

Achieving behaviour based energy efficiency in professional kitchens

Rose Maria Laden Holdt
Viegand Maagoe
Noerre Farimagsgade 37
DK-1364 Copenhagen
Denmark
rl@viegandmaagoe.dk

Keywords

behavioural change, kitchen, campaign, energy efficiency measures, concepts, end use, motivation, humour

Abstract

The goal of the project was to develop and test a pilot concept of behaviour based energy efficiency in professional kitchens. The Danish Energy Savings Trust established a partnership with the private catering company Fazer which runs 145 professional kitchens in the public and private sector in Denmark.

The data collection for developing and testing concepts were mainly based on

- 4 ex-ante observation studies and interviews with staff and managers in professional kitchens
- a 'best practice' guide for improving energy efficiency in professional kitchens
- 2 workshops collecting inputs from 17 managers representing their own kitchen staff and facilities
- 4 weeks of concept testing in 17 professional kitchens
- 8 ex-post interviews with staff and managers evaluating the test period and concepts.

An evaluation of the campaign period showed that the analyses of how to motivate and engage the target group combined with doable and effective pieces of advice resulted in actual behaviour changes and that several energy saving measures were implemented, e.g. how to make better use of a heated professional oven, remember to close the refrigerator door etc. The project delivered 43 pieces of advice for energy efficiency in 12 campaign materials such as stickers and posters to be placed

in kitchens. The stickers and posters included advice of how to change behaviour and also included estimates of potential savings in costs and greenhouse gas (GHG) emissions. The advice on behaviour change addressed both direct and indirect energy consumption. See Figure 1.

In their feedback, the trade organisations and interest groups told that the concept is relevant and suitable for implementation in both public and private professional kitchens.

Based on the findings of the pilot project, the Danish Energy Savings Trust was recommended to upscale the pilot project by launching and 'marketing' a free campaign concept to all types of professional kitchens in Denmark.

Introduction

A pilot project carried out for the Danish Energy Agency was launched in 2011 with the intension of raising awareness of reducing GHG emissions during everyday life in professional kitchens in Denmark. This paper outlines the project design and outcome. It also outlines how the pilot project results will be used further on.

Professional kitchens in Denmark are estimated to use around a total of 1,400 GWh per year which corresponds to 4 % of the total electricity consumption in Denmark (Viegand Maagoe, 2010). In Figure 2, the breakdown of direct electricity consumption for a typical professional kitchen is given. Please note that the figure does not contain energy consumption for heating and warm water.

Viegand Maagoe (2010) and Copenhagen City Council (n.d.) outline a range of potentials for reducing direct and indirect energy consumption by awareness rising, mostly by kitchen staff and managers changing their behaviour and by



Figure 1. Campaign sticker with energy efficiency messages placed at professional service cabinet.

incorporating this awareness into their procurement policies and planning of menus.

The goal of the pilot project was to develop, test and evaluate a concept of campaigning for behaviour based energy efficiency in professional kitchens in the private as well as in the public sector in Denmark.

The planning and development of the campaign went on in the autumn of 2011 and the campaign was implemented and evaluated in the spring of 2012. The pilot project was carried out by the consultancy Viegand Maagoe and an advertising agency for the Danish Energy Savings Trust; however the

trust was closed down just as the project was accomplished. Afterwards, the Danish Energy Agency took ownership of the project. The project was originally designed to be a pilot project with a natural phase 2, an upscale of the pilot project to a full implementation and marketing of a free concept to all professional kitchens in Denmark, possibly with technology specific advice for different types of professional kitchens according to their type of equipment, e.g. kitchens in the hospital sector. But the closing down of the trust put a limitation to this vision and the continuation of the pilot project. However, at this writing the project is being continued and financed by the Danish Energy Agency with a smaller scope and budget than the one pipelined by the trust. This is to be elaborated in the 'perspectives' section of the paper.

Project Design and Methodology

GOAL AND SCOPE

The overall goal of the pilot project was to gain experience with a pilot campaign on energy saving behaviour in selected professional kitchens with the purpose of using this experience to organise a broader campaign targeting all professional kitchens in Denmark.

The overall goal was split up into three intermediate goals:

- To develop and test advice on energy savings which will make the target group change their behaviour to become more energy efficient.
- To develop a campaign concept of how to deliver the advice developed, change behaviour of kitchen staff and apply it to a selection of the target group.
- To evaluate the concept and advice as a basis for decision on implementing a broader campaign targeting all professional kitchens in Denmark.

The scope of the project includes both direct energy use (electricity and heating) and indirect energy use (e.g. diminished

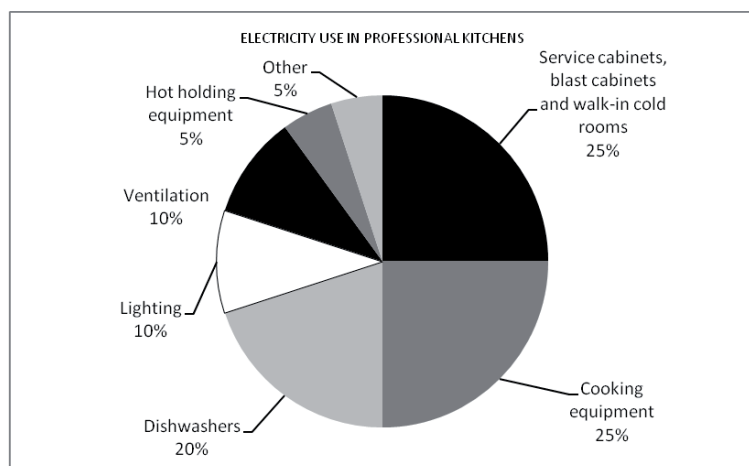


Figure 2. Estimated share of electricity consumption in professional kitchens (Danske Elvaerker Forening, 1993). The shares of electricity consumption vary within different – and more up to date – data sources, but not to a significant extend. Variations depend among other means on the food production concepts of the kitchen with regards to cooling and hot holding equipment.

food waste), however with a stronger focus on the prior, as prioritised by the project owner. Due to infrastructure it was not possible to measure the electricity consumption ex-ante and ex-post the campaign, nor was it reasonable because every day decisions in the kitchen influence the electricity consumption more than a possible effect of behaviour change. Please see further augmentation the 'recommendations' section.

At the point of departure, the project focused at initiating practical and doable actions while at the same time respecting a busy everyday life in the kitchens and respecting the culinary experience of food production. In addition, it was important to design the project to seek high support from top management as well as local managers when implementing the campaign.

TARGET GROUP

The target group included by principle all professional kitchens in Denmark both in the private and public sector. Through a selection process, a project partner was chosen as the pilot target group for development and test of the campaign concept.

The project had a strong focus on user participation so that kitchen staff and their managers were comfortable with and engaged in the campaign.

PROJECT PROCESS

The project followed the phases as outlined in Figure 3.

In the following paragraphs, these phases are to be elaborated and data collection methods and methodological choices described.

Analysis of Background Material

The sources analysed as background material mainly consisted of:

- An analysis of energy saving potentials in the sector of public and private professional kitchens in Denmark (Viegand Maagoe, 2010).
- A guide on energy savings targeting professional kitchens in Denmark with advice on interior design of professional kitchens, procurement of equipment and behavioural change (The Danish Energy Savings Trust, 2011).
- A checklist on reducing GHG emissions in restaurants (Copenhagen City Council, n.d.).
- A handbook of energy consumption of equipment and machinery (Tekniq, 2009).

Selection of Project Partner and Analysis of Target Group

In order to find a suitable project partner and to get to know the sector, four professional kitchens in different sectors were visited and qualitative interviews conducted:

- A public hospital kitchen (Herlev) (interviews with chef, kitchen assistant, unskilled kitchen assistant).
- A canteen in a private company (G4S), run by a catering company (Fazer) (interviews with chef, skilled cook, unskilled cook).
- A restaurant at a conference centre (interviews with chef, trainee chef).

- A canteen in a private company (Novozymes), run by a catering company (Fazer) (interviews with chef, deputy manager, dishwasher staff, skilled cook, baker, kitchen assistant).

The interviews were formed as classical face-to-face interviews based on semi-structured interview guides supplemented by site tours. The interviews had a strong focus on staff's working procedures, motivation means, sense of humour and use of kitchen appliances and equipment, in order to match the concept to the end users of it.

During the interview process, the catering company Fazer was proposed to join the project and they agreed to establish a partnership through the pilot project as participants in the campaign. Their organisation influenced the project process as of how to work with staff and managers. It was an iterative process to find and commit the participants. Thus, a portfolio manager and his portfolio of 17 kitchens including managers and staff were selected as participants to the campaign. See Figure 4.

DEVELOPMENT OF CONCEPT AND FEEDBACK

Based on background material and interviews with the four kitchens as described above, 43 pieces of advice were developed, containing calculations of potential savings in costs and GHG emissions, where meaningful. 12 campaign materials were developed containing the advice. The formulation of advice respected the tone and humour of the staff and the content respected the busyness of the staff.

Data collection for developing advice was supplemented with:

- A telephone interview about special kitchen appliances in the 17 kitchens (conducted with the portfolio manager).

The prepared advice and materials were presented to different actors and their feedback incorporated to it. The actors were:

- Manager (chefs) of the 17 participating kitchens, portfolio manager and Head of quality and environment at a workshop with presentation and discussions.
- Trade organisation of hotels and restaurants (Horesta) at a meeting.
- Interest organisation on nutrition (Kost- og Ernæringsforbundet) at a meeting.

Feedback from those workshops and meetings were incorporated to the advice and materials. Afterwards, materials were printed at a printing company.

CAMPAIGN KICK-OFF

The campaign was set out to run a period of four weeks. The campaign was kicked off in a workshop where 17 kitchen chefs (managers) and portfolio manager participated. The campaign was explained to them step-by-step and questions were clarified. The workshop took place two days before the beginning of the campaign. They had the printed campaign materials handed out. The managers received a guide in introducing the campaign to kitchen staff, but were responsible for introducing it in their own manner.



Figure 3. Project process.

EVALUATION OF THE CAMPAIGN

After running the campaign four weeks, it was ex-post evaluated through eight interviews. For the selection of respondents the following criteria were set up. The respondents were selected to be different with each other in the following criteria:

- job function
- length of service in professional kitchens
- gender.

In addition to members of the kitchen staff, it was prioritised to interview the two managers who had daily contact to the 17 kitchen chefs. This resulted in eight interviews with

- Dishwasher staff, 29 years of service.
- Chef, 10 years of service.
- Deputy manager, 5 years of service.
- Kitchens assistant, 1 year of service.
- Chef, 34 years of service.
- Kitchen assistant, 20 years of service.
- Fazer's portfolio manager for the 17 kitchens.
- Fazer's Head of quality and environment.

This sample of respondents consisted of five women and three men. The six first mentioned interviews were formed as classical face-to-face interviews based on semi-structured interview guides supplemented by site tours (materials were still in place in the kitchens). The two latter were conducted as telephone interviews based on semi-structured interview guides. The sample of respondents was regarded representative in a qualitative sense for the participants of the campaign, especially due to an interview with the portfolio manager who collected input from all participating kitchens throughout the period of campaigning.

DEVELOPMENT OF RECOMMENDATIONS FOR POLICY MAKERS

Recommendations about next steps for the Danish Energy Savings Trust were developed based on the data collection described above.

MEDIA EXPOSURE OF PILOT CAMPAIGN RESULTS

After the 4 weeks test period, results were communicated through targeted press activities in order to

- Share the experiences of the project.
- Take advantage of the news value and connect to other professional kitchens.

- Give publicity to the trust and its project partners.

This resulted in a press release with a case story and 10 pieces of energy efficiency advice delivered directly to six Danish trade-oriented media. News material was also published at a dedicated site on the homepage of the Danish Energy Savings Trust.

Presentation of Concept

Twelve materials were developed containing 43 doable pieces of green house gas reducing advice. See example in Figure 1. The materials were printed on washable and movable material and in a neon orange colour. The advice regarded:

- Cooking (use of oven, stoves, e.g. to coordinate meals and thereby exploit the heat).
- Planning of menu in terms of less meat intensive meals (equals less energy intensive meals).
- Diminished food waste and garbage (e.g. diminish use of disposable tableware).
- Cooling (use and handling of cooling appliances and rooms, e.g. thaw out food in the fridge).
- Ventilation (optimize).
- Lighting (turn off, optimize).
- Reduced consumption of warm water (e.g. full load of dishwasher).

The advice were supplemented by calculations of potential savings in costs and GHG emissions and the messages were expressed in a 'direct tone of voice' (sharp and humoristic formulations) as to fit in the environment of professional kitchens, though carefully not gender discriminating tones.

The materials consisted of:

- A brochure containing introduction to and guidance for participation in the campaign as well as an overview of all materials and guidance of how to place them in a kitchen (although the campaign was possible to establish without guidance).
- A quiz on energy efficiency measures formed as a pools coupon – rewarded with red wine.
- A small blackboard for crowning the 'energy star of the week' (most dedicated staff – judged by each local kitchen manager once a week).
- A large sticky poster with energy efficiency advice.

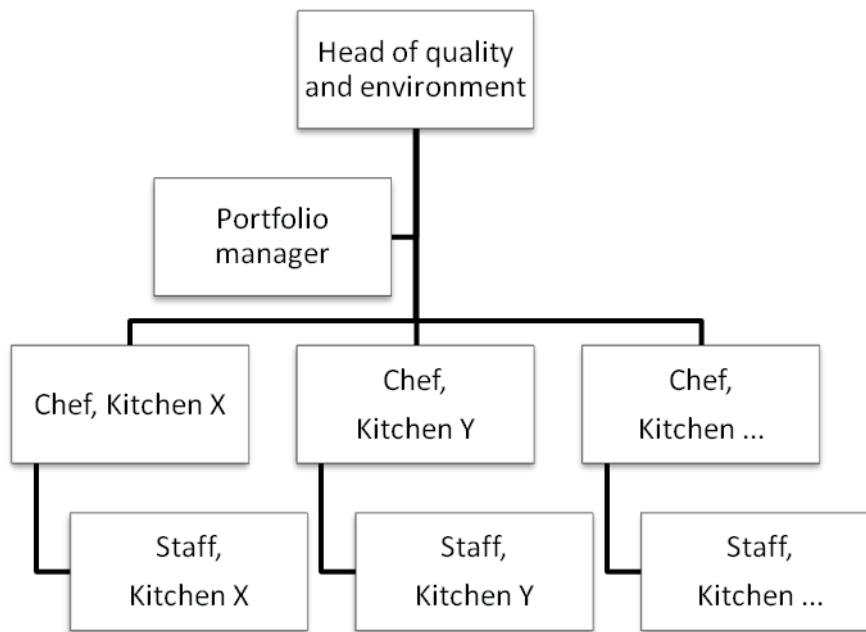


Figure 4. Participants' internal organisation. The campaign was developed with and applied to a sample of 17 kitchens, one each with managers and staff and led by a portfolio manager and Fazer's Head of quality and environment.

- Four stamped out stickers with short energy efficiency messages on cooling, dishwashing, baking and cooking, targeted staff.
- Three floor-stickers with short energy efficiency messages, targeted staff.
- A brochure for managers and planners with energy efficiency advice that required a managers' decision or participation.

The materials will be uploaded at www.goenergi.dk/offentlig-og-erhverv/indkoeb-og-adfaerd/adfaerdskampagne by spring of 2013.

Summary of Results

This short paper presents only summaries of results of the campaign. Detailed expositions of results are given in a project report for the project owner (in Danish only).

PARTICIPANTS' IMPRESSION OF THE CAMPAIGN

All participating kitchens engaged themselves and participated actively by implementing the advice in the campaign, supported by the local manager (chefs). Participants had a positive impression of the campaign and explicitly mention its ability to remind staff of energy efficient behaviour they already knew but needed to be reminded. Participants also enhanced its ability to propose easily applicable practices for changing habits. Moreover, they enhanced the focus on environmental benefits as well as the entertainment value of the campaign; they had fun while doing it. Especially the materials related to competitiveness were motivating to them. Participants found its messages relevant and appreciated the

design of materials and linguistic tone of messages (e.g. "Cool down" – this part involves Danish sayings and thus not easy to elaborate).

INDICATORS OF BEHAVIOUR CHANGE

Participants committed themselves in taking action and felt a sense of competitiveness in doing so. The most mentioned actions were turning off equipment and lights when not necessary, putting a lid on pots and pans, saving water, closing the refrigerator and taking advantage of the heat of the oven while once heated, for instance by taking over the oven from each other when heated instead of heating it twice.

Now we yell out loud when we're going to steam in the oven.
(Quote from an interview with staff, translated.)

Some participants mentioned that they changed behaviour at home as well, inspired by the campaign at work. They also inspired other staff of the company to turn off unnecessary lights. Finally, the staff began to speak more about energy consumption and to converse more on many issues.

The materials cause a stir and appeal to staff's sense of competitiveness. Managers' support has worked well too. The message is clear. It is indisputable. It just makes sense.
(Quote from an interview with portfolio manager, translated.)

MOTIVATION OF PARTICIPANTS

Participants were motivated to take action by different means. Some found numbers for savings motivating, some not. All staff participants were motivated by their managers' support to the campaign and vice versa. Motivating factors were all in

all: economy, environment, managers' support and entertainment value.

It might sound naive, but we have to take care of our planet and then it's also about cool cash, 'cause the energy bill is being reduced. To me, however, I hope for the prior, so we can leave our children a nice place to live. (Quote from interview with staff, translated.)

Some participants asked for a monitoring of the electricity consumption in order to measure effect of behaviour change. Some asked for a kick-off workshop for staff with an external energy expert introducing the campaign.

USE OF MATERIALS

Kitchens with less staff enhanced the possibility of adjusting the amount of material to smaller kitchens. Floor-stickers were mainly placed at eye level on appliances despite chefs' support to placing material at floors as agreed at the workshop. Participants found the materials washable and movable and thus not causing any problems in their daily routines.

Recommendations for Policy Makers

Based on the project experience, the Danish Energy Savings Trust was recommended to:

- Upscale the pilot project by launching and marketing a free campaign concept to all types of professional kitchens in Denmark, e.g. by offering free download of campaign guide and materials, direct contact to trade organisations, development of case stories, producing online 'marketing' video etc.
- Adjust materials to specific sector types of kitchens, e.g. to hospitals with special cooking equipment.
- Offer a free-of-charge external energy expert to participate in campaign kick-off workshops, if possible, e.g. by online conferencing.
- Ensure the target group's usage of the developed brochures to fully exploit the green house gas reduction potential of the campaign.
- Develop a new pilot project monitoring the electricity consumption ex-ante, en medias res and ex-post the campaign. This however implies training of staff to keep a journal of daily activities that influences the consumption. Thus, data could be rinsed from these factors (e.g. evening events re-

quiring extra servings, purchasing of processed or semi-manufactured food as opposed to home-made, closing down on holidays etc.). There could be a risk of demotivating participants if effects of behaviour change are not readable in the consumption pattern, however it should be possible to eliminate this risk by proper training of staff responsible for monitoring.

Status and Perspectives

Based on the evaluation, the Danish Energy Agency has decided to offer the tools developed from the project to all kitchens free of charge to encourage them to change behaviour around energy consumption. This is planned to take place in the spring of 2013, supplemented by information on this offer to selected trade organisations. However, no launching events or marketing measures are planned.

Based on the experience of the pilot project, Fazer decided to continue working with energy efficient behaviour and spread it to the rest of its organisation in Denmark, which are 145 kitchens. Fazer started to involve its customers, the companies, in focusing on energy efficiency, e.g. through status meetings on this topic. They also encourage customers to set up energy measurement units to the kitchens. To Fazer, this work is now a strategic competitiveness parameter.

The findings of the project can be generalised to other kitchens. There are no immediate reasons why the experiences of the pilot project cannot be successfully used in professional kitchens in other countries. Other projects can benefit from conclusions of this project – of which one of the most important is to know, respect and involve the target group.

References

- Copenhagen City Council. (n.d.). *Tjekliste for KLIMA+ Virksomhed*. Retrieved from http://kk.sites.itera.dk/apps/kk_pub2/pdf/924_kdQ3DhHITj.pdf.
- Danske Elvaerkeres Forening. (1993). *Energiraadgivning storkoekkener*.
- Tekniq. (2009). *Energihaandbog*.
- The Danish Energy Savings Trust. (2011). *Storkoekkenvejledning*.
- Viegand Maagoe. (2010). *Kortlaegning af viden paa storkoekkenomraadet*. Not published. Working paper carried out for the Danish Energy Savings Trust.