



Using behavioral insights to make firms more energy efficient: A field experiment on the effects of improved communication



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ABSTRACT

The Dutch government provides annual, detailed, energy-efficiency feedback to individual companies that have signed a voluntary agreement to increase their energy efficiency. However, only about 14% of all companies actually download their dedicated report containing this feedback. To increase the assumed positive effect of the feedback, the Dutch government aims to increase this download rate. Drawing upon insights from behavioral economics, the present study investigates the effects of alternative emails, inviting to download the feedback report, on 505 companies' download behavior, in a randomized controlled field experiment with two treatment groups and one control group. The download rates for our treatment groups are more than three times higher compared to the control group. Survey results indicate that the follow up behavior does not differ between the respondents who were nudged and those who were not. Moreover, we found indications that downloading the report induces the energy coordinators to consider energy-saving measures. More generally we have shown that policy targeting energy saving of firms can benefit from using behavioral insights. Relatively small changes in the implementation of specific interventions can have large influences on the effectiveness of the policy.

1. Introduction

The Energy Efficiency Directive of the European Union gives clear targets to the member states to reduce CO₂ emission levels. In the Netherlands, for non-ETS² sectors, this CO₂ emission reduction goal is 16% for the period between 2005 and 2020 (Daniëls et al., 2014). To contribute to this goal, the Dutch government and 1100 companies³ signed a voluntary agreement.⁴ These companies have a relatively high energy usage and differ largely with respect to their activities, production processes, energy usage, size, and energy efficiency. Companies who joined the agreement commit to making an Energy Efficiency Plan (EEP). Each plan contains energy-saving measures that should improve energy efficiency by 8% in 4 years—an average of 2% per year. In return, eligible companies can get a tax reduction. Monitoring of the

energy-efficiency improvements occurs annually, and each company is obliged to provide data. Based on this data, an annual dedicated company report is made by RVO.nl, an agency of the Dutch government that provides detailed feedback to the individual company regarding its energy efficiency. The report also contains anonymous scores of companies in the same sector and a sector average as a benchmark to which energy-efficiency improvements can be compared.

The provision of individual feedback is based on the assumption that it helps the companies to improve their energy efficiency. The assumption is based on a broad literature that shows that individuals move toward more energy-efficiency behavior when provided with feedback (see e.g., Darby (2006)). Of course, the feedback can only be effective if company representatives responsible for energy efficiency actually read their dedicated reports. When reports are available, the

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² ETS = The EU CO₂ emissions trading system.

³ In fact, these are 1100 business units that individually function as a company. More business units can be a part of one larger company.

⁴ This agreement concerned the MJA3 agreement (in Dutch: Meerjarensafpraak Energie-Efficiëntie 2001–2020)

companies receive an email that invites them to download the report from a password-protected website. However, only about 14% of all companies actually download their reports.⁵ To increase the assumed feedback effect on energy-efficiency improvement, the Dutch government wants to increase the report download rate.⁶

Drawing upon insights from behavioral economics, the research described here aims to investigate how the invitation email can be improved to substantially increase the number of report downloads. We established the effect by a controlled natural field experiment (randomized controlled trial). Moreover, we also monitored the feedback effect with a survey, asking the companies if and how they have used the reports to improve their energy efficiency (follow-up behavior). To the best of our knowledge, this study is one of the first natural field experiments specifically targeting the energy-efficiency behavior of company representatives.

We find that the download rates are more than three times higher for our treatment groups compared with the control group. The survey results indicate that we do not need to worry that the nudges did trigger respondents to download the report who subsequently do not do anything with it. We do indeed not find any significant differences regarding relevant follow-up behavior between the respondents who were nudged and those who were not nudged. Moreover, we find that downloading the report induces the energy coordinators to consider more energy-saving measures.

2. Theoretical background and hypotheses

Most of the research in behavioral economics on how to “nudge” individuals to adopt more energy-efficient behavior has focused on private consumers. Without doubt, consumers constitute a key target group for policymakers that aim for energy conservation. Abrahamse et al. (2005), for example, report that in the U.S., in 2003, private households were responsible for an estimated 1214.8 million metric tons (MMT) of U.S. energy-related CO₂-emissions, equivalent to 21% of the total. OECD figures on household contributions to total energy usage generally range between 15% and 20% (Biesiot and Noorman, 1999). While these figures suggest that private households are an important target group, they also show that organizations, including private firms, are important as well. The industrial sector accounted for around 26% of total final energy consumption in the EU-28 in 2012 (Ademe, 2015). However, decision makers and representatives of firms, such as managers and energy coordinators, receive comparatively little attention in behavioral economics research, despite the fact that they represent an important target group when it comes to energy efficiency. This omission may be due to the fact that bounded rationality within organizations has been only incompletely absorbed in the economics of organization literature (see Bromiley (2009)), and thus also within the field of behavioral change and nudging.

Research in behavioral economics has shown that behavioral changes are positively associated with the provision of a limited amount of relevant and targeted information, as well as specific and timely feedback (see, e.g., Fischer (2008), Darby (2006)). Regarding consumer responses to different forms of information and feedback about their energy use, the Energy Demand Research Project (EDRP), conducted by AECOM Building Engineering and Ofgem (June, 2011) in the U.K., shows promising results. In the EDRP, four energy providers each conducted trials on the impact of various interventions, with the majority directed at stimulating energy conservation, and others aimed at shifting use from peak to off-peak periods. The effect of

generic advice and historic feedback on energy consumption was not always seen, and when it was seen the reduction in [median] consumption was up to 5%. Information on energy conservation was most effective when provided in simple, short statements, and (repeatedly) over a period of time—minimal information but well-presented and easy to absorb. Therefore, the authors of the report concluded that, “advice should be provided but the details of delivery (e.g., clarity, quantity of information, timing) and combination with other interventions, are critical” (p. 167). The same conclusions applied to the provision of historic usage feedback.

Ehrhardt-Martinez et al. (2010) present a meta-review of 57 primary studies into household electricity saving in response to various types of feedback performed over the course of the past 36 years in 9 countries including the U.S., Canada, Australia, Japan, and European countries. Overall, they find that significant savings can be achieved. The key message from their meta-analysis is that the type of feedback matters crucially. Some forms of feedback appear to be much more effective than others in generating more substantial energy savings. In particular, the frequency and richness of the feedback seem important. Fischer (2008) and Darby (2006) indicate that regular feedback has the greatest effect. We can conclude that in order to have the desired (positive) effect, information should not only be relevant and provided regularly, it should also be limited, as an overload may induce people to abstain from acting.

To investigate the effect of an improved invitation to gain feedback and the effect of this feedback on follow-up energy-saving behavior, we formulate hypotheses for our randomized controlled field experiment and the survey, both previously mentioned, from a behaviorally enriched, rational-choice framework. We consider downloading behavior as the outcome of a trade-off: if the perceived benefits from downloading the dedicated report are larger than the perceived costs, the respective decision maker should decide to adopt this behavior. We explicitly allow these benefits to include non-monetary benefits and the costs to include cognitive costs and other frictions. The behavioral economics literature provides evidence from various contexts (see, e.g., Haynes et al. (2013), Gleerup et al. (2010)) that simplifying desired behavior can positively influence the likelihood that individuals display such behavior. We therefore hypothesize that if we reduce the perceived costs by making the message of the invitation email clearer and shorter and reducing the effort required to download, download rates should increase. Moreover, by emphasizing the additional informational value of downloading, we aim to increase the (perceived) benefits. This should additionally increase the download rate of the reports.

Hypothesis 1a. *Reducing the perceived costs of downloading by simplifying the message and the process leads to more downloading.*

Hypothesis 1b. *Reducing the perceived costs and increasing the (perceived) benefits from downloading by emphasizing the additional informational value leads to even more downloading.*

Regarding households, a series of U.S. trials have demonstrated that personalized behavioral feedback can help households reduce their energy consumption (Houde et al., 2013; Allcott, 2011). In the same way, we expect that companies that download the dedicated report will stimulate energy-saving behavior. We therefore hypothesize the effects of downloading the dedicated report on energy-saving behavior.

Hypothesis 2a. *Downloading the dedicated report stimulates energy-saving behavior.*

At the same time we would like to ensure that our nudges did not stimulate firms to merely download the report to thereafter ignore it. In this sense, we hypothesize that, for the companies that have downloaded their dedicated report, our nudges (simplifying the message and the downloading process) will not reduce (or increase) follow-up behavior that is relevant for or related to energy saving.

Hypothesis 2b. *Reducing the perceived costs and increasing the*

⁵ For safety reasons the report is not sent by email.

⁶ The low download rates can be caused by several factors, e.g. by the fact that the agreement is not very demanding, or because companies believe not to find much new information in the company report. However, the research described here aims to investigate how communication with the companies can be improved to substantially increase the request for feedback, which can lead to more energy saving.

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