

Appendix C: Summary of Proposed 15-Day Changes and Updated Economic Analysis

Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate

This attachment describes 15-day changes to California Air Resources Board (CARB or Board) staff's proposed amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate (Proposed Amendments) and their associated cost impacts.

The 15-day changes described below are changes made since CARB staff released the Initial Statement of Reasons (ISOR) for the Proposed Amendments on July 27, 2021. The 15-day changes collectively result in lower costs to TRU and applicable facility owners. The updated total net cost of the Proposed Amendments from 2022 to 2034 is estimated to be \$850.2 million compared to \$1.04 billion in the ISOR. The 15-day changes do not result in changes to cost methodology, emissions estimates, or statewide valuation from avoided adverse health outcomes.

I. Summary of 15-Day Changes

A. Update New Sales Populations

Staff updated the new sales populations in the Proposed Amendments used to calculate the cost to TRU owners to purchase new equipment. In the ISOR, new sales populations in the Proposed Amendments and the baseline were the same for trailer TRUs, domestic shipping container TRUs, railcar TRUs, and TRU generator sets. The new sales populations in the Proposed Amendments did not reflect that all model year 2023 and newer units would meet the proposed particulate matter (PM) standard and no longer need to comply with the in-use performance standard when the unit turns seven years-old. Staff updated the new sales populations to reflect that new sales populations in the Proposed Amendments would be lower than in the baseline. This update lowered staff's estimated cost of the Proposed Amendments for TRU owners.

B. Update TRU Operating and Applicable Facility Registration Fee Amounts

Staff updated the TRU operating and applicable facility registration fee amounts to account for the updated new sales populations (described above). As a result of the new sales population changes, there will be fewer TRU registrations from 2022 to 2034 than originally estimated.

Staff updated the fee amounts to remove the additional cost to CARB for indirect labor. In the ISOR, both direct labor costs to implement and enforce the TRU program and indirect labor costs that include administrative management, legal, and information technology costs to run the program were included in the fee calculation. The indirect labor cost was included as an additional 26 percent of the direct labor cost. Staff removed the additional 26 percent indirect labor cost since the salary amounts used for the direct labor cost already included operating expenses and equipment for each labor classification.

Lastly, staff updated the fee amounts to reflect current postage costs. In the ISOR, staff used a postage rate of \$0.62 per envelope. Staff updated the amount to \$1.20 per envelope based on current postage rates.

As a result of these changes, staff updated the TRU operating and applicable facility registration fee from \$54 to \$45 and the zero-emission TRU operating fee from \$27 to \$23. The updated TRU operating and applicable facility registration fee amounts lowered staff's estimated cost of the Proposed Amendments for TRU and applicable facility owners.

C. Addition of Zero-Emission Truck TRU Assurances

The zero-emission truck TRU industry is an emerging market and there will likely be variability in product quality and support. In the absence of a formal CARB zero-emission certification process for off-road equipment, the addition of zero-emission truck TRU assurances is needed to ensure that manufacturers produce reliable and quality products that meet the needs of owners and operators. Staff are proposing to add the following requirements for manufacturers of zero-emission truck TRUs to help ensure that zero-emission truck TRUs will function as intended and support is available when equipment issues arise.

- Provide a comprehensive warranty period of three years or 4,500 hours, whichever comes first
- Establish an authorized service-and-repair facility located in California to perform warranty repairs

The addition of zero-emission truck TRU assurances results in higher costs to manufacturers. Based on conversations with TRU manufacturers, comprehensive warranty costs range from 6 to 11 percent of the base unit price.¹ Therefore, staff assumed that the cost of a comprehensive three-year warranty for zero-emission truck TRUs would be approximately 8.5 percent of the capital cost. The warranty cost will ultimately be passed on to TRU owners and reflected in a higher capital cost for zero-emission truck TRUs. Staff did not include additional costs for the TRU manufacturer requirement to establish an authorized service-and-repair facility located

¹ Claimed confidential data obtained from an industry source that requested non-attribution.

in California. The two major TRU manufacturers, Carrier and Thermo King, have an existing authorized dealer and repair network with facilities in California capable of supporting warranty repairs for zero-emission truck TRUs. The addition of zero-emission truck TRU assurances increased staff's estimated cost of the Proposed Amendments for TRU owners.

D. Remove Low Carbon Fuel Standard (LCFS) Credits from Total Cost of the Proposed Amendments

TRU owners who use electricity as a power source to charge their zero-emission truck TRUs can generate LCFS credits based on the amount of energy they use. Staff originally assumed that all zero-emission truck TRU owners would take advantage of the incentive provided by LCFS. However, based on an analysis of the size of truck TRU fleets registered in CARB's Equipment Registration Program (ARBER), a majority of truck TRU owners are small owner-operators. Over 75 percent of truck TRU fleets registered in ARBER have three or fewer truck TRUs. Thus, to be conservative, staff are removing the LCFS cost savings from the total cost of the Proposed Amendments. Generating and selling credits under LCFS is resource intensive, as it requires owners to register with the LCFS program, track electrical data usage, submit required documentation and reports to CARB, and sell credits. Staff determined it was not reasonable to assume that all zero-emission truck TRU owners would take the time to generate LCFS credit revenue. Although LCFS credit revenue is not reflected in the total cost of the Proposed Amendments, truck TRU owners may generate up to \$2,000 in cost savings per zero-emission truck TRU per year. The removal of LCFS credits increased staff's estimated cost of the Proposed Amendments for TRU owners.

E. Extend Compliance Extension due to Private Financing, Equipment Manufacture Delays, or Installer Delays

Staff are proposing to extend the compliance extension due to private financing, equipment manufacture delays, or installer delays from a maximum of four months to six months. This change is necessary to provide TRU owners or owner/operators additional time to comply with the requirements in section 2477.5 (a), (b), (c), and (d) due to delays related to current supply chain issues. This change affects the amount of time TRU owners or owner/operators have to comply with the Proposed Amendments, but not the cost to comply. Therefore, these changes are expected to result in minimal or no impacts to the total estimated cost of the Proposed Amendments.

F. Clarify Requirements for Lessors and Lessees

Staff are proposing changes to the requirements for lessors and lessees to clarify the original intent to allow TRU owners (lessors) to delegate compliance responsibility for all the TRU owner requirements to the TRU operator (lessee) if the rental or lease agreement is for a period of one year or longer. These changes affect who may be responsible for compliance, but not the cost to comply with the Proposed

Amendments. Therefore, these changes are expected to result in minimal or no impacts to the total estimated cost of the Proposed Amendments.

G. Update Non-Compliance and Penalty Provisions to Match Other CARB Regulations

Staff are proposing changes to the non-compliance and penalty provisions to specify additional situations in which CARB retains the authority to assess penalties. These situations include submittal of inaccurate data, submittal of false statements and representations, and/or general failure to comply with the requirements of the TRU Regulation. The economic analysis assumes full compliance with the Proposed Amendments. The total cost does not reflect penalties paid for non-compliance. Therefore, these changes are expected to result in minimal or no impacts to the total estimated cost of the Proposed Amendments.

H. Update Facility Reporting Requirements

Staff are proposing changes to the facility reporting requirements in response to stakeholder comments to allow alternative information to be reported to CARB. The proposed changes would allow facility owners or owner/operators to report alternative information to CARB that they collect as part of the normal business practice and would lessen the burden to comply with the facility reporting requirements. The facility reporting requirements are largely administrative in nature. Therefore, these changes are expected to result in minimal or no impacts to the total estimated cost of the Proposed Amendments.

I. Add Severability Clause to Fee Requirements

Staff are proposing to add language to establish that if any of the fee provisions in section 2477.21 are deemed invalid, unconstitutional, or unenforceable, the Executive Officer shall continue to assess and collect payments from unaffected parties and the remainder of the TRU Regulation shall continue to be in effect. The new language will ensure that a successful legal challenge to any one particular fee provision will not necessarily void the remaining fee provisions or the remainder of the TRU Regulation. Therefore, these changes are expected to result in minimal or no impacts to the total estimated cost of the Proposed Amendments.

II. Updated Economic Analysis

As a result of the 15-day changes, the total net cost of the Proposed Amendments from 2022 to 2034 is estimated to be \$850.2 million compared to \$1.04 billion in the ISOR. Table 1 shows the total costs and cost savings for each cost category for the original proposal as presented in the ISOR compared to the updated cost as a result of the 15-day changes. Direct costs include capital costs for zero-emission truck TRUs and supporting infrastructure, new TRUs equipped with engines certified to meet the PM standard, lower-global warming potential refrigerant, TRU refrigerant maintenance

costs, truck TRU infrastructure maintenance costs, electricity usage, CARB fees, and administrative costs for registration and reporting. Cost savings include truck TRU capital costs, truck TRU maintenance cost savings, and truck TRU diesel fuel savings. The cost analysis does not include LCFS credit revenue or incentive funding. The actual cost of the Proposed Amendments may be lower if TRU owners take advantage of LCFS credits or incentive funding programs.

Table 1. Total Costs and Cost Savings for the Original Proposal (ISOR) Compared to the Proposed 15-Day Changes from 2022 to 2034 (2019\$)

Cost Category	Original Proposal (ISOR)	Proposed 15-Day Changes
TRU Capital Costs	\$886,200,000	\$575,000,000
Refrigerant Capital Costs	\$29,700,000	\$27,100,000
TRU Maintenance Costs	(-\$3,700,000)	(-\$6,700,000)
Diesel Fuel Costs	(-\$109,900,000)	(-\$118,400,000)
Electricity Costs	\$189,800,000	\$202,700,000
LCFS Credit Revenue	(-\$114,900,000)	\$0
Infrastructure Capital Costs	\$49,100,000	\$67,400,000
Infrastructure Maintenance Costs	\$12,300,000	\$13,200,000
Administrative Costs	\$101,700,000	\$90,000,000
Total	\$1,040,300,000	\$850,200,000

Note: totals may not add up due to rounding

A. Cost Inputs

1. Updated New Sales Populations

Staff updated the new sales populations to reflect that new sales populations in the Proposed Amendments would be lower than in the baseline. All estimates for annual TRU populations and new sales used to calculate the total cost of the Proposed Amendments are from the statewide TRU emission inventory. The data sources and methodology used in the statewide TRU emission inventory are described in Appendix H to the ISOR: 2021 Update to Emissions Inventory for Transport Refrigeration Units. The new sales populations in Table 2 and Table 3 update the data originally presented in Appendix H to the ISOR: Data - Emission Inventory Programming and Inputs.

Table 2. Annual Zero-Emission Truck TRU Populations from 2022 to 2034

Year	New Zero-Emission Truck TRU Sales Population	Total Zero-Emission Truck TRU Population
2022	0	0
2023	1,168	1,168
2024	1,125	2,293
2025	1,161	3,454
2026	1,197	4,651
2027	1,235	5,886
2028	1,520	7,406
2029	1,280	7,995
2030	1,194	8,122
2031	814	8,252
2032	898	8,384
2033	1,002	8,519
2034	1,125	8,655

Table 3. Annual Trailer TRU, Domestic Shipping Container TRU, Railcar TRU, and TRU Generator Set New Sales Populations that Would Need to Take Compliance Action to Meet the PM Emission Standard from 2022 to 2034

Year	Trailer TRUs	Domestic Shipping Container TRUs	Railcar TRUs	TRU Generator Sets	Total
2022	0	0	0	0	0
2023	15,987	37	341	2,595	18,960
2024	15,206	40	366	2,344	17,955
2025	13,450	43	387	1,777	15,657
2026	15,594	66	599	2,707	18,965
2027	16,489	113	1,031	3,965	21,599
2028	29,073	121	1,101	8,715	39,010
2029	17,557	83	752	4,053	22,445
2030	17,265	65	594	3,654	21,578
2031	11,341	51	462	1,606	13,460
2032	12,613	51	463	1,717	14,843
2033	14,379	54	488	1,965	16,886
2034	16,267	60	550	2,312	19,189
Total	195,221	784	7,134	37,410	240,547

B. Total Direct Costs and Cost Savings

Table 4. Total Direct Costs of the Proposed Amendments from 2022 to 2034 (2019\$)

Year	TRU Capital Costs	TRU Maintenance Costs	Infrastructure Capital Costs	Infrastructure Maintenance Costs	Truck TRU Electricity Costs	Administrative Costs	Total
2022	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$21,400,000	\$900,000	\$1,300,000	\$0	\$0	\$11,200,000	\$34,800,000
2024	\$41,800,000	\$1,400,000	\$2,600,000	\$400,000	\$5,800,000	\$4,300,000	\$56,300,000
2025	\$60,700,000	\$1,700,000	\$4,000,000	\$600,000	\$8,700,000	\$4,300,000	\$80,000,000
2026	\$81,700,000	\$2,200,000	\$5,400,000	\$800,000	\$11,800,000	\$11,200,000	\$113,100,000
2027	\$105,700,000	\$2,600,000	\$6,800,000	\$1,000,000	\$15,000,000	\$6,000,000	\$137,100,000
2028	\$121,000,000	\$3,400,000	\$7,200,000	\$1,200,000	\$18,200,000	\$6,800,000	\$157,800,000
2029	\$124,200,000	\$3,900,000	\$7,400,000	\$1,400,000	\$21,000,000	\$8,300,000	\$166,200,000
2030	\$127,600,000	\$3,900,000	\$7,400,000	\$1,500,000	\$23,300,000	\$7,000,000	\$170,700,000
2031	\$53,300,000	\$4,000,000	\$7,000,000	\$1,500,000	\$24,200,000	\$7,500,000	\$97,500,000
2032	\$36,200,000	\$4,000,000	\$6,600,000	\$1,600,000	\$24,500,000	\$7,600,000	\$80,500,000
2033	\$30,800,000	\$4,100,000	\$6,000,000	\$1,600,000	\$24,900,000	\$7,500,000	\$74,900,000
2034	\$28,500,000	\$4,200,000	\$5,800,000	\$1,600,000	\$25,300,000	\$8,200,000	\$73,600,000
Total	\$832,900,000	\$36,300,000	\$67,500,000	\$13,200,000	\$202,700,000	\$89,900,000	\$1,242,500,000

Table 5. Total Direct Costs of the Proposed Amendments from 2022 to 2034 (2019\$)

Year	Total Capital Costs	TRU Capital Cost Savings	Truck TRU Diesel Fuel Cost Savings	Truck TRU Maintenance Cost Savings	Total Cost Savings	Total
2022	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$34,800,000	\$0	\$0	\$0	\$0	\$34,800,000
2024	\$56,300,000	\$0	(-\$1,400,000)	(-\$4,000,000)	(-\$5,400,000)	\$50,900,000
2025	\$80,000,000	\$0	(-\$2,000,000)	(-\$5,900,000)	(-\$7,900,000)	\$72,100,000
2026	\$113,100,000	\$0	(-\$2,600,000)	(-\$7,700,000)	(-\$10,300,000)	\$102,800,000
2027	\$137,100,000	\$0	(-\$3,300,000)	(-\$9,400,000)	(-\$12,700,000)	\$124,400,000
2028	\$157,800,000	\$0	(-\$3,900,000)	(-\$11,000,000)	(-\$14,900,000)	\$142,900,000
2029	\$166,200,000	\$0	(-\$4,500,000)	(-\$12,200,000)	(-\$16,700,000)	\$149,500,000
2030	\$170,700,000	\$0	(-\$4,900,000)	(-\$13,100,000)	(-\$18,000,000)	\$152,700,000
2031	\$97,500,000	\$0	(-\$5,000,000)	(-\$13,200,000)	(-\$18,200,000)	\$79,300,000
2032	\$80,500,000	(-\$41,000,000)	(-\$5,100,000)	(-\$13,600,000)	(-\$59,700,000)	\$20,800,000
2033	\$74,900,000	(-\$78,900,000)	(-\$5,100,000)	(-\$14,000,000)	(-\$98,000,000)	(\$23,100,000)
2034	\$73,600,000	(-\$111,000,000)	(-\$5,200,000)	(-\$14,300,000)	(-\$130,500,000)	(\$56,900,000)
Total	\$1,242,500,000	(-\$230,900,000)	(-\$43,000,000)	(-\$118,400,000)	(-\$392,300,000)	\$850,200,000

C. Direct Costs on Individuals

As stated in the ISOR, the Proposed Amendments will not result in any direct costs on individuals. However, staff anticipate the Proposed Amendments will result in indirect costs to individuals to the extent that affected businesses pass compliance costs through to consumers of temperature-controlled products. Assuming the total net costs of the Proposed Amendments are fully passed through to consumers, Table 6 shows the total impact of the Proposed Amendments from 2022 to 2034 is \$64.06 per California household with a yearly average of \$4.93.

Table 6. Cost of the Proposed Amendments per California Household from 2022 to 2034 (2019\$)

Year	Annual Net Cost of the Proposed Amendments	Cost per Household
2022	\$0	\$0.00
2023	\$34,800,000	\$2.62
2024	\$50,900,000	\$3.83
2025	\$72,100,000	\$5.43
2026	\$102,800,000	\$7.75
2027	\$124,400,000	\$9.37
2028	\$142,900,000	\$10.77
2029	\$149,500,000	\$11.26
2030	\$152,700,000	\$11.50
2031	\$79,300,000	\$5.97
2032	\$20,800,000	\$1.57
2033	(-\$23,100,000)	(-\$1.74)
2034	(-\$56,900,000)	(-\$4.29)
Total	\$850,200,000	\$64.06

D. Fiscal Impacts

The following section describes costs and benefits that would be incurred by local, State, and Federal government agencies due to the proposed 15-day changes. The cost methodology used is the same as described in the ISOR.

1. Local Government

From 2022 to 2034, Table 7 shows the cost to local governments due to the Proposed Amendments is estimated to be \$3.96 million, resulting from TRUs and applicable facilities owned by local governments. Local governments would also see a direct increase in utility user and local sales tax revenue of \$26.7 million and a decrease in diesel fuel tax revenue of \$5.3 million. Table 8 shows the total fiscal impact on local governments from 2022 to 2034, which is estimated to be -\$17.5 million.

Table 7. Total Direct Equipment and Infrastructure-Related Costs to Local Government from 2022 to 2034 (2019\$)

Year	TRU Capital Costs	TRU Maintenance Costs	Truck TRU Infrastructure Capital Costs	Truck TRU Infrastructure Maintenance Costs	Diesel Fuel Costs	Electricity Costs	Administrative Costs	Total
2022	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$28,000	\$1,000	\$34,000	\$0	\$0	\$0	\$16,000	\$79,000
2024	\$55,000	\$0	\$67,000	\$11,000	(-\$5,000)	\$8,000	\$81,000	\$217,000
2025	\$80,000	\$0	\$101,000	\$16,000	(-\$8,000)	\$12,000	\$82,000	\$283,000
2026	\$108,000	(-\$1,000)	\$135,000	\$21,000	(-\$10,000)	\$16,000	\$94,000	\$363,000
2027	\$140,000	(-\$1,000)	\$171,000	\$26,000	(-\$12,000)	\$20,000	\$87,000	\$431,000
2028	\$160,000	(-\$1,000)	\$182,000	\$31,000	(-\$15,000)	\$24,000	\$89,000	\$470,000
2029	\$164,000	(-\$1,000)	\$186,000	\$35,000	(-\$16,000)	\$28,000	\$94,000	\$490,000
2030	\$169,000	(-\$1,000)	\$187,000	\$38,000	(-\$17,000)	\$31,000	\$92,000	\$499,000
2031	\$71,000	(-\$1,000)	\$176,000	\$39,000	(-\$18,000)	\$32,000	\$94,000	\$393,000
2032	(-\$6,000)	(-\$1,000)	\$166,000	\$39,000	(-\$18,000)	\$32,000	\$97,000	\$309,000
2033	(-\$64,000)	(-\$1,000)	\$151,000	\$40,000	(-\$19,000)	\$33,000	\$97,000	\$237,000
2034	(-\$109,000)	(-\$1,000)	\$147,000	\$40,000	(-\$19,000)	\$33,000	\$99,000	\$190,000
Total	\$796,000	(-\$8,000)	\$1,703,000	\$336,000	(-\$157,000)	\$269,000	\$1,022,000	\$3,961,000

Table 8. Estimated Fiscal Impact on Local Government from 2022 to 2034 (2019\$)

Year	TRU and Applicable Facility Owner Costs	Utility User Tax Revenue	Local Diesel Fuel Sales Tax	Local Sales Tax	Total
2022	\$0	\$0	\$0	\$0	\$0
2023	\$79,000	\$0	\$0	(-\$2,335,000)	(-\$2,256,000)
2024	\$217,000	(-\$198,000)	\$181,000	(-\$2,211,000)	(-\$2,011,000)
2025	\$283,000	(-\$298,000)	\$261,000	(-\$2,258,000)	(-\$2,012,000)
2026	\$363,000	(-\$402,000)	\$343,000	(-\$2,330,000)	(-\$2,026,000)
2027	\$431,000	(-\$510,000)	\$419,000	(-\$2,681,000)	(-\$2,341,000)
2028	\$470,000	(-\$619,000)	\$492,000	(-\$3,244,000)	(-\$2,901,000)
2029	\$490,000	(-\$717,000)	\$545,000	(-\$2,457,000)	(-\$2,139,000)
2030	\$499,000	(-\$796,000)	\$584,000	(-\$2,257,000)	(-\$1,970,000)
2031	\$393,000	(-\$824,000)	\$591,000	\$1,114,000	\$1,274,000
2032	\$309,000	(-\$836,000)	\$605,000	\$50,000	\$128,000
2033	\$237,000	(-\$848,000)	\$625,000	(-\$535,000)	(-\$521,000)
2034	\$190,000	(-\$863,000)	\$640,000	(-\$648,000)	(-\$681,000)
Total	\$3,961,000	(-\$6,911,000)	\$5,286,000	(-\$19,792,000)	(-\$17,456,000)

2. State Government

From 2022 to 2034, the cost to State government due to the Proposed Amendments is estimated to be \$1.1 million, resulting from TRUs and applicable facilities owned by State government (see Table 9); and approximately \$38.8 million in costs to CARB. State government will also see a direct increase in revenue from Energy Resources Fees, TRU operating fees, applicable facility registration fees, and State sales tax of \$67.1 million, as well as a decrease in diesel fuel tax revenue of \$24.3 million. Table 10 shows the total fiscal impact to State government agencies from 2022 to 2034, which is estimated to be \$3 million.

Table 9. Total Direct Equipment and Infrastructure-Related Cost to State Government from 2022 to 2034 (2019\$)

Year	TRU Capital Costs	TRU Maintenance Costs	Truck TRU Infrastructure Capital Costs	Truck TRU Infrastructure Maintenance Costs	Diesel Fuel Costs	Electricity Costs	Administrative Costs	Total
2022	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$17,000	\$1,000	\$8,000	\$0	\$0	\$0	\$8,000	\$34,000
2024	\$33,000	\$0	\$16,000	\$3,000	(\$3,000)	\$5,000	\$2,000	\$56,000
2025	\$48,000	\$0	\$24,000	\$4,000	(\$5,000)	\$7,000	\$2,000	\$80,000
2026	\$65,000	\$0	\$32,000	\$5,000	(\$6,000)	\$9,000	\$7,000	\$112,000
2027	\$84,000	(\$1,000)	\$41,000	\$6,000	(\$7,000)	\$12,000	\$3,000	\$138,000
2028	\$96,000	\$0	\$44,000	\$7,000	(\$9,000)	\$14,000	\$3,000	\$155,000
2029	\$99,000	(\$1,000)	\$45,000	\$8,000	(\$10,000)	\$17,000	\$4,000	\$162,000
2030	\$102,000	(\$1,000)	\$45,000	\$9,000	(\$10,000)	\$19,000	\$4,000	\$168,000
2031	\$42,000	(\$1,000)	\$42,000	\$9,000	(\$11,000)	\$19,000	\$4,000	\$104,000
2032	(\$4,000)	(\$1,000)	\$40,000	\$9,000	(\$11,000)	\$20,000	\$4,000	\$57,000
2033	(\$38,000)	(\$1,000)	\$36,000	\$10,000	(\$11,000)	\$20,000	\$4,000	\$20,000
2034	(\$66,000)	(\$1,000)	\$35,000	\$10,000	(\$11,000)	\$20,000	\$4,000	(\$9,000)
Total	\$478,000	(\$6,000)	\$408,000	\$80,000	(\$94,000)	\$162,000	\$49,000	\$1,077,000

Table 10. Estimated Fiscal Impact to State Government from 2022 to 2034 (2019\$)

Year	Costs to CARB	TRU and Facility Owner Costs	State Diesel Fuel Sales Tax	Energy Resources Fee	TRU Operating Fee and Applicable Facility Registration Fee	State Sales Tax	Total
2022	\$596,000	\$0	\$0	\$0	\$0	\$0	\$596,000
2023	\$2,236,000	\$33,000	\$0	\$0	(-\$9,542,000)	(-\$1,984,000)	(-\$9,257,000)
2024	\$3,275,000	\$55,000	\$783,000	(-\$9,000)	(-\$1,139,000)	(-\$1,879,000)	\$1,086,000
2025	\$3,268,000	\$80,000	\$1,146,000	(-\$14,000)	(-\$1,006,000)	(-\$1,918,000)	\$1,556,000
2026	\$3,268,000	\$112,000	\$1,510,000	(-\$18,000)	(-\$7,872,000)	(-\$1,980,000)	(-\$4,980,000)
2027	\$3,268,000	\$138,000	\$1,880,000	(-\$23,000)	(-\$2,425,000)	(-\$2,278,000)	\$560,000
2028	\$3,268,000	\$156,000	\$2,232,000	(-\$27,000)	(-\$3,372,000)	(-\$2,756,000)	(-\$499,000)
2029	\$3,268,000	\$163,000	\$2,528,000	(-\$31,000)	(-\$4,761,000)	(-\$2,088,000)	(-\$921,000)
2030	\$3,268,000	\$167,000	\$2,746,000	(-\$33,000)	(-\$3,575,000)	(-\$1,918,000)	\$655,000
2031	\$3,268,000	\$106,000	\$2,789,000	(-\$34,000)	(-\$4,005,000)	\$947,000	\$3,071,000
2032	\$3,268,000	\$57,000	\$2,837,000	(-\$35,000)	(-\$4,028,000)	\$43,000	\$2,142,000
2033	\$3,268,000	\$19,000	\$2,891,000	(-\$35,000)	(-\$3,858,000)	(-\$455,000)	\$1,830,000
2034	\$3,268,000	(-\$9,000)	\$2,941,000	(-\$36,000)	(-\$4,418,000)	(-\$551,000)	\$1,195,000
Total	\$38,787,000	\$1,077,000	\$24,283,000	(-\$295,000)	(-\$50,001,000)	(-\$16,817,000)	(-\$2,966,000)

3. Federal Government

From 2022 to 2034, Table 11 shows the cost to the Federal government due to the Proposed Amendments is estimated to be \$131,300, resulting from TRUs and applicable facilities owned by the Federal government.

Table 11. Total Direct Equipment and Infrastructure-Related Costs to Federal Government from 2022 to 2034 (2019\$)

Year	TRU Capital Costs	TRU Maintenance Costs	Infrastructure Capital Costs	Infrastructure Maintenance Costs	Diesel Fuel Costs	Electricity Costs	Administrative Costs	Total
2022	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$800	\$0	\$1,400	\$0	\$0	\$0	\$1,200	\$3,400
2024	\$1,500	\$0	\$2,700	\$400	(-\$100)	\$200	\$1,900	\$6,600
2025	\$2,200	\$0	\$4,000	\$600	(-\$200)	\$300	\$1,900	\$8,800
2026	\$3,000	\$0	\$5,400	\$800	(-\$300)	\$400	\$2,500	\$11,800
2027	\$3,800	\$0	\$6,900	\$1,000	(-\$300)	\$500	\$1,900	\$13,800
2028	\$4,400	\$0	\$7,300	\$1,200	(-\$400)	\$700	\$2,000	\$15,200
2029	\$4,500	\$0	\$7,400	\$1,400	(-\$400)	\$800	\$2,600	\$16,300
2030	\$4,600	\$0	\$7,500	\$1,500	(-\$500)	\$800	\$2,000	\$15,900
2031	\$1,900	\$0	\$7,000	\$1,500	(-\$500)	\$900	\$2,100	\$12,900
2032	(-\$200)	\$0	\$6,600	\$1,600	(-\$500)	\$900	\$2,700	\$11,100
2033	(-\$1,700)	\$0	\$6,000	\$1,600	(-\$500)	\$900	\$2,100	\$8,400
2034	(-\$3,000)	\$0	\$5,900	\$1,600	(-\$500)	\$900	\$2,200	\$7,100
Total	\$21,800	\$0	\$68,100	\$13,200	(-\$4,200)	\$7,300	\$25,100	\$131,300

III. Updated Macroeconomic Impacts

A. Updates since the ISOR

This section describes the estimated impact of the Proposed Amendments on the California economy. The methodology for translating the direct costs into the macroeconomic model is the same in the Standardized Regulatory Impact Assessment and the ISOR. However, since the ISOR, there have been updates to the Regional Economic Models, Inc. (REMI) Policy Insight Plus model version number and the California Department of Finance forecasts used to adjust the baseline used in the REMI model.

Since the ISOR, REMI has released a new model version and this analysis uses Version 2.5.0. REMI is a structural economic forecasting and policy analysis model that integrates input-output, computable general equilibrium, and econometric and economic geography methodologies. REMI Policy Insight Plus provides year-by-year estimates of the Proposed Amendments, pursuant to the requirements of Senate Bill 617 and the California Department of Finance.

Since the ISOR, the California Department of Finance has updated its economic and demographic forecast. The REMI model's National and Regional Control was updated to conform to the most recent California Department of Finance economic forecasts which include U.S. Real Gross Domestic Product, income, and employment, as well as California population and civilian employment by industry, released with the May Revision budget on May 14, 2021.^{2,3,4,5} After the California Department of Finance forecasts end in 2024, CARB staff made assumptions that post-2024, economic variables would continue to grow at the same rate projected in the REMI baseline forecasts.

B. Results of the Assessment

The results from the REMI model provide estimates of the impact of the Proposed Amendments on the California economy. These results represent the annual incremental change from the implementation of the Proposed Amendments relative to the baseline. The California economy is anticipated to grow through 2034, therefore, negative impacts reported here should be interpreted as a slowing of growth and

² California Department of Finance. Economic Research Unit. National Economic Forecast – Annual & Quarterly. Sacramento: California. April 2021.

³ California Department of Finance. Economic Research Unit. California Economic Forecast – Annual & Quarterly. Sacramento: California. April 2021.

⁴ California Department of Finance. Economic Research Unit. National Deflators: Calendar Year averages: from 1929, April 2021. Sacramento: California. April 2021.

⁵ California Department of Finance. Demographic Research Unit. Report P-3: Population Projections, California, 2010-2060 (Baseline 2019 Population Projections; Vintage 2020 Release). Sacramento: California. April 2021.

positive impacts as an acceleration of growth resulting from the Proposed Amendments.

1. California Employment Impacts

Table 12 presents the impacts of the Proposed Amendments on total employment in California and for the primary and secondary industries impacted by the Proposed Amendments, for the odd years of the analysis. The statewide employment impacts of the Proposed Amendments are anticipated to be slightly positive in 2023 and 2024, corresponding with demand for TRU equipment and infrastructure needed to support operation of battery-electric truck TRUs from in-state fleets. From 2025 through 2033, the employment impacts are estimated to be negative as the overall costs of the Proposed Amendments offset the positive impacts of additional in-state demand. The changes in statewide employment represent, at most, a 0.01 percent change relative to baseline California employment.

The overall trend in employment changes by major sector are illustrated in Figure 1. The major sectors that are estimated to have increased demand or direct increases to employment such as the retail and wholesale sector and the government sector are estimated to have increases in employment in the early years of the assessment. From 2027 through 2032, all major sectors are anticipated to have decreases in employment relative to the baseline. In 2034 there is anticipated to be an overall increase in overall employment growth as there would be fewer costs to truck transportation relative to the baseline in that year specifically.

Industries that are estimated to have net costs, decreases in demand, or revenue loss are anticipated to have decreases in employment growth. This includes the various transportation sectors that operate TRU equipment, warehousing, retail, and petroleum and coal products manufacturing. The wholesale trade industry includes both the suppliers of TRU equipment (the refrigeration equipment and supplies merchant wholesalers' industry) and some of the applicable grocery store and supercenters that would face costs under the Proposed Amendments. Cumulatively, this industry is estimated to have positive employment impacts from 2023 through 2029, followed by a slight decline in employment growth.

Industries that are estimated to have increased demand may see employment growth. In particular, the electric power and generation industry is estimated to see slight increases in employment growth in the latter years of the analysis associated with increased demand for electricity from truck TRUs.

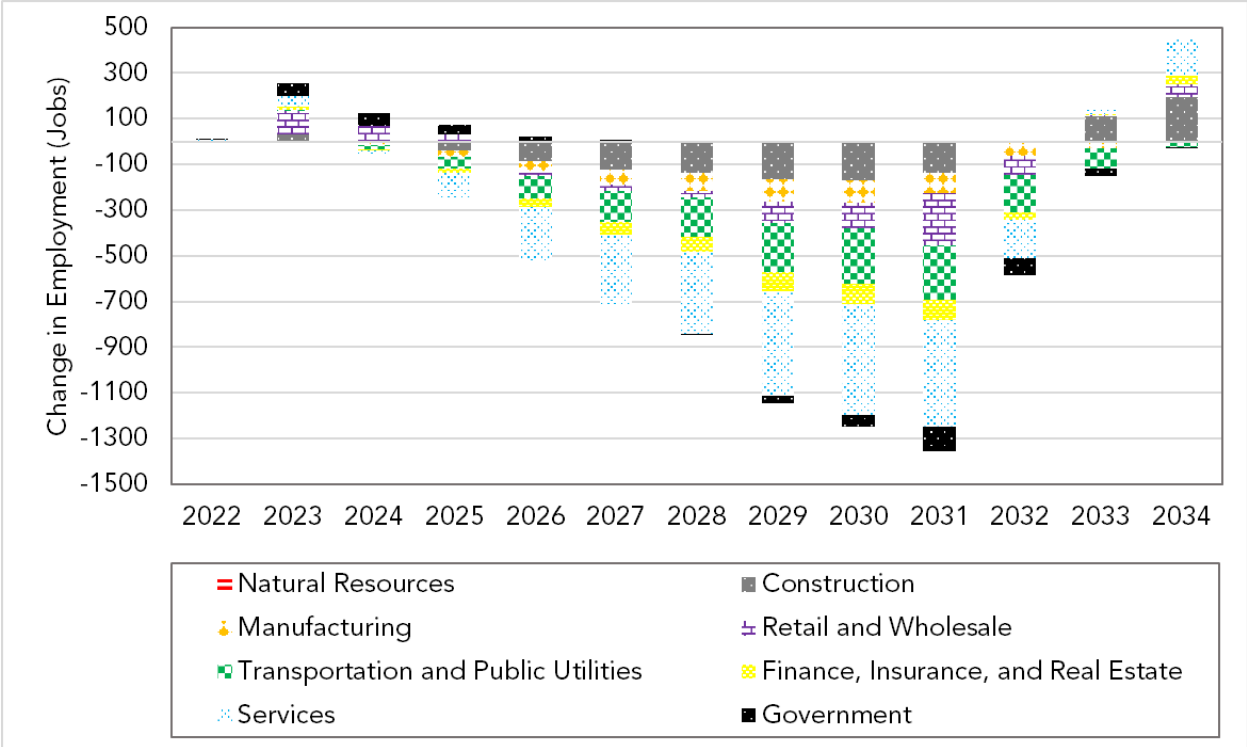
Table 12. Summary of Employment Impacts Associated with the Proposed Amendments

Industry	Units	2023	2025	2027	2029	2031	2033
CA statewide	Total employment (millions)	24.9	25.4	25.5	25.5	25.5	25.6
CA statewide	Percent change	0.00%	0.00%	0.00%	-0.01%	-0.01%	0.00%
CA statewide	Change in jobs	270	-190	-730	-1,150	-1,360	-10
Truck transportation	Percent change	0.00%	-0.02%	-0.04%	-0.05%	-0.06%	-0.03%
Truck transportation	Change in jobs	-10	-50	-100	-140	-140	-80
Water transportation	Percent change	-0.02%	-0.04%	-0.08%	-0.14%	-0.13%	-0.01%
Water transportation	Change in jobs	0	0	-10	-10	-10	0
Rail transportation	Percent change	0.00%	-0.01%	-0.03%	-0.06%	-0.07%	-0.04%
Rail transportation	Change in jobs	0	0	0	-10	-10	0
Scenic and sightseeing trans. and support activities for trans.	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.02%	0.00%
Scenic and sightseeing trans. and support activities for trans.	Change in jobs	0	0	-10	-20	-20	0
Warehousing and storage	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	-0.01%
Warehousing and storage	Change in jobs	0	0	-10	-20	-20	-10
Retail trade	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.00%
Retail trade	Change in jobs	-10	-60	-120	-150	-120	0
Wholesale trade	Percent change	0.02%	0.01%	0.01%	0.01%	-0.02%	0.00%

Industry	Units	2023	2025	2027	2029	2031	2033
Wholesale trade	Change in jobs	120	90	90	60	-110	0
Petroleum and coal products mfg.	Percent change	0.00%	-0.01%	-0.01%	-0.02%	-0.02%	-0.01%
Petroleum and coal products mfg.	Change in jobs	0	0	0	0	0	0
Electric power gen. and dist.	Percent change	0.00%	0.01%	0.02%	0.03%	0.03%	0.04%
Electric power gen. and dist.	Change in jobs	0	10	10	10	10	10
Construction	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.01%
Construction	Change in jobs	30	-40	-120	-160	-130	110
Other electrical equipment and component mfg.	Percent change	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
Other electrical equipment and component mfg.	Change in jobs	0	0	0	0	0	0
Office administrative services; Facilities support services	Percent change	0.00%	0.02%	0.01%	0.01%	0.01%	0.02%
Office administrative services; Facilities support services	Change in jobs	0	20	20	10	10	20
State government	Percent change	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%
State government	Change in jobs	30	30	20	0	-30	-10

Industry	Units	2023	2025	2027	2029	2031	2033
Local government	Percent change	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Local government	Change in jobs	30	10	-10	-40	-80	-30

Figure 1. Changes in Employment by Major Sector



2. California Business Impacts

Gross output is used as a measure for business impacts because it represents an industry’s sales or receipts and tracks the quantity of freight or services produced in a given time period. Output is the sum of output for each private industry, State, and local government as it contributes to the State’s gross domestic product and is affected by production cost and demand changes. As production costs increase or demand decreases, output is expected to contract, but as production costs decline or demand increases, industries would likely experience growth.

The Proposed Amendments are estimated to result in an increase in statewide output in 2023 and 2024. From 2025 to 2033, the Proposed Amendments are estimated to lead to a slight decrease in statewide output. The changes in statewide output are no larger than 0.01 percent of baseline levels.

Table 13 presents the output impacts by major sector associated with the Proposed Amendments for the odd years of the analysis. Figure 2 illustrates the impacts to output by major sector. Like the employment impacts, sectors and industries that are

anticipated to face production cost increases, decreases in demand, or decreased revenue are anticipated to have corresponding decreases in output, while industries that are anticipated to see increases in demand are estimated to have increases in output.

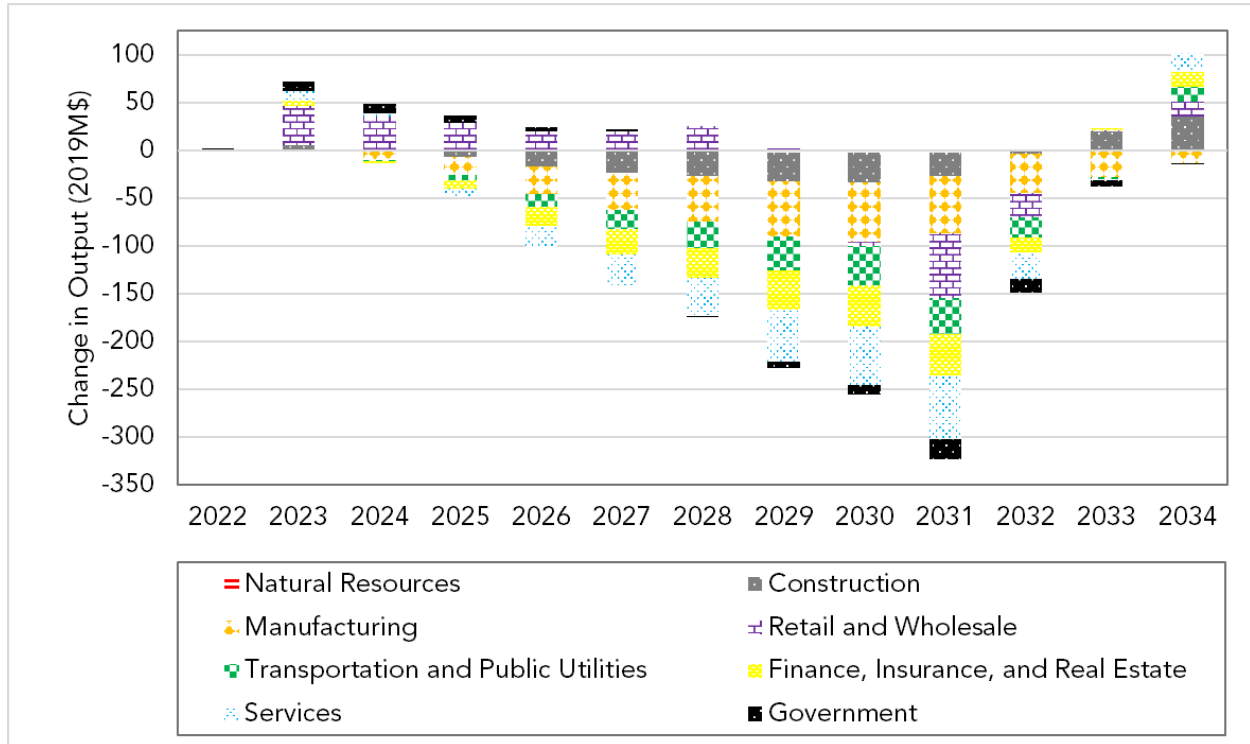
Table 13. Summary of Output Impacts Associated with the Proposed Amendments

Industry	Units	2023	2025	2027	2029	2031	2033
CA statewide	Total output (2019B\$)	5,341	5,582	5,710	5,855	5,991	6,156
CA statewide	Percent change	0.00%	0.00%	0.00%	-0.01%	-0.01%	0.00%
CA statewide	Change (2019M\$)	74	-16	-125	-227	-324	-15
Truck transportation	Percent change	0.00%	-0.02%	-0.04%	-0.05%	-0.06%	-0.03%
Truck transportation	Change (2019M\$)	-2	-9	-20	-29	-31	-18
Water transportation	Percent change	-0.01%	-0.02%	-0.06%	-0.13%	-0.13%	-0.01%
Water transportation	Change (2019M\$)	-1	-2	-4	-8	-7	-1
Rail transportation	Percent change	0.00%	-0.01%	-0.03%	-0.06%	-0.07%	-0.04%
Rail transportation	Change (2019M\$)	0	0	-1	-2	-3	-2
Scenic and sightseeing trans. and support activities for trans.	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.02%	0.00%
Scenic and sightseeing trans. and support activities for trans.	Change (2019M\$)	0	-1	-3	-5	-5	-1
Warehousing and storage	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	-0.01%
Warehousing and storage	Change (2019M\$)	0	0	-1	-2	-3	-1
Retail trade	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.00%
Retail trade	Change (2019M\$)	-1	-9	-17	-23	-19	0

Industry	Units	2023	2025	2027	2029	2031	2033
Wholesale trade	Percent change	0.02%	0.01%	0.01%	0.01%	-0.02%	0.00%
Wholesale trade	Change (2019M\$)	45	37	37	26	-50	2
Petroleum and coal products mfg.	Percent change	0.00%	-0.01%	-0.01%	-0.02%	-0.02%	-0.01%
Petroleum and coal products mfg.	Change (2019M\$)	0	-6	-11	-16	-17	-13
Electric power gen. and dist.	Percent change	0.00%	0.01%	0.02%	0.03%	0.03%	0.04%
Electric power gen. and dist.	Change (2019M\$)	0	6	10	14	16	19
Construction	Percent change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.01%
Construction	Change (2019M\$)	5	-7	-22	-30	-25	20
Other electrical equipment and component mfg.	Percent change	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
Other electrical equipment and component mfg.	Change (2019M\$)	0	0	0	0	0	0
Office administrative services; Facilities support services	Percent change	0.00%	0.02%	0.01%	0.01%	0.01%	0.02%
Office administrative services; Facilities support services	Change (2019M\$)	0	3	2	2	2	3
State and local government	Percent change	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Industry	Units	2023	2025	2027	2029	2031	2033
State and local government	Change (2019M\$)	10	7	1	-6	-21	-7

Figure 2. Summary of Output Impacts Associated with the Proposed Amendments



3. Impacts on Investments in California

Private domestic investment consists of purchases of residential and nonresidential structures and of equipment and software by private businesses and nonprofit institutions. It is used as a proxy for impacts on investments in California because it provides an indicator of the future productive capacity of the economy.

The changes in private domestic investment for the Proposed Amendments, relative to the baseline, are shown in Table 14 and show a decrease as large as \$50 million in 2029. In any given year this represents changes of less than 0.01 percent of baseline investment.

Table 14. Changes in Gross Domestic Private Investment

Units	2023	2025	2027	2029	2031	2033
Private Investment (2019B\$)	467	500	511	523	534	549
Percent Change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.00%
Change (2019M\$)	0	-16	-38	-50	-41	21

4. Impacts on Individuals in California

As modeled, the Proposed Amendments do not impose direct costs on individuals in California. However, the costs incurred by affected businesses and the public sector would cascade through the economy and affect individuals. One measure of the statewide impact is the change in real personal income.

Table 15 shows the annual change in real personal income across all individuals in California for the odd years of the analysis. Total personal income decreases by \$3 million in 2023, then continues a downward trend, with a decrease of \$192 million in 2029. The change in personal income can also be divided by the California population to show the average or per capita impact on personal income. Personal income decreases by about \$5 per person in 2029, the year with the greatest impact.

Table 15. Change in Personal Income

Units	2023	2025	2027	2029	2031	2033
Personal Income (2019B\$)	2,777	2,913	3,002	3,100	3,225	3,320
Percent Change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.00%
Change (2019M\$)	-3	-64	-138	-192	-164	10
Per Capita Change (2019\$)	0	-2	-3	-5	-4	0

5. Impacts on Gross State Product (GSP)

Gross State Product (GSP) is the market value of all freight and services produced in California and is one of the primary indicators used to gauge the health of the economy. Table 16 shows the annual change in gross state product as estimated due to the Proposed Amendments for the odd years of the analysis. Under the Proposed Amendments, GSP is anticipated to increase slightly in 2023 and 2024. This primarily reflects the initial increase in demand for TRU equipment from instate TRU fleets. There is a slight decrease in GSP growth as the Proposed Amendments increase in costs over time. In 2031, GSP is estimated to \$177 million lower than baseline levels, a 0.01 percent decrease.

Table 16. Change in Gross State Product

Units	2023	2025	2027	2029	2031	2033
Gross State Product (2019B\$)	3,178	3,325	3,410	3,512	3,616	3,735
Percent Change	0.00%	0.00%	0.00%	0.00%	-0.01%	0.00%
Change (2019M\$)	45	-5	-63	-119	-177	2

6. Summary of Agency Interpretation of the Assessment Results

As modeled, CARB estimates the Proposed Amendments are unlikely to have a significant impact on the California economy, as overall, the change in the growth of jobs, GSP, and output is projected to not exceed 0.01 percent of the baseline. Table 17 summarizes the major economic indicators in California for the odd years of the analysis.

Table 17. Summary of Macroeconomic Impacts of the Proposed Amendments

Economic Indicator	Units	2023	2025	2027	2029	2031	2033
GSP	Percent Change	0.00%	0.00%	0.00%	0.00%	-0.01%	0.00%
GSP	Change (2019M\$)	45	-5	-63	-119	-177	2
Personal Income	Percent Change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.00%
Personal Income	Change (2019M\$)	-3	-64	-138	-192	-164	10
Employment	Percent Change	0.00%	0.00%	0.00%	-0.01%	-0.01%	0.00%
Employment	Change (jobs)	270	-190	-730	-1,150	-1,360	-10
Output	Percent Change	0.00%	0.00%	0.00%	-0.01%	-0.01%	0.00%
Output	Change (2019M\$)	74	-16	-125	-227	-324	-15
Private Investment	Percent Change	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.00%
Private Investment	Change (2019M\$)	0	-16	-38	-50	-41	21