The efficacy of policy instruments to reduce the energy use of privately owned dwellings

Bram Entrop
Department of Construction Management and Engineering, University of Twente
Enschede, The Netherlands, a.g.entrop@utwente.nl

André Dorée
Department of Construction Management and Engineering, University of Twente
Enschede, The Netherlands, a.g.doree@utwente.nl

Abstract

Governments aim to increase the adoption rate of Energy Techniques and Measures (ETMs) for buildings. Although these schemes seem successful, the subsidised push for ETM adoption encounters budget cuts and policies aspiring deregulation. Governments face the challenge to develop a 'market' where ETMs are offered and adopted without the support of public subsidies.

This paper presents the case of the Dutch province of Overijssel. This province deployed several policies and instruments. To improve the energy performance of their houses, home owners could lend money under favourable conditions and some subsidies were provided. As for the adoption rate of ETMs, Overijssel has been relatively successful. However, it is unclear what instruments can contribute to the creation of a market where ETMs are adopted without the need for subsidies.

Document study, website analyses and interviews, show that the province and municipalities currently use policy instruments that vary in success. Entrepreneurs that offer ETMs were unaware of many of the available instruments and right out doubted their efficacy. For synthesis a model was developed that mapped the available instruments as relations between the four main actors. The model facilitated the development of future scenarios for the ETM market in Overijssel.

Keywords: policy instrument, energy use, dwelling, adoption rate, government

1. Introduction

In buildings a lot of energy is being used. According to the Energy Performance Building Directive, buildings account for 40% of total energy use in the European Union [1]. In order to reduce the environmental impact of buildings and to secure the energy supply of individual countries, the energy use of buildings and their users needs to be reduced. At the same time, the use of renewable sources needs preferably to be increased. In many countries, governments therefore aim to increase the adoption rate of Energy Techniques and Measures (ETMs).

Multiple intervention strategies and policy instruments are available to push the adoption of ETMs in buildings [2, 3]. Past research focused on how policy instruments helped to improve the adoption of a specific ETM in buildings (e.g. [4]) or on how one or more policy instruments helped to increase the adoption of ETMs on a national level (e.g. [5, 6]). However, the efficacy of policy instruments on a regional level has not that often been highlighted. This paper will focus on that level and on the level of municipalities.

Furthermore, two other developments currently can be noticed influencing the adoption of ETMs. The subsidised push for their adoption encounters budget cuts and policies aspiring deregulation. Governments face the challenge to develop a 'market' where ETMs are offered and adopted without the support of

expensive policy instruments, specifically public subsidies. Therefore, the specific aim of this research project was to gain more insights in what active market approach a province, being the regional governmental entity in the Netherlands, needs to apply to improve the adoption of ETMs successfully.

In this research project a specific case will be introduced and studied, namely Overijssel; one of the twelve Dutch provinces. Overijssel has a population of over 1.13 million and consists of 25 municipalities with a total surface of around 3.400 km^2. What makes this province interesting, is the given that she initiated a large regional fund enabling home-owners to invest in ETMs. Due to this fund, home-owners can apply for a sustainability subsidy and/or a sustainability loan. Within the time period 2012-2014, the aim of this province was to improve the energy performance of at least 10.000 of the 273.000 privately owned dwellings by two so called label steps [7, 8]. When the energy performance of a house is for example being improved from an orange energy label E to a green label B; the energy performance was improved by three label steps.

The province of Overijssel closed housing performance contracts with 24 out of her 25 municipalities. This contract specifies, among others, what effort a municipality needs to take in improving the adoption rate of ETMs. The last, 25th, municipality closed a contract on the 1st of January 2014. As a minimum, these contracts state that residents have access to the fund of the province. In return, the municipality needs to offer their residents at least an energy office (in Dutch “energieloket”), which is an (virtual) information desk for residents explaining how they can apply for the subsidy and/or loan of the province, what ETMs are and how they reduce the fossil energy use.

Although multiple requirements apply when home-owners want to finance their ETMs using the loan, it became a great success. This success did not stay unnoticed by the national government. The so called “Overijsselse Aanpak 2.0”, or in English the “Approach of Overijssel 2.0” was used as a blue print for a national fund in the Netherlands. In this research our interest was focusing on how the municipalities in this province and committed to the Approach of Overijssel were trying to stimulate owners of existing houses to adopt ETMs. The following section explains in more detail our research setup.

2. Research setup

This section explains how the research project is composed. In order to be able to achieve the aim of gaining insight in what active market approach a province can apply to improve the adoption of ETMs, three research steps are distinguished.

Step 1: Analysing the achievements within the Approach of Overijssel
Due to the given that the Approach of Overijssel is already in office for a few years, some data on the number of loans and subsidies provided per municipality is available. Within Step 1 this data will be used to find those municipalities that make a negative and positive stand. Due to time constrains, it is not possible to study the policies and instruments of all 24 or 25 municipalities in Overijssel. The aim of this first step is to find municipalities of interest. Municipalities can be interesting due to the number of adopted policies, loans requested or subsidies granted.

Step 2: Assessing the commitment of individual municipalities
A municipality can have adopted one policy or instrument or multiple policies and instruments to improve the adoption of ETMs. In the second part of our research the commitment by means of adopted policies and instruments will be revealed for the municipalities selected in Step 1. A document study will take place and interviews among concerned public servants will be conducted to get insights in what policies and instruments have been adopted with what success.

Step 3: Identifying the role of companies in meeting energy targets
Overijssel wants come to a market where ETMs are offered and adopted without the support of public subsidies. In their ideal market the role of the government is small and the implementation of ETMs in private households continues unabated or even increases. Step 3 involves a study on the role companies play to achieve a reduction of fossil fuels. Companies operating in the selected municipalities will be approached on what ETMs they offer and how their market changes under influence of governmental policies and instruments. These entrepreneurs will be asked what barriers they currently experience to operate in this ETM market for home-owners. The intention is to get in touch with approximately five SMEs per municipality.

3. Achievements in the municipalities

This section elaborates on the policy concepts and instruments that have been adopted and the number of subsidies and loans granted. It the end a selection of municipalities will be made for further analysis.

3.1 Adopted policy concepts and instruments

Concise fact sheets, provided by the municipalities in May 2013, were used to come to an overview of adopted policy concepts and instruments [9]. Originally, these fact sheets had been prepared for an energy project kick-off meeting organised by the province of Overijssel on June 3th 2013. By using the websites of the municipalities, specifically the municipalities' virtual energy offices, we checked if new developments had taken place concerning policy concepts and instruments. It shows that the 24 municipalities have adopted six policy concepts (see Table 1) and ten policy instruments (see Table 2).

#	Policy concept	Description of the policy concept
A	Sustainability at Home Ambassador Concept	Concept based on offering personal advice on ETMs to home owners for their specific situation. The advice can be offered in form of an informal kitchen table talk with a next-door energy ambassador up to an energy audit report of a professional energy advisor.
B	Sustainability Team	Within a municipality professional stakeholders involved in offering and installing ETMs (e.g. an advisor, a contractor, and an installer) work together as a team to make the adoption of ETMs easier. [e.g. 10]
C	District Approach Block by Block Approach	Concepts in which dwellings in a certain district or block(s) of flats are the focal point to introduce a set of ETMs. Main idea is that most dwellings in a block or area have the same year of construction. Therefore, a limited set of ETMs will be suitable to improve their energy efficiency. This large scale adoption reduces installation costs. [e.g. 11]
D	Steady Living Costs	Concept in which municipalities emphasize the importance of maintaining comparable or even lower costs of living. Investments in ETMs can lead to higher housing costs, but here these costs are compensated for by means of a lower energy bill.
E	Social Investment Challenge	Concept in which a municipality brings the challenge of improving the energy performance of existing dwellings to the market, where a commercial organisation offers customer-oriented packages of ETMs.
F	Facilitating Portal	A concept in which municipalities facilitate (local) companies to improve the adoption of ETMs in dwellings. Many municipalities within Overijssel apply this concept by means of developing a website with company information involving ETMs and starting sales projects.

Table 1: Policy concepts adopted by the municipalities in the province of Overijssel

The municipality of Zwolle has adopted most concepts and instruments. In that sense, it seems the most active community. The municipality of Enschede has adopted a relatively innovative approach, called in Dutch the Maatschappelijke Investerings-Opgave, what can be loosely translated as the Social Investment Challenge. Within this concept the challenge to come to more energy efficient housing was placed on the market as an open offer. In other to trigger commercial organisations to develop an energy renovation shop for existing privately owned houses, a significant number of houses of the local housing associations were offered as renovation project. This ensured that the selected commercial organisation could start relatively easily and could directly get some returns on their investment. On a much smaller scale, the municipalities Deventer and Zwartewaterland also tried to trigger commercial organisations to pick up the challenge of renovating existing houses systematically.

There are also a few municipalities quite passive, such as Oldenzaal and Tubbergen. These municipalities only provide a basic energy office to comply to the contract with the province. In the recent past three municipalities, Hellendoorn, Hengelo and Twenterand, tried to motivate home-owners to invest in ETMs by offering a subsidy. From one point of view, those subsidies have decreased the number of houses that now could benefit from a loan or subsidy of the province.

#	Policy instrument	Description of the policy instrument
1	Energy Office	All municipalities involved in the Approach of Overijssel offer an (virtual) information desk for residents explaining ETMs and how to apply for a subsidy and/or loan for these ETMs.
2	Information Meeting Sustainability Fair	In most municipalities meetings and sustainability fairs are being organised, where information is being shared between those who offer ETMs and potential adopters.
3	News Items & Articles	Most municipalities publish information on ETMs, the subsidies and loan in the form of news items and small articles in local papers and on the municipality website.
4	Energy bus	Five municipalities called forth a former American school bus which has been transformed into a mobile information office on ETMs.
5	Energy Advice	From kitchen table dialogue to advanced home energy audit
6	Information & Service Point	In three municipalities information & service points are located, where citizens can pass by to get their questions regarding ETMs answered personally.
7	Subsidy	Before the Approach of Overijssel, three municipalities have had their own local subsidies to stimulate the adoption of ETMs within existing dwellings. The municipality of Hengelo had put the emphasis specifically on insulation with a low environmental impact.
8	Exemplary Homes	Two municipalities try to improve the adoption of ETMs by showing what has been accomplished by other house owners within the municipality [12]. In Zwolle the EcoNexis-house is an exemplary home with multiple ETMs. It is also connected to a (fictive) smart grid [13].
9	Solar Map	Many municipalities are participating in the so called solar map or solar atlas on internet. These interactive tools show house owners if photovoltaic panels can be placed on their roof and what the effects, financially and energetically, will be [14].
10	Thermo Scan	Slightly comparable tool to the solar map, a thermo scan is a tool that using infrared pictures from roofs taken by a small airplane to provide insights in the attractiveness of applying roof insulation. This tool is available for three municipalities in Overijssel.

Table 2: Policy instruments adopted by the municipalities in the province of Overijssel

3.2 Loans and subsidies granted

Data on the number of requested and granted loans and subsidies were provided by the organisation “Meer met Minder” that is responsible for registration. The subsidy and the loan need to be applied for, before the ETMs are ordered and installed.

A *sustainability subsidy* of the province is provided when the thermal resistance of the building skin is going to be improved. If one part of the building skin –ground floor, walls, glazing, or roof– is to be insulated, € 300,- is available. If two parts were to be insulated, an additional € 300,- is available. When two measures are taken together with someone in the neighbourhood, even a third € 300,- is offered. Therefore, the maximum subsidy for one privately owned house is € 900,-. The municipalities with the biggest number of houses form the top. The municipalities of Wierden, Zwartewaterland and Dalfsen are at the top in terms of most subsidy requests in relation to the number of owner occupied houses. Municipalities Tubbergen and Deventer have the smallest number of subsidy requests. The municipality with the highest subsidy is Zwartewaterland, where on average € 451.58 per dwelling was granted. The municipalities Oldenzaal and Hengelo offered relatively low grants of € 319.23 and € 326.56 per request respectively.

The *sustainability loan* of the province can be provided for all kinds of ETMs. The list of ETMs even includes for example a green roof. A loan of € 2,500 to € 7,500 has a term of ten years and a loan between € 7.499

and € 20.000 (being the maximum) has a term of fifteen years. The interest on the sustainability loan is 3 % lower than the interest of a standard loan, with a minimum of 0.5 %. Up to July 2013 it was being monitored for which ETMs the loans were used. With 567 application forms, 69,4 %, the most popular ETM was the photovoltaic system. These systems needed on average a loan of € 8,121. Measures improving the thermal resistance of the building skin were with 203 requests or 24.8 % second best and cost on average € 10,476. In 2012 the expectation was that 4.000 loans would be granted with a total value of € 40 million. In December 2013 1.100 households had applied for a loan. 61.7% of these loans had actually been granted. The value of these loans were on average € 8.080,-, which was significantly lower than the expected € 10.000,- per loan. Especially in the municipalities Hardenberg, Kampen and Dalfsen the number of loans was high. In the time period July-December 2013, the number of loans in relation to the number of owner-occupied properties was increasing in Twenterand, Kampen and Staphorst.

3.3 Selecting municipalities of interest

Due to a limited amount of resources available for the research described, the number of research objects needs to be reduced. In three ways the municipalities participating in the approach of Overijssel will be placed in perspective. An energy policy perspective, a subsidy perspective and a loan perspective enable us to choose the most interesting municipalities.

From the *perspective of energy policy* the municipality of Enschede is interesting for further study due to their innovative Social Investment Challenge. A municipality with a block for block approach or district approach could also be of interest for further research, due the architectural logicality embedded in this concept. Finally, it seems wishful to include a municipality experienced in offering grants, because these past subsidies can limit the number of new sustainability subsides and loans provided by the province. From the *perspective of subsidies and loans* granted, the municipalities with the highest number and the lowest number of request are interesting. Furthermore, the municipalities that showed the most or smallest progress in requests between July and December 2013 can be of interest.

These perspectives made us choose the following four municipalities for further research:

- The municipality of Enschede due to their Social Investment Challenge. Although the absolute number of subsidy applications in this town is high, the relative number is still small;
- The municipality of Hardenberg uses a lot of different tools in order to motivate people to reduce fossil fuels. The number of loan requests is high and the number of applications for subsidies is moderate to high;
- The municipality of Twenterand only applies a few instruments, but in the period July to December there was a significant increase in loan requests. Subsidies play a small role in this municipality;
- The municipality of Zwartewaterland is part of the successful partnership Dalfsen, Staphorst and Zwartewaterland. Many subsidies and loans were requested, but between July and December 2013 little progress was seen.

4. Assessing the commitment of individual municipalities

Each of the studied municipalities applies various policy instruments to reduce the fossil energy use. This is not surprising, because already in 2010 and 2012 performance agreements between Overijssel and the municipalities on sustainability and housing were signed. By interviewing the public servants concerned, we came to the insight that each municipality has a certain basis in terms of commitment to achieving energy savings. Policies that are being applied, are meetings with (local) companies, websites that provide homeowners with information and that bring the subsidy and loan from the province to the attention.

All four municipalities agree that the subsidy and loan provided by the province to home-owners are suitable instruments to stimulate the adoption of ETMs. The interviewees pointed out correctly that these two instruments are not really instruments of the municipalities themselves, but of the province. The respondents also have trust in the efficacy of an energy advice for homeowners. An energy advice gives a clear insight in all ETMS possible for a particular home. An advice can help the owners to prioritise investments in ETMs. This advice could be provided by one of the energy consultants from the fairly extended network of consultants available in this field. However, in the municipality of Hardenberg a civil servant is charged to offer households an easily assessed energy advice on their houses. This civil servant is being employed, because not many homeowners are willing to pay around € 300, - for an advanced home energy audit advice.

According to the civil servant interviewed in Hardenberg, companies offering actual ETMs only make small profits. This makes it impossible for them to fund an energy advice, although funding them could help in selling the ETMs offered. This competitive race is fought over by price, so the cost of a custom advice can not easily be recouped. Nevertheless, in Enschede the Social Investment Challenge has triggered a cooperation called Reimarkt to start offering energy renovation services to tenants and house owners that does include a sort of energy advice. However, the number of dwellings in the municipality of Enschede is significantly larger than the number of dwellings and the densities in the municipalities Twenterand and Zwartewaterland for example.

In assessing the commitment of municipalities, it seems that we came across four levels or degrees to what extent a municipality has put its assigned task of improving the energy performance of dwellings onto the open market. These levels are:

- Level 1: procurement of the entire energy sustainability task of housing, both rental and owner-occupied housing, as was done in the city of Enschede;
- Level 2: outsourcing fully the role of stimulator and coordinator, as was done in the municipality of Twenterand. This municipality uses the services of a consultant and has embedded these services in her role. Local enterprises involved in improving the energy performance of buildings are being promoted and meetings are coordinated by the consultant in name of the municipality;
- Level 3:outsourcing the role of stimulator and coordinator on project level. This level applies to the municipality of Hardenberg. In several projects the role of stimulator and coordinator that was originally picked up by the municipality, have been placed in the hands of a commercial organisation. However, it is still clearly the municipality who oversees all activities in the field of improving the sustainability and energy performance within their boundaries;
- Level 4: no tasks or roles of the municipality are contracted out to the commercial market. A level that applies to the municipality of Zwartewaterland.

The respondents indicated that there is currently no market for ETMs that can maintain its momentum, let alone gain momentum, without governmental influence. However, two exceptions exist, namely: the market of insulation products, services for existing houses and the market of photovoltaic systems. In the opinion of the interviewees, only these two markets operate external to the municipalities. According to a part of the civil servants interviewed, some companies give information on insulation and sell their re-insulation services door by door. Meanwhile, also companies exist that offer at the local weekly market information on photovoltaic systems. These systems can be ordered through numerous websites and some stores and shops offer solar panels off the shelf. The observability, as Rogers refers to it [15], of photovoltaic panels is large, at least larger than cavity wall insulation. Therefore, one can expect that this attention is to stay or to grow at least for a while. Currently, solar collectors, heat pumps and micro-cogeneration do not get the similar attention and are not so widely or actively offered as insulation products and panels are being offered.

5. Identifying the role of companies

Within the four municipalities questionnaires about the Overijsselse Approach 2.0 were dispatched to 21 companies involved in offering and installing ETMs. Eight companies did not respond at all. Two construction companies indicated that they consider themselves not to be able to answer the questions. Which is quite surprising, considering the fact that these two companies had been involved in the process of procurement within the Social Investment Challenge of the municipality of Enschede. Three of the eleven entrepreneurs that responded (including an energy advisor) mentioned that they are not completely familiar with the instruments of the Approach of Overijssel. This means that the familiarity with the approach itself, but also the energy office, sustainability subsidy and sustainability loan leaves room for improvement. It seems almost impossible to state that companies who are not familiar with them have maximised their turn-over. Many of the other eight remaining respondents claim that the energy offices, subsidy and loan contribute to their sales, as is shown in Table 3.

An instrument that is not specifically part of the Approach of Overijssel 2.0, but was adopted by multiple municipalities and was mentioned by the respondents often, is the energy advice and the accompanying energy performance certificate. The advice will give the customer a better understanding of what ETMs can be adopted. Who that customer exactly is, seems to be well known by the companies. It could be a

replacement-customer in search for an ETM to substitute a former energy conversion system. In a new emerging market, it could also be a customer who patiently compares multiple offers before investing in the one and only perfect ETM to him. This client can easily postpone his decision to invest, but the offer of a subsidy or loan probably helps him to come to an earlier adoption.

Company	Energy Office	Sustainability Subsidy	Sustainability Loan
Consultant F	Contributes to turnover.	Contributes to turnover.	Contributes to turnover.
Consultant G	Respondent is not familiar with it.	Respondent is not familiar with this instrument.	Respondent is not familiar with this instrument.
Construction company D	By providing information, it contributes to turnover.	Does contribute, due to reduced pay back periods. Customers can be persuaded easier, when some subsidy is available. Only communicated to customers for insulation.	Contributes to turnover. 75% of the customers don't buy PV or other ETMs without this instrument. Sales strategy is especially adapted to loan.
Construction company F	Little turnover was generated from a sustainability stand. No comments regarding contribution.	Little turnover was generated from a sustainability stand. No comments regarding contribution, however the company website does mention availability subsidy.	Little turnover was generated from a sustainability stand. No comments regarding contribution, however the company website does mention availability subsidy.
Installation company B	Contributes to turnover, multiple leads enter via energy offices.	Does not contribute to turnover, but when it applies customers are being informed.	Contributes to turnover, because it helps people to invest. When it applies, customers are informed.
Installation company C	Contribution to turnover is hard to assess.	Contribution to turnover is hard to assess. Customers are being informed about its existence.	Contribution to turnover is hard to assess. Customers are being informed about its existence.
Insulation company A	No picture of its contribution to the turnover.	No picture of its contribution to the turnover, but customers are informed about its existence.	No picture of its contribution to the turnover. Most company's customers do not need a loan.
Insulation company C	Contributes to turnover, due to improved trustworthiness .	Contributes to turnover, because it reduces the investment costs for our customers.	Contributes to turnover, because customers without the financial means can still invest at a low interest, enabling them to reduce energy costs.
Insulation company D	Respondent is not familiar with it or the turnover it generates.	Contributes to turnover, because many customers are familiar with it and apply for it. Customers are being informed about its existence.	A small number of customers makes use of it, so it does contribute to turnover. Not everyone will be pleased, when suggesting them to take a loan.
Supplier A	Does not contribute to turnover.	Does not contribute to turnover, but customers are informed.	Does not contribute to turnover, but customers are informed.
Supplier B	Respondent is not familiar with it	Respondent is not familiar with this instrument.	Respondent is not familiar with this instrument.

Table 3: Impact of the energy office, subsidy and loan according to the companies interviewed.

A customer that wants a subsidy or loan to finance an ETM, is challenged by a relatively complex procedure. It is a procedure in which to the experience of two companies (and one municipality), a significant number of applications were rejected. Construction Company D indicates that some customers due to the amount of paperwork for a loan, decided not to invest in an ETM anymore. Installation Company C indicated that a website with information on the Approach of Overijssel 2.0 of a municipality was not up-to-date, resulting in a lot of additional work to rectify the mistakes that occurred. Despite these obstacles in the application process, promotion of Insulation Company C in early May and of Construction Company D and Installation Company C in early November 2013 seems to have been effective. In the particular municipality, the number of requests for a loan had been rising significantly in the time period July – December 2013. The activities of Insulation Company C may also have contributed to the number of loan applications in two other municipalities. In a third municipality their activities did not appear to have success in terms of an increase in

loan requests. A reason could be that another company already had been offering comparable products in the same municipality earlier / or because the residents applying this sort of ETMs did not need a loan. Given the relatively high number of subsidy requests, the latter can be a plausible explanation.

It can be stated that the entrepreneurs in general praise the subsidy and loan as part of the Approach of Overijssel 2.0. They also value the energy office positively, but they do not seem to be able to pinpoint what exactly the reason is for the added value they assign to it. It seems to be linked to the positive association their customers, being citizens, have with the local municipality as a governmental institution. The customers have greater faith when meetings are being organised by municipalities or at least in collaboration with municipalities than by commercial organizations alone. These meetings and the names of the participating companies are in some cases also being communicated by the energy office of a municipality. In this case the energy office becomes more than just an information access portal to request a subsidy or loan. The companies interviewed are or very modest about their own role in the ETM market, or they are not fully aware how important their own role is.

6. Conclusion and recommendations

The aim of this research project was to gain more insights in what active market approach a province can apply to improve the adoption of ETMs by private house owners successfully. A model can be very helpful in showing what relations exist and, therefore, in what insights were gained. For synthesis the model in Figure 1 is developed that maps the available instruments. It shows the role of policy instruments within the relations between the main actors involved. The four main actors are the province, the municipalities, home-owners and entrepreneurs. Except for the relation between the province and entrepreneurs, instruments aiming at increasing the adoption of ETMs were found that link every two actors out of these four actors. Having presented this model, this section will now present our final conclusion and recommendations.

6.1 Conclusion

The civil servants and entrepreneurs questioned in our interviews hold in general the opinion that currently

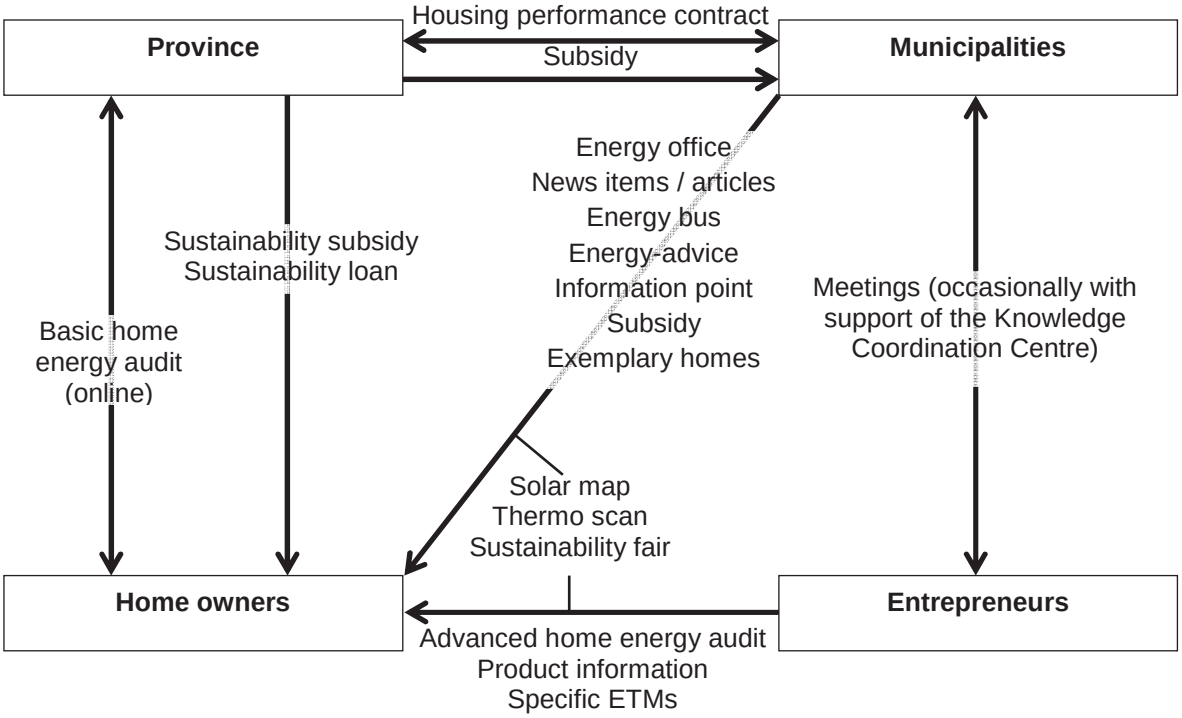

Figure 1: Overview of instruments to reduce fossil energy use in dwellings in Overijssel

the government plays an important role in stimulating the ETM market. When one wants to retain or increase the current adoption rate of ETMs by house owners, it is -in the opinion of the respondents- not desirable that

the government withdraws her instruments from this market. Therefore, we can conclude that there is not yet a full market for ETMs.

However, multiple respondents agree that certain ETMs exist that operate in an independent submarket without the support of public subsidies. These are the insulation market for existing dwellings and the solar industry, specifically the photovoltaic systems. These two product categories have little resemblance in terms of product characteristics or terms of sales technique employed. However, both seem to have fairly short payback periods. Regarding the insulation of existing dwellings, a door-to-door sales technique has been successfully applied. Additional advantages of photovoltaic systems are their compatibility, trialability, and observability [15].

When the adoption rate of these and other ETMs needs to be increased, there are essentially two scenarios to be distinguished in the respondents' answers:
Scenario 1: Given the current success and the generally positive reviews of the respondents to the Overijssel Approach 2.0, current policies could be continued with some improvements in the customer process of acquiring the loans and subsidies, or;
Scenario 2: The province could try to come to a more independent ETM market, in which she gradually recedes herself, while at the same time she stimulates a transition from generic instruments to more specific instruments (e.g. personal energy advice, solar map, thermo scan), and a shift from government driven instruments to corporate driven instruments.

We are aware that we only studied the role of instruments currently already applied within the province of Overijssel. This already resulted in quite an extensive list. We could imagine that other instruments do exist and we hope that especially new innovative instruments will be developed that help home-owners to get insights in what exactly certain ETMs can do for their specific situation.

6.2 Recommendations

Three groups of recommendations are distinguished: recommendations regarding Scenario 1, recommendations regarding Scenario 2, and recommendations for further research. Although in total 33 recommendations were offered to the province, the number of recommendations in this paper was for the sake of conciseness reduced to six.

In the context of Scenario 1 it is, firstly, recommended to simplify the application procedures for loans and subsidies. It seems desirable to reduce the number of process steps, reducing the number of organisations and to reduce the number of required documents in the application process. The civil servants interviewed shared a desire to increase the target group for the loans and subsidies. They did not mention anything about offering loans or subsidies for other ETMs than currently assessed.

Secondly, it is recommended to come to uniformity regarding the “energy office” instrument. The configuration of this instrument seems to differ greatly by each municipality. Rarely the website version of the energy office offers homeowners ways to find information for their specific situation. It often only offers some relatively general information. In multiple cases this information is outdated and not well structured. It is therefore recommended to specify a more uniform structure for the energy office at provincial level.

A first recommendation to come to Scenario 2 is to support the development of those instruments that help home-owners to gain information on ETMs for their specific situation by bringing reliable companies operating in the ETM market together. These instruments can also be developed by companies that already offer one or more ETMs. They can help home-owners to gain confidence that the desired added value can be achieved.

A second recommendation to come to Scenario 2 is to respect the potential of a tailored energy-advice and home energy audit in achieving an independent ETM market. The respondents give high priority to these instruments, because home-owners need to be aware of the quality level their property is at. These instruments can ensure that the order in which ETM investments take place, can be determined correctly. These tailored advices may act as a lubricant between the home-owners and providers of ETMs. The relatively self-operating sub-markets for photovoltaic systems and post-insulation show that home-owners can be tempted to apply ETMs.

In this research the opportunity was offered to a select group of municipalities and companies in Overijssel to give their comments regarding the success of policy instruments in coming to a lower fossil energy use of houses. Opinions of private home owners regarding the Approach of Overijssel and the policies themselves were not taken into account. Furthermore, one can wonder whether in other provinces similar tools have been deployed and if they have had the same effects as in Overijssel. Further research could take into account how private home-owners themselves perceive the instruments available.

7. References

[1] European Union (EU). “Directive on the energy performance of buildings”, Directive 2010/31/EU of the European Parliament and of the Council, 2010.

[2] W. Abrahamse, L. Steg, C. Vlek and T. Rothengatter, “A review of intervention studies aimed at household energy conservation”, *Journal of Environmental Psychology*, Vol. 25, 2005, pp. 273-291.

[3] T. Hoppe and K. Lulofs, “The impact of multi-level governance on energy performance in the current Dutch housing stock”, *Energy & Environment*, Vol. 19, No. 6, 2008, pp. 819-830.

[4] C. McGilligan, M. Sunikka-Blank and S. Natarajan, “Subsidy as an agent to enhance the effectiveness of the energy performance certificate”, *Energy Policy*, Vol. 38, 2010, pp. 1272-1287.

[5] T. Hoppe, J.Th.A. Bressers and K.R.D. Lulofs, “Local government influence on energy conservation ambitions in existing housing sites – plucking the low-hanging fruit?”, *Energy Policy*, Vol. 39, 2011, pp. 916-925.

[6] D. Majcen, L.C.M. Itard and H. Visscher, “Theoretical vs. actual energy consumption of labelled dwellings in the Netherlands: Discrepancies and policy implications”, *Energy Policy*, Vol. 54, 2013, pp. 125-136.

[7] Provincie Overijssel, “20% nieuwe energie in 2020”, *presentation,* 12-09-2012.

[8] Swing, “Registratiesysteem voor energielabels van gebouwen”, *CBS*, 2011.

[9] Syntens, “Slim Energie Thuis”, *http://www.syntens.nl/slimenergiethuis/*, 13-11-2013.

[10] Slim Energie Thuis, “Duurzaamheidsteam Zwartewaterland officieel van start”, *http://www.slimenergiethuis.nl*, 01-12-2013.

[11] AgentschapNL, “Blok voor Blok”, *http://www.agentschapnl.nl*, 01-12-2013.

[12] Gemeente Dalfsen, “Proeftuin energieneutraal renoveren”, *http://www.duurzaamdsz.nl*, 01-12-2013.

[13] EcoNexis Huis, “Over het huis”, *http://www.econexishuis.nl*, 03-12-2013.

[14] Zonnekaart, “Deelnemende gemeente”, *http://www.zonnekaart.nl*, 24-11-2013.

[15] E.M. Rogers, “Diffusion of innovations (5th edition)”, *Free Press*, New York, 2003.