



Energy Data Analytics

Elevate Your Strategy: From Basic Monitoring to In-Depth Analytics

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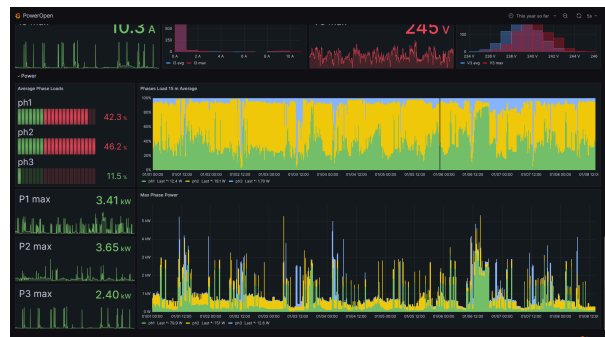
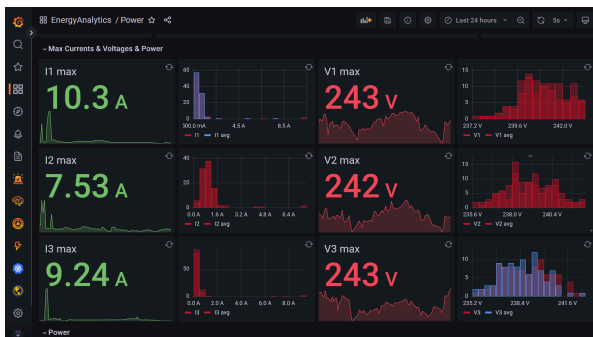
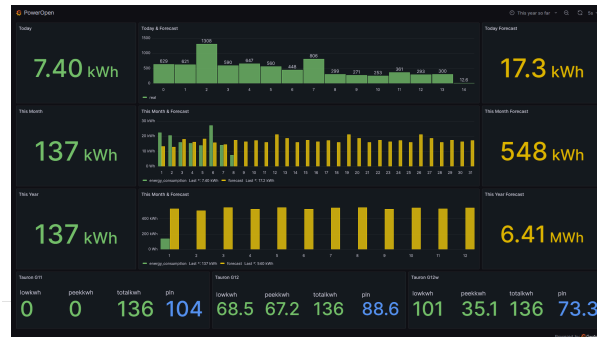
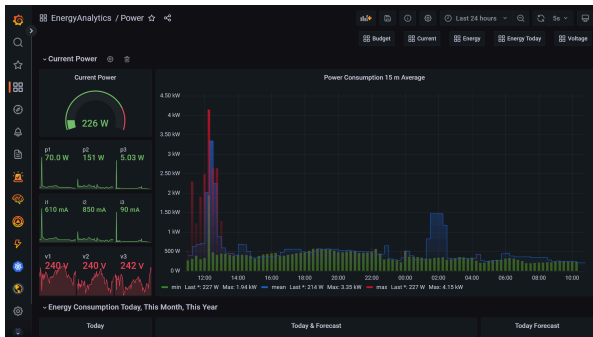
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Why Analyze Energy Data?

By leveraging sophisticated **algorithms**, our analytics delve deep into energy data, offering:

- **Enhanced Operational Insights:** Detailed understanding of your energy usage patterns.
- **Cost Reduction and Enhanced Operational Efficiency:** Strategic identification of savings opportunities.
- **Risk Mitigation:** Proactive detection and prevention of potential losses and damages.
- **Continuity Assurance:** Avoidance of unexpected production stops.





Meet the Energy Analytics Algorithms.

Group:

Consumption **Costs** **Past** **Forecast** **Tariff Comparison**

Algorithms:

- **Energy Consumption with Forecast**

Output

Energy consumption chart for past periods and forecasts, e.g., the current year with monthly forecasts until the end of the year.

- **Energy Cost with Forecast**

Output

Energy cost chart for past periods and forecasts

- **Energy Cost with Forecast at Available Tariffs**

Output

Energy cost simulation for defined available tariffs for past periods and forecasts.



Group:

Currents Voltage Power

Algorithms:

- **Overcurrent Protection**

Output

Histogram displaying the breakdown for three phases of maximal and average 1-minute current flows, indicating the duration the current exceeds safe limits, which could lead to breakdowns, production stops, or even fires.

- **Overvoltage Protection**

Output

Histogram displaying the breakdown for 3 phases of maximal and average 1-minute voltage.

- **Power Load**

Output

Chart displaying the breakdown for three phases of power consumption, highlighting the load for each phase and potential asymmetry in power consumption.

- **Power Guard**

Output

Chart showing the breakdown of ordered energy versus consumed energy, along with the calculation of the Optimal Ordered Energy Level and associated cost savings.

- **Reactive Power Guard**



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Output

Chart displaying the level of reactive power disruption, triggering an alarm when the limit is exceeded.

Group:

Realtime

Algorithms

- **Real-time Power Profile**

Output

Chart showing the total power consumption for the last 24 hours, for every 15 minutes, with maximal, average, and minimal temporary peaks. The chart's analytics may highlight potential disruptions, such as extraordinary load switches.

- **Current Energy Parameters**

Output

Real-time Power, Current, and Voltage breakdown for three phases, Total Power and Energy Consumption Chart for the last 24 hours.

- **Power Profile Analytics**

Output

Correlation between the Expected Power Profile, derived from past data, and the Current Power Profile for automated detection and assessment of disruptions. This analysis can trigger real-time alerts to prevent losses or damages.



Group:

Efficiency **Losses** **Leakage**

Algorithms

- **Compressors Efficiency**

Output

Chart illustrating the energy consumption required to produce 1 Nm³ of compressed air, compared with past periods to indicate the health of the compressor and its accessories. For multiple compressors, includes computation of load hours, frequency of compressor switching, and pressure stability control.

- **Pipeline Leakages**

Output

For pipelines carrying compressed air, water, gas, heat, and cooling, the algorithm calculates the input-to-output difference when feasible, or computes the minimum flow from past data and compares it to the current period's minimum flow. This comparison of minimum flows serves as an indicator of any decrease in the tightness of pipelines and installations.

- **General Machine (Process) Efficiency**

Output

This general algorithm correlates machine output, cycles, products, working time, and downtime with energy consumption, providing insights into the efficiency of energy use compared to past periods.



Group:

Data Processing

Algorithms

- **Time Synchronization**

Output

Measurement data is captured at time-synchronized intervals, including every full minute, 15 minutes, hour, or day, ensuring consistent time-based analysis.

- **Interpolation**

Output

To maintain data continuity, each missing sample is interpolated.

- **Aggregation**

Output

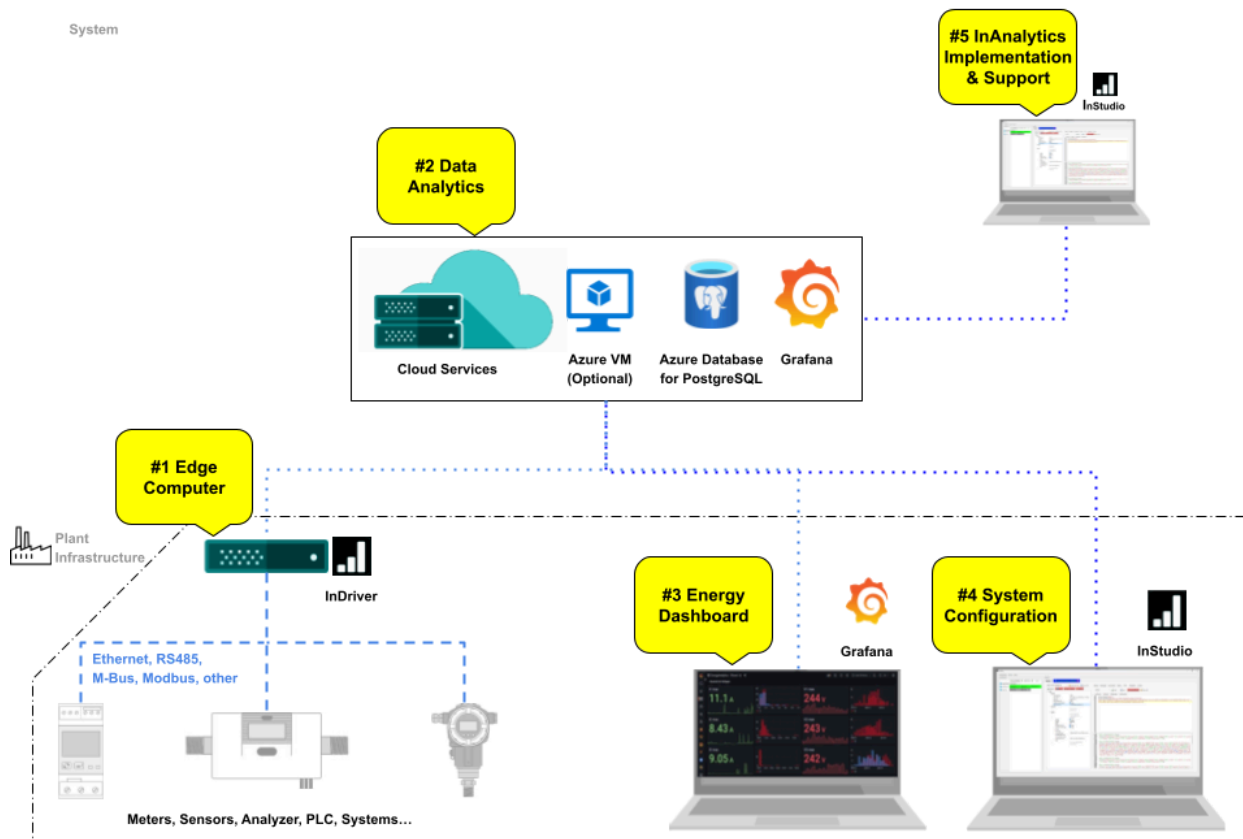
Measurement data is typically aggregated into time series of 1 minute, 15 minutes, 1 hour, and 1 day, with statistical values such as minimum, maximum, average, and delta values calculated for each period. These aggregated data sets form the foundation for further analytics.



Innovative Data Analytics

How Our System Works

We integrate modern technologies to create the ideal ecosystem for Energy Analytics, combining **InDriver** from **InAnalytics** with a **database** and an optional **virtual machine** from **Microsoft Azure***, and employing a **dashboard** from **Grafana**.





How to implement our Energy Analytics System?

We install Edge Devices (Windows Industrial Computers) equipped with InDriver Software at the plant, connecting them to meters, sensors, measuring instruments, or existing systems (databases). Depending on the implementation requirements, these computers come with Ethernet and serial RS 485/422/232, M-Bus, and I/O Ports for direct connection to existing or additional measurement devices. The InDriver Software installed on the Edge Device allows remote configuration to acquire and process data from the connected devices.

Cloud Solution - The Preferred Choice with Maximum Benefits

Cloud Architecture:

- **Edge Devices Integration:** These devices are linked to Cloud Servers, specifically to Azure Database for PostgreSQL and the Grafana Dashboard. For more complex applications, an additional Azure Virtual Machine can be utilized for running advanced data analytics algorithms.
- **Accessibility:** Users can log into Grafana from any computer or mobile device to access analytics data seamlessly.
- **Implementation and Support:** Inquire your IT department about managing connections between Microsoft Azure and Grafana.

Advantages:

- **Remote System Management:** InAnalytics offers remote implementation and ongoing support, ensuring efficient operation.
- **Universal Dashboard Access:** Users can access the dashboard from any location, using any computer or mobile device, providing flexibility and convenience.
- **Minimal Maintenance Required:** The system is hosted on secure cloud servers, supported by 24-hour assistance, reducing the need for extensive maintenance.



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On-premises Option - For Those Preferring Local Hosting

Local Setup:

- **Connection:** Edge Devices are linked to a local database and Grafana server, requiring direct management by the company's IT department.
- **Administration:** The local servers should be managed by the company's IT personnel. For the InAnalytics Support Team to provide remote implementation and support, access permissions are necessary.

Consideration: This approach is suited for companies that opt out of cloud solutions, preferring to keep their data and analytics processes within their local infrastructure for various reasons, including security, control, or compliance with specific regulations.



What is the Energy Analytics System Cost?

Our transparent pricing model ensures affordability and scalability.

Cloud Basic

In the Basic solution, all analytical computations are conducted on the Edge Computer, with results stored in a virtual database. This is sufficient for systems comprising a few measurement devices (such as meters, sensors, and other data sources).

- Edge Computer x1
- InDriver x1
- Microsoft Azure Database x1
- Grafana Dashboard x1

	Edge Computer	Software Subscription	TOTAL
	<ul style="list-style-type: none">• Minis Forum NAB5• WaveShare USB to 4RS485	<ul style="list-style-type: none">• InDriver• Microsoft Azure Database• Grafana Dashboard	
Cost First Year	720€	~1200€	~1920€
Cost Every Next Year		~1200€	~1200€

Note: The Edge Computer on-site installation cost **is not** included.



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Cloud Advanced

In the Advanced solution, analytical computations are performed both on the Edge Computer and on an additional Virtual Machine, which processes data stored in the virtual database. This approach is tailored for more complex systems that include numerous measurement devices or other data sources.



- Edge Computer x1
- InDriver **x2**
- **AzureVM B2s**
- Microsoft Azure Database x1
- Grafana Dashboard x1

	Edge Computer	Software Subscription	TOTAL
	<ul style="list-style-type: none">• Minis Forum NAB5• WaveShare USB to 4RS485	<ul style="list-style-type: none">• InDriver x2• AzureVM B2s• Microsoft Azure Database• Grafana Dashboard	
Cost First Year	720€	~3000€	~3720€
Cost Every Next Year		~3000€	~3000€

Note: The Edge Computer on-site installation cost **is not** included.



- The Edge Computer Specification

Id.	Model/Specification	Price
Minis Forum NAB5	Intel i5-12450H 8 rdzeni DDR4 16GB SSD 512GB 2xEth Windows 11 PRO 	690€
WaveShare USB to 4RS485	Industrial Isolated USB To 4-Ch RS485 Converter (B) 	30€

The quantity of Edge Computers required may vary based on the system's scope and the tally of connected measuring devices. Arrangements for delivery, on-site installation, and documentation will be established through agreement.

Note: The system can be installed on any similar Edge Computer.

- The Software Subscription Specification:

Id.	Software	Subscription monthly	Subscription yearly
InDriver	InDriver	90€	900€
GrafanaFree	Grafana Dashboard Free Plan	0€	0€
GrafanaUser	Grafana Dashboard per User	8€	96€



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AzurePostgr eSQL	Microsoft Azure Database for PostgreSQL 1core 2GB RAM	~17€	~204€
TOTAL		~115€	~1200€
AzureVM B2s +InDriver	Microsoft Azure Virtual Machine Standard B2s 2vCPU 4GB RAM, 128GB	~150€	~1800€

Conclusion

InAnalytics.io is dedicated to advancing energy management strategies through sophisticated analytics. Our mission is to offer analytical algorithms and data visualization tools that address today's challenges in the field of energy management. Our solution goes beyond cost optimization to improve operational efficiency and sustainability.

Demo

Click here to log in to the [Energy Analytics Demo](#)