



Title: Scalable Low-Head Axial-Type Venturi-Flow Energy Scavenger (SLAVES)

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Sponsor: U.S. Department of Energy

Summary:

In-depth studies of the turbine dynamics for an axial-flow hydropower generating system will show the technical feasibility to harvest or scavenge the maximum amount of energy from low-head/low-flow waterways. Outcomes of this feasibility study will provide a basis to design and develop a novel, scalable, low cost, easy to manufacture and assemble, modular and extremely portable, environmentally friendly, highly efficient, and a desirable technology for harvesting the unused hydroelectric resource potential offered by a natural, renewable energy source. Technical feasibility will show that substantial amounts of hydropower can be produced to support rapidly growing irrigation needs, provide rural electrification for the present and future farming communities, and contribute to a multitude of other micro-grid applications. Novel conceptualizations will be explored and developed.

Based upon the harvester specifications derived, NMSU will fabricate a 10kW hydropower harvester prototype for testing and validation. Laboratory experiments and procedures combined with appropriate instrumentation will enable field testing and validation of the prototype. Modular design will allow quick and efficient deployment of the prototype in EBID's irrigation canal system. In the system testing and validation phase of development, a fully integrated set of technology components including power electronics to convert generated power into standard 60Hz will be laboratory and field tested for performance. Testing and validation of the prototype will provide sufficient basis to further extend the concept to other run-of-river type water-flow mechanisms. Achieving this goal paves the way towards rapid commercialization of a revolutionary hydropower technology.