AUSTIN ENERGY®

MEMORANDUM

TO: Gage Loots, Corporate Purchasing Manager

FROM: Mark Dombroski, Interim General Manager

DATE: March 25, 2016

SUBJECT: Critical Business Need to Contract with Grant-Funded Project Team Members

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Action:

As detailed below, and in accordance with City Council approved purchasing procedures, I have designated the following purchases associated with a U.S. Department of Energy (DOE) Cooperative Agreement Grant as a Critical Business Need of Austin Energy (AE). All four partners below were named in the DOE $4.3 million grant SHINES award, thus the need for the unique deviation from the usual Purchasing process:

1. AE seeks to purchase Pecan Street Inc.'s services to design, deploy, manage, analyze and report on the performance of residential distributed energy resources (DER) (solar photovoltaics (PV), energy storage systems and smart inverters) in the Mueller development. Expected contract authorization of $900,000.
2. AE seeks to purchase 1Energy Systems' DER management platform, services for economic analysis and reporting, and an approximately 1.5 MW energy storage system to support the high penetration of residential and commercial solar PV. Expected contract authorization of $4,540,000.
3. AE seeks to purchase Ideal Power Inc.'s products and services to deploy smart inverters and energy storage systems for commercial applications to maximize the value of associated solar PV to commercial customers and the utility. Expected contract authorization of $60,000.
4. AE seeks to purchase Clean Power Research's solar forecast services to enhance 1Energy's DER management platform with input about expected solar generation customized to the Austin area. Expected contract authorization of $100,000.

Total contracts awarded as Critical Business Needs are estimated to be $5,600,000.

AE has made arrangements to present information on the SHINES award to the AE Utility Oversight Committee in March 2016. Additionally, AE has coordinated with Purchasing to bring related RCAs to City Council, expected in May 2016.

Background:

One of the key renewable metrics in Austin Energy's Generation Plan (approved by Austin City Council in December 2014) is deployment of distributed energy resources (DER), including specific goals for local energy storage and local solar PV. To support the *City Council goal, this project will advance AE's experience and deployment with emerging tech*nologies such as energy storage and smart inverters to support the increase of solar penetration within the AE service

area. AE proposes a limited deployment of battery energy storage and smart inverters and the development of a DER management software tool as further described below.

AE partnered with 1Energy Systems and Pecan Street, Inc. along with other named partners to apply for and receive a $4.3 million cooperative agreement grant from the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy (EERE) for its "Austin SHINES" project. The Grant awarded to Austin Energy and the Austin SHINES proposal participants, #DE-EE0007177, was announced by the DOE in January 2016. The Sustainable and Holistic Integration of Energy Storage and Solar PV (SHINES) program develops and demonstrates integrated solar PV and energy storage solutions that are scalable, secure, reliable, and cost-effective. One of the goals of SHINES is to create a credible pathway towards enabling increasing amounts of solar to be integrated reliably and cost effectively onto the electric grid. Ideal Power Inc. and Clean Power Research were also included in the grant application and identified in the award.

The application process for this DOE funding opportunity required the compilation of a project team from the onset of the project's proposal. Specifically, the Funding Opportunity Announcement (FOA) states, "The project team should include at least one utility, and is also expected to have a PV module supplier/solar installer, inverter company, energy storage supplier, and other key stakeholders as applicable, as part of their team, in designing, developing, and deploying the proposed SHINES solution." AE addressed this requirement by developing its Austin SHINES project in collaboration with several parties including those described below.

Pecan Street Inc. of Austin, TX is a 501(c)(3) research and development organization located at the University of Texas at Austin. Pecan Street's research focuses on accelerating innovation in energy by analyzing technology and behavior. It has a network of over 1,300 voluntary participants across the nation, the first of its kind commercialization lab, and the largest source of disaggregated customer energy data used by utilities, university researchers and industry-leading companies around the world. To accomplish the residential component of the Austin SHINES project, AE will rely on Pecan Street's expertise to design and deploy residential energy components then collect and analyze granular data to measure performance and advancement of project objectives. Pecan Street will leverage their extensive knowledge of and existing relationships with stakeholders and residents in the Mueller community to identify residential participants who will partner in project activities. As a neighborhood within AE's service territory with a high penetration of solar PV, the Mueller community is an ideal location, from an electrical perspective, to deploy energy storage and smart inverters to complement and maximize the value of existing renewable generation. Pecan Street is uniquely qualified to perform the residential component of the project, having over five years of experience implementing consumer energy research programs within the Mueller Development, an existing data collection and management platform, and pre-existing relationships within the Mueller community.

1Energy Systems is currently engaged with AE to provide the Kingsbery Pilot Energy Storage System (ESS) which uses the open, non-proprietary Modular Energy Storage Architecture (MESA) standard for ESS communications developed and patented by 1Energy. The MESA-ESS standard for integration of the ESS and utility IT infrastructure enables future systems to be integrated with minimal additional integration cost. AE has determined the best path forward to implement ESS's that will most fully comply with future standards is to be part of the current research and development to establish uniform standardization for this type of technology. The proposed systems under the DOE grant also rely on the MESA standards for integrating real-time control and automation of the ESS's, allowing for robust, standardized control and optimal performance. AE seeks to build upon the current relationship and advance its energy storage deployment through the DOE grant by obtaining 1Energy services to

- Develop and customize the 1Energy DER Optimizer (DERO), a control management platform intended to optimize the use of DER using open, non-proprietary standards driving toward the scalable goal of "plug-and-play" solutions;
- Perform economic modeling and analysis using the "System Levelized Cost of Electricity (LCOE) to Serve Load" metric defined by 1Energy to identify the optimal mix of devices and control schemes that result in the lowest system cost at the highest possible PV penetration; and
- Provide a second grid-scale energy storage system to advance City Council-approved goals for distributed energy storage and support the increasing penetration of solar PV in the Mueller development.

Ideal Power Inc. of Austin, Texas is a manufacturer of multi-port smart inverters that allow for integration of solar PV and energy storage systems for commercial customers utilizing patented "Power Packet Switching Architecture" technology. Ideal Power's technology significantly improves the weight, size, cost, efficiency and reliability of electronic power converters for the renewable energy and electric vehicle charging markets. Ideal Power is a member of the SunSpec Standards Alliance, a trade alliance of over 70 solar and storage distributed energy industry participants, together pursuing information standards to enable "plug & play" system interoperability. The use of open standards for all assets installed as part of the Austin SHINES project will allow AE to have a highly integrated system to optimize performance. Ideal Power is also providing a corporate in-kind contribution of $60,000 to support integration aspects of the DOE grant activities. Ideal Power is uniquely qualified to partner on this project, having a full array of commercially ready products to match the needs for commercial smart inverters able to accommodate storage and PV within one system, a local presence in Austin, the willingness to dedicate $60,000 in matching funds to support the grant application and successfully demonstrated ability to execute on projects of a similar nature in Austin in the past.

Clean Power Research will advance Austin SHINES objectives by helping to optimize the value of PV and increase reliability through solar prediction services. Clean Power Research's unique software, SolarAnywhere FleetView, will reliably integrate the distributed and utility-scale solar in this project into grid planning and operations through modeling and production forecasting. The product is scalable for use down to the feeder level, as well as across the entire AE grid. The output provides a unique combination of high accuracy satellite and numerical weather model-derived forecasting techniques with a PV simulation model that leverages the PV systems specific to AE. Energy predictions will help not only in load balancing but also in estimating the impact of increased PV penetration. Clean Power Research is uniquely qualified to partner on this project, having already worked extensively with AE to map out solar PV systems in Austin, and on a number of other initiatives, including ongoing development and updates to AE's Value of Solar.

The unique opportunities presented with the Austin SHINES project serve as a foundation to help AE develop best practices and programs for future deployments and ultimately advance the city's renewable energy goals to include distributed solar and storage.

CC: Marc A. Ott, City Manager