Appendix 3.6-A

Existing Plus Project Conditions Energy Analysis

1.0 Methodology

Per CEQA requirements, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project. Those conditions, in turn, "will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." (CEQA Guidelines §15125[a])

For a project such as the HST project that would not commence operation for almost 10 years and would not reach full operation for almost 25 years, use of only existing conditions as a baseline for energy impacts would be misleading. It is more likely that existing background traffic volumes (and background roadway changes from other programmed traffic improvement projects) and vehicle emission factors would change between today and 2020/2035 than it is that existing conditions would remain unchanged over the next 10 to 25 years. For example, Regional Transportation Plans (RTP) include funded transportation projects that are programmed to be constructed by 2035. To ignore that these projects would be in place before the HST project reaches maturity (i.e., the point/year at which HST-related traffic emissions reach their maximum) and to evaluate the HST project's energy impacts ignoring that these RTP improvements would change the underlying background conditions to which HST project traffic would be added, would be misleading because it would represent a hypothetical comparison.

Therefore, the energy analysis uses a dual baseline approach. That is, the HST project's energy impacts are evaluated both against existing conditions and against background (i.e., No Project) conditions as they are expected to be in 2035. This approach complies with CEQA. (See *Woodwark Park Homeowners Ass'n v. City of Fresno* (2007), 150 Cal.App.4th 683, 707 and *Sunnyvale West Neighborhood Assn. v. City of Sunnyvale* (2010), 190 Cal.App.4th 1351). Results for both baselines are presented. The results comparing the project with the future expected baseline are presented in detail in the main text of the energy memorandum. The results comparing the project with existing conditions are presented in the main text in summary format; details are presented in this attachment. This approach complies with CEQA. It informs the public of potential project impacts under both baselines, but focuses the analysis on the baseline analysis more likely to occur.

Using the methodologies described in the Energy Technical Memorandum, the impacts of the proposed project have been evaluated and are discussed in the following sections.

1.1 Electrical Requirements of the HST

The electrical demand for the propulsion of the trains, the operation of the trains at terminal stations, and in storage depots and maintenance facilities etc., has been conservatively estimated by the project's engineers to be 8 GWHs per day. Transmission losses, the percentage of energy lost due to transmission from the power plant to the project, have been estimated to be approximately 3%. Applying this factor to the 8GWH per day electrical requirement of the HST system results in the total electrical requirement at the power plant to be approximately 8.24 GWHs per day. As shown in **Table 1**, this is equivalent to an increase in energy use of approximately 28,166 MMBtus per day. This change is predicted to occur in both the existing conditions plus project scenario and the 2035 build scenario.

Table 1
Power Plant Emission Changes due to the Project

Electricity required (GWHs per day)	Change in Energy due to HST (MMBtus/day)
8.24	28,116

The HST system's electrical requirements will be met through the state's electrical grid, and no one generation source for the electrical power requirements can be positively identified. Energy changes from power generation can therefore be predicted on a statewide level only.

1.2 On-Road Vehicle Travel

Estimated VMT for the existing and existing plus project scenario are provided in **Table 2**. These values, together with associated average daily speed estimates, were developed on a county-by-county basis and then summed for the state as a whole. As shown, the HST is predicted to reduce daily roadway VMT by over 17 million miles a day statewide due to travelers choosing to use the HST rather than drive, resulting in an energy reduction of approximately 87,000 MMBtus/day, as compared to the existing scenario.

1.3 Aircraft Travel

As shown in **Table 3**, the number of plane flights statewide is anticipated to decrease with the HST due to travelers choosing to use the HST rather than fly to their destination. An average fuel consumption rate was calculated for the aircraft based on the profile of aircraft currently servicing the San Francisco to Los Angeles corridor. The number of air trips removed due to the HST was estimated using the travel demand modeling analysis conducted for the project. As shown in **Table 3,** the existing plus project scenario is estimated to reduce the number of statewide air trips by over 200 flights per day statewide, resulting in an energy reduction of approximately 9,800 MMBtus a day, as compared to the existing scenario, due to travelers choosing to use the HST rather than fly.

Table 2
2009 Existing Plus Project On-Road Vehicle Energy Changes

County	Existing VMT	Existing Plus Project VMT	Change in VMT with HST	Change in Energy with HST (MMBtus/Day)
Fresno	22,500,000	22,050,000	-450,000	-2,194
Kern	21,500,000	21,070,000	-430,000	-2,355
Kings	3,700,000	3,626,000	-74,000	-407
Madera	4,177,690	4,094,136	-83,553	-419
Merced	7,000,000	6,860,000	-140,000	-731
Tulare	9,900,000	9,702,000	-198,000	-949
Statewide Total	**888,400,000**	**870,632,000**	**-17,768,000**	**-87,496**

Table 3
Aircraft Energy Changes (MMBtus/Day) due to HST 2009

Origin	No. of Flights Removed	Change in Energy due to HST (MMBtus/Day)
Central Coast	-1	-25
Far North	-9	-407
Fresno/Madera	0	0
Kern	-9	-407
LA Basin_North	-25	-1095
LA Basin_South	-51	-2240
Merced	-1	-25
Monterey Bay	-9	-407
Sacramento Region	-9	-407
San Diego Region	-27	-1196
San Joaquin	-4	-178
SF Bay Area	-75	-3309
South SJ Valley	0	0
Stanislaus	-3	-127
W. Sierra Nevada	-1	-25
Statewide Total	-224	-9,851

2.0 Summary of Results

As, shown in Table 4, the existing plus project scenario is estimated to reduce roadway energy by approximately 87,000 MMBtus/day, reduce energy due to plane travel by approximately 9,800 MMBtus/day, and increase electrical energy demand by approximately 28,000 MMBtus/day, resulting in an overall savings of approximately 69,000 MMBtus/day over the existing scenario. The analysis conducted for this project estimated the changes in energy use anticipated throughout the state with and without the HST. The analysis estimated the energy changes from reduced on-road VMT, reduced intrastate plane travel, and increased electrical demand. Although the HST system would result in an increase in electricity demand, it is predicted to reduce the energy demands from automobile and plane travel, resulting in an overall beneficial effect on statewide energy use.

Table 4
2009 Estimated Energy Changes due to Existing Plus Project compared to Existing Scenario

Project Element	Change in Energy due to HST (MMBtus/Day)
Roadways	-87,496
Planes	-9,851
Energy	28,116
Total	-69,231