Finance & Administration Committee

Action Item III-D

June 10, 2010

Energy Storage Demonstration
FTA Energy Storage Demonstration Project

PURPOSE:

To request approval to a) implement FTA Energy Storage Demonstration Grant of $300,000 (100% federal funding, no match requirement); b) amend the FY2010 capital budget to reflect the award of the grant; c) create a new capital project and d) initiate and award competitive no-cost contract(s) to partner with one or more suppliers to provide, at no cost to Metro, a wayside battery storage system with installation support. Metro will monitor this sustainability initiative, test and evaluate the system to determine the benefits and feasibility of using this approach to reduce power consumption and increasing the stability and reliability of the traction power substations.

DESCRIPTION:

The Metro fleet of over 1,100 railcars produces regenerative braking energy which is transferred between railcars. This occurs when two railcars on adjoining tracks occupy the same traction block, one is braking and the other is accelerating. This is known as being "receptive". Currently, there is no capability of storing this energy when it cannot be immediately utilized by another railcar.

There are manufacturers that have developed wayside energy storage equipment capable of retaining the energy and making it available to a railcar that enters the block at a later time. The manufacturers contend that this will produce a substantial reduction in power usage; reduce peak power loads; reduce voltage sags at locations remote from the substations; and; where practical, delay or defer the need to add additional traction power capability. The objective of this project is to examine the technical performance, feasibility and cost-effectiveness of this type of system.

More than one test site and storage scheme may be used for this test depending on the response to the RFP and funding constraints. The testing will be structured to evaluate the relative performance of different storage methods.
and controls, determine the actual energy savings and how these may be optimized.

Discussions have been held with companies expressing an interest in partnering and sharing the costs for this project. To be considered they must show demonstrable experience with such systems. In addition to the experience, the companies must be willing to absorb the cost of the simulation and analysis to determine the size and cost-effectiveness of their equipment and to contribute to the supply and installation of the equipment for the demonstration project. Most companies willing to participate in this project do not appear to have experience with site preparation and installation and, therefore, this will be done in part by Metro staff. Further, discussions have been held with third-party experts to parallel the data collection process and to perform cost-benefit analysis during the study.

This initiative should reduce power consumption and increase the stability and reliability of the traction power substations allowing for a more efficient use of Metro resources.

FUNDING IMPACT:

<table>
<thead>
<tr>
<th>Action with Funding from One Fiscal Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program: Capital Improvement Program</td>
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<tr>
<td>Project: FY10 Beyond Metro Matters</td>
</tr>
<tr>
<td>Project Manager: Joe Krempasky</td>
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<tr>
<td>Budget: $300,000</td>
</tr>
<tr>
<td>This Action: $300,000</td>
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<tr>
<td>Prior Approval: $0</td>
</tr>
<tr>
<td>Remaining Budget: $0</td>
</tr>
<tr>
<td>Remarks: Create new capital project</td>
</tr>
<tr>
<td>Operating Budget Positions: 0</td>
</tr>
<tr>
<td>Impact: Annual Expense: $0</td>
</tr>
</tbody>
</table>

RECOMMENDATION:

Approval to:

a) implement FTA Energy Storage Demonstration Grant of $300,000;

b) amend the FY2010 Beyond Metro Matters Capital Budget from $0 to $300,000 to reflect the award of the grant;

c) create a new capital project and
d) initiate and award competitive no-cost contract(s) to partner with one or more suppliers to provide at no cost a wayside battery storage system with installation support, assess the cost savings, determine the return on
investment through simulations and actual testing, and increase the stability and reliability of traction power substations.
FTA Energy Storage Demonstration for Rail Transit Vehicle Operation

Finance and Administration Committee

June 10, 2010
Purpose

- Implement test program to potentially reduce rail system energy consumption through battery energy storage devices

- Obtain approval to initiate and award a competitive contract to install and test battery energy storage system
Metro’s 1100-railcar fleet generates usable energy during dynamic braking

Energy is lost if not immediately used by another railcar

Proposed wayside battery storage system will capture large portion of generated energy for use at a later time

Several manufacturers of battery storage systems are interested in participating

$300,000 funding provided by FTA grant – **DC-26-7209** as 100% federal contribution with no match requirement
Implementation and Outcome

• Implementation
  - Install and operate a test system for six months
  - Create a simulation model
  - Validate model with actual test data
  - Forecast cost savings based on system-wide implementation
  - Prepare a cost/benefit analysis and recommendation

• Desired Outcomes
  - Reduced rail system operating costs
  - Manufacturer’s suggested utility savings of up to 30%
  - Increased system reliability
  - Decreased maintenance costs
  - Increased stability of traction power substations (TPSS)
**FTA Energy Storage Grant Schedule and Budget**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Start Date</th>
<th>Duration</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board Approval</td>
<td>Jul 1 - Oct 29, 2010</td>
<td>120 days</td>
<td>Nov 1, 2010 - Jan 31, 2011</td>
</tr>
<tr>
<td>Project Organization and Procurement</td>
<td>24-Jun-10</td>
<td>90 days</td>
<td>Feb 1 - Jul 30, 2011</td>
</tr>
<tr>
<td>Installation</td>
<td>Aug 1 - Sep 30, 2011</td>
<td>60 days</td>
<td></td>
</tr>
<tr>
<td>Collection and Evaluation of Data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Report and Recommendation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Budget</strong></td>
<td>$300,000</td>
<td>$80,000</td>
<td>$60,000</td>
</tr>
</tbody>
</table>
Recommendations

Board authorization to:

a) Implement FTA Energy Storage Demonstration Grant of $300,000;

b) Amend the FY2010 Beyond Metro Matters, capital budget from $0 to $300,000;

c) Create a new Capital project; and

d) Initiate and award a competitive no cost contract(s) for installation and operation of energy storage system.
SUBJECT: AMEND THE FY2010 BUDGET TO INCLUDE THE ENERGY STORAGE DEMONSTRATION PROJECT

RESOLUTION
OF THE
BOARD of DIRECTORS
OF THE
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WHEREAS, The Washington Metropolitan Area Transit Authority (Metro) has been awarded a Federal Transit Administration grant totaling $300,000; and

WHEREAS, The grant is 100% Federal funding and does not require any local jurisdictional matching funds; and

WHEREAS, The grant provides support to examine the feasibility and cost-effectiveness of installing a wayside energy storage system to capture and reuse regenerated brake energy that is currently being lost; and

WHEREAS, The grant will fund project organization, procurement and management; installation; data collection and evaluation; and final report and recommendation costs; now, therefore be it

RESOLVED, That the Board of Directors increases the FY2010 Beyond Metro Matters Capital Budget from $0 to $300,000; and be it further

RESOLVED, That the Board of Directors authorizes the General Manager to initiate and award one or more competitive contracts to partner with one or more suppliers to provide, on a demonstration basis and at no cost to Metro, a wayside battery storage system with installation support which is hoped will increase the stability and reliability of the Traction Power Substations; and be it further

RESOLVED, That the Board of Directors authorizes the use of federal grant funds referenced in this Resolution to fund project organization, procurement and management; installation of the demonstration equipment; data collection and evaluation; and final report and recommendation costs which will include an assessment of the cost savings and determine the return on investment through simulations and actual testing; and be it finally

RESOLVED, That this Resolution shall be effective immediately.

Reviewed as to form and legal sufficiency,

Carol B. O'Keeffe
General Counsel