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## **The National Renewable Energy Laboratory Hybrid System Modeling Suite**

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Abstract:

Whether you are designing a power system for a remote village, investigating the cost of powering an off-grid house, or just curious about the potential of renewable energy, computer simulation tools can be a very helpful in determining the right architecture, components and component size that should be used.

The National Renewable Energy Laboratory and University of Massachusetts have long been involved in the area of hybrid system modeling and over the last ten years have developed a suite of simulation models to answer these questions, weather for the design of a single electrification system, a large diesel power system or now, distributed generation technology.

Whether conducting an options assessment looking at different technologies, optimizing hybrid systems designs or conducting detailed performance assessments, the NREL model suite provides a process to analyze the design space and provide detailed information to project planners and developers, a key step in any rural electrification program.

Both of the primary models of this suite, the Hybrid Optimization Model for Electric Renewables, HOMER and Hybrid2 have been recently upgraded and now allow the assessment of many more system designs, from micro-hydro to hydrogen, as well as better modeling of existing components, such as dispatchable generators with variable specific fuel consumption.

This paper will present, for the first time since the release of these models, an overview of their current capabilities, will discuss current validation work being conducted and present planned system expansion capabilities. As a guide to their application, several examples of system design processes will also be presented.