

# Switching off your lights has a bigger impact than you might think, says new study

June 30 2010

---



Fossil fuel power stations respond to changes in electricity demand

(PhysOrg.com) -- Switching off lights, turning the television off at the mains and using cooler washing cycles could have a much bigger impact on reducing carbon dioxide emissions from power stations than previously thought, according to a new study published this month in the journal *Energy Policy*. The study shows that the figure used by government advisors to estimate the amount of carbon dioxide saved by reducing people's electricity consumption is up to 60 percent too low.

The [power stations](#) that supply [electricity](#) vary in their carbon dioxide emission rates, depending on the fuel they use: those that burn fossil fuels (coal, gas and oil) have higher emissions than those driven by nuclear power and wind. In general only the fossil fuel power stations are

able to respond instantly to changes in [electricity demand](#).

Dr Adam Hawkes, the author of the new study from the Grantham Institute for Climate Change at Imperial College London, says the government should keep track of changing carbon emission rates from power stations to ensure that policy decisions for reducing emissions are based on robust scientific evidence. The new study suggests that excluding power stations with low carbon emission rates, such as wind and nuclear power stations, and focussing on those that deal with fluctuating demand would give a more accurate emission figure.

Scientists advising government on for the best ways to reduce electricity demand currently use an estimated figure for emission rates. The new study shows that, at 0.43 kilograms of carbon dioxide per kilowatt hour of electricity consumed, this figure is 60 percent lower than the actual rates observed between 2002 and 2009 (0.69 kilograms of carbon dioxide per kilowatt hour), meaning that policy studies are underestimating the impact of people reducing their electricity use.

Dr Adam Hawkes, author of the paper, and a Visiting Fellow at the Grantham Institute for Climate Change at Imperial College London, said: "One way governments are trying to mitigate the effects of climate change is to encourage people to reduce their energy consumption and change the types of technologies they use in their homes. However, the UK government currently informs its policy decisions based on an estimate that, according to my research, is lower than it should be.

"This means any reduction we make in our electricity use - for example, if everyone switched off lights that they weren't using, or turned off electric heating earlier in the year - could have a bigger impact on the amount of carbon dioxide emitted by power stations than previously thought. However, this also acts in reverse: a small increase in the amount of electricity we use could mean a larger increase in emissions

than we previously thought, so we need to make sure we do everything we can to reduce our electricity use," added Dr Hawkes.

Dr Hawkes drew upon 60 million data points showing the amount of electricity produced in each half-hour period by each power station in Great Britain from the start of 2002 to the end of 2009. He also calculated the emissions of each different type of generator by examining government data showing their average annual fuel use. Finally, he took these two sets of data to calculate the emissions rate that should be attributed to a small change in electricity demand.

The results show that, for 2002-09, the carbon dioxide emission rate for estimating the effect of a small change in electricity demand is 0.69 kilograms of carbon dioxide per kilowatt hour of electricity consumed. This is 30 percent higher than the average emissions rate across all power stations, which is 0.51 kilograms of carbon dioxide per kilowatt hour, and 60 percent higher than the figure currently used by government advisors, which is 0.43 kilograms of carbon dioxide per kilowatt hour.

Professor Sir Brian Hoskins, Director of Imperial's Grantham Institute for [Climate Change](#), said: "This is a very important study that could help policy makers make more informed decisions to reduce our carbon emissions. The government needs a good understanding of the figures it uses to support policy analysis, because this has a big impact on which technologies we employ to reduce our energy use. With a more accurate picture of what is going on, we will be much better equipped to tackle our [carbon dioxide emissions](#)."

**More information:** Paper: [dx.doi.org/10.1016/j.enpol.2010.05.053](https://dx.doi.org/10.1016/j.enpol.2010.05.053)

Provided by Imperial College London

Citation: Switching off your lights has a bigger impact than you might think, says new study (2010, June 30) retrieved 26 April 2024 from <https://phys.org/news/2010-06-bigger-impact.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.