



Invest-to-Save Food Waste Business Models report

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Executive Summary

The [BLUEPRINT to a Circular Economy Project](#) is an [Interreg-funded project with a total budget of €5.6M, of which €3.8M were contributed by the European Regional Development Fund](#). Led by Essex County Council, it will help local authorities in France and England to implement a circular economy. Working with local authorities, social enterprises, schools and households, the project will unlock circular economy growth opportunities within [the France \(Channel\) England \(FCE\) region](#).

The deliverable presents the detailed research study and financial assessment on how public sector investment can support behavioural change efforts for food waste prevention, diversion of food waste to local composting, and food waste recycling. The efforts are based on the BLUEPRINT food waste pilot and BLUEPRINT schools pilot food waste workshops, as well as external local authority food waste case studies. The evaluation focuses on the economies of scale impacts of scaling these pilot type efforts to the entire local authority as a structural programme of change, to save collection costs and gate fees paid to anaerobic digestion operators, through investment in food waste behaviour change. The referred to here as invest-to-save food waste strategy is based on a package of food waste prevention, composting efforts, schools' workshops, and food waste recycling promotion efforts. The analysis looks at how to make these efforts cost-neutral within a 5 year period and lead to further savings in a 10 year period, so as to open up to different invest-to-save business models including public loans and public-private partnership. A total of four business model options are evaluated. The report finishes with three recommendations for local authorities to take forward the works carried out from a more structured basis within their circular economy, waste and recycling programmes.

The report covers the following information:

- Chapter 2 provides for an overview of the public investment landscape in France and England, typical budgets spent by local authorities on waste and recycling, and specific public investment funds available for food waste related projects.
- Chapter 3 gives a brief overview of current and upcoming legislation related to food waste in France and England.
- Chapter 4 provides for a summary of use cases external to the BLUEPRINT project in France and England relating to food waste prevention, recycling and composting.
- Chapter 5 summaries two of the BLUEPRINT shift pilots that have impacted food waste prevention and recycling.
- Chapter 6 provides for the invest-to-save food waste strategy & business model to shift from pilot scale to full local authority scale with a financial cost and benefits.
- Chapter 7 summarises the report with conclusions and recommendations.

The main intended audience are local authority officers working on circular economy, recycling, waste prevention and food waste. They can utilise this resource alongside the BLUEPRINT model to evaluate how the recommendations, when taken on-board, impact their scoring in this model. The BLUEPRINT to a circular economy model is available on the BLUEPRINT website www.projectblueprint.eu.

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1 Introduction

One of the main challenges that arise along with a growing population is the need to feed more people whilst wasting less than what is produced. Food waste is not just a social or humanitarian concern but an environmental one as well because of all the resources and energy wasted when food is thrown away. Tackling food waste requires increased political focus from governments, local authorities, business, and individuals can all play an important role in the prevention of food waste and help increase food waste recycling. France and England have both taken various steps towards the prevention of food waste.

France adopted a law in February 2016 where supermarkets were no longer allowed to destroy unsold food products but are required to donate them instead. Since the law has been passed several provisions have been added to strengthen and increase the scope of the law for food retailers by using general objectives with aim of reducing food waste by 50% by 2050.¹ The UK government has taken steps against food waste by supporting several initiatives by relying on voluntary agreements. Households produce 70% of the food waste in the UK. They are followed by manufacturers who are responsible for 16% of food waste in the UK, the hospitality sector for 12% and the retail industry is responsible for 3% of total food waste. The food waste produced results in around £10 billion worth of food and drink are wasted annually.²

1.1 Overview of the report

The report seeks to provide for an analysis of how as much food waste as possible can be reduced from black bag or residual waste, in the journey to 65% overall recycling by 2035 for France and England. The approach is to look at the impacts of interventions and projects within the context of local authority financing and investments, so as to save money in the long run by reducing collection costs and paying gate fees for anaerobic digestion. The outcome is an overview of a package of interventions as an invest-to-save food waste strategy across an entire local authority, shifting from pilot scale (e.g. 5% to 10% of households) to covering as many households as possible to all households, either in a given year or over time. This scaled analysis is presented as a final result with their costings and benefits assessment and related options for the financial coverage of the investment needed based on four different business models.

The report is split into six different chapters:

- Chapter 2 provides for an overview of the public investment landscape in France and England including the geographies of funds available, the typical budgets spent by local authorities on waste and recycling, and specific public investment funds available for food waste related projects.
- Chapter 3 gives a brief overview of current and upcoming legislation related to food waste in France and England.
- Chapter 4 provides for a summary of use cases external to the BLUEPRINT project in France and England relating to food waste prevention, recycling and composting.
- Chapter 5 summaries two of the BLUEPRINT shift pilots that have impacted food waste prevention and recycling, the food waste campaign in Chelmsford in Essex and the Schools pilot result.

- Chapter 6 provides for the invest-to-save food waste strategy & business model to shift from pilot scale to full local authority scale with a concrete financial cost and benefit example.
- Chapter 7 summarises the report with conclusions and recommendations.

2 Overview of the public investment landscape

In this chapter the public investment landscape is evaluated for waste and recycling in France and England. The purpose is to evaluate the available existing funding available in both countries depending on the geographies from local to national funds, and also to establish the current budgets spend on waste and recycling in a sample of local authorities. On the basis of this research it becomes clear how different programmes can be funded with existing available funds, and also how additional investments in food waste related projects or interventions relate to the existing local authority budgets.

The chapter starts with evaluating the geographies of public investment in France and England (section 2.1 and 2.2), subsequently it evaluates a typical budget for waste collection and recycling in France and England (section 2.3 and 2.4), and finally it summaries some of the available public investment routes in France and England (section 2.5 and 2.6).

2.1 Governance geographies in France

There are four levels of waste governance of a territory in France: communes; intercommunity; Department; and Region. The four levels of governance, as visualised in Figure 1 below, each have a different role to play in relation to public investment in waste, reuse and recycling management.

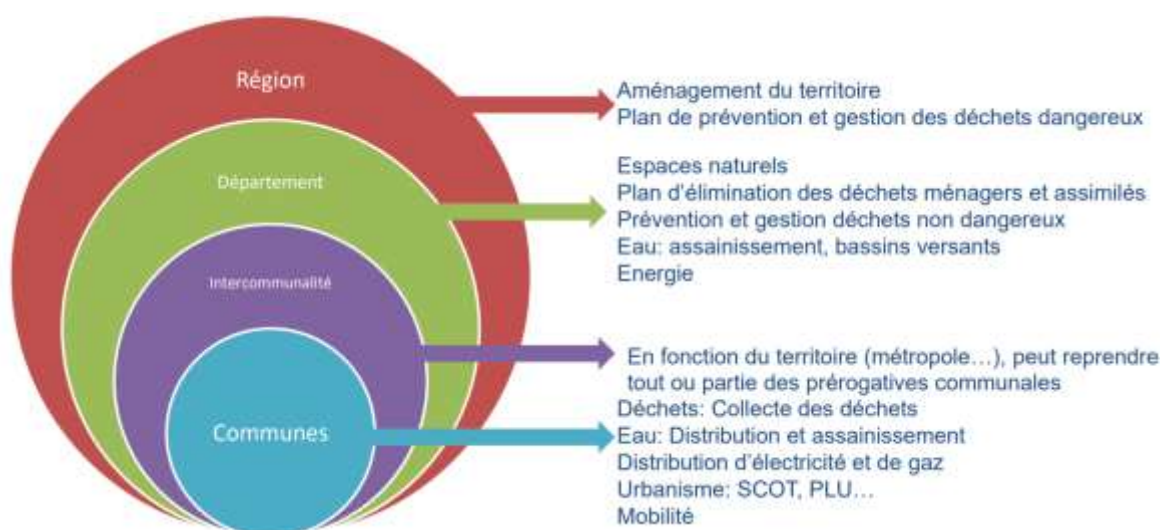


Figure 1. Territorial governance organisation in France. Source: "Enjeux Urbains" presentation by UniLaSalle

Regions in France set their regional plan for prevention and management of dangerous waste. Departments set the elimination plan of household and similar waste, as well as the prevention and management of non-dangerous waste. Communes are usually in charge of the collection and treatment of household waste management. These communes can then transfer the waste collection and/or treatment responsibility to the "Intercommunalité" or EPCIs (groups of communes). It is estimated that 95% of the French population lives in a commune that has transferred its waste treatment responsibility to the EPCI/intercommunalité and 86% of the population lives in an EPCI that is responsible for household waste collection.³

2.2 Governance geographies in England

Initially there was no legal requirement for food waste collection to be separate across England, the decision came down to the waste collection authority in that specific area, usually the local authority who would be responsible for recycling operations, decisions on collection regimes and frequency.⁴ Currently a law passed in November 2021 called the Environment Act 2021 introduced changes to the waste collection whereby recyclable household waste which includes food waste must be collected separately from other household waste at least once a week.⁵

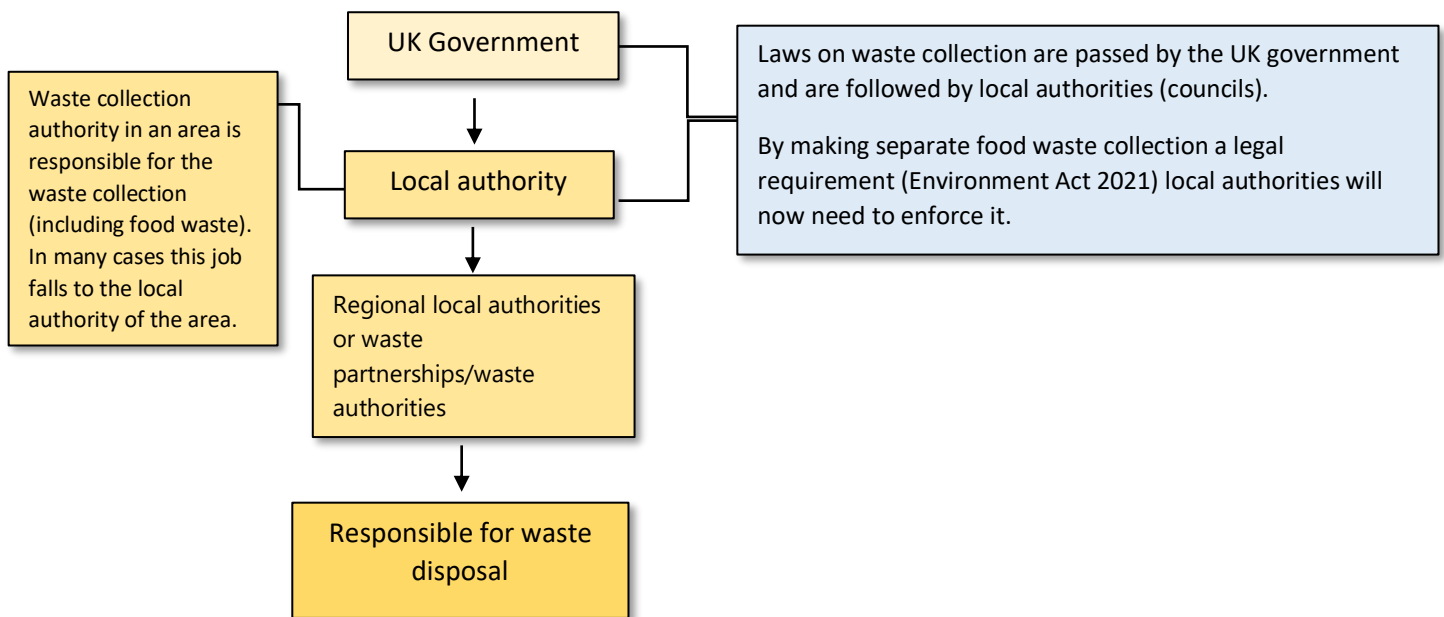


Figure 2. Framework of waste collection responsibility in England

2.3 Typical budget for waste/recycling for a council in France

Every year in France, ten million tonnes of consumable food is wasted – the equivalent of 150 kg/resident/year. Household waste is composed of an equivalent of 20 kg/resident/year of food waste, from which seven kilograms of food waste is still in its packaging. Food waste in France costs €12 million to €20 million per year; the equivalent of 159 euros per person for households.⁶ France has set ambitious goals to combat food waste, such as reducing food waste by 50% by 2025, and ensuring the scaling of food waste sorting for everyone, as set by the Energy Transition and Green Growth Law (LTECV).⁷ To do so, the French Environment and Energy Management Agency (ADEME) supports the implementation of circular economy projects by dedicating a fund to those activities. ADEME has allocated €164 million of its 2022 budget for the “Circular Economy and Waste” programme. In addition, the “France relance” Plan also supports ADEME to fund and implement new circular economy interventions. The amount of budget available for this is €236 million of which €104 million is dedicated to investments in reuse, recycling, and food waste sorting, and €132 million is dedicated to the modernisation of sorting centres, and improving recycling and waste recovery.^{8,9} This means that, in 2022, €400 million is dedicated to support the anti-waste and circular economy law (loi AGEC).¹⁰ It is estimated that two million tonnes of waste will be prevented, recycled, or recovered as a result of those funds. Local authorities in France are using this fund for various activities, in particular to put in place a separate food waste collection, as well as to create and ensure access to community or individual composting system to divert food waste from residual waste.¹¹

To give a general idea of the current cost of household waste collection in France, two examples are given for Rennes Métropole and Vannes Agglomération.

Rennes Métropole Example. In its 2020 report on the cost and quality of waste prevention and management services, Rennes Métropole has spent a total of €18 million on household waste collection. The population of Rennes Métropole is of 451,762.¹²

Table 1. Rennes Métropole household waste collection information

Town	Rennes Métropole
Population	451,762
Department	Ille-et-Vilaine
Region	Brittany
Total household waste collection cost	€18 million
Collection cost/resident	€40/resident

Vannes Agglomération Example. In its 2021 report on the cost and quality of waste prevention and management services, Vannes Agglomération has spent a total of €8.03 million on household waste collection. The population of Vannes Agglomération is 175,000.¹³

Table 2. Vannes Agglomération household waste collection information

Town	Vannes Agglomération
Population	175,000
Department	Morbihan
Region	Brittany
Total household waste collection cost	€8 million
Collection cost/resident	€46/resident

2.4 Typical budget for waste/recycling for a council in England

Food waste can be defined as any products that are thrown away as opposed to being consumed. In 2018 UK produced 9.5 million tonnes of food waste. The UK produces 9.52 million tonnes of food waste annually. WRAP estimates around 70% of this food waste (6.7 million tonnes) comes from households across the UK, and the rest is produced by businesses. WRAP has identified that 205,000 tonnes of food waste could be potentially redistributed. – Through a £15 million pilot fund. The budget set out for 2023-24 for food waste collection is £300 million and £100 million for 2024-2025. The funding is to implement free, separate food waste collections in every English local authority from 2025, supporting the near elimination of biodegradable municipal waste to landfill by 2028.

To obtain an estimate of spending in English councils on waste and recycling collection efforts the budgets were evaluated for Essex County Council and Basildon Borough Council, shown in table 4 and table 5 below.

1. Essex County Council

Table 3. Essex County Council waste information

LA	Essex County Council
County	Essex
Population	1,500,000
Net expenditure for waste disposal, reduction and recycling	£85 million
Waste disposal reduction and recycling /capita	£57/capita

*Waste reduction and recycling includes: waste minimisation, disposal and recycling, integrated waste management, waste strategy and waste programme delivery¹⁴

2. Basildon Borough Council

Table 4. Basildon Borough Council waste information

LA	Basildon Borough Council
County	Essex
Population	187,600
Total cost for waste collection and recycling	£4.8 million
Cost of waste collection and recycling / capita	£26/capita

*77,773 tonnes of household waste was collected from 78,000 households (2019/20)¹⁵

2.5 Public investment routes in France for local authorities

Local budget, TEOM, and REOM. Local authorities, or “collectivites territoriales” (communes and their wider authority, EPCIs) that ensure the collection of waste finance their work through their local budget, from taxing household waste removal (TEOM in French), or by collecting a fee for the removal of household waste (REOM in French). The TEOM is the equivalent of a refuse collection tax that councils collect with the annual property rates bill. While not all council impose the TEOM on their residents, it is currently the most common way for councils to finance their waste collection service. The REOM is a household refuse fee that is calculated depending on the household size and volume of waste produced by the household. It is less commonly used than the TEOM. Councils that have not put in place the TEOM or REOM have to rely on their local budget for the collection and treatment of their waste. As of 2012, 67% of communes or EPCIs financed their waste management service from TEOM, 29% from REOM and 3% from solely their local budget.¹⁶ The TEOM and local budget can be used together to complement each other.

ADEME. Since 2009, the government has been allocating credit to ADEME to build The Circular Economy Fund.¹⁷ This fund is supported by a tax called the General Tax on Polluting Activities¹(TGAP), collected by the French Government and donated to ADEME.¹⁸ Specifically, ADEME uses the Circular Economy fund to support enterprises and local authorities in their project to raise awareness and change behaviour. The fund directs investments towards projects in food waste prevention, separated sorting, organic recovery, and waste to energy recovery. The fund has been allocated €164 million for 2022, further supported with an additional €236 million from the “France relance” Plan.¹⁹

Aid from the Region. Regions in France can help local authorities access funds in two ways.²⁰ Regions are in charge of managing a share of EU funding, such as FEDER for example (ERDF in English). FEDER can support the development and improvement of sorting, recycling, and treatment of waste. It supports local authorities in financing projects related to different environmental programmes, including “Circular Economy and Quality of Life”. FEDER is broken down into different funding instruments, including INTERREG. Between 2021-2027, the programme had a budget of 226.05 billion euros at the European scale.

Regions have credits that can be used to finance circular economy project. In Hauts-de-France for example, there is a specific regional funds called FRATRI, that both ADEME and regions have. It was launched in 2013 and aims to decarbonise and encourage local and circular economic growth for the Hauts-de-France region.²¹

¹ This tax has been put in place by article 45 of the law on finances (loi de finances) in 1999. It is based on the “polluter pays” principle and concerns any enterprise that that landfills or incinerates waste.

2.5.1 Conditions of eligibility in France

ADEME provides investments for four types of projects as described below.^{22 23}

Aid for the implementation of diagnostic analysis, studies, investments. ADEME, along with an external service provider can run diagnostics and support projects that help local authorities to implement a circular economy. ADEME also financially supports the dissemination of technologies through the Circular Economy Fund. This can cover up to 70% of the total spending (up to €50,000) for preliminary studies for separate food waste collection, up to 55% of spending on investments such as community composting spaces, composters, equipment, and up to 70% of the spendings on separate food waste collection pilots. For the implementation or the extension of food waste collection services, ADEME can cover €10/person reached.²⁴

Research, observations, and benchmarks. ADEME supports research, development, and innovations projects to explore future solutions that would help local authorities reduces their impacts. In addition to that, ADEME also supports the development of knowledge useful for the design and implementation of public policies through general studies such as benchmarks, forecasts, development of tools, and methods and evaluations.

Behavioural campaigns such as training or animations. To raise awareness, ADEME runs training, animation, and communication campaigns. It also supports existing behavioural campaigns that are run by other agencies and that target the public, businesses, and local authorities.

Aid paid under a territorial objectives contract (COT) over several years. In addition to calls for funding, local authorities can sign a contract with ADEME – a territorial objectives contract. Financial help to implement a project can be given following a preliminary study to determine the ambitions and objectives of the contract. ADEME would then finance the project during 3 or 4 years, with an amount reaching up to 350,000 euros. The first 18 months of the contract is dedicated to fixing the objectives and defining an action plan. The second phase would then allow regions/local authorities to implement the action plan.

Depending on the call for funding criteria, there will thus be a variety of conditions that have to be met to be eligible for the funding. The projects must cover at least one theme that aims to scale separate food waste sorting and collection. While criteria will vary, the table 3 below summarises the types of food waste projects that can be eligible for funding. This information is adapted from the specifications for the Biowaste in Pays de La Loire call for funding in 2021.²⁵

Table 5. Summary of food waste project eligibility criteria for Local Authorities

Support for feasibility studies	Support for funding for different projects		
Theme 1	Theme 2	Theme 3	Theme 4
Development of a strategy to implement food waste sorting	Close-distance management of food waste	Separated food waste collection	Composting platforms
Diagnostic study for proximity food waste management Preliminary study for separate food waste collection Territorial diagnostic Preliminary study for investment in food waste treatment facilities	Animation and communication to facilitate the implementation of separate food waste sorting Community composting schemes Electromagnetic composters Compost shredders	Pilots Door to door collection or drop off points	Increasing capacity of composting spaces

2.6 Public investment routes in England for local authorities

Grants from the Waste and Resources Action Programme (WRAP). Supports local authorities in England deliver interventions that increase the yield of food waste collected for recycling example, in 2019 Norwich City Council was provided with a grant of £60,000 from WRAP to fund interventions with the aim of increasing food waste collection across 57,000 households in Norwich in a 2-week delivery period. Eastleigh Borough Council was awarded a £81,930 grant from WRAP with the objective of increasing food waste collections and processing and delivering more food away from disposal. This grant was used by the council to broaden a community group food waste pilot. 56,000 households were involved in the scheme in rural and urban areas. Derbyshire Dales District Council (2019) was awarded a grant of £68,000 to fund a food waste intervention pilot to increase food waste collections across 34,000 households and covered the cost of providing households with a free supply of caddy liners as well as, distribution of leaflets and bin stickers.

Department for Environment, Food and Rural Affairs (DEFRA) and UK Government funding. To support councils with food waste collection, and the commitment to explore options for the near elimination of biodegradable municipal waste to landfill from 2028. In 2020, £1.15M government funding to tackle food waste in households and supply chains. The 1.15 million is split into two small scale grants where £650,000 will go to The Citizen Food Waste Prevention grant. Within the organisation £25,000 to £100,000 will be awarded to SME businesses and for non-profit organisations that help the public reduce their household food waste through consumer education programmes, such as understanding shelf life and storing food appropriately. Around £500,000 of £1.15 million will go to The Value from Food Waste Fund which is open for collaborative projects from organisations of any size who aim to pilot methods to create useful materials out of food waste.

2.6.1 Conditions of eligibility in England

DEFRA work with WRAP to increase food waste collections through various funding opportunities and schemes. The Resource Action food waste fund addressed 3 key challenges that included, utilisation of surplus food, turning unavoidable food waste into valuable products and changing consumer behaviours.²⁶ WRAP works with local authorities and businesses, where funding for various projects and initiatives is awarded based on applications that are submitted. The small-scale food waste prevention fund was open to small and medium enterprises and not-for-profit organisations with the aim of supplying surplus food directly to individuals or to other organisations doing the same.^{27 28}

3 Current and upcoming legislation for food waste circularity in France and England

3.1 France

Article 88 of the anti-waste law for circular economy (loi AGEC) will make it mandatory from 31 December 2023 for any entity that produces food waste to sort their food waste, including local authorities as part as their waste strategy. This complements the law that will make it mandatory from the 1st of January 2023 for any entity that produces over five tonnes of food waste per year to sort their food waste. Currently, and since 2016, only producers who generate over 10 tonnes/year of food waste are legally required to sort their food waste.

As of 2021, 150 local authorities in France collect food waste separately, covering 5.8% of France's population.²⁹ Each region in France has its own waste prevention and management plan (PRPGD) that aims to accelerate the national food waste targets such as putting in place separated food waste collection, piloting proximity food waste management systems, and ensuring the generalisation of food waste sorting.³⁰

3.2 England

In recent years, the UK government has unveiled environmental legislation that aim to aid in the reduction of food waste generated. The Environment Act 2021, that was passed in November 2021 contains basic duties of collecting household waste by local authorities, which has been amended to require separate collections of recyclable waste. This law since has been amended further to provide a more comprehensive statement of what must be collected separately, and which recyclables can be collected together with other materials (co-mingled). The materials waste streams that fall within the Environment Act include glass, metal, plastic, paper and card, food and garden waste which need to be collected separately. The recent addition to the act includes a new duty to carry out a separate collection of food waste at least once a week.³¹ Currently, around 40% of local authorities collect food waste separately. Additionally, the authority collecting waste at present decides on the frequency and scheduling of the different collections. One in six waste collection authorities opt for a weekly collection from each household of general waste, but most alternate between a general residual waste collection and a dry recyclables collection. However, the Environment Act 2021 states that it will be a requirement for food waste to be collected at least once a week, where garden waste and food waste usually collected together will have to be collected separately as garden waste is not collected as frequently.³²

The Courtauld Commitment 2025, set up by WRAP and supported by the UK Government is a voluntary agreement aims to reduce food waste in the UK by 20% per capita by 2025. The Courtauld Commitment has been extended to 2030 where the main scope remains unchanged from the Courtauld Commitment 2025. The extended Courtauld Commitment covers manufacture, retail, hospitality and food service and household, as does the level of ambition for impact to 2025. Additionally, the Environment Act 2021 introduced changes to waste collection so that recyclable household waste, which includes food waste must be 'collected separately from other household waste' and food waste itself must be collected at least once a week.

4 External Case studies to reach a high rate of food waste recycling

4.1 France case studies

4.1.1 Case study of Lorient Agglomération

Context and journey in food waste recycling. In France, around 30% of municipal waste is putrescible waste. To reduce this waste stream, preventing food waste has become one of the priorities of local authorities in France, and specifically in local authorities within Brittany where sorting food waste has been prioritised over the past two decades. For example, Lorient Agglomération is in Brittany, and is in charge of the collection, recovery, and treatment of the waste produced by its 207,000 residents. It is mainly urban, and groups 25 communes. Since 2002 Lorient has put in place door-to-door separated food waste collection. Households were given 10 L food waste caddies, 10 L compostable bin liners and 80L outdoor bins. As of 2018, 100% of residents had access to a separate food waste collection.

In 2014, the local authority of Plouay (13,000 residents) was integrated into Lorient. This meant that in 2016, the separated food waste collection was also extended to the Plouay region and its six communes. This was done in two phases, a first one in March 2016 for 1,900 households (4,000 residents), and a second one in January 2017 for the rest of the households, covering the entire population of 13,000 residents. The project to extend food waste collection to the Plouay region was funded by ADEME and the Brittany region. ADEME provided €128,000 of funding, and the total cost of the intervention was €225,000.

In 2019, the spending linked to the door-to-door household waste collection within Lorient Agglomération reached €27 million, whereas the revenues reached €31 million, from which 75% were covered by TEOM.³³ As of 2017 the annual food waste collection cost per capita in Lorient Agglomération is broken down as per table 7.

Table 6. Biowaste service costs per capita in Lorient Agglomération

Biowaste service cost	Cost per capita (€/capita)
Pre-collection and collection	14
Treatment	4.5
Infrastructure	1.5
Communication	0.5
Total	20.5

Main initiatives deployed. This expansion was used as an opportunity to optimise the food waste collection service. To improve the service, the caddies were replaced with perforated food waste caddies to eliminate odours, and the outdoor bins were replaced with 50 L bins with smaller openings to discourage the disposal of garden waste in the bin. Households that didn't have space for the 50 L bins were given smaller capacity bins of 35 L. Bin stickers and leaflets were also distributed to support residents with their food waste sorting. The frequency of refuse waste collection from households and professionals also went from once a week to fortnightly to

encourage food waste sorting. Communications efforts were used as part of this intervention to inform and support residents. A team of eight ambassadors, and five people tasked with delivering the food waste bins have been hired.



Figure 3. Bins and equipment distributed, credits Lorient Agglomération

Lorient Agglomération Results. These changes allowed, in 2017, to collect 37 kg of food waste per capita per year for the whole of Lorient Agglomération (207,000 residents from Lorient Agglomération and 13,000 residents from Plouay). Lorient is one of the first local authorities to have put in place a door-to-door separated food waste collection service and have had a successful experience with it. From 2010 to 2019, there was a 16% increase in tonnage of food waste collected in Lorient.³⁴

Plouay Results. Focusing on the Plouay commune only, the tonnage of household waste collected reduced by 6% from 2016-2017, with a 29% drop in household refuse waste collected between that same period. In 2017, 35 kg of food waste per capita per year was collected. with the share of residents sorting their food waste increasing from 34% to 51% from 2016 to 2017. The table 8 shows a breakdown of the results of the biowaste collection expansion in Plouay.

Table 7. Results of the food waste collection expansion to the Plouay Commune

Number of people reached by expansion of service	13,000
Number of households reached by expansion of service	5,900
Total cost	€225,000
Cost per capita	€17/capita
Cost per household	€38/household
Total biowaste collected in 2017	35 kg/year/capita
Tonnage of refuse waste collected from 2016 to 2017	-29%

Future of the project. Biowaste is still being collected from Lorient Agglomération. To improve the service, ADEME recommends encouraging residents more to use of the biodegradable bin liners, and to keep residents aware of any collection day changes online or with letters from the commune. Full details of the case study can be found here.

4.1.2 Case study of Rennes Métropole

Context and journey in food waste recycling. As of 2021, Rennes Métropole in Brittany had 451,762 households across its 43 communes, of which Rennes (220,488). Rennes Métropole is in charge of the collection and treatment of household waste. In Rennes Métropole, 55% of the population already has access to either a communal or personal composting service, or a separate food waste collection, and around 32% of the residents already sort their food waste as of 2020.³⁵ As of 2021, 700 households had access to a separate food waste collection for food waste that were collected fortnightly. Since 2015, all households living in houses have the option to receive a free individual composters of 300 L. As of 2021, there were 500 communal composting areas, mostly for residents living in flats.

In 2018, it was estimated that there is 34.3 kg/capita/year of compostable food waste in household refuse waste out of 183 kg/capita/year of refuse waste. Rennes Métropole has set a goal to ensure 100% of its residents has access to a food waste sorting solution (composting or separate collection) by 2024 as per the AGEC law. Rennes Métropole wants to reach 60% of participation in community or individual composting by 2025.

With the support of three partners: “Vert le Jardin”, ADEME, and the European Union through the project “Miniwaste”, Rennes Métropole has been deploying more initiatives to reach its food composting goals. Vert le Jardin was in charge of providing training and support on the community compost schemes. The Miniwaste (2010-2013) project benefited from the LIFE+ financing programme from the EU.³⁶ Miniwaste had a budget of €2,289,402 of which €433,000 were allocated to Rennes Métropole.³⁷

Main initiatives deployed. Rennes is deploying and scaling two types of composting schemes to ensure proximity food waste management: community and individual composting. Those who are unable to compost will receive a separate food waste collection service by 2024. Since 2006 and as of 2021, 40,000 individual composters were distributed (they used to cost 20 euros, but are free since 2015), and 500 community composting were put in place, serving 28,000 households. The organisation Vert le Jardin has, since 2014, been monitoring shared composting areas for a year before leaving residents to be autonomously responsible for managing the shared composting.

Staff from the organisation then meet residents once or twice a year to follow up and get feedback regarding community composting, or to present new communication materials.



Figure 4. Part of the leaflet distributed to residents with access to community compost bins ³⁸

Results for individual composting

Table 8. Results of the individual composting initiative in Rennes Métropole

Number of people receiving individual composting (as of 2021)	40,000
Tonnage of food waste diverted from composting in 2016	5,100 t
Food waste diverted/capita in 2016	130 kg/capita in 2016
Average number of individual composter bins deployed yearly ²	2667
Cost of each composter bin ³	€20
Yearly spending on composter bins	€53,340

² Calculated based on the 40,000 composter bins that have been deployed between 2006-2021 (figure of 40,000 divided by 15 years).

³ There are no indication on how much composter bins cost for Renne Métropole, however as residents used to pay €20 for a composter bin, this is the cost considered in the calculations.

Results for community composting

Table 9. Results of the community composting initiative in Rennes Métropole

Number of community composting areas from 2006 to 2021	500
Number of households with access to community composting	28,000
Tonnage of food waste diverted from composting in 2016	1,600
Food waste diverted/household in 2016	600 kg/household in 2016
Number of new community composting areas per year	30 per year
Cost of materials and equipment in 2015	€228/composter
Cost of monitoring and support for community composting schemes in 2016	€157,807
Cost of animations and trainings in 2016	€32,327

Results for the Mini-waste project in Rennes Metropole (2010-2013)

Table 10. Results of EU-funded Miniwaste Project

Number of new community composting sites	170
Number of individual composters distributed	500
Cost per site for fitting out, equipment and supporting the shared composting area	€1,500 – 2,000
Training	€400 – €700 per training session for 15 to 20 people

Future of the project. Rennes Métropole aims to increase the number of distributed individual composter to 3,000 by 2022, and from 2023 onwards, it aims to distribute 4,000 composters per year. [Full details of the case study can be found here](#) and [here](#).

4.2 England case studies

There are several local authorities within England who worked with WRAP to increase their food waste recycling by using a package of interventions that include a 'no food waste' bin sticker for residual bins, a free supply of caddy liners and an information leaflet to help spread awareness among residents. Two local authorities highlighted within this report include Eastleigh Borough Council and Derbyshire Dales District Council.

4.2.1 Case study for Eastleigh Borough Council

Context and journey in food waste recycling. There are around 56,000 households in Eastleigh (urban and rural), where recycling rate was 42% in 2017/2018. In 2019, WRAP identified Estleigh Borough Council as a local authority that collected less than 1kg/household/week of recycling waste a week, despite offering a weekly separate food waste and dry recycling collection. The council had previously piloted small interventions to boost its food waste collection performance by partnering local community groups. In 2019, The council received a £81,930 grant from WRAP with the objective of increasing food waste collections. The project cost £1.46 per household.

Main initiatives deployed. The council used the grant from WRAP further the to design and produce communication materials, leaflets, residual bin stickers, printing on caddy liners, a year's supply of caddy liners, distribution of leaflets and liners to all households and application of stickers to wheeled bins. Council supported with dedicated communication: a centerfold spread in the Borough News, vehicle livery, billboard and bus stop posters, and ongoing organic and paid digital content on a range of social media platforms. Videos were also produced by the council highlighting the energy benefits of recycling food waste. All 56,000 households in Esteligh Borough Council benefited from the interventions



Figure 5. Eastleigh Borough Council food waste line sticker



Figure 6. Eastleigh Borough Council food waste leaflet

Results. The average tonnage of food waste collected increased from 151 tonnes per month from the three months pre-interventions to 203 tonnes per month three months post-interventions. The pre-intervention monitoring phases were April to June 2019, and the post-intervention monitoring phases were from July 2019 to September 2019. Table 12 shows the breakdown of the pre- and post-interventions results.

Table 11. Results of the Eastleigh Borough Council Pilot

	Pre-intervention	Post-intervention	Percentage change
Average monthly tonnage of food waste collected	151 tonnes/month	203 tonnes/month	+34%
Average monthly tonnage of residual waste collected	1950 tonnes/month	1681 tonnes/month	-13.8%
Recycling rate	41.52%	43.24%	+1.72%

Table 12. Current recycling performance of Eastleigh Borough Council ³⁹

Total recycling rate	40%
Total food waste recycling	1.81%
Average yield of food waste/household	17.1kg/year

Future of the project. The food waste recycling service was suspended during the lockdown, but later returned November 2020, and collected by smaller, lower emission vehicles.⁴⁰ [Full details of the case study can be found here](#) and [here](#).

4.2.2 Case Study for Derbyshire Dales District Council

Derbyshire Dales District Council was identified by WRAP in 2018/19 for a pilot to evaluate benefits of a package of interventions to help increase food waste collected. The yield of food waste before the pilot was less than 1kg/hh/wk from separate weekly collections as part of the recycling service alongside alternate week residual waste collections.

Context and journey in food waste recycling

- WRAP funding covered the cost of providing all 34,000 households with a free supply of caddy liners, and the distribution of the liners, leaflets and bin stickers.
- The council was awarded a grant of £68,000 to fund a food waste intervention pilot to increase food waste collections across households, where the cost of interventions was £2.00/household.
- The interventions were delivered to the households in May 2019 and tonnages were monitored for 9 weeks pre- and post-delivery.

Main initiatives deployed

- Along with the free supply of caddies, liners, leaflets and bin stickers. The council supplemented this by funding the design, production and printing of all communications materials, as well as the cost of additional caddies requested by approximately 5% of households as a result of the intervention measures.
- Roll out of interventions with printed articles, local media coverage and on social media.



Figure 7. Sticker placed on residual bins

Reasons to recycle your food

Q. Why recycle food waste?
A. Recycling your food waste is better for the environment. Food waste that ends up in the general rubbish, instead of your kerbside caddy, is sent for disposal. Rotting food in landfill generates methane, a greenhouse gas that is 25 times more potent than carbon dioxide and contributes to global warming and climate change.



To find out more about what happens to your food waste, visit www.derbyshiredales.gov.uk/myfoodwaste

Q. How is my food waste recycled?
A. Your food waste can be turned into something useful, if you recycle it. The food waste is taken to a special processing plant in Ashbourne where it is used to produce a safe compost material which is used on local farms and sold in garden centres.



Q. How can I waste less food?
A. For tips and recipes to help you waste less food and save money, visit lovefoodhatewaste.com



Food waste myth

- ✗** "The food caddy is dirty and smelly"
- ✓** Using caddy liners and tying them up before regularly putting them into your kerbside caddy keeps both of your caddies clean. Remember to rinse them out occasionally.

If you do not have a kitchen caddy or kerbside caddy, or require further information please contact us:
www.derbyshiredales.gov.uk/waste
Email waste@derbyshiredales.gov.uk
Waste Helpline 01629 761122

Thank you for recycling
 Last year Derbyshire Dales households recycled over 1100 tonnes of their food waste. Let's work together to recycle even more!



Figure 8. Food waste service leaflet

Results of the Derbyshire District Council food waste campaign

Table 13. Results of the food waste campaign

Food waste collected (tonnes)	Increased by 23 tonnes in 9 weeks post intervention
Residual waste collected (tonnes)	Decreased by 60 tonnes post intervention

Future of the project. The project received positive feedback from the public with people saying that it has made them more aware of food waste recycling, and the campaign has prompted them to begin participating in the service. On 1st March 2022 the council stopped food waste collection because of a permanent closure at the in vessel composting (IVC) site, Vital Earth GB. This news resulted in the council asking its residents to mix food waste with domestic waste while there was an ongoing negotiation with a new waste contractor Serco. However, on 11th April 2022, food waste collections in Derbyshire Dales restarted and residents were asked to keep their food caddies out for collection rather than mixing their food waste with general waste.

Table 14. 2022 recycling performance at Derbyshire District Council

Total recycling rate	56%
Total food waste recycling	4.1%
Average yield of food waste/household	31.9kg/year

5 BLUEPRINT SHIFT pilots food waste prevention and recycling impacts

5.1 SHIFT pilot results summary – Food Waste Pilot

The main aim of the Food waste pilot was to increase awareness about the need to reduce food waste, as well as awareness on separate collection for recycling, among residents within Chelmsford, Essex. The pilot covered 12,000 households to which leaflets, and bin stickers were provided, so as to encourage residents to use their food caddies rather than throw their food waste out in residual bins. A sample of the leaflet is provided in Figure 9 below, and the bin sticker used in Figure 10. The leaflet covered: a simple introduction to what happens with food waste that ends up in the black bin as residual waste; a few of the benefits of recycling food waste; an overview of how to reduce food waste with simple do's; and a message to get started with food recycling with Do's and Don'ts. The bin sticker provides a clear message not to put food waste in the black bin but to use a food waste bin instead, as a strong social pressure approach. The project also included a waste compositional analysis to gain a better understanding of food waste produced by residents, and an assessment of the food waste recycling service across a representative district in Chelmsford.

The pilot was deployed to understand the types and amounts of food waste generated covering both dedicated food waste and residual waste collections and investigate what food waste can be avoided. The pilot also included an estimate of the proportion of food waste that ends up in residual waste instead of food waste bins. Additionally, the data collected was compared with the results of a baseline study with that of a post intervention and repeat composition analysis to assess the impacts of interventions work delivered in the trial area by Essex County council.



Figure 9. Excerpt of flyer from the Chelmsford Essex Food waste pilot



Figure 10. Bin sticker used in Chelmsford Food Waste Pilot

Results for Chelmsford food waste pilot

The main result for the Chelmsford food waste pilot was a significant reduction in total food waste arisings, at a 16% food waste reduction across the 12,000 households. The pilot had a limited effect on food waste collections. The collected food waste capture rate improved at 52% to 58%, but the total amount of food waste collected dropped. The plausible explanation is that many residents who already provided food waste for separate collections reduced the food waste generated, such that even while more residents shifted to separating their food waste (by 5%), on overall less food waste was collected. An overview of the results including the financial costs can be found in Table

Table 15. Results analysis of BLUEPRINT food waste pilot

Number of households reached by pilot	12,000
Total cost	£39,300
Cost per household	£3.3/household
Total food waste prevented	29 kg/year/household
Total additional food waste collected	n/a

5.2 SHIFT pilot results summary – Schools Pilot

The pilot focused on waste, recycling and reuse in schools including food waste, and was divided into two phases with an iterative improvement in activities developed. Each phase is described focusing in the description on the food waste workshops, and the results describe this part of the pilot effort.

Phase 1 of the pilot was delivered by Brighton and Hove Environmental Education (BHEE), a partnership between Brighton and Hove City Council (BHCC) and Sussex Wildlife Trust (SWT). The pilot phase 1 took place from October 2021 to March 2022. Five schools in Brighton & Hove explored different parts of the circular economy through a series of activities and workshops. These focused on the following five themes:

Theme 1: Composting at Cottesmore School. Thirty year 1 pupils took part in a half-day workshop to understand what composting is and how it is useful. They then created their own compost and compostable pots.

Theme 2: Reducing food waste with St Mary Magdalen’s Primary School delivered by Brighton and Hove Food Partnership (BHFP). Twenty-five year 5 pupils visited the BHFP Community Kitchen and learned how to cook simple meals using surplus stock. They also found out about portion sizes how food breaks down into compost and then how this compost can be used to grow more food.

Phase 2 of the pilot included specially designed resources and videos for teachers and is also available as a 10-week online module, with weekly in-class presentations and a bi-weekly circular champion pledge form for each child to encourage engagement at home. The phase 2 pilot ran from September to December 2022. Each student was given a “Pledge Pack” at the start of each theme. Each pack contains 10 pledges relating to that theme, pledging specific actions that would result in waste prevention or recycling or other environmental improvements. The pledges are returned and uploaded the following week, so they become collectively known in the class who has made which pledge. The themes included Theme 1: Plastic; Theme 2: Food; Theme 3: Stuff; Theme 4: Climate.

Results for Brighton & Hove school pilot

A detailed analysis of how the impacts of the schools workshops on households was estimated is available in the BLUEPRINT Report “Start-to-End” Impact Analysis. This includes estimating the impacts of pledged made by students in terms of taking these pledges seriously, communicating about them at home, and subsequently action being undertaken at the household level to achieve the pledges. Based on these results the impact figures as described in

Table 16. Results analysis of BLUEPRINT Schools pilot

Number of households reached via students by pilot	200
Total cost	£32,440*
Cost per household	£162/household
Total food waste prevented	28 kg/year/household
Total increase in food waste recycled	4 kg/year/household

*Based on total costs divided by five, focusing on the food waste prevention thee.

6 Invest-to-save strategies & business models

6.1 SHIFT pilots scaling strategy analysis

The analysis of external use cases and BLUEPRINT shift food waste pilots showed four different approaches to invest-to-save strategies for reaching both food waste prevention and high rates of food waste collection.

The four approaches include:

1. Composter distribution and training to divert food waste to local composting, combining individual composters with community composters;
2. Household campaigns to promote food waste prevention and food waste recycling based on flyers and bin stickers alongside media communications;
3. Extensions to more households and upgrades to larger capacity household food waste collection bins with communication materials and door-stepping ambassadors;
4. Schools' workshops with pledges made by students to reduce food waste and start food waste recycling at home, and to introduce composting to students.

The use cases and pilots show that significant improvements can be made with an interventions. Firstly, to reach over 50% of residents that sort their food waste for recycling. Secondly, to reach significant food waste arisings reductions, both for local authorities with low rates of food waste recycling and with high rates of food waste recycling, such as the BLUEPRINT food waste recycling SHIFT pilot. The conclusions that can be reached from the BLUEPRINT project are that a combined approach covering both food waste prevention and food waste recycling is successful.

The aim for the invest-to-save approach is to evaluate the potential for a continuous and complete effort in the local authority to work on food waste prevention, recycling, and local composting. Continuous here meaning that the intervention is carried out on an on-going basis, at minimum repeated every five years. In some case the activity would be on-going (e.g. providing composters), or repeated every year (e.g. schools pilot) and in other cases ideally designed to be repeated in some form or updated every other year (e.g. food waste campaign). This does not necessarily mean the same scale of operations, but it can mean that the bin stickers are replaced when they are worn, for example, and that the flyers are distributed every other year in areas with low food waste recycling uptake or with high household transition. Complete here meaning that it covers all households and residents in a local authority. The possibilities to do so highly depend on the finances available to the local authority. Financially based on the local authority's budget, combined where needed with available public or private funds, depending on whether the intervention can save money and thus attract investment.

To evaluate the scaling of the SHIFT pilots we assume a hypothetical local authority with 250,000 households and 875,000 residents, based on 3.5 individuals per household. We assume a total food waste generation of 237 kg/household/per year (WRAP, 2021), and a food waste recycling rate around 35%. The most cost-effective pilot/use case was the BLUEPRINT Chelmsford food waste pilot, which would at the scale of the entire local authority cost £825,000 to implement, at a cost of around 5% to 10% of the typical budget of a local authority reserved for recycling and waste

collection, as identified in chapter 2. Similar cost levels were established for the case studies in Eastleigh Borough council (section 4.2.1) and Derbyshire Dales District Council (section 4.2.2).

The addition of composting at a systematic scale, as carried out by Rennes Metropole, would require an outlay of about £112,500 per year. This assuming 1% of households adopting an individual composting bin per year, at a cost around £20, and a training session of €500 per 20 households. The cost of a community composting area is about double this per household, based on the Rennes Metropole experience. Therefore, a local authority with flats can expect to expend at least 50% more to enable a similar composting coverage. When it comes to providing composters to households in a dense urban area, this also needs improved planning encourage participation and provides education and resources, such as to identify areas where composting can be implemented, which can come at an additional cost. Some compensation for this is possible, however, as the impacts can also be made more effective by including in the training session food waste prevention messages.

The final part of the strategy would include the schools waste prevention and food recycling pledge workshops, similar to the implemented approach, to cover two age years or age ranges focusing on primary and high-school students. In this manner, many households with children are included and a different cohort receives the workshop every year as children age. Based on the UK census information in a typical local authority if rolled out at all schools this would enable reaching around 3% of households, or 7500 households out of 250,000. Based on a cost of £162/household the total cost would amount to £1.2 million. However, since this effort would at this level be institutionalised it would likely no longer need external workshop teachers, different from the BLUEPRINT school pilot, and a cost saving of at least 30% is likely, to £850,500 per year.

The combined costs of scaling, so as to cover the completeness requirement for an invest-to-save strategy is displayed in Table 17 below. The total cost would amount to £1.8 million per year or £7.2 per household or £2 per resident. Based on the estimated expenditures for waste collection and recycling in both France and England for the sample of local authorities (chapter 2), this amounts to a 4% to 8% collection & recycling budget increase need for a local authority based on the evaluations from section 2.3 and 2.4.

Table 17. Invest to save food waste strategy for 250,000 household local authority

Food waste effort	Focus	Scale per year	Cost per year	Potential Impact
Food waste campaign based on flyers & bin-sticker	Food waste prevention & recycling	250,000 households	£825,000	29 kg/y/household food waste prevention
Composter handout & training	Food composting	2500 households (1% of 250,000)	£112,500 to £168,750	130 kg/year/household From collection to composting
Schools' food waste workshops & pledges	Food waste prevention & recycling	7500 households (3% of 250,000)	£850,500	28 kg/year/household food waste prevention 4 kg/year/household recycling
Total			£1,788,000	

The amounts that can be saved, assuming the investment is annual, relate to the tonnes of waste that no longer need to be collected and sent to anaerobic digestion at a gate fee, due to food waste prevention and diversion to composting. The gate fee cost in England for anaerobic digestion is £33 pounds in 2021/22 in England (WRAP 2022), plus the added cost of collection measured per bin lifts, which results in a total cost savings of around £50 per tonne of waste prevented or diverted. Based on this effort the annual savings would amount to £389,250 in total.

Table 18. Invest to save food waste savings for 250,000 household local authority

Food waste effort	Scale per year	Potential Impact	Reduced collection	Estimated savings/y
Food waste campaign based on flyers & bin-sticker	250,000 households	29 kg/y/household food waste prevention	7250 tonnes	£362,500
Composter handout & training	2500 households (1% of 250,000)	130 kg/year/household From collection to composting	325 tonnes	£16,250
Schools' food waste workshops & pledges	7500 households (3% of 250,000)	28 kg/year/household food waste prevention 4 kg/year/household recycling	210 tonnes	£10,500
Total				£389,250

To make the invest-to-save food waste strategy work the costs vs benefits need to be spread across at least five years, where the food waste campaign based on flyers and bin stickers and schools' food waste workshops & pledges are carried out once every five years, whilst the composter handout & training is continuous. On this basis the total benefits would amount to £2.1 million, whilst the total cost would be £2.2 million. This would allow for a close to cost neutral invest-to-save strategy for the five-year period, which would provide for further savings beyond this period.

6.2 Invest-to-save business models

The total cost requirements to scale the SHIFT pilots to an entire local authority, was estimated at £2.2 million for a five-year period with 250,000 households, as per the previous section. This translates to close to £2 per resident per year, based on 3.5 individuals per household. The research evaluated different options for local authorities to fund such a budget. A number of different business strategies and business models are possible to provide for this, varying by local authorities and available application funds which differ between France and England.

Three different business model options are proposed:

- **Business model option 1** - self-funded - extend the local authority waste & recycling budget by 5%-10% to cover the cost based on local taxation. This would mean the activity can be recurring on an on-going basis, but the risk is that this budget extension in a cost cutting environment may be difficult to maintain as it is not part of an essential service provisioning but is a medium-term cost savings effort.

- **Business model option 2** - self-invest + publicly grant funded - in this route the local authority would apply for available grants for parts of the invest-to-save food waste strategy as applicable, pending the available national or regional grants, as summarised for France and England in section 2.5 and 2.6.
- **Business model option 3** - public loan funded - in this route the local authority would lend the money as an investment with a national public investment scheme for local authorities at low interest rates, which should allow for paying back the investment based on the cost neutral balance sheet impact within a five-year period. The main risk is that the collection & recycling savings turn out to be less than expected, due to the variation in the effectiveness of food waste campaigns.
- **Business model option 4** - public-private partnership funded - in this route the local authority would setup an arms-length private organisation that is 100% owned by the local authority or a related public body, which carries out the food waste campaigns, composting and schools workshops or manages their oversight (e.g. similar to a privately owned company of a waste authority structure). The private organisation would be able to raise private funds with a 5-to-10-year return period, which can be managed like a carbon fund (e.g. crowdfunding from residents for carbon reductions) or a similar investment vehicle.

Each of the four routes has benefits and drawbacks. The best routes would be a combination of self-funding and public grant or loan funding (e.g. option 2 and option 3), as these options are most cost effective for local authorities. The option 4, public-private partnership, is more complex and usually less financially attractive for local authorities as they have access to funding vehicles with specific public funding. However, depending on the situation each of these routes can be valid, as it depends on the local authority, its financing strategy, the access to public funds, the ability for private fundraising of an arm's length organisation.

7 Conclusions and recommendations

The report evaluated the approaches for local authorities to work on food waste based on the BLUEPRINT shift pilots and use cases. In particular, to sharply reduce food waste that ends up in black bags/residual waste by initiating interventions related to food waste prevention, diversion of food waste to individual or community composting, and food waste recycling uptake. The research looked at scaling the efforts from pilot to full local authority scale, and the associated financial requirements to embed this in a local authority budget plus potential routes to cover the funding needs.

The research evaluated that a typical budget for a local authority waste collection and overall recycling in France and England ranges between £26 and £57 per resident. Based on this estimate an additional expenditure evaluation would like to need to be less than £3 pounds per resident, so as to fall between 5% and 10% of a budget increase for waste collection and recycling. The research also evaluated based on the package of interventions that it would be possible to adhere to this requirement, as the proposed package would amount to a 4% to 8% increased budget over the typical budget.

The evaluation of the invest-to-save food waste strategies and business models concluded that;

- To make the invest-to-save food waste strategy work the costs vs benefits need to be spread across at least five years, where the food waste campaign based on flyers and bin stickers and schools' food waste workshops & pledges are carried out once every five years, whilst the composter handout & training is continuous. This would allow for a close to cost neutral invest-to-save strategy for the five-year period, which would provide for further savings beyond this period.
- Based on the available public investment routes in England and France, concluded that the best business model routes would be a combination of self-funding and public grant or loan funding (e.g. option 2 and option 3 as per section 6.2), as these options are most cost effective for local authorities.

Based on the evaluated invest-to-save strategy and business models, the following recommendations can be drawn to local authority waste & recycling teams:

- To request in the budget setting with the respective councillors and financial teams to include a fixed budget item under waste & recycling allocated for on-going food waste prevention, recycling and composting efforts, with a minimum ring-fenced annual amount that can be topped up with additional attracted funds varying by business model route.
- To evaluate for their local authority the tailored costs and benefits for a combined food waste impacts strategy approach, similar to the proposed approach to combine food waste prevention, recycling, composting and schools' education. This can follow the BLUEPRINT approach followed here, with adjustments in expected impacts and tailored local costs (e.g. collection costs, gate fee costs) so as to provide for a specific financial 5 to 10 year estimate.
- Based on this assessment, define the route for funding the strategy, depending on the available existing budget for waste & recycling, and the available additional grant or loan based public funds as well as existing public-private organisations that could take on the works to be carried out and their cost profile vs. direct in-house costings.

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