

NETWORK QUALITY MEASUREMENT & ANALYSIS



From simple harmonic analysis to 24/7 storage of the briefest phenomena on your electrical network

Class A - Indisputable arbitration of the quality of the electricity supplied or delivered

Single, comprehensive software solution for managing a fleet of analyzers



To understand the details of your electricity bill

For energy monitoring, it is essential to be as close to your energy consumption as possible because when high power is involved, your electricity bill is high too. Measuring these high power values with mediocre accuracy therefore means leaving some uncertainty regarding actual energy consumption and its associated cost. This is why **we recommend opting for equipment offering 0.2 % measurement accuracy**, which is currently the highest accuracy standardized by the IEC 62053-22 international standard covering active energy metering.

Electrical **environments** may also be **disturbed** (presence of harmonics, phase shift of the current and voltage, etc.), thus causing deterioration of the power factor. In such conditions, energy measurement is more complex. For these environments, **the accuracy rating of your equipment must include the letter "s"**, which guarantees the most reliable energy measurements in disturbed environments.

If you choose 0.2s accuracy for your power monitor, it guarantees that you meter energy to the same standard as your tariff meter (or higher).

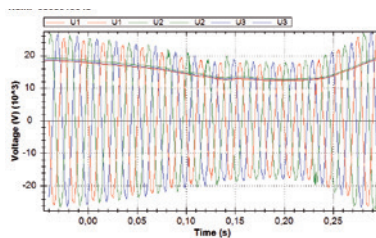


Estimate the impact of complex electricity consumption on your network so that you can react quickly. Electricity differs from the other utilities (gas, water, etc.) due to the complexity of its composition and the wide variety of indicators involved in optimizing its cost. **Apparent power is the most important aspect to monitor** because it will determine the quantity of electricity you need and the related contract. To achieve savings, you therefore have to take into account the two components of the apparent energy to be reduced:

➤ **Reactive energy:** the inductive loads on the network will lead to a mismatch between the current and voltage which naturally draws unwanted power. This power, called reactive power, has its rejection limited to a certain proportion of the active power by the network administrators. This limitation can be implemented by adding "compensation" solutions at the level of the load or certain points in the network.

➤ **Distorting power:**

Distorting loads on the electrical network change the shapes of the current and voltage



waveforms, producing signals whose frequency is different from the network's rated frequency. These signals, called harmonics, will have numerous negative effects such as changing the voltage level of the network, drawing additional "distorting" power and increasing the currents in certain conductors. These harmonics, whose presence is also limited by the standard, can be corrected by filtering systems.

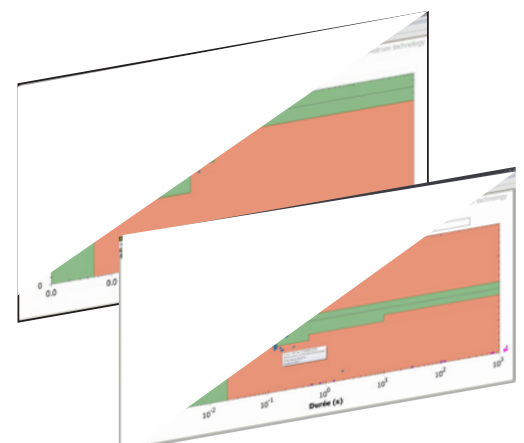
Understanding energy quality and finding means of adjusting it

The losses and maintenance costs on the equipment due to poor energy quality must be anticipated. The variations of the main electrical quantities outside the tolerance ranges shorten the life span of the electronic equipment in the network. Constant monitoring of these quantities will help to establish a correlation between equipment maintenance and the quality of the energy on the network.

Energy quality events such as voltage dips, outages and overvoltages have negative effects on the operating continuity of electrical installations. The costs linked to production losses and production downtime may be very high.

A recording to quantify and qualify the energy quality events will enable you later to find the causes of the anomaly and correct them. Sector-specific templates can be used to qualify the dips in terms of harmful effects on specific equipment:

- The **ITIC template** helps to qualify dips which may corrupt or damage computing bays
- The **SEMIF47 template** helps to qualify dips which may cause faults on sensitive production line tools (e.g. semiconductor production sites)



Monitoring electricity supply commitments

The **European standard** for energy quality is the **EN50160** standard. It describes the requirements which must be fulfilled by the voltage and frequency at any point of connection.

All electricity suppliers must comply with this standard. Use of an analyzer will enable you to check all the parameters and generate a compliance or non-compliance report.

Specific agreements may be drawn up between the electricity supplier and the customer, limiting the number of outages or voltage dips per year. Use of an **analyzer** will allow the electricity supplier to **confirm to their customer that these commitments are fulfilled** and will enable the customer to contest fulfilment of the requirements if events have occurred.



To provide **indisputable information on energy quality** (events or electrical quantities), the measurements must be reproducible. The IEC 61000-4-30 standard gives definitions of the measurement methods for events and electrical quantities, defining several classes. Class A is the most demanding.

It guarantees that two different pieces of equipment connected in the same place will give identical results.

Class A is the crucial criterion when choosing a network analyzer.

Don't miss a single disturbance

What makes troubleshooting difficult is that you are seeking to "trap" something you don't yet know anything about. This makes it difficult to stipulate in advance the fault capture characteristics of your network analyzer. **The crucial criterion for the analyzer will be the sampling frequency.** This will define the minimum resolution at which a transient phenomenon will be detected.

➤ **For more standard requirements, the 12 kHz sampling frequency** (256 points per cycle) will allow global analysis of the events.

➤ **For advanced troubleshooting**, with the aim of viewing all the variations before and after the fault very accurately, **the sampling frequency of the equipment must be at least 2 MHz**

A high sampling frequency guarantees that all the information needed to investigate has been stored.

Choosing your equipment

A simple, economical solution for supervising energy quality



ENERIUM 300

ASSESS THE IMPACT OF ENERGY QUALITY ON YOUR ELECTRICAL FEEDER

The power monitor focused on energy quality

- Accuracy class 0.2s
- Storage of consumption data
- Recording of trend curves
- Harmonic analysis
- Events log (dips, outages, etc.)
- Monitoring of compliance with the EN50160 standard
- Waveform capture
- Up to 8 inputs/outputs

Step up a gear with the MAP network analyzers

> IEC 61000-4-30 Class A

> Capture of the most complex energy quality parameters

> Continuous storage 24/7

> Generation of turnkey reports plus investigative tools in a broad software offering



MAP Compact

MONITOR YOUR ELECTRICAL NETWORK SIMPLY AND EFFECTIVELY

The economical solution for network analysis

- Compact format for simpler implementation
- A screen for the basic information
- Access to the data locally via USB or remotely via Ethernet
- 230/400 VRMS voltage input with 3 channels
- 0 – 6 A RMS current input with 4 channels
- Auxiliary power supply: 175 – 255 Vac (10 s power reserve)
- 2 on-off inputs/outputs



MAP 640

DON'T MISS A SINGLE DISTURBANCE

The comprehensive product for transformer station environments

- Capture of 2 MHz HF transients
- 4 analog inputs and 2 on-off outputs
- Generation of customized reports
- 400/690 VRMS voltage input with 3 channels
- 0 – 6 A RMS current input with 4 channels
- Access to the data locally via USB or remotely via Ethernet (Modbus TCP)
- Monitoring of the homopolar voltage (option)
- Auxiliary power supply: 175-255 Vac (10 s power reserve) or 24 Vdc

As the network analyzers in the MAP range do not have a screen, they must be used with management and analysis software.

- Integration in your SCADA or RTU supervision system by means of Modbus TCP communication



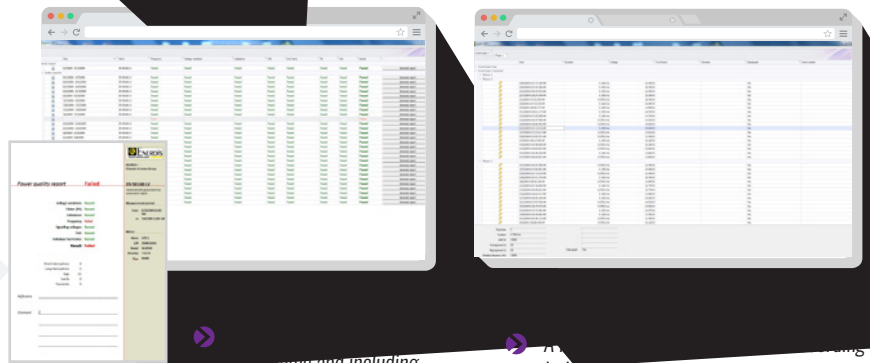
- Management of your network analyzer
Manual extraction of the measurement campaign files

Qual-View: the data can be viewed and shared at any time by any person who has the processing software

- Management of your fleet of network analyzers
E.Qual- Premium Server: complete, automatic backup of the whole history of the energy quality data from your equipment fleet

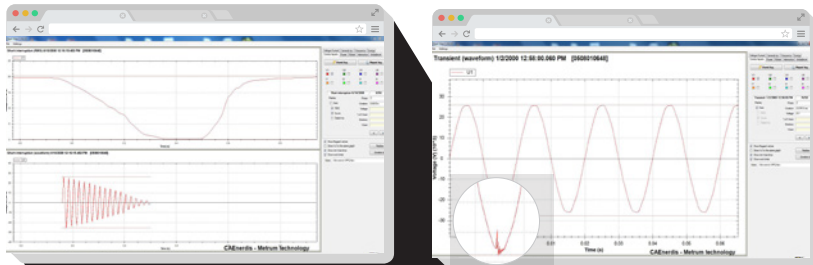
Qual-View

For examining energy delivery or supply quality at the point of connection



- your name and including information on the equipment
- For the current week and all past weeks

- to their type
- Relevant sorting systems (type, phase concerned, upstream/downstream, etc.)
- A time/date-stamped summary of each event along with a picture of it

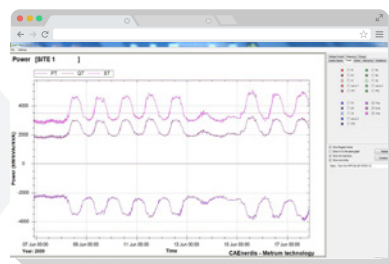


Intuitive, user-friendly and simple to use to understand the most complex phenomena

- Under
- What happened?
- Does it come from my installation?
- Observe the waveform of the event affecting delivery of the energy as a voltage
- Compare this event with the waveform of the current

- in-dep
- Zoom on the waveform at the time of the event (current and voltage)
- Display of the briefest events distorting the voltage waveform

View the evolution of your energy quality over time and measure its impact on ageing of the installation and on your energy bill

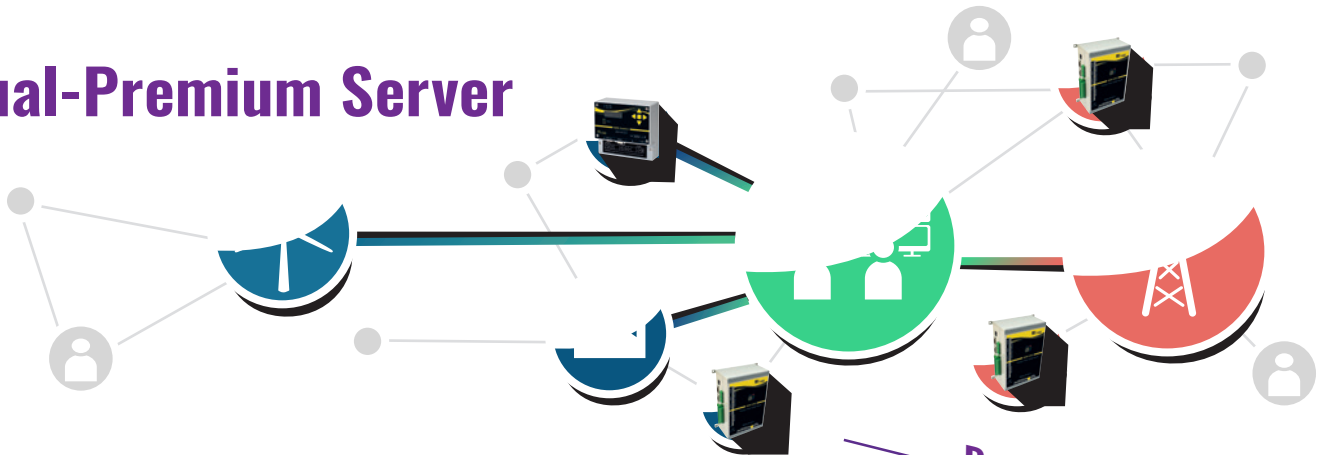


- An app
- down to
- behaviour in the variations of power and active energy consumption



- Main
- disturba
- Use a 10-minute view of all the electrical quantities simultaneously:
- Distorting power THDi compared with apparent power S
- Flicker disturbances
- Frequency and unbalance
- The harmonics and their components

E.Qual-Premium Server



The most extensive and critical electrical networks require close supervision of the energy quality at the points of connection.

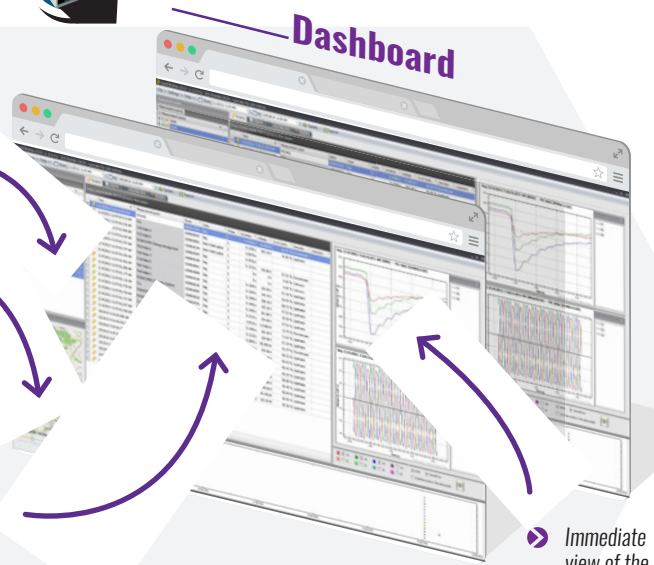
E.Qual-Premium Server is a unique, user-friendly solution for managing a fleet of ten to several hundred network analyzers.

Peace of mind: all the data are collected automatically by a high-performance remote data retrieval engine

Complete: a history starting when the fleet of equipment was commissioned allows you to benchmark all the analyzers

Analysis: tools designed to summarize the measurements from the fleet of analyzers and share the information concisely with decision-makers and operators

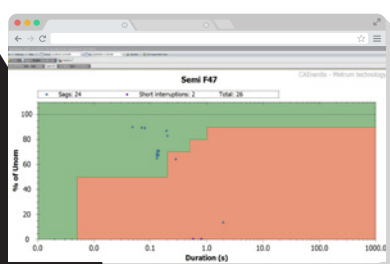
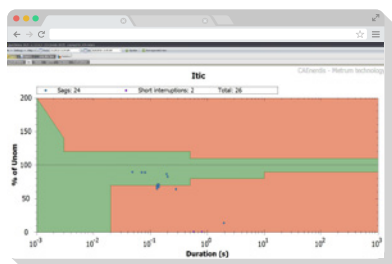
- Grouping of analyzers according to the feeder, type, etc.
- Representation and geographical location of the analyzers
- Build up a view of the network by quantifying the problems on all the stored data by means of an intuitive sorting system
 - > Identify the weaknesses in the network's structure (phase, type of event, directionality)
 - > Match up the phenomena according to their critical nature and their duration



➤ Receive email alerts

➤ Immediate view of the network anomaly

Analytical and statistical tools



- Sector-specific analytical tools for computing environments and sensitive industrial processes

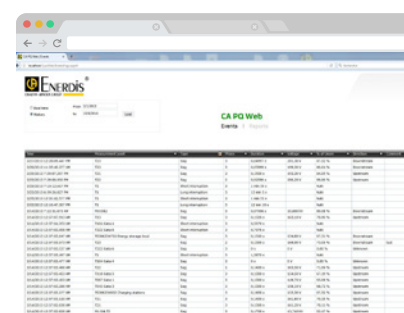


- Statistical analysis of electrical events

The Qual-Web module

Key information from your quality measurement database in your web browser

- Module allowing transmission of information from the database to other users (operators, customers, management, etc.)
 - > Does not require local installation of the software
- Management of EN50160 report generation and events
 - > Access manager: the administrator can limit access to a selection of devices to a subset of users





Urban transport

Check electrical energy supply quality at the level of the metering stations.

Assess the levels of harmonic pollution transmitted on the electrical network.

Anticipate anomalies which may negatively affect service operation (detection of deviations, distortions of the voltage waveform, monitoring of the homopolar voltage, etc.)



Industry

Benefit from the information necessary to ensure fulfilment of energy quality delivery commitments.

Control electrical energy consumption and all the subtleties of its composition:

- Reactive energy consumption
- Harmonic rejection

Sanctuarize the entire history of the electrical activity at your point of connection.

Take advantage of sector-specific analytical tools dedicated to your application (SEMIF47 profile for robotized production lines, etc.).



Specialized tertiary (Hospitals / Datacenters)

Control the electrical power supply's ranges of variation which may affect the operation of sensitive equipment.

Take advantage of the sector-specific analytical tools dedicated to your application (ITIC profile for IT premises, etc.). Relay the anomalies to contact outputs so that maintenance staff can react quickly.



Electricity transmission and distribution network managers

Manage your assets

Benefit from analytical tools capable of quantifying the evolution of the energy quality on the network and produce reports:

- Over time by storing all the data after implementation of the solution
- In space by means of a structural or geographical representation of the fleet of devices (differentiation between supplier / customer connections, presence of renewable energy, etc.).

Maintain your installation by regularly identifying the network nodes subject to problems and qualifying the problems' origins. Act quickly when network anomalies are reported by email by the system.

Manage your customer base

Arbitrate on the energy quality at the points of connection by issuing reports on compliance with the network quality standards. These reports can be customized with your name.

Assess the behaviour of customers on the network who are consumers and producers and identify any pollution emitted.

Benefit from an offering of fixed/portable analyzers allowing spot measurement campaigns at sensitive points.

Close to your concerns

A rugged, upgradable solution capable of handling several hundred devices.

Our know-how to propose ways of interfacing our solution with any system or type of equipment already in place (interoperability with proprietary software, roll-out of pqdif export modules, etc.).

Maintenance contracts for quick integration of your requirements and support for roll-out of the new software functions.

ENERIUM 300

MAP Compact

MAP 610

MAP 620

MAP 640

Functions

Monitoring of standards	EN50160	Status over the last 2 weeks	Historization of all past reports		Generation of customizable reports in Word format
	Creation of customized template	Limited	Complete		
Long-term measurement	Standard (1)				
	Advanced (2)				
Events	Dips, outages and overruns	Time/date-stamping and storage of the characteristics 4 associated waveforms (up to 12 can be stored)	Time/date-stamping and storage of the characteristics, upstream/downstream detection, 10 s pre-post recording of rms value, associated voltage and current, Systematic recording of the associated waveforms, UNIPeDE - ITIC - SEMIF47 presentation of the events via E.Qual-Premium Server		
	Transients		12.8 kHz	2 MHz	

Performance

Recording	Curves on event	All measured electrical activity			
Memory		4 weeks	14 weeks		
Measurement accuracy					
IEC 61000-4-30		Class A			

Electrical connection

Voltage	400 V / 230 Vac		690 V / 400 Vac		
Current	1 - 5 A	1 - 5 A	1 - 5 A	1 - 5 A	

Communication

Analog input / output	Up to 8 inputs/outputs	4 inputs			
Logical input / output	Up to 8 inputs/outputs	1 input / 1 output	2 outputs		
Communication	Ethernet or RS485 (Modbus TCP supported)	Ethernet or USB or RS232	Ethernet or RS232 (Modbus TCP supported)		

Mechanical specifications

Dimensions in mm		155 x 165 x 68	160 x 240 x 60	160 x 240 x 90	160 x 240 x 90
Mounting	Panel cut-out	Plate-mounting			
Weight (kg)	0.7	0.9	1.3	1.3	1.7
Operating temperature	-10 °C to +55 C	-10 °C to +55 C			

(1) Harmonics, THD, voltage, current, power values - (2) Interharmonics, RVC, flicker

Enerdis also offers

MAP607, the little black box for finding out everything about your network quality:

- Commissioning by non-expert staff who are not electricians
- Subsequent processing of the data recorded on your PC
- Connection to residential mains socket
- Compliant with EN50160 and IEC 61000-4-30 Class A



ENERIUM 300 is also available in a version without a display

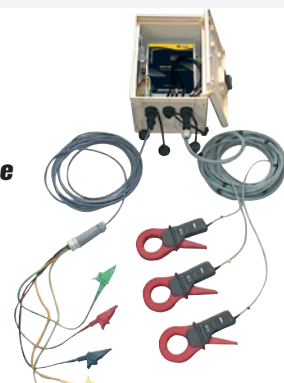
The MAP NI range, a non-intrusive solution

- For spot measurement campaigns



The self-powered analyzer for measurements in junction boxes at the top of electricity poles

- MAP620-NI in its case with the voltage strand and current sensor torch



ENERIUM 300 power monitors

MODEL	FREQUENCY	ACCURACY CLASS	POWER SUPPLY	COMMUNICATION	ON-OFF INPUT	ON-OFF OUTPUT	ANALOG OUTPUT	REFERENCE
ENERIUM 300	50 / 60 Hz	0.2s	80 to 265 Vac / 110 to 375 Vdc	RS485	0	0	0	P01330816
ENERIUM 300	50 / 60 Hz	0.2s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	0	0	0	P01330817
ENERIUM 300	50 / 60 Hz	0.2s	19 to 58 Vdc	RS485	0	0	0	P01330818
ENERIUM 300	50 / 60 Hz	0.2s	19 to 58 Vdc	Ethernet	0	0	0	P01330819

ENERIUM 300 is also available in a version configured to your specifications. Please do not hesitate to contact us.

Associated software		REFERENCE
E.Set	Settings	P01330501
E.View	Settings, display, diagnostics	P01330601

MAP network analyzers

MAP6

Model	
1	Three-phase - Voltage only
2	Three-phase - Voltage + current
4	Three-phase - Voltage + current + HF transients
Digital outputs	
C	2 digital outputs as standard
Communication	
0	Without Ethernet port (COM and MODEM only)
E	Without Ethernet port (+ COM and MODEM)
Power supply	
0	85 - 264 Vac / 110 - 375 Vdc
4	48 Vdc
Voltage input	
6	690 VRMS (ph/ph)



Example:
 Order the code MAP640CE46 for a MAP640 model with Ethernet port + 48 Vdc power supply + 690 VRMS voltage input

MAP COMPACT

MODEL	REFERENCE
MAP COMPACT without Ethernet	P01340010
MAP COMPACT with Ethernet	P01340020

Associated software		REFERENCE
FOR MAP COMPACT	Qual-View	Settings, display, analysis
FOR MAP610/620/640	E.Qual-Premium	Settings, display, analysis
FOR MAP610/620/640	E.Qual-Premium Server 5 licences	Settings, remote data retrieval, display, administration, analysis
FOR MAP610/620/640	E.Qual-Premium Server 20 licences	Settings, remote data retrieval, display, administration, analysis