



## Dynamic Load Management

Ripple Control – The most reliable technology  
for load management in the electricity industry.



## Meeting the challenges of the electricity industry with Dynamic Load Management.

Trends in the electricity market are clear. Energy prices are continually increasing, capacity constraints are becoming critical and power frequency response and measuring services become an issue. For electricity supply utilities, this calls for greater efficiency in all areas.

The demand for electrical energy continues unabatedly. With stagnating, or even decreasing supply of generation and network capacity, reserves will disappear. Reserves are vital to guarantee the security of supply, because electricity cannot be stored.

Consumers demand stable prices and security of supply whilst governments press for consumer-friendly products and services as well as environmentally responsible energy supply.

It is in this arena, where the forces of price, security of supply, ecology and cost efficiency meet, that load management is a vital tool for control of the core business of the electricity utility guaranteeing a sustainable and risk-free success.



## Load management with ripple control: reliable and efficient.

Ripple control utilises Power Line Carrier (PLC) technology. Signals are injected into the network at the point of bulk supply and flow, like the power, to every point in the entire network. Wherever there is power, a receiver can receive and decode control commands and carry out switching functions.



### Adaptive Dynamic Load Controller

This unit ensures that the electrical power of the controlled distribution network does not exceed the target demand. Enermet's dynamic load controller algorithms minimise the energy delivery's costs for a given network and generation capacity – let it be by own generation or contractual supply.

### Controller

This component generates the ripple control code based on time programmes or events. Enermet controllers are particularly user-friendly thus minimising operating errors.

### Transmitter

This device generates the ripple control signal. Enermet transmitters are robust devices utilising the latest power switching technology. The use of standard power modules guarantees a long working life and low cost maintenance.

### Receivers

These devices decode the signals and carry out the commands. Enermet receivers are extremely reliable and durable. Tariffs, space heaters, water heaters, air conditioners, lighting systems and other applications can be reliably controlled – anywhere and any time.

### Electricity network

The power network distributes the ripple control signals to any control device at the consumer's location. Propagation of the ripple control signals is as predictable and dependable as the distribution of electrical energy. The electricity network is under the complete control of the electricity utility. There is no licence fee or dependency on a third party to distribute the signal.

### Coupling circuit

These components feed the ripple control signals into the electrical distribution network. Enermet's low impedance coupling circuits provide stable signal levels, resulting in extremely reliable signal propagation and compliance with international standards for maximum transmission levels.

### Signals that deliver.

Enermet ripple control systems provide secure switching. Space heaters, water heaters, tariffs and street lights are controlled reliably and in real time – so that maximum demand is controlled and the network operated efficiently ensuring a safe and economical energy supply. Since the interaction of all components is vital, Enermet designs and supplies the complete system and takes responsibility for its reliable operation.

Action

Enermet – Guaranteed system performance

## Enermet takes complete system responsibility while you focus on your core business.

Taking responsibility for the system means that Enermet guarantees the performance of the ripple control system as the network evolves. This responsibility involves an undertaking to review the network development and answer any challenges that the changes may produce.

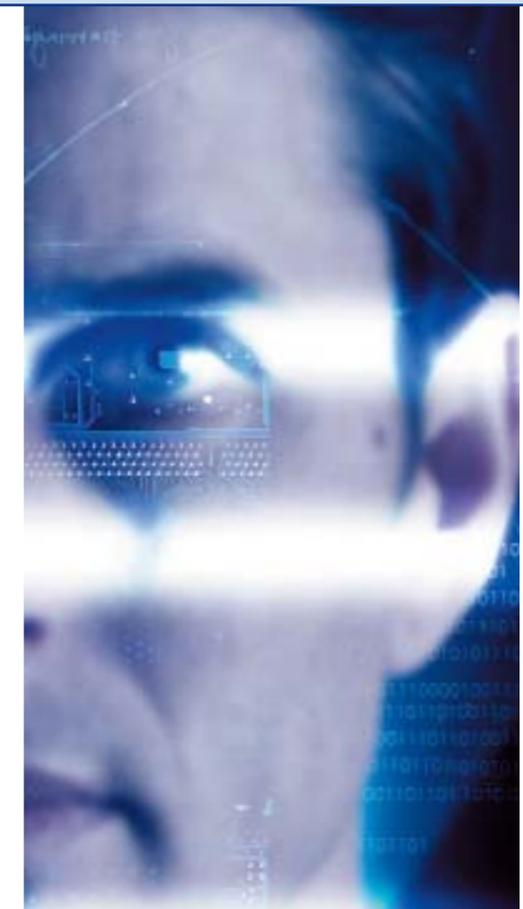
System responsibility means that Enermet has an ongoing commitment and is always at your disposal. Ripple control is Enermet's business allowing the electricity utility to focus on its core priorities.



- Enermet receivers guarantee that switch commands can be carried out anywhere – any time. Simple and flexible programming for customisation means that stock inventory can be reduced. Just in Time (JIT) production means short lead times and less cash tied up in stock resulting in competitiveness.

- Enermet transmitters utilise industry-standard power modules and components, thereby achieving low acquisition costs and long product lifetime. In addition, modular power components reduce downtime in the event of failure, and reduce the cost of holding spare parts at the same time. All this ensures extremely low cost of ownership.

- Partnership is the way of the future. Enermet understands the electric power industry and can design, install and maintain the most appropriate and economic control system to achieve a short payback time, allowing the utility to focus on its core business.



- Competence and a solid commercial base allow guaranteed system responsibility. We look after network calculations, expert reports and analyses regardless of the system you are operating. As experts in our business, aspects such as system design, upgrade and retrofit, as well as system extensions are our daily business. We provide the right solution for every system including a performance guarantee. In addition we even might look after the operation and maintenance of your load management system.

- Enermet looks after the entire system for its whole lifetime – just as you like.

**Enermet – Guaranteed system performance**

## Enermet ripple control: an effective tool for your success.

Success in the electricity business hinges on three essential elements: cost control, security of supply and sales. With ripple control costs can be cut, security can be improved, and consumers can be given real choice.

### Cost control and improved earnings

Ripple control makes it possible to avoid buying energy when the spot market is high. Additional income can be generated by the sale of saved peak output. Recharging the energy storages takes place when the price is low. Switching off load at the time of peak demand reduces the cost of network capacity expansion.

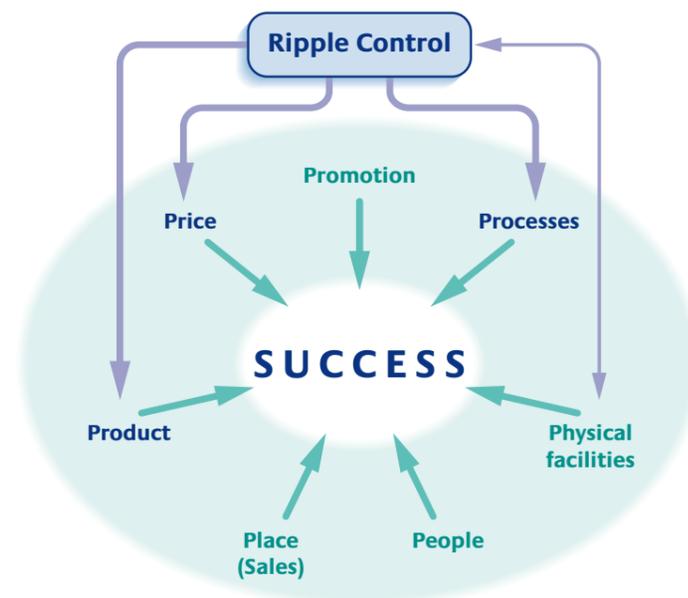
### Security of supply

Dynamic load management allows non-essential loads to be shed in response to emergency network constraints.

### Customised products

Enermet's load management systems based on ripple control enable you to design service offerings and multiple tariff structures that exactly suit the targeted consumer segment.

### Marketing mix for electricity



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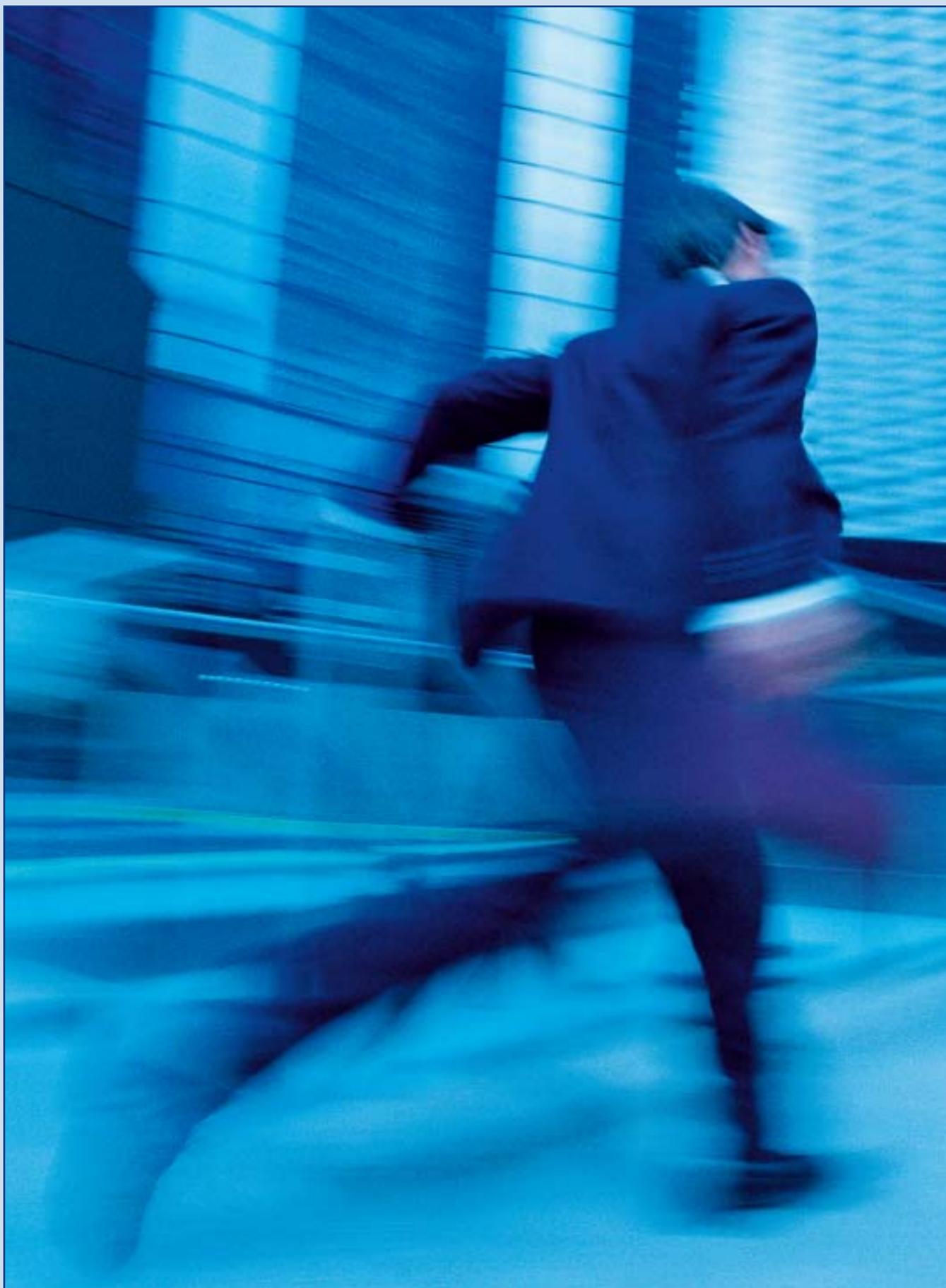
## Earn revenue and reduce your costs with load management and ripple control.

### Deregulation in the electricity sector has opened many opportunities for load management and ripple control.

- Run the ripple control system as a virtual power station. With fast system response to network congestions and underfrequency events, the Enermet ripple control system facilitates participation in the reserves markets by direct access to the consumer's loads.
- Manipulate and shape the load curve with load management by ripple control to minimise energy purchase costs, thus managing price risks permitting more competitive tariffs.

- Reduce the peak power in your distribution network with direct and indirect load control. Doing so you can save twice: reduced transmission charges and the avoidance of capital expenditure in the distribution network.
- In addition to network control, ripple control can provide dynamic congestion pricing signals, tariff switching, street light control and additional services for customers.





## Start from pole position and secure your guaranteed success.

Speed, direct access to consumers, reliability and flexibility are success factors in the market and it is precisely these strengths that make load management using ripple control an indispensable tool for successful marketing.

### **Customer retention with attractive products.**

With ripple control, products can be tailored to customer needs. For example, with heating services, the utility has the capability of dynamically selecting at the point of consumption the type of fuel used (electricity, oil, gas etc.) on the basis of the current market fuel price. The utility can minimise its costs whilst offering excellent customer service at a fair price.

With interruptible and time-dependent energy supply, the utility can optimise the utilisation of the distribution network and energy procurement to customer requirements. Ripple control provides the flexibility to allow customers to participate in the load management programme either by trading control rights or responding voluntarily to price signals.

In this way consumers themselves can determine how much they are prepared to pay for their electricity supply as you provide them the opportunity to individually react to the actual market situation. At the same time you increase the consumer's acceptance of your tariff policy.

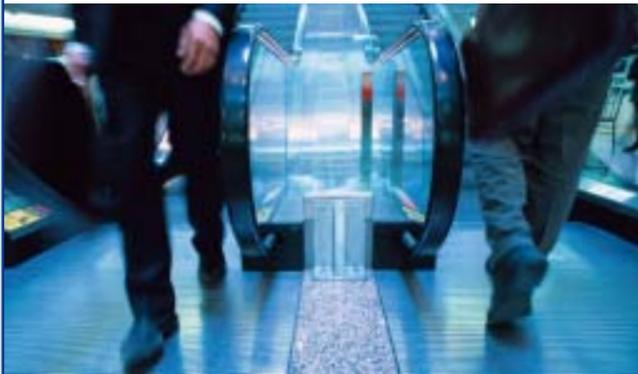
### **Efficient business processes.**

Electricity markets are intrinsically volatile and risky because electricity cannot be stored. Without load management you are at the mercy of market trends and are unable to match energy demand and procurement resulting in higher risk premiums.

Emerging green energy sources, such as wind farms, are particularly inflexible and aggravate the problem of matching supply and demand. However, enormous quantities of heat energy can be stored in domestic appliances. Ripple control is the means to access this valuable hidden resource and turn it into a virtual power station. This provides the utility the ability to match energy consumption and procurement in real time.

**Enermet – Guaranteed system performance**

## Ripple control provides security of electricity supply.



**Ripple control makes sure the lights do not go out. A healthy national economy needs a secure supply of electricity.**

The demand for electricity is increasing and reserve capacity is becoming scarce. Ripple control offers an important tool for guaranteeing quality and reliability of supply. With emergency load shedding capability, ripple control can avoid voltage drops and collapses caused by localised overloading. With ripple control the network company can even compete with spinning reserve at the energy market.

## Load management with ripple control – the right strategy.

Signal broadcast via the electrical distribution network delivers system-inherent benefits not achieved by any other technology:

**No dependence on third parties:**

The utility has all system elements including the transmission medium under complete control.

**Everything under control:**

There is no question of spectrum allocation, licence fees or third-party permission. In addition, the utility is assured that the transmission medium is not subject to obsolescence. Ripple control is the

technology that offers the lowest error rate. This is essential when millions of customer switches are under dynamic control.

**A high degree of investment comfort:**

Ripple control is an established technology with many respected competing vendors. This provides the best insurance that development will continue and that system designs will adapt to changing market requirements.

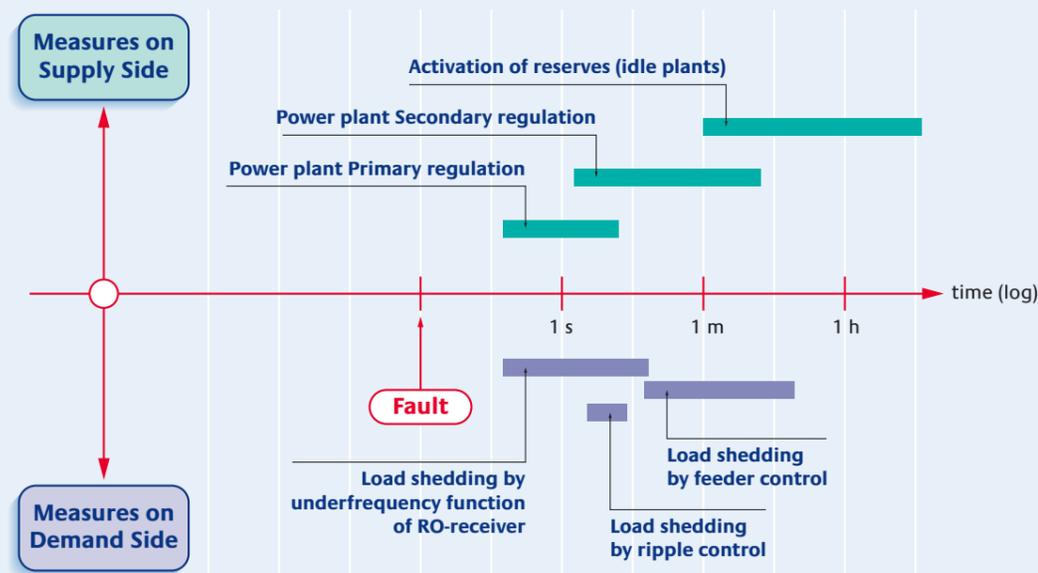
**Maximum value:**

As the electrical grid itself serves as transmission medium, the signal broadcast is limited exactly to the part of the network supplied. Individual sub-networks can be controlled separately and thereby maximum saving potential is achieved.

**No constraints on further developments:**

Ripple control can serve your core business as a stand-alone technology or it can be integrated into SCADA or other systems to maximise cost efficiency. There are considerable benefits to be derived from avoiding diffuse links with rapidly changing AMR technology which is in a state of flux, and also subject to changes in corporate structure. This means that the dynamic load management system can continue to evolve in an optimum way.

**Load shedding prevents electrical power outage.**



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## Win with Enermet.

Enermet ripple control offers more than just technology; it also provides reliability. Load management and ripple control have been part of Enermet's core business since 1946 – continuously, with no interruption. It is backed up by the commitment of Enermet's team of experts, both young and experienced from the IT, energy technology, electrical engineering, production, logistics, business economics, service and marketing sectors.

### A strong installed base:

There are over 2,000 Enermet transmitters and 5 million receivers in use throughout the world. This provides a solid and diverse base for Enermet's business. This experience allows Enermet to constantly adapt its products in line with the most modern requirements and technologies. Enermet partners with its customers who can rely on system compatibility to ensure that their systems achieve their maximum working life.



### System providers:

Enermet regards ripple control as a complex system. We ensure the best return on investment and put great emphasis on absolute user-friendliness. Our systems and services are designed to guarantee reliable system operation at any time.

### System technology:

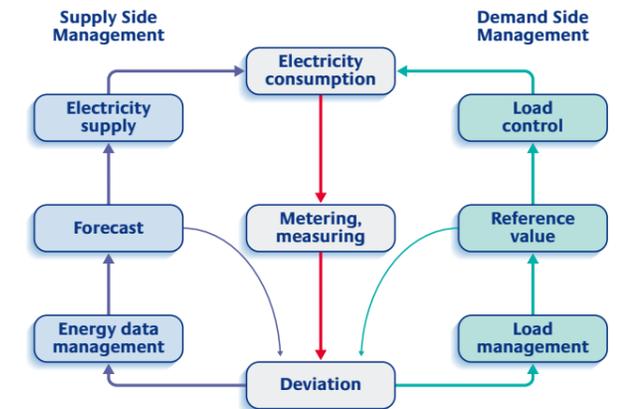
Ripple control is tailor-made for companies in the electricity industry. It is in no way dependent on other communications technologies. Add to this the fact that there are no licence fees or other surprises, and you have everything under control.

**Enermet – Guaranteed system performance**

## Complete the circle: ripple control and energy management.

Energy management is closely related to energy data management. Both are the key issues in a free electricity market. With ripple control you are closing the circle between energy data processing and energy management. You are in full command of your company's strategic intents.

The electricity market is designed to provide price signals giving consumers the power to choose when to use electricity. Ripple control is the practical means to exercise that choice.





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