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## Sustainable Operations

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Joseph M. Casey, General Manager  
Presentation to:  
MetroRail Conference  
March 24, 2012

- 6<sup>th</sup> Largest U.S. Transit Agency
- Population: 4 Million Residents
- Coverage Area: 2,200 Miles
- Ridership: 1 Million Daily (300 Million Annually)
- Employees: 9,200
- Vehicles: 2,550
- Fixed Routes: 144



## SEPTA Service Profile





# SEPTA Regional Rail & Rail Transit



### LEGEND

- Market-Frankford Line
- Broad Street Line & Broad-Ridge Spur
- Norristown High Speed Line
- Trolley Lines (Routes 10, 11, 13, 15, 34, 36, 101 and 102)
- Regional Rail Lines (end shows route destination)
- PATCO Line (no transfer needed between transit services)
- Free interchange
- Pedestrian Connection (additional fare needed for connecting service)
- Wheelchair accessible station

### INFORMATION

Customer Service: 215-580-7800  
TDD/TTY: 215-580-7853  
Website: [www.septa.org](http://www.septa.org)



**Broad Street Subway: 123**



**Commuter Rail: 357**



**Light Rail: 160**



**Market-Frankford Sub/EI: 220**



**Historic Streetcar: 25**



**Bus & Trolley Bus: 1,667**



**Multi-Modal Fleet of 2,550 Vehicles**

## Strategic Objectives

- Customer Service
- Ridership Growth for Transit
- Safety & Security
- Human Capital Development
- Rebuilding the System
- New Technologies
- Sustainability

## SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

Partnering for Regional Sustainability



Fiscal Years 2010 – 2014  
Five-Year  
Strategic Business Plan



# Strategic Business Plan (March 2009) Partnering for Regional Sustainability





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# SEP-TAINABLE GOING *Beyond* GREEN



**SEP-TAINABLE:  
Annual Report (Jan. 2012)**





## Triple Bottom Line Approach



- 472 Hybrid-Electric Buses (1/3 of Fleet)
  - Another 200+ by 2014
- Benefits of Incremental Capital Investment:
  - Fuel Efficiency (40%)
  - Extended Useful Life (15 vs. 12 Years)
  - Maintenance Savings
  - Improved Acceleration
  - Smoother, Quieter Operation



## Key Sustainability Initiatives: Hybrid Buses

- All Electric Propulsion-Based Rail Services Capable of Regenerative Braking
- New Silverliner V Railcars with Higher “Power Factor” = Better Regen Capacity
- Propulsion Control Retrofit on Broad Street Subway to Enable Regen Recapture – Will Pay for Itself in Less Than Two Years

Cost-Benefit Analysis of BSS Propulsion Control Retrofit	Cost	Benefit
<b>Upfront Cost</b>	<b>\$1.7M</b>	
<b>Annual Benefit</b>		<b>\$1.5M</b>
<i>30% Reduction in Traction Motor Failures</i>		\$86,534
<i>Reduced Labor Cost from Better Diagnostics</i>		\$147,825
<i>60% Reduction in Routine Maintenance</i>		\$106,320
<i>16.5M kwh Energy Reduction</i>		\$1,180,608

## Key Sustainability Initiatives: Regenerative Braking



- **Scope:** Two Storage Devices to be Installed at Substations to Capture, Store & Reuse Regen Power
- **Project Costs:** \$1.8 Million Each
- **Grant Awards:** \$900,000 from State Energy Development Authority; \$1.4 Million from Federal Transit Administration
- **Partnership:** Smart-Grid Firm Will Cover Incremental Project Costs in Return for Share of Revenues
- **Progress:** First Storage Device in Demonstration Phase; Second in Procurement



## Key Sustainability Initiatives: Wayside Storage Pilot Project

- **Project Goal 1:** Capture 50% of Wasted Regen Power
- **Project Goal 2:** Reduce Energy Consumption at Substation by 10-20% (More than 20 Similar Substations Across System)
- **Key Outcome:** Replicable, Scalable Public-Private Partnership Model for Energy Savings – Broader Application at SEPTA & Other Transit Agencies



## Wayside Storage Pilot Project: Goals & Outcomes



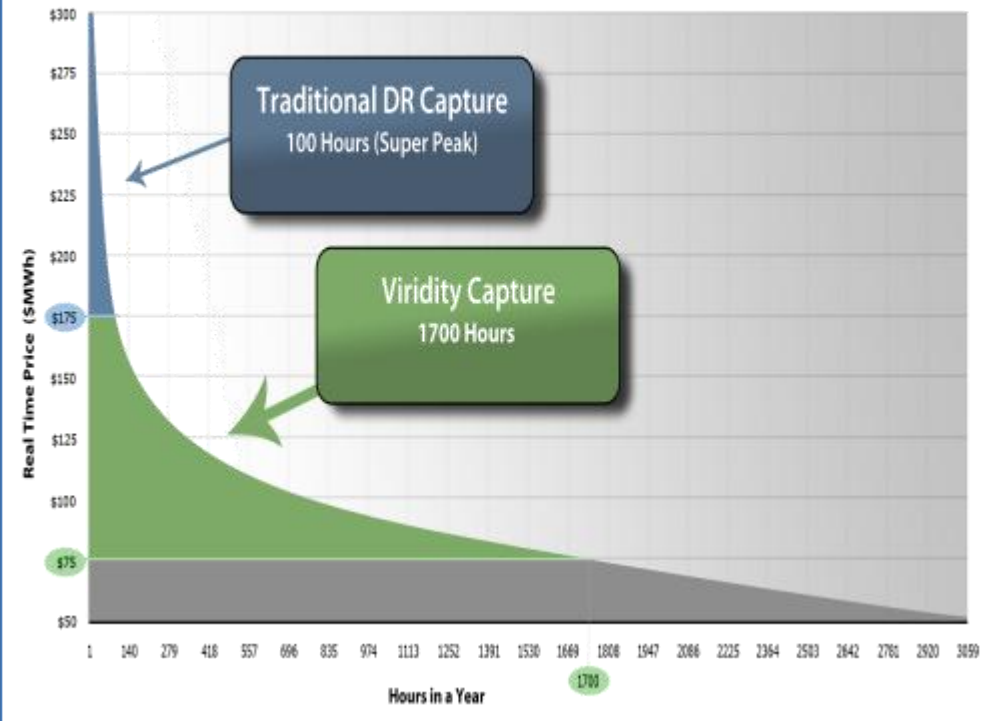
➤ **Benefits From:**

- 1) Reduced Energy Consumption
- 2) Demand Response
- 3) Regulation Market Participation  
(Selling Back to the Grid)

➤ **Annual Benefit Per Device:**  
\$261,571

➤ **10-Year Useful Life**

➤ **Net Return Per Device:**  
\$863,707



# Wayside Storage Pilot Project: ROI Calculation

- Strong Business Case With Return on Investment
- Source Separated, Single Stream Recycling at Headquarters & All City Transit Stations & Facilities
- \$41.33 Per Ton for Single-Stream Recyclables (Estimated Annual Benefit: \$170,000)
- Waste Oil Recycling (FY2011: 130,425 Gallons – \$123,780 Revenue, \$50,000 Avoided Disposal Fees)
- Railroad Ties Recycled/Reused to Avoid Disposal



## Key Sustainability Initiatives: Reduce-Reuse-Recycle



- **Lighting System Conversion**
  - Stations, tunnels, shops & signals
  - Rebates from electric utility (Total: \$22,492 rebate for three projects in FY2011)
- **New Boilers & Chillers for Fuel Efficiency**
- **Management of Hazardous & Non-Hazardous Shop Waste**
  - Used catalytic oxidizers to recover platinum
  - Waste fluorescent lamps to recover mercury
  - Antifreeze recycled and reused on site
  - Recycling of vehicle batteries
- **Resale of Scrap Metals**
- **Reclamation of Water on Vehicle Washers**
- **Underground Retention Basins In Design for Stormwater Management**
  - Partnership with Philadelphia Water Dep't



**Bus Washer at  
Midvale Depot**

## **Key Sustainability Initiatives: Energy, Water & Waste Efficiency**

- First LEED-Silver Railroad Station in America
- Designed For:
  - 20% Reduction in Potable Water Use
  - 30% Reduction in Electricity Use
- Use of Sustainable Construction Materials
- 96% Construction Waste Reused or Recycled
- Implementation of Ongoing Recycling Program



## Key Sustainability Initiatives: LEED Certification at Fox Chase Station



- EPA EnergyStar Award
- Motion Sensors & LED Lighting Fixtures
- Steam Cogeneration Facility
- Daytime Cleaning: 24% Reduction in Building Run-Time
- 14% Reduction in Electricity Consumption Since 2008 (\$100,000 in Annual Savings)



## Key Sustainability Initiatives: Energy Efficient Headquarters

*Sustainable  
Transit System*



*Sustainable  
Region*



## SEPTA's Leadership Position



*Sustainable*



*Not Sustainable*



## What's At Stake: Regional Sustainability



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