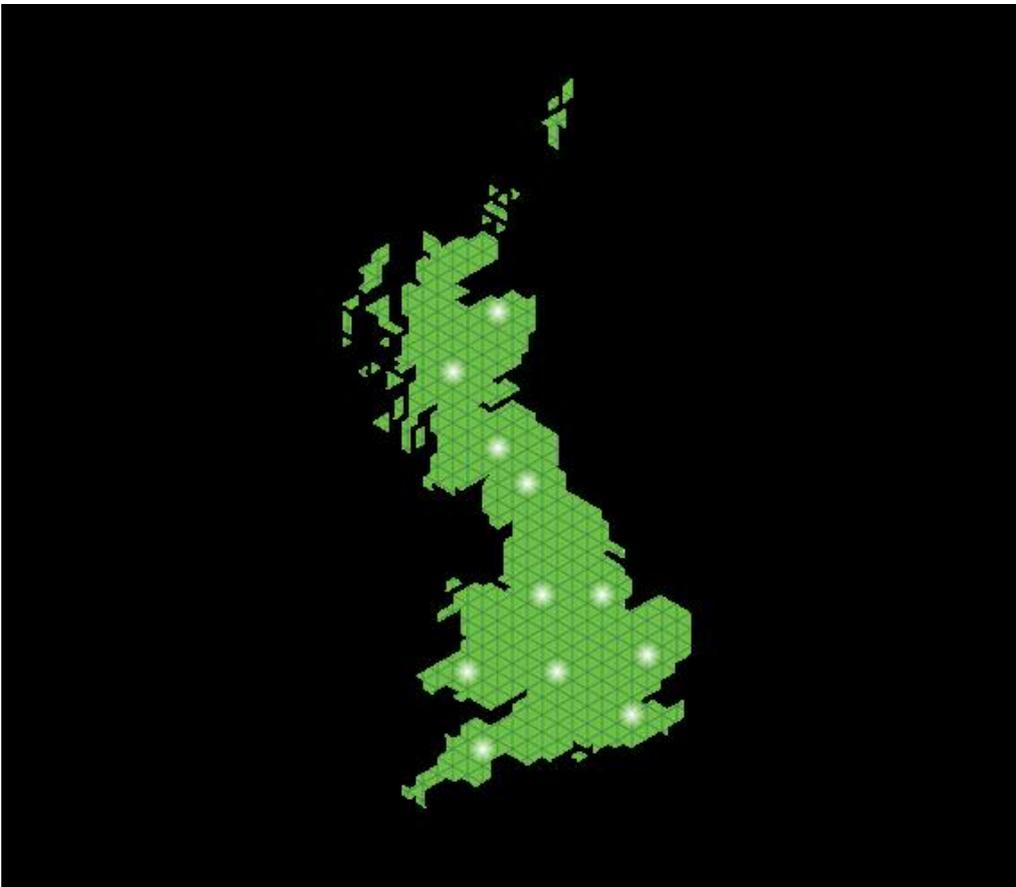


## MOVING TOWARDS A SMART GRID AND WHAT WILL THIS MEAN FOR HEAT PUMPS?

Smart meter technology is a crucial step towards a smart energy grid. A smart grid is a modern way of running our energy networks. Linking different hardware, communications and other technology, it's like an internet for gas and electricity.

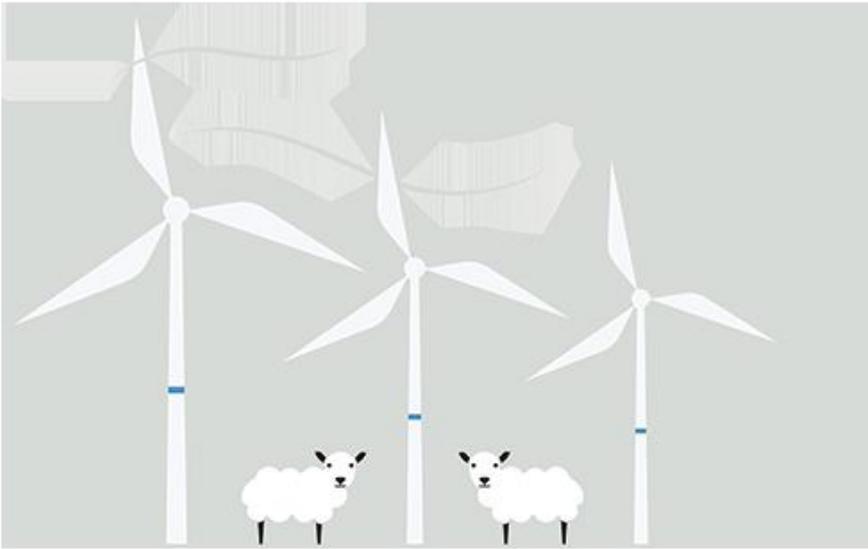
## WHY WE NEED A SMART GRID

The smart grid has the potential to solve lots of our energy problems. It'll better match supply and demand. It's more efficient, greener and wastes less energy. It's more secure and reliable. Unexpected power outages can be tackled faster too.



## PROMOTING GREEN TECHNOLOGIES

The smart grid will be much better at integrating green technologies, from electric cars to home rooftop solar panels and heat pumps. It will help us get the most from variable power sources like wind and solar.



## REBALANCING THE ENERGY MARKETS

Smart meters will change the relationship between us as customers and our energy suppliers. Understanding what we're spending on energy means comparing energy tariffs will be easy. Switching suppliers will be easier, faster and more transparent for all.

## BENEFITTING FROM 'TIME OF USE' TARIFFS

Smart meters can accurately measure real time use of electricity, which means energy suppliers will also be able to identify more off-peak time periods and offer more tariffs that include cheaper pricing.

## FAQS

### What is the smart grid and why do we need it?

Smart meters help enable the smart grid, which is a whole new way of running our energy networks. It's a bit like an internet for gas and electricity and will make us as a nation more secure and help us manage our energy usage.

The energy network we have now was designed for a time when our gas and electricity needs were much simpler. Now, we're using more energy and have to find ways to reduce our carbon emissions. We need to integrate new technologies, like electric cars and solar and wind energy.

The smart grid has the potential to help us solve lots of Britain's energy problems. It will:

- mean we can better match supply and demand

- help us be more efficient, greener and waste less energy
- help energy be more secure and reliable
- mean unexpected power outages can be tackled faster
- mean we can plan for the number of power stations we'll need in future with greater accuracy

The smart grid will be much better at integrating green technologies, from electric cars to home rooftop solar panels and heat pumps. In particular, we need the smart grid to help us get the most from variable power sources like wind and solar. For example, smart meters should open the door to flexible pricing that means we can use solar and wind energy when it's plentiful.

### What are the benefits for everyone?

Smart meters are a vital upgrade to Great Britain's energy system. The way we measure and pay for gas and electricity hasn't kept up to speed with improvements across almost every other area of our lives. Smart meters will enable a more efficient, greener, smarter energy system and lay the foundations for smart grids, which are a whole new way of running our energy networks.

## ELECTRICITY DEMAND

Electricity is generated in many ways but in the past it has been by burning fossil fuels. Renewable electricity comes from a number of sources but increasingly it is wind and solar power providing as much as 45% of our electricity. The problem with this is that it is intermittent; the sun doesn't shine at night or on cloudy days and the wind is unreliable.

If Britain is to change to a low carbon economy it is essential that we heat our buildings using renewable heat. We currently use natural gas to heat over 90% of our buildings in the UK which is not renewable nor particularly low carbon. Bio Mass as a fuel is a finite resource and requires large on site storage facilities and there are serious air pollution issues when considering urban use. For this reason the future of heating must be electric.

## THE SOLUTION

Heatpumps use the electrical power to move heat from a cold place to a warm place. In the process they deliver up to 4 times as much heat energy as the electrical energy they consume. This will vary during the heating season but the overall seasonal factor should be between 3.5 and 4. This means we don't need to generate as much electricity as the heat needed.

In the past we have had special tariffs to allow households to run storage heaters. These use electricity during the early hours when demand is low and the large power stations were running anyway. Now we have the reverse of the situation with renewable electricity; power can be abundant when the sun shines or the wind blows at any time. Underlying this is the same old problem of peaks and troughs in the demand.

## ENERGY STORAGE

What is needed is electrically powered heating that has storage and is flexible. Enter the heat pump era. Modern heat pump controls are very sophisticated, unlike boiler controls they incorporate the programmer and thermostats. In addition they manage the hot water temperature and have weather compensation as standard to ensure the highest efficiency.

Energy can be stored as heat very effectively for short periods. The insulation on modern storage cylinders is very good and heat loss is low, and water has the highest heat capacity of all common substances therefore it is best for storing heat. So why not use this to store the energy when it is abundant. A 500ltr cylinder would store enough energy to keep the temperature in a 4/5 bedroom house with underfloor heating for nearly 2 hours on the coldest day. This stored heat would be enough to ensure that the heating would not need to run during the times of high demand on the electricity grid. This would reduce the need to run the small inefficient, expensive power stations.

The Alpha InnoTec heat pumps can be enabled to run in Storage Mode on demand, to the highest temperature it can manage. This will range between 55degC and 70degC depending on the model of heat pump and the time of year.

## SMART ENERGY

Smart Meters are being introduced to the UK, the initial marketing is all about being able to see what you are using and therefore more efficient but there is another function; Time of Use Tariffs.

Energy suppliers are introducing Time of Use Tariffs. Higher tariffs during high demand periods are intended to discourage users from running non-essential appliances (for a short time). These would be tumble dryers, washing machines and heat pumps. Smart meters are equipped with an output signal that can be used to turn off devices or prevent them from running during high demand/tariff periods. In return the user gets a lower normal tariff.

## CLEVER HEAT PUMPS

Alpha InnoTec heat pumps are Smart Energy ready. They are equipped for the future of renewable heating, OMNIE can enable the heat pump to recognise these signals to make the most of the lower tariffs while maintaining a comfortable environment in your home or office.