

A Techno-economic Study of Rooftop GCPV Systems in Fiji

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Fiji is committed to decrease its heavy dependence on imported fossil fuels through the development of renewable energy based electricity generation. It has set itself a target of reducing GHG emissions by 30% by the year 2030 using sustainable energy measures. Thanks to abundant solar resource and cost effectiveness, grid-connected solar PV (GCPV) is one of the most viable interventions for reducing the fossil fuel consumption and greenhouse gas (GHG) emissions related to the electricity sector in Fiji. This paper presents a techno-economic feasibility study on a pilot rooftop GCPV project currently deployed in Fiji.

The pilot Fiji Grid Connected Rooftop Solar Power (FGCPV) project is a collaboration coordinated by Fiji Department of Energy (DOE)'s Renewable Energy Development Program with the support of EFL and the Public Service Commission (PSC). Under this project, GCPV systems totaling 110 kW were installed on 60 government house rooftops. The systems came in two sizes: 1.2 kW and 2.5 kW respectively. A typical system comprises Trina Solar/TSM-250PC05A modules and a SMA Sunny Boy 2500 HF inverter. The orientation of panels was close to the local latitude with modules facing northwards (azimuth angle 180 degrees). The system monitoring was done using SMA's web connect data module in conjunction with the online monitoring tool 'Sunny Portal'. Import/export of electricity was monitored using ACE2000 type 292 single phase electricity meter supplied by EFL, the utility. The total cost of installation was F\$ \$655,841.71 or about F\$ 5962/kW. Table 1 shows performance of one of the installed systems.

Table I. Actual system performance for one of the 2.5 kW systems

Yield	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	Total Yield produced per month (kWh)	322.7	293.0	341.7	285.6	214.6	266.8	215.6	228.1
Specific Yield produced per month (kWh/kWp)	129.8	117.2	136.7	114.4	85.8	106.7	86.3	91.2	103.7

Normalized productions (per installed kWp): Nominal power 2500 Wp

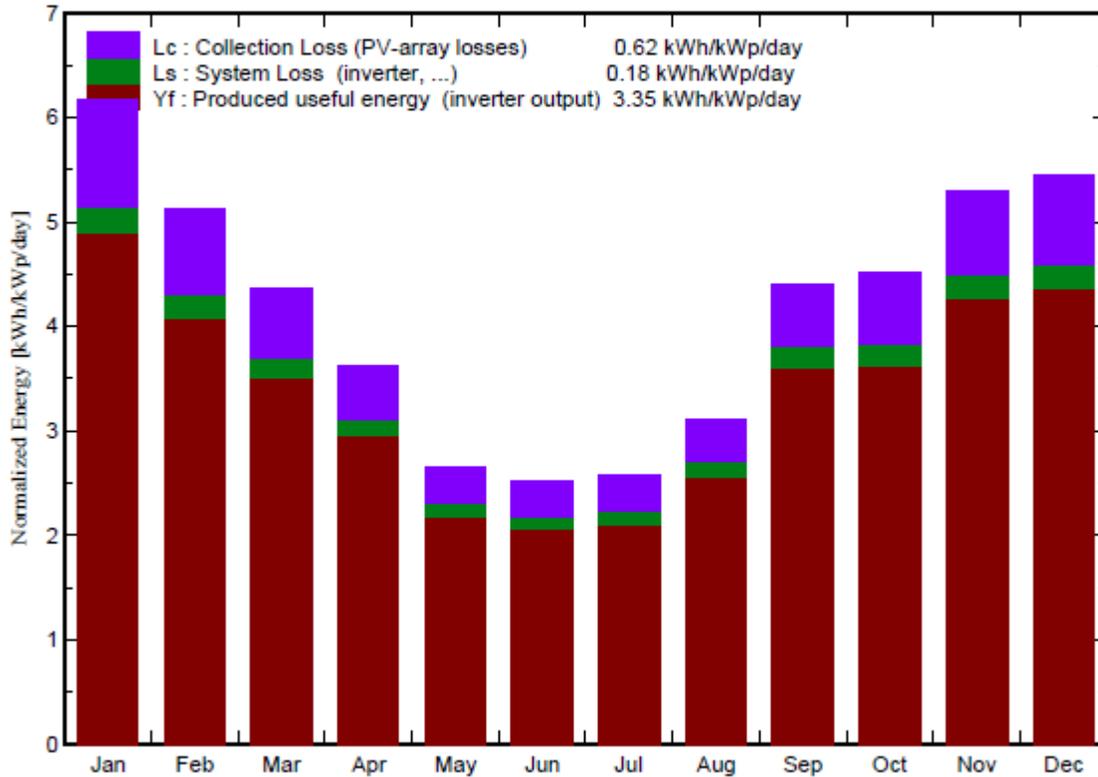


Figure 1. Simulation results for one of the installed systems

Economic evaluation of these systems was carried out in terms of payback time under various financing mechanisms such as net-metering and FiT. The impact of island-wide spread of such systems on the fossil fuel consumption and GHG emission reduction is also studied. Fiji is in the process of developing various pathways for solar PV expansion and rooftop solar can play a significant role in this endeavour.

References

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