



Taking the

REINS

LEADING YOUR FLEET TO THE NEXT LEVEL

Making the Case for an Effective Fleet Replacement Program

Austin, TX
June 22, 2010

Paul Lauria

MERCURY

Presentation Overview

- Why the timely replacement of vehicles and equipment is important
- Why organizations often under spend on fleet replacement
- Persuading decision makers to spend more money on fleet replacement
 - Determining optimal replacement cycles
 - Developing a fleet replacement plan
 - Determining fleet TCO under alternative replacement scenarios
 - Evaluating alternative replacement financing approaches



Why is the timely replacement of vehicles and equipment important?

- Controlling employee and public safety
- Controlling fleet maintenance and repair costs
- Managing total costs of asset ownership
- Promoting employee productivity
- Promoting efficiency of fleet management and maintenance activities
- Projecting a positive image to customers, upper management, taxpayers, elected officials, and/or the general public

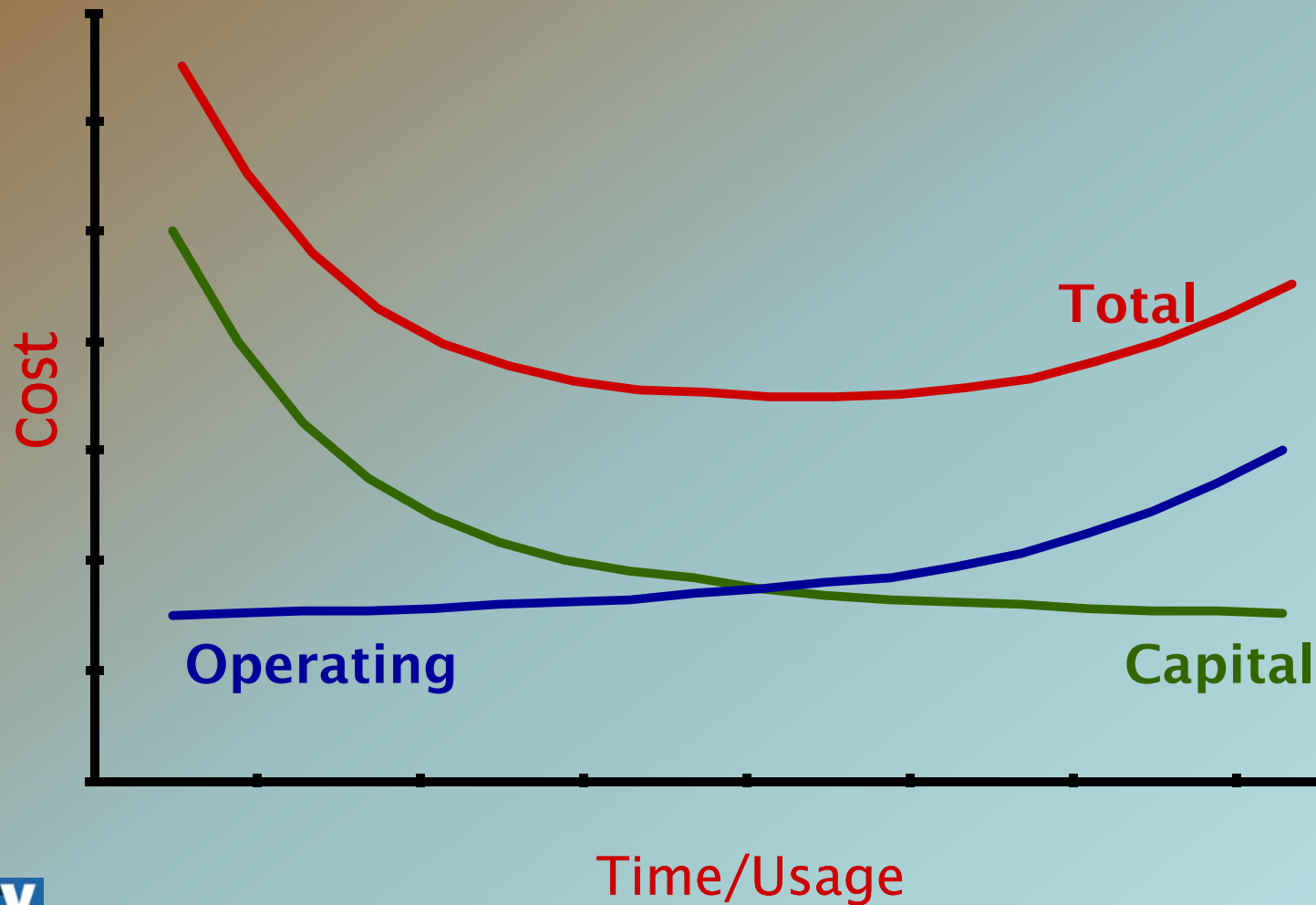


Why do organizations do a poor job of replacing vehicles in a timely manner?

- Lack of *willingness* to devote sufficient funds to the timely replacement of fleet assets
- *Not* lack of *ability* to pay for timely replacement of assets



Life Cycle Costs of a Vehicle



Vehicle Life Cycle Costs

A 7-yr cycle *is* cheaper than a 2-yr cycle...

Replacement Cycle in Years:	1	2	3	4	5	6	7	8	9	10
Meter at replacement	9,407	18,814	28,221	37,628	47,035	56,442	65,849	75,256	84,663	94,070
CAPITAL COST										
Annual Depreciation	\$58,684	\$29,342	\$19,561	\$19,561	\$12,793	\$10,680	\$6,150	\$6,398	\$5,344	\$4,464
Cumulative Depreciation	\$58,684	\$88,025	\$107,587	\$127,148	\$139,941	\$150,621	\$156,772	\$163,170	\$168,514	\$172,978
OPERATING COSTS										
Annual Maint and Repair Cost	\$2,473	\$6,296	\$11,011	\$16,511	\$22,758	\$29,740	\$37,462	\$45,935	\$55,178	\$65,214
Annual Fuel Cost	\$11,361	\$11,819	\$12,295	\$12,791	\$13,306	\$13,842	\$14,400	\$14,981	\$15,584	\$16,212
Total Annual Operating Cost	\$13,834	\$18,115	\$23,306	\$29,302	\$36,064	\$43,583	\$51,862	\$60,915	\$70,762	\$81,427
Cumulative Operating Cost	\$13,834	\$31,949	\$55,255	\$84,556	\$120,620	\$164,203	\$216,066	\$276,981	\$347,743	\$429,170
TOTAL COST										
Annual Total Cost	\$72,518	\$47,457	\$42,867	\$48,863	\$48,857	\$54,263	\$58,013	\$67,314	\$76,106	\$85,890
Cumulative Total Cost	\$72,518	\$119,975	\$162,842	\$211,704	\$260,562	\$314,825	\$372,837	\$440,151	\$516,257	\$602,148
NPV of Cumulative Total Cost	\$68,413	\$110,649	\$146,641	\$185,345	\$221,854	\$260,108	\$298,689	\$340,923	\$385,970	\$433,931
Equivalent Annual Cost	\$70,465	\$57,827	\$51,842	\$49,863	\$48,443	\$48,015	\$47,942	\$48,567	\$49,572	\$50,870

...and cheaper than a 10-yr cycle too



Why is there a lack of willingness to spend money on fleet replacement?

- Choice of capital financing approach colors perceptions:
 - Pay before you go versus pay as you go
 - Sunk cost versus ongoing depreciation
- Focus on marginal M&R cost versus total cost
- Lack of understanding of vehicle life cycle cost principles
- Lack of understanding of the magnitude and volatility of fleet replacement costs
- Lack of understanding of the impact of vehicle age on vehicle performance
- Lack of appreciation of the importance of the fleet to overall organizational success



How do you get more capital dollars for fleet replacement?

- *Empirically identify optimal vehicle replacement cycles*



Vehicle Life Cycle Costs (solid waste truck)

Replacement Cycle in Years:	1	2	3	4	5	6	7	8	9	10
Meter at replacement	9,407	18,814	28,221	37,628	47,035	56,442	65,849	75,256	84,663	94,070
CAPITAL COST										
Estimated Residual Value	\$136,929	\$107,587	\$88,025	\$68,464	\$ 55,671	\$ 44,991	\$ 38,840	\$ 32,442	\$ 27,098	\$ 22,634
Annual Depreciation	\$58,684	\$29,342	\$19,561	\$19,561	\$12,793	\$10,680	\$ 6,150	\$6,398	\$5,344	\$4,464
Cumulative Depreciation	\$58,684	\$88,025	\$107,587	\$127,148	\$139,941	\$150,621	\$156,772	\$163,170	\$168,514	\$172,978
OPERATING COSTS										
Annual Maint and Repair Cost	\$2,473	\$6,296	\$11,011	\$16,511	\$22,758	\$29,740	\$37,462	\$45,935	\$55,178	\$65,214
Annual Fuel Cost	\$11,361	\$11,819	\$12,295	\$12,791	\$13,306	\$13,842	\$14,400	\$14,981	\$15,584	\$16,212
Total Annual Operating Cost	\$13,834	\$18,115	\$23,306	\$29,302	\$36,064	\$43,583	\$51,862	\$60,915	\$70,762	\$81,427
Cumulative Operating Cost	\$13,834	\$31,949	\$55,255	\$84,556	\$120,620	\$164,203	\$216,066	\$276,981	\$347,743	\$429,170
TOTAL COST										
Annual Total Cost	\$72,518	\$47,457	\$42,867	\$48,863	\$48,857	\$54,263	\$58,013	\$67,314	\$76,106	\$85,890
Cumulative Total Cost	\$72,518	\$119,975	\$162,842	\$211,704	\$260,562	\$314,825	\$372,837	\$440,151	\$516,257	\$602,148
NPV of Cumulative Total Cost	\$68,413	\$110,649	\$146,641	\$185,345	\$221,854	\$260,108	\$298,689	\$340,923	\$385,970	\$433,931
Equivalent Annual Cost	\$70,465	\$57,827	\$51,842	\$49,863	\$48,443	\$48,015	\$47,942	\$48,567	\$49,572	\$50,870



How do you get more capital dollars for fleet replacement?

- Empirically identify optimal vehicle replacement cycles
- *Develop a plan that quantifies long-term fleet replacement costs*



Developing a Fleet Replacement Plan



Why develop a replacement plan?

- To determine and quantify the extent to which a backlog of vehicle replacement needs exists
- To develop an understanding of the magnitude and annual volatility of future fleet replacement costs
- To provide the foundation for developing a business case justification for increasing fleet replacement spending
- To support the evaluation of alternative capital financing approaches



Sample Replacement Cycles

Vehicle Type	Months	Miles
Ambulance (cab and chassis)	24	72,000
Hybrid Electric Sedan	48	50,000
Refuse Truck	48	42,000
Patrol Car	60	68,000
2x4 1/2T Pickup Truck	60	53,000
2x4 3/4T Pickup Truck	72	60,000
Investigative Sedan	84	70,000
Passenger Van	96	60,000
10-Yard Dump Truck	108	56,000
Fire Pumper Truck	108	75,000
Medium-Duty Utility Truck	120	57,000

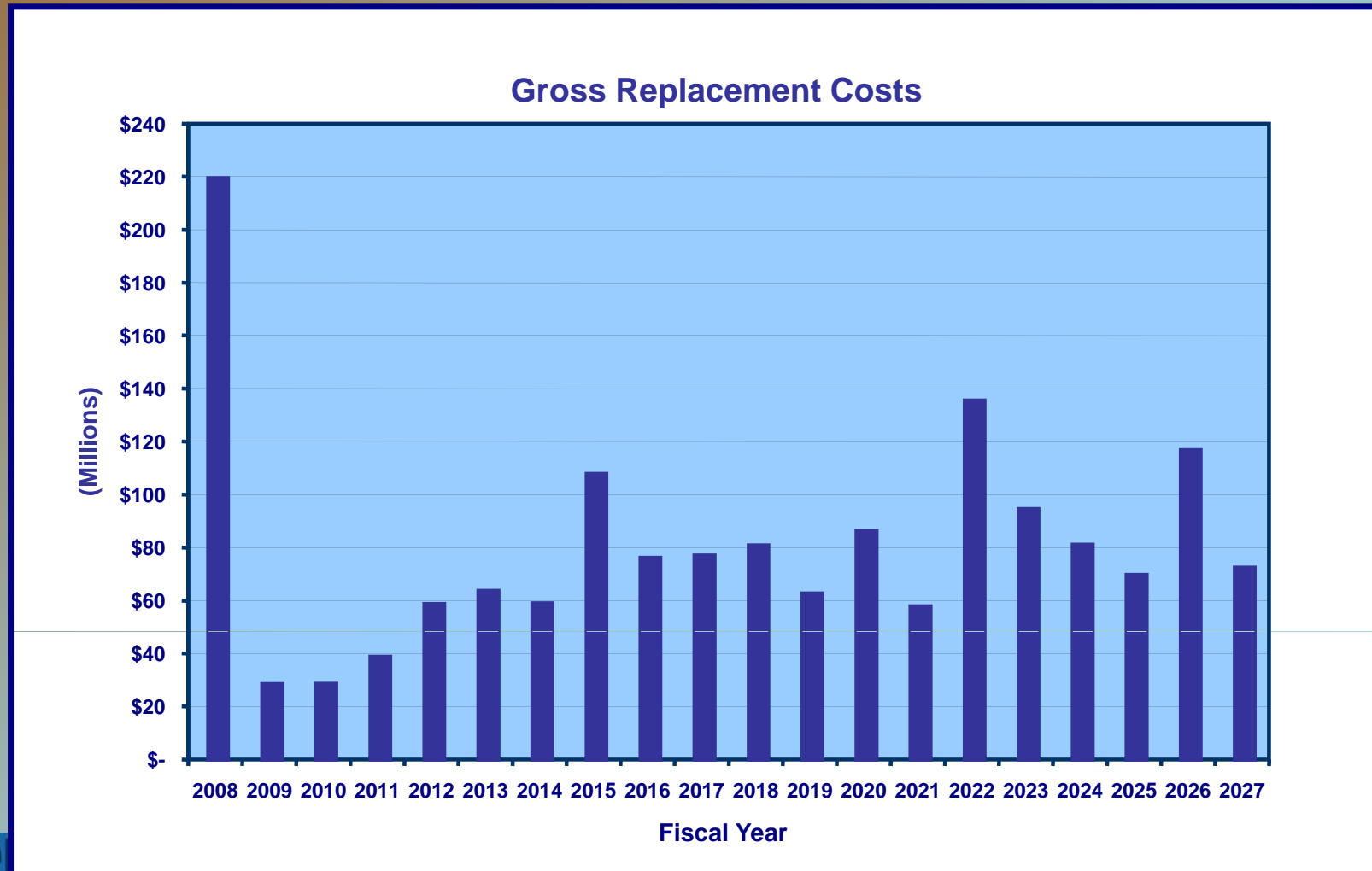


Sample Purchase Prices

Vehicle Type	Purchase Price
Ambulance (cab and chassis)	\$ 30,072
Hybrid Electric Sedan	\$ 20,876
Refuse Truck	\$ 190,000
Patrol Car	\$ 24,357
2x4 1/2T Pickup Truck	\$ 13,593
2x4 3/4T Pickup Truck	\$ 15,843
Investigative Sedan	\$ 16,076
Passenger Van	\$ 18,256
10-Yard Dump Truck	\$ 135,000
Fire Pumper Truck	\$ 445,000
Medium-Duty Utility Truck	\$ 78,616



Baseline Fleet Replacement Plan

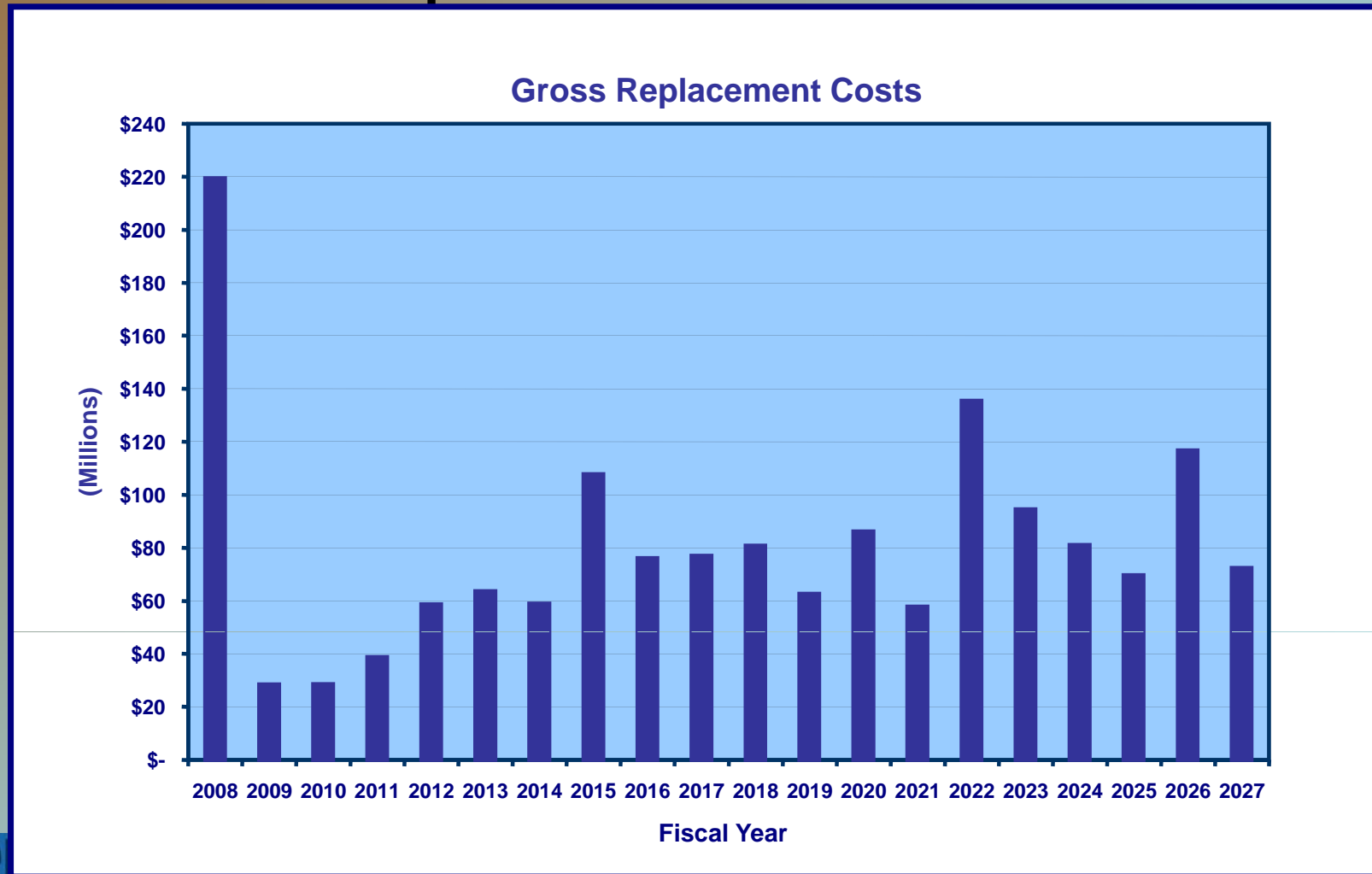


Fleet Statistics

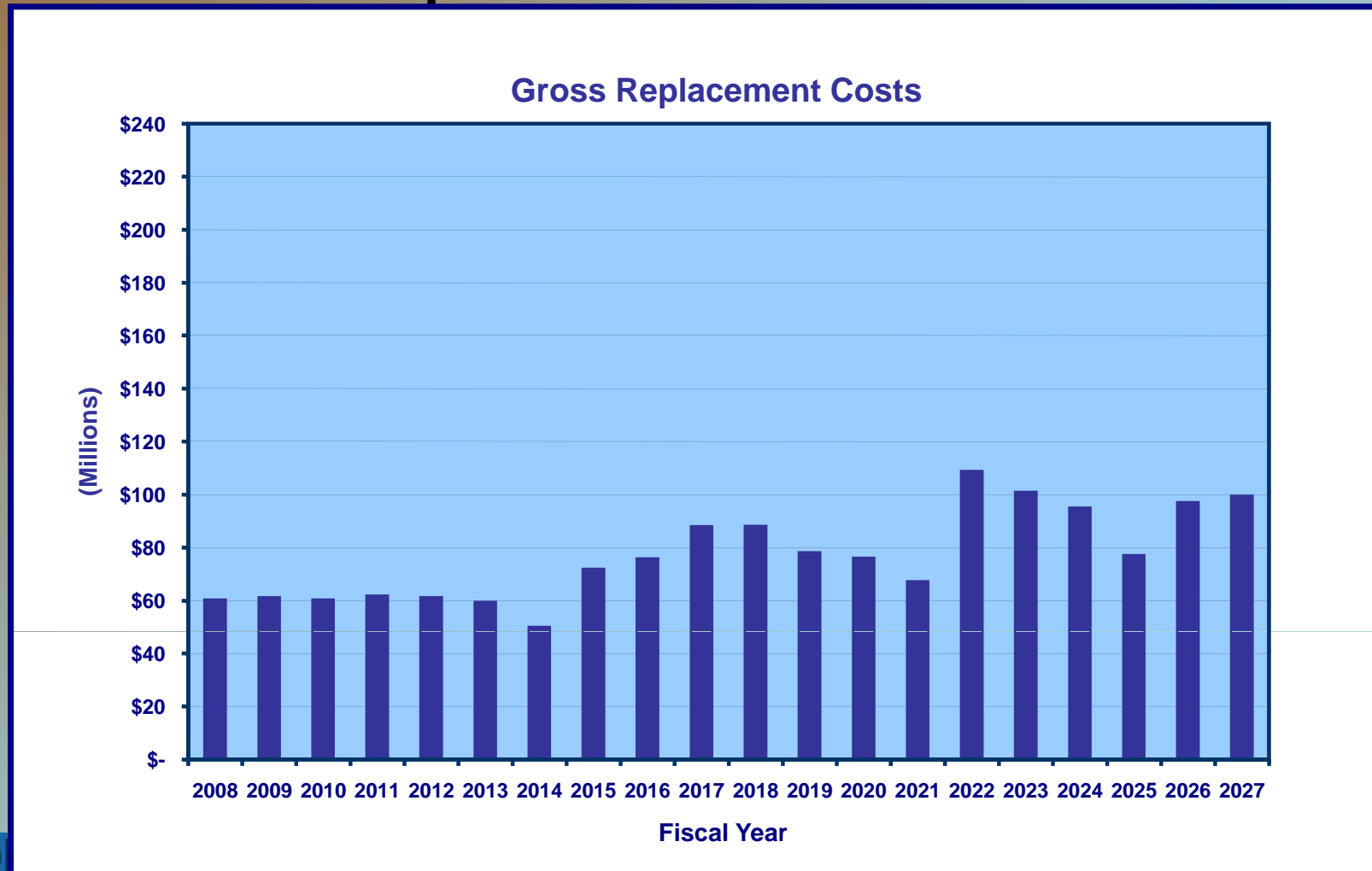
Total number of units	7,386
Number of asset types	233
Current average age (years)	7.5
Imputed average replacement cycle (years)	15.0
Average recommended replacement cycle (years)	6.2
Original purchase price	\$248 M
Replacement cost	\$366 M
Average annual replacement cost	\$59 M
Current replacement backlog	\$220 M
Number of units that exceed age and/or usage criteria for replacement	5,340
Percentage of units that exceed age and/or usage criteria for replacement	72%



Baseline versus Smoothed Replacement Plans



Baseline versus *Smoothed* Replacement Plans



How do you get more capital dollars for fleet replacement?

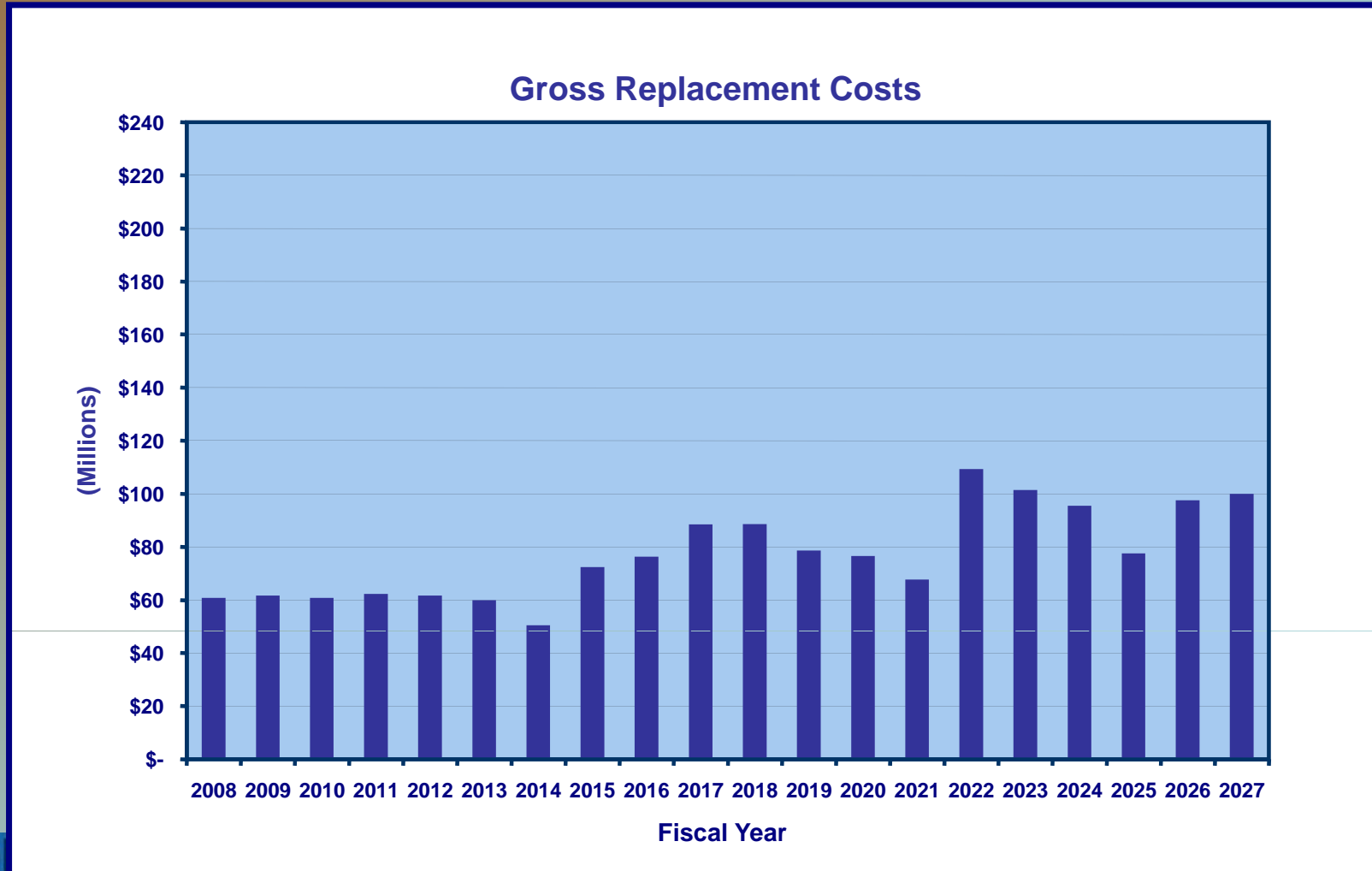
- Empirically identify optimal vehicle replacement cycles
- Develop a plan that quantifies long-term fleet replacement costs
- *Quantify fleet costs under alternative replacement scenarios*



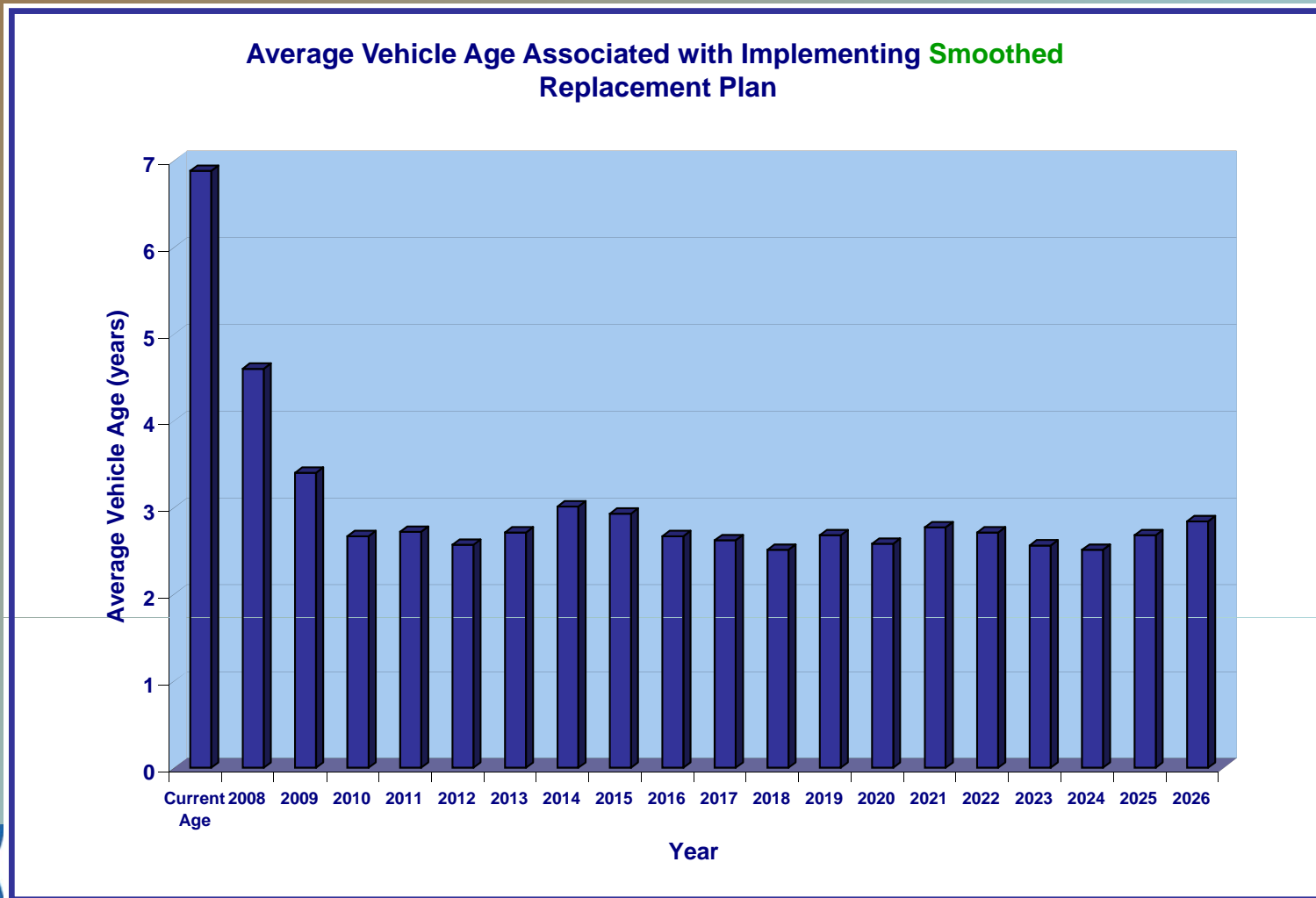
Determining Fleet Costs Under Alternative Replacement Spending Scenarios



Smoothed Replacement Plan

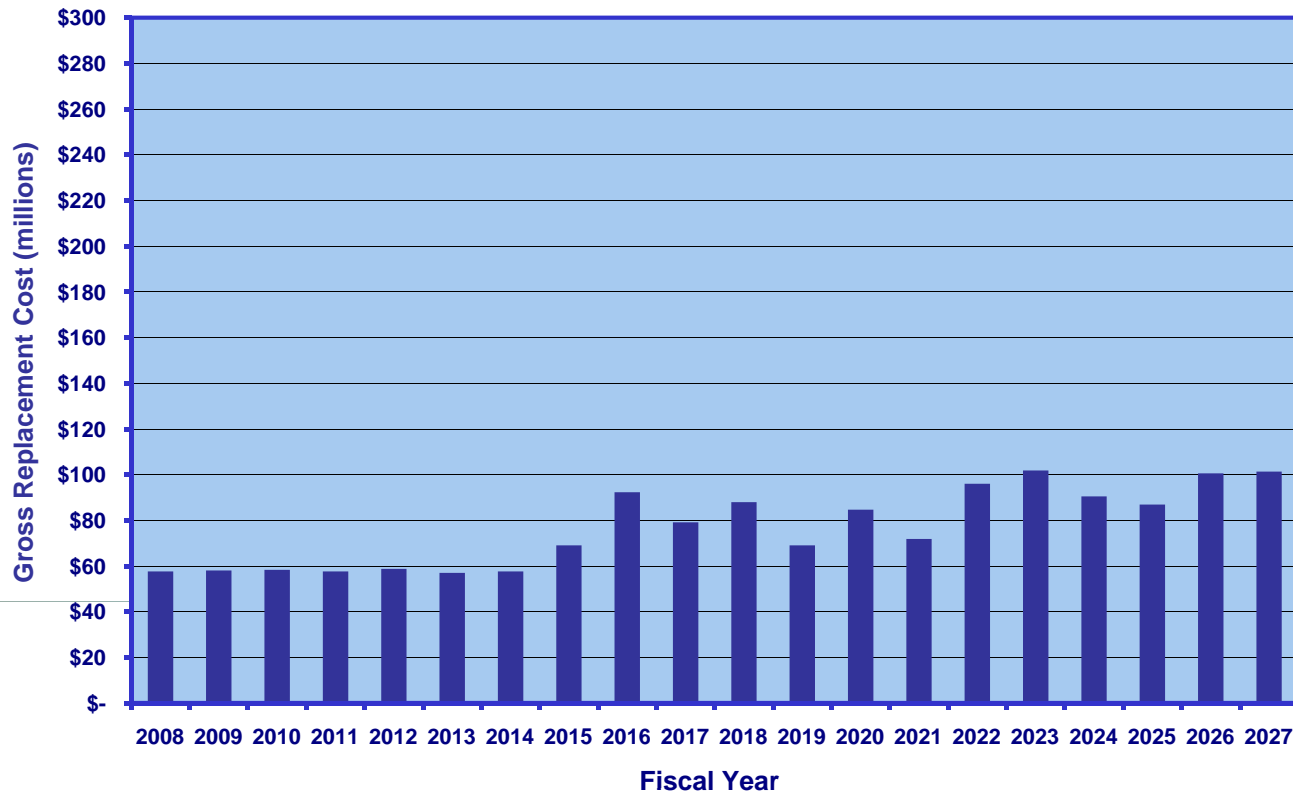


Reduction in Vehicle Age if Fleet is Renewed

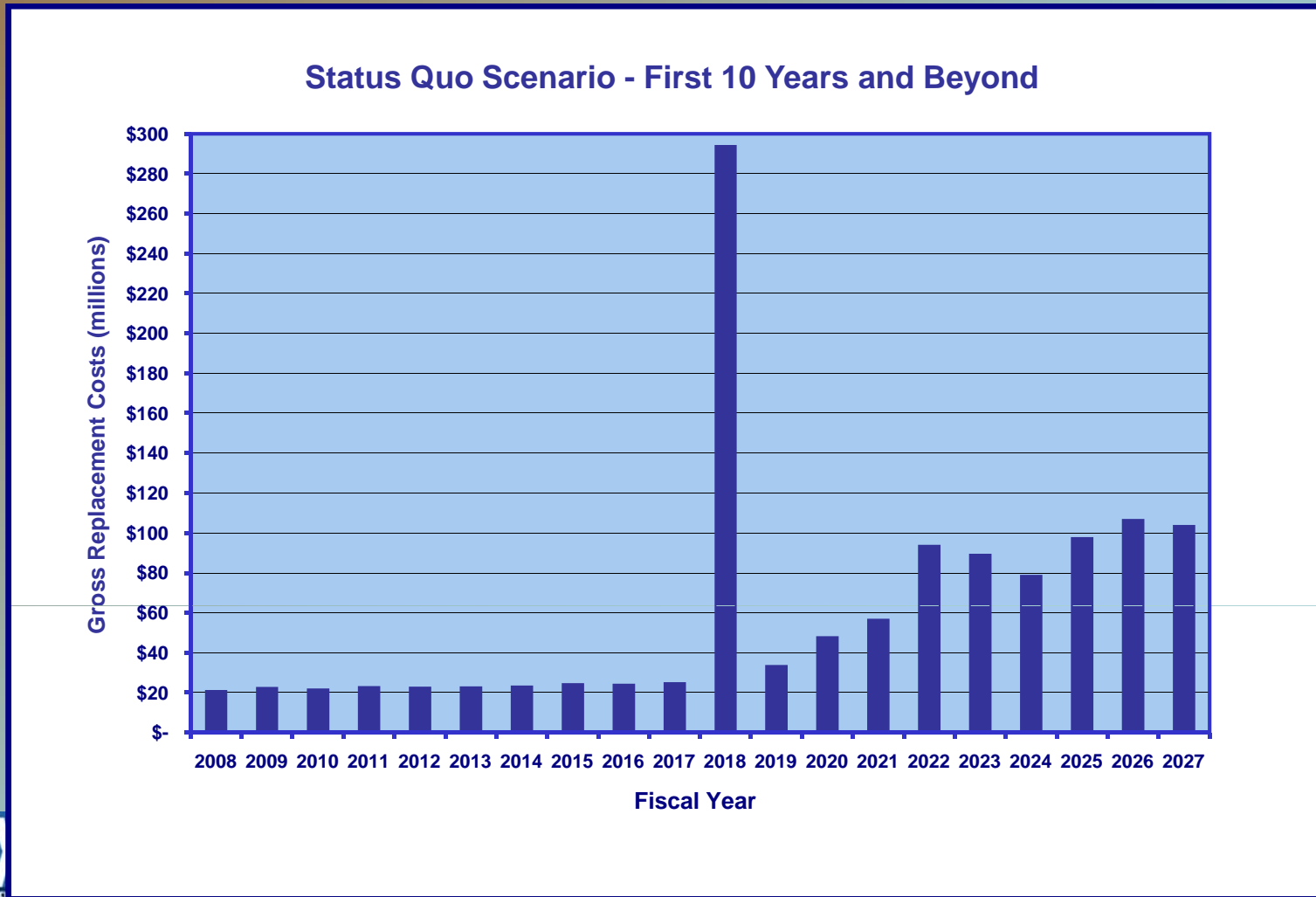


Fleet Replacement Costs Under “Fleet Renewal” Scenario

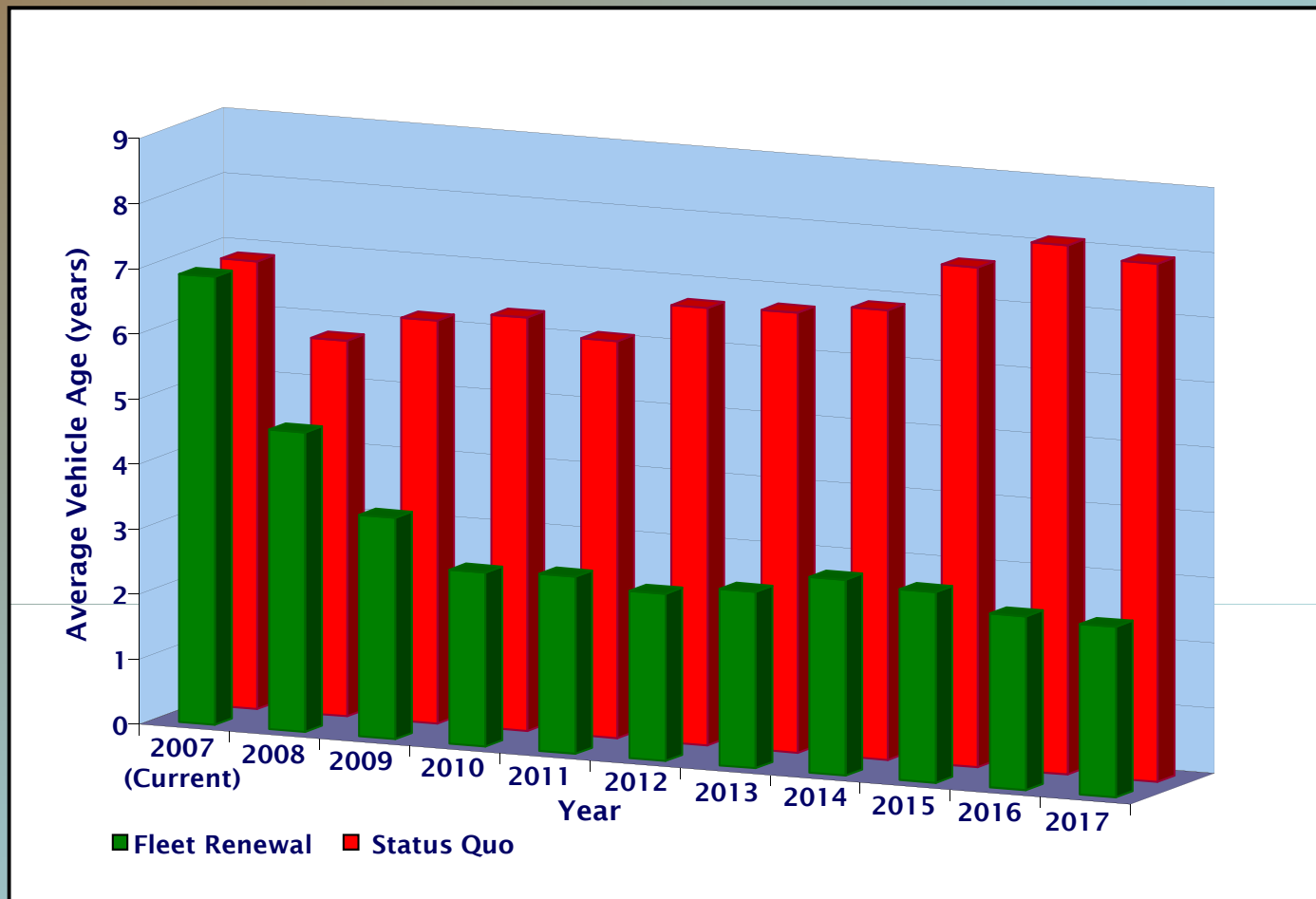
Fleet Renewal Scenario - First 10 Years and Beyond



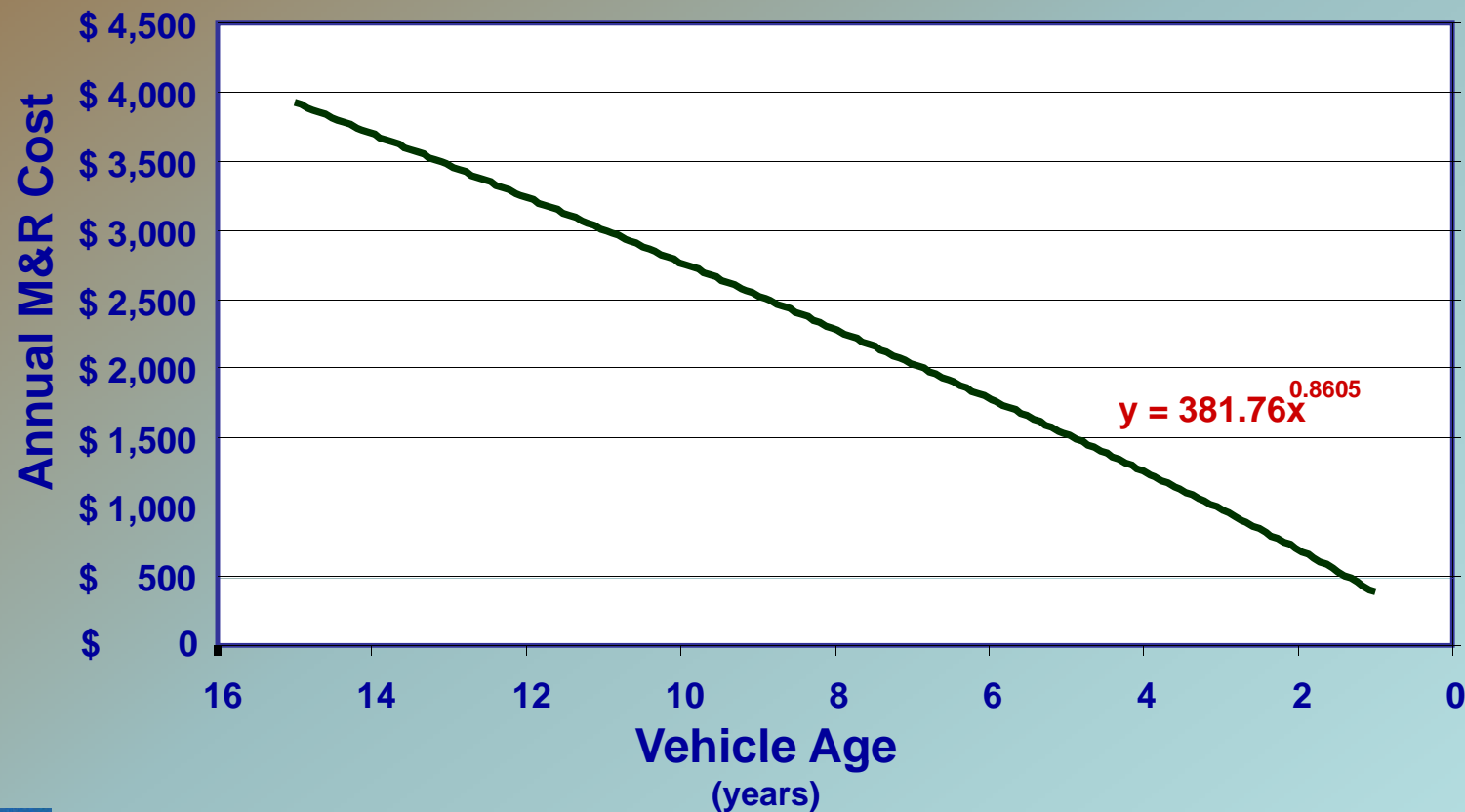
Fleet Replacement Costs Under “Status Quo” Approach



Change in Vehicle Age Under Renewal and Status Quo Scenarios



Annual Maintenance and Repair Cost Per VEU as a Function of VEU Age



Annual M&R Cost per VEU by Age

% Decrease	Age	Cost	% Increase
--	18	\$ 4,591	5%
5%	17	\$ 4,371	5%
5%	16	\$ 4,149	6%
5%	15	\$ 3,925	6%
6%	14	\$ 3,699	7%
6%	13	\$ 3,470	7%
7%	12	\$ 3,239	8%
7%	11	\$ 3,005	9%
8%	10	\$ 2,769	9%
9%	9	\$ 2,529	11%
10%	8	\$ 2,285	12%
11%	7	\$ 2,037	14%
12%	6	\$ 1,784	17%
15%	5	\$ 1,525	21%
17%	4	\$ 1,259	28%
22%	3	\$ 983	42%
30%	2	\$ 693	81%
45%	1	\$ 382	--



Fleet Fuel Cost Savings Resulting from Fleet Renewal

Year	Miles per Gallon	Annual Gallons Used	Annual Savings
Current	10.7	6,063,458	\$ 53,349
1	10.8	5,996,941	\$ 287,298
2	10.9	5,942,923	\$ 425,840
3	11.0	5,887,905	\$ 569,449
4	11.1	5,834,861	\$ 718,636
5	11.2	5,782,764	\$ 873,958
6	11.3	5,731,589	\$ 1,036,022
7	11.4	5,681,312	\$ 1,205,491
8	11.5	5,631,910	\$ 1,383,087
9	11.6	5,583,359	\$ 1,569,604
10	11.7	5,535,638	\$ 1,569,604
20	12.8	5,059,919	\$ 3,452,889



Economic Comparison of Fleet Renewal and Status Quo Scenarios

Fleet Costs/Asset Value Under Fleet Renewal Scenario (millions)

Cost Category/Year	1	2	3	4	5	6	7	8	9	10	Total
Gross Replacement Cost	\$57	\$58	\$58	\$57	\$58	\$56	\$57	\$69	\$92	\$79	\$641
Annual Asset Depreciation	\$34	\$34	\$37	\$39	\$41	\$42	\$42	\$46	\$54	\$53	\$422
Annual Maintenance and Repair Cost	\$24	\$20	\$17	\$15	\$14	\$16	\$17	\$17	\$17	\$17	\$175
Annual Fuel Cost	\$15	\$16	\$16	\$17	\$17	\$18	\$18	\$19	\$19	\$20	\$174
Annual Total Cost¹	\$74	\$70	\$71	\$70	\$72	\$75	\$78	\$82	\$90	\$89	\$771
Ending Fair Market Value of Assets	\$107	\$127	\$140	\$149	\$155	\$157	\$157	\$163	\$180	\$187	

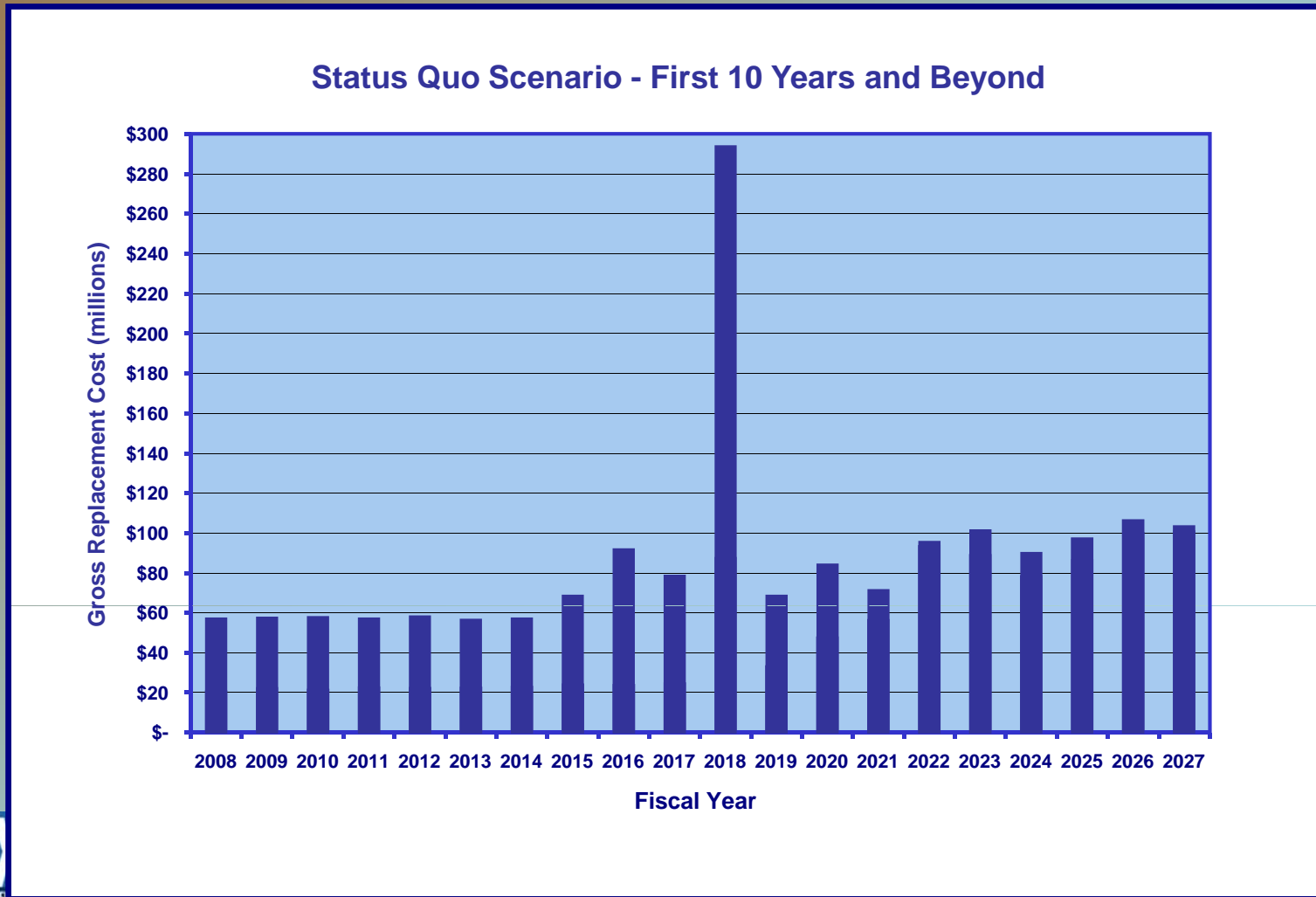
Fleet Costs/Asset Value Under Status Quo Scenario (millions)

Cost Category/Year	1	2	3	4	5	6	7	8	9	10	Total
Gross Replacement Cost	\$21	\$22	\$22	\$23	\$22	\$23	\$23	\$24	\$24	\$25	\$228
Annual Asset Depreciation	\$24	\$20	\$20	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$210
Annual Maintenance and Repair Cost	\$26	\$28	\$30	\$31	\$34	\$35	\$37	\$41	\$45	\$47	\$355
Annual Fuel Cost	\$15	\$16	\$17	\$17	\$18	\$18	\$19	\$19	\$20	\$21	\$180
Annual Total Cost¹	\$65	\$65	\$67	\$69	\$73	\$74	\$77	\$81	\$86	\$89	\$745
Ending Fair Market Value of Assets	\$84	\$85	\$85	\$85	\$86	\$86	\$85	\$83	\$82	\$83	

Savings (Costs) Associated with Fleet Renewal (millions)

Cost Category/Year	1	2	3	4	5	6	7	8	9	10	Total
Cumulative Savings from (Costs of) Fleet Renewal	(\$9)	(\$14)	(\$18)	(\$19)	(\$19)	(\$19)	(\$20)	(\$21)	(\$24)	(\$25)	
Increase (Decrease) in Value of Assets from Renewal	\$23	\$41	\$55	\$64	\$69	\$71	\$72	\$80	\$97	\$104	
Net Annual Savings (Costs) from Fleet Renewal²	\$14	\$28	\$38	\$44	\$51	\$52	\$52	\$60	\$73	\$78	
NPV Savings (Costs) from Fleet Renewal³											\$41

Fleet Replacement Costs Under Alternative Replacement Scenarios



What have we left out?

10-Year Fleet Costs/Asset Value Under Fleet Renewal Scenario (millions)

Cost Category/Year	1	2	3	4	5	6	7	8	9	10	Total
Gross Replacement Cost	\$54	\$54	\$56	\$57	\$58	\$55	\$55	\$66	\$89	\$76	\$621
Annual Asset Depreciation	\$33	\$33	\$36	\$38	\$40	\$41	\$41	\$45	\$52	\$51	\$409
Annual M&R Cost	\$23	\$18	\$15	\$14	\$14	\$15	\$16	\$17	\$16	\$16	\$164
Annual Fuel Cost	\$15	\$15	\$16	\$16	\$17	\$17	\$18	\$18	\$19	\$19	\$170
Annual Total Cost¹	\$71	\$66	\$67	\$68	\$70	\$73	\$75	\$80	\$87	\$87	\$743
Ending Fair Market Value of Assets	\$104	\$122	\$135	\$145	\$151	\$154	\$153	\$159	\$175	\$181	

10-Year Fleet Costs/Asset Value Under Status Quo Scenario (millions)

Cost Category/Year	1	2	3	4	5	6	7	8	9	10	Total
Gross Replacement Cost	\$21	\$22	\$22	\$23	\$22	\$23	\$23	\$24	\$24	\$25	\$228
Annual Asset Depreciation	\$24	\$20	\$20	\$21	\$21	\$21	\$21	\$21	\$21	\$21	\$210
Annual M&R Cost	\$26	\$28	\$30	\$31	\$34	\$35	\$37	\$41	\$45	\$47	\$355
Annual Fuel Cost	\$15	\$16	\$17	\$17	\$18	\$18	\$19	\$19	\$20	\$21	\$180
Annual Total Cost¹	\$65	\$65	\$67	\$69	\$73	\$74	\$77	\$81	\$86	\$89	\$745
Ending Fair Market Value of Assets	\$84	\$85	\$85	\$85	\$86	\$86	\$85	\$83	\$82	\$83	

10-Year Savings (Costs) Associated with Fleet Renewal (millions)

Cost Category/Year	1	2	3	4	5	6	7	8	9	10	Total
Cumulative Savings from (Costs of) Fleet Renewal	(\$6)	(\$7)	(\$7)	(\$7)	(\$4)	(\$3)	(\$1)	\$1	\$0	\$2	
Increase (Decrease) in Value of Assets from Renewal	\$20	\$36	\$50	\$59	\$65	\$67	\$68	\$76	\$92	\$98	
Net Annual Savings (Costs) from Fleet Renewal²	\$14	\$29	\$43	\$53	\$62	\$65	\$65	\$77	\$92	\$100	
NPV Savings (Costs) from Fleet Renewal³											\$57

How do you get more capital dollars for fleet replacement?

- Empirically identify optimal vehicle replacement cycles
- Develop a plan that quantifies long-term fleet replacement costs
- Quantify fleet costs under alternative replacement scenarios
- *Identify a viable strategy for financing fleet renewal costs*



Evaluating Alternative Capital Financing Approaches



Methods of Financing Vehicle and Equipment Acquisitions

- Ad hoc (i.e., year-to-year) allocations or appropriations of cash
- Accumulation of cash reserves in a fleet replacement fund, usually through the use of an internal leasing or replacement cost charge-back program
- Borrowing cash from financial institutions, including the financing units of vehicle manufacturers
- Borrowing cash from investors through the issuance of bonds



● Leasing from a leasing company, bank, or commercial finance company



A Note on Terminology

- **Financing:** The method used to pay for the acquisition of an asset
- **Funding:** The amount of money required to acquire an asset under a particular financing method

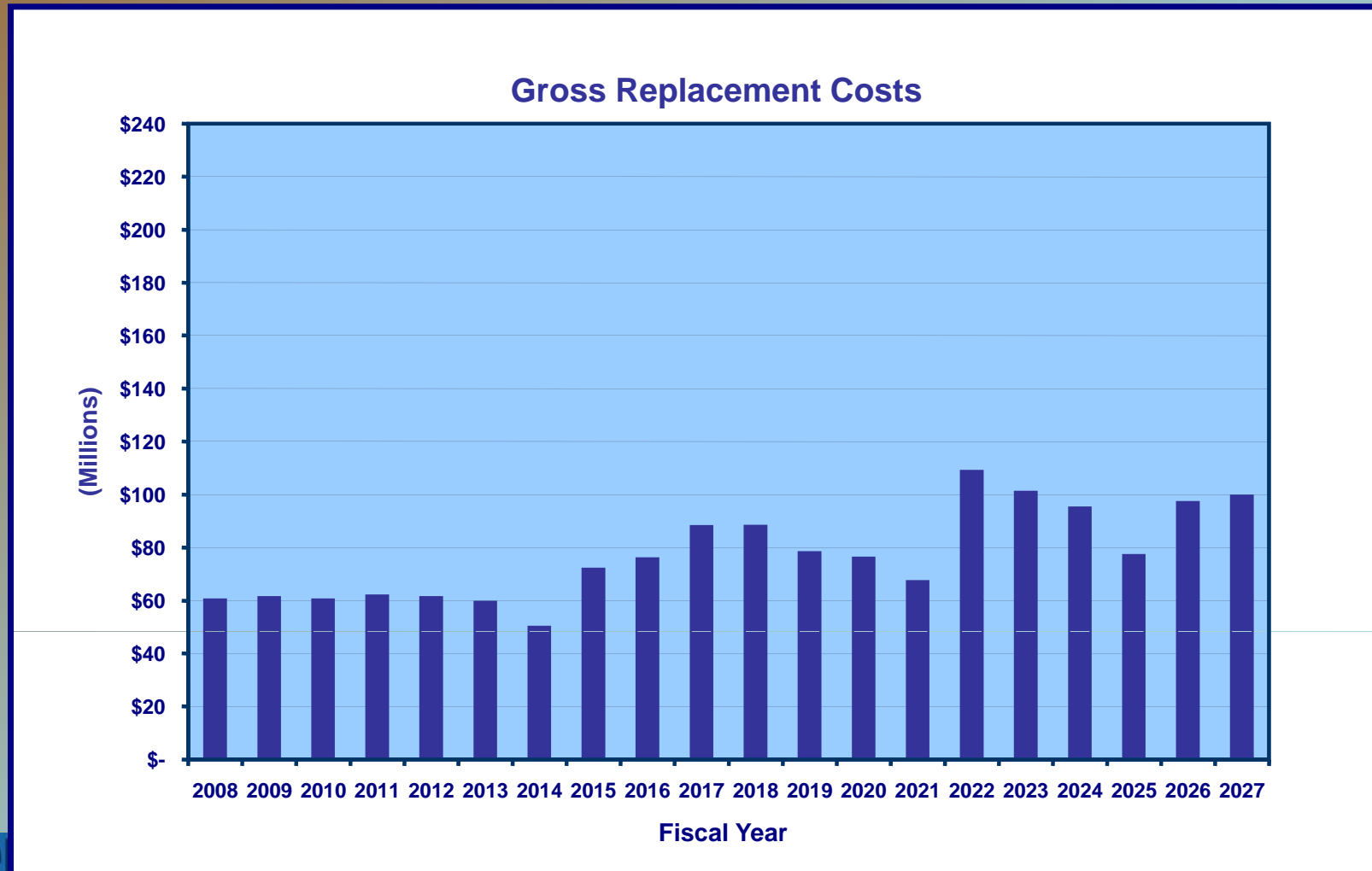


Why is the type of capital financing you use important?

- Because year-over-year funding requirements can vary dramatically depending on the type of financing used



Smoothed Replacement Plan



Replacement Funding Requirements by Financing Approach

Total	Year 1	Years 1-5	Years 1-10
Financing Approach A	\$ 56.6 M	\$ 265.4 M	\$ 517.6 M
Financing Approach B	\$ 58.5 M	\$ 265.6 M	\$ 526.6 M
Financing Approach C	\$ 4.1M	\$ 93.2 M	\$ 339.4 M
Financing Approach D	\$ 11.5 M	\$ 158.6 M	\$ 420.1 M
Annual Average	Year 1	Years 1-5	Years 1-10
Financing Approach A	\$ 56.6 M	\$ 53.1 M	\$ 51.8 M
Financing Approach B	\$ 58.5 M	\$ 53.1 M	\$ 52.7 M
Financing Approach C	\$ 4.1M	\$ 18.6 M	\$ 33.9 M
Financing Approach D	\$ 11.5 M	\$ 31.7 M	\$ 42.0 M

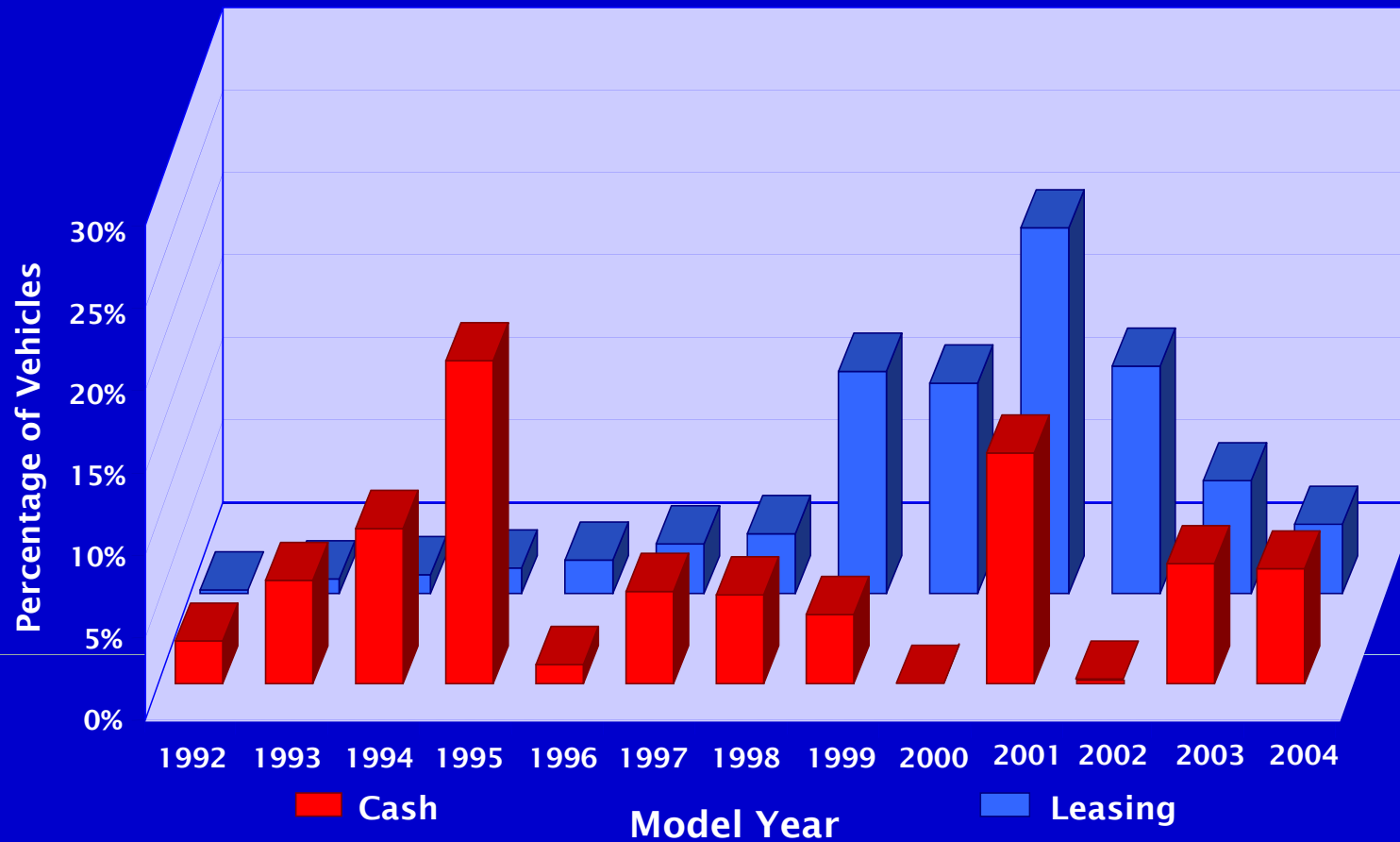


Why is the type of capital financing used important?

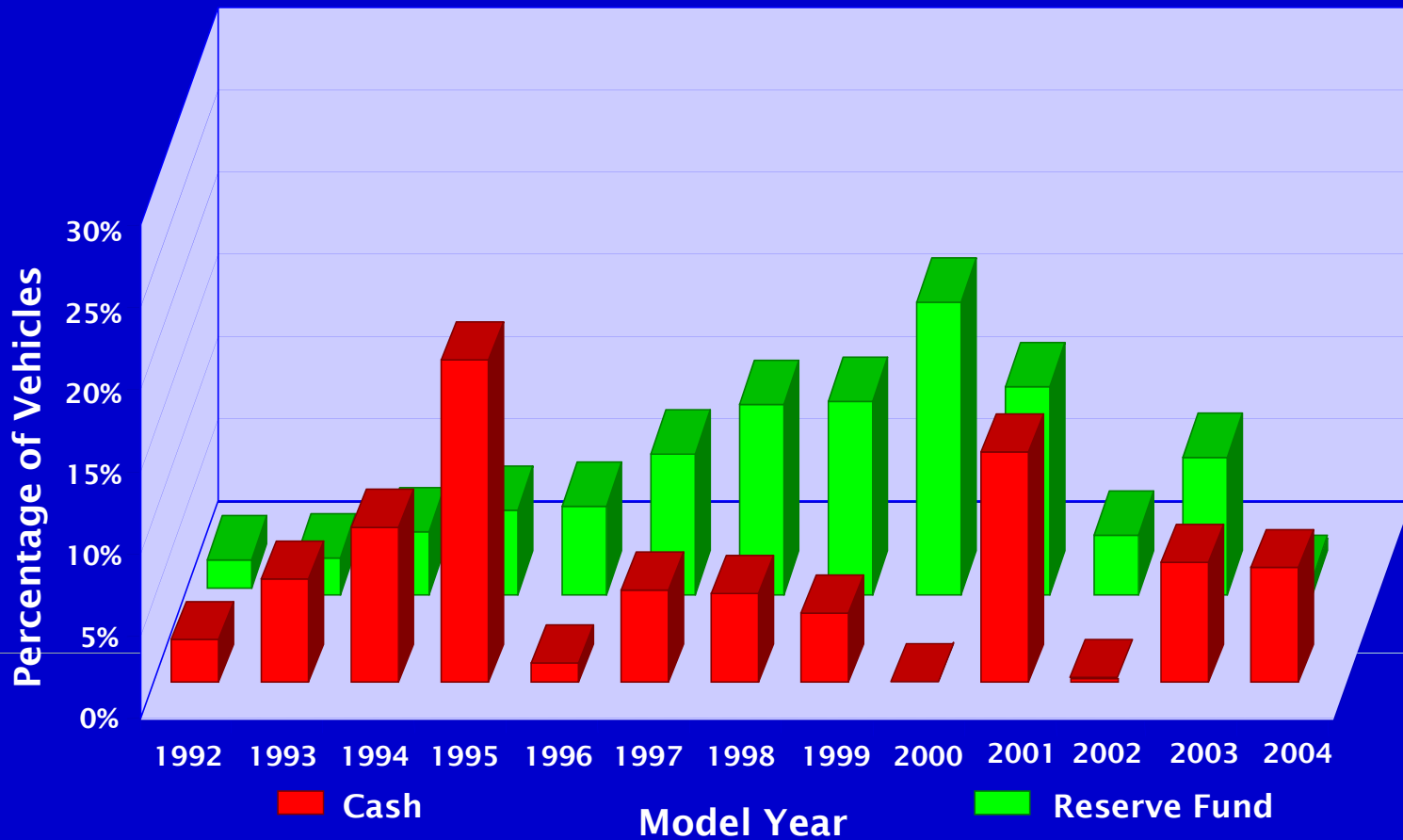
- Because year-over-year funding requirements can vary dramatically depending on the type of financing used
- Because year-over-year funding requirements are a key determinant of how much money most organizations devote to fleet replacement
- Because the amounts of funds an organization devotes to fleet replacement determine whether it has an old or a young fleet



Comparative Distribution of Vehicles by Model Year and Capital Financing Approach



Comparative Distribution of Vehicles by Model Year and Capital Financing Approach



Purchases Financed with Cash from Ad Hoc Appropriations

- Annual funding requirements equal purchase prices of assets to be replaced less proceeds from the sale of used vehicles
- Pros
 - Vehicles are owned free and clear as soon as they are paid for
- Cons
 - Pay-before-you-go approach results in lumpy year-over-year funding requirements
 - Volatile funding needs coupled with competition for available funds almost always results in under funding of replacement purchases and old fleets
 - Does not promote recognition of vehicle capital costs or management of TCO



Purchases Financed Using a Replacement Reserve Fund

- Cash reserves are accumulated in a special account or revolving fund, usually through the use of an internal lease or replacement cost charge-back system
- Pros
 - Pay-as-you-go approach makes year-over year funding requirements smooth and predictable
 - Use of cost charge-back system promotes recognition of fixed costs
- Cons
 - Revolving funds and cost charge-back systems are difficult to administer properly and cash reserves are susceptible to raiding during tough economic times
 - Costly to establish if fleet is old



Purchases Financed with Bonds

- Various Types, Including:
 - Commercial Paper Program
 - Certificates of Participation
 - General Obligation Bonds
 - Revenue Bonds
- Pros
 - Pay-as-you-go approach
 - Use of cost charge-back system promotes recognition of fixed costs*
 - Big budget savings if switching from cash financing
- Cons
 - Politicizable
 - Use often constrained by borrowing caps
 - More complicated to administer than other types of borrowing
 - Improper use can result in ever increasing debt burdens



Purchases Financed with Loans

- Frequently referred to as lease purchases
- Available from both commercial banks and many vehicle/equipment manufacturers
- Pros
 - Pay-as-you-go approach
 - Use of cost charge-back system promotes recognition of fixed costs*
 - Big budget savings if switching from cash financing
- Cons
 - Require long-term perspective and commitment
 - Difficult to stop using once started

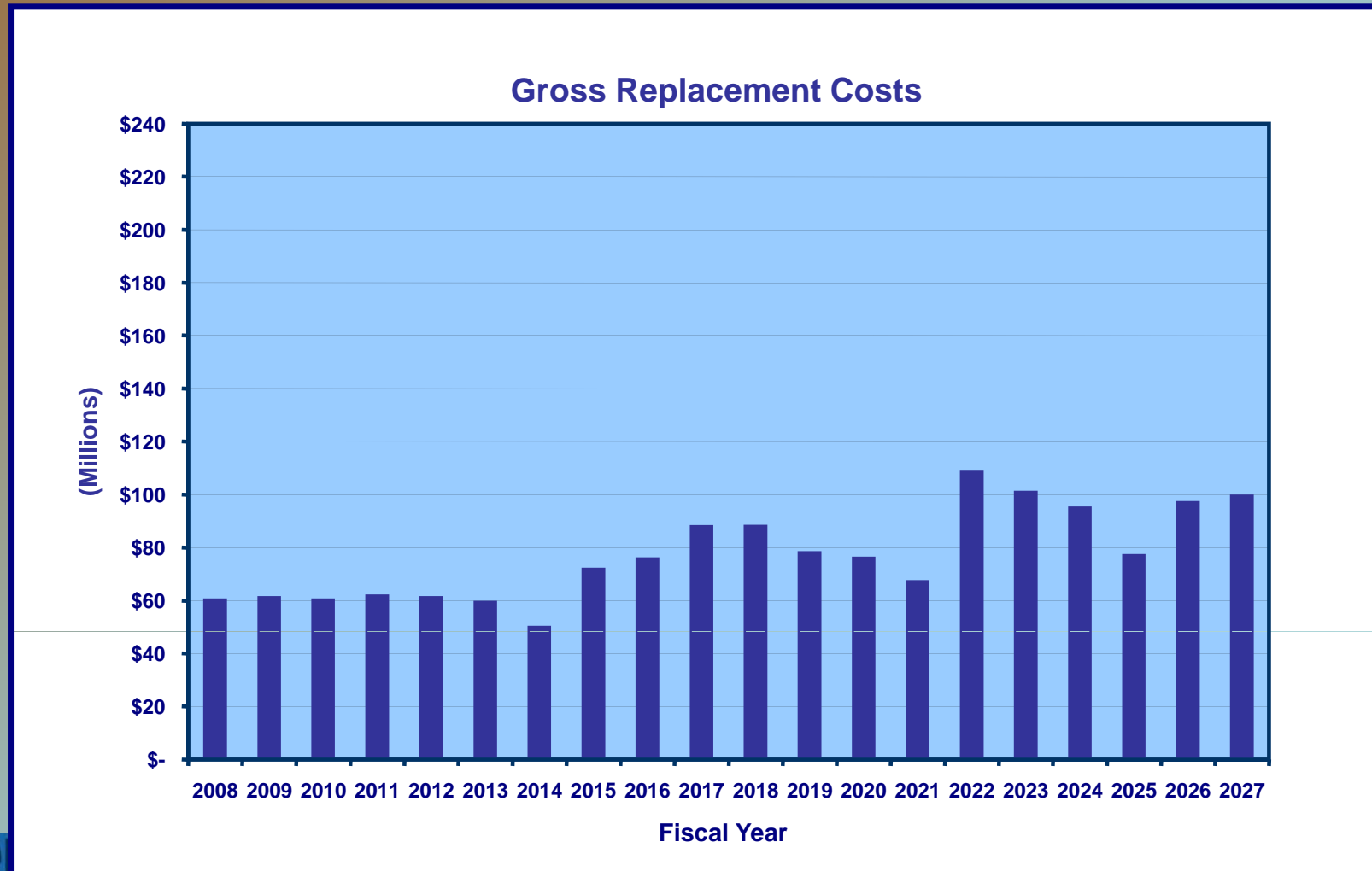


Operating Leases

- Two Types:
 - Open end (widely used by corporate fleets in US)
 - Closed end (widely used by corporate fleets in Europe, and by individuals in US)
- Pros:
 - Pay-as-you-go approach
 - Use of cost charge-back system promotes recognition of fixed costs*
 - Big budget savings if switching from cash financing
 - Cost of leasing is not considered to be debt
 - Can be bundled with asset management services
- Cons
 - Taxable
 - Somewhat higher cost of capital than loans
 - Off balance sheet (usually not good for investor-owned utilities)



Smoothed Replacement Plan



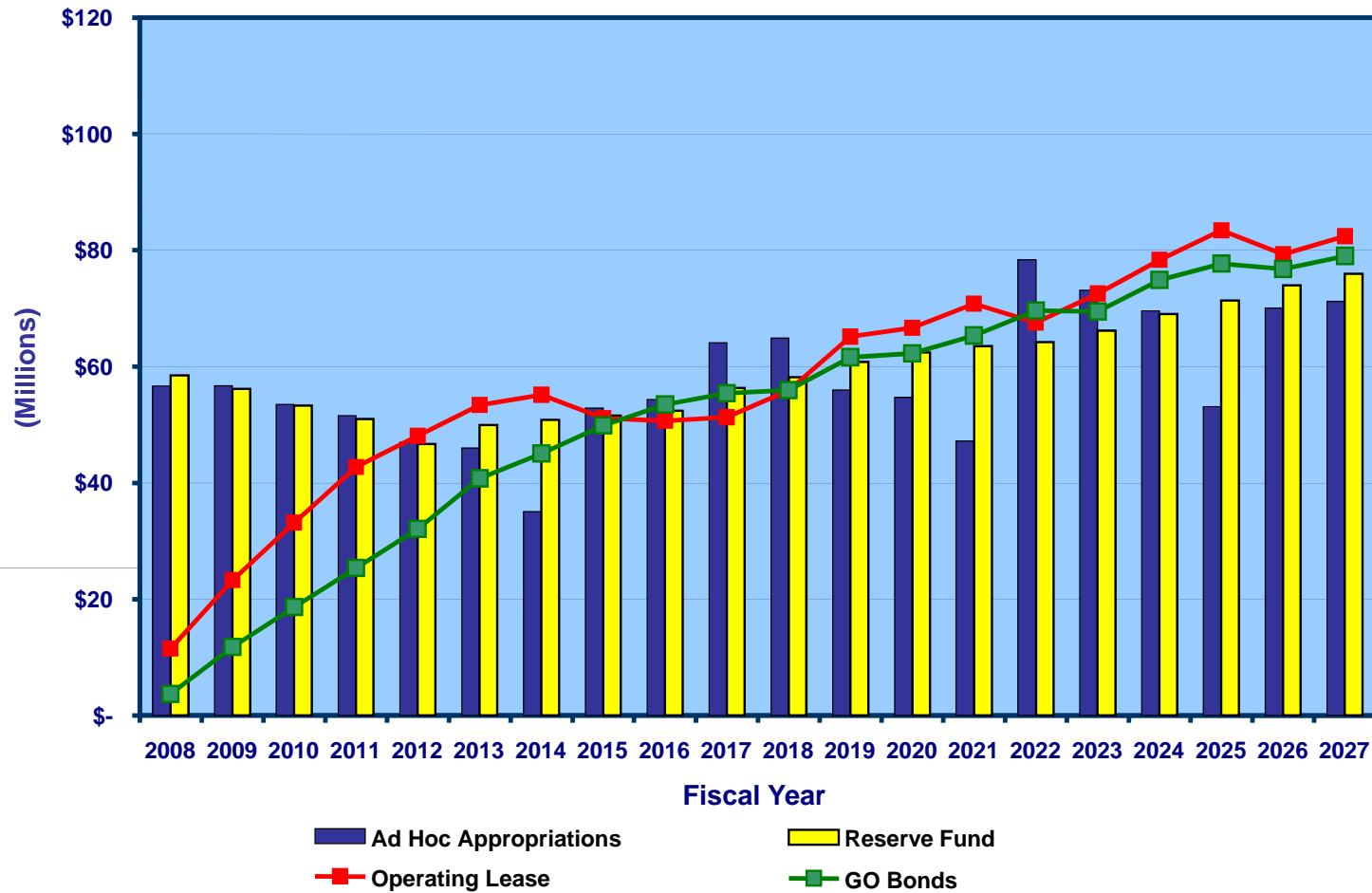
Financing Approaches Evaluated

- Ad Hoc Appropriations of Cash
- Reserve Fund and Charge-Back System
- General Obligation Bonds
- Operating Lease



Capital Financing Comparison

Net Funding Requirements



Net Funding Requirements by Financing Approach

Total	Year 1	Years 1-5	Years 1-10
Ad Hoc Appropriations	\$ 56.6 M	\$ 265.4 M	\$ 517.6 M
Reserve Fund and Charge-Back System	\$ 58.5 M	\$ 265.6 M	\$ 526.6 M
Bonds	\$ 4.1M	\$ 93.2 M	\$ 339.4 M
Operating Leases	\$ 11.5 M	\$ 158.6 M	\$ 420.1 M
Annual Average	Year 1	Years 1-5	Years 1-10
Ad Hoc Appropriations	\$ 60.5 M	\$ 53.1 M	\$ 51.8 M
Reserve Fund and Charge-Back System	\$ 58.5 M	\$ 53.1 M	\$ 52.7 M
Bonds	\$ 4.1M	\$ 18.6 M	\$ 33.9 M
Operating Leases	\$ 11.5 M	\$ 31.7 M	\$ 42.0 M



A Question About Interest

- Why pay it?



Questions



For More Information

Paul Lauria
Mercury Associates, Inc.
16051 Comprint Circle
Gaithersburg, MD 20877

301 519 0535

plauria@mercury-assoc.com

www.mercury-assoc.com

