Amplex Core Competencies

Advanced Energy Intelligence Systems

amplex

The Power of Utility Intelligence™

Adding intelligence to the low-voltage power grid can eliminate waste and streamline operations.

Today's cities are struggling with rising energy costs, high carbon emissions, ageing infrastructures and increasing regulatory requirements.

Even when experiencing shortages of electricity, only few cities have optimized their power networks. Waste is widespread with low-voltage (LV) network losses ranging between 5% and 20%.

Such wasteful scenarios put city and utility company budgets under pressure and the service quality begins to suffer.

A distributed approach

Most of the assets in the current LV power grids, streetlight systems and utility meter installations were installed without any kind of built-in monitoring or communication facilities. Consequently, many cities and utility companies in developed as well as developing countries have very limited knowledge of their power networks.

By turning existing utility assets into an intelligent and manageable system, through distributed equipment that can be monitored remotely, utility companies can analyze, visualize, automate and benchmark their power networks. The immediate benefits:

- Cost savings
- Improved quality
- Carbon footprint reductions

Competing visions for change

The term 'Smart Grid' refers to an intelligent electricity network that uses digital technology. The purpose of the Smart Grid is to save energy, reduce costs and improve reliability.

At Amplex, we believe that Smart Grid is an exciting vision shared by most cities, utility companies and vendors. However, what Amplex brings to the table is more than just a vision. It is a workable, proven solution that can pinpoint and overcome wasteful scenarios in the LV power network.

Amplex delivers

At Amplex, we guide our clients towards the best methods for optimizing their operations. With intelligent, distributed equipment in the LV power grid, we help obtain improved quality, better service and significant energy and resource savings.

Amplex delivers intelligent utility solutions for:

- Low-voltage power grids
- Metering networks
- Energy Management Systems

In the past few years, Amplex has completed more than 130 deployments in 12 countries. In our most comprehensive deployment to date (in the Emirate of Abu Dhabi), we have installed the world's most widely integrated utility infrastructure management project, encompassing thousands of streetlight cabinets and several hundred thousand utility meters.

We are familiar with the issues of energy savings, budget cuts and many more challenges that utilities face, and Amplex offers well-proven, advanced and cost-efficient solutions.

With smart steps towards a smart grid, we can give you a more efficient control of your utility assets – and greater insight.

Methodology

With Amplex on board from the beginning of a new project, we can offer advice on where to focus the energy saving efforts, and thus perform calculations on where the first dollar is best spent.

When we perform our field survey of the client's LV power grid, we take into account the streetlights, household meters, substation equipment and other related assets. These field surveys, combined with years of experience with utility systems, form a solid foundation for making the right decissions.

We believe there is a synergetic effect in implementing several projects at the same time. Reducing man hours, simplifying system integration and optimizing work flows cut down costs and ensure that your new business processes are integrated from day one.

First Steps

Amplex will guide you in realizing your energy saving initiatives.

Amplex is a highly flexible organization with unique field experience, which enables us to deal efficiently with most utility asset issues.

With our vast experience within energy management and efficiency solutions, we can handle the entire project course, from site surveys and installation to commissioning, system integration and support.

Amplex and partners

Amplex has a global network of certified partners, who are qualified to handle the installation, commissioning and subsequent support of our solutions.

With thorough knowledge of local conditions as well as rules and regulation within the utility industry, our partners are excellent co-players in our projects worldwide.

Along with the local partner, Amplex delivers either parts of or all the building blocks for the project, including:

- Consultancy and blueprints
- Installation and integration
- Technology platform
- Hardware components, including communication modules
- Training and support

Benefits for the local region

Creating a modern utility infrastructure not only benefits the city and utility budgets but also optimizes service quality, saves energy and reduces the regional carbon footprint. The many additional benefits include:

- The power supply will be more reliable (in some developing countries, companies report 10% losses in turnover due to power outages)
- The region will become increasingly attractive for new and innovative businesses
- Working with local teams, Amplex can create local jobs
- Fewer power outages reduces the burden on city resources (police, fire department)
- Data from the grid can help operators assist in emergency situations (fires, storms)

Environmental benefits

Cities and utilities are under increasing pressure to cut down their energy consumption and continually reduce their carbon footprint. The demand for energy saving solutions has never been greater.

Amplex systems optimize a number of processes in power networks and add visibility to help pinpoint where the efforts will have the greatest impact. Our solutions provide information about undesirable leaks and other inefficiencies. With added automation and intelligence, the utility companies stand to gain:

- Fewer losses through leak and theft detection
- Improved consumer awareness and reduced consumption
- The ability to control loads and eliminate the need for additional power generation
- The possibility of using carbon markets to increase the value of low carbon initiatives
- The ability to integrate new, greener energy sources into the power grid

Complete solutions backed by experience

At Amplex, we recognize that implementing end-to-end solutions is not just about installing hardware and software. Our solutions impact the way that utilities do their day-to-day business, and we help navigate through this change.

We know that most utility companies have invested heavily in high-voltage and medium-voltage monitoring and control equipment. With Amplex solutions, there is no need to replace previously purchased systems or equipment as we integrate seamlessly to other system components.

Offering a range of energy efficiency solutions, based on one central platform, Amplex handles everything from energy management systems in small organizations to full-scale advanced metering infrastructure roll-outs across entire regions.

From blueprint to completion

With our blueprints, we focus on maximizing the short term benefits while offering a roadmap of practical, working solutions. The blueprints constitute your building blocks for increased energy efficiency, fast return on investment and tangible benefits to both the end customer and the utility.

From Vision to Reality

The world's largest integrated utility infrastructure project.

Amplex has worked with the Abu Dhabi Water and Electricity Authority (ADWEA) on utility efficiency projects since 2004.

ADWEA called on Amplex to realize their vision of a networked utility infrastructure in order to:

- Streamline operations
- Cut down on energy inefficiencies
- Improve service quality

Amplex has been ADWEA's partner and advisor in making the vision come true and has delivered input to all phases of the process, from consultancy work and blueprint design to supplying and installing hardware and software.

Project scope

For better control and management of their streetlights, ADWEA requested a solution with advanced, real-time communication that would improve quality by increasing awareness of outages, flashing bulbs and other issues in the streetlight network. This project encompassed 275,000 streetlights across the entire emirate.

During the roll-out of the streetlight installation (with AmpLight™, a solution now sold to Philips), Amplex was asked to establish an Advanced Metering Infrastructure for the Emirate of Abu Dhabi. ADWEA was seeking a solution that could automate data collection and reduce network losses. Ampex installed the MeterMind™ solution for a total of 200,000 metering points, enabling precise and reliable data, scheduled and on demand.

Project realization

Amplex has worked closely with ADWEA to provide solutions that fit their requirements:

- Equipment in the field that communicates with the central control system
- Field surveys and deployment services
- Server equipment
- Custom-made control room and field tools
- Integration to Billing/CIS systems
- Training and ongoing support

Today, the AmpLight™ solution monitors and controls more than 275,000 street-lights through 8,000 control cabinets covering the entire emirate.

More than 200,000 power and water meters are remotely monitored and managed, sending valuable data into ADWEA's systems.

With frequent power outages and significant technical losses, ADWEA was later advised by Amplex to equip its LV substations with communication, monitoring and breaker equipment. When this project is completed, ADWEA's low-voltage power grid is fully controllable.

Benefits

In addition to the direct cost reductions and energy savings derived from detecting leaks, Amplex has built a networked, intelligent power grid for ADWEA which integrates a number of solutions on to one platform.

This allows ADWEA to improve operations and service quality through:

- Fast reaction to fault conditions
- Proactive maintenance
- Advanced wireless communications
- Improved maintenance procedures
- Field tools for workforce management
- Control room for achieving overview, receiving and handling alarms, and generating reports

A Modernized Power Grid

Amplex StartGrid™: Adding intelligence to the LV network.

The single greatest obstacle to improving utility infrastructures is lack of visibility. Therefore, Amplex deploys technology throughout the grid that provides much-needed insight.

Whereas high-voltage and medium-voltage networks are well-automated, the low-voltage network is often a black hole of inefficiency, waste and outdated equipment. With thousands of end-points, it may seem like a daunting task to add intelligence at this level.

With the Amplex StartGrid™ system, it is quick and easy to add smart meters and low-cost communication units throughout the LV network, generating useful insight and providing a factual basis on which to plan further automation initiatives. These subsequent steps can include more detailed monitoring and remote circuit breaker control within the substations, or further monitoring at a lower level in the network.

With this real-time information, you can:

- Detect energy losses and theft
- Adapt easily to changes in topology
- Accelerate repairs and reduce maintenance costs
- Improve customer satisfaction and billing accuracy
- Control loads and eliminate the need for additional power generation
- Use carbon markets to increase the value of low carbon initiatives
- Easily integrate new, greener energy sources into the power grid

Demand side management

A well-functioning and reliable power grid is an essential part of ensuring continued development and growth. Many countries are struggling with unstable power supply. In order to ensure continued operation during power outages, many companies in these areas invest in their own power generators that are used as buffer capacity in order ensure a more reliable availability of power.

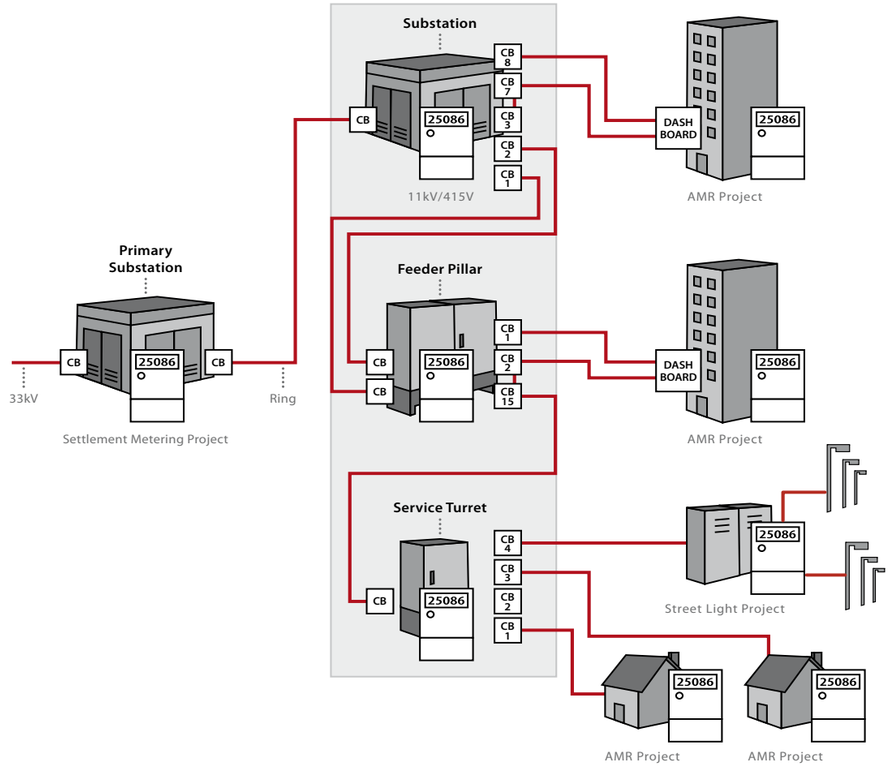
With Smart Grid technology, we can use this capacity to provide a more reliable power network. Through communication and control functionality, the power generators can aggregate to generate significant, just as if it was a conventional power plant at a single point on the network. Micro-CHPs, wind turbines, small solar plants, etc. can also be part of such a 'virtual power plant'.

With the correct approach, utility companies will be able to reduce the need for larger emergency power plants, reduce peak load, and be able to drastically reduce the number of blackouts resulting from overload.

What about the future?

Installing innovative technologies and establishing new methods require careful organizational management. Amplex takes part in this process as well. In new construction or urban developments, we assist in blueprint designs that prepare these new initiatives, from the beginning, for Smart Grid integration.

With distributed intelligence throughout the LV power grid, welcoming new input and technologies becomes much easier.



StartGrid™ solution overview

Beyond Metering

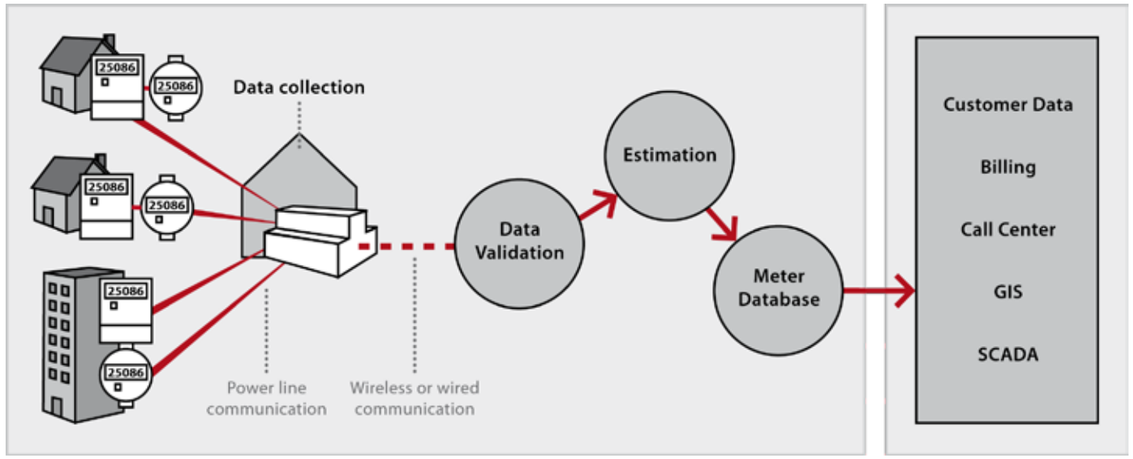
MeterMind™ is a future-proof solution that meets the requirements of the intelligent power grid.

From manual meter readings to AMI

Smart meters in households and industrial buildings not only eliminate the need for old-fashioned manual readings, they also help pinpoint leaks and ensure a more efficient use of electricity, water and gas. This leads to:

- Reduced consumption
- Increased consumer awareness
- Less waste
- Smarter houses that use energy, when it is more abundant and less expensive

Increased reliance on electricity for our modern society and infrastructure requires a stable power grid and the ability to connect and disconnect certain assets during critical periods. The Amplex MeterMind™ solution provides accurate, reliable and timely meter readings in a cost efficient manner. Automating meter readings enables load control and can even help customers shape consumption. MeterMind™ reads gas, water, heat and electricity data from most meter vendors.



Many meters to one concentrator, advanced communications architecture and integration with existing utility systems make MeterMind™ a cost-efficient solution.

The Amplex Way

The present challenge for the industry is to supply solutions for immediate use, while also being prepared for future challenges and full integration into whatever Smart Grid vision it will become part of.

At Amplex, we work with utility companies of all sizes. Our MeterMind™ solution has unlimited scalability and covers broadly from small to large-scale installations. The MeterMind™ solution collects data from most meter types and submits the data at a predefined schedule via wireless or wired communications technology such as GPRS and Ethernet.

The advantages of MeterMind™ include:

- Easy installation with integration to meters from most manufacturers
- No new major wiring - 'plug and play'
- Quick commissioning with advanced field tools
- Many meters per concentrator keep costs down

In the field

With two-way communication, the system is easily updated with new features and releases from a remote location. In addition, the system enables:

- Automatic data collection – without truck rolls or home visits
- Accurate billing – based on real-time information
- Better demand management – providing insight to make the right choices
- Improved forecasting and resource optimization
- Remote connection and disconnection – quickly and at no cost

The MeterMind™ solution is an excellent stand-alone system for any utility company that wants to actively use consumption data to gain insight and savings.

With integration to the GreenWise™ energy management system and the StartGrid™ solution for substation monitoring, MeterMind™ becomes an integral part of the Amplex Smart Grid vision for valuable insight and real-time monitoring of the LV power network.

Going Greener with Energy Management

GreenWise™ is an energy management platform that tracks and manages energy consumption across the entire distributed enterprise.

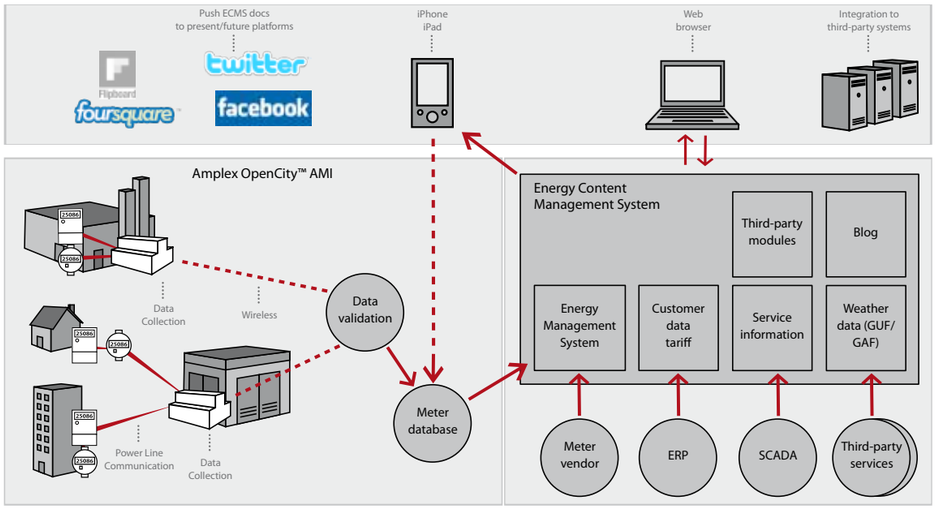
Amplex GreenWise™ brings individual smart meters together for a detailed, trackable image of energy use over time - by department, building, campus, city or entire organization.

GreenWise™ helps energy consultants and service engineers determine where to launch energy saving initiatives, and can measure whether they are paying off.

Using raw data from utility meters, GreenWise™ converts it into useful information. The system offers unique opportunities for interactive customer dialogue, a user-friendly web interface and an intuitive iPad app for easy consulting in the field.

With GreenWise™, the utility company can:

- Turn raw meter data into Energy Consumption Intelligence
- Show management exactly where energy is being used
- Set energy consumption targets and track progress on energy saving initiatives
- Let usage centers monitor their consumption trends
- Benchmark consumption against industry norms
- Identify preventable loss fast to minimize waste
- Support energy saving initiatives with powerful user communications



GreenWise™ collects data from the field and integrates it into an energy management platform.

Gaining insight

GreenWise™ is an efficient tool for:

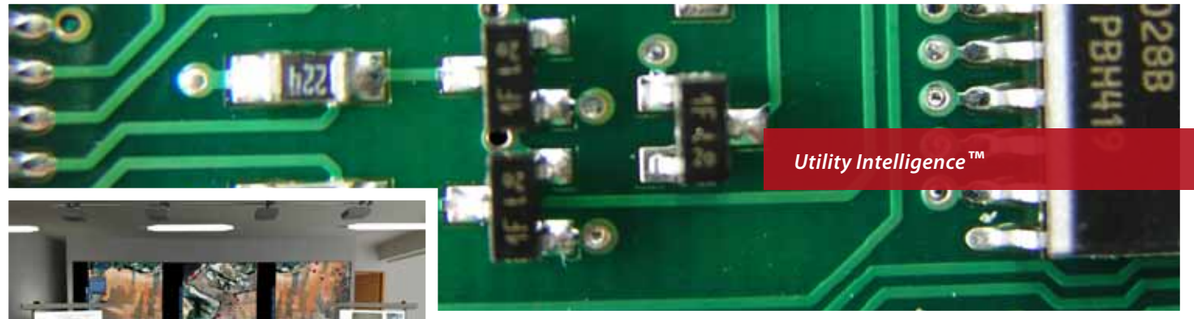
- **Utility companies** who want to help their customers use energy more efficiently by increasing awareness and offering energy advise.
- **Enterprises** who want to improve energy management for both carbon footprint reductions and for the bottom line.

Turning isolated metering systems and data points into an integrated platform for energy management is the first step towards driving down the energy usage - and keeping it down.

By establishing energy budgets, the users can track their progress. Adding alarms, they will receive notifications in case the budget is exceeded or if the consumption rises above a certain threshold level. Thus, energy waste is eliminated to the benefit of the environment as well as the bottom line. As a next-generation energy management solution, GreenWise™ combines:

- An affordable Energy Management System (EMS)
- An advanced Energy Consumption Intelligence platform
- A user-friendly web dashboard
- An integrated portal for 'energy evangelism' to users and managers
- Rich, role-based reporting and alarms

The GreenWise™ app for iPad enables the user to view energy consumption status in the field.



One Technology Platform

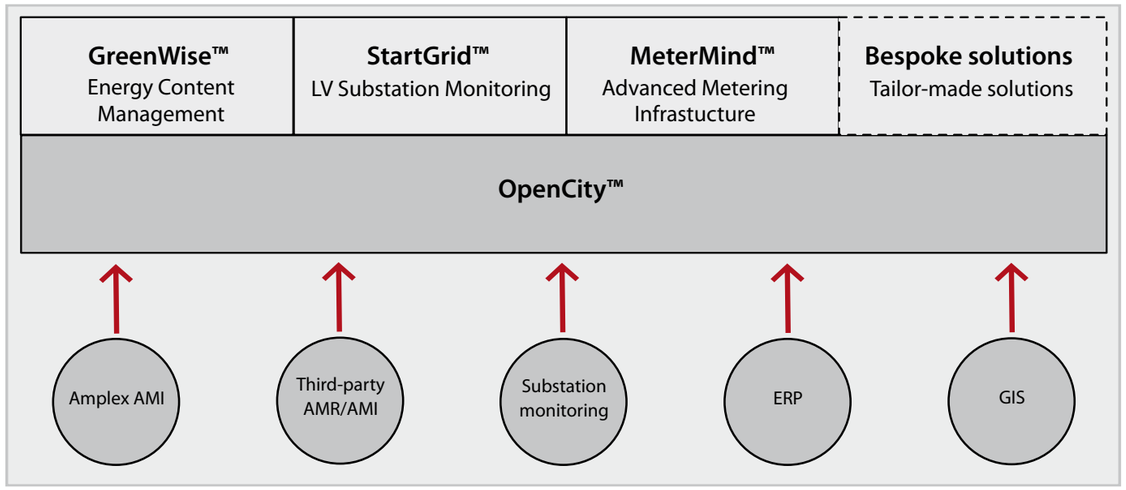
The Amplex OpenCity™ platform integrates all utility assets into one user-friendly platform.

At Amplex, we believe that distributed intelligence in the utility network is the best way to approach wasteful scenarios and accommodate energy saving solutions.

We create solutions from our off-the-shelf components to keep cost low, flexibility high and ensure easy support.

The Amplex OpenCity™ architecture is a modular, super-scalable data collection, analysis and management platform. It supports a range of applications for utility companies and distributed enterprises. The advantages include:

- Automating and optimizing the data collection process
- Configuring and managing thousands of sites
- Providing instant visibility and control of energy consumption dynamics
- Running any or all Amplex solutions as well as third-party applications - one or more at the time
- Integrating collected data into the OpenCity™ platform for loss detection, alarms and local intelligence
- Streamlining operations and improving business decisions
- Delivering insight to the field using advanced mobile field tools



OpenCity™ provides the architecture for distributed monitoring of utility assets while integrating to other utility systems.

Control room overview

OpenCity™ is a measurement, control and configuration system that can handle the complexities of thousands of distributed end points in the grid, all feeding information back to the central data server.

After the field data is received and processed, it is displayed on the user-friendly, web-based interface with clear, intuitive data visualization, reporting and alerting. Using screens in the control room, a dual monitor workstation or a laptop computer, the interface lets the user browse and navigate the network in order to:

- Display current readings
- See graphs of historical data
- View schematics of specific site equipment and their status
- Collect detailed data from field units
- View maps of the entire system or detailed images of specific sites
- Display alarm overviews
- Change configurations

Centralized infrastructure without the central headache

If you do not have enough sites to warrant your own server, or if the prospect of managing a server is a daunting proposition, then Amplex offers a hosted solution. With our web-based solutions, we offer a variety of options for small and large customers who prefer to host their solution with us.

Essential cyber security

As utilities increase their reliance on IT systems and open standards, they also increase their exposure to cyber crimes. Amplex has substantial experience in handling valuable and sensitive data, and we address the issues of cyber security from the initial blueprints to the fully operational system.

From deploying the world's most widely integrated and holistic utility infrastructure management project in Abu Dhabi, Amplex has unique field experience in:

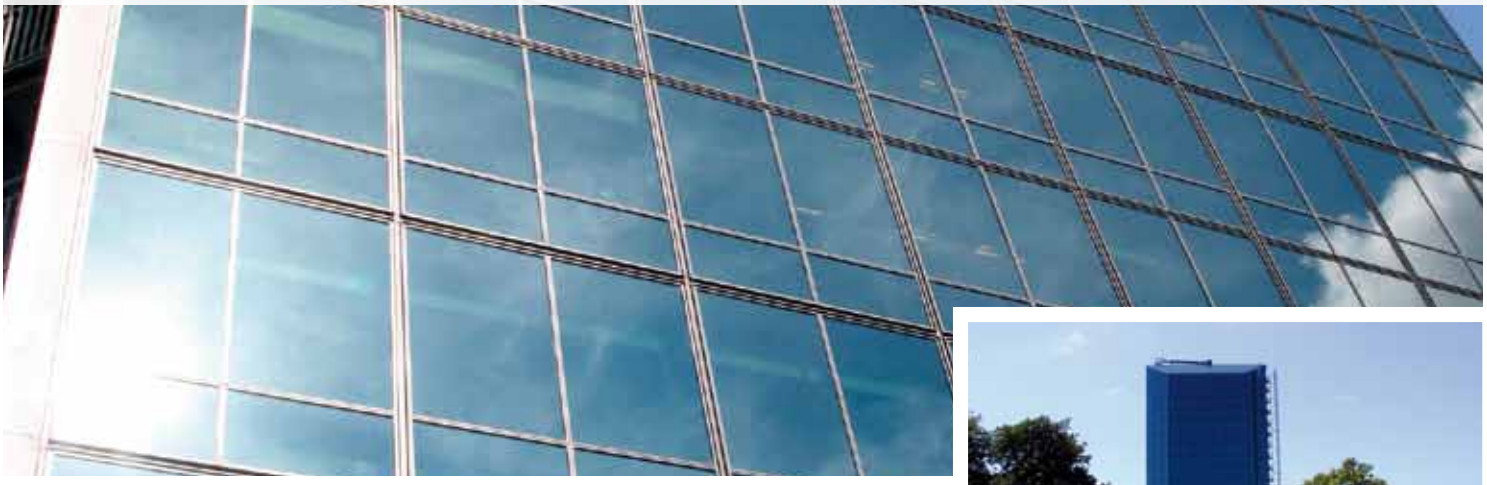
- Protecting the integrity of the client's assets
- Seamlessly integrating our solutions to the existing systems and workflows
- Handling data from thousands of endpoints in a safe manner
- Enabling secure wired and wireless communication to and from distributed units

Profile

At Amplex, we aim to create state-of-the-art utility systems by developing and implementing solutions that manage and conserve utility resources.

We have a modular, coherent and cost-efficient approach that takes energy efficiency to new levels. Through end-to-end visibility and actionable insight, utilities and enterprises can save energy and become increasingly efficient.

Amplex has established a global presence and a solid experience in implementing energy efficient solutions in any environment. Our clients are municipalities, utilities and system integrators who need practical solutions that are easy to deploy and can start saving energy right away.



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