

## SUPPLEMENT TO THE HEAVY-DUTY VEHICLE WARRANTY SURVEY FINAL REPORT

CARB staff analyzed the survey data used to construct the Sacramento Institute for Social Research's (ISR) final report on heavy-duty vehicles in California, and staff corroborates the conclusions reached by ISR in that final report except for several refinements as noted in this supplement. Staff took into account these refinements when writing the Staff Report.<sup>1</sup> The full text of ISR's final report, "Survey and Analysis of Heavy-Duty Vehicle Warranties in California |15MSC009," dated December 17, 2017, is provided as Appendix H to CARB's Initial Statement of Reasons (ISOR or Staff Report), issued May 8, 2018, on staff's proposed heavy-duty vehicle warranty amendments.

- ISR's final report estimated the amount of lost revenue due to downtime as \$1,360,750. It is unclear from ISR's analysis whether this amount was applicable to all repairs or only those repairs not covered under warranty. Regardless, this amount was inconsistent with staff's analyses that determined lost revenue amounts of \$1,697,250 for all repairs and \$1,070,500 for only those repairs that occurred outside of warranty. This discrepancy is due, at least in part, to the tabulation of lost revenue reported in excess of \$10,000. For all of the other dollar ranges of lost revenue as described in ISR's final report, ISR and staff are in agreement. However, staff tabulated lost revenue exceeding \$10,000 to be \$856,500 vs. ISR's tabulation of \$520,000. Table III-3 on page III-21 of the Staff Report shows lost revenue apportioned by number of respondents. A more informative estimate would be to apportion lost revenue directly by costs, which are available in the survey data. According to staff's estimate, this would result in significantly higher costs from the "More than \$10,000" bin (i.e., 50 percent of total costs).
- ISR's final report estimated the cost of repairs resulting in vehicle downtime to be \$1,710,750. The final report indicated that this amount is representative of all repairs, and that the total amount for repairs performed outside of warranty is \$1,148,768. These amounts are inconsistent with the amounts for repairs determined under staff's analysis resulting in vehicle downtime of \$2,159,250 for total repair costs, and \$1,485,250 for non-warranted repair costs. The discrepancy is due to the ISR final report's tabulation of reported repair costs greater than \$20,000. For all the other dollar ranges of repair costs described in the final report, the determined amounts by both ISR and staff are in agreement. However, staff tabulated repair costs exceeding \$20,000 to be \$448,500 vs. ISR's determination of \$0. Accordingly, staff's analysis results in a per vehicle emissions-related repair cost of \$2,204 for non-warranted repairs vs. ISR's per vehicle cost of \$2,131 for non-warranted repairs regardless of emissions-relation.

The ISR final report also has an arithmetic error in calculating non-warranted repair costs. It calculated non-warranted repairs costs as the remainder of total repair costs after subtracting both fully warranted repair costs and partially warranted repair

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<sup>1</sup> CARB staff took into account the refinements described herein when writing the Staff Report. However, staff did not address the discrepancy on page III-20, of Chapter III, where the Staff Report cites a per vehicle repair cost of \$2,131 rather than the corrected \$2,204 based on staff's refined analysis, because \$2,131 is presented as a direct finding from the ISR report.

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costs. As such, ISR calculated partially warranted costs as 15 percent of total repair costs (i.e., 15 percent x \$1,710,750 = \$256,613), but the resulting amount indicated in the ISR final report is only \$202,724. This arithmetic error then propagated into ISR’s calculation of non-warranted repair costs (i.e., \$1,148,768).

Additionally, the ISR final report apportioned repair costs according to warranty coverage (i.e., “fully covered,” “partially covered,” “none,” and “unsure”) using the percentages of respondents in each category rather than the actual costs in each category. Approximating costs in this manner is unnecessary because the survey data already included repairs costs for each warranty category, and because it introduced error into the calculations.

- ISR’s final report did not differentiate between cost estimates that were emissions-related and those that applied to all repairs. However, the survey’s data enabled staff to make such a determination, specifically by tabulating responses pertaining to the frequency of repairs and then by separating out repairs involving emissions-related parts (e.g., diesel particulate filters vs. climate control parts, etc.). Staff performed this analysis, which lead to a determination that 80 percent of repairs reported by respondents involve emissions-related parts. Staff then adjusted the cost of repairs and lost revenue due to downtime by 80 percent to estimate the costs of only emissions-related repairs and lost revenue.

The portions of the Staff Report where staff’s conclusions differ from ISR’s are reflected on page ES-4 of the Executive Summary, and page I-4 of the Chapter I Introduction.

Tables C1, Lost Revenue from Downtime, and C2, Cost of Repairs Leading to Downtime, summarize the resulting differences between the ISR final report’s analysis and staff’s refined analysis of lost revenue and repair costs:

INVESTIGATOR/ ANALYST	TABLE C-1 LOST REVENUE FROM DOWNTIME			
	Total	Non-Warranted		
		All	Emissions-Related	
			Total	Per Vehicle (/539)
ISR Final Report	\$1,360,750	-	-	-
CARB Staff	\$1,697,250	\$1,070,500	\$856,500	\$1,589

INVESTIGATOR/ ANALYST	TABLE C-2 COST OF REPAIRS LEADING TO DOWNTIME			
	Total	Non-Warranted		
		All	Emissions-Related	
			Total	Per Vehicle (/539)
ISR Final Report	\$1,710,750	\$1,148,768	-	\$2,131
CARB Staff	\$2,159,250	\$1,485,250	\$1,188,200	\$2,204