

Summary: Study of Renewable and Unconventional Energy in Hawaii

- Warren Bollmeier, et al.

The primary objectives of this study were to develop and evaluate a working database of potential wind, solar and biomass projects and other commercial activities for the generation of electricity in Hawaii over the next 30 years, and to examine possible frameworks for evaluating the resulting overall economics impacts to the state. The key outputs were the preparation of a strategy to phase renewables into the electric utility grids, an evaluation of the potential for alternative public policy options to facilitate the implementation process, and a preliminary assessment of the overall economic impacts.

An initial working database of about 108 candidate projects was assembled utilizing the Global Resource Assessment prepared by the Hawaii Natural Energy Institute as the reference point. The candidate projects were screened to determine which could be realistically developed during the 30-year timeframe. The screening process included evaluation of utility integration, land use and community acceptance issues. A total of 28 projects survived the screening process and estimates of future project performance and costs were prepared. Future project costs were compared with estimates of future utility market prices for electricity. A preliminary strategy was initially developed for phasing the projects on Hawaii's island grids, assuming: (1) today's economics, government policies, and utility and business practices ("business as usual" scenario), and (2) implementation of the projects would be paced primarily by market opportunities (when the market price for electricity is sufficient to make the project financially viable for a developer). The 30-year period was broken down into three sub-periods: near-term (2003 to 2008), mid-term (2008 to 2018), and far-term (2018 to 2033).

The phasing strategy included implementation of 9 projects in the near-term and 19 in the mid-term, resulting in a statewide renewable electricity fraction of 11.7% by 2008 and 28.6% by 2018. Specific results for each island are also provided.

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Regarding the far-term, a more qualitative approach was employed, based on an assessment of the factors that will influence the potential for reaching higher renewable fractions on each of the islands. However, it was noted the phasing strategy requires a proactive, constructive implementation of projects under the Public Utilities Regulatory Act (PURPA), which has not been the case for the past decade in Hawaii.

A brief analysis was conducted of two alternative public policy options to the business-as-usual scenario: market reform and increased incentives. The results indicated that either approach could accelerate the implementation process by two to five years, depending on the technology. In conjunction with the evaluation of public policy options, a preliminary assessment was made of the potential overall economic impacts associated with a shift towards renewables and other distributed generation technologies. A preliminary assessment was made for Oahu assuming future needs over the next 20 years based on inputs from the Hawaiian Electric Company and comparing the impacts of meeting those needs by central generation (conventional large powerplants) versus distributed generation (smaller facilities located closer to loads). The preliminary results indicate that the capacity costs of distributed generation would be 38% higher than for central generation, but there would be a savings of 22% in the delivered electricity costs to the customer.

Overall, the study provides a ladder of realistic projects and commercial activities, and a phasing strategy for implementing them, such that Hawaii could double its renewable use in the near-term and double it again in the mid-term. Backed by hard data and information, the phasing strategy is a viable, valuable input to further discussion on how to create a more renewable future for Hawaii.