ABSTRACT

TITLE:	Microhydroelectric Resource Development
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ABSTRACT: The goal of this project is to assess the feasibility of developing hydroelectric resources in the rural community of Chimborazo, Ecuador, and to provide a future design team with the methodology required to develop them. Since design-level site data is currently unavailable, the project provides a thorough review of parameters associated with designing and implementing a micro hydroelectric system. Parameters discussed include hydraulic infrastructure, turbine selection, generator style, and power transmission and distribution. Two case studies of existing micro hydroelectric systems are investigated to illustrate real-world application. The first case study is a stand-alone system installed in the rural village of Long Lawen in Sarawak, Malaysia; population 350. The project meets requirements similar to those in Chimborazo: the project is micro-scale (8.2 kW) and installed in a rural area in the developing world. The second case study is a grid-tied system installed in the Red Mesa area of Southwest Colorado. Analysis of the two cases revealed the costs of varying equipment selection and infrastructure, as well as important factors to consider while comparing power costs in widely varying situations. For example, the Long Lawen case appeared to have a very high upfront cost, but included in those costs were building a grid in the village, as no infrastructure existed prior to the project, and international travel expenses for technical consultants. These expenses were not associated with the project on Red Mesa. Furthermore, each case may have increased efficiency and decreased costs by installing different turbines and / or generators.