



State of Good Repair Roundtable Chicago, Illinois



Asset Management Systems MBTA Approach and Lessons Learned



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MBTA Profile



- ① 5th largest transit property, based on ridership
- ① Oldest subway system (opened in 1897)
- ① Multimodal (4 rapid transit lines, 182 bus routes, 5 BRT lines, 14 commuter rail lines, 3 ferry routes, paratransit)
- ① 175 communities served
- ① 1.2 million passengers per day
- ① 55% of all work trips to Boston are made on the MBTA



Fiscal Challenges - A Familiar Story?

- Ⓣ The transit agency has the responsibility to be a good steward of the system and meet customer expectations
- Ⓣ But capital needs of an antiquated system are growing faster than revenues
- Ⓣ Expansion has placed a strain on limited capital and operating revenues
- Ⓣ Debt burden and limited “pay go” financing limits the ability of MBTA to fund capital program

Maintenance and modernization of the current system must be the top priority



Defining the Problem is the First Step

- Ⓣ The first step is understanding the scope of the problem – i.e., the current condition of existing assets
- Ⓣ Only then can the transit agency set SGR goals and determine capital funding levels required to achieve them.



The asset management system is your friend



Defining SGR (at the MBTA)



- ④ State of Good Repair: SGR is the “condition where all assets perform their assigned functions without limitation”
 - With regular maintenance, assets will operate as intended, without restrictions, throughout their useful life
 - In general, assets within their useful life are considered to be in a state of good repair

- ④ Backlog: The total cost to renew or replace all assets that are currently beyond their useful life, based on MBTA and industry standards



SGR Database – Why do it?



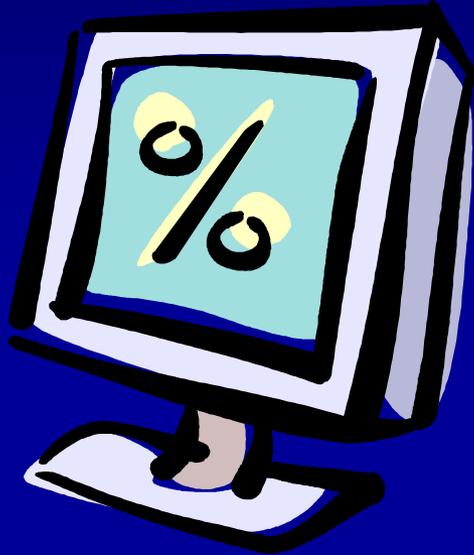
To develop a uniform, replicable and objective method for identifying and prioritizing capital renewal and replacement needs

① The SGR database can help to:

- Determine the current state of the agency's capital assets
- Identify measures/funding levels required to bring system to State of Good Repair (or least maintain current condition)
- Analyze the impacts of various funding and policy scenarios
- Provide quantitative analysis for prioritizing/selecting projects for capital plan
- Articulate the case for additional capital funding (e.g., State and Federal)



SGR Database – What is it?



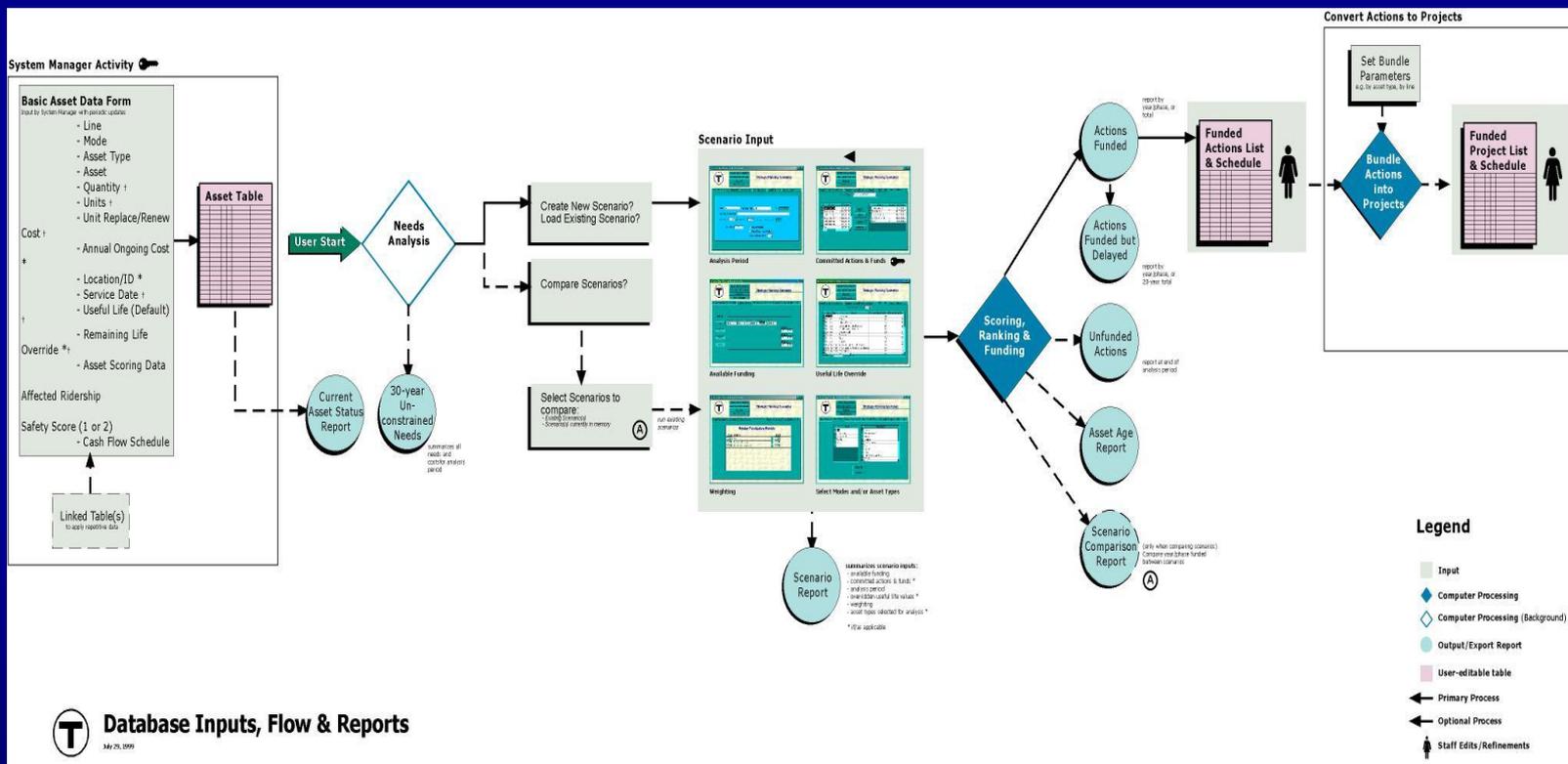
The SGR database is a comprehensive, dynamic database and analysis model for capital planning

- **Comprehensive:** Contains information for over 2,400 individual asset line items
- **Dynamic:** The database is not static; it requires periodic data updates from managers
- **Analysis Model:** Provides an objective assessment; reports consequences, and generates “what if” scenarios
- **Capital Planning:** It provides input for capital reinvestment and renewals; it is not a maintenance database



SGR Database - How does it work?

Data Inputs, Scenarios, Scoring System → Outputs





The SGR Database – Data Inputs



ⓘ Stores information about all MBTA asset types – for example:

- Vehicles (Revenue, Non-Revenue)
- Facilities, Yards & Shops
- Stations
- Elevators & Escalators
- Tunnels & Bridges
- Power
- Signals
- Fare Equipment
- Parking Facilities
- Track



The SGR Database – Scenario Inputs

Annual Budgets

Useful Life Overrides

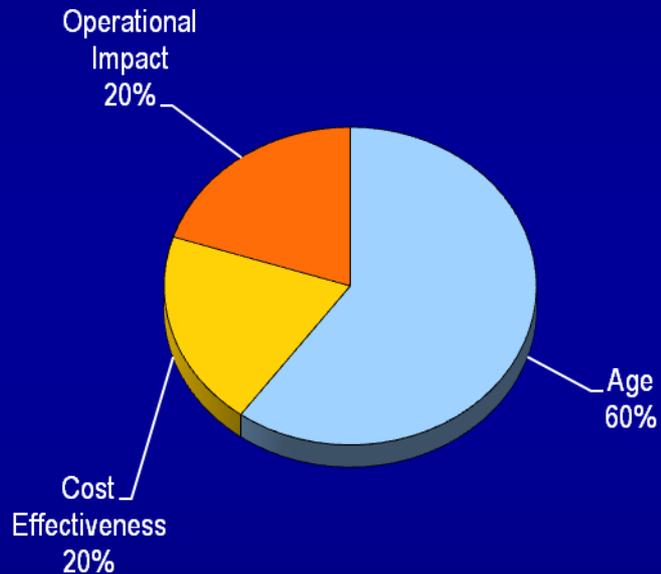
Prioritization Weights

Weight	Description	Default
25%	Age	80%
40%	Operational Impacts	10%
35%	Affected Passengers / \$	10%



The SGR Database – Scoring System Inputs

Default Weighting



(weights variable)

T Age

- Age as % of Service Life
- Measures service quality and reliability

T Operational Impact

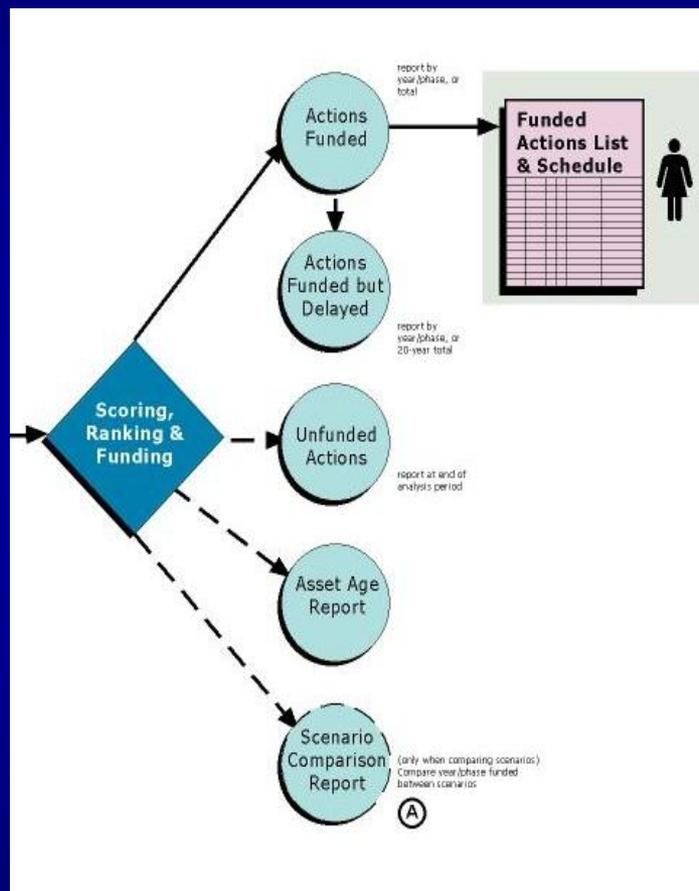
- Yes/No (Selected assets are essential to system operations)
- Measures how essential asset is to daily system operations

T Cost-Effectiveness

- Ridership/Cost of Action
- Measures customer service impacts, in relation to cost



The SGR Database - Output



- Ⓣ Ranks capital actions, based on scoring system
- Ⓣ Develops basic schedule and cash flows within specified funding limits (e.g., 5-year capital program, 20-year capital investment plan)
- Ⓣ Determines system impacts from various investment scenarios (e.g., resulting backlog over time)



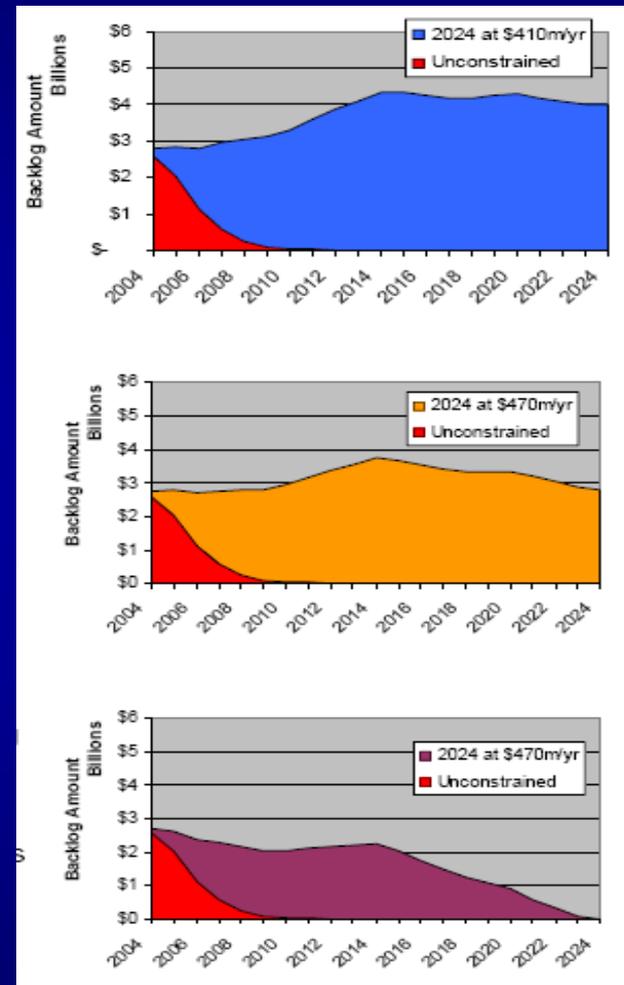
The SGR Database – Output

State of Good Repair

Backlog = \$2.7 billion*

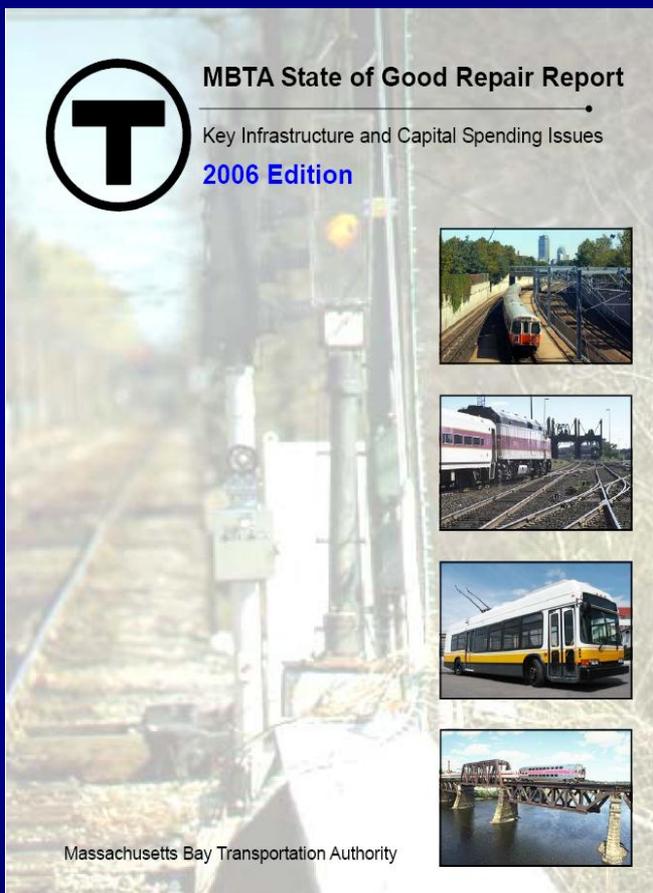
- Ⓣ Chart 1 – Investing \$410M per year increases backlog to \$4 billion in 2024
- Ⓣ Chart 2 – Investing \$470M annually maintains the backlog at \$2.7 billion
- Ⓣ Chart 3 – An investment of \$620M per year is necessary to eliminate the backlog by 2024

*Analysis performed in 2006





The SGR Database – What we learned



2006 SGR Analysis/Report:

- Ⓣ Backlog of capital investments required to achieve SGR estimated at \$2.7 billion
- Ⓣ \$620 million annual reinvestment required to eliminate backlog in 20 years.
- Ⓣ \$470 million annual reinvestment needed just to maintain current SGR backlog (becomes MBTA commitment)
- Ⓣ Failure to make this annual investment will result in downward spiral of increasingly unreliable service and declining ridership

(SGR asset data currently being updated)

SGR Benefits: Public understanding of problem



- Ⓣ Quantitative/objective SGR analysis promotes public understanding of the problem
 - SGR service life/backlog definition is easily understood
 - SGR backlog often cited by press

- Ⓣ Better legislator understanding of problem leads to favorable action
 - State has committed to pay capital costs for future system expansion (as well as future operating costs)
 - \$160M annual operating subsidy
 - Understand need to focus on SGR



SGR Benefits – New capital planning focus



Investing in the MBTA's Future

Capital Investment Program

FY 2008 - FY 2012



Massachusetts Bay Transportation Authority
Driven by Customer Service

- ① MBTA committed to minimum \$470M annual capital program
 - To maintain \$2.7B SGR backlog (based on 2006 analysis)

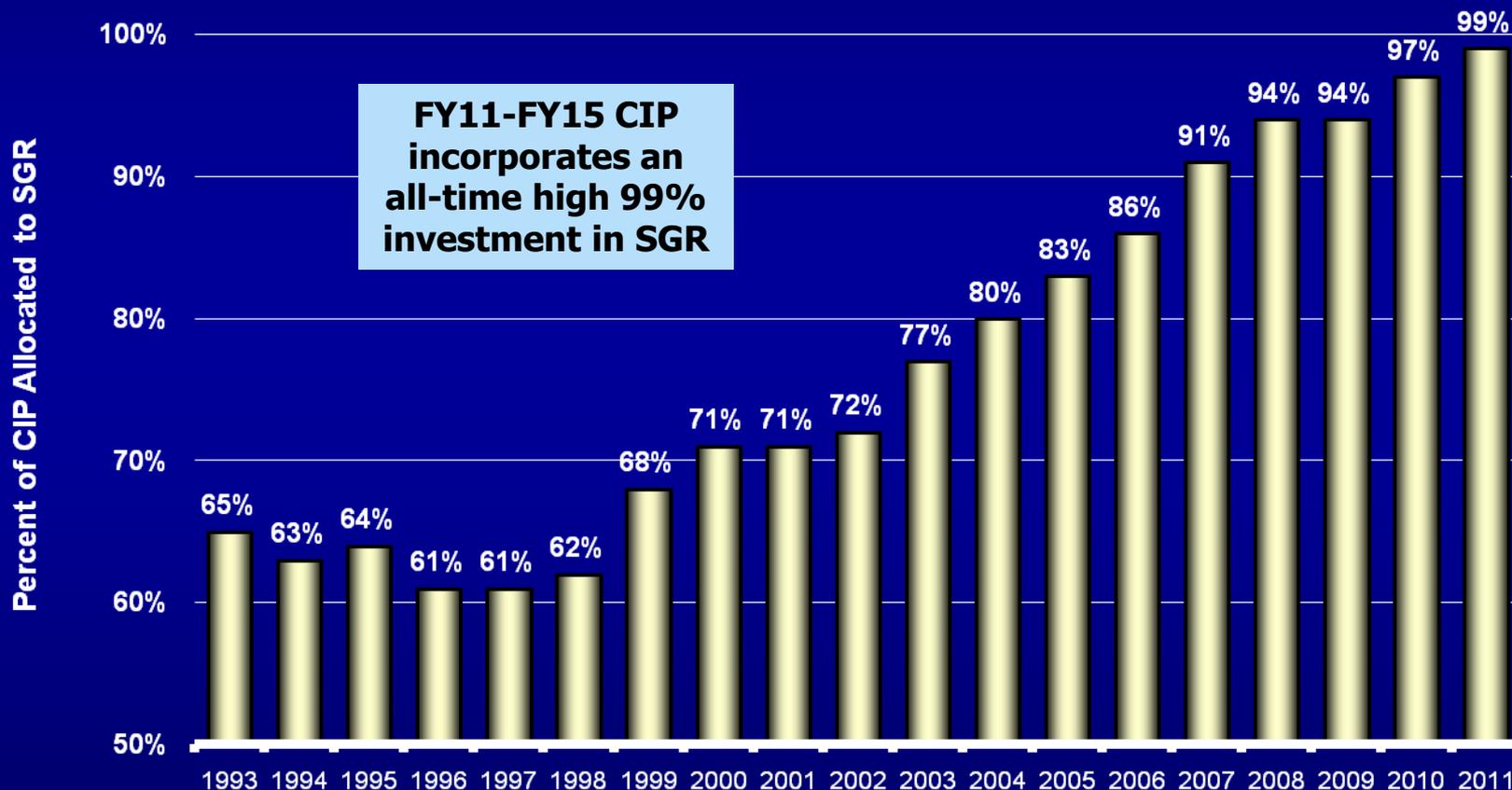
- ① The Authority can now prioritize SGR capital reinvestment needs
 - A “fix-it-first” strategy
 - A focus on less visible but more critical projects

- ① SGR is now the primary focus of the 5-year Capital Improvement Program
 - A higher percentage of CIP dedicated to SGR (less expansion)



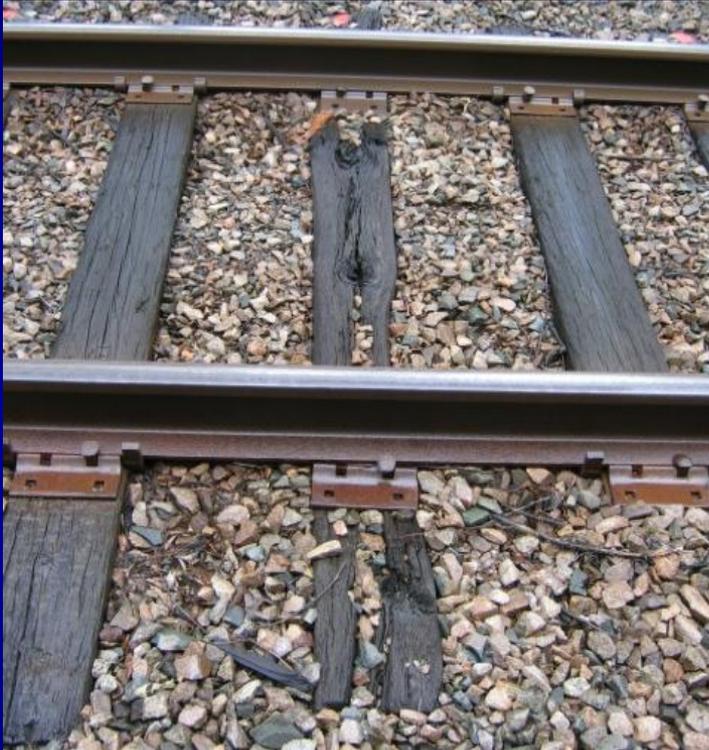
SGR Benefits – More dollars to SGR

FY2011-FY2015 CIP Focus: SGR – 99% of MBTA capital dollars





The SGR Database – Results (Track)



Before



After



The SGR Database – Results (Stations)



Before



After

Boylston Station



The SGR Database – Results (Tunnels)



Before



After

New Equipment for Pump Rooms



The SGR Database – Results (Power)



Before



After

Substation DC Breakers



The SGR Database

Just one tool in the capital planning toolbox



- Ⓣ The SGR output is incorporated into the capital planning process
- Ⓣ It is an important part of the process; but not the only one



MBTA Capital Planning – Other Factors



- ① The MBTA ranks projects based on five factors specified in its enabling legislation:
 - Factor 1: Safety, Health and Environmental Impacts
 - **Factor 2: State of Good Repair**
 - Factor 3: Cost/Benefit
 - Factor 4: Operational Impact
 - Factor 5: Legal Commitments



Capital Project Selection – An Example



Replace the Roof of Everett Subway Repair Facility



Capital Project Selection – An Example

- Ⓣ Scope: Roof replacement at Everett subway repair facility
- Ⓣ Safety concerns
- Ⓣ SGR project
- Ⓣ Productivity and efficiency
- Ⓣ Repair of all T subway cars
- Ⓣ No legal commitment under ADA, or other
- Ⓣ Cost: \$1.6m

Factor 1: Safety, Health, Env. (20)	16
Factor 2: SGR (20)	15
Factor 3: Cost/Benefit (20)	11
Factor 4: Ops Impact (20)	12
Factor 5: Legal Commit. (20)	0
Total Score (100 Max.)	54



The SGR Database - Under Construction

ⓘ New SGR module under development, to help answer the following questions:

- What is the impact on the operating budget if funding constraints reduce annual capital reinvestment?
- What is the impact on the operating budget if the MBTA defers an asset replacement or renewal?
- Does replacing an asset earlier than needed reduce annual maintenance expense?

ⓘ SGR data model being updated to reflect 2009 assets, ages, renewal/replacement values





SGR Database – Where do we go from here?

- Ⓣ Build upon and improve current model/process:
 - Update more frequently
 - Bring database updates and modeling in-house
 - Improve “buy-in” at all levels of agency
 - Incorporate safety
 - Include condition and performance metrics
 - Make a more critical factor in capital planning and project selection



- Ⓣ Learn more about what other transit agencies are doing:
 - Best practices; what’s worked; what hasn’t; and why?
 - FTA guidance/support



SGR / Asset Management – Keys to Success

- ① Department managers must see the benefit of inputting accurate data, and believe in the outputs
- ① Upper management must see the SGR database as an important tool for asset management, capital program development and long-term financial planning
- ① Keep it simple. If understood by State policymakers and legislators, the SGR database can be an important tool for documenting the capital backlog and making the case for increased funding.





State of Good Repair - Conclusion



- Ⓣ No transit system can achieve and maintain the “ideal” SGR condition over time
- Ⓣ However, an asset management system can help to:
 - Better define the current problem
 - More accurately forecast future capital funding needs
 - Optimize investments (i.e., best value)
 - Make an argument for increased capital funding levels

It's well worth the effort