

MINUTES

Submitted by Marc Brown

Commission to Investigate the Implementation of Next Generation Nuclear Reactor Technology in New Hampshire

December 12, 2022

Attendance:

Commission Members: Representative Keith Ammon, Cathy Beahm, Dan Goldner , Matthew Lavender, David Shulock, Christopher McLarnon, Marc Brown, Representative Michael Harrington, Bart Fromuth. Representative Carry Spier (remote), Richard Steeves, Alex Fries

Absent: Senator Bill Gannon

Meeting:

1. A quorum was established. Rep. Ammon opened the meeting at 1:42pm
2. A motion was made by Cathy Beahm to approve the minutes from the November 21, 2022 meeting. Barth Fromuth seconded the motion, and the commission voted unanimously to approve the minutes.
3. Rep. Ammon invited the public to introduce themselves and share comments. No members of the public responded.
4. The first presentation was given by Meredith Angwin, author of *Shorting the Grid*. Ms. Angwin discussed the 3 components that comprise a strong electrical grid: reliable electricity, electricity that is relatively inexpensive, and a manufacturing process that creates minimal pollution and ecosystem disruption. She then went on to discuss the juxtaposition between the physical grid (the people and the infrastructure that make electricity work) and the policy grid (which is essentially how the physical grid is paid for). She then introduced the concept of a “could” grid, which explores other options such as wind and solar power.

Ms. Angwin next discussed how energy auctions work, and the implications they have to both grids. She explained how the system works with energy payments, capacity payments, and out of market payments all contributing to the equation. The failures in the system stem from reliance on a “fatal trifecta” of renewables that start and stop on their own schedules, overdependence on neighbors for resources a given location doesn’t have (which is impacted by demand), and baseload, which is the minimum amount of power in use, or constant demand.

She then described how nuclear is good for the grid, for several reasons:

- It has a solid baseload
- It has over a year of fuel stored on-site
- Inertia keeps a nuclear system functioning during minor glitches
- It has a small footprint
- It is not weather dependent

Mr. McLarnon asked Ms. Angwin to speak a little further on inverter-based issues. She shared that although there is still research in progress on this topic, it's a matter of creating virtual inertia on an inverter-based grid. Frequency plays into it as well, but inertia is the primary driver.

Rep. Ammon asked for more information about the subject of frequency response, its importance and its pitfalls. Ms. Angwin explained that as demand goes up, frequency goes down unless you add more supply. So, there is a very tight boundary that grid operators use to manage this, and if it's not done well, it can lead to equipment damage which can create rolling brownouts and blackouts across a grid.

Rep Spier asked what will happen with nuclear waste as the world moves to using more and more nuclear energy. Ms. Angwin explained that comparatively speaking, it's a minimal amount of waste, and is very contained. She also pointed out that there are plants that can reuse that waste.

5. Rep. Ammon introduced the next speaker, Jackie Siebens, Director of External Affairs and Policy for Oklo. Her company develops small advanced reactor systems. Some of the benefits of the type of reactors they are building include:
- Small carbon footprint (about the size of a single family home)
 - Smaller inherently safe and robust safety systems
 - Greater flexibility for where to operate
 - Requires minimal water resources

Ms. Siebens next reviewed the Aurora powerhouse, a model for this new type of reactor. She explained how it is built and how it functions. A primary change in this type of reactor is the use of fast neutrons. This enables the reactor to unlock a lot more of the energy that lives in that uranium than the existing reactors are able to do. They also have the ability to recycle used fuel, and are cooled via liquid sodium which is very safe and effective.

Ms. Siebens cited several cost & operating benefits to their reactors, such as

- Requiring 1000 times fewer parts to construct,
- Requiring less complex and less expensive components,
- The ability to construct offsite in a more efficient manner,
- Site flexibility and the ability to build close to where the fuel is used.
- They can product process heat in addition to electricity, which can be utilized across the industrial sector.

Oklo is also planning to use a business model which allows end users the option to subscribe to fission-as-a-service. This helps to eliminate deployment hurdles and operational burdens. They are also working closely with NRC to modify the licensing process to accommodate this new reactor design.

Ms. Siebens shared that Oklo is also working hard on projects surrounding fuel recycling. This recycling effort will be leveraged with the new reactor design to create a paradigm shift from large, complex, and expensive programs to smaller, simpler, cost-effective recycling models. Current plans include starting construction on their own pilot recycling facility in 2027 with hopes to bring it online by the end of the decade. Ms. Siebens responded that is dependent upon the location, as some locations would still require the sale of a certain percentage of the power.

Ms. Beahm asked about purchase power agreements and if that mean Oklo would have agreements with an industry or community directly and you wouldn't be part of an RTO system and how that would play into the reliability of the entire grid?

Mr. Richard Steeves asked if thorium mixed with uranium, of course, have a future in your Aurora system. Ms. Siebens stated that it does not, that they are pursuing exclusively the high-assay, low-enriched uranium, without thorium.

Rep. Spier asked if selling the recycled fuel to plants like Seabrook was part of the recycling planning Oklo is doing. Ms. Siebens responded that it is not, because of the type of reactor they are developing, and the recycling process that stems from that. Rep. Spier asked for some additional information regarding recycling policy, and Ms. Siebens agreed to provide it via email to Rep. Ammon for distribution to the commission.

Rep. Walter Stapleton asked if the experimental breeder reactor in Idaho that was mentioned is operational, or if there were other reactors in the world of similar design that are operational at this point? Ms. Siebens indicated that the Idaho reactor is not yet operational, but similar fast reactors are already in use in China and Russia.

Matt Lavendar discussed the Seabrook facility and potential for a recycling model there based on what Oklo is doing. He noted it could be a good solution for Seabrook for the future.

Chris McLarnon asked when the efficient products are pulled during the recycling process, do they go back to the original fuel supplier? Who takes ownership of that material? Ms. Siebens stated that this is still under discussion and development.

Mr. McLarnon also asked if Aurora was load following. Ms. Siebens shared that while it may look a little different than traditional models, yes, Aurora is designed to be load following.

6. Rep. Ammon asked if there was any further public comment. None was presented.
7. Rep. Ammon next gave an overview of what the monthly meetings for the next year will look like. He discussed several ideas for presenters, and members provided other suggestions, such as Tom Popik on resiliency, and the NRC for a discussion on their timeline and regulatory improvements. Ms. Beahm will get contacts for an EPA presenter, and Mr. Lavendar will get a contact at NRC.
8. Rep. Ammon shared updates to the nuclear energy, including commission bios. He asked each member to review theirs, and for Mr. Fries to provide a headshot. Mr. Fromuth volunteered to be the backup administrator to Rep. Ammon.
9. No other questions or issues were presented by the commission.
10. A poll of commission members will be taken to determine the next meeting date and finalize the location.
11. A motion to adjourn was made by Bart Fromuth and seconded by Marc Brown. Meeting adjourned at 3:36 PM.