Smart Meters: Do Prices Matter to Their Adoption and Do They Save Energy?

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Sector(s): Environment & Energy

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Sample: 39,133 British Gas customers

Target group: Families and households

Outcome of interest: Technology adoption Energy conservation

Intervention type: Monetary incentives

Partner organization(s): British Gas

Smart meters, which tell consumers how much energy they are using on a regular basis, have been heralded as a way to encourage energy conservation and reduce greenhouse gas emissions. Researchers conducted a randomized evaluation to test the impact of financial incentives on the take-up of energy-efficient smart meters and subsequent energy use in partnership with British Gas. While offering incentives increased smart meter adoption, customers did not reduce their energy consumption.

Policy issue

Improving home energy efficiency has long been touted as one of the easiest and most cost-effective ways to reduce climate change. In theory, energy efficiency could offer a "win-win" solution that both saves households money and reduces carbon emissions by encouraging energy conservation. However, many energy-efficient technologies have fallen short of predicted energy savings. There is evidence that energy-efficient technologies are not as effective at reducing consumption as previous estimates suggest, and that take-up for efficient appliances can be low.

Smart meters, which tell consumers how much energy they are using on a regular basis, have been heralded as efficient devices to encourage energy conservation and reduce greenhouse gas emissions. Can offering households financial incentives encourage them to install smart meters? If so, do they encourage energy conservation?

Context of the evaluation

While the United Kingdom has reduced its carbon emissions over time, it still was responsible for around 7.1 tons of carbon dioxide per person in 2013, ranking in the top forty highest-emitting countries.[1] The energy sector, including both gas and electricity, was responsible for the highest emissions of any sector.[2] Of all residential energy-saving technologies, smart meters have garnered some of the largest investments by utilities. In 2011, the government of the United Kingdom announced a plan to roll out 50 million energy smart meters to homes and small non-residential sites by 2020, a goal that was later extended to 2024. The motivation behind the United Kingdom's smart meter rollout was both to encourage two-way communication between consumers and utilities and to advance the nation's climate goals.[3]

British Gas, a private utility company, is the largest energy supplier in the United Kingdom and provides the model of smart meters most commonly used in many countries in Europe and North America. Before the intervention began at the start of 2013, around 24,040 smart gas and electricity meters were in use in the United Kingdom.[4]



Man performs a check on a smart meter.

Photo credit: Defense Visual Information Distribution Service

Details of the intervention

Researchers conducted a randomized evaluation to test the impact of financial incentives on the takeup of energy-efficient smart meters and subsequent energy use in partnership with British Gas. In April 2013, 26,025 British Gas customers who were not already using smart meters randomly received letters offering different levels of incentives to have the smart meter installed:

1. *£5 Incentive group (8,677 participants)*: Customers were offered free installation of a new smart meter, including an in-home display and a meter that frequently measured their energy use, along with a financial incentive of £5 accredited to a loyalty card upon the successful installation of the meter.
2. *£10 Incentive group (8,680 participants)*: Customers were offered the same free installation package, along with a financial incentive of £10 accredited to a loyalty card upon the successful installation of the meter.
3. *Comparison group (8,668 participants)*: Customers were offered the free installation package with no additional incentives.

In June 2013, 13,108 additional eligible customers who had not received a letter two months prior were randomly assigned to receive letters offering the following incentives to have smart meters installed, or to a comparison group:

1. *£10 Incentive group*: Customers were offered free installation of a new smart meter, including an in-home display and a meter that frequently measured their energy use, along with a financial incentive of £10 accredited to a loyalty card upon the successful installation of the meter.
2. *£1000 Lottery group*: Customers were offered the free installation package and were entered into a prize lottery with the opportunity to win the point equivalent of £1000, which would also be accredited to a loyalty card upon the successful installation of the meter.
3. *Comparison group*: Customers were only offered the free installation package with no additional incentives.

To have the meter installed, customers had to call British Gas to arrange an appointment to have the meter installed at their residence, and the customer had to be present during the installation process.

In addition to tracking how many smart meters were installed after customers received the incentive offers, researchers collected data on customers' energy use from January 2012, just over one year before the intervention began, until March 2016, three years after the letters were sent.

Results and policy lessons

All of the monetary incentives increased the adoption of smart meters. There was no difference in the adoption rate between the groups that offered £5 and £10 incentives, while the £1000 lottery was less effective at increasing adoption. However, adopting a smart meter did not affect energy use.

Smart meter installation: The £5 and £10 incentives had a similar impact on the adoption of smart meters. In the first round, participants in the £5 incentive group and the £10 incentive group were 4.2 and 4.5 percentage points more likely to have a smart meter installed, respectively, a 29.7 and 31.8 percent (4.2 and 4.5 percentage points) increase from the comparison group adoption rate of 14.1 percent. In the second round of letters, customers who received the £10 incentive and the £1000 lottery incentive were 23.9 and 14.7 percent (2.6 and 1.6 percentage points) more likely to have a meter installed, respectively, relative to the comparison group adoption rate of 10.9 percent. Customers who were less familiar with the loyalty card were the most likely to adopt the smart meters across all incentive groups.

Energy use: Across all groups, the demand for gas and electricity decreased over the course of the intervention. However, none of the incentive groups reduced their gas or electricity consumption relative to the groups that did not receive incentives, suggesting that the smart meters did not reduce energy use. Researchers recommend that more research on the impact of smart meters and technologies on energy use is needed before they are rolled out to the public.

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2. Department of Energy and Climate Change (UK). 2014. "2013 UK Greenhouse Gas Emissions, Provisional Figures and 2012 UK Greenhouse Gas Emissions, Final Figures by Fuel Type and End-User: Statistical release"

3. Hinson, Suzanna. 2019. "Energy Smart Meters" Briefing Paper 8119. House of Commons Library.

4. Department of Energy and Climate Change (UK). 2014. "Statistical Release: Experimental National Statistics. Smart Meters, Great Britain, Quarterly report to end December 2013"