Metro Transit's Electrifying Service Expansion to Grow Regional Economic Opportunities

Location: City of Madison, Wisconsin

Type of Application: TIGER Discretionary Grant

Applicant Organization Name: City of Madison Metro Transit

Type of Eligible Applicant: Local

Amount of TIGER funding requested: $19,628,600

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SECTION I: PROJECT DESCRIPTION

1. INTRODUCTION

As the only full-service transit system in Dane County, Wisconsin, Metro Transit (Metro) saw 13,584,517 annual fixed-route and paratransit riders in 2016, and in the most recent ranking (2014) put it 15th best in the country for ridership per capita[1]. Operated by the City of Madison, the system is truly regional in providing service to five outlying communities, large area employers, the University of Wisconsin-Madison, the Madison Metropolitan School District, and coordinating service with four commercial bus services that connect the region with communities across the state, Midwest and nation. From 2000 to 2014, Metro saw significant annual increases in use but has now become a victim of its own success. Many routes are dramatically over-crowded, service needs in disadvantaged neighborhoods go unmet, and demands from key regional employers for increased workforce access go unaddressed because the existing facility to service and store the fleet is stretched well beyond its capacity. As a result, we have no capacity to expand our fleet and no ability to add desperately needed articulated buses. Consequently, boardings in 2016 actually decreased by 7.3% due in part to rider frustrations with overcrowded buses and long travel times, both of which represent compelling customer service reasons to expand our system.

To address these deficiencies and meet our ambitious goals for sustainably increasing ridership to urban and rural users, Metro's System Expansion Project consists of the following specific components to be funded as part of this grant and match:

1. Construction of a new bus maintenance and storage facility
2. Purchase of five, all-electric articulated buses
3. Solar and back-up power systems for the new facility and electric bus charging stations

As detailed in this application, our project has expanded in terms of its scope, impacts and in partnerships since our previous two TIGER applications. Specifically, Metro is now moving forward with conversion to an electric bus fleet with the inclusion of five, all-electric articulated buses in this application instead of the hybrid vehicles previously proposed. **Our local private utility, Madison Gas and Electric (MGE), has now signed on as a significant partner** in providing the necessary infrastructure to support our fleet electrification over the grant period **at an estimated cost of $3,900,000 and up to an additional $12,500,000 in equipment through 2035**. In addition, the City of **Sun Prairie – Dane County's second largest municipality – has recently committed an initial $50,000 toward the project** to facilitate expansion of our transit services to their 33,000 residents and those in surrounding rural areas. Further, the City is continuing its discussions with Epic Systems – the county's largest employer and whose campus in outlying Verona is 15 miles from central Madison – about a substantial commitment toward our project, but a final dollar amount had not yet been determined at the time this application was completed. Altogether, our project now has a total cost of $39,650,000 with the majority now being local funds $20,021,400 (or 50.5%), with the commitments that are finalized, to match a request for $19,628,600 (or 49.5%) in TIGER funds.

As described throughout this application, this System Expansion Project is designed specifically to allow us to better serve existing riders and further extend our reach to outlying employers and the rural workforce. To date the City has spent more than $1.4 million on the project and has included another $16,000,000 in its capital budget over the next three years. However, the TIGER grant is essential to keeping the project on schedule for a 2021 completion as without the grant the project will be delayed for 5-10 years in order secure other funding sources. **Working together with the FTA and our other project partners, though, we can bring this multi-component project to reality at a time when it is needed most – NOW – to sustain the economic expansion of the fastest growing metropolitan area in Wisconsin and the third fastest in the Midwest.**

[1] *WisDOT UPT Per Capita 2014 Report*. See link in: http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm.

Note that a project webpage (http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm) has been created where all supporting documents referenced in the application can be found as can full-sized files of all graphics included in this narrative.

Figure 1: Proposed Nakoosa Trail Facility

2. PROJECT DESCRIPTION

Beyond simply looking to address existing system deficiencies to continue business as usual, Metro is committed to building a next generation transit system including, **1)** 50% of our fleet being all-electric, zero emissions by 2035, **2)** all new facilities meeting the highest requirements for energy efficiency and sustainability, **3)** the introduction of Bus Rapid Transit by 2023, and **4)** increasing ridership by 31% by 2035. Over the last year, our partnerships and our System Expansion Project have grown to include the following crucial foundational components to be funded under this TIGER grant to further all of these goals.

a. Nakoosa Trail Satellite Bus Storage Facility

Based on a detailed, multi-facility Master Plan that included the Nakoosa Trail Satellite Bus Storage Facility (Nakoosa Trail Facility), a 165,000 square-foot facility is planned for a 5.75-acre site and will provide space for 20 40-foot standard buses and 36 60-foot articulated buses (see Figure 1 for illustrative graphic). Preliminary design includes two fueling stations, two washing stations, nine bays for preventative maintenance and running repair, as well as ample parts and materials storage, administration offices, training space, and an employee health and wellness center. The facility will alleviate some of the significant overcrowding at the existing bus maintenance and storage facility located at 1101 East Washington Avenue on Madison's East Isthmus corridor that currently services all 232 vehicles in a facility designed to maintain and store no more than 160 vehicles (see Safety Sec. IV.1.a. for more information). In addition, it will service the five articulated buses to be purchased as part of this grant and all of those to be purchased in the future as the existing facility is not capable of servicing buses of this size (see Project Location Sec. II.2. for a graphic depiction of the proposed Nakoosa Trail Facility).

Based on a detailed Master Plan completed in 2014,[2] preliminary design for the facility has been started and is expected to be completed by the end of 2017. The building will be a 2-story steel- and concrete-framed structure enclosed with insulated exterior precast concrete walls and insulated metal panel siding. The overall design concept will be utilitarian in nature with the character derived from industrial architecture of the region and be similar in appearance to the adjacent Fleet Services building. The administration offices and operations offices are planned to be on the second floor with bus parking and bus maintenance on the first floor. Staff and public parking and visitor entrance will be on the rooftop above the bus parking garage below with direct drive access to the adjoining Commercial Avenue. The building will achieve LEED Certification-Silver following the U.S. Green Building Council's Rating System. Total construction cost is estimated at $23,276,600 with another $4,163,300 in maintenance equipment, not including the electric support infrastructure to be provided by MGE as described below (see Grant Funds, Sources and Uses Sec. III for a complete breakdown of project costs).

b. Electric Articulated Buses

The grant budget also includes the purchase of five all-electric, 60-foot articulated buses to serve our most overcrowded routes, add service to the county's second largest city, Sun Prairie, and increase service to our region's largest employers such as Epic Systems (9600 employees), as well as new employers looking to locate in our region, such as Foxconn healthcare technology facility (which is currently considering a 600-employee medical device facility in Dane County at one of two locations – and not to be confused with the Foxconn touchscreen production facility locating in Southeast Wisconsin). A specific bus manufacturing vendor has not been chosen, but features on each of the buses are expected to include low-floor; 50 seats;

[2] *2014 Master Planning Study-Nakoosa Facility Phase I. See link in:* http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm.

65 standees; ADA accessibility with two wheel chair positions; GFI Fast Fare System equipped; bike racks; Buy America Compliant (more than 70% domestic and assembled in USA); extended range 200-300 miles; 800 KW battery; 8-12 hours of operating time; curb boarding; traffic signal prioritization; slide glide doors front and rear; Siemens PEM 1D82016 Electric drive (or approved equal); turning radius of 44'; Vansco instrument panel with touch screen (or approved equal); EMP cooling; luminator signs; Trapeze IVLU; and twelve camera IP security system. Based on models currently being offered by various vendors, we have budgeted $1,200,000 for each bus, with each to have a service life of 12+ years and battery degradation of no more than 20%.

c. Electric Support Infrastructure

Our private utility partner, MGE, has committed to providing the following support infrastructure to facilitate our move toward electric vehicles, energy efficiency, and reduced dependence on oil (see Partnerships Sec IV.2.b. and Environmental Sustainability Sec. IV.1.d. for more information on this partnership and our energy efficient project).

Bus Charging Stations – During the grant period, MGE will provide at least 10 charging stations to serve the five buses purchased as part of the grant and an additional five buses Metro plans to purchase with other funds as part of its regular fleet replacement program by 2023. Each charger will be capable of charging standard and articulated buses overnight in the Nakoosa Trail Facility. As part of its match commitment to this grant, MGE will own and maintain the charging stations and associated electric infrastructure. A vendor for the stations has not yet been selected, but each station is estimated to cost $90,000 based on similar chargers offered by various manufactures for a total estimated cost of $900,000.

Solar Photovoltaics – As part of construction of the Nakoosa Trail Facility, MGE will install 400-450 kW of solar photovoltaics on the flat roof areas that cover most of the building that are capable of generating up to 600,000 kWh per year. A vendor for the panels has not yet been selected, but the total cost of the installation is estimated to be $1,500,000 based on similar systems with which MGE has been involved.

Back-up Power – To ensure that resiliency and reliability goals are maintained, MGE will provide back-up power to supply the charging stations and the rest of the facility. A specific system has not yet been selected, but it generally expected to consist of a diesel-fueled engine capable of producing 1350 kW at an estimated cost of $1,500,000.

3. TRANSPORTATION CHALLENGES THE NAKOOSA FACILITY AIMS TO ADDRESS

Transportation challenges impacting Metro's existing system or constraining expansion are outlined below. Many challenges are both immediate AND detrimental to providing a robust, sustainable 21st century system. How our project will address these challenges is described in the next subsection and throughout this application.

Challenge 1: Overcrowded East Washington Avenue Facility

Our East Washington Avenue Facility (East Washington Facility) was designed to accommodate 160 buses, yet it presently houses 215 buses and 17 demand response vehicles, often parked overnight in drive aisles and maintenance bays. The existing facility poses numerous safety challenges to operators, maintenance workers, and the buses themselves (see Safety Sec. IV.1.a. for more on facility conditions).

Challenge 2: Overcrowded Buses and Capacity Exceedance of our Existing System

In our recent On-Board Survey,[3] overcrowding on buses ranked as our users' highest concern. Dissatisfaction with the ride itself has a growing potential to lead to a stagnant or decreasing ridership. While lower gas prices undoubtedly account for some of this, there is no question that user frustrations are increasing. Given the current storage constraints at the existing East Washington Facility, we have no

[3] *2015 Transit On-Board Survey Final Report. See link in:* http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm.

capacity to expand our fleet or house articulated buses (see Safety Sec. IV.1.a. for crowding conditions and Quality of Life Sec. IV.1.e. for proposed route improvements).

Challenge 3: Lack of Capacity to Connect Workforce to Regional Employers

Area employers have consistently indicated that a lack of transportation options was a significant deterrent to attracting and retaining employees. More than a third of all jobs in the county are located outside of the City of Madison, and that percentage continues to grow as the City begins to reach buildout. The planned facilities will allow Metro to expand services to growing and new employers located throughout the region (see Economic Competitiveness Sec. IV.1.c. for service to employers).

Challenge 4: Lack of Capacity to Improve Service to Rural Residents

Metro's current service area includes more than 73 square miles over five different communities and intervening unincorporated areas. In addition, the system includes five designated park and ride facilities in addition to dozens of informal commuter lots to serve the 31.1% of the county's workforce that lives in the five surrounding counties and beyond. Central Madison is blessed with more than 211,000 jobs, but its location on narrow strips of land between several large lakes creates significant traffic capacity constraints. And parking – if available at all – is very expensive. Accordingly, affordable and efficient park and ride service is critical for those commuting into the area from outlying rural areas (see Economic Competitiveness Sec. IV.1.c. for service to rural employees).

Challenge 5: Lack of Capacity to Connect Underemployed Neighborhoods with Jobs

At 2.4%,[4] Dane County has the lowest unemployment rate in the state and the fifth lowest of MSA's in the Midwest, and Dane County's employment is forecasted to increase from 314,000 to 398,700 jobs between 2010 and 2050.[5] Despite this, several neighborhoods in the central part of Madison, at the periphery, and in adjoining communities continue to experience unemployment rates of 4% or more. Not surprisingly, these are lower income areas where residents have limited transportation options to access jobs (see Economic Competitiveness Sec. IV.1.c. for proposed service to underemployed areas).

Challenge 6: Need to Increase Energy Efficiency and Reduce Dependence on Oil

Madison Mayor Paul Soglin has established a firm goal of achieving a 50% zero emissions fleet by 2035 and has backed that up with the $1.4 million the City has already spent on advancing our Service Expansion Project and the $16 million more it has budgeted for it over the next three years (see Appendix C for Commitment Letter from Mayor Soglin). The fuel cost per mile of an electric bus is less than 20% of that for a diesel bus and reduces oil consumption by 306 barrels per year per bus (see Environmental Sustainability Sec. IV.1.d. for environmental benefits of electric buses).

Challenge 7: Advancing Bus Rapid Transit & Our 21st Century Transportation System Vision

A 21st Century Transportation System provides the most efficient, cost-effective, and expedient service with innovative features for just-in-time scheduling, cutting edge equipment and transfer technology, and environmentally sustainable practices. However, storage of the larger, articulated buses that are required for BRT is not feasible at our East Washington Facility. Implementing our System Expansion Project, including the purchase of these buses and construction of the Nakoosa Trail Facility that can house them, are the critical first steps toward implementing the BRT in our region (see Quality of Life Sec. IV.1.e. for more on our planned BRT service).

4. HOW OUR SYSTEM EXPANSION PROJECT ADDRESSES CHALLENGES

The following System Expansion Project goals address the corresponding challenges outlined above:

Goal 1: Improve Conditions at our East Washington Facility

- Reduce overcrowding by relocating 55+ buses to the Nakoosa Trail Facility (see State of Good

[4] *Bureau of Labor Statistics.* https://www.bls.gov/regions/midwest/data/xg-tables/ro5xg02.htm#ro5xg02msa.f.p.
[5] *Regional Transportation Plan 2050*. Pg. 2-6. See link in: http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm

Repair Sec. IV.1.b.)

- Improve driver and maintenance worker safety by clearing overcrowded drive aisles and relocating hazardous materials to more adequately-sized and safer storage (see Safety Sec. IV.1.a.)

Goal 2: Acquire Articulated Buses and Expand Capacity of Existing Transit System

- Improve rider satisfaction by reducing overcrowding by 25% for every 10 buses (see Safety Sec. IV.1.a.iii.)
- In advance of BRT, increase service capacity on most heavily travelled commuter routes by 20-50% by replacing standard buses with articulated buses (see Quality of Life Sec. IV.1.e.)

Goal 3: Expand Transit to Better Serve Regional Employers

- Use articulated buses to increase capacity to outlying employers to the east, south and west (see Economic Competitiveness Sec. IV. 1.c.iv.)
- Use increased capacity to enter into additional employer service agreements in the Village of DeForest, City of Sun Prairie and City of Middleton (see Partnerships Sec. IV.2.b.)
- Use articulated buses to double service to Epic Systems to a capacity of up to 500 boardings per day (see Economic Competitiveness Sec. IV.1.c.)
- Increase the sale of employer-purchased bus passes by 30% by 2035 (see Quality of Life Sec. IV.1.e.ii. and Partnerships Sec. IV.2.b.ii.)
- Work with regional partners to advance the legislative process required to create a Regional Transit Authority to more efficiently and effectively fund a regional transportation system (see Partnerships Sec. IV.2.b.i.)

Goal 4: Acquire Articulated Buses and Expand Transit to Better Serve Rural Residents

- Add or increase service to outlying areas including: Far East Side – City of Sun Prairie; Far West side – Old Sauk and Valley View; South side – McKee and Cross Country and an East-West route in Fitchburg to Madison's south; and the Far Northeast side – the 1-94/190 interchange park and ride (see Economic Competitiveness Secs. IV.1.c.i. and IV.1.c.ii and Quality of Life Sec. IV.1.e.i.)
- Coordinate and plan for Park-and-Rides near system ends and existing transfer points where adjacent land is available (see Economic Competitiveness Sec. IV.1.c.i.)
- Strengthen partnerships with commercial bus services to enhance service to rural residents who periodically visit Madison to access healthcare facilities, government services, and family members (see Quality of Life Sec.IV.1.e.i.)

Goal 5: Aggressively Reduce Barriers to Opportunity for Underemployed Neighborhoods

- Add 8 - 12 additional buses in the peak hours to fulfill potential new and expanded service to 16 minority and low-income neighborhoods (see Quality of Life Sec. IV.1.e.ii.)
- Increase 20,000 - 30,000 service hours and 200,000- 600,000 rides annually[6] (see Quality of Life Sec. IV.1.e.ii.)

Goal 6: Reduce Dependence on Oil and Improve Energy Efficiency

- Attain a 50% zero emissions fleet by 2035 (see Environmental Sustainability Sec. IV.1.d.i.)
- Construct the Nakoosa Trail Facility to LEED Certification-Silver or better (see Environmental Sustainability Sec. IV.1.d.)
- Work with MGE to seek additional opportunities to add solar and other renewable energy sources to serve existing facilities (see Project Description Sec. 2.c. and Partnerships Sec. IV.2.b.)
- Reduce vehicle miles traveled by single occupant vehicles (see Environmental Sustainability Sec. IV.1.d.i.)

[6] Estimates provided by City planning staff

Goal 7: Expand Metro Transit System to Include Bus Rapid Transit Service

- Pursue New Starts funding in 2019 to begin design and construction of BRT facilities (see Quality of Life Sec. IV.1.e.i.)
- Initiate BRT service in 2023 with nine articulated buses along the primary East-West Corridor and subsequently acquire nine additional articulated buses for a phase 2 expansion to serve the primary North-South corridor (see Quality of Life Sec. IV.1.e.i.)

5. PROJECT HISTORY

In 2005, Madison commissioned a study to address renovation and/or expansion at Metro Transit's antiquated and overcrowded 32-year old East Washington Facility.[7] **That study concluded that renovation and/or expansion of the current facility would be too costly and would not accommodate larger, articulated buses to better serve the needs of the growing transportation system.** Following that, the City began looking for and evaluating sites for a new satellite facility before arriving at the former grocery site on Nakoosa Trail in 2013 (see Project Location Sec.II.1. for site selection process).

Pre-design activities for the Nakoosa Trail Facility began in 2014 with a Master Plan Design Study[8] that determined the size, preliminary cost, and configuration of the building on the site. Demolition of the existing Cub Foods building shell and core was completed in November 2016. The NEPA Categorical Exclusion for the proposed project site location was approved by the FTA in January 2017.[9] The schematic design phase for the site and building began in June 2017 and is planned to be completed in December 2017.

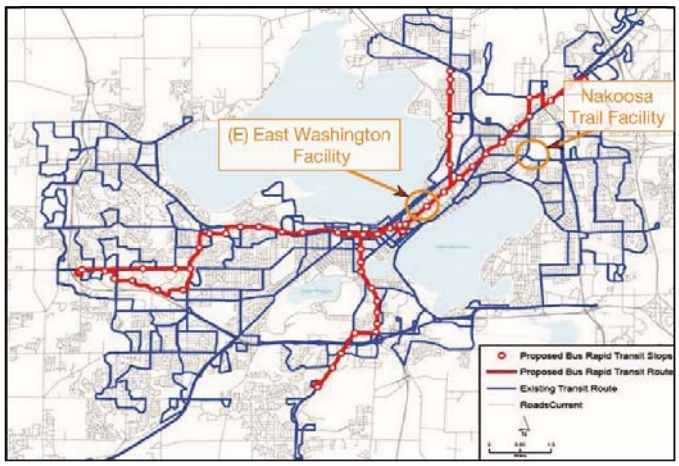
In 2015 and 2016 Metro applied for TIGER funding to assist in completing design and construction of the Nakoosa Trail Facility. Although unsuccessful with both attempts, the City continued to advance the project. This included a commitment to a 50% zero emissions fleet by 2035 and discussion of partnership opportunities with MGE that ultimately lead to their offer of a $3,900,000 match to this grant. In addition, the City continued its outreach to area communities leading to the City of Sun Prairie's offer to provide matching funding and Metro's agreement to extend service to Sun Prairie once the Nakoosa Trail Facility is completed and can house the additional needed buses. **To date, the City has spent $1.4 million of its own funds to advance our System Expansion Project and has budgeted another $16 million to be used as match in bringing it to completion** (see Grant Funds, Sources, and Uses Sec. III.1. for project budget table).

SECTION II: PROJECT LOCATION

1. DETAILED GEOGRAPHICAL DESCRIPTION

The Nakoosa Satellite Facility will be located at 4141 Nakoosa Trail at the corner of Commercial Avenue on a former Cub Foods grocery site. The 15-acre site is less than a quarter mile from Stoughton Road (US 51) – a major north-south arterial serving the near east side of the City. This is an ideal location due to its proximity to the existing East Washington Facility (3.8 miles), the East Transfer Point (1.6 miles), North Transfer

Figure 2: Nakoosa Trail Facility Location



[7] *2005 Facility Expansion Report. See link in:* http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm.
[8] *2014 Master Planning Study-Nakoosa Facility Phase I. See link in:* http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm.
[9] *Approval, Checklist and Assessment Reports. See link in:* http://www.cityofmadison.com/metro/tigergrant/applicationdetails.cfm.