

**Rebuttal to SCE&G Testimonies in Docket No. 2008-196-E
On behalf of common sense, people, industry, institutions of SC.**

By Joseph Wojcicki – intervenor.

1. SCOPE:

The covered topics are associated mostly with the proposed new location for the two AP 1000 reactors. The various aspects, as initially proposed that can mislead readers, are extremely important in the overall decision of the PSC. My Motion to Change the Location of the Two Reactors Planned by Applicant (“Motion”) was entered on November 10, 2008. SCE&G / Applicant in their letter dated November 20, 2008 requests that Commission deny this motion claiming “existing Virgil C. Summer Nuclear Station site near Jenkinsville, South Carolina is a superior site for the construction and operation of two nuclear base load generating facilities.”

2. OBJECTIVES:

Facts: Atlantic Ocean Location (AOL) proposed in my Motion and in initial proposal PSC doc # 195528 entered into the docket on 10/15/2008 is decidedly better than Jenkinsville. None of SCE&G or ORS documents consider AOL or compared with other locations. In this paper I want to present again:

Savings of large amount of water that is critical for the Southeast Region of the United States of America (“USA_SE”) by using seawater for cooling systems.

Avoiding losses that become savings in the GWh of electrical energy

Avoiding costs of long transmission lines, mostly 230 kV

Avoiding, in the worst case scenario, a lack of funds to accomplish this high cost investment.

Avoiding, in the worst case scenario that changes in the U.S. financial and energy politics as well as another unpredicted events may force SCE&G to a bailout.

Identify gains and losses in solutions that affect the process outcome and its parties.

Be sure that a misunderstanding of science and technology does not create wrong decisions.

Used abbreviations and units:

AOL = Atlantic Ocean Location (proposed by Joseph Wojcicki as a much better solution than the Applicant’s “superior” Jenkinsville)

SC = South Carolina

GW = Gigawatt = one billion watts; W is the unit of power in International System of Units (“SI”).

MW = one million W

kW = one thousand W

J =Joule –SI unit of energy,

kWh = kilowatt-hour – practical electrical energy unit, measured by a meter, installed mostly in a service to the user. 1 kWh = 3.6 *1,000,000 J. = 3.6 MJ

PV panel: photovoltaic panel to convert sunlight (solar) energy to electricity.

3. TESTIMONY & EXHIBITS of STEPHEN A. BYRNE –Senior VP of SCE&G Company.

In the entire testimony of VP Byrne, including his Conclusion, there is not a word mentioned about my already proposed reactor localization (AOL) close to the Atlantic Ocean, to save a critical amount of water and energy as well as significantly improving their cooling systems.

The Selection of Nuclear Technology to Generate Electricity.

It is obvious that are two points of view on how to generate electricity to cover an increasing load demand and are a conflict in the processing this Application.

- (a) The electric company producing a big number of GWh of electrical energy that requires power measured in MW to serve their costumers in a very competitive world.
- (b) The individual homeowners, industry, and other customers. They mostly need uninterrupted kW of power, but their number served by SCE&G + Santee Cooper is in the millions, and now they are looking for the cheaper kWh, which is hard in a monopolistic distribution networks.

You may see these two points in Testimony by Dr. Byrnes and Ms Nancy Brockway. We can expect a bias in the opinions, but our obligation is to weigh the solution.

Even the concept of solar electricity, although weak in the GW range, could be a good solution if, for example, it will follow Europe's solutions. Germany has much lower sun radiation than SC, but prefers solar over nuclear. Of course an average SC home PV unit could be 5 kW, some of our larger plants need 20 or more MW delivered via a single or double power supply line. Please allow me to continue my rebuttal in the form of a Q & A section.

Q. Do electric companies and their customers have the exact same objectives being sellers and buyers of the electrical energy?

A. No. Electric companies want to maximize profit as well as to minimize production and distribution costs. Customers want to buy a good quality product (no outages, get required kW power service) at a reasonable kWh rate, plus the ability to select a provider (no monopolistic policy). There are rules and regulations and ORS should represent public interest (convenience and necessity). The compromise must be reached here in the interest of the state as ultimately determined by the Governor.

Q. How can these objectives be realized in the case of renewable energy, with solar power, for example?

A. Let us use data from SCE&G Application for two generating stations with two nuclear reactors (AP 1000) to show the difference and very possible events in the near future of SC and the world.

SCE&G plans to build the first reactor and start its operation by April 1, 2016, with 1,117 MW of power generation. The second AP 1000 is planned to be in operation by 2019.

Problems and speculations in load predictions, costs, and a learning curve that may change deadlines and total costs are covered by other intervenors.

It is easy to predict that PV panels will be installed in large numbers in the near future because of the following factors:

- (a) Intensive public education by many already existing groups and institutions in SC (e.g. DOE).
- (b) T.Boone Pickens Plan, with already over a million supporters and a still growing army of activists that strongly promotes solar energy. The plan is already recognized by the Federal Government, Congress and Senate as a positive force in solving our energy crisis.
- (c) Dramatic trend to lower PV unit costs in dollars per kilowatt (\$/kW). Some plants already produce PV cells with costs of \$330/kW.
- (d) New roofing technology and solutions, e.g. integrated shingle with PV elements.
- (e) Increasing potential of contractors in a new job market announced by President Elect Obama.
- (f) Increased kWh rates for energy offered by SCE&G Company. Any deeper analysis done today shows that well done roof with PV integrated shingles delivers additional solar electricity in less than \$1000/kW compared to nuclear of over \$5000/kW. Remember that solar is clean, does not require sources of energy to operate, 230 kV transmission lines, does not require also highly qualified personnel, and above all, delivers uninterrupted power while the grid could suffer an outage.
- (g) Significant decreased attraction of Wall Street for investment. People's savings can be redirected into an investment towards their homes.
- (h) Possibility to organize cooperative actions in local communities because of failure of centralized financing (big banks).
- (i) Final effect for homeowners: low cost electricity without interruptions by grid outages.
- (j) Increased migration of seniors to SC. These people usually come with savings and want security in electricity delivery (no outages).
- (k) Possible lowering of kW demands when geothermal means will be used for heating/cooling.
- (l) Other states such as California are already beyond the first phase of the "learning curve" in solar power and can serve as a good indication for this business in SC. Also, Germans are investing heavily in solar and stopped the nuclear track.

Q Can we see any practical path for better action to introduce higher progress for solar initiatives in the state of South Carolina?

A Yes. For example, by constructing a \$100 million manufacturing plant in one year that would be producing PV cells of a total power of 200-300 MW annually. Its product (according to data

from western states) costs \$330/kW. New contractors would install panels on roofs or yards, successfully lowering total demand from electric companies (in ten years, up to 2,500 MW).

It is misleading to require a demand of 5 times of 2,234 MW of nuclear to be an equivalent for PV installation, just to completely block any solar initiative which is obviously not in the interest of the Applicant, but very realistic and motivating in the present energy situation of the U.S.

It is also practically impossible that both reactors will produce a maximum of 2,234 MW continuously during the 8760 hours per year. The solar energy applications do not require a learning curve in SC, where the number of sun hours per day is approximately the same as in California, and higher than in New Jersey and Germany where solar installations are growing fast.

On the solar side, the perspective of lowering unit prices are real and even already reported to be less than \$5000/kW. And solar power does not require 230 kV transmission lines. Lines cost money to install and would create losses when transmitting the power. Undisputed are costs of nuclear fuel before and after generation of heat. Other intervenors and witnesses discuss these problems in more details.

The Applicant must be aware of possible negative effects of above PV installations. You may estimate the number of lost customers from the solar action as follows:

Ten years of 250 MW with average 5 kW per house:
 $(10 * 250 \text{ MW} * 1000 \text{ kW/MW}) / (5 \text{ kW/house}) = 500 \text{ 000 houses.}$

This number is probably overestimated for SC, but if these 2,500 MW of PV power will be installed in the SE region, SCE&G cannot expect the market for their product (electricity) in residential and business loads (maybe also loads from schools, churches, and administrative buildings).

Q Can PV panels completely replace central generating stations?

A No, of course not. SCE&G has other customers, including big commercial and industrial businesses. Having a higher capacity, SCE&G can attract wholesalers as well to export energy to other regions if other states/ local rates are much higher, or if they have critical needs. This aspect is very weak in the Applicant's materials/testimonies, and, of course, there is no objective discussion on the **localization and cooling water problem**. On the other hand, solar and geothermal **will decrease in demand** for electricity from customers. And this must be considered in SCE&G documents.

Their documents, as well as the testimony of the ORS team of experts, **do not respect SC future plans**. Some of these plans will create dramatic changes in load and locations of new substations, therefore assumed modeling of steady increase of the base load is not proper to do a prudent analysis.

Furthermore, to correctly process under the Nuclear Regulatory Commission, South Carolina institutions, including the Applicant, must deliver all materials from deeper analyses of all aspects of this major project. The Atlantic Ocean Localization of the electrical generator nuclear station with much better technical and economical aspects cannot be ignored in this stage.

Q. Are there some other important aspects for public concern and needs?

A Yes, there are, and they must be reviewed for public behalf. An electric company charges some fixed amount per month for connection, but does the homeowner charge the company in reverse for undelivered power? What happens with children, the elderly, the handicapped and sick in times of outages? Most of these problems are important, but not covered in delivered materials. There is a list of risk factors, but they do not completely receive protection in conditions for the application approval.

4. TESTIMONY & EXHIBITS of JIMMY E. ADDISON –Senior VP of SCE&G Company

4.1 In the entire testimony of VP Addison, including his Conclusion, there is also not a word mentioned about the Atlantic Ocean Location, to save water and energy estimated to translate into billions of dollars.

4.2 The financial matters discussed in this testimony are not the subject in this rebuttal overview.

5. TESTIMONY & EXHIBITS of JOSEPH M. LYNCH –Represents SCE&G Company

5.1 In the entire testimony of VP Lynch, including his Conclusion, there is also not a word mentioned about the AOL.

5.2 The financial matters and SCE&G DSM planning process, discussed in this testimony, is not the subject in this overview.

5.3 Page 4_ Line 13. The phrase “insufficient solar radiation”, especially while comparing the solar radiation in Germany where they still successfully substituted nuclear with solar, should not be used because it may suggest hostility towards rapidly increased solar installation in the U.S., as it is obviously seen as being a competitor in the area of small electricity generators. This phrase is rewritten in several other SCE&G documents. Please make the corrections.

5.4 Page 5_ Lines 22-25. From an individual electrical energy user, these arguments are not important. S/he needs to (a) lower monthly payment and (b) lower the amount and time of interrupted power.

5.5 Page 9_ Lines 13-22. The number of 10,276 MW from solar suggested PV panels to be a 24 hour source of electricity is misleading. We know they are for day peak hours. Fortunately, during the time when air conditioners need maximum power, PV systems generate their maximum power. They are exactly peak-hour generators. At the minimum of demand, PV sources do not need to produce electricity because other 24-hour generators will deliver enough power. Mostly, of course, from the grid.

10,276 MW/2,234 MW = 4.6 is not a true value for P max/P base power ratio. Do not mislead the commissioners; just try to use well-known methods of load-power generated time functions for analysis. In the Application, there are no serious indications to close base load generating plants working 24/7.

- 5.6. Page 11_ Lines 8-13. If my group could have \$100 million to invest in an energy project, the PV Production Plant would be our choice. New \$100-million plants, built within one year, produce 200-300 MWe of PVs annually. Reported unit cost is \$0.33/W or \$330/kW. Compared to other indicators today, all of them are higher. Nuclear is \$5000-6000/kW. Investments of individuals in his/her home are much better than buying bonds on Wall Street. Opening the SC market for solar will create jobs. Making this idea to work can make SCE&G stakeholders very happy, along with the Governor of SC and many others.
- 5.7. Even locating this PV plant in Jenkinsville would create real jobs for local manpower without nuclear higher education.

6. CONCLUSION

The Applicant has not satisfied the burden of showing that the Jenkinsville location is better than the proposed Atlantic Ocean Location (AOL). Their technical staff probably already knows that AOL is much better.

Common sense along with undisputable fundamental science supports the AOL as a better candidate for localization of the nuclear power plant.

The Commission's verdict cannot reveal before the US Nuclear Regulatory Commission (NRC) ignorance of simple knowledge in SC for such an expensive project.

The hundreds of pages I have read have many errors, not just typos. Additional Testimonies have not made any corrections.

I found in testimonies from the ORS Expert Panel a lot of omissions and errors and could not find any verification of the work that is required after such a big project application, especially with new and never before installed nuclear reactors. In those documents, the interest of SC was ignored as well.

The list of problems and things to clarify is long, and I request the ability to cross-examine all witnesses.

Many documents submitted by the Applicant and ORS **are signs of the absenteeism of a professional verifier in their teams. Any draft of Settlements should not become the bypass of serious hearings. New proper analysis that needs to be enclosed before a final PSC decision should be sent to the US NRC.**

I see a grave necessity to rework many of the submitted documents by the Applicant and ORS.

Sincerely,

Joseph Wojcicki – intervenor
Columbia, SC November 25, 2008