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► To cite this version:

| Theo Piens. A preliminary analysis of waste management policies in France. 2024. hal-04580417

HAL Id: hal-04580417

<https://hal.science/hal-04580417>

Preprint submitted on 20 May 2024

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A preliminary analysis of waste management policies in France

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Competency test conducted simultaneously with the thesis writing

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Introduction

This article examines the issues of waste management in France from various angles, as well as the challenges faced by policies and the results they promise. France's status as one of Europe's leading economies and a member of the international climate change organization supports its efforts to promote effective waste management and transparent policies. France's waste management policy is structured on several levels. It comprises waste treatment and distribution fees, recycling, energy reduction, and the introduction of waste reduction plans (Hemidat et al., 2022). These policies are fundamental and undeniably ensure a functional solution to the negative environmental impacts of waste production, as well as an improvement in resource efficiency. They also include various ways to address the nation's waste management issues. The increasing amount of discarded materials that are no longer reused, and the transition to a circular economy, pose complications for the country. Additionally, this article examines the key elements of policy changes in waste management in France. The above political strategies aim to create a circular economy, strengthen waste prevention, improve distribution and recycling, promote technological innovation in the waste sector, and increase public awareness and education (Rweyendela and Kombe, 2021).

Waste Management Policies in France

Incentive Pricing and Recycling Development

In France, the policy of incentive pricing and the construction of a recycling infrastructure are part of a multifaceted plan to address the waste problem. Zhou et al. (2021) recommend an intelligent recycling system based on incentives for household recyclables and demonstrate that such strategies can effectively control recycling behavior. These principles encourage residents to recycle individually and raise environmental awareness among municipalities. However, while optimizing this system may have positive implications, certain opinions must be critically analyzed. Bahers and Giacchè (2019) highlight specific waste management practices in Rennes, France, concerning metabolic ruptures in urban agriculture. They assert that urban agriculture projects can create situations where waste is reduced. However, side effects, such as increased resource consumption and ecological imbalances, could negatively impact the environment.

According to a study by Islam et al. (2022), the diversity factor of the board of directors in organizational parameters is evaluated for their environmental and societal sustainability. It is suggested that while incentive pricing schemes are intended to stimulate recycling activities, the basic structure of the organization and decision-making processes must also be considered as equally critical elements for promoting sustainability. Additionally, Zhang et al. (2020) investigate the effectiveness of green logistics policies, offering insights into a broader range

of environmentally-focused policy initiatives. The value of including comprehensive approaches that address operational difficulties and fundamental systemic obstacles is emphasized to achieve sustainable waste management systems. Although the French experience with incentive pricing and recycling development schemes appears to be a good approach to waste management, this approach must be carefully analyzed, and all other systemic factors must be considered. The complexities of logistics, organizational dynamics, and issues of unforeseen outcomes require an integrated approach to promote sustainable waste management practices efficiently and effectively.

Energy Recovery and Waste Prevention

In waste management policies, energy recovery from waste and waste prevention methods are key factors for ensuring resource sustainability and efficiency. The primary idea behind energy recovery is to transform municipal solid waste into useful energy sources, thereby reducing environmental damage and promoting a circular economy. Waste prevention involves reducing waste generation and efficiently using resources to lessen the need for energy-intensive waste treatment processes. Scarlat et al. (2019) illustrate the situation and opportunities for energy recovery from municipal solid waste in Europe, showing the potential for waste-to-energy technologies to produce renewable energy sources and reduce fossil fuel dependency. However, it is essential to evaluate the environmental, technological, and social effects of these technologies, such as air pollution and waste residues.

No waste recovery can assist in decarbonizing the EU's energy sector, as examined by Psomopoulos et al. (2022), who analyze energy recovery from waste for the decarbonization of the EU energy sector. The importance of including waste-to-energy programs in overall sustainability plans to achieve carbon reduction targets is clear. However, it is necessary to consider the relationship between energy recovery and other waste management options, such as recycling and composting, to ensure adequate resource use. Gatto (2023) demonstrates the effectiveness of energy recovery from waste for transitioning to a circular economy in Europe. The importance of comprehensive waste management systems, which rely on both energy recovery and environmental effects, is paramount.

However, the regulatory and policy issues mentioned by McCauley (2016) regarding the complexities of waste-to-energy policies in France are crucial to address. While the benefits of energy recovery from waste and waste prevention strategies are considerable, issues such as emissions, resource consumption, and the choice of alternative waste management strategies must also be considered. This proves the necessity of adopting a balanced approach to introducing effective waste management policies that cover environmental, economic, and social aspects.

Challenges in Waste Management in France

Increased Waste Production

The Europe as a whole is dealing with the problems of the increasing amount of waste in France which are also a proof of the consumer habits which are not sustainable and the high rates of waste production in the country (Minelgaitė & Liobikienė, 2019). The most important reasons of this nature are the population growth, urbanization, industrialization, and lifestyle changes. Although there have been some attempts to make people aware of recycling and to reduce waste, the total amount of waste is still on the rise, thus being very detrimental to the environment, economy, and society. The main problem that has triggered the increase in the waste production is that many products and packaging are being thrown away without use (Ncube et al., 2021). In societies where convenience is the main factor, productivity is dropping gradually, which leads to the over usage of the resources and, in turn, the generation of big amounts of waste.

In addition, the use of unrecyclable plastics and materials that are not recyclable leads to an increase in landfills and, consequently, environmental pollution. The third reason based on which more waste is produced is the lack of producer liability and product stewardship laws (Tasaki et al., 2019). In some cases, manufacturers need to be held accountable for the end-of-life management of their products, leading to the wastage of resources and the creation of waste. The absence of incentives for designing better products and recycling their materials leads to the harmful waste accumulation cycle.

Moreover, socio-economic factors such as the rise of the middle class and consumerism are the reasons for the increased waste production. The increase in disposable incomes is the reason for the desire to consume. Hence, the demand for goods and services also increases. This rebound effect encourages the linear resource use model. Thus, the amount of waste production goes up. This problem of increased waste production should be solved by various methods: regulations, public awareness campaigns and incentives for sustainable consumption and production. The policies regulating product responsibilities, eco-design standards, and waste reduction targets can solve the problems that come with waste generation (Joltreau, 2022). Besides, creating a culture of reuse, repair, and recycling through education and awareness-raising initiatives can develop more sustainable consumption behaviors among the citizens.

Persistence of Unvalorised Waste

The unresolved problem of unvalued waste in France is still a big challenge in managing the materials that have yet to be recycled, reused or recovered for their real price. Even though the programs meant to popularize waste valorization and the circular economy were in place, a large part of the waste generated in France has to be processed or used, which, in turn, leads to environmental degradation and resource inefficiency (Doussoulin & Bittencourt, 2022). The main reason the unvalued waste remains popular is the necessity for more infrastructure and technologies to treat and recycle the waste. The absence of funds for recycling facilities and collection systems roots the possibility that materials still need to be recovered from the waste stream. Therefore, the waste that is not valued will be thrown into landfills or incinerators.

In addition, the market forces and the economic factors can be obstacles to valorizing some waste streams. For instance, the low demand or small market opportunities for recycled materials can be why a city or a town needs to invest in recycling programs, leading to unprocessed waste. On the other hand, regulatory obstacles or inconsistent policies may be the main reason for the concern of waste management stakeholders. Hence, they will need the help to achieve the waste valorization goals (Joltreau, 2022). In addition, social attitudes and actions towards waste disposal are the main factors in determining unvalued waste. The main causes of the inefficiency of the waste management systems are the poor separation of waste, illegal dumping, and ignorance of the benefits of recyclable materials. Therefore, unprocessed waste will be the main problem. The conflict of unappreciated waste is the joint work of the government, the private sector, and the public participation. The infrastructure handling waste treatment and recycling, the initiatives promoting waste valorization projects, and raising awareness about sustainable waste management practices are crucial for fostering eco-economic sustainability.

Obstacles to the Development of the Circular Economy

The obstacles impeding the progress of circular economy growth in France are obstructing the shift towards a more sustainable and resource-efficient economic model. The primary obstacles that hinder the use of renewable energy are legal mandates, financial deterrents, technical complexities, and behavioral impediments (Lee Mendoza, 2019). It is faced with regulatory troubles as the legislation is very fragmented, and the policies need to be more consistent regarding waste management, recycling, and the use of resources.

Regulatory compliance is primary. Thus, they should enhance our performance in implementing circular economy practices. The economic disadvantages, such as the subsidies for linear production processes and the limited financial incentives for recycling and reuse, decrease the business case for circularity (Enriquez et al., 2021). Circular business models are characterized by high initial expenses which can deter investors from pledging in sustainable investment opportunities, out of fear of risk incurring loss. The main impediments of the circular economy business models include the technological barriers like extra investment in the construction of certain infrastructure to facilitate waste separation and recycling. Lack of the high technology for proper re-cycling and no sufficient inventiveness in the selection of materials are the key barriers blocking the progress of the course of the circular economy. While they can be overcome, the current barriers exist, like consumers' willingness to buy and consume fast fashion products and their habituation of what and how they consume, these barriers are limiting the adoption of circular economy initiatives. The development and alignment the strategic plan of the organization should eliminate the border barriers that affect the flow of the shipment of materials, the introduction investments for circular business models, the development of innovative technology and infrastructure for development, and the promotion of sustainable consumption through projects of education and public awareness.

Perspectives for Waste Management in France

Advancing the Circular Economy Transition

The circular economy transition in France is all about the shift from the current system to a more sustainable and resource-efficient economic model that cuts down waste and puts resources to the best use. Thus, the perspective supports moving from the "take-make-dispose" system to the other based on the circularity principle, where the materials and resources are used again, recycled, or reused (Elisha, 2020). The most significant components of the change to the circular economy are:

- The reorganization of products and processes to reduce waste production.
- The promotion of the reuse and refurbishment of products.
- The improvement of resource recovery through recycling and remanufacturing.

On the other hand, it is also necessary to encourage cooperation between different industries and supply chains to exchange and recycle the materials. It is important to have a

system where waste is considered a valuable resource. France has already succeeded in the circular economy transition through various policy initiatives, like the Circular Economy Roadmap and the Circular Economy Law (Domenech & Bahn-Walkowiak, 2019). The prime objective of these actions is to stimulate designing for environmental sustainability, making green consumption habits and introducing new technologies to manage waste and recover resources (Sharma et al., 2021). While there are challenges to be addressed, such as the need for increased investment in circular infrastructure and the establishment of supportive regulatory frameworks, the key to overcoming these lies in the involvement of all stakeholders: the government, businesses, academia, and civil society, together should strive to achieve the systemic change and speed up the transition to a circular economy in France. Every stakeholder has a different position, and their combined effort is essential for achieving the goal.

Strengthening Waste Prevention and Reduction Efforts

Enhancing the waste prevention and reduction programs in France means introducing obligatory measures to help minimize the waste at its origin (Diemer et al., 2022). Therefore, the volume of waste will be lessened. This highlights the necessity of adopting sustainable consumption and production practices, promoting reuse and repair initiatives, and raising awareness about the environmental impacts of excessive consumption.

The main strategies to increase waste prevention and reduction are the EPR schemes, which are used to motivate the design of the products for long life and the recyclability, eco-labeling, and certification schemes, which guide the consumers to choose sustainable products and the businesses which can be encouraged to the circular business model in which the waste prevention is the priority and this is the resource-efficient company. France has successfully addressed the issue of plastic waste through programs such as the National Waste Prevention Program and the elimination of single-use plastics (Cornago et al., 2021). However, more work is still required to deal with the actual reasons for waste production, including the materialistic consumer attitude and the concept of planned obsolescence. By reinforcing the waste prevention and reduction policies, France can reduce environmental pollution and save natural resources, and the economy will go towards a circular.

Innovating Waste Valorization and Recycling Technologies

The French innovation in waste valorization and recycling technologies is developing and applying modern processes and techniques to get value from waste materials and increase recycling efficiency. This view shows the necessity of technological innovation, which will lead to the maximization of resource recovery, the reduction of the environmental impact, and the promotion of a circular economy. Waste valorization techniques are concerned with transforming waste materials into resources with economic value, i.e., energy, chemicals, or raw materials for manufacturing. The above technologies are thermal treatment methods like pyrolysis and gasification, biological processes such as anaerobic digestion and composting, and new techniques like chemical recycling and upcycling (Pratap et al., 2021). Through converting waste into valuable products or energy sources, waste valorization technologies help to reduce the usage of limited resources. Thus, they also play a significant role in reducing the environmental impact of waste disposal.

On top of that, developing new recycling technologies means improving the waste sorting, separation, and processing methods. This mainly means using cutting-edge technologies, like optical sorting systems and artificial intelligence - robotics, to improve the recovery of recyclable materials from mixed waste streams. Moreover, the advances in recycling methods, such as closed-loop recycling and new material recovery techniques, allow the production of high-quality recycled materials for use in new products (Hagelüken, & Goldmann, 2022). Thus, the materials flow is closed, and the demand for new resources is reduced. France has been on the leading edge of waste valorization and recycling technologies through the joint efforts of research institutes, the industry, and the government to create and implement the latest technologies. Projects such as the National Plan for the Circular Economy and the Research and Innovation Strategy for Smart, Sustainable, and Inclusive Growth priorities funding the research and development to innovate in the waste management sector (Möslinger et al., 2023).

However, there are still challenges that need to be solved such as the need to scale up and commercialize the emerging technologies, the technical and economic feasibility barriers, and the compatibility with the existing waste management infrastructure. The challenges that have to be faced in order to succeed are many and they involve collaboration among different specialists, investing of resources and the support of the regulating authorities (Abelsen et al., 2020). Through the use of innovative technologies, France will open the door to the new prospects of sustainable waste management and resource recovery, thus enabling the transition to circular and resource-efficient economy.

Conclusion

The difficulties and views shown in the waste management policies of France point out the intricacies and the seriousness of dealing with the waste matters to attain environmental sustainability and resource efficiency. The country has achieved a lot in the field of the waste management problems, in particular, the country has introduced the policies and the initiatives to overcome the problems, for instance, the recycling, the energy recovery and the prevention strategies. However, the problems that are still not solved such as the increase of the waste production, the persistence of the valueless waste and the difficulty in the development of the circular economy prove that the efforts and the innovation should continue. To solve these problems, France should concentrate on the progress of the circular economy transition, the enhancement of waste prevention and reduction strategies and the development of waste valorization and recycling technologies. Making the shift to a cyclic economy is necessitated by the changes that have to be made in different sectors, i.e. consumption and production patterns, that are environment friendly, in addition to the eco-design and product stewardship that have to be introduced, and lastly, by the different stakeholders have to work together for the same. Waste prevention is the way of making stronger the efforts of the waste control by the means of the implementation of the proactive measures that will help in minimizing the amount of waste produced and promoting the sustainable consumption behaviors among citizens and businesses. In addition, the development of waste valorization and recycling technologies is important for the maximization of resource recovery, the reduction of environmental impact, and the closing of the loop on material flows. Through the funding of research and development, support to technological innovation and the creation of a supportive regulatory environment France can find new ways to manage the wastes and use the resources sustainably.

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