METS 2018 POSTER ABSTRACT

RAPIDLY DEPLOYABLE ADVANCED INTEGRATED LOW HEAD HYDROPOWER TURBINE PROTOTYPE

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The primary objective of this project is to develop and demonstrate a rapidly deployable advanced integrated hydropower turbine-generator system with a low Levelized Cost of Energy (LCOE). The innovative features of the concept include:

1. a multi-blade row, hub-less (ecological friendly and self-cleaning for low maintenance) hydro turbine to provide high efficiency, low head, variable flow energy extraction,
2. a unique combination of corrosion resistant metallic components and/or other usable advanced materials that are amenable to low cost additive manufacturing methods,
3. a condition based monitoring sensor suite to facilitate uninterrupted unit operation and mitigate catastrophic failure and mean time between maintenance intervals resulting in a significant reduction in operation and maintenance costs, and
4. a direct-rim-drive generator design that would minimize drivetrain and casing geometry while providing variable speed capability to enhance deployment site operational flexibility (i.e., high efficiency over a broad range of flow rates) with high quality grid compatible electricity, and could be manufactured and readily implemented into the prototype turbine with follow-on support.

Design, fabrication and test/evaluation of our concept will be completed using our proven concurrent engineering development and demonstration approach that integrates all key technology disciplines from the onset of concept development through prototype demonstration testing. The prototype design of the integrated low head hydropower turbine is shown in Figure 1.

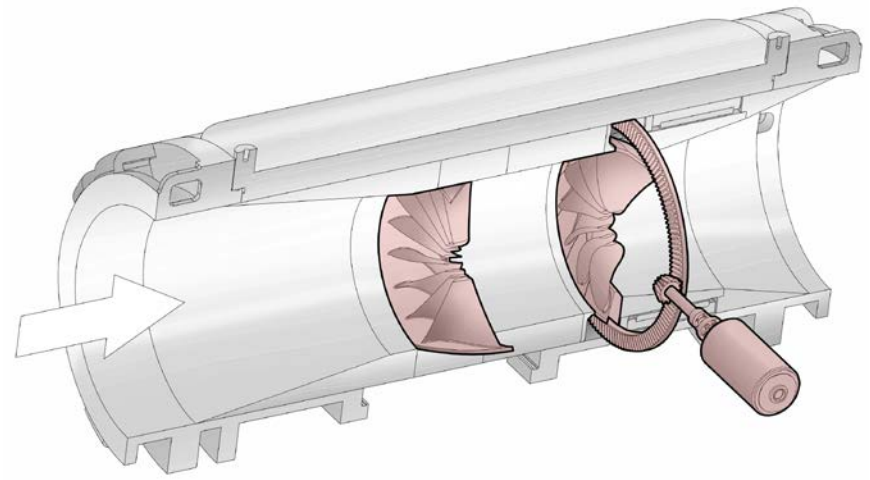

FIGURE 1. DIAGRAM OF THE PROTOTYPE HYDROPOWER TURBINE

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