DOCKETED

Docket Number:	16-EPIC-01
Project Title:	EPIC Idea Exchange
TN #:	212488
Document Title:	Peter Said Comments: Consider Funding for GENSETS and CHP applications.
Description:	N/A
Filer:	System
Organization:	Peter Said
Submitter Role:	Applicant
Submission Date:	7/27/2016 6:04:45 PM
Docketed Date:	7/28/2016

Comment Received From: Peter Said
Submitted On: 7/27/2016
Docket Number: 16-EPIC-01

Consider Funding for GENSETS and CHP applications.

In 2013, centralized U.S. power plants had an average electricity generation efficiency of only 33%, wasting 67% of primary energy as heat and emitting 2 billion tons of CO2, about 38% of U.S. total emissions. Further, 6% of electricity is generally lost during transmission and distribution from the power plant to the customer. An alternative to centrally produced power is distributed generation, in which electricity is generated at the point of use. Residential combined heat and power (CHP) systems can burn natural gas to produce electricity for a home while also using the waste heat for space and water heating. The potential energy efficiency for CHP systems is more than 80% and significant adoption of such systems would enable dramatic reductions in primary energy use and concurrent CO2 emissions. However, usage of small CHP systems is not widespread because the few systems currently on the market are limited by high prices, low efficiency, lack of readily available components, and short lifetime. SmartComptonSaid Distributed Energy (DBA Smart Grid Technologies) seeks to develop 1 kW - 5kW (electric) Organic Rankine Cycles (ORC) CHP generators that have high natural gas-to-electricity generation efficiency, long life, low cost, and low emissions.

Distributed energy (DE) systems have the capacity to create Net Zero Buildings by producing environmentally friendly low emission energy onsite, allow remote adjustment of output, decrease distance (line loss), and impact overall energy use through economies of scale. DE systems provide the residential user energy independence while preventing brown outs, blackouts and threats to national security through a distributed net of energy makers.

Organic Rankine Cycles (ORC) are proven to convert heat into 1-5kW electricity and exist in large industrial systems (>100kW); however, the miniaturized components and systems are not being developed due a lack of demand.

Applied Research and Demonstration of optimized systems parameters, and testing of environmental outputs and reliability are needed to develop miniaturized components, and identify fiscal impacts. Further, heat capture methods utilizing biomass, solar thermal, and geothermal need further applied research and demonstration to determine how to efficiently tie into ORC systems and support Combined Heat and Power units.

Market Analysis must be performed to assess the impact on, and role of, Investor Owned Utilities, as well as Researching Road maps for High Penetrations of the market, quick implementation, installation, and servicing of technology and more.

Technology Demonstration and Deployment of miniaturized components, and GENSET system assemblies in conjunction with CHP's.

Please consider funding for GENSETS for Residential and Commercial applications.

Additional submitted attachment is included below.

TRYDEN ONE

CRITICAL NEED:

In 2013, centralized U.S. power plants had an average electricity generation efficiency of only 33%, wasting 67% of primary energy as heat and emitting 2 billion tons of CO2, about 38% of U.S. total emissions. Further, 6% of electricity is generally lost during transmission and distribution from the power plant to the customer. An alternative to centrally produced power is distributed generation, in which electricity is generated at the point of use. Residential combined heat and power (CHP) systems can burn natural gas to produce electricity for a home while also using the waste heat for space and water heating. The potential energy efficiency for CHP systems is more than 80% and significant adoption of such systems would enable dramatic reductions in primary energy use and concurrent CO2 emissions. However, usage of small CHP systems is not widespread because systems currently on the market are limited by high prices, low efficiency, lack of readily available components, and short lifetime. The Tryden One program seeks to develop 1 kW (electric) CHP generators that have high fuel-to-electricity generation efficiency, long life, low cost, and low emissions.

PROJECT INNOVATION AND ADVANTAGES:

SCSDEC (SmartComptonSaid Distributed Energy Company) in coordination with, Air-Squared, Inc, California State University of Northridge will design and develop a CHP Generator that uses an efficient burn, natural gas heat exchanger and incorporated thermal batteries to create heat and pressure driving an expander/generator in an Organic Rankine Cycle thereby transferring thermal energy into mechanical/electrical energy. The natural gas heat exchanger incorporates a low btu, high efficiency burner with aggressive exhaust gas recirculation to deliver a higher thermal efficiency with low emissions, and a heat exchanger charged with thermal batteries enabling efficient heat transfer resulting in an a system able to sustain prolonged production of 1 Kw. The system uses solar thermal heating to pre-charge the working fluid and decrease the energy input from natural gas, and an integrated cooling tower which doubles as a water heater. The team will further increase the system's efficiency and maintainability by developing a 'power-node' which incorporates the expander, pumps, and generator into one unit, controlled electronically to adjust daily production by the user or remote operator.

POTENTIAL IMPACT:

If successful, SCSDEC project will facilitate development and commercialization of economical, efficient, and durable CHP systems for residential use. These advancements support progress toward overall goals as follows:

SECURITY:

Innovations developed in this project could help households and businesses become more energy self-reliant and less susceptible to energy-related outages through distributed, local generation of power and heat.

ENVIRONMENT:

Widespread adoption of high-efficiency residential CHP systems could decrease overall primary energy consumption and therefore reduce CO2 emissions associated with electricity generation by up to 10%.

ECONOMY:

Cost-effective natural gas-fueled residential CHP systems could offer consumers lower electricity and heating bills.

Peter Said 07/18/16