

Appendix T
Description of Offset Package

APPENDIX T
DESCRIPTION OF OFFSET PACKAGE
HYDROGEN ENERGY CALIFORNIA
PROJECT
KERN COUNTY, CALIFORNIA

Prepared for:

- San Joaquin Valley Air Pollution Control District
- California Energy Commission
- U.S. Environmental Protection Agency Region IX

Prepared on behalf of

Hydrogen Energy International LLC

March 16, 2009

URS

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This section discusses the mitigation measures proposed by the Applicant that will be implemented to reduce Project-related impacts to air quality.

1.0 Mitigation Measure AQ1

Section 4.5.3 of San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 2201 requires a project with operational emissions above 10 tons per year (tpy) of nitrogen oxide (NO_x) or volatile organic compounds (VOC), 100 tpy of carbon monoxide (CO), 14.6 tpy of particulate matter less than 10 microns in diameter (PM₁₀), and 27.375 tpy of sulfur oxides (SO_x) to provide offsets for net emissions increases resulting from the project as project mitigation. Pursuant to the rule, the Hydrogen Energy California project (HECA or Project) is required to provide emission offsets in the form of emissions reduction credits (ERC) for increases in emissions of non-attainment pollutants in excess of specified thresholds that will result from the operation of the Project on a pollutant-specific basis.

Section 4.6.1 of SJVAPCD Rule 2201 exempts projects from the offset requirement for increases in CO in attainment areas if the Applicant demonstrates to the satisfaction of the Air Pollution Control Officer (APCO), that the Ambient Air Quality Standards (AAQS) are not violated in the areas to be affected, and such emissions will be consistent with Reasonable Further Progress, and will not cause or contribute to a violation of Ambient Air Quality Standards. Modeling results presented in Section 5.1, Air Quality, of the Application for Certification (AFC) provide this demonstration for carbon monoxide. Thus, offsets for this pollutant are not proposed.

Based on operational emissions data presented in Section 5.1, Air Quality, and summarized in Table T-1, Project Annual Operating Emissions, the annual Project emissions exceed the offset thresholds for four criteria pollutants. According to Rule 2201 Section 4.7.2, offsets need to be provided for the quantity of emissions above the offset thresholds described above.

**Table T-1
Project Annual Operating Emissions**

Pollutant	Annual Operational Emissions (tons/year)	Annual Operational Emissions (pounds/year)	Offset Requirement Thresholds (pounds/year)
VOC	40.7	81,338.08	20,000
NO _x	203.8	407,682.18	20,000
SO _x	42.2	84,357.12	54,750
PM ₁₀	141.1	282,102.88	29,200

Source: HECA Project

Notes:

NO_x = nitrogen oxide(s)

PM₁₀ = particulate matter less than 10 microns in diameter

SO_x = sulfur oxides

VOC = volatile organic compounds

2.0 Emission Reduction Credits Estimates

Hydrogen Energy International LLC (HEI or Applicant) will obtain sufficient ERCs to comply with SJVAPCD and California Energy Commission requirements. ERCs are required to be provided at an appropriate distance offset ratio to determine the final quantity of offsets required.

Section 4.5.3 of Rule 2201 states that the required offset amounts for stationary sources that remain constant throughout the year are expressed in pounds per year, whereas offsets for quarterly potential to emit that is not constant throughout the year and seasonal sources are calculated in pounds per quarter. The Project will not be a seasonal source (a source with more than 90 percent of annual emissions occurring within a consecutive 120-day period, as stated in Rule 2201 Section 3.35).

Table T-2, Estimated ERCs Required, lists the estimated offset requirements for the operation of the Project. Annual Project emissions from Table T-2 have been apportioned equally among the four calendar quarters. The quantity of ERCs needed to offset emissions for each pollutant will depend on the distance from the Project Site at which the offsetting emission reductions occurred. Rule 2201 Section 4.8 specifies distance ratios that must be applied in determining the quantity of ERCs to be provided for a new source. If the location of the offsetting emission reduction is less than 15 miles from the new source, the ratio for a major source is 1.3 to 1. If the location of the offsetting emission reduction is 15 miles or more from the new source, the applicable offset ratio is 1.5 to 1. Note that the Project will be a major source as defined in Section 3.24 of Rule 2201 (25 tpy of NO_x or VOC, 15 tpy of PM₁₀ or SO_x, 100 tpy of CO).

Due to the very rural character of the Project Site and the lack of significant nearby emission sources, it is probable that the maximum distance ratio of 1.5 to 1 will be applicable for most of the ERCs used to offset Project emissions. Accordingly, the ERC amounts presented in Table T-2, Estimated ERCs Required, reflects an assumed 1.5 distance ratio.

**Table T-2
Estimated ERCs Required**

Pollutant	Total Annual Offset Requirement (pounds/year)	Total Quarterly Offset Requirement (pounds/quarter)	Annual ERC* (pounds/year)	Quarterly ERC* (pounds/quarter)
VOC	61,338	15,335	92,007	23,002
NO _x	387,682	96,921	581,523	145,381
SO ₂	29,607	7,402	44,411	11,103
PM ₁₀	252,903	63,226	379,354	94,839

* assumed 1.5 distance ratio

Notes:

ERC = emission reduction credits

NO_x = nitrogen oxide(s)

PM₁₀ = particulate matter less than 10 microns in diameter

SO₂ = sulfur oxides

VOC = volatile organic compounds

3.0 Emission Reduction Credits Availability

The Applicant has been active in pursuing ERCs for the Project, and has determined that sufficient ERCs are available to cover the offset requirements shown in Table T-2, Estimated ERCs Required. Discussions are ongoing with various ERC owners and ERC brokers.

Table T-3, San Joaquin Valley Air Pollution Control District ERC Registry, is a simplified ERC registry from SJVAPCD showing a sufficient amount of ERCs available for purchase to provide the required emission offsets for the Project. The table includes the locations of the offset sources and the nature of their source reduction activities, as well as ERC certificate numbers.

As shown in Table T-3, San Joaquin Valley Air Pollution Control District ERC Registry, the Applicant is capable of providing the required emission offsets for the Project.

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EMISSION REDUCTION CREDITS AVAILABILITY

**Table T-3
San Joaquin Valley Air Pollution Control District
ERC Registry**

Region ¹	Facility Name	Certificate	Pollutant	1st QTR (pounds)	2nd QTR (pounds)	3rd QTR (pounds)	4th QTR (pounds)	Total Annual (pounds)	Facility City
S	AERA ENERGY LLC	S-843-6	H2S	11,097	11,220	11,344	11,344	45,005	BAKERSFIELD
C	VENDO COMPANY	C-6-6	H2S	30	38	23	16	107	FRESNO
S	BIG WEST	S-2183-2	NOx	219,700	222,089	224,530	224,530	890,849	BAKERSFIELD
S	PASTORIA ENERGY FACILITY, LLC	S-3114-2	NOx	178,929	181,004	183,080	184,561	727,574	LEBEC
S	CHEVRON USA INC	S-2041024/401	NOx	151,178	149,517	149,517	152,840	603,052	BAKERSFIELD
S	AERA ENERGY LLC	S-162-2	NOx	128,454	152,970	128,743	130,786	540,953	BAKERSFIELD
S	AERA ENERGY LLC	S-2958-2	NOx	92,377	104,409	103,047	99,014	398,847	BAKERSFIELD
S	AERA ENERGY LLC	S-163-2	NOx	96,698	107,197	101,158	78,678	383,731	BAKERSFIELD
S	CHEVRON USA INC	S-1584-2	NOx	78,972	79,850	80,728	80,728	320,278	BAKERSFIELD
N	GALLO GLASS COMPANY	N-278-2	NOx	83,525	66,849	77,176	81,929	309,479	MODESTO
N	CANTORCO2E LP	N-767-2	NOx	75,000	75,000	75,000	75,000	300,000	SAN JUAN CAPISTRANO
S	AERA ENERGY LLC	S-1030-2	NOx	93,295	83,665	32,600	77,083	286,643	BAKERSFIELD
N	GALLO GLASS COMPANY	N-276-2	NOx	69,524	70,655	72,080	67,173	279,432	MODESTO
S	CHEVRON USA INC	S-1100-2	NOx	62,167	62,857	63,548	63,548	252,120	BAKERSFIELD
S	CHEVRON USA INC	S-1102-2	NOx	57,160	57,795	58,430	58,430	231,815	BAKERSFIELD
S	TURLOCK IRRIGATION DISTRICT	S-3113-2	NOx	55,800	55,800	55,800	55,800	223,200	TURLOCK
S	OCCIDENTAL OF ELK HILLS, INC (OEHI)	S-2761-2	NOx	53,738	54,477	55,216	55,214	218,645	TUPMAN
S	FEDERAL POWER AVENAL, LLC	S-2955-2	NOx	51,000	51,000	51,000	51,000	204,000	OAKLAND
S	CHEVRON USA INC	S-2448-2	NOx	45,847	46,388	46,930	46,930	186,095	BAKERSFIELD
S	CHEVRON USA INC	S-1256-2	NOx	45,238	45,741	46,244	46,244	183,467	BAKERSFIELD
S	AERA ENERGY LLC	S-1437-2	NOx	42,372	49,588	46,800	43,954	182,714	BAKERSFIELD
S	AERA ENERGY LLC	S-140-2	NOx	36,695	46,397	47,292	36,806	167,190	BAKERSFIELD
C	CALPINE CORPORATION	C-942-4	PM10	50,845	67,976	8,408	841	128,070	SAN JOSE
S	CHEVRON USA INC	S-3084-4	PM10	25,396	19,774	26,397	22,818	94,385	BAKERSFIELD
N	GALLO GLASS COMPANY	N-161-4	PM10	23,150	22,909	24,274	22,565	92,898	MODESTO
N	BERRY SEED & FEED COMPANY	N-773-4	PM10	17,630	15,335	16,869	18,974	68,808	KEYES

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**Table T-3
San Joaquin Valley Air Pollution Control District
ERC Registry (Continued)**

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N	CALPINE CORPORATION	N-297-4	PM10	0	0	101	66,394	66,495	SAN JOSE
N	PARAMOUNT FARMS	N-206-4	PM10	0	0	65	52,685	52,750	LOST HILLS
C	PARAMOUNT FARMS, INC.	C-288-4	PM10	1,000	1,000	36,000	12,000	50,000	LOST HILLS
S	EVOLUTION MARKETS LLC	S-2876-4	PM10	0	0	0	46,954	46,954	WHITE PLAINS
N	LA PALOMA GENERATING COMPANY	N-500-4	PM10	11,695	16,203	9,929	8,254	46,081	SAN FRANCISCO
C	CHEVRON USA INC	C-339-4	PM10	11,300	11,300	11,301	11,301	45,202	BAKERSFIELD
C	EVOLUTION MARKETS LLC	C-941-4	PM10	0	0	0	41,215	41,215	WHITE PLAINS
C	OLDUVAI GORGE, LLC	C-789-4	PM10	0	0	0	40,000	40,000	NEW YORK
N	CE2 ENVIRONMENTAL MARKETS LP	N-696-4	PM10	5,973	10,000	10,000	14,027	40,000	SOLANA BEACH
S	PARAMOUNT FARMS, INC., ATTN D. LEE	S-1350-4	PM10	0	0	0	37,321	37,321	LOST HILLS
C	BRITZ AG FINANCE CO., INC.	C-559-4	PM10	0	0	0	35,897	35,897	FRESNO
C	WESTSIDE FARMERS COOP GIN	C-352-4	PM10	0	0	0	33,444	33,444	SAN JOAQUIN
C	CE2 ENVIRONMENTAL MARKETS LP	C-957-4	PM10	0	0	0	29,978	29,978	SAN DIEGO
S	FRITO-LAY NORTH AMERICA INC	S-3002-4	PM10	7,136	7,320	7,507	7,506	29,469	BAKERSFIELD
C	OLDUVAI GORGE, LLC	C-887-4	PM10	0	0	0	29,243	29,243	NEW YORK
S	BUTTONWILLOW GINNING CO	S-2937-4	PM10	0	0	0	28,460	28,460	BUTTONWILLOW
C	FARMERS FIREBAUGH GINNING CO.	C-956-4	PM10	6,374	0	0	20,615	26,989	FIREBAUGH
C	ANDERSON CLAYTON CORP	C-959-4	PM10	0	0	0	26,896	26,896	FRESNO
N	CE2 ENVIRONMENTAL OPPORTUNITIES I LP	N-697-4	PM10	0	8,185	13,499	5,136	26,820	SOLANA
C	UNITED STATES GYPSUM COMPANY	C-847-4	PM10	0	0	0	26,284	26,284	CHICAGO
S	NORTHERN CALIFORNIA POWER AGENCY	S-2844-4	PM10	5,830	5,830	4,500	9,830	25,990	ROSEVILLE
N	CASTLE AIRPORT AVIATION & DEVELOP CENTER	N-109-4	PM10	6,262	6,332	6,402	6,402	25,398	ATWATER
S	FRITO-LAY NORTH AMERICA INC	S-3000-5	SOx	71,703	71,500	75,296	75,296	293,795	BAKERSFIELD
S	AERA ENERGY LLC	S-1337-5	SOx	127,827	90,500	22,163	48,838	289,328	BAKERSFIELD
S	KERN OIL & REFINING COMPANY	S-3106-5	SOx	78,598	78,599	51,520	78,598	287,315	BAKERSFIELD

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S	FEDERAL POWER AVENAL, LLC	S-2791-5	SOx	92,179	23,666	69,157	96,288	281,290	OAKLAND
S	AERA ENERGY LLC	S-2008-5	SOx	85,594	40,615	57,148	91,993	275,350	BAKERSFIELD
S	AERA ENERGY LLC	S-2962-5	SOx	66,569	67,318	68,066	68,066	270,019	BAKERSFIELD
S	BIG WEST	S-2177-5	SOx	55,479	65,755	62,724	69,141	253,099	BAKERSFIELD
N	EVOLUTION MARKETS LLC	N-771-5	SOx	88,068	87,945	37,822	37,822	251,657	WHITE PLAINS
N	GWF POWER SYSTEMS INC	N-575-5	SOx	50,000	50,000	50,000	50,000	200,000	PITTSBURG
S	TURLOCK IRRIGATION DISTRICT	S-3129-5	SOx	55,614	40,150	0	84,936	180,700	TURLOCK
S	AERA ENERGY LLC	S-1339-5	SOx	102,863	63,756	0	10,468	177,087	BAKERSFIELD
S	AERA ENERGY LLC	S-1032-5	SOx	28,371	72,172	48,856	9,900	159,299	BAKERSFIELD
N	CORN PRODUCTS	N-264-5	SOx	39,050	39,050	39,050	39,050	156,200	STOCKTON
S	CHEVRON USA INC	S-2080-5	SOx	35,848	36,301	36,756	36,756	145,661	BAKERSFIELD
S	AERA ENERGY LLC	S-457-5	SOx	24,881	31,082	33,126	32,380	121,469	BAKERSFIELD
S	AERA ENERGY LLC	S-841-5	SOx	26,339	26,631	26,924	26,924	106,818	BAKERSFIELD
S	GULF CAPITAL PARTNERS, INC.	S-2999-5	SOx	24,000	24,000	24,000	24,000	96,000	HOUSTON
S	CHEVRON PIPE LINE-MIDWAY	S-1542-5	SOx	25,189	21,032	18,790	30,130	95,141	TAFT
S	CHEVRON USA INC	S-2061-5	SOx	23,027	23,282	23,538	23,538	93,385	BAKERSFIELD
S	BERRY PETROLEUM COMPANY	S-3025-5	SOx	22,500	22,500	22,500	22,500	90,000	BAKERSFIELD
S	CHEVRON USA INC	S-2454-5	SOx	9,938	15,295	38,474	24,993	88,700	BAKERSFIELD
S	CHEVRON USA INC	S-2934-5	SOx	11,539	16,868	23,727	33,544	85,678	BAKERSFIELD
S	CHEVRON USA INC	S-411-5	SOx	10,304	20,626	26,873	26,303	84,106	BAKERSFIELD
N	FEDERAL POWER AVENAL, LLC	N-762-5	SOx	21,000	21,000	21,000	21,000	84,000	OAKLAND
S	OLDUVAI GORGE, LLC	S-2692-5	SOx	22,146	30,918	8,240	22,190	83,494	NEW YORK
N	GRIMMIUS CATTLE COMPANY	N-636-5	SOx	21,307	28,000	6,627	20,577	76,511	HANFORD
N	EVOLUTION MARKETS LLC	N-700-5	SOx	762	72,578	0	0	73,340	WHITE PLAINS
S	AERA ENERGY LLC	S-260-5	SOx	19,004	28,541	13,717	8,240	69,502	BAKERSFIELD
S	VANDERHAM WEST	S-2401-5	SOx	16,875	16,875	16,875	16,875	67,500	TIPTON
N	MODESTO IRRIGATION DISTRICT	N-392-5	SOx	26,443	26,370	13,765	0	66,578	MODESTO
N	BULLARD ENERGY CENTER LLC	N-717-5	SOx	0	0	64,800	0	64,800	S JORDAN

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**Table T-3
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ERC Registry (Continued)**

Region ¹	Facility Name	Certificate	Pollutant	1st QTR (pounds)	2nd QTR (pounds)	3rd QTR (pounds)	4th QTR (pounds)	Total Annual (pounds)	Facility City
N	BULLARD ENERGY CENTER LLC	N-718-5	SOx	21,899	23,000	0	14,704	59,603	S JORDAN
N	EVOLUTION MARKETS LLC	N-698-5	SOx	55,742	2,294	0	0	58,036	WHITE PLAINS
S	AERA ENERGY LLC	S-1825-5	SOx	19,164	21,001	4,803	11,650	56,618	BAKERSFIELD
S	AERA ENERGY LLC	S-284-5	SOx	19,831	12,103	6,514	16,106	54,554	BAKERSFIELD
N	GULF CAPITAL PARTNERS, INC	N-744-5	SOx	0	0	0	52,748	52,748	HOUSTON
S	NORTHERN CALIFORNIA POWER AGENCY	S-2843-5	SOx	13,298	10,631	12,619	13,452	50,000	ROSEVILLE
N	GILROY FOODS	N-485-5	SOx	7,118	18,526	23,007	910	49,561	MODESTO
S	PASTORIA ENERGY FACILITY, LLC	S-2744-5	SOx	11,324	11,450	11,576	11,576	45,926	LEBEC
S	EVOLUTION MARKETS LLC	S-2632-5	SOx	11,102	11,225	11,348	11,348	45,023	WHITE PLAINS
S	BIG WEST	S-3118-1	VOC	894,225	886,448	916,875	916,878	3,614,426	BAKERSFIELD
S	AERA ENERGY LLC	S-3104-1	VOC	219,197	221,785	224,428	224,481	889,891	BAKERSFIELD
S	CHEVRON USA INC	S-1432-1	VOC	135,357	136,861	138,364	138,364	548,946	BAKERSFIELD
S	AERA ENERGY LLC	S-1082-1	VOC	130,768	132,221	133,675	133,675	530,339	BAKERSFIELD
S	CHEVRON USA INC	S-2887-1	VOC	113,431	114,707	116,073	116,094	460,305	BAKERSFIELD
S	OCCIDENTAL OF ELK HILLS, INC. (OEHI)	S-2822-1	VOC	83,976	85,157	86,339	86,339	341,811	TUPMAN
S	CHEVRON USA INC	S-620-1	VOC	83,316	84,241	85,167	85,167	337,891	BAKERSFIELD
S	OCCIDENTAL OF ELK HILLS, INC (OEHI)	S-3065-1	VOC	69,169	77,848	80,424	75,737	303,178	TUPMAN
S	CHEVRON USA INC	S-2766-1	VOC	72,796	73,747	74,664	74,698	295,905	BAKERSFIELD
S	AERA ENERGY LLC	S-2725-1	VOC	65,082	65,830	66,578	66,578	264,068	BAKERSFIELD
S	AER GLAN ENERGY	S-3052-1	VOC	61,750	61,750	61,750	61,750	247,000	SAN FRANCISCO
S	AERA ENERGY LLC	S-2395-1	VOC	59,410	59,839	60,983	61,950	242,182	BAKERSFIELD
S	BIG WEST	S-2452-1	VOC	53,758	54,557	54,966	54,874	218,155	BAKERSFIELD
C	PACIFIC GAS & ELECTRIC CO.	C-280-1	VOC	21,981	68,020	71,348	53,244	214,593	WALNUT CREEK
S	AERA ENERGY LLC	S-1142-1	VOC	39,631	39,976	40,411	40,489	160,507	BAKERSFIELD
S	CHEVRON USA INC (REFINERY)	S-657-1	VOC	35,011	35,399	35,788	35,788	141,986	BAKERSFIELD

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San Joaquin Valley Air Pollution Control District
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S	CHEVRON USA INC	S-3063-1	VOC	34,635	35,052	35,469	35,469	140,625	BAKERSFIELD
S	SAN JOAQUIN FACILITIES MGMT	S-2148-1	VOC	34,024	28,739	32,822	38,107	133,692	BAKERSFIELD
N	CASTLE AIRPORT AVIATION & DEVELOP CENTER	N-523-1	VOC	31,801	32,175	32,549	32,549	129,074	ATWATER
S	CLEAN HARBORS BUTTONWILLOW, LLC	S-685-1	VOC	31,195	31,541	31,888	31,888	126,512	BUTTONWILLOW
C	DART CONTAINER CORPORATION	C-555-1	VOC	30,481	26,626	14,213	50,680	122,000	MASON
N	PACTIV CORPORATION	N-339-1	VOC	27,192	27,192	27,192	27,192	108,768	BAKERSFIELD
S	AERA ENERGY LLC	S-2964-1	VOC	25,277	26,605	25,902	25,800	103,584	BAKERSFIELD

Note:

1. Regions:
 C = Central
 N = Northern
 S = Southern

4.0 Reference

San Joaquin Valley Air Pollution Control District, 2009, ERC Registry, Updated March 16, 2009.