Linda Engle Introduction: Sustainable Idaho is brought to you by the Portneuf Resource Council.

Madison Long: Welcome to Sustainable Idaho. I'm your host Madison Long and today I talked with Levi Adams, the superintendent of Pocatello's Water Pollution Control Department. A few weeks ago, my co-host Holly and I discussed how the Pocatello Wastewater Treatment plant works, and in that discussion, we brought up the treatment plant's ability to convert wastewater into energy.

Pocatello's wastewater to electricity conversion started in the 1950's by connecting a methane gas power generator to the bio-solids collected at the Treatment Plant. Biosolids are any solids produced by the treatment process. The excess heat generated was used to heat the facility and the waste lagoons, before being sold to Idaho Power, and eventually going on to heat our Pocatello homes.

What are the processes behind this electricity conversion?

Levi Adams: We take the side stream of the biosolids and we put them in anaerobic digesters. The main purpose of those digesters is to reduce the volume of solids because those solids we land apply and use as fertilizer to farmland that the city owns. A byproduct of that process, breaking it down, is water and certain gases. And one of the majority of those gases is methane. We are able to capture that methane and give it a beneficial use by burning it in generators and making power.

ML: What capacity do those generators have and how much electricity do they typically produce?

LA: We have two separate generators. Each one has a capacity of 300 kilowatt hours and we currently produce between 220 and 250 kilowatt hours a day. It all depends on how the plant's running and what's going on in the city at the time, but that's usually what we average. Because it's a biological process, there's ebbs and flows, so we have found it better to actually sell the power back to Idaho Power. I believe that it would be about 30 houses worth of power, it's about 10-25% of the power of the plant that we can produce.

ML: For context, ebbs and flows refers to the daily fluctuations in electricity demand.

The Environmental Protection Agency has regulations about releasing methane gas into the atmosphere because it's a greenhouse gas that traps heat 80 times more effectively than carbon dioxide. To prevent this, the treatment plant captures all the gas and runs it through a generator. If the generators are down, the methane gas can be burnt off with a flare, a process that converts methane into carbon dioxide and water vapor. This process can minimize a facility's long-term carbon dioxide emissions since methane is 25 times more damaging to the environment.

What additional energy efficiency measures complement this methane gas use?

LA: The methane gas goes into what we would call a cogeneration system. So there's two benefits. The first benefit is obviously the power that is made. The second benefit is we capture the heat from the generators, and we use that to heat our anaerobic digesters. Those digesters we need to keep anywhere between 95 and 100 degrees, very similar to body temperature, because that's where those microorganisms are most efficient. So we're able to offset a lot of the natural gas usage that we would run through a boiler to heat those digesters.

ML: Have you quantified that annual electricity saved, or offset?

LA: When things were running well, as far as the monetary side of things, it was about 20% we could monetize. Our average power bill for the plant is anywhere from $50,000 to $60,000 a month, which is tough to fathom until you've been doing it for 20 years. And there was a time when we were making up to $13,000 a month.

Recently, we had a new contract with Idaho Power, and it's not nearly as beneficial for the city. They've reduced the amount that they pay per kilowatt to the city. A lot of that has to do with government subsidies that are no longer available to Idaho Power.

ML: In the last episode, we talked about the 2023 Package #1 Improvements. These updates focused on the Pocatello Water Pollution Control Facility's general infrastructure and allowed for the necessary water flow capacity expansion. Were there any adaptations made in the construction improvements, which completed earlier this year, to support the methane capture?

LA: We've done it over several stages. We used to use the gas itself to mix the digesters. We'd basically pump the gas back into it, have a bunch of straws in there that would bubble up the liquid that is in the anaerobic digesters. But that isn't very efficient, and it caused a lot of problems as far as maintaining pressures going back down to the generators.

We've since put in a pump mixing, so we're actually mixing the liquid itself, and we no longer have that imbalance of the gas that we're trying to run through generators also going back into mixing the digesters themselves.

ML: The Package #1 Improvements are only one part of the Pocatello Wastewater Facilities Planning Study, which includes a 20-year facility plan that goes out to 2030. Are there any additional improvements planned as part of that 20-year plan?

LA: They are always looking for improvements. Because the contract isn't quite as favorable with Idaho Power right now, we're looking at maybe putting some cleaners, some scrubbers on that methane gas, and we can sell it back to Intermountain Gas for renewable natural gas.

We're also considering putting what we would call battery banks around each of those buildings. By putting basically a big battery outside those buildings, you're going to create a very pure, clean power for all the equipment to use, because we have a lot of very sensitive equipment

that requires that. And we'll also take all of the spikes out of what we're taking from Idaho Power.

When your power bill is assessed, it's not what you're using that they really care about, it's how much you can use. So if we were to turn everything on, what's that initial power draw? By putting these banks in there, we can greatly reduce that, which would improve our rates. And then we can add whatever form of renewable power flowing into those battery banks. Whether it's our generators, wind turbines, solar, anything we do that goes in those battery banks offsets what comes from Idaho Power.

ML: The use of battery banks can smooth out inconsistencies in power from wind and solar, providing another source of emergency power for the city.

In 2019, the City of Pocatello signed a resolution to implement and support Idaho Power's commitment to generating 100% clean energy by 2045. This includes all sources of energy use, including electricity generation, buildings, transportation, and waste management. How does this methane-to-energy use align with Pocatello's clean energy resolution?

LA: I believe it fits right in. We want to be as efficient and as forward-thinking as we possibly can. We always want to be looking to the future to see what is going to be best, what is going to be the most efficient ways to deal with what we have. Some people call it a waste product, but it's just a different product that we use a different way. Whether it's the power that we can collect from the energy or the fertilizer that we create and put on the farm fields, or the water that we clean and put back into the environment. It's always how efficient and how well can we do that and how are we doing that looking forward.

ML: Is there anything else you would like to add about the processes behind methane gas to energy conversion?

LA: We're going to create that methane gas, whether it's just a byproduct of what we're doing, and we're always trying to find a beneficial use for it. We can always just run it through the flare, burn it off, and meet the letter of the law from the EPA, and that's not what we want to do. We want to use everything that we have in a beneficial way.

We all live outside, play outside, and we understand that what we're doing has a beneficial use for the environment all the way around. It's more than just working at a wastewater plant. There's a lot that goes on, and we're always looking forward to try to be the most efficient in the best way.

ML: Thank you to Levi Adams from Pocatello's Water Pollution Control Department. If you want to learn more about the standard processes of a wastewater treatment plant, Adams suggests doing your own research, but also requesting a tour of the plant on the City of Pocatello website under the Water Pollution Control page. You can also learn more about the energy practices

through Idaho Power's website. More details can be found on our website at KISU.org/SustainableIdaho.

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