Environmental Justice Task Force

Comments on Integrated Energy Plan November 15, 2019

Unitarian Universalist FaithAction is a faith-based group. The Environmental Justice Task Force addresses environmental issues at the state-wide level, especially those that affect environmental justice. This is in line with Unitarian Universalist principles of the inherent worth and dignity of every person; justice equity, and compassion in human relations; and respect for the interdependent web of all existence.

We thank the staff of the Board of Public Utilities for their hard work developing the Energy Master Plan and applaud the work of the Rocky Mountain Institute and Evolved Energy for their development of a model of New Jersey's energy economy and the projection of alternative energy choices out to 2050.

We were delighted and relieved to see that the cost of transitioning to renewables is less than the cost of continuing on our present path. The model includes health impacts as estimated by the NJ DEP and the social cost of carbon as estimated by the EPA. However, the EPA admits that its estimate of the social cost of carbon does not include all the costs. Climate change also threatens New Jersey treasures such as the Jersey shore, New Jersey agriculture, our wetlands, and the Pine Barrens. The excellent news from the model results is that policy makers can make the financially responsible choice while working to protect New Jersey's values and New Jersey's future.

While the long-term costs are lower with renewables, the cost is front-loaded requiring heavy investments up front. Passing these on to rate-payers is a highly regressive tax, because utility bills are a larger percentage of the income of low-income residents. Other methods of paying for the investments must be found. Also, rates should be lowered when the utilities begin to receive the benefits of the lower operations and maintenance costs.

Additional comments have two sections. The first section raises some questions about the model. The second section addresses using the model in decision-making.

Modeling.

1. Addressing some current technologies that could reduce costs further.

The study mentions only solar, wind, biogas, and nuclear for the 100% clean requirement. This seems overly restrictive. The model was limited to current technologies, but there are a number of current technologies not considered but already in use in New Jersey and other states. These include geothermal (the DEP is encouraging use of geothermal systems), aquifer thermal energy storage (Stockton University uses this for air conditioning campus buildings), use of passive solar which can be used in applications such as water heaters (offered by a number of New Jersey businesses), and use of hydrogen to fuel large trucks (as is done in California now).

2. Impact of forests and soils on reducing energy needs and emission.

The model includes 8 megatons of carbon sequestration by New Jersey's forests. Does the model assume the current level of forestation will remain constant over the next 30 years? Policies must be adopted to address the current and future pressures on our forests such as insect infestations and development pressure. In urban environments trees offset the impact of "heat island effect" by reducing air temperatures. Trees can reduce building heating and cooling needs by providing shade in summer and wind breaks in winter. Tree planting and reforestation programs should be encouraged, including urban and suburban programs.

Carbon sequestration can also be supported by regenerative farming, a new paradigm in agriculture. Its primary focus is on restoring healthy soil. Current chemical/factory farming techniques gradually transform healthy soil into dead dirt. Eventually, there is no way (even with fertilizers and pesticides) to grow anything. On the other hand, healthy soil is teeming with a diverse microbiome of bacteria, viruses, fungi, and so forth embedded in organic matter. Healthy plants are fed by healthy soil. The plants then absorb atmospheric CO2 and produce sugars, some of which are exuded through the roots to feed the microbiome. Thus, the carbon sequestration by plants comes not just from their root system or the structural wood of trees. It is also in the vast subterranean microbiome and organic matter. Widespread implementation of regenerative techniques would significantly reduce the level of CO2 in the atmosphere. We call New Jersey the Garden State. Let's get back to the garden!

3. Considering potential reductions in usage.

Energy efficiency is addressed by the model by assuming that as appliances and other equipment reach end of life, they will be replaced by the most efficient technology. However, the best way to reduce emissions is to go beyond just efficiency and eliminate unnecessary equipment and unnecessary activities, for example, reducing vehicle miles traveled by improving the public transit system. Since this requires people to change their behavior, it is harder than just changing the technology used, but could be more effective. Behavioral changes are relatively unpredictable, but can

be influenced by incentives and advertising. It would be difficult to try to model them directly but a variation assuming some reductions in the end uses of energy could provide interesting information.

4. Re-evaluating technology costs and climate change risks every five years.

As the modelers recommended in the Webinar on Nov. 1, New Jersey's emissions and energy mix need to be re-evaluated every few years. The study shows that removing nuclear power entirely would increase cost tremendously because of the need for massive amounts of 36 hours' of storage, but new improvements in storage technology might dramatically cut that cost. Our state hosts many colleges and universities such as Rutgers, Princeton, and NJIT, and with adequate state funding for innovation and entrepreneurship, we can act to make this happen. The state must make a substantial investment in the research needed to improve storage technology quickly, and for this to be a subject of periodic review, so that we can move away from nuclear energy as soon as storage technology and capacity improve.

On the risk side, with sea levels rising and the Jersey shore subsiding, nuclear reactors are ever more in danger of being flooded, and yet they must be located on a source of cooling water. In addition, warmer weather and water increase the amount of water needed for cooling and have in some cases led reactors to be shut down temporarily — making their use as "firm" capacity questionable in the context of global warming.

We feel that it is imperative to phase out nuclear power generation, as it is increasingly unable to compete economically with other energy sources, creates waste that is some of the most lethal materials on the planet, and is increasingly threatened with outages due to warming. The BPU and DEP must keep abreast of the current state of storage technology and be ready to implement it as it proves itself practical, affordable, or necessary due to phasing out existing nuclear plants.

5. **Considering additional storage technologies.**

The reason for the extreme increase in cost when nuclear is eliminated is the requirement for firm capacity. It appears that the model assumes that the substitute for firm capacity would be chemical energy storage, and it would have to be large enough to last for several days when both wind and sun fall below the levels required to supply New Jersey. That is quite expensive to do with chemical storage methods.

One alternative would be to enforce reductions in usage during periods when energy is not being produced from renewables.There are also other approaches to firm capacity that we could try. Geothermal — possibly the cheapest source of energy — could also supply firm capacity, and so should be included in the mix of energy sources. Alternatively, where storage capacity is used, would it be possible to use higher capacity storage, such as thermal, pumped hydro, or even rail energy to deal with the long-term problem? The big disadvantage of the higher capacity energy storage systems is that energy isn't available quickly enough for intermittent outages, so clearly

you have to have enough chemical storage to deal with the initial hours, but relying on large-scale storage systems such as thermal, pumped hydro, or rail would reduce the amount of chemical storage and be far less expensive.

This idea is analogous to the standard approach to memory in computers: use expensive, very fast storage in the processor caches, less expensive but still fast for the main memory, and slow but highly reliable and non-volatile memory for long term storage. The problem then becomes, which type of long-term storage is most appropriate for conditions in NJ, and what are the costs?

6. **Effects of natural gas on the computation of emissions.**

A recent study has found that natural gas from high-volume fracking has a greater effect on global warming than even coal (https://link.springer.com/content/pdf/10.1007%2Fs10584-011-0061-5.pdf). Over a 20-year period, the global warming potential of methane is 79 to 105 times that of CO2 (https://science.sciencemag.org/content/326/5953/716). Are the latest values used in computing the emissions graphs? If not, the graphs should be modified to include a range of emissions values.

7. **Additional variants.**
Some additional policy questions might be answered by additional variants.

a. How much emphasis should NJ policy makers put on efforts to reduce energy-using activities, such as weather-proofing buildings and improving NJ Transit? A variant examining reductions in energy demand in various sectors and the impact on costs would help decision-makers with this.
b. Should NJ put a moratorium on all fossil fuel infrastructure1? In fact, to what extent do any (all) of the variations require no new natural gas infrastructure, and thus model the impact of a moratorium? Is an additional variant necessary for that?
c. The IPCC has recently said that a 45% drop in emissions by 2030 is necessary to avoid increasing global average temperature by more than 1.5C. This plan does not constrain the emissions reduction to 45% by 2030. Could a variant testing the cost of that be developed?

The decision process.

1. The difficulty of including externalities.

The modelers deserve kudos for finding and including figures on health benefits and the social cost of carbon. It is daunting even to think about including a comprehensive list of the costs of climate change in a model. Global warming will impact health, increase property damage, cause work stoppages, reduce work productivity, reduce quality of life, and increase the number of excess deaths in ways that are still not fully understood and probably can't be until the harm is done. Although the EPA estimates the social cost of carbon, it admits that it cannot account for all of the damage. This means that policy-makers cannot justify their decisions purely on the basis of known costs. The values associated with protecting the vulnerable and sustaining our way of life must also be considered. It will be necessary to make every possible effort to limit the impact of climate change and to do it as rapidly as possible — more rapidly even than the current plans.

2. Failure to include representative sample of stakeholders in modeling workshops.

A broader sample of stakeholders in the modeling workshops or at least in a focus group to discuss concerns might have produced a number of variations of even more real importance to New Jerseyans. We have included a few possibilities above, but one small group is unlikely to come up with a truly representative sample of questions.