DAVIS ENERGY GROUP
INCORPORATED

October 23, 2007

Mr. Richard Karney
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

Re: Energy Star Residential Water Heaters Draft Criteria Analysis

Dear Mr. Karney:

Davis Energy Group is in receipt of the Department's May 2, 2007 "Draft Criteria Analysis" document addressing the establishment of criteria for the inclusion of solar and other water heating technologies in the Energy Star (ES) program. We appreciate the opportunity to provide comments on this important topic.

Davis Energy Group (DEG) is a consulting engineering firm that has focused on residential and commercial building energy efficiency since its inception in 1981. DEG specializes in building energy simulation, monitoring, and analysis; residential green building mechanical system design; codes and standards development; and research and development of solar water heating (SWH) systems, energy efficient HVAC equipment, and building products. DEG is a member of the CARB Building America team, and is the LEED for Homes provider for California and Northern Nevada. Products recently commercialized or under development by DEG include:

- SunCache low cost residential polymer solar water heating system (sponsored by DOE and administered by NREL).
- NightBreeze automated residential nighttime ventilation system
- FIZE Building integrated hybrid solar water heating and photovoltaic system (sponsored by DOE and administered by NREL)
- HyPak ultra efficient commercial packaged HVAC system (sponsored by DOE and administered by NETL)
- Formsulate leave-in-place concrete slab forming system with integral perimeter insulation (sponsored by DOE and administered by NETL)

Advanced Energy Products (AEP) is a recent spin-off from DEG formed to commercialize products developed by DEG. AEP has already commercialized NightBreeze and intends to begin marketing SunCache and Formsulate in 2008. More than 50 SunCache prototypes have been installed, and AEP intends to produce and sell 150-250 units in 2008.

DEG and AEP are pleased to see solar water heating incorporated into the Energy Star program. Solar water heating has lower system costs than PV, and is more cost-effective at reducing utility bills and greenhouse gas emissions than PV. After carefully reviewing the draft criteria and comments from SEIA and SRCC, DEG and AEP reaffirm the SEIA and SRCC comments, with a slight change to item #4.

123 C Street • Davis, CA 95616 • Tel 530-753-1100 • Fax 530-753-4125

1. **Favored Energy Source:** On page 3, the DC states "The Department is intent on establishing a fuel neutral program that does not favor one energy source over another." While we understand why this approach is taken when evaluating technologies which utilize different types of fossil or other non-renewable fuels, we believe that characterizing solar energy as a "fuel" is inaccurate. Fossil fuels are not renewable, nor is electricity generated from non-renewable resources. The Department has invested heavily in the development of solar energy technologies for the express purpose of displacing non-renewable energy sources with renewable ones. SEIA maintains that the DOE has consistently taken the position that solar energy is a favored energy source. As stated on the Department's Solar Energy Technologies Program website:

   "*Solar energy technologies have great potential to benefit our nation. They can diversify our energy supply, reduce our dependence on imported fuels, improve the quality of the air we breathe, offset greenhouse gas emissions, and stimulate our economy by creating jobs in the manufacturing and installation of solar energy systems.*"

   SEIA and SRCC suggest that the Department has consistently indicated a desire to increase the use of solar energy, thereby offsetting and decreasing the use of non-renewable fuels. The criteria should be consistent with this.

2. **Market Share:** We note that, throughout the draft criteria document, the Department's analysis of the market share of conventional high-efficiency water heating appliances references a market penetration of 10% and its corresponding energy savings, SWH is evaluated with a market share reference of 2% to 3%, despite the fact that some of the conventional high-efficiency products described in the DC are not yet available for sale. In contrast, SWH systems are used throughout the world, and have been in use in the U.S. since the late 1800s. Market penetration of SWH in Hawaii is over 25%; other countries such as Israel have even higher penetration. At the very least, SWH's market share potential should be evaluated on the same basis as the advanced conventional technologies.

3. **Warranty:** It is unclear why the DC includes a requirement for a 15 year warranty for SWH systems when the warranty requirement for the other advanced technologies does not exceed 10 years. Conventional water heater warrantees are based on expected life and decline rapidly as life expectancy nears. The standard solar industry warranty is usually five years for the solar system and up to 10 years for the solar collector(s). This should apply to ES solar water heaters as well. Five year solar system warrantees exceed those of most appliances available for purchase today (unless an extended warrantee is also purchased at time of sale). Further, where minimum warranty requirements for ES are mentioned at all, consider the current ES language for other products:

   Roof Products – "*Each company's roof product warranty for reflective roof products must be equal in all material respects to the product warranty offered*

by the same company for comparable non-reflective roof membrane products. A company that sells only reflective roof products must offer a warranty that is equal in all material respects to the standard industry warranty for comparable non-reflective roof products."

Furnaces – "*For purposes of this agreement, a manufacturer limited warranty is an assurance by the Partner that purchased system equipment and components are warranted by the manufacturer for a period of time. The period of time is typically expressed in numbers of years. The exact terms of the limited warranty shall be determined by the Partner*."

Warrantee requirements for SWH should not be excessive as compared with other residential products.

4. **50% Solar Fraction:** On page 6 of the DC, the Department suggests that the Federal Investment Tax Credit (ITC) language makes a requirement for a 50% solar fraction. We do not believe this to be the case. Rather, the ITC language states that at least 50% of the energy produced by the equipment for which the tax credit is claimed must be derived from solar energy. Given that SWH systems augment conventionally-fueled water heaters, the ITC applies to the solar energy portion of the water heating system only, which derives 100% of its energy from solar. Please note that this interpretation of the statute appears on the Energy Star website on the page "Federal Tax Credits for Energy Efficiency," with language as follows:

   "At least half of the energy generated by the "qualifying property" must come from the sun. Homeowners may only claim spending on the solar water heating system property, not the entire water heating system of the household."

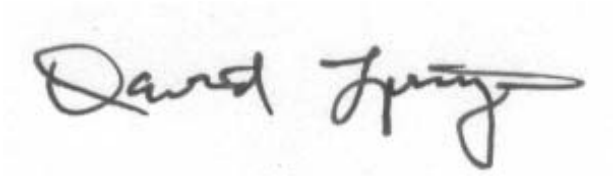
   DEG and AEP agree with the DC's proposed use of OG-300 certification, however we believe that the minimum Solar Fraction should be reduced to **0.25** for ES qualification. SEIA and SRCC proposed a 0.30 Solar Fraction, however this is likely to disqualify the SunCache system in some traditional ICS regions. NREL and DOE have invested about $1.5M in SunCache R&D, as well as an additional cost match from DEG of about 25%. It would be unfortunate if the ES program did not accommodate this technology, which will sell for about one-half that of the lowest cost conventional SWH systems.

   However, we do agree with SRCC and SEIA that the SRCC OG-300 Solar Energy Factor should not be used to determine the Solar Fraction of a solar water heater in all geographic areas of the U.S. The OG-300 Solar Energy Factor rates performance at one solar radiation condition (1,500 Btu/ft-day) and environmental temperature (67.5 F) only, and was developed merely to facilitate the comparison of various solar water heating systems operating within a common set of standard weather conditions. Accordingly, a Solar Fraction of **0.20** is a more appropriate determining factor. SRCC uses a computer model to determine the annual performance of OG-300 systems in various U.S. locations.

The annual energy savings published by SRCC provides an estimate on how solar water heaters perform over an entire year at a specific location. A geographical consideration when determining the Solar Fraction is important to ensure that lower performing SWH systems such as ICS's (including SunCache) and thermosiphon systems are not used in cold climates where they will have little or no reduction on water heating energy consumption, and could actually lead to higher consumption.

Along with SEIA and SRCC, DEG and AEP stand ready to work with the Department to resolve these issues and to participate in the Stakeholder Meeting on June 5th. We are pleased to discuss these topics at any time, and look forward to the inclusion of SWHs in the Energy Star Program.

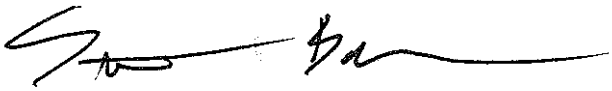
Sincerely,



David Springer
President, Davis Energy Group

Mark Berman
President, Advanced Energy Products

Eric Lee
Lead engineer, SunCache and HyPak projects
Senior Engineer, Davis Energy Group



Stephan Barsun
Lead engineer, FIZE and Formsulate projects
Senior Engineer, Davis Energy Group

CC: Les Nelson, Solar Rating & Certification Corporation
Rhone Resch, Solar Energy Industries Association