

Linear Model Summaries

Model 1

Predictors	Estimate	Std. Error	t value	p-value
Intercept	775.1660	80.0140	9.688	<2e-16 ***
GHI	12.4620	0.2649	47.037	< 2e-16 ***
Temp	-44.4782	2.4273	-18.324	< 2e-16 ***
WS	-23.9056	21.4332	-1.115	0.265

Note. GHI = Global Horizontal Irradiance, Temp = Ambient Temperature (C), WS = Wind Speed (mph). *** indicates statistical significance. Daily mean values are used for GHI, Temp and WS. Model is fit to predict total daily output (kWh).

Residual standard error: 365.2 on 361 degrees of freedom

Multiple R-squared: 0.8765, Adjusted R-squared: 0.8755

F-statistic: 854.1 on 3 and 361 DF, p-value: < 2.2e-16

Model 2

Predictors	Estimate	Std. Error	t value	p-value
Intercept	222.76587	71.22622	3.128	0.00191 **
GHI	15.84265	0.46819	33.838	< 2e-16 ***
Temp	-5.61942	5.23948	-1.073	0.28421
GHI:Temp	-0.21842	0.02682	-8.143	6.34e-15 ***

Note. GHI = Global Horizontal Irradiance, Temp = Ambient Temperature (C), : denotes interaction (product of two variables). *** indicates statistical significance. Daily mean values are used for GHI, Temp and GHI:Temp. Model is fit to predict total daily output (kWh).

Residual standard error: 336.3 on 361 degrees of freedom

Multiple R-squared: 0.8953, Adjusted R-squared: 0.8944

F-statistic: 1029 on 3 and 361 DF, p-value: < 2.2e-16

Takeaways: Basing our decision off of Multiple R-squared (correlation coefficient) and lowest p-values, we can deduce that Model 2 with the highest R² of 0.8953 is the best model to use going forward. The coefficients for this model are 222.76587 for intercept, 15.84265 for GHI, -5.61942 for Temp and -0.21842 for the interaction effect of GHI and Temp. This can be written into a linear equation of $y = 222.76587 + 15.84265(\text{GHI}) - 5.61942(\text{Temp}) - 0.21842(\text{GHI:Temp})$. Where $y = \text{kWh}$, and GHI:Temp is the product of the two.