

Abstract Submitted  
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**Ventilation Exhaust Power Recovery Design** JEREMY YANDELL, ALBERTO ALISEDA, University of Washington — Due to the expense of designing ductwork and exhaust fans to meet the exact desired flow rate for building exhaust, there is wasted energy that is unrecovered when exhausted to the atmosphere. By designing a small diameter wind turbine the kinetic energy in the exhaust stream can be recovered and power provided back into the building. Unlike large scale commercial wind turbines that must be designed to provide power from a large range of wind speeds and directions, this smaller scale turbine can be optimized for a single constant wind speed with no variation in direction. The critical component is to prevent backpressure feeding through the system and increasing the load on the exhaust fan. This design project began with the theoretical airfoil and blade design, followed by modeling the system in fluid dynamics software, a full CAD design was created and modified for the selected manufacturing process, prototype creation and testing will be completed both in a wind tunnel and in a real environment, and the completed data will be compared with theoretical and computational results. Note: There is a patent pending for this design and concept.

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