Asset Inventory Development and Implementation Plans for an Enterprise Asset Management System

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SFMTA | Municipal Transportation Agency

Agenda

- Agency context
- Assembly of asset inventory
- Identification of capital projects
- Initial application of asset inventory
- Implementation of enterprise asset management system
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SF Municipal Transportation Agency

- Multi-modal transportation agency
- Responsible for the planning, design, construction and operation of the surface transportation network, including:
  - Pedestrians and streetscapes
  - Bicycles
  - Transit and paratransit service
  - Traffic and parking
  - Taxi regulation

San Francisco Municipal Railway

- Approaching 100 years
- Roughly 47 square mile service area
- Carries over 200 million customers per year
- 80 transit routes
- Transit modes operated:
  - Motor Coach
  - Trolley Coach
  - Light Rail Vehicle
  - Historic Streetcars
  - Cable Cars

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Underlying Need for Asset Inventory

- Basis for effective asset management
- Better understand long-term renewal needs
- Foundation for attaining the Agency's sustainability goals
- First step in implementing enterprise asset management system
- Consider relationship between asset condition, maintenance cost and reliability

MTC Regional Transit Capital Inventory

- As reinvestment needs increase, how do we best invest limited funds?
- Inconsistent information across operators and asset types
- Significant system assets reaching replacement
- Wide variation in asset holdings and needs by operator
- Create a consistent and comprehensive transit asset inventory for entire region
- Used to project the region's preservation costs into Regional Transportation Plan
- Support prioritization of capital projects utilizing federal, state, and regional funds that MTC allocates
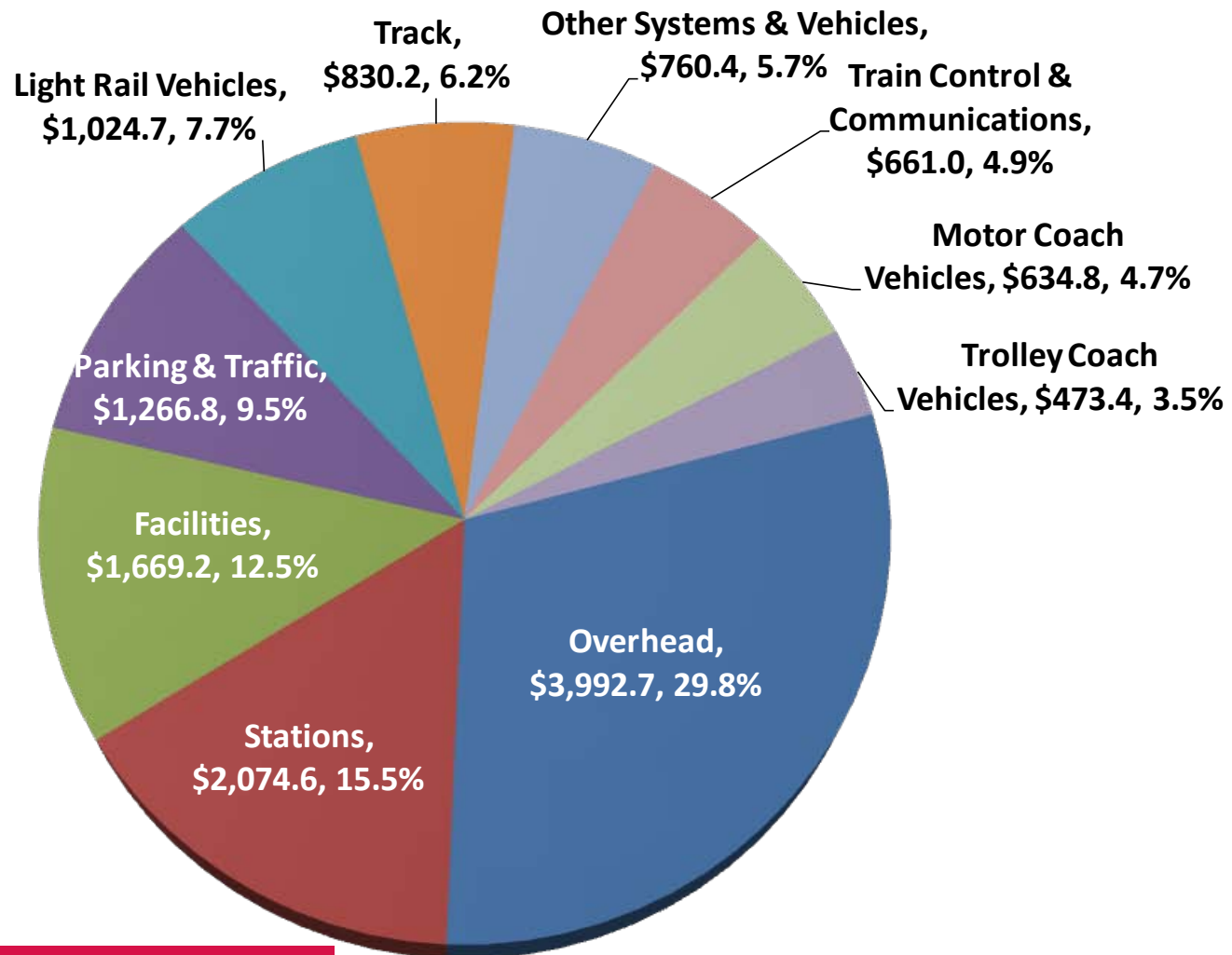
Sample of MTC RTCI Asset Inventory

Category	Element1	Element1A	Element1B	Element2	Element3	Element4	Units	Manufacturer	Model	Quantity	Service Date	Useful Life	Unit Replacement Cost (000)
Railway/Track	Cable Car	California	Track	Track	Tangent		Linear Feet			14362	1984	50	$4.77
Railway/Track	Cable Car	California	Switches	Switches			Each			10	1984	25	$250.00
Systems	Traction Power	Light Rail	Overhead	4/0 Trolley Wire		Junipero Serra Blvd., Ocean Ave, Metro Green	Linear Feet			20785	2003	18	$0.09
Systems	Traction Power	Light Rail	Overhead	Feed Span (+ and -)		Junipero Serra Blvd., Ocean Ave, Metro Green	Linear Feet			20785	2003	18	$0.08
Systems	Traction Power	Light Rail	Overhead	Tangent Span		Junipero Serra Blvd., Ocean Ave, Metro Green	Linear Feet			20785	2003	18	$0.09
Systems	Traction Power	Light Rail	Overhead	Special Work		Junipero Serra Blvd., Ocean Ave, Metro Green	Linear Feet			20785	2003	15	$0.65

SFMTA Capital Assets

- 9 subway & 24 surface light rail stations
- 6.6 miles of subways & tunnels
- 71.5 revenue track miles for rail operations
- 8.8 miles of track miles for cable car operations
- 219.9 miles of overhead wires & 25 power substations
- Nearly 1,000 transit vehicles, plus paratransit vans & support vehicles
- 19 operations, maintenance & administrative facilities
- 40 off-street parking garages & lots
- 1,184 signalized intersections & approx. 224,000 signs
- 28,862 on-street metered parking spaces
- 208 miles of bicycle facilities (Classes I, II and III)
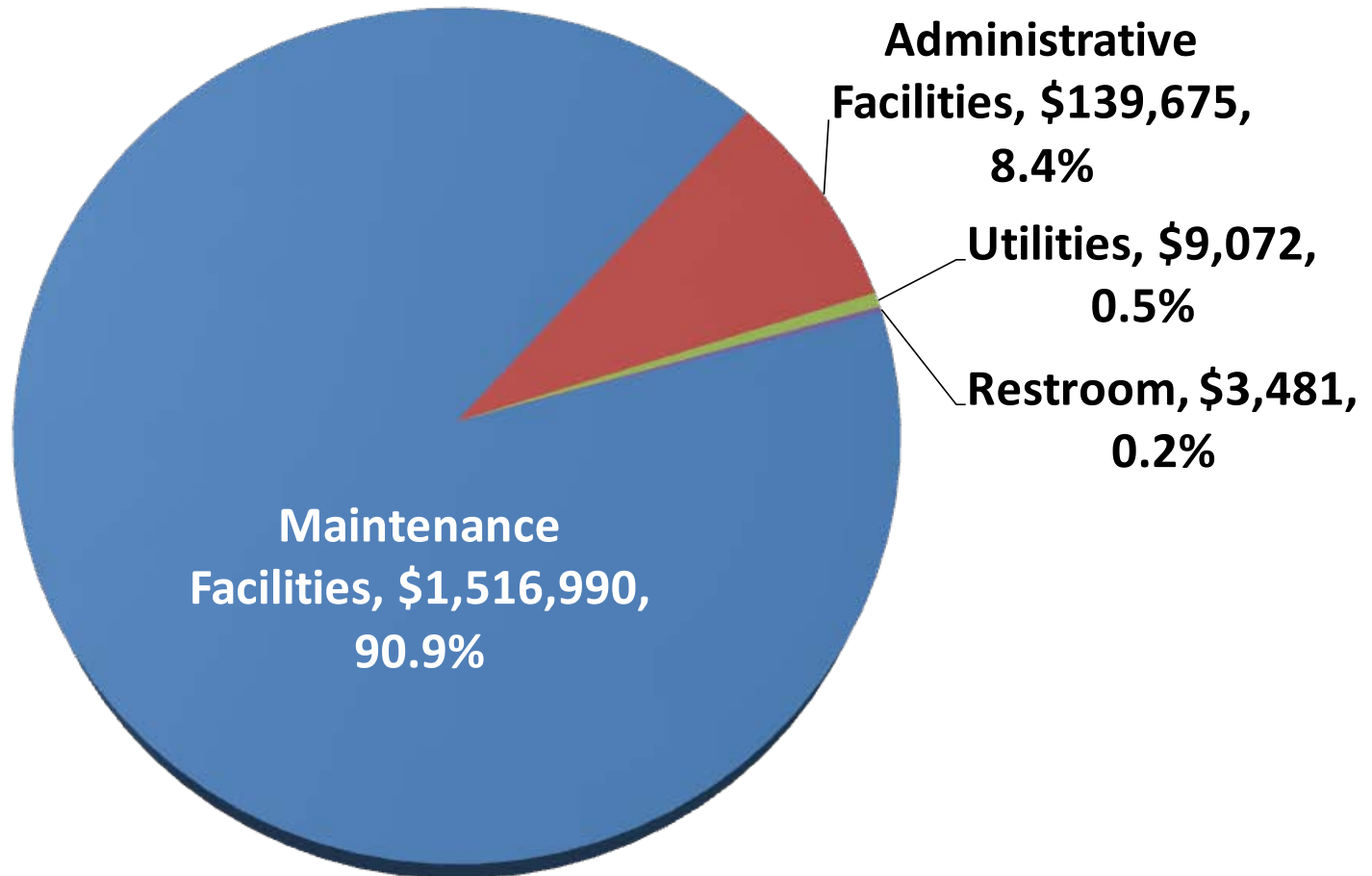- Numerous transportation information & communications networks

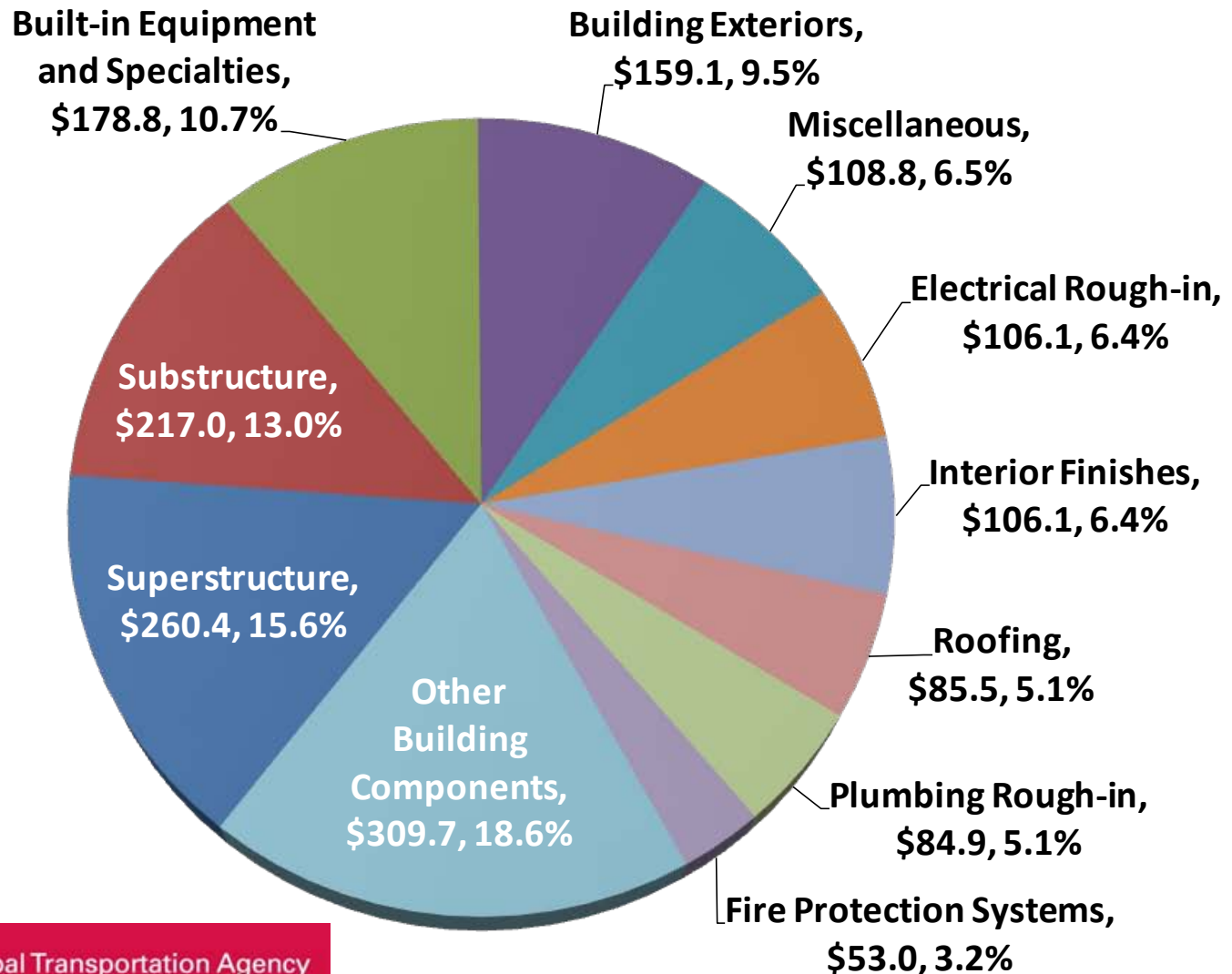# SFMTA Assets
Total Value = $13.4 Billion

- Track, $830.2, 6.2%
- Other Systems & Vehicles, $760.4, 5.7%
- Train Control & Communications, $661.0, 4.9%
- Light Rail Vehicles, $1,024.7, 7.7%
- Motor Coach Vehicles, $634.8, 4.7%
- Trolley Coach Vehicles, $473.4, 3.5%
- Parking & Traffic, $1,266.8, 9.5%
- Facilities, $1,669.2, 12.5%
- Overhead, $3,992.7, 29.8%
- Stations, $2,074.6, 15.5%

Facilities by Building Type
Total Value = $1.6 Billion

Administrative Facilities, $139,675, 8.4%

Utilities, $9,072, 0.5%

Restroom, $3,481, 0.2%

Maintenance Facilities, $1,516,990, 90.9%

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Facilities by Building Component
Total Value = $1.6 Billion

Built-in Equipment and Specialties, $178.8, 10.7%

Building Exteriors, $159.1, 9.5%

Miscellaneous, $108.8, 6.5%

Electrical Rough-in, $106.1, 6.4%

Substructure, $217.0, 13.0%

Interior Finishes, $106.1, 6.4%

Superstructure, $260.4, 15.6%

Roofing, $85.5, 5.1%

Other Building Components, $309.7, 18.6%

Plumbing Rough-in, $84.9, 5.1%

Fire Protection Systems, $53.0, 3.2%

Overhead Contact System Assets by Component Total Value = $3.9 Billion
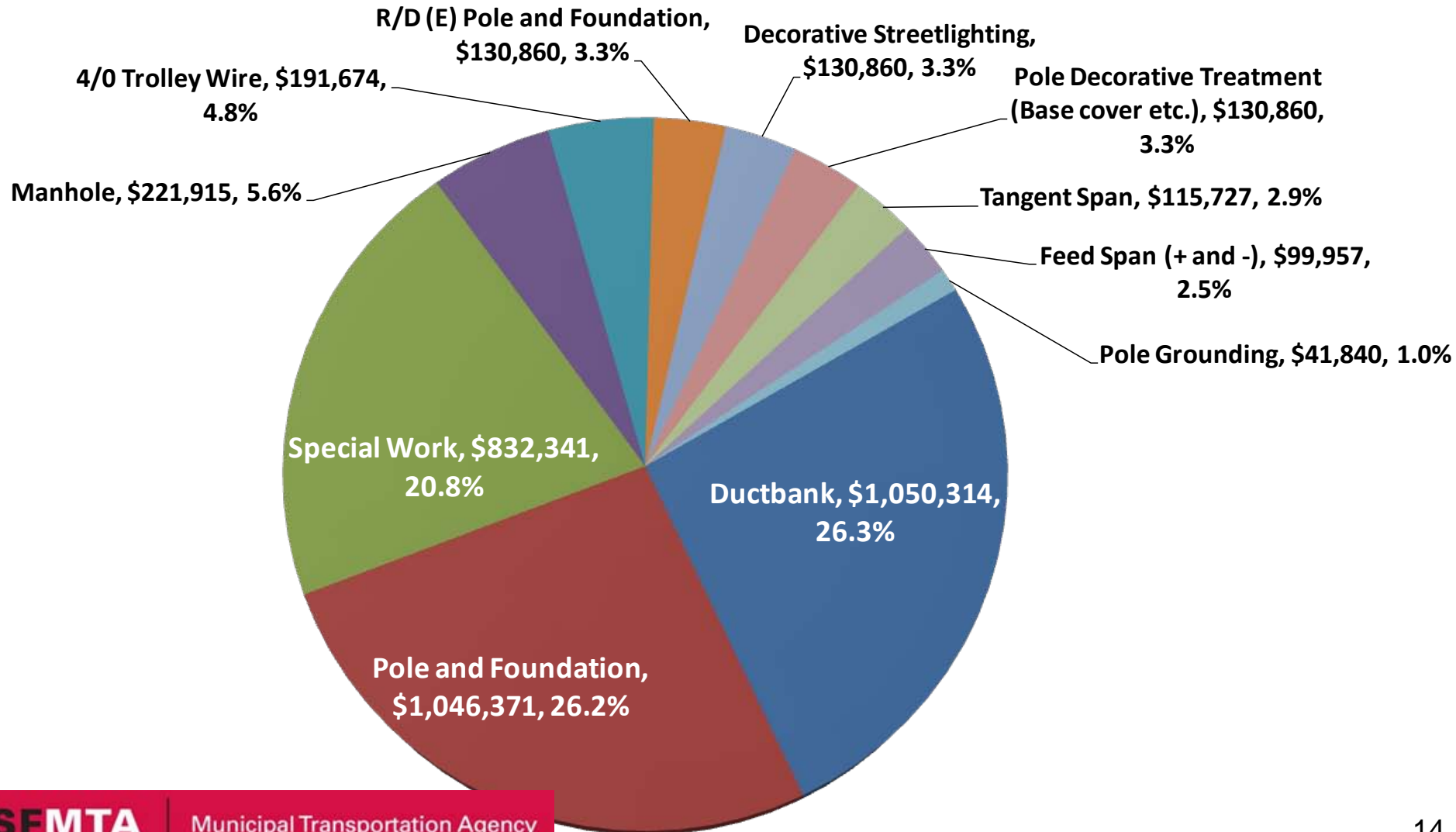
Current Asset Conditions
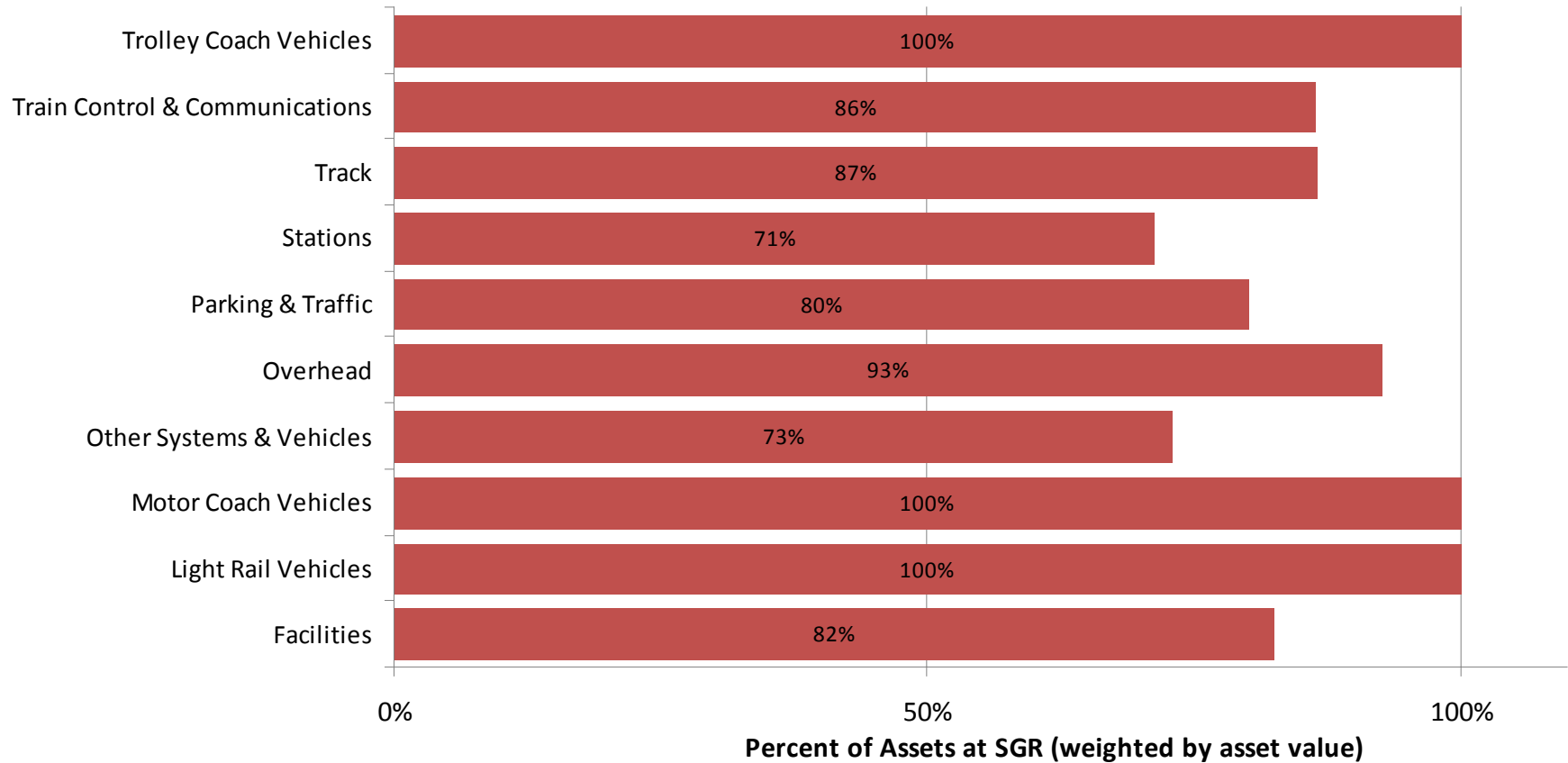
Bar chart titled "Percent of Assets at SGR (weighted by asset value)":

Category	Percent
Trolley Coach Vehicles	100%
Train Control & Communications	86%
Track	87%
Stations	71%
Parking & Traffic	80%
Overhead	93%
Other Systems & Vehicles	73%
Motor Coach Vehicles	100%
Light Rail Vehicles	100%
Facilities	82%

Percent of Assets at SGR (weighted by asset value)

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Identifying Capital Projects

- Update to 20-year Capital Plan is concurrent with development of asset inventory

- Easier for SFMTA and the public to relate priorities to capital <u>projects</u> rather than <u>assets</u>

- Consensus-based process generated priority scores for each capital project

- Capital projects mapped to assets: assigns project priorities to each line-item asset

Mapping Assets to Projects
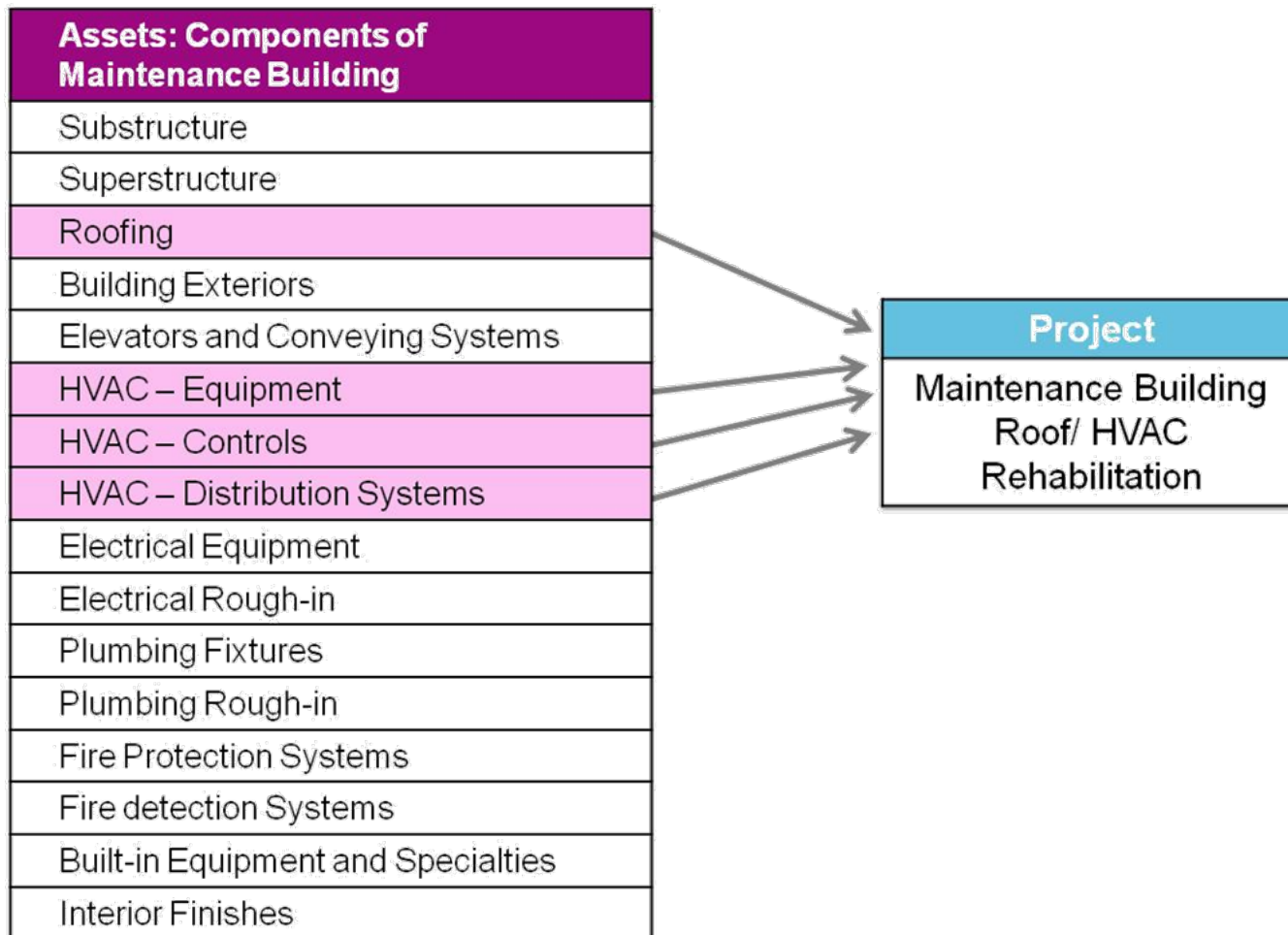
Prioritizing Capital Projects

- Decision Lens is a consensus-based decision support tool that provides quantitative analysis of qualitative project evaluation criteria

- Executive Team identified and established relative importance of evaluation criteria

- Capital Working Group scored projects against evaluation criteria

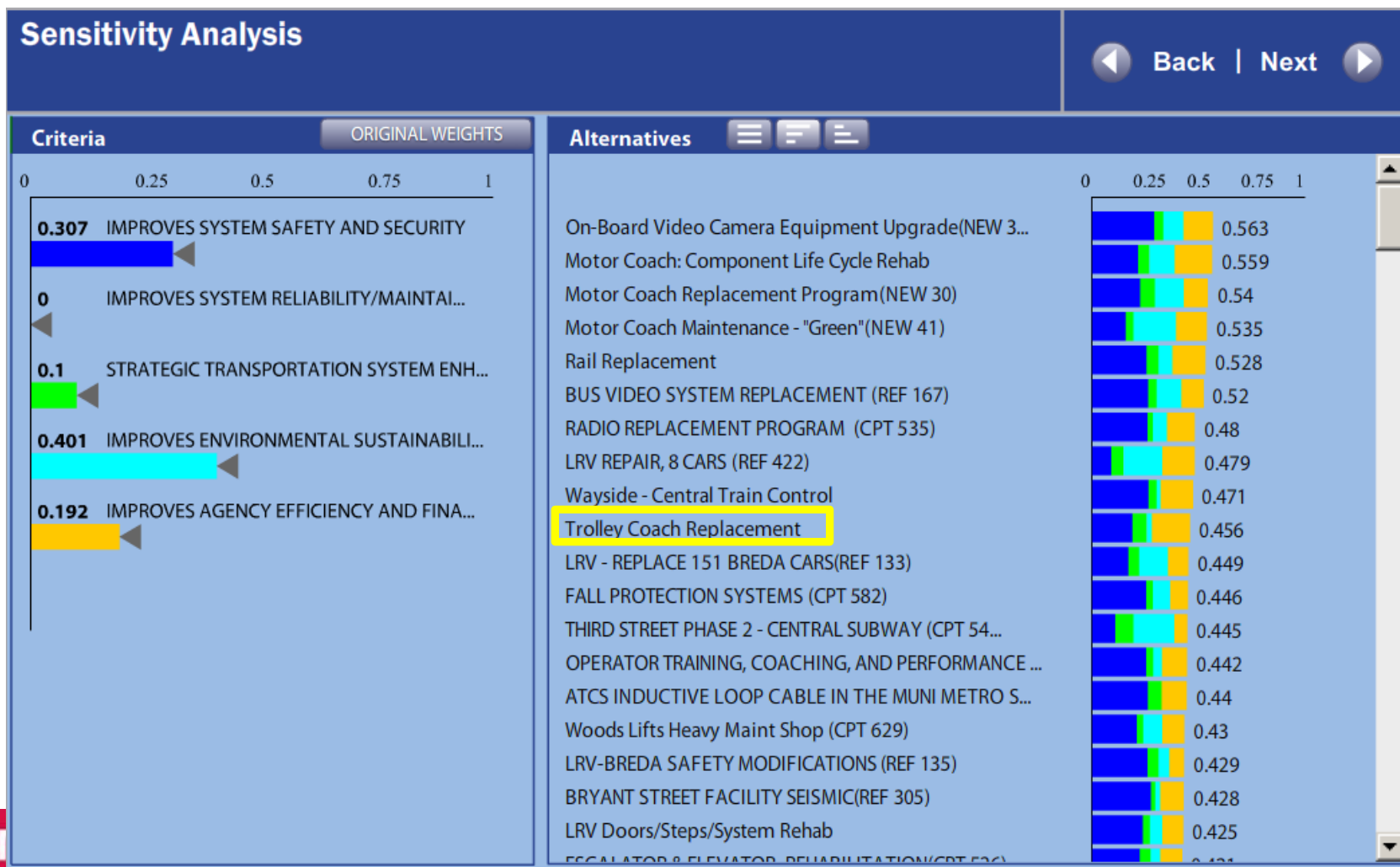- Structured process leading to greater collaboration, transparency, efficiency, and consistency

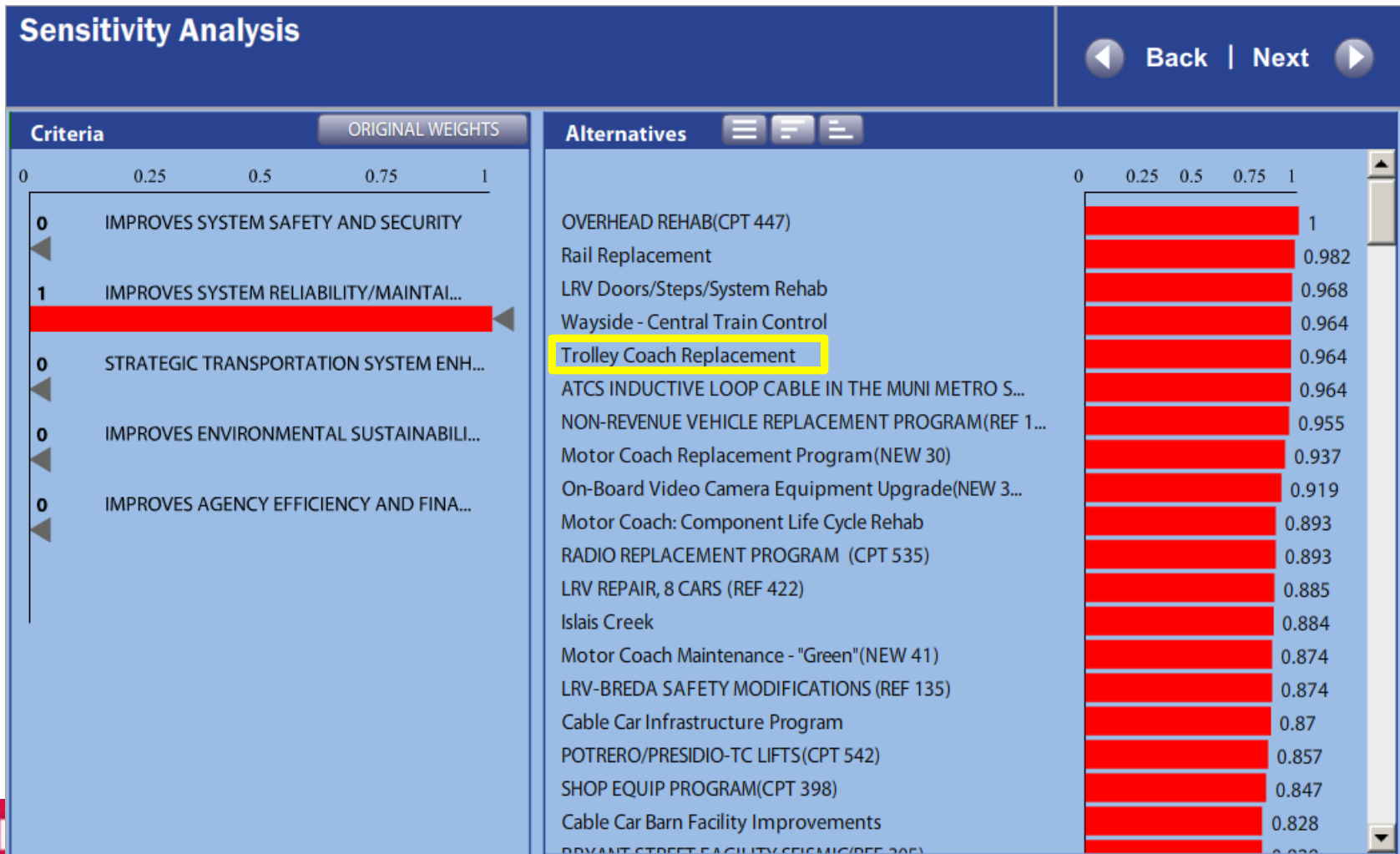## Project Priorities Using Original Evaluation Criteria Weights
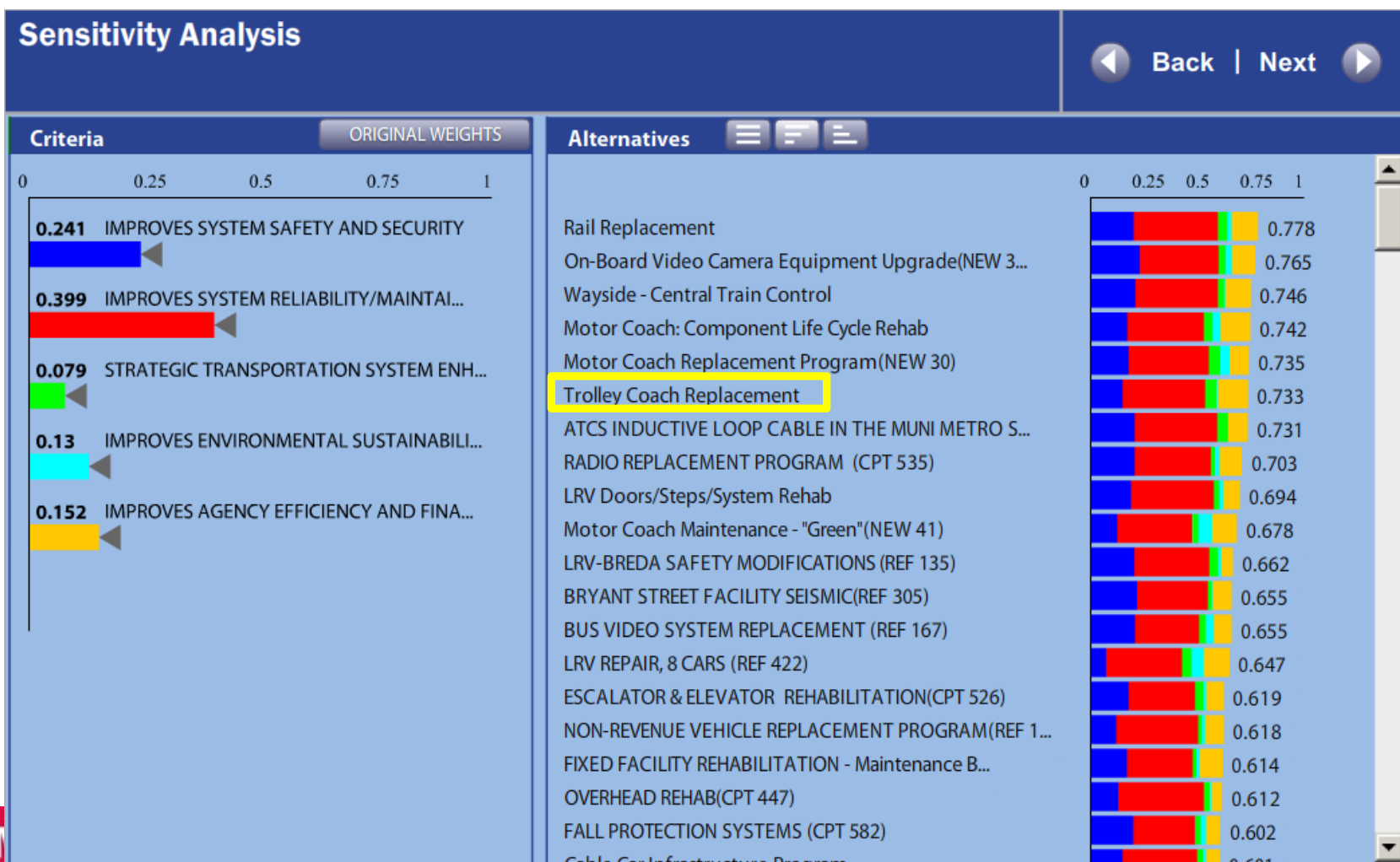
Project Priorities with Increased Priority of Safety and Security
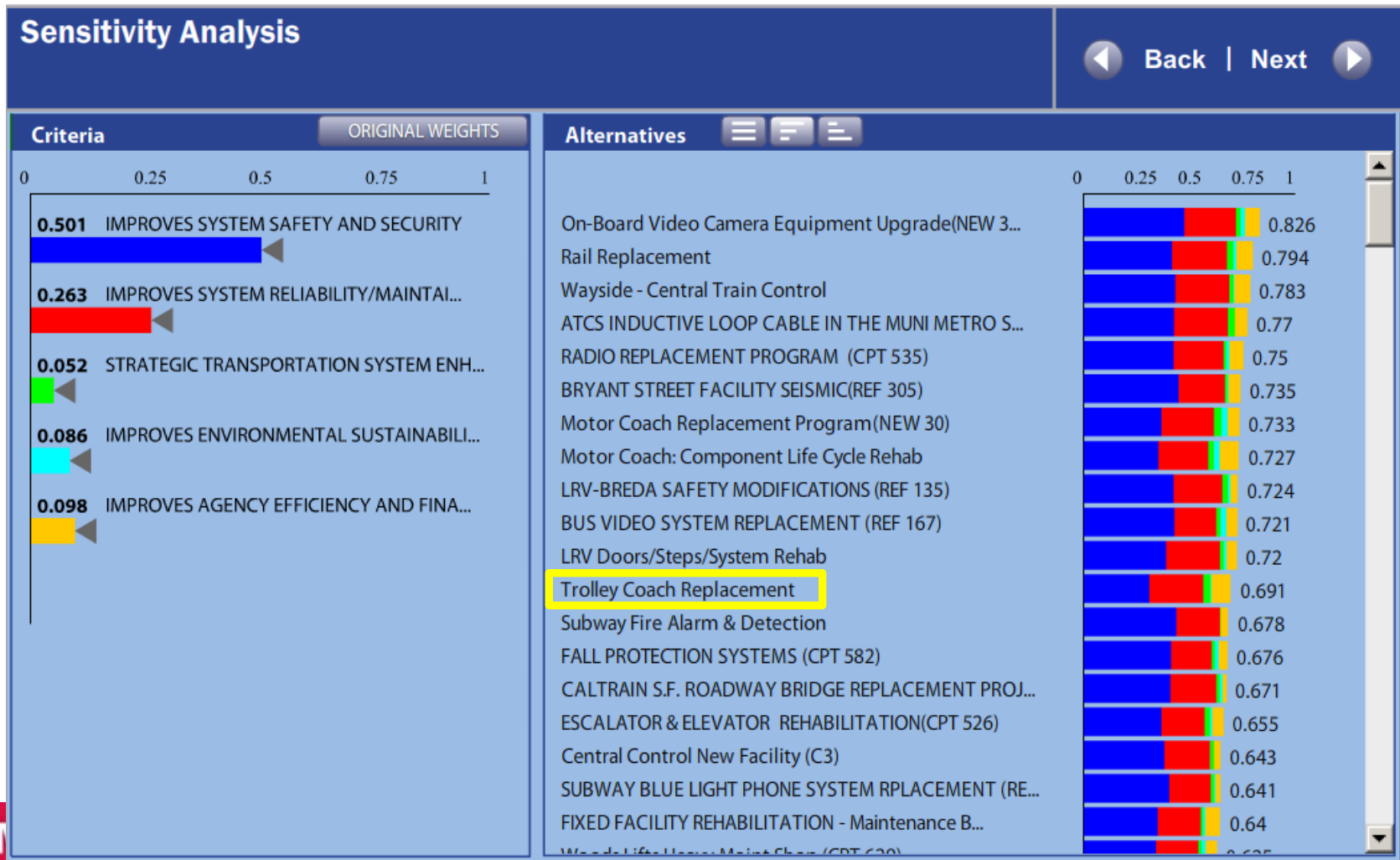
Project Priorities with Increased Priority of Environmental Sustainability/Remove System Reliability

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Project Priorities Based Only on System Reliability/Maintains a State of Good Repair
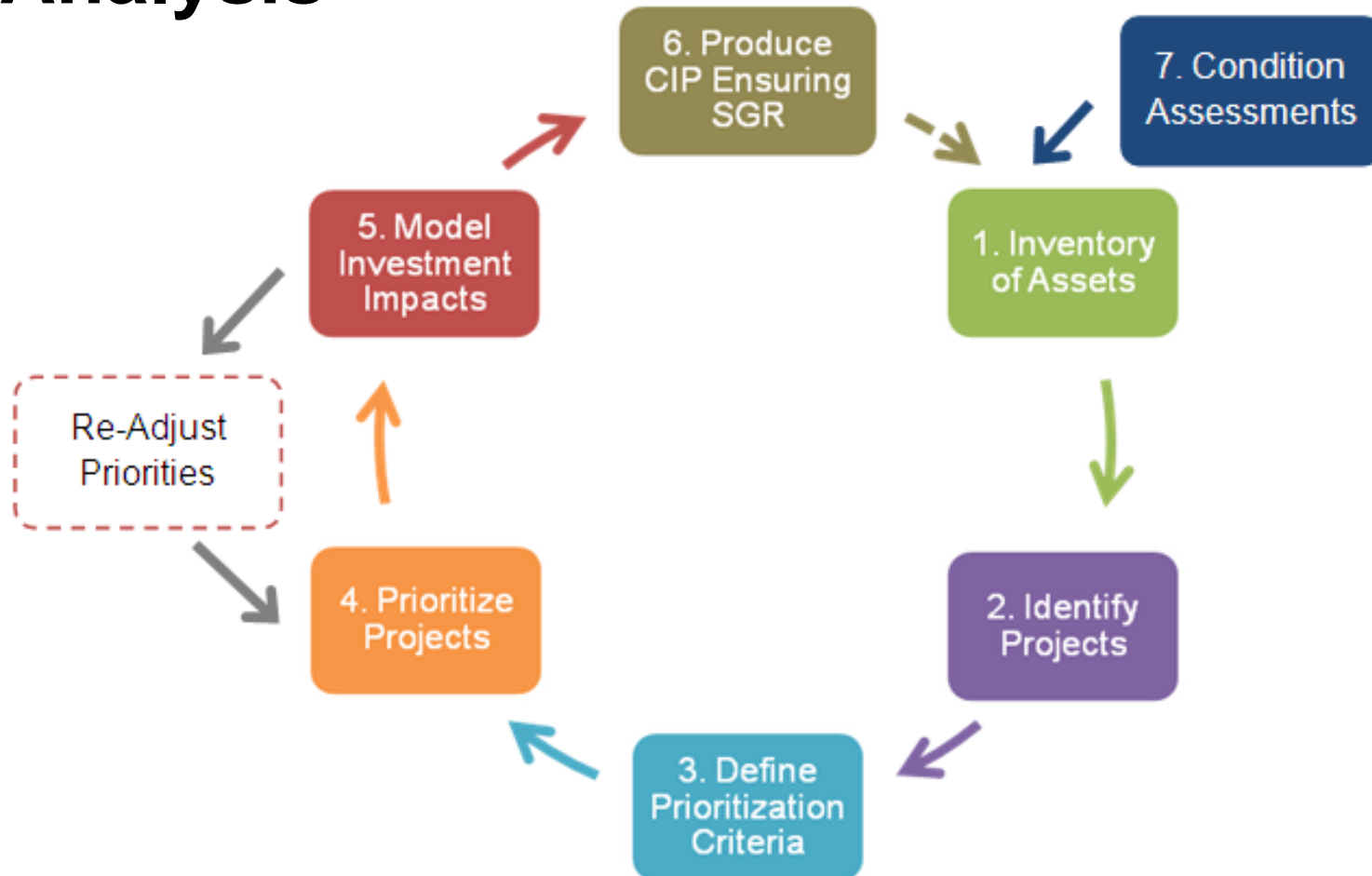
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Developing a 20-year Financial Plan

- FTA response to FY2009 New Starts required comprehensive asset-based examination of infrastructure renewal needs

- The RTCI database provided basis for analysis

- MBTA SGR database provided the platform to conduct the analysis

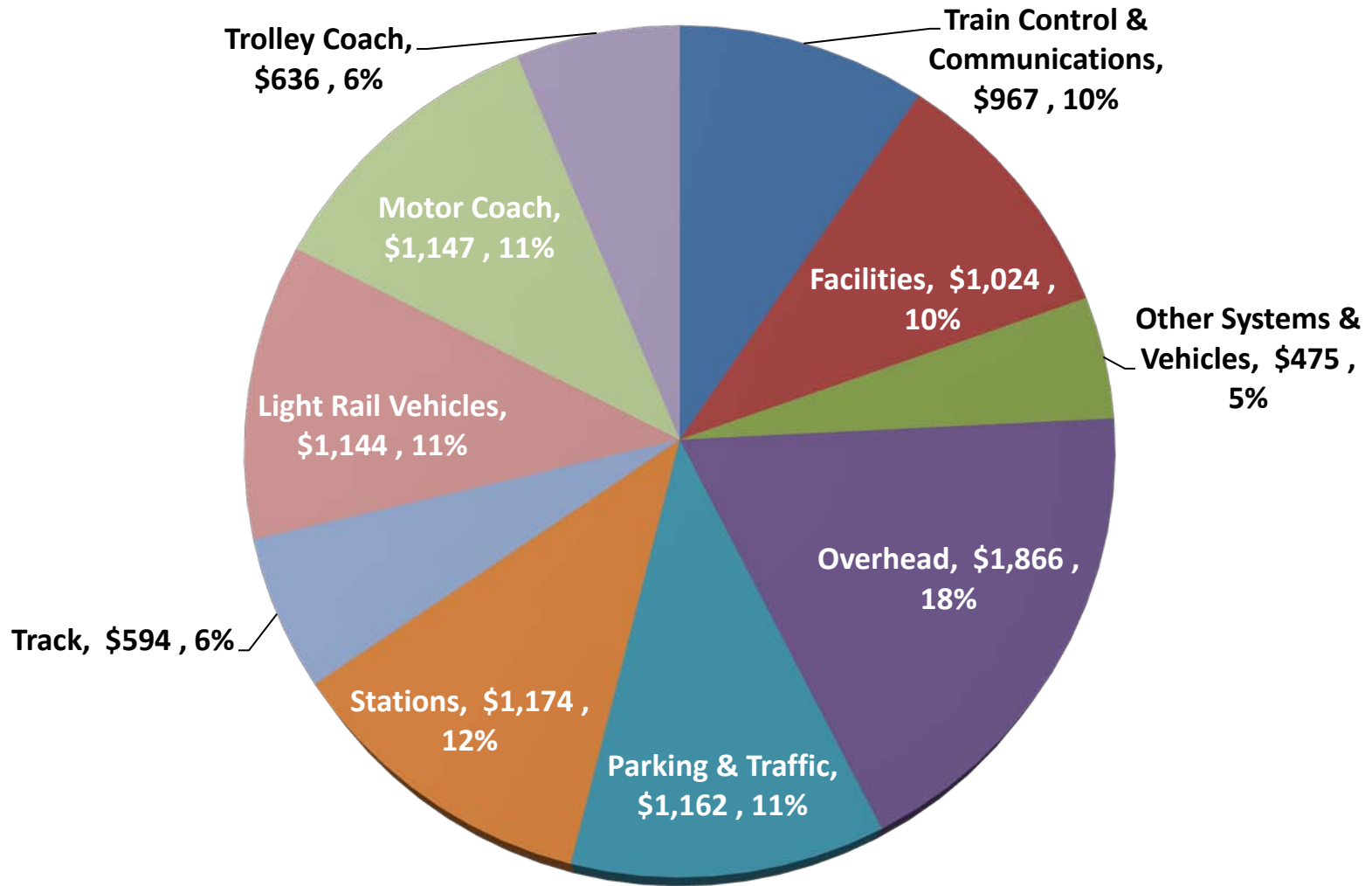# Application of Asset Inventory for SGR Analysis

SGR Analysis Addresses Four Fundamental Questions

- What is the magnitude of the SGR backlog?

- How much larger will the SGR backlog grow if we continue to fund at the current level?

- How much more do we need to spend to maintain the current SGR backlog?

- How much more than that do we need to spend to reduce the SGR backlog to zero?
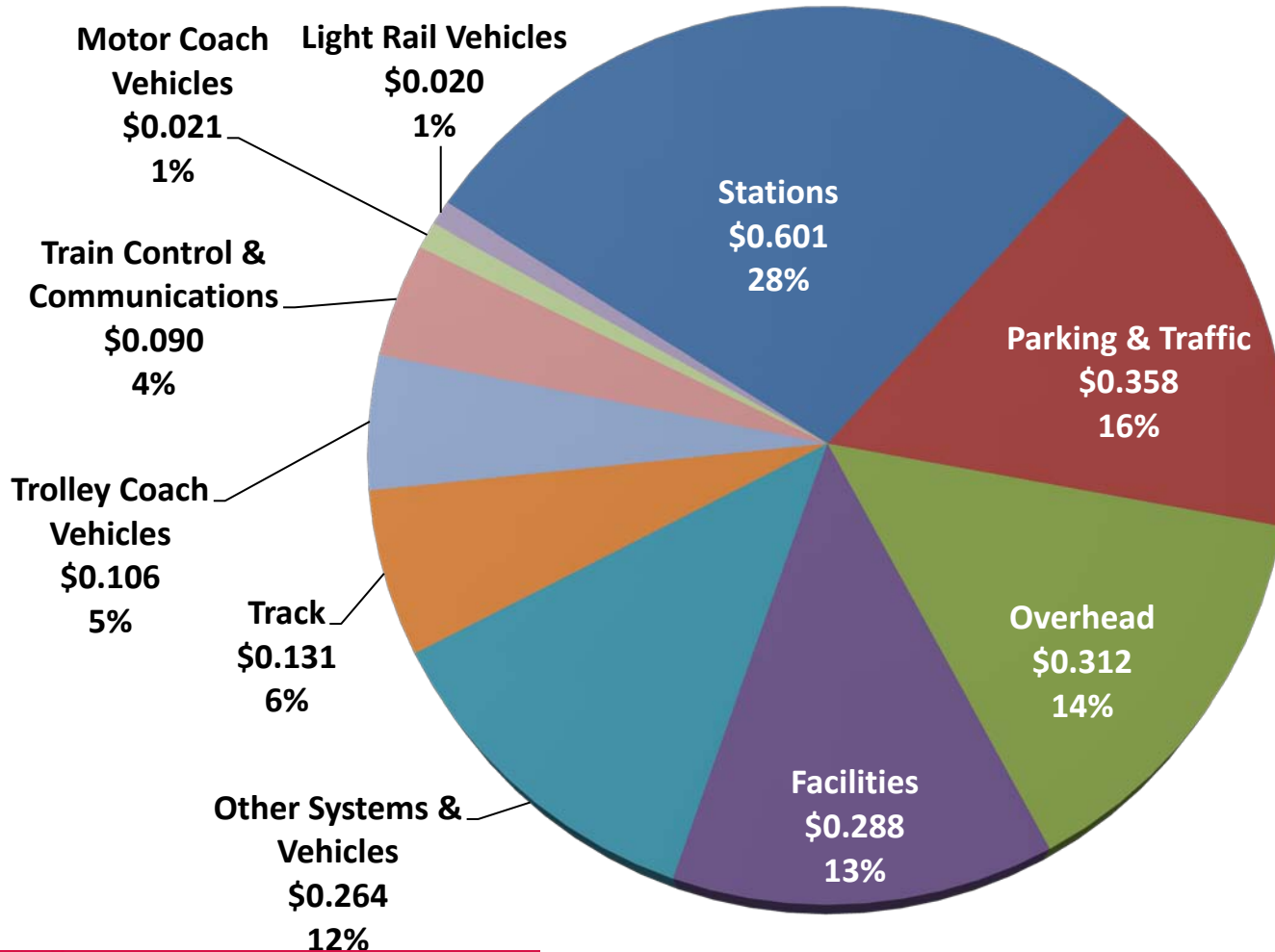
20-year Unconstrained Needs
Total Needs = $10.2 Billion

Trolley Coach, $636 , 6%

Train Control & Communications, $967 , 10%

Motor Coach, $1,147 , 11%

Facilities, $1,024 , 10%

Other Systems & Vehicles, $475 , 5%

Light Rail Vehicles, $1,144 , 11%

Overhead, $1,866 , 18%

Track, $594 , 6%

Stations, $1,174 , 12%

Parking & Traffic, $1,162 , 11%

Backlog by Asset Type
Total Value = $2.2 Billion

- Motor Coach Vehicles $0.021 1%
- Light Rail Vehicles $0.020 1%
- Train Control & Communications $0.090 4%
- Trolley Coach Vehicles $0.106 5%
- Track $0.131 6%
- Other Systems & Vehicles $0.264 12%
- Facilities $0.288 13%
- Overhead $0.312 14%
- Parking & Traffic $0.358 16%
- Stations $0.601 28%
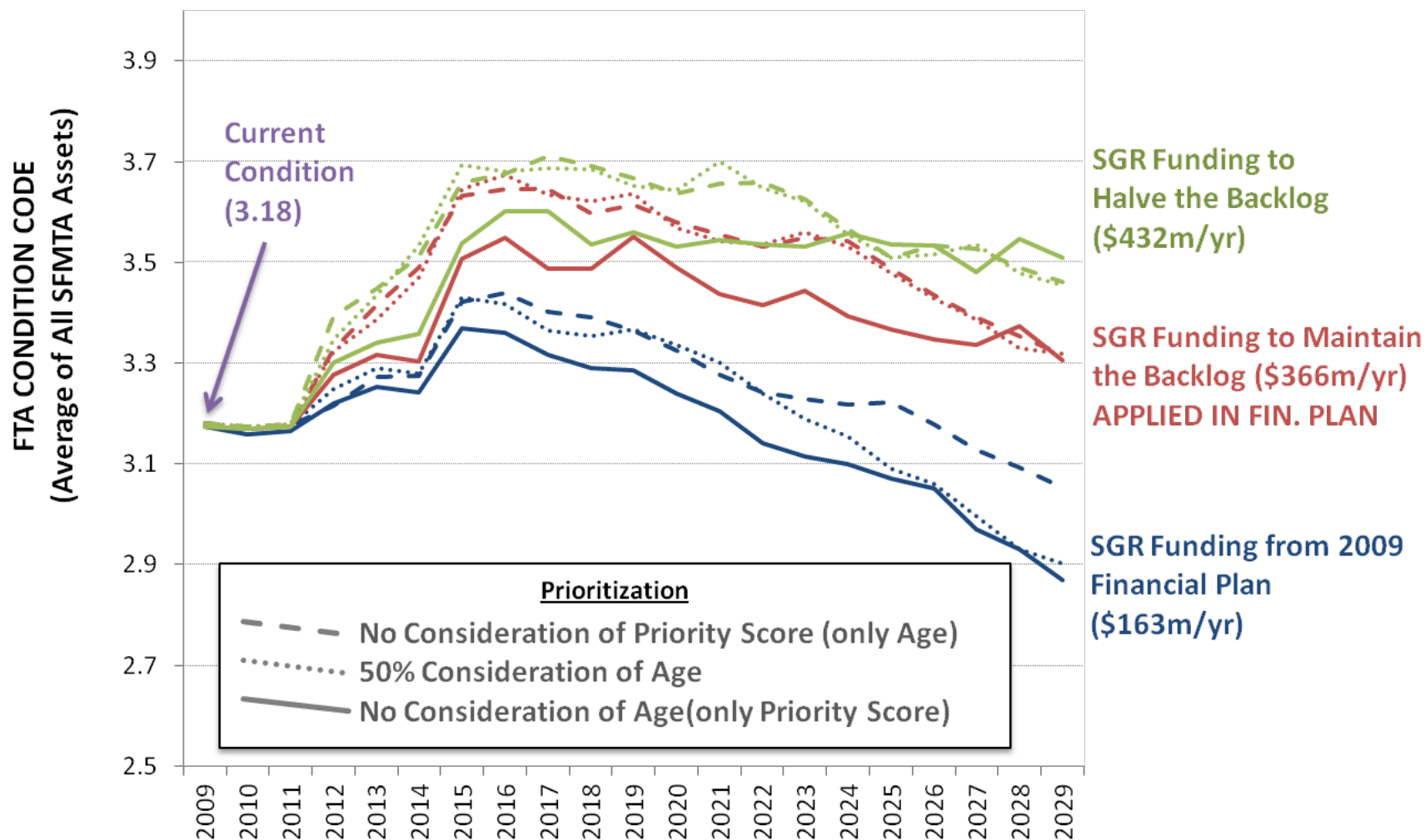
Annual Unconstrained Needs by Asset Class
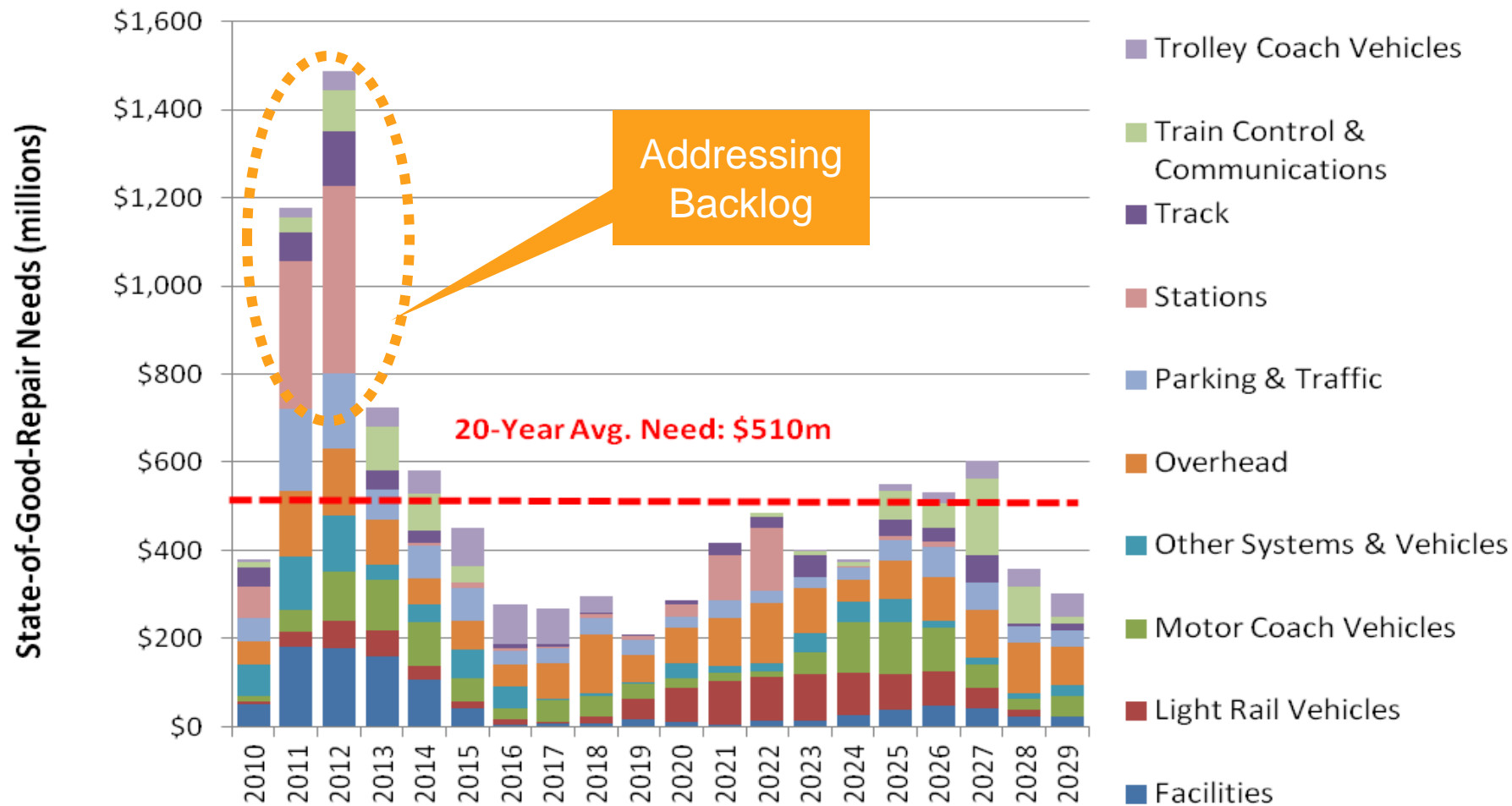
SGR Analysis Projected Asset Condition

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Implementation of EAM System

- Integrated within existing SFMTA capital planning/ programming processes to establish clear program goals and objectives related to the state of good repair, safety, and reliability of existing assets

- Still support SGR measurement and monitoring processes

- Develop a centralized system to capture asset data currently maintained in over 15 independent databases

Refinement of Asset Inventory

- Procurement of data storage hardware
- Asset data collected using repeatable condition assessment approach:
  - Annual assessments of vehicles
  - Biennial assessments of facilities
  - Triennial assessments of rail assets
- Level of detail will at minimum meet the most detailed level for RTCI purposes

Initial Condition Assessment

- Conducted via on-site inspection by qualified engineering staff
- Conditions assessed with industry best practices
- Use large or near-complete samples for initial assessment for accuracy
- Asset condition and replacement needs derived from the asset age and maintenance and utilization history
- Data applied for direct needs assessment and development of SFMTA specific asset decay curves
- Frequency of subsequent assessments determined by asset type
- Will estimate the decay curves for uninspected assets.

Timeline for EAM Implementation

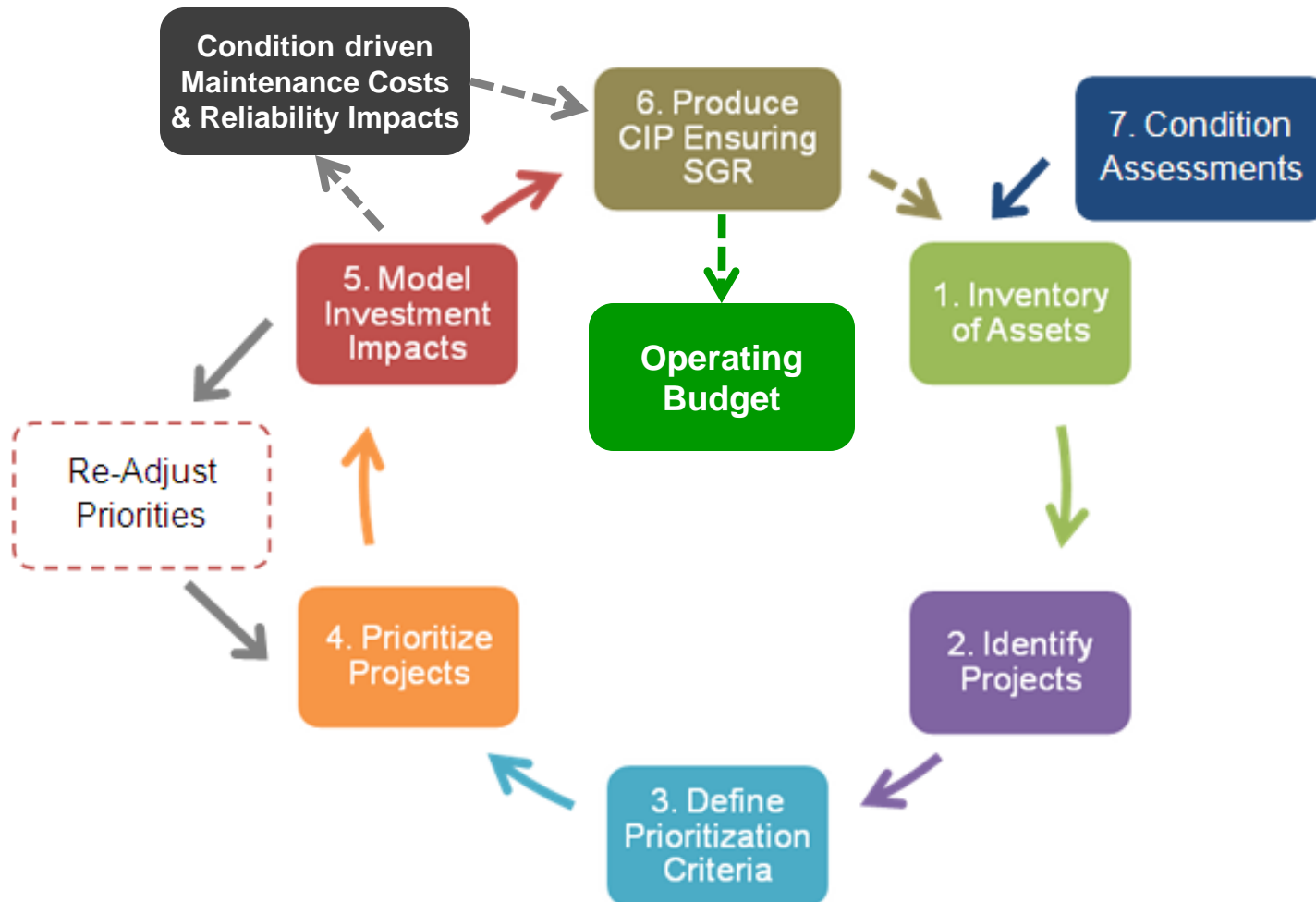| Activity	Start	Finish
Scoping the Procurement	Aug 2011	Nov 2011
Develop Business Processes	Dec 2011	Mar 2012
Solution Selection	Mar 2012	May 2012
EAM System Implementation	Jun 2012	May 2013

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Next Steps for SGR Analysis

- Break large asset groups into smaller constituent projects to avoid having too many renewal/ replacement actions with the same priority score

- Update in service year and useful life of assets based on field inspection and assessment of individual assets

- Integrate EAM data and staff knowledge to link asset condition to O&M costs to more fully assess life-cycle costs

- Expand analysis beyond 20-years

Advancing the Asset Management Framework

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Questions?

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