



RIVERSIDE PUBLIC UTILITIES

Board Memorandum

BOARD OF PUBLIC UTILITIES

DATE: May 23, 2016

ITEM NO: 11

File16-1610

SUBJECT: **THE UNIVERSITY OF CALIFORNIA RIVERSIDE'S PROPOSAL FOR RIVERSIDE PUBLIC UTILITIES' ENERGY INNOVATIONS GRANT FOR \$100,000.**

ISSUE:

The issue for Board of Public Utilities consideration is to recommend approval for an Energy Innovations Grant (EIG) to the University of California, Riverside (UCR) in the amount of \$100,000 to fund research for Coordinated Energy Management in Net-Zero Mixed-Use Buildings.

RECOMMENDATION:

That the Board of Public Utilities approve and recommend that the City Council approve the UCR request for an Energy Innovations Grant in the amount of \$100,000, to be paid in three installments to be funded in Fiscal Year 2016-17, to research Coordinated Energy Management in Net-Zero Mixed-Use Buildings.

BACKGROUND:

One of Riverside Public Utilities' (RPU) programs funded through the Public Benefits Funds is the Energy Innovations Grant Program. This Program was developed for the funding of research, development and demonstration programs for the public interest to advance science or technology in electric related projects in the institutions of higher education within the City of Riverside. Participation in the EIG Program is restricted to public or private post-secondary institutions whose primary activities fall within City limits. The grant funds must comply with the relevant portions of California Public Utilities Code Section 385 related to the use of Public Benefits Funds. Section 385(a)(3) provides that Public Benefits Funds may be used for "Research, development and demonstration programs for the public interest to advance science or technology, which is not adequately provided by competitive and regulated markets."

UCR has been awarded grant funds through this Program in the past in various separate projects ranging from: the Control of NOx (nitrogen oxides), SOx (sulfur oxides) and Particulate Matter in Biological Filters to the establishment of the Southern California Research Initiative for Solar Energy (SC-RISE). To date, UCR has received more than \$2 million in grant funding through this program. Today the utility is focusing these projects and funding request towards applications that directly affect the utility, its operations and potential impacts to RPU's electric system.

A new proposal was recently submitted for grant funding by Assistant Professors Shaolei Ren and Qi Zhu. This project proposes a new coordinated approach to optimize energy consumption for cost saving in mixed-use buildings that have both datacenter operation and other non-datacenter usage as an integrated cyber-physical system. As typical complex facilities, both datacenters and buildings are energy-intensive and have received a significant amount of attention to optimize energy efficiency in the past. The majority of datacenters are physically located within mixed-use buildings that include both datacenter operation and a significant space for other non-datacenter usage (e.g., office). Nonetheless, the existing efforts on datacenter energy efficiency have dominantly centered around dedicated datacenter, which by itself is a stand-alone building where all the spaces and supporting infrastructure (e.g., cooling, electrical) are directly

associated with datacenter. On the other hand, the vast literature on building energy efficiency has been focused on non-datacenter load (e.g., office HVAC— heating, ventilating, and air conditioning, which has a very limited scheduling flexibility), while treating datacenters as “miscellaneous” loads and ignoring the high scheduling flexibilities associated with datacenter workloads. Consequently, such isolated/uncoordinated energy management in mixed-use buildings results in undesired outcomes (e.g., high peak demand).

The key idea is that datacenter loads and non-datacenter loads have their own dynamics (e.g., computing load dynamics and temperature dynamics) that can be holistically managed in concert with each other, reducing the peak power demand and also maximizing the utilization of on-site renewables (if any). They propose a coordinated software-based online resource management approach, with a salient feature being that it optimizes the energy consumption decisions without foreseeing the far future information. Further, it can be applied in both new and existing buildings without any infrastructure upgrades, climate/location requirement or capital investment.

FISCAL IMPACT:

The total grant award is \$100,000 to be paid in three installments, \$50,000 at Energy management algorithm, \$25,000 at Simulation platform, and \$25,000 at evaluation results and final project report included in Fiscal Year 2016-17 Public Benefit Funds Budget for Energy Innovations Grant Program – Non-Residential Account No. 6020100-456048.

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Attachments: Grant Contract with UCR