



**Regional
Transportation
Authority**

**Performance Based
Capital Planning & Programming
for achieving a
State of Good Repair :
Asset Condition & the Prioritization of Projects**

TRB

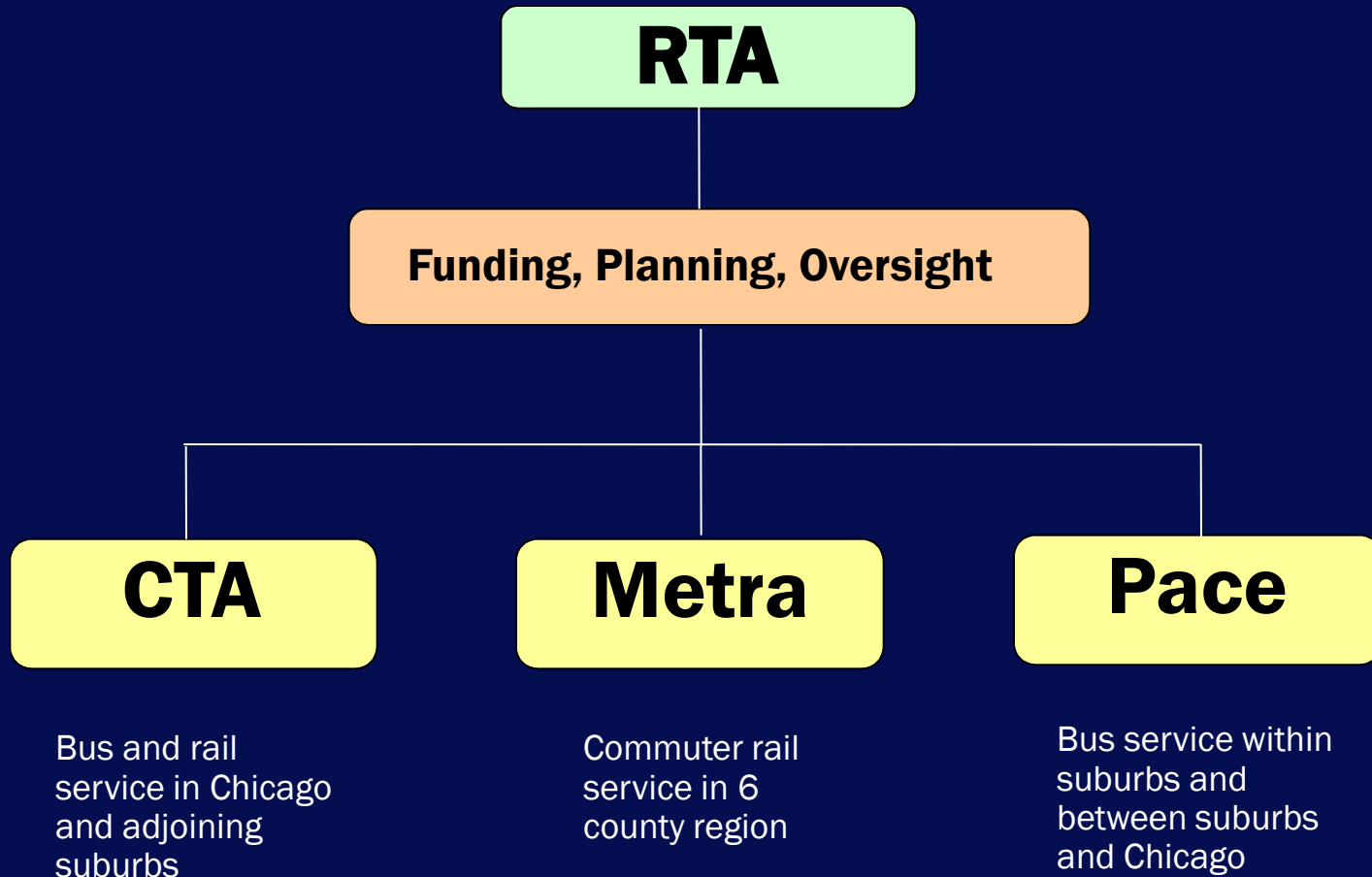
9th National Conference on
Transportation Asset Management

April 17, 2012

Grace Gallucci

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Northeastern Illinois Transit System



Capital Program Oversight

□ Authority

- RTA Act (as amended January 2008)
 - Requires performance measures to assess whether system is meeting the needs of the citizens and the region
 - Requires criteria for evaluating capital projects

How do you want the regional transit system to be described across the globe?

Compared to:

London

Paris

Berlin

Tokyo

Others?



How do we want to compare with the other largest U.S. transit systems?

New York

Los Angeles

Washington

Boston

Philadelphia

Others?



Performance Measures

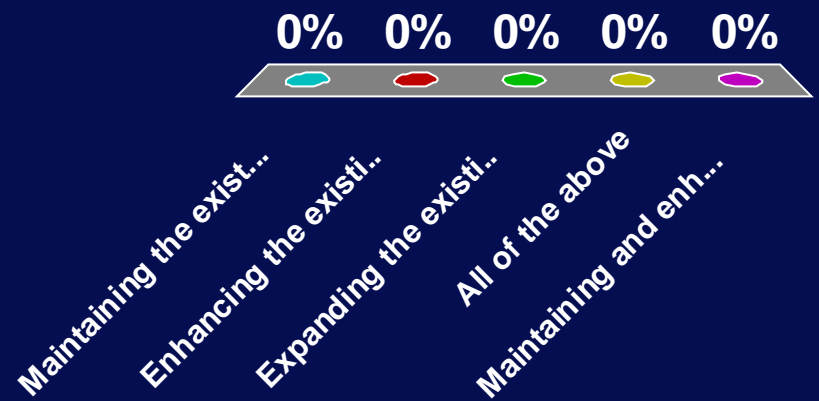
Service Maintenance / Capital Investment State of Good Repair & Reliability:



- Capital Program Maintenance / Enhancement / Expansion
- Percent of Assets in Good Condition
- Percent of Vehicles Beyond Useful Life
- Miles Between Major Mechanical Failures

Based on the information presented, should available capital funds be spent on:

1. **Maintaining the existing system**
(replacing or rehabilitating old assets to achieve a constant state of good repair)
2. **Enhancing the existing system**
(new stops on existing rail lines, greater vehicle capacity, etc)
3. **Expanding the existing service**
(creating new rail lines, developing bus rapid transit, etc)
4. **All of the above**
5. **Maintaining and enhancing the existing system**



Submitted to
Regional Transportation Authority
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Chicago, IL 60604-2711

REGIONAL TRANSPORTATION AUTHORITY Capital Asset Condition Assessment

prepared by
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in association with
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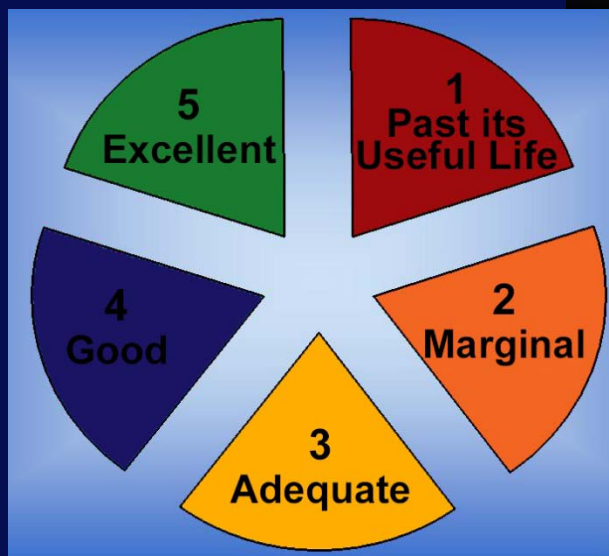
August 2010

*This report is confidential and intended solely for the use and
information of the agency to whom it is addressed*



State of Good Repair

The Ultimate Goal:
Sustainability and
Reliability of Service



Transit State of Good Repair BEGINNING THE DIALOGUE

October 2008

Prepared by:



April 2009

Prepared by:
Federal Transit Administration

The goal of the Capital Asset Condition Assessment: **Sustainability and Reliability of Service**

- **Tactical**

- Estimate total 10 year Capital Needs based on age of inventory
- Determine the future replacement, rehabilitation, and capital maintenance costs



- **Strategic**

- Bring facilities into a State of Good Repair (SOGR)
- Assist the RTA to obtain needed capital funding



Asset Condition Assessment Process

- Establish Teams
- Review Existing Databases
- Create Inventory Tables
- Collect Data
 - Age and Useful Life
 - Maintenance/Life Cycle
 - Rehab/Replacement
- Sample Assets (Physical)
- Identify Data Gaps
- Output: Ten Year Needs Assessment for State of Good Repair



Rating of Assets

Assets	Condition Rating				
	1	2	3	4	5
	Past Useful Life	Marginal	Adequate	Good	Excellent
Assets in 10-Year Needs	BACKLOG	Assets which reach the end of their useful life during the 10-Year Horizon			



Terminology

- Backlog
- Normal Replacement
- Capital Maintenance



Overall Results of 10-Year Needs Assessment

10-year Capital Program Needs Summary (in billions)

Program Needs	CTA	Metra	Pace	Total RTA
Backlog	\$10.0	\$3.7	\$.1	\$13.8
Normal Replacement	\$3.2	\$1.7	\$1.9	\$6.9
Capital Maintenance	\$1.8	\$2.0	\$.2	\$3.9
Total	\$15.0	\$7.4	\$2.3	\$24.6
% of Total	60.90%	29.94%	9.16%	100.00%

Condition Findings

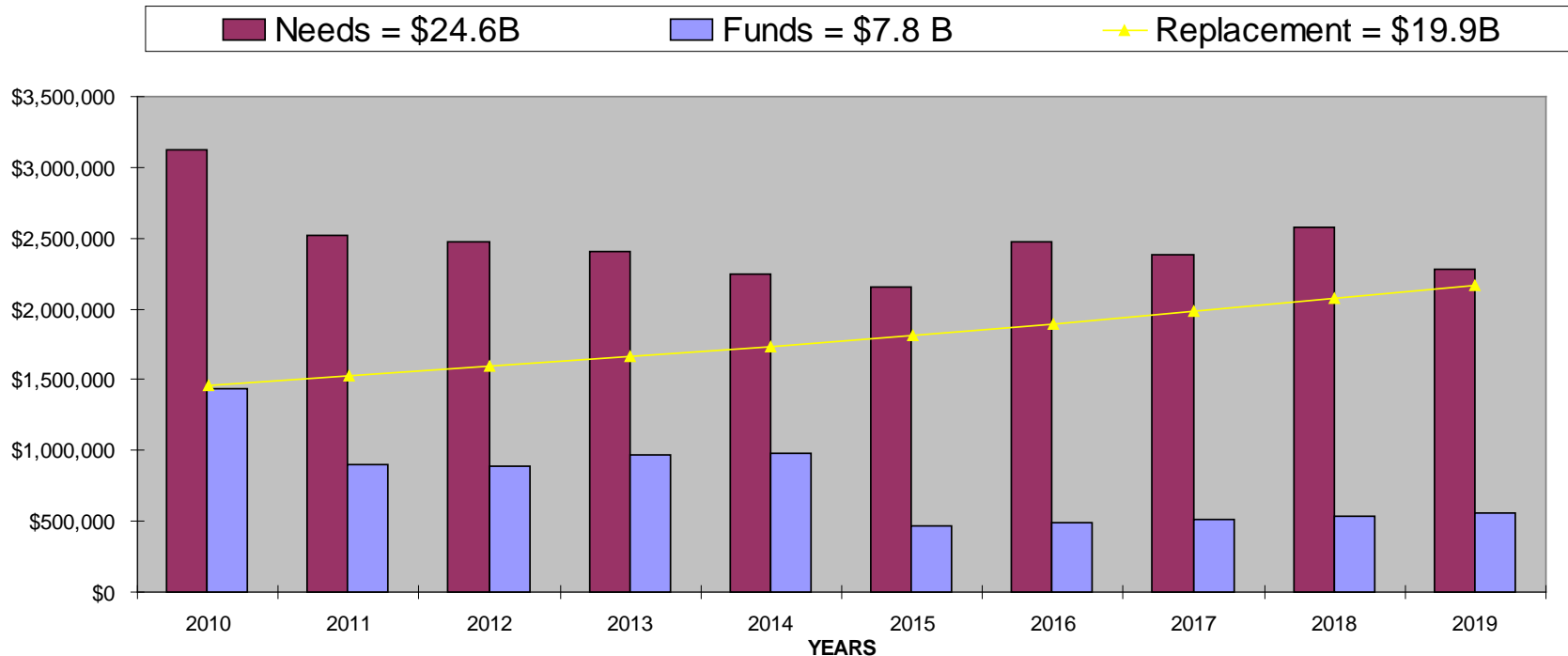
Mode: Bus/Rail



RTA Assets	(000's)
Rail	\$19.6 B
Bus	\$4.2 B
Other	\$.8 B
Total	\$24.6 B

Condition Findings

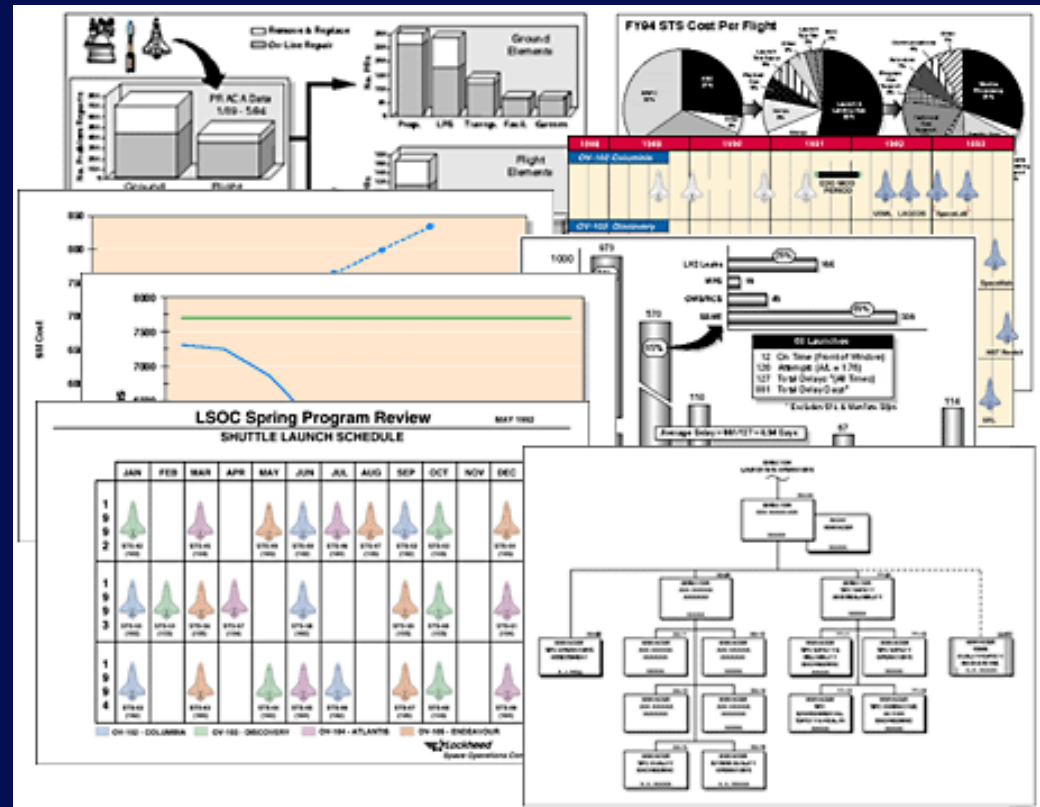
RTA SYSTEM 10-YEAR TOTAL CAPITAL NEEDS



- 10 year analysis: Needs vs. Funding
- Continued Challenges to State of Good Repair
- Policy Issues (Maintenance vs. Enhancement/Expansion)

What is a Capital Decision Prioritization Support Tool?

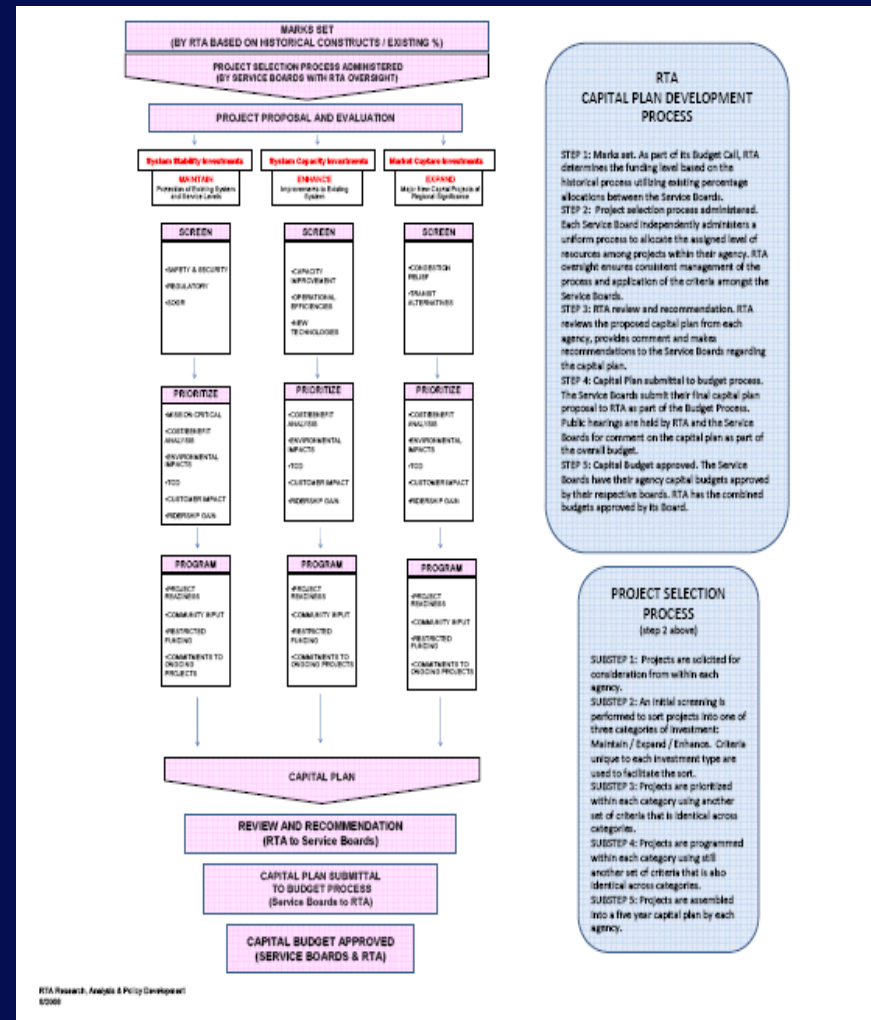
A technology driven resource that will facilitate the development and prioritization of a regional capital program by integrating many data and decision points into a single instrument.



Why do we need a Decision Support Tool? - Background

⇒ Phase 1: Capital Plan Development Process adopted by RTA Board in 2008 for use by SBs

⇒ Phase 2: Further refine and improve screening, prioritization and programming of capital projects



Why do we need a Decision Support Tool? - Background

Integrate objective criteria and data to drive decision making in support of achieving the Strategic Plan vision

- ⇒ Asset Condition Assessment
- ⇒ Market Analysis
- ⇒ System Analysis
- ⇒ 10 Year Financial Plan
- ⇒ Other



What is a Capital Decision Prioritization Support Tool?

The Original Bracketology Blog

BRACKETOLOGY 101

The most reliable and accurate
NCAA Tournament
seeding projections and predictions on the Web

NCAA TOURNAMENT BRACKET 2009

The image shows a detailed 2009 NCAA Tournament bracket. The bracket is divided into four regions: WEST, MID WEST, EAST, and SOUTH. The WEST region includes teams like Utah, Utah State, and New Mexico. The MID WEST region includes teams like Iowa State, Kansas State, and Missouri. The EAST region includes teams like Duke, Georgetown, and Virginia Tech. The SOUTH region includes teams like Florida State, North Carolina, and South Carolina. The bracket shows the progression from the first round to the Final Four, with the championship game scheduled for April 6th in the Alamodome in San Antonio, Texas. The logo for VIEVA is visible at the bottom of the bracket.

Capital Decision Prioritization Support Tool – Project Requirements

Provide inherent decision elements in a single collaborative tool to facilitate the optimization of limited resources

- ⇒ develop rating scales and weigh strategies
- ⇒ recognize and balance inconsistencies
- ⇒ perform sensitivity analyses
- ⇒ measure and assess value
- ⇒ present and evaluate scenarios/alternatives
- ⇒ quantify and judge results
- ⇒ formulate reasonable constructible programs



Prioritization Tool: Conceptual Model

Needs

SGR / Preservation

- Reinvestment in existing assets

Enhancement

- Improve performance

Expansion

- Add new capacity

Identify Preferred / Feasible Options

*RTA Capital
Decision
Prioritization Tool*

*Multi-Criteria
Investment Scoring*

Funding Capacity

Prioritized Plan

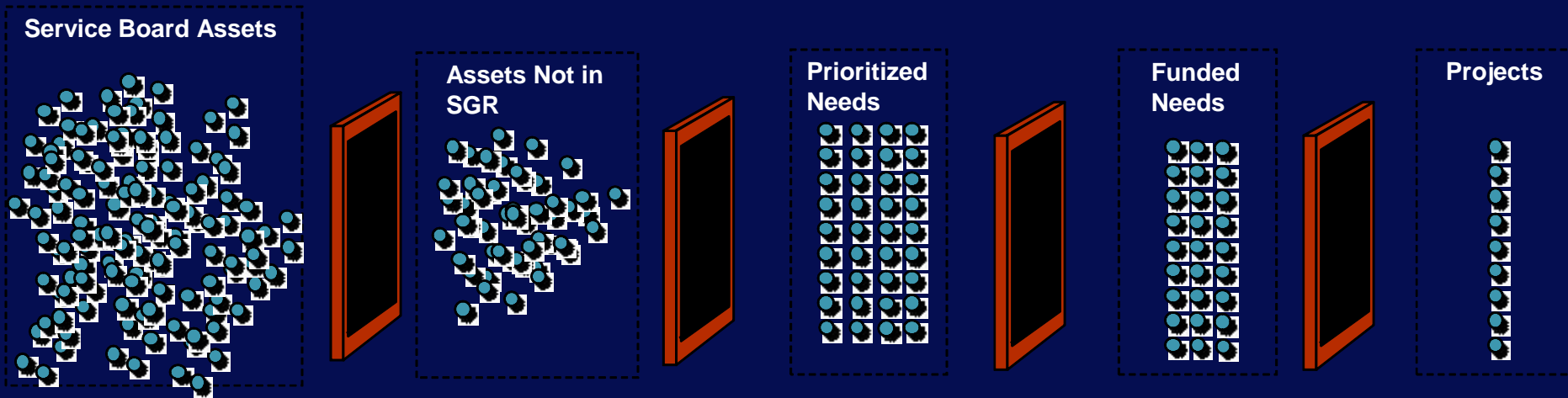
10 Year Capital Plan

- Prioritized Investments
- Funding Allocation

Initial Development Focused on Preservation

Annual Investment Prioritization Process

(Repeated Iteratively to Generate 10-Year Plan)



Preliminary Screen

- Required LifeCycle Event (i.e., rehab / replace)?

Prioritization

- Asset Condition
- Reliability
- Safety
- Rider Impacts
- O&M Cost Impacts

Program

- Restricted Funding
- Commitment to Ongoing Projects

Group into Projects

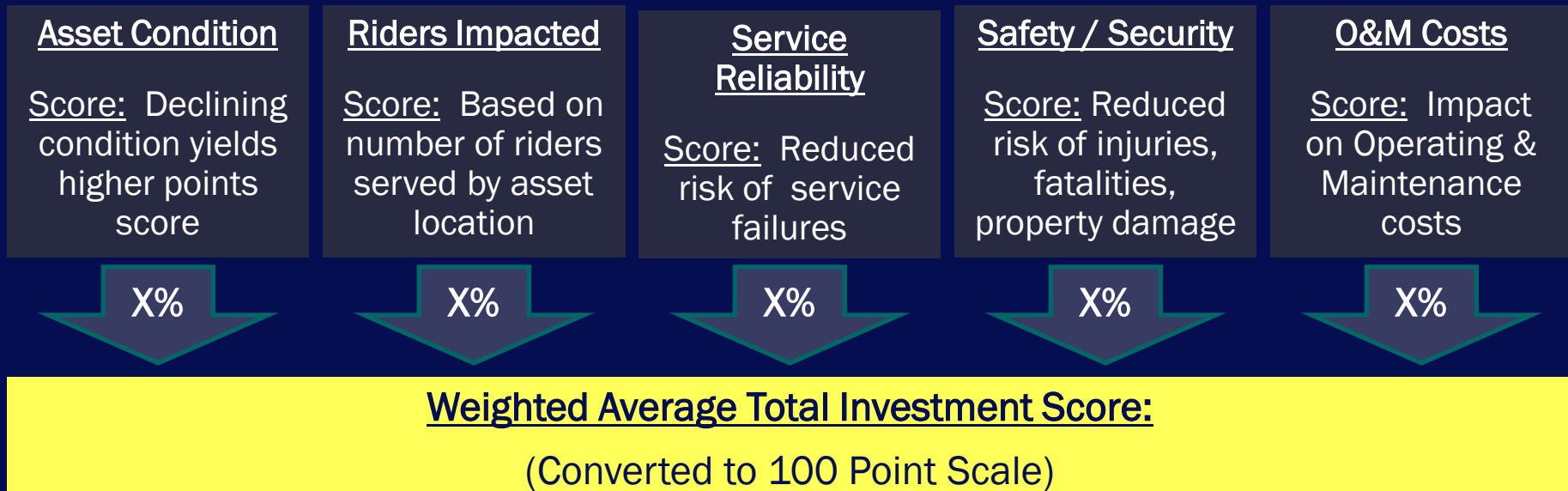
- By Location
- By Asset Type

Assets

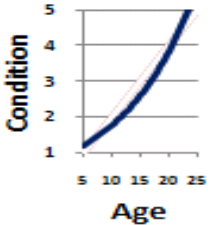
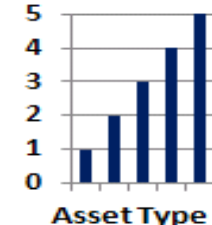
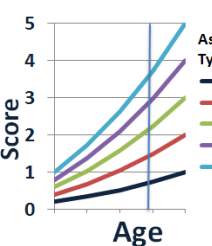
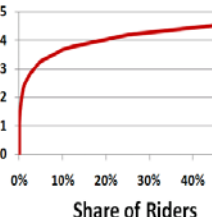
Multi-Criteria Prioritization

- All assets scored on five criteria
 - Each criteria scored on 1 to 5 scale
 - Scores weighted, summed, & converted to 100 point scale

Multi-Criteria Decision Analysis (MCDA) Based Approach



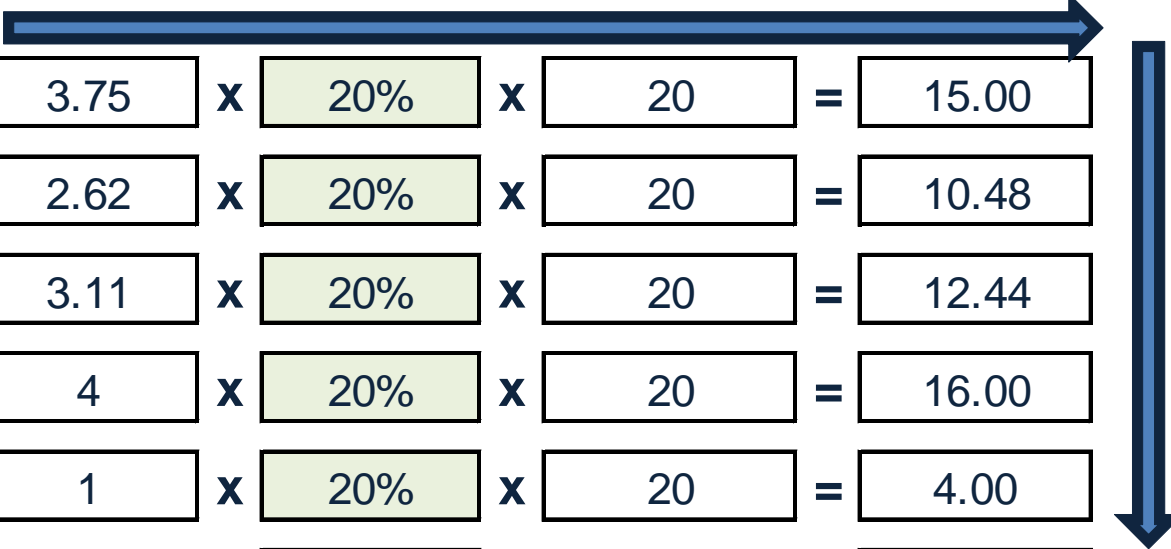
Approaches to Criteria Scoring

Criterion	Approach	Dynamic or Static?	Illustration
Condition	<ul style="list-style-type: none"> Decay curve based condition estimate <ul style="list-style-type: none"> Age based 1 to 5 scale 	<ul style="list-style-type: none"> Dynamic 	
O&M Cost Impact	<ul style="list-style-type: none"> Fixed score by asset type 	<ul style="list-style-type: none"> Static 	
Reliability and Safety	<ul style="list-style-type: none"> Combination of: <ul style="list-style-type: none"> Fixed score by asset type Dynamic score by asset age 	<ul style="list-style-type: none"> Mixed 	
Riders Impacted	<ul style="list-style-type: none"> Logarithmic score based on share of total agency riders impacted <ul style="list-style-type: none"> Scale ensures all assets obtain score 	<ul style="list-style-type: none"> NA 	

Total Asset Prioritization Score

Total Asset Score Calculation

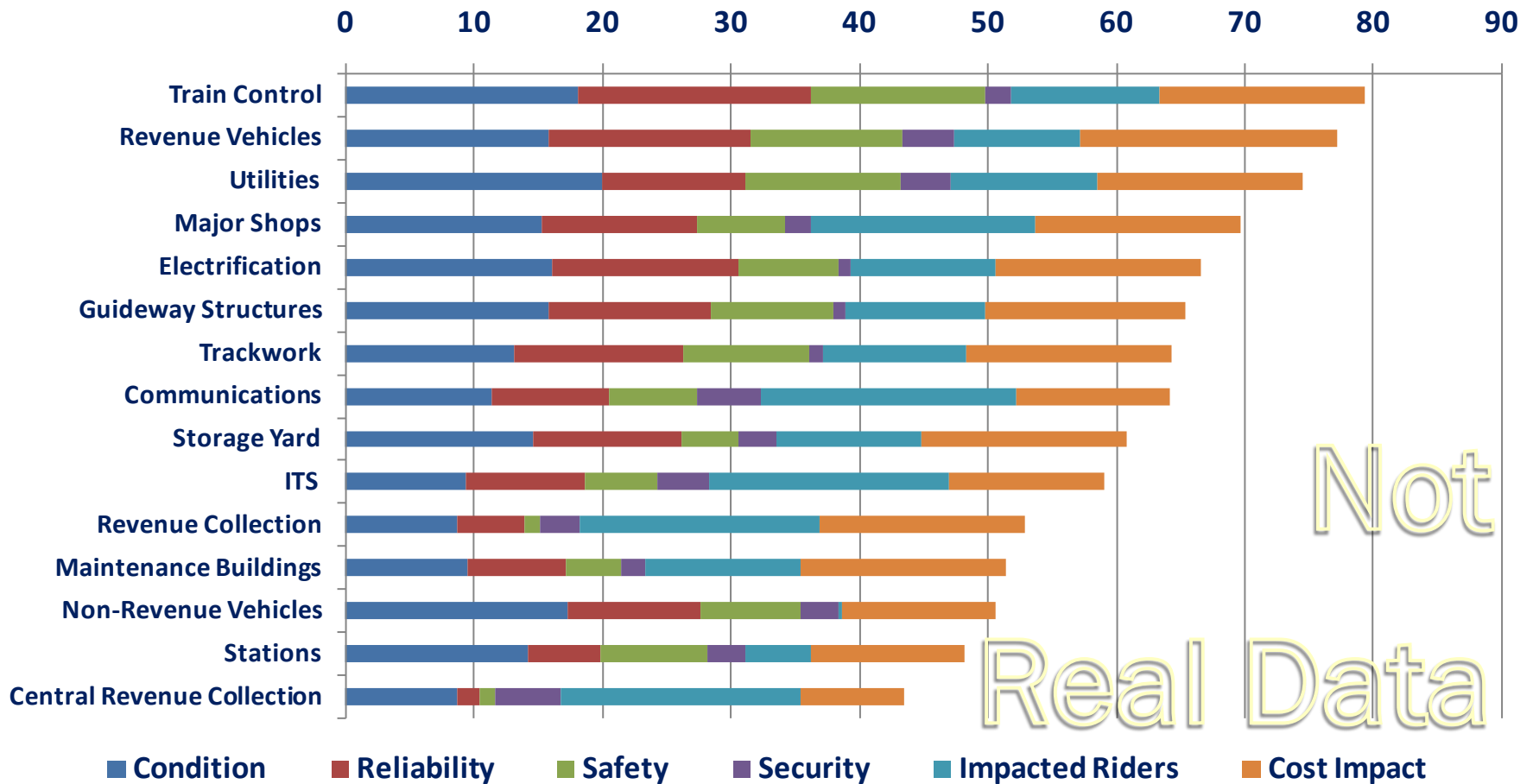
Criteria	Score (1 to 5)	Criteria Weight	Convert to Base 100	Base 100 Score
SGR / Condition	3.75	x 20%	x 20	= 15.00
Reliability	2.62	x 20%	x 20	= 10.48
Safety	3.11	x 20%	x 20	= 12.44
Riders Impacted	4	x 20%	x 20	= 16.00
O&M Cost Impact	1	x 20%	x 20	= 4.00
Total		100%		= 57.92



 User input

Summary Prioritization: Example

Average Prioritization Scores Summary for Assets Requiring Reinvestment



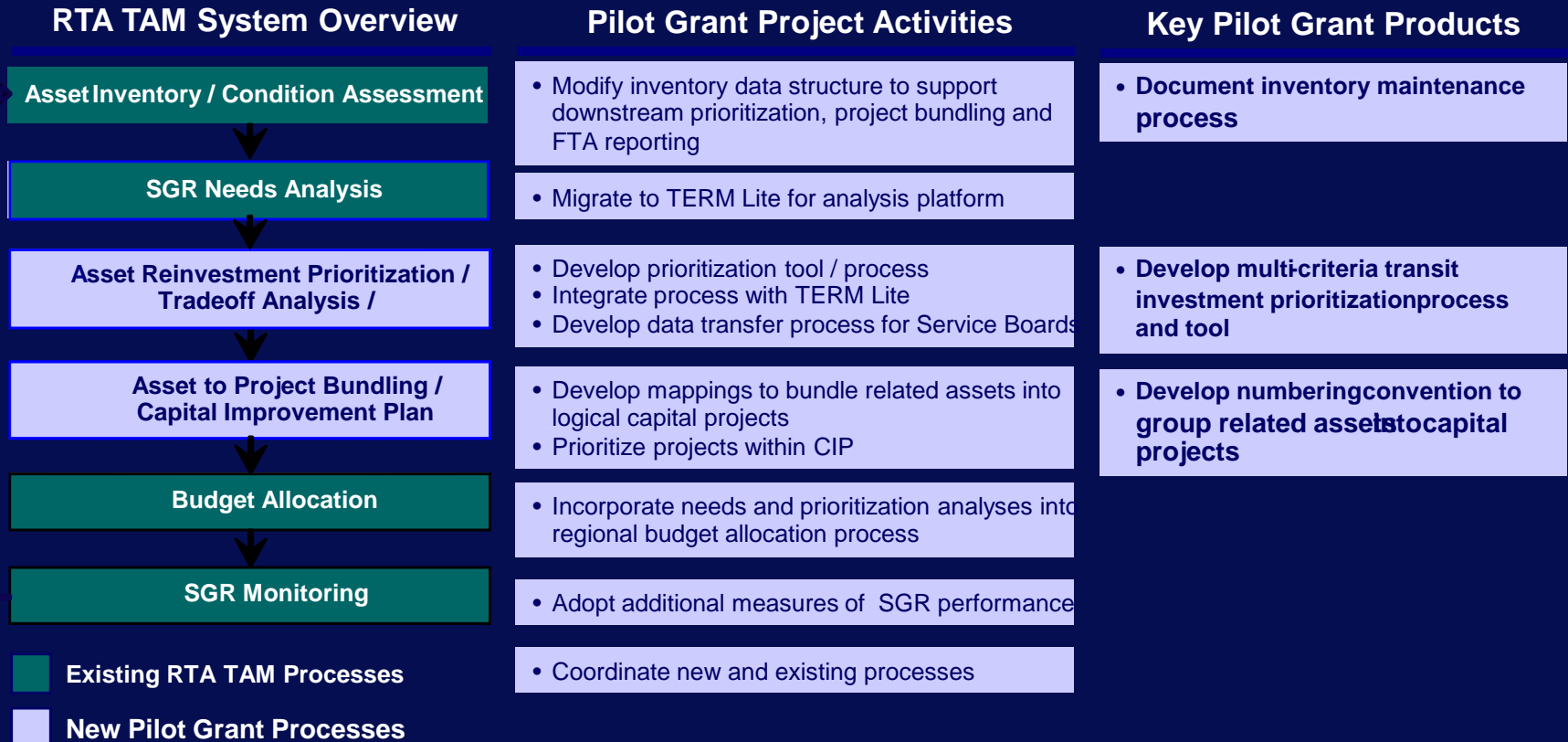
Capital Decision Prioritization Support Tool – Status & Next Steps



- ⇒ Pilot Model developed
- ⇒ Use by RTA to evaluate SB 2012 budgets
- ⇒ FTA TAM Development



RTA TAM System Overview and Pilot Grant Products



Methodologies for Development of Primary Pilot Project Products

Product	1. Document Inventory and Condition Assessment Process	2. Multi-Criteria Investment Prioritization Process	3. Asset-to-Capital Project Numbering Convention	4. Capital Prioritization Decision Support Tool
Existing System	<ul style="list-style-type: none"> RTA's existing performance measurements process, asset inventory / condition assessment process, market and system analysis process. 	<ul style="list-style-type: none"> RTA Project screening and prioritization process (see Section 7.2) RTA CAM / FTA TERM model as platform Multi-criteria decision analysis approach (MCDA) 	<ul style="list-style-type: none"> TERM's hierarchical asset type numbering system Asset inventory location markers 	<ul style="list-style-type: none"> FTA's TERM model and RTA's preexisting CAM tool
Product Evolution	<ul style="list-style-type: none"> Document process for wider industry application ("How to guide") 	<ul style="list-style-type: none"> Develop multi-criteria investment prioritization tool for implementation in TERM based tool Document approach/process 	<ul style="list-style-type: none"> Develop asset numbering convention to map related assets to capital projects based on type and location Document approach/process 	<ul style="list-style-type: none"> Incorporate products 1, 2 and 3 within TERM Products provides key points of development support for RTA, industry and FTA's proposed TERM Lite tool



Regional Transportation Authority

