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Department	EEE
Master thesis title:	Conventıonal PV system and PV system wıth optımızers sımulated ın PV -SOL software
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Thesis background:	In order to achieve the best performance of a solar energy system, it is necessary to take into account some factors that cause losses to the system. These losses are related to the increase of temperature, electronic components of converters, electrical wiring (ohmic loss), the degradation of the PV modules, mismatch losses, accumulation of dirt and partial shading. Partial shading is one of the main reasons for losses in solar energy systems. Clouds, trees, buildings, and the accumulation of dirt cause reduce the capture of incident irradiance and, hence, the PV power generation of the system. Mismatch losses are other problems in PV systems and with the aging of the modules, the mismatch increases, causing the increase of the losses. To reduce the losses of PV systems some alternatives are explored in this Thesis.
Thesis objective:	The purpose of this work is to describe methodology for accurate prediction of partial shading and electrical mismatch related losses in PV arrays using PV-SOL Software. PV-SOL is a software tool that allows the design and calculation of PV systems. Shading significantly reduces the efficiency of a solar array system and can occur entirely or partially due to dynamic or static obstacles. This project will demonstrate the differences between two configurations, Conventional Inverter Configuration, and Configuration with Power Optimizer. A conventional system employs a PV array, in which many PV modules are connected in series or parallel to obtain sufficient DC input voltage for generating AC grid line voltage. However, the conventional system suffers from power losses caused by mismatch between PV modules and shadows created by trees, buildings, and other obstacles partially covering modules. On the other hand, power optimizers are a DC/DC converter which is connected by installers to each solar module, turning them into smart modules. Power optimizers increase energy output from PV systems by constantly tracking the maximum power point (MPPT) of each module individually. The effect of shading on solar Photovoltaic (PV) models will be evaluated, discussed, and analysed, both the I-V and P-V characteristics curves for PV panels. At the end, we will be able to see improvements of the configuration which uses optimizers instead of conventional method which uses string or multi string PV module connections. The main aim of this project is to study and enhance the

	performance of a PV system under different configurations and reach to the most convenient topology.
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