February 13, 2014

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From: Roger Moliere, Los. Angeles County Metropolitan Transportation Authority (Metro)

Subject: Docket # 12-EPIC-01- “EPIC second investment plan”

On behalf of the Metro organization, we are pleased to submit our Research Questionnaire under the Electric Program Investment Charge 2015-2017 Second Investment Plan

Title of Proposed Initiative: High Desert Corridor High Speed Rail Renewable Energy Technology

Investment Areas:

X Applied Research and Development  X Technology Demonstration and Deployment
X Market Facilitation

Electricity System Value Chain (Check only one):
  _Grid operations/market design  X Generation
  _Transmission  _ Distribution
  _Demand-side management

Issues and Barriers:

Describe the issues and barriers that are impeding full market adoption of the proposed clean energy technology or strategy (such as cost, integration, or lack of information). The Metropolitan Transportation Authority of Los Angeles County (Metro) manages all aspects of public transportation within the County of Los Angeles. Among these areas of activity are rail, buses, highway planning, transit oriented development and supporting energy, environmental and other technical activities. Metro currently is overseeing the $30+ billion Measure R local sales tax-funded transit funding measure, as well as other federal, state and local funding programs. Renewable energy and overall system sustainability is a very high priority for Metro. Past Metro energy projects have included comprehensive energy conservation measures in all Metro facilities, and solar systems installed at bus operations. Metro is also evaluating combined heat and power projects in association with private developers.

However, Metro’s ability to apply comprehensive renewable energy technology solutions is limited by the complex nature of the Metro system. The electricity for the Metro system is supplied by multiple electric utilities – SCE, City of Pasadena, Los Angeles Department of Water and Power). The Metro system links more than 50 cities, and in conjunction with the sister agency, Metrolink, six Southern California Counties with more than 25 million people. Each of the Metro rail lines (a combination of subway, light rail and high speed bus) uses somewhat different technology, supplied by different contractors and vendors over a period of 25 years.

Initiative Description and Purpose:

How will this technology or strategy help address the issue/issues? Describe knowledge to be advanced to overcome critical barriers. Include the recommended funding level (minimum and maximum) for each project under this initiative. The proposed EPIC project would master plan a renewable energy technology series of demonstration projects along a new transit and highway corridor, the Metro High Desert Corridor (HDC). The project would be the construction of a new multi-modal link between State Route (SR)-14 in Los Angeles County and SR-18 in San Bernardino County. The entire HDC is in the SCE territory. This will likely included a High Speed
Rail Feeder service between Palmdale and Victorville, ideally designed as a sustainable and environmentally responsible project, particularly through use of wind and solar energy.

The renewable energy elements of the HDC, particularly relative to high speed rail, could be conceptualized and developed as a prototype for other high speed rail efforts within the State of California. The HDC project, if approved, would be designed and built under carefully controlled design conditions into which the EPIC program technologies could be carefully integrated. As HDC will receive some level of federal funding, the potential for USDOE project match can be considered as well.

The EPIC funding requested is $10 million over the life of the project, as the HDC moves into the design and construction phases. The earliest allocation of funding would be in the renewable energy demonstration phases, to validate candidate systems and choose optimum renewable energy technology solutions which could then be integrated into the final design and construction of the HDC.

**Stakeholders:**

The current stakeholders of the program include the County of Los Angeles, L.A. County Metro, County of San Bernardino, and cities of Palmdale, Lancaster, Victorville, Adelanto and Apple Valley, Metro, XpressWest (high speed rail to Las Vegas), and industrial entities along the HDC which could also be candidate recipients for use of renewable energy technology, and Burns & McDonnell, one of the nation’s largest energy engineering and construction firms.

**Background and the State-of-the-Art:**

What research development and demonstration has been done or is currently being done to advance this technology or strategy (cite past research as applicable)? Metro has conducted extensive research into the energy required for rail propulsion, constructed solar facilities at bus maintenance yards, electrical sub-metering at many Metro facilities, strategic electricity savings programs on a per-rail line basis, and other approaches. Metro works with many of the universities around the region on specialized analysis of energy-related systems.

Describe any public and/or private successes and failures the technology or strategy has encountered in its path through the energy innovation pipeline: lab-scale testing, pilot-scale testing, pre-commercial demonstration, commercial scale deployment, market research, workforce development. The proposed project with EPIC would be the first formal research partnership between Metro and the California Energy Commission.

Identify other related programs/initiatives that deal with the proposed technology or strategy, such as state and federal programs or funding initiatives (DOE, ARPA-E, etc.). While Metro has worked extensively with the Federal government, including project grants, it has not received substantial funding from the USDOE or other energy agencies. Metro is confident that with a HDC research project in place through EPIC, other funding sources would wish to participate in the program.

**Justification:** Describe how this technology or strategy will provide California IOU electric ratepayer benefits and provide any estimates of quantified annual savings/benefits in California, including:

- **Name of sector and estimated size and energy use.** Transportation Sector – Transit systems are large users of electricity. For example, in 2012, Metro’s rail lines consumed approximately 199 million kilowatt hours (kWh) of electricity.

- **Quantifiable performance improvements for the proposed technology/strategy.** The proposed Metro EPIC demonstration program would primarily focus on renewable energy technology applicable to high speed rail systems.
• **Maximum market potential, if successful.** High speed rail systems are being implemented worldwide, including in California. A technology developed for this project would have application in multiple other systems, and could be presented to the engineering consortia involved in these projects. In this way, knowledge of these technologies would rapidly spread to other projects.

• **Number of direct jobs created in California.** The number of individuals employed in testing, manufacturing, and installing new renewable energy technology for high speed rail systems would ultimately reach more than 500 statewide.

• **Why this research is appropriate for public funding.** Most high speed rail projects worldwide have an element of public funding. Therefore, the public funding entities have the obligation to operate them in an energy-efficient manner as possible through the use of renewable energy technologies.

**Ratepayer Benefits** (Check one or more):

- Promote greater reliability
- Increased safety
- Environmental benefits – specify
- Low emission vehicles/transportation
- Economic development

X Potential energy and cost savings
X Societal benefits
X GHG emissions mitigation/adaptation
X Waste reduction

**Describe specific benefits (qualitative and quantitative) of the proposed initiative**

An EPIC-funded renewable energy technology research project associated with the HDC would (1) generate best practices/technologies for a multi-hundred million dollar transportation corridor including potential high speed rail systems, (2) would generate renewable energy technologies potentially applicable to other high speed rail projects in California and elsewhere, and (3) would lead to a strong relationship with the $30 billion-funded Metro system for other applied research, development, commercialization and deployment projects.

**Public Utilities Code Sections 740.1 and 8360:**

Please describe how this technology or strategy addresses the principles articulated in California Public Utilities Code Sections 740.1 and 8360.

Under Section 740.1., the project would offer a reasonable probability of providing benefits to ratepayers, not unnecessarily duplicate research, support environmental improvement, conservation by efficient resource use or by reducing or shifting system load, development of new resources and processes, particularly renewable resources and processes which further supply technologies, and improve operating efficiency and reliability or otherwise reduce operating costs. Under Section 8360, the project would help to modernize the state's electrical transmission and distribution system to maintain safe, reliable, efficient, and secure electrical service, including deployment and integration of cost-effective distributed resources and generation, including renewable resources.