

Sharp Electronics Corporation: Presentation to TVA Board

First of all, let me thank the Board and staff of TVA for inviting Sharp to present at this panel. We certainly treat it as a very important venue for discussing the solar industry. I appreciate the careful planning that went into this meeting, and suggest that this should serve to deepen communication between TVA and Sharp. Please feel free to call on me after this meeting for clarification and further discussion. I would also direct you to the Solar Alliance website, www.solar-alliance.org for discussions of policy implementation at the state level.

When former Secretary of the Treasury Snow visited our solar electric module manufacturing plant in Memphis not so long ago, one of his comments, paraphrased, was that he had come expecting to see the future of solar technology. “But”, he said, “the future is already here.” I certainly echo that thought that solar energy is viable right now. Even though our Memphis production facility is less than five years old, we have expanded rapidly to become one of the largest module producers in the nation, running three shifts and employing hundreds of staff. And these are good jobs, in an industry that is growing so fast, we can’t keep up. But, before I speak more about how strong the current market for solar is, and how much progress has been made over the last decade or so, let me try to present simply and clearly what I believe the solar and related industries require in terms of government and utility support, and why.

I believe there is general consensus that solar electric, or solar photovoltaic (PV) generation will be a key electricity producer in the near future. There are no major technical issues to be solved until grid penetration is orders of magnitude higher than it is now. Therefore, the implication is that in order to see greater use of solar in electric generation, the problems to be solved are ones that relate to economics. So, the question is how can TVA best support the continuing cost reduction and cumulative installations of solar energy. I suspect that I am not going to surprise you with the directions I suggest. The solar industry needs support in three areas: strong fundamental policies, reasonable long term incentives and research support. TVA has a very direct role in the first two. Examples of strong fundamental policies include net metering agreements and consistent and reasonable utility interconnection standards. Reasonable long term incentives include feed-in tariffs that decline over time, with limited lifetimes.

Healthy policy and long term incentives are not just “good things” the industry would like to have. There is a very clear chain of events that accompanies initiatives in these areas. Specifically, they lower the perceived financial risk of growing solar businesses by introducing a climate of stability. That lowering of perceived financial risk motivates companies like Sharp to commit to major capital expansion programs, and has the potential to lower cost of capital, as well. I mention Sharp not just as a theoretical, offhand example. Since establishing our solar production facility in the U.S. in 2003, the company has followed through on its commitment to the plant, expanding more than ten-fold in just a few years to become the largest solar module manufacturer in the U.S. Sharp has serious plans for continued growth in the U.S. over the next five years, potentially expanding even more rapidly in the next few years than in the past, to become

one of the largest solar manufacturing facilities in the world. Sharp upper management is keeping a careful watch on the investment environment here, and I guarantee that policy and incentives implemented in the near term will have a substantial impact on their decisions.

It is not hard to see how with that pace of expansion solar can be an engine of economic growth in the U.S., including in the TVA region. The relatively much lower rate of growth industry-wide in the US, 25% from 2006 to 2007, created thousands of jobs downstream and brought billions of dollars into the economy. The next step in the chain is that this strategic expansion fosters economies in the module manufacturing and installation processes. More modules installed means more installers being more efficient, resulting in lower costs of installation, in addition to the direct economies of scale that result from volume increases. This cycle is closed as the decreased costs result in greater numbers of solar installations. The strength of the link between solar support and job growth is emphasized in the statement by the Solar Energy Industries Association that, "An 8-year extension of the Investment Tax Credit (ITC) will create more than 55,000 new American jobs in the solar industry and over \$45 billion in economic investment by 2015."

As a federal corporation with the authority to establish electricity retailing regulations, TVA should certainly be involved in some of the key policy decisions affecting solar. Net metering, for instance, is one policy fundamental for which the TVA can be an important advocate. Net metering is at its essence an attempt to begin to level the playing field for alternative energy sources. Only seven states in the U.S. are still fully without net metering, and three of those, including Tennessee, are in the TVA power service region.

Likewise, the standardization of interconnection requirements, and the assurance of their fairness and affordability, is another important step that can be taken to make sure solar has a basis from which to compete. IREC, the Interstate Renewable Energy Council, has developed a recommended set of interconnection standards. I see the Green Power Switch Generation Partners Program as simultaneously addressing both policy and incentives, and am grateful for it. Sharp has taken advantage of this program, building a small-but-respectable 50 kW solar array for generation on our own property that will pay back in a reasonable time frame.

This is my graceful segue into the issue of incentives. I believe the extension and expansion of the GPS Generation Partners Program is a powerful way to introduce renewable generation into the region. Lead users of solar in Memphis, for instance, have taken advantage of this program to lower their facility electric bills, create publicly visible technology landmarks, and begin to build the infrastructure that will be needed to sustain rapid growth in solar installations that will occur in the TVA region when solar energy comes closer to parity with traditional generation sources, and as Renewable Portfolio Standards are introduced. The installation of our own solar array in Memphis, for instance, introduced a major electrical contractor and a number of engineers to solar technology for the first time. To repeat what I mentioned earlier, the positive

downstream effects of solar module sales are tremendous. Green pricing programs put the initiative for renewables installation in the hands of individuals and corporate entities (rather than governments or utilities), which is a potentially powerful way of sparking market growth.

The issue of developing Renewable Portfolio Standards (RPS) is not simple to address. I certainly believe that one size does not fit all, with respect to resources and existing energy prices in the TVA power service region. RPS are valuable in meeting TVA goals in that they respond to the issue of environmental stewardship and serve as a surrogate for explicit recognition of the cost of mitigation of the effects of carbon generation. I prefer to remain mute on the subject of whether solar “carve-outs” should be created in RPS design. I think solar will be able to hold its own against other renewables in the fairly near term. Perhaps I can address in our question session later what initiatives not to pursue. Ultimately, the RPS will not constrain the growth of renewables, including solar, but will serve as a springboard for continuing solar expansion. For instance, in New England RPSs are supporting limited near-term solar market growth. However, in the very near term (2010), if solar can reach installed cost targets of \$4.50 per watt, it reaches grid parity for many gigawatts of capacity in the region. It is notable that solar has the potential for cost effectiveness even in the relatively poor resource region of New England. In the TVA region, the driver of solar cost competitiveness is more the cost of electricity from conventional generators than any solar resource issues.

Which brings me finally to the technology and its cost prospects. Yes, solar costs will decrease. Over the last two decades, solar costs have declined dramatically. This was the case until very recently, when shortages in polysilicon, a key raw material in the silicon solar cell manufacturing process, led to leveling of module prices, and then modest price increases and product shortages. Now, with the construction of polysilicon plants underway, most analysts expect to begin seeing relief from the shortages by next year. Meanwhile, other solar technologies are making significant inroads. So-called “thin film” solar technologies, have tremendous potential for reducing module costs. In 2007, a thin film solar module producer became the fifth largest PV manufacturer in the world. Sharp is committed to a 1 GW thin film solar plant in Japan. Various thin film technologies have the potential to decrease first costs by an order of magnitude, even if product warranties (read, “lifetimes”) are somewhat reduced. Even now, some thin film PV manufacturers are claiming costs approaching \$1 per watt.

The bottom line is that solar installations have been expanding, and continue to expand, at double digit rates. That will certainly continue, and solar electric installations are nearing grid parity in many regions. The role that TVA can play is to make appropriate policy and incentive decisions to help insure that the solar costs decline more rapidly, and that the infrastructure is prepared to handle growth as it occurs in their service region.