

Vehicle Replacement Backlogs: You're Out of the Recession – Now What?

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Presentation Overview

- Defining and quantifying a fleet replacement backlog
- Reasons backlogs exist
- Strategies for overcoming a backlog
 - Determining appropriate replacement cycles
 - Developing a long-term replacement plan
 - Performing a fleet modernization justification study
 - Exploring alternative replacement financing methods
 - Rightsizing the fleet
- Preventing a backlog from developing





What is a replacement backlog?

- 1. Number of fleet assets in a fleet that are *overdue* for replacement.
- 2. Percentage of all assets in a fleet that are overdue for replacement.
- 3. Cost of replacing, in today's dollars, all fleet assets that are overdue for replacement.
- 4. Cost of replacing all fleet assets that are overdue for replacement, as a percentage of the cost of replacing all assets in the fleet.
- 5. Number of years' worth of overdue fleet replacement costs
 - a. Based on average annual fleet replacement *costs*
 - b. Based on average annual fleet replacement *purchases.*





Number of vehicles currently in the fleet	1,969
Number of vehicles that will meet or exceed recommended replacement age in FY 2017	1,071
Percentage of vehicles that will meet or exceed recommended age in FY 2017	54%
Number of vehicles that will exceed recommended replacement age in FY 2017	955
Percentage of vehicles that will exceed recommended age in FY 2017	49%



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Current replacement cost of the entire fleet	\$87.2 M
Cost of replacing vehicles that will meet or exceed recommended age in FY 2017	\$47.8 M
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Weighted average recommended replacement cycle (years)	7.1
Average annual fleet replacement cost	\$12.3 M
Average annual value of vehicle purchases (FY2012-16)	\$ 6.5 M
Years of replacement backlog based on average annual replacement cost	3.5
Years of replacmt backlog based on average annual value of replacement purchases	6.5





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Average current odometer reading	45,500
Average annual mileage	6,000
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7.1	Weighted average recommended replacement cycle (years)
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53%	Average annual percentage of replacement cost funded



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\$6.5 M	Average annual value of vehicle purchases (FY2012-16)
53%	Average annual percentage of replacement cost funded
10	Alternative average recommended replacement cycle (years)
\$8.7 M	Alternative average annual fleet replacement cost
\$ 6.5 M	Average annual value of vehicle purchases (FY2012-16)
75%	Average annual percentage of replacement cost funded



Why do organizations have fleet replacement backlogs?

- Lack of willingness to spend money on vehicle replacement
- Not lack of ability to afford effective replacement practices





Life Cycle Costs of a Vehicle

Capital, Operating and Total Cost Trend Lines (Single-Axle Dump Truck – Large Rocky Mtn-Area Fleet)



Basic Truths About Fleet Replacement

- A fleet of properly replaced vehicles is cheaper than one with improperly replaced vehicles
- If you can afford to operate an old fleet you can afford to operate a less old one
- Avoiding spending money on fleet replacement does not save agencies or taxpayers money or help the "bottom line" – except, perhaps, in the short term; over the long term, it hurts the bottom line





Reasons Organizations Underspend on Fleet Replacement

- Lack of understanding of vehicle life cycle cost principles (the U-shaped curve)
- Lack of understanding of the magnitude and yearto-year lumpiness of fleet replacement costs
- Lack of appreciation of the importance of the fleet to overall organizational success
- Skepticism about the need for every vehicle in the fleet
- Lack of visibility of direct and indirect vehicle operating costs
- Political sensitivity about the fleet looking too good
- Lack of understanding of replacement reserve fund rate setting and management principles
- Use of capital financing methods that discourage vehicle replacement

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Overcoming a replacement backlog requires doing two things:

- 1. Convincing decision makers that a younger fleet is a *cheaper* fleet
- 2. Persuading decision makers that making an old fleet younger is *affordable*
- Step 1 requires knowing how to quantify current and future fleet *costs*
- Step 2 requires knowing how to quantify future fleet *expenditures*



How do you get more capital dollars for fleet replacement?

• Start by showing decision makers that old vehicles cost more than young ones







Optimal Replacement Cycle of a Vehicle

Capital, Operating and Total Cost Trend Lines



Optimal Replacement Cycle Analysis Results – Medium–Duty Trucks

Replacement Cycle (years)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Year-End Odometer Reading	8,300	16,600	24,900	33,200	41,500	49,800	58,100	66,400	74,700	83,000	91,300	99,600	107,900	116,200	124,500
CAPITAL COST															
Year-End Fair Market Value Percentage	87.2%	76.0%	66.3%	57.8%	50.4%	44.0%	38.3%	33.4%	29.2%	25.4%	22.2%	19.3%	16.9%	14.7%	12.8%
Year-End Fair Market Value	\$49,705	\$43,343	\$37,796	\$32,959	\$28,740	\$25,062	\$21,854	\$19,057	\$16,618	\$14,491	\$12,637	\$11,019	\$9,609	\$8,379	\$7,307
Annual Capital Cost	\$7,295	\$6,362	\$5,547	\$4,837	\$4,218	\$3,678	\$3,208	\$2,797	\$2,439	\$2,127	\$1,855	\$1,617	\$1,410	\$1,230	\$1,072
OPERATING COSTS															
Annual M&R Cost	\$2,961	\$3,239	\$3,542	\$3,874	\$4,237	\$4,634	\$5,068	\$5,543	\$6,063	\$6,631	\$7,252	\$7,931	\$8,675	\$9,487	\$10,376
Annual Fuel Cost	\$4,160	\$4,328	\$4,503	\$4,685	\$4,875	\$5,072	\$5,276	\$5,490	\$5,711	\$5,942	\$6,182	\$6,432	\$6,692	\$6,962	\$7,244
Total Annual Operating Cost	\$7,122	\$7,567	\$8,046	\$8,560	\$9,112	\$9,706	\$10,345	\$11,033	\$11,774	\$12,573	\$13,434	\$14,364	\$15,367	\$16,450	\$17,620
Total Annual Operating Cost (2014\$)	\$7,122	\$7,347	\$7,584	\$7,833	\$8,096	\$8,372	\$8,664	\$8,971	\$9,295	\$9,636	\$9,996	\$10,377	\$10,778	\$11,201	\$11,649
Cumulative Operating Cost (2014\$)	\$7,122	\$14,469	\$22,053	\$29,886	\$37,982	\$46,354	\$55,018	\$63,989	\$73,283	\$82,920	\$92,916	\$103,292	\$114,070	\$125,272	\$136,920
Avg Annual Operating Cost (2014\$)	\$7,122	\$7,234	\$7,351	\$7,471	\$7,596	\$7,726	\$7,860	\$7,999	\$8,143	\$8,292	\$8,447	\$8,608	\$8,775	\$8,948	\$9,128
TOTAL COST															
Annual Total Cost	\$14,417	\$13,929	\$13,593	\$13,397	\$13,330	\$13,384	\$13,553	\$13,830	\$14,213	\$14,700	\$15,289	\$15,981	\$16,777	\$17,679	\$18,692
Cumulative Total Cost	\$14,417	\$28,346	\$41,939	\$55,336	\$68,666	\$82,050	\$95,603	\$109,433	\$123,646	\$138,346	\$153,635	\$169,616	\$186,393	\$204,072	\$222,765
Equivalent Annual Cost	\$14,417	\$14,177	\$13,988	\$13,847	\$13,749	\$13,693	\$13,675	\$13,692	\$13,743	\$13,827	\$13,941	\$14,085	\$14,257	\$14,457	\$14,685





Replacement Cycle Analysis Results - 10 Key Vehicle Types

Asset Type	Number of Units	Current Average Age (years)	Current Replacmt Cycle (years)	Recom- mended Replacmt Cycle (years)	Avg Ann Operating Cost Under Current Cycle	Avg Ann Operating Cost Under Recomm. Cycle	Avg Ann Operating Cost Savings per Vehicle	Ann Operating Cost Savings per Vehicle (%)	Total Avg Annual Operating Cost Savings
Intermediate Sedan	3,155	6.2	10	8	\$3,531	\$3,291	\$240	7%	\$757,200
Compact SUV	803	7.2	12	9	\$3,588	\$3,215	\$373	10%	\$299,519
Minivan	1,470	5.6	9	7	\$4,497	\$4,260	\$237	5%	\$348,390
MD Passenger Van	2,428	6.4	11	8	\$5,181	\$4,826	\$355	7%	\$861,940
MD Cargo Van	1,131	7.7	12	8	\$4,658	\$4,194	\$464	10%	\$524,784
LD Pickup Truck	1,135	8.4	14	9	\$5,009	\$4,729	\$280	6%	\$317,800
MD Pickup Truck	1,684	7.2	13	9	\$6,097	\$5,824	\$273	4%	\$459,732
HD Pickup Truck	1,139	7.2	13	9	\$5,183	\$4,953	\$230	4%	\$261,970
MD Truck	1,086	9.5	15	8	\$9,128	\$7,999	\$1,129	12%	\$1,226,094
HD Truck	2,396	7.3	14	7	\$26,134	\$15,430	\$10,704	41%	\$25,646,784
Total/Average	16,427		12	8					\$30,714,213



How do you get more capital dollars for fleet replacement?

- Identify optimal replacement cycles for selected vehicle types
- Develop a plan that quantifies current fleet replacement backlog and future replacement costs based on reasonable, if not optimal, replacement cycles





Replacement Analysis Parameters

	Asset Class Code	Asset Class Description	Replacement Cycle (months)	Current Purchase Price	
	MT-A	Black and White Patrol Cars	36	\$55,000	
	MT-B	Undercover Emergency Vehicles	84	\$36,000	
	MT-BB	Full Size Sedans – Station Wagons	84	\$36,000	
	MT-C	7–8 Passenger Vans	96	\$35,000	
	MT-CC	15 Passenger Vans	96	\$49,000	
	MT-E	Compact Sedans – Cars	96	\$34,000	
	MT-EV	Electric Vehicles	96	\$34,000	
	MT-F	Full Size Pick Up Trucks, Crew Cabs, Two Wheeldrive, Single Rear Wheels, One Ton and Under	96	\$39,000	
	MT-FF	Full Size Trucks with Service Bed, Stake Bed, Utility Bed, and Flat Bed Bodies, One Ton and Under with Dual Rear Wheels	96	\$47,500	
	MT-G	Full Size and Mini Cargo Vans	96	\$37,000	
	MT-H	4x2 or 4x4 Sport Utility Vehicles	96	\$50,000	
	MT-HF	4x4 Full Size Pickup Trucks	96	\$42,000	
	MT-HG	4x4 Full Size and Mini Cargo Vans	96	\$42,000	
	MT-HI	4x4 Compact Pick Up Trucks	96	\$42,000	
	MT-I	Two Wheel Drive Compact Pick Up Trucks	96	\$32,000	
	MT–J	4x2 or 4x4 Black and White Sport Utility Vehicles	48	\$50,000	
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Baseline Replacement Plan



Key Fleet Replacement Statistics (all costs in 2016 \$)

Number of vehicles currently in the fleet	1,969
Current mean/median vehicle age (years)	7.4/7.1
Imputed or <i>de facto</i> average replacement cycle (years)	14.8
Weighted average vehicle purchase price	\$44,300
Current replacement cost of the entire fleet	\$87.2 M
Weighted average recommended replacement cycle (years)	7.1
Number of vehicles that will exceed recommended replacement age in FY 2017	955
Percentage of vehicles that will exceed recommended age in FY 2017	49%
Cost of replacing vehicles that will exceed recommended age in FY 2017	\$42.2 M
Cost of replacing vehicles overdue for replacmt as a percentage of total fleet rep cost	48%
Average annual fleet replacement cost	\$12.3 M
Average annual value of vehicle purchases (FY2012-16)	\$ 6.5 M
Years of replacement backlog based on average annual replacement cost	3.5
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Baseline Replacement Plan



Smoothed Replacement Plan



Comparison of Baseline and Smoothed Replacement Plans

	Baseline	Plan	Smoothed Plan			
Year	Gross Rep Cost (millions)	Gross Rep Vehicles Gross Re Cost (millions) Replaced Cost (millions)		Vehicles Replaced		
1	\$ 47.8	1,071	\$ 14.1	292		
2	\$ 3.5	70	\$ 14.5	316		
3	\$ 9.9	184	\$ 14.9	321		
4	\$ 11.8	215	\$ 15.3	285		
5	\$ 6.6	138	\$ 15.8	290		
6	\$ 7.2	133	\$ 13.4	277		
7	\$ 21.1	363	\$ 15.8	276		
8	\$ 18.2	354	\$ 14.0	253		
9	\$ 45.9	802	\$ 15.6	261		
10	\$ 17.8	258	\$ 29.0	474		
Total	\$ 189.8	3,588	\$ 162.2	3,045		





How do you get more capital dollars for fleet replacement?

Identify optimal replacement cycles

- Quantify fleet replacement backlog and future costs
- Quantify reduction in fleet total cost of ownership (TCO) from implementing modernization plan





Smoothed "Modernization" Plan



"Status Quo" Replacement Plan



Comparison of Status Quo Replacement and Modernization Plans

	Мо	derniza	tion Plan	St	atus Qı	io Plan	
Year	Gross Cost (m	Gross Rep Vehicles Cost (millions) Replaced		Gross Re (millio	ep Cost ons)	Vehicles Replaced	
1	\$	14.1	292	\$	6.6	151	
2	\$	14.5	316	\$	6.8	150	
3	\$	14.9	321	\$	7.0	151	
4	\$	15.3	285	\$	7.2	149	
5	\$	15.8	290	\$	7.4	141	
6	\$	13.4	277	\$	7.6	139	
7	\$	15.8	276	\$	7.9	150	
8	\$	14.0	253	\$	8.1	143	
9	\$	15.6	261	\$	11.1	190	
10	\$	29.0	474	\$	10.0	164	
Total	\$	162.2	3,045	\$	79.7	1,528	



Impact of Alternative Replacement Plans on Fleet Age



Impact of Alternative Replacement Plans on Fleet Capital Costs



Impact of Alternative Replacement Plans on Fleet Operating Costs



Impact of Alternative Replacement Plans on Fleet Total Cost (TCO)



Impact of Alternative Replacement Plans on Fleet Asset Value



Fleet *Costs* and Other Statistics Under Status Quo Replacement Plan

Fleet Statistics and Costs and Value (millions) Under Status Quo Replacement Plan													
Fiscal Year													
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Avg	2017\$	
Number of Assets in the Fleet	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969		
Number of Assets Replaced	151	150	151	149	141	139	150	143	190	164	1,528		
Average Asset Age (years)	6.0	5.8	5.6	5.6	5.7	5.8	5.8	5.9	6.3	6.7	5.9		
2027 Replacement Cost (2027\$)										\$61.9			
Asset Capital Costs*	\$7.9	\$5.4	\$5.7	\$5.6	\$5.4	\$6.0	\$7.1	\$6.6	\$7.7	\$7.5	\$64.7	\$55.0	
Asset M&R Costs	\$5.6	\$5.9	\$6.2	\$6.1	\$6.6	\$6.8	\$7.4	\$8.0	\$8.8	\$9.1	\$70.4	\$59.3	
Asset Fuel Costs	\$5.2	\$5.0	\$4.9	\$4.5	\$4.4	\$4.2	\$4.2	\$4.1	\$4.1	\$4.0	\$44.5	\$38.3	
Total Direct Asset Costs (TCO)	\$18.8	\$16.3	\$16.8	\$16.2	\$16.3	\$17.0	\$18.7	\$18.7	\$20.5	\$20.6	\$179.7	\$152.5	
Increase/(Decrease) in Fair Market Value (FMV) of all Assets	\$2.6	\$1.1	\$1.0	\$1.4	\$1.6	\$1.3	\$0.3	\$0.6	\$0.7	\$0.3	\$11.1	\$9.8	
Fleet TCO less Change in Fleet FMV	\$16.1	\$15.1	\$15.8	\$14.8	\$14.6	\$15.6	\$18.3	\$18.1	\$19.9	\$20.3	\$168.6	\$142.7	

*Change in asset fair market value (FMV) from one year to the next.





Fleet *Costs* and Other Statistics Under Modernization Replacement Plan

Fleet Statistics and Cos	Fleet Statistics and Costs and Value (millions) Under Modernization Plan													
	Fiscal Year													
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Avg	2017\$		
Number of Assets in the Fleet	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969			
Number of Assets Replaced	292	316	321	285	290	277	276	253	261	474	3,045			
Average Asset Age (years)	5.8	4.7	3.3	3.3	3.1	2.9	3.2	3.3	3.5	2.9	3.6			
2027 Replacement Cost (2027\$)										\$18.4				
Asset Capital Costs*	\$9.2	\$8.6	\$9.5	\$8.5	\$9.2	\$10.0	\$9.2	\$11.0	\$9.9	\$14.8	\$99.9	\$84.3		
Asset M&R Costs	\$4.9	\$4.9	\$4.6	\$4.8	\$4.8	\$5.2	\$5.5	\$6.1	\$6.4	\$6.4	\$53.6	\$45.3		
Asset Fuel Costs	\$4.7	\$4.4	\$4.0	\$3.9	\$3.6	\$3.6	\$3.5	\$3.4	\$3.4	\$3.2	\$37.7	\$32.5		
Total Direct Asset Costs (TCO)	\$18.8	\$18.0	\$18.1	\$17.1	\$17.7	\$18.7	\$18.2	\$20.5	\$19.7	\$24.5	\$191.2	\$162.2		
ncrease/(<mark>Decrease)</mark> in Fair Market Value (FMV) of all Assets	\$7.2	\$4.9	\$4.5	\$2.8	\$3.5	\$1.8	\$1.3	(\$0.2)	\$1.0	\$6.1	\$32.9	\$29.0		
Fleet TCO less Change in Fleet FMV	\$11.6	\$13.0	\$13.6	\$14.4	\$14.1	\$17.0	\$16.9	\$20.6	\$18.7	\$18.4	\$158.3	\$133.2		

*Change in asset fair market value (FMV) from one year to the next.





Net *Economic* Impacts of Modernization

Economic Impacts of Modernization Relative to Status Quo Replacement													
Fiscal Year												Total	% Diff/
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Avg	2017\$	Change
Increase/(Decrease) in Number of Assets Replaced	141	166	170	136	149	138	126	110	71	310	1,517		99%
Increase/(Decrease) in Average Asset Age (years)	(0.3)	(1.2)	(2.3)	(2.3)	(2.6)	(2.9)	(2.5)	(2.6)	(2.8)	(3.8)	(2.3)		-39%
Increase/(Decrease) in Next Year's Replacement Cost										(\$43.5)			
Increase/ <mark>(Decrease</mark>) in Asset Capital Costs	\$1.3	\$3.3	\$3.8	\$2.9	\$3.8	\$4.0	\$2.1	\$4.4	\$2.2	\$7.4	\$35.1	\$29.4	53%
Increase/(Decrease) in Asset M&R Costs	(\$0.7)	(\$0.9)	(\$1.5)	(\$1.3)	(\$1.8)	(\$1.6)	(\$1.9)	(\$2.0)	(\$2.4)	(\$2.7)	(\$16.8)	(\$14.0)	-24%
Increase/(Decrease) in Asset Fuel Costs	(\$0.5)	(\$0.6)	(\$0.9)	(\$0.6)	(\$0.7)	(\$0.7)	(\$0.7)	(\$0.7)	(\$0.7)	(\$0.8)	(\$6.8)	(\$5.8)	-15%
Increase/(Decrease) in Total Cost	\$0.1	\$1.7	\$1.4	\$1.0	\$1.4	\$1.8	(\$0.5)	\$1.7	(\$0.9)	\$3.9	\$11.5	\$9.7	6%
Increase/(Decrease) in Fleet FMV*	\$4.6	\$3.8	\$3.5	\$1.4	\$1.9	\$0.4	\$0.9	(\$0.8)	\$0.3	\$5.8	\$21.9	\$19.2	195%
Increase/(Decrease) in Fleet TCO less Change in Fleet FMV	(\$4.5)	(\$2.1)	(\$2.2)	(\$0.4)	(\$0.5)	\$1.4	(\$1.4)	\$2.5	(\$1.2)	(\$1.9)	(\$10.3)	(\$9.5)	- 7%
Cummulative Increase/(Decrease) in Total Fleet Cost	(\$4.5)	(\$6.6)	(\$8.7)	(\$9.2)	(\$9.7)	(\$8.4)	(\$9.8)	(\$7.2)	(\$8.4)	(\$10.3)			

*Applies only to assets replaced after 2016





Impact of Alternative Replacement Plans on Direct Fleet *Expenditures*



Modernization Plan Eliminates Replacement Backlog



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Status Quo Plan Does Not



How do you get more capital dollars for fleet replacement?

- Identify optimal replacement cycles
- Quantify fleet replacement backlog and future costs
- Quantify reduction in fleet TCO from modernizing the fleet
- Show that fleet modernization is affordable under some, but not necessarily all available, capital financing methods





Alternative Capital Financing Methods

- Outright cash purchase
- Replacement reserve fund and charge-back system
- Debt (e.g., tax-exempt "lease-purchase" or "master lease" program)





Cash Purchase Financing of Modernization Plan



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Reserve Fund Financing of Modernization Plan



Assumes FY 2017 starting ISF unencumbered cash balance of **\$0.95M**.

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Debt Financing of Modernization Plan



Side-by-Side Comparison of Alternative Financing Approaches



Side-by-Side Comparison of Alternative Financing Approaches

	Fiscal Year												
Costs/Funding Requirements/Savings	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total		
Gross Replacement Costs	\$14.1	\$14.5	\$14.9	\$15.3	\$15.8	\$13.4	\$15.8	\$14.0	\$15.6	\$29.0	\$162.2		
Replcmt Purchases Less Used Veh Sale Proceeds	\$12.6	\$13.6	\$14.0	\$11.3	\$13.0	\$11.9	\$10.6	\$10.9	\$10.9	\$20.9	\$129.7		
Reserve Fund Cash Infusions Plus Charges	\$11.8	\$13.6	\$14.1	\$11.2	\$13.1	\$11.7	\$11.9	\$12.5	\$12.9	\$16.4	\$129.1		
Loan Payments Less Used Veh Sale Proceeds	\$1.7	\$4.9	\$7.2	\$5.3	\$8.1	\$12.6	\$10.5	\$13.7	\$12.1	\$11.2	\$87.4		
Budget Savings, Debt versus Cash Financing	\$10.9	\$8.7	\$6.8	\$6.0	\$4.9	(\$0.7)	\$0.1	(\$2.8)	(\$1.1)	\$9.8	\$42.3		
Cumulative Cash Savings	\$10.9	\$19.6	\$26.3	\$32.3	\$37.2	\$36.5	\$36.5	\$33.7	\$32.6	\$42.3			
	Fiscal Year												
Costs/Funding Requirements/Savings	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total		
Gross Replacement Costs	\$18.4	\$13.9	\$22.7	\$13.6	\$23.4	\$18.9	\$25.7	\$29.6	\$31.7	\$17.4	\$215.3		
Replcmt Purchases Less Used Veh Sale Proceeds	\$14.2	\$9.5	\$15.4	\$10.1	\$17.0	\$12.2	\$19.8	\$22.0	\$22.4	\$13.0	\$155.6		
Reserve Fund Charges	\$14.1	\$14.0	\$14.0	\$14.5	\$15.4	\$16.3	\$16.7	\$17.3	\$19.8	\$17.8	\$160.0		
Loan Payments Less Used Veh Sale Proceeds	\$15.7	\$15.8	\$13.3	\$17.2	\$14.3	\$16.1	\$16.8	\$16.8	\$16.4	\$21.8	\$164.2		
Budget Savings, Debt versus Cash Financing	(\$1.5)	(\$6.3)	\$2.1	(\$7.1)	\$2.7	(\$3.9)	\$3.0	\$5.1	\$6.1	(\$8.8)	(\$8.6)		
Cumulative Cash Savings	\$40.8	\$34.5	\$36.6	\$29.5	\$32.2	\$28.3	\$31.3	\$36.4	\$42.5	\$33.7			





Cash Savings from Financing Fleet Modernization *Capital* Costs with Debt v. Cash



Fleet *Expenditures* and Other Statistics Under Status Quo Replacement Plan

Fleet Statistics and Costs and Value (millions) Under Status Quo Replacement Plan												
	Fiscal Year											
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Avg	2017\$
Number of Assets in the Fleet	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	
Number of Assets Replaced	151	150	151	149	141	139	150	143	190	164	1,528	
Average Asset Age (years)	6.0	5.8	5.6	5.6	5.7	5.8	5.8	5.9	6.3	6.7	5.9	
2027 Replacement Cost (2027\$)										\$61.9		
Asset Capital Costs*	\$6.4	\$6.5	\$6.7	\$6.9	\$7.0	\$7.3	\$7.4	\$7.3	\$8.4	\$7.7	\$71.7	\$60.8
Asset M&R Costs	\$5.6	\$5.9	\$6.2	\$6.1	\$6.6	\$6.8	\$7.4	\$8.0	\$8.8	\$9.1	\$70.4	\$59.3
Asset Fuel Costs	\$5.2	\$5.0	\$4.9	\$4.5	\$4.4	\$4.2	\$4.2	\$4.1	\$4.1	\$4.0	\$44.5	\$38.3
Total Direct Asset Costs (TCO)	\$17.2	\$17.4	\$17.8	\$17.5	\$17.9	\$18.3	\$19.0	\$19.4	\$21.2	\$20.8	\$186.6	\$158.3

*Asset purchase costs less used asset sale proceeds.





Fleet *Expenditures* and Other Statistics Under Modernization Replacement Plan

Fleet Statistics and Costs and	Value (millions)	Under Modernization	Plan
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	Fiscal Year											Total
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Avg	2017\$
Number of Assets in the Fleet	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	1,969	
Number of Assets Replaced	292	316	321	285	290	277	276	253	261	474	3,045	
Average Asset Age (years)	5.8	4.7	3.3	3.3	3.1	2.9	3.2	3.3	3.5	2.9	3.6	
2027 Replacement Cost (2027\$)										\$18.4		
Asset Capital Costs*	\$1.7	\$4.9	\$7.2	\$5.3	\$8.1	\$12.6	\$10.5	\$13.7	\$12.1	\$11.2	\$87.4	\$72.1
Asset M&R Costs	\$4.9	\$4.9	\$4.6	\$4.8	\$4.8	\$5.2	\$5.5	\$6.1	\$6.4	\$6.4	\$53.6	\$45.3
Asset Fuel Costs	\$4.7	\$4.4	\$4.0	\$3.9	\$3.6	\$3.6	\$3.5	\$3.4	\$3.4	\$3.2	\$37.7	\$32.5
Total Direct Asset Costs (TCO)	\$11.3	\$14.2	\$15.9	\$13.9	\$16.5	\$21.4	\$19.6	\$23.2	\$21.8	\$20.8	\$178.7	\$150.0

*Debt service costs less used asset sale proceeds.





Impact of Alternative Replacement Plans on Direct Fleet *Expenditures*



Net Fiscal Impacts of Modernization

Fiscal Impacts of Modernization Relative to Status Quo Replacement													
	Fiscal Year											Total	% Diff/
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Avg	2017\$	Change
Increase/(Decrease) in Number of Assets Replaced	141	166	170	136	149	138	126	110	71	310	1,517		99%
Increase/(<mark>Decrease</mark>) in Average Asset Age (years)	(0.3)	(1.2)	(2.3)	(2.3)	(2.6)	(2.9)	(2.5)	(2.6)	(2.8)	(3.8)	(2.3)		-39%
Increase/(Decrease) in Next Year's Replacement Cost										(\$43.5)			
Increase/(Decrease) in Asset Capital Costs	(\$4.7)	(\$1.7)	\$0.5	(\$1.6)	\$1.1	\$5.3	\$3.1	\$6.5	\$3.7	\$3.4	\$15.7	\$11.4	19%
Increase/(Decrease) in Asset M&R Costs	(\$0.7)	(\$0.9)	(\$1.5)	(\$1.3)	(\$1.8)	(\$1.6)	(\$1.9)	(\$2.0)	(\$2.4)	(\$2.7)	(\$16.8)	(\$14.0)	-24%
Increase/ <mark>(Decrease)</mark> in Asset Fuel Costs	(\$0.5)	(\$0.6)	(\$0.9)	(\$0.6)	(\$0.7)	(\$0.7)	(\$0.7)	(\$0.7)	(\$0.7)	(\$0.8)	(\$6.8)	(\$5.8)	-15%
Increase/ <mark>(Decrease)</mark> in Total Cost	(\$5.9)	(\$3.2)	(\$1.9)	(\$3.6)	(\$1.4)	\$3.1	\$0.5	\$3.8	\$0.6	(\$0.0)	(\$7.9)	(\$8.4)	- 5%
Cummulative Increase/(Decrease) in Total Cost	(\$5.9)	(\$9.1)	(\$11.0)	(\$14.6)	(\$16.0)	(\$12.9)	(\$12.3)	(\$8.5)	(\$7.9)	(\$7.9)			





How do you get more capital dollars for fleet replacement?

- Identify optimal replacement cycles
- Quantify fleet replacement backlog and future costs
- Quantify reduction in fleet TCO from modernizing the fleet
- Show that fleet modernization is affordable
- Rightsize the fleet





Rightsizing Your Fleet

- Asking for money to modernize a fleet absent an understanding of the appropriateness of its current size, composition, and utilization is a mistake
- Attempting to rightsize an old fleet when users lack confidence in the availability and reliability of assets to meet their business need also is a mistake
- In short, vehicle allocation and utilization management and fleet replacement practices are interdependent; don't try to improve in one area while ignoring the other



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How do you avoid developing a replacement backlog in the future?

- Institutionalize the replacement budgeting and funding process
- Maintain fleet user engagement in this process
- Quantify and publicize costs of aging vehicles and benefits of fleet modernization
- Make fleet operating costs transparent
- Re-educate decision makers regularly to maintain autonomy of, and political support for, replacement program





Questions



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