Production Techniques of PV's and Polycrystalline PV Performance Analyses for Permanent Resistive Load

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Abstract: - Photovoltaic (PV) panels which are used to convert solar energy to electrical energy one of the fastest growing source on energy sector. Their efficiencies are increasing day by day with new technologies. Photovoltaic's average efficiencies are still 15-20% in daily usage. In this study general photovoltaic production techniques are explained briefly. New technological developments affect these production techniques so the new methods on photovoltaic production are examined. During one year period polycrystalline PV performance which feeds the permanent resistive load is tested experimentally for Istanbul-Goztepe.

Key-Words: - Photovoltaic, D.C. Loads, Energy Consumption, Production Techniques.

1 Introduction

The photovoltaic (PV) systems are generally designed for operating hybrid, grid connected or stand alone. Their most importing advantages against the conventional energy production systems are their modular structures, silence operation property, having no moving parts, less maintenance needs and having no harmful gas emissions. For that reasons PV systems are good alternatives to diesel generator systems that have been widely used in rural areas in recent years.

The most important disadvantage of these systems is high initial investment costs. Although, the investment costs of PV cells have decreased 10 times in the last twenty years, they are still not an alternative to conventional energy production systems in grid connected networks. PV cells had the biggest share in initial investment costs for PV systems [1].

Unfortunately, PV generation systems have two major problems: the conversion efficiency of electric power generation is very low (15-20%) especially under low irradiation conditions, and the amount of electric power generated by solar array changes continuously with weather conditions [2].

Efficiency is an important matter in the photovoltaic conversion of solar energy because the sun is a source of power whose density is not very low, so it gives some expectations on the feasibility of its generalized cost-effective use in electric power production. However, this density is not so high as to render this task easy. After a quarter of a century of attempting it, cost still does not allow a generalized use of this conversion technology [3].

Efficiency forecasts have been carried out from the very beginning of PV conversion to guide the research activity. In solar cells the efficiency is strongly related to the generation of electron–hole pairs caused by the light, and their recombination