

The advertisement features a background image of a rooftop solar and energy storage system. The system includes several solar panels, a battery storage unit, and various electrical components. Overlaid on the image are digital graphics: a blue line graph showing power output over time, with labels for 8:00 am, 12:00 pm, 4:00 pm, and 8:00 pm. There are also orange and yellow light trails representing energy flow. A white box in the top left contains the Siemens logo and tagline. A large blue box in the bottom right contains the main headline and product name. A white box at the very bottom contains the website URL.

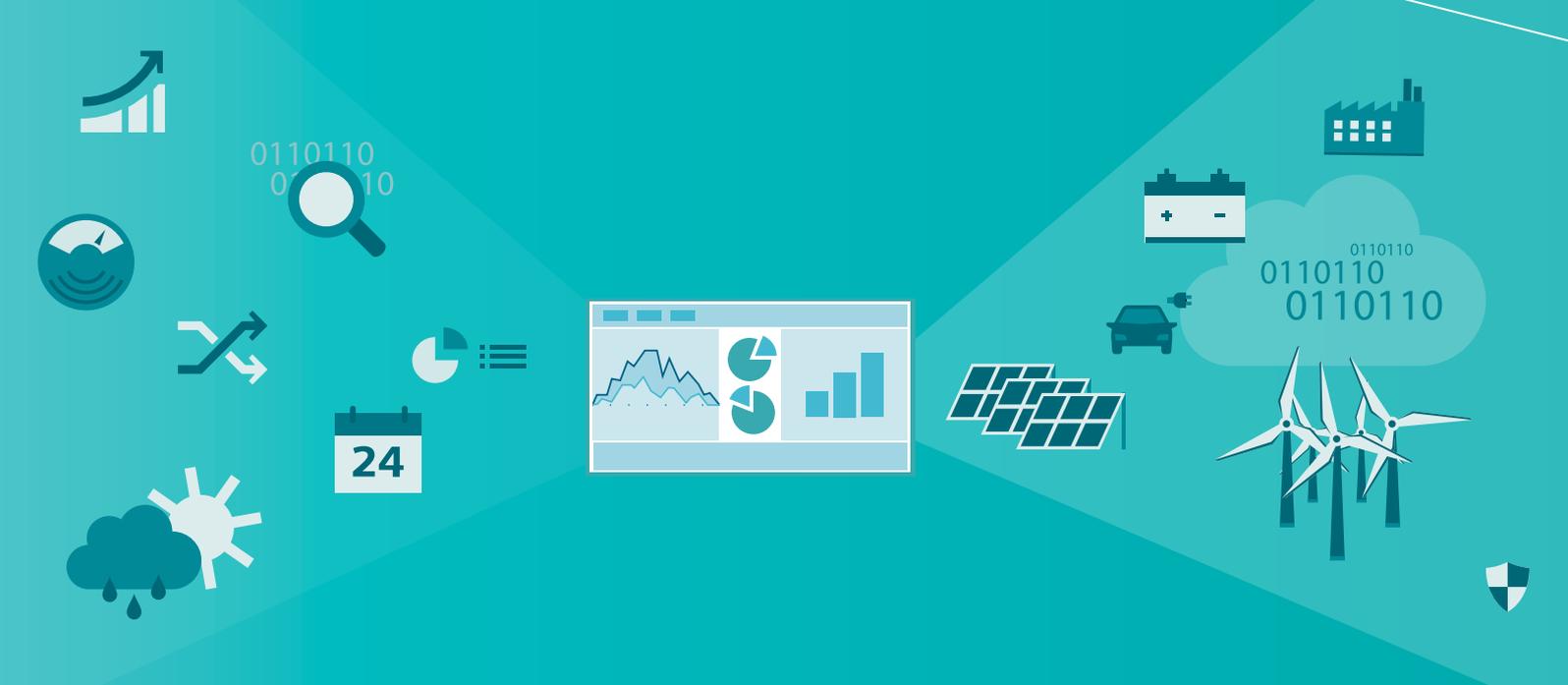
**SIEMENS**

*Ingenuity for life*

Real-time knowledge,  
real-time results

EnergyIP Distributed Energy Optimization

[siemens.com/energyip-deop](https://www.siemens.com/energyip-deop)

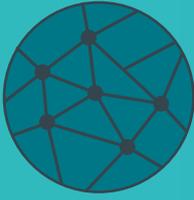


# Real-time energy management

## **EnergyIP Distributed Energy Optimization (EnergyIP DEOP)**

Meet your unique energy management challenges head-on with real-time performance data. With EnergyIP Distributed Energy Optimization (EnergyIP DEOP), you gain a comprehensive overview of all your facilities and assets – worldwide. Near real time performance data helps you to achieve increased transparency across facilities, as well as get an edge up on potential problems and avoid downtime. An intuitive and flexible program, EnergyIP DEOP allows you to have complete oversight of your plant's energy use – regardless of energy type.

**Discover new insights allowing for improved decision-making.  
Access real-time knowledge to achieve real-time results.**



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## One central system, one decision-making application

**Increased transparency.** Simplify data collection, while gaining clarity. One central system allows you to:

- Integrate data coming from other systems to correlate consumption information.
- Get real-time energy monitoring and energy reporting (electric/thermal/gas) at enterprise global level and for each specific site.
- Collect energy data for each site regardless of type: industrial/production plant, commercial building, or microgrid.

**Greater insights.** Keep up with the competition. Successful market participation requires insights found when you:

- Integrate energy tariff models to estimate and simulate energy costs.
- Use load and generation profiling and forecast.
- Optimize algorithms toward energy efficiency, renewable optimization, energy dispatching optimization, and demand response.

**Better decision-making.** Apply knowledge gained through increased transparency and greater insights. Stay ahead of the game, when you:

- Gain a comprehensive overview for a standardized approach.
- Benchmark assets.
- Act on real-time alarms with real-time response measures.

# Distributed energy optimization at its best

Meet energy management challenges head-on

Today's operational requirements demand better situation analysis achieved through the sharing of knowledge and experience within your facility. By combining historical and real time data, you can increase transparency, benchmark assets and locations, as well as apply advanced analytics to maximize your performance. Get an edge up on potential challenges by having real-time information when you need it most – in the moment.

## What is EnergyIP DEOP?

EnergyIP Distributed Energy Optimization or EnergyIP DEOP helps you get the most out of your facility's energy production and consumption by:

- Collecting and processing data (production, consumption, and assets).
- Unifying reporting and analysis to calculate KPIs.
- Managing assets to optimize performance.
- Monitoring and benchmarking devices against each other regardless of location.

## How does it work?

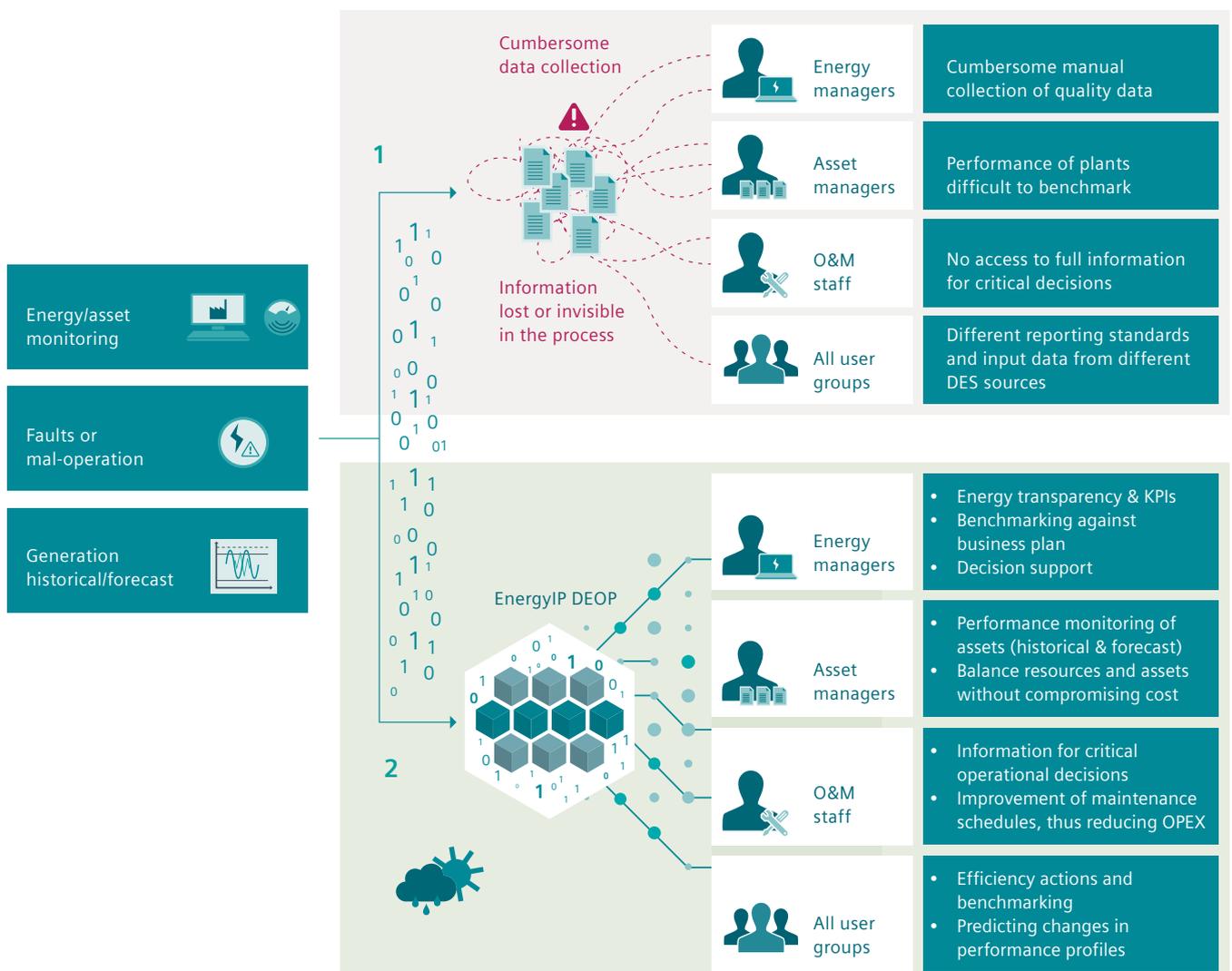
EnergyIP DEOP helps photovoltaic plants, wind parks, communication centers, campuses, and Microgrids increase performance through optimization. By giving you a comprehensive view of your facilities, you're able to benchmark your locations, react in real time with the support of near real time data, and create an optimal schedule algorithm.

## What is the Energy of Things?

There are millions of connected meters and devices. The Energy of Things (EoT) bring these assets together to improve grid planning, operations, and maintenance. Interconnectivity establishes enhanced reliability and efficiency, reduces effort, improves investment planning, integrates conventional and renewable power, and improves grid reliability.

## Without EnergyIP DEOP

### 1. Today's typical dilemma when collecting data from various sources



## With EnergyIP DEOP

### 2. One central system simplifies data collection

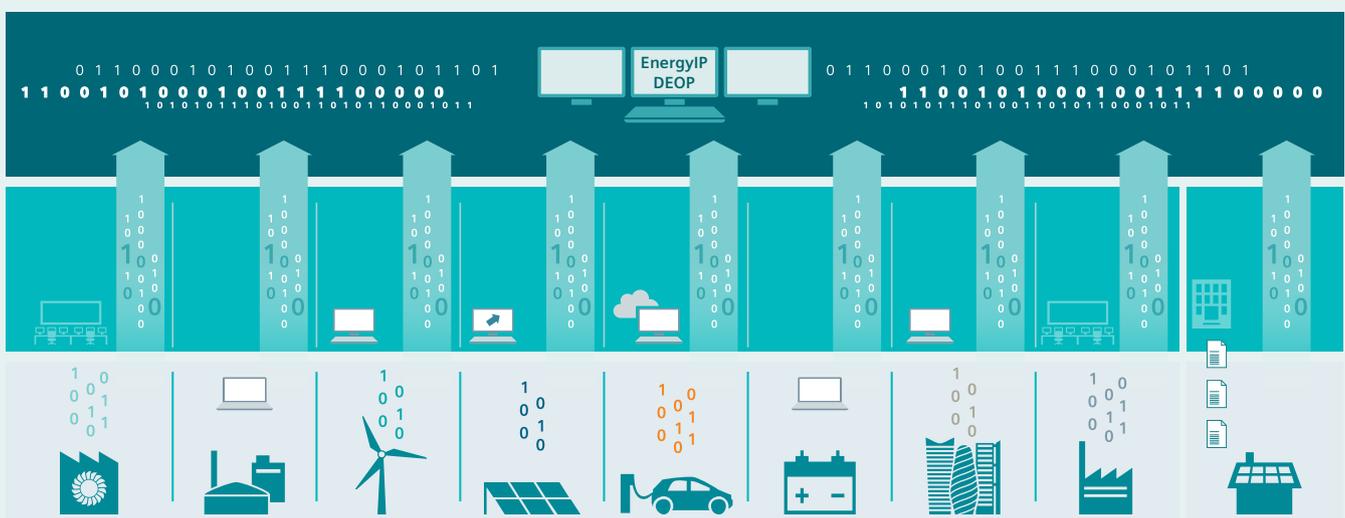
# Solve problems (before they happen)



## Transparency and energy key performance indicators (KPIs)

Avoid multiple information sources and cumbersome, manual data collections. And avoid information loss. With EnergyIP DEOP, you can extract all of your data from one cloud application. Take a standardized approach to viewing, and analyzing, all of your assets and/or sites.

- React immediately with real-time alarming and asset status.
- Take advantage of faster reporting.
- Pull from a consistent set of data for benchmarking and decision-making.



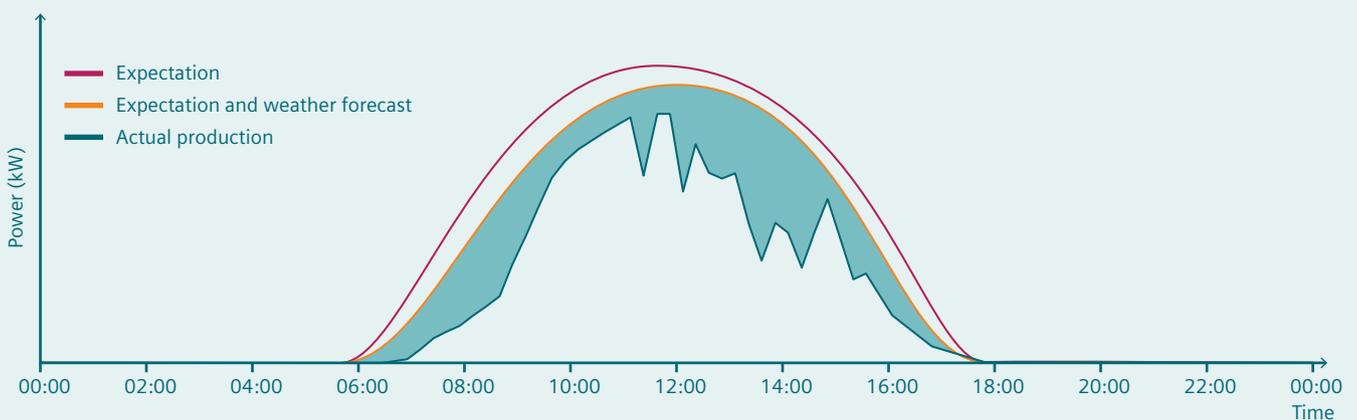
Collect data in near real time for immediate availability. Formats, sampling rates, etc., are standardized. KPIs can be defined and automated signal control leads to early detection of malfunctions.



## Distributed energy resources (DER) forecasts and performance monitoring

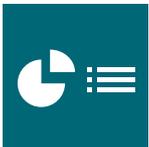
Improve scheduling, implement predictive maintenance, and forecast energy purchases. Apply weather forecast data for photovoltaic- and wind-based energy sites, while taking a closer look at performance monitoring vs. historical data. Aggregate your own forecasts, plus import forecasts for photovoltaic, building, and diesel assets.

- Compare historical events with current forecasts for comprehensive insights that lead to better decision-making.
- Optimize scheduling for grid operators, trading, demand response program participation, and maintenance.
- Get a combined overview for improved forecasting and performance monitoring.



Gain greater insights when you compare past events with current forecasts. Bring together forecasting and performance monitoring to optimize scheduling.

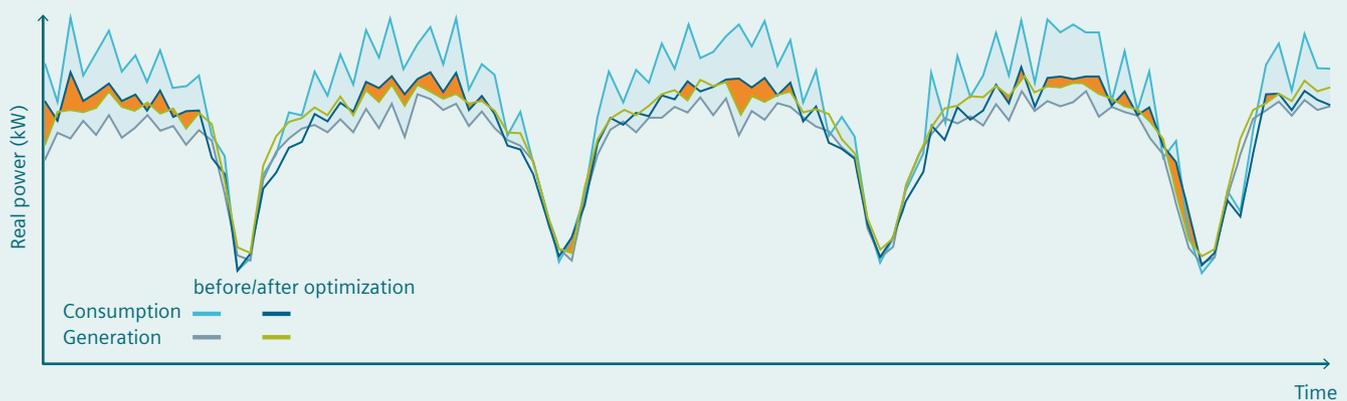
# Solve problems (before they happen)



## Microgrid optimization

In today's world of single automation devices per asset, increasing energy efficiency through automation has not been possible. Additionally, existing automation systems are not expandable with advanced features. With EnergyIP DEOP, you can optimize your assets with rule-based load management, prioritize self-consumption (e.g., load + battery + photovoltaic), and achieve optimal scheduling based on each unit's constraints and costs.

- Improve energy production, while reducing CO<sub>2</sub>.
- Gain real-time awareness of production and consumption.
- Rectify errors faster for minimal downtime.



Improve asset performance with rule-based load management, optimize self-consumption, and optimize scheduling based on asset ability and expense.

## Optimizing photovoltaic plants, wind parks, commercial centers, campuses, and microgrids



### Transparency and energy KPIs

- Geo map/energy/tech navigation
- Geo map support
- Electric/thermal/gas monitoring
- Dashboards and reporting
- Trigger- and KPI-based alarming



### DER forecasts and performance monitoring

- Generation forecast data of photovoltaic/wind based on weather forecast data
- Performance monitoring vs. historical data/benchmarking
- Financial reporting



### Microgrid optimization

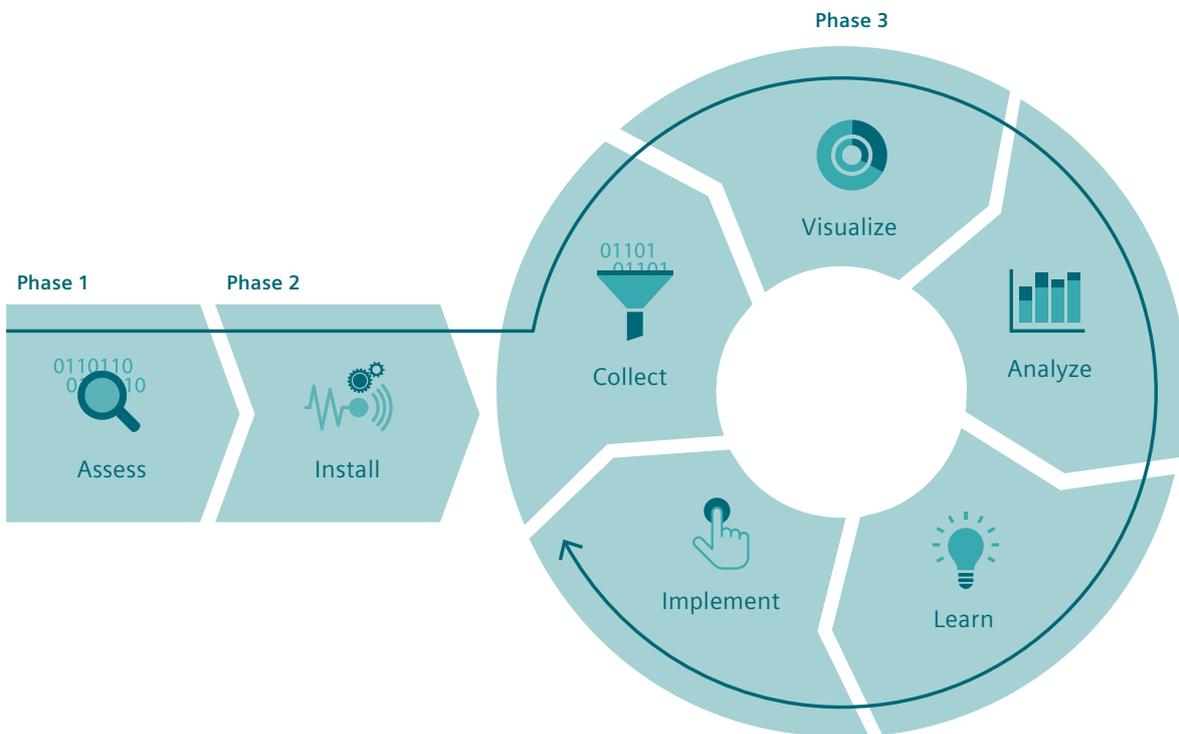
- Rule-based load management
- Self-consumption optimization
- Optimal scheduling based on unit's constraints and costs



# Implementation: Phases 1-3

Get the tools you need to collect the data you want

Whether a photovoltaic plant, wind park, campus, commercial center, or microgrid, EnergyIP DEOP matches your needs to best optimize energy production and consumption. That's why the very first implementation phase incorporates an individual assessment of your assets and requirements to maximize performance. The outcome of this initial assessment? An individualized solution to help you gain greater insights and improve decision-making.





## Phase 1: Assessment

To begin, we evaluate your current situation – taking your asset's or plant's unique needs into consideration. After developing an individualized concept, we help you optimize performance and improve energy production. How? Through collaboration. Siemens' experts will come together with your experts to evaluate existing automation systems, determine hardware needs, and connect your existing data to the cloud. No CAPEX: Financial options are available through Siemens Financial Services.

## Phase 2: Installation

We'll install the hardware – meters, sensors, and gateway devices – in smartfoot panels near monitored equipment or integrate into existing panels. Soon after, our experts will commission the system and validate the data upload to the cloud. Communication follows secure protocols and, where possible, uses a separate network within facilities to ensure appropriate segregation.

## Phase 3: Analyze. Learn. Repeat.

Analysis begins after we implement software, or optionally provide consulting. Your data is accessed through a secure web portal. So, you can make energy decisions based on data. Learn where you can save, reallocate resources, and more. Discover new saving opportunities as more data is collected and analyzed. Continue to benchmark against your other assets and between your vendors to see where you can improve and where you're "getting it right." In a nutshell, make your business leaner, stronger, and more profitable.

### Why invest in EnergyIP DEOP?

- Monitor all of your assets and sites – worldwide in real time.
- Optimize your energy production for cost-effective performance.
- Gain insight you need for preventive maintenance to plan ahead.
- Learn from current performance to make future investment decisions.

# Technology for a cohesive, digitalized future

## Universal connectivity and real-time monitoring

EnergyIP DEOP's cloud platform was designed to follow the Internet of Things paradigm allowing for interconnectivity and real time data. The system's software supports energy monitoring, energy management, and performance monitoring. The intuitive, user-friendly interface offers a wealth of information to help support your business-level decisions. Even better, our technology grows with your requirements.

### Connect your assets and sites

Integrated features help you to manage all your assets and sites, including non-programmable generation (i.e. photovoltaic, wind plants), programmable generation (ie. diesel, gas turbine co-generators), as well as electric and thermal storage systems.

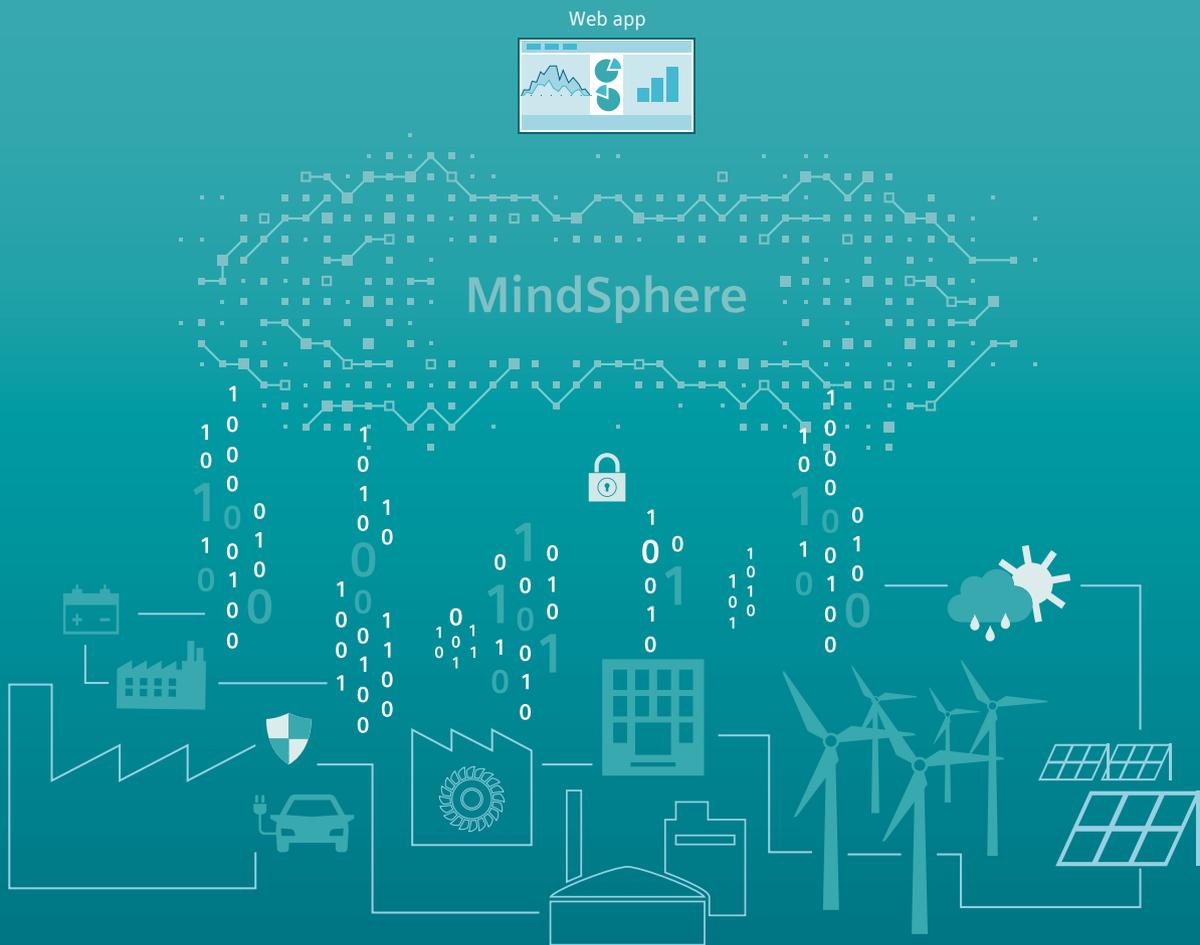
- **Meters:** Connect directly to devices or acquire data from an existing MDM application.
- **Buildings:** Gather environmental data (temperature, humidity, and luminosity) to correlate with consumption data.
- **Industry:** Extract production data to correlate with consumption data through your existing SCADA system.

### Improve your energy and Microgrid management

Our unique system collects energy data for each site, whether it's an industrial/production plant, commercial building, or a Microgrid. By providing real-time energy monitoring and energy reporting at the enterprise global level and for each specific site, the platform is able to integrate data coming from other systems to correlate consumption information. This information enables the system to integrate energy tariffs, as well as provide load and generation profiling and forecasts. Additionally, EnergyIP DEOP implements optimization algorithms toward energy efficiency, renewable optimization, energy dispatching optimization, and demand response.

### Access to the cloud with Openstack

EnergyIP DEOP runs on a private cloud that utilizes Openstack, a cloud-operating system that controls large pools of computing, storing, and networking resources through a data center. The system is deployed from two data centers, from two different locations. Each center has redundant servers, so each data point is stored in four different servers to ensure the security and availability of data.



## The tech behind the technology

### Apache Cassandra:

The choice when you have a high volume of writes. Big data and requests to write on the database are always successful.

### Docker:

Flexible and lightweight, you can containerize even the most complex applications. Deploy updates and upgrades on the fly. Scalable and stackable means you can automatically distribute container replicas, and stack services vertically and quickly.

### Redis:

Supports data structures, such as strings, hashes, lists, sets, and sorted sets with range queries, bitmaps, hyperlogs, and geospatial indexes with radius queries. Provides higher availability via Redis Sentinel and automatic partitioning with Redis Cluster.

## Cybersecurity is key

Your secrets are important to us, too. Siemens' tried-and-true cybersecurity features ensure your data's integrity and safety. We have built in strong features at every front and within every process, including:

- **Your facilities:** internal firewall, VPN, and more
- **Cloud platform:** encrypted data, certificate-protected and role-based access, and more
- **Web access:** role-based access, digital certificate authentication, and more

# Better decision-making, better business

Make improvements based on real-time data

Finding the right technology, opting for a customizable solution that will address your challenges, as well as financial resources, are all top of mind when finding a solution to optimize energy production. Keeping your business nimble means producing energy with the least amount of resources and in the most cost-effective manner.

Optimize your energy use and production with distributed energy resources. With our system's cloud-based platform you gain worldwide connectivity, while avoiding CAPEX. Forecast costs by practicing preventive maintenance over corrective. Take advantage of real-time transparency for quicker reaction times. Monitor worldwide activity via a common platform web portal. Save on energy while reducing CO<sub>2</sub> with load and generation optimization.

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## Four ways to save

- 1. Big data and the cloud:** Gain insights into your energy production. Benchmark facilities (and assets) against each other. Respond to asset alarms in real time.
- 2. Flexible financing:** Take advantage of Siemens Financial Services to avoid CAPEX.
- 3. Customized solution:** Scale and adapt your energy production solution based on your needs and requirements. Receive an individualized metering concept along with a potential-savings forecast based on your business.
- 4. Managed service:** Decide whether you want to use your own resources or use our experts for service delivery. The choice is yours.

## Increased transparency for maximum performance –

Discover the benefits of EnergyIP  
Distributed Energy Optimization.  
[siemens.com/energyip-deop](http://siemens.com/energyip-deop)