Smarter energy use by industry could cut electricity demand by 75 percent

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(Phys.org) —As the Government debates the UK Energy Bill, new research has found that turning down non-essential services, such as heating, air-conditioning and pumping equipment, at times of peak electricity demand could play a far greater role in helping the UK achieve future energy security.

The study, conducted by researchers at the University of Reading working with KiWi Power, found that electricity demand from some industry sites, including telecommunications centres, could be reduced by more than 75% at times of peak load on the national grid. In many cases this was because businesses switched from metered electricity to stand-by diesel generators but in some of the sites studied, particularly in the hotel sector, a genuine reduction of nearly 25% occurred. This was achieved through the turn-down of air-conditioning and heating and lighting and did not impact or discomfort customers.

The study also found that these measures will also reduce the need for additional power stations and keep down climate damaging carbon dioxide emissions.

The results of the study are particularly pertinent as current proposals in the Government's Energy Bill may encourage investment in extra electricity generation capacity, such as expensive and polluting power stations and stand-by generators, rather than encourage consumers to reduce electricity demand.

Researchers from the University's School of Construction Management and Engineering used half-hourly meter readings, supplied by KiWi Power, from 176 non-domestic sites including warehouses, hotels, offices and telecommunication centres. The data, drawn from businesses already using KiWi Power's demand response services, were used to investigate the potential for reducing electricity use or shifting use to times of the day when electricity demand on the national grid is lower.

Jacopo Torriti, from the School of Construction Management and Engineering and lead researcher on the project, said: "Encouraging business to lower their electricity usage at times of peak demand on the national grid would reduce the need for new power stations and help keep the nation's lights on in the future. But it's less clear whether the Government's Energy Bill will really encourage such demand turn down. Working with KiWi Power has been vital for the provision of data and industry expertise in the complex world of energy demand resources."

Yoav Zingher, director and co-founder of KiWi Power commented: "This research from the University of Reading shows the clear potential to reduce energy demand by encouraging businesses to turn down non-essential power for short periods of time and that's a far more environmentally friendly option than building more power stations, and will reduce peaking power issues as the grid becomes increasingly congested."

The study also found that if businesses are given more warning (four hours or more) of the need to reduce their electricity use, then reductions in demand could be doubled in some cases. One example from the study showed that, given sufficient warning, warehouses could pre-load their fridges and build up cooling, which would allow fridges to be safely turned down and so lower electricity use when the grid needs it.

Rewarding industry to reduce their demand at critical times could make

a significant contribution to the UK electricity 'capacity market' being proposed in the Government's Energy Bill the study concluded. Under a 'capacity market' contracts will be awarded to supply electricity (or reduce demand) at times of peak demand on the grid to help ease the potential electricity shortage as electrified transport increases and aging fossil-fuel power stations are taken off-line.

However, the study found that a failure to explicitly cater for demand characteristics (e.g. the need for longer warning periods) in the policy development, could lead to an inadvertent promotion of standby generation, such as diesel generators, rather than genuine demand turn down.

Provided by University of Reading