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Research suggestion / Initiatives 7.2.1 and 7.2.2 (Haider Taha, Altostratus Inc.)

Please see attached document.

Additional submitted attachment is included below.

Altostratus Inc.

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California Energy Commission
Dockets Office / Docket 17-EPIC-01
1516 Ninth Street
Sacramento, CA 95814

Subject: EPIC 2018-2020 Triennial Investment Plan

Proposed research under Initiatives 7.2.1 and/or 7.2.2

Proposed research title: Exacerbation of heat-wave effects by urban areas under present and future climates

Thank you for the opportunity to provide comments and suggestions on the EPIC 2018-2020 Triennial Investment Plan.

This is to propose that Initiatives 7.2.1 and/or 7.2.2 include research that will develop detailed understanding of the mechanisms through which urban areas in California can exacerbate excessive heat events and heat waves. The impacts on electric demand will be quantified under both current conditions and future climates.

Building upon on-going research on intra-urban enhancements to probabilistic weather forecasting for the electric system (EPC-15-070), the proposed research will assist in the development of a next generation of fine-resolution projections for California that include an improved assessment of risks to infrastructure from heat events. It will also assist in better resources planning related to deployment and operation of microgrids in and near urban areas.

Based on fine-scale meteorological modeling and analysis of observational intra-urban meteorological data in selected Californian cities, the main research components will address the following (not in any particular order):

- Characterize the spatial distributions of urban areas impacted by exacerbated, excessive heat and how these distributions and properties can change over the long term, i.e., future

climates, when the frequencies and durations of heat waves in California are expected to increase.

- Consider the changes over time in land use/land cover and urban morphology along with projected changes in climate (e.g., various RCP scenarios through year 2050), energy use, and population, to develop an understanding of their impacts on urban heat and how these effects can exacerbate excessive heat events and increase electric demand in the long term.
- Evaluate the physical processes and mechanisms through which urban areas can affect local meteorology during heat events under various climate conditions and in different geographical regions including 1) coastal areas, 2) inland regions, 3) deserts, and 4) urban-climate archipelagos, such as the Los Angeles region and the San Francisco Bay Area. Initial studies have indicated that different areas can exacerbate the urban temperature and wind fields differently.
- Quantify the potential of urban cooling measures (a.k.a. urban heat-island reduction) in mitigating or reducing the exacerbation of heat events by urban areas, both under present and future conditions, if such measures were implemented.
- Translate the results into indexes and metrics that are useful to energy planners, California ISO, utilities, and the Energy Commission in quantifying the potential electric load implications as well as in decadal planning through 2050 for grid operations, microgrids, and resilience.

Respectfully submitted,

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