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To:	Representative: Caddy McKeown, Co-Chair of The Joint Committee on Transportation
From:	Mazen Malik, Senior Economist, Legislative Revenue Office
CC:	Senator: Lee Beyer, Senator: Brian Boquist, Representative: Ron Noble
Date:	May 22, 2019
Subject:	Impacts on the Highway Fund by HB 2020

You Asked the following questions relating to HB 2020 and Transportation:

1. The impact of HB 2020 on the ability of ODOT to meet its obligation to the debt service on bonds being sold for the 2017 Transportation Package.
2. The impact of HB 2020 on the viability of the Highway Trust Fund out to 2055.
3. How might HB 2020 impact Cost Responsibility?
4. What modeling has been done on impact of increased fuel costs across sectors ie:
    a. Trucking
    b. Passenger
    c. Recreational Vehicle

1) HB 2020 could potentially reduce the revenue stream to the Highway Fund by as much as $18.5 billion by 2050. ODOT share of that reduction is about 55% of the totals shown in Table 2 and Table 4. The rest of the reductions impact the revenues of Cities and Counties. ODOT uses its share to service the outstanding debt of the agency. Current outstanding bonds are about $3.2 Billion. Those Bonds are expected to be fully paid by 2042. As the current debt is paid, it opens more capacity for the state and allows for the lower amounts of revenue to finance a bigger debt amount. HB 2017 authorizes two sets of bonds. $483 million for the projects specified in the bill, and another $450 for the Rose Quarter project. A third amount of bonds (not specified but) assumed to be approximately $250 million to finance the I-205 projects. According to the Division of Debt Management, the debt service for current outstanding bonds seem not to be jeopardized by the reduction to the highway

Fund (as it gets slowly paid off by 2042). Moreover, the two sets of bonds specified in HB 2017 will also be secured and not likely to push the capacity below the (critical) 3 times coverage except for one year (2035). However, the two scenarios of reductions to the Highway Fund (Table 2, and Table 4), will push the capacity snugly against that ceiling, and consequently limit the ability of issuing any more Highway user bonds. In other words, the unspecified amount of bonds for the Abernathy Bridge would likely not be issued under the new tight debt capacity ceiling. Furthermore, future bonding will also be curtailed until a replacement of the lost revenues are found. This could be new revenue in the form of higher registration fees, or Road Use Charge (RUC) (per mile charge). Until that replacement is found, it is difficult to see how the bonding prospects will not be significantly impacted.

2) The Cap and Trade program (in HB 2020) stated two distinct but connected goals. The first is to reduce CO^2 emissions in the state to 45% (below 1990 levels) by the 2035. The second is to extend that reduction to 80% (below 1990 levels) by the year 2050. For the transportation sector these goals translate to a reduction in the combustion of fuel equivalent to all the fuel amounts currently used by Oregon's light fleet. According to the BEAR[1] report, achieving that reduction in transportation fuel emissions requires complete electrifications of Oregon's light fleet by 2050. Naturally that transformation occurs gradually over the coming thirty years. As we approach that landmark, the the Gas-Tax that has been the staple of Highway funding since 1917, will gradually become quaint until it no longer exists by 2051. Much of the highway funding system is dependent on the gas tax, and in the absence of an alternative funding mechanism, the Highway Fund is likely to experience significant reductions.

To model the reduction to the Highway Fund I utilized most of the assumptions proposed by the BEAR report in addition to the HCAS and the Carbon Tax study of 2015. Those assumptions are:

- The moderate scenario profile for the full electrification of the light fleet, with the Plug-in-Hybrids Electric Vehicles (PHEV) playing a gateway role to full electrification before they fade away by 2048. (see Table 1)
- The Heavy fleet to continue the current path of (Diesel) fuel use that follows the general reduction path in fuel use caused by the general improvement of fuel efficiency.
- The higher EV registration fees instituted by HB 2017 will allow for some recovery of lost funds. The EV registration fee of $115, is parsed into $25 to match the general registration increases and $90 to compensate for some fuel revenue loss. At the time of HB 2017, the registration fee was estimated based on an annual 4500 miles per Electric Vehicle (the current range of the EV fleet). However, for PHEV that difference is only $10. As the EV's improve their range increased registration fees are needed. To allow for the registration fees to fully compensate for the losses caused by the reduction in fuel use, EV fees would need to double, while the HPEV registration fees need to go up by ten folds.

Two sets of results are shown in tables (2) and (4). Table (2) shows the reductions caused by the loss of the fuel tax ($10.1 billion), registration revenues from EV's and HPEV's are added, then the adjustment

[1] BEAR: Berkeley Economic Advising and Research. Oregon's Cap-and-Trade Program (HB 2020): An Economic Assessment. Roland-Holst, Evans, Heft-Neal, and Behnke.

of the Weight Mile payments to the cost responsibility proportions are subtracted ($3.4 billion). The result is a total reduction of $2.7 billion by 2035, and $10.1 billion by 2050.

Table (4) include the amounts from table (2), with the further subtraction of adjustments of heavy taxes and fees to compensate for the Revenues going to the Transporting Decarbonization Fund (TDCF) from emission allowances. That total heavy adjustment comes to $8.5 billion, leaving the total reduction in the Highway Fund (HF) at $3 billion by 2035, and $18.55 billion by the year 2050.

3) As to the Cost Responsibility effects: Adjustments are needed for the heavy payments to balance two separate revenue reduction effects caused by the lower light fleet payments.

First: As a result of the electrification of the fleet and the reduced fuel use, the light fleet will contribute less to the Highway Fund ($10.144 billion), thus the Heavy payments will have to be reduced (through a reduction in Weight-Mile Taxes) commensurate to the cost responsibility requirements. This first adjustment comes to $3.431 billion by the year 2050. (Table 2)

Second: HB 2020 charges allowance prices to fuel use based on emissions equivalency of fuel used. Revenues from the sale of allowances ($32 Billion) are directed to a subaccount of the Highway Fund (Transportation Decarbonization Fund TDCF) which is restricted in its uses to mitigation and adaptation.

According to the white paper that was done by the Highway Cost Allocation Study (HCAS)[2] consultant (ECO Northwest), the TDCF projects carry a different cost responsibility (28% for Heavy) than the general highway project mix. This is likely to require further adjustment to the Light/Heavy balance and proportionality. Therefore, the heavy payments will require further adjustments to maintain the cost responsibility ratios. Since revenue from allowances are not allowed to be reduced, then a reduction must occur to the main Highway Fund taxes and fees. Thus, a reduction in Weight Mile tax rates and Heavy Registration fees ($8.477 Billion). (Table 4). The adjustments to heavy taxes are positive (increase) at the beginning before turning negative (decrease) in 2031. Moreover, as we approach advanced years, there will be more reductions required than heavy contributions (all heavy payments to the highway Fund will be reduced to 0). In that case, the light payments would be the instrument of reduction to adjusted down accordingly (at approximately twice the amount needed for heavy reduction). This process effectively sets in motion a downward spiral of Highway Fund revenues.

4) The Price elasticity of Demand works to change fuel consumption in a similar way as electrification. In other words, faced with the higher prices of fuel, consumers will either use less fuel or move away from the Internal Combustion Engines (ICE) to Battery Electric Vehicles (BEV) as an alternative for their transportation needs. Therefore, the estimates based on the electrification assumption under HB 2020 are roughly equivalent to the price effects imposed by the allowance prices.

[2] Cap-and-Invest Issue Paper, Oregon Highway Cost Allocation Study, October 2018. EcoNorthwest, for DAS/OEA.

a) Trucking will experience elevated costs from the allowance prices on Diesel estimated (in Table 3) at $17.44 billion through 2050, however, the industry is likely to experience a reduction in tax rates (Weight Mile and Registration Fees) equivalent to the cost responsibility adjustment of about $11.8 billion (As shown in Table 4). That leaves the Trucking industry encumbered by about $5.2 billion (over 30 years), or about $173 million average annual additional costs.

b) The passenger vehicle fleet effects are explained in the body of the answer to question (4), however, I was able to consult the results of SB 306 (Carbon Tax Study[3]) that LRO contracted PSU's Northwest Economic Research Center (NERC). That study examined a tax that operates in much the same way the allowance prices do. According to that study a $20 tax on CO^2 emissions reduces fuel consumption by 2% in short run and about 7% in the long run. Similarly Cap and Trade allowance prices (as shown in table 3 as WCI Med price) impose about 22 cents on a gallon of gas in 2021 increasing to above $3 dollars by 2050[4]. That large price impact will facilitate the abandoning of gasoline by the consumers, and likely to push the consumers in favor of electric vehicles or other alternatives.

c) Recreational Vehicles impacts were not estimated explicitly. However, it is reasonable to assume that they will be impacted in the same way as the light fleet reacts to the higher fuel prices. I hope to have the time to refine the estimate of that impact at a later date.

In summary; the steps for estimating the financial impacts to the Highway Fund are the following:

Step 1: The change of the fleet and the move to PHEV and EV vehicles will generate an additional registration revenue (as mandated by HB 2017) of $210 million through the year 2035, extending to $3.4 billion by 2050. Table 1 shows that process.

Step 2: The fuel tax reductions as a result of changing the fleet mix are $2 Billion through the year 2035, extending to $10.1 billion by 2050. (Table 2)

[3] Economic and Emissions Impacts of a Clean Air Tax or Fee in Oregon (SB306) https://www.oregonlegislature.gov/lro/Documents/RR%204-14%20SB%20306%20Clean%20Air.pdf

[44] A dollar of allowance price represents about one cent on a gallon of fuel. The WCI price in Table 3.

Table 1 Fleet Change to full electrification and Higher Registration Fee revenue

Year	Fleet Vehicles	ICE	PHEV	BEV	ICE	PHEV	BEV	Reg recovery		
	Millions	%	%	%	Millions	Millions	Millions	PHEV	BEV	Total
2021	3.80319	97.6%	1.5%	0.1%	3.7128	0.0588	0.0022	$ 587,572	$ 194,747	$ 782,318
2022	3.86135	96.9%	2.1%	0.1%	3.7399	0.0803	0.0038	$ 802,691	$ 331,188	$ 1,133,879
2023	3.91951	95.8%	2.8%	0.2%	3.7568	0.1086	0.0061	$ 1,086,123	$ 534,017	$ 1,620,140
2024	3.97862	94.5%	3.7%	0.2%	3.7614	0.1460	0.0095	$ 1,459,863	$ 829,936	$ 2,289,799
2025	4.03868	92.9%	4.8%	0.4%	3.7500	0.1950	0.0144	$ 1,950,079	$ 1,253,992	$ 3,204,071
2026	4.09875	90.7%	6.3%	0.5%	3.7171	0.2587	0.0213	$ 2,586,892	$ 1,850,741	$ 4,437,633
2027	4.15881	88.0%	8.2%	0.7%	3.6580	0.3404	0.0307	$ 3,404,215	$ 2,674,890	$ 6,079,104
2028	4.21888	84.6%	10.5%	1.0%	3.5675	0.4437	0.0436	$ 4,437,137	$ 3,789,784	$ 8,226,921
2029	4.27990	80.4%	13.4%	1.4%	3.4419	0.5719	0.0605	$ 5,718,970	$ 5,264,591	$ 10,983,561
2030	4.33996	75.5%	16.8%	1.9%	3.2762	0.7270	0.0823	$ 7,270,267	$ 7,162,384	$ 14,432,651
2031	4.40289	69.8%	19.3%	2.7%	3.0725	0.8517	0.1170	$ 8,516,773	$ 10,178,719	$ 18,695,492
2032	4.46581	63.4%	21.7%	3.7%	2.8311	0.9708	0.1634	$ 9,707,526	$ 14,213,568	$ 23,921,094
2033	4.53065	56.5%	23.7%	4.9%	2.5597	1.0742	0.2239	$ 10,741,684	$ 19,476,353	$ 30,218,037
2034	4.59548	49.3%	25.0%	6.5%	2.2674	1.1511	0.3005	$ 11,510,639	$ 26,146,946	$ 37,657,585
2035	4.66127	42.2%	25.6%	8.5%	1.9674	1.1933	0.3952	$ 11,933,343	$ 34,385,179	$ 46,318,522
2036	4.72800	35.4%	25.3%	10.8%	1.6731	1.1965	0.5094	$ 11,965,455	$ 44,315,339	$ 56,280,794
2037	4.79570	29.1%	24.2%	13.4%	1.3962	1.1610	0.6442	$ 11,609,698	$ 56,045,475	$ 67,655,174
2038	4.86530	23.5%	22.4%	16.5%	1.1456	1.0914	0.8011	$ 10,914,409	$ 69,695,066	$ 80,609,475
2039	4.93490	18.8%	20.2%	19.9%	0.9259	0.9952	0.9813	$ 9,951,787	$ 85,369,277	$ 95,321,065
2040	5.00545	14.8%	17.6%	23.7%	0.7389	0.8815	1.1868	$ 8,814,510	$ 103,254,393	$ 112,068,903
2041	5.07791	11.5%	15.0%	28.0%	0.5837	0.7593	1.4208	$ 7,592,707	$ 123,610,610	$ 131,203,317
2042	5.15037	8.9%	12.3%	32.7%	0.4571	0.6360	1.6863	$ 6,359,697	$ 146,705,481	$ 153,065,177
2043	5.22474	6.8%	9.9%	38.1%	0.3556	0.5177	1.9882	$ 5,176,986	$ 172,977,628	$ 178,154,614
2044	5.29910	5.2%	7.7%	44.0%	0.2752	0.4083	2.3315	$ 4,082,925	$ 202,839,904	$ 206,922,829
2045	5.37538	3.9%	5.8%	50.7%	0.2121	0.3103	2.7232	$ 3,103,172	$ 236,921,945	$ 240,025,117
2046	5.45260	3.0%	4.1%	58.2%	0.1629	0.2247	3.1707	$ 2,247,496	$ 275,851,288	$ 278,098,784
2047	5.53078	2.3%	2.7%	66.6%	0.1249	0.1517	3.6827	$ 1,516,825	$ 320,393,711	$ 321,910,535
2048	5.61087	1.7%	1.6%	76.1%	0.0955	0.0906	4.2701	$ 905,639	$ 371,496,886	$ 372,402,525
2049	5.69096	1.3%	0.7%	86.9%	0.0730	0.0404	4.9433	$ 403,859	$ 430,062,905	$ 430,466,764
2050	5.77295	1.0%	0.0%	99.0%	0.0557	0.0000	5.7173	$ -	$ 497,402,466	$ 497,402,466
Total to 2035								$ 81,713,772	$ 128,287,036	$ 210,000,808
Total to 2050								$166,358,938	$3,265,229,409	$3,431,588,347

Step 3: Add the new revenue being generated from higher registrations $3.4 billion (in 2050) as shown in Table (2).

Step 4: The resulting revenue change to the light fleet payment, requires adjusting the Heavy overpayment as the light vehicle pay less. This leaves a reduction of heavy payments of $896 Million through the year 2035, extending to $3.4 billion by 2050.

Step 5: The total impact to the Highway Fund is a reduction of $2.7 Billion through the year 2035, extending to $10.1 billion by 2050. The last column of Table 2 shows that summation.

Table 2 Impacts to the Highway Fund before considering Allowance Revenues.

Year	Fuel Gallons Reduction	Fuel Tax Reduction	Reg recovery Total	Weight Mile Adjustment	Total HF Revenue
2021	(101,576,925)	$ (36,567,693)	$ 782,318	$ (17,892,687)	**$ (53,678,062)**
2022	(113,392,685)	$ (43,089,220)	$ 1,133,879	$ (20,977,671)	**$ (62,933,012)**
2023	(129,159,521)	$ (49,080,618)	$ 1,620,140	$ (23,730,239)	**$ (71,190,717)**
2024	(146,366,630)	$ (58,546,652)	$ 2,289,799	$ (28,128,426)	**$ (84,385,279)**
2025	(166,998,632)	$ (66,799,453)	$ 3,204,071	$ (31,797,691)	**$ (95,393,072)**
2026	(189,216,572)	$ (75,686,629)	$ 4,437,633	$ (35,624,498)	**$ (106,873,494)**
2027	(215,282,770)	$ (86,113,108)	$ 6,079,104	$ (40,017,002)	**$ (120,051,005)**
2028	(254,683,150)	$ (101,873,260)	$ 8,226,921	$ (46,823,169)	**$ (140,469,508)**
2029	(301,032,362)	$ (120,412,945)	$ 10,983,561	$ (54,714,692)	**$ (164,144,076)**
2030	(355,791,688)	$ (142,316,675)	$ 14,432,651	$ (63,942,012)	**$ (191,826,037)**
2031	(427,709,261)	$ (171,083,704)	$ 18,695,492	$ (76,194,106)	**$ (228,582,318)**
2032	(510,638,535)	$ (204,255,414)	$ 23,921,094	$ (90,167,160)	**$ (270,501,480)**
2033	(603,036,299)	$ (241,214,520)	$ 30,218,037	$ (105,498,241)	**$ (316,494,724)**
2034	(704,517,080)	$ (281,806,832)	$ 37,657,585	$ (122,074,623)	**$ (366,223,870)**
2035	(809,426,446)	$ (323,770,579)	$ 46,318,522	$ (138,726,028)	**$ (416,178,085)**
2036	(916,837,315)	$ (366,734,926)	$ 56,280,794	$ (155,227,066)	**$ (465,681,198)**
2037	(1,019,322,070)	$ (407,728,828)	$ 67,655,174	$ (170,036,827)	**$ (510,110,481)**
2038	(1,113,914,293)	$ (445,565,717)	$ 80,609,475	$ (182,478,121)	**$ (547,434,363)**
2039	(1,198,856,190)	$ (479,542,476)	$ 95,321,065	$ (192,110,706)	**$ (576,332,117)**
2040	(1,273,045,357)	$ (509,218,143)	$ 112,068,903	$ (198,574,620)	**$ (595,723,860)**
2041	(1,336,320,449)	$ (534,528,180)	$ 131,203,317	$ (201,662,431)	**$ (604,987,294)**
2042	(1,389,269,299)	$ (555,707,719)	$ 153,065,177	$ (201,321,271)	**$ (603,963,813)**
2043	(1,432,672,656)	$ (573,069,063)	$ 178,154,614	$ (197,457,224)	**$ (592,371,673)**
2044	(1,467,692,760)	$ (587,077,104)	$ 206,922,829	$ (190,077,137)	**$ (570,231,412)**
2045	(1,495,434,119)	$ (598,173,647)	$ 240,025,117	$ (179,074,265)	**$ (537,222,795)**
2046	(1,517,027,612)	$ (606,811,045)	$ 278,098,784	$ (164,356,131)	**$ (493,068,392)**
2047	(1,533,496,215)	$ (613,398,486)	$ 321,910,535	$ (145,743,975)	**$ (437,231,926)**
2048	(1,545,740,301)	$ (618,296,121)	$ 372,402,525	$ (122,946,798)	**$ (368,840,393)**
2049	(1,554,554,859)	$ (621,821,944)	$ 430,466,764	$ (95,677,590)	**$ (287,032,770)**
2050	(1,560,588,038)	$ (624,235,215)	$ 497,402,466	$ (63,416,375)	**$ (190,249,124)**
Total to 2035	(5,028,828,555)	$ (2,002,617,301)	$ 210,000,808	$ (896,308,246)	**$ (2,688,924,739)**
Total to 2050	(25,383,600,088)	$ (10,144,525,914)	$3,431,588,347	$(3,356,468,783)	**$(10,069,406,350)**

Step 6: During the period from 2021 to 2050, HB 2020 charges a price for the allowance to emit CO2. That price will be charged on fuel emission based on emission factors of fuel type (Diesel and Gasoline). For the price of allowances, I Once again adopted the price forecast reported by the BEAR report. The price that was considered for the purpose of these estimates was the medium price of the WCI (Western Climate Initiative). However, those prices were reported in constant dollars, so they were adjusted to reflect current dollar prices. It is worth noting that the Med WCI allowance prices were relatively close to the Core price estimates (If Oregon did not Join the WCI).

The revenue generated from the sale of allowances and credited to the Transportation Decarbonization Fund reaches $14 billion in 2035 and extends to $32 billion by 2050.

Table 3 Revenue from Allowances by Light and Heavy payments.

Year	Transportation Allowances Qnty		Allowance Price	Transportation Allowance Revenues		Transp Decarb Fund	Heavy Over (under)
	Light Fleet	Med&heavy	WCI Med	Light Fleet	Med&heavy	(TDCF) Total	payment
2021	14,387,861	4,902,314	$ 22.87	$ 329,034,940	$ 112,110,655	**$ 441,145,595**	$ (11,410,112)
2022	14,279,723	4,901,757	$ 26.01	$ 371,377,037	$ 127,481,455	**$ 498,858,493**	$ (12,198,923)
2023	14,120,159	4,896,123	$ 29.55	$ 417,300,774	$ 144,697,790	**$ 561,998,563**	$ (12,661,808)
2024	13,916,824	4,880,621	$ 33.62	$ 467,906,166	$ 164,094,391	**$ 632,000,557**	$ (12,865,765)
2025	13,652,247	4,855,380	$ 38.23	$ 521,908,334	$ 185,615,121	**$ 707,523,454**	$ (12,491,446)
2026	13,356,530	4,824,739	$ 43.44	$ 580,252,056	$ 209,602,679	**$ 789,854,735**	$ (11,556,647)
2027	13,020,808	4,792,382	$ 49.38	$ 642,944,067	$ 236,639,208	**$ 879,583,274**	$ (9,644,109)
2028	12,632,520	4,781,652	$ 56.10	$ 708,657,584	$ 268,240,538	**$ 976,898,122**	$ (5,290,936)
2029	12,181,734	4,770,946	$ 63.74	$ 776,496,170	$ 304,112,799	**$ 1,080,608,969**	$ 1,542,287
2030	11,655,291	4,760,264	$ 72.45	$ 844,436,297	$ 344,885,378	**$ 1,189,321,676**	$ 11,875,309
2031	10,974,416	4,749,606	$ 77.73	$ 853,063,299	$ 369,196,341	**$ 1,222,259,640**	$ 26,963,642
2032	10,194,457	4,738,971	$ 83.41	$ 850,271,240	$ 395,255,100	**$ 1,245,526,340**	$ 46,507,724
2033	9,329,309	4,728,361	$ 89.50	$ 834,982,515	$ 423,193,010	**$ 1,258,175,525**	$ 70,903,863
2034	8,382,445	4,717,774	$ 96.05	$ 805,145,970	$ 453,148,997	**$ 1,258,294,967**	$ 100,826,406
2035	7,404,781	4,707,211	$ 103.09	$ 763,364,557	$ 485,269,962	**$ 1,248,634,519**	$ 135,652,296
2036	6,404,665	4,696,671	$ 110.66	$ 708,719,507	$ 519,718,423	**$ 1,228,437,930**	$ 175,755,802
2037	5,448,982	4,686,156	$ 118.79	$ 647,282,163	$ 556,666,329	**$ 1,203,948,492**	$ 219,560,751
2038	4,564,443	4,675,663	$ 127.53	$ 582,104,155	$ 596,288,053	**$ 1,178,392,208**	$ 266,338,235
2039	3,766,877	4,665,194	$ 136.93	$ 515,793,187	$ 638,798,480	**$ 1,154,591,667**	$ 315,512,813
2040	3,066,211	4,654,749	$ 147.03	$ 450,834,344	$ 684,401,919	**$ 1,135,236,263**	$ 366,535,765
2041	2,463,897	4,644,327	$ 157.90	$ 389,040,399	$ 733,322,327	**$ 1,122,362,726**	$ 419,060,763
2042	1,954,642	4,633,928	$ 169.58	$ 331,468,018	$ 785,821,031	**$ 1,117,289,049**	$ 472,980,097
2043	1,531,416	4,623,553	$ 182.14	$ 278,937,403	$ 842,150,097	**$ 1,121,087,501**	$ 528,245,597
2044	1,183,751	4,613,201	$ 195.64	$ 231,588,748	$ 902,525,181	**$ 1,134,113,930**	$ 584,973,281
2045	901,703	4,602,872	$ 210.19	$ 189,526,966	$ 967,467,206	**$ 1,156,994,172**	$ 643,508,838
2046	675,088	4,592,566	$ 225.82	$ 152,446,780	$ 1,037,082,640	**$ 1,189,529,420**	$ 704,014,402
2047	494,693	4,582,283	$ 242.65	$ 120,035,627	$ 1,111,875,315	**$ 1,231,910,942**	$ 766,940,251
2048	352,412	4,572,024	$ 260.74	$ 91,887,587	$ 1,192,106,542	**$ 1,283,994,129**	$ 832,588,186
2049	241,084	4,561,787	$ 280.21	$ 67,553,086	$ 1,278,238,081	**$ 1,345,791,167**	$ 901,416,554
2050	154,874	4,551,573	$ 301.16	$ 46,642,099	$ 1,370,760,629	**$ 1,417,402,728**	$ 973,887,865
Total to 2035				$ 9,767,141,007	$ 4,223,543,424	**$ 13,990,684,430**	$ 306,151,783
Total to 2050				$ 14,571,001,077	$ 17,440,765,676	**$ 32,011,766,753**	$8,477,470,985

While the fuel consumption is going down for the light fleet matching the electrification levels of the light fleet, the Heavy fleet continues the profile of general decline in fuel as assumed by the BEAR report. The result is that the light fleet will approach low levels of payments as the electrification of the fleet approaches 100% in 2050. This dichotomy in fuel emissions of the two fleets, results by 2041 in virtually flipping the level of payments between the light and heavy fleets. This change in pattern changes the amounts that needs to be recovered from the Cost Responsibility proportions. TDCF projects carry a different cost responsibility (28% for Heavy) than the general highway project mix (34%) (Table 3). It is not clear what mix of projects will the revenue form HB 2020 be spent on, but assuming the same project mix and the cost responsibility of 28%, then adjustments to the heavy payments will need to be done.

Step 7: Because there is no mechanism of reducing the allowance prices or refunding the revenue payments, then the adjustments must be done in the payments of fees and taxes that go to the main highway fund. If that happens then an amount equal to $306 million has to be adjusted by 2035, extending to $8.5 Billion in 2050.

Step 8: The total results of all these adjustments to the highway fund are likely to reach reductions of about $3 billion in 2035, and $18.55 billion in 2050. Table (4) summarizes all the additions and subtractions to show the total effects in the last column of the table.

Table 4 Changes and adjustments to revenue going to the Highway Fund Including Allowance Revenues.

Year	Fuel Tax Reduction	Reg recovery Total	Subtotal HF Revenue	Weight Mile Adjustment (HF)	Weight Mile Adjustment (TDCF)	Weight Mile Adjustment (Total)	Total HF Revenue
2021	$ (36,567,693)	$ 782,318	$ (35,785,374)	$ (17,892,687)	$ 11,410,112	$ (6,482,576)	**$ (42,267,950)**
2022	$ (43,089,220)	$ 1,133,879	$ (41,955,342)	$ (20,977,671)	$ 12,198,923	$ (8,778,748)	**$ (50,734,090)**
2023	$ (49,080,618)	$ 1,620,140	$ (47,460,478)	$ (23,730,239)	$ 12,661,808	$ (11,068,431)	**$ (58,528,909)**
2024	$ (58,546,652)	$ 2,289,799	$ (56,256,853)	$ (28,128,426)	$ 12,865,765	$ (15,262,662)	**$ (71,519,515)**
2025	$ (66,799,453)	$ 3,204,071	$ (63,595,381)	$ (31,797,691)	$ 12,491,446	$ (19,306,244)	**$ (82,901,626)**
2026	$ (75,686,629)	$ 4,437,633	$ (71,248,996)	$ (35,624,498)	$ 11,556,647	$ (24,067,851)	**$ (95,316,847)**
2027	$ (86,113,108)	$ 6,079,104	$ (80,034,004)	$ (40,017,002)	$ 9,644,109	$ (30,372,893)	**$ (110,406,896)**
2028	$ (101,873,260)	$ 8,226,921	$ (93,646,339)	$ (46,823,169)	$ 5,290,936	$ (41,532,233)	**$ (135,178,572)**
2029	$ (120,412,945)	$ 10,983,561	$ (109,429,384)	$ (54,714,692)	$ (1,542,287)	$ (56,256,979)	**$ (165,686,363)**
2030	$ (142,316,675)	$ 14,432,651	$ (127,884,025)	$ (63,942,012)	$ (11,875,309)	$ (75,817,321)	**$ (203,701,346)**
2031	$ (171,083,704)	$ 18,695,492	$ (152,388,212)	$ (76,194,106)	$ (26,963,642)	$ (103,157,748)	**$ (255,545,960)**
2032	$ (204,255,414)	$ 23,921,094	$ (180,334,320)	$ (90,167,160)	$ (46,507,724)	$ (136,674,884)	**$ (317,009,205)**
2033	$ (241,214,520)	$ 30,218,037	$ (210,996,482)	$ (105,498,241)	$ (70,903,863)	$ (176,402,104)	**$ (387,398,586)**
2034	$ (281,806,832)	$ 37,657,585	$ (244,149,247)	$ (122,074,623)	$ (100,826,406)	$ (222,901,030)	**$ (467,050,277)**
2035	$ (323,770,579)	$ 46,318,522	$ (277,452,057)	$ (138,726,028)	$ (135,652,296)	$ (274,378,325)	**$ (551,830,381)**
2036	$ (366,734,926)	$ 56,280,794	$ (310,454,132)	$ (155,227,066)	$ (175,755,802)	$ (330,982,869)	**$ (641,437,001)**
2037	$ (407,728,828)	$ 67,655,174	$ (340,073,654)	$ (170,036,827)	$ (219,560,751)	$ (389,597,578)	**$ (729,671,233)**
2038	$ (445,565,717)	$ 80,609,475	$ (364,956,242)	$ (182,478,121)	$ (266,338,235)	$ (448,816,356)	**$ (813,772,598)**
2039	$ (479,542,476)	$ 95,321,065	$ (384,221,411)	$ (192,110,706)	$ (315,512,813)	$ (507,623,518)	**$ (891,844,930)**
2040	$ (509,218,143)	$ 112,068,903	$ (397,149,240)	$ (198,574,620)	$ (366,535,765)	$ (565,110,385)	**$ (962,259,625)**
2041	$ (534,528,180)	$ 131,203,317	$ (403,324,863)	$ (201,662,431)	$ (419,060,763)	$ (620,723,195)	**$ (1,024,048,057)**
2042	$ (555,707,719)	$ 153,065,177	$ (402,642,542)	$ (201,321,271)	$ (472,980,097)	$ (674,301,368)	**$ (1,076,943,911)**
2043	$ (573,069,063)	$ 178,154,614	$ (394,914,449)	$ (197,457,224)	$ (528,245,597)	$ (725,702,822)	**$ (1,120,617,270)**
2044	$ (587,077,104)	$ 206,922,829	$ (380,154,275)	$ (190,077,137)	$ (584,973,281)	$ (775,050,418)	**$ (1,155,204,693)**
2045	$ (598,173,647)	$ 240,025,117	$ (358,148,530)	$ (179,074,265)	$ (643,508,838)	$ (822,583,103)	**$ (1,180,731,633)**
2046	$ (606,811,045)	$ 278,098,784	$ (328,712,261)	$ (164,356,131)	$ (704,014,402)	$ (868,370,533)	**$ (1,197,082,794)**
2047	$ (613,398,486)	$ 321,910,535	$ (291,487,951)	$ (145,743,975)	$ (766,940,251)	$ (912,684,226)	**$ (1,204,172,177)**
2048	$ (618,296,121)	$ 372,402,525	$ (245,893,595)	$ (122,946,798)	$ (832,588,186)	$ (955,534,983)	**$ (1,201,428,579)**
2049	$ (621,821,944)	$ 430,466,764	$ (191,355,180)	$ (95,677,590)	$ (901,416,554)	$ (997,094,144)	**$ (1,188,449,324)**
2050	$ (624,235,215)	$ 497,402,466	$ (126,832,749)	$ (63,416,375)	$ (973,887,865)	$ (1,037,304,240)	**$ (1,164,136,989)**
Total to 2035	$ (2,002,617,301)	$ 210,000,808	$(1,792,616,493)	$ (896,308,246)	$ (306,151,783)	$ (1,202,460,030)	**$ (2,995,076,523)**
Total to 2050	$ (10,144,525,914)	$3,431,588,347	$(6,712,937,567)	$(3,356,468,783)	$ (8,477,470,985)	$ (11,833,939,768)	**$(18,546,877,335)**

I hope that gives a clearer idea to the effects of HB 2020 on highway funding. In short, the highway fund revenues available for distributions between the State, Cities and Counties, will lose about 1/2 of its value through 2050. If no remedy is implemented by 2050, the highway program will be half its size by 2051 and will primarily be operating on the federally funded portion. Clearly, several strategic choices need to be made if the intent is to preserve the financial system for funding transportation in Oregon while implementing a Cap and Trade Program.