



# Autonomous power grid management software



## Who are we?

SMPnet provides cutting-edge power grid management solutions based on highly advanced technical expertise. Complementary and accessible, our Omega suite of products offers seamless integration with existing network systems and is designed with precision focus on power grid optimisation. We understand that utilities are looking to the future and with that knowledge, have developed products to increase network capacity, reduce costs and allow integration of more renewable energy assets.

Through the design and application of our technology, SMPnet is kickstarting a revolution to transform power grid management.

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## Mission

We seek to catalyse the global energy transition and grid digitalisation by deploying our highly advanced software technology, Omega. We have harnessed years of research and technical expertise into a suite of products that are shaping a future of clean energy integration and efficient grid management. Our mission is to continue to develop and provide utilities with the tools to transform their power grid operations through analytics, advanced optimisation, and real-time control. We create advanced software technology to transform operations for a stronger, greener energy future.



## A suite of products designed to transform power grid management at any voltage level.

We have developed leading edge power grid management software to revolutionise the energy industry. The Omega suite of products integrates with existing systems to unlock grid capacity, integration of 100% renewable assets and significant cost reductions. From fully digitised, daily reporting to complex millisecond control, each product within the Omega suite offers utilities a new level of insight and confidence to operate their systems in a net zero world.



### Defer network reinforcements

Omega helps utilities maximise asset utilisation by intelligently managing existing resources, delaying the need for costly grid reinforcements.



### Enhanced network availability

Omega offers better visibility and control over network assets, enabling utilities to prevent overloads and ensure higher network availability and reliability.



### Seamless integration

Omega is technology-agnostic, enabling seamless integration with all vendors and technologies, using a digital interface compatible with legacy systems and no need for additional equipment. By leveraging utilities API connections and all communications protocols and standards, Omega allows network management to the asset level.

## Omega suite: An advanced, holistic approach

Each product within the Omega suite can be operated as a standalone solution to the needs of grid operators within networks of any voltage level. In combination they offer an innovative, holistic package designed to address the full spectrum of grid operation challenges, from enhancing operational efficiency, security and reliability to integrating renewable energy sources.



## Data Analytics for grids at any voltage level

Gain comprehensive insights into your grid performance with advanced analytics such as substation headroom, CO2 projections, and renewables projections.

Aware is a reporting and data visualisation software tool which sits in the cloud or the edge and creates highly customisable, real-time monitoring dashboards and automated reports, alarms and notifications. Offering data analytics, Aware complements existing systems by streamlining data from across the grid, at any voltage level and from any platforms that integrate various data sources (e.g., SCADA, ADMS, etc.).

Widen your visibility across the network allowing:

- Automated reports: Generated daily or as needed, these would cover substation activities, distribution grid performance, voltage profiles, power profiles of assets, and the status of Intelligent Electronic Devices (IEDs).
- Real-time grid monitoring dashboards: Visual interfaces showing live data about the grid status, activities, and performance metrics.
- Data Analytics Insights: Extracted patterns, trends, or anomalies from the operational data to help in decision-making.



Seamlessly integrate data streams, streamline operations, and achieve sustainability targets accurately.



## Adaptive optimisation for grids at any voltage level

**Minimises costs and maximises efficiency by optimising DERs, meeting diverse grid demands, and managing voltage levels.**

Optisys is a highly adaptive software engineered to optimise grids and give utilities the tools to make data-driven decisions for an efficient, reliable, and secure power grid.

With a powerful ability to adapt to the conditions of the grid, at any voltage level, the benefits of Optisys for grid management include:

- Defer CAPEX by maximising the use of the current grid infrastructure.
- Enhance grid stability and scalability to evolving grid requirements.
- Reduce OPEX via network loss minimisation and augmented efficiencies.
- Guarantee uninterrupted system operation.
- Meet regulatory compliance.
- Allow for maximum renewables penetration & real-time decision making.



When it comes to network operation, Optisys gives you the power to keep energy flowing and the lights on, no matter the grid conditions and constraints.



## Real-time control, whatever your grid voltage level

**Achieve unparalleled control over your power grid with applications like island re-synchronisation, coordinated voltage/frequency control, and wide area control.**

Control takes the concept of power grid management to the millisecond and offers the most advanced real-time edge software for time-critical applications.

Using Control and its unique ability to control grids of any voltage level, allows dynamic, responsive engagement with the grid and gives you:

- Enhanced resilience through avoidance of shutdown methods.
- Cost-efficiency via renewable energy sources.
- Remote operation reduces the need for onsite personnel.
- Millisecond precision in controlling renewables, replacing standard generators.
- Cleaner operation by reducing reliance on fossil fuel generators.
- Multi-vendor compatibility with equipment from various manufacturers (technology-agnostic).

A truly real-time control system for dynamic grid management, Control will ensure stability and optimal performance in the net zero future.





# Enabling autonomous power grid management with the Omega suite

## Industry Solutions

### Real-time flexibility coordination



#### Challenge

DSOs face difficulties in balancing supply and demand due to the variability of renewable energy, leading to potential instability.



#### Solution

Utilise adaptive optimisation and digital twin technology to analyse scenarios and coordinate flexibility resources effectively and autonomously.

#### Applicable to:

DSOs managing significant adoption of flexibility resources and participating in flexibility marketplaces, DSOs aiming to automate the processes of flexibility assessment, procurement, and dispatch.

### Dynamic congestion strategies for distribution grids



#### Challenge

DSOs encounter thermal overloads and voltage violations, leading to underutilised capacity, frequent disconnections, and costly reinforcements.



#### Solution

Implement adaptive optimisation and wide-area voltage optimisation to dynamically manage grid assets, prevent overloads, and maintain stability.

#### Applicable to:

DSOs operating in regions with high renewable penetration and facing congestion due to capacity constraints; DSOs facing regulatory incentives or penalties, utilities seeking to defer CAPEX on grid reinforcements through operational improvements.

### Dynamic control of integrated AC/DC grids



#### Challenge

Hybrid AC/DC grids pose challenges, requiring precise coordination of diverse energy resources for voltage and frequency stability, power flow efficiency, and interoperability.



#### Solution

Provide millisecond-level control across hybrid grids, ensuring dynamic balancing and coordinated operation and effective resource allocation.

#### Applicable to:

Utilities managing multi-terminal DC systems, microgrids, or regions with a mix of AC/DC systems requiring real-time, multi-vendor coordination and control, DSOs serving rapid electrification and mixed voltage systems

### Autonomous control for critical grid infrastructure



#### Challenge

Critical grid sections are increasingly vulnerable to disruptions from extreme weather, cyber-attacks, and equipment failures, risking service continuity.



#### Solution

Employ predictive dispatch and dynamic control to maintain stability and continuity, even under adverse conditions.

#### Applicable to:

Utilities managing critical grid infrastructure, islanded grids, or microgrids in areas prone to extreme weather or requiring heightened cybersecurity measures, islands or weakly interconnected grids.



# Enhancing existing SCADA/ADMS with the Omega suite

As the industry seeks to optimise grid operations, integrate distributed energy resources, and ensure grid reliability, utilities are looking for ways to enhance the capabilities of their existing SCADA/ADMS infrastructure. Specifically designed to offer an intelligent, and adaptive platform, the Omega suite software works alongside existing systems, adding value by enabling seamless integration and expanding operational efficiency.

## Adding value to SCADA and ADMS to enable autonomous grid management

SCADA/ADMS without Omega Suite	SCADA/ADMS with Omega Suite	Added Value
Manages individual grid points (e.g., substations) in isolation, with <b>limited coordination</b> across the grid.	Runs optimal power flows & grid controls across multiple substations, DERs, and feeders, optimising the <b>entire grid holistically</b> .	<b>Coordinated, system-wide</b> control for a <b>more efficient and resilient</b> grid
Operators <b>manually</b> adjust grid settings based on alarms and predefined rules, making it reactive and slower by nature.	<b>Autonomously</b> optimises pre-selected grid operations in real time, predicting issues and adjusting controls without human intervention.	<b>Faster, smarter</b> decision-making and a self-regulating grid.
Often <b>vendor-locked and hardware-dependent</b> , making integration with other systems complex and costly. Scaling <b>requires custom engineering</b> .	<b>Protocol-agnostic</b> and cloud/edge-compatible, allowing seamless integration with SCADA, ADMS, DERMS, and IoT systems while scaling effortlessly.	Future-proof, flexible grid management <b>without vendor constraints</b> .
Typically restricted to specific asset types (e.g., switches, batteries, PVs) and manages them <b>individually</b> .	Integrates any asset type, any size, and optimises them all <b>simultaneously</b> , ensuring <b>holistic grid coordination</b> .	<b>Unified control</b> of diverse grid assets for maximum efficiency.
<b>Reactive and limited:</b> Responds to issues after they occur, lacking proactive control, which leads to inefficiencies and <b>increased asset strain during normal operations</b> .	<b>Smart and adaptive:</b> Uses real-time forecasting and a physics-based network model with continuous, real-time optimisation and control.	<b>Extended</b> asset lifespan with <b>proactive real-time control</b> .

## Upgrade legacy systems with integrated software

SCADA/ADMS systems are the backbone of power grid operations, enabling operators to monitor substations, transformers, and other critical infrastructure, facilitating prompt responses to anomalies and emergencies.

The Omega suite software has been developed to support and enhance conventional SCADA/ADMS systems in the call to handle increasing complexity and data volume generated by evolving power grids. Offering state-of-the-art features, including AI-driven analytics, cybersecurity robustness, and scalable architecture, the Omega suite seamlessly integrates without disrupting existing operations. Acting as a powerful add-on to SCADA/ADMS capabilities, equipping the systems and their operators to meet the new challenges of modern power grid management.



# Omega suite applications for SCADA/ADMS enhancements

Omega suite applications integrate seamlessly with SCADA and ADMS, enhancing their capabilities for modern grid management. The table below (and over the page) outlines key applications and their benefits when used in conjunction with existing SCADA and ADMS.

	SCADA/ADMS without Omega Suite	SCADA/ADMS with Omega Suite	Added Value
 <b>Voltage Control</b>	<p><b>Conventional Volt/VAR: Isolated, reactive and slow.</b> Adjusts capacitor banks and tap changers locally based on fixed rules, often leading to <b>delayed responses, voltage swings, and inefficiencies.</b></p>	<p><b>Grid-wide, and dynamic:</b> Continuously optimises voltage by coordinating substations, DERs, batteries, inverters, and <b>any asset with reactive power capability</b>, using real-time, adaptive setpoints instead of fixed rules.</p>	<p>Seamless, <b>self-adjusting voltage control</b> that maximises grid stability, efficiency, and capacity.</p>
 <b>Congestion Management</b>	<p><b>Pre-defined load-shedding and curtailment schemes:</b> Turns off loads and curtails generation <b>when congestion exceeds a set threshold.</b></p>	<p><b>Continuously</b> analyses grid conditions in real time, <b>dynamically</b> redistributing power flows across substations, flexible loads, and DERs. Instead of shedding loads, and disconnecting generation, the Omega suite optimises generation, adjusts demand, and reroutes power flows to prevent congestion <b>before it happens.</b></p>	<p><b>Preventing congestion before it occurs</b>, reducing outages and disconnections and maximising reliability.</p>
 <b>Black Start &amp; Grid Sync</b>	<p><b>Manual restoration</b> for standalone units: Black start capability is limited to isolated generators and requires <b>operator-led switching</b>, posing a high risk of synchronisation errors and potential voltage/frequency instability when reconnecting to the grid.</p>	<p><b>Autonomous, grid-aware</b> re-synchronisation intelligently coordinates multiple grid sections, DERs, and storage assets to enable <b>self-healing islanding</b> and seamless reconnection, ensuring a safe, fast, and stable transition back to the main grid <b>without operator intervention.</b></p>	<p>Eliminates manual risks, accelerating <b>safe grid restoration</b> and ensuring stability during blackouts.</p>



## Omega suite applications for SCADA/ADMS enhancements

	SCADA/ADMS without Omega Suite	SCADA/ADMS with Omega Suite	Added Value
 <p><b>Flex Management</b></p>	<p>Simplistic, reactive, and <b>rule-based</b>: Uses <b>basic IF-Then-Else logic</b> to determine renewable curtailment and flexibility activation, often leading to inefficient RES curtailment and suboptimal grid performance due to its <b>lack of dynamic network awareness</b>.</p>	<p><b>Intelligent</b>, proactive, and physics-driven: Leverages forecasting and a real-time network model to dynamically optimise the location and volume of flexibility activation, RES curtailment, and reactive power management.</p>	<p>Optimises flexibility activation in real time, <b>reducing unnecessary curtailment</b> and improving overall grid efficiency; ensuring grid-aware, <b>adaptive decision-making instead of rigid predefined rules</b>.</p>
 <p><b>Load Balancing</b></p>	<p><b>Pre-scheduled</b>: Adjusts grid parameters based on historical data and fixed schedules, relying on local controllers to react <b>after demand spikes occur</b>, often leading to delayed corrections and inefficient balancing.</p>	<p><b>Adaptive, real-time balancing</b>: Continuously monitors grid conditions and dynamically adjusts generation, storage, and flexible loads within milliseconds, preventing frequency and voltage deviations before they happen by anticipating fluctuations instead of reacting to them.</p>	<p>Maintains grid stability by proactively balancing supply and demand, <b>reducing reliance on corrective actions</b>.</p>
 <p><b>Power Flow Engines</b></p>	<p><b>Basic, static power flow</b> calculations: Performs periodic load flow assessments with limited scope, often ignoring real time conditions, dynamic stability constraints, and evolving fault levels, leading to suboptimal network operation and delayed corrective actions.</p>	<p><b>Advanced, real-time power flow</b> optimisation: Integrates high-fidelity power flow engines that continuously analyse losses, voltage stability, thermal constraints, and fault levels, enabling precise, dynamic grid control and optimised energy dispatch.</p>	<p>Delivers <b>full visibility of real-time grid conditions</b>, ensuring optimal power distribution and stability.</p>
 <p><b>Grid Event Forecasting</b></p>	<p>Grid events are <b>detected only after they occur</b>. Operators rely on historical trends rather than real-time predictive analytics. Response is delayed, which leads to <b>reactive measures</b> rather than proactive solutions.</p>	<p><b>Predictive and proactive</b> Uses ML-driven forecasting to analyse real time sensor data, weather patterns, and grid behaviour, enabling it to <b>predict disruptions early</b> and recommend preventive control actions to maintain grid stability.</p>	<p><b>Reduces unplanned disruptions</b> through early issue detection, <b>minimising emergency interventions</b>, and ensuring stable, efficient load and DER management.</p>



## Vision

Our vision is to be the trusted partner for utility companies in advanced power grid management. Through cutting-edge software, we provide unparalleled analytics, optimisation, and real-time control. Together, we shape a future of sustainable energy integration and efficient grid management, revolutionising the industry for a sustainable planet.

## WHAT OUR CLIENTS SAY

**“SMPnet have successfully utilised Omega technology to address network distribution challenges, including power island re-synchronisation. Excited about its potential, we look forward to further collaboration to overcome various challenges across our business units.”**

**Patxi Pazos, Technology Transfer and Projects**



**“Partnering with SMPnet and their Omega suite transforms our grid management approach within the Community DSO project, delivering enhanced flexibility and autonomous operations. Their expertise keeps us ahead in the fast evolving energy landscape, and we look forward to more collaboration.”**

**Maurice Lynch, Head of System Flexibility**





**Take the first step towards  
a smarter energy future**

[info@smpnet.tech](mailto:info@smpnet.tech)  
[smpnet.tech](http://smpnet.tech)