

**BETTER FUTURE WITH BETTER FOOD: A PROTOTYPE SOLAR-POWERED COLD
STORAGE USING THERMOELECTRIC PELTIER COOLING**

A Project Study Report

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ABSTRACT

Off grid areas particularly rural islands and other remote areas have difficulty securing electricity and are dependent on the solar panel as an alternative source, which only the financially stable households in the island are capable of. Foods must be refrigerated or be stored to avoid spoiling and to keep their freshness. This study was conducted to construct, design, and test a prototype of a cold storage room and evaluate if it is capable of being implemented into an actual full-scale system into rural islands and other remote areas. The study used a Peltier module as the cooling system, an ice box made of Styrofoam with dimensions of 310mm by 205mm by 232mm with wall thickness of 22mm, a 12V, 100AH battery, and photovoltaic solar panels. The tests used tomatoes, mangoes, eggplant, okra, and chili as the loads. The four-day tests were separated into two parts, one with loads (fruits and / or vegetables) and the other one with no loads inside. On the testing without loads, results have shown that the system was capable of reaching the lowest temperature of -1.2° Celsius at t 25.7° ambient temperature. On testing with loads, the lowest recorded temperature is 7° Celsius. Based on the assessment of the results from the prototype system, the implementation of the actual full-scale cold storage room is possible, provided an improved cooling system is used that could run the system.