

Experiment 1: Addendum

ECEN 4517/5517

In case of bad weather

Steps 4, 5, 6, and 8 of Exp. 1 can be performed outside when the solar irradiance is as low as approximately 250 W/m^2 — there must be enough solar irradiance so that shading cells in step 6 significantly changes the measured i - v curve. With solar irradiances in the 250 to 1000 W/m^2 range, the power and current will be reduced but useful i - v curves can still be measured. So if your lab day is cloudy, go outside with a pyranometer and see if you can measure at least 250 W/m^2 — note that when the sun is behind a cloud, the greatest solar irradiance may be in a different direction.

Sometimes the weather simply does not cooperate on your lab day. In that case, here is the alternative plan:

Do all of the steps (other than 4, 5, 6, and 8) inside at your lab bench. The bulk of your time will be spent developing the equivalent circuit model, step 12 and the following steps. Use the data provided on the PV panel datasheet (85 W panel at NOCT), and develop a model that matches this data. During this time, you can discharge the battery according to steps 3 and 7, and then answer step 15.

There is more than one week before the lab report is due. It will be necessary to come in on your own, when the weather is good, to perform steps 4, 5, 6, and 8. It may be possible to do these steps in lab next week, since Exp. 2 is not expected to require the entire 4 hours of lab. With this data, you can then adjust your PV panel model (step 12) and complete your lab report.