Alleviating fuel poverty through energy efficiency measures: the French programme Habiter mieux

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Abstract

The paper is a case study of the French programme "Habiter mieux" that has been launched in 2011 with the objective to realise thermal refurbishments of homes of low-income households. This programme was designed to target low-income households, a population for which few countries have elaborated thermal renovation programmes. Realising comprehensive thermal renovations of homes of low-income households is desirable not only from a social point of view, but also because these people often live in the worst homes, and therefore thermal renovations allow important energy efficiency gains. But implementing these renovations is a difficult task in contexts where the beneficiaries are in difficulties on many dimensions of their lives. Two factors make these renovations particularly difficult to implement: the beneficiaries have a limited capacity to contribute financially to the required investments, and they need to be closely accompanied throughout the whole renovation process.

This case study analyses Habiter mieux over the period 2010–2014. It shows that the programme has met initial implementation difficulties and has therefore been reformed in 2013. It discusses the characteristics and the effects of the reform.

Three main lessons can be drawn from the case study of Habiter mieux. Firstly, this type of programme needs to be carefully designed. Realising energy efficiency measures for vulnerable households is a highly complex exercise because of the simultaneous presence of several implementation difficulties, both on the "demand" side and on the "supply" side. Secondly, setting up this kind of programme has an "investment" character because this requires building up specific capacities from the part of the local actors in charge of implementing it. Finally, a consequence of the two previous points is that this type of programme should benefit from a stable framework. Because of their intrinsic implementation difficulties and of their "investment" character, they can be implemented only slowly. Therefore, they should not be subject to frequent adjustments which would modify their implementation conditions too much. Indeed, the design constraints inherent to this type of programmes make them fundamentally different in nature from other policy instruments like for example fiscal incentives or public subsidies.

Introduction

Realising energy efficiency improvements in homes of low-income households is both an important task and a difficult one. The importance of realising substantial energy efficiency measures especially for the low-income households that can be qualified as fuel (or energy) poor households does not need to be demonstrated. It generally allows significant energy savings, thus contributing both to energy and climate policy goals and to social objectives. For the fuel poor households, the benefits include: (1) better thermal comfort of homes, which has, among others, impacts on health, especially for elderly people (reduced winter mortality); (2) lower energy bills, and therefore less financial constraints, which can have effects for example on the "eat or heat" decision. This can also have an impact on psychological health because these households will not be exposed to the stressful situation of being unable to pay their energy bills; (3) healthier homes (less mould or damp), and therefore less asthma or respiratory diseases. This is particularly important for young children; and finally (4) Safety improvements,

because some energy poor households use dangerous auxiliary heating systems.

However, this kind of measures appear very difficult to implement, which perhaps explains why only few countries have developed thermal renovation programmes directed towards low income people. In France, the programme "Habiter mieux" (living better) has been launched in 2010, with an initial objective of realising 300,000 thermal renovations until 2017 in homes of low-income homeowners.

The present paper aims at analysing this programme. Starting with a discussion of the difficulties that make this kind of programme intrinsically difficult (section 1), it shows what have been the key characteristics of the programme during its first two years of operation, i.e. its governance structure (section 2) and how it was initially implemented (section 3). The remainder of the paper discusses the reform of Habiter mieux that was realised in 2013 (section 4) and the main consequences of this reform (section 5). Section 6 concludes.

Habiter mieux: a programme that combines several difficulties

The initial goal of Habiter mieux was to target low-income households, especially to those who have been identified in the first estimations of fuel poverty realised in France in 2009 (Anah, 2009, Rapport Pelletier, 2009). These studies, which were based on actual budget shares for energy, concluded that the fuel poor households were living mainly in the private sector, with a high proportion of homeowners on low or very low incomes living in single family homes. This targeting of Habiter mieux poses several difficulties. A first difficulty that appears in general for energy efficiency programmes is related to the "energy efficiency gap" (Gillingham et al., 2009): it takes the form of investment inefficiencies, where consumers do not undertake investments that are actually beneficial. A second difficulty is related to the specificities of the target population of the programme: households on low incomes.

ADOPTION COSTS OF ENERGY EFFICIENCY PROGRAMMES …

The economic literature on the adoption of energy efficiency measures by consumers shows that they often make decisions about energy efficiency that do lead to a lower penetration of energy efficient products than what might be expected if they made all positive net present value investments (Gillingham, 2014). This is called the energy efficiency "gap" or "paradox".

Different explanations exist for these suboptimal decisions on the adoption of energy efficiency measures. In the 1990s', Joskow and Marron (1991) have discussed consumer transaction costs as an explanation of lower than expected adoption of energy efficiency measures. These transactions costs "include time spent shopping, with energy auditors, and dealing with those who install the measures (e.g. waiting at home for the electrician to show up and keeping your eye on him to make sure he doesn't steal the silver). They also include (…) inconvenience incurred while the measures are being installed." Other explanations in the economic literature relate to market barriers, which include market failures (elements that may justify public intervention) as well other barriers as explanations of sub-optimal investment in energy efficiency (Jaffe and Stavins, 1994). Market failures include for example limited availability of information on energy efficiency measures, principal-agent problems (the energy efficiency investment does not benefit to those who invest). The other market barriers include for example:

- High discount rates due to uncertainties about future savings and energy prices,
- Qualitative attributes of new technologies which make them less desirable than existing, less efficient technologies,
- Costs of adoption, for example learning how a technological improvement fits into one's home or learning about reliable suppliers,
- Heterogeneity of the population regarding energy use,
- Inertia in consumers' adoption behaviour.

More recently, Gillingham et al. (2009) have discussed behavioural failures as another explanation of the energy efficiency paradox. Examples of this type of failures can be found in prospect theory, where welfare changes from gains and losses are evaluated with respect to a reference point, which is usually the status quo. These failures are analysed as differences between *decision utility* and *experienced utility.* These failures can be linked to non-standard preferences, to non-standard beliefs. These elements can lead to an undervaluation of the benefits that are generated by energy efficiency investments (Gillingham, 2014).

To summarise, there are several explanations of the fact that consumers' decisions on energy efficiency investments will be lower than what could be respected. This impacts energy efficiency programmes in the form of low rates of adoption.

Economic approaches are not the only possible approaches for understanding under-investment in energy efficiency. Explanations of the adoption gap can also be found in the literature from other disciplines. For example, Gram Hanssen (2014) has analysed retrofitting using practice theory. She concludes that the human dimension of the retrofitting process is crucial: "understanding that houses are owned, occupied and retrofitted by (the same) people implies the need to focus on the human dimension of the retrofitting process".

… WHICH ARE INTENSIFIED BY THE TARGETING OF THE PROGRAMME ON LOW-INCOME HOUSEHOLDS

Habiter mieux was designed after first diagnoses of fuel poverty had been realised in France (Anah, 2009, De Quero and Lapostolet, 2009). These diagnoses concluded that one particular group of the population was severely affected by fuel poverty: elderly low income homeowners living in rural areas. In 2010, the French state has given to the national habitat agency Anah the mission to implement this first programme combining energy efficiency measures with social policy goals (Anah, 2011a).

In accordance with the general mission of Anah, which is to develop and improve private housing for people on low-incomes, the thermal renovations were proposed to low-income households, especially to elderly homeowners (over 60 years) living in single family homes in rural areas. The initial targeting on elderly people was also justified by another goal of Anah's policies: to adapt homes to an ageing population. However, in practice Habiter mieux has also been proposed to people younger than 60 years.

The difficulty of this particular targeting has been recognised by the agency from the beginning.

> [I]n rural areas, elderly people with modest incomes have the specificity that they do not signal themselves spontaneously. They are often isolated or live alone and they stay in a home that is poorly heated or not heated at all without external help. (Anah, 2011b)

The economic literature discusses this problem of a low uptake of energy efficiency measures, even in cases where energy efficiency measures are free. In the United States, Fowlie et al. (2015) have shown that the participation of households in a weatherization programme is very low among the target population (2 %). When households have been encouraged to participate in the programme, 15 % of households sent an application and only 6% actually received a weatherization. This suggests that households have not only information costs, but that other obstacles exist, which limit the uptake of energy efficiency measures even when they are realised at no cost.

The literature on fuel poverty shows for example that fuel poor people do not necessarily take up energy efficiency measures, for example when they have to refer themselves for assistance schemes (Boardman, 2010). There are various reasons for a low uptake of assistance schemes in a population (Warin, 2010). A first form can be that households are not demanding them by choice, due for example to a lack of interest for an offer or to low self esteem. A second form is related to an absence of demand due to certain constraints: people may be discouraged by complex procedures, because they believe that they are not eligible, but also for financial reasons, because of a difficulty to express ones needs or because of a fear of stigma. Finally, low uptake of certain offers can be explained by the fact that people abandon their request or do not adhere to the offers, or that they do not follow the procedures.

As Habiter mieux is an energy efficiency programme targeted at low income households, its implementation difficulties are not only those that can be observed for energy efficiency programmes in general: the uptake of the programme is also influenced by its targeting on a group of households who are generally not signalling themselves in case of difficulties and rather remain "hidden".

The governance structure of Habiter mieux

This initial difficulty has been recognised by Anah from the beginning. For this reason, a particular governance structure was implemented in order to take into account the difficulty to implement a thermal renovation programme for this particular population. Another element of the governance structure is the combination with the French white certificates system, in order to allow the main energy suppliers to fulfil their energy efficiency objectives while contributing to the alleviation of fuel poverty.

A NATIONAL COORDINATION, BUT A STRONG RELIANCE ON DECENTRALISED IMPLEMENTATION STRUCTURES

The coordination of the programme is done at the national level, by the national habitat agency (Anah), who has traditionally been in charge of implementing national policies of habitat improvement in the private sector, with a focus of low income households.

With the programme Habiter mieux, Anah became responsible for the management of the fund for the development of thermal renovation (called FART) which was created as a part of a larger public programme, the "investments for the future" (investissements d'avenir), that was adopted in March 2010. The total amount of subsidies of the French state dedicated to the programme was 500 million euros (for a programme running from 2010 to 2017). This amount was complemented by additional resources (classic Anah funding and contributions of energy suppliers).

With Habiter mieux, the intervention practice of Anah has been fundamentally modified. Previously, Anah was acting as a simple intermediary for the attribution of public subsidies and played no role in the qualitative evaluation of projects. Its role was rather to verify whether demands of subsidies were in conformity with the general mission of Anah and to finance them, regardless of the technical characteristics of the projects. In Habiter mieux, the role of Anah is not limited anymore to a simple role of a funding agency. Rather, the beneficiaries are offered a complete diagnosis of their home and a precise technical recommendation, as well as advice and a follow-up on technical and financing choices. The idea is to realise the whole package of thermal renovations that will result in the highest overall energy efficiency gains.

In practice, these tasks go far beyond Anah's traditional competences. Therefore, the implementation of the programme has been based on a network of local actors in charge of the identification of households and on local "operators" who are in charge of the practical implementation of the thermal renovations, from the initial diagnosis of the thermal renovation needs to the implementation of measures. The underlying idea of such a decentralised implementation structure was that each French département[1] is a particular case regarding specificities of its territory or the actors who were previously involved in the field of energy poverty policies.

Formally, the programme is transposed locally through "contracts of commitment", the *contrats locaux d'engagement* (CLE). The main purpose of these local contracts was to implement the programme locally. For each department, these contracts evaluate the number of fuel poor households, define quantitative objectives of thermal renovations to realise over two periods (2010-2013 and 2014-2017) and formalise the involvement of the various local actors who play a role in the identification of households: social workers at the department and municipal levels, inter-communal structures, energy suppliers, organisations like housing information associations or associations of home care for elderly people, pension funds, etc.[2]. The main idea was that the identification of programme beneficiaries could not be done in a centralised way, but that it should rather be done by local actors who are already in contact with households. In practice, identification often relies mainly on social workers at the municipal or département level. But the programme also benefits from the presence on a territory of other local actors who were previously involved in energy poverty measures, and who can contribute to the identification of households.

1. Départements are subdivisions of the French state. They are in particular is charge of social and of housing issues. There are currently 100 départements in France.

2. See for example the contracts of Département de l'Isère (2011) and Département du Jura (2011).

Another aspect is the implementation of thermal renovations, from the initial diagnosis of the home to the supervision of renovations. This task requires the intervention of specialised "operators". These operators are in charge of several tasks:

- a global diagnosis of the home in order to make recommendations on which improvements should be done,
- a proposal of a renovation package that has to allow an energy efficiency gain of 25 % at least,
- an energy evaluation before and after the renovation,
- assistance for searching professionals to realise the work,
- financial coordination of the renovation, especially mobilisation of the different assistance schemes,
- help with the follow-up of the renovation and acceptance of work.

To summarise, the specificity of the programme is that it heavily relies on local partners for its implementation. The methods for coordinating the local identification and implementation measures have been elaborated in detail by the national habitat agency, in cooperation with local actors in order to allow an adaptation of the programme to local circumstances.

A FINANCING STRUCTURE COMBINING PUBLIC FUNDING AND A FINANCIAL CONTRIBUTION OF ENERGY SUPPLIERS

Concerning the financing of the programme, it is not limited to the subsidy resulting from the FART, which represents 500 million euro for the period 2010–2017. The global envelope[3] of Habiter mieux also includes 600 million euro of classic Anah funding as well as a contribution of 250 million euro of the three biggest French energy suppliers, EDF, GDF Suez and Total[4], which allow them to fulfil a part of their obligations in the French white certificates scheme. 85 million euro out of these 250 million have been scheduled for the years 2011 to 2013. This last financing source was a way to link companies' energy saving obligations with the political objective of fuel poverty reduction, which in principle has the advantage to direct the energy efficiency investments towards those people who will benefit most of these measures. This relation with the white certificates scheme has played an important role in the evolution of Habiter mieux.

France has a system of white certificates since 2006. These certificates did not initially include measures in favour of energy poor households. In 2011, the link between the white certificates scheme and Habiter mieux has been formalised in the following way. In practice, on each territory where a local contract of commitment (CLE) has been signed, one of the three big suppliers is designated as the "referent obliged party" (*obligé référent* in French). This means that he will get 75 % of the white certificates corresponding to renovations made by households on that territory. The remaining 25 % will be attributed to the local public authorities who contribute through subsidies to the thermal renovations eligible to "Habiter mieux". To allow this, the homeowners who realise thermal renovations funded by the programme have to sign a document in which they transfer all white certificates generated by the renovations to the "referent obliged party". In that document, the households certify that the companies that realize the renovations will (1) use materials that fulfil the performance criteria that are required by the white certificates system and (2) deliver all documents that are necessary to obtain the white certificates (invoices, certificates related to materials and to the realization of work). The information on the certificates that have been generated locally is then aggregated and the suppliers obtain certificates on the basis of the renovations which have been effectively realised.

The financial counterpart is a contribution of the suppliers to the programme, which is calculated in the following way: a global amount of 85 million euro has been scheduled for the period 2011–2013. But in practice, the financial contribution of suppliers is split in two components:

- a fixed part of 500 euro per home, which is paid in advance by the suppliers, representing 50 million euro between 2011 and 2013,
- a variable part, which depends on the realised renovations.

As a consequence, if the number of actual thermal renovations is below the number of planned renovations, the suppliers will contribute to the programme for an amount that is much larger than the counterpart they will receive in the form of white certificates. This happened during the first two years of implementation of the programme.

The implementation of the programme

The main characteristic of the implementation of the programme was a long starting phase. Whereas the programme has officially started in 2010, the year 2011 was mainly dedicated to the signature of the local CLE contracts. Therefore, in the first 18 months (until the end of 2011), thermal renovations have been initiated only in 20,000 homes. Thus, 2012 was the year during which Habiter mieux was expected to be really operational. Two main aspects will be discussed concerning the implementation. The first one concerns the first results of the programme: while the number of thermal renovations has been lower than expected, the realised renovations have led to higher energy efficiency gains than anticipated. The second aspect concerns its overall acceptance by the energy suppliers who contributed to the financing of the programme: due to a slow start, the white certificates generated for the suppliers remained far below the level that was initially planned, which resulted in pressures to reform the programme.

NUMBERS OF REFURBISHMENTS FAR BELOW THE INITIAL OBJECTIVE BUT HIGH ENERGY SAVINGS

After the programme was launched at the national level, the French departments entered a phase of elaboration of the local contracts of commitment and of work on the local identification procedures. This preparatory stage was relatively time consuming. This is why the number of renovation projects that

3. The figures discussed here concern only the national funding sources. In addition, many local authorities also contribute to the thermal renovations through local subsidies, but the amount of these subsidies varies from one location to another.

4. This has been formalised in a contract that was signed in September 2011 between the minister of industry, the national habitat agency ANAH and three big energy suppliers.

have been launched remained relatively low during the initial stage. There is only little information available on the implementation of the programme. Anah publishes statistics on the progress of the programme at irregular intervals, but there is no annual report on renovation projects which have been started and which have been completed. The available figures generally relate to renovation projects which have been launched, but no data on completed renovations have been published yet. And it is known that not all initial renovation projects have been actually completed.

Quantitative results of the programme (number of renovations started) of the programme have been presented in a report of the French court of auditors (Cour des comptes, 2013). They show that, at the end of 2012, only 20,000 renovations had been started (while the total objective of thermal renovations was 300,000 between 2010 and 2017).

This very slow start of the programme can be explained by several factors. Firstly, difficulties to identify potential beneficiaries (Dubois, 2012). The identification of households requires an active involvement of many actors who are in direct contact with households "on the field". For example social workers, who are able to evaluate the overall situation of households and try to respond to their various needs. But for social workers, energy poverty is only a small part of their work. If they have to promote measures of reduction of energy poverty, then they must be informed, trained and convinced, which cannot be done quickly at the scale of a territory. This requires a huge initial investment in terms of creation of local identification networks.

Secondly implementation difficulties of different kinds. These difficulties include:

- the fact that households needed to pay for the initial diagnosis of their home (300 euro approximately), before taking a decision about whether to undertake a thermal renovation,
- the inability of certain households to finance even a small share of the cost of work,
- payment of the subsidies at a late stage of the renovation process, which requires for beneficiaries to pay for the renovations and to wait until the end of work to receive the subsidies, which is often not feasible for low-income households,
- a certain "volatility" of the demand of the target population, who often does not consider the thermal renovation as a priority in comparison with other necessary expenses,
- difficulties of certain households to deal with the complexity of the process (technical advice on a comprehensive renovation, financing mechanisms),
- the reluctance of a part of the target population (especially elderly households) to accept a renovation that will have several inconveniences for their day to day life (temporary loss of comfort of the home, dirt).

However, if we consider the thermal renovations which have been launched in this initial phase, the technical results in terms of energy efficiency gains are better than what was initially planned. The initial condition to launch a renovation financed by the programme was an energy efficiency gain of 25 %. Actually, the renovations that have been realised resulted in a (theoretical) energy efficiency gain of 37 % on average during the period until June 2013. The budget dedicated to renovation projects differs from one case to another, depending on the energy efficiency gain: from €13,000 for renovations with energy efficiency gains between 25 % and 35 % to €30,000 for renovations with energy efficiency gains higher than 50 %.

The effects of the programme on the energy class of homes are also significant, as shown in Table 3. The energy class of homes after renovation shows significantly lower energy consumptions in comparison with the situation before the thermal renovation. However, a majority of homes is still in energy classes D or E after renovation, which raises the question whether this is sufficient to move households out of energy poverty.

Despite these positive results, at the beginning of 2013, the programme could still be considered as being in a starting phase. The networks of identification of households were still in a learning phase and, despite a design of the programme aimed at facilitating the process for the beneficiaries, several obstacles to a successful implementation remained.

PRESSURES TO REFORM THE PROGRAMME

At the end of 2012, the energy suppliers who were contributing financially to the programme noted that there was a gap between the initial schedule concerning the white certificates and the actual progress of the programme.

Between 2011 and 2013, it was planned that EDF, Gaz de France and Total would contribute 85 million euro to the programme. Their actual contribution was lower due to a difference between planned and realised renovations. Therefore, their contribution was 64 million euro. The corresponding theoretical cost of the whites certificates generated was 5.5 euro per of actualised cumulated MWh (i.e. 20 % more than the

Table 1. Rhythm of engagement of households into renovation projects funded by "Habiter Mieux".

	1st semester 2011	2nd semester 2011	1st semester 2012	2nd semester 2012	Jan. 2013 to Aug. 2013
Number of renovations started in the semester	464	6,669	3,453	9,333	8,400
Total number since start of programme	464	7,133	10,586	19,919	28,319

Source: Cour des Comptes (2013).

Table 2. Characteristics of homes renovated by Habiter mieux until June 2013.

Year of construction	Total number of homes	Percentage	Percentage of single family homes	Average amount of work	Average energy efficiency gain	Part of very low-income homeowners
Before 1949	10,887	47 %	97 %	€22,056	40 %	65 %
From 1949 to 1975	9,151	39 %	88 %	€13,879	37 %	58 %
After 1975	3,184	14 %	89 %	€13,763	35 %	56 %
Total	**23,222**	**100 %**	**92 %**	**€17,679**	**37 %**	**61 %**

Source: Anah (2013) Programme Habiter Mieux – Etat d'avancement mensuel, juin 2013.

Table 3. Energy class of buildings renovated by Habiter mieux (June 2013) (percentage of homes).

Energy class (kWh/m²/yr)	Before thermal renovation	After thermal renovation
A (less than 50)	0 %	0 %
B (from 51 to 90)	0 %	2 %
C (from 91 to 150)	1 %	14.5 %
D (from 151 to 230)	10.5 %	29.0 %
E (from 231 to 350)	23.0 %	29.0 %
F (from 351 to 450)	26.5 %	16.5 %
G (more than 450)	39.0 %	9.0 %

Source: Anah (2013) Programme Habiter Mieux – Etat d'avancement mensuel, juin 2013.

market price). But as the number of renovations was much lower than anticipated, the cost for the suppliers was higher. And the number of white certificates obtained by the suppliers was dependent on actual renovations, and was therefore significantly lower than initially planned.

This is why, in February 2013, the three suppliers asked Anah to adjust the fixed part of their contribution to the programme and they suspended their payment for the first semester of 2013: they had paid 60 % of what was planned for 2011–2013 but Anah had only realised 20 % of its initial objective. This discrepancy had been recognised by Anah who had made several proposals of adjustment of the programme to the ministry of housing in July 2012. This also raised the question of the political objective of the thermal renovation programme: if realising thermal renovations was a central goal, then the political question was whether the system should be continued in its initial form, knowing that the number of renovations would probably not increase rapidly enough.

In a report on the white certificates system published in October 2013, the French Court of auditors states that "the complexity of the programme and the difficulty to identify the targeted population leads to a delay and the programme will probably not be able to make up for lost time" (Cour des comptes, 2013). This situation led to a reform of the programme that was announced in April 2013 and was officially adopted by a decree on July 2013.

The reform of the programme in 2013: change of eligibility thresholds and higher subsidies

The reform took place in a larger set of measures, the Plan of energetic renovation of habitat (PREH) that was announced on 21st March 2013. The main goal of the plan is to reach 500,000 renovations per year until 2017 (for all types of households, i.e. not only the energy poor). Several measures have been created to realise that goal. Regarding energy poverty, Habiter mieux became the "fuel poverty" component of the plan. Its characteristics have been modified, especially regarding the targeting of the programme.

The main changes of Habiter mieux concern three elements: the types of households who are eligible (enlargement of the programme to owners of flats in collective housing and to landlords who are not the occupants of the homes), the income thresholds to benefit of the programme (enlargement of the number of beneficiaries) and the amount of total subsidies for each thermal renovation. The evolution of the eligibility conditions is presented in Table 4[5].

In order to overcome the difficulties related to the identification of fuel poor households, the recruitment of 1,000 "Energy

5. The income thresholds are different for the region Ile de France (surrounding Paris) and for other regions: in Ile de France, incomes are generally higher than on the rest of the French territory, but living costs (especially housing costs) are also significantly higher.

Table 4. Evolution of eligibility conditions to Habiter mieux.

	From 2011 to June 2013	Since June 2013
Eligibility criteria No.1 – types of homes	Homeowners of single family homes living in these homes	Homeowners of single family homes living in these homes + low income landlords + collective housing (co-ownership) in difficulty
Eligibility criteria No. 2 – Income thresholds	**Very low incomes** Example: single person household in other regions than Ile de France → €11,811/yr (January 2013)	**Very low and low incomes (income threshold is increased by 15 % in the region Ile de France and 20 % in other regions)** Ex: single person household in other regions than Ile de France → €18,262/yr (January 2014)
Level of subsidies	– Habiter mieux subsidy: €1,600 – Subsidy for engineering: approximately €300–€450, depending on the type of intervention – Classical Anah subsidy (from 20 % to 35 % of amount of work) – Local authorities (€500–€1,000) – Charities, pension funds – Microcredit, … **Total: approximately €5,000**	– Habiter mieux subsidy: €3,000 – Subsidy for engineering: + €100 – Classical Anah subsidy (from 30 % to 50 % of amount of work) – Local authorities (€500–€1,000) – Charities, pension funds – Microcredit, … **Total: approximately €10,000**
Other conditions	Building older than 15 years, no other public subsidies for 5 years, expected energy efficiency gain = 25 %, work done by professionals	

ambassadors" was announced (but in April 2014, only 88 ambassadors had actually been recruited). The main mission of these ambassadors is to facilitate the identification of households by the realisation of first diagnoses at the home of potential beneficiaries of the programme.

Following the Plan of energetic renovation of habitat, information points called "Points renovation info-service" (PRIS) and a national help desk were created, in order to give an independent advice to households on their renovation projects. The objective was also to improve the coherence of the various schemes that can be proposed to households who want to realise thermal renovations.

The procedure of attribution of white certificates to the energy suppliers was also modified in order to be able to give more certificates to the suppliers.

Consequences of reform

These modifications have led to a drastic increase in the uptake of the programme: the number of households who have initiated a renovation project has drastically increased after the modifications of the programme which have been decided mid 2013. After two years during which the programme could not achieve its objective, there has been an explosion of demands of subsidies which has resulted in higher financial needs of the national habitat agency.

A HIGHER UPTAKE OF THE PROGRAMME

The enlargement of the target group of the programme has in practice resulted in a situation where half of the French households could benefit from Habiter mieux. This has modified the very nature of the programme, which is not anymore restricted to the poorest households. The higher income thresholds and the increase of the amounts of subsidies have resulted in a situation where more households have been able to take up the programme, in particular because they have some savings that allow them to contribute to the investment. For the operators in charge of the project engineering, these households also appear to be a more attractive target than the previous target group because they have a higher probability to remain in the programme.

The effects in terms of number of beneficiaries have been spectacular. Table 5 shows this evolution on the basis of the figures published by Anah. These figures concern the number of households who have started a renovation project. No data are currently available on the completed renovation projects.

This evolution has led to the modification of the objective of Anah in terms of numbers of renovations. Whereas the initial objective was to refurbish 38,000 homes in 2014, this objective was modified in October 2014 to reach 50,000 renovations. This has also led to higher financial needs of Anah: in October, the budget of Habiter mieux was raised by 68 million euros (Anah, 2014).

LEADING TO ANOTHER ADJUSTMENT OF THE PROGRAMME

This evolution suggests that the very nature of the programme has been modified by the reform. Two factors can explain the higher uptake of the programme. The first one is the increase of the amount of subsidies: the demand of thermal renovations has probably increased as a consequence of better financing conditions, which enabled households who were previously reluctant for financial reasons to refurbish their homes without

Table 5. Number of households who engaged into renovation projects funded by "Habiter Mieux".

	June 2013	Nov. 2013	June 2014	Aug. 2014
Number of renovations started since beginning of each year	3,745	21,161	18,303	27,505
Total number since start of programme	27,505	39,638	70,000	78,211

Source: Anah (June 2013, November 2013, June 2014 and August 2014) Etat d'avancement du programme Habiter mieux.

enduring some hardship due to cost of renovation. The second explanation is the fact that the population of beneficiaries has evolved following the change of eligibility thresholds. Whereas the people on very low incomes have been very difficult to attract, people on low incomes but who have comparatively less difficulties are probably easier to reach. In this second case, this would mean an eviction of the initial target – households with the highest difficulties – in favour of those potential beneficiaries who have less difficulties.

This risk has been recognised by Anah in the first half of 2014. The strong increase of the demand for thermal renovations has resulted in a situation where the agency was not able anymore to finance all renovation projects that had been initiated by the local operators: after a slow start, Habiter mieux entered in a phase of tensions, where the available budget became insufficient to satisfy all demands.

There is no public information on the evolution of the income categories of beneficiaries of the programme. But after a phase (from July 2013 to June 2014) where households with intermediate incomes (the new category called "modest incomes") could benefit from Habiter mieux, the Ministry of housing had to restrict the target group again. In July 2014, it announced that the target group would be limited to the "very modest income" households, and that the demands of households with "modest incomes" (who had been included in the target group in 2013) could not be accepted anymore.[6]

Consequently, the local actors in charge of the implementation of the programme had to announce that no funds were available anymore.[7] During the autumn of 2014, some households who had applied for Habiter mieux and whose projects had been approved in a first time had to be removed from the programme, which led to strong dissatisfactions of local operators who did not feel able to commit to certain projects anymore.[8] However, it appears that this refocusing of the target group of the programme has not produced major negative effects, despite a certain discouragement of households with intermediary incomes and of local operators. At the beginning of 2015, it seems that Habiter mieux has finally entered in a phase where there is a strong and continuing demand for thermal renovations by low-income households.

Conclusion

This case study has analysed the implementation of an energy efficiency programme for low income households by considering the whole set of conditions that are necessary for the realisation this kind of programme – from the individual constraints (uptake and commitment of individual households) to the larger political conditions (creation of local implementation network, acceptance and long term sustainability of policy options).

The case of Habiter mieux shows that three "layers" should be considered in the analysis of the implementation of this kind of programme. The first layer concerns individual households. The experience of Habiter mieux has confirmed what has already been shown for other programmes: households are not only asking for sufficient amounts of subsidies because their ability to contribute to the financing of projects is limited. They are also asking for information, advice, and a follow-up of the whole renovation process (as shown by the French expression *accompagnement*, being accompanied). Many conditions should be fulfilled for a household to commit in a renovation programme.

The second layer concerns the "supply" side of energy efficiency programmes, which consists in two main tasks: identifying the beneficiaries and offering them the bundle of services. The actors on the supply side do not only need to have the information or the knowledge to propose energy efficiency measures. They also need to organise as networks because identification can be done only by local actors. And the creation of these networks of individuals (who are often in contact with households for other reasons) can be assimilated to an investment.

Finally, the third layer is the aggregate (political) level. In the long term, this kind of programme can only exist if there is sufficient acceptance of the options that have been selected. As shown by Habiter mieux, the stability of the programme has been compromised by the fact that it had not generated enough white certificates for the suppliers who were contributing to its financing. This has resulted in the need to modify important characteristics of the programme: a more extensive public financing and a (transitory) enlargement to populations who the core group of households at highest risk of fuel poverty.

Analysing the interplay of these layers allows understanding the evolution of the programme Habiter mieux. After a first phase of learning and a slow start, the programme was transformed under the pressure of the energy suppliers who

6. Circulaire n° C2014-02 du 9 juillet 2014 orientations à mi-parcours pour la programmation 2014 des actions et des crédits de l'Agence nationale de l'habitat (Anah).

7. Laetitia Mirjol, the coordinator of Habiter mieux at Anah, at the conference of the National observatory of energy poverty (ONPE) in October 2014.

8. The difficulties related to the "inconsistencies" of the national programme have been highlighted by some local operators at the annual conference of the Rappel network (French network of fuel poverty actors) on 7th October 2014.

had contributed to its financing. The necessity to accelerate the development of the programme has resulted in a stronger commitment of the state in the financing of renovation measures, but also in a temporary transformation of the objectives of programme, which lost its narrow targeting on low-income households. Between mid-2013 and mid-2014, the target group of the programme was relatively large, which could raise doubts about the primary objective of Habiter mieux. The question whether it would remain a fuel poverty programme or evolve in order to become a less targeted energy efficiency programme was answered in July 2014, when the decision was taken to limit the target group again, in order to limit the programme to those households who have the lowest incomes.

Three main lessons can be drawn from the case of Habiter mieux. Firstly, it shows that this kind of programme needs to be designed carefully. Realising energy efficiency measures for vulnerable households is a complex exercise because of the simultaneous presence of several implementation difficulties, both on the "demand" side and on the "supply" side. Secondly, setting up this kind of programme has an "investment" character because this requires building up specific capacities from the part of the local actors in charge of implementing it. Finally, in order to preserve the credibility of energy efficiency measures directed towards the fuel poor, this kind of programme should not be adjusted too often in a way modifying its implementation conditions.

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