

# EMOS® CELL PERFORMANCE ANALYZER

## Switching to Predictive Maintenance

### Features

- Monthly Analysis of Precise KPI for each cell (CE, Uo, k and SPC)
- Precise characterization of each cell components: anode, cathode and membrane

### Benefits

- Save energy and maintenance costs
- Reduce unplanned shutdowns
- Increase throughput
- Stops the aging of the plant

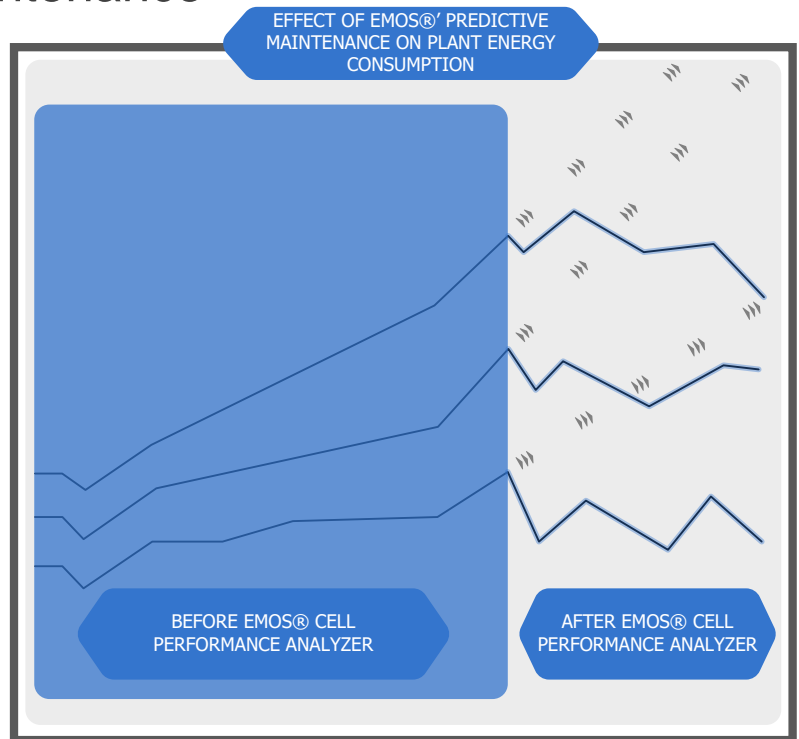
### Overview

Presently, most producers are conducting two (2) types of maintenance strategy:

1. Component replacement campaigns based on the life-time warranty of their components or when the overall performance of their electrolyzers has greatly deteriorated. This demands a large amount of capital expenditure and a long shutdown period to conduct the maintenance activity.

2. Breakdown maintenance when operating a cell to failure. This is costly due to sudden and unplanned shutdown, loss of production and costs associated with consequential damages.

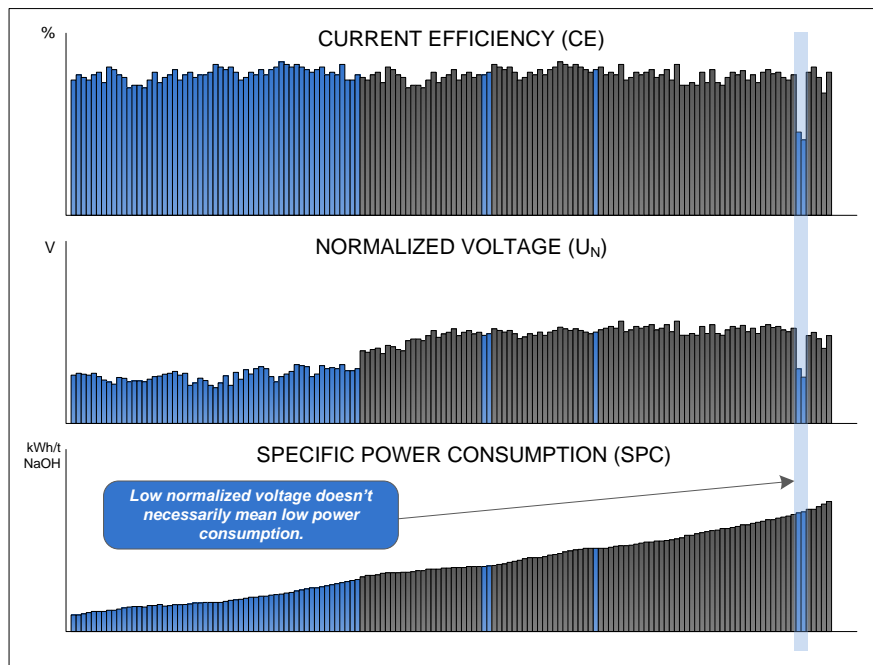
At the core of the EMOS® Predictive Maintenance Package, the EMOS® Cell Performance Analyzer consists of the monthly determination of highly precise KPI's **for each cell**: Current Efficiency (CE), Uo, k Value and the Specific Power Consumption. This provides the **precise performance and operating costs of each single element** which is key to be able to switch to a **performance-base predictive maintenance strategy**.



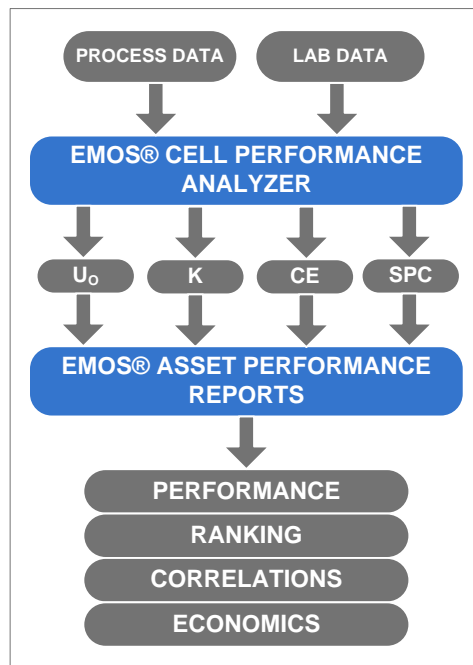
The decision to replace components can reliably be based on the concept that if a cell is costing more to operate than to replace, it should be replaced during next planned shutdown. Scheduled replacement of degraded components greatly reduces the occurrence of unplanned shutdowns and production loss due to sudden element failure.

On the other hand, keeping over-performing elements in operation, translates in savings in component replacement.

This performance-base Predictive Maintenance Strategy has proven effective in stopping the aging of the plant in terms of Specific Power Consumption, reducing energy costs, increasing throughput, extending the life of components and lowering the number of unplanned shutdown.



EMOS® Asset Performance Report



EMOS® Cell Performance Analyser Inputs/Outputs

## Technical Specifications

| Accuracy of the Analysis                          |                  |
|---|------------------|
| Individual Cell $U_o$                             | ±2.5 mV          |
| Individual K-Factor                               | ±0.001 $Vm^2/kA$ |
| Current Efficiency (CE) of each membrane          | ±0.25 %          |
| Specific Power Consumption (SPC) of each membrane | ±0.5%            |

## Requirements

| Process Data   |
|--|
| Historical process data is required for building the EMOS® Cell Performance Analyzer Engine. Contact us for the complete list. |

| Laboratory Data  |
|--|
| A list of lab analysis must be supplied for our specialists to complete the EMOS® Cell Performance Analysis. |

| Pre-Requisites   |
|--|
| SWPER - EMOS® Asset Performance Reports*   |
| <i>*The results of the EMOS® Cell Performance Analyzer are integrated into the EMOS® Asset Performance Reports for viewing, sorting and correlating with other parameters.</i> |

## Related Products

| Part Number | Description                     |
|-------------|---------------------------------|
| SWPER       | EMOS® Asset Performance Reports |
| SW310       | EMOS® Asset Management Database |

## Ordering Information

| Part Number | Description  |
|-------------|--|
| EN505       | EMOS® Cell Performance Analyser Initial Setup, Test and Validation |
| EN506       | EMOS® Cell Performance Analyzer Annual Service                     |

## Additional Information

EMOS® Cell Performance Analyzer is part of R2's Electrolyser Maintenance, Optimization and Safety System. Contact us for more information.

