

Appendix H Greenhouse Gases/Climate Change

Appendix H-1 Supplemental Greenhouse Gas Analysis - Supporting Calculations

Source	Potential to Emit				Reasonably Foreseeable Increase in Emissions			Notes
	2015 (MTCO ₂ e/yr)	2019 (MTCO ₂ e/yr)	2020 BAU (MTCO ₂ e/yr)	2020 Project (MTCO ₂ e/yr)	2020 BAU (MTCO ₂ e/yr)	2020 Project (MTCO ₂ e/yr)	Percent Change	
Asphalt Processing	2,360	5,316	5,316	5,316	5,316	5,316	0%	LCFS (10%) + Conveyor
Off-Road Equipment	1,478	952	3,239	857	3,239	857	74%	
Motor Vehicles – On-Site								
Material and Product Diesel Trucks	70	215	215	194	215	194	10%	LCFS (10%)
Support Diesel Trucks	4	4	4	4	4	4	10%	LCFS (10%)
Support Light Pickup Trucks	1	<1	<1	<1	<1	<1	0%	
Outside Services and Miscellaneous Visitor Vehicles	<1	<1	<1	<1	<1	<1	0%	
Employee Vehicles	5	6	6	5	6	5	10%	LCFS (10%)
Motor Vehicles – Off-Site								
Material and Product Diesel Trucks	2,017	6,040	6,040	5,436	633	570	10%	LCFS (10%)
Outside Services and Miscellaneous Visitor Vehicles	1	2	2	2	2	2	10%	LCFS (10%)
Employee Vehicles	76	90	90	81	90	81	10%	LCFS (10%)
Electrical Generation	718	2,484	2,484	2,129	2,484	2,129	14%	RPS/RES (24%)
Water Supply	31	109	109	109	109	109	0%	no change
Total	6,759	15,218	17,505	14,132	12,098	9,266	23%	
Reduction from BAU:				19.3%	23%			

Notes: the Project is credited for replacing haul trucks with a conveyor system beginning in 2019; the Low Carbon Fuel Standard (LCFS); and the Renewable Portfolio Standard (RPS). From a regional perspective, the materials produced by this Project will substitute for materials that would have been produced elsewhere. The Project's fair share of increase in regional GHG emissions from on-road transport of these materials is 10% of the potential to emit value presented above. The Proposed Scoping Plan (CARB, 2008) states that 12% of electricity is produced from renewable sources and that amount will increase to 33% by 2020 which is a 24% reduction from BAU.

Offroad Haul Truck and Dragline Emissions

	Haul Trucks		Dragline		Total	
	2015	2020	2015	2020	2020	
Hours per Year	4,160	14,857	2,080	7,429		Conversions, Assumptions and Factors
Tons per Year	350,000	1,250,000	350,000	1,250,000	1,250,000	
Hp-Hr/Yr	807,789	2,884,960	403,894	1,442,480	4,327,440	
Gallons of Diesel	42,051	150,182	21,025	75,091	225,272	
BAU Fuel Burning Emissions (MTCO ₂ e/yr)	427	1,524	213	762	2,287	
Proposed Electricity Use After Electrification (kW-hr)		-		1,075,484	1,075,484	
Emissions from Proposed Electricity Use (MTCO ₂ e/yr)		-		312	312	0.639 lb CO ₂ e/kW-hr 10.15 kg CO ₂ /gal
Reduction from BAU (MTCO ₂ e/yr)					(1,975)	

Notes: the Project is credited for replacing offroad haul trucks with a conveyor and with electrifying the dragline. Conveyor system electricity use is included in Dudek estimates but dragline electricity is not and is added in the calculation above.

General Notes:

Decreased VMT and GHG emissions from trips considered to be in the baseline could be but have not been credited to the Project. Recycle related trips are excluded from Project increment primarily because the Project does not induce generation of recycleables and creating a new location to accept recycleables will shorten trips for recycleables in the region.

Co-locating the concrete plants with the mine is a design feature of the Project that reduces emissions and for which no credit has been taken.

Year	Baseline						Project+LCFS
	2014	2015	2016	2017	2018	2019	2020
Population	1,137,162	1,150,526	1,171,778	1,193,029	1,214,281	1,235,532	1,256,784
Demand (tons)	6,333,992	6,408,431	6,526,803	6,645,174	6,763,545	6,881,916	7,000,287
Demand (truckloads)	253,360	256,337	261,072	265,807	270,542	275,277	280,011
Demand (VMT, 50 miles r.t.)	12,667,985	12,816,863	13,053,605	13,290,347	13,527,090	13,763,832	14,000,574
Demand (MTCO2)	24,222	24,506	24,959	25,412	25,864	26,317	26,770
Growth (tons)	-	74,439	192,810	311,181	429,552	547,924	666,295
Growth (truckloads)	-	2,978	7,712	12,447	17,182	21,917	26,652
Growth (VMT, 50 miles r.t.)	-	148,878	385,620	622,362	859,105	1,095,847	1,332,589
Growth (MTCO2)	-	285	737	1,190	1,643	2,095	2,293
Project Share (%)	-	5.5%	5.4%	5.3%	5.2%	18.2%	17.9%
Project Share (tons)	-	4,066	10,339	16,390	22,228	99,522	118,976
Project Share (truckloads)	-	163	414	656	889	3,981	4,759
Project Share (VMT, 50 miles r.t.)	-	8,131	20,679	32,780	44,457	199,045	237,953
Project Share (MTCO2)	-	16	40	63	85	381	409
Project Share + Other (VMT)	-	10,184	25,901	41,058	55,684	249,310	298,043
Project Share + Other (MTCO2)	-	19	50	79	106	477	570
Summary and Notes:		350,000 tons/yr				1,250,000 tons/yr	

Demand: 5.57 tons per capita*
 50-Year Aggregate Demand: 435 MMtons (CGS, 2012)

Department of Finance population projections are from January 2013.

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029
Population	1,277,552	1,298,320	1,319,088	1,339,857	1,360,625	1,382,710	1,404,794	1,426,879	1,448,964
Demand (tons)	7,115,966	7,231,644	7,347,323	7,463,001	7,578,679	7,701,692	7,824,705	7,947,718	8,070,731
Demand (truckloads)	284,639	289,266	293,893	298,520	303,147	308,068	312,988	317,909	322,829
Demand (VMT, 50 miles r.t.)	14,231,931	14,463,288	14,694,645	14,926,002	15,157,359	15,403,385	15,649,410	15,895,436	16,141,462
Demand (MTCO ₂)	27,212	27,654	28,097	28,539	28,981	29,452	29,922	30,393	30,863
Growth (tons)	781,973	897,652	1,013,330	1,129,009	1,244,687	1,367,700	1,490,713	1,613,726	1,736,739
Growth (truckloads)	31,279	35,906	40,533	45,160	49,787	54,708	59,629	64,549	69,470
Growth (VMT, 50 miles r.t.)	1,563,946	1,795,303	2,026,660	2,258,017	2,489,374	2,735,400	2,981,425	3,227,451	3,473,477
Growth (MTCO ₂)	2,691	3,089	3,488	3,886	4,284	4,707	5,131	5,554	5,977
Project Share (%)	17.6%	17.3%	17.0%	16.7%	16.5%	16.2%	16.0%	15.7%	15.5%
Project Share (tons)	137,362	155,160	172,398	189,101	205,294	221,980	238,142	253,803	268,987
Project Share (truckloads)	5,494	6,206	6,896	7,564	8,212	8,879	9,526	10,152	10,759
Project Share (VMT, 50 miles r.t.)	274,725	310,321	344,796	378,202	410,588	443,961	476,284	507,607	537,974
Project Share (MTCO ₂)	473	534	593	651	707	764	820	874	926
Project Share + Other (VMT)	344,101	388,686	431,867	473,709	514,274	556,075	596,560	635,793	673,829
Project Share + Other (MTCO ₂)	658	743	826	906	983	1,063	1,141	1,216	1,288

Summary and Notes:

Low Carbon Fuel Standard (LCFS) implemented by 2020 to reduce emissions by 10%.

"Other" refers to asphalt cement, Portland cement, water, and fuel transport which account for

20% 701,640.5 VMT/yr at 1,250,000 tons/yr

(See Table 17 of the Emission Inventory and Air Quality Impact Analysis by Dudek, Oct. 2013).

Recycle related trips are excluded from Project share assessment because the Project does not induce the generation of recycleables and creating a new location shorten trips.

Co-locating concrete plants with the mine is a design feature that reduces emissions and for which no credit has been taken.

Diversion of baseline activity was also not accounted for as discussed on the next page.

Summary and Notes are continued on following pages.

Year	2030	2031	2032	2033	2034	2035	2036	2037	2038
Population	1,471,049	1,493,040	1,515,030	1,537,021	1,559,011	1,581,002	1,599,831	1,618,661	1,637,490
Demand (tons)	8,193,744	8,316,231	8,438,719	8,561,206	8,683,694	8,806,181	8,911,061	9,015,940	9,120,819
Demand (truckloads)	327,750	332,649	337,549	342,448	347,348	352,247	356,442	360,638	364,833
Demand (VMT, 50 miles r.t.)	16,387,488	16,632,463	16,877,438	17,122,413	17,367,388	17,612,363	17,822,121	18,031,880	18,241,638
Demand (MTCO2)	31,334	31,802	32,270	32,739	33,207	33,676	34,077	34,478	34,879
Growth (tons)	1,859,751	1,982,239	2,104,726	2,227,214	2,349,702	2,472,189	2,577,068	2,681,948	2,786,827
Growth (truckloads)	74,390	79,290	84,189	89,089	93,988	98,888	103,083	107,278	111,473
Growth (VMT, 50 miles r.t.)	3,719,503	3,964,478	4,209,453	4,454,428	4,699,403	4,944,378	5,154,137	5,363,895	5,573,654
Growth (MTCO2)	6,401	6,822	7,244	7,665	8,087	8,508	8,869	9,230	9,591
Project Share (%)	15.3%	15.0%	14.8%	14.6%	14.4%	14.2%	14.0%	13.9%	13.7%
Project Share (tons)	283,715	297,947	311,766	325,190	338,235	350,917	361,499	371,834	381,932
Project Share (truckloads)	11,349	11,918	12,471	13,008	13,529	14,037	14,460	14,873	15,277
Project Share (VMT, 50 miles r.t.)	567,430	595,895	623,533	650,380	676,469	701,833	722,997	743,668	763,864
Project Share (MTCO2)	976	1,025	1,073	1,119	1,164	1,208	1,244	1,280	1,314
Project Share + Other (VMT)	710,724	746,376	780,994	814,620	847,299	879,068	905,576	931,467	956,763
Project Share + Other (MTCO2)	1,359	1,427	1,493	1,558	1,620	1,681	1,731	1,781	1,829

Summary and Notes:

There are baseline trips that are likely to be shortened the amount of which has not been quantified because doing so was not feasible given the time and resources available for the EIR. However, the amount of baseline activity reduction is likely to be substantial as indicated by the fact that the amount of aggregate leaving Coalinga destined for the Fresno Metro area was sufficient to warrant comment in Map Sheet 52. Thus, the Project is consistent with the 2011 Scoping Plan and AB-32. it will have a less than significant impact from GHG emissions and could represent a benefit if the additional baseline activity reductions were quantified and included in the analysis.

Summary and Notes are continued on following page.

Year	2039	2040	2041	2042	2043	2044	2045	2046
Population	1,656,319	1,675,149	1,691,121	1,707,094	1,723,066	1,739,039	1,755,011	1,770,646
Demand (tons)	9,225,698	9,330,578	9,419,545	9,508,511	9,597,478	9,686,445	9,775,412	9,862,497
Demand (truckloads)	369,028	373,223	376,782	380,340	383,899	387,458	391,016	394,500
Demand (VMT, 50 miles r.t.)	18,451,397	18,661,155	18,839,089	19,017,023	19,194,956	19,372,890	19,550,823	19,724,993
Demand (MTCO2)	35,280	35,681	36,021	36,361	36,701	37,042	37,382	37,715
Growth (tons)	2,891,706	2,996,585	3,085,552	3,174,519	3,263,486	3,352,452	3,441,419	3,528,504
Growth (truckloads)	115,668	119,863	123,422	126,981	130,539	134,098	137,657	141,140
Growth (VMT, 50 miles r.t.)	5,783,412	5,993,171	6,171,104	6,349,038	6,526,971	6,704,905	6,882,838	7,057,008
Growth (MTCO2)	9,952	10,313	10,619	10,926	11,232	11,538	11,844	12,144
Project Share (%)	13.5%	13.4%	13.3%	13.1%	13.0%	12.9%	12.8%	12.7%
Project Share (tons)	391,800	401,447	409,461	417,326	425,045	432,622	440,061	447,212
Project Share (truckloads)	15,672	16,058	16,378	16,693	17,002	17,305	17,602	17,888
Project Share (VMT, 50 miles r.t.)	783,601	802,894	818,923	834,652	850,089	865,243	880,121	894,425
Project Share (MTCO2)	1,348	1,382	1,409	1,436	1,463	1,489	1,515	1,539
Project Share + Other (VMT)	981,484	1,005,649	1,025,726	1,045,427	1,064,763	1,083,744	1,102,379	1,120,294
Project Share + Other (MTCO2)	1,877	1,923	1,961	1,999	2,036	2,072	2,108	2,142

Summary and Notes:

* Per capita consumption is approximated assuming that the Fresno P-C region population used in Map Sheet 52 equals the Department of Finance population projections for Fresno and Madera County. Precision of the absolute number of people and resulting per capita use rate are not as important as relative population growth (DoF) and 50-year Demand (MS52) in evaluating project impacts. If the population were higher, then the per capita use rate would be lower and the market growth would remain unchanged. Per capita use was adjusted iteratively by hand until the 50-year demand summed to the amount in Map Sheet 52.

Year	2047	2048	2049	2050	2051	2052	2053	2054
Population	1,786,280	1,801,915	1,817,550	1,833,184	1,848,949	1,864,715	1,880,480	1,896,245
Demand (tons)	9,949,582	10,036,667	10,123,751	10,210,836	10,298,648	10,386,460	10,474,272	10,562,084
Demand (truckloads)	397,983	401,467	404,950	408,433	411,946	415,458	418,971	422,483
Demand (VMT, 50 miles r.t.)	19,899,163	20,073,333	20,247,503	20,421,673	20,597,297	20,772,920	20,948,544	21,124,168
Demand (MTCO2)	38,048	38,381	38,714	39,047	39,383	39,719	40,054	40,390
Growth (tons)	3,615,589	3,702,674	3,789,759	3,876,844	3,964,656	4,052,468	4,140,280	4,228,091
Growth (truckloads)	144,624	148,107	151,590	155,074	158,586	162,099	165,611	169,124
Growth (VMT, 50 miles r.t.)	7,231,178	7,405,348	7,579,518	7,753,688	7,929,312	8,104,935	8,280,559	8,456,183
Growth (MTCO2)	12,444	12,743	13,043	13,343	13,645	13,947	14,249	14,552
Project Share (%)	12.6%	12.5%	12.3%	12.2%	12.1%	12.0%	11.9%	11.8%
Project Share (tons)	454,239	461,143	467,929	474,599	481,211	487,710	494,101	500,386
Project Share (truckloads)	18,170	18,446	18,717	18,984	19,248	19,508	19,764	20,015
Project Share (VMT, 50 miles r.t.)	908,478	922,287	935,858	949,198	962,421	975,421	988,202	1,000,771
Project Share (MTCO2)	1,563	1,587	1,610	1,633	1,656	1,679	1,701	1,722
Project Share + Other (VMT)	1,137,896	1,155,192	1,172,191	1,188,900	1,205,462	1,221,744	1,237,754	1,253,496
Project Share + Other (MTCO2)	2,176	2,209	2,241	2,273	2,305	2,336	2,367	2,397

Summary and Notes:

No notes on this page.

Year	2055	2056	2057	2058	2059	2060
Population	1,912,010	1,927,474	1,942,938	1,958,402	1,973,867	1,989,331
Demand (tons)	10,649,896	10,736,031	10,822,166	10,908,301	10,994,436	11,080,572
Demand (truckloads)	425,996	429,441	432,887	436,332	439,777	443,223
Demand (VMT, 50 miles r.t.)	21,299,791	21,472,062	21,644,332	21,816,603	21,988,873	22,161,143
Demand (MTCO2)	40,726	41,055	41,385	41,714	42,044	42,373
Growth (tons)	4,315,903	4,402,038	4,488,174	4,574,309	4,660,444	4,746,579
Growth (truckloads)	172,636	176,082	179,527	182,972	186,418	189,863
Growth (VMT, 50 miles r.t.)	8,631,807	8,804,077	8,976,347	9,148,618	9,320,888	9,493,158
Growth (MTCO2)	14,854	15,150	15,447	15,743	16,040	16,336
Project Share (%)	11.7%	11.6%	11.6%	11.5%	11.4%	11.3%
Project Share (tons)	506,566	512,531	518,401	524,177	529,864	535,462
Project Share (truckloads)	20,263	20,501	20,736	20,967	21,195	21,418
Project Share (VMT, 50 miles r.t.)	1,013,133	1,025,062	1,036,801	1,048,355	1,059,728	1,070,924
Project Share (MTCO2)	1,743	1,764	1,784	1,804	1,824	1,843
Project Share + Other (VMT)	1,268,980	1,283,921	1,298,625	1,313,097	1,327,342	1,341,365
Project Share + Other (MTCO2)	2,426	2,455	2,483	2,511	2,538	2,565

Summary and Notes:

No notes on this page.