

Case Study 1

The Green Energy Train in The Hague A demand driven approach based on 'Live Energy'

The Netherlands



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Project co-funded by the European Commission within
THE SEVENTH FRAMEWORK PROGRAMME
THEME ENERGY.2007.9.1.2
Energy behavioral changes



Changing Behaviour



Work package 2

Development of the conceptual model: Analysis of success factors,
underlying models and methods in target group interaction

Case Study 1:

The Green Energy Train in The Hague
A demand driven approach based on
'Live Energy', the Netherlands

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March, 2009

Grant agreement no: 213217

Project acronym: CHANGING BEHAVIOUR

Project full title: *Contextualising behavioural change in energy programmes involving intermediaries and policymaking organizations working towards changing behaviour*

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Summary of the case

This case study focuses on the implementation of the Green Energy Train programme in apartment buildings in the neighbourhood of Leijenburg in The Hague. The Green Energy Train project took place between September 2001 and May 2003 and targeted 228 households in eight apartment blocks. It was performed by consultancy firm Aarde-Werk in close cooperation with housing association Vestia who owned the apartments. Other important project partners were the municipality of The Hague and energy supplier Eneco. The project aimed at reducing the energy, heat and water use of these households with 5%. This target was not reached due to several reasons.

The most important 'indicators of failure' were problems with monitoring (heating savings could not be measured), the used education and information materials (too philosophical for the target group), no alignment with a planned renovation ('behavioural and technical track' were not performed in parallel) and not enough knowledge about the target group and their relation with Vestia at the start of the project. However although the primary goal of the project was not reached, many other secondary goals of the different project partners have been reached (method has been tested, inhabitants got better relation with Vestia, lasting behavioural changes have been achieved, people have been educated, living environment of target group has been improved, etc).

The Green Energy Train was based on the philosophy of 'Leve Energie' (Live Energy) that builds upon the energy in the five elements (earth, water, fire, air and ether) and the four different levels of energy within these elements (individual body, in house, direct environment, rest of the world). The communication and education materials were based on these categorization and general idea about energy. The method is demand driven. This means that the education and information materials are adapted to the demands of the target group.

Step 1: Context of DSM programme

National and local context in general

This Green Energy Train project was enrolled between September 2001 and May 2003 in eight apartment buildings in Leyenburg, a neighbourhood in the south east of the city of The Hague. The Hague is the third largest Dutch city (475.000 inhabitants) situated in the west of the Netherlands and houses the government, the parliament and all ministries of the country.

Leyenburg has around 14,500 inhabitants of which 25% are immigrants. Most of the neighbourhood is build before the Second World War and the houses are relatively small and consists mainly of apartments in blocks. A detailed study of the municipality of The Hague on the inhabitants of the neighbourhood published in 2004 states that many elderly people live in Leyenburg (in 2003 over 50% of the inhabitants were 55 years or older). The average income (around 1,835 euros per household in 2003) of the city district Escamp in which Leyenburg is situated is below average of the city The Hague. Also a relatively large percentage of the households (17% in 2003) has debts and a relatively low educational level. In 2003 the majority of the inhabitants also declared that their economic situation was getting worse compared to the years before¹. The main complains of the inhabitants of Escamp at that time were inconvenience caused by street litter, crimes, bad maintenance of the streets and too little integration of immigrants. A surprisingly high percentage of the inhabitants are willing to perform actions their selves to improve the neighbourhood (43% in 2003).

The Green Energy Train project in The Hague aimed at reducing the energy consumption in the 228 households of eight apartment buildings. The inhabitants are renting their apartments from housing association Vestia who owns the buildings. The majority of the inhabitants of these flats are elderly people with lower incomes. This target group had not been specifically targeted by earlier energy reduction programmes.

The Netherlands is a relatively small and densely populated country. The total number of inhabitants exceeds 16 million and population density is around 486 persons per km² (CBS, 2008). Power and heat supply predominantly come from fossil fuels and natural gas accounts for about half of the total primary energy supply (EIA, 2004). In 2006, renewable energy supply accounted for 2.8% of total domestic primary energy consumption. Domestic net electricity production from renewable energy amounted to 6.5% of the net domestic electricity consumption (CBS, 2007). Wind energy and biomass are the main applications in the field of renewables. The electricity market and a large share of the natural gas market have been liberalized in the course of the nineties. Current Dutch energy policy emphasizes security of supply, a competitive market and environmental protection, whereby the emphasis on security of supply is of recent origin.

Dutch renewable energy policy has been very volatile, thereby undermining the perceived reliability and discouraging entrepreneurs to plan and invest in renewable energy projects (Breukers and Wolsink, 2007). The Netherlands has both demand-side and supply-side measures to promote renewable energy. On the demand side, exemptions for renewable energy from the Energy Tax and investment subsidies for households purchasing renewable equipment have been in place (IEA, 2004). On the supply side, a fiscal support scheme for renewables replaced direct investment subsidies from 1996 onwards. This fiscal support system however, was partly abandoned in 2002 - because it mainly supported biomass (and waste incineration) in old environmentally unsound power stations abroad. It was replaced with a limited feed-in tariff system in 2003, which triggered realization of e.g. wind power schemes. However, after a couple of years the financial ministry judged it to be too costly, and this

¹ Data from the 'Stadsdeelanalyse Escamp' (2004).

support system was also abandoned. In 2008, a new arrangement has been adopted to support producers of renewable energy.

Energy efficiency has been encouraged by policy that includes the use of benchmarking covenants and active evaluation and monitoring. The first National Environment Plan from 1989 introduced the concept of target groups of national environmental policy (Weale *et al*, 2003). Instead of enforcing strict regulations, government set voluntary agreements with these target groups. Since 1992, such voluntary long term agreements with target groups - including the energy sector - have been in place. Between 1989 and 2000, the industrial sector has improved its efficiency with 22.3% (NEEAP, 2007). The covenants with the energy distributors resulted in a CO₂ reduction of 17 million tons by 2000 (EnergieNed, 2001). Other conservation and efficiency policies involve regulation (e.g. standards for insulation, dwelling quality and car efficiency), financial incentives to purchase more efficient equipment, financial encouragement for saving behaviour (taxes, etc.); and communication, agreements, advice and labeling. The 1992 Building Decree sets constructional requirements, including minimal demands for energy efficiency. In 1995, the Energy Performance Standard (EPS) was introduced. Over time the standard in the Building Decree has been tightened several times and this has resulted in a stricter EPS as well (NEEAP, 2007). In 1996, Energy Labeling for Appliances was introduced as a European Measure. Another EU measure, the EU building energy (EPBD) law, was rejected by the Dutch government in 2005 because of high administrative costs. A simpler version of energy labeling for dwellings has been developed instead and will be adopted in 2008 (Odyssee, 2006). Energy efficiency within existing dwellings is a difficult chapter. Grants, information campaigns and energy tax do have some effect, but it all depends on voluntary action by households or house owners (Tichelaar, 2006). Several initiatives in the field of information campaigns and information provision have been in place over the years. MilieuCentraal is an important actor, offering practical and reliable information on environmental issues. Several websites provide tailored energy advice, advice on efficient household appliances and energy labels that apply in the Netherlands (NEEAP, 2007). In terms of climate policy, the Dutch government takes efforts to meet its Kyoto target of a 6% reduction in greenhouse gas emissions (IEA, 2004).

Generally, Dutch citizens and policy makers are perceived to share a tradition of environmental awareness and concerted efforts to solve environmental problems. Eurobarometer (2006) data on awareness of climate change and energy issues among the general public confirm this. The 2007 Eurobarometer indicates that 50% of the Dutch consumers consider the reduction of energy consumption very important. However, the outcomes of such polls say little about actual behaviour.

In 2006, an average Dutch family household (2-3 persons) used 1,652 m³ gas per year, 3,402 kWh electricity per year and 105 m³ water per year (www.milieucentraal.nl). Electricity prices are relatively high. Natural gas is relatively expensive for households, but somewhat cheaper than average for industrial customers. Overall, the Energy Tax per unit of energy is higher for small consumers compared to large consumers, and have resulted in significant price rises for the first. Between 1996 and 2004 (the Green Energy Train ran from 2001 to 2003), energy efficiency of final consumers improved by 1% per year. This improvement was largely attributable to households (20%) and manufacturing industry (8%). With a yearly average improvement rate of 1.4%, the Dutch residential sector was one of the best performing sectors in Europe. Stringent building standards that have been tightened repeatedly have improved the energy efficiency of newly built dwellings considerably (Tichelaar, 2006).

Specific context of the project

In 2002 Vestia planned to renovate the eight buildings by means of implementing an improvement-package aiming at saving energy and increasing the comfort of the apartments. As the improvement-package would imply an increase of rent, Vestia needed to have the support of at least 70% of the renters of each block in order to implement the renovation. The Green Energy Train project aimed at using the renovation as a moment of change to educate and inform the inhabitants about energy savings and reduce their energy use. In addition to the 'technical track' with the measures of Vestia to improve and renovate the apartments, a 'behavioural track' was thus planned to be performed by consultants of Aarde-Werk in close cooperation with Vestia.

One of the reasons that Vestia was planning the renovation and willing to cooperate with the initiators of the Green Energy Train project was that they were at the time suffering from a bad reputation in the perspective of the renters. There had been many complains from the inhabitants about the safety and security, the commitment, the contactability and responses of Vestia by phone and mail, rent increases, etc. Vestia considered both the technical and the behavioural track as ways to improve the living conditions of the renters and thus their relation with the housing association. However due to the bad relation with the inhabitants, Vestia only received the needed 70% majority in three out of the eight buildings to perform the renovation. The majority of the renters were not willing to pay a higher rent and - in their eyes - thus pay (again) more to Vestia.

Due to several reasons Vestia did not manage to perform the renovations in the three apartment buildings in 2002 as planned. They only started the installation of the 'technical track' in March 2003. This meant that the 'behavioural track' was not performed parallel to the 'technical track'. There was thus no alignment with the 'moment of change' as the education and information campaign was already finished when the renovations of Vestia took place.

Although this case study focuses on the Green Energy Train project in the apartments of housing association Vestia, the Green Energy Train programme was also executed by the same project manager in apartments rented from private people in The Hague. It was also executed, by another project manager, in the newly build neighbourhood Leidsche Rijn in the city of Utrecht. The latter project is discussed in detail in another case study within this report.

Step 2: focus of DSM programme (1A4)

General issues

The Green Energy Train project in the apartments of Vestia started in September 2001 and lasted until May 2003. The total budget of the 1,5 year project was €265,000. The start date of the project was related to the approval of the subsidy by the governmental Enter subsidy programme. The end date was also determined by this programme as the whole subsidy programme was ending in May 2003 and all projects had to be evaluated from that moment. According to the project manager it was a pity that the project could only last for 1.5 year as it is difficult to measure behaviour changes on a short time period. It would have been better if the households could have been followed for at least 2 years (2 heating seasons).

Initiator and partners

The project was initiated and managed by Aarde-Werk. This consultancy firm is specialized in projects and education promoting a sustainable lifestyle. At the time of the Green Energy Train project Aarde-Werk was developing a methodology to educate people about energy savings in their household. Director of Aarde-Werk, Gea Boessenkool had a lot of experience in both changing consumer's behaviour and managing projects. She became one of the key figures within the project by managing and communicating personally with the other project partners.

The most important project partner was the housing association Vestia who owned the houses of the target group and who was planning a renovation to improve the energy efficiency and comfort of the apartments. The municipality of The Hague, represented by the Energy Coordinator, was also a partner of the project. Another partner was the energy company Eneco, the energy supplier of the targeted households who could also provide the data on the energy-use of these households. The University of Leiden performed research on the outcomes and effect of the project. Other less relevant partners were four consultancy firms involved in smaller parts of the project, for example in the development of the communication materials.

The project was financed by the Enter subsidy programme of the governmental agency Novem with €250,000. The Enter programme specifically aimed at stimulating experiments and knowledge transfer of new methods to influence energy related behaviour in households. The other smaller financers were the energy company Eneco, the municipality of The Hague, the province of Zuid Holland and the housing association Vestia.

Goals and objectives

The Green Energy Train in The Hague had three main objectives. Firstly it aimed at developing a method to change consumer behaviour and save 5% energy in households (both electricity and gas). Secondly the project aimed at using this method in practice and testing its efficiency. A third objective was to investigate the results of the effects of the method on the behaviour of consumers. Secondary aims of the project were stimulating environmental friendly behaviour of consumers in general, optimizing the cooperation between the housing association and the renters and strengthening the social cohesion within the neighbourhood.

These goals and objectives were a combination of the preconditions of the different partners for joining the project:

- Aarde-Werk was developing a method to change consumers behaviour in relation to energy and wanted to test this method in practice. They are convinced that sustainability is larger than the individual environment and includes a large social component.

- The Enter programme of Novem only subsidized projects aiming for 5% energy reduction within households by means of lasting behaviour change with consumers. The second precondition for projects within this subsidy programme was performing an extended evaluation of the results to gain knowledge on the effects of different methods aiming at changing consumers behaviour. Because this meta-analysis had to be performed, all projects within the Enter programme had to be finished by May 2003.
- The city of The Hague linked the project to the CO₂ reduction target of the city. They therefore saw this project as a pilot project for decreasing the energy use of the inhabitants. Their aim was a 5% energy reduction by means of concrete physical measures (the renovation). These two 5% targets were thus complementary and aimed for a 10% reduction of energy use in total.
- Vestia was willing to invest in measures that would improve the living conditions of the renters, the cooperation between the building association and the renters, the social cohesion within the neighbourhood and thus the image of the association as a whole.
- Energy company Eneco joined the project to make the inhabitants more aware of (the services of) their energy supplier. They often experienced that inhabitants did not know who their energy supplier was and what services this company could perform.

The goals of this project were relatively ambitious. Although a 5% decrease of energy use is not a large reduction, the used method was. This method was demand driven in stead of supply driven. This meant that the exact content (for example what information channels were going to be used) of the project was not known in advance because it was shaped by the demands of the target group during the project. The method focused on the beliefs of the target group, their own insights and their link with their environment in a broader sense.

The targets and target group

The target group of the Green Energy Train in The Hague were the inhabitants of 228 apartments of eight apartment blocks owned by housing association Vestia. The inhabitants were mainly elderly people (couples) with lower incomes and lower education levels. This target group was chosen because the many possibilities for scaling up the project, the link to a 'moment of change' in the apartments (the planned renovation) and the fact that these people had not been reached by energy saving programmes before.

The Green Energy Train aimed at changing the behaviour of the target group in relation to heating, cooking, using hot tap water and the use of electronic appliances in order to achieve a reduction of 5% in the use of gas (for cooking and hot water), heat (the apartments are connected to a district heating system) and electricity. No research had been performed on the target group before the project started. The target group investigation was part of the demand-side approach of Aarde-Werk and was the first step of the method.

Step 3: design of programme

What knowledge and ideas informed the design of the programme?

An important aspect of the Green Energy Train is the connection of the ‘behavioural track’ with the ‘technical track’ or moment of change in the housing situation. In this case, the connection between the two could not be made due to delays in the renovation of the apartments. The ‘behaviour track’ of this Green Energy Train project is based on a larger philosophy of ‘Leve Energie’ (Live Energy) and consists of education and information supply. It focuses on the motivations of the target group and their answer to the question: “What do you consider as sustainable and pleasant living?”. It consists of a set of interventions of which a selection is made depending on the reactions of the target group on this question in combination with the demands of the housing association.

It is thus a demand driven method that searches for the elements that the target group experiences as important in their lives. The Green Energy Train philosophy believes that the convictions of people (related to questions as: what does the world look like, who am I within the world, what do I think is important and what are my capabilities) design their connection with the environment and their behaviour. Convictions exist on several levels: environment level, behaviour level, capability level, values and truths, identity level, etc. Changes in convictions on the higher logical levels will stimulate changes in lower logical levels. Participants of the Green Energy Train should thus focus on the cause of their behaviour. Convictions determine behaviour according to ‘Live Energy’. Changes in the convictions thus have lasting behavioural change as a result.

The education of the philosophy of ‘Live Energy’ focuses at four levels of energy (energy of the body, energy in house, energy in the environment, energy in the world) of the five elements (earth, water, fire, air and ether) and on a broad set of subjects: saving water, saving energy, indoor climate, waste, healthy food, etc. Another aspect of this philosophy is that people interpret, use and translate information in different ways. Some are more visual oriented, other more audile. Therefore a large variety of information carriers is used in the communication with the participants: excursions, games, photos, working groups, meetings, video, newsletter, etc.

The philosophy of ‘Live Energy’ was very dominant in this case. According to the project manager the necessary translation of theory into practice had not been performed sufficiently. This resulted in information materials that were too complicated (too philosophical) for the target group and thus not efficient in changing peoples behaviour. For the project manager this is one of the most important lessons to be learned from this case.

The intervention methods/instruments and activities used

The method that Aarde-Werk used in this project consisted of three steps: introduction and investigation of demand, execution of the information and education campaign and evaluation and measurement of the method. Firstly the project was introduced to the inhabitants of the apartments. Aarde-Werk wanted to investigate the demands of the target group via an elaborated enquiry. Due to resistance from housing association Vestia this enquiry has not taken place. Instead a *meeting with the inhabitants* was organized in which Aarde-Werk presented the plans. To get better insights into the demands of the target group, Aarde-Werk initiated additionally several *in depth interviews* with representatives of Vestia and with ten inhabitants. These interviews showed that the inhabitants put more priority on handling issues regarding safety, the improvement of comfort of the buildings and reduction of costs than saving energy or environmental friendly actions. Aarde-Werk incorporated these demands of the

target group into the further steps of the project, for example in the foci of the working groups.

The second step consisted of the execution of the project based on the outcomes of the demand-research of the first step. A first element of the execution is the formation of *working groups*. These groups were formed by inhabitants and representatives of Vestia and Aarde-Werk and came together on a regular basis to discuss and execute new actions. Three working groups were installed. Each group was responsible for another aspect of the project: the excursions, the newsletter and the cleaning and safety of the buildings. The second element of the execution are the excursions. Two excursions took place with 40 participants in total. During these excursions the participants visited several projects that illustrated sustainable living in practice. These excursions were positively evaluated both in terms of information and education as socially pleasant.

Aarde-Werk had suggested to build an *'example-apartment'* in which the inhabitants could see what the renovations (the technical track) would imply for their apartment. This *'example-apartment'* could then also be used to show the different elements of the *'behavioural track'*, the possible behavioural changes that inhabitants could do and their effects. It could also be used to take away possible hesitation, distrust, uncertainties, etc in relation to the renovation. Due to the problems Vestia had with the approval of the renovations, they did not follow the recommendations of Aarde-Werk in the planning of the *'example-apartment'*. It was only realized in May 2002 after the decisions on the renovation were already made. This meant that the *'example-apartment'* could not help all inhabitants that needed to decide upon the renovations. However the *'example-apartment'* was used by Aarde-Werk to show in practice the *'behavioural track'*: different things inhabitants could perform in their own houses to save energy and live more sustainable in general, for example, the use of paint on natural base, isolation, water saver in toilet, etc. The *'example-apartment'* was situated within one of the buildings of Vestia and also served as a meeting location for Aarde-Werk and the inhabitants for the energy course and other events. It turned out to be a pleasant location where everybody felt comfortable and at home.

Another element of the project was a *energy-course* consisting of four evening programmes. 25 inhabitants participated in this course. Three of these evenings were dedicated to educating the participants on sustainability and energy savings. The main focus was on the personal demands of the participants and describing personal goals. The education materials were adapted to these personal demands of the participants. The fourth evening was an evaluation of the course and the whole project. At the end of the course the participants received a certificate for successfully taking the course. Based on the information gained in the course about the demands of the target group, three specific *information-evenings* were organized. During three meetings inhabitants were informed by specialists on the topics: ventilation, green electricity and saving water and were able to ask all their questions. Also the possibility was offered to the participants during the meetings to perform concrete actions on the subjects: an appointment could be made to have an investigation of the ventilation in the individual apartments, water saving equipment could be bought and people could subscribe to green electricity supply.

During the execution of the project a variety of *education and information materials* were used that were developed within the philosophy of *'Live Energy'*:

- A photo-set of 20 photos each representing one of the levels in each element. These photos were shown to the participants during the courses and in the *'example-apartment'*.
- An association-game to help the participants with discussing the different elements and levels in an enjoyable way.
- A map of the symbolic research landscape that was shown in the *'example-apartment'*.

- A participants-file including information on the philosophy of 'Live Energy', a list of appliances and their energy use, a table to fill in the personal targets of the participants and a table to enable discussions on the different topics. The whole file was based upon the five elements and the different levels within these.
- A 'discussing-disc' which the participants used during discussions in smaller groups to search for answers on questions like: which facilities do I need from society to fulfill my demands?
- A booklet of intentions and practical information for the participants on how to achieve energy savings for each element. This was introduced later to the project after demands of the participants.

Monitoring and evaluation

The third step of the method was the measurement and evaluation (of the effects) of the method. This was a relatively large part of the project as the Enter subsidy programme requested detailed information on the effects of the used method. The University of Leiden performed an elaborate research on the effects of the project on the behaviour of the target group. This research was based on data collected at the start of the project compared to data collected at the end of the project. The data collection was done via an elaborate enquiry at the start and the end of the project. The enquiries were brought personally to all the 228 households in the eight buildings and collected again a few days later. The enquiry at the start of the project aimed at mapping the starting position of the households both in terms of energy use, behaviour in relation to energy, perceptions and demographic characteristics. This list of questions was completed by 52% of the households. The enquiry showed that many of the respondents did not behave efficiently in relation to heating, lighting, ventilation, etc. Also a large part of them did not associate energy savings with saving money, environmental friendliness or with a 'good feeling'. It was therefore concluded that there was enough room for improvement and that an information campaign focusing on energy saving could be worth a lot. Still the average electricity use of those who returned the enquiry was below (1825 kWh per year) the national average (2375 kWh per year).

Those who had returned the first enquiry received a second enquiry at the end of the project to measure the effect of the project on energy related behaviour, energy saving and perceptions of energy. Also questions were added to evaluate the different elements of the project. Only 56% of the households who had completed the first enquiry also returned the second enquiry. Of these a large majority (86%) had changed their behaviour towards energy compared to the year before by for example turning low the heating one hour before going to bed, showering shorter, use less water for doing the dishes, use energy saving bulbs, etc. The households that had not completed the first enquiry were asked to fill in a smaller enquiry at the end of the project focusing on the effect and visibility of the project. Only 14% of these enquiries have been returned while a majority of these households even reacted aggressively because they had indicated already at the start of the project that they were not interested in filling in any enquiries related to this project. The returned enquiries at the end of the project show that the project was known by a large majority of the target group (95% of the respondents). A majority of 58% of the respondents had visited the 'example-apartment' and almost a quarter had joined one of the information-evenings or excursions or joined a working group. 19% had followed the most intensive part of the programme: the energy course.

To measure the effect of the Green Energy Train project a division is made between people that had been actively involved in one or more activities of the project and those that were not (and only received the newsletter). The answers of the enquiries show large differences between the active and not active participants. The active participants have changed their behaviour largely on several aspects as for example turning low the heating one hour before going to bed. The active participants improved ten different behaviours towards energy reduction

significantly compared to only small behaviour changes of the not active ones. Questions in the enquiries related to information suppliers show that after the project more inhabitants would ask Vestia and or Aarde-Werk for information on energy reduction and savings than at the start of the project. This means that these organisations have become trustful sources of information. Eneco is considered as less trustful as an information supplier.

Focussing on the effect of the project on the energy use of the households, the data showed that the goal of 5% reduction in gas (for cooking and hot tap water) and electricity use was not reached. Because the numbers for the use of heating were not available for the individual households but only for the complete building, the effects of the project on the use of heating could not be measured. Eneco provided (after approval of the inhabitants) the historical data of gas (for cooking and hot tap water) and electricity use to Aarde-Werk. Together with the meter readings of the participants their selves at the end of the project, an overview could be made of the real energy savings during the project. In total data of 39 households were available of which 19 were active participants. Both gas and electricity use with both active and non-active participants had increased instead of decreased (increase 3,7% gas and 10% electricity use with active participants and increase of 7,5% gas and 10,4% electricity use for non-active participants. Due to the small number of available data, these outcomes should not be taken too serious according to the University of Leiden. It should also be taken into account that most of the savings were related to heating and these numbers were thus not available. It could therefore be possible that the saving of 5% was still reached.

Apart from the evaluation by the University of Leiden, Aarde-Werk also performed evaluations with the participants. A final meeting was organized with the participants of the energy course in which they discussed the effects of the programme on their behaviour. It turned out that large improvements had been achieved in the relation between the inhabitants and the living environment and less behavioural change in relation to energy. Also in depth interviews have been taken with four inhabitants after the end of the project. Two of the interviewees were active participants and very satisfied with the project both in terms of improvements to the living environment as to changing their own behaviour towards saving energy. The other two interviewees were not actively involved and not satisfied with the project due to different reasons.

Communication

During the project a set of specific communication activities were undertaken towards the target group as well as in between the project partners. The involvement and communication strategy towards the target group consisted of the following:

- In depth interviews at the start of the project to investigate the needs and demands of inhabitants.
- Creating a database of participation of different inhabitants to invite them purposefully for other activities.
- Direct contact with inhabitants during courses and excursions.
- Inviting inhabitants for excursions and courses via telephone and mail.

Several communication channels were used to execute the above described strategy: the installation of the working groups, producing and distributing 10 newsletters, organizing and accompanying excursions, preparing and distributing posters and folder, a video with illustrations of the renovation, etc.

These and other communication activities were described in the communication plan of Aarde-Werk that was written at the start of the project and adapted after the communication problems between Vestia and Aarde-Werk (described in step 4 and 5). However, due to the

flexibility of the methods in adapting to the demands of the target group, large parts of this communication plan have not been executed (for example contests and party-evenings).

Step 4: process of programme

Interaction between partners

As said earlier, consultancy firm Aarde-Werk was project manager of the Green Energy Train in The Hague. The municipality of The Hague was the official principal (taskmaster). The representative of the municipality was present at important moments of the project, for example the opening of the 'example-apartment'. Apart from these two, the project team was formed by representatives of Vestia, Eneco, University of Leiden and some smaller consultancies. The project team met every 3-4 months to align and discuss activities. Apart from these meetings, Aarde-Werk had regular contact with all the partners separately. Also meetings took place regarding specific parts of the project with those partners involved in that part, for example the development of the communication materials, monitoring effects and results and contact with the target group.

Reaction of the project manager to issues/problems

In the beginning of the project problems existed between Aarde-Werk and Vestia related to the communication towards the target group. Vestia was not used to cooperating with partners in the communication towards their renters and indistinctness appeared about the roles of both parties. In the beginning of the project Aarde-Werk contacted the renters directly without informing Vestia. The latter therefore considered the involvement of Aarde-Werk as negatively interfering in their relation with the renters. On the other hand Vestia contacted their renters, for example sending the overview of the yearly energy-costs just after the introduction of the project to the target group, without informing Aarde-Werk. One of the reasons for the communication problems was that different departments of Vestia were involved with the project and the renters. When agreements were made with one department, this was not communicated to the other departments.

The problems in the relation between Aarde-Werk and Vestia were solved by the implementation of a strict structure for the cooperation between Aarde-Werk and Vestia and the communication with the renters. This structure was mainly based on regular contact between both parties on different levels (boardlevel, stafflevel and projectteam). Together with regular direct telephonic contact between the directors of both parties, who had a good relationship, this led to an improvement of the relationship between the two most important project partners.

During the project the cooperation with one of the smaller partners, a consultancy firm responsible for providing the energy course, was ended prematurely. Their tasks have been taken over by employees of Aarde-Werk and other partners

Step 5: outcome of process

Objectives/goals/outcomes

As the paragraph on monitoring and evaluation shows, the goal of 5% energy savings was not reached. However many of the other goals of the project partners have been reached:

- Aarde-Werk has tested their method to change consumers behaviour via education and information.
- Vestia improved their relation with their renters.
- The inhabitants were satisfied with the improved relationship with their neighbours (and therefore feeling more save in their own neighbourhood) and the improvements in their living environment.
- The target group has changed their behaviour (mostly related to heating).

Efficiency and effectiveness

Due to short consultation lines and direct contact between responsible persons within the different partner organisations, the project worked relatively efficiently. Rapid reactions were taken when things went wrong (for example, the implementation of an improved communication strategy between Aarde-Werk and Vestia) and partners reacted flexible on changes in the project (for example the leave of one of the project partners).

Apart from the continuous time pressure by all partners to execute the project within the given timeframe, the cooperation between the different partners was relatively efficient and the expertise of the different partners were used in the right ways at the right moments according to the project manager. Another efficient element of the project was the 'example-apartment'. This apartment worked both as an information source for the target group as a meeting location for the target group and all the project partners. When the 'example-apartment' would have been available earlier (like the initial planning), it could also have served in recruiting more active participants of the target group.

Less efficient was the linking of the 'behavioural track' of the Green Energy Train with the 'technical track' of the renovation. Due to the delay of the renovations, both tracks could not run parallel. This might have influenced the results of the project negatively as better results may be achieved when the target group was able to align the changes in their apartments with changes in their behaviour.

Another aspect that influenced the project negatively were the difficulties Aarde-Werk had with getting the data of historical energy use of the target group from Eneco. The energy supplier was not willing to provide these data in the first place, and Aarde-Werk had to ask for them many times. Also the information on current energy use was difficult to get and often not accurate (evaporation meters). This made the process of giving feedback to the participants on their behaviour less efficient.

Although the project officially stayed within the budget, Aarde-Werk has put many more man hours in the project than planned and budgeted. The extra work was mainly caused by the solving of issues and problems that occurred in the process of the project: the communication problems in the beginning of the project between Aarde-Werk and Vestia and the (re)writing of the communication strategy resulting from this. But also the extra efforts that needed to be made to get the needed data on energy use from Eneco, etc.

Social learning

Regarding the method the following can be learned:

- The project team has evaluated the education and information materials which were used during the courses. They concluded that unless the high quality of the materials, the theoretical general story about energy on the different elements and levels was too complicated (too philosophical) for the target group to start with. It would have been better to start with practical recommendations and only focus on the philosophical / theoretical aspects in a later phase to illustrate the larger context of the behavioural changes.
- The association game and the list of possible savings of different appliances in households were evaluated as very positive.
- Taken the above into account combined with the outcomes of the project, the Green Energy Train method is evaluated as successful and could be implemented in many contexts in the Netherlands when a link to a 'moment of change' is possible (renovation or newly build house).
- The method offers the possibility to consumers to formulate their own demands and goals including the ways on how to reach these. In depth research is needed to investigate these demands.
- Communication and education material is available for all different target groups and participants can choose the materials which they feel comfortable with (some prefer reading newsletters, other prefer joining excursions, etc). The materials even offer many more possibilities than the ones implemented in this case. However the flexibility of the method also implies more work for the project partners to adapt and implement the education and information materials.
- Another positive element of the method is the continuity of contact with the target group due to the variety of interventions in both content and timing. This lead to a positive feeling with the participants of active cooperation with their neighbours.
- The goals of the project must be broader than just energy savings. Other behavioural changes (for example switching to green electricity) should also be incorporated in goals of the project.
- The flexible method offers the possibility to link to other demand side management programmes focusing on changing behaviour, for example the Ecoteams. Linking projects is usefull and can save money and time.

Many things can also be learned from the evaluation of the relations between project partners:

- It is important to investigate and decide upon the best communication channels for reaching the inhabitants. A clear communication strategy must be set up in order that all partners know how and who to reach for what. Especially the communication towards the target group should be clearly defined in advance. Should all communication be done via the housing association or should it be done by the consultant?
- It is important to have clear rules on how and when discussions and communication between the partners and target group take place.
- Also the task division between partners must be clear and activities must be aligned. In this case Aarde-Werk had collected data for monitoring that turned out not to be usefull for the University of Leiden and other partners that were calculating and evaluating the outcomes.
- It is important that the target group is informed about their own energy-use at the start of the project. In this case the participants had not received any details of their energy use in two years. Therefore they had not been confronted with rising energy prices or did not know their use at all.
- A demand steered project as this case, requires flexibility from all partners. In this case Vestia had to adopt to the wishes of the target group (a majority did not want any renovations).

Follow-up of the programme

Although the project only lasted until May 2003, Aarde-Werk has contacted the target group again a year later and found out that most of the behavioural changes had lasted. The method used in this Green Energy Train is further developed and applied by Aarde-Werk in many other cases.

Step 6: analysis and conclusion

The following five lessons can be learned from this case:

1. *A success factor for education and information campaigns is knowing the demands of the target group before starting the project.* Herefore in depth research must be done on a wide range of subjects (not only on energy related topics). Also it is important to investigate the relations between the target group and other project partners. In this case the target group had larger demands in relation to improving the living environment, the safety and security than in saving energy or changing energy related behaviour in general. According to the project manager this is one of the reasons that the goals in relation to energy reduction have not been reached. However due to the flexible method and the possibility to set up working groups including one focusing on safety and cleaning, still the participants were satisfied with the improvements by the project in their direct environment and thus with the results of the project. Another important effect on the outcomes of the project was the problematic relation between the housing association Vestia (one of the project partners) and the target group.
2. *Although it is a success factor to inform a project on theory, this theory must be translated completely into practice and not be visible anymore in at least the beginning of the project.* In this case many participants have not been reached effectively due to the complicated theoretical (philosophical) communication materials used. It is therefore important to adjust the communication materials to the daily life of the target group and give concrete tips on how to save energy in house, etc. Only in a later phase when the target group is familiar with changes in their own behaviour to save energy, a more philosophical and theoretical approach can be added to the communication.
3. *It is important to check in advance whether the needed (accurate) data for measuring effects of the project are/will be available.* In other words, the goals of the project must be aligned with the data availability. In this case the data for heating were not available and to collect data on gas and electricity use during the project, the project team was depending on the participants as they had to read their electricity and gas meters their selves (only the historical data on gas and electricity provided by the energy supplier Eneco were reliable). The gas meters in the households were evaporation meters. These are not very accurate
4. *Projects aiming at decreasing gas and electricity use in households should at least last for three years.* In the first year the education and information is provided to the target group. The results of this campaign can be measured after the second year and to see whether the behavioural changes are lasting, the data of the third year are necessary. Also these longer project provide the possibility to adapt the education and information material more to the reactions and behavioural changes of the target group.
5. *There are many advantages of working together with project partner who have real interests in reaching the goals of the project.* These project partners are often much more motivated to be actively involved in the project and solve possible problems in an effective way. In this case Vestia wanted to improve the relation with their renters. Also the housing association has an environmental norm of emitting 15% less CO₂ compared to 2005.

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Interviews

Interview with Gea Boessemkool, director of Aarde-werk and project manager of the Green Energy Train in The Hague on 23rd June 2008 in The Hague.