Distributed Generation – Getting to 12,000 MW by 2020

The Solar Alliance appreciates the opportunity to provide the following comments on implementation of Governor Brown's goal of deploying 12,000 MW of distributed generation (DG) in California by 2020. The Solar Alliance is a national alliance of solar photovoltaic (PV) manufacturers, integrators, and financiers dedicated to accelerating the deployment of solar electric power in the United States by promoting cost-effective state-based policies.

The Solar Alliance recommends the 12,000 MW goal be segmented into two parallel efforts; the first to establish the market potential and the second to identify constraints to market growth. The first track – establishing the market potential – should focus on documenting the baseline of installed capacity and forecasting the potential growth from completing and extending existing programs. The agreement of stakeholders on the characteristics of the capacity to be installed is a prerequisite for identifying where the remaining capacity will be built. The second, parallel track should identify constraints to market growth resulting from non-programmatic barriers. These barriers include local policies, regulatory rules and/or technical constraints limiting DG. After the barriers are identified they should be layered over the analysis of market opportunity. It is important to weave together the assumptions resulting from establishing market opportunity with the impact resulting from constraints to market growth to ensure a narrowly targeted plan to achieve 12,000 MW by 2020.

Establishing the Market Opportunity

A. Establishing the Baseline

In the May 9, 2011 IEPR Committee Workshop on "Distributed Generation – Getting to 12,000 MW by 2020" (IEPR Workshop), both the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC) identified a number of programs that if completely successful will provide a significant capacity contribution from DG resources. These programs support an approximately equal mix of "customer-side" and "system-side" resources. Customer-side programs include the California Solar Initiative (CSI), the Emerging Renewables Program (ERP), and the Self-Generation Incentive Program (SGIP), while system-side programs include the RPS-compliance programs undertaken by the state's investor-owned utilities ("IOU Programs"), and the forthcoming Renewable Auction Mechanism (RAM), and SB32-authorized Feed-In Tariff (FIT) program.

Although these programs are in various stages of implementation, if fully realized, they will result in the deployment of nearly 6,000 MW of DG capacity by 2015 – i.e., half of the 12,000 MW DG goal. Accordingly, the Solar Alliance recommends assessing whether these programs will meet their goals and by when. It is not sufficient to look at the stated goals of these programs and assume they will be successful. For example, the CSI program needs additional funding for the investor-owned utilities to achieve their Senate Bill 1 target for non-residential MWs. Once the programmatic shortfall or barrier, if any, is identified, stakeholders can rationally and reasonable target where growth is likely to occur and what sources of additional funding for capacity is needed.

B. Identifying the Source of the Remaining MW

As a basic principle, the Solar Alliance believes the state should equally encourage deployment of customer-side and system-side resources. In this respect, we support targeting 6,000 MW for customer-side resources and 6,000 MW for system-side resources as a good starting point to frame the analysis. In order to reach these goals, the Solar Alliance recommends leveraging existing programs.

Once the baseline is established and realistic projections for completed programs are made it will be relatively simple to ascertain how much additional capacity is needed and which programs are best positioned to deliver the incremental installations. It would be inefficient to devise new programs as the existing programs can easily be modified to meet the new growth requirements. Customers, contractors, developers, and utilities all understand the processes used in the existing programs and there has been significant work done to establish their operation. Additionally, efforts are underway to coordinate these programs with utility processes such as interconnection. Lastly, the data generated by the programs is being used by a myriad of market participants to assess investment and evolution of the DG market. It is becoming increasingly apparent that programs which capture market data are critical inputs for regulators and legislators attempting to balance the natural market evolution of DG with longer term policy objectives. To that end, the Solar Alliance believes that establishing a whole new set of programs would be confusing and counterproductive.

The Solar Alliance urges support for two actions for existing programs. First timely implementation of previously authorized DG programs must be a priority, and would require very little, or nothing at all, in the way of new legislation or regulation. Prominent among these programs are the 1,000 MW RAM program and the 750 MW SB 32 program. Second, we urge continuation of the California Solar Initiative. With more than 500 MW of DG solar capacity installed, the California Solar Initiative has been the most successful solar program in U.S. history. As the program reaches end-of-life, a policy structure must be identified and implemented for the continued deployment of small to mid-sized residential and commercial DG. There are benefits to extending this program such as tracking system cost reductions, consumer and contractor behavior, equipment purchases and providing consumer protection.

While the Solar Alliance appreciates the rationale behind setting geographical targets for DG deployment, such as setting higher targets in areas with high concentrations of load and high-quality

resources, and where DG deployment may currently be lagging, the market should be the ultimate determinate of the best locations for system deployment. However, the exercise of setting and tracking regional MW goals will be helpful to monitor market activity and to flag if there are specific local issues that are constraining market development.

II. Constraints to Market Growth

A. Policies

There are several policies or procedures related to DG, and PV in particular, which must be addressed in order to reach the 12,000 MW goal. In fact, many of the existing programs may be constrained by these policies prior to fulfilling their current objectives. Consequently, the Solar Alliance strongly advises assessing the impact of these barriers in conjunction with setting out projections for market growth. This makes practical sense as the constraints impact projects differently depending on the project's characteristics. The list below is an initial list of barriers needing statewide consideration:[1]

Net Energy Metering (NEM) Caps

- Expand or eliminate NEM size limits and improve virtual net metering (VNM) rules
    - The current net metering cap is 5% of peak load. Applications for net metered systems may approach 5% as early as 2012.
    - The current system size cap of 1 MW constrains attainment of economies of scale for larger customer-side applications.
    - Virtual net metering has the benefit of expanding the ability of customers to install solar, even if they lack a suitable site.

Rate Design

- Implement DG-friendly rate design
    - Employ energy-based rate structures with time of delivery differentiation.
    - Reduce demand charges.

Permitting

[1] The Solar Alliance would note that certain of these issues are currently pending before the Commission or have been addressed with respect to individual investor owned utilities. None, however, have been resolved statewide.

- Implement simplified, streamlined and uniform permitting and inspection policies across local governments
    - Reduce excessive permit fees.
    - Streamline application and inspection processes.

Interconnection Procedures

- Reduce time and costs of current processes
    - Cut time required for interconnection studies and agreements.
    - Improve and streamline the utility interconnection queues.
    - Cap interconnection fees.
    - Address feeder line limits.

B. Implementation of a Statewide Penetration Rate of 15 percent of Peak Load or 50 to 100 Percent of Minimum Load

In order to achieve the 12,000 MW goal, it will be necessary to accommodate higher penetrations of distributed generation. The current interconnection screens are acting as an unnecessary barrier to achievement of this higher penetration by applying an overly conservative approach.[2] It is clear that a 15% of peak load penetration rate could be implemented statewide as that is currently the standard that is in place throughout California and in much of the United States. Rule 21 and the FERC regulated Generation Interconnection Procedures adopted by the CAISO and the IOU's all require projects that cause aggregate generation on a circuit to exceed 15% of peak load on the circuit proceed to a full study process. Indeed, the 15% penetration screen was implemented to avoid situations where PV penetration could match load, creating islanding risk. An International Energy Agency study[3], however, found that the risk of islanding is "virtually zero for low, medium, and high penetrations of PV systems." Moreover as the 15% of peak load screen was originally arrived at as an

[2] Penetration-based screens are particularly important because they limit the size and number of systems that can be interconnected quickly without going through a costly and time-consuming interconnection study process that may prove prohibitive for many proposed systems.

[3] "Probability of islanding in utility networks due to grid connected photovoltaic power systems", Report IEA-PVPS T5-07: 2002, page 5: http://www.iea-pvps.org/index.php?id=9&eID=dam_frontend_push&docID=384

approximation of 50% of minimum load it is entirely possible to use 50% of minimum load statewide without the need for additional study. That said, the Solar Alliance believes that it is possible to achieve penetrations greater than 50% of minimum load with appropriate supplemental screens in place. In this regard, data presented in the Renewable Distributed Energy Collaborative proceedings suggest that feeder penetrations as high as 50% to 100% can easily be accommodated. The CEC and CPUC should move quickly to instigate any necessary procedures to resolve any issues or concerns regarding higher penetration rates so that such do not serve to impede reaching the Governor's 12,000 MW DG goal.

1. Discussion on European experience integrating large amounts of DG

Advocates often point to Germany as the model for national renewable energy deployment policies. Whether or not one fully embraces this view, the KEMA memo[4] documents that both Germany and Spain have been successful in integrating large amounts of variable-output resources, such as solar and wind, into the electricity grid.

KEMA also notes that the network configurations and voltages in Germany and Spain are comparable to those in California and that the grid rules regarding the reliability impacts of DG are "**at least as strict"** as those in California. The memo also notes that, to date, "no sweeping changes" in the grids have been required to accommodate the large DG penetrations. Most telling perhaps is that in Germany any required system upgrades are performed as a component of normal system operations and thus are considered common practice.

To put this in perspective, Germany has already installed approximately 18,000 MW of distributed PV with a grid system comparable in size to California and continues to install PV at an average rate of about **1,000 MW every two months**, whereas California's target is to deploy **12,000 MW of DG over 10 years**.[5] In the end, the issue is not one of technological knowhow or technology

[4] http://www.energy.ca.gov/2011_energypolicy/documents/2011-05-09_workshop/documents/Memo%202%20DG%20Network%20Planning%20and%20Operational%20Impacts.pdf

[5] Including CSI, SGIP, and other programs already in progress, California has already deployed more than 1,000 MW of DG resources.

availability. Solutions to high penetration clearly exist both in terms of utility equipment upgrades and PV system functionality. KEMA noted that what is considered "smart grid" among U.S. utilities is considered "normal grid" in Germany. Rather, the key issue is cost allocation and cost causation where upgrades to the grid are needed. The benefits of utility system upgrades accrue to many stakeholders. These include customers who may want to install PV or plug in their new PHEV, the utility that is replacing aged equipment, and society as a whole by increasing the use of clean energy sources. An equitable means of allocating such costs must be derived.

The Solar Alliance strongly urges the CEC to incorporate the important lessons learned from Germany and Spain on grid integration of DG resources (as documented by KEMA) in its assessment of how to achieve California's 12,000 MW DG goal.

III. Research Development and Demonstration (RD&D) can Help Advance Distributed Generation

The average price of solar panels has declined by 50% over the last two years, with the cost of installed systems declining concomitantly. As a result, solar is now much closer to grid parity. The state should adjust to this reality by focusing research dollars on projects that would provide incremental cost reductions with a high probability of success, using proven technologies rather than projects promising revolutionary cost reductions with a low probability of success.

Specifically, the Solar Alliance believes the top priority areas for R&D efforts should be:

1) Grid Integration;
2) Micro inverters;
3) Reduction of balance of system costs (such as new types of ground-mounted tracking systems for large-scale PV systems, that are better designed for quick, low-cost installation, i.e. using driven steel piers instead of concrete foundations); and
4) Storage technologies.

IV. Conclusion

Distributed generation has been a bright spot for the California economy and will continue to provide jobs, savings and reliable clean energy to the state. The Solar Alliance recognizes the difficulty

in balancing the policy objectives underlying a 12,000 MW target and is eager to participate in mapping its achievement. An important factor in our success is a plan focused on results that leverage our existing experience. The Solar Alliance believes that modifying the current market programs to make them more cost effective, while protecting the grid, consumers and our energy future is the path towards meeting our shared goals.

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