Generation Constraint Subcommittee - Storage Working Group
Meeting Notes
8/28/2020

Attendees: Anne Margolis, Bill Powell, JJ Vandette, Dan Kopin, Jay Pilliod, Marc Allen, Morgan Casella, Shawn Enterline, Nathaniel Vandal, Lou Cecere, Josh Castonguay

The group discussed our goals to use the Vergennes generation constraint as an example that will enable us to assemble tools and characterize those tools in terms of how they interplay.

The group also discussed the data needed to define the constraint, and thus the relevant solution characteristics. Hourly load and generation at the substation level is helpful in terms of how to size/operate a storage project. GMP provided this data at the load management work group meeting, and is available on the VSPC website. The data could be used to spec a potential solution – at least roughly (in a real situation, you might need sub-hourly data). The shape of the constraint will steer you toward the type of battery.

Dan Kopin shared a draft table of characteristics, and the group provided initial feedback. Useful additions to consider might be:

- Investment to bring storage online as well as the operational cost for the life of the project
- Scale (e.g., in terms of choreography)
- Nameplate lifetime warranty (can compare to a 50yr substation investment)
- Life cycle
- Frequency and depth of discharge
- Benefit/cost tradeoffs
- Ramp rate or discharge lead time
- Round-trip efficiency or losses
- Balance-of-system costs
- Capex
- Opex
- Other necessary infrastructure
- Custom or standard solution
- Additional benefits/limitations (e.g. Powerwalls provide backup power to customers but might be unavailable if they're drawn down waiting to soak up solar)
- Opportunity for leveraging assets that have some customer investment

Dan will add these additions to the iterative table and share with the subcommittee for additional columns/rows and populating.

Some discussion took place about the parameters of the solution, including:

- Are we looking at the storage as a distribution asset that has to solve 100% of the problem? Or as a generator/part of a generator that's able to solve some of the problem – or that generator's specific problem? Having it be a distribution asset in place of a larger transformer that can handle 100% of the problem is very different. The group agreed to start with one large asset designed to solve 100% or 50% etc. of the constraint and get more complicated from there.

- Are we looking at the cost to install a system of which the primary purpose is to address the constraint, or instead, a system that's installed to optimize other value streams, and therefore you need to assess the opportunity cost of blocking off some of that capacity & energy to address the constraint? If the goal is to unlock 2 MW/6 MWh to cover 100% of the needs, and the battery is there to charge during the day and discharge at night, that's a simple analysis – though not likely to pencil out. You will quickly get into what else you will allow that battery to do to help justify its costs. It gets interesting and complex. Perhaps we need to think of the hierarchy of the cases. If this is the generation constraint solving team, this is at the top of the stack. The generation constraints from solar show up certain times of the year and day but you have the rest of the year to do what you want. Then you can start to stack and prioritize. (However, there may be limitations to "doing what you want" that are not immediately obvious – batteries need to be pre-positioned, which can limit some other charge/discharge opportunities, and if you're not careful with when the system discharges, you can cause the same problem you're trying to prevent.)
- There may be fundamental interconnection standards questions that we will need to unearth and discuss. The primary reason more generation can't go in is you fail the test of total generation on the circuit vs. transformer nameplate. But if you look at the data, there's still 5 MW of capacity on the best solar day. Would it be possible to unlock 2, 3, 4 MW of capacity just by discussing the total generation on the transformer nameplate? We'll also need more discussion about contingency cases that might need to be solved for – loss of largest customer or two etc. Also, "solving" for today's constraint doesn't take into account "headroom" needed for the future.

JJ Vandette discussed the thermal storage presentation he gave to the load management work group that took place earlier in the week. He is looking specifically at thermal storage with water heaters, the extent of the opportunity that exists on the circuit (houses, etc.), and load shapes. The table our group is developing could be useful for the load management group, as many of the parameters are relevant to thermal storage.

Next meeting will be held on September 10, 2020.