

Tuesday, March 7, 2023
Old Town Hall
91 Bow Center Rd

Bow Energy Committee
Approved Minutes

Meeting started at 6:34 PM.

Present: Jessica Dunbar, Committee Chair
Dana Mosher, Vice Chair, Member
Chris Moore, Committee Member
Michael Leuchtenberger, Member
Alexander Grene, Member
Chris Andrews, Building and Facilities Manager, Town of Bow
Karri Makinen, Community Development Director, Town of Bow
Rachel Eades, Co-Owner, Revision Energy

Meeting opened with introductions and a broad discussion of ReVision's size and placement. Rachel works on the commercial, as opposed to residential, team to assist schools, towns, businesses, and nonprofits. ReVision includes commercial, residential, and service teams. Following mention of the Town's current ReVision array on the Safety Center, the discussion opened up to questions.

Ms. Eades suggested: The Bow Energy Committee might want to start by looking at data gathering of town building & school energy usage to help inform what size project might be needed. Generally, economies of scale are created through building large single installations vs piecemeal arrays.

Net Metering: municipalities can do arrays up to 5 MW AC, but must be within town boundaries. SB 68, which has passed the Senate, but not House, would allow towns to share land on these kinds of projects; decision on this may be made by this June. Discussion of trying to expand net metering in New Hampshire. There may be a nicely sized area available in Bow that could cover Town usage. The bill would allow low-usage towns with good sites to invite other towns to share in their energy production.

Ms. Dunbar stated: If Bow had a plot capable of producing more energy than the Town uses, would we need to tailor the size of the array to meet current consumption, or, if we could produce more onsite, could we construct for maximum production and figure out what to do with the overage afterward?

Ms. Eades answered: All of the above are possible. Generally, usage must be matched for net metering, but it shouldn't be a problem within reason. **Thought there was a 20/80 rule (20% onsite, 80% offsite) – will look into this to confirm details.** Good idea to accommodate expected future usage. Mentioned South Portland landfill site, constructed in two stages. **Recommends sizing to current usage plus what we might use in future, without becoming a utility.**

Mr. Andrews asked: If a larger array has no town buildings around it (ex. three miles of distance), is it financially beneficial to construct the large solar array several miles out?

Ms. Eades answered: Definitely, as long as all on one utility. Unitil lines deliver to all municipal and school buildings. So the array needs to be near Unitil lines.

Ms. Dunbar asked: So a big array could be cheaper, but if you're transporting energy instead of going behind-the-meter, might that not be less economically beneficial?

Ms. Eades answered: You take a bit of a haircut, but you will still make some money back. Somewhere around 87% of full value of kilowatt hour. We've definitely seen both work: onsite with behind-the-meter, like school roofs, can be great installs. Offsite, you're installing a new meter which tends to have the best rate value. The electricity would technically be 100% export because all going to the grid, and all municipal buildings would be your off takers.

Mr. Leuchtenberger mentioned: Some big sites out in the Midwest are not being considered due to concern about too much new load for the grid to handle. When you interconnect new electricity, it goes into the system, and the system may not be built up enough to carry it. If you're the person who needs to upgrade the lines, you have to pay the entire cost of the grid infrastructure upgrade.

Ms. Eades answered: This is not a problem in NH at this time, a bit of a benefit to NH being behind that curve. For Unitil, we wouldn't know for sure until we put in an interconnection application (only like \$500). In our particular context today, though, it's not really an issue. Ms. Eades has checked main Eversource line going through Bow, and it was in the blue 5-10 MW capacity.

Ms. Dunbar asked: One of the potential sites is the landfill. It is closer to the street than the school, so seems like there would be a lot of line to run to connect to the school for behind the meter. When can you do do behind-the-meter vs net metering?

Ms. Eades answered: Anytime you're going back a long distance, you have to think about the cost of that, and voltage drop. Need an engineer to do this kind of calculation. We could look at sites specifically on request to figure that out.

At the moment, ReVision is installing 580 watt panels, and could do 1.8MW on that landfill. Looks like the previous 1MW prediction had more to do with a legislative cap.

Landfills are awesome for solar, but "special," as they require the use of special racking, (ballasted instead of drilled into the ground). NH only has two operational solar landfills, but there are others in development. Have done dozens in Maine, where there are fewer restrictions. Permitting is a big hurdle for solar landfills in NH. You need to approach it almost as though putting on a whole new cap in terms of meeting requirements. ReVision is in discussion with NHDES on how to handle this. Used concrete blocks for Portland in phase I, but now using lobster-cage looking constructions filled with rocks. No drilling into the landfill cap.

Also, depending on access roads: trucks are heavy. Can't drive them out there. This adds up to extra cost. Solar is overall a great match for landfills, though. But it's more costly on a per-watt basis to do landfills.

The IRA includes some language around brownfield sites. Guidance hasn't come out yet for municipalities. The incentives are less to create big savings and more to help offset the embedded costs and make the project more realistic. If we could build to 1.8MW, would probably be cost effective, but building a small array there probably would not be.

Ms. Dunbar asked: We've started looking at municipal usage, though that has not yet included school usage. Depending on the needs of the municipal and school buildings, could we use the landfill site for both the schools and municipal buildings? Could we behind the meter some of it, and net meter the rest to the other group?

Ms. Eades answers: Could use group net metering. Schools are also municipal as long as they are in Bow. Would not be able to take Dunbarton's bills and add them to our usage, but any Bow locations could be included.

Mr. Andrews said: If you could really put 1.8MW on that site, and ship power through the transmission lines, all three schools are within 1000 feet of each other.

Ms. Eades replied: That does not matter, could be in a different county as long as they are the same utility. To do behind the meter, the array needs to be very close to where the electricity is being used, like next door. Could do behind the meter from the High School roof, for sure.

Mr. Moore asked: Given the system's size, if the school is using 1MW, and we have the potential for a 1.8MW system, is there a reason to do it?

Ms. Eades answered: 1MW requires a big transformer, which the school probably doesn't have, so might have to build one just for the school. So good base assumption is that behind the meter from the landfill to the school is less likely than everything grouped into new metering.

Mr. Moore suggested: What about the possibility of two separate electrical systems, one to the school and one for net metering?

Ms. Eades answered: For that, you might as well do an install on the school roof.

Mr. Andrews said: We know the technology has changed. Part of this process might be to have companies actually take a look at the roof, figure out what could go up there.

Ms. Eades answered: Age and condition is everything. If it's gravel ballast up top, it's not feasible. However, ballast roofs being replaced are perfect; if the roof is ballast, it's generally structurally strong enough to support the weight of solar panels, although you need an engineer to verify. Commercial lifespan of panels 25 years, expected 40 years, so it helps to pay back the cost of a roof replacement. Income generating asset for 25-40 years.

Mr. Moore asked: Have you done a project where you packaged roof and solar into a single project, for IRA purposes?

Ms. Eades answers: The IRA tax credit will not include the roof, and ReVision doesn't handle roofing. The credit only includes the renewable project itself. Until the IRA, it did not even include utility upgrades. For a roof mount, the whole solar system would be eligible. For ground mounts, the fence around it is not eligible for the credit, despite being required by law.

Mr. Leuchtenberger asked: Who gets the tax credit? Do we (the Town) pay taxes?

Ms. Eades answered: Post-IRA, a PPA (Power Purchase Agreement) is no longer your only option. PPA is for a taxable entity; ReVision has impact investors who want renewable energy and get a return. They would own the array for at least five years and would take the tax credit and the depreciation (panels are eligible for accelerated depreciation). From year six onward, you can buy it from them for a lower price. You can also stay in it for longer, but you get depreciating returns. Until you buy it, there is no upfront cost. Great option. Works well on a warrant article, and gives you time to put the money together. Think of a PPA as a six-year runway to buy it out, because if you don't, you won't save as much money.

One of the best parts of the IRA is the extension of the solar ITC (Investment Tax Credit) to non-taxable entities like towns. Pre IRA, towns and nonprofits had to pay full price, even though for-profit businesses got a 30% tax credit. Post IRA, town gets a check for a direct 30% rebate. It is after the fact, so you'll have a gap where you're out money before it comes back, but

it means you get to own the system for 70% of its actual costs. The downside is that you are responsible for maintenance.

Options include PPA, early buyout or term, cash buyout, getting a loan or some kind of financing source. Generally, larger projects go PPA because it is harder to come up with upfront cash, but seeing some smaller projects going with turnkey cash purchase to take full advantage of IRA incentives.

Also, actual guidance has not yet come out from treasury/IRS, supposed to be end of Q1 but unlikely, more likely summer. However, the 30% tax credit is a law and provided as a rebate to towns and nonprofits.

Ms. Dunbar asked: Wanted to catch prior comment on the school roof, could we back up?

Ms. Eades answered: Having taken a quick look, estimates 262KW could be built on the flat sections of the High School, avoiding curves and rooftop HVAC units; moving stuff around would allow for more power capacity. School roofs are great because the power can go behind the meter, the space is not really doing anything otherwise, and, if you've already got rock ballasts, that suggests good structural support for roof mounted solar infrastructure. Definitely engage with the school early and often.

Ms. Dunbar said: We've got some contacts at the school.

Mr. Andrews added: School board has affirmatively voted that they want to participate in an RFP to look at solar on school property.

Mr. Leuchtenberger asked: What is ReVision's backlog like?

Ms. Eades answered: Not too bad. We're very busy, but lucky to be big and growing. The first things are permitting and interconnection: 3-5 months to get through those. For over 100KW system impact study, takes a couple months; AoT (Alteration of Terrain) permit if impacting more than 100K sq ft. Actual install is not as long as people think: days to weeks. The process takes a long time. All told, ballpark, perhaps 1-1.5 years.

Mr. Andrews asked: What is your wait time dealing with the state on landfills?

Ms. Eades answered: More like years. ReVision has not actually completed any landfill arrays in NH yet.

Mr. Grene asked: Are you having supply chain issues?

Ms. Eades answered: Last year was weird, but ReVision is an AMICUS member, 4th largest buyer of solar panels in the US. Lucky to have buying power beyond their size. Over the past year, there was some gear that was unavailable. In general, larger projects with larger gear needed are going to take longer. But the future looks good, AMICUS membership helpful on this front.

Ms. Dunbar asked: What are the potential advantages/problems with a large, relatively flat roof?

Ms. Eades answered: Flat roof means you can pick your orientation. We install ballasted racking, panels tilted 10 degrees so they don't shade each other, no damage to roof warranty. You always face them south. On a pitched roof you flush mount. Where we are, 35 degrees is a good angle, but anything from 5 to 45 is good; a flat panel produces less than one tilted toward the sun. In both cases, observe fire code setbacks from the edges, setbacks from access points.

Ms. Dunbar asked: Will snow be an issue with a flat roof?

Ms. Eades answered: Not more than normal. A foot of snow might shade the bottoms of the panels for a while, but the weather model takes this into account, so production should still be as expected. Snow melts pretty much the same rate. Black membrane roofs melt a bit faster than white membrane roofs.

Mr. Moore asked: Do you see efficiency degradation in the summer with black roofs radiating heat?

Ms. Eades answered: Yes. Spring and fall are best seasons, bright cold days are perfect. That said, solar panels still work in hotter climates than here. May and October are probably your best days. Manufacturers warranty them to produce perfectly year one, -.5% every year after that. This is modelled in. If it's not living up to spec, you can take it back to manufacturer under your 25-year warranty.

Mr. Moore asks: How do you mow for a ground-mounted system? Do you have to weedwhack under the panels?

Ms. Eades answered: Rows have to be spaced pretty far to not shade each other, so there will be plenty of room for a riding mower between them. We don't actually do that maintenance, we only do electrical. You can also use sheep.

Discussion: Aesthetic issues related to landfill?

Consensus: No, unlikely. Landfill is hardly visible.

Ms. Eades noted: If you're in a historic district, this is worth thinking about. Always good to check for opposition anywhere it will be visible.

Ms. Dunbar asked: What do you look for regarding viability of a site near high voltage transmission lines?

Ms. Eades answered: You can't build under power lines or within a certain setback from them. The utility will tell you their setback. Town ownership is important. Flat or slightly south facing. Exposed bedrock or ledge is a problem for ground mount. Wetlands also need to be avoided. NH Granite is an awesome free resource, gives us a quick GIS mapping of wetlands.

Mr. Andrews asked: Have you done work on carports?

Ms. Eades answered: Yes. Carports make a ton of sense. France has a new regulation that parking lots must be covered with solar. Carports are more expensive, 2-3x more expensive than rooftop installations. Very rough ballpark: ground mount is around \$2-5 per watt, carports are \$6-10 per watt, roof mounts are somewhere in between. ReVision is really only installing carports of 250KW and above; that's where the economics make sense. That would be an entire parking lot.

Ms. Dunbar asked: Can you have solar carports that double as charging stations?

Ms. Eades answered: Yes. Easier to do at same time – can put in conduit when digging for the structure.

Mr. Grene asked: Anything we need to know for the future, in terms of good things or bad things coming down the pipe?

Ms. Eades answered: ITC is good for 10 years, and if the US doesn't hit its emissions goals, it'll be automatically extended. The Domestic Content Requirement kicks in in 2026. 90%, then 80%, then no incentive, by 2026, if parts are not compliant. Unclear as of yet what US market will look like, production currently ramping up domestically.

Mr. Leuchtenberger asked: How to sell this?

Ms. Eades answers: PPAs are often successful because there are no upfront cost. Business owners often want two or three-year payback, but realistically, if you're 10 years or under on payback, that is a really good return on investment. We do an IRR (internal rate of return) calculation.

Mr. Mosher asked: What about the environmental impact of decommissioning?

Ms. Eades answered: The recycling industry is going to look very different in 25 to 40 years. But today, when panels break, we do have to recycle them. There's a recycler in Goffstown, one in Mass; there is enough value so the recyclers want the materials, you don't have to pay them to take it away. As part of permitting, we have to have a decommissioning plan, though it's pretty general.

Ms. Dunbar asked: Is having three-phase important in every project? When is three-phase needed?

Ms. Eades answered: Basically, it's needed to build large arrays. Average house is single phase. Schools are probably three phase. You can have three phase running along a street and have single phase coming off it. Seeing three phase lines is a good sign that you can connect. Utility will cap what you can connect on single phase. If you have a 400 amp service, can go up to 67kV AC; if you want to go over 100kW AC of production, you need three phase. Town hall or smaller building on single phase, probably fine. Main thing is size of the project. Large ground mount definitely needs three phase. The meter bill will tell you whether it's single or three phase.

Ms. Dunbar asked: What site specifics do developers look for on an RFP?

Ms. Eades answered: The more detail the better. Definitely include a site walk with time for questions. Last 12 months of electricity usage, including copies of bills. Sizing of electrical infrastructure. Some specifics to include: Main breaker? If you have a transformer, size in kVa, is it on a pole, electrical infrastructure sizing generally. Also, if you have any boundary or wetlands surveys that might have already been done, that's helpful. Building plans, roof, pitch, structural, etc. Any quirks about the property, future plans. For battery storage, interval/demand data.

RFQs (request for qualification) are also an option. Through an RFP, pick a capable vendor instead of asking for a price for a specific project. Winner acts as consultant and developer.

Warrant article: if you know you want to do a PPA, language revolves around permitting selectmen to enter into an agreement spanning X years with option to buy out after X years.

Where does the IRA come into play with a PPA? Goes to the investor.

Solar is fully depreciated after five years.

Ms. Dunbar asked: What are the options pertaining to RECs (renewable energy credits)?

Ms. Eades answered: In NH, the developer cannot sell your RECs. They are sold by the owner on the open market at about \$20-40/MW. Utilities have to meet certain percentage of renewable energy. You can sell that green credential. These help add an income stream to your project. Sometimes you have to say solar on site instead of solar-powered if you're selling your RECs – you get extra money, but you lose your right to claim that you're producing solar power. If we buy the array, we get to decide what we do with our RECs, can retire them or keep selling. If you really want to own the RECs under a PPA, can do that, but it's not usual. Typically only model RECs for 10 years.

Mr. Moore said: What about REC sweeping whereby unregistered RECs can be claimed by the utilities themselves. New legislation is supposed to remove that ability.

Member asked: Do you know about eRINs (renewable fuels incentive)? Ms. Eades could not really speak to this.

Ms. Dunbar asked: Do you know if there are any other towns that could provide a good role model for Bow, or places where there has been cooperation between schools and town?

Ms. Eades answered: Dover comes to mind; they did high school roof, city pool, children's museum. Probably others. We've worked with Lebanon, Hanover, Keene. Nashua's done schools plus fire station.

Meeting adjourned at 8:44 PM.