

Figure 1.10: Time series plot of the variation of Performance Ratio of the PV with the fitted weekly average (Blue – 10 W Mono; Red – 15 W mono; Black – 20 W Mono; Yellow – 10 W Poly; Ash – 15 W Poly; Green – 20 W Poly)

Figure 1.10 shows that monocrystalline PV module always performed higher than polycrystalline modules. Therefore it suffices to say that that is a condition in the Enugu, Eastern Nigeria.

1.4 Conclusion

The modules indicated a decrease in V_{oc} with time. The V_{oc} of the Polycrystalline modules indicated a higher rate of degradation compared to that of mono crystalline modules. Within the thirty days of exposure, the polycrystalline modules clearly showed the Staebler -Wronki degradation effect. The short circuit current (I_{sc}) of the two technologies indicated a very small change with the number of days of exposure. This is not unusual since I_{sc} unlike the V_{oc} indicated a very minimal change with time of exposure. The average mean value efficiency for polycrystalline modules was found to be 17.4 which was low compared to that of monocrystalline modules whose efficiency was 18.7. The maximum power (P_{max}) of all the modules indicated a degradation trend. It was also noted that the P_{max} quoted by manufacturers in most of the modules could not match the measured P_{max} . The output power of PV modules increased with module temperature but has shown a decrement from linear trend at high module temperature. This effect is due to decrease in modules open circuit voltage. The daily inspection on the modules revealed a defect in the polycrystalline module and that has highly contributed to its low performance. The efficiency of the modules used in this study increased with increase in solar irradiance. The monocrystalline module showed higher power output efficiency compared to polycrystalline module at high level of average solar Irradiance, while in low average solar radiation per day, the power output for polycrystalline were at low level compared to the monocrystalline photovoltaic module. At low

ambient temperature, PV module showed high performance ratio which decreased with increase in temperature.

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