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WP2 D2.1: Market gap analysis

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1. Preface

This market gap analysis (MGA) is carried out in the context of a comprehensive study of the status of existing private residential properties in Frederikshavn municipality as geographical boundary.

The MGA-Excel spreadsheet contains detailed information about profiles of different types of private residential properties in the municipality and potentials for energy renovations in private houses. It also includes mapping and analysis of barriers and drivers for promoting deep energy retrofit in private residential properties, mapping cross-sectoral stakeholders, their role-play and interrelationships with other stakeholders on the energy retrofit market. The survey includes financial markets' willingness to facilitate loan offers for energy renovations and the conditions for borrowing to private homeowners as well as their moving ground and degree of motivation for the promotion of energy renovations in private houses as the whole. In addition, the survey includes a comprehensive mapping of existing providers of services, targeted private property and the individual providers' conditions and prerequisites for service deliveries, targeted to the target group. Finally, the study contains a SWOT analysis that highlights the strengths and weaknesses of cross-sectoral actors.



2. The topic

Together with its external stakeholders Frederikshavn already offers a set of energy efficiency (EE) services to homeowners, Frederikshavn will on the one hand upgrade their services with the aim to offer a more attractive integrated EE service package to homeowners and on the other hand share its knowledge with other partners in the project to improve all approaches.

Frederikshavn municipality has an expectation that the Innovate-project activities will result in a total of 100 dwellings units in condominiums and 20 single-family houses will be energy refurbished within the Innovate project period. The total investment for the aforementioned energy refurbishment is estimated to amount to 11.1 mio. €.



3. The current state

This analysis focuses on developing methods for improving and increasing the number of renovations of Danish single-family houses, taking the typical single-family houses built during the 1960s and 1970s as a specific case.

Although there are many good reasons and solutions available for increasing the energy efficiency of existing single-family houses, very few houses receive major renovation due to barriers and lack of motivation. The aim of this analysis is to study the barriers, incentives, and the process of energy refurbishment to identify possible improvements in promoting energy savings in homes. The analysis includes carrying out evaluation of the entire process and its complications in real life.

3.1 Interpretation of segmentation

For many years, it has been a political goal to reduce energy consumption and to increase the share of the production covered by sustainable sources with a view to reducing the human impact on the climate. **In Denmark, 22% of all energy consumption takes place in single-family houses**, which makes this the largest single contributor after road transport (Bjørneboe et al., 2017; DEA, 2015a). The majority of the single-family houses in Denmark were built during the period from 1960 to 1979. Many of the 450,000 houses from this period are in need of renovation due to their age. Although they may not be the most energy-consuming houses in Denmark, their sheer number makes them one of the housing segments with the highest potential for energy savings. However, despite the potential, the renovation of this segment is only proceeding slowly.

If houses are not maintained, they will deteriorate over time and thereby lose their function and value. It is not just a question of postponing an investment; it can also be a case of creating a maintenance backlog, eventually resulting in large restoration expenses. According to DACC and GI, there was a maintenance backlog of about DKK 27 000 million (about EUR 3 6000 million) in the stock of Danish single-family houses in 2011 (DACC and GI, 2011).



In a report mapping the stock of single-family houses and their owners, Sbi, Danish Building Research Institute et al. (2016) makes a rough estimate that at least 78% of single-family houses in Denmark are either in need or very much in need of renovation. This figure includes 26%, which are significant challenges such as a lack of finances. Many sources back up the statement that there is a large potential for energy renovation in Danish single-family houses built in 1960–1980 (DEA, 2014; Gram-Hanssen, 2014; Kragh and Rose, 2011; Vanhoutteghem and Rode, 2014; Wittchen, 2009). Tommerup and Svendsen (2006) calculated the savings achievable in a typical Danish single-family house built 1960–1980. They estimated that the initial heating consumption of 167 kWh/m² a year could be reduced by 13–75% depending on the scale of renovation. The least ambitious renovation was just improving the roof insulation, and the most ambitious extended to improved windows, external wall insulation, and ventilation with heat recovery.

Kragh et al. (2010) produced a report estimating the amount of energy that would be needed to supply buildings in Denmark in 2050. The report estimated the current energy consumption in buildings of all types and ages. For example, in 2010 the average energy consumption in the Danish single-family houses built in 1960–1980 was estimated to be between 111 and 136 kWh/m² a year, depending on whether they were built late or early in the period. Since they make up about 17% of the total built area in Denmark (based on data from BBR, an official Danish database of buildings, presented by Kragh et al. (2010)), this is a significant place to search for possible reductions in energy consumption. The report (Kragh et al., 2010) estimates the total consumption in the Danish single-family houses built in 1960–1980 to be 27,665 TJ a year, corresponding to 17% of the total consumption in buildings. They introduce three scenarios for the renovation of the building stock. Here they use varying percentages of renovation implemented for each major building element, ranging from 50% (scenario A, one in two houses receive external wall insulation) to 100% (scenario C, all houses have windows replaced) for all buildings where the current thermal transmittance is below a certain value. Using this method, they find a saving potential in the Danish single-family houses built in 1960–1980 of 46–66 % depending on the scenario. In total for all building types and ages, the least ambitious scenario would bring the building stock up to the level of new houses in 2010, and reduce the total energy consumption in buildings by 52%, whereas the most ambitious would reduce the consumption by 73%. **All three scenarios show a potential for a significant contribution to the reduction of energy consumption in the building stock by 2050.**



Another report (SBI Danish Building Research Institute, 2016) presents a number of renovation scenarios for the Danish building stock on the basis of different assumptions concerning regulation in the field. The scenarios range from 'business as usual' to levels of compliance with the regulations and strengthening the requirements in the building regulations. **They estimate energy savings ranging from 24.3% to 35.2% across the entire building stock.**

That is why Frederikshavn Municipality has chosen the housing segment built in 1960–1980 as a special focus area within the framework of the Innovate project.



4. Gap-analysis

4.1 Interpretation of barriers and drivers

Despite the potential for achieving energy savings, the upgrading of Danish single-family houses built in 1960–1980 progresses slowly. This is due to a number of barriers and a lack of motivation among homeowners.

Various models have been used to describe the barriers. A report by SBI and Jensen (2004) describes two different models: a **techno-economic “Barrier-model”** based on Guy and Shove (2000), and an **inertia-model**, also known as a lifestyle-model.

The techno-economic ‘Barrier-model’ focuses on the human barriers that block the flow from research & development, and demonstration and dissemination to actual implementation. According to the model, the human barriers can be divided into:

- 1) Lack of interest (people are unaware that the possibility exists or just do not care)
- 2) Lack of knowledge (people are not sure what their specific options are or what they might gain)
- 3) Lack of solutions (e.g. specific technical solutions, trained craftsmen, or finances)
- 4) Lack of movement (a combination of laziness, conservatism, scepticism, and the competition of other priorities).

The barriers can be categorized in different ways, but the content is much the same. Subsequent is an attempt to identify barriers. In the ongoing work on promoting energy refurbishment of private homes, homeowners emphasize two types of barriers:

- Economic barriers (lack of resources, unwillingness to increase borrowing, doubts about economic benefits)



- Non-economic barriers (thinking no further renovation is necessary, lack of time, wanting to do as little as possible, or worries about the mess and stress of a renovation)

Often policy mostly focuses on lack of interest, lack of knowledge, and lack of solutions, because these are the most measurable and easiest to handle. However, the fourth group of barriers, **the lack of movement**, must also be tackled, because it is not sufficient to find solutions to the first three. When people are unaware of the potential for savings in their house, they will decide on maintenance and improvements based on their immediate needs or choose the cheapest solutions in the short term. Most people will not consider all the relevant information, but rather be influenced by their initial starting point.

Another way of looking at the barriers is to use an **Inertia-model**, also known as a lifestyle-model (SBI and Jensen, 2004). Here consumption is seen as a form of cultural currency. This means that people will react differently towards the same energy-saving measure, depending on what signals it will send to their social surroundings. An energy efficiency measure can be economically unfeasible, and still be attractive, if it sends a strong signal that strengthens their social status. On the other hand, an economically feasible measure might not have any signalling effect (for example, cavity insulation). This model indicates one of the problems when it comes to energy improvements, because they are often invisible. The idea that choosing energy efficiency is not necessarily an economically rational choice is supported by Gram-Hanssen (2014). **Apart from concluding that the renovation of kitchens and bathrooms often has a higher priority than energy efficiency**, the author states that economic benefit seldom works as an incentive for renovation. A lack of finance can set the limits of a possible renovation, but this does not imply that homeowners are calculating payback periods. Often the renovation will be part of a certain lifestyle of improving the house or a DIY project. Gram-Hanssen emphasises the importance of including social factors when promoting energy efficiency.

We note that it is difficult to draw strong statistical conclusions because research in this field follows many different methods and covers a large area. However, one problem we meet in particular is the focus on habitual behaviour (frequent actions, e.g. daily), which can be described with the common behavioural models. This is, however, not the case for large investments, because these are rarer and rather follow patterns influenced by consequences than personal norms and habits.



A survey among people, who received a subsidy for renovating their house, investigated what effect this had on their perception of comfort in the house and why they chose to renovate (Niras A/S, 2015). While the survey showed that a majority had experienced better comfort in their house after renovation, only 39% claimed this as one of their two main motivations for renovating. This is probably because there is limited focus on the comfort benefits that can be achieved, but massive attention on savings, which 67% claimed as a reason for renovating.

4.2 Interpretation of the gap

The interpretation of the gap field is based on the research of barriers and means related to energy refurbishment in private households. The research indicates that there are a number of barriers and that they are diverse and include lack of legislative regulations.

One way of boosting energy refurbishment of single-family houses is to involve politicians as advocates of refurbishment. This can take place at different levels ranging from local over regional to national level.

At a local level, the research presents a new overview of the most important barriers and motivation factors related to identifying the gaps. However, these are highly influenced by the gaps at a national level, which still exist and influence the local initiatives on promoting energy refurbishment in the municipality.

The research found that the following are the most important barriers:

- Lack of awareness: many homeowners are not aware of the difference between conventional refurbishment and modernization and energy refurbishment. When homeowners are not aware of the option of energy refurbishment, they often make decisions related to maintenance based on their immediate needs or they choose the short-term cheapest solution.
- Lack of information: Most homeowners do not consider all relevant information, but are rather influenced by their original ideas.
- Lack of signalling effect when choosing energy refurbishment over ordinary refurbishment. Some improvements can be economically unfeasible, but still be desirable to the homeowner, because it has a strong signalling effect and



contributes to the **social status** (for example new bathroom, kitchen or terrace). On the other hand, improvements of the home, which are economically feasible, might not have the same signalling effect. This is a barrier to energy refurbishment, as many energy saving improvements are not visual.

- Lack of resources in terms of time (most homeowners wish to do as little as possible).
- Homeowners worry about a messy home and stress related to the refurbishment.
- Lack of will to borrow money for energy refurbishment.
- Doubt about the financial advantages of energy refurbishment.
- Financial barriers (some homeowners' economic latitude does not match their 'dreams', why they choose not to do any refurbishments at all).

Drives

Based on the analysis and experiences from the recently concluded project Infinite Solutions, there is a need for measures within three areas. Together these areas make up drives that can have a positive impact on homeowners as motivational factors:

1. Information

- There is a need to inform the target group in order to increase the awareness of the benefits related to energy refurbishment in contrast to ordinary refurbishment.
- There is a need to highlight the benefits that are not directly related to energy refurbishment when carrying out energy refurbishment. Examples of these are 'increased comfort' and 'better indoor climate'.
- Training or educating artisans in the building sector in order to make them take responsibility for encouraging homeowners to carry out energy refurbishments. In addition, the training and education should also make the artisans carry out energy refurbishment professionally and in a convenient and problem free manner in consideration of the homeowner's other wishes for refurbishment even though these are not related to saving energy.

2. Financing



- There is a need for improved support through relevant subsidies for entrepreneurs within energy refurbishment.
- There is a need for further efforts to increase the awareness of the existing soft loan schemes in the local area.
- The local banks, who offer the soft loans to homeowners in the local area, need to change their focus from 'energy refurbishment as an investment' because the marketing parameters has turned out not to be effective, and actually hampering instead of motivating.
- There is a need for reducing the lack of subsidies. Financial support will help motivate the target group. A number of homeowners consider it unfair that they have to pay for energy reports without knowing whether there is a potential for saving energy in their home. Another group of homeowners' priority is to use their savings on other things. Facilitating a professional energy advisor, which is both free and impartial, will be a good motivator.

3. Decision makers

- There is a need for the involved stakeholders (banks, energy companies, energy advisors, real estate agents, artisans and public energy offices) to support the homeowners, when they are deciding whether to carry out energy refurbishment. The majority of the homeowners are not experts in refurbishing, why they need expert and impartial guidance.
- There is a need to 'adjust' the existing legislation, which is a barrier for some types of energy refurbishment (for example tax on solar panels in private homes when the system is connected to the local electricity grid).
- There is a need for the decision makers to 'demand' a maximum allowed energy usage in existing homes in order to promote energy refurbishment. With the current legislation, homeowners 'voluntarily' carry our energy refurbishment.



4.3 Interpretation of the actors mapping

This section describes mapping of two groups of actors:

- Existing actors: existing local and external actors
- Future actors

The characteristic of both groups of actors is that the action and attitude of these groups influences whether or not initiatives for the promotion of energy conversion of homes (buildings in general) in Denmark will succeed.

Existing actors

This group includes groupings of local actors with which Frederikshavn Municipality already collaborates. The municipality has signed a cooperation agreement with eight local banks. In contrast, the cooperation with other actors is informal and based on a common understanding of the importance/necessity of cooperating in order to gain increased earnings for those, who join the cooperation to promote growth and reduction of emissions in the local community. Existing "internal" actors include the following groups:

- a) A group consisting of eight national banks' local branches
- b) A group of real estate agents
- c) Groups of local artisans associated with the construction industry
- d) A smaller group consisting of energy advisors
- e) The citizen group "My Energy City"

Existing "external" actors include actors with which the municipality cooperates with the aim of promoting energy savings in private property. The following actors draw the group:

- f) Danish Energy Agency, DEA
- g) SBI
- h) Aalborg University
- i) Technical University of Denmark, DTU

Future players

Mapping of future actors is based on the function, characteristics, networks of the individual actors, and last, but not least, influence on their own members or in their surrounding environment, including political decision makers. It is assumed that



establishing cooperation with future players at best covers a lack of holistic effort for a comprehensive energy innovation in Denmark. Future players are as follows:

- j) Danish Construction
- k) Crafts Council
- l) Banking Council
- m) Associations of DIY stores (stores selling building materials)
- n) Wholesalers' associations (chain stores selling refrigerators, freezers and other household electrical appliances)
- o) Association of Danish Architects

4.4 Interpretation of the services mapping

In Denmark, there is a problem of motivating homeowners to conduct energy renovation. A great energy saving potential is found in the Danish single-family houses build 1960-1979, but the potential has not been utilized for various reasons. However, mapping of the EE-services shows that the average Danish single-family homeowner **can be motivated by improvements in comfort, indoor environment and architecture combined with a reasonable economy**. The objective of this analysis is, based on the motivation survey results, to determine if all homeowners can be assumed as one homogeneous group or if there are significant differences among the homeowners, what causes these differences and how does this affect the future motivation strategy. The key parameters for, if and how the homeowner can be motivated, are related to the homeowner's position in life. These parameters are factors such as age, children's age, time of ownership, occupation and income. Furthermore, the results until now conclude that the homeowners cannot be assumed as one group, but must be seen as individuals. The group who is most likely to be motivated to perform an energy renovation is the young generation of homeowners. The old generation will be harder to motivate, but results nonetheless show that it is possible.

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Most of the single-family houses in Denmark were built during the period from 1960 to 1979. Many of the 450,000 houses from this period are in need of renovation due to their age, and although they may not be the most energy-consuming houses in Denmark, their sheer number makes this one of the housing segments with the highest potential for energy savings. However, despite the potential, the renovation of this segment is only proceeding slowly.

Danish EE-services and available information regarding renovation

A: Building Regulations (BBR)

The Building Regulations, currently BR15 (Danish Transport and Construction Agency, 2015), regulate all buildings in Denmark and must be taken into account when building new or renovating. The table below shows selected relevant requirements for insulation of the building envelope for conversions, maintenance and replacement, according to the Danish Building Regulations from 2010 (BR10) when the case studies in this thesis took place and from 2015 (BR15), which are the current building regulations (Danish Ministry of Economic and Business Affairs, 2010; Danish Transport and Construction Agency, 2015).

REQUIREMENTS FOR INSULATING THE BUILDING ENVELOPE

		BR10	BR15
External walls	W/m ² K	0.20	0.18
Roof structures	W/m ² K	0.15	0.12
External doors	W/m ² K	1.65	1.8

The regulations on energy consumption in buildings have been continuously tightened since the 1970s, and it is planned to further tighten the rules for new buildings in 2020, setting the limit at 20 kWh/m² a year for heating, ventilation, cooling and domestic hot water in residential buildings. However, while the ruleset for new buildings has received a lot of attention, there is less regulation when it comes to renovation. In the latest version of the building regulations, two new voluntary renovation classes have been added:

REQUIREMENTS FOR RENOVATION

RENOVATION CLASS 1	RENOVATION CLASS 2
<ul style="list-style-type: none"> • Total demand for energy supply for heating, ventilation, cooling and domestic hot water must not exceed 52.5 + 1650/A kWh/m² per year (EPC label A2010) • Requirement for supplied energy improved by at least 30 kWh/m² per year • Part of the total energy supply to buildings must be renewable energy • Requirements for indoor climate 	<ul style="list-style-type: none"> • Total demand for energy supply for heating, ventilation, cooling and domestic hot water must not exceed 110 + 3200/A kWh/m² per year (EPC label C) • Requirement for supplied energy improved by at least 30 kWh/m² per year • Part of the total energy supply to buildings must be renewable energy

However, in other respects the rules have concerned the specifications for specific improvements. The regulations state that cost-effective energy savings must be implemented when alterations are made to external walls, floors, roof structures, windows or installations, but there are currently no rules for how much energy an existing building can consume.

B: Energy Performance Certificate (EPC)

The EPC is a system for benchmarking buildings based on their energy consumption. The EPC is part of the Energy Performance of Buildings Directive (EPBD) initiated by the EU member states and Norway about a decade ago. Only the framework for the EPC is decided at a central level; it is up to the countries to decide how to introduce it.



In Denmark, the EPC includes a rating of buildings on a scale from high-energy consumption, G, to low energy consumption, A2020, see the table above. The calculated energy consumption is based on standard values for consumption, enabling easy comparison of different buildings at the expense of an accurate reflection of the actual



consumption in a particular house. The consumption for domestic buildings includes heating, ventilation and domestic hot water. It does not include lighting or electricity used for other purposes.

It is mandatory to obtain an EPC report when a house is put up for sale. Apart from containing a rating of the building, the EPC report also makes a few suggestions for feasible improvements that could be implemented to reduce energy consumption and improve the rating. The idea is to inspire the new homeowner to implement these improvements, but studies have shown this usually does not happen. A survey carried out among homeowners who had received an EPC showed that they did not find it useful, even though they considered it reliable and easy to understand (Christensen et al., 2014). To keep the cost of making an EPC report down, the energy consultant is not required to visit the house before making it. This means that the suggested improvements are often too general and might not even be suitable for the specific house (Bolius, 2014).

However, many studies in Denmark and abroad have shown that the energy label does have a direct effect on house prices (Bio Intelligence Service et al., 2013; Brounen et al., 2009; DEA, 2015b; de Ayala et al., 2016; Fuerst et al., 2016). It affected the distribution of house prices when displaying the EPC rating in sales material became mandatory in 2010 (Jensen et al., 2016), so the EPC has increased awareness about energy renovation, even if it has not directly caused people to renovate.

C: House Condition Report

A house condition report (in Danish: tilstandsrapport) describes the condition of a house (including repairs needed) compared to similar houses, and it is often made in connection with the sale of the house. It is drawn up following an on-site assessment made by a building professional appointed by the Danish Business Authority. In its current form, it does not provide information about renovation (except for the expected remaining lifetime of the roof), but it does give the new homeowners important information about their houses. It provides a systematic overview of repairs needed in the house and their severity. The house condition report represents an opportunity, where the inclusion of



possible energy improvements might supply all new homeowners with valuable information on what they could do to improve their house in a sensible way.

D: BedreBolig

To make energy renovation more approachable, the Danish Energy Agency, DEA launched the “BedreBolig” (BB) scheme as a test in nine municipalities in 2013 and nationwide in the autumn of 2014. It is a voluntary market-based scheme. The idea is to guide the homeowner through the process from first idea through planning and execution and ending with follow-up on the project. In this scheme, artisans, advisors and other building professionals are trained to provide holistic counselling, so that homeowners should receive better advice on how to make energy improvements on their house. Homeowners, who contact a BB advisor, receive an assessment of their house and a BB-plan, containing the renovation suggestions they have decided on with the advisor. They can then use the plan to get quotations from contractors and get a loan in the bank. There are currently no figures on the number of issued BB-plans or how many renovations the scheme has generated, but 134 companies are represented as BB-advisors on the official website.

Description of the approach

By this scheme, homeowners can get a non-binding chat with a BedreBolig advisor, and they can consult the advisor on what it costs to invest in energy renovation of the better home. After the unobtrusive talk, and if the BedreBolig consultant can conclude that there is potential for energy savings in the home, the homeowners must pay the consultant for the development of a better housing plan. A better housing plan includes:

- Facts about the state of the house and energy consumption
- Clarification of what the owners want with their house
- Priority list of where homeowners can energy optimize the house
- Good advice for energy-efficient behaviour
- Total budget incl. investments and savings

Very few evaluations have been carried out since the initiation of the scheme in 2013. The introduction of the scheme in the test municipalities was evaluated by Geelmuyden Kiese (2014), who found it difficult to draw any strong conclusions after such a short time, because the building professionals had to receive training before reaching out to customers. One conclusion that was drawn was that many homeowners might consider



the cost of getting a BedreBolig-plan a big obstacle, because it cost about DKK 2–3000 (EUR 270–400).

E: EnergiTjenesten (the Energy Service)

EnergiTjenesten (Energy Service) offers impartial and tailor-made advice on energy conservation and renewable energy. EnergiTjenesten is one of the few independent bodies in the field, and they are represented in all regions of Denmark with a secretariat in Aarhus. The efforts are aimed at minor energy consumers. EnergiTjenesten offers advice to Danish households, but their work also extends to schools, construction, industry and municipalities.

The vision of EnergiTjenesten is a world of sustainable energy supply based on 100% renewable energy and local CO2 neutral resources with strong popular ownership.

EnergiTjenesten provides free of charge advisory to anyone, who intends to act in a way that saves energy at home. The EnergiTjenesten's main task is to provide independent information on energy savings and renewable energy to the individual citizen, company and public authority.

EnergiTjenesten's housing work covers information on energy-efficient housing including existing homes such as renovation, insulation and the like practical home remedies that can save energy.

EnergyTjenseten will stop delivering its services by the end of 2017 and all offices in Denmark will resemble as the Danish state has removed funding to EnergiTjenseten via PSO funds (public service obligations fund).

F: Subsidies

There are currently two different schemes for people who want to renovate their house: **The “Energiselskabernes Energispareindsats” (EE) and the “BoligJobOrdning” (BJO).**

The EE scheme is based on the commitment of the Danish energy grid and distribution companies to achieve annual energy savings (DEA, 2012). One way for the companies to meet these goals is to buy the right to report the energy saving that a homeowner



achieves through renovation. A homeowner can only sell this right once for each renovation, and the agreement has to be made before the work starts. The homeowner receives the full benefit of the renovation (DEA, 2016d). However, there are some problems connected with this scheme. Each company has their own system for calculating the size of the subsidy, so the homeowner often has to contact more than one company to get a good deal, making it time-consuming and inconvenient. Moreover, the actual size of the subsidy is unknown before the scale of the renovation has been determined. Therefore, although the EE scheme is intended to motivate more renovations, the system makes it doubtful whether this is the case. A survey among homeowners in the process of a renovation showed that only 4% were motivated by an energy company subsidy (Bolius, 2016). Finally, the subsidy is a very small amount compared to the expenses of an extensive energy renovation.

The second subsidy scheme, the BJO, is actually a tax reduction scheme, where expenses for the salaries of artisans or advisors up to DKK 12,000 (approx. EUR 1,600) can be deducted. The main purpose of this scheme is to create more jobs, but it has been modified a number of times since 2011 and now promotes more green solutions such as energy refurbishment. Since the scheme, despite being extended every year, is always temporary, it does not promote long-term planning. Moreover, the maximum size of the subsidy only promotes smaller improvements. On the positive side, it might encourage people to have an EE-plan made, because it can cover the cost.

G: Sparenergi.dk – the building guide

The DEA has a website dedicated to promoting energy savings, SparEnergi.dk. This website includes a new building guide, featuring the 15 most common types of single-family houses in Denmark. For each type of house, the website provides easily accessible information for owners and building professionals about materials, design, common energy levels and possible improvements. Here it is possible for the owner to get information early in the process, and it can be used as a tool for the building professionals to explain their ideas to the customer.

H: BetterHome

Four Danish industrial companies, Grundfos, Danfoss, Velux and Rockwool, have created the BetterHome-scheme to develop a new and easier access to energy refurbishments of



private homes. BetterHome has its own head office in Copenhagen with its own management. Danfoss, Grundfos, ROCKWOOL and VELUX GROUP many years of experience with energy-efficient solutions - and a long tradition of close collaboration with artisans. These industrial companies have come together to make it easy for Danish homeowners to energy renovate their house. They call the scheme BetterHome

Description of the approach

Homeowners must go to the BetterHome's website (www.betterhome.today) and provide details about the house's energy consumption, age of the house, property address and homeowner's contact details. The energy consultant then contacts the homeowner within 24 hours. The energy consultant will then prepare an energy-saving plan for the homeowner, which contains investment needs for the individual energy-saving proposals.



Scope of offers

The offers are divided into three different categories, allowing the customer to freely choose the extent to which one wishes to re-energy their housing:

H.1: Energy package:

The energy package includes simple energy improvements, where the homeowners' energy savings pay the investment. The energy package is a simple place for homeowners to start energy savings if the homeowners want to save energy, improve indoor climate and make the home more attractive, without having to undertake major renovation and investment. The solution can for example be installation of automatic adjustable circulation pumps, new thermostats on the radiators, cavity and ceiling insulation and replacement of windows and doors. Homeowners can freely choose between the different energy saving options. BetterHome has established collaboration with certain BetterHome's craft partners in all regions in Denmark. Together with the craft partners, homeowners can put together a solution to fit their wishes and needs.

Example of the Energy Package:



Brick detached house in one plan from the 1970s. The technical installations are of often of older date. Both the roof and windows are in original shape. The old windows are in need of replacement, and there may be problems with a skylight window. The insulation level does not live up to today's standard.

Total current energy bill is at approximately DKK 32,000. Heat consumption is at 28,000 kWh or 2,800 litres of heat oil and electricity consumption is at 3,400 kWh.

Concrete solution suggestions:

- Energy efficient and automatically adjustable circulation pumps
- Wireless controlled radiator thermostats with built-in spare programs
- Insulation of pipes, hollow walls and attic rooms
- New windows in windows, doors and skylights
- Mounting the blackout curtain in the oven light solution
- Mounting the blackout curtain in the oven light solution

Total Investments are at DKK 99,000.

Example of Loan Calculation:

Energy savings pay the loan in 7 years. After 7 years, the energy package generates a profit of DKK 1,250 per month via energy savings. Subsidy via local energy company is at DKK 7,500. Investment requirement up to 99,000 KR. Energy savings up to 46%, equivalent to 15,000 DKK / year.

H.2: Comfort package

The comfort package is the major energy innovation that includes both energy renovation and at the same time a more modern home with a good indoor climate. The comfort package supplements the simple energy-saving measures with solutions that make the home bright, appealing and more comfortable. A housing with conducted comfort package is worth more, depending on the location. Energy saving proposals can for example be new windows, doors and top solutions, cavity and ceiling insulation and insulation of technical installations as well as heat pump. Homeowners can freely choose between the many options. In collaboration with BetterHome's craft partner, homeowners can put together the solution to fit your wishes and needs.



Example of Comfort Package:

The house could be a 1 ½-level villa from the 1930's heated by natural gas or heat oil. The technical installations are often of older date. Both roofs, windows and doors with double-glazing need to be replaced. There are problems with the skylight windows, and there is generally no daylight in the home. The insulation level does not live up to today's standard.

Total current energy bill is at approx. DKK 38,000. Heat consumption is at approx. 33,000 kWh or 3,300 liters of heat oil and electricity consumption is at 4,000 kWh.

Concrete solution suggestions:

- Energy efficient and automatically adjustable circulation pumps
- Wireless controlled radiator thermostats with built-in spare programs
- Replacing old skylight windows or trusses and installing interior curtain accessories
- Establishment of additional skylights, trunks or modules
- Heat pump solution
- Insulation of pipes, hollow walls and attic spaces
- New windows and doors

Total Investments: 318,000 kr.

Example of Loan Calculation:

Energy savings pay the loan in 15 years. After 15 years, the comfort package gives a surplus of DKK 1,750 per month. Subsidy via the energy company is at DKK 18,000. Investment requirement up to DKK 318,000. Energy savings up to 55%, corresponding to DKK 21,000 / year.

H.3: Modernization package

The modernization package is the comprehensive renovation package. The package is intended for homeowners who want a comprehensive renovation of their homes and dream of living in a house that is brand new, modern and with a healthy indoor climate. With the modernization package, the housing will appear completely new, bright and comfortable. The homeowner will be able to reduce the energy bill significantly. The



solution can for example be replacement to new windows, doors and roof top windows, reconstruction of the roof, including new insulation, facade insulation with plaster and ventilation systems and installation of a heat pump. The homeowner can freely choose between the many possibilities. In cooperation with approved craft partners, homeowners can put together the solution to suit their wishes and needs.

Example of energy conversion with the Modernization Package:

Brick house with flat roof from the 1960s. The technical installations are of older date. Both roofs, windows and doors with double-glazing need to be replaced. There are problems with the top light windows. The insulation level does not live up to today's standard.

Total current energy bill is at approx. DKK 37,000. Heat consumption is approx. at 30,000 kWh or 3,000 litres of heat oil and electricity consumption is approx. at 5,000 kWh.

Concrete solution proposal:

- Energy efficient and automatically adjustable circulation pumps
- Wireless controlled radiator thermostats with built-in spare programs
- Insulation of technical installations
- New windows and doors
- Replacing old oven lights
- Establishment of additional skylights or modules
- Remodelling of roof structure with additional insulation
- Facade insulation with plaster or clothing
- Ventilation system and Heat pump solution

Total Investments: 715,000 kr.

Example of loan calculation:

The energy saving pays the loan in 36 years. After 36 years, the Modernization Package gives a surplus of 1,700 kr. / Month. Energy subsidy: DKK 17,000. Investment requirement up to DKK 715,000. Energy saving up to 54%, equivalent to DKK 20,000 / year.



I: Establishment of soft loan schemes and low-rate loan facility in Frederikshavn Municipality

In Frederikshavn Municipality, the goal is to be 100% renewable energy by 2030. To achieve this goal, it is necessary to reduce energy emissions from private homes. It is therefore essential to mobilize homeowners' savings for energy conversion. Part of the solution to this has been to establish cooperation with local banks. The following describes how this is done.

Composition of team:

Project Manager and Chief Consultant from Energy City prepared a model for the preparation of a low-interest loan facility.

Execution of market analysis:

A market analysis of the financial market was conducted to gain insight into the market as a whole and in existing financial instruments and to identify the growth potential of energy conversion of private housing. Local bank directors were interviewed in this context.

The market analysis concluded that approximately 67% of homes in Frederikshavn Municipality are privately owned and 75% of them are inhabited by the owner. 16,000 residential units were built before the 1970s (corresponding to 54% of the housing in the municipality). These housing types had the greatest potential for reducing energy consumption. The majority of homeowners had savings that were sufficient to finance energy conversion or were qualified to raise loans for energy conversion. It could therefore be concluded that there was not money that was the barrier to carry out energy refurbishment. Some commercial banks offered loans dedicated to energy conversion, but they were not used significantly, due to customer uncertainty and risk fears that arose in connection with the financial crisis.

The market analysis resulted in a recommendation to develop a targeted communication and marketing strategy that would convince the homeowners of the benefits of energy innovation. In addition, it was recommended to coordinate market participants, thus facilitating the entire process of energy innovation for the customer. Local banks should



also be convinced to offer attractive low-yielding loan schemes to homeowners. This new business area should help banks to promote themselves.

Cooperation with the banks had two purposes:

- Train customer advisors on the benefit of energy innovation. Counsellors improve their understanding of energy reports and are aware of the economic benefits energy conversion can have on the customer's private economy. They are also better equipped to advice on the financial opportunities associated with energy conversion and offer customers a tailor-made financial plan.
- Development of specific low-rate loans for energy conversion. The municipality persuaded local banks to develop a new product with reduced interest rates and longer maturity compared to standard market conditions. The loans are targeted homeowners who cannot or will not use their savings on energy conversion. It succeeded in creating competition between the local banks, which resulted in spontaneous improvements in loan terms for customers. The cooperation was established with eight national banks' local branches in the municipality: Nord Jyske Bank, Jyske Bank, Spar Nord Bank, COOP Bank, Danske Bank, Sparekassen Vendsyssel, Nykredit Bank and Arbejdernes Landsbank.

Development of loan schemes

Frederikshavn Municipality chose to position itself as a coordinator and catalyst for the process of energy conversion of homes. The municipality did not want to compete with the local financial market by forming a specific municipal fund that would offer a low-interest loan facility. This decision was taken on the following basis, as the municipality:

- To focus on primary municipal service tasks, targeted citizens including spending a significant annual amount of energy renovation of public buildings.
- Do not compete with players in the private financial market by acting as a "public bank" but instead promoting the development of a new business area for commercial banks (low-rate loans for energy conversion).
- Do not have unlimited funds to finance energy loans on the long run, as is the case with banks.
- Already offers municipal guarantees to housing associations



Frederikshavn Municipality observed that there is a good network and trustworthy relationship between banks and customers, including homeowners as a customer segment. Banks can therefore act as a trustworthy partner in the promotion of energy refurbishment.

Strategic cooperation with banks

The municipality started dialogue with all local banks with the purpose of engaging them as the municipal official in energy conversion of private homes. Banks showed interest in offering low-interest loans and entered into cooperation that obliged them to:

- Increase the loan portfolio dedicated to energy conversion
- Develop low-interest loans with more attractive terms than loans under normal market conditions
- Promote energy conversion to customers and encourage them to invest their savings in this
- Participate actively in the launch of low-interest loans together with the municipality and other market players
- Convince the banks' headquarters to further develop the new business area and spread the concept at national level

The benefits of the cooperation were that the banks would not only develop a new business area for themselves but also for their customers: local artisans, building materials suppliers and real estate agents. It was the expectation that the new loan type would create growth in the local economy and create jobs. In addition, customers' homes would increase their market value. Another advantage was that banks could mobilize homeowners' passive capital in a time of financial stagnation.

A challenge in the cooperation was to reach an agreement on a fixed interest rate on loans for energy conversion. The banks determine the interest rate based on the economic situation and creditworthiness of the individual homeowner (e.g. annual income, existing debt, housing value, age, etc.). The banks agreed to offer loans better than the standard terms, but rejected a fixed interest rate agreement. Some customers can achieve close to 0% in interest rates.



Strategic cooperation with key actors

Frederikshavn Municipality cooperates with the local supply company 'Forsyningen' in Frederikshavn, which has energy advisors employed, free advisor homeowners. The municipality also collaborates with the organization 'BetterHome', which is owned by four Danish companies that have products related to energy innovation. BetterHome also offers energy advice, but since this is against payment, most of them use the energy supply advisors from 'Forsyningen'.

The municipality also involved artisans in the process from the view that energy innovation will create growth in the local building sector and thus create new job opportunities.

Launch of the soft loan schemes and communication

Training

The municipality organized a number of training sessions targeted to market participants. The aim of these was to encourage participation in the municipality's energy conversion program, to inform about the benefits of energy conversion and to equip them to promote energy conversion to homeowners. As a result, bank advisors, artisans and real estate agents informed their customers about the benefits of energy conversion when they bought/renovated their homes. Participants in the training received a list of energy advisors and the geographical areas they covered. The customers were thus informed of the relevant energy advisor and about the artisans, who belong to the Building Guarantee, which ensures the quality of the artisan's services. It is a type of insurance that covers loss or damage due to poor quality or which does not meet the homeowner's expectations.

Marketing and Communication

The municipality developed a communication strategy to inform homeowners about the free services offered by the energy advisors as well as the low-interest loans offered by local banks.

Among the most effective tools in the strategy were:

- The transportable information car 'Banke'
- Meetings with homeowners



- Municipal magazine
- Energibyen's Facebook page and website
- Promotion through the partners' communication channels

The municipality also produced a promotional film that provided information on the benefits of energy innovation. The film was shown on television screens in construction markets, in companies with at least 50 employees in banks and in selected supermarkets.

In spite of further activities and increased media coverage, it takes a long time to convince homeowners to make changes, and it has not yet been possible to reach the goal of getting homeowners to carry out energy refurbishment.

Monitoring and improvements

Energy consultants annually report on the number of visits, energy reports and implemented changes in homes. Banks annually report on the amount of low-interest energy loans. When private homeowners register via the portal 'BetterHome', they are automatically registered in a central system, which can indicate how many people in Frederikshavn Municipality use their services in counselling, loans and what artisans performed the work.

The municipality does not allocate any funds to the financing scheme. Soft loans are provided by the partner banks. They run a creditworthiness check of homeowners, decide who gets a loan and under what conditions. All risk is borne by the partner banks.

Advantages and disadvantages of individual Current EE services

A: Building Regulations (BBR)

Advantages:

The building regulations set up rules for the maximum allowed energy consumption of new buildings.

Disadvantages:



The consumption of existing buildings is usually only regulated when the owner plans a renovation of a part of the building.

There is less regulation when it comes to energy renovation. The two new renovation classes are volunteered for homeowners to fulfil and not mandatory.

B: Energy Performance Certificate (EPC)

Advantages:

The new owners, owners of detached houses and owners of cooperative homes are made aware of energy savings potentials in their properties.

Disadvantages:

Owners of properties are "not obliged to implement" energy-saving initiatives, as demonstrated in energy labelling reports.

Energy labelling reports are based on the most profitable energy saving proposals.

No funding scheme or loan offer is included in the energy labelling reports.

C: House Condition Report

Advantages:

The Household Report gives all new homeowners valuable information about what they could do to improve their house in a sensible manner.

Disadvantages:

The new homeowners are not required to implement the report's recommended energy conservation measures.

D: BedreBolig (A Better Home)

Advantages:

Homeowners become acquainted with energy savings potentials in their properties.



When performing renovation work, homeowners could reimburse a so-called artisan deduction for energy measures in their homes. Every person in the household over 18 years can deduct up to 12,000 kr. of the used working hours per year. If you for example are two persons over the age of 18 the households will be able to deduct 24,000 kr.

A Better Home offers total subcontracting and project management of energy renovation work if homeowners want it.

Disadvantages:

It costs homeowners to order a Better Residential Consultant to develop a Better Residential Plan for the house. It is important for many homeowners to make use of the scheme.

Owners of properties are "not obliged to implement" energy-saving initiatives, as demonstrated in a BetterHome report.

No funding scheme or loan offer is included in the energy labelling reports

E: EnergiTjenesten (the Energy Service)

Advantages:

EnergiTjenesten provides free of charge advisory on energy savings to home owners.

Disadvantages:

The energy advisory service focuses mainly on visualization and detection of energy savings, but does not include funding for implementing energy saving proposals.

There is no follow-up to energy advisory services, and homeowners are not obliged to implement the recommended energy-saving proposals.

EnergiTjenesten is closing at the end of the year 2017.

F: Subsidies (Energy companies)

Advantages:

An initiative from energy companies that provide free of charge energy advice to Danish homeowners.



Energy advisors follow up on their energy counselling cases with homeowners every six months in order to motivate homeowners to carry out recommended energy savings.

Disadvantages:

Owners of properties are "not obliged to implement" energy-saving proposals.

Each company has their own system for calculating the size of the subsidy, so the homeowner often has to contact more than one company to get a good deal, making it time-consuming and inconvenient.

The actual size of the subsidy is unknown before the scale of the renovation has been determined.

The subsidy is a very small amount compared to the expenses of an extensive energy renovation.

F: BoligJobOrdning

Advantages:

Homeowners can get a financial benefit from tax reduction scheme, where expenses for the salaries of artisans or advisors up to DKK 12,000 (about EUR 1,600) can be deducted.

The scheme might encourage homeowners to have an EE-plan made, because it can cover the cost.

Disadvantages:

The main purpose of this scheme is to create more jobs for artisans and not to promote energy savings in homes.

The tax authorities have often criticized the scheme, as they have detected major irregularities in the financial reports of the artisans. The Minister of Housing, which is the authority in the area, has ordered a Screening the scheme.

The scheme is temporary.

G: BetterHome



Advantages:

The division offers three categories in the form of package offers allows a majority of homeowners, regardless of financial ability or ambition to make use of the BetterHome-scheme.

Whichever package the homeowner chooses, the procedure for delivery of the scheme will be the same.

It is free of charge for the homeowner to order a BetterHome energy adviser to review the house, who together with the owner prepares an energy renovation plan that, depending on the owners' wishes and financial space, may be an Energy-, Comfort- or Modernization Package.

All energy advisors and all artisans who are affiliated with the BetterHome scheme are subject to a special upgrade process and approval procedure, which is determined by the BetterHomes Executive Board. Quality assurance of advisory and execution features make homeowners feel safe and in "good hands"

It is very easy and convenient for homeowners to get started. Homeowners must go to the website and provide details. The energy consultant then contacts the homeowner within 24 hours.

The BetterHome scheme covers the all of Denmark as a geographical boundary.

Homeowners become acquainted with energy savings potentials in their properties.

Homeowners could refund a so-called artisan deduction for energy initiatives in their homes. Every person in the household over 18 years can deduct up to 15,000 kr. Of the used working hours per. year. If you for example are two persons over the age of 18 the households will be able to deduct 30,000 kr.

Banks, especially those banks that use BetterHome as marketing for their home loan offer, accept BetterHome Energy Renewal Plans and use the report's financial calculations to draw up a loan offer to homeowners.

Disadvantages:

Although Grundfos, Danfoss, Velux and Rockwool products are particularly good, and relatively expensive products, it is mandatory for artisans to use these products in energy-



renewal projects. The high quality of the products makes the energy renovation work "a little more expensive" on average. In return, the renovation work is of high quality, both in terms of products and the project (quality assured artisans).

A financing scheme or a loan offer is not directly included in the scheme. It is the individual homeowner's bank, which assesses the homeowners' creditworthiness in relation to the amount to be borrowed for energy conversion. Our survey shows that banks generally look positive at homeowners' requests to raise loans for energy conversion when it takes place under the auspices of BetterHome. Danske Bank, which uses the BetterHome scheme, has stated to us that the bank has not yet rejected a homeowner, who wants to borrow money for energy conversion through the BetterHome scheme.

I: Establishment of soft loan schemes and low-rate loan facility in Frederikshavn Municipality

Advantages:

A local initiative, which is tailored to the community's and homeowners' wishes and needs.

Disadvantages:

Initiators must work continuously and sustainably to keep attraction of the key players' interest towards the scheme. Homeowners should also be reminded of the benefits of energy conversion continuously. Lack of motivation efforts towards key actors and homeowners can threaten the objectives of the scheme.

Demanding workouts, including the development of specific training materials for each group of stakeholders.



5. General conclusions

The initial planning of an energy renovation is a good way to raise awareness and help identify any maintenance in the house that the homeowners may not be aware of, but such information should not be limited to those, who seek for it. To drive the development forward, assistance with such planning should also be offered and made available for those, who are not currently thinking about energy refurbishment.

Most houses would benefit from having a long-term renovation plan based on the necessary/advantageous maintenance over the next 10-30 years. While this is being produced, the homeowners could include their wishes for updating the functions of their house and receive information about minimum requirements for energy improvements and inspiration to go further.

The One-Stop-Shop could be a good concept in terms of guiding the homeowners through the process and ensuring the quality of the renovation, in terms of both careful planning and validation after the renovation. **It is also a great benefit to have an independent advisor.** This gives the homeowners more security and wider degree of freedom to act.

It is important to have validation to ensure that the renovation has provided the expected outcome, but it should not be expected that 100% of the possible energy saving will be achieved. The so-called recurrent effect means that a varying portion will probably be used on comfort improvement without achieving energy savings.

Efforts so far to promote energy savings in private houses have made a serious misunderstanding by focusing so much on the economic savings that can be achieved. Indeed, it has been the case in recent years. This has meant that homeowners have come to expect that an energy renovation should be able to pay for itself within few years, and if it cannot do so, they see no reason to implement it at all.



When energy improvements are considered as an investment, the money saved sets a limit for the level of renovation rather than being an added incentive. It would be beneficial to no longer look at energy renovation as an isolated event, but as an integrated part of a general renovation and update of the house.

If Denmark's long-term political goals are to be met, it will be necessary for the society to invest in energy renovation. Today, there is no support that can overcome the barrier related to lack of funding. An extensive renovation of a house can be a very large investment for a homeowner, and many people will not have the money for it, unless they have been living in their house for a long time and have equity to draw on. Targeted loans and subsidies would enable more people to carry out extensive renovations, thereby contributing to reaching the long-term goals for a society independent of fossil fuels.

Finally, it will probably be necessary to use regulation to reach those who cannot be motivated by incentives alone. To achieve the greatest effect, the regulation should target those with the highest energy consumption, e.g. by putting a ceiling on the maximum allowed energy consumption per m² in a house. This ceiling could take effect when houses are sold, with an injunction to reach an acceptable energy level within a year or two of buying the house. In order to avoid that a regulation like this could create social imbalance, it would be necessary to back it up with a funding system, because people living in old, non-renovated houses often do not have sufficient funds available for energy renovation.



6. SWOT analysis

6.1 Strong points

- There are many good initiatives aimed at energy renovation in single-family houses in Denmark. The renovation of single-family houses in Denmark is progressing, but slowly.
- The many different energy conversion schemes help raise awareness of Danish homeowners about energy saving potentials in their homes.
- Danish building legislation continuously tightens requirements for building energy consumption (BR 2015 & BR 2020), when it comes to construction of new homes.
- Danish building law provides recommendations energy consumption, when it comes to extension or rebuilding of existing homes, but the recommendations are only voluntary.
- Possible improvements can be necessary to overcome the shortcomings identified in current Danish policy. Improvements such as:
 - Change of focus (effects of comfort and indoor climate instead of economical savings by energy conversion)
 - Increased financial support
 - Comprehensive energy renovation plan for houses
 - Long-term regulation of maximum energy consumption.



6.2 Weak points

- Lack of information on existing schemes: Existing schemes are already in effect to raise awareness and train building professionals. The area that needs some work focusing on promoting the non-energy benefits of energy renovations.
- Lack of finance on existing schemes: subsidies are small and sometimes non-transparent, there is an overwhelming focus on energy improvement as a financial investment, and current policies do not address the barrier of lack of funds.
- Lack of decision-making-support on existing schemes: only those who actively seek it get support, subsidy policy promotes only small improvements, and there is little regulation or enforcement.
- When energy improvements are considered as an investment, the money saved sets a limit for the level of renovation rather than being an added incentive. It would be beneficial to no longer look at energy renovation as an isolated event, but as an integrated part of a general renovation and update of the house.



6.3 SWOT conclusions

Denmark has a vision of becoming 100% fossil free in the year 2050. The first act in the transition to fossil-free development is to reduce existing energy consumption. Today, single-family houses in Denmark consume 22% of Denmark's total energy consumption. Optimizing and improving the energy consumption of single-family houses is therefore still an important area of action.

Based on the foregoing in this material, the following issues are concluded:

1. Even though energy renovation of houses progresses slowly, the work on energy savings in single-family houses must continue. Lack of effort will damage the credibility of the existing schemes.
2. The involvement of future actors (see the actor's map) can strengthen the efforts on promoting energy renovations in Danish houses.
3. Without regulation of legislation on subsidy schemes, it will be difficult to boost energy conversion of homes.
4. Without regulating legislation on what the maximum energy consumption of existing homes may be, it will continue to be difficult to motivate homeowners to energy renovate their homes. The European Union, in cooperation with the EU member states, should take the initiative to legislate in this area.
5. The European Union, in cooperation with EU member states, should take the initiative for mandatory energy inspection of private houses. The energy audit should be periodic so that it will be renewed, for example every five years. It should also be mandatory to implement energy saving measures that are contained in the periodic energy review.
6. The many different initiatives to promote energy savings in Danish houses can easily confuse homeowners. Homeowners should be offered very few, but comprehensive, holistic, and long-term schemes for the energy conversion of their houses.



7. The European Union, in cooperation with EU member states, should take the initiative to standardize energy conversion schemes for houses, so that there are fewer schemes than those existing today.
8. The few standardized schemes should provide impartial information to homeowners about "all" benefits of energy conversion and not just the economic. The new schemes should also contain information about homeowners' access to grants and funding opportunities for the implementation of energy innovations.
9. The European Union, in cooperation with EU member states, should take the initiative to standardize energy advice, which is currently offered to homeowners.
10. The European Union, in cooperation with EU nationals, should take the initiative to make the standardized house energy consulting free of charge for homeowners.

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