Institut européen
European Institute

Master in Global Energy Transition and Governance

Beyond trade-offs: Combining Social & Climate Policy in France

The Social Climate Fund as a catalyst for the French energy poverty strategy

Supervised By Laurent Baechler

Joren Schepers
June 2024

Acknowledgement

This thesis marks the culmination of my Master in Global Energy Transition and Governance 2023/2024. I would like to take this opportunity to express my sincere gratitude to those who supported me throughout this journey.

First and foremost, I am deeply grateful to Dr Rachel Guyet for her unwavering support, enthusiasm, and guidance. Her passion for European energy legislation, and energy justice ignited my own interest in these areas. Her continuous stream of papers, articles, and feedback played a crucial role in shaping this project.

I also extend my sincere thanks to Laurent Baechler for his insights and feedback on my thesis. His insightful courses on energy economics throughout the year provided us with a balanced perspective and a deeper understanding of the complexities surrounding the energy transition.

The friendships of my fellow students during this program made all the difference. I am grateful to the entire "energy family" for making this an unforgettable experience. A special thanks goes out to Ankica Sokolić, Aston Horton, and Maria Vivancos Mirapeix for their support, warm-heartedness and most importantly their tomfoolery.

Finally, my deepest gratitude goes to my friends and family, whose unwavering love and support made this entire journey possible. Including my mother, Ingrid, my brother, Robin, and especially my girlfriend, Alexe for taking on this daring adventure and moving to Nice with me. Dankjewel!

Abstract

This thesis investigates the potential of the Social Climate Fund (SCF), a European policy combining climate and social objectives, to reshape France's energy poverty strategy. Funded by the EU Emissions Trading System 2 (ETS2) for the building and transport sectors, the SCF aims to alleviate energy poverty through national Social Climate Plans. For this thesis, energy poverty is defined by the Energy Effort Rate. Applying John Rawls' Theory of Justice, this study examines whether the SCF can be a gamechanger in equitability. The theory emphasizes the importance of sustaining the Energy Effort Rate of the least well-off and maximise their benefit of energy efficiency time when implementing new policy.

The SCF targets vulnerable households facing higher energy costs due to the ETS2. By investing in energy efficiency and offering direct income support, France can leverage its €9 billion allocation (2026-2032). Effective usage of the fund should address shortcomings in the existing strategy. The Yellow Vest movement highlights the importance of revenue recycling to mitigate the regressive impacts of carbon pricing. While France is the European leader in energy poverty policy with current strategy prioritising energy efficiency, gaps remain regarding technical assessments of energy-saving measures, short term income support and out-of-pocket costs for low-income households.

While the SCF supports vulnerable households, its annual allocation of €1.299.336.418 may be insufficient to simultaneously address short term income support and out-of-pocket financing in France. Further, addressing technical assessments of energy-saving measures within the national building renovation plan may be more efficient. This research explores the SCF's potential to accelerate equitability in the French energy poverty strategy, considering the limitations and requirement of the respective regulation.

Table of Contents

List of tables

List of figures

List of abbreviations

ANAH	L'Agence nationale de l'habitat (National Housing Agency)
CAS	Compte d'affectation spéciale (special purpose account)
CCE	Contribution Climat-Énergie (Climate-energy contribution)
CICE	Tax Credit for Competitiveness and Employment
CEE	Certificat d'économie d'énergie (energy saving certificate)
CO2	Carbon dioxide
Council	Council of the European Union
DPE	Diagnostic de performance énergétique (energy performance certificate)
EC	European Commission
EELV	Europe Écologie Les Verts (Green party)
EER	Energy effort rate
EPBD	Energy Performance of Buildings Directive
ETS	Emissions Trading System
ETS1	Emissions Trading System: Installations in Power and Manufacturing Sectors, aircraft & maritime transport
ETS2	Emissions Trading System: Building & Transport sector
EU	European Union
EWC	White certificate
FGRE	Fonds de Garantie Rénovation Energétique (Guarantee Fund for Energy Renovation)
FSL	Le fonds de solidarité pour le logement (Solidarity Fund for Housing)
GHG	Greenhouse gas emissions
IEEP	Institute for European Environmental Policy
MPR	MaPrimeRenov

MS	Member State
MSR	Market stability reserve
NECP	National energy and climate plan
NRRP	National Recovery and Resilience Plan
ONPE	Observatoire National de la Précarité Énergétique (French Observatory on Energy Poverty)
PAR	Prêt Avance Rénovation (Renovation Advance Loan)
RGE	Reconnu Garant de l'Environnement (Recognized Guarantor of the Environment)
SCF	Social Climate Fund
SCP	Social Climate Plan
TICC	Domestic consumption tax on coal
TICGN	Domestic consumption tax on natural gas
TICPE	Domestic consumption tax on energy products
ToJ	Theory of Justice
VAT	Value-added tax
YV	Yellow Vest movement

1. Introduction

"Climate change is the greatest market failure the world has ever seen" (p.40, [1]). Due to our economic activities, we release greenhouse gas (GHG) emissions into the atmosphere. These gases have a wide and lasting impact on society and mother nature. Carbon dioxide (CO2) is the most impactful GHG in the atmosphere, accounting for approximately 64% of the warming effect [2]. Knowing the damaging impact of GHG, the world is taking action with broad agreement of putting a price on carbon emissions is the most effective way to do it [3]. Currently, 74 countries have some sort of carbon pricing mechanism [4], either via carbon taxes or cap-and-trade systems. A carbon tax sets a direct price on carbon emissions by defining an explicit tax rate on emissions or on the carbon content of fossil fuels like a price per ton CO2 emitted. A cap-and-trade system establishes a price for emissions based on supply and demand via a market. It is a system where emitters can trade emission units to meet their emission targets. The exact workings of such a system are explained in section *3.1 Emission Trading System 2*.

In March 2000, the European Commission (EC) presented a green paper with the first ideas on the design of a European cap-and-trade system. This paper got translated into the European Union Emissions Trading System (EU ETS) Directive in 2003 and the system was launched in 2005 [5]. Currently, the EU ETS is the oldest and largest carbon market in the world, accounting for around 40 percent of the European Union's (EU) GHG emissions [6]. On 22 April 2021, Ursula von der Leyen announced the expansion of EU ETS to buildings and transport [7], which immediately raised concerns. Frans Timmermans (Climate commissioner at that time) said he was personally against including road transport in the ETS because it risks pushing up fuel prices and disproportionately hurts the poor [8]. Several member states (MS) shared this concern, because in 2020, 8% of the EU population was unable to adequately warm their house. In 2021 this declined to 6.9%, but in 2022 it increased to 9.3% [9]. When the new ETS directive got approved in 2023, buildings and transport got established alongside the former ETS and got called ETS2.

The concerns regarding rising prices for vulnerable households became a part of the directive. A part of the revenue generated from the ETS2 would be recycled and redistributed

through the Social Climate Fund (SCF). The aim of the fund is to prevent the most vulnerable people from being exposed to transport and energy poverty[1] as a result of the pricing policy.

The SCF primarily funds investment in energy efficiency but also direct income support for vulnerable households and micro-enterprises. This is the first time the EU combines climate policy (lowering carbon emissions with carbon pricing) and social policy (supporting vulnerable people) in one Directive. According to the EC, this was necessary for acceptance of the policy and more importantly, making the energy transition a just transition [10].

To access the funding, MSs are obliged to submit national Social Climate Plans (SCP). These plans will describe the usage of the money. The SCPs will be assessed by the EC and must be submitted by June 2025. The SCF regulation sets out ambitious objectives and allocates a total budget of € 86,7 billion from 2026 to 2032. The EC is convinced that the SCF is necessary for a just transition, and an equitable distribution of resources is therefore paramount. Yet the MS are responsible for defining the details of distribution with the SCPs. This thesis digs deeper into the equitability aspect of the SCF. As all countries are obligated to write their own SCP and method of distribution, this thesis is focused on one MS, France. Currently, France renovates 100.000 houses annually, but has set the goal to renovate 200.000 houses in 2024 and 900.000 houses in 2030 [11]. In total there were seven million poorly insulated houses in 2019 and half of them belonged to people living in energy poverty [12]. Meaning many people living in energy poverty need retrofitting, but the current policy falls short of the stated goal. With the SCF primarily focusing on increasing energy efficiency for people living in energy poverty, it addresses exactly this issue and therefore makes France an interesting case study.

Before the research question can be stated, the study needs to be scoped. The SCF is a comprehensive fund trying to alleviate energy and transport poverty. This thesis only addresses energy poverty. This choice has been made based on more available literature on energy poverty and more importantly, the current policy in France. Energy poverty is defined and been a part of French policy since 2010. Transport poverty is a new term brought up by the SCF regulation with limited available research done on the matter. Secondly, this research is focused on vulnerable households and not on vulnerable micro-enterprises. This decision is also based on the same grounds. Lastly, the study looks at the economic aspect of the SCF. It questions the amount of financial resources allocated to France and whether they are enough to meet the

[1] People in energy poverty are defined as being in the first three income deciles and above the threshold of 8% of the energy-income ratio [14].

objectives set by the regulation. The social and economic aspects are evidently connected and thus, cannot be completely separated in the research. Therefore, social outcomes of past and current policy are used as input for this research. Having established the scope, this thesis aims to answer the following question:

"Can the Social Climate Fund be a gamechanger in accelerating the equitability of the French national energy poverty strategy?"

The question is made up of multiple components. First, the term gamechanger stands for the necessity and importance of the SCF as described by the EC. Is the SCF able to deliver on the objectives set by the EC? Equitability relates to the just transition, supporting the least well-off in the energy transition. The least well-off is a broad term with different interpretations. How this is interpreted and defined in this thesis is explained in chapter *2*.

Theoretical Framework. Lastly, the SCF will be added to the current energy poverty strategy in France. As it is no standalone tool in the whole strategy, this thesis assesses the contribution of it and simultaneously meet the objectives set by the EU.

1.1 Structure & Methodology

The thesis starts with a theoretical framework, the Theory of Justice (ToJ) by John Rawls. The ToJ can be used to judge legislation and ensure the fairness with the difference principle being of particular importance to evaluate the equitability of the SCF. The theory has also been criticized, most notably by Sen in his book 'The Idea of Justice' [13]. Why Rawls is preferred over Sen's interpretation of justice is explained in the chapter. The theory helps interpret two underlying questions of equitability: 'When has the policy succeeded in making the distribution of resources fair?' and 'Who are the people it should be allocated to?' The ToJ as such does not answer these questions itself enough and thus a supplement interpretation of the theory is used. The reciprocity view by Paula Casal adds two requirements to the difference principle. These requirements help define when a policy is fair, and the distribution of resources is equitable. For the second question, the working definition of energy poverty by the French Observatory on Energy Poverty (ONPE) is used to define the least well-off. That is the energy effort rate (EER). This rate considers energy poverty to be a threshold of 8% in the energy-income ratio for people in the first three income decile [14]. Energy poverty itself is a multi-dimensional phenomenon, considered to be caused by a combination of low income, high energy expenses, and poor energy efficiency in buildings [15]. The EER combines the first two

parameters together. When energy efficiency is considered as a variable, it can influence the other two. When energy efficiency increases, energy expenses decrease. Income can also be a variable when governments choose for direct income support. These methods of influencing energy poverty is analysed in more detail in paragraph *4.4 Measures in place.* When this part of the research question answered, the remaining sections can be addressed.

The second chapter dives deeper into the SCF regulation. And to make it more understandable, it is divided into six sections. The first looks at source of the revenue, the ETS2. The questions answered are: 'how does the cap-and-trade work exactly?' and 'how does the system generate revenue?' The second section describes the general purpose of the fund, and tries to answer the question: 'Why is it necessary that the SCF exists?' The third analyses the allocation and distribution on the EU level. The fourth analyses the requirements of the fund, such as the SCP, eligible measures, and limitations of revenue usage. The fifth looks at the assessment of the SCP, what should be written in the SCP and what is important to the EC? Before it can be assessed whether the SCF can be a gamechanger for France, the needs and requirements need to be clear to produce adequate measures and achieve a successful implementation. Lastly, the SCF itself is assessed by the ToJ. This helps framing the general regulation in the theory. Answering these questions helps maximising the equitability of the SCF in France. When this is clear, the next step can be executed, the case study.

The third chapter describes the French context in four sections with a conclusion. France introduced carbon pricing in 2013 as a tax component and recycled the revenue it generated. This first section analyses the system in place and what happened with the revenue. A notable event as a consequence of carbon pricing is the Yellow Vest movement (YV). These were protests against the increase in fuel prices. It gives valuable input for the implementation of the SCF and what should be considered. This social uproar is described in further detail in the second paragraph. The third analyses the current energy poverty strategy by increasing energy efficiency. The fourth gives an overview of the most important measures in place in 2024 and their shortcomings. The SCF is no standalone tool and should fill in the gaps of the current policy, so there is no overlap in measures addressing the same issue. This information sets the base for the last chapter, implementing the SCF.

The final chapter brings the SCF and the gaps in the French policy together. Whether the SCF could adequately fill in these shortcomings from an economic perspective. Then to answer

whether it is equitable, the theoretical framework is used. All these parts together form the definite answer to the research question.

2. Theoretical Framework

A theoretical framework helps answering the research question by providing measurement tool. In this chapter, the usage of the ToJ is explained and the choice for this specific theory is argued. Lasty, the link between the ToJ and energy poverty is made. These subchapters together form the theoretical framework and lay the foundation for remainder of the research.

2.1 Theory of Justice

2.1.1 The theory in a nutshell

The Theory of Justice was introduced by political philosopher John Rawls in 1971 in his book 'A theory of Justice'[16]. The ToJ can be used to judge legislation and ensure the fairness of such. Within the theory is a theoretical framework which can be applied to various decision-making processes to determine if the proposed policies or changes in legislation would be considered just and favourable for society. The idea is "to set up a fair procedure so that any principle agreed to will be just" (p.118, [17]). Everyone who is concerned with a decision and needs a way to assess if the decision will be just can use the principle. This framework can be especially useful for legislators that make impactful decisions for society [18].

The theory is based on a thought experiment which is called the "Original Position". It is an external viewpoint which means that one imagines he[2] is crafting a new political system from the outside. One has to put himself behind the veil of ignorance in order to achieve that viewpoint. That means that one has to ignore his own personal characteristics and biases when judging a principle. Rawls says to achieve that "we must nullify the effects of specific contingencies" (p.118, [17]). His decisions should be made as if one has no particular knowledge of his own circumstances, such as gender, race, particular talents, or disabilities; age, social status, particular conception of what makes for a good life, or the particular state of the society in which one lives. However, that person would "know the general facts about human history" (p.118, [17]). that are needed to make such a decision such as "principles of

[2] In his Theory of Justice John Rawls used 'he' when referring to a gender-neutral person. Because some parts of his theory are quoted, this is sustained in the theoretical framework to avoid misconceptions.

economic theory", "laws of human psychology" or any other "general facts that might affect the choice of the principles of justice" (p.119, [17]). With these circumstances Rawls argues that decisions can be made rational and fair.

People would choose principles of justice that do not benefit one certain social class but are fair to everyone. No one has any of the particular knowledge about themselves that he could use to develop principles that favour his own particular circumstances and "no one is in a position to tailor principles to his advantage" (p.16, [17]). There is no self-interest in choosing those principles, because no one knows if they are choosing principles that would make their lives harder (p.16, [17]).

Following the original position Rawls argues that people would choose two basic principles of justice to guide them. They can be used to "assign […] rights and duties in the basic institutions of society and […] define the appropriate distribution of benefits and burdens within society" (p.4, [17]). These two principles together are known as 'justice as fairness':

First Principle: Each person has the same indefeasible claim to a fully adequate scheme of equal basic liberties, which scheme is compatible with the same scheme of liberties for all.

Second Principle: Social and economic inequalities are to satisfy two conditions:

1. They are to be attached to offices and positions open to all under conditions of fair equality of opportunity.
2. They are to be to the greatest benefit of the least advantaged members of society, the difference principle.

People choose these principles because they will protect and promote their capacity to exercise their two moral powers: their power to be rational and their power to be reasonable. The first moral power is exercised when people form a rational plan of life, whereas the second power is exercised when people formulate and live out a conception of justice [19].

The first principle ensures that people will be able to claim and exercise the basic liberties required to exercise their two moral powers, by protecting freedom of speech, religion, and press, among others; and by protecting procedural rights, like the right to a fair trial. Citizens must also have the means to realize the "worth" of those liberties, that is, to be able to exercise them in meaningful ways on a regular basis [19]. This principle has priority over the second principle, meaning the second principle never overrides the first.

The second principle ensures that people will be able to enjoy the worth of those liberties on equal terms. Fair equality of opportunity protects against the dominance of any one social group, whereas the difference principle ensures that even the poorest have access to the primary goods necessary to exercise their two moral powers [19].

Rawls claims that choice based on the two moral powers derives from our shared conception of the person. Reasonable people have different views about what the human person is, but they agree on at least some common features, and those common features form the basis of the justice as fairness [20].

2.1.2 The Difference Principle

First, the Second Principle is analysed as a whole. “The second principle applies, in the first approximation, to the distribution of income and wealth and to the design of organizations that make use of differences in authority and responsibility, or chains of command” (p.61, [17]). According to Rawls, a completely equal distribution of wealth, all people having exactly the same amount of wealth, is unnecessary. A completely equal distribution of wealth is impossible in any society. What is necessary, according to Rawls, is that all social positions are open to all. The two sub principles are to be arranged in serial order with the first principle prior to the second. This ordering means that a starting at the institutions of equal liberty required by the first principle cannot be justified by, or compensated for, a greater social and economic advantages. “The distribution of wealth and income, and the hierarchies of authority, must be consistent with both the liberties of equal citizenship and equal opportunity ” (p.61, [17]). The ordering is designed to ensure that basic rights and liberties cannot be undermined to serve social or economic injustices. Economic inequalities are only just if they do not make the least well-off more disadvantaged. “All social values like liberty and opportunity, income and wealth, and the bases of self-respect are to be distributed equally unless an unequal distribution of any, or all, of these values is to everyone’s advantage” (p.62, [17]). According to this formulation of justice as fairness, society is both just and fair only if inequalities can be shown to be for the benefit of all citizens. The only reason the state may allow people to become wealthy, influential or powerful is if they do so under a system of rules that promotes equal opportunity for everyone. Unequal wealth, influence, and power, no matter how nobly and virtuously achieved or deserved, can be eliminated, even if it arises within a social system that

provides great but unequal opportunities to everyone. Unless the opportunities are equal, they are unjust. Rawls allows one exception: opportunities to make the least well-off better off.

The *Difference Principle* is therefore the most important instrument to evaluate the justness of the SCF. Inequalities are justified, only if the least well-off are better off than they were before the policy was implemented. This is the most important aspect of a successful implementation of the SCF regulation according to the ToJ and the justice as fairness framework.

2.1.3 Resourcism & capability approach

The theory is based on 'justice as fairness', so the ToJ may not be the best name for Rawls' theory. ToJ falls within the field of philosophy called egalitarianism. Egalitarians favour equality of some sort: People should get the same, or be treated the same, or be treated as equals, in some respect [21]. Within egalitarianism two of the most important streams are resourcism and the capability approach [22]. Rawls theory is an example of resourcism. Where Amartya Sen is an example of the capability approach, primarily with his book 'The Idea of Justice'. The main difference between the two is that resourcism focuses on justice through distribution of primary goods (general social goods such as liberties, opportunities, income, wealth, leisure time and the social bases of self-respect that are useful means for almost everyone). The capability approach focuses on functioning and capability.

Functioning is an achievement of a person: what he manages to do or be ('doing' or 'being'). Achieving a functioning (e.g., being adequately nourished) with given resources (e.g., bread or rice) depends on a range of personal and social factors such as: metabolic rates, age, gender, access to medical services, nutritional knowledge and education, climatic conditions [22]. A functioning, therefore, refers to the use a person makes of the resources he has or can get.

Capability reflects a person's ability to achieve a given functioning. People may choose not to exercise their capability of functioning [22]. Some people may choose to fast for reasons of religion or health, but this is different from starving because you lack the means to obtain food.

Sen published the book 'The Idea of Justice' as an alternative approach to Rawls [23]. Sen essentially has two disagreements with Rawls theory. The first disagreement is focused on how Rawls discusses what a perfectly just society should do, whereas for Sen, the most important problems that we need to confront are comparative problems, concerning ways of moving toward societies that are less unjust. The second disagreement concerns the role of institutions:

for Rawls, justice is essentially about institutions and the distributions of goods are derivatively just if they are produced by just institutions; Sen, on the contrary, thinks that justice is essentially about how well or badly off individuals actually are. The first disagreement is not particularly important for this thesis, so the focus will be on the second.

This disagreement comes from the thesis difference between the two philosophers. Sen believes that fairness should properly apply to persons whereas Rawls' principles apply only to institutions [24]. Sens main argument for this is that a person with a large amount of wealth cannot be considered advantaged if he suffers from a severe disability. This person is then still disadvantaged in his capability (as defined above). In Sen's perspective this is still unjust, and this person should therefore get more goods to become more equal with the rest of society. Equalising peoples functioning as described in the capability approach is a great theoretical goal of a society, but unfeasible in real life. The capability approach has the advantage of adjusting the criteria of justice to differences between people, however such sensitivity to interpersonal variability also leads the theory to become subjective. When trying to equalise what each individual requires in order to reach a certain degree of welfare, every individual's demand for satisfaction of their preferences becomes relevant [22]. Targeting policy on terms of personal satisfaction is unfeasible. Rawls understood this and justified the ToJ that it should apply to 'normal cases' where institutions have the competence to provide in primary goods [17]. "The government cannot make us all healthy or supply us all with equal amounts of hormones. But the government can provide a public health service and redistribute taxation revenues. The government can deliver the social basis of such capabilities" (p.487, [17]).

In short, resourcism provides primary goods to society through institutions. This is a similar approach as the redistribution of revenue by the SCF. The EU (an institution) makes revenue by pricing carbon and redistributes money or opportunities (to compensate energy bills and increase energy efficiency) to benefit the least well-off. If the situation of the least well-off is improved compared to before the regulation was in place, and the first and second principle are not disregarded, the policy can be implemented. For the capability approach, the policy depends on the functioning and capability of a person. To reach a certain degree of welfare for all people, with regards to each individual functioning and capability, it is practically impossible to fulfil all individual demand. As an example, governments cannot make us all healthy. Therefore, the ToJ is justified as the theoretical framework to assess the possible measures within the SCF regulation to make the French energy poverty strategy more equitable.

2.2 Energy poverty link

The core of the difference principle is: 'Inequalities are justified, only if the least well-off are better off than they were before the policy was implemented'. This statement raises two questions:

- What does 'better off' uphold?
- Who are the 'least well-off'?

Let's start with the latter. Rawls defines 'least well-off' as "those belonging to the lowest income class with the least expectations" (p.59, [17]). This is as precise of a definition Rawls gives of this group, which leaves room for interpretation. Rawls also admits the difficulty of defining the group: "We are to aggregate to some degree over the expectations of the worst off, and the figure selected on which to base these computations is to a certain extent ad hoc" (p.98, [17]). This is logical depending on the implementation of the procedure who this group is. It is up to the user to determine the least well-off. Tungodden and Vallentyne researched a clear universal definition of the least well-off. In their paper 'Who are the least advantaged' [25], they tried to come up with a determination in relative terms but were unable to make a framework without involving Minimal Maximin (explained in next paragraph). The ONPE applies a definition of energy poverty in absolute terms: energy effort rate (EER) [14]. The EER considers energy poverty to be a threshold of 8% in the energy-income ratio for the first three income deciles. Through excluding households above the first three income deciles, it excludes those with a high income who choose to consume more energy but who have the means to finance it without any hardship. As stated in the introduction, energy poverty is a multi-dimensional phenomenon, considered to be caused by a combination of low income, high energy expenses, and poor energy efficiency in buildings [15]. Increasing efficiency has a reducing impact on energy expenditure over time, while increasing income direct influences the EER. Institutions provide primary resources (funding), which can be used to either influence income or energy efficiency and thus the EER. Yet how this is done is dependent on the choices made by the institutions. Moreover, the definition of the ONPE fits the conditions of the least well-off as defined by Rawls. Furthermore, it is the working definition of the ONPE, so it is assumed that the French government will also focus on this group when drafting their SCP. For these reasons it will be the working definition in this thesis.

With a clear definition of the least well-off, it is important to define what 'better off' exactly means. In the prior paragraph, Minimal Maximin got mentioned. When placed behind

the veil of ignorance, people will maximise the least well-off (minimal) as it is unsure in which class they will be in society. This is called Minimal Maximin and is one interpretation of the Difference principle. Another interpretation is the Reciprocity View. This interpretation claims that any point of improvement is acceptable, as long as inequalities don't expand over time [26].

The difference between these two interpretations can be clearly explained by Figure 1 [26]. The horizontal axis (X) measures the advantage of the wealthier members of society and the vertical axis (Y) measures the advantage of the least well-off. The curve reflects the possibilities of distribution. The difference principle constraints the possibilities of how it can be distributed. Point a is the benchmark of these two groups of citizens before policy implementation. Point b marks the spot where the least well-off get the maximum allocation (minimal maximin). Line s defines the minimal level of sufficiency. Everything to the right of b is prohibited according to the difference principle because it fails to maximally benefit the least well-off.

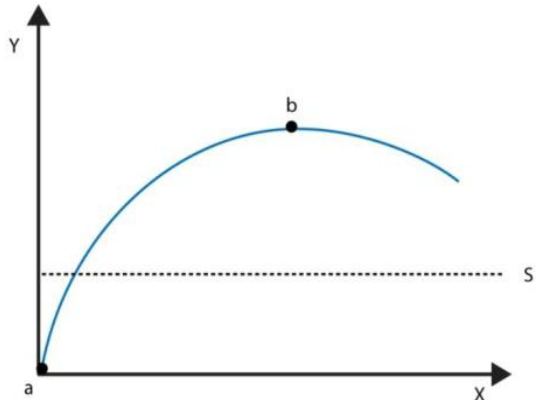

Figure 1, Advantages of wealthier (X) and least well off (Y) [26].

According to Casal, the Difference principle is joined by two requirements [27]:

- Governments have to ensure a minimal distributive sufficiency (line s).
- Governments are required to maximise the distribution of lifetime expectations of primary goods for the least well-off.

The principle of basic liberties (Rawls first principle) takes priority over the difference principle and constraints the means available to maximise lifetime expectations of primary goods for the least well-off. But in ToJ, social minimum is not subordinate to the principle of basic liberties, and thus more resources should be allocated. The reciprocity view does not require maximising the level of benefits for the least well-off (point b). It merely requires avoiding any inequalities in expectations that would disadvantage the least well-off. Following

this view, a government might choose to any way of distribution on the line between a and b as long it is above line s. For this thesis, sufficiency is defined as sustaining the EER for the least well-off. The Minimal Maximin requires maximizing the benefits (point b). This could result in inequality of primary goods over time, which goes against Rawls principle of intergenerational justice [26].

The reciprocity view is therefore desired over the Minimal Maximin as it supports the objective of the SCF. The least well-off should be supported over time with sustainable measures and measures that guard least well-off of the sufficiency line over time.

In summary, the least well-off people are, as defined by ONPE, the people in the first three income deciles above the 8% threshold of their energy-income ratio in France. According to the theory, the SCF is not obligated to maximise the primary goods of the least well-off now but keep the people above the sufficiency line and maximise their benefits in the objective of alleviating energy poverty over time.

3. The SCF unravelled

In this chapter the specifics of the SCF are analysed. The regulation at hand (EU Regulation 2023/955) is broken down, to make clear what to pay attention to when implementing it. The regulation is broken down into purpose, allocation, SCP requirements and assessment & monitoring. The analysis is rounded up with a theoretical debate to judge the objective of the SCF to the difference principle. But before the SCF can be broken down, it is important to know where the funding comes from; the ETS2.

3.1 Emission Trading System 2

The ETS is based on the 'cap-and-trade' principle. The cap is a limit set by the EU on the total amount of GHG that can be emitted by actors covered by the system and is reduced annually in line with the EU's climate target, ensuring that emissions decrease over time [28]. Equal to the total amount of the cap, are tradable permits issued called allowances. Each allowance represents the right to emit a certain amount of the pollutant (one ton of CO2). The first allowances are deployed on the market using two methods, direct allocation to businesses and auctioning. The trade aspect works as follows [29]:

- Companies need allowances: Businesses that produce the targeted pollutant need to hold allowances to cover their emissions. The emissions are calculated based on their monitoring plan. This plan needs to be compliant with Monitoring and Reporting Regulation (Implementing Regulation (EU) 2018/2066) [30].
- Trading market: Companies can buy and sell allowances on a dedicated market platform.
- Price fluctuations: The price of allowances is determined by supply and demand. If a company emits more than its allowances, it must acquire additional ones through the market. Conversely, companies that reduce their emissions below their allowances can sell their surplus allowances on the market.

This system creates a market incentive for reducing pollution and a cost reduction for companies as they have a financial incentive to reduce their emissions. Less emissions lowers the number of allowances they need to purchase and a possible second stream of income. Companies with high reduction can sell their surplus allowances and that generates revenue [31].

The EU introduced the ETS in 2005 which currently applies to three main categories of emitters [28]:

1. Installations in the Power and Manufacturing Sectors: This includes facilities such as:
    a. Power plants (coal, gas, oil)
    b. Industrial plants (steel, cement, refineries)
    c. Other large combustion installations
2. Aircraft Operators: This covers airlines operating flights:
    a. Within the EU
    b. Departing the EU to Switzerland and the United Kingdom
3. Maritime Transport: Emissions from ships operating within the European Economic Area (EEA).

Alongside this ETS1[3], the ETS2 is going to be implemented in 2027. This is a similar ETS with the same cap-and-trade principle, but focused on the building and transport sector [32]. The scheme does not impose obligations on individual vehicle and building owners who use the fuel and create the emissions because this is unworkable. Instead, responsibility for compliance falls on the regulated entity. This is generally the person liable to pay excise duty on the fuel, rather than the final fuel consumer. The definition of 'regulated entity' is broad and makes it difficult to determine who is involved. For natural gas, the excise duty arises at the moment of delivery to the final customer. The regulated entity will be the one who supplies the gas to the end-user. For road fuels, the release for consumption takes place when the fuel is sent from the warehouse to the fuel station. The regulated entity will likely be the warehouse [33]. In short, the regulated entities that are responsible for monitoring emissions and acquiring allowances, will be the upstream fuel suppliers and not the vehicle and building owners (end-consumers).

3.2 Purpose of the SCF

In essence, the SCF's purpose is straightforward and already defined clearly in the first proposal from the EC in 2021 (p.1, [34]):

[3] To distinct the two ETSs, the ETS for installations in Power and Manufacturing Sectors aircraft & maritime transport is called ETS1. And the ETS for buildings and transport is called ETS2.

"The Commission has reviewed the climate and energy legislation currently in place and proposes the 'Fit for 55' legislative package. The increased EU climate ambition also means the contribution from all sectors need to be increased. For that purpose, emissions trading for buildings and road transport is proposed as part of the revision of Directive 2003/87/EC ('ETS Directive'). It should provide an additional economic incentive to reduce the direct consumption of fossil fuels. However, the increase in the price for fossil fuels will have significant social and distributional impacts that may disproportionally affect vulnerable households, vulnerable micro-enterprises and vulnerable transport users who spend a larger part of their incomes on energy and transport. To address the social and distributional impacts on the most vulnerable arising from the ETS revision, the SCF is created. The SCF aims at mitigating the price impact of the new carbon pricing and should provide funding to MS to support their policies to address the social impacts of such emissions trading on vulnerable households, vulnerable micro-enterprises, and vulnerable transport users."

In the absence of any revenue recycling, the ETS2 is shown (blue bars) to have negative welfare impacts (Figure 2 [35]) for all deciles, with a broadly regressive pattern. The poorest 30% of households are impacted worst, and the richest 10% of households least. The importance of the SCF for the poorest households is clear by comparing the welfare impacts of recycling 25% of total EU-wide ETS2 revenues with the SCF (orange bars) and without the SCF (yellow bars).

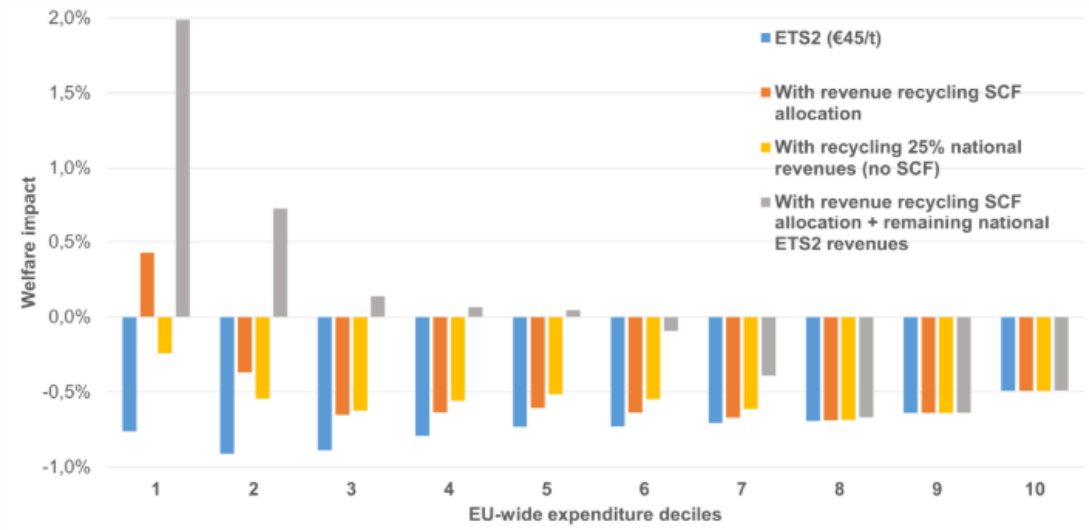

Figure 2, Welfare impact (% total expenditure) EU-wide from ETS2 (€45/tCO2) without and with revenue recycling, via SCF and/or nationally [35]

If revenues[4] are recycled to the benefit of the poorest 50% in each MS, The SCF inter-MS redistribution results in moderate net positive welfare benefits for the poorest 10% and reduces the adverse impacts significantly for households in the second and third expenditure group. According to Institute for European Environmental Policy (IEEP) however the lower middle-income households (group 3 – 6) tend to be better served by redistributing revenues nationally [35].

Meanwhile the SCF makes no difference for the richest households (group 7 – 10). In particular, the richest 10% see the smallest relative welfare impacts of the measure. This graph shows the need of a SCF as it is an important mechanism to especially benefit the poorest 10% of EU-wide households. It also shows a redistribution from the middle of the EU-wide income distribution to the bottom. With the least positive or negative change for the richest groups (7 – 10).

3.3 Allocation

The revenue made from the auctioning of the allowances to the regulated entities in the ETS2 is recycled. Revenue recycling is the basis of the SCF as 25% of the auctioning revenue will go into the fund. The remaining 75% should also be used for climate and energy measures. 25% translates to approximately 150 million allowances. As the price of the allowances is

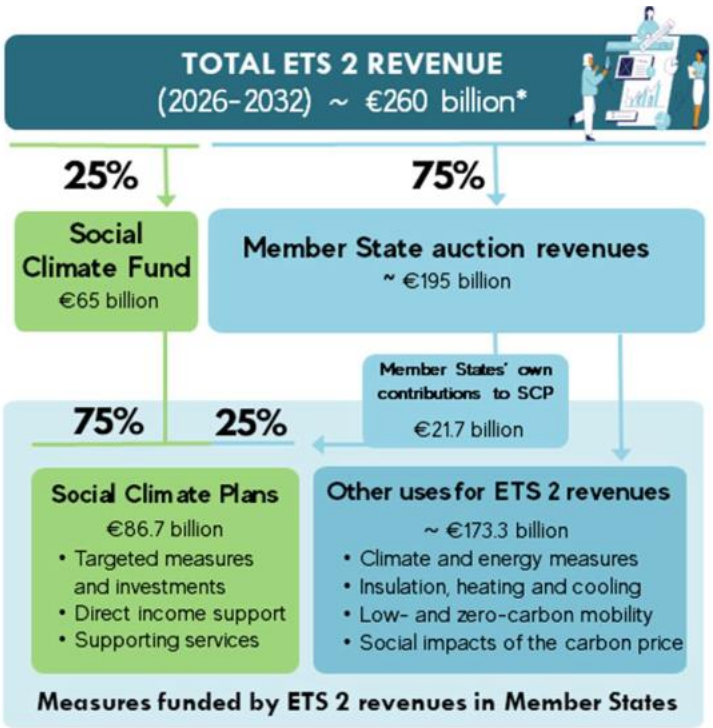

Figure 3, Overview of the ETS2 revenue [37]

[4] For this model a simple single payment (lump-sum) recycling method is used for all scenarios.

dependent on the market, the maximum amount of the SCF is set on €65 billion over the 2026-2032 period [36]. An overview of the complete ETS2 revenue and the usage of it is given in Figure 3 [37].

The proposal of the SCF from EC had a total amount of €72.2 billion, so an average price of €50/tCO2 is assumed as this corresponds to the 25% of the expected auctioning revenues [38]. Following these calculations, the average price for the actual SCF of €65 billion should then be €45/tCO2. This average price and consequently the size of the fund has been heavily debated in the Council of the European Union (Hereinafter referred to as: Council). A high price is necessary to incentivise a change in consumption behaviour but if it is too high, the burden on especially vulnerable households can become problematic. Some MSs like: Finland, Germany, Sweden and Denmark were supportive of a higher price to increase incentive, but didn't want a SCF [39] [40]. Germany was particularly against the SCF and stated: "Germany cannot afford this solidarity because the country is in need of the (full) carbon pricing revenues itself."[41]. Other MSs like: Poland, Hungary, Romania, Cyprus, Lithuania, Czech Republic and Malta were especially worrisome of a high price and wanted no ETS2 at all or a bigger share of the SCF [39] [40]. The EC represented by Frans Timmermans emphasised the necessity of the fund: "The SCF is an integral part of the new ETS2. It can really help us address social issues... No ETS2, no SCF" [39]. The SCF was ultimately established, though with a smaller budget than originally proposed by EC[5].

In order to protect citizens from high prices, the regulation includes an additional price stability mechanism to release 20 million additional allowances from the market stability reserve (MSR) in the event the carbon price exceeds €45/tCO2 for two consecutive months (article 30h-2, [42]). The MSR has a total of 600 million allowance. In principle, the measure should apply once during a period of 12 months. However, it is possible to apply again during a same period of 12 months where the EC, assisted by the Climate Change Committee, considers that the evolution of the price justifies another release of allowances. If the average price of allowances is more than three times the average price of allowances during the six preceding consecutive months, 150 million allowance shall be released from the MSR (article 30h-3, [42]). In the instance of too low prices to safeguard the size of the SCF, The EC ensures

[5] The debate around setting the average price and the measures is not a core aspect in answering the research question, however it does give some insight on the establishment of the regulation with an average price where all MSs compromised.

that an additional amount of allowances, which are part of the MSR are auctioned and the revenues made available to establish the SCF until 2032 (article 30d-4, [42]).

Another aspect that catches the attention is the maximisation of the fund. €65 billion is a respectable size, but according to the Impact Assessment Report which was part of the EC's proposal of the ETS2, the prices could have been a lot higher than €45/tCO2 as Figure 4 [43] shows.

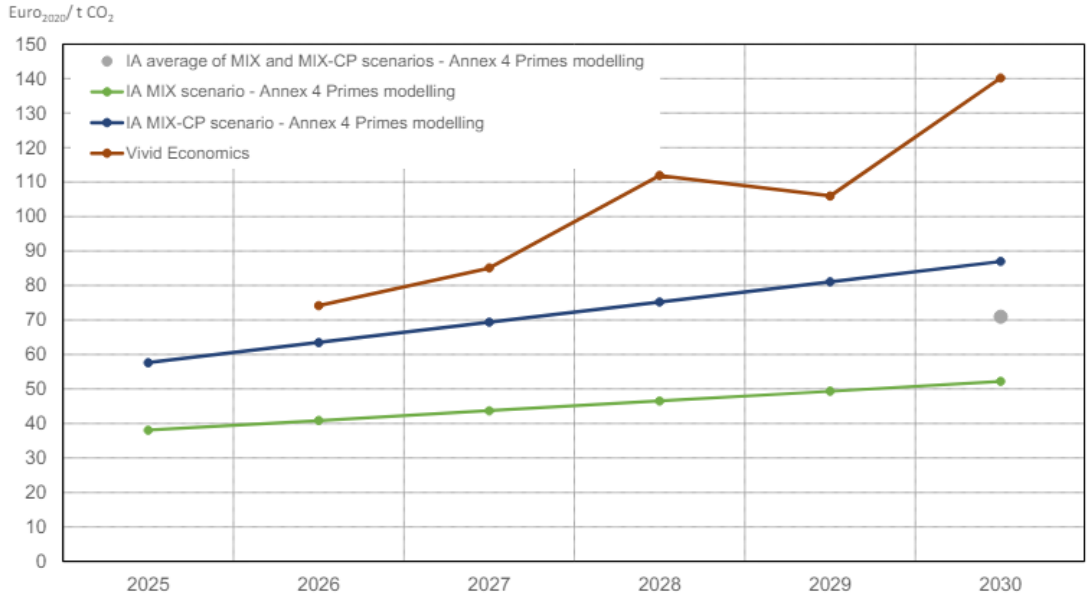

Figure 4, Price projection ETS2 [43]

The Öko-Institut in Germany did their own calculation using these three different price assumptions: 50, 70 and €110/tCO2. They compared these prices to the SCF adopted *fixed amount* (€72.2 billion regardless of ETS2 price) to the *25% alternative* (25% of the auctioning revenue depend on the ETS2 price). The results are displayed in Figure 5 [38]. Looking at Figure 5, At €50/tCO2 the total amount of the SCF would be the same for the fixed amount and the 25% alternative (orange bars both €72.2 billion). At €70/tCO2 the total amount would have been €100.6 billion for the 25% alternative. And at €110/tCO2, the total amount of the SCF would more than double (€158 billion) if the 25% alternative would have been adopted. The current regulation with a fixed SCF could foster an unpleasant situation for people living in energy poverty in the possibility of high allowance prices. The MSR moderates this but acts at the fastest two months later. To be ahead of the consequences, the fund goes into action one year prior (2025) to the ETS2. And this gap year is filled by the revenue from the ETS1 allowance auctioning [44]. The size of the SCF and the unproportional allocation has been specifically part of debate and will be further analysed in

Theoretical debate.

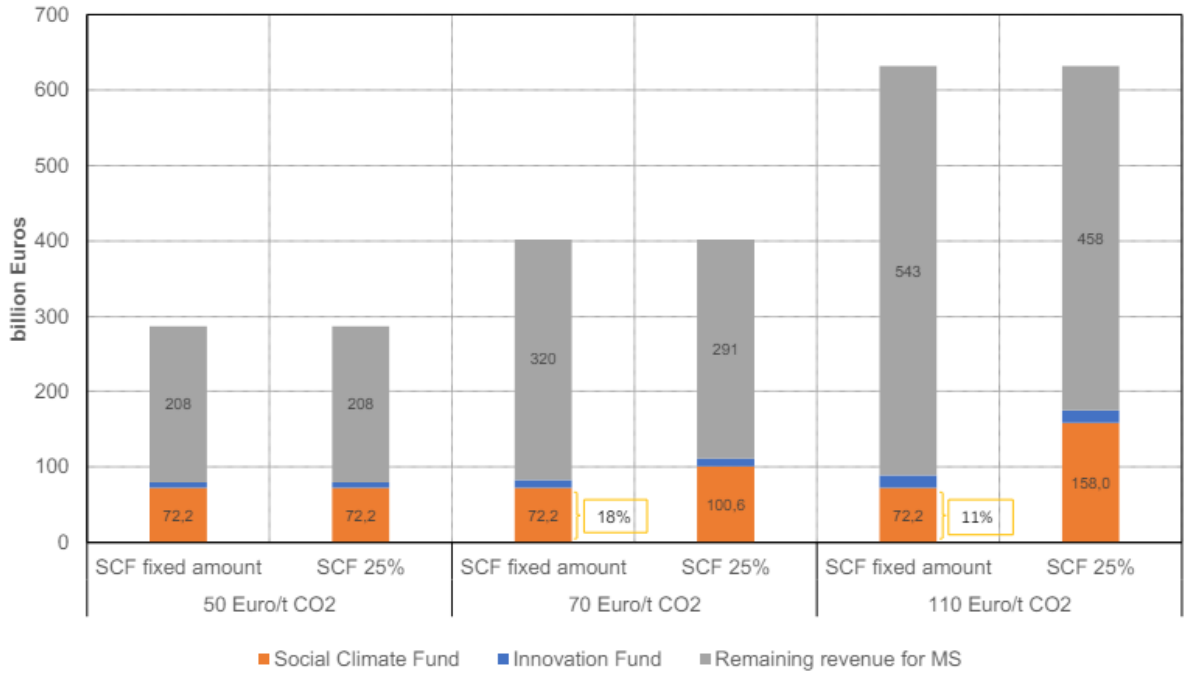

Figure 5, Revenue allocation with fixed amount of SCF and fixed ratio of SCF at different CO2 price assumptions (2025/26 – 2032. [38]

The allocation of the maximum €65 billion SCF shall be calculated for each MS in accordance with Annex I and II from the Regulation (article 14, [45]). Each MS can submit a request up to its maximum financial allocation and shall contribute at least 25% of the estimated total cost of their SCP themselves (article 15, [45]).

In the event of exceptional high energy prices the implementation of ETS2 can be postponed until 2028 in accordance with article 30k of Directive (EU) 2023/959 [42]. In this case, the maximum allocation of the SCF will be €54.6 billion (article 10, [45]). As this would be an exceptional case, the maximum allocation of the standard situation will be used for the further research of this thesis.

Annex I explains the methodology of the maximum allocation, which is technical and less important for the goal of this thesis. Annex II gives the clear numbers, which for France is respectively: €7.276.283.944 (11,19% of the SCF).

To be eligible for this allocation, the MSs have to submit their SCP by 30 June 2025. Consequently, the EC shall assess the plan and decide whether the Member State can implement and carry out the SCP (article 17-1, [45]). In the following section the exact content of the SCP will be discussed.

3.4 SCP requirements

Before a MS can submit their SCP to the EC, they have to conduct a public consultation with local and regional authorities, representatives of economic and social partners, relevant civil society organisations, youth organisations and other stakeholders.

In the SCP a summary must be included with the input of the stakeholders that participated and how it is reflected in the plan. When this is done, the regulation gives an overview of the elements that should be part of the SCP.

The first aspect discussed in the SCP should be an explanation of how the definition of energy poverty is applied at a national level (article 6-1f, [45]). This determines the scope of the SCP and its coherence with other social policy. A clear application and explanation of the definition is therefore important. Additionally, the regulation describes an estimate of the likely effects of the increase in prices resulting from the inclusion of GHG from buildings and road transport in the ETS2 (article 6-1d, [45]). When energy poverty is defined and the likely effect of price increases are estimated, the regulation demands an estimate of the number and identification of vulnerable households (article 1-6e, [45]). The regulation also emphasises the importance of gender equality as women are disproportionately affected by energy poverty. particularly single mothers, who represent 85% of single parent families, as well as single women with disabilities, and elderly women (article 1-24, [45]). Lastly, the SCP should be consistent with the information and commitments made by the MS under the following programs and plans (article 6-3, [45]):

- the European Pillar of Social Rights Action Plan;
- its cohesion policy programmes under Regulation (EU) 2021/1060;
- its recovery and resilience plan under Regulation (EU) 2021/241;
- its building renovation plan under the Directive of the European Parliament and of the Council on the energy performance of buildings (recast);
- its updated integrated national energy and climate plan under Regulation (EU) 2018/1999; and
- its territorial just transition plans under Regulation (EU) 2021/1056.

The definition and functioning policy frames the scope of the measures of the SCF per MS. Within this quandary of establishing measures that check all the boxes, the EC gives examples of eligible measures and investments that can be included.

With the objective in mind of energy poverty alleviation, the most measures are directly targeted at achieving this. This is translated to two types of measures: Preventive measures related to housing & curative measures related to income.

Preventive measures housing:

- Supporting building renovation in particular vulnerable households occupying the worst performing buildings, including tenants and people living in social housing (article 8-1a, [45]).
- Support access to affordable energy efficient-housing, including social housing (article 8-1b, [45]).
- Contribute to the decarbonisation, such as through electrification, of heating and cooling of, and cooking in, buildings by providing access to affordable and energy-efficient systems, and by integrating renewable energy generation and storage, including through renewable energy communities, citizen energy communities and other active customers to promote the uptake of the self-consumption of renewable energy, such as energy sharing and peer-to-peer trading of renewable energy, connection to smart grids and to district heating networks, that contributes to achieving energy savings or to reducing energy poverty (article 8-1c, [45]).
- Provide targeted, accessible and affordable information, education, awareness and advice on cost-effective measures and investments, supporting building renovation and energy efficiency (article 8-1s, [45]).
- Support public and private entities, including social housing providers, in particular public-private cooperatives, in developing and providing affordable energy efficiency solutions and appropriate funding instruments (article 8-1e, [45]).

Curative measures income:

- It may include the costs of providing direct income support to vulnerable households to reduce the impact of the increase in heating fuel prices. Such support shall be temporary and decrease over time. MSs may provide temporary direct income support if their SCP contains measures or investments aimed at those vulnerable households. The costs of measures providing temporary direct income support shall not represent more than 37,5 % of the estimated total costs (article 8-2, [45]).

All eligible measures are focused on increasing energy efficiency through financing or raising awareness, except the measure describing direct income support. It alleviates the pressure on the EER of the vulnerable households that might have been put under higher constraints due to increasing energy prices.

Yet the usage of the money cannot be guaranteed when direct income support is used. The assessment and monitoring will be discussed and analysed in the next chapter.

3.5 Assessment & Monitoring

Article 16 of the SCF regulation describes the assessment of the EC. In essence, the SCPs are assessed on the basis of relevance, effectiveness, efficiency, and coherence. Each has certain sub criteria which will be considered.

Relevance (article 16-3a, [45]):

1. Adequate response to the social impact on and challenges faced by vulnerable households in particular households in energy poverty taking into account the challenges identified in the assessments of the concerned MS national energy & climate plan (NECP).
2. Measures and investments included in the SCP do not significantly harm environmental objectives within the meaning of Article 17 of Regulation (EU) 2020/852 and whether the SCP helps reduce fossil fuel dependency.

Effectiveness (article 16-3b, [45]):

1. Lasting impact on vulnerable households in the MS on the challenges addressed by the SCP.
2. Effective monitoring and implementation of the SCP, including the envisaged timetable, milestones and targets, and the related indicators.
3. Measures and investments are consistent and compliant with the requirements of the Energy Efficiency (recast) Directive 2023/1791.

Efficiency (article 16-3c, [45]):

1. Justification of the MS provided amount of the estimated total costs of the SCP to be reasonable, plausible and in line with the principle of cost efficiency.
2. Arrangements proposed by the MS are expected to prevent, detect, and correct corruption, fraud and conflicts of interests.

3. Milestones and targets proposed by the Member State are efficient, in view of the scope, objectives and eligible actions of the SCF.

And lastly coherence (article 16-3d, [45]): The EC shall consider whether the SCP contains measures and investments that represent coherent actions.

On the basis of the assessment carried out in accordance with the above mentioned criteria, the EC decides on the plan no later than five months after 30 June 2025 (article 17-1, [45]). If a positive assessment is given by the EC, the SCP shall be transformed into an implementing act. This act sets out the measures and investments with the estimated total costs of the plan with suiting milestones and targets. It also holds the maximum financial allocation, national contribution and monitoring indicators (article 17-2, [45]). If the SCP is no longer achievable, as a consequence of the direct effect of the ETS2, the MS shall submit an amended SCP and redo the assessment (article 18-1, [45]). By 15 March 2029 the MS assesses the appropriateness of the measures and investments taken and the actual direct effect of the ETS2 (article 18-5, [45]). Two years after the start of the implementation of the SCP, the EC provides an evaluation report on the implementation and the functioning of the fund. This report is based on the monitoring of the MS. Specifically, the report assesses the efficiency of measures and investments and the use of the direct income support in light of the achievement of the milestones and targets set out in the SCP.

All things considered the objectives of the SCP are clear cut, but the specifics are still clouded. What can be concluded from the analysis of the SCF regulation is that improving energy efficiency is the main goal. The eligible measures and the assessment criteria are primarily focused on this with a reference to the Energy Efficiency Directive. But answering the 'How' question seems to be the most pressing. There is no priority given to certain measures and the eligible measures are proposed yet not mandated. As the measures are case specific, comparing the SCP of the different MSs will be difficult with the assessment criteria. A lasting impact targeted at vulnerable households seems to be the main objective and most important assessment criteria but this cannot be verified. With building renovation, social housing and poverty being mostly a competence of lower-level government, sufficient stakeholder consultation is essential. This does not seem highlighted enough in the regulation and is not mentioned in the assessment criteria. The regulation sets an objective and allocates money but gives limited guidance to MSs.

3.6 Theoretical debate

Coming back to the conclusion of the Theoretical Framework: the SCF is not obligated to maximise the primary goods of the least well-off now, but keep the people above the sufficiency line and maximise their benefits in the objective of alleviating energy poverty over time. This is partially what investments going towards energy efficiency does. It reduces the usage of energy and consequently the risk of people staying or getting in energy poverty over time. This does however leave the need of minimum sufficiency in disregard because it is no solution for all the least well-off on the short term. When the definition of least well-off (people in the first three income deciles with an energy-income ratio above 8%) is extrapolated to the whole of the EU, it does not concern all MSs equally. In a report from Ariadne project, the relative energy expenditure per household income deciles in the EU is researched. The results are shown in Figure 6 [46].

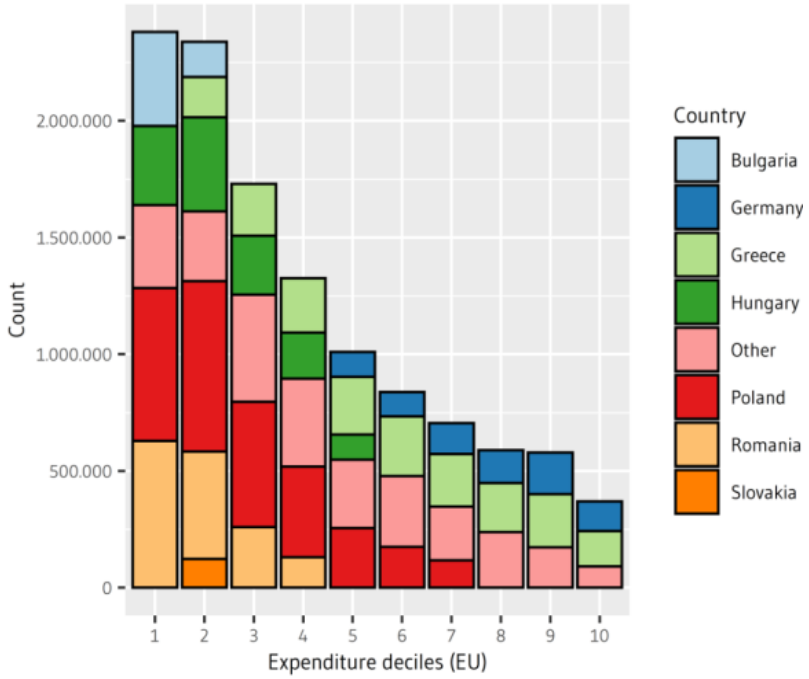

Figure 6, Relative energy expenditure per household income deciles in the EU [46]

What is made clear is that households in Bulgaria, Hungary, Poland, and Romania would be at the greatest risk of experiencing energy poverty as they have the biggest representation of relative energy expenditure in the three lowest income-deciles. If the SCF was to be completely coherent with the definition of least well-off in the theoretical framework on an EU level, the distribution of the fund would have been vastly different. The SCF would have been allocated to the concerned households (energy-income ratio above 8% in the first three income deciles) in the above mentioned MSs.

Instead, each MS in the EU gets a part of the fund. This shows the political dimension of the fund, which influences the fairness of distribution. However, the regulation has already been adopted, so this is insignificant for this study. It is more relevant to focus on a fair distribution within the MS as the adopted SCF now prescribes. Justice is defined by the implementation of measures. And so, justice lays in the details of the policy.

The SCF regulation tries something new on a European level: combining climate policy with social policy. Mitigating the price impact of the ETS2 and addressing social impacts is an important aspect of making the energy transition just. However, the description of eligible measures is still general: support renovation, decarbonise through electrification, provide information & direct income support. This lack of guidance makes the assessment of justice of the SCF impossible. Moreover, it prescribes a limited and decreasing use of direct income support. This could play a significant role in sustaining above the sufficiency line as investment in energy efficiency takes time. Still the focus is on long term value creation and not directly on maintaining purchasing power. This could be disastrous for the sufficiency line of the ToJ. To determine the justness of the SCF, a case study is needed to understand the implementation of measures. France is a very suiting case to do this due its extensive energy poverty strategy and history of carbon pricing with revenue recycling. This got heavily influenced by YV, which also played a significant role in the origination of the SCF. The equitability of the measures is analysed. If there are gaps in the equitability, which are solvable in the SCF framework, suiting measures for the French SCP can be determined.

4. French case study

As described in the previous chapter, France also has a history with carbon pricing and revenue recycling. It is important to understand what happened prior to the YV and what can be learned from it. To assess the effectiveness of French energy poverty policy and identify potential gaps, this analysis examines the objectives, resources, and eligibility criteria of existing measures. By evaluating these aspects, lessons can be identified for improving equitability. To maximize its impact, the SCF measures should be designed to complement existing policies and ensure a more equitable approach.

4.1 Carbon taxation in France

In the past, France has explored three different approaches to carbon pricing, ultimately adopting the last system. In 2000, the ecotax was proposed but was invalidated the same year by the Constitutional Council because it breached the principle of tax equality (article 37, [47]). The tax rate to be paid by companies was calculated by an abatement coefficient which increased progressively with energy consumption. Meaning a company with higher energy consumption in comparison to a similar size company would pay less taxes [48]. According to the Constitutional Council, this was against the principle of tax equality and thus unconstitutional[6] (article 13, [49]). In 2009, it was reattempted as a carbon contribution. It taxed companies which were not taxed by the already in place ETS1 [50]. Yet the companies falling under the ETS1 received free allowances until 2013 [51] and were therefore exempted of environmental taxation. So again the Constitutional Council invalidated it, but this time for environmental inefficiency (point 82, *polluter pays principle*[7] [52]).

In 2013 under Francoise Hollande's presidency, the climate-energy contribution (CCE) was adopted. Hollande's Socialist Party (PS) had a parliamentary coalition with the Green Party (EELV). In 2012, EELV expressed their concerns to the government on the absence of an environmental taxation and as a consequence put their cooperation in jeopardy [48]. In July 2013, the Environment Minister Delphine Batho was fired from the government after criticising the budget cut for her ministry [53].

[6] Principle of tax equality: Article 13 of the French Declaration of the Rights of Man and Citizen of 1789.'*a common contribution is essential for the maintenance of the public forces and for the cost of administration. This should be equitably distributed among all the citizens in proportion to their mean'*

[7] Article 4 of Charter of the Environment 2004: *'Everyone shall be required, in the conditions provided for by law, to contribute to the making good of any damage he or she may have caused to the environment.'*

As this was the second Environment minister being fired in a year, EELV was discontent with the government's attitude towards environmental issues [54]. With that being the EELV main concern, it exacerbated their coalition. Against this backdrop of political uncertainty, the EELV submitted a bill proposal to create the CCE [55]. Figure 7 gives a brief overview of the process. As the first two systems did not get approved, the focus is on the CCE.

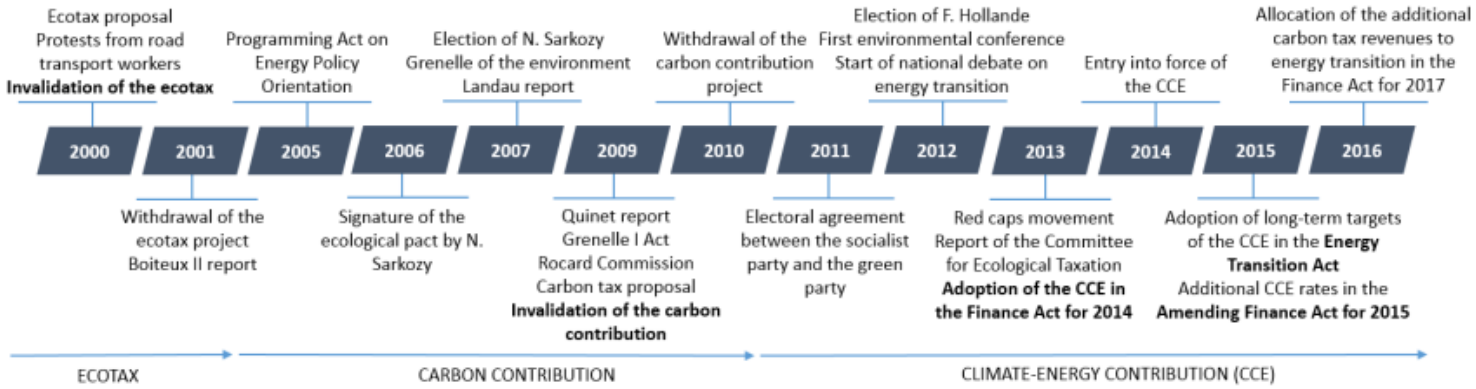

Figure 7, Chronology of main domestic events and measures that had an influence on the carbon tax [48]

The CCE was not get implemented as a new tax, but as a component of existing energy taxes in the Finance Act for 2014. This made it easier to implement, because it became part of the already existing energy taxes that got implemented under EU Energy Tax Directive (2003)[56]. Mainly the domestic consumption tax on energy products (TICPE), the domestic consumption tax on natural gas (TICGN) and the domestic consumption tax on coal (TICC) were impacted. As the CCE was complimentary to the already implemented ETS1, the companies falling under the ETS1 was excluded, meaning that primarily the transport and building sector were subject to CCE. The price of the CCE is €44,60/tCO2 and the ETS2 will be around €45,00/tCO2. So, if the exclusion is progressed to the ETS2, it would mean that the CCE will become redundant.

Although not directly mentioned in the Finance Act, a memo from the Ministry of Economy shows that the CCE creates a carbon price of €7/tCO2 in 2014, €14.5/tCO2 in 2015 and €22/tCO2 in 2016 [57]. A long-term progressive increase of the carbon price was added in the impactful Energy transition law (2015) with the objective of being €100/tCO2 by 2030 [58] (Table 1).

Table 1, Carbon component in €/ton CO2 [58]

2017	**2018**	**2019**	**2020**	**2021**	**2022**
30.5 (30.5)	44.60 (*39*)	55 (*47.5*)	65.40 (*56*)	75.80	86.20

In 2014, it only targeted natural gas and the price increase was completely compensated by an equivalent decrease of the TCGN itself [59]. In 2015, the other fossil fuels were added to the CCE scheme without a compensation decrease. It is estimated that the CCE covers 40% of the total GHG emissions in France [60].

After the previous failed attempts of carbon pricing, the committee for ecological taxation emphasised the importance of compensation measures, specifically vulnerable households and the competitiveness of economic actors (p.16, [59]). For households, the committee calculated an increase of average annual cost of €40 with the introduction of CCE at €7/tCO2 (Figure 8) [59]. The graph being in absolute numbers, the poorest households pay the smallest contribution but it leaves out the relative burden to income. The main measure would be a regressive tax credit focused on low-income households, neutralising the cost for households in the lowest decile, then gradually decrease in value until the fourth decile. This tax credit would amount to 30% of the contribution required by the carbon component.

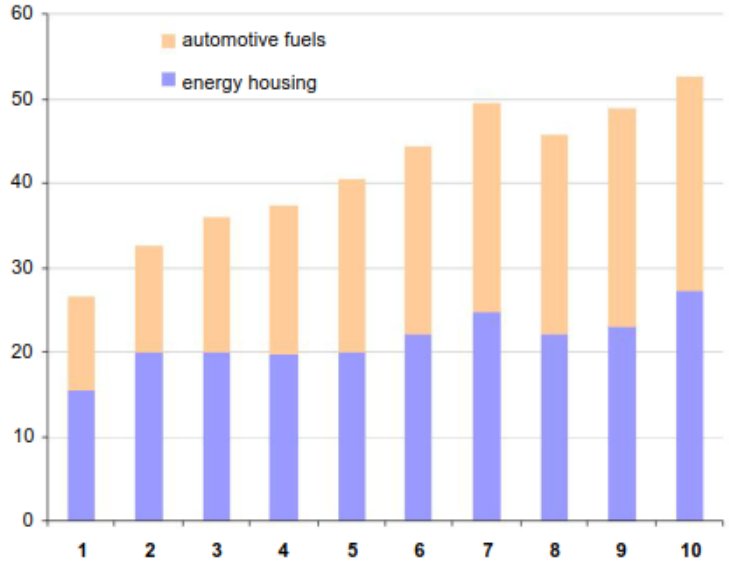

Figure 8, Additional cost per household (income decile on x-axis) of the introduction of a carbon base of €7/ T in energy taxation (in €/ year on y-axis) [59] .

For companies, the main measure would be to use the tax revenues to finance the Tax Credit for Competitiveness and Employment (CICE). As an example, in 2016 the CCE generated around €4 billion of tax revenues, which were recycled as follows [48]:

- €3 billion was used for redistribution to companies through the tax credit for competitiveness and employment (CICE).
- €700 million was used for the value-added tax (VAT) reduction to 5.5% on thermal building renovation and essential goods and services for energy transition.

- €300 million was used as compensation for households through a green check. The redistribution was proportionate to the income levels, spanning from €1,350 for a person earning up to €25,000 per year to €3,000 for the lowest earners.

As can be seen above, three quarters of recycling was directed towards companies. The CICE already existed and was implemented to improve competitiveness and employment. The total financing of this measure was €26 billion in 2016 [61]. The €3 billion contribution of the CCE is a major part of its revenue, while it is only a minor contribution to the CICE. Since 2018 the CCE had a revenue of approximately €10 billion annually [62]. If the ETS2 will substitute the CCE, it could bring uncertainties to the ministry of energy transition. The remaining revenue of the ETS2 that is not used for the SCF is dependent on the auctioning price of the allowances and does not have a guarantee as the SCF. While the MSR should keep the price in balance around €45/tCO2, it does not fully eliminate the possibility of fluctuations.

4.2 Yellow vests

As mentioned before, the carbon price was meant to increase steadily to €100/tCO2 by 2030. Yet, at the end of 2018, the government decided to abandon this trajectory and froze the price level for an undetermined period. This turnaround in French climate policy was a direct consequence from the YV, that started against the carbon tax [63]. Between the implementation of the CCE and the YV, the price of diesel increased by 44% [64] (Figure 9). France's upper-class lives more in cities and lower-classes more in suburbs due to more affordable housing [65].

Figure 9, Monthly average diesel consumer prices in France 2016 - 2018. [64]

This price increase affected low- and middle-class citizens more than the upper-class, because fuel expenditure is around 9.2% for the least well off while around 3.2% for the three highest income deciles [66]. On top of these increase of burden on the middle and lower income, the wealth tax got abolished and created a 30% 'flat tax' rate on capital gains [67]. This only added fuel to the fire for the YV and increased their perception of inequality and giving President Macron the nickname: "le président des riches" (the president of the wealthy) [68].

In response to the heavy protests, Macron formulated multiple measures by Presidential address like a €100 increase in minimum wage from 01/01/2019 by reforming the activity bonus without supplementary costs to employers [69]. In addition to this increase, one million more households benefited. Other measures include: tax exemption for overtime, end-of-year bonus incentive for employers and reimbursement for pensioners receiving less than €2.000 per month [70]. But one of the main responses was a one-year postponement of the carbon tax increase of what was planned (see Table 1). This had a provisional impact of €3.9 billion on the 2019 state budget [70]. Eventually, the postponement was kept for an undetermined period and is still in place. Figure 10 [71] shows the evolution of the CCE. In 2022 the price was still €44,60/tCO2 (orange bar), while the long term progressive increase of the Energy transition Law stated €86,20/tCO2 for 2022 (blue bar) with the objective of €100/tCO2 in 2030 [72]. Altogether, the measures increased public spending by €17 billion as a consequence of the YV [68].

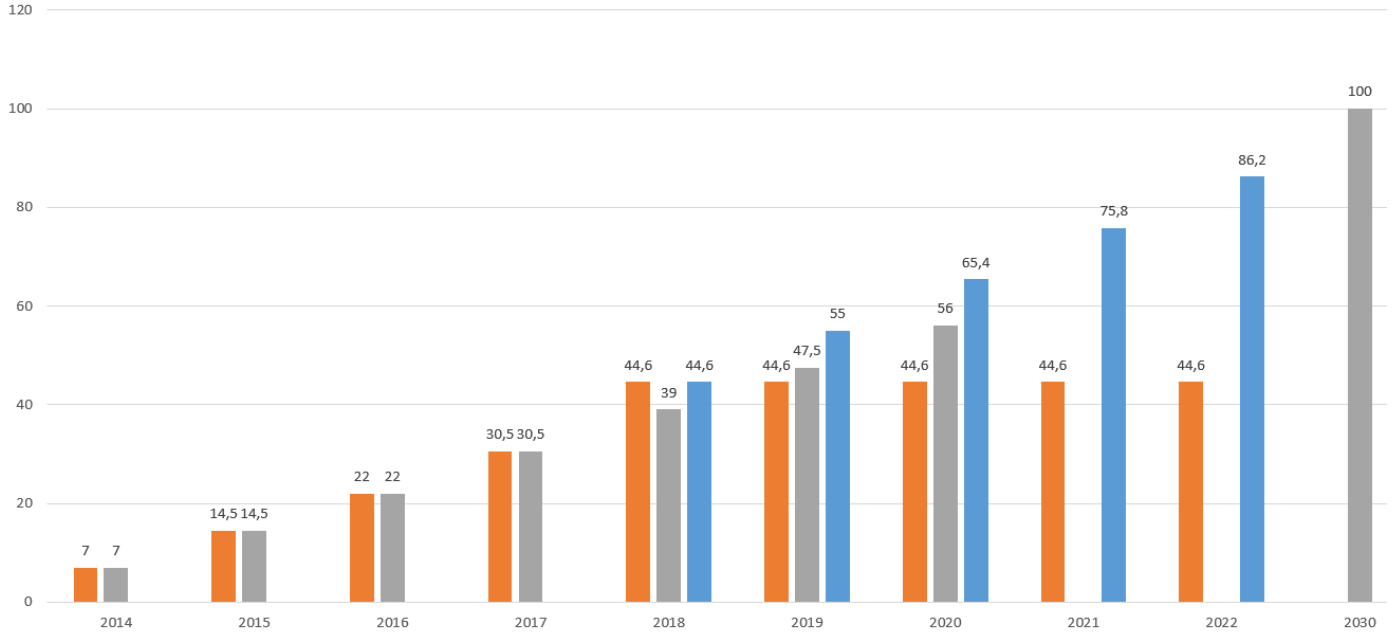

Figure 10, Evolution of the CCE (in €/tCO2). Orange: real, Grey: Finance law 2014, Blue: Energy transition law 2015 [71]

Coming back to the theoretical framework, the YV does not exactly align with the definition of least well-off as defined in the ToJ. The protesters were primarily people from the lower middle class. Nicolas Duvoux described the issue as the following [73]:

> "The issue concerns the feelings of downgrading (déclassement) experienced by the lower middle class. while in the recent past, these social groups tended to compare themselves to the more disadvantaged and blame them for their dependency on welfare, nowadays they are more likely to look upwards and complain about increased inequalities, and in particular unacceptable tax injustice."

This may not be the exact position of the vulnerable households in energy poverty which should be supported in according to the SCF regulation, but there are similarities between the two.

The actual regressive effect and the perception of inequality are similar. The YV started as an uproar against the rising fuel price, but evolved into a social movement against inequality [65]. While the YV expressed its discontent about the increase in fuel price, it did not oppose climate change reform itself. For example, in their list of demands [74] they called for the creation of a hydrogen car industry and a tax on fuel and kerosene for ships and airplanes. This is a valuable lesson for sufficient carbon pricing. Carbon pricing always tends to have a regressive effect since poor households spend a relatively larger share of their income on carbon-intensive goods [75]. As widely understood, adequate recycling can decrease regressivity and research found that information provision and communication are crucial to gathering sufficient public support for carbon pricing [76]. Yet in France the communication of revenue usage is bound by the *principle of budgetary universality*. This principle prohibits the use of specific revenue to finance a specific expense [72]. Consequently, it not only limits the communication, but also hinders a clear stream of revenue recycling. Exemptions to this principle do exist, so called 'Compte d'affectation spéciale'[8] (CAS). Between 2016 and 2020 there was a CAS Transition Énergétique (TE) in place. This CAS TE was directly funded by the revenue of the tax on energy products (TICPE) and the revenue was used for energy sector expenditures [77]. The CAS TE had a total budget of around €6 billion in its last year (2020), but only €40 million was used to support energy consumption (more specifically for Demand Side Response) [78]. The remaining was used to support companies develop renewable energy sources.

[8] In English this is called 'special purpose account'. Typically authorized by state law to provide a single service and/or work in a designated functional area of public policy. In this case the energy transition.

In 2021 the exemption of the principle was stopped and the revenue of the TICPE was added to the budget of the ministry of Energy Transition for their financial program 345 ‘Public energy service’. This program covers, among others, ‘the protection of consumers in situations of energy poverty’ [77]. It is unclear whether the change of this reallocation was a consequence of the YV, but it can be assumed that it played a part.

Much research is done on the acceptance of carbon taxation. The key role of governance is the use of revenue in the acceptance of the taxation [79]. Shifting carbon tax revenue from supporting renewables to tackling energy poverty suggests the French government has acknowledged the urgency of the issue. While directing carbon tax revenue towards vulnerable households aligns better with the ToJ, the program's effectiveness depends on its implementation. Therefore, the exact measures currently in place are analysed in the next section of this chapter.

4.3 Energy poverty

The policy to combat energy poverty was initiated in France by a law dating from 2010, known as “Grenelle 2”. This law defined energy poverty for the first time in France.

A person is considered fuel poor "if he/she encounters particular difficulties in his/her accommodation in terms of energy supply related to the satisfaction of elementary needs, this being due to the inadequacy of financial resources or housing conditions” (p.37, [80].

Subsequently, the law created the ONPE, which produces data on the phenomenon of energy poverty and on the measures and financial aid which aim to prevent it and limit its extent [81]. The main indicator of energy poverty published by the Ministry for Energy Transition is the EER, i.e. the share of households in the first three equivalised income deciles whose energy bill amounts to 8% or more of their income. On average, this rate, adjusted for temperature variations, amounted to 11.7% of households, or 3.6 million, over the 2010-2019 period. Figure 11 [82] shows the evolution of the EER over time. Using all available indicators, the ONPE reports that 5.6 million households remain particularly vulnerable to climate hazards and variations in the price of energy despite the rise in energy support policies [83].

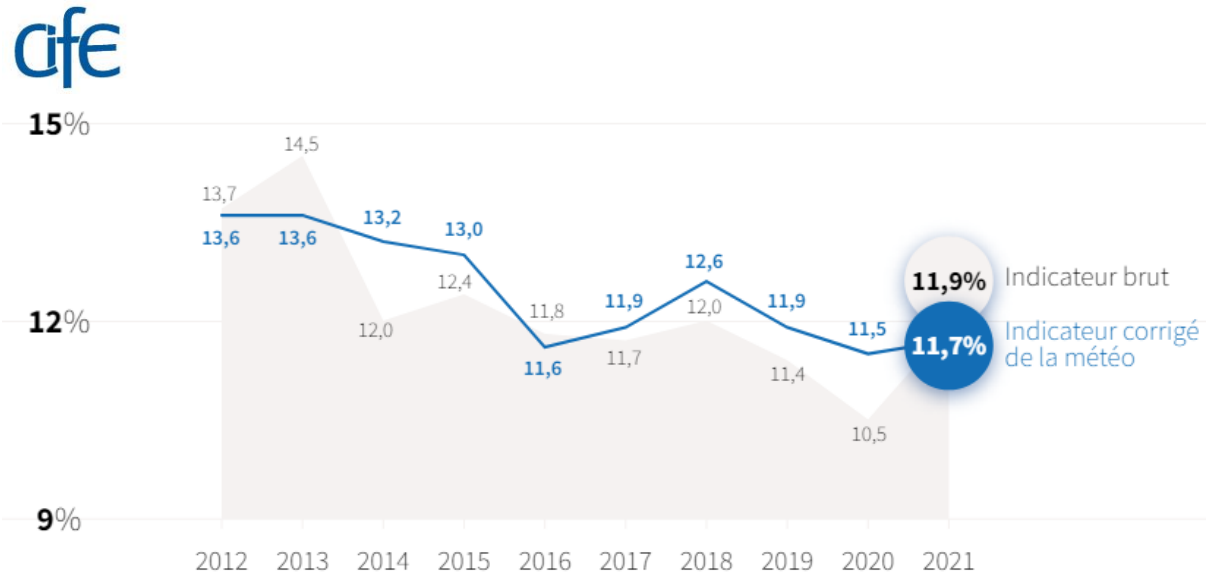

Figure 11, EER 2012-2021. Grey surface: Gross indicator & blue line: corrected by weather [82]

One important aspect of energy poverty is poorly insulated housing [84]. Out of 30 million primary residence dwellings on 1 January 2022, 5.2 million, or 17,3%, had a very high energy consumption [85]. This means being in the categories F and G of the diagnostic de performance énergétique (DPE)[9], also called energy sieves. There were 7 million poorly insulated buildings in 2019, and half of them belonged to the poorest 30% of the population, who spent more than 8% of their income on their energy bill [12]. To tackle this, France introduced the ALUR law in 2014 to follow-up the Grenelle 2, which included energy poverty in housing policy. In 2015, the energy transition law was adopted. More recently in 2021, the climate and resilience law went into action [83]. From 2010 to 2022, about fifty measures have been implemented. These measures can be simplified to 2 types: investment in subsidies or investment in efficiency (Figure 12 [86]). The figure shows France emphasis on investing in energy efficiency (far above blue median line) yet on the orange line of the median subsidy investments. France is one of the most active MS in the EU in alleviating energy poverty. With the goal of reducing energy consumption by 40% by 2050 (same level as 1960s) it has also set a very ambitious target for energy efficiency [87].

[9] Energy performance certificate. It is a rating scheme to summarise the energy efficiency of buildings going from A (most efficient) to G (least efficient).

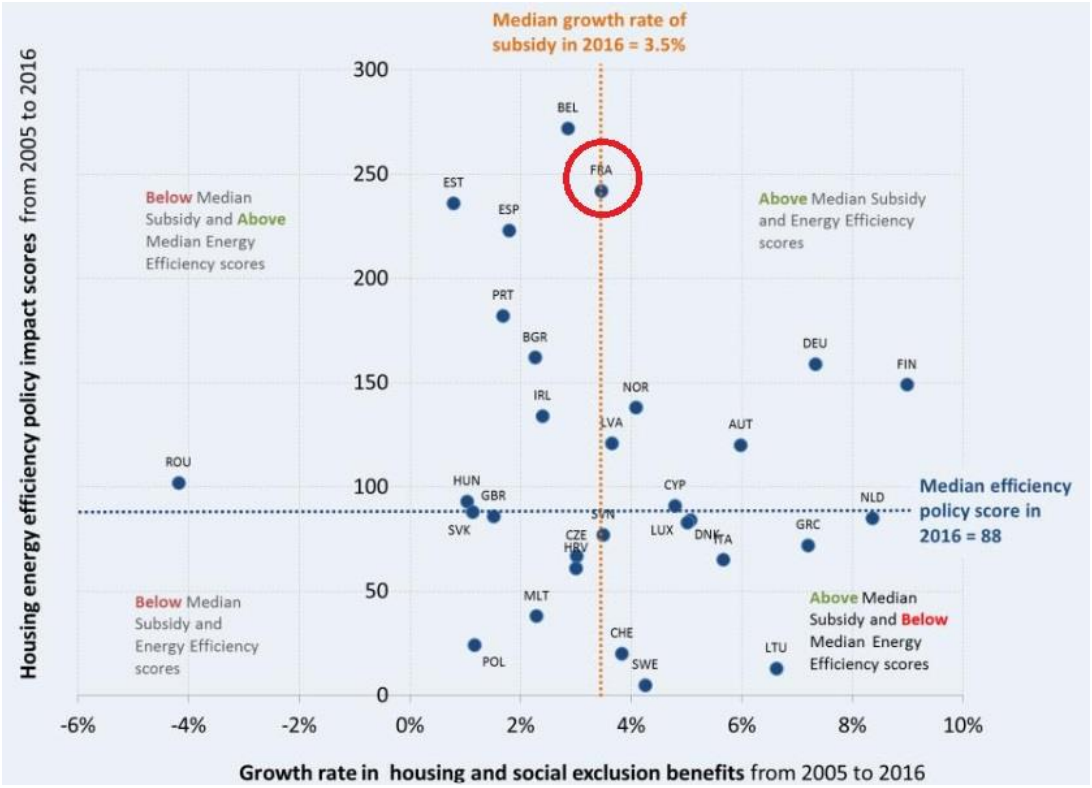

Figure 12, Changes in subsidy and energy efficiency policy scores 2005-2016 [86]

4.4 Measures in place

Not all fifty measures can be discussed in detail, so a short list is made of the most prominent measures for vulnerable households which are similar to the eligible measures to the SCF as described in 3.4 SCP requirements. Educational and advisory measures like the ONPE, Maison de l'Habitat Durable, ANAH and local initiatives like Amelio are not discussed as they are not within the scope of the thesis nor the direct target of the SCF. Additionally, with these measures already in place, it seems unlikely that France will establish a new institute or agency, nor can the SCF be used for internal administration costs. This list makes up the main French strategy to alleviate energy poverty which evolved over time through different acts and policies (see Table 2 for a short overview). There are three types of measures:

- Preventive measures related to housing;
- Curative measures related to income;
- Behavioural measures related to energy consumption.

Before going through the measures, the standard terms are defined. For multiple measures the same terms and conditions apply for receiving the financing.

The standard terms are as follows:

- It concerns main residences (owner or tenant themselves live in the concerned housing).
- Everyone can apply for the financing scheme, but it is dependent on [88]:
    - the total income of the household
    - The amount of people composed of the household
    - Whether the housing is inside or outside Île-De-France
- The work has to be carried out by a certified professional from the RGE registry (Reconnu Garant de l'Environnement)[10]

4.4.1 Preventive measures

MaPrimeRenov

This is the main measure to finance energy efficiency. For MaPrimeRenov (MPR), the standard terms apply but only very modest, modest, and intermediate incomes can receive the grant. It is accessible to housing built at least 15 years ago and it can be used to finance energy performance and concerns actions relating to heating and domestic hot water as well as thermal insulation (for example: thermal insulation of walls from the inside, installation of an air/water heat pump, etc.). For each type of work or piece of equipment there is a set maximum of funding depending on the standard terms. Lastly, the renovation should be approved by the ANAH (National Housing Agency) and the grant gets paid once the work is complete [89].

Subsequently, there are two other types of the MPR: Guided tour & Co-ownership. Guided tour supports large-scale work where housing has to improve two energy classes with a maximum allocation of €63.000 [90]. And Co-ownership helps to improve communal areas of the co-ownerships, so hallways in apartment buildings for example. This grant finances a maximum of 45% of the work with a maximum of €25.000 [91].

Zero-interest Eco-loan (Eco-PTZ)

As the name implies, it is a zero-interest rate loan with a 20-year repayment period to improve the energy performance. For this scheme, the standard terms apply but the accommodation must be at least 2 years old. The loan finances the same type of work as the MPR. Depending on the work carried out, the loan can go up to €50.000 for work with a minimum of 35% energy gain and to be removed from 'energy sieve' status.

[10] Recognized Guarantor of the Environment. Sign of quality issued to a company that meets certain criteria when carrying out energy saving work in housing.

The work has to be carried out within 3 years after granting it by a state authorized bank. Lastly, this loan can be combined with all the other financial measures mentioned [92], especially since 2024 as there's a special model combining Eco-PTZ with MPR.

Heating boost

It finances the replacement of heating with a less energy-intensive installation (e.g. heat pumps, solar panels, biomass boiler). The standard terms apply with a maximum of €5.000 for modest incomes for certain installations. The work must be completed before January 1, 2027. The payment for this scheme can be made by bank transfer, check, or by deduction from the invoice or another method agreed upon with the RGE professional. [93]. Lastly, it can be combined with MPR and Eco-PTZ.

Energy Saving Certificates

In 2005 the energy saving certificates (CEE) scheme was created by the French government to involve energy suppliers in the demand reduction strategy. The system is based on a three-year obligation imposed by the public authorities on energy suppliers to make energy savings which is measured in CEE. 1 kWh Cumac (for cumulative over the life of the system and actualised) of final energy = 1 CEE [94]. If an energy supplier does not make the three-year target, it needs to pay a fine per kWh. The energy transition law of 2015 introduced a new obligation to be carried out exclusively for the benefit of very low and low-income households.

The CEE offers financial assistance to partly or fully finance energy performance work. Only 'standard' work is eligible and is defined by the ministry of energy. The amount of money depends on income and the amount of energy savings, but also on the energy supplier that supply the grants. The grant can take form as a bonus, vouchers, reductions or other dependent on the supplier. The CEE grant can be combined with MPR and Eco-PTZ [95].

VAT reduction

Everyone can benefit from the VAT reduction of renovation work, but the accommodation must be at least 2 years old. There are 2 types of reduced VAT rates: 10% and 5,5%. The 10% concerns labour and heating equipment (not eligible for 5,5%). The 5,5% concerns condensing boilers, thermal insulation, and heating control devices. The work has to be carried out by a professional that certifies compliance with the conditions of the reduced taxes [96]. Lastly, it can be combined with the other financing schemes [97].

Tax reduction Denormandie

It is an income tax reduction granted to individuals purchasing housing to renovate in certain areas, to then rent it out. The accommodation must be in a municipality that is either: 'in the heart of the city' zone, in a territory revitalization operation agreement or with a significant need for housing rehabilitation. To benefit from the tax reduction, one of the following works most be carried out: improving the energy performance of housing by at least 20 to 30% depending on the housing (decree of March 26, 2019) and at least two types of work (including changing the boiler , insulating the roof , insulating the walls , changing the production of hot water , insulating the windows) [98]. The work must be completed no later than December 31 of the second year following the acquisition and rented out with a maximum per m^2 dependent on the location.

Renovation Advance Loan

The Renovation Advance Loan (PAR) is a mortgage loan granted by state authorised financial institutions for energy sieves (F or G DPE) for households with a very modest, modest, and intermediate incomes. It is a loan with a fixed rate of 2% and the maximum allocation depends on the bank. The money is reimbursed upon sale of the renovated property or at the time of inheritance. Interest can, for its part, be paid throughout the duration of the loan for borrowers under sixty years old. For people aged over sixty, they can be sold off in fines. It does not involve application fees nor require borrower insurance, but credit is covered by a mortgage taken out on the home. The insurance is associated with the public guarantee provided by the State. The FGRE (Guarantee Fund for Energy Renovation) insures up to 75% of any losses incurred [99]. The loan can be combined with the other financing schemes, so it complements the subsidies and can cover the remaining costs.

Social housing

Most of these measures facilitate and support a bottom-up approach of increasing energy efficiency in the building sector but not completely suffices the needs of social housing. The main measure implemented in social housing is similar to CEE but is called white certificates (EWC). EWC can be used by social housing cooperations to increase energy efficiency for the respective energy supplier and thus support them meeting their target. According to Eqinov, 46,7% of EWC are used for vulnerable households [100] (Figure 13).

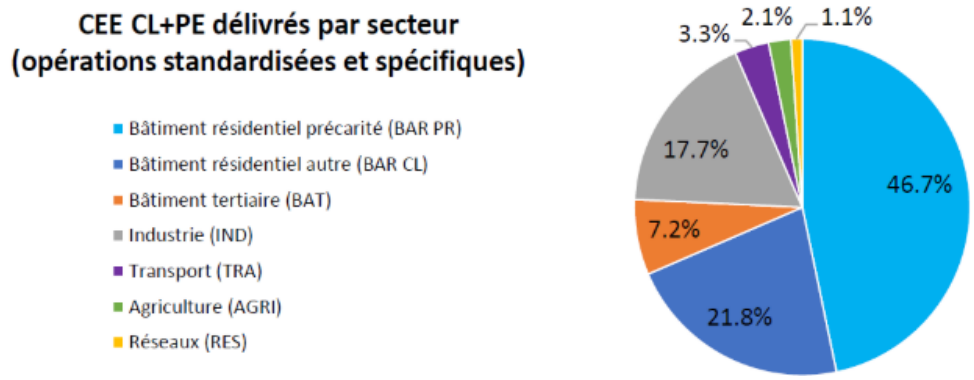

Figure 13, Usage of white certificates per sector [100]

The National Recovery and Resilience Plan (NRRP) allocates €1 billion to supporting social housing organisations and local authorities operating social housing in order to support deep renovation of buildings. 60.000 within the category of social housing receiving a grant for renovation, with an objective of achieving at least 30% of energy savings on average [101]. Projects financed through this measure should be completed by the end of 2024 [102].

Another important measure is the social housing eco-loan. It is a €6 billion loan for the duration of 2023 – 2027 to remove energy sieves. Eligible projects can get a maximum of €33,000 per accommodation and have to meet an A, B, C, or D label (DPE) after the work is done. Also, they are prohibited to install new fossil fuel boilers [103].

Lastly, Article 2a of the Energy Performance of Buildings Directive (EPBD) [104] increases the urgency of the matter. From 2025, it will be forbidden to rent accommodation classified as G label for the purposes of the assessment of DPE and from 2028 for the rest of the accommodations classified as F. And from 2034, it will be dwellings classified as E that will also be prohibited from renting (§2.2.3, [105]).

4.4.2 Curative measures

Energy voucher

It is a direct voucher send by mail to the lowest 20% of income households. The amount is dependent on the amount of people living in the dwelling but is between €48 and €277 euro. The voucher can be used to pay the energy bills, energy renovation and since 2024 for rental charges in social housing [106].

Solidarity Fund for Housing

The Solidarity Fund for Housing (FSL) supports people having difficulty paying expenses related to housing (bills, rents etc.). Each territory has one FSL. 93% of the FSL is granted as grants, the remaining in the form of loans [82]. The amount of money is calculated by all the resources of all the people living in the accommodation with expenses of the specific house. A household with a low income can obtain more aid than a household with a higher income [107].

4.4.3 Behavioural measures

Energy sobriety plan

The Ministry of Energy Transition launched the "Every Action Counts" energy sobriety campaign on October 17, 2023, promoting green actions and responsible everyday environmental practices. Among the actions encouraged is the installation of a thermostat to allow everyone to better control their energy consumption. Between August 2022 and August 2023, the combined consumption of electricity and gas reduced by 12% over the entire year after correcting for weather effects by these simple changes [108].

4.4.4 Gaps in current measures

Impact of measures

An easy assessment can be made by looking at Figure 11. Energy poverty has decreased since France started its strategy in 2010. However, the amount it has decreased is questionable and the impacts of the measures should be assessed in more detail.

The state authorisation of the RGE registry guarantees quality execution of the renovation work and sufficient equipment. From 2016 to 2022, around €6.7 billion of work was financed under energy poverty through the EWC scheme of which 23% have been financed since the beginning of 2022. Within the energy sobriety plan, the level of obligation for EWCs increased by 25% for the 5th period 2022-2025 (§2.4.3, [105]). On top of this, in 2022 67% of the projects financed by the MPR concerned low-income households, out of a total budget of €3 billion. And lastly, 5.8 million households benefited from the energy voucher of which 82.6% used it. An exceptional additional energy voucher of €100 - €200 was distributed between the end of 2022 and the beginning of 2023 to the lowest 40% of households. This decreased the indicator of energy poverty corrected for weather from 11.7% to 10.2%.

Considering the exceptional voucher, the energy poverty indicator corrected for weather is reduced to a total of 11.7% to 9.2%. The energy voucher therefore decreases the energy poverty indicator by 1,5 percentage points and the exceptional energy voucher by an additional 1 point, with a total reduction of 2,5 points (§2.4.3, [105]). Lastly, achieving a 12% consumption reduction in a year and the implementation of the Energy Sobriety Plan, demonstrates the government's communication skills. This is another impactful measure with relative low effort.

CEE

These numbers demonstrate the effectiveness of the different schemes. However, in November 2023 Wald & Glachant researched the actual effects of the CEE using data from more than 2.7 million energy retrofits subsidized over 2017-2019. They concluded that the policy achieves in the best-case scenario 27.9% of its energy efficiency targets. This result is primarily driven by a minimum 49% energy performance gap overestimation during the engineering of the projected savings [109]. As for many other measures engineering of projects is necessary before obtaining funding, this issue cannot be solely for CEE.

MPR

Along CEE, the MPR policy also encounters difficulties. Of the 650,000 financing applications filed under the scheme between 2021 and April 2023, only 10% were for “deep” renovations, even though 17% of the country’s housing stock is considered leaky. In total, only 50,000 to 100,000 homes in France are fully renovated each year, even though achieving carbon neutrality would require 700,000 a year to be fully renovated as of 2030 [110]. Comparing the ‘regular’ MPR with the Guided-tour: Guided-tour is applied to 72% vulnerable households. The average cost of the work is €29.000 per dwelling and enables energy savings of 51%. Before work 60% of the dwellings is labelled F or G and afterwards only 3,8% is labelled as such [82]. MPR finances on average €3.841 and 67% of projects concerns vulnerable households. This is not enough to finance deep renovations and drop the DPE level of dwellings. Full-scale renovation of housing across the country would require €21 billion annually between now and 2030, including €14 billion in public funding, according to a report submitted to French Prime Minister Elisabeth Borne in May 2023 [111]. So, it is acknowledged that financing is indubitably a critical barrier, other factors may also hinder progress. In 2023, 24% less files were funded than 2022. It is assumed that this is due to the increase of material and labour costs [82]. What amplifies this effect is the rate the grants are approved.

The assessment of the funds should be assessed within 5 weeks. Currently, the average waiting time is around 3 months [112]. This weighs heavy on the argument that the prices increase. The government still plans to fully renovate more than 200,000 homes by 2024 through MPR before building up to 900,000 full-scale renovations per year by 2030 [11].

Eco-PTZ

According to a report by I4CE, the out-of-pocket costs of retrofits for households, in other words the investment minus aid, which households finance using personal funds or by taking out a loan, still stands at tens of thousands of euros. This represents more than a year's income for middle-income households, and 10 years or more for the lowest-income households [113]. The Eco-PTZ whose ceiling has been increased to €50.000 for retrofits, is a solution to cover out-of-pocket costs. The energy savings are in most cases sufficient to repay the monthly loan payments. The I4CE calculated the sufficiency of the loans for six different housing. Figure 14 [113] shows the results and what can be seen, is that for the first four income deciles, for all housing types the energy savings are sufficient for the monthly loan payments. This means that the combination of the loan to cover out of pocket costs with the MPR subsidy to cover the remaining is economically viable for the least well-off.

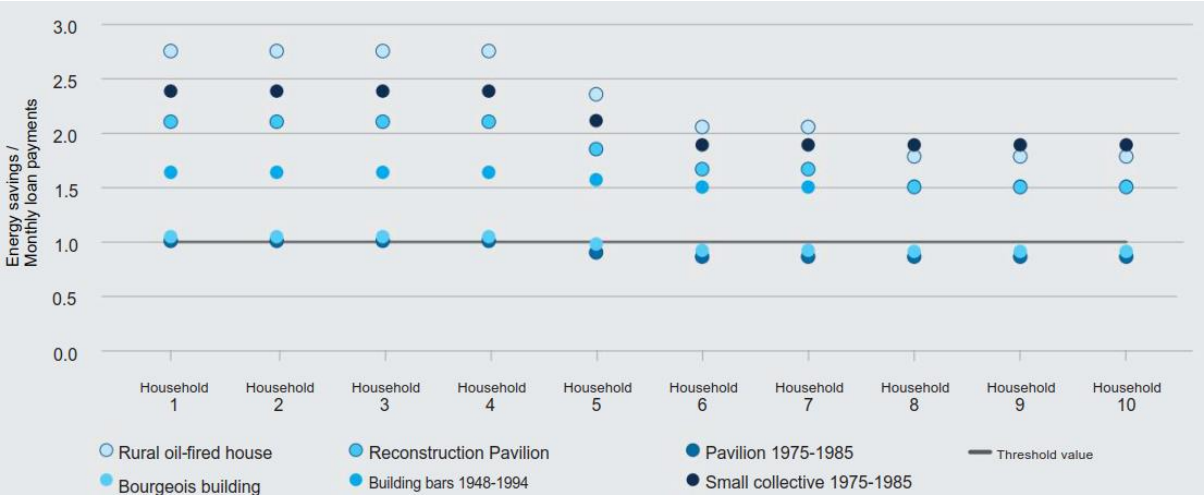

Figure 14, Energy savings related to monthly loan payments per housing [113]

However, obtaining the loan is associated with numerous obstacles for households, including complex administrative procedures and increasing debt load (sum total of all the money owed) that can reach 70% for the lowest-income households. This should be below 5% according to experts [113]. Decreasing this rate is essential for people being able to obtain a loan which they can pay off within a respectable time period. Otherwise, it is still not economically viable and consequently redundant for the least well-off.

PAR

Regarding the PAR, similar issues occur as the Eco-PTZ. But the difference between the two scheme is that households must repay interest when using PAR. Furthermore, it can only be obtained at the same bank as where the mortgage is granted, resulting in only 100 loans being distributed until 2023 [113].

In general, most measures have a bottom-up approach. This is justified due to the many diverse needs of the people within the country. Cold in the north, warm in the south; Urban versus rural divide; Different eras of building construction etc. It makes it impossible to deploy a universal top-down approach where all aspects are considered. On the other hand, it creates a challenge to ensure vulnerable households are prioritised. The coherence with the ToJ can be questioned. The measures do indeed help people and therefore also the least well-off, but the measures do not seem to be tailored or targeted to this group, with some exemptions. Especially the critics on obtaining the Eco-PTZ challenges the requirement of keeping the least well-off above the sufficiency line (Figure 1). The SCF can only succeed in equitability if this aspect is considered.

4.5 Conclusion of the French policy

France has a history of carbon pricing with the most notable disruption being the YV. This has changed the revenue recycling policy completely. Looking at the numbers, the €10 billion revenue the CCE generated in 2018 [62] was nullified by the €17 billion emergency plan to calm the waters in 2018/19. After the YV, the government changed the recycling scheme completely. The CAS TE was discontinued in 2020 and the revenue of the CCE was reallocated to the Ministry of Energy Transition to support energy poverty. Consequently, breaking the direct link between a climate and social tool, opposed to the SCF which does have that direct link. This can be an opportunity to prevent another potential social uproar. The revenue recycling of the CCE using 75% for tax credit for companies was a wrong decision. Also, the limited use of the CAS TE to support vulnerable households was, in retrospection, the wrong choice. So, in conclusion it is important that enough funding is allocated and adequately used, not only to alleviate the impact of the ETS2, but also to prevent another social uproar and the need for another emergency plan.

Currently, France is one of the most advanced countries in energy poverty policy. It has multiple measures in place to increase energy efficiency for the long term and direct income support for vulnerable households in the short term. Since 2012 energy poverty has decreased, but only slightly (Figure 11). The NECP highlights the importance of energy vouchers in addressing energy poverty. This suggests the limitations in France's current energy efficiency strategy. While income support offers temporary relief, it doesn't tackle the root causes. Therefore, long-term investments focused on improving energy efficiency remain crucial for sustainable solutions, but the implementation needs improving.

As the numbers of the MPR shows, vulnerable households know to find the funding, but the financing falls short to adequately execute a deep renovation, so the EER stays high. Secondly, vulnerable households struggle to afford the high out-of-pocket costs. The MPR is granted afterwards which increase the threshold for vulnerable households to consider a deep renovation. The PAR or the Eco-PTZ are unreachable for the least well-off due to the debt load and other reasons mentioned. Lastly, the overestimation of energy efficiency is a pressing issue that needs to be resolved to meet the 2030 and 2050 targets. These obstacles underline the statement of justice being in the details. As Figure 14 displays, correct allocation can be net positive, arguing the importance of targeting measures towards the least well-off. The gaps of these issues and the objective of the SCF do align. However, how and to what extend the SCF can play a role in making the energy transition more equitable in France, is analysed in the next chapter.

Table 2, Overview measures energy poverty policy [11]

Measure type	Measure	Description	Allocation	Responsible authority	Focus group
Preventive	MaPrimeRenov	A premium to improve energy performance of a main residence home at least 15 years old.	€ 5 billion in 2024 [114]	ANAH	All owners and all co-ownerships of housing
Preventive	Zero-interest Eco-loan	Loan without interest to improve energy performance of a main residence home at least 2 years old.	€ 500 million annually [109]	Ministry of Ecological Transition	All owners or tenants
Preventive	Heating boost	A premium to replace gas, coal or oil boiler to save energy of a detached house.	n/a	Ministry of Ecological Transition	All owners or tenants of a detached house
Preventive	Energy Saving Certificates (CEE)	Aid from energy supplier to finance energy savings work for tenants and owners of an accommodation at least 2 years old.	€ 4 billion annually [109]	Ministry of Ecological Transition	All owners or tenants
Preventive	VAT reduction	Reduced VAT of energy renovation services to save energy, improve insulation or produce renewable energy.	€ 1 billion in 2024 [114]	Ministry of Economics and Finance	All owners or tenants
Preventive	Tax reduction Denormandie	Tax reduction of income tax to individuals purchasing old housing and renovate to rent it out.	n/a	Ministry of Economics and Finance	Old accommodation
Preventive	Renovation Advance Loan	Mortgage loan from financial institution to finance energy renovation work.	n/a	Ministry of Economics and Finance	Modest and very modest household owners
Curative	Energy voucher	Nominative aid for the payment of home energy bills.	€ 900 million in 2024 [114]	Ministry of Economics and Finance	Lowest 20% of French households
Curative	Solidarity Fund for Housing (FSL)	Financial aid to people who have difficulties in paying expenses related to their housing (bills, rent etc.)	n/a	Ministry of Ecological Transition	All owners or tenants
Behavioural	Energy sobriety plan	To promote green actions and responsible everyday environmental practices.	n/a	Ministry of Ecological Transition	All French inhabitants

[11] Some allocations were not clearly defined within the budgets of the ministries and are therefore not added in the table.

5. Implementing SCF

After analysing the various aspects of the SCF regulation, the French context and adding the theoretical framework to scope the research, the last part can be executed. This chapter will align the requirements & limitations of the SCF with the gaps in the current French policy of the analysis executed in the prior chapters. This together with the theoretical framework, can answer the research question. Firstly, the requirements and objective of the SCF is repeated. Then the gaps in the current policy. Where these two intersect within the frame of the theory of justice, lays the opportunity to maximise the equitability of the SCF.

5.1 SCF requirements & limitations

The most important limitation of the fund is the maximum allocation. For France it is: €7.276.283.944 (11,19% of the SCF) for 2026 – 2032. Every MS has the obligation to contribute 25%, so the total will be: €9.095.354.930. It depends on how the government decides to utilise the money, but for now it is assumed that this will be divided equally over the 7 years meaning: €1.299.336.418 annually. In summary, the measures should:

1. Be targeted at vulnerable households;
2. Be coherent with other policies and programs;
3. Support
    a. Building renovation
    b. Access to housing
    c. Provide information
    d. Electrification
    e. Direct income
4. Response adequately to challenges of vulnerable households
5. Have a lasting impact
6. Plausible & cost efficient
7. Prevent corruption

The actual supporting measures (3) are up to the MSs to determine. The EC has not given a preference for certain measures in the SCF regulation but in other documents (Commission Recommendation (EU) 2023/2407 of 20 October 2023 on Energy Poverty & the accompanying Commission Staff Working Document Energy Poverty) a clear precedence is given.

It can be assumed that the EC will use these documents whilst assessing the SCP, so these documents are used as a benchmark to increase the chances of a positive assessment on the French SCP.

The EU Recommendation prescribes: “Measures that empower and enable households affected by energy poverty and vulnerable households to take their own steps to improve their ways of living in terms of energy efficiency and renewable energy consumption should therefore be given priority” (article 18, [115]). Furthermore, article 20 acknowledges that while income support measures offer valuable social safety, they may not lead to long-term structural changes. Additionally, these measures could create a dependence on fossil fuels and subsidies. (article 20, [115]). And one last article that is important to note is 24 out of Section VIII – Financing: “MS should keep in mind that these households cannot afford paying upfront costs of renovation although they would be reimbursed afterwards, and that they do not benefit from tax-related bonuses and deductions as their income tax is minimal” (Section VIII - 24, [115]).

5.2 Policy gaps

The strength of the French strategy is the strong institutionalisation of energy poverty. It is intertwined with many laws and regulation like the Energy Sobriety Plan, and different governmental agencies monitor and act upon it like the ONPE. Still, three main gaps are observed in the analysis, one short term and two long term gaps. The first gap is focused on the short-term impact of carbon pricing. The price of energy will immediately rise as a consequence of the implementation of ETS2. Yet increasing energy efficiency happens gradually, because not all houses can be renovated at the same time. A substantial portion of the least well-off are left without adequate measures until their houses are renovated. The SCF goes into action one year prior to the ETS2 to be ahead of the consequences but this is still not enough to renovate all the houses at once. Following the line of the theory of justice, these people should be supported to stay / become above the sufficiency line.

For the long term, the first gap is the technical assessment on the energy efficiency of the renovations. If the energy performance is not achieved, the potential savings for vulnerable households become endangered and therefore impossible to break out of energy poverty. The second long term gap concerns the financing. €14 billion of public financing is needed annually, whilst all funding combined adds up to €11 billion roughly (Table 2). A part of this general gap,

is the out-of-pocket financing. Vulnerable households are often unable to supply the upfront costs and obtaining a loan is usually out of the question as well.

5.3 Implementation

5.3.1 Technical assessment

This gap falls outside of the competency scope of the SCF regulation. Changing the thresholds in the standards of the DPE is not directly targeted at vulnerable households, but at all buildings in France. This gap is better addressed in legislation focused on the energy performance of all buildings. In April 2024, the EPBD (EU/2024/1275) got revised. Article 3 of the directive prescribes the obligation that every Member State shall write a national building renovation plan. “Each national building renovation plan shall include an evidence-based estimate of expected energy savings and wider benefits, including those related to indoor environmental quality” (article 3-2h, [104]). Hence, the French government is obliged to adjust the estimate of expected energy savings to the actual evidence. The research of Wald & Glachant (2023) showed the gap between the estimate and the actual performance. This research can be the foundation for a revision of the expected energy savings calculation. As this thesis revolves around the SCF regulation, this gap is not further addressed in more detail. However, The SCP should be consistent with this plan. This is an evident relationship, because without adequate engineering of the efficiency measures, deep renovations are not possible. Addressing the issue of overestimation is therefore paramount in succeeding the renovation targets for 2030.

5.3.2 Direct income support

As the ToJ prescribes, the least well-off should be or become above the sufficiency line. Meaning, their current EER should be sustained compared to before the policy got implemented. Whether or not the ETS2 will replace the CCE plays a significant role in assessing it. A plausible solution for direct income support is extending or expanding the energy vouchers. If the ETS2 will substitute the CCE, the energy voucher can stay in place as is, because the carbon pricing contribution is almost the same for both methods. In the situation that the CCE does stay in place, the ETS2 will expand the energy voucher doubling the possible allocation to alleviate the direct impact of the ETS2 pricing aspect. The second scenario is more unlikely, because the CCE is complimentary to the ETS1. In the case that the CO2 prices are the same, the CCE does not add anything. Keeping the energy voucher would makes sense,

because it is an easy to implement solution as the bureaucratic changes are minimal. On the downside, it uses almost the whole budget of the SCF (€900 million). This is far above the maximum allocation of 37,5% (€487.251.156,75/y) for direct income support. In this regard, the SCF falls short in supplying the least well-off with enough resources to stay above the sufficiency line. This could have serious political and social consequences for the acceptance of the ETS2 in France. With the ever-fresh memory of the YV it is undesirable that the least well-off receive less resources.

5.3.3 Public financing

The general gap lack of financing is difficult to fulfil as whole. The funding needs to be targeted towards vulnerable households as the regulation prescribes. On top of this, it needs to have a lasting positive impact on the least well-off. This objective is stated in the regulation as well and the group is defined by the ToJ. Renovation investments can have a long return on investment, it is estimated that 95% of the current building stock will still be here in 2050 [104]. Increasing energy efficiency is therefore an effective way of maximising the lifetime expectations of primary goods. One part where public financing can fill the gap are the out-of-pocket costs. MPR is one of the primary measures France uses to increase in energy efficiency. This has been confirmed by their NECP (p.137, [105]) and NRRP [116]. As stated before, around 67% of MPR supports low-income households (first three income deciles). Unfortunately, the supplied grants are often small. This is insufficient to deep renovate the houses and increase energy efficiency. So, instead of people having to get a loan to pay for the upfront expenses, an additional grant seems better suited to cover out-of-pocket costs.

Of the 67%, on average 59% of the first decile, 24% of the second decile and 17% of the third decile live in energy poverty per income decile [117]. This adds up to 44.667 households. Supporting these households with a grant to pay for the out-of-pocket costs, approximately €1 billion is needed annually[12] (calculation in Annex). This a rough estimate, but it gives an indication of the needed funding. This is only enough if the money is targeted correctly and allocated to people in energy poverty. To ensure proper allocation of funds, evaluating the EER can be incorporated into the existing MPR funding assessment process. Since MPR already considers income levels, this addition would not require significant changes. Furthermore, this approach aligns with the SCF's focus on gender equality, as women

[12] The numbers used for this calculation are from before the inflation from the last two years. It is therefore likely that the prices are higher now.

are disproportionately affected by energy poverty. Thus, making energy poverty part of the assessment is likely to lead to increased female representation among MPR funding recipients. Additionally, verifying how the out-of-pocket fund is used is crucial. This can be achieved by requiring grantees to submit documentation such as invoices and bank transfers demonstrating the fund is spend on the intended project. And at last, MPR is supported by France Renov and ANAH with advisors and bureaus throughout the country. With the importance of public consultation in the SCF, investing in out-of-pocket costs would likely be supported by these agencies and therefore local and regional authorities, representatives of economic and social partners, relevant civil society organisations.

6. Conclusion

France is one of the leading countries in alleviating energy poverty. It has a strong institutionalisation with multiple agencies such as ONPE and ANAH. It has also been part of their energy policy since 2010 and it recognises the problem as multi-dimensional. Most notable economic measures of the strategy are the energy voucher, MPR, CEEs and Eco-PTZ. France has been able to decrease the EER and subsequently energy poverty since its start of the policy. Between 2013 and 2021, the EER went down from 13,6% to 11,7%. However, according to the NECP, much of this is due to the energy voucher. This merely increases disposable income of vulnerable households and helps pay energy bills. This is not sustainable for the long term, and the French government shares this ideology. From the 7 million poorly insulated houses, half are inhabited by the least well-off. While France's strategy prioritizes energy efficiency through home renovations, the current pace of 50,000 to 100,000 renovations per year falls significantly short of the estimated 700,000 annual renovations needed to achieve carbon neutrality by 2030. It is safe to say that the current strategy falls short in accelerating renovations, and it disproportionately hits the least well-off. The SCF objective is focused on this as well and the EC called its existence necessary to make the energy transition just. This overlap of objectives raised the following question:

"Can the Social Climate Fund be a gamechanger in accelerating the equitability of the French national energy poverty strategy?"

In this study, energy poverty is defined by the EER: considering energy poverty to be a threshold of 8% in the energy-income ratio for the first three income deciles. The theory of justice is used to determine equitability. The SCF is not obligated to maximise the primary goods of the least well-off now but sustaining the people's EER and maximise their benefits in the objective of alleviating energy poverty over time.

The SCF regulation prescribes that vulnerable households should be central in the SCP and the measures should increase energy efficiency or fund direct income support. Using the ToJ, the energy efficiency is used to maximise benefits over the long term and direct income support is used to stay above the sufficiency line.

Whether it can be a gamechanger, historical revenue recycling in France is analysed. With the YV as mentionable event, the most important lesson that can be learned from it is: Clear communication of how revenue is used and correctly target the people most affected by the implementation of the ETS2. The current measures are analysed to ensure equitable usage of the SCF as a complimentary program to the current strategy. The gaps in the current policy can be boiled down to overestimation of energy efficiency, short term impact and public financing. The first gap should be addressed in the national building renovation plan. Direct income support is estimated to need around €900 million annually, because the ETS2 carbon price is approximately the same as the current CCE. And lastly, the best use for public financing money is covering out-of-pocket investment to enable deep renovations with MPR. When this is targeted at only people in energy poverty with the objective of retrofitting 200.000 houses annually, it would cost around €1.020.026.090,00.

So, sustaining the EER of the least well-off and simultaneously maximising their benefits overtime, it would need at least €2 billion annually. This is a conservative calculation, because the numbers used were prior to the inflation of the last two years and the annual retrofitting needs to scale up to 700.000 by 2030. Also, direct income support is capped at 37,5% of the total SCF, meaning a maximum of €487.251.156,75/y is allowed. In conclusion, the SCF cannot be a gamechanger in accelerating the equitability of the French national energy poverty strategy. However, this does not mean that it cannot play a part. Effective utilisation can still be of importance for many vulnerable households. If surplus revenue from ETS2 is allocated towards energy efficiency, France could accelerate its renovation plans and ultimately reduce energy poverty.

References

[1] N. Stern, 'Stern Review: The Economics of Climate Change', Cambridge University Press, Jan. 2007. [Online]. Available: http://mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/sternreview_report_complete.pdf

[2] 'Greenhouse Gas concentrations hit record high. Again.' Accessed: Jun. 03, 2024. [Online]. Available: https://wmo.int/news/media-centre/greenhouse-gas-concentrations-hit-record-high-again

[3] D. R. Känzig, 'The Economic Consequences of Putting a Price on Carbon', *SSRN Journal*, 2021, doi: 10.2139/ssrn.3786030.

[4] 'Global carbon accounts in 2023 - I4CE'. Accessed: Jun. 11, 2024. [Online]. Available: https://www.i4ce.org/en/publication/global-carbon-accounts-2023-climate/

[5] 'Development of EU ETS (2005-2020) - European Commission'. Accessed: Jun. 03, 2024. [Online]. Available: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/development-eu-ets-2005-2020_en

[6] 'EU Emissions Trading System (EU ETS) | International Carbon Action Partnership'. Accessed: Jun. 06, 2024. [Online]. Available: https://icapcarbonaction.com/en/ets/eu-emissions-trading-system-eu-ets

[7] 'EU carbon market will be extended to buildings and transport, von der Leyen confirms – Euractiv'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.euractiv.com/section/energy/news/eu-carbon-market-will-be-extended-to-buildings-and-transport-von-der-leyen-confirms/

[8] 'EU carbon market not the right policy for cars, says Timmermans – Euractiv'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.euractiv.com/section/transport/news/eu-carbon-market-not-the-right-policy-for-cars-says-timmermans/

[9] 'Energy poverty'. Accessed: Jun. 03, 2024. [Online]. Available: https://energy.ec.europa.eu/topics/markets-and-consumers/energy-consumer-rights/energy-poverty_en

[10] 'Statement by Executive Vice-President Timmermans on delivering the European Green Deal - EU monitor'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.eumonitor.eu/9353000/1/j9vvik7m1c3gyxp/vlkiczgiw0yz?ctx=vg09llk9rzrp

[11] '"Deep" renovations needed to meet climate goals, French industry warns – Euractiv'. Accessed: Jun. 04, 2024. [Online]. Available: https://www.euractiv.com/section/energy-environment/news/entire-homes-need-renovating-to-meet-climate-goals-french-industry-warns/

[12] 'France 2021 Energy Policy Review', International Energy Agencey, Nov. 2021. [Online]. Available: https://www.iea.org/reports/france-2021

[13] S. Amartya, *The Idea of Justice*. Belknap Press, 2011. [Online]. Available: https://www.hup.harvard.edu/books/9780674060470

[14] 'thema_essentiel_energie_precarite_energetique_2019_janiver2021_0.pdf'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.ecologie.gouv.fr/sites/default/files/thema_essentiel_energie_precarite_energetique_2019_janiver2021_0.pdf

[15] W. Agnieszka, 'Energy poverty in the EU', *European Parliamentary Research Service*, p. 12, Sep. 2023.

[16] T. Williamson, 'Review of *Political Philosophy in the Twentieth Century: Authors and Argument | Reviews | Notre Dame Philosophical Reviews | University of Notre Dame*', Feb.

2012, Accessed: Jun. 03, 2024. [Online]. Available: https://ndpr.nd.edu/reviews/political-philosophy-in-the-twentieth-century-authors-and-argument/
[17] J. Rawls, *A Theory of Justice*, 2nd ed. Harvard University Press, 1999. [Online]. Available: https://www.hup.harvard.edu/books/9780674000780
[18] E. Sommer, 'Justice for all: John Rawls Theory of Justice and the Green New Deal', *El Río: A Student Research Journal*, vol. 3, no. 1, Art. no. 1, Jul. 2020.
[19] 'A Rawlsian Case for Libertarianism | Libertarianism.org'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.libertarianism.org/publications/essays/rawlsian-case-libertarianism#nn7_3
[20] N. Schneider, 'Two theories of fairness', Master of Arts, Louisiana State University and Agricultural and Mechanical College, 2005. doi: 10.31390/gradschool_theses.2.
[21] R. Arneson, 'Egalitarianism', in *The Stanford Encyclopedia of Philosophy*, Summer 2013., E. N. Zalta, Ed., Metaphysics Research Lab, Stanford University, 2013. Accessed: Jun. 03, 2024. [Online]. Available: https://plato.stanford.edu/archives/sum2013/entries/egalitarianism/
[22] E. Yilmaz, 'Resources versus Capabilities in Social Justice', *SAgE Publications India*, p. 25, 2016, doi: 10.1177/0260107916643588.
[23] 'Amartya Sen's capability theory approach - CMI Business School'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.cmiuniversal.com/en/amartya-sens-capability-theory-approach/
[24] S. Maffettone, 'Sen's Idea of Justice versus Rawls' Theory of Justice', *Indian Journal of Human Development*, vol. 5, no. 1, p. 16, 2011.
[25] B. Tungodden and P. Vallentyne, 'Who are the least advantaged?', *Egalitarianism: New Essays on the Nature and Value of Equality*, pp. 174–195, 2006.
[26] J. Ferret Mas, 'Rawls's Difference Principle, the Trickle-Dow Economy and Climate Change', *Teorama*, vol. 42, no. 1, pp. 101–121, 2023.
[27] P. Casal, 'Why Sufficiency Is Not Enough', *Ethics*, vol. 117, no. 2, pp. 296–326, 2007, doi: 10.1086/510692.
[28] 'What is the EU ETS? - European Commission'. Accessed: Jun. 03, 2024. [Online]. Available: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en
[29] 'Which is better: carbon tax or cap-and-trade? - Grantham Research Institute on climate change and the environment'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.lse.ac.uk/granthaminstitute/explainers/which-is-better-carbon-tax-or-cap-and-trade/
[30] *Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012 (Text with EEA relevance)Text with EEA relevance*. 2021. Accessed: Jun. 10, 2024. [Online]. Available: http://data.europa.eu/eli/reg_impl/2018/2066/2021-01-01/eng
[31] 'Cap and Trade Basics - Center for Climate and Energy SolutionsCenter for Climate and Energy Solutions'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.c2es.org/content/cap-and-trade-basics/
[32] 'ETS2 : buildings, road transport and additional sectors - European Commission'. Accessed: Jun. 03, 2024. [Online]. Available: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/ets2-buildings-road-transport-and-additional-sectors_en
[33] 'The new offshoot EU emissions trading scheme – EU ETS 2 | Perspectives | Reed Smith LLP'. Accessed: Jun. 03, 2024. [Online]. Available:

https://www.reedsmith.com/en/perspectives/2023/09/the-new-offshoot-eu-emissions-trading-scheme-eu-ets-2
[34] *Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a Social Climate Fund*. 2021. Accessed: Nov. 14, 2023. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52021PC0568
[35] T. Gore, 'Can Polluter Pays policies in the buildings and transport sectors be progressive?', Mar. 2022, [Online]. Available: https://ieep.eu/wp-content/uploads/2022/12/Can-polluter-pays-policies-in-buildings-and-transport-be-progressive_IEEP-2022.pdf
[36] 'Social Climate Fund - European Commission'. Accessed: Jun. 03, 2024. [Online]. Available: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/social-climate-fund_en
[37] 'Policy Report - Putting the ETS 2 and Social Climate Fund to Work - EUKI'. Accessed: Jun. 04, 2024. [Online]. Available: https://www.euki.de/en/euki-publications/policy-report-putting-the-ets-2-and-social-climate-fund-to-work/
[38] D. Ritter, 'The Social Climate Fund – Opportunities and Challenges for the buildings sector'.
[39] 'EU countries slam new carbon market plans as energy prices soar – Euractiv'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.euractiv.com/section/energy/news/eu-countries-slam-new-carbon-market-plans-as-energy-prices-soar/
[40] 'EU's proposed social climate fund comes under fire from all sides – Euractiv'. Accessed: Jun. 03, 2024. [Online]. Available: https://www.euractiv.com/section/energy-environment/news/eu-social-climate-fund-comes-under-fire-from-environment-ministers/
[41] 'A German perspective on the EU Emissions Trading System trilogues - Emissions Trading Extra'. Accessed: Jun. 03, 2024. [Online]. Available: https://etxtra.org/a-german-perspective-on-the-eu-emissions-trading-system-trilogues/
[42] THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION, 'DIRECTIVE (EU) 2023/959 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL', *Official Journal of the European Union*, vol. 130, no. 134, p. 69, May 2023.
[43] *COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT REPORT Accompanying the document DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757*. 2021. Accessed: Jun. 04, 2024. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021SC0601
[44] *Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC (Text with EEA relevance)Text with EEA relevance*. 2024. Accessed: Jun. 03, 2024. [Online]. Available: http://data.europa.eu/eli/dir/2003/87/2024-03-01/eng
[45] *Regulation (EU) 2023/955 of the European Parliament and of the Council of 10 May 2023 establishing a Social Climate Fund and amending Regulation (EU) 2021/1060*, vol. 130. 2023. Accessed: Jun. 03, 2024. [Online]. Available: http://data.europa.eu/eli/reg/2023/955/oj/eng

[46] B. Görlach, M. Jakob, K. Umpfenbach, M. Kosch, M. Pahle, and T. Konc, ‘A Fair and Solidarity-based EU Emissions Trading System for Buildings and Road Transport’.
[47] ‘Décision n° 2000-441 DC du 28 décembre 2000 | Conseil constitutionnel’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.conseil-constitutionnel.fr/decision/2000/2000441DC.htm
[48] A. R. Rocamora, ‘THE RISE OF CARBON TAXATION IN FRANCE’, May 2017. [Online]. Available: https://www.iges.or.jp/en/publication_documents/pub/workingpaper/en/5983/The_Rise_of_Carbon_Taxation_in_France_Rocamora_May_2017.pdf
[49] ‘The Declaration of the Rights of Man and of the Citizen | Élysée’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.elysee.fr/en/french-presidency/the-declaration-of-the-rights-of-man-and-of-the-citizen
[50] Sénat, ‘PROJET DE LOI de finances pour 2010’. Sénat, Dec. 18, 2009. [Online]. Available: https://www.senat.fr/leg/tas09-034.pdf
[51] ‘Directive - 2009/29 - EN - EUR-Lex’. Accessed: Jun. 04, 2024. [Online]. Available: https://eur-lex.europa.eu/eli/dir/2009/29/oj
[52] ‘Décision n° 2009-599 DC du 29 décembre 2009 | Conseil constitutionnel’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.conseil-constitutionnel.fr/decision/2009/2009599DC.htm
[53] ‘French minister sacked for criticising budget’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.france24.com/en/20130702-french-environment-minister-sacked-slating-budget-cuts-economy
[54] ‘Green Party threatens to quit French government’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.france24.com/en/20130703-batho-hollande-environment-eelv-greens-socialist-france-government-politics
[55] ‘N° 1317 - Proposition de loi de Mme Eva Sas visant à créer une contribution climat-énergie’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.assemblee-nationale.fr/14/propositions/pion1317.asp
[56] ‘taxing-energy-use-france.pdf’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.oecd.org/tax/tax-policy/taxing-energy-use-france.pdf
[57] Ministère de l’Économie et des Finances, ‘Présentation des dispositions législatives adoptées dans le cadre des lois de finances pour 2014 et de finances rectificative pour 2013 concernant la fiscalité énergétique et environnementale.’ Mar. 12, 2014. [Online]. Available: https://www.douane.gouv.fr/sites/default/files/dana/files/F2_14-008.pdf
[58] ASSEMBLÉE NATIONALE, ‘AU NOM DE LA COMMISSION DU DÉVELOPPEMENT DURABLE ET DE L’AMÉNAGEMENT DU TERRITOIRE SUR LE PROJET DE loi de finances pour 2018 (n° 235)’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.assemblee-nationale.fr/dyn/opendata/AVISANR5L15B0266-tI.html
[59] C. DE PERTHUIS, ‘TRAVAUX DU COMITE POUR LA FISCALITE ECOLOGIQUE’, Jul. 2013. [Online]. Available: https://www.vie-publique.fr/files/rapport/pdf/134000547.pdf
[60] P. Canfin, A. Grandjean, and G. Mestrallet, ‘Propositions pour des prix du carbone alignés avec l’accord de Paris’, Jul. 2016. [Online]. Available: https://www.vie-publique.fr/files/rapport/pdf/164000418.pdf
[61] B. Ducoudré, É. Heyer, and M. Plane, ‘CICE et Pacte de responsabilité : une évaluation selon la position dans le cycle. Simulations ex ante a partir d’un modele macroeconomique’, *Revue de l’OFCE*, vol. 146, no. 2, pp. 5–42, 2016, doi: 10.3917/reof.146.0005.

[62] O. Hanalfi, ‘Energy Taxation in France (cepInput) | cep - Centre for European Policy Network’. Accessed: Jun. 07, 2024. [Online]. Available: https://www.cep.eu/eu-topics/details/energy-taxation-in-france-cepinput.html
[63] T. Douenne and A. Fabre, ‘YELLOW VESTS, CARBON TAX AVERSION, AND BIASED BELIEFS’.
[64] ‘Monthly average consumer prices in metropolitan France - Diesel (1 litre) | Insee’. Accessed: Jun. 06, 2024. [Online]. Available: https://www.insee.fr/en/statistiques/serie/000442588#Tableau
[65] ‘France’s Yellow Vest Movement and the Global Debate on Climate Change’. Accessed: Jun. 04, 2024. [Online]. Available: https://hir.harvard.edu/frances-yellow-vest-movement-and-the-global-debate-on-climate-change/
[66] ‘Gilets Jaunes: Is the Energy Transition Possible while still Reducing Inequality? - le blog’. Accessed: Jun. 06, 2024. [Online]. Available: https://www.ofce.sciences-po.fr/blog/gilets-jaunes-is-the-energy-transition-possible-while-still-reducing-inequality/?print=print#_ftn3
[67] R. Kempin, P. Tokarski, and Stiftung Wissenschaft Und Politik, ‘Macron, the Yellow Vests and the national debate: playing for time, not solving the political legitimacy crisis’, *SWP Comment*, 2019, doi: 10.18449/2019C17.
[68] ‘Five years of Macron: Yellow Vests, Covid-19 stymie plans for social cuts (Part 3 of 4)’. Accessed: Jun. 07, 2024. [Online]. Available: https://www.france24.com/en/france/20220323-yellow-vest-protests-covid-19-stymied-macron-s-plans-for-social-welfare-cuts
[69] ‘“‘Yellow vest” crisis: the executive suspends several tax measures in the hope of “appeasement”’. Accessed: Jun. 07, 2024. [Online]. Available: https://www.banquedesterritoires.fr/crise-des-gilets-jaunes-lexecutif-suspend-plusieurs-mesures-fiscales-en-esperant-lapaisement
[70] C. Martin, ‘What changes has the Yellow Jacket movement triggered in French social protection and tax systems?’.
[71] ‘Contribution Climat Energie : la fiscalité au service de la transition énergétique - Sélia Entreprises’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.selia-energies.fr/entreprises/contribution-climat-energie-la-fiscalite-au-service-de-la-transition-energetique/
[72] ‘Qu’est-ce que la taxe carbone et pourquoi est-elle indispensable ?’ Accessed: Jun. 04, 2024. [Online]. Available: https://www.hellocarbo.com/blog/compenser/taxe-carbone/
[73] N. Duvoux and A. Papuchon, ‘Qui se sent pauvre en France ?Pauvreté subjective et insécurité sociale’, *Revue française de sociologie*, vol. 59, no. 4, pp. 607–647, 2018, doi: 10.3917/rfs.594.0607.
[74] ‘La liste des revendications des gilets jaunes’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.cnews.fr/france/2019-02-28/la-liste-des-revendications-des-gilets-jaunes-801586?ref=hir.harvard.edu
[75] C. A. Grainger and C. D. Kolstad, ‘Who Pays a Price on Carbon?’, *Environmental and Resource Economics*, vol. 46, no. 3, pp. 359–376, Jul. 2010, doi: 10.1007/s10640-010-9345-x.
[76] G. Marshall, D. Conway, C. Louise, D. J. Besley, and I. Saldarriaga Arango, ‘Guide to Communicating Carbon Pricing’. World Bank Group, Dec. 01, 2018. [Online]. Available: http://documents.worldbank.org/curated/en/668481543351717355/Guide-to-Communicating-Carbon-Pricing

[77] ‘Projet de loi de finances pour 2021 : Écologie, développement et mobilité durables - Sénat’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.senat.fr/rap/l20-138-311-1/l20-138-311-110.html
[78] Cour des Comptes, ‘Compte d’affectation spéciale Transition énergétique’, p. 40, 2020.
[79] A. L. Bristow, M. Wardman, A. M. Zanni, and P. K. Chintakayala, ‘Public acceptability of personal carbon trading and carbon tax’, *Ecological Economics*, vol. 69, no. 9, pp. 1824–1837, Jul. 2010, doi: 10.1016/j.ecolecon.2010.04.021.
[80] H. Thomson and S. Bouzarovski, ‘Addressing Energy Poverty in the European Union: State of Play and Action’, EU Energy Poverty Observatory, Apr. 2019. [Online]. Available: https://energy-poverty.ec.europa.eu/system/files/2022-04/paneureport2018_updated2019.pdf
[81] ‘Les missions de l’ONPE | Observatoire National de la Précarité Énergétique’. Accessed: Jun. 04, 2024. [Online]. Available: https://onpe.org/missions-onpe
[82] ONPE, ‘TABLEAU DE BORD DE LA PRÉCARITÉ ÉNERGÉTIQUE 2023’. Nov. 2023. [Online]. Available: https://librairie.ademe.fr/ged/8354/ONPE-tableau-de-bord_vlb_4.pdf
[83] M. Legros and C. Martin, *2022 ESPN - Flash report Energy poverty - 51 - FR - July 2022*. 2022.
[84] ‘Comment a évolué la précarité énergétique en 2021 ?’ Accessed: Jun. 04, 2024. [Online]. Available: https://www.notre-environnement.gouv.fr/actualites/breves/article/comment-a-evolue-la-precarite-energetique-en-2021
[85] R. Le Saout, B. Mesqui, and J.-P. Rathle, ‘LE PARC DE LOGEMENTS PAR CLASSE DE PERFORMANCE ÉNERGÉTIQUE AU 1ER JANVIER 2022’, Observatoire national de la rénovation énergétique, Jul. 2022. [Online]. Available: https://www.statistiques.developpement-durable.gouv.fr/sites/default/files/2022-07/document_travail_60_parc_logements_dpe_juillet2022.pdf
[86] E. Omic and H. Jerome, ‘Energy Poverty in Europe: How Energy Efficiency and Renewables Can Help’, Council of Europe Development Bank, Mar. 2019. [Online]. Available: https://coebank.org/media/documents/CEB_Study_Energy_Poverty_in_Europe.pdf
[87] ‘Energy Pathways to 2050 Key results’, RTE France, 10/21. [Online]. Available: https://assets.rte-france.com/prod/public/2022-01/Energy%20pathways%202050_Key%20results.pdf
[88] ‘Les aides financières en 2024: Édition février 2024’, Agence nationale de l’habitat, Feb. 2024. [Online]. Available: https://www.anah.gouv.fr/sites/default/files/2024-02/202402_Guide_des_aides_WEBA.pdf
[89] ‘MaPrimeRénov’ : la prime pour la rénovation énergétique | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/prime-renovation-energetique
[90] ‘MaPrimeRénov’ Parcours accompagné : tout savoir sur cette aide | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/maprimerenov-parcours-accompagne-tout-savoir-sur-cette-aide
[91] ‘MaPrimeRénov’ Copropriété : tout savoir sur cette aide pour rénover les parties communes de votre copropriété | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/maprimerenov-copropriete-tout-savoir-sur-cette-aide-pour-renover-les-parties-communes

[92] ‘L’éco-prêt à taux zéro (éco-PTZ) : pouvez-vous en bénéficier ? | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/eco-pret-a-taux-zero-ptz-renovation-performance-energetique
[93] ‘Comment bénéficier de la prime « Coup de pouce chauffage » ? | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/prime-economies-energie
[94] ‘Target energy saving certificates quotas (CEEs) fees to vulnerable households | Interreg Europe - Sharing solutions for better policy’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.interregeurope.eu/good-practices/target-energy-saving-certificates-quotas-cees-fees-to-vulnerable-households
[95] ‘Certificats d’économie d’énergie (CEE) "Standard" | Service-Public.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.service-public.fr/particuliers/vosdroits/F35584
[96] ‘TVA à taux réduit : pour quels travaux ? | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/tva-taux-reduits-travaux
[97] ‘Peut-on cumuler la TVA à taux réduit avec d’autres aides ?’ Accessed: Jun. 04, 2024. [Online]. Available: https://www.lenergietoutcompris.fr/financer-mes-travaux/tva-taux-reduit/cumuler-cette-aide
[98] ‘Rénovation d’un logement ancien : tout savoir sur la réduction d’impôt « Denormandie » | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/reduction-impot-denormandie
[99] ‘Prêt avance rénovation : comment ça marche ?’ Accessed: Jun. 04, 2024. [Online]. Available: https://reno.fr/pret-avance-renovation/
[100] M. Dejobert, ‘White Certificates in France’, Eqinov, 2022. [Online]. Available: https://energie-fr-de.eu/fr/manifestations/lecteur/conference-sur-les-services-defficacite-energetique-en-france-et-en-allemagne.html?file=files/ofaenr/02-conferences/2022/220920_services_efficactie_energetique/Presentations/06_Maureen_Dejobert_Eqinov_OFATE_DFBEW.pdf
[101] ‘Renovate2Recover: How transformational are the National Recovery Plans for Buildings Renovation?’, E3G, Oct. 2021. [Online]. Available: https://www.renovate-europe.eu/wp-content/uploads/2018/09/Renovate2Recover_Full-Study-1.pdf
[102] ‘Proposal for a Council Implementing Decision on the approval of the assessment of the recovery and resilience plan for France COM(2021) 351 final 2021/0172(NLE)’. Accessed: Jun. 04, 2024. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0351&from=EN#footnote4
[103] ‘Éco-prêt logement social | Ministère de la Transition Écologique et de la Cohésion des Territoires’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.ecologie.gouv.fr/eco-pret-logement-social
[104] *Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast) (Text with EEA relevance)*. 2024. Accessed: Jun. 04, 2024. [Online]. Available: http://data.europa.eu/eli/dir/2024/1275/oj/eng
[105] ‘France - Draft Updated NECP 2021-2030’, Nov. 2023. [Online]. Available: https://commission.europa.eu/publications/france-draft-updated-necp-2021-2030_en
[106] ‘Comment bénéficier du chèque énergie ? | economie.gouv.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.economie.gouv.fr/particuliers/tout-savoir-cheque-energie

[107] ‘Quelle aide apporte le Fonds de solidarité pour le logement (FSL) ? | Service-Public.fr’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.service-public.fr/particuliers/vosdroits/F1334
[108] ‘Sobriété énergétique : un an après, on continue ! | Ministère de la Transition Écologique et de la Cohésion des Territoires’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.ecologie.gouv.fr/sobriete-energetique-apres-continue?lang=en
[109] G. Wald and M. Glachant, ‘The Effect of Energy Efficiency Obligations on Residential Energy Use: Empirical Evidence from France’. Nov. 2023. [Online]. Available: https://www.faee.fr/files/file/aee/seminaires/2023/WALD_GLACHANT_2023.pdf
[110] ‘L’EFFICACITÉ DES POLITIQUES PUBLIQUES EN MATIÈRE DE RÉNOVATION ÉNERGÉTIQUE’, Sénat, Jul. 2023. [Online]. Available: https://www.senat.fr/rap/r22-811-1/r22-811-1-syn.pdf
[111] J. Pisani-Ferry and S. Mahfouz, ‘LES INCIDENCES ÉCONOMIQUES DE L’ACTION POUR LE CLIMAT’, France Stratégie, May 2023. [Online]. Available: https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/2023-incidences-economiques-rapport-pisani-5juin.pdf
[112] ‘MaPrimeRénov’ - Monogeste, rénovation d’ampleur, DPE… À quels changements s’attendre encore ? - Actualité - UFC-Que Choisir’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.quechoisir.org/actualite-maprimerenov-monogeste-renovation-d-ampleur-dpe-a-quels-changements-s-attendre-encore-n119518/
[113] C. Vailles and L. Kessler, ‘Is the transition accessible to all French households? - I4CE’. Accessed: Jun. 04, 2024. [Online]. Available: https://www.i4ce.org/en/publication/is-transition-accessible-households-climate/
[114] S. Mourlon, ‘PROGRAMME 174 Énergie, climat et après-mines’, MINISTRE DE LA TRANSITION ÉNERGÉTIQUE, 174, 2024.
[115] European Commission, ‘COMMISSION RECOMMENDATION (EU) on energy poverty’, *2023/2407*, p. 11.
[116] ‘MaPrimeRénov’ | economie.gouv.fr’. Accessed: Jun. 07, 2024. [Online]. Available: https://www.economie.gouv.fr/plan-de-relance/mesures/maprimerenov
[117] ‘Qui sont les ménages en précarité énergétique dans les copropriétés du parc privé ?’, ONPE. [Online]. Available: https://onpe.org/sites/default/files/2024-03/Qui%20sont%20les%20locataires%20en%20pr%C3%A9carit%C3%A9%20%C3%A9nerg%C3%A9tique%20dans%20le%20parc%20priv%C3%A9.pdf

Annex I: Calculation out-of-pocket financing

Step 1: How many low-income households live in energy poverty per income decile:

Numbers / percentages are extracted from report: Qui sont les ménages en précarité énergétique (2019). Written by the ONPE [117].

Objective of MaPrimeRenov for 2024 is renovating the houses of 200.000 households.

67% of the 200.000 households are low-income households (first three income deciles). Which comes down to: 134.000 low-income households.

134.000 households divided over 3 deciles = 44.667 households per decile.

59% of households in first income deciles live in energy poverty.

24% of households in second income deciles live in energy poverty.

17% of households in third income deciles live in energy poverty.

59% of 44.667 households = 26.353 households in energy poverty in *first* income decile

24% of 44.667 households = 10.720 households in energy poverty in *second* income decile

17% of 44.667 households = 7.593 households in energy poverty in *third* income decile

Step 2: Financing gap for renovation per housing type per income decile

Numbers extracted from report: La transition est-elle accessible à tous les ménages (Octobre 2023). Written by the IC4E[113].

The table below shows the missing amount of aid per house type for the three different income deciles. This is calculated with the two constraints. First the debt load (sum total of all the money owed) of being below 5% is respected. Second, the energy savings related to the monthly loan payment are respected. Meaning, the revenue coming from the savings in energy is enough for the payments of the loans per income decile and housing type (price of energy start 2023).

House type	Decile 1	Decile 2	Decile 3
Rural Oil-fired housing	€ 26.578,00	€ 19.578,00	€ 13.578,00
Suburban housing (post-war)	€ 32.834,00	€ 25.834,00	€ 19.384,00
Suburban housing 1975-1985	€ 39.683,00	€ 32.683,00	€ 26.683,00
Bourgeois flat	€ 22.746,00	€ 15.746,00	€ 9.746,00
Flat apartment 1948 - 1994	€ 29.353,00	€ 22.353,00	€ 16.353,00
Small collective	€ 8.471,00	€ 1.471,00	€ -
Average	€ 26.610,83	€ 19.610,83	€ 14.290,67

Step 3: Total amount of financing needed to bridge the gap

To calculate the cumulative amount of financing needed to bridge the gap, the average missing amount of financing needed is used (last row of the table). This is done, because it is not documented how many houses per type are renovated annually.

Annual aid needed first income decile: 26.353 households x € 26.610,83 = € 701.284.161,11

Annual aid needed second income decile: 10.720 households x € 19.610,83 = € 210.228.133,33

Annual aid needed third income decile: 7.593 households x € 14.290,67 = € 108.513.795,56

Total needed in 2024: € 701.284.161,11 + € 210.228.133,33 + € 108.513.795,56 = €**1.020.026.090,00**