RIVERSIDE PUBLIC UTILITIES

Board Memorandum

BOARD OF PUBLIC UTILITIES **DATE**: JULY 10, 2017

ITEM NO: 11

SUBJECT: **DEPARTMENT OF ENERGY PROJECT ON THE IMPACT OF HIGH PHOTOVOLTAIC PENETRATION ON DISTRIBUTION CIRCUITS - STATUS REPORT**

ISSUE:

Receive a status report for the Department of Energy project on the impact of high photovoltaic penetration on distribution circuits.

RECOMMENDATION:

That the Board of Public Utilities receive and file the status report for the Department of Energy project on the impact of high photovoltaic penetration on distribution circuits.

BACKGROUND:

RPU is committed to increased use of renewable energy resources and sustainable living practices that help reduce environmental impacts within the City of Riverside. RPU's commitment to higher penetration renewables generation is an important part of its annual planning process. In 2013, a 7.5 Megawatt (MW) photovoltaic (PV) electric generating facility was being installed on the decommissioned Tequesquite Landfill. RPU sought assistance from industry leaders to evaluate the impact of this high penetration (PV) on the distribution circuits. The project provided an opportune time to thoroughly characterize the "before" and "after" distribution circuit impacts and model validation.

During this time, Department of Energy (DOE) grant funding became available in 2013 for optimizing grid performance with PV. RPU entered a partnership on a DOE grant opportunity with Lawrence Berkeley National Laboratories (LBNL), UC Berkeley, Power Standards Lab, and California Institute for Energy and Environment (CIEE). The project was sponsored by the DOE's Advanced Research Projects Agency – Energy (ARPA-E) program. CIEE led the project together with LBNL. The manufacturer and prime contractor, Power Standards Laboratory (PSL), supplied and tested the technology.

DISCUSSION:

The purpose of the three-year research project was to evaluate the performance and potential benefits of a new monitoring technology, micro-synchrophasors or µPMUs, for use on power distribution systems. By installing a number of µPMUs in various locations in electric distribution systems, and evaluating the data collected by the devices, the project determined that precise voltage measurements can enable advanced diagnostic, monitoring and control methodologies in distribution systems. The project showed that the measurements from the µPMU data can assist in the development of applications for the monitoring and control of distribution systems.

The uPMU project team developed a framework for validation of distribution planning models. They managed significant model validation issues, impacting integration of PVs on distribution systems that limited grid modernization. The µPMUs were used to measure impedance, topology, and loads on a selected feeder. The uPMU team gained an understanding of the minimum requirements for model accuracy in order to address future distribution planning needs.

FISCAL IMPACT:

There is no fiscal impact related to Board action.

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Attachment: Presentation