

SHIFT & SAVE

*Making Coleraine's
Network Smart*



About NIE

Northern Ireland Electricity (NIE) owns the electricity transmission and distribution network and operates the electricity distribution network which transports electricity to over 840,000 customers.

Acquired by ESB in December 2010, NIE remains an autonomous organisation with its own Board and management teams and separate regulation via the Utility Regulator.

NIE's transmission and distribution network consists of:

- 45,000 kilometres of overhead lines and underground cables
- 75,000 transformers
- 258 major substations



Shift and Save

The Shift & Save trial, supported by Coleraine Borough Council, was launched in January 2012 and ended in May 2014. The aim of the trial was to investigate how smart meters and smart grid technology could change home energy usage patterns, particularly at times of peak demand.

Introducing the Project Team

We had a talented team managing the project. From troubleshooting technical problems to designing leaflets, this team brought it altogether and made it happen. If you participated in the trial over the last 24 months then you may have seen some of these faces at some point.

From left to right: Christine Baker, Peter Johnston, Chris Huntley, Mark Lindsay, Ben Cupples, Brian Moorhead, Stephanie McCullagh.



“This report is for those who have participated in or have an interest in the Shift and Save trial. Thank you for supporting the Shift and Save trial over the last 2 years.”

What did we do?

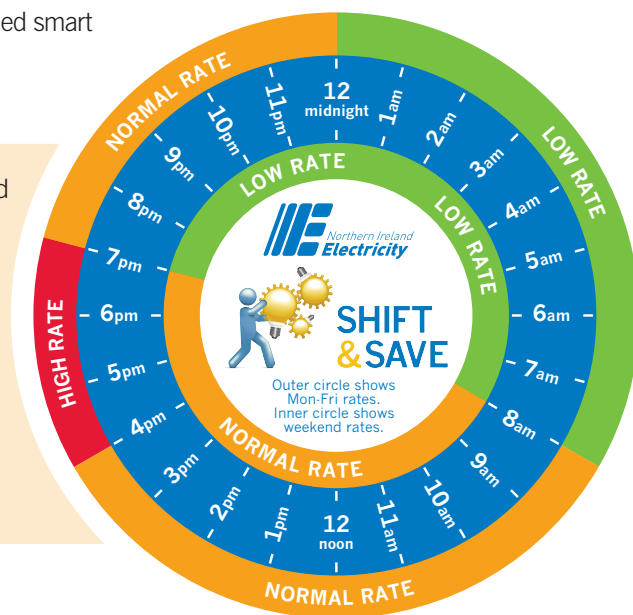
200 customers in Coleraine had new smart meters installed as part of the Northern Ireland Electricity (NIE) 'Shift & Save' trial, the first trial in Northern Ireland that combined smart meters and smart network technology.

The purpose of the trial was to investigate how smart meters and smart grid technology could change homeowners' energy usage patterns to reduce demands on our network, particularly at times of peak demand.

Over the first 9 months (Phase 1), NIE collected base data from the meter. After that the 200 participants were divided into two groups:

THE TEST GROUP - 175 participants who **were** incentivised to change their electricity usage patterns.

THE CONTROL GROUP - 25 participants who **were not** incentivised to change their electricity usage patterns.



OWL+USB

A popular IHD that displays usage information in kWh and energy cost in £ and p.

OWL Z-Smart

An advanced feature of the OWL Zsmart meant that the display backlight lit either red, amber or green depending on high, medium or low tariff.



During Phase 2, trial group participants were encouraged to use their high energy appliances during the low tariff times and use minimal load at times of peak cost. This worked by rewarding the participant with a financial saving based on a 'shadow tariff' up to the value of £75.

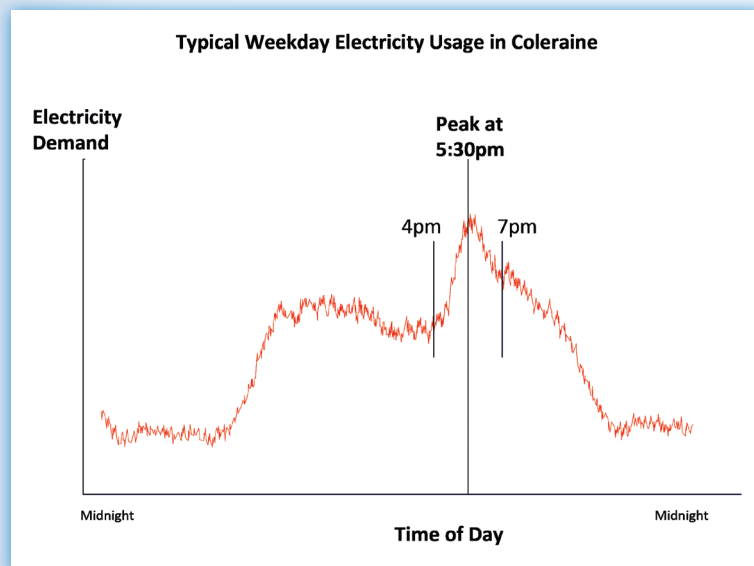
NIE also installed some other 'smart grid' technologies in two small local substations and at the primary electricity substation that supplies most of the local network in the Coleraine West area.

Why?

We decided to run the Shift and Save trial so that we could:

1) Investigate whether smart meters can be used to change how customers use electricity.

Electricity usage in the Coleraine area rises by approximately 30% on weekdays between 4pm and 7pm, peaking at around 5.30pm. Local electricity usage is constantly growing on an annual basis and we must ensure that our network is always rated to cope with these short duration 'peaks'. This often involves spending money to replace transformers and other equipment to make sure we have the right capacity.



2) Investigate the scope to achieve an effect that is scalable up to a level where it may be possible to defer network investment in the future.

In simple terms, if we can shift the peak on a trial with 200 participants then is it also possible to do on a larger scale? What would it look like if the whole of Coleraine changed the times that they use electricity? Would it be possible to delay significant network investments for a few more years and save us all a little bit on our electricity bills? That's one of the areas we wanted to investigate through the Shift and Save trial.

“We wanted to see if it was possible to change householders’ energy usage patterns to reduce this peak. ”

Chris Huntley, Shift and Save Project Manager



3) Investigate the functionality and viability of load monitoring at distribution substation (11/0.4kV) level.

From electric vehicles to photovoltaic (PV) panels installed on the roofs of houses, the way we produce and consume electricity is changing. As a network company, we need to understand the effect that these changes may have on the electricity flows on our network. In the future, this may mean that we need to install special equipment in substations to monitor the electricity flows to help us plan and operate our network.

This trial has helped us to understand the technology that could be used on a wider scale on the Northern Ireland network.

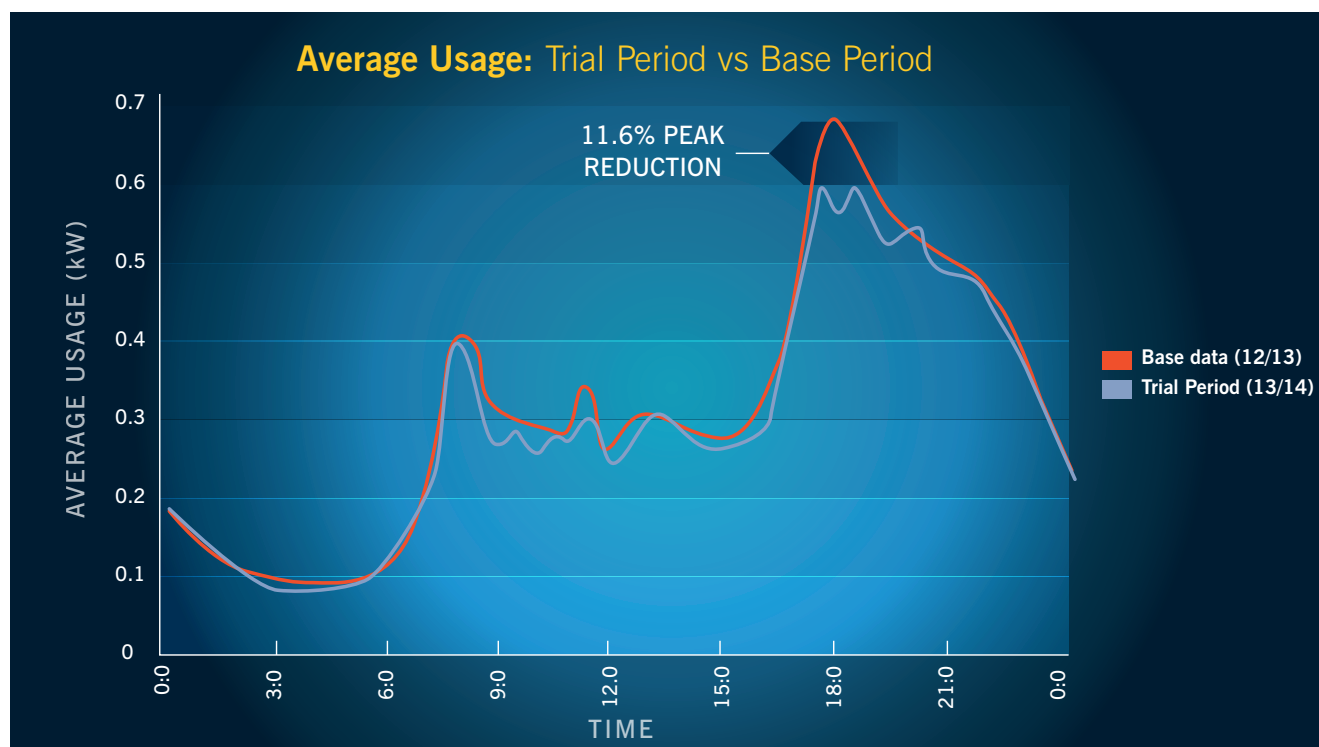
4) Investigate the functionality and viability of condition monitoring at primary substation (33/11kV) level.

Understanding the condition of our network is vitally important to us. Knowing what is going on 'under the hood' of our transformers and other equipment helps us to target the right assets with maintenance and replacement programmes. The Shift and Save trial gave us an opportunity to test some condition monitoring equipment at a local Coleraine substation.



Did we shift the peak?

To assess whether we reduced the peak demand, we compared the average weekday usage for the test group during year 2 with the same data from year 1. Shifting or flattening the peak was our number one goal - so how did we get on?



Here's the facts:

We reduced the average tea-time peak by **11.6%**.

The total units used between 4pm and 7pm reduced by **7.3%**.

Overall electricity usage decreased by **2.3%**, a significant reduction in waste by the test group.



Is it scalable?

Similar trials in the past have used many forms of 'intervention' to try to encourage participants to achieve the best possible result. We decided to intervene as little as possible as we wanted to see if the effects achieved on the trial were scalable if smart meters, multi rate tariffs and IHDs were made available to several thousand customers instead of a few hundred.

So once the IHDs were installed and participants had been provided with their starter packs, we had very little involvement - other than a quarterly newsletter and we still got a great result!

Therefore, we believe that what we have achieved on the Shift & Save trial could be scaled up to a level whereby it could actually defer significant network investment.

Everyone's a saver!

The average saving made by test group was **£67.73** during the year.

This worked out as a saving of **10%** compared to the standard rate tariff we compared it against.

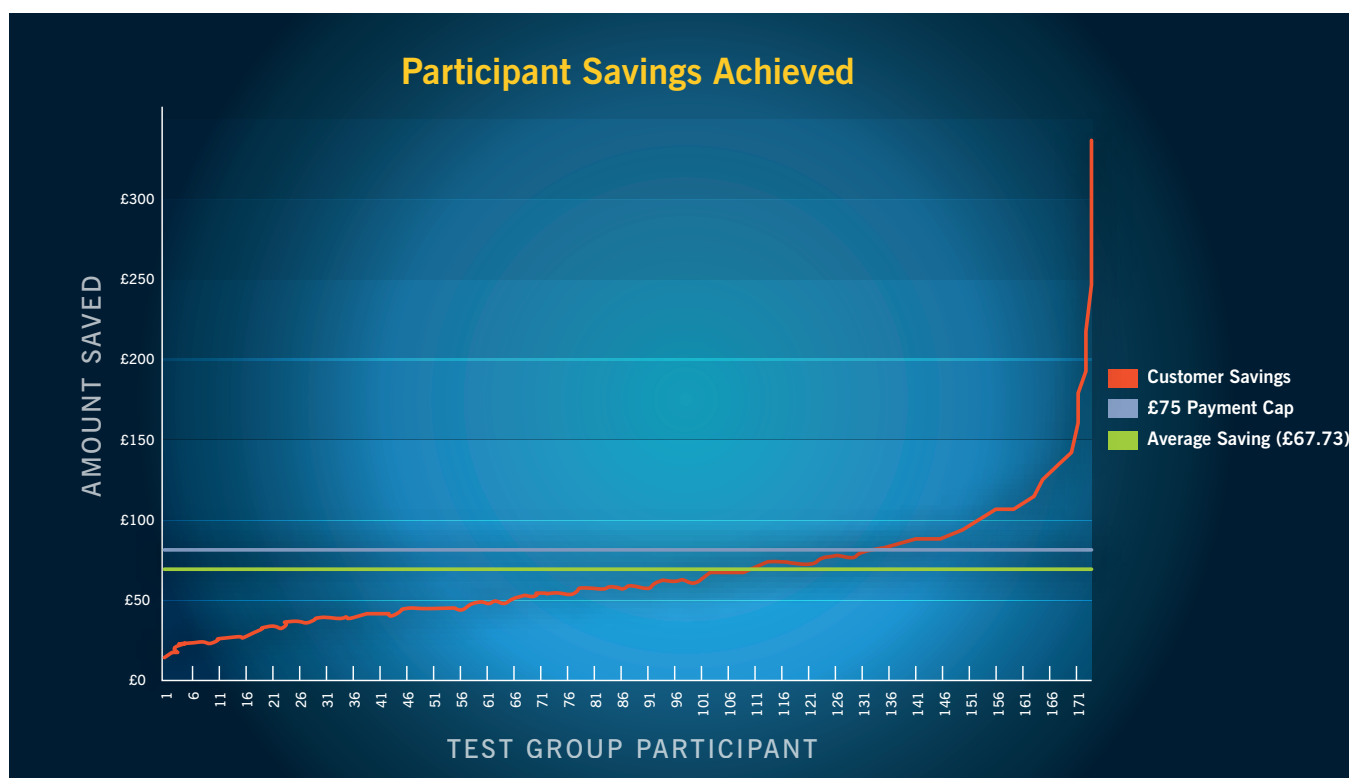
The minimum saving was **£8** during the year.

13% of participants were paid the maximum amount available - **£75!**



Were you part of the test group?

Find out how you compared against the rest of the test group



Meet some of our savers...



Karen Armstrong and her family took part in the Shift and Save trial. We provided her with an **OWL+USB IHD** to help her monitor her usage and, where possible, shift usage away from the peak periods.



Karen built up savings **over and above the £75 cap** during the 1 year trial period. This worked out at approximately 15% of her annual electricity costs.

How did she do it?

Karen told us that she changed the times that she used her washing machine and other high powered appliances so that she used less electricity during the peak period. Karen enjoyed taking part in the trial and told us that she is now more careful about how much electricity she uses.

Debbie Barber took part in the Shift and Save trial. She lives in Coleraine with her husband and 3 children.

We provided her with a **Zsmart IHD** to help her monitor her usage and, where possible, shift usage away from the peak periods.

Debbie also built up savings **over and above the £75 cap** during the 1 year trial period. This worked out at approximately 15% of her annual electricity costs.

How did she do it?

Debbie said, "My only significant change was putting the washing machine on at night and look how much that has saved - amazing!"

Debbie enjoyed taking part in the trial and was delighted to receive a cheque for £75 as a reward for shifting her usage.



“The trial gave me a greater understanding of the benefits I could gain by using my electricity at off-peak times. I think this is the way forward!”

Karen Armstrong, Trial Participant

What else did we learn?



Money Talks

Our survey results indicated that **80%** of test group participants preferred using the display in the cost mode (pounds and pence). With 2% preferring CO₂ mode and the other 18% preferring Watts.

Less is more

Our analysis showed that participants who had the Zsmart display which had the 'traffic lights' feature built in, reduced the peak by 3% more than those with the standard display.

Survey feedback also suggested that participants preferred using the colours as a guide rather than actually looking at the detail of the display itself.

This is an interesting result and shows the power of simple and easy to understand information - less is more!



Lost link?

The majority of In-Home Display products available for use with smart meters use a type of low power radio communication called Zigbee to 'talk' to the smart meter. Our experience of Zigbee is that it works fine as long as the meter and the IHD are in fairly close proximity with few obstructions. The display will disappear out of range when the distance from the meter increases. As a result, we had a number of 'lost link' reports throughout the trial, however in all instances these could be resolved fairly easily by removing the batteries for a few seconds.

Any other interesting facts?

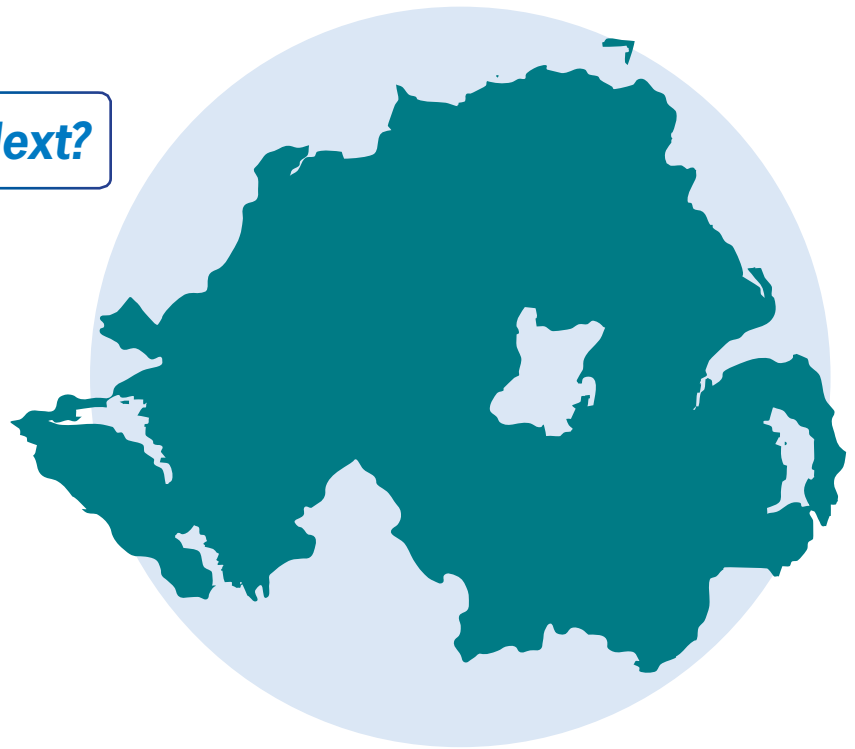
90% of trial participants told us that they had become more careful with energy use during the course of the trial.

94% of participants understood how shifting electricity usage away from peak periods could enable NIE to delay investments to the electricity network.

79% of participants said that they would opt for a multi-rate tariff if made available by their energy supplier.

Smart Metering - What's Next?

- Several European nations have now rolled out smart meters.
- The GB roll-out is set to commence in 2015 with over 53 million gas and electricity meters to be installed by 2020.
- In Republic of Ireland, the roll-out is set to commence in 2015.
- In Northern Ireland, DETI (NI) is responsible for energy policy and, along with the Utility Regulator, will be consulting on the NI roll-out during 2014/15.



Energy Efficiency - A few points to remember

- Only use low energy light bulbs or LEDs.
- Look out for 'A' rated appliances when purchasing a new fridge or freezer. Also, try not to buy bigger than you need as empty space costs more to keep cool.
- Always wash full loads.
- Set washing machine to 30 degrees where possible.
- Try to minimise tumble dryer usage and opt to hang washing outside to dry instead.
- Try not to leave your oven on for long periods of time without any food being cooked.
- Watch out for outside lights with sensors - it's been known for cats and dogs to activate the sensor through the night.

Did you know?

*The average tumble dryer can cost up to **60p** a cycle. That means that using it twice a week could cost up to **£63** over the course of a year.*

*Leaving 6 x 50 W halogen spotlights on in the kitchen for 3 hours a day will cost approximately **£50** over the course of a year.*

*An inefficient fridge freezer could cost you an extra **£100** a year.*

Notes



