

Back-up Documentation for Business Meeting November 12, 2014

EISG Program Solicitation 14-02

TRUSTEES OF THE CALIFORNIA STATE UNIVERSITY. Possible approval of a resolution approving the five highest ranking grant applications totaling \$584,311 from the Public Interest Energy Research (PIER) Energy Innovations Small Grant Solicitation 14-02 Natural Gas and Transportation Natural Gas. These grants were competitively selected and are capped at \$150,000 each. (PIER natural gas funding) Contact: Raquel E. Kravitz (10 minutes)

List of recommended grants are:

Natural Gas 14-02G

Three projects values at \$359,351

Project Title: The Building Occupant Mobile Gateway: Principal Investigator: Konis, Kyle, University of Southern California, Los Angeles, CA

Rank: 1

Amount: \$149,400

Project Summary: This project will develop and evaluate the feasibility of using smartphone software to provide detailed occupant feedback to building management personnel. The goal is to use the occupant feedback from embedded sensors to achieve space heating and ventilation energy reduction goals while maintaining occupant comfort. If successful, this technology has the potential to achieve 30% or greater annual natural gas reduction in California commercial buildings through identifying and helping to minimize over-heating, over-ventilation, and over-scheduling.

Project Title: Maximizing Efficiency of Natural Gas Engines Through Argon Power Cycle: Principal Investigator: Chen, Jyh-Yuan, University of California, Berkeley: Berkeley, CA

Rank: 2

Amount: \$135,000

Project Summary: This project is to determine the feasibility of applying highly efficient Argon Power Cycle to natural gas internal combustion engines for energy generation and storage. The goal is to demonstrate high efficiency and low emissions of an argon/methane cycle compared to a standard air methane cycle. If successful, this technology has the potential to increase efficiency by 30-35% due to the increase in argon's higher specific heat than air and has the potential to improve the performance and reduce the natural gas consumption in California, and also drastically reduce the CO2 emissions from power generation.

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Project Title: Multi-Family Residential Natural Gas Monitoring and Analysis Software (MFR-MAS): Principal Investigator: Nelson, Hal , Policy Consultants, LLC., Claremont, CA.,

Rank: 3

Amount: \$74,951

Project Summary: This project will develop spatial analytics using Geographic Information Systems that aggregate Multi-Family Residential building data and natural gas meter data. The goal is to merge and analyze existing databases relevant to Multi-Family residential buildings for utility services areas and provide recommendations on applicable natural gas energy efficiency measures for each building. If successful, this technology has the potential to help utilities identify buildings with high gas use for benchmarking.

Transportation Natural Gas 14-02TNG

Two projects values at \$224,960

Project Title: Exhaust Gas Heat Exchanger Model for Mobile ICEs: Principal Investigator: Stewart, John, Cliff Edge Consulting, LLC, Sylmar, CA.,

Rank: 1

Amount: \$74,960

Project Summary: This project will develop a waste heat recovery system (WHRS) for internal combustion engines in mobile applications, such as heavy-duty trucks and locomotives. Recovered heat would be used to power and organic Rankine cycle engine. The innovations include organic working fluid rather than water (reduces size), uses radiation heat transfer in addition to usual conduction. If successful, this technology has the potential to decrease diesel fuel gallons in California heavy-duty, long-haul trucks by 0.6B gallons and \$2.7B at a fuel cost of \$4.50/gallon and has the potential to decrease greenhouse gases and criteria pollution from truck emissions by 16.7% as a consequence of using natural gas.

Project Title: Low Cost High Performance Natural Gas Vehicle: Principal Investigator: Wong, Jim, McMem, Diamond Bar, CA.,

Rank: 2

Amount: \$150,000

Project Summary: This project will demonstrate the feasibility of using a patent-pending expander-compressor concept in order to increase natural gas vehicle engine performance at a much lower incremental cost. Proposal is targeting full size pickup trucks and cars. If successful, this technology has the potential to save 50% in fuel cost in California compared to gas or diesel.

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Benefits to California

The EISG program is bringing energy solutions to California ratepayers. It encourages growth in the clean tech industry by proving the feasibility of numerous innovative energy concepts. Many new California companies have been started after successful completion of EISG projects. These companies are providing benefits to California and California ratepayers.

The EISG program funds and helps bring to market energy technologies that provide increased environmental benefits, greater system reliability, lower system costs, and tangible benefits to electric utility customers through the following investments:

- Advanced transportation technologies that reduce air pollution and greenhouse gas emissions beyond applicable standards and that benefit electricity and natural gas ratepayers.
- Increased energy efficiency in buildings, appliances, lighting, and other applications beyond applicable standards and that benefit electric utility customers.
- Advanced electricity generation technologies that exceed applicable standards to increase reductions in greenhouse gas emissions from electricity generation and that benefit electric utility customers.