Energy research, read in real signal.

Tenaga is the energy research arm of 3 Orbit Solutions Sdn Bhd — an in-house programme spanning solar irradiance forecasting and irradiance-linked ESG research, built and validated on real data rather than described in the abstract.

Stream 1 validated on held-out data

Manuscript in preparation — Renewable Energy (Elsevier)

STREAM 01 — SURIA

Solar Irradiance Forecasting

Hour-ahead and day-ahead surface solar irradiance forecasting trained on multi-year NASA POWER satellite data, calibrated against ground sensors.

0.9111
TFT R^2 (VS. 0.9075 LSTM)

51.21
TFT MAE, W/M^2 (VS. 55.04 LSTM)

STREAM 02 — LESTARI

Irradiance-Linked ESG Research

Links Suria's solar generation forecasts to emissions-avoidance accounting — calculating the real climate impact of forecasted solar output, using Malaysia's published grid emission factor.

0.7148
XGBOOST R^2 — EMISSIONS MODEL

0.984
ISOLATION FOREST F1 — ANOMALY DETECTION

Feeds into **MENTARI PRIMA**, our sister product from 3 Orbit Solutions — a standalone RM 2,500 flat-fee ESG compliance gap analysis for Bursa Main Market issuers, covering the full multi-framework disclosure scope beyond Lestari's solar-specific research.

ROADMAP

Stream 1 — Forecasting. Pipeline complete and validated; grid expansion beyond initial coverage cities planned once Streams 2–4 close out.

Stream 2–4 — ESG research, plant optimisation. Emissions-avoidance and anomaly detection models trained and benchmarked (XGBoost R^2 0.7148, Isolation Forest F1 0.984, SOx forecaster R^2 0.9565).

TEAM

Built and maintained entirely in-house — no subcontracted development. Tenaga is built and run by 3 Orbit Solutions' own in-house team, spanning software engineering, cloud infrastructure, data analytics, and applied ML. Every model, pipeline, and report shown here is built and maintained in-house.

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