

OEE and energy data kit

Read the guides, clarify the project questions and complete the worksheet with your team.

01 OEE calculation: get the data right before the formula

Calculate availability, performance and quality for the same time window and the same definition of production.

02 Energy monitoring: from kWh to consumption per unit

Combine meter readings with production quantities and matching time windows to create meaningful energy indicators.

03 Project worksheet

Space for meeting notes, owners and acceptance evidence.

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This workbook is a planning aid. Product version, plug-in availability and licence scope must be verified for the project.

OEE calculation: get the data right before the formula

Calculate availability, performance and quality for the same time window and the same definition of production.

Three factors, one scope

OEE is availability multiplied by performance multiplied by quality. Availability is run time divided by planned production time. Performance is ideal cycle time multiplied by total count, divided by run time. Quality is good count divided by total count. All inputs must refer to the same line, shift and product scope. A break excluded from planned production time must not also be counted as downtime within that interval. Document these conventions before comparing shifts or plants.

Define times and counts at the source

Take planned time from the shift calendar, downtime from machine state events, and total and good counts from counters or quality systems. Define how counter resets, rollovers and machine restarts are handled. Store source timestamps separately from ingestion timestamps. Change the ideal cycle time when the product changes; a single cycle time across different products can overstate or understate performance. Reject negative increments unless they represent a documented correction and keep the correction history.

Check a worked example

With 450 planned minutes, 50 minutes of downtime, an ideal cycle of one second, 20,000 total units and 19,000 good units, run time is 400 minutes. Availability is 88.89%, performance is 83.33% and quality is 95%. OEE is approximately 70.37%. If performance exceeds 100%, do not silently clamp it to 100%. Investigate cycle time, count scope and time units. Our calculator flags that combination as inconsistent so a plausible-looking result does not hide bad inputs.

Do not average percentages blindly

A simple average of two shift OEE percentages can mislead when their durations or products differ. Aggregate underlying times and counts; for mixed products, calculate ideal production time for each product and sum it appropriately. High speed should not hide a poor quality rate. Show loss reasons and data coverage alongside OEE in operational reviews. Missing telemetry is not the same as zero production: flag it as a separate data-quality condition and resolve it before reporting an improvement.

Technical references

OEE calculation methodology

<https://www.oee.com/calculating-oee/>

Energy monitoring: from kWh to consumption per unit

Combine meter readings with production quantities and matching time windows to create meaningful energy indicators.

Identify the measurement type

Instantaneous power in kW and cumulative energy in kWh describe different quantities. Adding power values directly does not produce energy consumption; time intervals matter. For a cumulative meter, consumption over a period can be calculated from the difference between two readings. Flag meter resets, rollovers and replacements separately. Automatically turning a negative difference positive can hide a measurement problem. Record the meter's unit and scaling factor alongside its source identifier.

Use matching production intervals

Energy per good unit requires energy and good production counts for the same window. Consumption of 1,200 kWh for 6,000 good units means 0.2 kWh per unit. However, assigning a shared compressor or utility load entirely to one line can mislead. Make allocation rules explicit. When production is zero, report idle consumption separately instead of dividing by zero. Decide how changeovers and rework are represented so production and energy teams interpret the number consistently.

Control comparison conditions

Daily kWh totals alone are incomplete when product type, line load, shift length or ambient conditions differ. Group comparable operating conditions first. Flag intervals with sensor outages as incomplete data. If calculating cost, record the tariff's date and scope; consumption and financial cost are different indicators. A change in tariff can alter reported cost without any change in the process. Keep the underlying physical measurements available for later recalculation.

Ask for three pilot outputs

Start with an hourly consumption series, energy per good unit and the baseline load outside production hours. Set alert thresholds using a representative baseline period. Before interpreting a sudden change as a saving or a fault, check measurement quality, meter replacement and the production schedule. After OPC Router transfers readings to the destination database, have energy and production owners validate the reports together. Document known coverage gaps so the dashboard does not suggest more precision than the measurement system provides.

Technical references

OPC Router integration platform
<https://www.opc-router.com/>

03 / PROJECT WORKSHEET

Complete with your team.

Project / plant: _____

Date / owner: _____

Decision / check	Notes, owner and verification
Line / product / shift interval	
Planned time / break definition	
Downtime / ideal cycle	
Total count / good count	
Meter / unit / consumption interval	
Data issue / correction owner	

Next step

Share your open questions and source-destination systems with info@opcturkey.com. Interactive tools:
opcrouter.com.tr/en/tools