Appendix 22B
Energy 2040 Analysis

This appendix compares the No Project Alternative at 2040 to the project alternatives at 2040 using modeling tools and methods appropriate for the evaluation of impacts on energy. Modeling for the No Project Alternative at 2040 and project alternatives at 2040 incorporates assumptions regarding changes to hydrology and sea level rise as a result of climate change. Information regarding how climate change was considered in the modeling is provided in Appendix 5A, *Modeling Technical Appendix*. The analysis in this appendix is provided for informational purposes to help decision-makers and the public better understand whether any of the impact conclusions documented in Chapter 22, *Energy,* would change when considered under future conditions when construction is complete, and the project is fully operational. This analysis also supports the Draft Environmental Impact Statement prepared by the U.S. Army Corps of Engineers. This analysis is not required by CEQA and is not used to support the CEQA conclusions provided in Chapter 22.

This appendix focuses exclusively on energy impacts associated with operations and maintenance (O&M) activities, assuming project construction activities will be completed by approximately 2040. As described in Chapter 22, State Water Project (SWP) and Central Valley Project (CVP) system energy operations were analyzed for each alternative under 2020 conditions to define baseline conditions although the project would not be fully operational until 2040. Based on current information, it is projected that the energy consumption in 2040 would be less than consumption under 2020 conditions because of reduced deliveries (see Appendix 5B, *Surface Water 2040 Analysis*), resulting in a reduction in overall energy consumption.

Energy usage from construction of the project alternatives is described in Impacts ENG-1 and ENG-2, Chapter 22, Section 22.3.3.2, *Impacts of the Project Alternatives on Energy*. Electrical energy needs for construction were evaluated based on the estimated annual energy required for each alternative. The construction energy requirements were estimated from the facilities that would require electrical energy during construction for each alternative. Project construction would also consume gasoline and diesel fuels through operation of heavy-duty construction equipment and vehicles. Accordingly, the analysis focuses on energy associated with physical construction of the water conveyance facilities (i.e., fuels consumed by heavy-duty equipment and vehicles).

22B.1 No Project Alternative

The No Project Alternative is the condition that would occur if none of the project alternatives were implemented. Activities associated with long-term maintenance of the existing SWP and CVP systems (e.g., inspection trips) would continue, and there would be no substantial changes attributable to the No Project Alternative that would affect long-term maintenance or operations energy consumption.

Tables 22B-1 and 22B-2 present SWP and CVP electricity generation, use, and net consumption for each alternative (respectively) under existing (2020) conditions and 2040 No Project conditions. As shown in summary Table 22B-3, SWP and CVP electricity consumption of the No Project Alternative under 2040 project conditions is expected to decrease relative to existing conditions, resulting in a net surplus of energy.

22B.2 Impacts and Mitigation Approaches

Tables 22B-1 and 22B-2 summarize average annual SWP and CVP operational energy requirements for each alternative. Table 22B-3 provides a comparison of fuel consumption per alternative under existing (2020) conditions and 2040 conditions.

Table 22B-1. Summary of Annual Average Long-Term Pumping and Total SWP Net Energy Use in Gigawatt Hours for Operation of the Alternatives Under 2040 Conditions Compared to No Project

	EC	NP	Alt 1	Alt 2a	Alt 2b	Alt 2c	Alt 3	Alt 4a	Alt 4b	Alt 4c	Alt 5
SWP Generation	3,925	3,766	4,077	4,077	3,993	4,042	4,077	4,077	3,993	4,042	4,079
SWP Use	6,744	6,223	7,404	7,398	7,093	7,284	7,413	7,401	7,101	7,293	7,619
SWP Net Energy Consumption (+) or Surplus (-)	2,819	2,457	3,328	3,322	3,099	3,242	3,336	3,324	3,108	3,250	3,539
% Change from NP [a]	–	–	35%	35%	26%	32%	36%	35%	26%	32%	44%

Alt = Alternative; EC = Existing Conditions; NP = No Project; SWP = State Water Project.

[a] Changes only include pumping plants located south of the Delta. Pumping plants north of the Delta did not experience changes due to the project.

Table 22B-2. Summary of Annual Average Long-Term Pumping and Total CVP Net Energy Use in Gigawatt Hours for Operation of the Alternatives Under 2040 Conditions Compared to No Project

	EC	NP	Alt 1	Alt 2a	Alt 2b	Alt 2c	Alt 3	Alt 4a	Alt 4b	Alt 4c	Alt 5
CVP Generation	4,645	4,579	4,593	4,601	4,589	4,579	4,593	4,601	4,589	4,579	4,592
CVP Use	1,333	1,034	1,051	1,078	1,042	1,034	1,051	1,079	1,042	1,034	1,051
CVP Net Energy Consumption (+) or Surplus (-)	-3,312	-3,545	-3,541	-3,523	-3,547	-3,545	-3,541	-3,522	-3,547	-3,545	-3,541
% Change from NP	–	–	0%	-1%	0%	0%	0%	-1%	0%	0%	0%

Alt = Alternative; CVP = Central Valley Project; EC = Existing Conditions; NP = No Project.

Table 22B-3. Summary of Annual Average Gasoline and Diesel Estimates for Operations and Maintenance per Alternative

Alternative	2020 Gasoline and Diesel Fuel Use (gallons)	2040 Gasoline and Diesel Fuel Use (gallons)	Percent Difference
1	35,322	33,689	-5%
2a	40,851	38,607	-5%
2b	31,251	29,900	-4%
2c	35,161	33,565	-5%
3	35,056	33,166	-5%
4a	40,514	38,042	-6%
4b	30,917	29,315	-5%
4c	34,891	33,040	-5%
5	25,554	24,010	-6%

Impact ENG-1: Result in Substantial Environmental Impacts due to Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources, during Project Operation

For all project alternatives, SWP energy consumption is expected to result in an increase, while CVP energy consumption is expected to result in a surplus. There would be relatively no difference in operating assumptions regarding energy consumption relative to the 2020 analysis presented in Chapter 22, except deliveries under 2040 project conditions are expected to be reduced (Appendix 5B). Additionally, as presented in Table 22B-3, fuel consumption (gasoline and diesel) would experience a decrease under 2040 conditions. This decrease is attributable to improvements in engine technology and regulations to reduce combustion emissions and more efficient vehicles and electric-powered vehicles being added to the fleet. Accordingly, though overall electrical consumption under 2040 conditions is expected to be reduced, the relative impact of the project alternatives under 2040 project conditions would be similar to what is described in Impact ENG-1 in Chapter 22 and would not result in wasteful, inefficient, or unnecessary consumption of energy resources.

Impact ENG-2: Conflict with or Obstruct any State/Local Plan, Goal, Objective, or Policy for Renewable Energy or Energy Efficiency

As discussed in Chapter 22 for the 2020 analysis, operation of all project alternatives under 2040 conditions would be supplied by the same power portfolio used for current SWP operations. The increase in power needed to move water through the new water conveyance facilities would be procured by the California Department of Water Resources, and the energy requirements would be directly linked to the SWP and CVP exports. The potential for the project alternatives under 2040 conditions to conflict with or obstruct renewable energy or energy efficiency plans, goals, objectives, or policies would be similar to what is described in Impact ENG-2 in Chapter 22.