

VIA ELECTRONIC MAIL

November 15, 2019

Ms. Grace Strom Power
NJBPU Chief of Staff
NJ EMP Committee Chair
44 S. Clinton Avenue
Trenton, NJ 08625

RE: UD Electric Vehicle R&D Group's Public Comment on the Integrated Energy Plan

We understand that RMI's Integrated Energy Plan (IEP) will be integrated into New Jersey's final Energy Master Plan (EMP). In this comment we want to register our judgment that the model is not fully robust because it omits low-cost storage resources. This omission has led RMI to conclude that storage is not cost-effective at high penetrations of variable generation (wind and solar), leading to the conclusion that biogas and synthetic gas generation will be needed to balance growth of wind and solar. Specifically, the IEP model seems to exclude technologies incorporating storage into end-use devices, both heating and EVs. Models including those two, published in the peer-reviewed literature (Budischak et al, and Noel et al) bot for PJM, as well as multiple other published models for other jurisdictions, show that storage, possibly with occasionally-used legacy generation, enable very high proportions of variable generation.

As an example we provide more detail on a technology we have worked with multiple companies on, Vehicle-to-Grid (V2G) technology. As you know, this enables electric vehicles (EVs) to charge or inject electricity back onto the grid, under dispatch by a utility or RTO, or wind operator, to provide valuable grid storage services. Since several states in the region are testing or deploying this technology, it's absence in the IEP is an anomaly.

Results from the IEP show the important role that storage will play in transitioning the grid to become carbon-neutral. In the least-cost scenario, 8,600MW of storage capacity capable of providing 69,000MWh are installed by 2050. This represents more than 80% of off-shore wind capacity installed by 2050. Though we do not have information on how the variable inputs assumed for the model, it seems that the amount of storage required, and the cost of that storage, both appear to be inordinately high.

These high cost projections for storage, given the large amount, yield the reduced role of storage in the least-cost scenario presented in the IEP. This then lends credence to the idea that NJ would need to incorporate new biogas or synthetic gas plants to responsibly achieve the EO28 goals by 2050. It should be noted that numerous studies have shown utility-scale storage prices are projected to continually decline, and, as mentioned above, low cost storage options have been ignored.

A large contribution to the over-cost conclusion is that, the model projections neglect the integration of pre-existing storage, such as that found in V2G-enabled EVs, that would not require additional investment by the state or by utilities. According to the stated assumptions in the IEP models, namely assumptions T1 to T3 regarding the electrification of vehicles, there would be a significant number of electric vehicles deployed and therefore increased storage resources deployed as well.

Additionally, the actual locations of energy storage are not addressed in the IEP. As mentioned during the webinar by RMI staff, distributed energy storage would reduce energy system costs. V2G-enabled EVs is a prime example of this opportunity as a distributed energy resource. This technology could be capitalized upon in proposals to electrify state fleets – whereby the one-time investment in state EVs and e-buses would also serve to incorporate additional storage. Furthermore, by allowing V2G to

participate NJ markets, the state allows for greater integration of private distributed energy resources that do not require added state and/or ratepayer support. In fact, these resources can serve to alleviate demand on the grid, reducing the need for infrastructure upgrades and thereby preventing additional costs upon ratepayers¹.

As we have noted in a separate comment on the EMP, subsidies are not required for V2G (other than perhaps some initial demonstration programs). Rather, V2G is blocked in NJ by inadvertently discriminatory policy barriers to V2G technology integration in NJ. Removing these barriers only require administrative action, which we have outlined. This would add another technology in NJ's distributed energy storage profile and thus could help lower storage investments costs of the overall energy system.

We suggest acknowledging this technology in the final EMP, and making changes into New Jersey Administrative Code to allow V2G to be used in New Jersey. Both tasks are addressed in our previous comment from September 16, 2019 on the Draft EMP.

Respectfully,

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¹ Kempton, Willett, and Tomić Jasna. 2005. "Vehicle-To-Grid Power Implementation: From Stabilizing the Grid to Supporting Large-Scale Renewable Energy." *Journal of Power Sources* 144 (1): 280–94. doi:10.1016/j.jpowsour.2004.12.022.