

## Funding Proposal: Backup Generator for Thomas Memorial Library

May 3, 2018

Thomas Memorial Library Foundation Board of Directors:

On behalf of the Thomas Memorial Library, I am submitting to you a proposal to fund the purchase and installation of a propane fueled backup generator for the Library. I appreciate your consideration of this request.

### Background ~

The idea of providing the Thomas Memorial Library with a backup source of power is not new. It was seriously considered during the planning process for the recent building project. According to one member of the Thomas Memorial Library Building Committee whom I spoke with, the inclusion of a generator was scratched due to concerns over costs based on estimates provided by the architect and interior designer. In the end, those cost estimates proved to be excessive. Unfortunately, by the time that was realized it was too late to reintroduce a generator. In the hopes of making use of an older, existing generator at another town building, the necessary wiring and hookups were installed as part of the building project. Unfortunately, that generator reuse plan did not come to fruition.

The generator conversation reemerged in the aftermath of the late October 2017 storm that left much of Cape Elizabeth without power for several days, including the Library. The Library was lucky enough to regain power on Tuesday afternoon, but most of the town did not regain power until late on Wednesday. Tuesday afternoon and especially all day Wednesday, we were packed with patrons looking for a place to warm up, charge their devices, and connect to the internet. We had a huge number of telecommuters using our services. I had several conversations with library staff, the Thomas Memorial Library Committee, and the Town Manager and it was agreed that it would be very advantageous for the Library to have a backup generator. This proposal is born from those discussions.

### Need ~

Public libraries are established as a resource and service center in their communities. Thus, it's only natural that members of the community would turn to their public libraries in times of need. As we have seen during recent storms in Cape Elizabeth, community members have looked to their public library as a place to warm up, charge their devices, gather with their neighbors, communicate with the outside world, keep their businesses running, and access the internet, along with all of the Library's normal services. But without a generator, the community cannot depend on the Library being there for them in their time of need. By having a generator, the Library could provide something as simple as a storytime for young families that can bring a sense of normalcy to life interrupted by a prolonged power outage. With a generator, the community would know it

could depend on the Library being open to provide a warm or cool space (depending on the season) -- something that could be life saving for members of the community who have no other places to go. Those are just a couple of the examples of the times that having a generator for the Thomas Memorial Library could make a big difference in the lives of our citizens.

#### Generator Details ~

After much consultation with Perry Schwarz, Facilities and Transportation Director, I am proposing a propane fueled generator for this project. Also considered were a diesel powered generator and a solar/battery array.

The solar and battery array is attractive from an environmental standpoint. However, in order to power a building requiring 40-50 kw for any length of time, the necessary size of the solar array plus the battery bank plus an inverter makes the solar option not a practical solution.

The comparison between diesel and propane is a little closer. At this generator size, a propane engine will provide the same load characteristics as a diesel engine. The propane unit will use a 8.0L V8 engine (like something found in a heavy duty pickup truck), while the diesel unit would use a 4.5L engine (like something found in a medium sized farm tractor). At 50% load, the diesel unit would use 3.7 gal/hr, while the propane unit would use 6.5 gal/hr. However, due to the price difference between propane and off road diesel the different rates of consumption would even out the operational costs.

Propane does have some advantages over diesel. First, the propane unit will produce fewer emissions than a diesel one. The propane unit will also have a longer run time before needing refueling. Assuming both units have a full fuel tank, the diesel unit will run for close to 48 hours, while the propane unit will run for about 120 hours. The diesel unit would also require more maintenance over its lifetime. It has an extra fuel filter and uses two additional gallons of oil. Every service will cost about \$100 more over the propane unit at this engine size. Another maintenance issue with the diesel is related to the fuel -- if the diesel fuel sits unused for a long period of time there can be bacterial growth and sludge build up in the tank. Another issue is called Wet Stacking; this is where unburnt fuel in the exhaust system collects. To fix this issue it is necessary to perform a "load bank test" on the unit and run it at full load for a few hours. This is an extra \$300 every two years.

A propane generator would tie into our current propane boiler system, but would require an additional tank. Zachau Construction, through Derek Converse, confirmed that the boiler system at the Library is about 460,000 btu's. The existing buried propane tank holds 1,000 gallons. The current tank will supply about 850,000 btu/hr at 40°F. The generator will require about 980,000

btu's at full load<sup>1</sup>. Due to the combined fuel need of the generator and boiler, the existing 1,000 gallon tank would not be able to support both. An additional fuel tank would need to be installed parallel with the first tank. The two tanks would provide around 1.7MM btu/hr.

Cost ~

Attached are quotes for a diesel unit and a propane unit, both from Electrical Systems of Maine<sup>2</sup>. The cost for the diesel generator is \$38,986.52. The cost for the propane generator is \$36,112.13 but would require an estimated \$7,500 - \$10,000 for additional work including: propane piping, additional propane tank, and excavation to bury the tank.

Conclusion ~

The addition of a generator to the Thomas Memorial Library would give our community a near guarantee that they will be able to depend on their local Library to be open for them no matter the circumstances. After evaluating all of the options, I believe that a propane generator is the best solution to provide that reassurance because of its lower emissions, longer runtime, and lower maintenance costs. If the Thomas Memorial Library Foundation chooses to fund this project, they will have a powerful narrative to tell the community -- We support your Library in the best of times with outdoor summer concerts and other programs, and also in times of great needs by providing a generator to keep the Library open for you.

Sincerely,

Kyle Neugebauer  
Director, Thomas Memorial Library

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<sup>1</sup> Note from Matt Tassinari of Electrical Systems of Maine: "The generator's engine may never hit its maximum but we always design the fuel system to full load, the highest loads will be in the summer with the AC running. In the winter, we need to account for the boiler."

<sup>2</sup> Perry Schwarz respects the TMLF's request for three bids for this proposal. He also is mindful of contractor's time and long term commitments when requesting estimates for projects that are not approved and funded. He will receive multiple bids prior to beginning the project.