



Killer Applications in PME

Customized solutions to fit your business needs

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Tenants of Power and Energy Management

Measure

Gather accurate power and energy data from key distribution points, monitor power quality, and log events



Interoperability: Standard Industry protocols and form factors
Customization: Scalability in size and performance

Understand

Turn data into meaningful, actionable information for you and your stakeholders



Robust, flexible software platform architectures
Real-time energy consumption monitoring
Dynamic control interfaces
Real-time and historical power quality analysis

Act

Make timelier, intelligent decisions based on valid, actionable information



Increased energy efficiency and cost savings
Maximize electrical network reliability and availability
Optimize electrical asset performance

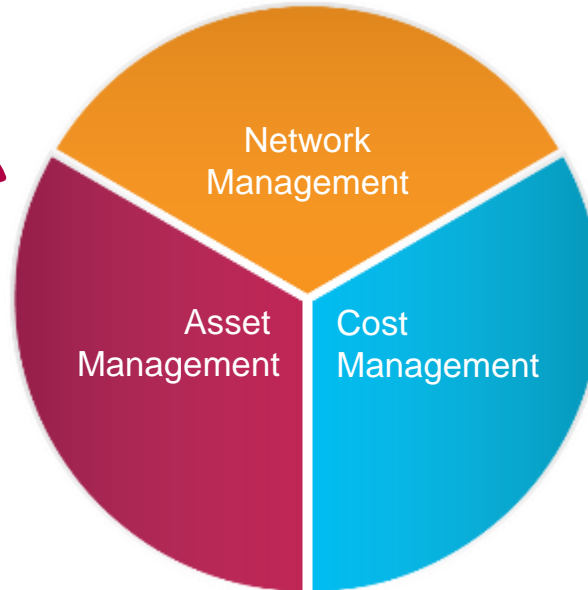
What we do

Improve Electrical Reliability

“Help my facility run reliably”

Manage Electrical Assets

“Help me make my equipment run optimally”



Improve Financial Performance

“Help me save money on my utility costs”

How we do it

PME Base (Standard/Datacenter/Healthcare)

Alarm/event management, data reporting/analytics/visualization, real-time data monitoring & visualization for (WAGES), modbus & ION protocol support, power quality monitoring & analysis



20%

Energy Savings



Cost Management

10%

Savings on Operations & Maintenance



Network Management

10%

Improved Uptime & Reliability



Asset Management

Solution Modules

Solution Modules: Measure → Understand → Act



Cost Management



Energy Analysis Module:

- Improve Operational Efficiency, Energy Performance and help achieve ISO50001 compliance

Energy Billing Module:

- Flexible rate engine and reports for cost allocation, bill verification and tenant billing.

IT Billing Module

- Flexible rate engine and reports for datacenter applications

Power Efficiency Module

- Track and analyze PUE, losses and overall system efficiency.

Network Management



Power Quality Advisor Module (coming soon):

- Simple, global overview of the impact of power quality on your facility's operations

Generator Test/EPSS Module:

- Automated generator and ATS testing and reporting for maintenance and regulatory compliance

Power Capacity Module:

- Monitor the capacity loading of electrical equipment (UPS, Transformers)

Event Notification Module:

- Receive text or email notifications when power system events occur.

Asset Management



UPS Performance Module:

- Global overview UPS status, battery health, auto test report etc.

Breaker Performance Module:

- Breaker status diagrams and reports including electrical ageing and mechanical wear, for proactive maintenance

Generator Performance Module:

- Monitor the parameters of your generator

Energy Billing Module

The Energy Billing Module provides the ability to do cost allocation, energy usage chargeback and export energy data into accounting or financial systems

Prevent unnecessary utility charges

- Ensure that utility bills are correct via shadow billing
- Avoid demand charges and Power Factor penalties

Improve Energy Accountability

- Allocate energy costs and share energy billing data
- Create energy charge back reports and summarize tenant energy spend
- Export energy billing data to accounting or financial systems

Module Contents

- Billing Report
- Billing Summary Report
- Multiple Billing Report
- Multiple Billing Export Report
- Web Based Rate Editor

Billing Report

Report Details

Schneider Electric		Monthly Tenant Bill	
12/1/2012 12:00:00 AM - 12/31/2012 12:00:00 AM (Server Local)			
Tenant Name	Tenant A		
Physical Tenant Meter(s)	Victoria_Keating_PNL_K, Victoria_Keating_RTU_4, Victoria_Keating_elevator		
Rate Name	Sample Large Rate		
	Reading	Unit Cost	Cost
Energy Register Readings			
Victoria_Keating_PNL_K 530,741.44 kWh @ 12/1/2012 12:15 AM 530,927.51 kWh @ 12/31/2012 12:00 AM			
Victoria_Keating_RTU_4 526,475.06 kWh @ 12/1/2012 12:15 AM 544,002.06 kWh @ 12/31/2012 12:00 AM			
Victoria_Keating_elevator 930.54 kWh @ 12/1/2012 12:15 AM 958.93 kWh @ 12/31/2012 12:00 AM			
Energy Consumption Charge			
Victoria_Keating_PNL_K: 6,188.75 kWh	23,749.02 kWh	\$0.0570 per kWh	\$ 1,353.69
Victoria_Keating_RTU_4: 17,531.98 kWh			
Victoria_Keating_elevator: 28.40 kWh			
Transmission Charge	23,749.02 kWh	\$0.0034 per kWh	\$ 80.75
Line Maintenance Charge	23,749.02 kWh	\$0.0073 per kWh	\$ 173.37
On Peak Usage Charge [Weekdays between 8:00am-6:00pm]			
Victoria_Keating_PNL_K: 2,433.50 kWh	9,982.15 kWh	\$0.5479 per kWh	\$ 4,921.32
Victoria_Keating_RTU_4: 6,540.19 kWh			
Victoria_Keating_elevator: 8.47 kWh			
Off Peak Usage Charge			
Victoria_Keating_PNL_K: 3,755.25 kWh	14,766.87 kWh	\$0.1296 per kWh	\$ 1,913.79
Victoria_Keating_RTU_4: 10,991.69 kWh			
Victoria_Keating_elevator: 19.93 kWh			
Tenant A - Coincident Peak Demand Charge [Main Meter Peak @ 12/25/2012 2:00 PM]			
Victoria_Keating_PNL_K: 9.52 kW	38.45 kW	\$6.890 / kW	\$ 264.93
Victoria_Keating_RTU_4: 28.93 kW			
Victoria_Keating_elevator: 0.00 kW			
Processing Fee	Fixed Fee		\$ 3.75
Facility Fee	Fixed Fee		\$ 20.00
Total			\$ 8,731.60

Billing Report	
Title	Billing Report
Location	Victoria_Keating
Reporting Period	Last 7 Days (Start Date: 12/24/2012 End Date: 12/31/2012)
Rate	Sample Large Rate
<input type="button" value="Generate Report"/>	

Create accurate energy allocation reports for departments or tenants

Verify utility bill is correct with no errors

Powerful rate engine supports custom utility rates and charges

Configurable line items for flexible report output

Supports net metering, meter splitting and common area allocation

Supports any energy measurement (WAGES)

Summary Billing Report

Report Details

Schneider Electric		Billing Summary Report		
Billing Period: 3/1/2012 12:00:00 AM - 3/31/2012 12:00:00 AM (Server Local)				
Tenant	Item	Units	Unit Cost	Cost
ABC Co. 8	Energy Consumption Charge			
1/1 Mile 1000, South, Floor 701	1/1 Mile 1000, South, Floor 701 AT&T 10	22,845.46 kWh	\$0.0202	4,615.61
Charge Rate - Basic	Peak Demand Charge 1400.000 Pk.Dem. 3/1/2012-3/31/2012 1/1 Mile 1000, South, Floor 701	15.45 kW	\$3.25	50.44
	Processing Fee			25.00
			Total:	\$473.05
ACME Technology	Energy Consumption Charge			
1/1 Mile 1000, South, Floor 701	1/1 Mile 1000, South, Floor 701 AT&T 10	22,845.46 kWh	\$0.0202	4,615.61
Charge Rate - Basic	Peak Demand Charge 1400.000 Pk.Dem. 3/1/2012-3/31/2012 1/1 Mile 1000, South, Floor 701	20.00 kW	\$2.00	40.00
	Processing Fee			25.00
			Total:	\$480.61
Alpha Co.	Energy Consumption Charge			
1/1 Mile 1000, South, Floor 701	1/1 Mile 1000, South, Floor 701 AT&T 10	22,845.46 kWh	\$0.0202	4,615.61
Charge Rate - Basic	Peak Demand Charge 1400.000 Pk.Dem. 3/1/2012-3/31/2012 1/1 Mile 1000, South, Floor 701	22.71 kW	\$4.00	90.88
	Processing Fee			25.00
			Total:	\$491.49
Group Financial	Energy Consumption Charge			
1/1 Mile 1000, South, Floor 701	1/1 Mile 1000, South, Floor 701 AT&T 10	22,845.46 kWh	\$0.0202	4,615.61
Charge Rate - Basic	Peak Demand Charge 1400.000 Pk.Dem. 3/1/2012-3/31/2012 1/1 Mile 1000, South, Floor 701	18.12 kW	\$4.00	72.48
	Processing Fee			25.00
			Total:	\$493.09
Gamma Inc.	Energy Consumption Charge			
1/1 Mile 1000, South, Floor 701	1/1 Mile 1000, South, Floor 701 AT&T 10	22,845.46 kWh	\$0.0202	4,615.61
Charge Rate - Basic	Peak Demand Charge 1400.000 Pk.Dem. 3/1/2012-3/31/2012 1/1 Mile 1000, South, Floor 701	21.11 kW	\$4.00	84.44
	Processing Fee			25.00
			Total:	\$495.05
		Grand Total:		\$2,010.20

Aggregate several entities or tenants into a single report

Summarize charges to departments or tenants

Show the grand total of all entities in the summary

Billing Summary

Title: Billing Summary Report

Tenant: HOPE Technology, Renacle Inc. ABC Coft. Co.

Reporting Period: (Start on day 31/2012 End on day 31/2012)

Rate:

Tenant Filter:

Use Main Filter:

Hide Billing Totals: Yes No

Hide Line Totals (regardless of Billing): Yes No

Multiple Billing Report

Report Details

Multiple Billing Export

Title:

Tenant: ACME Technology, Pinnacle Inc, ABC Soft, Group ...

Reporting Period: [start of day 3/1/2015 to end of day 3/31/2015]

Rate:

XML Transform File:

XML Export File:

Overwrite XML Export (No to Append): Yes No

Stylesheet (optional):

Save Billing Totals: Yes No

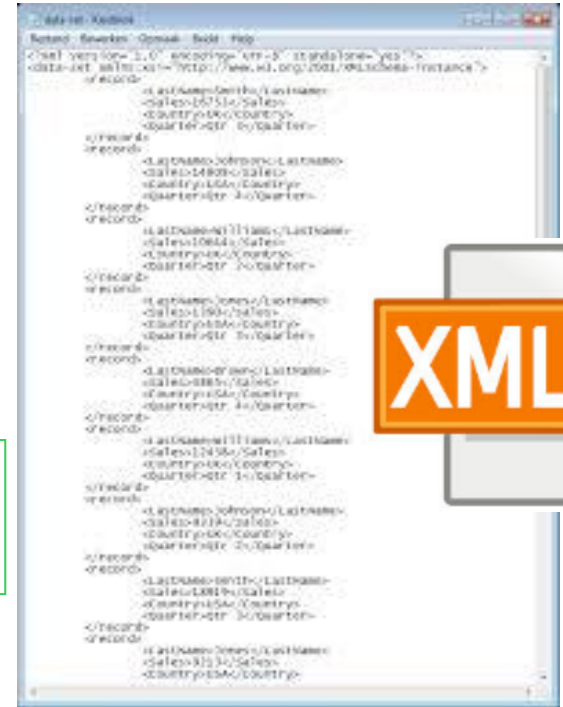
Email XML Export: Yes No

Email Recipients (comma separated):



XML Transform File

Basic Default Export
CSV
Export Pass Through
Multiple File
Report Billing



Automatically save or email tenant billing data
Customisable output formats via XML transforms

Billing data file

Generator Performance Module

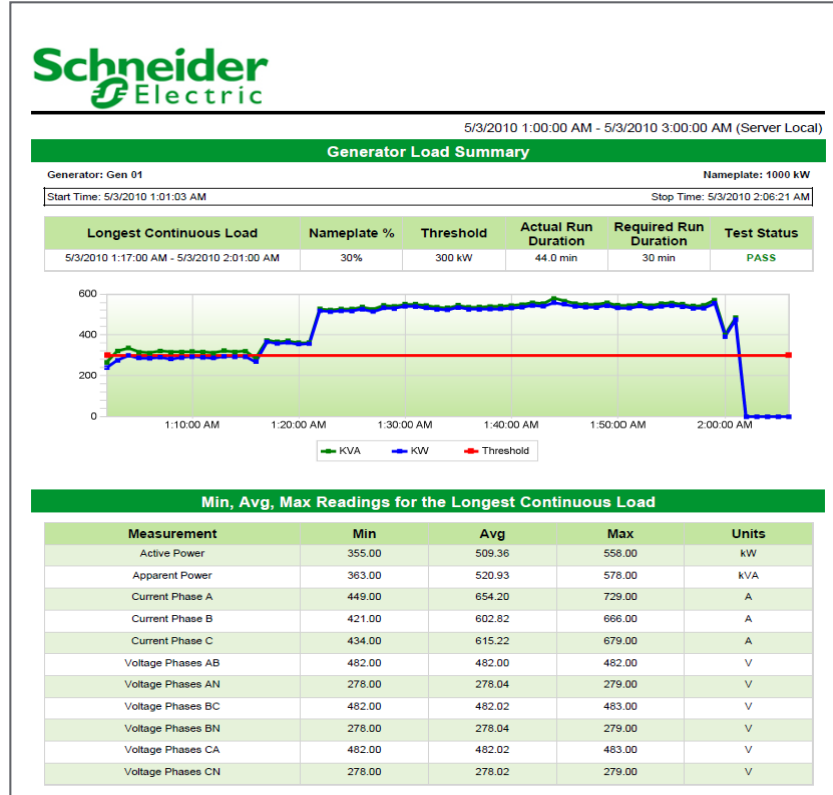
The Generator Performance Module provides the ability to automatically record and document the backup Generator System test. It provides a standard methodology for testing the generators and provides a detailed report of the generator operation during the test

Module Contents

- Generator Test Report
- Battery Health Report
- Generator Activity Report
- Load Summary Report
- Generator Test Configuration Utility

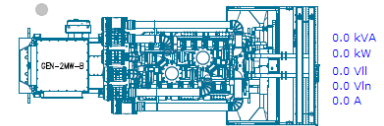
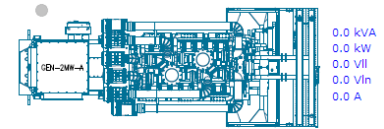
Generator Power Report

Report Details



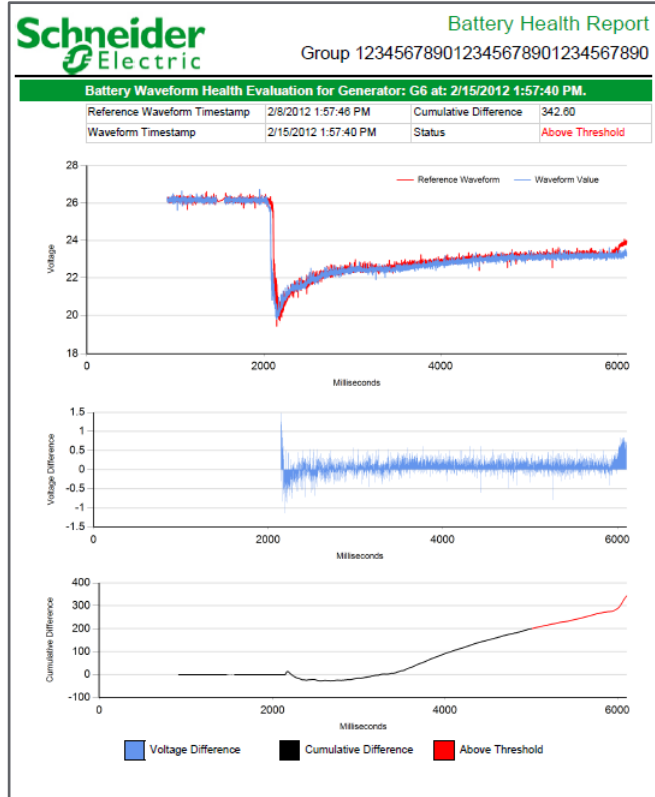
Provide documented evidence of a regular and consistent generator system testing process.

Identify any generator problems that could prevent a transfer to backup power.



Battery Health Report

Report Details



Understand if batteries are healthy enough to start your generator.

Compare last start to baseline record.

ION 7x50 Power Quality Meter

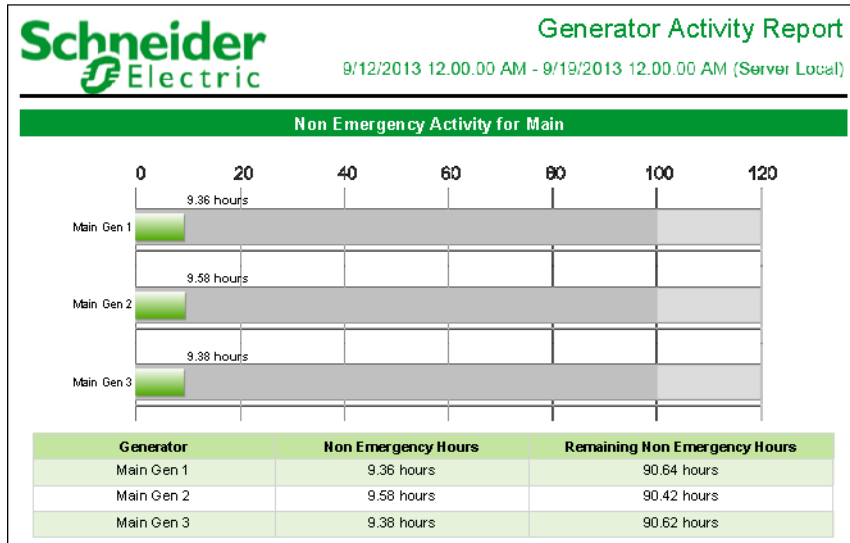
- > Monitors Generator 3 Phase Power *and* DC Battery Voltage
- > High Speed Sampling Records Battery Signatures During Engine Starting Sequence



Generator Activity Report

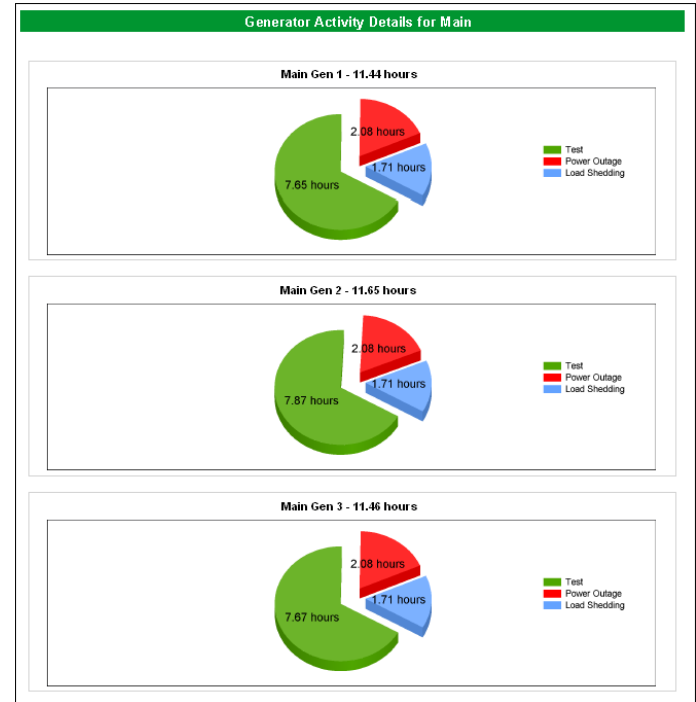
Report Details

Easily understand and report how much run time has been for Emergency and Non-Emergency situations.



Reports ALL Non Emergency Run Time Versus Total Time Allowed

Provides a Breakdown of Cumulative Run Time Per All Operating Categories



Breaker Performance Module

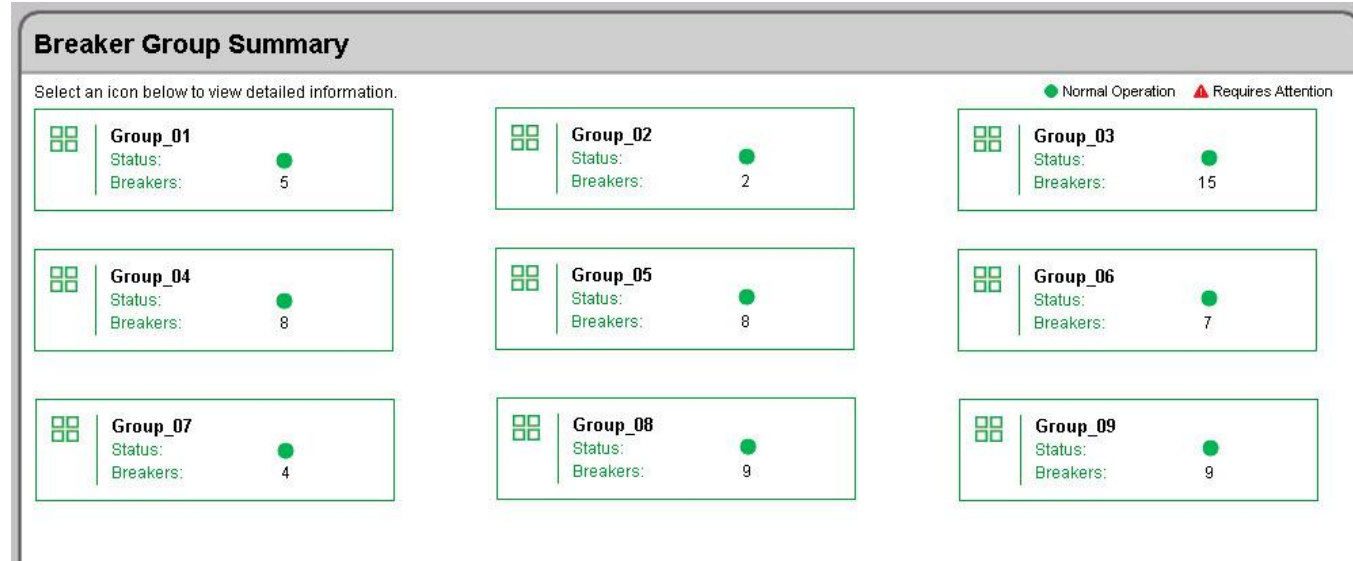
The Breaker Performance module provides a report that displays aging and wear for all breakers defined in the system and real-time summary screens that display breaker aging and wear parameters by group or equipment. There is also a VIP framework that can be configured to provide real-time status alarms in the vista diagrams

Module Contents

- LV Breaker Aging Report
- Circuit Breaker Aging Configuration Utility

Main LV switchgear monitoring – Breaker Aging

- Breaker aging monitoring based on
 - Electrical data
 - Mechanical endurance
 - Environmental condition
- Including all Schneider breaker driver and technical characteristic
 - Micrologic of Compact NSX, MasterPact and PowerPact



High expertise level to support predictive maintenance

- Direct result of Circuit breaker endurance performance (%) to better manage predictive maintenance

Deep breaker analysis



Financial performance

- Increase MTBF of the main electrical switchboard
- Support the maintenance predictive action plan and associated budget

LV breaker aging report

- Global synthesis of all Breaker health in the Main LV Switch
- Exclusive offer dealing with the Masterpact, Compact NSX, Power
- Electrical aging
 - Base on the tripping quantity /profile
- Electrical wear
 - Base on the quantity of operation and environment condition

Breaker Aging and Wear Summary

Switchboard	Level	Breaker Name	Electrical Aging (%)	Electrical Wear (%)
Switchboard A1	Critical	Breaker A2	84.8	53.7
		Breaker A3	87.8	85.7
		Breaker A4	96.7	71.9
		Breaker A5	30.8	90.3
		Breaker A7	73.2	74.5
		Breaker A8	38.2	66.3
		Breaker A9	42.5	66.8
		Breaker A10	6.3	89.1
		Breaker A11	2.3	78.3
		Breaker A12	47.4	53.2
		Breaker A13	67.3	71.7
		Breaker A14	57.2	69.5
		Breaker A15	80.7	50.8
		Breaker A16	12.1	93.9
		Breaker A17	81.4	13.6
		Breaker A18	19.7	53.5
		Breaker A21	56.6	3.4
		Breaker A22	55.9	61.0
		Breaker A24	6.1	93.5
		Breaker A25	47.0	81.1
		Breaker A26	98.6	35.4
		Breaker A27	11.9	72.4
		Breaker A28	14.0	62.3
		Breaker A29	96.5	31.6
		Breaker A30	86.4	16.2
		Breaker A32	91.1	80.0
		Breaker A33	78.2	50.9
		Breaker A34	31.4	59.6
		Breaker A35	54.8	84.7
		Breaker A36	28.6	99.5
		Breaker A37	36.0	59.1

Maintenance facility

- Predictive maintenance with the priority short list

Financial performance

- Anticipate and optimize the maintenance cost for the main LV Switchgear focus mainly on some identified circuit breakers.

Interpretation

- Circuit Breaker aging represents a statistical model for similar devices under similar conditions.
- Like any statistical model, the aging prediction is not 100% accurate 100% of the time. It simply provides an estimation of the increased probability of failure due to aging.
- If a device has aged to 100%, this does not mean that the device will fail imminently; it means that the probability of failure is increasing dramatically.

Aging Factors

The lifetime of the breaker and control unit is influenced by the following factors:

- The number of operations (open/close/trip) along with conditions of each operation (interrupted currents),
- The operating temperature,
- The presence of corrosive atmosphere: humidity, salty atmosphere, corrosive gas (SO₂, H₂S, Cl₂, NH₃ and NO₂),
- The presence of dust,
- The presence of vibrations,

These factors may be measured by sensors, estimated through some indirect measurement or given by the user through an HMI.

Aging Factors

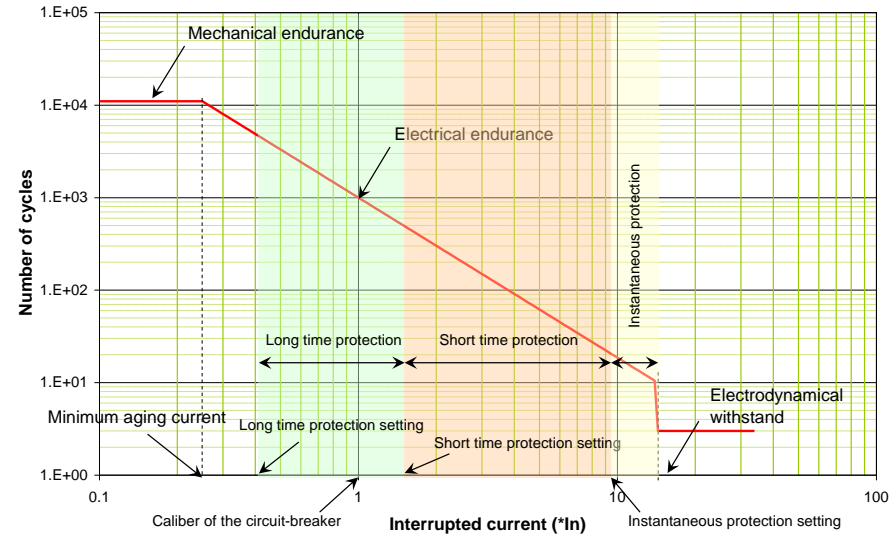
Aging of the breaker due to the number of operations is measured as:

- **Mechanical Wear:** This is the wear of the breaker without taking into account the interrupt current. For most breakers, the mechanical endurance is ~10k operations
- **Electrical Wear:** This is mainly affected by the magnitude of the interrupted current. The arcing caused by the opening of the breaker wears the contacts.

PME Breaker Performance Module: Aging Categories

Aging of the breaker due to the number of operations is broken down into two categories:

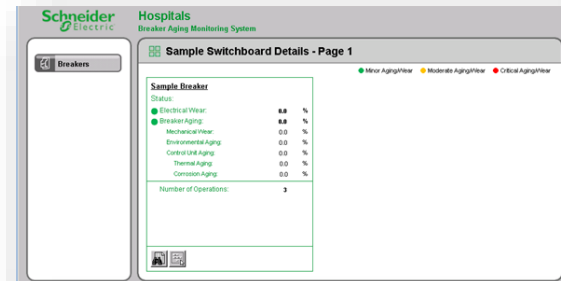
- > **Electrical Wear:** This is the wear of the contacts resulting from the breaker operating under various interrupt currents. For example, breaker contacts may wear by over 30% in case of a short circuit interrupt at max. fault current.
- > **Mechanical Wear:** This is the result of mechanical stress aging mainly caused by the number of operations, but does not take into account contact wear.



- The above endurance curve for a circuit-breakers, like Masterpact, illustrates the relationship between interrupted current and electrical wear (number of cycles).
- The current is given as a fraction of the nominal current of the circuit-breaker.
- When the interrupted current is below the min aging current, we consider that aging is not impacted by current and the endurance is the mechanical endurance for the device

PME Breaker Performance Module: Aging Categories (cont'd)

- > **Environmental Aging:** Considers aging due to temperature, vibration and corrosion (humidity, corrosive gas and salty atmosphere)
- > **Control Unit Thermal Aging:** This monitors the temperature that the control unit is operating in
- > **Control Unit Corrosion Aging:** Considers aging due to humidity, corrosive gas and salty atmosphere. These factors are not independent. For example, humidity increases the effect of corrosive gas and salty atmosphere.



Circuit Breaker Aging Report
3/23/2015

Breaker Aging and Wear Summary					
Switchboard	Level	Breaker Name	Electrical Aging (%)	Electrical Wear (%)	
Switchboard A1	Critical	Breaker A38	32.5	99.0	
		Breaker A39	22.4	86.4	
		Breaker A40	22.2	64.7	
		Breaker A41	65.6	63.6	
		Breaker A42	22.4	99.6	
		Breaker A43	52.1	78.7	
		Breaker A44	82.0	8.9	
		Breaker A45	99.6	57.4	
		Breaker A46	57.0	6.1	
		Breaker A47	56.6	14.7	
		Breaker A49	12.2	75.9	
		Breaker A50	82.8	80.1	
		Moderate	Breaker A1	40.6	44.0
			Breaker A6	44.8	12.8
			Breaker A19	37.6	43.0
Breaker A20	30.9		47.1		
Breaker A23	31.0		2.6		
Minimal	Breaker A31	28.5	27.2		
	Breaker A48	18.6	29.4		

Life Is On



Schneider
Electric

