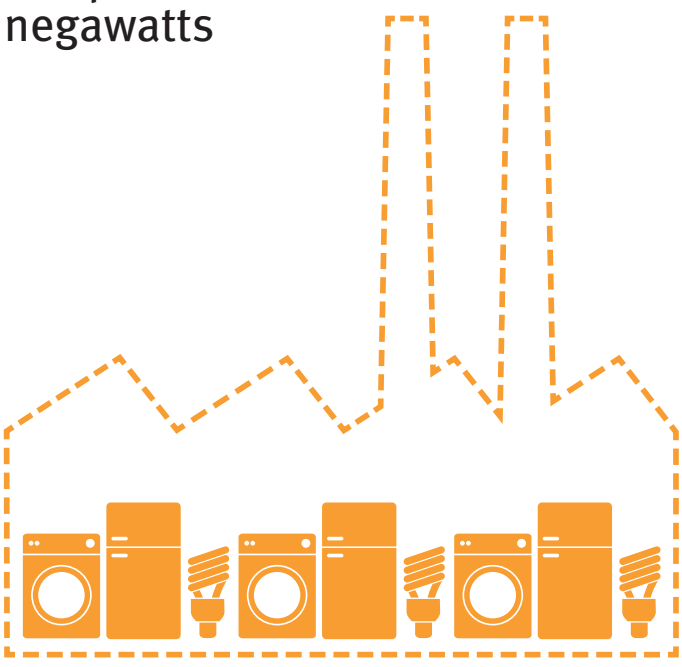
The power of negawatts



green alliance...

MPs and Peers want negawatts

"The draft bill and its associated documents are fundamentally flawed by the lack of consideration given to demand side measures, which are potentially the cheapest methods of decarbonising our electricity system. We recommend an amendment to the draft bill to provide the secretary of state with powers to introduce a feed-in tariff for energy efficiency, if this cannot be achieved through existing legislation."

House of Commons Energy and Climate Change Select Committee

"We and others feel that the demand side should have been given more emphasis in the bill. The bill could, for example, more clearly support the aggregation of consumer demand management that would offer cost savings for all consumers by helping to reduce the need for back up capacity."

House of Lords informal working group on the draft Energy Bill

Why negawatts are the answer

There is cross party consensus over the need for a demand reduction mechanism in the Energy Bill. A wide range of stakeholders, including energy companies, agree that a mechanism to reward demand reduction is an essential but missing component of electricity market reform.

We have assessed a range of efficiency measures which could be introduced into the Energy Bill in our report *Creating a market for electricity savings*. We conclude that an efficiency feed-in tariff is the best policy for the UK because it employs competition to deliver efficiency.

Britain's liberalised electricity market seeks to use competitive pressure to lower consumer bills. However, the market structure is biased in favour of high cost supply: because customers pay per unit of electricity consumed, profits only increase if electricity use increases. Companies can't make money by helping consumers to use less energy: they compete to find the cheapest power supply rather than the cheapest means of delivering the service consumers want from electricity.

An electricity efficiency FiT expands the scope of this competition: it makes supply compete with demand, so high cost power generators compete with companies making energy savings – generating negawatts – at lower cost. This ensures that we buy cheap negawatts rather than just invest in expensive low carbon power.

A FiT would provide a predictable payment for each negawatt (a unit of electricity saved). This simple revenue stream would allow new market entrants to focus on how best to save electricity, driving innovation in businesses to find the best ways to cut electricity use.

Examples of efficiency businesses in the US include companies which offer finance or discounts to replace inefficient appliances with more efficient ones; companies which retrofit existing buildings with smart controls and new heating and cooling systems to reduce energy use; and those which provide consumers with tailored advice on electricity reduction.

An electricity efficiency FiT works without major structural change to the market and could easily be introduced alongside the new FiTs for low carbon supply. It fills policy gaps, targets all electricity users, and would complement other existing policies, such as product standards.

The Energy Bill is a one-off opportunity to save money. Introducing an electricity efficiency FiT will help to reduce electricity demand by the 40 per cent which the government believes is possible by 2030.

The infographic overleaf is a simple explanation of negawatts and how an electricity efficiency FiT would work. For a fuller explanation, and an assessment of how it compares to other policies, see our report *Creating a market for electricity savings: paying for energy efficiency through the Energy Bill* (October, 2012).

Data sources

[1] Generation costs from Mott Macdonald, *Costs of low carbon generation technologies*, May 2011. Since 2011, nuclear costs have risen as high as £160/MWh, making this estimate highly optimistic for nuclear.

[2] Refrigerator savings data from Larry Kinney and Rana Belshe, *Refrigerator replacement in the weatherization program*, September 2001

[3] Laundry savings data from Swiss Federal Institutes of Technology, *Utility rebates for ENERGY STAR appliances*, September 2011

[4] Lighting savings data from Natural Resources Defense Council, *Reanalysis of the 2006-2008 upstream lighting program*, July 2011

[5] The total negawatts savings for each year are:
2006 = 163.5 MWh
2007 = 167 MWh
2008 = 202 MWh
2009 = 240 MWh
2010 = 300 MWh

[6] Texas savings and expenditure from *Energy efficiency accomplishments of Texas investor owned utilities, years 2006 to 2010*, available from www.texasefficiency.com/index.php/publications/reports

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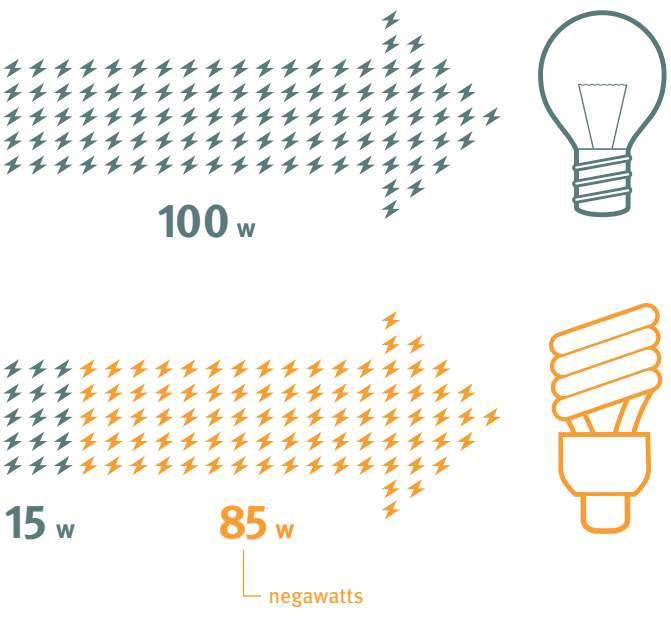
What are negawatts?

We need to cut the emissions of the power sector. We can do this by building new low carbon power stations, or through negawatts. **But what are negawatts?**

Imagine a 15 watt lightbulb replacing a 100 watt bulb. The 85 watts saved can be used elsewhere: these are negawatts.

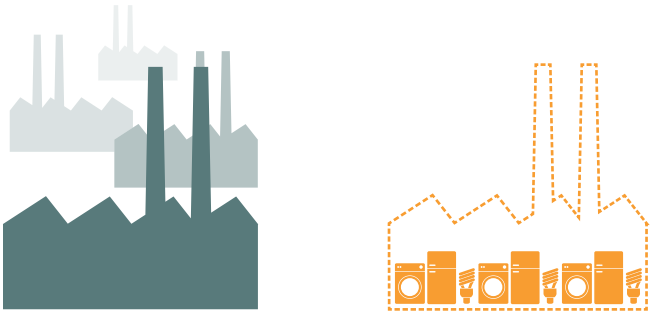


Low carbon power versus negawatts

New, efficient appliances do the same thing as old, inefficient ones, but use less energy. Gaining negawatts from new appliances mean we don't have to build so many new power stations.

Building new power stations is expensive; negawatts are cheap. Energy saving programmes in the USA have proved to be **three times cheaper** than new supply. When scaled up to the size of power stations these savings really add up.

We all pay for new power stations through our electricity bills. Negawatts can be combined into **virtual negawatt power stations.** Why don't we pay for these instead of building new power stations?



How do we get negawatt power stations?

Under the government's electricity market reforms, a levy (called a CfD FiT) will be added to consumer electricity bills to meet the cost of low carbon power stations.

In the 'power stations only' scenario, 4 MWh of electricity (a bit more than a large family uses in a year) could be bought from a range of conventional and low carbon sources.

This is a good way of supporting investment in low carbon power, but doesn't allow cheaper negawatts to compete with new power stations. By contrast, if negawatts are used too (as on the right), 1 MWh comes from a negawatt 'power station' which receives a FiT just like a low carbon generator.

In the 'with negawatts' scenario, a MWh of energy (costing £80) is replaced with a cheaper MWh of avoided energy (costing £28) with a net saving to the consumer of £52. So, even though the consumer levy rises, it is outweighed by much lower electricity bills overall.

Texas buys negawatts Why don't we?

Even in the oil boom state of Texas, they have been paying for negawatts instead of building new power stations since 1999.

Negawatts prevent the need to build new power stations and lower fuel use in existing power stations.

Building fewer new power stations means Texans have saved around three times what they have spent to incentivise lower consumption.