enef

developed by
QUARTZ MATRIX®

Energy and Utilities Management System

The leap to digitalization of energy consumption monitoring with Quartz Matrix

Why Quartz Matrix

We have constantly turned our attention to digital transformation, Industry 4.0 solutions, modern methods of interactive education and we have always paid special attention to research and development.

We, the people of Quartz Matrix, are a dedicated and determined team to deliver innovative digital solutions because technology and evolution are the key words that define our business directions. In our company more than 100 employees dedicated and passionate about digitization join forces in the name of innovation. Continuous research and adaptation to market needs have guided our path since 1994, the year Quartz Matrix first saw the digital light. In over 27 years of activity, we have become a reliable partner for over 2000 companies in Romania, in 2020 reaching a turnover of 50.2 million RON.

During this time, we have focused on long-term partnerships, managing to be close to our customers both with customized solutions, tailored to their needs and with complete services, from consulting and implementation to project management and maintenance, services that ensure the perfect operation of the proposed solutions, down to the last detail.

We are convinced that we can also become your business partner, and together we can build the path to digitisation, efficiency and performance with solutions adapted to the specifics of the company you represent. And because lasting relationships are a characteristic feature of our company, we want to provide you with all the necessary support and the ability to understand your needs.

Why choose Quartz Matrix as a provider of energy monitoring services?

1 For our experience of over 27 years in the technological solutions market

2 For the 3500+ projects that have already been implemented and are working successfully

3 For 20+ authorizations in performing complex energy audits by the National Energy Regulatory Authority

4 For the possibility of customizing the solutions on the specifics of the clients in the industry due to the existence of our own R&D Department

5 For complete services: Consulting - Design - Implementation - Training - Maintenance – Service

6 For innovation and experience in Industrial IoT and Industry 4.0

Why do you need an Energy and Utilities Management System?

Often, we tend to ignore energy consumption. It is a natural thing, we must consume, mustn't we? But what would it be like to be **able to track all these consumptions, to be notified, in real time, through a digital system** when an equipment consumes too much or unnecessarily? And, on top of that, to be able to act in real time?

It is essential for the business you run to understand financial expenses. A detailed analysis of consumption through a daily, monthly, or annual report can indicate you the areas with high consumption and the moments when these fluctuations occur.

Go green! Let's not limit ourselves to cost optimization. Let's see the bigger picture. We are consuming more and more, and our planet is suffering. We are facing accelerated global warming and frequent natural disasters. Although the damage has been produced, we can stop this galloping process. The possibility of change depends on everyone's awareness and the power to realize that every small step towards streamlining consumption can produce big changes. Not to mention the political targets regarding climate change mitigation that are getting more and more ambitious in the years ahead: by 2050, the EU needs to cut GHG emissions by 80-95% below 1990 levels.

What processes will take place next?


Data collection


Data analysis


Changing the physical environment based on the analyzed data

What do we obtain through these actions based on data analysis?

1. Framing consumption in budgeted values
2. Tracking specific consumption by location and area, local accountability and central monitoring
3. Making business decisions based on the analysis of reports of the remote management system
4. Elimination of unnecessary consumption and strengthening the discipline of use
5. Accurate calculation of cost and energy intensity per location
6. Efficient use of energy resources and utilities
7. Analysis of the quality of energy distribution and consumption
8. Analysis of incidents in case of damage
9. Prevention of major flaws by monitoring consumption parameters and preventive maintenance

Are there any laws governing the digitization of energy management?

Yes! There are several rules and standards of good practice for energy management and energy efficiency.

Internationally, best known and most used law is **ISO 50001: 2018** for energy management, which is based on the efficiency cycle: Plan-Do-Check-Act. The ENEF app developed by Quartz Matrix complies with and even exceeds the requirements of this standard.

Energy Efficiency Directive (2018/2002) - In 2012, the EU established an Energy Efficiency Directive (2012/27/EU) that determined a set of binding measures to help achieve a 20% energy efficiency improvement by 2020. In 2018, the EU noticed that the efforts that were made were not sufficient and amended the directive, publishing a new Energy Efficiency Directive (2018/2002). The key element of the 2018 Directive is the new overall target, which goes from 20% improvement in energy efficiency by 2020 to 32.5% by 2030.

Introduction of building control and automation systems as an alternative to physical inspections. The automation of buildings and the monitoring of their energy consumption will make it easier for both consumers and businesses to achieve energy savings and being economically profitable.

Control systems are the most cost-effective alternatives for large residential and non-residential buildings. In addition, control systems will make it effortless for a third party to check that installations are working properly.

The directive will require non-residential buildings with ventilation and/or heating/air conditioning systems of more than 290 kW to install building automation and control systems from 2025 (provided it is technically and economically feasible).

In keeping with the EU Energy Efficiency Directive, all large companies in Europe countries must carry out energy audits. Each company is required to present a report detailing its total energy usage and how it is accounted for by the separate parts of its operations. The report should also contain suggestions for cost efficiency improvement measures. Every fourth year, a new report is to be produced, in which the results are evaluated, the energy usage verified, and new improvement measures suggested.

Short chronology

2003 The first implementation of the e-Net Energy Consumption Monitoring System, Orion Foundry
First place in the hierarchy of companies - Research, Development and High-Tech field, awarded by the Iasi Chamber of Commerce and Industry

2006 Brikston Ceramics Implementation - Introduction to utilities and web interface

2007 Implementation to Rulmenți Bârlad - 2 specific desktop applications for cogeneration

2010 Delphi Technologies - introduction of sending e-mail reports as a service

2012 Implementation to RECOMPLAST

2013 Implementation to Cummins Romania and Preh Romania

2014 Implementations to Arctic, Continental, UZUC, Timken Ploiesti, Barlinek

2015 Implementations to Preh, Romcarton, SOMPLAST, Caremil

2017 Implementations to OMV Expert Petroleum, IRUM

2019 Implementations to Celestica, Roca, Infopress, SILCOTUB

2020 Implementations to Autoliv and TESTER

ENEF Architecture

The ENEF platform has a versatile architecture that can be configured in structures such as:

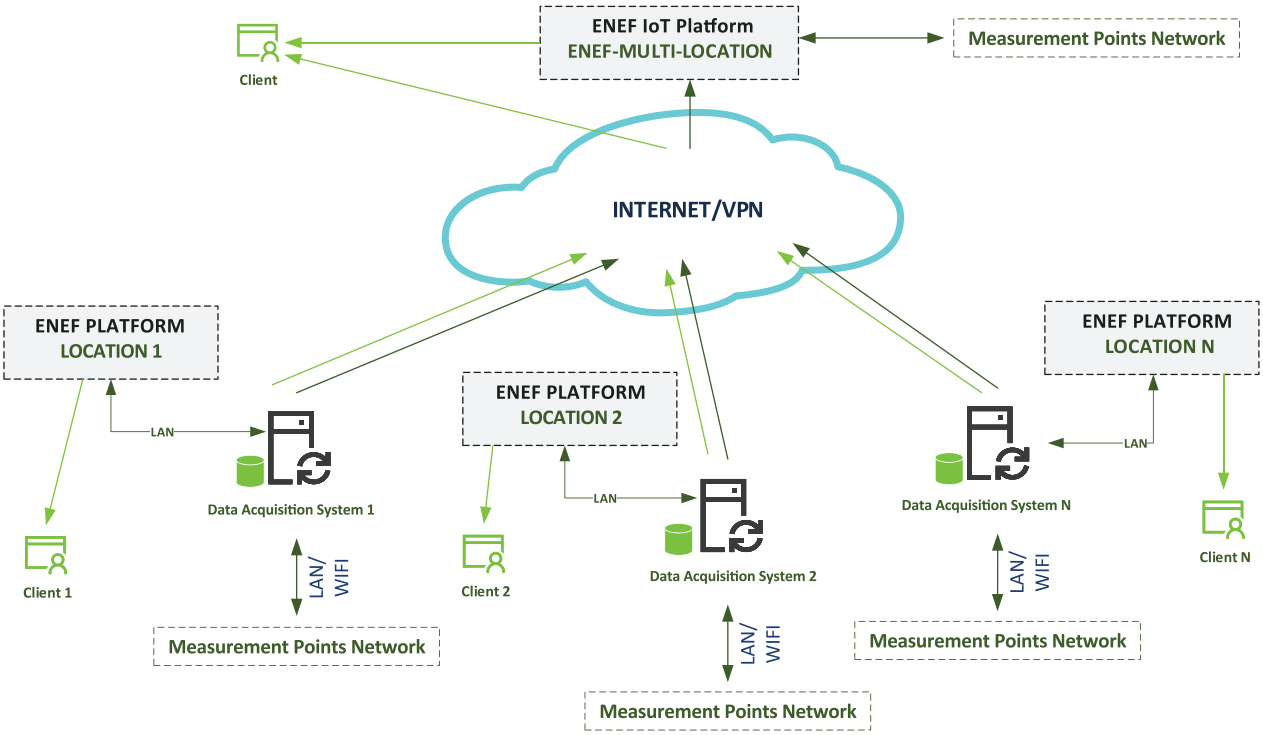
SINGLE LOCATION: On the local server of the client

DISTRIBUTED ACQUISITION:
Via VPN the server communicates with several locations simultaneously

DISTRIBUTED-ACQUISITION CLOUD:
Server in cloud, communicates with multiple locations simultaneously

MULTI-LOCATION:
Via VPN, the MASTER server communicates with multiple SINGLE LOCATION platforms

ENEF IoT Platform Block Diagram



ENEF Functionalities

- Measurement of quantitative and qualitative parameters at which internal energy consumption and distribution is made
- Measurement of utility consumption (water, natural gas, thermal energy)
- Transmission of this information to the collecting point
- Data collection and database formation for the history report
- Generating real-time alarms and checks
- Display of measured quantities via the human-machine interface and take over configurations and commands
- Generating reports, configurable on user profiles

Benefits of using ENEF

1. Elimination of penalties for exceeding peak limits
2. Reducing the cost of the electricity bill by up to 20%
3. Introduction of a high-performance measuring instrument
4. Real-time monitoring of the consumption and distribution system for energy and utilities
5. Selecting the type of supplier from which you can buy energy in the most advantageous conditions
6. Selection of technologies to reduce the CO2 footprint
7. Monitoring the discipline of resource use
8. Assessing the energy efficiency of existing and future technologies and measures to reduce consumption and energy intensity
9. Cost transparency
10. Highlighting the residual consumption and those necessary for the operation
11. Accurate determination of energy efficiency of locations or areas
12. Integrated and correlated monitoring of energy and utilities
13. Monitoring and recording of environmental effects related to these consumptions
14. Recovery periods of less than 6 months for electricity, steam and about 1 year for natural gas

ENEF integrates IoT technologies and is an integral part of Industry 4.0

To best meet the needs of your company, ENEF can integrate Industry 4.0 and IoT technologies. This way, technologies can "communicate" with each other, offering added value, dynamism, and performance in production. Through a balanced combination of digitization, process automation and rapid access to information, drastic changes can be made in terms of efficiency and productivity, all in an increasingly competitive and connected global market.

Application Customization

- Accessible from any location, via the Internet, in the form of dynamic web pages by authorized and authenticated users
- They are configurable depending on the type or profile of the user
- Provides the ability to automatically generate reports at programmable intervals
- The possibility of extending the network by as many measurement points as desired
- Organizing measurement points in any configurationby cost centers, production areas, etc.
- Possibility to integrate a multitude of types of meters, from different manufacturers

Services provided for system implementation

Consulting services

Execution of work

Commissioning

Customization

Personal training

Maintenance and technical support

Roadmap ENEF (2003-2022)

Year	2003	2007	2010	2013
Version	e-Net 1.0	e-Net 2.0	e-Net 3.0	e-Net 4.0
Developed features	Desktop data retrieval application	Energy Management Module Weighted averages in automatically forecasted calculations	**Technological upgrade: web-based interface**	BiggieBone Integration (Research Project)

Year	2017	2018	2019	2020
Version	e-Net 5.0	ENEF 1.0	ENEF 2.0	ENEF 2.1
Developed features	GMS/GPRS communication support	**ENET becomes ENEF** Friendly and intuitive user interface	**Change of architecture and support, Edge computing, Tehnological Upgrade, IoT Integration, Industry 4.0 Compatibility, Extension of communication protocols (Ethernet, IP, SNMP)**	Real-time data support Multi user support Active Support Directory Flexible reports Real-time alarm Configurable Alarms

Year	2021		2022	
Version	ENEF 2.2	ENEF 2.3	ENEF 2.4	
Features to be developed	Developed Features: Values history in dashboard, Multilanguage support, Optimized dashboard for mobile devices, Reports with all consumptions in ANRE format with a single click, Real-time loss detection	**Machine Learning Module** Google Maps support	**Floor Planning Module** Machine Learning models organized by fields of activity	

Case study - Automotive Client

BorgWarner Romania - How the ENEF system contributes to the management of electricity costs in a factory in the automotive industry

The customer operates in the production of automotive components. In his field of activity control over the final cost of production is a key element for market competitiveness. The customer needed a system that would provide real-time data on electricity consumption, so that he knew exactly how much the electricity cost represented in the total production cost.

For the control of electricity costs, we recommended the installation at the distribution level, as well as at the equipment level of the ENEF system that monitors the energy consumption. In 2011, the customer implemented the ENEF system in the factory for a number of 20 measurement points targeting the largest energy consumers in the factory. Year by year, convinced of the benefits obtained from the implementation of ENEF, he extended the system to a number of over 900 measurement points which currently fully monitors the electricity consumption of the factory. Thus, by using ENEF, the customer achieves efficient management of electricity costs, has control of energy costs in the final cost of products and has streamlined electricity costs.

„BorgWarner Romania collaborated with QUARTZ MATRIX SRL in the implementation of the energy management system for monitoring industrial consumers and compressed air installations. We hereby want to confirm the quality of work and professional competence of Quartz Matrix specialists who have designed and executed a solution appropriate to our needs. We would like to highlight the quality of the services offered regarding the installation of the equipment, the technical support provided post-implementation and the reports made on our specific activity. We are aware of the complexity of the work you have performed at our company's headquarters and we continue to count on you to provide technical support whenever needed. Thus, we recommend the Quartz Matrix to other companies for the good identification of the solutions we needed, for the good execution and the timely compliance with the execution terms. We mention that the project was implemented without any incident, the implementation team adapted to our working conditions, they carried out the implementation without interrupting the planned production. The commissioning and operation of the equipment have also been successfully completed."

(Lucian ȘANDRU, Facility Manager, BorgWarner Romania)

Why choose ENEF?

The energy consumption monitoring system ENEF is fully developed by the R&D Department of Quartz Matrix. Our specialists are always anchored in the constantly changing and evolving reality of the energy market.

Over the years, more than 20 people have contributed to the development of the ENEF Energy Management System. Today, ENEF team is made up of the following colleagues:

Research & development:

Bogdan Bălănică
Laura Davlea
Toma Vararu

Automation Research Engineers:

Emanuel Măgdici
Ovidiu Brănuț

Testing & Support:

Lucian Toma

Project Manager:

Victor Navrea

Product Manager & Sales Rep.

Constantin Maftei

ENEF is a fully integrated application for:

- analyzing metering data
- real-time consumption tracking
- technical, commercial, and managerial reports
- precise substantiation of consumption forecasts related to the level and structure of activities.

The ENEF solution is implemented and supplemented to the beneficiaries with their specific requirements so that it responds to the entire spectrum related to technical and financial energy management, real-time control of consumption and distribution, forecasting and tracking allocated consumption quotas.

Recommendations & Testimonials

BorgWarner Romania - ENET energy consumption remote management system in 1190 measuring points

"We want to confirm the quality of work and professional competence of Quartz Matrix specialists who have designed and executed a solution appropriate to our needs."
(Lucian Șandru - Facility Manager)

Neptun S.A. Câmpina - ENET energy management remote control system in 20 measuring points

"The major help offered was in streamlining energy processes. The benefits and the results we obtained exceeded our estimates, and the return on investment was made below the deadline. (...) By using the reports provided by ENEF we managed to obtain forecasts with an accuracy of 2% compared to 10-15% and thus we renegotiated and obtained a better price from the electricity supplier. Other benefits brought by the ENEF system are optimization of working time by centralizing field data, reporting on time levels, timely control of energy processes, highlighting losses and we hope that soon, by expanding the system, to highlight consumption by centers of cost."
(Rudolf Leica - Deputy General Manager)

Companies that use ENEF

BorgWarner · Autoliv · Continental · preh

arctic · ipg · ROMAERO · Cummins · Celestica

TIMKEN · RECOMPLAST · Roca · BRIKSTON Mai rezistentă decât prevede legea. · URB

Electrolux · MEFIN · TenarisSilcotub · SOMPLAST

QUARTZ MATRIX®

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