

Applicant's Response to Questions Raised at January 16, 2013 Status Conference Regarding Fuel Blend

Amended Application for Certification for
HYDROGEN ENERGY CALIFORNIA
(08-AFC-8A)
Kern County, California

Prepared for:
Hydrogen Energy California LLC



Submitted to:



California Energy Commission



U.S. Department of Energy

California Energy Commission

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**RESPONSE TO QUESTIONS RAISED
AT JANUARY 16, 2013 STATUS CONFERENCE
REGARDING FUEL BLEND**

LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

AFC	Application for Certification
CCPI	Clean Coal Power Initiative
CEC	California Energy Commission
CO ₂	carbon dioxide
DOE	U.S. Department of Energy
HECA	Hydrogen Energy California

BACKGROUND

During the Status Conference held on January 16, 2013, Commissioners Douglas and McAllistar raised several questions regarding the Project's proposed fuel blend of 75 percent coal and 25 percent petroleum coke. The Commissioners were specifically interested in understanding considerations that led to that proposed fuel blend, and whether or not there was flexibility to alter the proposed fuel blend. Applicant's representatives provided some responses during the Status Conference, and committed to follow up with a written response. Applicant's written response follows.

RESPONSE

The 75 percent coal and 25 percent petroleum coke (petcoke) fuel blend proposed for the HECA Project is driven by regulatory, technological and commercial reasons.

Regulatory

HECA is the recipient of a \$408 million CCPI Round 3 grant from the U.S. Department of Energy (DOE). The minimum requirement for coal use for the CCPI Round 3 (CCPI-3) grant is 55 percent coal with the main focus being on carbon capture technologies.¹ However, HECA's specific Cooperative Agreement with the DOE that governs the grant requires that HECA use coal for at least 75 percent of the energy input for operations during the Demonstration Phase.² The Demonstration Phase runs for the first two years of operations.

In addition, HECA is the recipient of approximately \$103 million in Section 48A tax credits. The program requires that qualifying Projects use 75 percent coal for the first five years of operations.³

¹ "Proposed CO₂ capture technologies must be integrated within existing or new power plant facilities that use U.S. mined coal or coal refuse for at least 55% of the energy input, use other solid feed stocks such as petroleum coke or biomass for up to 45% of the energy input, and produce electricity as at least 50% of the energy output." Financial Assistance Funding Opportunity Announcement- CCPI Round 3 (<http://www.fossil.energy.gov/programs/sequestration/publications/arra/DE-FOA-0000042.pdf>)

² "The parties agree that US-mined coal or coal refuse must be used, on a fuel input (Btu) basis, for at least 75% of the energy input for the operation of the power plant facilities with the integrated carbon capture technology, during the Demonstration Phase". Cooperative Agreement between HECA and US DOE, p. 35.

³ e) Qualifying advanced coal projects
(1) Requirements
For purposes of subsection (c)(1), a project shall be considered a qualifying advanced coal project that the Secretary may certify under subsection (d)(2) if the Secretary determines that, at a minimum—
(A)the project uses an advanced coal-based generation technology—
(i)to power a new electric generation unit; or
(ii)to retrofit or repower an existing electric generation unit (including an existing natural gas-fired combined cycle unit);
(B)the fuel input for the project, when completed, is at least 75 percent coal;
(C)the project, consisting of one or more electric generation units at one site, will have a total nameplate generating capacity of at least 400 megawatts;
(D)the applicant provides evidence that a majority of the output of the project is reasonably expected to be acquired or utilized;
(E)the applicant provides evidence of ownership or control of a site of sufficient size to allow the proposed project to be constructed and to operate on a long-term basis;
(F)the project will be located in the United States; and
(G)in the case of any project the application for which is submitted during the period described in subsection (d)(2)(A)(ii), the project includes equipment which separates and sequesters at least 65 percent (70 percent in the case of an application for reallocated credits under subsection (d)(4)) of such project's total carbon dioxide emissions.

Thus, these regulatory requirements restrict HECA's fuel use for the first five years of operations.

Technological

The choice of 75 percent coal and 25 percent petcoke fuel blend also stems from technological requirements associated with the MHI gasifier. The Applicant chose the MHI gasification technology after a thorough review of all commercially viable gasifier technologies.

The MHI technology is a newer design and has features that work to reduce capital costs, reduce operations and maintenance costs, improve efficiency, and improve product availability. All of these factors work to lower the cost of the finished products that HECA will produce. The 2009 Revised Application for Certification (AFC) was based on an entrained flow, slurry-fed, refractory-lined, quench design featuring two operating 900-cubic-foot reactors with a common spare to facilitate maintenance on feed nozzles, refractory, and other wear items. For comparison, the MHI gasifier is a two-stage, dry feed, entrained flow, membrane wall gasifier that employs a synthesis gas (syngas) cooler for steam production. The membrane wall and feed nozzle design in the MHI configuration is expected to provide a longer run time between shutdowns. A single MHI gasifier is capable of producing 50 percent more syngas at a level of availability comparable to the original configuration—which required three vessels along with their associated structures, appurtenances, piping, and instrumentation. Although the gasifier is larger and more complex, the Project expects to capture economies of scale, reductions in equipment count, and a reduction in the frequency of shutdowns; this translates into lower costs, higher efficiencies, and lower emissions.

The MHI gasifier has the *theoretical capability* to achieve feedstock flexibility similar to that of the previously proposed General Electric refractory lined gasifier; however, more operating experience is necessary to determine whether this theoretical capability can be fully realized. During the gasification process, ash from coal and petroleum coke (petcoke) is melted, and then cooled by a membrane wall in the MHI design, where it vitrifies to form a protective layer. This protective function is a critical design element of all entrained flow gasifiers, and the melting point, viscosity, and other important properties are very dependent on the ash properties of the feedstock. Petcoke has a much different quantity and composition of ash; demonstration at scale must be incorporated into the experience base of MHI before the full range of feedstock flexibility can be determined and guarantees can be made. This is part of the normal technology deployment/learning cycle, and is consistent with the step-by-step progression that other technologies have followed.

To date, the maximum performance guarantee the manufacturer has been willing to provide HECA is a 75 percent coal 25 percent petcoke blend. This performance guarantee is required to obtain long-term financing.

Commercial

The funding of the HECA Project will consist of debt and equity obtained from a variety of sources. In addition to the funding obtained from the CCPI-3 grant provided by the DOE, like virtually all other domestic, industrial-scale projects, HECA will rely upon capital markets to fund a significant portion of the Project. In order to attract investors in the market place, a project must clearly demonstrate that it is based upon a solid economic basis and provides returns on equity that will be attractive to investors. For a project such as HECA, this is typically achieved by demonstrating to the satisfaction of investors that future cash flows are real and dependable over time. Although investors review numerous aspects of a project before making the investment decision, a critical step occurs during due diligence where investors review the

characteristics of third-party contracts. The reality of this investing environment has been carefully considered throughout the development of the HECA Project and more specifically, influenced the proposed feedstock ratios as detailed in the Amended AFC.

Prospective investors prefer that major third-party contracts, such as feedstock, are stable and long-term in duration. In general, coal procurement conforms to investor preferences as coal providers seek long term (typically 20+ years) supply contracts enabling them to recoup the high capital outlays associated with mine development. In contrast, petcoke is sold as a traditional commodity product in spot markets. Considered a waste product from the petroleum refining process, petcoke production tends to be inconsistent over time and therefore refineries are reluctant to enter into long-term procurement contracts based on specified volumes. In sum, from an investor's perspective, the use of petcoke as a feedstock is less desirable than coal due to a perceived increased risk of supply disruption.

Due to the above mentioned commercial issues associated with this feedstock, HECA continues to develop the Project based on the preferred feedstock ratios as presented in the Amended AFC.



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**AMENDED APPLICATION FOR CERTIFICATION
FOR THE HYDROGEN ENERGY
CALIFORNIA PROJECT**

**Docket No. 08-AFC-08A
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(Revised 2/5/13)**

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DECLARATION OF SERVICE

I, Dale Shileikis, declare that on February 7, 2013, I served and filed copies of the attached Applicant's Response to Questions Raised at January 16, 2013 Status Conference Regarding Fuel Blend, dated February, 2013. This document is accompanied by the most recent Proof of Service, which I copied from the web page for this project at: http://www.energy.ca.gov/sitingcases/hydrogen_energy/.

The document has been sent to the other persons on the Service List above in the following manner:

(Check one)

For service to all other parties and filing with the Docket Unit at the Energy Commission:

X I e-mailed the document to all e-mail addresses on the Service List above and personally delivered it or deposited it in the US mail with first class postage to those persons noted above as "hard copy required";
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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am over the age of 18 years.

Dated: 2/7/13


