

**CITY OF AUSTIN – AUSTIN ENERGY
RECOMMENDATION FOR COUNCIL ACTION**

AGENDA DATE: 08/18/2016

SUBJECT: Approve issuance of a rebate to Apple, Inc., for the installation of energy efficiency measures at its Riata Vista Phase IIB Campus and Central Plant, located at 5401 and 5501 West Parmer Lane, in an amount not to exceed \$248,019. (District 6)

AMOUNT & SOURCE OF FUNDING: Funding is available in the Fiscal Year 2015-2016 Operating Budget of Austin Energy.

FISCAL NOTE: A fiscal note is not required.

FOR MORE INFORMATION CONTACT: Jeff Vice, Director, Local Government Issues (512) 322-6450; Denise Kuehn, Director, Energy Efficiency Services (512) 322-6138.

BOARD AND COMMISSION ACTION: July 18, 2016 - To be reviewed by the Electric Utility Commission. July 19, 2016 – To be reviewed by the Resource Management Commission.

Austin Energy requests authorization to issue a rebate to Apple Inc., in an amount not to exceed \$248,019, for energy efficiency measures installed at its Northwest Austin campus. The office buildings, cafeteria and central plant are located at 5401 and 5501 West Parmer Lane, in Council District 6.

Apple Riata Vista Phase IIB includes Buildings 5, 6 and 7 and a Thermal Energy Storage System at the Central Plant. The energy efficiency measures installed include high efficiency lighting, variable frequency drives, Flywheel UPS systems, split system and variable refrigerant flow air conditioner systems, and a 7,200 ton-hour ice Thermal Energy Storage System. The estimated total cost of installing the measures is \$12,991,428 and the rebate will cover approximately 1.9% of the total cost. The demand savings associated with this energy efficiency project are estimated at 793 kilowatts (kW) at a program cost of \$313 per kW saved.

These improvements are in accordance with the City of Austin's Commercial Rebate Program guidelines. This program is one element of the comprehensive Austin Energy Resource, Generation and Climate Protection Plan to realize 700 MW of energy efficiency and 200 MW of demand response by 2025. The original plan, approved by City Council in April 2010 and updated in December 2014, is designed in part to reduce local air pollution through energy conservation, reduce peak demand, reduce the need to purchase additional generation and assist customers in reducing electric consumption.

The avoided kilowatt hours (kWh) estimated at 1,751,171 kWh per year represents a major benefit to the local environment. This project is estimated to offset the production of the following air emissions: 1,051 metric tons of Carbon Dioxide (CO₂), 0.663 metric tons of Sulfur Dioxide (SO₂) and 0.733 metric tons of Nitrogen Oxides (NO_x). The project savings are equivalent to an estimated 2,360,898 vehicle miles traveled, the removal of 201 cars from our roadways, the planting of 27,014 trees or 1,351 acres of forest in Austin's parks.

PROJECT FACT SHEET – Apple Riata Vista Phase IIB

Property Name	Apple Riata Vista IIB				
Customer Name	Apple, Inc.				
Property Address	5401 & 5501 West Parmer Lane				
Customer Contact	Pat Moore	<div>Total Measure Costs\$12,991,428</div> <div>Total Rebate – Not to Exceed\$248,019</div> <div>% of Total Measure Costs1.9%</div>			
ECAD Status N/A - New Construction					
SCOPE OF WORK					
Measure	Rebate Amount	kW Saved - Estimated	kWh Saved - Estimated	Measure Costs	\$/kW
Lighting	\$12,078	113.12	494,098	\$2,196,596	\$107
ACDX ¹	\$6,050	9.32	71,965	\$184,564	\$649
Variable Frequency Drives	\$62,734	172.52	538,259	\$386,103	\$364
Uninterruptible Power Supply ²	\$18,374	70.74	620,096	\$560,525	\$260
Transformers ³	\$1,666	7.07	26,753	\$50,824	\$236
Thermal Energy Storage	\$147,117	420.33	0	\$9,612,817	\$350
Totals	\$248,019	793	1,751,171	\$12,991,428	\$313

Previous Measures Performed in last 10 Years	Completion Date	Rebate Amount
None – New Construction	N/A	N/A

AE Commercial Energy Efficiency Program for FY2016 (as of June 30, 2016)⁴							
Program	kW Savings Goal	YTD kW Savings	% of Goal	Budget	YTD Dollars Spent	YTD Participation	\$/kW
Commercial Rebates	13,500	5,154	38%	\$3,227,000	\$1,625,451	140	\$315

¹ Split System and Variable Refrigerant Flow A/C Units

² These technologies bring a higher measure of efficiency and are above current building code requirements

³ ibid

⁴ These values align with the historical trend of when rebates are issued for this program. Typically spring and summer months show an increase in additional projects.

**CITY OF AUSTIN – AUSTIN ENERGY
RECOMMENDATION FOR COUNCIL ACTION**

AGENDA DATE: 08/18/2016

SUBJECT: Approve issuance of a rebate to Cascade Affordable Housing, for performing energy efficiency improvements at the Rosemont at the Williamson Creek Apartments located at 4509 East St. Elmo Road, in an amount not to exceed \$79,612. (District 2)

AMOUNT & SOURCE OF FUNDING: Funding is available in the Fiscal Year 2015-2016 Operating Budget of Austin Energy.

FISCAL NOTE: A fiscal note is not required.

FOR MORE INFORMATION CONTACT: Jeff Vice, Director, Local Government Issues (512) 322-6450; Denise Kuehn, Director, Energy Efficiency Services (512) 322-6138.

BOARD AND COMMISSION ACTION: July 18, 2016 - To be reviewed by the Electric Utility Commission. July 19, 2016 – To be reviewed by the Resource Management Commission.

Austin Energy requests authorization to issue a rebate to Cascade Affordable Housing, in an amount not to exceed \$79,612, for an energy efficient measure to be completed at the Rosemont at Williamson Creek Apartments located at 4509 East St. Elmo Road, in Council District 2.

The Rosemont at Williamson Creek Apartments is listed in the 13th Edition of the Guide to Affordable Housing in the Greater Austin Area published by The Austin Tenant's Council. The property is comprised of eight buildings and 163 apartment units, with a total of 167,425 square feet of conditioned space. The monthly rent for a two bedroom unit is \$779, a three bedroom unit is \$894 and a four bedroom unit is \$1,024. The energy efficiency measures proposed at this property are duct sealing and solar screens. The estimated total cost of the project is \$79,612 and the rebate will cover 100% of the total cost.

These improvements will be made in accordance with Multifamily Weatherization Assistance Rebate Program. This program was created in response to recommendations of the Low Income Consumer Advisory Task Force to further promote energy efficiency in this underserved market sector. While similar to the standard Multifamily Rebate Program, this program offers larger rebates customized for each measure, based on historical savings and cost data.

This program is one element of Austin Energy's comprehensive Resource, Generation and Climate Protection Plan, to realize 700 MW of energy efficiency and 200 MW of demand response by 2025. The original plan, approved by City Council in April 2010 and updated in December 2014, is designed in part to reduce local air pollution through energy conservation, reduce peak demand, reduce the need to purchase additional generation and assist customers in reducing electric consumption.

The avoided kilowatt hours (kWh) estimated at 152,122 kWh per year represents a major benefit to the local environment. This project is estimated to offset the production of the following air emissions: 91 metric tons of Carbon Dioxide (CO₂), 0.064 metric tons of Nitrogen Oxides (NO_x), and 0.058 metric tons of Sulfur Dioxide (SO₂). The project savings is equivalent to an estimated 205,088 vehicle miles traveled, the removal of 18 cars from our roadways, or the planting of 2,347 trees or 117 acres of forest in Austin's parks.

PROJECT FACT SHEET – Rosemont at Williamson Creek

Property Name	Rosemont at Williamson Creek		
Customer Name	Cascade Affordable Housing		
Property Address	4509 E St. Elmo		
Average Rent:	2BR \$779 / 3BR \$894 / 4BR \$1,024		
Number of Units	163	Contractor	360 Energy Savers
Housing Type:	Affordable Housing	Total Measure Costs	\$79,612
Total AC Tonnage	261 ¹	Total Rebate – Not to Exceed	\$79,612
Heating Fuel Type	Gas	% of Total Measure Costs	100%
ECAD Status	Pending	Rebate per Unit	\$488

PROJECT ANNUAL SAVINGS AT 100% OCCUPANCY	
kW Saved – Estimated	125
\$/kW – Estimated	\$638
kWh Saved – Estimated	152,122

SCOPE OF WORK
Duct Sealing – Furrdown
Solar Screens – Double Paned Windows

MONTHLY SAVINGS PER CUSTOMER - ESTIMATED	
Dollar Savings per Residential Customer from efficiency improvements	\$9

Measures Performed in last 10 Years at this property	Completion Date	Rebate Amount
Compact Fluorescent Lightbulbs	2008	\$19,962

Rebate (\$/kW)			
Measure	Multifamily Weatherization Assistance Rebate Program Proof of Concept	Standard Single Measure Rebates	Standard Bundled Measure Rebates
Duct Seal	\$600	\$400	\$500
Solar Screens	\$735	\$400	\$500
Attic Insulation	\$500	\$400	\$500
Water devices	\$600	\$400	\$500
LEDs	\$750	\$400	\$500

¹ The amount of the rebate for duct seal is affected by the tonnage, system type and fuel type. An electric furnace is going to save more kW & kWh than a gas furnace. A furred-down air handler is going to save more than an up-flow or wall-mount air handler. A high capacity HVAC saves more than one with lower tonnage. For screens, the window type, total square footage of eligible window, and shading coefficient affect the rebates. Screens on a single pane window save more than screens on double pane windows. Large square footage saves more than small square footage. A higher shading coefficient number saves more than a smaller shading coefficient number.

**CITY OF AUSTIN – AUSTIN ENERGY
RECOMMENDATION FOR COUNCIL ACTION**

AGENDA DATE: 08/18/2016

SUBJECT: Approve issuance of a rebate to Texas Old Manor Housing, for performing energy efficiency improvements at the Primrose of Shadow Creek Apartments located at 1026 Clayton Lane, in an amount not to exceed \$152,657. (District 1)

AMOUNT & SOURCE OF FUNDING: Funding is available in the Fiscal Year 2015-2016 Operating Budget of Austin Energy.

FISCAL NOTE: A fiscal note is not required.

FOR MORE INFORMATION CONTACT: Jeff Vice, Director, Local Government Issues (512) 322-6450; Denise Kuehn, Director, Energy Efficiency Services (512) 322-6138.

BOARD AND COMMISSION ACTION: July 18, 2016 – To be reviewed by the Electric Utility Commission. July 19, 2016 – To be reviewed by the Resource Management Commission.

Austin Energy requests authorization to issue a rebate to Texas Old Manor Housing, in an amount not to exceed \$152,657, for an energy efficient measure completed at the Primrose at Shadow Creek Apartments located at 1026 Clayton Lane, in Council District 1.

The Primrose at Shadow Creek Apartments is listed in the 13th Edition of the Guide to Affordable Housing in the Greater Austin Area published by The Austin Tenant's Council. The property is comprised of six buildings and 176 apartment units, with a total of 144,656 square feet of conditioned space. The monthly rent for a one bedroom unit is \$666 and a two bedroom unit is \$797 per month. The energy efficiency measures to be completed at this property are duct sealing and solar screens. The estimated total cost of the project is \$152,657; the rebate will cover 100% of the total cost.

These improvements will be made in accordance with Multifamily Weatherization Assistance Rebate Program. This program was created in response to recommendations of the Low Income Consumer Advisory Task Force to further promote energy efficiency in this underserved market sector. While similar to the standard Multifamily Rebate Program, this program offers larger rebates customized for each measure, based on historical savings and cost data.

This program is one element of Austin Energy's comprehensive Resource, Generation and Climate Protection Plan, to realize 700 MW of energy efficiency and 200 MW of demand response by 2025. The original plan, approved by City Council in April 2010 and updated in December 2014, is designed in part to reduce local air pollution through energy conservation, reduce peak demand, reduce the need to purchase additional generation and assist customers in reducing electric consumption.

The avoided kilowatt hours (kWh) estimated at 272,342 kWh per year represents a major benefit to the local environment. This project is estimated to offset the production of the following air emissions: 164 metric tons of Carbon Dioxide (CO₂), 0.114 metric tons of Nitrogen Oxides (NO_x), and 0.103 metric tons of Sulfur Dioxide (SO₂). The project savings is equivalent to an estimated 367,167 vehicle miles traveled, the removal of 31 cars from our roadways, or the planting of 4,201 trees or 210 acres of forest in Austin's parks.

PROJECT FACT SHEET – The Primrose at Shadow Creek Apartments

Property Name	Primrose at Shadow Creek Apartments		
Customer Name	Texas Old Manor Housing		
Property Address	1026 Clayton Ln		
Average Rent:	1 BR \$666/2BR \$797		
Number of Units	176	Contractor	360 Energy Savers
Housing Type:	Affordable Housing	Total Measure Costs	\$152,657
Total AC Tonnage ¹	425	Total Rebate – Not to Exceed	\$152,657
Heating Fuel Type	Gas	% of Total Measure Costs	100%
ECAD Status	Pending	Rebate per Unit	\$867

PROJECT ANNUAL SAVINGS AT 100% OCCUPANCY	
kW Saved – Estimated	233
\$/kW – Estimated	\$655
kWh Saved – Estimated	272,342

SCOPE OF WORK
Duct Sealing – Furrdown
Solar Screens – Double Paned Windows

MONTHLY SAVINGS PER CUSTOMER – ESTIMATED	
Dollar Savings per Residential Customer from efficiency improvements	\$14

Measures Performed in last 10 Years at this property	Completion Date	Rebate Amount
Compact Fluorescent Lightbulbs	2008	\$15,104

Rebate (\$/kW)			
Measure	Multifamily Weatherization Assistance Rebate Program Proof of Concept	Standard Single Measure Rebates	Standard Bundled Measure Rebates
Duct Seal	\$600	\$400	\$500
Solar Screens	\$735	\$400	\$500
Attic Insulation	\$500	\$400	\$500
Water devices	\$600	\$400	\$500
LEDs	\$750	\$400	\$500

¹ The amount of the rebate for duct seal is affected by the tonnage, system type and fuel type. An electric furnace is going to save more kW & kWh than a gas furnace. A furred-down air handler is going to save more than an up-flow or wall-mount air handler. A high capacity HVAC saves more than one with lower tonnage. For screens, the window type, total square footage of eligible window, and shading coefficient affect the rebates. Screens on a single pane window save more than screens on double pane windows. Large square footage saves more than small square footage. A higher shading coefficient number saves more than a smaller shading coefficient number.

**CITY OF AUSTIN – AUSTIN ENERGY
RECOMMENDATION FOR COUNCIL ACTION**

AGENDA DATE: 08/18/2016

SUBJECT: Approve issuance of a rebate to Texas Old Manor Housing, for performing energy efficiency improvements at the Rosemont at the Hidden Creek Apartments located at 9345 U.S. Highway 290 East, in an amount not to exceed \$143,428. (District 1)

AMOUNT & SOURCE OF FUNDING: Funding is available in the Fiscal Year 2015-2016 Operating Budget of Austin Energy.

FISCAL NOTE: A fiscal note is not required.

FOR MORE INFORMATION CONTACT: Jeff Vice, Director, Local Government Issues (512) 322-6450; Denise Kuehn, Director, Energy Efficiency Services (512) 322-6138.

BOARD AND COMMISSION ACTION: July 18, 2016 – To be reviewed by the Electric Utility Commission. July 19, 2016 - To be reviewed by the Resource Management Commission.

Austin Energy requests authorization to issue a rebate to Texas Old Manor Housing, in an amount not to exceed \$143,428, for an energy efficient measure to be completed at the Rosemont at Hidden Creek Apartments located at 9345 U.S. Highway 290 East, in Council District 1.

The Rosemont at Hidden Creek Apartments is listed in the 13th Edition of the Guide to Affordable Housing in the Greater Austin Area published by The Austin Tenant's Council. The property is comprised of 13 buildings and 250 apartment units, with a total of 237,600 square feet of conditioned space. The monthly rent for a one bedroom unit is \$666, a two bedroom unit is \$779, and a three bedroom unit is \$894. The energy efficiency measures to be completed at this site are duct sealing and solar screens. The estimated total cost of the project is \$143,428 and the rebate will cover 100% of the total cost.

These improvements will be made in accordance with Austin Energy's Multifamily Weatherization Assistance Rebate Program. This program was created in response to recommendations of the Low Income Consumer Advisory Task Force to further promote energy efficiency in this underserved market sector. While similar to the standard Multifamily Rebate Program, this program offers larger rebates customized for each measure, based on historical savings and cost data.

This program is one element of Austin Energy's comprehensive Resource, Generation and Climate Protection Plan, to realize 700 MW of energy efficiency and 200 MW of demand response by 2025. The original plan, approved by City Council in April 2010 and updated in December 2014, is designed in part to reduce local air pollution through energy conservation, reduce peak demand, reduce the need to purchase additional generation and assist customers in reducing electric consumption.

The avoided kilowatt hours (kWh) estimated at 276,505 kWh per year represents a major benefit to the local environment. This project is estimated to offset the production of the following air emissions: 166 metric tons of Carbon Dioxide (CO₂), 0.116 metric tons of Nitrogen Oxides (NO_x), and 0.105 metric tons of Sulfur Dioxide (SO₂). The project savings is equivalent to an estimated 372,779 vehicle miles traveled, the removal of 32 cars from our roadways, or the planting of 4,265 trees or 213 acres of forest in Austin's parks.

PROJECT FACT SHEET – Rosemont at Hidden Creek

Property Name	Rosemont at Hidden Creek		
Customer Name	Texas Old Manor Housing		
Property Address	9345 US-290		
Average Rent:	1 BR \$666 / 2BR \$779 / 3BR \$894		
Number of Units	250	Contractor	360 Energy Savers
Housing Type:	Affordable Housing	Total Measure Costs	\$143,428
Total AC Tonnage ¹	387	Total Rebate – Not to Exceed	\$143,428
Heating Fuel Type	Gas	% of Total Measure Costs	100%
ECAD Status	Pending	Rebate per Unit	\$574

PROJECT ANNUAL SAVINGS AT 100% OCCUPANCY	
kW Saved – Estimated	221
\$/kW – Estimated	\$648
kWh Saved – Estimated	276,505

SCOPE OF WORK
Duct Sealing – Furrdown
Solar Screens – Single Pane Windows

MONTHLY SAVINGS PER CUSTOMER - ESTIMATED	
Dollar Savings per Residential Customer from efficiency improvements	\$10

Measures Performed in last 10 Years at this property	Completion Date	Rebate Amount
Compact Fluorescent Lightbulbs	2008	\$28,006

Rebate (\$/kW)			
Measure	Multifamily Weatherization Assistance Rebate Program Proof of Concept	Standard Single Measure Rebates	Standard Bundled Measure Rebates
Duct Seal	\$600	\$400	\$500
Solar Screens	\$735	\$400	\$500
Attic Insulation	\$500	\$400	\$500
Water devices	\$600	\$400	\$500
LEDs	\$750	\$400	\$500

¹ The amount of the rebate for duct seal is affected by the tonnage, system type and fuel type. An electric furnace is going to save more kW & kWh than a gas furnace. A furred-down air handler is going to save more than an up-flow or wall-mount air handler. A high capacity HVAC saves more than one with lower tonnage. For screens, the window type, total square footage of eligible window, and shading coefficient affect the rebates. Screens on a single pane window save more than screens on double pane windows. Large square footage saves more than small square footage. A higher shading coefficient number saves more than a smaller shading coefficient number.



Recommendation for Council Action (Purchasing)

Austin City Council	Item ID:	60259	Agenda Number	
Meeting Date:	August 4, 2016			
Department:	Purchasing			
Subject				
Authorize negotiation and execution of a 36-month contract with 1ENERGY SERVICES, LLC., to provide energy storage and control software implementation, economic modeling and analysis services, in an amount not to exceed \$4,501,000.				
Amount and Source of Funding				
Funding in the amount of \$4,501,000 is available in the Fiscal Year 2015-2016 Capital Budget of Austin Energy.				
Fiscal Note				
A fiscal note is required.				
Purchasing Language:	Critical Business Need			
Prior Council Action:				
For More Information:	Gage Loots, Corporate Purchasing Manager, 512-322-6251			
Boards and Commission Action:	July 18, 2016 – To be reviewed by the Electric Utility Commission. July 19, 2016 – To be reviewed by the Resource Management Commission.			
Related Items:				
MBE / WBE:	This contract is exempt from the City Code Chapter 2-9C Minority Owned and Women Owned Business Enterprise Procurement Program; therefore, no subcontracting goals were established.			

Additional Backup Information

In February 2016 the U.S. Department of Energy (DOE) awarded the City of Austin (Austin Energy) a \$4,300,000 cooperative agreement grant under the DOE Sustainable and Holistic Integration of Energy Storage and Solar PV (SHINES) program. Austin Energy's proposal for the "Austin SHINES" project includes the design, development, and demonstration of integrated photovoltaic (PV) and energy storage solutions that are scalable, secure, reliable, and cost-effective. The integration of field assets is supported by a software management platform that optimizes the use of solar PV and energy storage. The goal of the DOE funding opportunity is to enable holistic design and widespread sustainable development of low-cost, flexible, and reliable solutions that have energy storage as one of the key components, for successful integration increasing levels of solar PV generation. Austin SHINES is a pilot project designed to demonstrate the capabilities of energy storage at the utility, commercial, and residential scale with solar

PV integration. Austin Energy presented an [overview of the Austin SHINES project](#) to the Austin Energy Utility Oversight Committee in March 2016.

The application process for this DOE funding opportunity required the compilation of a project team from the onset of the project's proposal. 1Energy Services, LLC ("1Energy") is a key member of the Austin SHINES project and a named sub-recipient of the DOE award. As such, Austin Energy designated this purchase as a Critical Business Need in accordance with Senate Bill 7, as adopted by the City of Austin as Resolution No. 040610-02.

This contract will allow 1Energy to provide the products and services necessary to complete several aspects of the Austin SHINES project, including:

- Development, deployment and demonstration work for a grid-scale Energy Storage System (SHINES ESS);
- Configuration, deployment and demonstration work for the Distributed Energy Resource Optimizer (DERO), an optimization controls platform for distributed energy resources, and the local energy storage system controller (1Energy Intelligent Controller or 1E-IC);
- Coordination with and support of other Austin SHINES project team members, related to communications design and testing and DERO integration, for the commercial and residential aspects of the project;
- Economic modeling and analysis; and
- Analysis and reporting associated with the DOE award.

The Austin SHINES project aims to establish a template for other utilities and regions to follow to cost-effectively maximize the penetration of distributed solar PV. In addition, the proposed solution will enable distribution utilities to mitigate potential negative impacts of high penetration levels of PV caused by the intermittency and variability of solar production, which causes stress to the grid. Specific objectives include the installation of approximately four megawatts (4 MW) of distributed storage, approximately 30 smart inverters, and other enabling technologies. All of these resources will be integrated and optimized at the utility level using an approach that allows a variety of management strategies, and drives development of enabling standards as well as technology innovation.



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

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 technologies* 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