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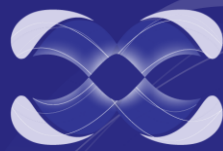
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The ups and downs of the French EEO scheme: positive and negative impacts on the building renovation market

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ABSTRACT

Since its inception in France in 2006, the Energy Efficiency Obligation (EEO) scheme has been subject to a growing obligation in each new period. However, the scheme has experienced different historical phases with low or more recently high prices (a fourfold increase of the price index was observed between January 2017 and December 2019) that show different contexts depending on the year reflecting in a first approximation the ease or otherwise of fulfilling the obligation.

In parallel with standardized actions mainly used in the scheme, specific programmes have been set up in a marginal way. Historically, these programmes include actions concerning information, and training of professionals. Today, these programmes are also used to manage the EEO scheme by facilitating the issuance of certificates or to target specific actions (e.g. disappearance of fuel oil or coal space heating).

In that way, a new programme concerning the energy renovation of housing allowing for an additional bonus was implemented above expectation at the beginning of the year 2019 with large impact on the retrofit market. This paper reviews the positive outcomes and the unexpected problems and their impacts on the energy renovation market (increase of retrofit market, orientation towards different technical solutions, up-front cost coverage structure, targeted customer, quality problem, lack of a long-term vision, etc.). These impacts show how difficult it is for public bodies to manage a scheme based on an obligation on utilities in connection with a market driven by other economic actors. On the long-term, the main question is how to manage the EEO price between too low incentive and high impact on energy price to transform the building renovation market.

Introduction

The French energy efficiency obligation (EEO) scheme (in French CEE – “*Certificat d’Economie d’Energie*”) was introduced in 2006. Based on a multi-year timeframe (Table 1), the EEO scheme has seen its level of obligation revised upwards each period and nowadays the scheme is in the middle of its 4th period (2018-2021).

Today, according to the head of climate and energy efficiency at DGEC¹: “*the CEE scheme is the major mechanism for energy efficiency*” (Enerpresse 2019) in France and in response to the obligation of energy savings defined in the Art7 of the EED directive (European Commission 2020). The preparation of the fifth period (post 2021) being in a phase of discussion² between the stakeholders, it seemed appropriate to us to look again at this scheme.

The description of the French scheme has been already provided in several papers (Bertoldi et al. 2010; ENSPOL 2015; Giraudet, Bodineau, and Finon 2012; Bodineau, and Bodiguel 2009; Lees 2014). As a descriptive and a historical review of the French EEO scheme was recently carried out (Osso, Laurent, and Nösperger 2019)

¹ DGEC - Directorate-General for Energy and Climate.

² Concerning the implementation of the 4th period in 2018, the discussion between stakeholders started in September 2016 (Gendron 2018).

we will only detail in this document the most recent development. Moreover, evaluations of the French scheme were recently published (Glachand, Kahn, and Lévêque 2020, Atema Conseil et al. 2019). The recent and important modification of the French EEO scheme was the introduction in 2016 of an additional obligation (targeting fuel poverty) dedicated to low-income households³ (aka low-income EEO as opposed to standard EEO).

The document is organized as follows: the first section will provide an overview of the outcomes of the EEO scheme, the second section the EEO programmes dedicated to the residential retrofit, the third section will present the customers eligible to the “1€ retrofit”, the fourth section will present the consequences on the retrofitting market and the fifth section will discuss the question of quality of implemented energy efficiency measures.

General outcome of the French EEO scheme

Certificates delivered

Since the beginning of the scheme in 2006, the obligation level has been exceeded by the certificates delivered (increase of obligation⁴ by a factor 30 between 1st period and 4th period) and the following period was starting with a surplus (i.e. a positive cumulative deviation) of certificates which has decreased over the periods (Table 1). Thus, the second period started with a surplus representing approximately 26% of the following period obligation against less than 4% surplus at the beginning of the current fourth period.

Currently the delivering of certificates is lacking of standard certificates and oversupplying low-income certificates (Table 1). Concerning the standard EEO obligation for the fourth period allocated on a straight-line basis (i.e. 33 TWhc/month), the current rate of issuance is insufficient despite an increase in the pace over the past year (13 TWhc⁵/month in 2018, 21 TWhc/month in 2019 and currently 24 TWhc/month in 2020 (MTE 2020c). At the opposite the low-income EEO are delivered at a rate higher than necessary. We must noticed that there is an existing stock of submitted EEO but not yet delivered.

Table 1. EEO national obligation level and certificates delivered (October 1st, 2020). *in stock under investigation by PNCEE⁶. **compared to a linear annual issuance of the obligation. Positive sign means surplus of EEOs and negative means lack of certificate. (source: MTE).

Period	Years	Obligation (TWhc)		EEOs delivered (TWhc)		Cumulative deviation from obligation (TWhc)	
		Standard	Low-income	Standard	Low-income	Standard	Low-income
1 st	2006-2009	54	none	65.2	-	+11.2	-
-	2010	none	none	99.1	-	+110.3	-
2 nd	2011-2014	465	none	469.8	-	+113.1	-
3 rd	2015-2017	700	150	646.0	175	+59.1	+24.0
4 th	2018-2021	1600	533	598 (+96*)	462 (+126*)	-694.0**	+221.0**

Prices of the certificates

The current lack of standard certificates delivered and the high level of issuance of low-income certificates result in a significant increase in the price index of certificates (Figure 1). Thus the price index of

³ Households with an income below two different thresholds (“low-income” and “very low-income”). The amount of certificate for the very low-income households is doubled.

⁴ Including the low-income obligation.

⁵ The French certificates are expressed in kWh of energy savings cumulated over lifetime and discounted (4%) (i.e. kWhc).

⁶ PNCEE: National Energy Efficiency Certificate Pole.

certificates rose from €4.18/MWhc at the beginning of the fourth period (January 2018) up to more than €8/MWhc since December 2019 (Pownext 2020). We could assumed that the announcement of the fourth-period obligation level at the end of 2016 led to the anticipation of a strong demand for certificates, which resulted in the start of the index increase.

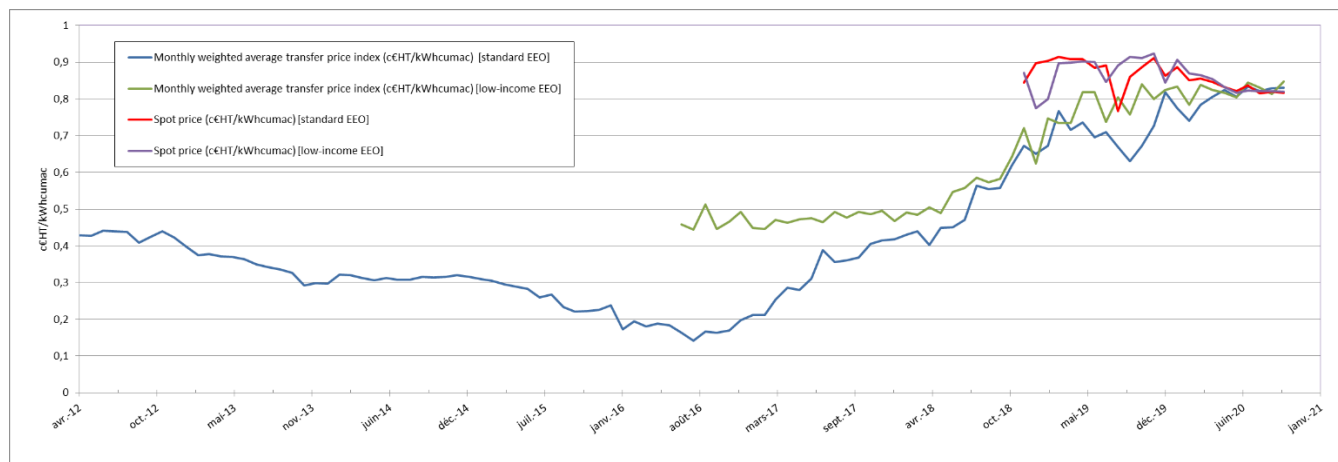


Figure 1. Monthly weighted average transfer price index (a blend of spot and forward prices) and spot price of standard and low-income EEO certificates (in cent€/kWhc) (source: EEO national register⁷) (Pownext 2020).

It should be noted that the fluctuations in the price index of EEO certificates have a significant impact on the customer’s incentive as well as the financial health of the companies (especially delegate parties⁸) involved in the EEO scheme. According to (Saint Martin et al. 2019) “when a delegate party undertakes to pay fixed-price EEOs to an obligated party, the same delegate party must be able to cover the volume and price of the EEOs at a price equal to or higher than the subsidy to be paid to the client. Too many players do not cover their commitments and expose themselves to the risk of market reversal and inability to pay the subsidy to their customers”.

Thus, the company EFFY⁹, which was the first to launch roofspace insulation at €1 in 2013 for low-income households, was placed under the protection of commercial justice (safeguard procedure¹⁰) in the year 2015, due to fall in certificate price index (< €2/MWhc) (Batiactu 2016). At the opposite, the company has announced a doubling of its turnover for the year 2019 (Laurent 2019) in the context of a weighted average spot price of more than €8/MWhc.

Cost of the EEO scheme

We can consider that the price index in the national register approximately reflects the cost of the scheme in the first instance as a significant proportion of the EEO certificates are now traded¹¹. The cost¹² of the

⁷ <https://www.emmy.fr>.

⁸ A delegate party is a company that could produce, buy or sell EEO certificate under some conditions without supporting an obligation. For example, the delegates are companies which take over the obligation of an obligated party (some companies have developed a business model based on the EEO scheme) (Osso, Laurent, and Nösperger 2019).

⁹ Launched in 2008 and previously named Certinergy.

¹⁰ <https://www.infogreffe.fr>.

¹¹ In 2019, 185 TWhc of standard certificates and 136 TWhc of low-income certificates have been traded (source: Pownext). A new market place (C2E market), to provide spot and forward products, was launched in november 2020 with the aim of greater transparency. A previous market place was launched in 2012 but failing to succeed.

¹² 265 TWhc of standard certificates deposited in 2019 with an average price of €7.13/MWhc and 219 TWhc of low-income certificates deposited with an average price of €7.69/MWhc.

scheme for the year 2019 is assessed at €1.8 billion for the standard certificates and at €1.7 billion for the low-income certificates.

This rising cost of certificates has led some players to worry about the cost of the EEO scheme (Deschaseaux 2019; Rodrigue 2019). According to (UFIP 2019): “in November [2019] the cost of CEE certificates was already cent€5.86 /litre of fuel” (i.e. around 4%¹³ of the retail price).

The residential sector in the EEO scheme

Concerning the residential sector and during the third period (2015-2017), the EEO scheme has notably help the implementation of 896,000 energy efficiency measures (i.e. 298,000 /year) (Gendron 2018). Unfortunately, the complete list of implemented measures is not publicly available. The residential sector remains the main source of certificates delivering (Table 3).

Table 2. Example of energy efficiency measures implemented (partial list) in the residential sector in the EEO scheme (2015-2017).* 2016-2017 only as there was no low-income energy efficiency obligation in 2015 (source: ATEE)

Measure implemented	Standard EEO certificates	Low-income EEO certificates*
efficient boilers	160,000	27,300
wood stove	100,000	
insulated lost attic and roof	250 000	144,000
insulated wall	100,000	18,700
with insulated floor	20,000	13,800
efficient collective boiler		7,600
double-glazing windows		55,000

Table 3. Sectoral breakdown of EEO certificates (standard and low-income) according to timeframe (in % of EEOs delivered). * by the end of September 2020 (source: DGEC - Directorate-General for Energy and Climate).

%	2006-2013	2006-2015	2015-2017	2018-2020*
Low-income residential	-	-	20.6	48.1
residential	78	65.0	39.3	20.9
Tertiary	11	15.9	13.5	6.3
Industry	7	10.8	16.9	17.8
Transport	1	3.8	4.5	4.2
Farming	1	2.5	3.6	1.6
Network	2	2.0	1.6	1.2

The EEO programmes

In parallel with standardized actions¹⁴ (ATEE 2018) mainly used in the EEO scheme, support programmes have been set up in a marginal way as well as specific measures¹⁵. Historically, these support programmes include different actions like (Gendron 2018):

- Subsidy programmes for operations to reduce the energy consumption of fuel poor households.

¹³ With a fuel price of €1.457/litre (source: <http://www.carburants.org/statistiques/evolution-prix-essence>).

¹⁴ Energy efficiency measures listed in a portfolio of 200 actions with assessed deemed savings (expressed in kWhc) to calculate the amount of EEO certificate.

¹⁵ Specific measures are mainly concerning very peculiar energy efficiency measures in industry which are not very reproducible.

- Information, training or innovation programmes promoting energy savings or relating to logistics and fossil fuel-efficient mobility.
- The contribution to the energy retrofit guarantee fund.

Today, these programmes are also used to manage the EEO scheme by facilitating the issuance of certificates or and targeting specific renovation measures in accordance to policy orientation (e.g. elimination of fuel oil or coal space heating) by providing EEO bonus to the deemed savings of the standardized actions.

In that way, a new programme called “Helping hand energy savings bonus” (JORF 2019) concerning the energy renovation of housing allowing for an additional bonus was implemented with great success (David 2020) at the beginning of the year 2019 with large impact on the retrofit market. This programme is described in the following section.

The “Helping Hand Energy Savings Bonus” programme

Description and historical perspective

The « Helping hand energy saving bonus » (in French “*Les primes Coup de pouce économies d’énergie*”) started in February 2017 (MTES 2017). Its goal was to help low-income households replace their gas and oil boilers with high efficiency boilers or biomass boilers, significantly reducing their heating bills. The incentive given was at least €800 for a high efficiency gas or oil boiler, and €1,300 for a biomass boiler, only for low-income households (with the same threshold as the one for low-income certificates).

All partners¹⁶ have to sign a specific charter for each type of subsidised retrofit. The charter contains the following:

- Commitment to set up an offer with minimum subsidy amounts.
- Commitment on the type of the product replaced, on the performance of the retrofit.
- Commitment to monthly reporting to the public body in charge of the programme (DGEC).
- The charter also provides on-site controls to be carried out by applicant.

This programme was updated in April 2018 (JORF 2017), and was supposed to go on until the end of 2020. The government had the objective of eradicating individual oil boilers in the short-term, so the “helping hand” incentive was only given for a renovation of an oil boiler with equipment using renewable energies: air to water and hybrid heat pumps and biomass boilers. The insulation of roofs was also added to the program, and the incentive was increased: for heat pumps and biomass boilers, the incentive was at least €3,000 for very-low income households and €2,000 for low-income households.

But it had an even bigger update in the beginning of 2019 (JORF 2019a): the program was enlarged to all households (with still a higher premium for low-income households), the renovated boiler can be a non-condensing gas or oil boiler, the high-efficiency gas boiler was reintroduced, and insulation of the floor was added (with two commitment charts for EEO applicants: “helping hand space heating” or “helping hand insulation”). The minimal incentives were again increased (Table 3), reaching €4,000 at least for a low-income household that installs a heat pump (some companies went up to an incentive from €5,000 to €7,000). These minimal financial incentives correspond to a multiplication by 2 (insulation) or by 6 (space heating) of the energy savings of the standard EEO certificate (Glachand, Kahn and Lévêque. 2020).

The programme aim is to achieve 25,000 retrofits per month both for space heating retrofit and insulation measures, totalling an expected monthly rate of 50,000 retrofits for the 2019-2021 period (MTES 2019).

These updates were a change of perspective for the “helping hand” programme: in 2017 and 2018 it was a quite specific program, aiming to help low-income households renovate their old boilers with a moderate

¹⁶ 60 companies are referenced on the Ministry's website as of September, 2020 (DGEC 2020).

incentive, but in 2019 it became one of the main subsidy source to renovate a dwelling, targeting all households and completely changing the market by allowing some households to install a heat pump or a boiler for €1.

The outcomes of the “Helping hand energy savings bonus” programme

The “Helping hand energy savings bonus” programme increase the delivering of energy efficiency measures (MTE 2020a) with around 1 million energy efficiency measures engaged from January to December 2019 (Table 3) above expectation (i.e. 25,000 retrofit per month). Such rate of has to be compared with the previous annual rate of 300,000 /year for the 2015-2017 period of retrofit measures in the EEO scheme.

So from January to December 2019, an equivalent amount of 300 TWhc were saved by retrofit measures implemented in this programme including the bonuses deemed savings (from 50% to 80%¹⁷ according to implemented measure) (MTE 2020c). This level of bonus helps to cover a larger share of up-front. This increase of retrofit focused on the bonused measures of the programme was at the detrimental of others measures which were less attractive (i.e. lowest incentive).

Table 3. Outcomes of the EEO “Helping hand energy savings bonus” programme) *Mainly water heat pump but also marginally biomass boiler or wood stove (source: MTE 2020a)..

(January – December 2019)	Renewable energy using equipment*	Gas boiler	Roof or attic insulation	Floor insulation
Number of measure	119,869	152,549	541,520	208,680
Average financial incentives / measure	€3,963	€886	€1,520 (€18/m ²)	€1,790 (€27/m ²)
Low-income household share	41-47%	31%	70%	60%
(January – September 2020)				
Number of retrofitted dwellings	80,426	109,679	367,021	184,748
Average financial incentives / measure	€4,193	€1,003	€1,441	€1,177
Low-income household share	50%	41%	67%	49%

Reorientation of the scheme and impacts on commercial offer

Customer targeted

Since the year 2016, an EEO obligation dedicated to “low-income households” was added to the historical obligation. This second type of certificates (aka low-income certificates), were created with a specific obligation (the total obligation of the 4th period was initially¹⁸ 1,200 TWhc of standard certificates and 400 TWhc of low-income certificates).

To get low-income certificates, companies must finance renovation works to decrease the energy consumption of buildings occupied and owned by households that have an income below a threshold, depending on the number of people in the household. Moreover, if the income of the household is below another threshold (aka very low-income households), the amount of certificate that the company gets is doubled.

This definition of “low-income households” is rather large, with 40% of the households in it, but it shows the will of the public bodies to direct EEO subsidies toward the households that need strong incentives to undertake renovation works in their homes. with the earnings distribution data from the national statistic agency

¹⁷ This means an added level of EEO certificates per action, thus, an increase of the financial incentive to the households.

¹⁸ The 4th period is extended by 1 year (until December 2021) with a total obligation of 2,133 TWhc (including 533 TWhc of Low-income obligation).

The very-low income households are the households in the two first decile of income, and the low-income households are in the decile of income 1 to 4 (INSEE 2018).

This addition of an EEO obligation dedicated to “low-income households” leads to a reorientation of the types of customers targeted. As presented in the Table 2, at the beginning of the scheme, the share of the residential sector was preponderant (78%), but it was reduced at the end of the second period (65%). Thanks to the low-income obligation the share of residential certificates increased to represent today 69% of issued EEOs with a majority of low-income certificates (50%). These figures have to be compared with a low-income obligation of 25% of the total EEO obligation.

The “1€ free” retrofit

The increase in the price of the certificate results in a higher incentive for the beneficiary customer and lead to renovations costing as little as 1€ for some households.

A website survey¹⁹ in 2019 shown that the average incentive for a residential customer was around €5.7/MWhc for a roof insulation measure²⁰ (i.e. a bonus from €340 to €1,200 for a regular customer and from €340 to €2,500 for a low-income customer). These figures are coherent with the figures provided by the MTE (Table 3). It should be noted that according to the court of auditors, during the second period, the premium for the customer was around €3/MWhc (Court of Auditor 2013) showing an increasing cost of incentive.

For example²¹, and concerning the insulation of a roofspace (with an area of 80 m²), the up-front cost is €1,600²², material and labour is fully covered by the EEO premium in case of a household with an annual low income.

The “helping hand” incentive can be combined with other incentives²³ which apply to the remaining up-front cost, and particularly with the Housing Agency ANAH²⁴ programme (“live better” and “Living Better Agility”²⁵) which allows 50% of the up-front cost (ex-VAT) of the retrofit to be covered for the very low-income households (35% for the low-income) (ANAH 2018). The incentives in combination make up the offer of “free” retrofit (households are required to contribute a small up-front cost of €1 - called “1€ offers”) to low-income households even for space heating systems (boiler, heat pump...). As example, according to (ANAH 2018), the €11,000 up-front cost of an air-to-water heat pump are covered by the ANAH’s incentive of €5,200 for a very low-income household. The remaining up-front cost is covered by the EEOs incentive linked with the “helping hand” programme (between €4,000 (MTES 2019) and €5,500 according to a website survey²⁶) and the last remaining cost by a soft-loan. In the case of a wealthy household, the incentive will be less but still substantial, with a total of €6,350, of which €2,850 is tax credit. The remainder to be financed will be €4,650 (Noble 2019).

The retrofitting market

The value chain and the technical solutions implemented

The take-off of the EEO programme has a large impact on the insulation sector and the craftsmen. The technical solution used for attic insulation offers at 1€ are today based on blown-in insulation in lost attic space

¹⁹ Based on 22 different companies providing financial incentives in the framework of the EEO scheme.

²⁰ Standard EEO measure named BAR-N-101.

²¹ Source: <https://www.pacte-energie-solidarite.fr>.

²² According to the minimal incentive of the helping hand programme of €20 per m² for low-income household.

²³ Tax Credit (CITE - Energy Transition tax credit), Eco-PTZ (soft-loan). We must noticed that the Tax Credit does not exist anymore and is replaced by an incentive from the National Housing Agency (see below).

²⁴ National Agency for Housing Improvement (in French: *Agence Nationale de l'Amélioration de l'Habitat*).

²⁵ In French: “*Habiter Mieux Agilité*”.

²⁶ 14 different incentives surveyed (January 2020).

at a very low cost (< €20/m²) which is covered by the EEOs incentive. Historically for standard EEO measures, in 2016 the median price of roof insulation (lost attic and converted attic) according to internal studies²⁷, was €55/m² and in 2019 was €38/m² based on unrolled and blown-in insulation. In 2019, concerning the very low-income EEO for the same measure the observed market price is €17/m². This value is consistent with other study showing an assessed market price of €12/m² (ATEE, ENEA consulting 2020).

We must keep in mind that between 2016 and 2019, the share of low-income EEOs have increased significantly (Table 4). Then, according to an insulation materials manufacturer, "In three years, the French market for blown wool has tripled, the main use of blown wool is to insulate the attics of houses. The thermal insulation market in France is growing... and it is particularly driven by the use of blown insulation." leading to import of material from foreign countries (Reinteau 2019).

Concerning the heat pump, the take-off of the EEO programme has also a tremendous impact on the market according to observers (Thiphaneaux 2019, Noble 2019, Batirama 2019, Lacas 2019). Driven by public and private (i.e. EEO) subsidies, sales of air-to-water heat pumps increased by 83% in 2019 with 176,220 air sourced heat pumps sold (Uniclimate 2020).

According to a market analysis study (ATEE and ENEA 2020), beyond the number of implemented measures, the positive impacts of the "helping hand" programme concern: an increase of the skilled installer/craftsmen and the industrialisation of the value chain; notably on the installation, manufacturing and distribution of materials and equipment and the generation of commercial contacts.

The cost of the "helping hand" scheme is also highlighted: it appears that part of the value of the EEO certificate is to cover the costs of the professionals, and in particular of the contractors (e.g. delegate parties) acting as project managers, but also by the installers. More than a third of the value of EEO subsidies covers the cost of delivering²⁸ (the rest going back to the beneficiaries). Large-scale implementation of low-cost insulation work requires a high level of low-income customer canvassing (ATEE and ENEA consulting 2020, Atema Conseil et al. 2019).

Impact on market price

The question of price is central to energy renovation, but households are generally poorly informed about prices, which are the subject of great uncertainty and variation (Vouillamoz et al. 2018; Granclément et al. 2018; Osso et al. 2018). While the scheme seems to have had a decreasing effect on the price of insulation measures by using the cheapest technical solutions (see above), for space heating equipment the situation appears more complex to apprehend. We must keep in mind that the up-front cost is also dependant of the technical implementation of space heating system (installed power, water output temperature) and market position (e.g. brand).

According to some observers, the last version of the "helping hand" programme that started in January 2019, leads to an increase of the price (supply and installation) of thermal equipment installed under the umbrella of this programme. According to a consumer association the price of a condensing boiler increased from €4,000-€4,500 to €7,400-€8,800 with the €1 commercial offers (Chesnais 2019).

Similarly the up-front cost of air/water heat pump has increased by €4,000 since the beginning of 2019, from between €12,000 and €13,000 to between €17,000 and €18,000 in 8 months (Poggi 2019) and even more according to a consumer association (> €20,000) (Chesnais 2019). Unfortunately, currently no large study is able to validate these figures.

Partly as a result of an observed sharp market price increase, some of the "€1 offers" concerning space heating and especially heat pumps were suspended due to the modification in the ANAH housing agency incentive programme which has capped their amount of incentive and by cutting it in half. According to ANAH

²⁷ Based on more than 10,000 invoices.

²⁸ EEO cost of intermediaries who coordinate the commercial activities, supply, installation and sale of retrofit and lead generation (web agencies, Google ads, call center, etc.) (ATEE, ENEA consulting 2020).

the aim is to “deflate the inflation in equipment prices caused by the addition of public aid” (Génie Climatique 2019). One of the consequences is the disappearance of the “€1 offers” which should have a negative impact on the air-to-water heat pump market in 2020 (Poggi 2019). Due to these changes, in the beginning of 2020, the number of heat pumps in the “helping hand” programme is sharply declining from 15,000 units/month in the 4th quarter 2019 to less than 10,000 units/month in the 1st quarter 2020 (MTE 2020c).

In 2020, the ANAH programme has been blended with the revised tax credit. After 2020, the new scheme will be calculated with a flat rate for each type of action capped to 75% or 90% of the expenses (Roguli et al. 2020). This modification of the tax credit²⁹ into a bonus in the beginning of 2020 (MTE 2020b), is a concern of energy renovation professionals about the now famous “€1 offers” for insulation and space heating systems. Because in the new tax credit scheme, the proposed financial incentives³⁰ will not be able to cover more than 90% of the amount of the up-front cost for the very low-income households (a minimum of 10% of the cost of the work will remain to be paid), 75% for low-income households (Lacas 2020). The remaining cost could be covered by a soft loan (as provided by some obligated parties³¹).

Fraud and quality issues

Fraud³² and quality of work has been an issue within the programme related to both the “€1 offer” retrofits for low-income households and with the increase of the EEO price that has increased the potential margin for some stakeholders. It should be kept in mind that the program provides on-site inspection³³ mandated by the entity at the origin of the certificate but concerning only insulation measure³⁴ (MTES 2019).

The fraud in itself seems to be marginal (assessed to less than 5% (ATEE ENEA Consulting 2020)) but remains emblematic because the sector is sensitive and it is in the interest of craftsmen/installers to detect scammers (Leroy 2020)

Concerning the quality, according to ADEME (Lefebvre 2019), the “€1 offers” are undeniably an incentive to take action but sometimes to the detriment of quality. Concerning the quality of the insulation (floor, roof) measures implemented in the framework of the EEO scheme, the evaluation study shows that only 16% of the households are unsatisfied (i.e. poor or medium quality assessed) (ADEME 2019). According to another study (ATEE ENEA Consulting 2020) the lack of quality³⁵ concerns from to 15% of retrofit.

Even if 90% of households are satisfied with the quality of the retrofit carried out, this rate is slightly lower for low-income households: 84% (Lefebvre 2019). This difference in satisfaction according to the type of household may raise the question of the quality of the work when the household does not pay for it (or pays very little compared to the up-front cost). These studies raise the question of the capacity of household to assess the quality of the retrofit.

As example, the Confederation of Crafts, Trades and Small Businesses in the Building Industry (CAPEB), reports quality issues range from insulating material peeling off in basements to fires which were declared in insulated attics (Chesnais 2019) and the question of subcontracting arises (Poinssot 2020). However, the level of fraud and quality problem remains difficult to assess as explained by (ATEE ENEA consulting 2020) whose considers that no single actor has access to all the relevant data to monitor the evolution of quality per operation.

²⁹ Named « my retrofit bonus » (in French: “*MaPrimeRénô*”) but concerning only lowest income decile (from 1 to 5).

³⁰ Concerning “national state level” incentives: (tax credit bonus, ANAH and EEO programmes), but doesn’t concern incentives coming from NGO or at a local level (i.e. region) (Lacas 2020).

³¹ As example: <https://www.domofinance.com/prest-professionnel/prest-travaux>.

³² The term “fraud” refers to retrofit carried out by craftsmen who are not qualified or who do not intentionally comply with the EEO declaration or even do not exist (ATEE ENEA Consulting 2020).

³³ Satisfactory on-site inspection shall cover, for each application EEO file at least 10% of the works carried out for the benefit of low-income households, and at least 5% of those carried out for the benefit of other households (MTES 2019).

³⁴ Concerning space heating system, on-site inspection is supposed to be implemented in mid-2021.

³⁵ Quality problem defined as a deviation from the rules of the art (i.e. good practice of RGE qualification).

The emergence of fraud and lack of quality appears to be promoted by prices that change over time, a market that is not perfect and a situation that has not yet stabilised (Saint Martin et al. 2019). In order to reduce fraud, an inter-Ministerial working group was being set up and the government decided to enforce on-site control and qualification of professionals (RGE qualification) (Batirama 2019; Leroy 2020) and defined critical fields (Reinteu 2020).

Conclusion and policy implication

The EEO obligation is regarded by the public authorities as one of France's major measures for achieving its renovation energy policy objectives. The level of the EEO obligation has drastically increased since 2006 and has been the subject of particular targeting (low-income households, energy and equipment). Moreover, the year 2019 will have been a year of change for the EEO scheme and especially in the residential energy renovation market.

With pressure on the EEO scheme (high price of certificate and insufficient delivery in 2019) and the launch of a new subsidised incentive programme, the impact on the residential renovation market has been significant. It is considered by (Glachand, Kahn and Lévêque 2020) that the obligation of the 4th period has been imperfectly calibrated leading to the introduction of enhanced EEOs not rewarding energy savings.

The take-off of these programmes led to an increase of the number of energy efficiency measures implemented and in particular a strong increase of the heat pump market. The programme helped to accelerate the replacement of old space heating equipment by efficient and low carbon equipment using renewable energy such as heat pumps and biomass boiler, promising equipment but still little installed in renovation³⁶. This development of these programmes towards dedicated retrofit actions help to mitigate climate change by phasing out oil and coal boilers. In addition, these programmes have enabled low-income households to carry out retrofit work which are not historically the households who mostly carry out energy efficiency work.

Unfortunately, the modification of different schemes to adapt to the context leads to changes in household subsidies with accelerations and decelerations of the actions undertaken. Thus, the retrofit market was subject to wide fluctuations to the detriment of a robust industry in the long term. Reducing the regulatory instability is also a way to stabilise the EEO scheme and the retrofit market as assessed by (Glachand, Kahn and Lévêque 2020).

The question of the increasing cost of customers canvassing by intermediaries as part of the value of the certificate was also raised.

The development of low-price renovation offers has indeed had an incentive effect, but it has also raised questions about the quality of the work carried out by certain craftsmen/companies due to the large increase of the market. So a balance between a large number of implemented measures and their quality to have a steady and performing regime of EEO is necessary.

The EEO scheme appears to be a work in progress and still evolving (learning by doing) with a lack of stability in the long term. A need to a properly calibrate policy scheme and a progressive one appears to be necessary (long term vision). This is all the more necessary as the EEO scheme has taken on a significant scale leading to the implementation of measures to facilitate the achievement of the obligation. Advances have been made to avoid problems, but more curatively than anticipated by design partly due to a lack of data and evaluation studies. Thus the EEO scheme has now a great power to change the residential retrofit market but with a great responsibility on the part of the stakeholders especially the public bodies.

In addition, the EEOs scheme must continue to evolve in order to be in phase with the French climate policy targets (as mentioned in the last energy-climate law (JORF 2019b)) and more re-inforced towards measures to reduce carbon emissions. With this in mind, it was recently proposed to limit the EEO incentive only

³⁶ In 2018 in France a market of 99,000 water heat pumps against 544,000 condensing boilers (inc. new building and retrofit housing) (Uniclimate 2019).

to global renovation and cease to finance individual measure to achieve these ambitious targets (Haut Conseil pour le Climat 2020).

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