STATEMENT OF

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Chairman Bingaman, Ranking Member Murkowski and Members of the Committee, thank you for the opportunity to discuss the Department of Energy's (DOE's) solar and geothermal energy programs. Today, I am pleased to discuss the Department's perspective and answer questions related to the Department of Energy Administrative Improvement Act (S. 1160), the 10 Million Solar Roofs Act of 2011 (S. 1108) and the Geothermal Exploration and Technology Act of 2011 (S. 1142). However, the Administration is still reviewing these bills and we do not have a position on any of them at this time.

Solar Technology

We thank the committee and the sponsors of this legislation for your strong leadership on solar technologies over the years. The Department has set an ambitious goal for solar energy with the SunShot Initiative (SunShot) – to reduce the total costs of solar energy systems by about 75 percent so that they are cost competitive with other forms of energy without subsidies before the end of the decade. In 2012, under SunShot, the Department will support solar research across the development pipeline, from basic photovoltaic (PV) cell technologies to manufacturing scale-up to total system development.

Reducing the total installed cost for utility-scale solar electricity to roughly 6 cents per kilowatt hour without subsidies will result in rapid, large-scale adoption of solar electricity across the United States. Reaching this goal will help re-establish American technological leadership, improve the nation's energy security, and strengthen U.S. economic competitiveness in the global clean energy race.

SunShot takes a unique approach to developing solar energy. Historically, solar investments focused on achieving incremental efficiency improvements to solar cells and arrays. SunShot focuses on reducing the installed cost of the system as a whole, including non-technical barriers. In addition to investing in improvements in cell technologies and manufacturing, the SunShot Initiative also focuses on steps to reduce installation and permitting costs, which account for 40 percent of the total installed system price of solar electricity.[1] This includes efforts to streamline and digitize local permitting processes and to develop codes and standards that ensure high performance over the approximately 20-year lifetime of residential solar products. Decreasing the installed cost of solar is one of the key goals of SunShot.

As the United States is the world's largest consumer of electricity and, at the same time, has the largest solar resource of any industrialized country, SunShot is well-positioned to help the Nation realize the significant benefits from the wide-scale use of solar energy. Sunshot underscores solar energy's benefits to the United States and will have multiple positive impacts for the country, including:

- Achieving solar energy cost parity with baseload energy rates. Attaining a total installed system cost of utility solar equivalent to the wholesale cost of electricity from fossil fuels

[1] http://www1.eere.energy.gov/solar/sunshot/pdfs/dpw_white_paper.pdf

($0.06 per kWh) would likely result in rapid and large-scale adoption of solar electricity across the United States

- Increasing solar photovoltaic market share. As recently as 1995, the United States manufactured 43 percent of the world's PV materials, whereas today our manufacturers are only responsible for 6 percent.[2] Expanding the use of solar will help boost the U.S. solar manufacturing industry while driving innovation and providing long lasting, domestic jobs to support global PV demand that will represent a multibillion dollar industry
- Reducing greenhouse gas emissions – Solar technologies have the potential to significantly reduce the amount of conventional fossil-based electricity generation necessary, which in turn would reduce the amount of greenhouse gases emitted into the atmosphere.

Recently, as part of ongoing Market Transformation activities, DOE announced a Funding Opportunity Announcement (FOA) which we are calling the "Race to the Rooftop" to help standardize, streamline and digitize the permitting process, while improving interconnection and net metering standards, increasing access to financing, and updating planning and zoning codes. This national competition engaging teams of local and state governments along with utilities, installers, and nongovernment organizations, will help standardize processes, cut upfront fees and paperwork, and reduce the overall costs associated with permitting and installation, making it easier and cheaper for homeowners, businesses, and their local communities to deploy solar energy. The standardization and uniformity of local permitting efforts under the "Race to the Rooftop" are similar to the challenge grant provision in the 10 Million Solar Roofs Act, which calls for applicants to develop best practices for solar permitting.

The proposed legislation, S. 1108, employs a bottom-up approach so that local teams can identify approaches best-suited for them. A bottom-up approach, coupled with a preference for applicants that have partnered with states, public utility commissions, or other stakeholders, could allow for local and regional variability while still increasing the speed and scale of installation across large geographic areas. This approach could also allow states to expand existing state programs that have been effective in promoting rooftop solar installations.

Geothermal Technology

The Department is committed to developing and deploying a portfolio of innovative technologies for clean, domestic geothermal power generation. Geothermal energy is a baseload energy resource with a small environmental footprint and emits little to no greenhouse gases.

Despite geothermal's enormous potential, in 2010, only 15 MW of new geothermal power generation was added to the grid in the United States. There are two principal barriers facing the geothermal industry: the high cost and risk of exploration and most of the identified hydrothermal resources have already been developed.

[2] PV News (2/1993, 3/2001, 3/2006) and Navigant Consulting (2/2011)

Drilling costs represent approximately 42 percent of geothermal project development costs, and financing costs are significantly higher for exploratory drilling than for plant construction.[3] Removing the obstacles to exploratory drilling is vitally important to increasing our geothermal power generation capacity. In many cases, geothermal resources have no surface expression, leaving our nation's hydrothermal potential – estimated at 30 GWe by the U.S. Geological Survey – untapped and inaccessible. Exploratory drilling could also identify resources for enhanced geothermal systems (EGS), which have the potential to produce 16,000 GWe of power in a wide range of geographic areas throughout the U.S.[4]

Under the American Recovery and Reinvestment Act of 2009 (Recovery Act), DOE invested $97.3 million in 24 hydrothermal exploration projects, at which 34 exploration wells are planned. It is expected that from these wells, 400 MW of new resources will be confirmed by 2014.

DOE is also funding seven EGS demonstrations. At Desert Peak, Nevada, the initial stages of reservoir stimulation were successfully completed– a critical milestone in creating an enhanced geothermal reservoir.

DOE supports projects in low temperature geothermal resources as well. For example, DOE is working with industry to develop and field test a variable phase turbine which has the potential to generate 30 percent more power from low temperature geothermal resources than current power conversion technologies, at a lower cost.

DOE's National Geothermal Data System (NGDS) effort is a distributed information system for data sharing in its second year of development, which will enable the availability of comprehensive and accurate data to facilitate geothermal development. The NGDS is scheduled to be fully operational in August 2014, at which time it will make geothermal data from major geothermal centers, DOE-funded geothermal projects and state geological surveys or universities publicly available.[5]

Geothermal heat pumps (GHPs) for building applications also face barriers impeding greater marketplace adoption: high initial cost associated with the installation of the ground loop heat-exchanger, lack of consumer knowledge in GHP benefits, and limitations in GHP design and business planning infrastructure. DOE is developing a roadmap that will serve to strategically direct activities in geothermal heat pumps.

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[3] http://www.nrel.gov/applying_technologies/pdfs/46022.pdf

[4] Augustine, Young, and Anderson, *Updated U.S. Geothermal Supply Curve*, National Renewable Energy Laboratory and US Department of Energy, February, 2010, http://www.nrel.gov/docs/fy10osti/47458.pdf

[5] NGDS data sources include: DOE Geothermal Data Repository (Boise State University); Energy & Geoscience Institute (University of Utah); Geo-Heat Center (Oregon Institute of Technology); Stanford Geothermal Program (Stanford University); Great Basin Science Sample and Records Library y (University of Nevada, Reno); SMU Geothermal Laboratory (Southern Methodist University); and state geological surveys represented by Arizona Geological Survey and the American Association of State Geologists (AASG).

Through the Recovery Act, DOE currently funds 26 projects deploying geothermal heat pumps. $24M of the $58M Recovery Act funds allocated to GHPs have been spent in 15 states in both new and retrofit applications. Two projects are completed and several more are already providing data for performance analysis. The Recovery Act projects incorporate innovative business and financial strategies and/or GHP technologies and applications designed to overcome the initial cost premium that has prevented GHPs from being directly cost-competitive with other HVAC technologies, and from gaining wider marketplace acceptance.

DOE currently has projects in many of the areas identified for further RD&D and commercial application in S. 1142, including district heating and cooling at large institutions, use of hot water in shaft mines, combined GHP-solar PV and desiccant projects, and use of carbon dioxide as a refrigerant fluid for heat exchange.

The Department is also addressing other obstacles to geothermal development such as delays in the siting and permitting process which increase overall project costs and could further strain economics. Currently, it takes approximately seven years for a new geothermal project to move from exploration to power generation.

While the Administration is still reviewing the bill, there are serious technical concerns that would need to be addressed. Any new program should be consistent with applicable laws, and structured to mitigate risks and costs to the taxpayer.

S.1160 – Department of Energy Administrative Improvement Act

S.1160 proposes a variety of changes intended to improve the administration of the Department of Energy. The Department is still reviewing this bill and does not have a position on it at this time. However, I will address Sections 4, 6, and 7 as they relate to the Department's current authority.

Section 4

Section 4 of S.1160 concerns the administration of the Department's "Other Transactions" (OT) Authority. Section 4 is similar in many respects to DOE's current OT Authority, which is codified at Section 646(g) of the DOE Organization Act (42 U.S.C. 7256(g)). However, there are some important differences.

Currently, the Department has two kinds of OT Authority: Research OT Authority and Prototype OT Authority. Research OT Authority is used to carry out a public purpose of support or stimulation (e.g., RD&D projects). By contrast, Prototype OT Authority is used for the pre-acquisition development of technology prototypes. Such prototypes are used to evaluate the technical or manufacturing feasibility or utility to DOE's mission of a particular technology, process, concept, end item, or system.

Section 4 provides DOE with permanent and independent OT Authority similar to the authority Congress provided the Defense Department in 1991. However, the precise scope of DOE's OT Authority is left undefined in S.1160.

Additionally, Section 4 of S.1160 requires the Secretary to determine that "the use of a standard contract, grant, or cooperative agreement for the project is not feasible or appropriate" before the Department's OT Authority can be used. Section 4 restricts the delegation of this authority to officials "appointed by the President and confirmed by the Senate."

Section 6 and 7

Section 6 of S.1160 provides the Secretary with direct hire authority for "highly qualified scientists, engineers, or critical technical personnel" for two years following the enactment of the Act. Similarly, Section 7 provides the Secretary with special hiring and pay authority for persons with "expertise in an extremely high level in a scientific or technical field." The Secretary's authority under Section 7 is permanent, but not more than 40 persons may be hired under this authority at any time.

Sections 6 and 7 are analogous to Sections 621(b) and (d) of the DOE Organization Act (42 U.S.C. § 7231(b)-(d)). Section 621(b), which expired after four years, allowed the Secretary to appoint 311 scientific, engineering, and administrative personnel without regard to civil service laws and to fix their compensation at "super grades" (formerly GS-18, now Executive Level IV). Section 621(d), which is still in effect, authorizes the Secretary to appoint 200 scientific, engineering, professional, and administrative staff without regard to civil service laws, but subject to a GS-18 pay cap (now Executive Level IV).

Additionally, Congress granted the Department's ARPA-E program special hiring authority. The Director of ARPA-E has the authority to make appointments of scientific, engineering, and professional personnel "without regard to the civil service laws," "fix the basic pay of such personnel" up to Level II of the Executive Schedule, and provide "additional payments" up to a certain cap.

Conclusion

In conclusion, I would like to again thank this Committee for its leadership in supporting both solar and geothermal energy technologies.

It is important to tap valuable assets like solar and geothermal energy to continue growing our economy to expand the Nation's clean energy portfolio and energy security.

I would be pleased to address any questions the Committee might have.