the San Joaquin Valley Air Pollution Control District's (APCD) emission standards.
- This facility would be similar to the cleanest of natural gas power plants, but instead of using natural gas to run its electrical generators, this plant would use hydrogen.
- The HECA project would capture and store more than 2 million tons per year of CO<sub>2</sub>.
- The project would create hydrogen for electrical power generation and other possible future uses, including clean transportation.
- The sulfur along with 90% of the carbon and other contaminants usually associated with coal fired plants, would be captured and NOT emitted into the air.
- Utilizing a refining by-product, and reducing stress on natural gas demand for power generation, would contribute to enhanced energy security.
- By maximizing non-potable water use for plant needs, it would be preserving California's limited fresh water sources.
- The HECA project would be accelerating development of the hydrogen economy in California.

1. based on Southern California average household consumption.  
2. California Air Resources Board