December 14, 2017

Martha Lynn Jarvis
Chief Clerk
North Carolina Utilities Commission
430 North Salisbury Street
Raleigh, NC 27603

OFFICIAL COPY

RE: Docket No. EMP-93, Sub 0
Wilkinson Solar LLC

Dear Clerk Jarvis:

Introductory Comments:

I am an Emeritus Professor in Mechanical & Aerospace Engineering at NC State University. I retired on June 30, 2016. In late August of 2015, I received a phone call from an NCSU Extension Agent located in Eastern North Carolina. He called me because of my reputation in building the NCSU Solar House and my other solar teaching and research activities. He was very concerned about what was happening to his county. In his words, he stated, "They are covering my farmland and cutting down my forests to put in these solar panels. I don't know what is going to happen to my county." He ended his call by asking, "Can you help me?"

That is how I initially got involved with the Solar Farm Industry and why I am writing to you today – as a former professor and as a private citizen. There are people all across North Carolina concerned about what is happening to their communities and their state. They sense something has gone terribly awry.

To the Commissioners:

I have been an advocate for solar energy for the past 40 years. In the late 1970s, I led the fight to get funds to build the NCSU Solar House on campus. I had to convince the NCSU Administration that solar would help us deal with the energy crisis that was affecting all North Carolinians. Larry Montieth, the Dean of Engineering at that time, finally came on board and the Solar House project became a reality in 1980-81. Governor Jim Hunt dedicated the House in September of 1981. Our purpose for the Solar House was research, education and outreach. The House remained open to the public every business day for over 30 years to educate North Carolinians on the many ways in which solar energy could be used to improve our lives.

In 1987, I founded the NC Solar Center to spread the solar message to the four corners of our state. I served as the Faculty Chair of the Solar Center for 15 years and directed its research programs. Simultaneously, I developed and taught solar courses to our Mechanical

Engineering students, and taught workshops/seminars for home builders, architects and the public across the United States. Gradually, people began to get the idea that solar was a good deal – to provide heat for their homes and later, to generate some electricity.

In every phase of our solar work, we had to recognize that solar energy is not available all the time. Our use of solar is affected by rain, snow, clouds, storms and nightfall. Mother Nature is definitely a factor. Regardless if we were using solar for heating or for electricity, we always needed a back-up energy source to carry us over. That was simply a fact of life.

In recent years, solar (PV) electricity has become popular. We see solar panels on the roofs of houses in our neighborhood, providing power when the sun is available. That makes us feel proud that we are doing our share to improve the environment.

More recently, we have seen utility scale solar power systems (called solar farms) spring up as we travel across our state. These solar power plants often cover hundreds of acres of farmland. Because of government subsidies and tax credits, solar developers are able to lease land from farmers and landowners at 10 times the income they might receive from farming. These leases are usually for 15 or 20 years. For many landowners, the decision is a "no-brainer." The solar farm industry offers something for everyone involved in the decision making process. For example, the County Commissioners who ultimately have to make the final decision on approving or denying a solar farm application often find the potential increase in tax revenue a very persuasive argument. They are strapped for funds to run the County government and are only too happy to get some additional funds. For many Commissioners, project approval is a slam dunk. Other beneficiaries of this system are the attorneys and expert witnesses who represent the solar developers at the Hearings. They are paid handsomely for their services. This is an example of the array of forces facing the County Extension Agents and the local citizens who are concerned about the transformation taking place in their communities.

The Rest of the Story

Some of you may remember Paul Harvey's newscasts some years ago that ended with "And now you know the rest of the story."

As you consider the Wilkinson Solar project before you today, it is important to look at other aspects of the solar farm business that are seldom mentioned in the popular press. I would like to share with you some operational issues to consider:

- A solar power plant generates power on average 5 hours/day, but only on a sunny day.
- For the remainder of the day, power will have to be supplied by the traditional power company.
- For rainy days, you are totally dependent on the traditional company for power.

- The power rating of a solar plant is established by its generation at around noon when the sun is highest in the sky. For example, a 5 MW plant will generate 5 MWh between 11:30 am and 12:30 pm. For remainder of the 5 hour period, the power generation will be less.
- For the remaining 19 hours of the day, the solar farm generates essentially no power, whereas a traditional 5 MW gas-fired plant would continue to produce 5 MWh each hour (if needed).
- Thus, by its very nature, a solar farm is a "part-time" power supplier.
- Solar power is intermittent. It performs at the pleasure of Mother Nature. Given that reality, it isn't a reliable source of power.
- For solar power to play a role in our lives, traditional power must be available as a backup supplier at all times.
- As a cloud passes by overhead, the solar power output will drop like a "rock." To avoid a disruption in power service, the traditional utility has to have special equipment spinning all the time to pick up instantaneously when the cloud first begins to intercept to the sun's rays.

As I close, I am reminded of the questions and concerns posed by the County Extension Agent two and one-half years ago. Out of that first call, the following questions have evolved. I believe that they are worthy of your consideration as you deliberate on this case.

- It is common for power plants to be located near where the power is needed. *Why should North Carolina build a new solar power plant in rural Beaufort County (where there is little load)?*

- Agriculture is North Carolina's largest industry. *Why cover our richest farm land with a solar power plant that requires more land per Megawatt than all other known power generating sources?*

- *From a land-use perspective, why pit power production against agriculture, our largest industry?* This makes no sense.

- A 5 Megawatt plant goes up in 11 days. *Thereafter, it employs essentially no one. Why support a policy that displaces the basic essential industry of a region (agriculture) with a solar power plant that employs no one?* This will only exacerbate an already serious unemployment problem.

- *Why are we building solar power plants in North Carolina to send the power north to Virginia, Maryland, and other states? Of what benefit is that to our citizens?*

- *Why is the NC Utilities Commission ruling on solar power plants that do not serve the power needs of North Carolinians?*

- *Since solar power plants have a relatively short life of about 20 years, what will North Carolinians turn to for power after the solar plants have been decommissioned? Will we have to turn back to coal?*

- *Why don't solar developers purchase the land on which they intend to build a solar farm? Why aren't they in the power business for the long haul?*

- *How would the NC Utilities Commission feel if Duke Energy built a new power plant on rented property? Would this give the Commission the impression that Duke was in the business for the long-term?*

- *Why does the ownership of solar power plants turnover frequently during the plant's lifetime? What kind of long-term commitment does that suggest?*

- *Why is North Carolina investing all this land for a power source that is intermittent, not reliable, and available only for a few hours on a sunny day?*

In Conclusion

In closing, I must tell you that I am as firmly committed to the use of solar energy in our society today as I was 40 years ago. I still have that passion. However, in the case of solar electricity, perhaps we should consider putting the panels on the roofs of our buildings rather than covering our farmland. Covering farmland simply has too many "unintended consequences" as the above questions suggest. Perhaps that County Extension Agent was onto to something that the rest of us didn't foresee.

If you have any questions or concerns, please do not hesitate to contact me. Thank you for your time and consideration.

Sincerely,

Herbert M. Eckerlin, Ph.D.
Emeritus Professor
Mechanical & Aerospace Engineering
NC State University