A PROFILE OF LOCAL GOVERNMENT CLIMATE ACTIONS IN IRELAND

JANUARY 2020

LGMA RESEARCH
DR D. CLARKE AND DR B. O'DONOGHUE-HYNES

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Local Government Management Agency

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Figures

Tables

Appendices 123

Abbreviations

CARO	Climate Action Regional Office
CCMA	County and City Management Association
CHP	Combined heat and power
ECCEP	Environment, Climate Change and Emergency Planning
EPA	Environmental Protection Agency
EV	Electric vehicle
GWS	Group water scheme
ISO	International Organisation for Standardisation
LGMA	Local Government Management Agency
NLACASG	National Local Authority Climate Action Steering Group
NZEB	Nearly zero energy buildings
OPW	Office of Public Works
PV	Photovoltaic
SAC	Special areas of conservation
SFRA	Strategic flood risk assessment
SDZ	Strategic Development Zone
SEAI	Sustainable Energy Authority of Ireland
SuDS	Sustainable drainage systems

Foreword

Local authorities have been working to address climate-related issues for many years. They have also been at the forefront of dealing with many climate-related emergencies such as flooding and snow events. However, public attention has been heightened more recently as media prominence of climate change and environmental issues nationally and internationally continues to increase. The recent launch and publication of the national *Climate Action Plan* has further heightened public attention on the need for climate action (Government of Ireland, 2019). The *Climate Action Plan* seeks to provide a roadmap for all stakeholders to work together to "create a resilient, vibrant and sustainable country" (ibid, p. 8), and details the significant role all public sector bodies will play in realising this goal. In particular, local authorities are recognised as a key stakeholder within the plan in achieving national climate change commitments.

Prior to the publication of the *Climate Action Plan*, the County and City Management Association's Environment, Climate Change and Emergency Planning Committee had independently decided that there was a need to document the range of projects, initiatives and actions that local authorities were delivering in the area in order to develop a full understanding of both the range and depth of actions and existing expertise within local authorities. We knew that staff across the various local authorities were engaged in a huge number of activities, and had developed and embedded processes into how we were working to address some of the most serious symptoms of climate change. However, they were often working independently of each other, thus losing out on the opportunity to share their learning or partner and create synergies around projects that were relevant to other local authorities. This research project was designed to capture information about the climate-related processes and activities being carried out over the past number of years through a detailed questionnaire in order to share learning, spread best practice and highlight innovation through case study illustrations. One of the most fundamental structural innovations in recent years in the context of climate change has been the establishment of Climate Action Regional Offices (CAROs). These will be the key structure through which our actions and learning will be synergised. They have already played a critical role in gathering the data for this research and in assisting local authorities to develop their local adaptation strategies. The offices were established in 2018 in response to Action 8 of the *National Adaptation Framework (NAF)*. Uniquely, the composition of the four Climate Action Regions has been determined by distinct geographical and topographical characteristics, vulnerabilities and shared climate risks experienced across local authority areas, meaning local authorities with similar climate risks are clustered together.

The national *Climate Action Plan* states that "local authorities occupy a pivotal role in their respective communities and can act to demonstrate public sector leadership on climate action in their areas as well as key mobilisers of action at a local and community level" (ibid, p. 127). What this research report demonstrates is that the capacity within the local government sector to lead on climate-related actions has developed over a considerable amount of time. It also illustrates that the local authority focus extends far beyond adaptation plans. Rather, the practical implementation of actions over the years reveals that there can be a huge overlap and interdependence between adaptation, mitigation and, in some incidences, emergency responses. These experiences and knowledge mean that local government is well placed to act as the "catalyst for much wider change" (ibid, p.127).

Prior knowledge and real-world implementation experience are essential to ensure the most efficient realisation of the goals contained in the national *Climate Action Plan*. Local authorities can build upon their experiences and expertise to lead on the full range of actions contained in the plan. They are named as a lead or a key stakeholder in 30 of the 183 actions in the national plan and are indirectly involved in many more. Local authorities are identified as having a role to play in the implementation of the *National Planning Framework*, the development of the built environment, more energy efficient transport and waste management. They are also recognised as a public sector body that should lead by example, particularly in the area of citizen engagement and community leadership. Here, local authorities have a key role to play in driving change through the implementation of local adaptation strategies, the support of flagship and pilot projects, skills fora, the development of checklists, templates and quality marks. CAROs, Local Enterprise Offices, Regional Waste Management Planning Offices and the Local Government Management Agency are specifically named as delivery agents.

The *Climate Action Plan* highlights the need for local authorities to develop a baseline of current climate change activities and establish best practices (Government of Ireland, 2019b). This report demonstrates that local authorities are already well positioned to provide the leadership needed, with the delivery of many of those actions detailed in the *Climate Action Plan* already underway. As this research highlights, commitment to environmental awareness and climate change is now 'business as usual' for local authorities. While we must track the implementation of all named actions nationally and locally, the ultimate goal is to ensure the kind of culture shift necessary so that a mindset exists across the public service and amongst citizens that a more long-term sustainable view to how we utilise and consume resources exists, and recognise the need to protect and respect the environment in all operational and policy decision making. With the appropriate resources, local authorities will undoubtedly be able to lead out on this vision, as well as realising the actions identified in national and local strategies. In the short to medium term, these elements should combine to effect real change.

Paddy Mahon

Chairperson

County and City Management Association (CCMA)

Environment, Climate Change and Emergency Planning Committee (ECCEP)

Executive summary

With climate change already being experienced in many countries worldwide there is growing acceptance that significant, far-reaching actions are required to minimise its impacts. To effectively respond to the challenge the Irish Government, under its *Climate Action Plan* published in June 2019, committed the State to achieve ambitious greenhouse gas emission reduction levels by 2030 in line with legally binding EU commitments, with national net zero emissions committed to by 2050. Within the *Climate Action Plan* public sector bodies, including local authorities, are required to lead in the delivery of fundamental changes in how they operate and in how they provide public services to support State ambitions regarding climate action. The local government sector, as a key public sector body, therefore has a crucial role to play in national climate action commitments.

Employing the use of a detailed questionnaire and case studies across all local authorities nationally, the aim of this research was to quantify the role of local authorities in delivering climate change actions between 2011 and 2018. Whilst the results from this report represent only a snapshot in time of local authority achievements with respect to climate action, the research finds that the local government sector has been proactive in many areas, providing a range of services to the public, including critical infrastructure, flood risk management and water resources, as well as nature-based solutions and public engagement, each of which have delivered positive climate actions. This is in addition to publication of a Local Authority Adaptation Strategy across each local authority in September 2019, committing each local authority to specific adaptation targets between 2019 and 2024. Taken together, the findings show that local authorities prioritise different needs and therefore implement different climate actions based on prevailing climate change risks in their jurisdictions. Specifically, in the context of critical infrastructure, between 2011 and 2017 innovations in local authority energy efficiencies prevented over 60,000 tonnes of CO_2 from being produced – equivalent to the CO_2 emissions produced by approximately 11,000 Irish homes annually. In addition, the National Public Lighting Upgrade Project being advanced by the sector is expected to avoid 31,000 tonnes of CO_2 annually once completed, saving the equivalent of the annual CO_2 produced by more than 5,600 homes. Efforts to mitigate climate change have also been achieved in electric vehicle and cycling infrastructure, with some local authorities reporting 15% of their vehicle fleet as electric, and more than 260 electric vehicle charging points for the public available on local authority property at 2018 year end. Cycling infrastructure also continues to expand across local authorities, with approximately 14,000 bicycling parking spaces installed by the local authority sector nationally and more than 1,500km of segregated cycle lanes across local authorities at 2018 year end.

Where flood risk management and water resources are concerned, local authorities collaborated with the Office of Public Works on 21 major flood defence schemes and delivered a further 228 smaller flood defence schemes between 2014 and 2018, with local authorities investing approximately €12.4 million of funding towards flood defences. Local authorities also spent approximately €101 million in responding to emergencies following extreme weather events between 2014 and 2018 when the impacts of extreme weather events arose.

Local authorities also demonstrated significant commitment towards nature-based climate change solutions. They planted approximately 74,000 trees between 2017-2018 and implemented a significant number of nature-based policies with specific climate actions, including policies dealing with invasive alien species, managing trees and urban woodlands, developing green infrastructure and public open spaces and parks, and reducing pesticide usage. Many of these policies are supplementary measures, which local authorities have advanced in addition to their statutory requirements under biodiversity management.

Finally, the findings show that, through public engagement across those actions that can impact upon climate change, local authorities provided over 2,400 allotments and 97 community gardens for public use in 2018. Moreover, they supported 884 towns and neighbourhoods in 2018 through the Tidy Towns programme, many of which undertook specific climate actions such as increasing biodiversity and tree planting. The study highlighted that many local authorities are also training employees, communities and social housing residents to reduce their climate change impact and save energy as part of the sector's commitment to encourage public action. The local government sector is expected to play a critical role under the government's *Climate Action Plan*, which sets ambitious and binding climate action targets for all public sector bodies by 2030. These results act as a baseline measure, highlighting existing sectoral efforts regarding climate change. The growing importance placed on achieving measurable outcomes under the *Climate Action Plan* for all public service bodies means that it would prove useful for the local authority sector to begin to examine a standardised way of measuring, recording and reporting climate change actions on a frequent basis. Only then can it begin to demonstrate in a consistent, transparent and efficient manner the range of climate actions local authorities are developing, supporting national climate action efforts in the process.

INTRODUCTION

1. Introduction

1.1 Climate change context

Climate change is already occurring, and there is unequivocal evidence that humans are responsible. Most of this warming of the climate has occurred during the last 35 years (NASA, 2019). Indeed, 20 of the warmest years on record have occurred in the last 22 years, and the warmest four years have occurred in the last four years (World Meteorological Organization, 2018). Since the late 19th century, average global temperatures have increased by approximately 1.0°C, with global warming likely to reach 1.5°C between 2030 and 2052 if temperatures continue to increase at current rates (Intergovernmental Panel on Climate Change, 2018). Other evidence of climate change includes sea level rise, ocean warming and acidification, and sea ice and glacier melt, with extreme weather also continuing to cause significant devastation globally.

Irish temperature records are broadly in line with global temperature increases, increasing by 0.7°C between 1890 and 2008 (Environmental Protection Agency, 2019b). Ireland has already experienced the impacts of climate change in terms of flooding in 2015/16, extreme weather events such as Storm Ophelia in 2017 and Storm Emma in 2018, and drought in the summer of 2018. Climate change is expected to have further profound impacts for Ireland, including:

- a reduction in the number of frost days and shortening of the frost season length;
- an increase in annual rainfall in northern and western regions with decreases or small increases in the south and east;
- more intense storms and rainfall events;
- sea level rise;
- increased likelihood and magnitude of river and coastal flooding;
- water shortages in summer in the east of the country;
- adverse impacts on water quality; and,
- changes in distribution of plant and animal species (Environmental Protection Agency, 2019b).

1.2 Responding to climate change

Broadly speaking, dealing with climate change requires two key responses. First, there is a need to prevent further climate change from occurring, i.e., *mitigation*. And second, given that climate change has already occurred and will occur into the future there is a requirement for societies to adjust to anticipated and actual changes in the climate, i.e., *adaptation*. However, adaptation and mitigation often interact and overlap with one another (Intergovernmental Panel on Climate Change, 2014), whereby implementing an adaptation measure can help to mitigate climate change at the same time, and vice versa. Indeed, there is significant benefit in combining both mitigation and adaptation efforts, not least in terms of the economic benefits derived. Separate to both of these, as climate events take effect through extreme weather, on the ground responses are required to deal with those extreme weather events as they arise, i.e., *emergency response*.

Indeed, there is significant benefit in combining both mitigation and adaptation efforts, not least in terms of the economic benefits derived.

1.2.1 Ireland's climate change response – public sector leading by example

The Irish Government's *Climate Action Plan*, published in June 2019, set out a trajectory for how Ireland will support European Union ambitions to achieve a net zero emissions target by 2050.[1] Achieving these ambitious targets requires delivering a range of integrated policies and a deep level of collaboration across all sectors of Government. Whilst the *Climate Action Plan* outlines specific goals and performance monitoring for all Government sectors, every public body is expected to lead by example. Accordingly, public sector bodies are required to engage in and empower innovation, not only in leading by example in reducing their own emissions, but by also encouraging and inspiring action across Irish society.

Many of the services local authorities provide have the potential to be significantly impacted by climate change, particularly given that those services include social housing, planning, road management and maintenance, and waste management. In 2018, local authorities invested €4.66 billion in the services they provide to the public, spending €979 per capita on those services. They also provided

[1] Net zero emissions means that all human-caused greenhouse gas emissions must be removed from the atmosphere through emissions reduction, thereby reducing the Earth's net climate balance to zero (after accounting for natural and artificial carbon storage sinks).

almost 135,000 social houses, and managed and maintained more than 95,762km of regional and local roads, both of which have the potential to be significantly impacted by climate change and extreme weather. Moreover, given that they employed more than 28,300 people in 2018 (National Oversight and Audit Commission, 2019), local authorities have the ability to both encourage employee engagement around climate change challenges, and to support those employees in developing climate change initiatives in their communities. In this context, local authorities, as the level of Government closest to citizens, have been recognised as a key public sector body in delivering on State commitments outlined in the *Climate Action Plan*.

1.2.2 Mitigation

To minimise further global temperature increases, greenhouse gas emissions must be mitigated. Broadly speaking, climate change mitigation can be achieved by limiting or preventing greenhouse gas emissions or by supporting activities that remove these gases from the atmosphere. The December 2015 Paris Agreement outlines the international agenda for addressing this challenge. The Paris Agreement, which was approved by almost all countries worldwide, outlines the global response needed to reduce the threat of climate change by keeping global temperature increases this century well below 2°C above pre-industrial levels, and to take all efforts to limit the temperature increase even further to 1.5°C (United Nations Climate Change Secretariat, 2018). The window of opportunity to act is fast closing however, and many countries, including Ireland, are currently far off meeting Paris Agreement commitments. To be successful, these targets must be addressed at both national and sub-national levels, and by cities, businesses and communities.

To be successful, these targets must be addressed at both national and sub-national levels, and by cities, businesses and communities.

Ireland, as an EU Member State, has a statutory responsibility to meet binding EU targets with respect to greenhouse gas emissions reductions by 2030. Specifically, it must mitigate climate change by reducing its greenhouse gas emissions by 30% by 2030 relative to 2005 greenhouse gas emissions (European Union, 2018b). In June 2019, the Irish Government set out a *Climate Action Plan* for the coming decade to meet our EU 2030 mitigation targets, and to work towards our mid-century objectives to decarbonise the economy (Government of Ireland, 2019a). This plan outlines specific targets and actions that will be undertaken to achieve these ambitions across all of society, with a key aspect focusing on the role of the public sector in leading by example across all targets. Specifically, within the *Climate Action Plan*, local authorities have been identified as a key public sector stakeholder to mitigate climate change given their responsibility for a broad range of public services delivered at a local level, including housing, planning, traffic, economic and community development, and environmental and recreational facilities. Furthermore, they play a pivotal role in their respective local communities in demonstrating both public sector leadership on climate action and in mobilising communities into action.

1.2.2.1 Mitigation through energy efficiencies

Energy efficiency measures are predicted to play a fundamental role in mitigating climate change and in transitioning to a low-carbon world. The Intergovernmental Panel on Climate Change thus estimates that investment of around US$900 billion will be required annually until 2050 on energy-related mitigation alone if climate change is to be limited to 1.5°C (Intergovernmental Panel on Climate Change, 2018).

In the context of energy efficiencies, Ireland has legally binding EU energy efficiency and renewable energy targets for 2020 (European Union, 2012). Beyond 2020, all Member States are required to contribute to overall EU energy efficiency of 32.5% by 2030 relative to 2007 projected levels (European Union, 2018a).

Moreover, one of the key measures committed to under the *Climate Action Plan* includes 50% energy efficiency and 30% greenhouse gas emissions reduction across the public sector by 2030 (relative to 2009 base). This is a significant commitment needed by public sector bodies to reduce their energy footprint and in subsequently leading by example to influence broader societal change. Achieving energy efficiencies across local authorities is therefore likely to require considerable investment by the local government sector if ambitious

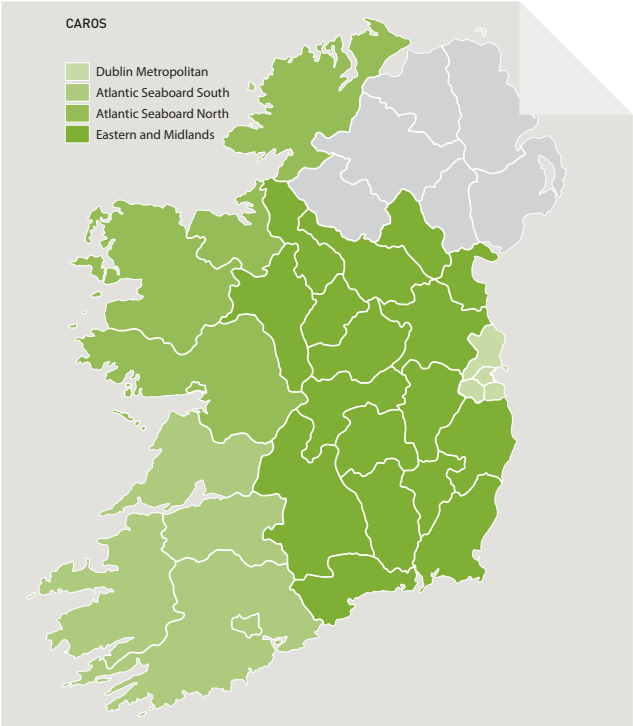


Figure 1.1: Local Authority Climate Action Regional Offices (CAROs).

EU and national energy efficiency targets are to be achieved.

1.2.3 Adaptation

Whilst mitigation is essential to limit further climate change, even if the goals of the Paris Agreement are achieved, some climate impacts are now locked into the climate system because of the delay in taking action in response to past emissions, and these impacts will continue for centuries (Intergovernmental Panel on Climate Change, 2014). Given the current impacts of climate change being experienced by many countries, mitigation alone is therefore insufficient, and adaptation is also recognised as necessary. Adaptation subsequently describes the process of adjusting to actual or expected climate and its effects (Intergovernmental Panel on Climate Change, 2014). Change in climate is already bringing profound increases in desertification, rising sea levels and population displacement, and is generating significant challenges for the natural world, as well as causing economic and social disruption. All of these events require individuals and natural systems to adjust to a warming climate and its associated consequences.

At a national level, adaptation as a policy issue is an emerging strategy in Ireland. Until 2012, national efforts to deal with climate change were primarily centred on mitigation (Department of the Environment, Community and Local Government, 2012a). Following the publication of the *National Adaptation Framework* in 2018, adaptation is now a core priority across all areas of Government (Department of Communications, Climate Action and Environment, 2018b). Arising from the publication of the *National Adaptation Framework*, both sectoral and local authority adaptation plans are now being developed to respond to the impacts of climate change.

Table 1.1: Local authorities in each CARO region.

CARO region (lead Local Authority)	Local Authorities in region
Atlantic Seaboard North (Mayo County Council)	Donegal County Council
	Galway City Council
	Galway County Council
	Mayo County Council
	Sligo County Council
Atlantic Seaboard South (Cork County Council)	Clare County Council
	Cork City Council
	Cork County Council
	Kerry County Council
	Limerick City & County Council
Eastern and Midlands (Kildare County Council)	Carlow County Council
	Cavan County Council
	Kildare County Council
	Kilkenny County Council
	Laois County Council
	Leitrim County Council
	Longford County Council
	Louth County Council
	Meath County Council
	Monaghan County Council
	Offaly County Council
	Roscommon County Council
	Tipperary County Council
	Waterford City & County Council
	Westmeath County Council
	Wexford County Council
	Wicklow County Council
Dublin Metropolitan (Dublin City Council)	Dublin City Council
	Dún Laoghaire Rathdown County Council
	Fingal County Council
	South Dublin County Council

As the level of Government closest to communities, local authorities have a crucial role to play in adapting to climate change, and in subsequently assisting communities to adapt. The establishment of four Climate Action Regional Offices[2] (CAROs) in 2018 is a significant

[2] Climate Action Regional Offices were established in 2018 across different regions of Ireland, each of which are classified based on the predominant climate risk(s) in that

action by the local government sector to assist local authorities adapt to climate change. **Figure 1.1** and **Table 1.1** provide an overview of each of the CARO regions. Indeed, developing robust local authority adaptation plans in each local authority (with the support of CAROs) for the period 2019-2024 has been a key priority for the local authority sector since the *National Adaptation Framework* was published in 2018. With the support of CAROs, there is scope for local authorities to deliver much wider change that demonstrates measurable impacts with respect to climate change.

1.2.4 Emergency response to extreme weather

Climate change is predicted to increase the frequency and intensity of flooding by the end of this century, with river flooding damages alone across Europe expected to cost approximately €11 billion per annum (Martinez *et al.*, 2014). Whilst changes in extreme rainfall vary by region, there is growing evidence that extreme rainfall will disproportionately affect large parts of northern Europe. Some of the largest increases in river flooding are expected to occur over Ireland (Martinez *et al.*, 2014). Specifically, in an Irish context, projected rainfall increases in winter are likely to lead to an increase in flood risks nationally. Flooding is now considered as one of the most significant hazards (climate or otherwise) which Ireland faces in terms of likelihood and impacts (Government of Ireland, 2018).

As the primary public sector body with responsibility for co-ordinating and managing extreme weather events such as flooding when they arise, local authorities play a key role in responding directly to the impacts of climate change. Given their close relationship with communities and their local knowledge of the natural and built environment, local authorities can respond faster and more effectively to local climate events than other Government agencies (Department of Communications, Climate Action and Environment, 2019). In partnership with other first responders, they have responded effectively to numerous extreme weather events in Ireland over recent years, including Storm Darwin in 2014, Storm Ophelia in 2017 and Storm Emma in 2018. Expected increased frequency and intensity of storms and flooding in Ireland as a consequence of climate change is likely to result in further demands on local authorities to respond when such extreme weather arises.

1.3 Aim of this research

Given the role that local authorities play in dealing with the climate change challenge, the County and City Management Association (CCMA) Environment, Climate Change and Emergency Planning (ECCEP) Committee requested in 2018 that research be undertaken to assist the local government sector in quantifying the role local authorities play in delivering a wide range of climate actions (mitigation, adaptation and emergency response). To date, local authority activities supporting climate actions have not been recorded or collated.

In this context, the aim of this research is to:

- quantify the role of local authorities in delivering climate change actions between 2011 and 2018.

While all local authorities have already developed statutory Climate Adaptation Strategies in 2019, the ECCEP Committee highlighted the need to map a wider range of climate actions (mitigation, emergency response and adaptation) delivered by local authorities, and to link these to the objectives of the *National Mitigation Plan* (Department of Communications, Climate Action and Environment, 2017b) and the *National Adaptation Framework* (Department of Communications, Climate Action and Environment, 2018b), as well as local, regional and national plans. The proposal also received the support of the National Local Authority Climate Action Steering Group (NLACASG).

1.4 Contribution of this research

The need to generate evidence to underpin Government policy and support actions is well recognised (Government of Ireland, 2019a). A particular emphasis has been placed on the need for research in relation to energy, climate action and sustainability, with decarbonising the energy system and sustainable living named as national priority areas for the next four years (Department of Business, Enterprise and Innovation, 2018).

With the support of CAROs, there is scope for local authorities to deliver much wider change that demonstrates measurable impacts with respect to climate change.

region. Each CARO provides expertise to local authorities around specific climate risks in that region. CARO regions are: Atlantic Seaboard North; Atlantic Seaboard South; Dublin Metropolitan; and, Eastern and Midlands.

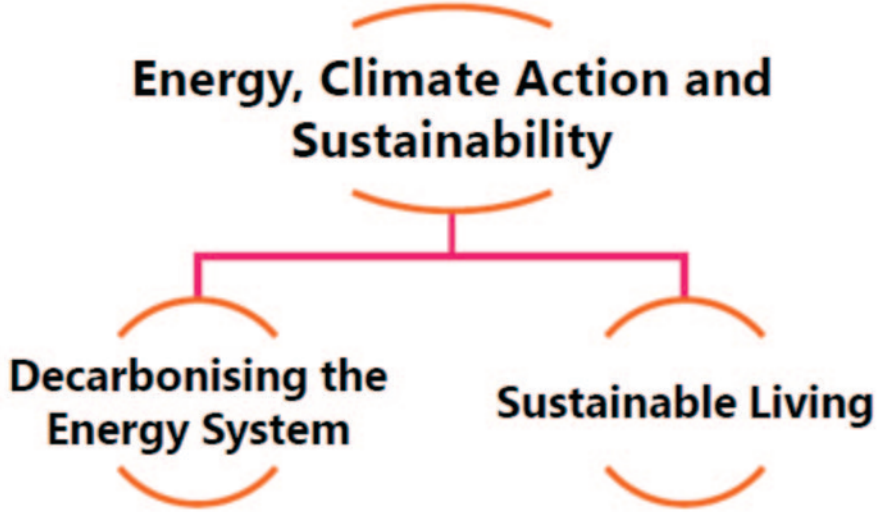


Figure 1.2: National research priority theme 2018-2023.

Source: Department of Business, Enterprise and Innovation, 2018; p. 20.

This research seeks to contribute to the national research and development agenda (**Figure 1.2**), and to enable local authorities to assess specific activities taking place at a local level, make an assessment about what is working and use that information to inform future developments. This research is timely, particularly given the Government's recently published *Climate Action Plan* in June 2019, which committed the State to achieving ambitious climate action targets (Government of Ireland, 2019a). Whilst the Government is taking the lead on this agenda, climate actions and targets have been set for public sector organisations, including the local government sector. This report subsequently presents an overview of those climate actions (mitigation, adaptation and emergency response), which local authorities are engaged in. In so doing, it also addresses a primary deliverable within Action 150 of the *Climate Action Plan*, namely for local authorities to develop a baseline of current climate change activities and to establish best practice actions (Government of Ireland, 2019b). Moreover, it also highlights to the wider public the extensive work local authorities are engaged in with respect to climate action. The results from this research represent a snapshot in time of local authority achievements with respect to climate action (2011-2018). However, it should be noted that local authorities are continuing to invest significant financial resources to advance a range of additional measures to mitigate and adapt to climate change as this report goes to print. Many recent additional actions will therefore not be captured in this report.

The results from this research represent a snapshot in time of local authority achievements with respect to climate action (2011-2018).

1.5 Conclusion

This chapter sets the context and objectives of this research. Section 1.1 provided a brief overview of the current state of the climate, both globally and with respect to Ireland. In section 1.2, a summary of the main responses to climate change were provided, namely mitigation, adaptation and emergency response measures. Section 1.3 then outlined the key aim of this research, before the contribution of the research was discussed in section 1.4.

The remainder of this research is structured as follows: Chapter 2 outlines the methods used in this research, with Chapter 3 presenting research results. A discussion and concluding remarks are provided in Chapter 4. Finally, Chapter 5 presents case study examples of climate action best practice across the local authority sector.

METHODS

2. Methods

2.1 Introduction

This chapter provides an overview of the methods employed in the research. First, in section 2.2 it outlines the data collection methods employed for the purposes of this research, namely a questionnaire, case study examples and desk-based research. Section 2.3 describes the content of the questionnaire component in greater detail, including the core themes examined and how it was administered and subsequently analysed. In section 2.4, case study methods are discussed in greater detail, including the content and selection criteria used for inclusion. Finally, in section 2.5 an overview of desk-based research methods is provided.

2.2 Multiple research methods

Data was gathered using a detailed questionnaire that addressed seven different themes. The first three themes focused on the processes in place to assist local authorities in developing their climate adaptation strategies, whilst the remaining four sections examined specific climate actions undertaken by local authorities across their core functional areas. These were supplemented with an extensive range of case studies to illustrate the findings from the questionnaire with practical examples. Extensive desk-based research was also conducted in order to contextualise and interpret results in the context of local authority climate actions (**Table 2.1**).

Table 2.1: Research elements.

	Comment
Questionnaire	A broad overview of local authority structures and policies, and the sector's climate actions between 2014 and 2018, were identified across functional areas including critical infrastructure, water resources and flood risk management, nature-based solutions, and public engagement.
Case studies	Case studies illustrating current climate action practices were developed across key local authority functional areas.
Desk-based research	The policy context of each area was examined, including current evidence in relation to climate action impacts and proposed actions.

It is important to note that this type of mixed methods research only provides a snapshot at a point in time. Given the wide range of policies impacted both directly and indirectly by climate change issues and the range of actions that are underway across all local authorities, it is therefore not possible to provide a complete picture of all local government responses and initiatives across all functional areas. Moreover, owing to the breadth of the topic, the questionnaire only focused on key areas under specific themes (see section 2.3.1). Where possible, topics were selected where it was felt most local authorities were delivering outcomes or where some local authorities were proactively leading by example and demonstrating best practice. As a consequence, the findings reveal that in some cases all local authorities are engaged in similar actions while in other cases some local authorities focus on one type of response more than another.

2.3 Local authority climate change actions questionnaire

2.3.1 Questionnaire content

The first component of the research was designed to capture the broad range of climate actions local authorities engaged in between 2014 and 2018. To capture these actions a questionnaire consisting of eight sections and comprising 119 questions was developed (Appendix 1).

The first three sections of the questionnaire focused on adaptation only and were structured to align to *Local Authority Adaptation Strategy Development Guidelines* (Department of Communications, Climate Action and Environment, 2018a). The questions were designed to demonstrate the processes in place across local authorities for developing their adaptation strategies.

The remaining four sections of the questionnaire were more detailed and expanded to focus on mitigation and emergency response as well as adaptation. Three of the four themes (natural and cultural capital, critical infrastructure, water resources and flood risk management) aligned to those identified in the *National Adaptation Framework* (Department of the Environment, Community and Local Government, 2012a). A fourth theme in the Framework, 'public health' was substituted, as it is the responsibility of the Department of Health, with the theme 'services' to capture services relevant to local authorities.

It is often difficult to distinguish between what constitutes mitigation, adaptation or emergency response as an action can impact on all aspects concurrently. However, for ease of reporting a classification was made for each action as to whether it was considered mitigation, adaptation or an emergency response, or in some cases a combination of these. These classifications are in **bold** print at the start of each section in Chapter 3. **Table 2.2** provides an overview of each questionnaire section.

Table 2.2: Local authority climate action questionnaire themes and number of questions.

Questionnaire thematic areas	Number of questions	Climate action measure
1. Convening an adaptation team	4	Adaptation
2. Assessing current adaptation baseline	4	Adaptation
3. Identifying future climate impacts, vulnerabilities and risks	3	Adaptation
4. Critical infrastructure	40	Mitigation; Adaptation
5. Flood risk management and water resources	23	Mitigation; Adaptation; Emergency Response
6. Nature-based solutions	23	Mitigation; Adaptation
7. Services/public engagement	22	Mitigation; Adaptation; Emergency Response

The questionnaire concluded with a request for local authorities to include details of case studies of best practice relating to any climate change action which they were engaged in.

2.3.2 Questionnaire administration

The questionnaire was designed by staff from the Local Government Management Agency Research Unit in collaboration with staff from the four CAROs and academic staff from University College Cork who developed the *Local Authority Adaptation Strategy Development Guidelines* (Department of Communications, Climate Action and Environment, 2018a).

A draft questionnaire was piloted using SurveyMonkey with two local authorities, Sligo County Council and South Dublin County Council, in January 2019. Following this, changes were made to the structure and the wording of questions before the final questionnaire was circulated to Directors of Service in each local authority's environmental department in February 2019. Local authorities were given four weeks to complete and return the questionnaires. CARO staff were included in the circulation list and were actively involved in following up and supporting local authorities to complete questionnaires. The questionnaire required significant amounts of detailed information sourced from various sections and departments of local authorities. Consequently, several people were frequently involved in collecting the data in each local authority. Despite this, all 31 local authorities submitted questionnaires resulting in a 100% response rate.

2.3.3 Questionnaire analysis

In May and June 2019 extensive follow-up took place with local authorities to clarify any ambiguous responses and to query incomplete information, for example, responding 'Yes' or 'Work in Progress' to a primary question but subsequently not responding to further sub questions.

Data was amalgamated and final analysis of the questionnaire took place in July 2019 using *IBM SPSS Statistics*. Results are presented in Chapter 3 and align to the section headings in the questionnaire (**Table 2.2**).

2.4 Climate action case studies

2.4.1 Case study content

Case studies were gathered to illustrate the range and diversity of actions taking place across the sector and to demonstrate best practice relating to mitigation, adaptation and emergency response following extreme weather. A template was developed outlining key headings in the report (i.e., critical infrastructure, flood risk management and water resources, nature-based solutions, and public engagement) and instructions were provided about the suggested length and content of each section (Appendix 2).

2.4.2 Case study selection criteria

The criteria for identifying which case studies to collect was developed in consultation with CARO Co-ordinators and representatives from the CCMA ECCEP Committee. It was agreed to collect examples under each of the thematic areas in the questionnaire and to seek responses from as many local authorities as possible. In July 2019 a list of potential case studies was developed. CARO Co-ordinators took responsibility for circulating the templates and ensuring their submission by the end of August 2019.

Forty-four case studies were subsequently developed for this research, with contributions from all local authorities across six thematic areas (**Table 2.3**). Summary descriptions of the case studies are dispersed throughout Chapter 3 to contextualise the questionnaire findings with practical examples of local authority climate actions. Full details of each case study are provided in Chapter 5.

Table 2.3: Local government climate action case studies.

	Case Study Title	Theme	Local Authority
1	Developing a climate action plan	Theme 1: Convening an Adaptation Team	Cork County
2	Special projects team to consider operational elements of environmental plans	Theme 2: Assessing Current Adaptation Baseline	Cork County
3	Local energy masterplan	Theme 4: Critical Infrastructure – Energy Efficiency – Energy Masterplan	South Dublin
4	Energy efficiency projects 2015-2019	Theme 4: Critical Infrastructure – Energy Efficiency – Energy Masterplan	Louth
5	Better energy communities	Theme 4: Critical Infrastructure – Energy Efficiency – Energy Masterplan	Waterford
6	Designing an 'A'-rated public building	Theme 4: Critical Infrastructure – Energy Efficiency	Mayo
7	Leisure centre heating upgrade	Theme 4: Critical Infrastructure – Energy Efficiency	Galway City
8	District heating pilot – HeatNet	Theme 4: Critical Infrastructure – Energy Efficiency	South Dublin
9	Energy performance contracts	Theme 4: Critical Infrastructure – Energy Performance Contracting	Dublin City
10	Improving public lighting energy efficiency	Theme 4: Critical Infrastructure – Public Lighting	Kilkenny
11	Local authority public lighting upgrade	Theme 4: Critical Infrastructure – Public Lighting	Laois
12	Improving public lighting energy performance	Theme 4: Critical Infrastructure – Public Lighting	Monaghan
13	Waste to energy – landfill site	Theme 4: Critical Infrastructure – Renewable Energy	Kerry
14	Solar photovoltaic (PV) panels providing energy to public buildings	Theme 4: Critical Infrastructure – Renewable Energy	Tipperary
15	Solar PV panels on fire station	Theme 4: Critical Infrastructure – Renewable Energy	Roscommon
16	Solar PV panels on County Hall	Theme 4: Critical Infrastructure – Renewable Energy	Carlow
17	Solar PV panels on car park	Theme 4: Critical Infrastructure – Renewable Energy	Wicklow
18	Social housing energy upgrade	Theme 4: Critical Infrastructure – Renewable Energy	Dublin City
19	Local authority housing estate upgrades	Theme 4: Critical Infrastructure – Renewable Energy	Sligo
20	Group water scheme – hydropower technologies	Theme 4: Critical Infrastructure – Renewable Energy	Wexford
21	Local authority electric vehicle fleet	Theme 4: Critical Infrastructure – Local Authority Vehicle Fleet	Dún Laoghaire Rathdown
22	Low carbon town	Theme 4: Critical Infrastructure – Planning and Public Realm	Laois
23	Bicycle sharing scheme – dublinbikes	Theme 4: Critical Infrastructure – Planning and Public Realm	Dublin City
24	Testing roads over peatlands pilot	Theme 4: Critical Infrastructure – Planning and Public Realm	Offaly
25	Smarter Travel Programme	Theme 4: Critical Infrastructure – Planning and Public Realm	Leitrim
26	MyWaste.ie	Theme 4: Critical Infrastructure – Waste Management	Regional Waste Management Offices
27	Extreme weather response – household and road infrastructure	Theme 5: Flood Risk Management and Water Resources – Responding to Flooding	Donegal
28	Extreme weather response – coastal flooding	Theme 5: Flood Risk Management and Water Resources – Responding to Flooding	Clare
29	Quantifying cost of storm damage	Theme 5: Flood Risk Management and Water Resources – Responding to Flooding	Cavan
30	Nature-based flood relief scheme	Theme 5: Flood Risk Management and Water Resources – Nature-Based Flood Solution	Dublin City
31	Flood defence scheme – Portavolla	Theme 5: Flood Risk Management and Water Resources – Flood Defences	Offaly
32	Flood defence scheme – Athlone	Theme 5: Flood Risk Management and Water Resources – Flood Defences	Westmeath
33	Beach coastal protection works	Theme 5: Flood Risk Management and Water Resources – Flood Defences	Cork County
34	Preserving biodiversity	Theme 6: Nature-Based Solutions – Biodiversity and Environment	Longford
35	Invasive alien species strategy	Theme 6: Nature-Based Solutions – Biodiversity and Environment – Invasive Alien Species	Galway County
36	Eradicating invasive alien species	Theme 6: Nature-Based Solutions – Biodiversity and Environment – Invasive Alien Species	Limerick
37	Biodiversity in public parks	Theme 6: Nature-Based Solutions – Biodiversity and Environment – Public Open Space and Parks	Fingal
38	Developing park meadowlands	Theme 6: Nature-Based Solutions – Biodiversity and Environment – Public Open Space and Parks	South Dublin
39	Park masterplan	Theme 6: Nature-Based Solutions – Biodiversity and Environment – Public Open Space and Parks	Cork City
40	Green roofs	Theme 6: Nature-Based Solutions – Biodiversity and Environment – Green Roofs	Dún Laoghaire Rathdown
41	Climate change camps for children	Theme 7: Services/Public Engagement – Educational Awareness	Kildare
42	Climate change workshops for communities	Theme 7: Services/Public Engagement – Educational Awareness	Kildare
43	Sustainable energy community outreach	Theme 7: Services/Public Engagement – Community Initiatives	Meath
44	Carbon credits project	Theme 7: Services/Public Engagement – Community Initiatives	Dublin City

2.5 Desk-based research

A detailed content analysis of national and EU policy documents, academic literature, websites and reports was also undertaken. This approach was utilised to assist with contextualising the findings contained in this research. This review of existing literature and subsequent analysis forms a core part of the findings in Chapter 3.

2.6 Conclusion

This chapter provided an outline of the key research methods used within this research – specifically, a detailed questionnaire and case studies. The chapter also outlined the role of desk-based research to contextualise the results contained in the report. Chapter 3 subsequently provides the results of the questionnaire component of the research.

RESULTS

3. Results

3.1 Introduction

This chapter presents the findings from the questionnaire component of the research and utilises case study highlights to illustrate sectoral best practices throughout. Sections 3.2-3.4 examine the extent of local authorities' preparedness in developing their climate adaptation strategies for publication in September 2019.

These sections examine whether an adaptation team had been established in each authority (section 3.2), whether local authorities had assessed their adaptation baseline (section 3.3) and whether future climate impacts, vulnerabilities and risks had been identified by local authorities (section 3.4) in advance of publishing their climate adaptation strategies. In section 3.5, climate actions in the context of local authority critical infrastructure are examined.

Section 3.6 then presents results of local authority involvement in flood risk management and water resources. In section 3.7, results of nature-based solutions used across the local authority sector to address climate change are presented. Finally, local authority involvement in public engagement and community services with respect to climate actions is explored in section 3.8. To contextualise the findings, relevant national and EU policy contexts are identified and discussed in each section within this chapter.

3.2 Convening an adaptation team

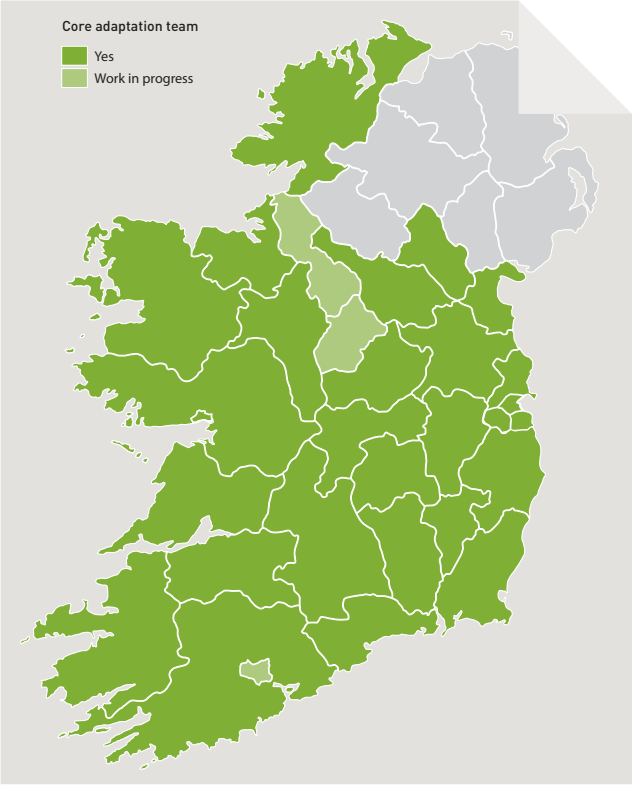
Category: Adaptation

The *Local Authority Adaptation Strategy Development Guidelines*, developed in 2016 and subsequently revised in 2018, required all local authorities to develop a local *Climate Adaptation Strategy* by September 2019 (Department of Communications, Climate Action and Environment, 2018a). The guidelines specify that a 'Core Adaptation Team' and 'Planning Adaptation Team' be established and representation from all relevant departments be included.

These adaptation teams are instrumental in planning for current and future climate change impacts as they include a wide variety of relevant stakeholders with responsibility for implementation as well as planning.

The questionnaire examined whether:

- local authorities were adhering to the methodology outlined in the *Local Authority Adaptation Strategy Development Guidelines* for the establishment of a core adaptation team/planning adaptation team.



3.1: Local authorities with core adaptation team established.

Planning adaptation teams include team members at all levels within local authorities, from those implementing climate actions on the ground to senior management to ensure buy-in to the adaptation planning process across the entire organisation.

Findings revealed that **all local authorities had established or were in the process of establishing a core adaptation team** (**Table 3.1**), engaging relevant stakeholders in developing their local climate adaptation strategy, whilst 24 local authorities had established or were in the process of establishing a planning adaptation team.

Specifically:

- twenty-eight local authorities reported convening a core team to develop their climate adaptation strategy; the remaining three local authorities reported being in the process of convening a core team to develop their climate adaptation strategy (**Figure 3.1/Table 3.1**); and,
- fourteen local authorities had established a climate planning team, with a further ten local authorities in the process of establishing one to support implementation of their climate adaptation strategy.

Table 3.1: Local authorities core teams/departments/staff appointed to progress climate adaptation strategy.

Local Authority	Core team/core department/core staff
Carlow County Council	Yes
Cavan County Council	Yes
Clare County Council	Yes
Cork City Council	Work in progress
Cork County Council	Yes
Donegal County Council	Yes
Dublin City Council	Yes
Dún Laoghaire Rathdown County Council	Yes
Fingal County Council	Yes
Galway City Council	Yes
Galway County Council	Yes
Kerry County Council	Yes
Kildare County Council	Yes
Kilkenny County Council	Yes
Laois County Council	Yes
Leitrim County Council	Work in progress
Limerick City & County Council	Yes
Longford County Council	Work in progress
Louth County Council	Yes
Mayo County Council	Yes
Meath County Council	Yes
Monaghan County Council	Yes
Offaly County Council	Yes
Roscommon County Council	Yes
Sligo County Council	Yes
South Dublin County Council	Yes
Tipperary County Council	Yes
Waterford City and County Council	Yes
Westmeath County Council	Yes
Wexford County Council	Yes
Wicklow County Council	Yes

Overall, the results demonstrate that appropriate structures are in place across the local government sector to ensure the timely development of local adaptation strategies through well-developed consultative channels.

CASE STUDY:
Developing a climate action plan

Case study details the processes of setting up a team and developing a climate adaptation strategy and the anticipated outcomes from this. **See page 70.**
Local authority: Cork County Council

3.3 Assessing current adaptation baseline

Category: Adaptation

An adaptation baseline is designed to examine how well adapted a local authority is to current climate hazards and is a crucial first step in developing an adaptation strategy.

Under the *Local Authority Adaptation Strategy Development Guidelines* (Department of Communications, Climate Action and Environment, 2018a), local authorities are expected to identify, monitor, and assess climate hazards, impacts and consequences to increase their capacity to plan effectively for climate adaptation.

The questionnaire subsequently sought to determine whether local authorities had identified the full range of extreme weather events to have affected the local authority for the purposes of developing an adaptation baseline.

The results revealed that **all local authorities had identified or were in the process of identifying the full range of extreme weather events to have affected their local authority in order to specify their adaptation baseline**.

In order to assess levels of progress, the questionnaire sought not only to identify if extreme events had been identified, but also whether the impact and vulnerabilities of these hazards had been considered and whether relevant stakeholders who are key to the management of events had been identified.

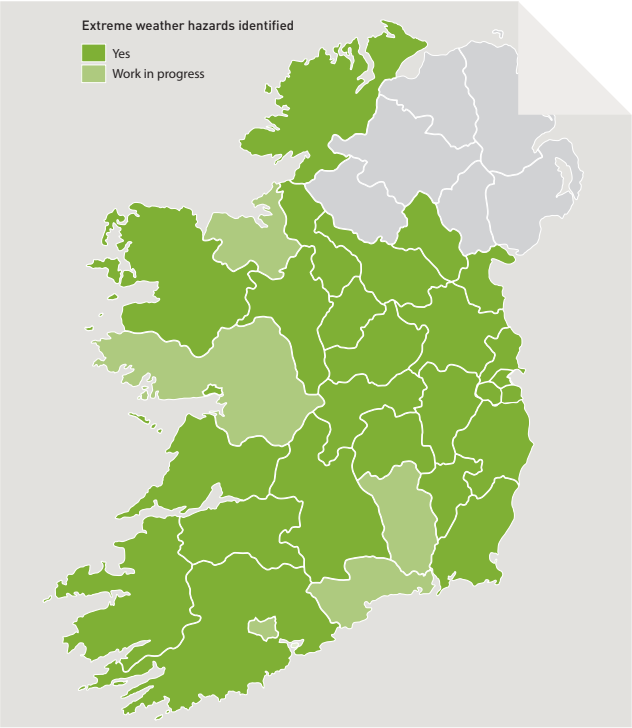


Figure 3.2: Local authorities extreme weather hazards identified.

Table 3.2 reveals that **all local authorities had made very significant progress in developing a comprehensive baseline with key actors also identified**.

Specifically:

- twenty-six local authorities had already identified the full range of extreme weather events to affect their local authority for the purposes of assessing their current climate adaptation baselines; the remaining five local authorities reported that they were in the process of identifying the full range of extreme weather events to affect their local authority for the purposes of assessing their climate adaptation baselines (**Figure 3.2**);
- twenty-three local authorities reported that they had developed an understanding of the local level impacts and vulnerabilities to these hazards; the remaining eight local authorities reported that they were in the process of developing an understanding of the local level impacts and vulnerabilities to these hazards; and,
- twelve local authorities reported that they had identified a list of external actors relevant to the management of identified climate impacts. A further eighteen local authorities reported that they were in the process of identifying a list of external actors relevant to the management of identified climate impacts.

Table 3.2: Local authorities progress on the development of a local adaptation baseline.

Local Authority (County/City Council)	Full range of extreme weather events identified	Impact and vulnerabilities of weather hazards assessed	Full list of external actors relevant to the management of events
WiP = Work in progress			
Carlow	Yes	Yes	WiP
Cavan	Yes	Yes	Yes
Clare	Yes	WiP	WiP
Cork City	WiP	WiP	WiP
Cork County	Yes	Yes	Yes
Donegal	Yes	Yes	Yes
Dublin City Council	Yes	Yes	Yes
Dún Laoghaire Rathdown	Yes	Yes	WiP
Fingal	Yes	Yes	WiP
Galway City	Yes	Yes	Yes
Galway County	WiP	WiP	No
Kerry	Yes	Yes	WiP
Kildare	Yes	Yes	Yes
Kilkenny	WiP	WiP	WiP
Laois	Yes	Yes	Yes
Leitrim	Yes	WiP	WiP
Limerick City & County	Yes	Yes	Yes
Longford	Yes	Yes	WiP
Louth	Yes	Yes	WiP
Mayo	Yes	Yes	Yes
Meath	Yes	Yes	WiP
Monaghan	Yes	Yes	WiP
Offaly	Yes	WiP	Yes
Roscommon	Yes	Yes	WiP
Sligo	WiP	WiP	WiP
South Dublin	Yes	Yes	Yes
Tipperary	Yes	Yes	Yes
Waterford City and County	WiP	WiP	WiP
Westmeath	Yes	Yes	WiP
Wexford	Yes	Yes	WiP
Wicklow	Yes	Yes	WiP

The study also revealed that the rate of progress in developing a Climate Adaptation Strategy varied between local authorities for a variety of valid reasons. Some local authorities already had data available given their experience in dealing with events, whilst others were gathering data for the first time in relation to new threats (e.g., coastal erosion). In some instances, collating data for the purposes of developing a Climate Adaptation Strategy for local authorities is also difficult given the potential number of stakeholders involved (e.g., where emergency flood responses impact urban and rural areas of the local authority). Overall, considerable work was underway across all local authorities to ensure they advanced actions to adequately plan for potential extreme weather events within their Climate Adaptation Strategy.

CASE STUDY: Special projects team to consider operational elements of environmental plans

Case study describes how a dedicated team was established to consider the operational requirements of delivering climate change mitigation actions in council plans/policies. **See page 71.**
Local authority: Cork County Council

3.4 Identifying future climate impacts, vulnerabilities and risks

Category: Adaptation

Following the identification of an adaptation baseline, the *Local Authority Adaptation Strategy Development Guidelines* (Department of Communications, Climate Action and Environment, 2018a) highlight the need for local authorities to identify future climate impacts, vulnerabilities and risks within their area. There are two elements to this requirement. The first is to identify future weather and climate-related risks and the second is to assess the level of those risks. The guidelines recommend examination of available climate projection data in order to identify future risks, following which a risk register should be developed to identify assessed risk levels so that risks can be prioritised accordingly. This enables local authorities to consider a range of future climate scenarios to assess their capacity to adapt to climate change under different scenarios. These risk registers are important in synthesising, ranking and communicating multiple threats regarding climate change, demanding effective characterisation of risks so that responses can be tailored to individual climate risks. Two questions were examined within the questionnaire to gather information on whether local authorities had identified future climate impacts, vulnerabilities and risks, namely whether:

- local authorities had examined available climate projection data to understand the frequency and intensity of extreme weather events and climate variability; and,
- a climate risk register was in place.

The findings revealed that **almost all local authorities had made significant progress in assessing and documenting the potential future risks posed by extreme weather and climate variability** (**Table 3.3**).

Specifically:

- twenty-five local authorities reported that they had examined available climate projection data to develop an understanding of frequency and intensity of extreme weather events and how climate variability might change in the future; the remaining six reported that they were in the process of examining available climate projection data to develop an understanding of frequency and intensity of extreme weather events and how climate variability might change in the future; and,
- fourteen local authorities reported that they had developed a climate risk register summarising information gained from the adaptation baseline assessment; a further 16 local authorities reported that they were in the process of developing a climate risk register summarising information gained from the adaptation baseline assessment.

Table 3.3: Local authorities progress on identifying risk of extreme weather events and production of risk register.

Local Authority (County/City Council)	Climate projection data examined and an understanding of the frequency and intensity of extreme weather events and how climate variability might change in the future has been identified	Development of climate risk register
Carlow	Yes	No
Cavan	Yes	Yes
Clare	Yes	Work in progress
Cork City	Work in progress	Work in progress
Cork County	Yes	Yes
Donegal	Yes	Work in progress
Dublin City Council	Yes	Yes
Dún Laoghaire Rathdown	Yes	Yes
Fingal	Yes	Work in progress
Galway City	Yes	Work in progress
Galway County	Yes	Yes
Kerry	Yes	Work in progress
Kildare	Yes	Yes
Kilkenny	Work in progress	Work in progress
Laois	Yes	Yes
Leitrim	Yes	Work in progress
Limerick City & County	Yes	Yes
Longford	Yes	Work in progress
Louth	Yes	Work in progress
Mayo	Yes	Yes
Meath	Yes	Yes
Monaghan	Yes	Yes
Offaly	Yes	Yes
Roscommon	Work in progress	Work in progress
Sligo	Work in progress	Work in progress
South Dublin	Yes	Work in progress
Tipperary	Yes	Yes
Waterford City & County	Work in progress	Work in progress
Westmeath	Yes	Yes
Wexford	Yes	Work in progress
Wicklow	Work in progress	Work in progress

Overall, the results demonstrate that processes surrounding the identification of extreme weather events and the development of a climate risk register were significantly advanced across all local authorities. As local authorities implement their Climate Adaptation Strategy continuous comprehensive planning will enable them to assess and co-ordinate responses to extreme weather events and climate variability in a systematic, evidence-informed and consistent manner.

Having considered the processes and plans needed to respond and adapt to climate and weather related events, the report now examines additional actions being carried out by local authorities to address the need for adaptation and to mitigate against climate change and extreme weather events. Four questionnaire topics were identified that align in part to the topics identified in the *National Adaptation Framework* (Department of Communications, Climate Action and Environment, 2018b). The research therefore maps to the actions within the Framework to highlight how local authorities contribute to realising national as well as local policy objectives. Topic headings addressed in the remainder of the chapter are:

- critical infrastructure (section 3.5);
- water resources and flood risk management (section 3.6);
- nature-based solutions (section 3.7); and,
- services/public engagement (section 3.8).

3.5 CRITICAL INFRASTRUCTURE

3.5 Critical infrastructure

Category: Mitigation/Adaptation

3.5.1 Introduction

In the context of critical infrastructure, local authorities are primarily responsible for social housing, road management and maintenance, public lighting, planning, waste management and extensive infrastructure within their administrative areas, each of which impact and are impacted by climate change. Given the significant provision of critical infrastructure by local authorities, they are therefore well placed to advance initiatives that reduce the impacts of climate change whilst supporting behavioural change of citizens through those initiatives. The range of services impacted is significant. However, for the purposes of analysis, the questionnaire examined the following 'Critical Infrastructure' aspects:

- energy efficiency;
- public lighting;
- renewable energy;
- local authority vehicle fleet;
- planning and public realm; and,
- waste management.

Sections 3.5.2 – 3.5.7 examine each of these themes in turn.

CASE STUDY:
Energy efficiency projects 2015-2019

Case study describes a range of initiatives carried out over the period 2015-2019. **See page 73.**
Local authority: Louth County Council

3.5.2 Energy efficiency

Category: Mitigation

Energy efficiency continues to be a national priority and is expected to play a crucial role in Ireland meeting its national and international climate targets. Reducing energy consumption is one of the key measures needed to mitigate climate change. The *Energy Efficiency Directive (EED) (2012/27/EU)* (European Union, 2012), which outlines the EU policy direction to 2020, provides legally binding targets for Member States in relation to using energy more efficiently. In this context, the 2015 energy white paper, *Ireland's Transition to a Low Carbon Energy Future* (Department of Communications, Energy and Natural Resources, 2015) maps out the overall national policy context and details how energy efficiency will be central to a transition to clean, low-carbon energy usage by 2050. The strategic importance of public sector energy efficiency is detailed in the *National Energy Efficiency Action Plan* (Department of Communications, Climate Action and Environment, 2017a) and *National Mitigation Plan* (Department of Communications, Climate Action and Environment, 2017b). It is also central to the Government's *Public Sector Energy Efficiency Strategy* (Department of Communications, Climate Action and Environment, 2017d). Specifically, under the *National Energy Efficiency Action Plan* the public sector is required to improve its energy efficiency by 33% by 2020 relative to 2009 energy usage.

CASE STUDY:
Local energy masterplan

Case study describes how an energy masterplan was developed for the Clonburris Strategic Development Zone (SDZ) with the support of SEAI funding. Includes an emphasis on constructing nearly zero energy buildings (NZEB). **See page 72.**
Local authority: South Dublin County Council

More recently, however, the *Climate Action Plan* (Government of Ireland, 2019a) sets more onerous targets on public sector bodies regarding energy efficiencies, whereby they must achieve energy efficiency of 50% by 2030 (relative to 2009). As a core public sector body, the local government sector plays a crucial role in supporting national efforts to transition to a low-carbon state in accordance with national and European obligations.

In order to assess progress on realising national goals, this section of the report focuses on the following:

- whether energy management teams had been established to monitor progress;
- whether local energy masterplans had been developed by local authorities;
- recognition of local authority leadership in energy efficiency;
- support infrastructure: role of energy agencies; and,
- quantifying the impact of local authority energy efficiency actions 2011-2017.

3.5.2.1 Energy management teams

Energy management teams and energy masterplans are the mechanisms through which most local authorities track and monitor progress towards meeting the *National Energy Efficiency Action Plan* 2020 energy efficiency targets of becoming 33% more energy efficient (Government of Ireland, 2009), and the *Climate Action Plan* target of 50% more energy efficiency by 2030 relative to 2009 usage (Government of Ireland, 2019a). The results of the questionnaire show that **30 local authorities had established or were in the process of establishing energy management teams**.

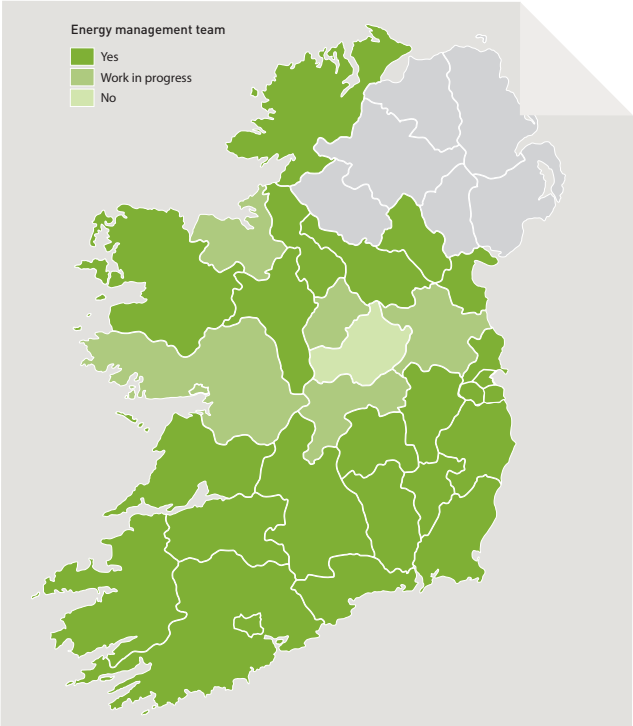


Figure 3.3: Local authorities with energy management team established.

Specifically:

- twenty-four local authorities reported that they had created an energy management team to monitor and improve energy use; a further six local authorities reported that they were in the process of creating an energy management team to monitor and improve energy use (**Figure 3.3**).

CASE STUDY: Better energy communities

Case study describes an investment in energy efficiency projects and green technologies that are contributing to the development of the green economy in Waterford. **See page 74.**
Local authority: Waterford City & County Council

3.5.2.2 Energy masterplans

Local authority energy action plans serve as a tool to track and monitor targets. The plans detail building rating, energy use, and renewable energy technologies in all local authority-owned buildings. These plans are complemented with local community energy masterplans developed with the support of the Sustainable Energy Authority of Ireland (SEAI) in their attempts to enable "bottom-up community energy solutions" that focus on energy audits of local buildings and on establishing Building Energy Rating baselines of homes (Sustainable Energy Authority of Ireland, n.d.-b).

The questionnaire subsequently found that **twenty-six local authorities had developed or were in the process of developing an energy masterplan**.

Specifically:

- nine local authorities reported that they had developed an energy masterplan, while a further 17 local authorities reported that they were in the process of developing an energy masterplan showing building energy rating, energy use, and renewable energy technologies in all local authority-owned buildings.

Twenty-five local authorities had also advanced work on prioritising retrofit projects and other energy-saving projects.

Specifically:

- thirteen local authorities reported that they had prioritised areas/buildings for retrofits and potential energy projects within their energy masterplan; and, a further 12 local authorities reported that they were in the process of prioritising areas/buildings for retrofits and potential energy projects within their energy masterplan.

3.5.2.3 Recognising local authority leadership

Work on increasing energy efficiencies has been ongoing for many years across the local government sector, even prior to the establishment of energy management teams and the development of masterplans. As a result, 15 local authorities are on course to surpass 33% energy efficiency by 2020 relative to 2009 baseline year (**Table 3.4**) (Sustainable Energy Authority of Ireland, 2018a).

Table 3.4: Local authorities on course to surpass 2020 public sector energy efficiency targets.

Local authorities on course to surpass 2020 energy efficiency targets
Carlow County Council
Cork City Council
Dublin City Council
Dún Laoghaire Rathdown County Council
Fingal County Council
Galway City Council
Kerry County Council
Kilkenny County Council
Laois County Council
Longford County Council
Louth County Council
Monaghan County Council
Offaly County Council
Tipperary County Council
Wexford County Council

CASE STUDY: Designing an 'A'-rated public building

Case study describes use of a combined heat and power (CHP) unit, rainwater harvesting and LED sensor lighting to operate Castlebar Swimming Pool and Leisure Facility. **See page 75.**
Local authority: Mayo County Council

Fourteen local authorities are also signatories to the Covenant of Mayors for Climate & Energy, a global initiative of over 9,000 local and regional authorities across 57 countries linked to the EU's climate and energy policy framework (Covenant of Mayors for Climate & Energy, 2019). The Covenant subsequently pledges that all signatories will support implementation of the EU's 40% greenhouse gas reduction target by 2030 (relative to 1990 levels), and the adoption of a joint approach to tackling mitigation of and adaptation to climate change.

The study also showed that **13 local authorities** had demonstrated their commitment to increasing energy efficiencies and **had received certification or were in the process of applying for best practice in energy management certification with the International Organisation for Standardisation (ISO)** (**Table 3.5**). ISO 50001 certification is outlined as a focal action in which the public sector is expected to lead by example under the *Climate Action Plan*, with the SEAI also advocating pursuance of ISO 50001 certification. Certification requires organisations to establish, implement, maintain and improve energy management systems to continually improve energy performance so that best practice energy management is embedded in day-to-day operations (Sustainable Energy Authority of Ireland, n.d.-a).

CASE STUDY: Leisure centre energy upgrade

Case study describes how savings were made upgrading heating system in local authority leisure centre. **See page 76.**
Local authority: Galway City Council

Table 3.5: Local authorities certified or in process of applying for ISO 50001 certification in energy management practices.

Local Authority	Hold ISO 50001 accreditation related to energy management
Cork City Council	Work in progress
Cork County Council	Yes
Donegal County Council	Yes
Dublin City Council	Work in progress
Dún Laoghaire Rathdown County Council	Yes
Fingal County Council	Work in progress
Kerry County Council	Yes
Kildare County Council	Work in progress
Limerick City & County Council	Work in progress
Louth County Council	Yes
Mayo County Council	Work in progress
Offaly County Council	Work in progress
South Dublin County Council	Work in progress

CASE STUDY: District heating pilot – HeatNet

Case study explores how waste heat feed can be used to provide low-carbon heat to the local authority's own buildings as well as new residential and commercial developments. **See page 77.**
Local authority: South Dublin County Council

3.5.2.4 Support infrastructure: role of energy agencies

The SEAI targets homeowners, businesses, communities and the public sector to help transform how people think about, generate and use energy. It thus has a very broad national brief. However, regional or county level energy agencies provide more specific support to local authorities. In this context, a range of energy agencies exist nationally that add synergy to the work of local authorities in relation to energy efficiencies.

Specifically:

- seventeen local authorities had an energy agency within their administrative area (**Table 3.6**).

Energy agencies provide energy awareness and information to the public, offer energy management and procurement services, and deliver energy efficiency and renewable energy projects and sustainable energy training. Local authorities collaborate with these energy agencies locally to meet national and EU energy efficiency targets. Local authorities have made significant advancements with respect to energy efficiency in recent years, working in collaboration with a range of energy agencies in the process. Given that energy planning plays a critical role in mitigating climate

change, actions taken by the local government sector are crucial if the public sector is to meet 2020 and more ambitious 2030 energy efficiency targets laid out for the public sector in the *Climate Action Plan* (Government of Ireland, 2019a).

3.5.2.5 Quantifying the impact of local authority energy efficiency actions 2011-2017

Additional to this study, one of the energy agencies, 3CEA, submitted a report to the CCMA with questionnaire results from twenty local authorities[3] in 2018 (O'Mahony, 2019). The report aimed to highlight the energy mitigation projects completed by local authorities between 2011 and 2017. **Table 3.7** provides a summary of those local authorities included in the study. The results demonstrate that local authorities made significant strides in both residential (i.e., dwellings and apartments owned by local authorities) and non-residential (e.g., local authority buildings, municipal buildings, transport upgrades, street lighting upgrades and local authority vehicle fleet) energy saving reductions between 2011 and 2017. The investment and savings breakdown between non-residential and residential projects is detailed in **Table 3.8**.

CASE STUDY:
Energy performance contracts

Case study details the role of Codema energy agency in facilitating two energy performance contracts that are designed to deliver guaranteed energy savings across ten public leisure and community sports facilities in Dublin city. **See page 78.**
Local authority: Dublin City Council

Table 3.7: Local authorities included in 2018 3CEA climate action questionnaire.

Local Authority included in the 2018 3CEA climate action questionnaire	
Carlow County Council	Clare County Council
Cork County Council	Dublin City Council
Galway City Council	Kerry County Council
Kilkenny County Council	Laois County Council
Leitrim County Council	Limerick City & County Council
Longford County Council	Monaghan County Council
Louth County Council	Offaly County Council
Roscommon County Council	South Dublin County Council
Tipperary County Council	Waterford City & County Council
Wexford County Council	Wicklow County Council

Some of the key findings relating to the 20 local authorities included:

- capital investment in local authority energy efficiency projects of **over €120 million** between 2011 and 2017 in residential and non-residential properties across the 20 local authorities; and,
- during the period examined (2011-2017), over **185GWh of energy savings** were achieved within the residential and non-residential sector – this equates to the prevention of 61,100 tonnes of CO_2 from being produced – a saving **equivalent to the CO_2 emissions of 11,000 Irish homes** annually.[4]

Table 3.6: Local authorities with energy agencies.

Energy Agency	Codema	Midlands Energy Agency	Three Counties Energy Agency	Limerick and Clare Energy Agency	Waterford Energy Bureau	Kerry Energy Agency	Tipperary Energy Agency	Cork City Energy Agency
Local Authority	Dublin City Council	Offaly County Council	Carlow County Council	Limerick City & County Council	Waterford City & County Council	Kerry County Council	Tipperary County Council	Cork City Council
	Fingal County Council	Laois County Council	Kilkenny County Council	Clare County Council				
	South Dublin County Council	Longford County Council	Wexford County Council					
	Dún Laoghaire Rathdown County Council	Westmeath County Council						

[3] 31 responses were received but 11 partially completed responses were excluded from the final research report findings.

[4] CO_2 emissions were estimated at 5.5 tonnes CO_2 per household in 2016 by the Sustainable Energy Authority of Ireland. See: Sustainable Energy Authority of Ireland 2018b. Energy-related CO_2 emissions in Ireland 2005-2016. Dublin: Sustainable Energy Authority of Ireland.

Table 3.8: Local authorities investment and savings from energy efficiency projects 2011-2017 (20 local authorities).

Non-residential projects

- The non-residential sector accounted for €40 million of the €120 million investment in local authority energy efficiencies, of which local authorities attracted €9.2 million in grant funding.
- Key non-residential projects funded across local authorities included the retrofitting of public lighting to energy efficient LEDs and installation or upgrade to existing CHP plants.
- The implementation of these initiatives has resulted in estimated energy savings of 43.5GWh.
- The non-residential sector initiatives helped to prevent an estimated 20,000 tonnes of CO_2 from being produced – a saving equivalent to the CO_2 emissions produced by more than 3,500 Irish homes annually.

Residential projects

- €80 million capital investment was made in local authority energy efficiencies related to residential projects.
- This primarily related to energy efficiency upgrades to local authority-owned houses and apartments, the implementation of which resulted in energy savings of over 142GWh.
- Investment in residential energy-saving initiatives by local authorities subsequently helped to prevent an estimated 41,000 tonnes of CO_2 from being produced – a saving equivalent to the CO_2 emissions produced by approximately 7,500 Irish homes annually.

3.5.3 Public lighting

Category: Mitigation

Public lighting plays a very significant role in terms of energy use and in its potential to contribute to energy savings. It has subsequently been identified as a targeted measure in efforts to achieve a 50% energy reduction by 2030 (relative to 2009) detailed in the *Climate Action Plan* (Government of Ireland, 2019a). In this context, 24 local authorities are working on a co-ordinated basis to upgrade their public lighting stock through the National Public Lighting Upgrade Project, managed by the Road Management Office, to support public sector energy efficiency targets. **Table 3.9** provides an overview of those local authorities participating in this project. The project involves the upgrading of approximately 280,000 public lights nationally, which account for approximately half of the energy consumption of those 24 local authorities. These lights currently consume 140 million kWh of energy annually. Through an investment of €151 million over the coming years the project aims to replace all non-LED public lights across these 24 local authorities. It is estimated that the project will avoid 31,000 tonnes of CO_2 per annum once completed. It will also provide energy savings of c. 70 million kWh, saving the equivalent of the annual CO_2 produced by more than 5,600 homes[4].

Table 3.9: Local authorities participating in National Public Lighting Upgrade Project.

Region	Local Authorities	Quantity of Luminaires
Southern Region	Clare County Council	
	Cork County Council	
	Kerry County Council	
	Limerick City & County Council	
	Waterford City & County Council	91,262
Eastern Region	Carlow County Council	
	Kildare County Council	
	Kilkenny County Council	
	Longford County Council	
	Louth County Council	
	Meath County Council	
	Offaly County Council	
	Tipperary County Council	
	Westmeath County Council	
	Wicklow County Council	113,992
North West Region	Cavan County Council	
	Donegal County Council	
	Galway City Council	
	Galway County Council	
	Leitrim County Council	
	Mayo County Council	
	Monaghan County Council	
	Roscommon County Council	
	Sligo County Council	75,006
TOTAL		**280,260**

Source: (Road Management Office, n.d.)

The questionnaire revealed that local authorities had already taken significant steps to reduce public lighting energy usage, not limited to those local authorities involved in the National Public Lighting Upgrade Project. Specifically, **all local authorities had mandated the use of LED lighting in new public lighting installations**.

Case study:
Improving public lighting energy performance

Case study describes the public lighting project of a local authority and demonstrates increased energy performance.
See page 82.
Local authority: Monaghan County Council

Specifically:

- 30 local authorities reported that they had already converted some public lighting to LED energy-efficient light bulbs.

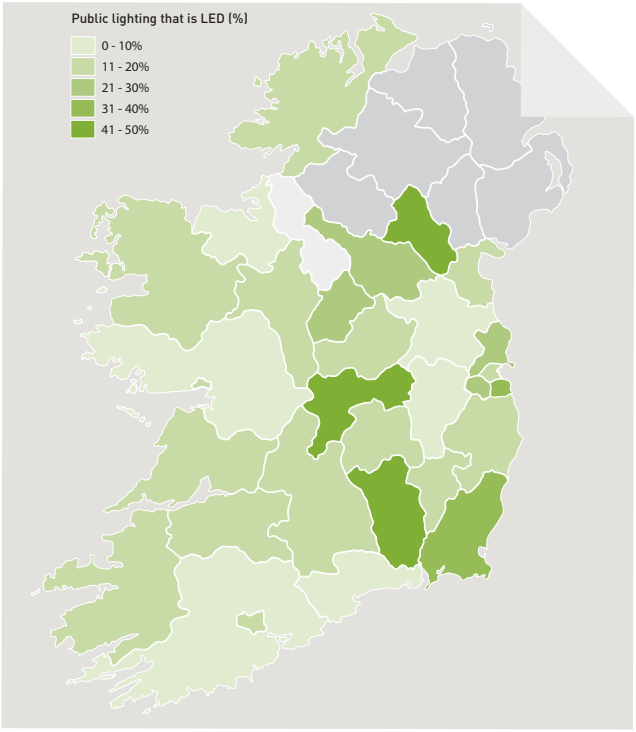


Figure 3.4: Local authorities percentage of LED public lighting.

The rate at which lights are being replaced varies across the sector. Some local authorities are proactive and replace lights systematically while others are replacing as required (i.e., natural replacement cycle or new lighting). However, 24 local authorities reported that in excess of 10% of their public lighting stock was already fitted with LED bulbs at 2018 year end (**Figure 3.4**). The data also demonstrated that local authorities that are not involved in the National Public Lighting Upgrade Project were converting public lighting to LED bulbs at a high rate relative to those in the project. For instance, in the Dublin region the percentage of LED public lighting bulbs ranged from 15% to 34% across the four local authorities. Given the volume of public lighting in the Dublin region this represents a significant proportion of national public lighting and substantial CO_2 and financial savings.

CASE STUDY: Improving public lighting energy efficiency

Case study describes how the local authority was able to achieve a 68% saving in energy spending by changing to energy-efficient LED lamps in a large project consisting of the declassified road network. **See page 79.**
Local authority: Kilkenny County Council

Once completed, the National Public Lighting Upgrade Project will avoid CO_2 emissions of a multiple of those already achieved by the local government sector to date. In an additional effort to improve public lighting efficiency some local authorities have also piloted smart lighting projects using central management systems. These commitments by the local government sector in relation to public lighting contribute to ambitious climate action targets set out in the *Climate Action Plan*, which seeks to deliver a 50% improvement in energy efficiency by 2030 by the public sector (relative to 2009 base) and which requires local authorities to exercise planning and regulatory roles to improve climate outcomes by influencing or requiring the achievement of certain efficiency standards (e.g., outdoor lighting).

CASE STUDY: Local authority public lighting upgrade

Case study describes the public lighting upgrade of a local authority which is not involved in the National Public Lighting Upgrade Project. It highlights the operational advantages of LED lighting as well as the savings secured over time. **See page 81.**
Local authority: Laois County Council

3.5.4 Renewable energy

Category: Mitigation/Adaptation

Renewable energy (e.g., solar, wind, wave) will play a key role in both climate change mitigation and adaptation. For instance, it can mitigate climate change by reducing reliance on fossil fuels (coal, oil, gas, peat) as a source of energy. Additionally, adaptation opportunities may also be generated from projected increased storm intensity and frequency, providing additional prospects of developing renewable wind and wave energy (Environmental Protection Agency, 2019b).

CASE STUDY: Waste to energy – landfill site

Case study describes how landfill gas has been used to generate electricity. The project was the first in Ireland to be managed under an Environmental Protection Agency (EPA) waste licence. **See page 83.**
Local authority: Kerry County Council

CASE STUDY: Solar PV panels on car park

Case study details how an innovative solar panel project will reduce energy consumption. **See page 87.**
Local authority: Wicklow County Council

CASE STUDY: Social housing energy upgrade

Case study describes a fabric upgrade programme of over 8,000 units of social housing since 2013. Savings on energy bills of €29.6 million have been estimated. **See page 88.**
Local authority: Dublin City Council

Under the EU *Renewable Energy Directive (2009/28/EC)* (European Union, 2012), Ireland is committed to produce at least 16% of all energy consumed from renewable sources by 2020. At a national level, this is largely being implemented through the *National Energy Efficiency Action Plan* (Department of Communications, Climate Action and Environment, 2017a), *National Renewable Energy Action Plan* (Department of Communications, Climate Action and Environment, 2017c), and the *Local Authorities Renewable Energy Strategies* (Sustainable Energy Authority of Ireland, 2013). This target is to be achieved by generating 40% of consumed electricity from renewable electricity and 12% of heat from renewable resources, with 10% of private vehicles to be electrified.

CASE STUDY: Solar PV panels providing energy to public buildings

Case study outlines how the local energy agency, established by the local authority, installed 200kW of solar PV panels on nine buildings. This was a flagship project to encourage other sectors to invest in solar panels. **See page 84.**
Local authority: Tipperary County Council

Wind energy continues to act as the primary renewable energy resource nationally and in 2018 provided 85% of Ireland's renewable electricity and 30% of our electricity demand. As the primary State body with respect to planning and development, local authorities play an important role in renewable electricity targets through their assessment of renewable energy planning applications. In this context, through their granting of planning permission for renewable energy projects, local authorities have played a crucial role in the State working towards national and EU renewable energy targets.

CASE STUDY: Solar PV panels on fire station

Case study details how solar panels, LED lighting and a building management system on the heating system have been combined to reduce energy consumption. **See page 85.**
Local authority: Roscommon County Council

CASE STUDY: Solar PV panels on County Hall

Case study details how solar panels reduce energy consumption. **See page 86.**
Local authority: Carlow County Council

In addition, local authorities have also undertaken actions with respect to renewable energy projects for several years. In the context of this research, the level of local authority engagement with respect to renewable energy projects was assessed through an examination of the number of projects they funded or part funded, and whether local authorities had received funding for renewable energy or energy efficiency projects over the previous five years (2014-2018). The findings revealed that **almost all local authorities had been both funding (29 local authorities) and receiving funding (27 local authorities) for renewable energy or energy efficiency projects between 2014 and 2018** (**Table 3.10**).

Specifically:

- twenty-seven local authorities reported that they had received funding for renewable energy and energy efficiency projects between 2014 and 2018; funds were received for a variety of projects including upgrading public buildings and housing stock (retrofits, lighting and heating systems, insulation, etc.) and piloting new lighting solutions, heating systems, electricity generation, etc. (**Table 3.10**).

Table 3.10: Local authorities receiving/providing funding for renewable energy or energy efficiency projects between 2014 and 2018.

Local Authority	Received funding for renewable energy and energy efficiency projects (2014-2018)	Funded/ part funded renewable energy and energy efficiency projects from own resources (2014-2018)
Carlow County Council	Yes	Yes
Cavan County Council	No	Yes
Clare County Council	Yes	Yes
Cork City Council	Yes	Yes
Cork County Council	Yes	Yes
Donegal County Council	Yes	Yes
Dublin City Council	Yes	Yes
Dún Laoghaire Rathdown County Council	Yes	Yes
Fingal County Council	No	Yes
Galway City Council	Yes	Yes
Galway County Council	Yes	Yes
Kerry County Council	Yes	Yes
Kildare County Council	Yes	Yes
Kilkenny County Council	Yes	Yes
Laois County Council	Yes	Yes
Leitrim County Council	Yes	Yes
Limerick City & County Council	Yes	Yes
Longford County Council	Yes	Yes
Louth County Council	Yes	Yes
Mayo County Council	Yes	Yes
Meath County Council	Yes	Yes
Monaghan County Council	Yes	Yes
Offaly County Council	Yes	Yes
Roscommon County Council	Yes	Yes
Sligo County Council	No	No
South Dublin County Council	Yes	Yes
Tipperary County Council	Yes	Yes
Waterford City & County Council	Yes	Yes
Westmeath County Council	Yes	No
Wexford County Council	Yes	Yes
Wicklow County Council	No	Yes

One specific measure that local authorities are required to adhere to, as detailed in the EU *Directive on the Energy Performance of Buildings Directive 2010/31/EU*, is the need to ensure that under the planning process all new buildings are designed to NZEB standards by 31st December 2020. In addition, all new buildings owned and occupied by public authorities are required to adhere to NZEB standards from 31st December 2018 (European Union, 2010).

CASE STUDY: Local authority housing estate upgrades

Case study details the process of regenerating a housing estate built in the early 1970s to the mid 1980s. Extensive consultation on all phases of the masterplan have resulted in positive community engagement. **See page 89.**
Local authority: Sligo County Council

CASE STUDY: Group water scheme – hydropower technologies

Case study outlines how the local authority partnered to have a pump as turbine installed on a group water scheme (GWS) to reduce reliance on carbon-based energy. Funded as part of a European project called DWR Uisce. **See page 90.**
Local authority: Wexford County Council

This NZEB requirement equates to a building energy rating of A2 or greater. NZEB requirements demand the use of renewable resources to a very significant extent in all new buildings. Local authorities have already advanced efforts significantly towards commitments contained in NZEB regulations. Questionnaire responses revealed that **20 local authorities had piloted or were in the process of piloting NZEBs in the delivery of their social housing**.
Specifically:

- six local authorities reported that they had undertaken a NZEB pilot programme in their delivery of social housing; a further 14 local authorities reported that they were in the process of undertaking a NZEB pilot programme in their delivery of social housing (**Figure 3.5**).

As already noted, the role of local authorities in the planning process of renewable energy projects is also important in the context of national and EU renewable energy targets. Local authorities have

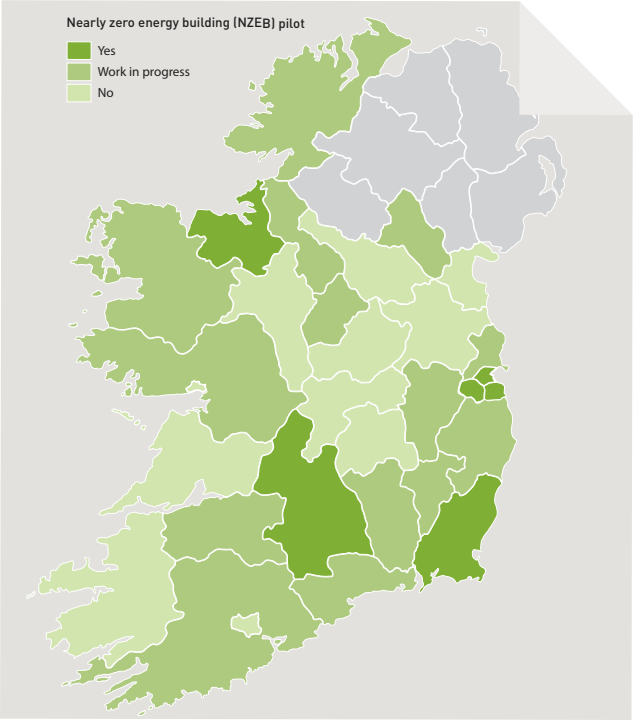


Figure 3.5: Local authorities with pilot NZEB programmes.

played a significant role in the current progress achieved by the public sector in meeting EU and national renewable energy targets. Moreover, their investment in renewable energy projects for the purposes of their own day-to-day operations, further reinforces the sector's commitment to mitigating and adapting to climate change.

3.5.5 Local authority vehicle fleet

Category: Mitigation

Under the *Climate Action Plan* (Government of Ireland, 2019a), significant focus has been given to low-carbon technology within the transport sector. CO_2 emissions from transport contributed to 19.8% of Ireland's greenhouse gas emissions in 2017 (Environmental Protection Agency, 2018). The transport sector in Ireland represents the second largest source of greenhouses gases after agriculture (33.3% – 2017). The questionnaire subsequently focused on local authorities' own use of electric vehicles (EVs) and hybrid vehicles, and their role in facilitating their increased use amongst the general public through the provision of parking spaces and charging points for such vehicles.

Uptake of EVs and hybrid vehicles has been relatively low in Ireland to date in comparison to international standards. Nationally, 7,650 EVs were registered in the State at the end of 2018 from a total of approximately 2.7 million vehicles (Central Statistics Office, 2018, Houses of the Oireachtas, 2019a). Notwithstanding this challenge, local authorities have taken proactive steps to demonstrate leadership in the adoption of low-emission transport options as illustrated in responses to questions regarding the percentage of EVs or hybrid vehicles they own or lease and the provision of EV charging infrastructure to the public. In the context of this study, **15 local authorities reported owning or leasing EVs or hybrid vehicles for their day-to-day operations.**

Specifically:

- thirteen local authorities reported owning or leasing EVs for day-to-day operations; and,
- four local authorities reported owning or leasing hybrid vehicles, with two local authorities owning or leasing both EVs and hybrid vehicles.

CASE STUDY:
Local authority electric vehicle fleet

Case study details how 125 staff members signed up to use EVs for work purposes. Widespread use of these vehicles helps to promote this form of transport throughout the county and provides motivation for provision of more charging points. **See page 91.**

Local authority: Dún Laoghaire Rathdown County Council

In line with national trends on EV uptake, the percentage of EVs is relatively low across local authorities with the exception of Dún Laoghaire Rathdown County Council, which reported that 15% of its vehicle fleet was electric. It is more common however for local authorities to replace vehicles as they become eligible for replacement. The growth of the EV fleet has therefore been gradual in most local authorities to date. In addition, local authorities have provided infrastructural support to the public to facilitate the transition to EVs and hybrid vehicles. The primary mechanisms of support are through the provision of car parking spaces and EV charging points. This study revealed that **charging points were available in 29 local authorities** and **EV parking spaces** were available or proposed **in 24 local authorities**.

Specifically:

- twenty-one local authorities reported that they provided designated EV car parking spaces for public use; three local authorities reported that they were in the process of providing designated EV car parking spaces for public use; and,
- there were in excess of 260 EV charging points available on local authority property for public use across 29 local authorities (**Figure 3.6**).

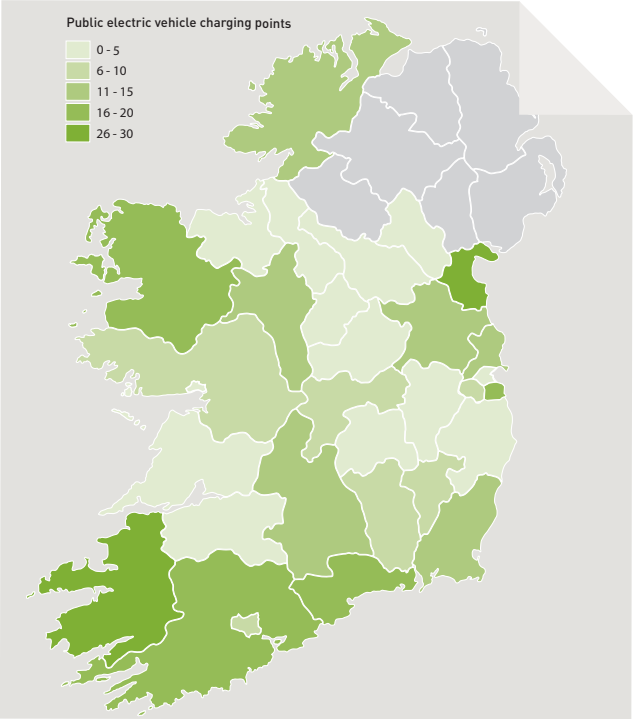


Figure 3.6: Local authorities number of electric vehicle charging points available.

Nationally, most charging points are provided by the ESB, i.e., 668 standard public charging points exist in the ESB's eCars network, with the company expected to move towards charging for this service in the near future. Consequently, the Department of Communications, Climate Action and Environment recently committed to funding the addition of approximately 1,000 new EV charging points across local authorities over the next five years (Houses of the Oireachtas, 2019b), complementing existing local authority EV charging infrastructure.

3.5.6 Planning and public realm

Category: Mitigation

The development of cycling infrastructure is an important component of encouraging the public to switch from private vehicles towards more climate-friendly modes of transport. The key role local government plays in the development of cycling infrastructure is outlined in several policy documents.

The *National Cycle Policy Framework* (Department of Transport, Tourism & Sport, 2009), identifies local authorities as the primary delivery agent for a range of appropriate cycling initiatives. In addition, their function under the *Planning and Development Act* (Government of Ireland, 2000) as the statutory State body with responsibility for planning and development ensures that all developments subject to planning permission are planned in a manner that encourages the transition to climate-friendly modes of transport such as walking, cycling and public transport. More recent policies, including the *Climate Action Plan* (Government of Ireland, 2019a), place significant emphasis on expanding sustainable travel measures, including a comprehensive cycling and walking network for metropolitan areas of Ireland's cities.

CASE STUDY: Low carbon town

Case study details the actions taken to transform Portlaoise into Ireland's first 'Low Carbon Town Centre' through:

- reducing the impacts of car use on the public realm;
- improving overall air and environmental quality;
- supporting more active travel through walking and cycling; and
- providing a better quality environment for leisure and social uses.

The project also aims to refurbish and re-purpose derelict buildings to positively contribute to a low-carbon town. The *Project Ireland 2040 National Planning Framework* identifies Portlaoise as a national demonstration project on how sustainability and low carbon development can be implemented at community level. **See page 92.**

Local authority: Laois County Council

In order to ascertain local authorities' impact on cycling initiatives, the questionnaire sought to examine strategic leadership, provision of infrastructure and involvement of local authorities in climate-friendly transport actions and projects. To ascertain this, local authorities were asked whether:

- they had developed walking or cycling strategies, or participated in other sustainable travel initiatives;
- bicycle parking spaces were available for use; or,
- they had engaged in projects to support the increased use of cycling or other sustainable transport methods.

In the context of developing strategies and initiatives aimed at encouraging sustainable transport, local authorities reported significant actions.

Specifically:

- twenty-six local authorities had developed or were in the process of developing a walking or cycling strategy (**Figure 3.7**);
- twenty-five local authorities reported that they participated in or were in the process of participating in the Smarter Travel Programme, a national transport initiative in how a sustainable travel and transport system can be achieved through encouraging

a modal transport shift by citizens to more sustainable transport methods; and,

- eleven local authorities reported that they measured or were in the process of measuring modes of transport used by employees commuting to work.

CASE STUDY: Testing roads over peatlands pilot

Case study details efforts to address the problem of maintaining roads over peatlands where cracking, particularly after drought periods, is an issue. **See page 95.**
Local authority: Offaly County Council

These strategies are key to providing leadership, vision and transparency around potential future developments. The strategies encourage the use of bicycles as a mode of transport for commuting in order to reduce congestion and decrease CO_2 emissions. In addition, they also encourage healthier lifestyles and reduce negative health impacts of sedentary lifestyles.

On a more practical level, local authorities are instrumental in providing basic infrastructure to encourage and facilitate greater bicycle usage. To this end:

- local authorities reported that approximately 7,000 council-installed bicycle parking facilities were available for use in public spaces at 2018 year end; most of these facilities can accommodate two bicycles, meaning **parking was available for almost 14,000 bicycles**.

In addition to the provision of infrastructure and policy, local authorities have directly undertaken or collaborated on a significant number of projects that support the increased use of bicycles as a mode of transport. For instance:

- **more than 1,600km of integrated cycle lanes**, which have specifically designated cycle lane markings, existed across local authorities at year end 2018.

CASE STUDY: Bicycle sharing scheme - dublinbikes

Case study describes how the city-wide bicycle share scheme 'dublinbikes', with over 100 stations, reports in excess of 27 million journeys over the past ten years. The scheme has encouraged a modal shift away from short distance car journeys. **See page 94.**
Local authority: Dublin City Council

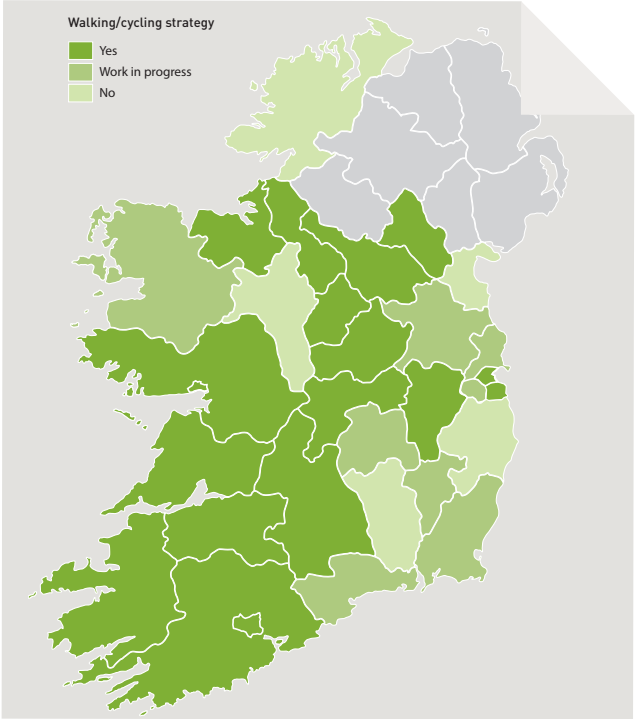


Figure 3.7: Local authorities with cycle/walking strategies.

Integrated cycle lanes offer benefits to local authorities as they can be space efficient, cost effective, are environmentally passive and can also increase driver awareness of cyclists. Whilst integrated cycle lanes are often appropriate where space is limited or significant access and egress access is needed, segregated cycling, which separates cyclists with some form of a kerb, plinths, or soft margin are increasingly being developed in other scenarios. While more costly, they protect cyclists from motorised traffic and improve reliability of journey times (National Transport Authority, 2011). They also encourage more novice and risk-averse cyclists to cycle, which is a key objective of the *National Cycle Policy Framework* (Department of Transport, Tourism & Sport, 2009).

More than 1,500km of segregated cycle lanes, including cycle tracks, cycle trails and cycle ways (Blue/Greenways), existed across local authorities at year end 2018.

Implementation of infrastructure that encourages positive public behavioural change is crucial in the context of national climate change commitments and targets. Between 2011 and 2016, Central Statistics Office data revealed that the number of people who commuted to work by cycling rose by nearly 43% from 39,803 to 56,837 (Central Statistics Office, 2017). A further 175,000 commuters walked to work in 2016, accounting for 9% of the commuting population.

The increasing roll-out of cycling infrastructure (cycle lanes/parking) and footpaths by local authorities as part of their planning function is

demonstrable of the local government sector's actions, which support the transition by citizens to more climate-friendly forms of transport.

The focus within this report on cycling is limited. In reality, local authorities have been proactive across several other transport initiatives detailed in the *Climate Action Plan*. Specifically, **27 local authorities reported that they had developed or were involved in a range of other innovative transport initiatives**, including Car Free Day, National Bike Week, Active Travel Towns, City Centre Movement Strategies (restricting private car access in city centre locations), Park and Ride, Public Bicycle Sharing, Stationless Bicycle Sharing Licences, Car Sharing Licences, Last Mile Delivery, Autonomous Vehicle Pilots, Bus Priority Measures, Age-Friendly Parking, European Mobility Week and Transport Workshops, amongst other initiatives.

In an effort to encourage local authority employees to utilise sustainable modes of transport, local authorities also reported that they engaged in a range of sustainable transport initiatives for employees, often through the support of the Department of Transport, Tourism & Sport Smarter Travel Programme, including Bicycle Fleet (standard and EV bikes), Staff Walkathons, Cycle-to-Work scheme, Car-Free Day, Car Pooling, EV Car Fleet and Staff Cycle events. To understand the total involvement and full range of activities being undertaken across the sector, these initiatives should therefore also be considered. However, due to the scope and breadth of this questionnaire, it was not possible to explore all initiatives that demonstrate the entirety of the local government sector's commitment to climate-friendly transport initiatives.

CASE STUDY: Smarter Travel Programme

Case study describes the implementation of a comprehensive plan to increase non-car travel options. It involved provision of additional cycling infrastructure, increasing and connecting cycling/walking routes, running safety campaigns and provision of bike maintenance training. **See page 96.**

Local authority: Leitrim County Council

3.5.7 Waste management

Category: Mitigation

Regulating waste emissions in Ireland can be particularly difficult as it is directly coupled with economic growth. Reducing waste and sending less waste to landfills can however lower Ireland's CO_2 emissions, helping to mitigate climate change.

Under the *EU Waste Framework Directive* (European Union, 2008b) Member States are required to take action to reduce landfill waste. At a national level, local authorities along with other relevant sectors

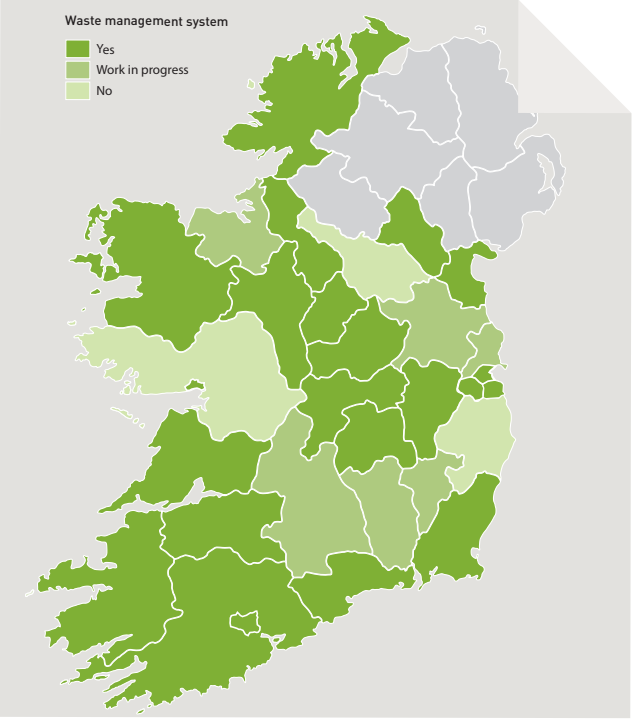


Figure 3.8: Local authorities with waste management systems.

work in accordance with *Waste Management: Changing Our Ways* (Department of the Environment and Local Government, 1998), *Delivering Change: Preventing and Recycling Waste* (Department of the Environment and Local Government, 2002), *Waste Management: Taking Stock and Moving Forward* (Environmental Protection Agency, 2004) and *A Resource Opportunity: Waste Management Policy in Ireland* (Department of the Environment, Community and Local Government, 2012b) to implement this EU directive.

The policies place responsibility on local government to drive and manage waste policy in their area and to take a leadership role in how their own waste is managed and monitored. The questionnaire subsequently sought to establish whether local authorities:

- were actively investing in waste management systems in their own local authorities;
- actively monitored their own recycling rates;
- operated bring centres/civic amenity sites for public use;
- had implemented food waste campaigns; and,
- had delivered anti-dumping initiatives/anti-litter campaigns.

In the context of internal waste management practices, local authorities have shown leadership and advocacy on waste prevention and resource efficiency. The study revealed that **28 local authorities had implemented or were in the process of implementing an internal waste management system**.

CASE STUDY: MyWaste.ie

Case study details the MyWaste.ie website, which acts as a trusted 'one-stop-shop' portal for all waste queries in Ireland. A strong social media presence on Twitter, Facebook and Instagram also enhances the levels of engagement on the site.

See page 98.

Local authority: Regional Waste Management Offices

Specifically:

- twenty-two local authorities reported that they had developed an internal waste management system; a further six local authorities reported that they were in the process of developing an internal waste management system (**Figure 3.8**).

Increasingly, public sector bodies are also improving the capacity to track and monitor initiatives so that they can report on the impact of their actions. Findings from the research indicated that **19 local authorities were monitoring or were in the process of monitoring their waste generation** at the time of the questionnaire.

Specifically:

- seven local authorities reported that they monitored waste generated in council-operated buildings; a further 12 local authorities reported that they were in the process of beginning to monitor waste generated in council-operated buildings; and,
- recycling rates across individual local authorities reached in excess of 85% during 2017-2018 (**Table 3.11**); monitoring this data therefore enables local authorities to set targets and monitor progress towards achieving them.

Table 3.11: Recycling rates in local authority public buildings 2017-2018.

Local Authority	Recycling rates in public buildings 2017 (%)	2018 (%)
Clare County Council	85	87
Cork City Council	39	39
Kildare County Council	28	17
Mayo County Council		32
Offaly County Council	19	25
Roscommon County Council	47	41
Westmeath County Council	63	
Wexford County Council	65	69

Local authorities also reported operating a range of additional waste management measures and initiatives, including operating bring centres/civic amenity sites to facilitate effective waste management by the public and implementation of food waste campaigns and anti-dumping/anti-litter initiatives.

Specifically:

- all 31 local authorities reported operating a combined 900 bring centres or civic amenity sites in 2018;
- twenty-eight local authorities reported that they had collaborated with the EPA *Stop Food Waste* campaign or had run similar food waste projects between 2017-2018; and,
- all 31 local authorities reported delivering a combined 294 initiatives in 2017, and 334 initiatives in 2018, aimed at discouraging dumping or littering by the public, e.g., Conscious Cup campaign, gum litter and cigarette disposal campaigns, use of drones, use of CCTV.

The implementation of sustainable waste management practices by the local government sector is further evidence of local authorities' commitment to reducing their environmental and climate change footprint by reducing waste and increasing rates of recycling, much of which would otherwise end up in landfill or incineration facilities. Whilst not representing all waste actions which local authorities implement given the nature of this study, the results nonetheless act as a foundation upon which future waste actions can be delivered upon by the sector.

3.5.8 Summary

Sections 3.5.2-3.5.7 demonstrated the range of critical infrastructure actions local authorities have progressed in recent years. The results highlighted that local authorities are well placed to deliver on those targets set out for public sector bodies in the Government's *Climate Action Plan*. Specifically, improving energy efficiencies remains a core priority for the sector as illustrated by the establishment of the National Public Lighting Upgrade Project.

Findings also demonstrated that local authorities nationally continue to support the development of renewable energy projects at national level, and are beginning to transition their vehicle fleets to EVs in an effort to both lead by example and reduce their carbon emissions. Whilst much remains to be achieved in the context of encouraging a modal transport shift to more environmentally sustainable transport, through effective planning of public spaces, walking and cycling initiatives and infrastructure also continue to be advanced by local authorities, e.g., walking/cycling policies, segregated cycle lanes. Moreover, the results illustrated that local authorities invested in waste management systems and services that supported waste reduction in their own buildings and by the general public.

Whilst much has been achieved by the local government sector in recent years, one of the primary critical infrastructural assets which local authorities own and manage relates to social housing; approximately 135,000 social houses were in local authority ownership at the end of 2018. In this context, a significant action within the *Climate Action Plan,* which the sector will begin to implement over the coming decade, is the deep retrofit of its social housing stock to a minimum B2 building energy rating. Given the scale of retrofits required, this is likely to be one of the most ambitious commitments any public sector body will undertake over the coming decade, further demonstrating the role local authorities are likely to play in the State meeting climate action targets.

3.6 FLOOD RISK MANAGEMENT AND WATER RESOURCES

3.6 Flood risk management and water resources

Category: Mitigation/Adaptation/Emergency Response

3.6.1 Introduction

While there are many weather-related events that can pose risks (e.g., snow, drought, etc.), flooding remains the primary focus within national frameworks and local plans.

An increase in more intensive rainfall events in recent years has meant that local authorities, through city/county development plans, have had to address flood resilient planning and consider a range of adaptation and mitigation efforts, including how to manage surface water runoff and how to plan for and maintain riparian zones,[5] etc.

CASE STUDY:
Extreme weather response – household and road infrastructure

Case study describes a local authority response to an extreme pluvial (one in 100 years) rainfall event, which caused extensive damage and disruption in the north-west of the county in August 2017. **See page 99.**
Local authority: Donegal County Council

In this section of the report, local authority actions in relation to the management of flood risk and, more generally, how water resources are managed are explored. The findings are presented under six distinct headings:

- flood risk management – whether City/County Development Plans and Local Area Plans were being utilised by local authorities to manage flood risk and water resources, and whether flood risk assessments were carried out;
- responding to flooding – how frequently emergency flood plans had been activated and the estimated costs of these events between 2014 and 2018;
- nature-based flood solutions – the extent to which local authorities were utilising nature-based flood solutions such as sustainable drainage systems (SuDS);
- flood defences – the number of major and minor flood defence works that had been implemented between 2014 and 2018;
- water conservation and management – local authorities' monitoring of water consumption and implementation of water conservation measures and whether initiatives were rolled out to include social housing stock and training for the general public; and,
- bathing water quality and safety – information on bathing water quality as a water safety measure.

Sections 3.6.2-3.6.7 explore these areas in greater detail.

3.6.2 Flood risk management

Category: Adaptation

There are two primary management tools used by local authorities to address flood risks in their area. The first is through active management of the planning process and the second is through the City/County Development Plans and Local Area Plans. Specific regulations and guidelines subsequently inform decisions made by local authorities within the planning and building control process. For instance, both the *Planning and Development Act* (Government of Ireland, 2000) and *Planning System and Flood Risk Management – Guidelines for Planning Authorities* (Office of Public Works, 2009) place restrictions on development in areas of flood risk. These policies must be taken into consideration by local authorities when assessing planning applications and when developing Local Area Plans.

CASE STUDY:
Extreme weather response – coastal flooding

Case study describes a local authority response to severe winter storms, which caused extensive damage along the Clare coastline in January and February 2014. **See page 101.**
Local authority: Clare County Council

Whilst all local authorities consider flood risk assessments submitted in relation to planning applications, given the nature of flooding, some local authorities are more prone to flood risks than others. Consequently, **18 local authorities reported that by 2018 year end a dedicated person within the local authority had been appointed to review flood risk assessments submitted as part of planning applications**.

In addition to managing the planning process each local authority, through their County/City Development Plan and their Local Area Plans, is informed by their strategic flood risk assessment (SFRA). The SFRA details all flood risk issues within the local authority area and the spatial distribution of those flood risks to inform strategic land-use planning decisions.

[5] Riparian zones (a strip of land along a river corridor) in urban areas have come under increasing pressure to the point where some natural corridors have been replaced by development built directly beside bank top (e.g., carparks, walls, fences, etc).

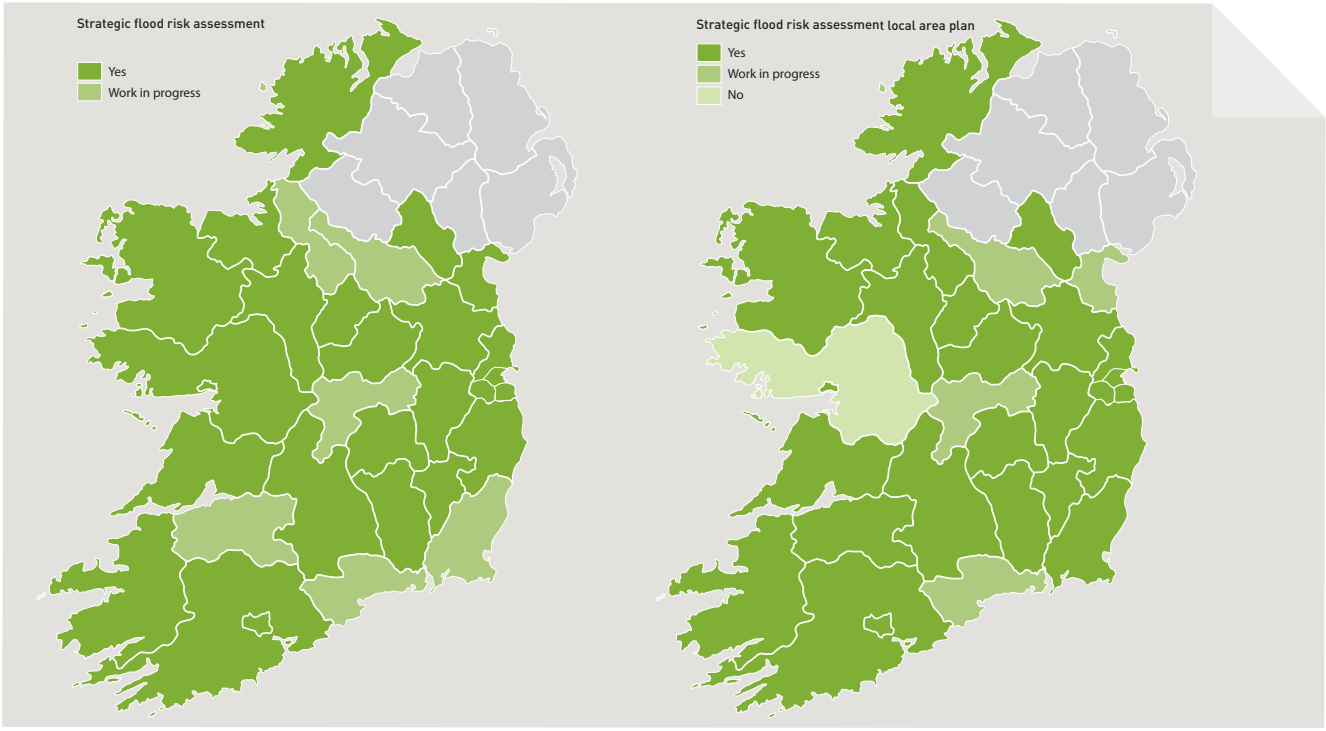


Figure 3.9: Local authorities with strategic flood risk assessments for City/County Development Plans and Local Area Plans.

At the time of the questionnaire, **all local authorities had developed or were in the process of developing their SFRA for their Development Plan, whilst 30 local authorities had completed or were in the process of completing a SFRA for their Local Area Plans**. Specifically:

- twenty-five local authorities reported that they had undertaken a SFRA for their County/City Development Plan; the remaining six local authorities reported that they were in the process of undertaking a SFRA for their County/City Development Plan (**Figure 3.9**); and,
- twenty-six local authorities reported that they had undertaken a SFRA for their Local Area Plans; a further four local authorities reported that they were in the process of undertaking a SFRA for their Local Area Plan (**Figure 3.9**).

Similarly, in the context of SDZs, which are of strategic national importance in facilitating the fast-tracking of developments through the planning process, of the **ten local authorities that reported that they had a SDZ in their area, eight stated that by 2018 year end the SFRA of those SDZs was up to date or was in the process of being updated**.

3.6.3 Responding to flooding

Category: Emergency Response

Local authorities are identified as a lead State body with responsibility for preparation and response to flood risks within their jurisdictions under the *Framework for Major Emergency Management* (Department of Environment, Heritage and Local Government, 2015). Given their close relationship with communities, local authorities can react faster and more effectively to local climate risks than other Government agencies. Specifically, they are designated as the lead authority with responsibility for emergency management co-ordination at a local and regional level during severe weather events.

CASE STUDY:
Quantifying cost of storm damage

Case study describes how accounting systems were changed to facilitate the monitoring of financial costs associated with extreme weather events. **See page 102.**
Local authority: Cavan County Council

All local authorities work in partnership with a range of agencies, including An Garda Síochána and the Health Service Executive, following extreme weather events such as flooding. Emergency response plans subsequently outline the roles and responsibilities of all stakeholders in the event of an emergency. Local authorities reported that they implemented their flood emergency response plans frequently between 2014 and 2018, especially in the west, south-west and south-

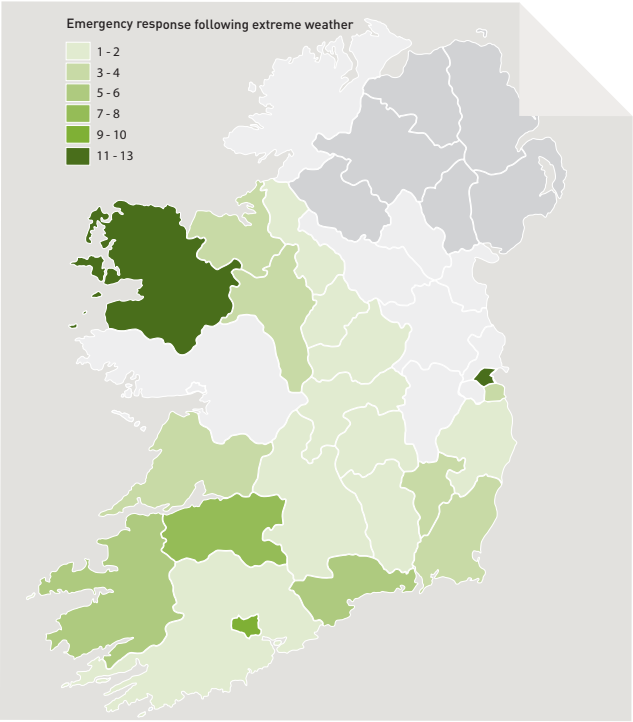


Figure 3.10: Number of times local authorities activated flood emergency response plan 2014-2018.

east and in cities such as Cork and Dublin. In total, **flood emergency response plans were activated on 82 occasions across 21 local authorities between 2014 and 2018** (**Figure 3.10**).

The costs associated with these events were considerable. While not all local authorities monitored the specific spending on emergency events, those that did reported **spending a minimum of €101 million in responding to emergencies following extreme weather events between 2014-2018.**[6] Specifically:

- €35.2 million was spent by 13 local authorities in 2014;
- €5.4 million was spent by 11 local authorities in 2015;
- €39 million was spent by 14 local authorities in 2016;
- €9.5 million was spent by 24 local authorities in 2017; and,
- €12.3 million was spent by 26 local authorities in 2018.

Local authorities have invested significantly in responding to extreme weather events between 2014 and 2018, demonstrating their commitment to rebuilding communities dealing with the impacts of climate change. Much of the investment in recent years relates to clean-up and road repair costs following major storm events, including Storm Darwin in 2014, Storm Ophelia in 2016 and Storm Emma and Storm Eleanor in 2018.

[6] Some local authorities reported that they do not have management systems to record emergency spending following extreme weather events. Some local authorities also indicated that this is something that they are working to capture given the increased likelihood of such events as a result of climate change and the associated costs borne by them.

3.6.4 Nature-based flood solutions

Category: Mitigation/Adaptation

Nature-based flood solutions can offer both climate change mitigation and adaptation benefits. For instance, planting trees, expanding green areas and promoting green infrastructure can help to mitigate climate change by trapping greenhouse gases that would otherwise enter the atmosphere. Equally, these measures may also help societies adapt to climate change by helping to reduce temperatures, e.g., trees and plants through shading or by storing rainfall that might otherwise lead to flooding. Similarly, urban and road designs increasingly incorporate rain gardens and grassed swales to allow surface runoff to be retained and filtered, and to subsequently penetrate the surface at a lower flow rate, replacing traditional sewage and rainwater pipelines (Xie *et al.*, 2017).

CASE STUDY:
Nature-based flood relief scheme

Case study details how surface water runoff was managed to eliminate discharge to an overloaded combined sewer system, which significantly reduced discharges to the surface water system. **See page 103.**
Local authority: Dublin City Council

In this regard, local authorities have embraced the use of sustainable, nature-based solutions to manage flood risks. One solution that local authorities are implementing is the use of SuDS. These systems aim to alleviate flood risks by storing or re-using surface water at the point where the rainfall occurs, thereby decreasing flow rates to waterways and improving water quality. SuDS are particularly effective at managing flood risks during heavy rainfall events in urban areas where the surface is largely impermeable due to pavement and road construction. In addition, as part of their SuDS programme some local authorities have also converted publicly owned land to constructed wetlands[7] for flood control and water quality improvement measures. At the time of this study, **30 local authorities reported that they had developed or were in the process of developing a policy within their County/City Development Plans to include SuDS in new/existing developments**.

Specifically:

- twenty-eight local authorities reported that they had developed a policy within their County/City Development Plans to include

[7] A constructed wetland is an artificial wetland to manage municipal or industrial wastewater, greywater or rainfall runoff.

SuDS in new/existing developments; two local authorities reported that they were in the process of developing a policy within their County/City Development Plans to include SuDS in new/existing developments;

- six local authorities reported that they had converted local authority land to wetlands for flood control/water quality improvement purposes between 2014 and 2018; a further three local authorities reported that they were in the process of converting local authority land to wetlands for flood control/water quality improvement purposes; and,
- thirteen local authorities reported that they had developed a surface water management plan to manage flood risks (e.g., drain clearage, etc.); a further 11 local authorities reported that they were in the process of developing a surface water management plan to manage flood risks.

3.6.5 Flood defences

Category: Adaptation

Major flood defences have generally been implemented under the *Arterial Drainage Act 1945* and the *Arterial Drainage Amendment Act 1995* by the Office of Public Works (OPW). Historically, flood risk has been addressed using structural or engineered flood protection measures in response to flood events.

CASE STUDY: Flood defence scheme – Portavolla

Case study details how the installation of a clay embankment was constructed in response to flooding of a housing estate. **See page 105.**
Local authority: Offaly County Council

However, the *National Flood Policy Review* of 2004 and the *EU Floods Directive* of 2007 are now the primary statutory policies guiding flood management and prescribe a more proactive, sustainable flood risk management approach with increased use of non-structural and flood mitigation measures (Office of Public Works, n.d.). Similarly, the *Irish Coastal Strategy Study* provides information to support decision making about how best to manage risks associated with coastal flooding and coastal erosion (Office of Public Works, 2013).

In recent years, local authorities have played an important role in implementing major flood defences within their administrative areas, working in close collaboration with the OPW to undertake such flood defence works. Local authorities also commit additional financial resources to those provided by the OPW towards delivering major flood defences.

CASE STUDY: Flood defence scheme – Athlone

Case study describes the expected benefits of a flood alleviation scheme that requires the construction of flood barriers and pumping infrastructure. **See page 106.**
Local authority: Westmeath County Council

For minor flood defence works and studies costing less than €0.75 million, local authorities act as the lead agency nationally, implementing these works directly in their administrative areas through funding under the OPW's Minor Flood Mitigation Works & Coastal Protection Scheme. Similar to major flood defence schemes, funding under the OPW Minor Flood Mitigation Works & Coastal Protection Scheme is often supplemented with additional financial investment by local authorities.

CASE STUDY: Beach coastal protection works

Case study outlines how and why an erosion control armour block was constructed to address the issue of coastal erosion and flooding. **See page 107.**
Local authority: Cork County Council

Between 2014 and 2018:

- fourteen local authorities reported that they collaborated with the OPW on 21 major flood defence projects;
- twenty-five local authorities reported that they delivered 228 schemes under the OPW's Minor Flood Mitigation Works and Coastal Protection Schemes;
- approximately €173.5 million was invested in major flood defences and Minor Flood Mitigation Works and Coastal Protection Schemes by the OPW and local authorities; of this investment, local authorities contributed approximately €12.4 million towards these flood defences; and,
- work is continuing across many local authorities in advancing both major and minor flood defence projects in partnership with the OPW to respond to increased flood risks from climate change.

Major schemes in progress include Athlone Flood Alleviation Scheme (OPW in partnership with Westmeath County Council costing €12 million) and the Lower Lee Flood Relief Scheme (OPW in partnership with Cork City Council costing approximately €140 million). Moreover, local authorities will continue to act as the lead State agent in responding to flood risks when they do arise, supporting communities to respond to and recover from flooding.

3.6.6 Water conservation/management

Category: Mitigation/Adaptation/Emergency Response

The delivery of water to end users, including pumping it to homes and businesses and wastewater disposal, requires significant use of electricity resources, much of which is powered by fossil fuels (Loge, 2016). Conserving water can therefore help to mitigate climate change by reducing the need to burn fossil fuels to deliver water and to dispose of wastewater. Similarly, given the existing strain on water resources, particularly in eastern coastal counties of Ireland, and the likelihood that water shortages are likely to increase in Ireland in summer months under a warming climate (Environmental Protection Agency, 2019b), water conservation measures can also assist in adapting to reduced water availability.

Water conservation is crucial to ensure sustainability for future generations. The *Water Services Policy Statement 2018-2025* (Department of Housing, Planning and Local Government, 2018) noted that Government departments, agencies and State bodies should play a leadership role in sustainable water use. In this context, local authorities are among those playing a key role, both in their own day-to-day operations, and across social housing and public education.

In the context of this study, **19 local authorities reported that they measured or were in the process of measuring water use in local authority buildings.**

Specifically:

- fourteen local authorities reported that they measured water use in local authority buildings; a further five local authorities reported that they were in the process of measuring water use in local authority buildings (**Figure 3.11**); and,
- eight local authorities reported that water conservation measures were also implemented in their social housing.

Examples of water conservation and sustainability improvements implemented by local authorities include fitting of water efficient appliances within their own buildings and in social houses, including retrofitting taps and toilets; many local authorities have also embarked on initiatives that aim to promote water conservation to the wider public.

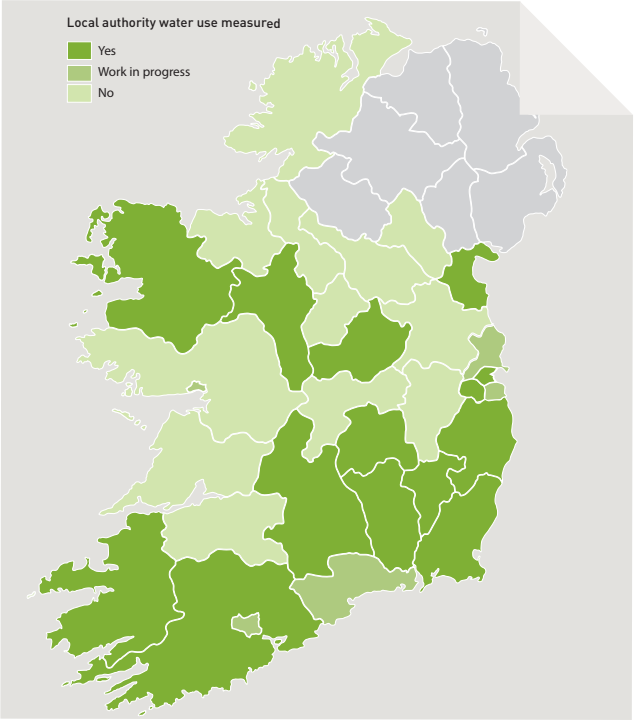


Figure 3.11: Local authorities currently measuring or in the process of measuring water usage in local authority buildings.

Specifically:

- fifteen local authorities reported that they rolled out water conservation initiatives to the public.

Whilst public water infrastructure has transitioned to Irish Water, given their previous role in managing water infrastructure nationally local authorities are now working contractually with Irish Water to conserve water and reduce water leakage in its water infrastructure. These actions demonstrate the local government sector's commitment to reducing the impacts of climate change by taking proactive measures to manage potential risks associated with water shortages during droughts and water contamination during flood events.

This study also showed that in the context of water management during extreme weather events local authorities play an important role, **intervening on more than 300 occasions between 2014 and 2018 to provide drinking water supplies to residents following extreme weather events** because of poor water quality or damaged water infrastructure.

3.6.7 Bathing water quality and safety

Category: Adaptation

Ireland's bathing waters are managed and monitored by local authorities. The results are shared with the EPA and reported annually. The process for monitoring and assessing bathing water

quality is standardised across the EU and is detailed in the EU *Bathing Water Directive (2006/7/EC)* (European Union, 2006) and in Irish legislation under *Bathing Water Regulations S.I. No. 79 of 2008* (Government of Ireland, 2008). The legislation requires water at all designated bathing areas to meet stringent microbiological standards in order to protect the health of people who choose to bathe there. Annually, local authorities identify official bathing areas where water quality is monitored.

Bathing waters are classified into four quality categories: 'excellent', 'good', 'sufficient', or 'poor', with a minimum of 'sufficient' required for all bathing waters. Local authorities subsequently work closely with the Health Service Executive on public and environmental health issues related to bathing water. In addition, the public can make submissions to their local authorities to identify new bathing waters and to keep their local beaches clean. In 2018:

- 94% (137 of 145) of bathing waters (beaches/bathing areas) nationally met the minimum required standard of 'sufficient' (Environmental Protection Agency, 2019a); and,
- 71% (103) of bathing waters were classified as 'excellent' and 15% (22) were classified as 'good' (Environmental Protection Agency, 2019a).

The summer of 2018 was particularly dry and warm across Ireland, with heat wave and drought conditions in many parts of the country (Met Éireann, 2019). The dry and warm weather through much of the 2018 bathing water season contributed to good quality bathing water nationally due to reduced rainfall runoff. Despite this, in the context of climate change, there remain risks to bathing water quality due to potential low water flow and higher temperatures. Many local authorities have subsequently taken proactive measures to protect bathing water quality standards from climate change through their Local Authority Climate Adaptation Strategies, e.g., Louth County Council, Leitrim County Council and Wexford County Council.

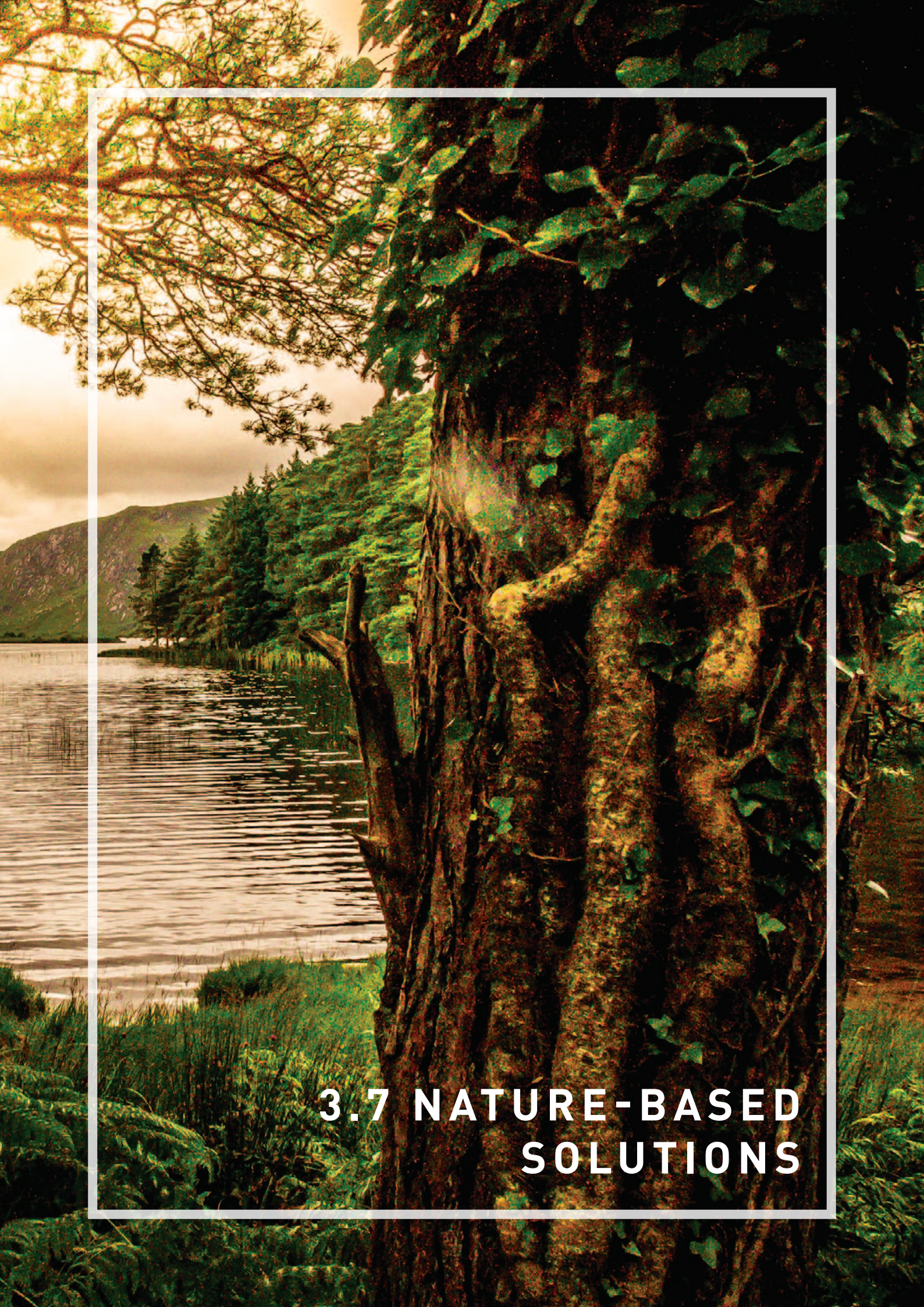
In the context of this study, local authorities reported that they were required to implement beach closure notices on 80 occasions between 2014 and 2018 owing to extreme weather events impacting on water quality. In some of the official bathing areas, local authorities have also invested in qualified lifeguards during summer months to patrol popular beaches within their areas as water safety is a key concern in public bathing areas. Lifeguards are increasingly assisting in enforcing warnings issued by local authorities related to bathing following weather-related events (e.g., a ban on swimming after flooding).

Demands for local authorities to maintain and improve bathing water quality and safety standards in the coming years are likely to be further compounded both as a consequence of expected population growth nationally from 4.74 million in 2016 to up to 5.81 million people by 2036 (Central Statistics Office, 2019), and warmer, drier summers under a changing climate. While there is a general increase in demand for more outdoor activities in Ireland (Coillte, 2017), many local authority climate adaptation strategies have subsequently considered the increased public usage of bathing waters in response to an increase in summer heat wave events and drought conditions (Monaghan County Council, 2019; Louth County Council, 2019).

3.6.8 Summary

Flooding remains one of the most significant hazards (climate or otherwise) which Ireland faces in terms of likelihood and impacts. This section has demonstrated the involvement of local authorities across all aspects of flood risk management, from prevention to emergency response, through to infrastructural investment following extreme weather events. This includes actions that consider flood risks arising from climate change through local development policies, collaboration with the OPW on major flood defence projects, own delivery of minor flood defence projects, use of nature-based solutions to manage flood risks, activation of flood emergency response plans or rebuilding infrastructure in the aftermath of extreme weather events. Conversely, in terms of reducing water usage local authorities have demonstrated commitment to both implementing water conservation measures within their own buildings and across social housing, and in providing water conservation training to the wider public.

As risks of both flooding and drought increase owing to climate change, local authorities are likely to play an even greater role in managing those risks in the future than at present. For instance, expected population increases nationally and predicted warmer, drier summer months in the future under a changing climate indicate that greater demands will be placed on local authorities to both implement further water conservation measures, and to maintain and improve bathing water quality and safety standards in the coming years. Equally, increased flood risks coupled with population increases in the future will result in the need for strict adherence to development planning where flood risks are concerned; demands for increased collaboration with the OPW on an extensive number of planned major flood defence projects nationally; implementation of minor flood defence schemes; the provision of support to communities before, during and after flood events; and, re-building infrastructure following flooding. Continuing to manage both flood risk management and water quality and conservation issues in the future is therefore likely to place an even greater responsibility on the sector than is currently the case.



3.7 NATURE-BASED SOLUTIONS

3.7 Nature-based solutions

Category: Mitigation/Adaptation

3.7.1 Introduction

There is increasing recognition that biodiversity is under threat as a result of changes in land use and climate (Kuemmerlen *et al*., 2015). The Paris Agreement calls on all parties to acknowledge the role of maintaining the integrity of all ecosystems and the protection of biodiversity because research has demonstrated that biodiversity can form a strong line of defence against the direct impacts of climate change and support human adaptation over the long term (Seddon, 2018).

With respect to nature-based solutions, the questionnaire examined the role of biodiversity plans across local authorities in addition to the role of the following supplementary plans and actions:

- biodiversity and the environment;
- landscape classification assessments;
- invasive alien species;
- tree management and urban woodlands;
- green infrastructure;
- public open space and parks;
- pesticide/herbicide usage;
- green roofs; and,
- environmental awards and designations.

In sections 3.7.2-3.7.10, each of these issues are examined in greater detail.

3.7.2 Biodiversity and environment

Category: Mitigation/Adaptation

Biodiversity has significant climate change mitigation and adaptation benefits. For instance, planting trees, expanding green areas, and developing green infrastructure can help to mitigate climate change by trapping greenhouse gases that would otherwise enter the atmosphere. Equally, these measures can also help individuals adapt to climate change by reducing temperatures, e.g., through shading or by storing rainfall that might otherwise lead to flooding.

CASE STUDY:
Preserving biodiversity

Case study details actions being taken to reverse the loss of bog lands habitats in Special Areas of Conservation (SAC) utilising European LIFE funding through the National Parks and Wildlife Service. **See page 108.**
Local authority: Longford County Council

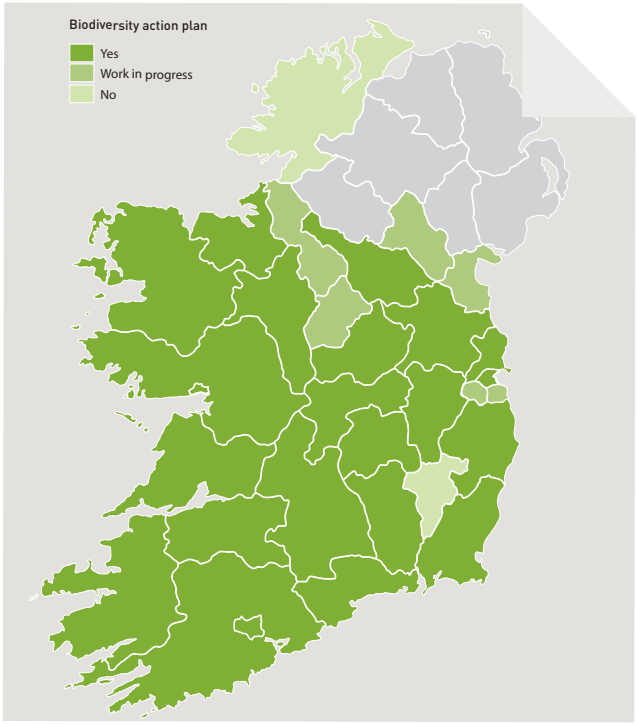


Figure 3.12: Local authorities with Biodiversity Action Plans.

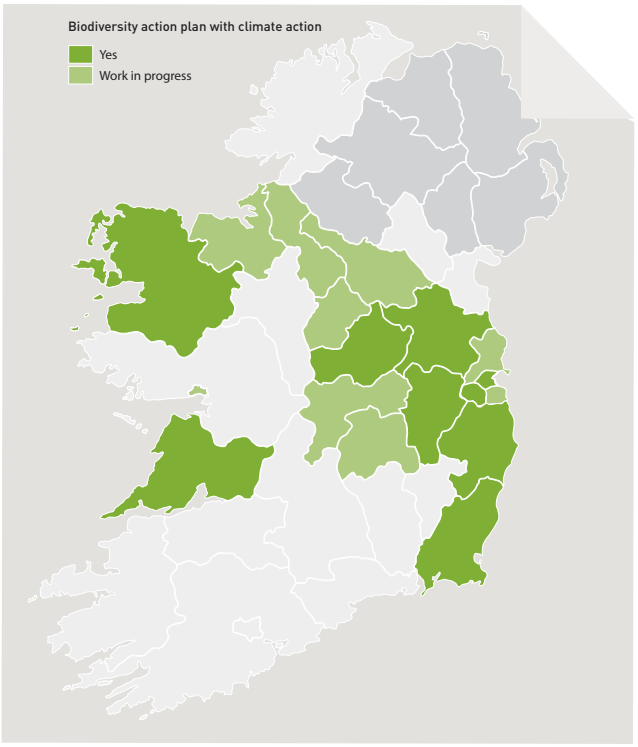


Figure 3.13: Local authorities Biodiversity Action Plans incorporating climate change actions.

Local authorities play a key role in biodiversity conservation through the planning system, the extensive range of environmental services they provide, their network of biodiversity and heritage officers and through the Local Authority Waters Programme.

The *National Biodiversity Plan 2017-2021* (Department of Culture, Heritage and the Gaeltacht, 2017) is the primary national policy through which all local authorities work to improve biodiversity within their area. In addition, local authorities' County or City Development Plans include policies and objectives for the protection and restoration of biodiversity.

Development and implementation of local Biodiversity Action Plans by local authorities is the primary mechanism for promoting and protecting biodiversity at a local level. Moreover, these plans are an important tool for local authorities to effectively deal with climate change biodiversity risks. By 2018 year-end, **29 local authorities had developed or were in the process of developing Biodiversity Action Plans** (**Figure 3.12**).

Specifically:

- nine local authorities reported that actions related to climate change were included in their Biodiversity Action Plan; a further eight local authorities reported that actions related to climate change will be included in their Biodiversity Action Plan when those plans are updated or finalised (**Figure 3.13**).

The impacts of climate change are most pronounced at a local level. Development and implementation of Biodiversity Action Plans by local authorities, and the inclusion of specific climate actions relating to biodiversity by many urban and rural local authorities in those plans, demonstrates local authorities' commitment to reduce biodiversity loss from climate change at a local level, particularly as climate change is predicted to be one of the most significant drivers of biodiversity loss during this century (Convention on Biological Diversity, 2016).

Whilst Biodiversity Action Plans are the primary policy through which local authorities are managing biodiversity, local authorities are also proactive in developing supplementary environmental policies and practices as discussed in sections 3.7.3 – 3.7.10. Many of these policies and practices detail specific actions to mitigate and adapt to climate change.

3.7.3 Landscape classification assessments

Category: Adaptation

Local authorities, through the identification and implementation of landscape categories across their areas, play an important role in managing existing landscapes. Landscape classification assessments are an effective tool to subsequently support local authorities in managing the range of landscape categories within their boundaries. In this context, **29 local authorities reported that they had included or were in the process of including a landscape classification assessment within their County/City Development Plan, with 27 local authorities reporting that these assessments were also incorporated or were in the process of being incorporated into existing sustainability/conservation policies**.

Such policies enhance existing policy provision taking account of each area's sensitivity and the key characteristics that make landscape areas distinguishable from each other, supporting the development of appropriate environmental policies that provides for sustainable management of each area.

3.7.4 Invasive alien species

Category: Adaptation

Predicted increases in temperature, changes in precipitation patterns, weather extremes (storms and flooding, sea surges, flash floods) and sea level rise will affect the abundance and distribution of Irish plant and animal species, and possibly encourage the spread of invasive alien species. Whilst local authorities manage the control and eradication of invasive alien species through their Biodiversity Action Plans, **19 local authorities have also been proactive with respect to distinct invasive alien species plans**.

CASE STUDY:
Invasive alien species strategy

Case study outlines the range of actions included in an invasive alien species strategy, including leaflets, dedicated phone line and workshops, each of which aim to increase public awareness about treatment methods. **See page 109.**
Local authority: Galway County Council

Specifically:

- six local authorities reported that they had developed an invasive alien species plan, with two local authorities reporting that specific actions related to climate change were included in their invasive alien species plan (**Table 3.12**); and,
- a further 13 local authorities reported that they were in the process of developing an invasive alien species plan, with nine local authorities reporting that specific actions related to climate change will be included in their plan once finalised (**Table 3.12**).

Table 3.12: Local authorities with invasive alien species plan and specific climate change actions.

Local Authority	Invasive alien species plan	Invasive alien species plan with climate change actions
Clare County Council	Yes	Work in progress
Cork City Council	Work in progress	Work in progress
Cork County Council	Work in progress	
Dublin City Council	Yes	Yes
Dún Laoghaire Rathdown County Council	Work in progress	Work in progress
Fingal County Council	Work in progress	Work in progress
Galway City Council	Work in progress	Work in progress
Galway County Council	Yes	
Kerry County Council	Work in progress	Work in progress
Kilkenny County Council	Work in progress	Work in progress
Laois County Council	Yes	
Limerick City & County Council	Work in progress	
Longford County Council	Work in progress	
Offaly County Council	Yes	Work in progress
Sligo County Council	Work in progress	
South Dublin County Council	Yes	Yes
Waterford City & County Council	Work in progress	
Westmeath County Council	Work in progress	
Wexford County Council	Work in progress	Work in progress

Invasive alien species are recognised as a significant financial burden in terms of water, grazing and biodiversity losses. The development of invasive alien species plans, which specifically detail climate actions by many local authorities will help to preserve Ireland's biodiversity and contain the spread of high-risk alien species nationally, whilst also providing additional social, economic, health and ecological benefits through their control and eradication.

CASE STUDY: Eradicating invasive alien species

Case study details a three-year control programme to eradicate giant hogweed. **See page 110.**

Local authority: Limerick City & County Council

3.7.5 Tree management/urban woodlands

Category: Mitigation/Adaptation

Many local authorities have also developed strategies/policies to enhance tree planting and reduce risks associated with climate change. The development of either a tree management policy or an urban woodland strategy is a cornerstone of many urban local authorities' environmental policies. The need for an urban woodland strategy is more prevalent in urban local authorities where green space is limited in comparison to rural local authorities. **Twelve local authorities had developed or were developing a tree management policy** and of these, **six had also developed or were also developing an urban woodland strategy**.

Specifically:

- seven local authorities reported having already developed a tree management policy; five of these reported that specific actions related to climate change were included in their tree management policy; many of these local authorities are large urban centres, e.g., Cork City Council, Dublin City Council, Dún Laoghaire Rathdown County Council, Fingal County Council and South Dublin County Council – a further five local authorities reported that they were in the process of developing a tree management policy and each of these local authorities reported that they will include specific actions related to climate change in their policy once finalised (**Table 3.13**). and,
- three local authorities reported that they had developed an urban woodlands strategy, and all three of these local authorities included actions related to climate change; a further three local authorities reported that they were in the process of developing an urban woodlands strategy and each of these will include specific actions related to climate change in their policy once finalised (**Table 3.13**).

Table 3.13: Local authorities with tree management policy/urban woodland strategy.

Local Authority	Tree management policy	Urban woodland strategy/ guidelines
Clare County Council	Work in progress	
Cork City Council	Yes	
Cork County Council	Yes	
Dublin City Council	Yes	Yes
Dún Laoghaire Rathdown County Council	Yes	Yes
Fingal County Council	Yes	Work in progress
Galway City Council	Work in progress	Work in progress
Kildare County Council	Work in progress	
Mayo County Council	Work in progress	Work in progress
Offaly County Council	Work in progress	
South Dublin County Council	Yes	Yes
Wicklow County Council	Yes	

The development of a tree management policy or urban woodland strategy that includes climate-related actions within those strategies/policies is an important proactive step by urban local authorities to reduce human health risks associated with increased urban heat island[8] risks as a result of climate change, in addition to the many additional environmental and social benefits that these policies provide.

Local authorities also collaborate with various stakeholders nationally and support national events/programmes, including the Tree Council of Ireland's National Tree Week, annually planting many native trees in addition to their own ongoing tree planting measures.

Specifically:

- **In total, more than 37,600 trees were planted in 2017 and more than 36,400 trees were planted in 2018 by 23 local authorities**. Of those trees, Dublin City Council and Wexford County Council each reported planting approximately 20,000 trees, with Dún Laoghaire Rathdown and Kildare County Councils reporting tree planting of approximately 10,000 and 7,000, respectively, during these years.

Such initiatives can mitigate climate change by absorbing greenhouse gases that would otherwise enter the atmosphere and can assist in reducing flood risks by reducing rainfall runoff through absorption. As already noted, trees can also contribute to urban cooling through evapotranspiration and provide micro-climatic benefits that can reduce energy consumption in buildings, thereby representing a key tool that can contribute to both climate change mitigation and adaptation.

3.7.6 Green infrastructure

Category: Mitigation/Adaptation

Green infrastructure plays an important role in managing the risks associated with climate change and is defined as an interconnected network of green space that preserves natural ecosystem values and functions, and generates associated societal benefits (Benedict and McMahon, 2002). It is largely concerned with: i) biodiversity; ii) parks, open space and recreation; iii) sustainable water management; and, iv) archaeological and architectural heritage. Green infrastructure is increasingly recognised as a component of building resilient communities capable of adapting to the impacts of climate change and local authorities are identified as an important stakeholder in furthering their development (Comhar, 2010).

A range of EU, national and local policies and plans, including the *EU Habitats Directive* (European Union, 1992), *EU Birds Directive* (European Union, 2009) , *EU Water Framework Directive* (European Union, 2000), *EU Floods Directive* (European Union, 2007), *EU Marine Strategy Framework Directive* (European Union, 2008a), *All-Ireland Pollinator Plan* (National Biodiversity Data Centre, 2015), County Development Plans (Government of Ireland, 2000) and the *National Biodiversity Action Plan* (Department of Culture, Heritage and the Gaeltacht, 2017) are important instruments for assisting local authorities with their green infrastructure agendas.

CASE STUDY:
Biodiversity in public parks

Case study describing a management plan to promote biodiversity in Malahide Demesne Castle. **See page 111.**
Local authority: Fingal County Council

In order to assess how local authorities were implementing a structured approach to managing green infrastructure, the questionnaire focused on identifying those local authorities that had developed or were developing specific green infrastructure strategies/guidelines. The study showed that **19 local authorities had developed or were developing a Green Infrastructure Strategy/Guidelines.**

CASE STUDY:
Developing park meadowlands

Case study describes the development of park meadowlands after a botanical and insect questionnaire demonstrated the extensive biodiversity potential of parklands. **See page 112.**
Local authority: South Dublin County Council

Specifically:

- eleven local authorities reported that they had a specific green infrastructure strategy/guidelines; five of these local authorities reported that specific actions related to climate change were included in their green infrastructure strategy/guidelines, with a further four local authorities reporting that they were in the process of including specific actions related to climate change in their green infrastructure strategy/guidelines; and,
- a further eight local authorities reported that they were in the process of developing a specific green infrastructure strategy/guidelines; seven of these local authorities reported that specific actions related

[8] Urban heat island effect is where urban areas experience higher temperatures in comparison to outlying rural locations, an issue which is likely to be more pronounced as a result of climate change. The development of green areas and tree planting can reduce temperatures in urban areas in such instances.

to climate change will be included in their green infrastructure strategy once those plans are finalised (**Table 3.14**).

Table 3.14: Local authorities with green infrastructure strategy/guidelines and specific climate change actions.

Local Authority	Strategy/guidelines in place	With actions related to climate change
Cavan County Council	Work in progress	Work in progress
Clare County Council	Yes	Work in progress
Cork County Council	Yes	
Dublin City Council	Yes	Yes
Dún Laoghaire Rathdown County Council	Yes	Yes
Fingal County Council	Work in progress	Work in progress
Galway City Council	Work in progress	Work in progress
Kildare County Council	Work in progress	Work in progress
Kilkenny County Council	Work in progress	Work in progress
Laois County Council	Yes	Work in progress
Leitrim County Council	Work in progress	Work in progress
Louth County Council	Yes	Yes
Offaly County Council	Work in progress	Work in progress
South Dublin County Council	Yes	Yes
Tipperary County Council	Yes	Work in progress
Waterford City & County Council	Work in progress	
Westmeath County Council	Yes	Yes
Wexford County Council	Yes	Work in progress
Wicklow County Council	Yes	

Green infrastructure strategies will continue to play an important role for both urban and rural local authorities in responding to climate change risks by assisting local authorities in designating and retaining substantial networks of green space in urban, urban fringe and adjacent countryside areas to meet the needs of communities now and in the future as we adapt to climate change. Specifically, they complement other local authority policies in responding to climate change by supporting their efforts in managing biodiversity, flood risks, water resources, and archaeological and architectural heritage under a changing climate.

3.7.7 Public open space and parks

Category: Mitigation/Adaptation

Modern global environmental issues of sustainability, biodiversity and climate change now influence decisions in the design and management of parks and natural areas. This is reflected in the *Planning and Development Act* (Government of Ireland, 2000) where sustainable development is named as a key principle to inform all planning and development decisions, and where the need for local authorities to provide open spaces and public recreational amenities is outlined.

CASE STUDY: Park masterplan

Case study describes how a former landfill site was converted into a public park, which focused on energy and the environment as well as events, activities and attractions. **See page 113.**

Local authority: Cork City Council

Local authority parks and open spaces act as an important resource for learning about the environment and climate change. Educational institutions from primary schools to third-level educational bodies regularly use local authority parks as real-world classrooms. In this context, **13 local authorities reported that they had developed tree trails**, providing an educational resource for children on Ireland's native trees in public parks or open spaces.

Local authority staff also provide guided walks, lectures and information for schools, organising environmental education events and programmes year round in parks. Many of these events and initiatives also have a positive impact on reducing the impacts of climate change, including World Wetlands Day, National Tree Week, International Biodiversity Day and National Heritage Week.

Public green spaces help to conserve natural systems, supporting ecosystems and wildlife habitats within both urban and rural areas. Some local authorities have also developed strategies which outline their goals and objectives for the development and maintenance of such open spaces. In this regard, **11 local authorities reported that they had a specific public open space and parks strategy**. Five urban local authorities reported that specific actions related to climate change were included in their strategies: Cork City Council, Dublin City Council, Dún Laoghaire Rathdown County Council, Fingal County Council and South Dublin County Council.

Effective environmental management of public spaces provide considerable social, economic and environment benefits (Raymond *et al*., 2017). They include air quality, flood management, protection against erosion, biodiversity of vegetation and animal life, public health, job creation and democratic involvement in management of spaces or activities in those spaces. The risks posed by climate change are a contributing factor to many local authorities detailing climate change actions within their strategies and represent an important step by the local government sector in responding to climate change risks through nature-based strategies.

3.7.8 Pesticide/herbicide usage

Category: Adaptation

A major contributing factor towards declining biodiversity is the use of pesticide sprays, which include herbicides, fungicides, insecticides and other industrial chemicals that impact negatively on pollinating insects. Their use is responsible for a decline in insect and invertebrate populations globally. They also pollute water courses, threatening both aquatic and human health (van Lexmond *et al*., 2015).

To address such concerns **alternative weed control methods to herbicides are currently being trialled across 18 local authorities** to replace the use of herbicides. Specifically:

- eight local authorities reported that they had created a policy on pesticide/herbicide reduction; a further ten local authorities reported that they were in the process of creating a policy on pesticide/herbicide reduction (**Table 3.15**).

Table 3.15: Local authorities with pesticide/herbicide policy or plan.

Local Authority	Policy/plan on pesticide/ herbicide reduction/use
Carlow County Council	Work in progress
Cavan County Council	Work in progress
Cork City Council	Yes
Dublin City Council	Yes
Dún Laoghaire Rathdown County Council	Yes
Fingal County Council	Yes
Galway City Council	Work in progress
Kerry County Council	Work in progress
Kildare County Council	Work in progress
Kilkenny County Council	Work in progress
Laois County Council	Yes
Monaghan County Council	Work in progress
Offaly County Council	Yes
Sligo County Council	Work in progress
South Dublin County Council	Yes
Tipperary County Council	Work in progress
Waterford City & County Council	Yes
Westmeath County Council	Work in progress

The commitment by local authorities to reduce herbicides is important in the context of climate change given that their usage can act to compound biodiversity loss already occurring as a result of climate change. The physical removal of weeds by hand or using tools is also an important means of weed control and in addition to developing alternative weed control methods, some councils support residents/community groups through Tidy Towns and related community initiatives which include the physical removal of weed growth.

3.7.9 Green roofs

Category: Mitigation/Adaptation

A green roof refers to a roof of a building that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproof membrane. As land continues to be replaced with impermeable surfaces due to population growth and urbanisation, the need to regain green space is becoming increasingly important to maintain environmental quality. Installing green roofs is one option that can reduce the negative effect of development while offering environmental, economic, and social benefits. Questionnaire results revealed that **12 local authorities had incorporated or were in the process of incorporating green roofs in council buildings as part of new buildings or upgrades to new buildings**.

Specifically:

- eight local authorities reported that they incorporated green roofs on council buildings; a further four local authorities reported that they were in the process of incorporating green roofs on council buildings (**Table 3.16**).

Table 3.16: Local authorities incorporating green roofs in new or upgraded council buildings.

Local Authority	Incorporate green roofs in new or upgraded council buildings
Cork County Council	Yes
Dublin City Council	Yes
Dún Laoghaire Rathdown County Council	Yes
Fingal County Council	Yes
Galway City Council	Work in progress
Kilkenny County Council	Work in progress
Laois County Council	Work in progress
Limerick City & County Council	Work in progress
Roscommon County Council	Yes
South Dublin County Council	Yes
Westmeath County Council	Yes
Wexford County Council	Yes

Green roofs can improve stormwater management by reducing rainfall runoff and can improve water quality, reduce energy

requirements, mitigate the urban heat island effect, increase the longevity of roofing membranes, reduce noise and air pollution, capture CO_2, increase biodiversity by providing wildlife habitats, provide space for urban agriculture, and offer a more aesthetically pleasing and healthy environment to work and live. The installation of green roofs on local authority buildings demonstrates the sector's commitment to lead by example in terms of innovative and sustainable biodiversity solutions to climate change. Moreover, some local authorities have demonstrated further commitments towards such innovation in recent years by mandating the installation of green roofs on all new property developments where the roof area exceeds certain dimensions, e.g., Dún Laoghaire Rathdown County Council.

CASE STUDY:
Green roofs

Case study describes how green/blue roofs have been used to manage rainwater run-off from large developments and to enhance biodiversity. **See page 115.**
Local authority: Dún Laoghaire Rathdown Council

3.7.10 Environmental awards and designations

Category: Mitigation/Adaptation

Aside from the development and implementation of those environmental policies detailed throughout this chapter, **28 local authorities reported that they managed or were engaged in a range of environmental awards or designations** including, An Taisce Green Flag programme, An Taisce Blue Flag programme, Natura 2000 sites, UNESCO Biosphere Reserves and Geoparks, RAMSAR Wetland Sites, Natural Heritage Areas, Nature Reserves, Special Areas of Amenity, Tidy Towns, Entente Florale and the Forôige Youth Citizenship award.

3.7.11 Summary

The results demonstrate the extensive range of nature-based environmental initiatives that local authorities have advanced in recent years across biodiversity planning, invasive alien species management, tree management and urban woodlands, green infrastructure, public open spaces and parks, pesticide/herbicide usage and green roofs, and in the maintenance of environmental awards and designations. Given the importance of effective environmental and biodiversity management in protecting against the impacts of climate change, the results act as an important baseline for the local government sector as it works towards climate change commitments both at a local level and those contained within the *Climate Action Plan*.

3.8 SERVICES/PUBLIC ENGAGEMENT

3.8 Services/public engagement

Category: Mitigation/Adaptation/Emergency Response

3.8.1 Introduction

Public engagement in decision making has long been advocated for as a successful strategy in helping to reduce potential challenges in responding to climate change (McEvoy *et al*., 2010, Wehn *et al*., 2015). Specifically, engagement and participation has been shown to increase the legitimacy of decision making, engendering trust between parties (Carter *et al*., 2015) and encourages greater action. In this section of the report, local authority engagement with staff, social housing residents and wider citizens in relation to climate change is explored. While there are many climate actions underway across local authorities, two were selected as representative:

- educational awareness; and,
- community initiatives.

Sections 3.8.2-3.8.3 present the results across these two themes.

3.8.2 Educational awareness

Category: Mitigation/Adaptation/Emergency Response

Educational awareness is crucial for both climate change mitigation and adaptation. Through targeted awareness campaigns, individuals can be encouraged to change their behaviours in key areas such as energy conservation or waste reduction. Such campaigns have clear objectives such as mitigating climate change by reducing fossil fuel consumption, pollution and greenhouse gas emissions.

Equally important however, given that individuals also need to adapt to climate change, is the need for training and awareness that assists individuals to take positive actions in advance of experiencing the potential impacts of climate change, e.g., water conservation awareness or training in how to respond to flooding or droughts.

One of the main challenges to addressing climate change is public acceptance of the risks and the subsequent need for solutions to reduce these risks through policy and services. In a recent European Commission study, 68% of Irish respondents viewed climate change as a very serious problem, with 49% stating that it is the national government's responsibility to address it. However, 30% believed that this was the responsibility of local government (European Commission, 2017). Local government have been engaged in a range of educational initiatives aimed at supporting and informing the general public, residents of social housing and employees.

Local government, as the level of Government closest to the citizen, is well positioned to provide local climate action leadership, and specifically, has an influential role in climate education and awareness raising. This is achieved in a number of ways including via statutory community networking (e.g., Public Participation Networks, Local Community Development Committees), support of community groups, Local Enterprise Offices and environmental awareness campaigns, which are sometimes run in collaboration with energy agencies, e.g., Think Energy Awareness Day in the Dublin region and Tipperary's Environmental Schools display campaign.

Local authorities are the largest State body with responsibility for social housing, with almost 135,000 social houses in their ownership in 2018. This represents an opportunity for the sector to provide support to those residents in relation to climate change education and energy-saving measures. Moreover, local authorities as employers of more than 28,000 people have developed a number of awareness campaigns and initiatives seeking to not only change or influence staff behaviour in the work environment but also in their own private lives.

CASE STUDY:
Climate change camps for children

Case study outlines details relating to climate change camps for children. **See page 116.**
Local authority: Kildare County Council

The questionnaire sought information on whether local authorities held training initiatives or events for staff, communities or social housing residents on either climate action or waste management over the previous two years (2017-2018). The results demonstrate that **27 local authorities were involved in running some climate events, training or initiatives between 2017 and 2018 (Table 3.17).**

Specifically, between 2017 and 2018:

- twenty-two local authorities reported that they held climate action training or events for local authority employees;
- twenty-three local authorities reported that they held climate action training or events for communities; and,
- ten local authorities reported that they held climate action training or events for social housing residents.

Similarly, in the context of waste management between 2017-2018:

- twenty-three local authorities reported that they held waste management training or events for local authority employees;
- twenty-nine local authorities reported that they held waste management training or events for communities; and,
- thirteen local authorities reported that they held waste management training or events for social housing residents.

Table 3.17: Local authority events, training or initiatives on climate change or waste management 2017-2018.

	CLIMATE CHANGE			WASTE MANAGEMENT		
Local Authority	Local Authority employees	Citizens	Social housing residents	Local Authority employees	Citizens	Social housing residents
Carlow County Council		√			√	√
Cavan County Council	√	√	√		√	
Clare County Council	√	√		√	√	
Cork City Council	√	√		√	√	
Cork County Council	√			√	√	
Donegal County Council	√	√	√	√	√	
Dublin City Council	√	√	√	√	√	√
Dún Laoghaire Rathdown County Council	√	√	√	√	√	√
Fingal County Council	√	√	√	√	√	√
Galway City Council	√	√	√	√	√	√
Galway County Council	√			√	√	
Kerry County Council		√		√	√	
Kildare County Council	√	√		√	√	√
Kilkenny County Council	√		√	√		√
Laois County Council	√	√		√	√	
Leitrim County Council						
Limerick City & County Council				√	√	√
Longford County Council	√	√			√	
Louth County Council	√	√	√		√	
Mayo County Council	√	√		√	√	√
Meath County Council	√	√		√	√	
Monaghan County Council					√	
Offaly County Council	√	√		√	√	
Roscommon County Council	√			√	√	√
Sligo County Council				√	√	
South Dublin County Council	√	√	√	√	√	√
Tipperary County Council	√	√		√	√	√
Waterford City & County Council		√			√	
Westmeath County Council		√			√	
Wexford County Council	√	√	√	√	√	√
Wicklow County Council		√		√	√	

CASE STUDY: Climate change workshops for communities

Case study describes the range of training available to communities and small-medium enterprises in order to encourage them to become climate resilient and environmentally sustainable. **See page 117**.
Local authority: Kildare County Council

The provision of education and training to local authority employees who serve communities, and to citizens and social housing residents, demonstrates local authority climate action leadership. Moreover, several local authorities have committed to further climate action training for local authority employees, elected representatives and communities as some of the core actions within their Local Authority Climate Adaptation Strategies, e.g., Cavan County Council, Cork County Council, Laois County Council and Mayo County Council. The commitment of the local government sector to date in terms of climate change training aligns closely with actions detailed in the *Climate Action Plan* (Government of Ireland, 2019a), which require local authorities to foster community engagement with respect to climate change, and in the proposed piloting of 'climate action community engagement' offices across some local authorities under this plan.

3.8.3 Community initiatives

Category: Mitigation/Adaptation

Similar to nature-based solutions such as tree planting and greening areas, community initiatives such as allotments and community gardens provide climate change mitigation and adaptation benefits. Specifically, the planting of trees and plants absorbs greenhouse gases that would otherwise enter the atmosphere, thereby mitigating climate change.

Conversely, these measures can also help with climate change adaptation efforts by reducing air temperatures through shading or by storing rainfall that might otherwise lead to flooding.

Moreover, allotments typically provide food for individuals, which would otherwise need to be grown, packaged, stored and transported for use, each of which has a significant climate change footprint. Allotments therefore also help to mitigate climate change.

Twenty-two local authorities reported that they **provide allotments and/or community gardens** for communities to grow vegetables, fruits, trees and other plants (**Figure 3.14**). Specifically:

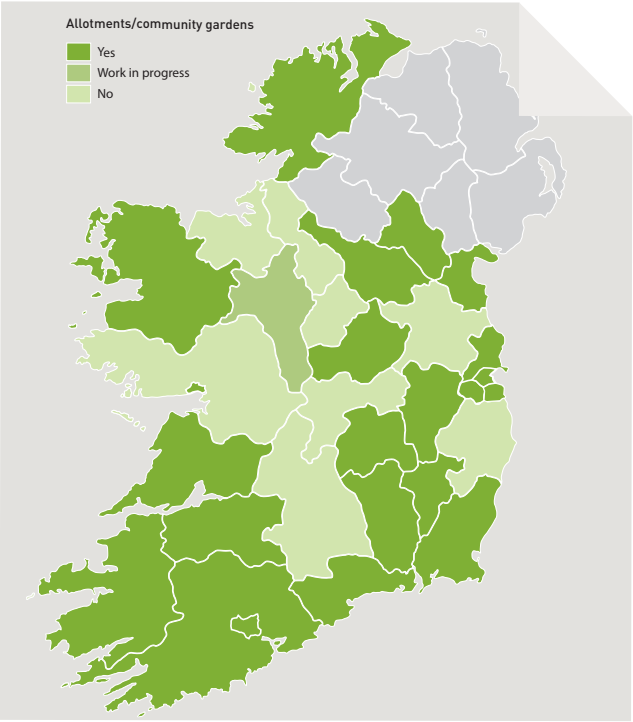


Figure 3.14: Local authorities providing allotments or community gardens.

- twenty local authorities reported that they provided over 2,400 allotments for public use in 2018; a significant proportion of allotments were provided by larger urban local authorities in the Dublin region, e.g., Dublin City Council (N=682), Dún Laoghaire Rathdown County Council (N=218), Fingal County Council (N=800) and South Dublin County Council (N=424); and,
- eighteen local authorities reported that they provided 97 community gardens for public use in 2018; 16 of these also provided allotments.

CASE STUDY: Sustainable energy community outreach

Case study describes how local authority showcased work of one sustainable energy community to raise awareness about climate change and share knowledge with other groups. **See page 118.**
Local authority: Meath County Council

In urban areas, the provision of allotment space by local authorities where garden and green space is limited is important to encourage

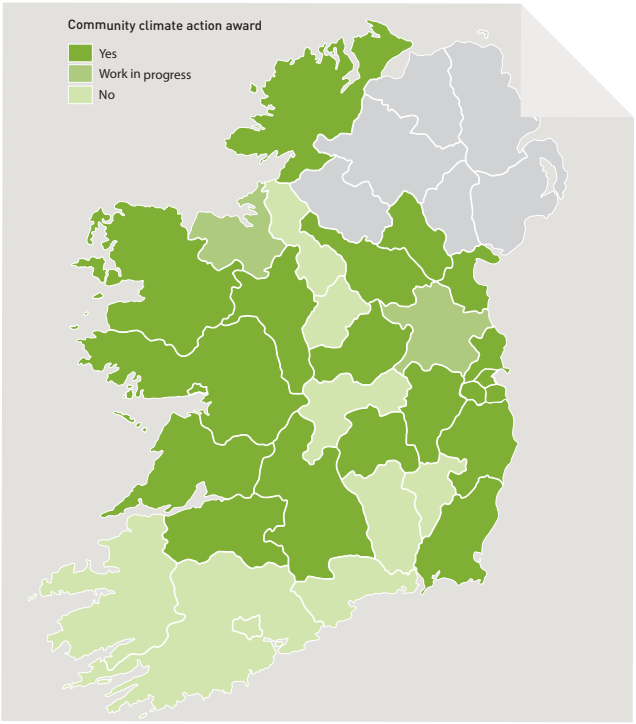


Figure 3.15: Local authorities with community climate action award.

sustainability and promote climate change actions by citizens. Notwithstanding the concentration of allotments in urban areas, many rural local authorities also reported providing allotments and community gardens for public use, demonstrating the sector's overall commitment to sustainable climate change practices (**Figure 3.14**). Local authorities also play a lead role in developing and supporting programmes and awards that recognise the achievement of local communities with respect to climate action and the environment. In this context:

- twenty local authorities reported that they ran community climate action programmes in 2018, which promote communities' commitment to changing behaviour to more climate-friendly practices (**Figure 3.15**).

The reduction of the carbon footprint associated with food production through the provision of allotments is a small step. Nevertheless, it encourages greater self-sufficiency and reduces reliance on imported produce, thereby helping to limit climate change. Similarly, planting trees and plants by communities in community gardens is an important means of increasing citizen ownership around climate change issues.

Initiatives such as An Taisce's Green Flag for Schools and Clean Coasts programmes, Community Environment Action Fund (formerly Local Agenda 21), energy exhibitions, Local Authority Waste Prevention Network, Re-use Month, International Biodiversity Day, Science Week, Engineering Week, International Dark Skies Week, insect pollinator workshops, Master Composter events, World Wetlands Day, Earth Day, Water Heritage Day, National Spring Clean, ECO-Merit for businesses and Green Business initiatives are important additional ways through which local authorities engage with businesses and communities to promote more environmentally friendly and climate friendly actions at a community level. Specifically, **in the context of Green Business initiatives, 27 local authorities reported that they supported or were in the process of supporting such initiatives, which specifically aim to both help enterprises save money and reduce their environmental impacts.**

CASE STUDY: Carbon credits project

Case study details an innovative project where the local authority offsets its carbon emissions generated from business flights by buying credits from the Vita Project, which invests the funding in eco-initiatives in Ethiopia and Eritrea. **See page 119.**

Local authority: Dublin City Council

In addition, local authorities directly support the annual Tidy Towns programme, providing litter bins, regular refuse collection and street cleaning, supporting a range of proactive environmental measures that aim to enhance the local environment and reduce climate change impacts.

Specifically:

- local authorities supported 884 towns and neighbourhoods in 2018 through the Tidy Towns programme, many of which undertook specific climate actions such as increasing biodiversity, tree planting and improving waste management practices.

Twenty-eight local authorities in Ireland employ a heritage officer (Heritage Council, 2019), and some also employ a biodiversity officer. Whilst heritage officers and biodiversity officers provide strategic advice, support and information to local authorities, they also provide advice and information to the public on the protection and enhancement of built, natural and cultural heritage. Specifically, local authority heritage and biodiversity officers have a long history of working with and supporting the work of Tidy Towns groups, providing advice and information on conserving and enhancing local heritage, an aspect of the environment which is likely to be impacted by climate change. In addition, through the Tidy Towns initiative local authorities have also established a pollinator award to create

awareness of pollinators and increase pollinator-friendly habitats nationally. Moreover, under the Tidy Towns programme local authorities have established a waters and communities award, which aims to encourage communities to become more involved with the natural heritage in their local areas by helping to protect, maintain and improve the quality of local waterbodies arising from climate change impacts. These initiatives, coupled with ongoing community support through the Tidy Towns programme, demonstrate the positive actions that local authorities are implementing to encourage community change and ownership of both mitigating and adapting to climate change.

3.8.4 Summary

Sections 3.8.2 and 3.8.3 focused on local authority actions to encourage public engagement with respect to the environment and climate change, and highlighted the local government sector's work on delivery of climate change and waste management events for local authority staff, social housing residents and the general public. Local authorities were also found to be delivering or supporting a range of additional community initiatives such as the provision of allotments, community gardens and community climate action and Green Business and Tidy Towns programmes.

The development of a baseline measuring existing public engagement and community initiatives relating to climate change is timely, particularly as the sector works towards implementing its Climate Action Charter under Action 147 of the *Climate Action Plan*, which specifically places an onus on local authorities to work closely and co-operate with staff and citizens to meet ambitious climate change commitments. Whilst local authorities demonstrated the delivery of extensive public engagement initiatives with respect to climate action in this study, the implementation of a Climate Action Charter is likely to see local authorities encouraging even greater levels of citizen and staff engagement. As the level of Government closest to citizens, effective public engagement will prove essential if more ambitious climate actions are to be supported and subsequently implemented at both local and national levels.

3.9 Conclusion

This chapter presented the results of mitigation, adaptation and emergency response measures local authorities have advanced in recent years in response to climate change. Sections 3.2 – 3.4 demonstrated local authority preparedness in advance of the development of their Climate Adaptation Strategies in September 2019. Local authority progress was subsequently examined with respect to critical infrastructure (section 3.5), flood risk management and water resources (section 3.6), nature-based solutions (section 3.7) and public engagement and community services (section 3.8). Whilst much work remains to be done across all sectors of society, the findings nonetheless serve as a particularly useful benchmark for local authorities given the lead role public sector bodies are expected to play in responding to national climate change commitments detailed in the *Climate Action Plan*.

In Chapter 4, these findings are discussed in the context of national and EU climate change commitments.

DISCUSSION AND CONCLUSIONS

4 Discussion and conclusions

4.1 Introduction

With the impacts of climate change already being felt in many countries worldwide, there is a growing acceptance that significant, far-reaching actions are needed to both mitigate and adapt to a changing climate. To effectively respond to the climate crisis the Irish Government has set ambitious targets for how Ireland will meet legally binding EU greenhouse gas emission reduction targets by 2030 and how the State intends to be carbon neutral by 2050.

When such dramatic changes are required in how societies operate, individuals often look to the State to provide leadership and guidance – dealing with the climate change crisis is no different in this respect. The publication of a *Climate Action Plan* by the Irish Government in 2019 serves to provide the policy basis for how the State will address the climate change challenge. Specifically, within this plan, all public sector bodies are expected to lead by example in delivering broad changes in how they operate and in how they provide public services to support State ambitions regarding climate action. The local government sector, as a key public sector body, has a crucial role to play in this regard.

Using a detailed questionnaire, case study examples and secondary data resources this research examined local authority climate actions through climate change mitigation, adaptation and emergency response measures. A summary of the research findings is presented in section 4.2, before detailing research limitations and future research opportunities in section 4.3. Finally, in section 4.4, concluding remarks are provided.

4.2 Summary of research findings

Whilst there is much work for the local government sector to do in achieving ambitious targets set out in the *Climate Action Plan*, the results from this research demonstrate that local authorities are already delivering in mitigating and adapting to climate change. Moreover, local authorities have shown that they can effectively respond to climate change impacts being felt as they happen at a community level through flood, storm and drought responses in recent years. They are therefore well placed to contribute to ambitious commitments set out in the *Climate Action Plan* and beyond.

Specifically, in the context of local authority critical infrastructure this research has illustrated that between 2011 and 2017, local authority innovations in energy efficiencies resulted in the prevention of over 60,000 tonnes of CO_2 from being produced – a saving equivalent to the CO_2 emissions produced by approximately 11,000 Irish homes annually. In addition, the National Public Lighting Upgrade Project currently being advanced by the sector is expected to avoid 31,000 tonnes of CO_2 annually once completed. Moreover, the project is expected to save the equivalent of the annual CO_2 produced by more than 5,600 homes. Local authorities' efforts to mitigate climate change have also been achieved in EV and cycling infrastructure, with some local authorities reporting 15% of their vehicle fleet as electric, and more than 260 EV charging points for the public available on local authority property at 2018 year end. Cycling infrastructure also continues to expand across local authorities, with approximately 14,000 bicycle parking spaces nationally and more than 1,500km of segregated cycle lanes across local authorities at 2018 year end.

Local authorities also spent approximately €101 million in responding to emergencies following extreme weather events between 2014 and 2018, demonstrating their commitment to rebuilding infrastructure to support communities when the impacts of extreme weather events arise.

This study also showed that where flood risk management and water resources are concerned, local authorities collaborated with the Office of Public Works on 21 major flood defence schemes and delivered a further 228 smaller flood defence schemes between 2014 and 2018, with local authorities providing approximately €12.4 million of funding towards flood defences. Local authorities also spent approximately €101 million in responding to emergencies following extreme weather events between 2014 and 2018, demonstrating their commitment to rebuilding infrastructure to support communities when the impacts of extreme weather events arise.

In the context of nature-based climate change solutions, local

authorities also demonstrated significant commitment, planting approximately 74,000 trees between 2017 and 2018, and implementing a significant number of nature-based policies with specific climate actions included within these, including policies dealing with invasive alien species, managing trees and urban woodlands, developing green infrastructure and public open spaces and parks, and reducing pesticide usage. Many of these policies are supplementary measures which local authorities have advanced in additional to their statutory requirements under biodiversity management.

Finally, the findings contained in this report show that through public engagement, local authorities provided over 2,400 allotments and 97 community gardens for public use in 2018. Moreover, they have also supported 884 towns and neighbourhoods in 2018 through the Tidy Towns programme, many of which undertook specific climate actions such as increasing biodiversity and tree planting. The study highlighted that many local authorities are also training employees, communities and social housing residents to reduce their climate change impact and save energy as part of the sector's commitment to encourage the public into action.

4.3 Research limitations/future research

Given the nature of this research, this report represents a snapshot in time (2011-2018) and a baseline of those climate actions (mitigation, adaptation and emergency response) which local authorities engaged in. It thus demonstrates the actions local authorities have taken in recent years to lead by example where climate change is concerned. However, local authorities are continuing to advance a range of additional measures to mitigate and adapt to climate change that have not been captured in this report. Further studies would be useful in the future to demonstrate the sector's progress as it aims to meet those targets set out in the *Climate Action Plan* by 2030 for public sector bodies.

Owing to the range of policies impacted both directly and indirectly by climate change issues, and the diverse range of actions that are underway across all local authorities, it is not possible to provide a complete picture of all local government responses and initiatives in this area. Given the breadth of the topic, it was only possible to focus on key areas related to critical infrastructure, flood risk management and water resources, nature-based solutions, and public engagement. Where possible, topics were chosen where it was determined that a significant number of local authorities were delivering similar outcomes or where some local authorities were proactively leading by example and demonstrating best practice. To this end, the case studies provided in this research are therefore particularly useful as they provide a richness to the data and offer novel or new initiatives, which can advance further climate actions across the sector. Finally, the publication of the *Climate Action Plan* in 2019 emphasised the role of the public sector leading by example on national climate targets which the State has committed to by 2030. Indeed, the growing importance placed on achieving measurable outcomes under the *Climate Action Plan* for all public service bodies means that it would prove useful for the local authority sector to begin to examine a standardised way of measuring, recording and reporting climate change actions on a frequent basis. Such an approach could assist the sector in demonstrating its progress on climate change in an efficient and standardised manner for future reporting purposes.

4.4 Conclusion

Implementing climate actions which provide mitigation and adaptation co-benefits have been shown to provide a range of social, financial, economic and environmental benefits (Campagnolo and Davide, 2019; Harlan and Ruddell, 2011). This research has highlighted the co-benefits of mitigation and adaptation actions which local authorities are currently engaged in, such as implementing nature-based flood solutions, conserving water, increasing biodiversity, tree planting, maintaining public open spaces and parks, implementing green roofs, developing green infrastructure, funding and implementing renewable energy projects, and providing educational training and support to communities through various initiatives. This is an important point in the context of climate change as local authorities continue to seek cost-effective ways of mitigating and adapting to climate change that can serve to provide additional benefits if implemented, i.e., environmental, social, financial and health benefits.

This research was devoted to examining the role local authorities play in delivering a wide range of climate actions. To date, local authority activities that support climate actions have not been recorded or collated at a national level. The information from this study can therefore be used to inform future climate action developments at both local and national levels. Importantly, it has demonstrated that local authorities prioritise different needs and therefore implement different climate actions based on prevailing climate change risks in their jurisdictions. For instance, in many cases the results demonstrate the different actions prioritised by urban/rural or coastal/inland local authorities. Notwithstanding differences between local authorities, the results serve as a useful baseline of climate actions for local authorities at 2018 year end. This research therefore serves as an important benchmark, as the requirement for public sector bodies to measure and achieve significant climate action progress intensifies in the coming years and decades.

CASE STUDIES

Background

Cork County Council has recognised the importance of achieving the transition to a low-carbon, climate-resilient, and environmentally sustainable society by 2050. Cork County Council's draft Climate Adaptation Strategy highlights a series of actions that the local authority proposes to undertake to adapt to existing and future climate risks facing the county. In addition, the recently published all-of-government *Climate Action Plan* has brought greater responsibilities and challenges to the local authority sector, particularly in the area of climate change mitigation.

Solution

In recognition of the demands facing Cork County Council to achieve its climate adaptation and mitigation targets, the Chief Executive has decided to develop two individual action plans to guide Council operations in the areas of climate action and biodiversity (Figure 5.1).

The development and implementation of the action plans will be led by a dedicated focus group (a sub-committee of the senior management team) and chaired by the Chief Executive. A working group will also be established, which will be chaired by a divisional manager. This Working Group will include Environment, Roads and Municipal Districts, with input from other directorates as required. These plans will run parallel to the Council's Climate Adaptation Strategy. Together, these will form the basis of dealing with climate change mitigation within the organisation.

The aims of the initiative are to:

1. Drive behavioural change across the organisation by embedding climate action into corporate governance, daily working practices, systems and projects.
2. Develop a Climate Change Operational Action Plan focusing on climate change mitigation projects in the following operational activities and business areas:
   - infrastructure (buildings, fleet, etc.);
   - everyday activities (systems and processes);
   - procurement and contracts; and,
   - impacts on stakeholders and partners, e.g., how Cork County Council proposes to champion best practice in climate change mitigation and biodiversity across communities and other stakeholders.
3. Develop a Biodiversity Operational Action Plan to run parallel to and complement the actions set out in the Climate Adaptation Strategy.

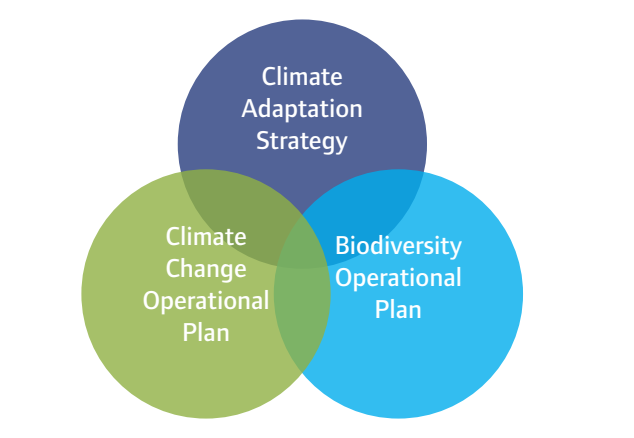


Figure 5.1: Cork County Council approach to climate change mitigation.

Benefits of solution

Environmental

It is envisaged that this innovative approach to climate action will ensure continued advancement towards the 2050 public sector targets to achieve a low-carbon and climate-resilient society. The implementation of actions set out in Cork County Council's draft Climate Adaptation Strategy, and those outlined in both the proposed Climate Change Plan and Biodiversity Operational Plan, will assist Cork County Council in embedding climate action measures into its frontline operations, and set out realistic and achievable targets and timelines for delivery.

PROJECT DETAILS:

Local authority project contact

Louis Duffy
Director of Service
Cork County Council
Floor 5
County Hall
Co. Cork
T12 R2NC

Timeframe/timescale

The plans will include milestones and key performance indicators and will progress parallel to Cork County Council's Climate Adaptation Strategy.

Background

Publication of the *Climate Action Plan* has brought greater responsibilities and challenges to the local authority sector. Organisational transformation is needed to demonstrate an exemplar role of local authorities. Cork County Council has always been at the forefront of this agenda. In recognition of the urgency of the challenge, the Chief Executive has enacted the development of the following plans:

1. A five-year Climate Change Operational Action Plan; and,
2. A five-year Biodiversity Operational Action Plan.

Solution

A dedicated special projects team has been put in place and is led by a director of service. The purpose of these plans is to set out the mitigation actions required from an operational perspective. These mitigation measures are intended to reduce the severity, scale and nature of the current challenges. They will help to challenge and change behaviour in order to limit further escalation of the current climate situation.

Accordingly, directors have been asked to engage with their senior teams initially in identifying a range of measures that can be taken over the coming five years to mitigate the problem. Consideration will be given but not limited to the following operational activities/ supports and business areas:

- infrastructure (buildings, fleet, operational plant etc.);
- everyday activities (systems and processes);
- procurement;
- contracts; and,
- impacts on stakeholders and partners, e.g., how the Council may be able to champion best practice in climate change mitigation and biodiversity across communities and other stakeholders.

The Plans will set out how the Council will embed mitigation measures into its frontline operations. It will also include target timelines relating to the implementation of these measures.

Benefits

Environmental

Embedding mitigation measures into frontline operations and services represents a first in the local authority sector. An innovative approach of this nature ensures continued advancement towards the onerous 2030 and 2050 public sector climate action targets. The five-year plans will set out realistic and achievable projects, many of which are underway or 'shovel ready'. This process, backed up by a dedicated and resourced Energy and Climate Change Unit, will undoubtedly lead to environmental improvement, economic efficiency and a culture of behavioural change.

PROJECT DETAILS:

Local authority project contact

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Timeframe/timescale

In the short term, directorates' responses were due by 30th August 2019. Plans are to be presented by the Chief Executive to councillors for consideration in September 2019.

In the medium to long term, five-year plans will be adopted to include milestones and key performance indicators, and to progress the plans in parallel to Cork County Council's Climate Adaptation Strategy.

Background

In December 2015, the Government approved the designation of lands at Clonburris as a site for the establishment of a SDZ.

The *Clonburris Strategic Development Zone Draft Planning Energy Masterplan* (September 2017), was prepared by South Dublin County Council with the help of SEAI funding to support the energy master planning for the scheme (Figure 5.2). It comprises an overarching energy strategy for the Clonburris SDZ lands. In addition, it incorporates an energy demand mapping exercise and, through an economic appraisal, a detailed comparison of energy provision regarding viability, energy supply, and emissions.

Key objectives of the Energy Masterplan are to:

- provide an overarching energy strategy for the site and identify discrete project opportunities;
- consider the site as a stand-alone community in the first instance, but also consider opportunities for integration with neighbouring developments;
- demonstrate best practice and a future-proof design, while taking account of crucial economic viability factors;
- clearly illustrate the development of an evidence base and analysis of the energy provision options from which planning policy can be updated, and against which future planning applications can be assessed; and,
- demonstrate the innovative use of an energy master planning process as an exemplar for other developments in Ireland.

Solution

It is anticipated that by 2020 all new buildings in Clonburris will be required to be constructed to the NZEB standard, in accordance with the *Energy Performance of Buildings Directive 2010/31/EU*.

The modelling and economic appraisal carried out as part of the Energy Masterplan demonstrates that the economic viability of local heat networks could be favourable at the two urban centres planned under the planning scheme. To accommodate infrastructure associated with the local heat network, the Energy Masterplan and the planning scheme identify that energy centres would be required in the Clonburris and Kishoge urban centres with a level of flexibility regarding location, i.e., as individual stand-alone buildings, as part of a larger block, or at basement level.

Benefits of solution

Environmental

Expected benefits of the Energy Masterplan include a reduction in household CO_2 emissions for the development and increased public health through improved air quality.

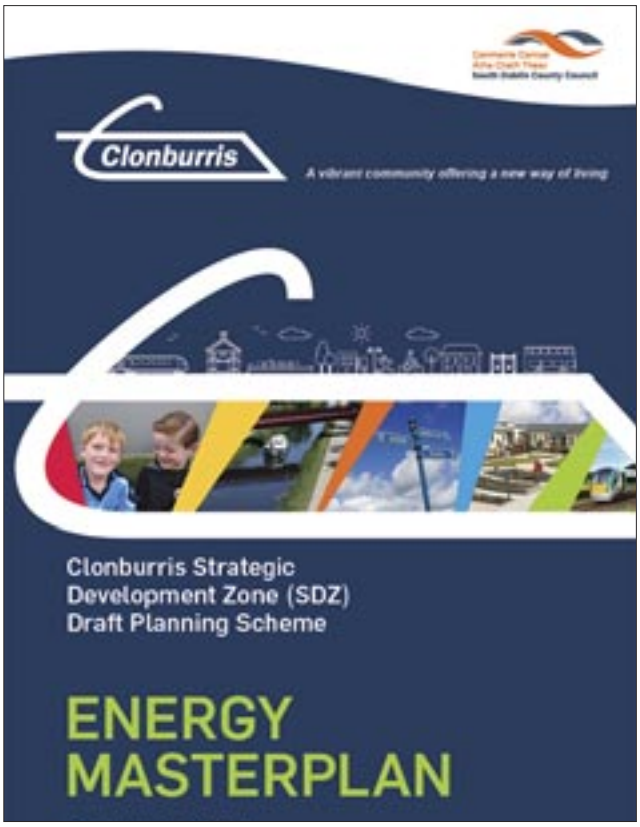

Figure 5.2: The Clonburris Strategic Development Zone Energy Masterplan.

Economic

It is expected that households will save money on heating costs.

PROJECT DETAILS:

Local authority project contact

South Dublin County Council Architects Department
South Dublin County Council Planning Department

Timeframe/timescale

Commencement date to be confirmed.

Further information

www.sdcc.ie
www.clonburris.ie

Background

Prior to 2015, little or no energy efficiency works were being undertaken by Louth County Council and there was no evidence of a system for encouraging energy efficiency projects at county level. Under EU and national legislation, public sector bodies, including local authorities, are required to reduce energy by 33% by 2020 relative to 2009. In addition, Ireland has a national target of 20% reduction in energy use by 2020 relative to average energy usage between 2000 and 2005. Given that there was no obvious system in place to promote the non-public sector target, the Council established a dedicated energy team. This team's focus was to establish a system for encouraging energy efficiency in the county.

Solution

Louth County Council, working in partnership with Dundalk Institute of Technology, other public bodies, community groups and local businesses, secured an investment in excess of €3.3 million from the SEAI for community energy projects in the north-east region for successive years between 2015 and 2019.

Benefits of solution

Environmental

The estimated actual energy savings achieved by the community energy projects in the north-east region between 2015 and 2018 is 10,700,000kWhrs (10.7GWhrs).

Economic

The solution resulted in estimated total expenditure on energy projects in the region of €8,550,000, including total grant funding by SEAI of €3,346,693 between 2015 and 2018.

Social

The process was led by Louth County Council and this formed a key objective of the Louth Economic Forum Energy Task Group – that forum consists of the business interests in County Louth. The process involved a partnership with Dundalk Institute of Technology and was promoted in order to encourage active participation in a grant application for energy works across the entire community.

PROJECT DETAILS:

Local authority project contact

Padraig O'Hora
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Energy and Property Section

Timeframe/timescale

The project is an annual project and has been led by Louth County Council from 2015-2019.

Further information

https://www.louthcoco.ie/en/services/sustainable-energy-cross-border-european-relations/better-energy-communities-grant/

Background

Waterford City & County Council via Waterford Energy Bureau received funding for the Deise Better Energy Communities 2018 project from the SEAI under the Better Energy Communities Scheme 2018. The project included a range of project partners and had an overall grant award of €374,592, with community groups/schools receiving 88% of the funding, Waterford City & County Council receiving 8% of the funding, and others receiving 4% funding. The overall investment in green technologies, which was in excess of €1,400,000, will contribute to the development of the green economy in Waterford. The primary issue relating to better energy communities projects relates to the strict four-month timeline for delivery of projects from the awarding of grant funding.

Solution

Energy efficiency upgrades/renewable energy installations include LED park lighting, heat pump installation and windows/insulation upgrades at primary school/language college/care for the elderly centre, community centre heating system/insulation upgrades and retail LED lighting upgrades.

Benefits of solution

Environmental

Reduced CO_2 emissions and green technologies being used that will benefit the development of the green economy in Waterford.

Economic

Grant award of €374,592, with community groups/schools receiving 88% funding, Waterford City & County Council receiving 8% funding, and others receiving 4% funding. The overall investment in green technologies was in excess of €1,000,000.

Social

Significant public engagement was undertaken to attract partners in the funding application.

PROJECT DETAILS:

Local authority project contact

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Timeframe/timescale

July – November 2019.

Background

The existing Castlebar pool was more than 35 years old and was used extensively by members of the public. The facility had consistently averaged 70,000 visits per annum for the past number of years and was particularly popular for its children's swimming lessons. However, as the pool was constructed over 35 years ago, there were significant ongoing and recurring maintenance and running cost issues with the facility. As a result, it operated at a significant annual loss and was a struggle to maintain in good working order. In addition, the development of a new public pool and leisure facility was seen as a strategic and key piece of local social infrastructure that had to be delivered in the immediate future. In light of these challenges, Mayo County Council subsequently led the delivery of a new state of the art leisure centre in Castlebar at the beginning of 2019.

Solution

A primary objective for the development of the leisure centre was to provide a pleasant, controllable environment for staff, patrons, and visitors alike. Thermal and overall energy efficiency designs were set as priorities for the environmental services' consultant appointee. The overall control and monitoring of the building environment through patent computer software and controls were also embodied in the same service requirements.

The design, materials, construction, and management of the development reflects the stakeholders' commitment to environmental protection, energy conservation, and sustainable development. Proven techniques and technology (passive/active) were used to achieve these objectives and contributed to the successful delivery of an 'A'-rated public leisure facility, far in excess of requirements (Figure 5.3).

Benefits of solution

Environmental

The complex's primary source of heating is a CHP unit that operates at 50kWh max output of electricity, which is 60% of the Council's power usage during the day. The by-product of the electrical generation heats the complex's domestic hot water and swimming pools. A secondary heating system is also operated by natural gas.

To add to its energy efficiency, the building has rainwater harvesting which feeds the Council's toilet cisterns, and passive infrared sensors that control LED lighting throughout the building. This is all complemented with a state-of-the-art building management system.

Figure 5.3: Castlebar Leisure Centre upgrade.

Economic

The council has installed 15 square metres of solar thermal panels, which preheat the mains incoming water, which in turn reduces heating costs.

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Local authority project contact

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Mayo County Council
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Timeframe/timescale
Completed January 2019.

Background

Galway's Leisureland Complex is a leisure centre and swimming pool owned by Galway City Council (Figure 5.4). The centre is open to the public seven days per week, 16-18 hours per day, with a simultaneous electric and heating load during these hours.

This case study relates to the climate mitigation action undertaken in 2011 and 2012 to upgrade an existing 32-year-old heating system at the leisure centre from oil to natural gas boilers with the onsite co-generation of electricity using a CHP system. At the time of project inception in 2009, the Leisureland complex had an annual electricity consumption of 1,800MWh and a heating fuel consumption of 3,500MWh, which together represented 19% of the City Council's total annual energy consumption, including water services.

Figure 5.4: Galway Leisureland Complex.

Solution

A detailed feasibility study was undertaken, with support from the SEAI, to assess the viability of CHP and to determine the optimum size of plant and unit selection based on summer baseload heating. In 2011/2012, the entire heating system at the Leisureland complex was upgraded, switching the main fuel supply from oil to natural gas and incorporating a CHP system for onsite electricity generation. This project upgrade was supported through the Department of Transport, Tourism and Sport Energy Efficiency in Local Authority Swimming Pools Programme.

In advance of this work schedule, Galway City Council disconnected the existing oil boiler and installed a temporary (hired) 550kW oil boiler (oil supply from existing tank) to supply heat demand. This strategy allowed the facility to operate as normal during the removal of all redundant units and the installation of the new system plant and equipment.

Benefits of solution

Environmental

This project provided an estimated emission saving of approximately 712,072kg CO_2 equivalent per year. In addition, the consumption of natural gas instead of oil resulted in the burning of a cleaner fuel with less air pollution. The natural gas was also consumed to generate electricity at the local level, displacing imported electricity that has a much higher carbon intensity factor. The removal of oil storage from site within this project upgrade also eliminated a number of health and safety hazards and risks from the Galway City Council Risk Register.

This climate action continues to make a major contribution to Galway City Council making progress towards meeting its energy efficiency of 33% by 2020 relative to 2009 energy usage.

PROJECT DETAILS:

Timeframe/timescale

This energy upgrade was undertaken in 2011 and completed in 2012.

Background

The Tallaght District Heating Pilot – HeatNet – will be among the first of its kind in Ireland and will provide low-carbon heat to South Dublin County Council-owned public buildings, as well as new residential and commercial developments planned nearby.

Solution

South Dublin County Council is in advanced discussions with a new datacentre under construction on Belgard Road, Tallaght, to secure the supply of waste heat feed to power the district heating system. The datacentre is committing to capital investment in data hall heat collection systems to supply the waste heat to the district heating system. The system will utilise the low temperature, carbon-free heat from the datacentre and bring it to the required supply temperature for the connected buildings using heat pumps. The South Dublin District Heating System is highly innovative, not just at a national level, but at a European level, and will be the first of its kind in Ireland to use this type of low-energy waste heat linked to the heat pump technologies involved.

At a time when opposition to datacentres – focussing on energy waste – is growing, this partnership demonstrates a way forward utilising waste heat to drive public buildings and heat the homes of Tallaght residents into a low-carbon future. It represents an opportunity to address climate change and to promote an ongoing, low-carbon, urban solution to the problem of space heating in buildings. The planned district heating system will reduce CO_2 emissions by more than 60% through the supply of low carbon heat produced through heat pumps that consolidate waste heat.

Benefits of solution

Environmental

There are many direct benefits that the district heating system will offer customers. Among the environmental benefits provided by this solution is low-carbon heat. Low-carbon heating reduces the emissions from fossil fuels in the Tallaght area, and helps South Dublin County Council and commercial customers to meet their climate goals (Figure 5.5).

Economic

This new programme will save commercial and residential customers money in the forms of:

- low-cost heat — protecting against fuel poverty for residential customers and increasing competitiveness of commercial customers;
- protection from price volatility — the flexibility offered through district heating supply means a variety of heat sources can be utilised and switched according to market prices; and,
- low development costs — connecting new developments to district heating saves on space and on required investments in building-based heat production equipment.

Figure 5.5: HeatNet project overview.

Social

This HeatNet programme is expected to supply on-demand hot water. The district heating system provides on-demand, unlimited hot water supply, so there is no timing, waiting, or running out of hot water. In addition, the customer heat exchanger is a simple unit with no moving parts and requires very little maintenance, much like an electricity supply. This results in less maintenance costs and user stress.

Background

Dublin City Council leisure centre facilities incur high utility and maintenance costs. To meet legal, financial, and social targets for

PROJECT DETAILS:

Local authority project contact

South Dublin County Council Architects Department

Timeframe/timescale

Completion due 2020.

Further information

www.sdcc.ie

2020, leisure centres were identified from an energy audit as being very high energy users and suitable for an energy performance contract. As sports facilities are typically high energy users, Dublin City Council is using the energy performance contract model to upgrade these facilities rather than using more traditional methods. Initial independent audits indicated that greater than 30% energy efficiency improvement was realistic. Dublin City Council obtained SEAI support through the form of a contract, workshops, and technical assistance. This is an opportunity to significantly improve energy efficiency with a guaranteed performance (as per contract) that mitigates financial and performance risk for Dublin City Council. The project of improving the energy efficiency of these facilities is facilitated by Codema. The Deputy Chief Executive of Dublin City Council was also a senior management sponsor of the project.

Solution

An energy performance contract is a contractual agreement by an energy services company to guarantee energy savings over an agreed period. It differs from the traditional method of carrying out energy efficiency measures, as the energy services company must ensure that a guaranteed level of savings is achieved, and the contractor is paid based on measured and verified performance.

Dublin City Council has two energy performance contracts delivering guaranteed energy savings across 10 of its public leisure and community sports facilities.

The suite of measures includes CHP upgrades, BMS, LED lighting controls, and solar PV installations, all operating within a defined list of client requirements (e.g., pool temperature 29°C, etc.).

Benefits of solution

Environmental

From this solution, Dublin City Council expects a reduction of more than 1,000 tonnes of CO_2 emissions and more than 5GWs reduction in energy consumption.

Economic

Two energy performance contracts are scheduled to deliver a net saving of €2.5 million (42% energy and 46% cost savings verified from the latest measured and verified report for the first project). Additional contracts are under consideration. There is potential to scale across local authorities to make effective use of limited resources and avoid duplication in the face of increasingly challenging energy efficiency targets for 2030 (energy performance contracts are more suited to greater than €1m capital investment). Contractors are subsequently more prepared to invest capital in projects delivering guaranteed performance.

Social

These changes mean improved conditions for leisure centre users, improved maintenance of assets in those facilities, and a reduction in workload for facility managers.

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Local authority project contact

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Timeframe/timescale

The first energy performance contract started the service phase in December 2016. The second contract is in a works phase, due to enter service in December 2019.

Further information

https://www.codema.ie/media/video/what-is-energy-performance-contracting/

Background

In April 2014, Kilkenny County Council became city partner, and 3 Counties Energy Agency (3CEA) acted as facilitator, in the Intelligent Energy Europe Streetlight Energy Performance Contract project.

The aim of the project was to create the demand and supply for energy performance contracting for street lighting in Ireland and across Europe. As part of this, energy performance contract projects were identified and delivered. Kilkenny County Council and 3CEA identified a large project consisting mainly of the declassified road network in Kilkenny and other areas of the city and county with inefficient lighting.

Solution

Street lighting in Kilkenny County Council accounts for 50% of the annual energy spend. After the M8 and M9 motorways were opened, previous national roads in Kilkenny were declassified to regional roads. The lighting on these declassified regional routes in Kilkenny consisted of a mixture of high-energy intensity discharge SON and SOX lighting. There are in excess of 10,000 streetlights owned and operated by Kilkenny County Council. The pilot project identified the retrofit of 1,300 (13%) of the street lighting stock of Kilkenny County Council.

The project involved energy savings on the declassified road networks, as well as roads in one industrial estate and four housing estates (Table 5.1). A successful application for funding was submitted to the SEAI through the Better Energy Communities 2017 grant application.

The project was procured in May and awarded in July 2017. The project commenced in July 2017 with the ordering of lanterns (six to eight weeks). The project was completed in October 2017 and consisted of 1,300 lamps being changed to energy-efficient LED bulbs. Each lantern was designed individually, and the lighting scheme benefitted from the new dimming profiles (Figures 5.6-5.9).

Table 5.1. Changes in annual energy, costs and CO_2 (kg).

	Annual energy (kWh)	Annual costs (€)	Annual CO_2 (kg)
Before project	1,091,873	€148,713	580,876
After project	346,300	€47,166	184,231
Savings	745,573	€101,547	396,645
% saving	68%	68%	68%

Figure 5.6: Clara, Co. Kilkenny – LED lighting.

Figure 5.7: Clara, Co. Kilkenny – non-LED lighting.

PROJECT DETAILS:

Local authority project contact

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Declan Keogh
Energy Officer
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Timeframe/timescale

January 2017 – December 2019.

Figure 5.8: Hebron Industrial Estate, Co. Kilkenny – LED lighting.

Figure 5.9: Hebron Industrial Estate, Co. Kilkenny – non-LED lighting.

Benefits of solution

Environmental

The energy-efficient lighting project achieved 68% savings in energy spending and has made a significant contribution to Kilkenny County Council's energy efficiency target of 33% by 2020 relative to 2009 energy usage.

Social

The benefits of the new lighting can be seen in towns and villages across Kilkenny. Additional social benefits of an LED lighting system include providing a safer environment, helping to lessen street crime and the fear of crime, and reducing the number and severity of night-time accidents. Residential estates have also benefited from more energy-efficient streetlights, coupled with the benefit of better security and better light output, resulting in peace of mind and safety at night.

Further information

Following the success of the pilot project, Kilkenny County Council has continued with the retrofit of street lighting across the county. In 2018, Kilkenny County Council was successful in securing grant aid from the SEAI to retrofit a further 2,200 streetlights. The Council has further planned to retrofit an additional 1,500 streetlights in 2019.

Background

Laois County Council currently operates and maintains approximately 8,500 public lights. The lights are a mix of old technology SOX, SON, fluorescent, and newer LED lights. Newer LED lights are more energy efficient, cheaper to run, and have a much longer bulb lifespan. The local authority's current policy is to install LED bulbs for all new installations. There is also a request for the planning departments to include a condition to require LED lights to be used in all developments that will likely lead to an eventual takeover by Laois County Council. However, there has been no upgrade of public lighting in the local authority in the last 20 years. The current stock includes 821 LED energy-efficient lights, which equates to 9% of stock on national roads, and which was funded by Transport Infrastructure Ireland. The remaining 90% or 7,766 lights are very old and excessively costly to operate and maintain. Older SOX lanterns are almost obsolete at present and it is becoming very difficult to obtain fittings for this type of lantern. In any case, the price differentials between old and more modern fittings are substantial. The cost of a SOX bulb is €55 at present compared to a SON bulb at €10. These bulbs have a lifespan of 2.5 years compared to LED lanterns of up to 15 years. There was therefore a compelling case for implementing a public lighting replacement programme to maximise the opportunity to secure substantial energy efficiencies and savings in both energy and maintenance costs by upgrading all lights to LED.

Solution

Upgrading the lights to LED will result in significant energy savings. Many of the lanterns are old and need to be replaced in any event. It therefore makes sense to renew outdated stock with more energy efficient lanterns given that older SOX lanterns are becoming obsolete and are costly to run. The longer the replacement is delayed, the costlier parts for these effectively obsolete lanterns will become.

Benefits of solution

Environmental

Switching public lights to LED bulbs will result in an estimated CO_2 saving of 467 tonnes annually.

Economic

The estimated energy cost reduction of using LED bulbs is €230,000 per year.

PROJECT DETAILS:

Local authority project contact

Farhan Nasiem
Email: fnasiem@laoiscoco.ie

Timeframe/timescale
2019 – 2022.

Background

All public bodies have an obligation under the *National Energy Efficiency Action Plan* to achieve energy efficiency improvements of 33% by 2020 based on the 2009 baseline.

Monaghan County Council identified public lighting as its most significant energy user following the transfer of water services to Irish Water in 2014. Electrical energy consumption for public lighting contributed 61% of its total electrical energy consumption and 32% of its total electrical/thermal/transport energy consumption in 2014, excluding water services. Moreover, the cost of electrical energy for public lighting was approx. €0.5m in 2014.

Solution

An analysis by the County Council revealed that the retrofit of existing SOX and SON lighting with high energy efficiency LED lighting would provide an approximate 50% energy reduction and a consequent reduction in energy cost. This energy reduction would significantly help the Council to progress towards the 33% energy improvement 2020 target.

Benefits of solution

Environmental

CO_2 has been reduced as result of decreased energy consumption. The use of LED lighting minimises (and in many cases eliminates) sky glow and light intrusion, thereby improving the visibility of our 'dark sky'. The reduction in SOX/SON lighting is also beneficial for the night-time wildlife population in Monaghan.

Economic

Energy costs for Monaghan County Council have reduced due to reduced energy consumption. Additionally, maintenance costs for public lighting have reduced due to the long life of LEDs.

Social

White LED lighting provides an improved illumination over SOX/SON lighting, thereby improving road safety for vehicle users, cyclists and pedestrians. Additionally, improved LED illumination makes town and village streets safer at night-time, thereby encouraging social activities.

PROJECT DETAILS:

Local authority project contact
Vincent McKenna
Executive Engineer
Corporate Energy & Public Lighting

Timeframe/timescale
This project started in 2015 and is ongoing as of 2019.
As of the end of August 2019, 53% of public lights in Monaghan have been retrofitted with LEDs. All public lighting retrofits within County Monaghan are planned to be completed by the end of 2020.

Further information
https://psmr.seai.ie/public (SEAI Monitoring and Reporting – public access).

(Please note, this site is updated for 2017 data at present; 2018 will be updated by the SEAI in due course. The site details the energy reduction or energy efficiency improvements made by each public body. To view Monaghan County Council performance, input Monaghan County Council into the search box and select "View".)

Background

Landfilling of waste commenced in 1994 in North Kerry Landfill, the first engineered landfill site in Ireland. Furthermore, it was the first landfill site in Ireland to be managed under an EPA Waste Licence *(W0001)*. It accepted non-hazardous waste including a percentage of biodegradable material. A flare was operated on site to manage the landfill gas being abstracted from the gas wells. Methane, carbon dioxide, and oxygen were also produced during the waste decomposition. Gas wells were drilled down into the waste body and connected to a flare system, which burned the gas at over 1,000°C.

Solution

In the early 2000s, Kerry County Council identified that, in order to mitigate against any fugitive emissions and odours from the site, and to utilise the gas produced as an energy resource where feasible, it was necessary to introduce a well-managed gas utilisation plant to the site (Figure 5.10). The overall objective of a landfill gas management system was to collect all gas produced from the waste and treat it in a manner so as to minimise odours and emissions from the landfill and to provide energy recovery where feasible. It was the intention of Kerry County Council to use the landfill electricity generation process to realise the financial value of the landfill gas while at the same time meeting EPA requirements.

The gas utilisation plant was identified along with the flare as the key gas infrastructure to:

- minimise the impact on air quality and the effect of greenhouse gases on the climate;
- minimise the risk of migration of landfill gas beyond the perimeter of the site;
- minimise the risk of migration of landfill gas into services and buildings on site;
- avoid unnecessary ingress of air into the landfill and thereby minimise the risk of landfill fires;
- minimise the damage to soils and vegetation within the restored landfill area;
- permit effective control of gas emissions; and,
- where practicable, permit energy recovery.

Kerry County Council also highlighted the need to engage landfill gas experts to manage the gas production and utilisation in order to adhere to EPA Waste Licence conditions. The contractor was responsible for constructing the generation facility and for the installation, operation, and maintenance of the electricity generation equipment to utilise the landfill gas from the landfill site to generate electricity.

Benefits of solution

Environmental

According to the EPA Landfill Manuals, *"[m]ethane is estimated to be 20 – 30 times more damaging (per molecule) than carbon dioxide to the global climate due to its greenhouse effect"*. [8] With the conversion of gas to electricity and flaring of landfill gas produced to over 1,000°C, there have been very little fugitive emissions from the North Kerry Landfill site. This has been confirmed through volatile organic compound questionnaires in accordance with the EPA Air Guidance Note 5. Over the years, the gas utilisation plant has been operating at full capacity (330kW) 80-90% of the time. Since 2018, there has been a reduction in gas produced but there have been no environmental impacts as a result of this reduction.

Figure 5.10: Kerry gas utilisation plant.

Economic

The landfill gas generated on site yields a monthly royalty payment to Kerry County Council. This is calculated based on the electricity produced from the landfill gas intake, and the actual and base energy prices. Between 2011 and 2018, the average amount of electricity produced was approximately 1.6MWh per annum.

Social

The number of public complaints regarding the landfill reduced considerably between 2012 and 2018. With the introduction of a gas utilisation plant to a landfill site, landfill gas management is better managed with a key focus on any fugitive emission from site. Even though the site is located away from residential properties, odour management is one of Kerry County Council's key priorities. Since the closure of North Kerry Landfill to the public, there have been no odour complaints.

PROJECT DETAILS:

Local authority project contact

David Donegan
Environmental Engineer
Kerry County Council, Maine Street, Tralee, Co. Kerry V92 H7VT

9 Landfill Manuals, (2000), https://www.epa.ie/pubs/advice/licensee/EPA%20Landfill%20Site%20Design.pdf (Accessed on 12th Aug 2019)

Background

The former North and South Tipperary County Councils, now Tipperary County Council, established Tipperary Energy Agency in 1998 with the aim of developing better sustainable energy usage and improved energy management. The *National Energy Efficiency Action Plan* published in 2009 set out a national target of a 20% reduction in energy demand for Ireland. Recognising that the Government must lead by example, the public sector was challenged to achieve a 33% reduction in public sector energy usage by 2020 relative to 2009 levels.

In 2014 Tipperary Energy Agency embarked on a programme to install solar PV panels on Tipperary County Council's public buildings. Market research findings confirmed the availability of suppliers with the capacity to design and install the PV panels and a public procurement exercise was initiated. The energy requirement for each building was quantified and the installations were designed to produce energy that would be used whilst the buildings were operating only. The cost of the project was approximately €326,850, of which 50% was funded under the Better Communities Scheme of the SEAI. The project payback period, including the grant contribution, was seven years.

Solution

This project involved the installation of just under 200kW of solar PV panels on nine Tipperary local authority buildings to provide clean, renewable electricity and reduce demand from the grid by over 164MWh per year. The buildings included civic offices, fire stations, leisure centres and libraries (Figure 5.11). The role of Tipperary Energy Agency was to facilitate public procurement and project management from the initial stages of feasibility studies and project creation, through to detailed design. Tipperary Energy Agency worked closely with the contractors and Tipperary County Council to ensure that the project was delivered to a very high standard.

Benefits of solution

Environmental

The use of solar panels has offset 70 tonnes of CO_2 emissions per annum since 2014. The project was a significant contributor in assisting Tipperary County Council to meet its energy efficiency targets, currently at 35%. The savings per annum are 161MWh from these nine installations of solar PV panels.

Economic

The nine installations were expected to generate, on average, 164,473kWh per year. In practice they generated an average of 161,275kWh per year, 98% of the initial designed generation. From the most recent monitoring exercise carried out in 2019, the total project is saving Tipperary County Council €23,384 per year with little or no maintenance required.

Figure 5.11: Joe MacGrath, CEO, Tipperary County Council – Nenagh Civic Buildings solar PV.

Since the installation of these solar PV panels, installation costs have reduced significantly. Costs are currently approximately €1,100/kW compared to over €1,700/kW when the panels were initially installed. Tipperary County Council has a further 300kW solar PV project planned in 2019 with these units being designed to generate electricity on site, supply excess to the national grid, and generate revenue for the local authority. Other societal drivers of PVs are the recent changes in Building Regulations, which require a certain amount of renewable energy to be economically attained through the installation of solar PV panels. As noted in the *Climate Action Plan*, there is a plan to introduce a feed-in tariff for microgeneration, which will increase PV installation and contribute to CO_2 offsetting in Ireland. This report predicts that a total of 1.5GW solar PV will be installed in Ireland by 2030.

Social

This project increased the PV capacity in the country by 44% in 2014 and was a flagship project to encourage other sectors to invest in solar panels as a replacement for non-renewable energy sources.

PROJECT DETAILS:

Local authority project contact

Marion O'Neill
Senior Executive Officer
Environment & Climate Action Section

Timeframe/timescale
The timescale for the project from initiation to completion was one year (March 2014 – March 2015), in line with the SEAI's Better Energy Communities Grant Programme.

Further information
W: www.sustainabletipp.ie
W: https://www.tipperarycoco.ie

Background

Roscommon County Council is aware of its responsibilities and obligations as a public body in the context of Ireland's EU and national commitments and wider *Climate Action Plan* goals in achieving a 33% energy efficiency improvement by 2020 relative to 2009 energy usage. The use of renewable technologies is seen as a key element in striving for this energy efficiency target.

Roscommon Town Fire Station was chosen for the installation of solar PV panels based on a reasonably consistent year-round usage, i.e., no major summer/winter differences. Total electricity consumption per annum was approximately 38,000kW (**Figures 5.12–5.13**).

Solution

A 6kW array was recommended and the building allowed a south-west aspect to the installation of the PV panels on the existing roof. Projected savings per annum of 5,100kW net consumption and €1,020 (excl. VAT) were expected for this measure with a capital cost of €7,700 (excl. VAT), taking account of SEAI Better Energy Community Scheme funding.

This measure was undertaken in conjunction with other energy improvement works such as retrofitting internal LED lighting and installing a building management system on the heating system.

Benefits of solution

Environmental

Roscommon County Council recently prepared a draft Climate Change Adaptation Strategy 2019–2024. These measures, along with subsequent actions carried out on other buildings, are cited as examples of the role being undertaken by Roscommon County Council in decreasing the organisation's dependency on fossil fuels. It is hoped that these examples would influence other organisations and residents of County Roscommon to pursue similar innovative activities.

Economic

This measure, in conjunction with other energy improvement works, has resulted in an overall saving per annum of €1,800 (excl. VAT), with consequent reductions in electricity consumption and CO_2 emissions.

Figure 5.12: Aerial view of solar PV panels, Roscommon Town Fire Station.

Figure 5.13: Solar PV panels on Roscommon Town Fire Station.

PROJECT DETAILS:

Local authority project contact

Jim Grogan
Senior Executive Engineer
Assets, Climate Action & Energy Management
Email: jgrogan@roscommoncoco.ie

Timeframe/timescale
The Energy Audit Report was carried out in February 2017 and the solar PV system was commissioned and installed in July 2017.

Background

In 2016, Carlow County Council was behind target to meet energy efficiency commitments detailed for all public sector bodies in the *National Energy Efficiency Action Plan*. Identifying the significant energy users showed that County Hall used 18% of the building stock's total electricity demand and had the second highest usage after the Visual Art Theatre. Following on from several energy efficiency projects, including lighting upgrades and IT shutdown protocols, the next step was to examine generating electricity from renewable sources.

Solution

A solar PV array was subsequently designed for the County Hall building to maximise roof space and solar emissions. 15.75kW of PV panels were installed in September 2016, with 30% grant funding from the SEAI under the Better Energy Community grants programme. The PV array is south facing to maximise solar emissions, with an angle tilt of 10°. As County Hall is one of the tallest buildings in the area, the PV panels have no over-shading or visual issues with neighbouring buildings (Figure 5.14).

Benefits of solution

Environmental

The PV panels were estimated to generate 8% of the total electricity demand. Due to losses in the electrical grid, this equates to 9% savings of primary energy and CO_2 reduction of 6,955kg. This measure alone accounts for 0.15% of the 33% energy efficiency target (relative to 2009 energy usage) local authorities are required to achieve by 2020.

Economic

The cost of the installation was €30,000, 30% of which was grant funded. Therefore, the total outlay for Carlow County Council, including VAT, design, and project management fees, was €24,245.50.

The verified generated savings since installation equal 13,346kWh annually. At current electricity unit prices of €0.165/kWh, this equates to an annual saving of €2,202. Simple pay back, including grant, is therefore 11 years.

Figure 5.14: Solar panels on Carlow County Hall.

PROJECT DETAILS:

Local authority project contact

Brian O'Donovan
A/Senior Executive Officer
Email: bodonovan@carlowcoco.ie
Tel: 059 913 6231

Timeframe/timescale

The PV array was installed in September 2016 and went live on the 25th of October 2016. Since then, a total of 35,591kWh of electricity has been generated.

Further information

Carlow County Council
County Buildings
Athy Road
Carlow
R93 E7R7
Tel: 059 917 0300
Email: secretar@carlowcoco.ie
www.carlow.ie

Background

In 2018, Wicklow County Council put in place the governance and management support to achieve progress towards 2020 energy reduction obligations applying to all public sector bodies – namely a 33% reduction in energy usage relative to 2009 levels. Multiple energy audits were carried out, including for County Buildings, which identified the possibility of building a 300kW solar PV array to meet the building's baseload demand. However, the 1970s era flat roof and asbestos-covered pitched roof were deemed impractical to use for rooftop solar power, with possible significant hidden cost implications. The large surface carpark on site, with an open southern exposure, was identified as an ideal location for a solar PV array built as a carport-style canopy.

Solution

Wicklow County Council is planning to build a 300kW solar car park canopy, covering c.1,600m^2 or c.140 parking bays. The canopy will consist of a T-frame, monopitch angled at 10° to the south, approx. 3m high. The canopy will have uninterrupted exposure to the sun, will provide shade from sun and rain to cars and pedestrians underneath, and will significantly reduce light pollution through under-canopy lighting. It will be co-located with EV charging points, which offer the potential of renewably powered EVs and increased comfort for EV drivers while connecting their vehicles to a charger (Figures 5.15-5.16).

Benefits of solution

Environmental

The canopy would provide approx. 285,000kWh/year of 100% renewable energy. It is not currently anticipated that any of the electricity will be exported or lost to the grid. With anticipated increased staff and fleet uptake of EVs, the potential for renewably powered transport is significant. The canopy will have guttering that reduces surface pluvial flooding in the carpark and offers future potential for rainwater collection or attenuation, thereby providing a dual benefit.

Economic

The expected amount of renewable energy is equivalent to the baseload, or 40% of County Buildings' requirement, saving an estimated €40,000/year in energy costs. The canopy is being considered on a power purchase agreement basis. However, project costings have indicated that the project would have a simple payback of 10 years before grants are considered. The installation comes with a 25-year warranted life expectancy. As a proof of concept, there is significant potential to replicate at virtually any local authority public surface carpark.

Figure 5.15: Flexisolar car park installation example.

Figure 5.16: Proposed view, car park PV panels.

Social

A Part 8 planning application with public display was carried out. The application was approved by Wicklow County Council in September 2019 and comments from the public were positive with no objections received.

PROJECT DETAILS:

Local authority project contact

Declan Marnane
Chartered Engineer
Senior Engineer
Housing and Corporate Estate, Wicklow County Council
Tel: 040 420 120 Email: dmarnane@wicklowcoco.ie

Timeframe/timescale
Part 8 planning was applied for on 3rd July 2019;
Approval granted on 2nd September 2019;
Tender documents to be published: September 2019;
Tender award: November 2019;
Construction: Approximately one month.

Further information
Email: raoneill@wicklowcoco.ie

Figure 5.17: St Bricín's social housing energy upgrade.

Background

Dublin City Council is continually upgrading its social housing units through its Fabric Upgrade Programme.

Solution

Since 2013, over 8,000 units have been refurbished, resulting in significant energy and cost savings, and improved comfort levels for residents. This includes the recent fabric upgrade works undertaken at St. Bricin's social housing scheme at Arbour Hill, Dublin 7 (**Figure 5.17**). The energy upgrades carried out as part of Phase 1 of the programme involved measures such as attic, water tank and pipe insulation, new windows, lagging jackets for hot water cylinders and cavity wall fill insulation.

Benefits of solution

Economic

The Fabric Upgrade Programme has saved an estimated €29.6 million on energy bills to date.

PROJECT DETAILS:

Timeframe/timescale

Phase 2 of the programme is ongoing and will provide external insulation to a further 5,243 units.

Background

Cranmore is a local authority housing estate located within Sligo town. Constructed in phases between the early 1970s and mid-1980s, it suffered social and economic decline through the 1990s. As a result, a regeneration process was initiated by Sligo County Council in 2007 supported by central Government departments. This process resulted in the development of a masterplan in 2016 that had three main aims, namely, to regenerate the area through economic development, social development, and physical intervention. Within the physical plan for the regeneration of Cranmore a focus was placed on building and environmental energy upgrades to ageing housing stock. These works were considered important for two main reasons: first, to address the level of dereliction of the housing stock; and second, to address fuel poverty being felt by residents due to the rising costs of burning fossil fuels and the impact this was having on health and well-being within the community.

Solution

Following publication of the masterplan in 2016, work began to assess the building fabric of each individual house and propose a suite of works that was tailored to improve energy performance. These works included insulating walls and attics, improvements in ventilation and airtightness, and the introduction of air to water heat pumps.

Benefits of solution

Environmental

It has been estimated that the works will result in a one-tonne reduction in carbon emissions per house per year.

Economic

The upgrade is expected to provide savings of 40-50% to residents on current energy costs.

Social

Throughout the development of the masterplan for Cranmore, and in particular as works progress to implement improvements in the housing stock, community consultation has been extensive. This has resulted in positive community engagement and support for the regeneration project across all strands of the masterplan in relation to the implementation of social, economic and physical projects, schemes and services.

PROJECT DETAILS:

Timeframe/timescale

This is a six-month works contract running from September 2019 to March 2020.

Further information

http://www.sligococo.ie/media/SligoCountyCouncil2015/Services/Regeneration/Cranmore/Brief_masterplanningTeam.pdf

Background

One of the most significant costs in water production is electricity. The National Federation of Group Water Schemes and Wexford County Council recognised that water suppliers needed to be encouraged to become more efficient in their energy consumption and avail of new technologies, where they exist, to reduce reliance on carbon-based energy. Both organisations became aware of a European-funded project, co-ordinated by Trinity College Dublin and Bangor University (Wales), called DWR Uisce. This project aimed to harness energy from high pressure in the water network, using a pump as turbine, and using the energy recovered to help power the scheme's treatment plant (Figure 5.18). This project is the first of its kind in Ireland and, as a result, provided opportunities to trial new technologies, monitor its success, and provide a demonstration site to other water providers that might be interested in implementing the same treatment.

Solution

Following a series of feasibility studies facilitated by GWS's in County Wexford, the Blackstairs GWS was identified as a scheme with the most potential to harness and recover energy. Both the Rural Water Liaison Officer and the Engineer for Wexford County Council worked with the National Federation of Group Water Schemes, the Blackstairs GWS committee and the DWR Uisce team to progress the project. Wexford County Council was able to provide technical assistance on the GWS network and associated infrastructure and pressures, as well as providing advice on the procurement process. A pump as turbine was installed at a suitable location on the site earlier this year and has been operating successfully. The site was officially launched in May 2019 as a demonstration site for the project.

Benefits of solution

Environmental

This project saw the successful installation of hydropower technology on the Blackstairs GWS and, in turn, a reduction in CO_2 emissions. It is an example of an innovative way in which a GWS can lessen its reliance on carbon-based energy and reduce its carbon footprint.

Economic

It is currently estimated that the GWS will require 4kW/day less electricity from the national grid as a result of installing this device. There will be a cost saving of €6,000 per annum to the GWS in the reduction of pumping costs. The GWS has decided that any cost savings will be donated to a water-related charity.

Social

The National Federation of Group Water Schemes believes this to be an excellent example of how communities, local authorities and academia can work effectively together towards implementing effective climate change solutions.

Figure 5.18: Blackstairs GWS hydropower technology.

PROJECT DETAILS:

Local authority project contact

Martina Birney
Rural Water Liaison Officer
Wexford County Council

Timeframe/timescale

Wexford County Council and the National Federation of Group Water Schemes facilitated the commencement of this project between the DWR Uisce team and the Blackstairs GWS in August 2017 and it was completed in May 2019.

Further information

The National Federation of Group Water Schemes is keen to work with other local authorities on similar initiatives that have a focus on action against climate change, and on enhancing biodiversity. The organisation recently appointed Roisin Dowd Smith as its Climate Action Officer and Adrian Smith as its Biodiversity Officer, both of whom are working with schemes and local authorities to progress opportunities for the GWS sector to empower rural communities to bring about change in these areas.

https://www.dwr-uisce.eu/
https://nfgws.ie/category/climate-change/

Background

Dún Laoghaire Rathdown County Council's Climate Change Action Plan 2019-2024 sets targets for the of reduction of CO_2 emissions. In addition, the Dún Laoghaire Rathdown County Development Plan sets out measures to support the Government's Electric Transport Programme. The Council has an older vehicle fleet – 40% of the fleet is over 10 years old. Dún Laoghaire Rathdown County Council has adopted the Energy Management System ISO 50001. The Council's vehicle fleet was identified as a significant energy user, but staff need access to transport for work-related activities.

Solution

Dún Laoghaire Rathdown County Council undertook a complete review of its fleet, comprising 230 vehicles. Discussions took place with the fleet manager, inspectors, and fleet users about their needs and requirements. Examination of the yearly spend and maintenance costs was also undertaken. A 10-year plan with specific milestones was prepared. It was decided vans and cars would be a good starting point, with the provision of designated EV charging spaces in the Council's buildings.

As a result of the review, Dún Laoghaire Rathdown County Council has acquired a number of electric cars, vans, tipper buggies, tipper vans, and e-bikes. Each of these has both the local authority and EV branding to promote awareness among the public. Dún Laoghaire Rathdown County Council is providing EV charging points at its various council-owned buildings and parks, as well as at public lighting poles (**Figure 5.19**).

Benefits of solution

Environmental

The Council's fleet renewal programme is demonstrating its commitment to reducing emissions by 2020 in line with national targets. A total of 125 staff have signed up to use EVs for work purposes. Through uptake of this programme, environmental benefits include:

- improvements in energy efficiency;
- aligning with the Government's *Climate Action Plan*; and,
- reduction of CO_2 emissions.

Economic

Economic benefits of the fleet upgrade that impact Dún Laoghaire Rathdown County Council include:

- modernisation of the council's fleet;
- lower maintenance costs; and,
- lower fuel costs.

Figure 5.19: EV public lighting charging point.

Social

Along with the environmental and economic benefits, there are noticeable public benefits, including the promotion of the use of EVs throughout the county and the provision of public lighting EV charging points.

PROJECT DETAILS:

Local authority project contact

Marcella Murphy

Timeframe/timescale

The provision of EVs will continue as part of the annual budget process.

Background

In 2017, *2040 and Beyond: A Vision for Portlaoise*, a strategy for a better town centre, was developed by Laois County Council. The strategy re-examines and re-purposes the town centre of Portlaoise. The overarching aims are to formalise a shared vision to focus on public spaces, buildings and walkways in a way that acknowledges the unique characteristics and heritage assets that the town possesses, and to provide the foundation for the future development of a thriving town centre.

This vision for Portlaoise presents a unique opportunity to transform the town into Ireland's first 'Low Carbon Town Centre' through:

- reducing the impacts of car use on the public realm;
- improving overall air and environmental quality;
- supporting more active travel through walking and cycling; and,
- providing a better-quality environment for leisure and social uses.

The project also envelops the idea that refurbishing and re-purposing derelict buildings impacts positively on low carbon commitments. A low carbon town centre must also create balance: preserving heritage and history while promoting the re-occupation of vacant residential stock within Portlaoise town centre, as well as the efficient use of the town's convent, CBS, and parish lands for residential and other uses. The project aims to increase the residential population of the town centre from c.600 to 2,500 by 2040 by increasing the provision of social spaces and facilities for exercise, play, and relaxation to improve community health and well-being.

The *Project Ireland 2040 National Planning Framework* identifies Portlaoise as a national demonstration project on how sustainability and low carbon development can be implemented at community level.

Solution

The aim of the Low Carbon Town Centre is to remove the dominance of cars within Portlaoise town centre and address the poor pedestrian and cycling experience of the area. Laois County Council will be investing an estimated €2.7 million over the next three years to make the Low Carbon Town Centre a reality.

The objective of this is to ensure and increase the resilience of infrastructural assets and the built environment, informing investment decisions. This will be achieved by removing large volumes of traffic from congested areas, utilising the South Circular Road, and reconfiguring existing traffic flows throughout the town centre. Building on the development of the 'Park and Stride' policy, Laois County Council will also promote an increase in cycling by extending on-road and off-road cycleways, and creating the Triogue River Blueway as an environmental and amenity objective. The local authority will also upgrade the laneways of Portlaoise by improving their overall appearance, retrofitting existing streetlights

with energy-saving LEDs, and adding additional lighting to poorly lit areas. Further energy-efficient amenities will include the addition of 30 EV charging points. The number of solar powered compactor bins in the town will be increased to 50. The local authority will also partner with retail services and businesses in providing ongoing advice and support in relation to energy performance and aligning businesses with the low carbon objective. Laois County Council also plans to re-purpose the old Scoil Mhuire at the heart of the town centre site to become the new home for the Laois School of Music, Music Generation Laois. Repurposing existing buildings reduces the carbon footprint created by new builds.

A low carbon town implementation group was established in May 2019 involving stakeholders from the sphere of academia, energy generation, the health service, retail, and transport. The group is serviced by Laois County Council and its aim is to work with the community in implementing energy efficiency and carbon reduction measures at all levels of urban living. The Portlaoise Town Team, in existence since 2017, has also established a low carbon subgroup that collaborates with the low carbon town implementation group. The Town Team draws its membership from local business, traders and retailers. One of its primary objectives is to work towards sustained progress in transitioning to renewable energy, better insulation standards, modal shift and reduction of single use plastics.

Benefits of solution

Environmental

The project, which is a community-implemented, community-led and community-driven solution, will provide seven key benefits:

- removal of large volumes of traffic from the town centre via delivery of the Portlaoise Southern Circular Road;
- reconfiguration of traffic flows through the town centre is expected to reduce traffic and traffic congestion;
- significant reduction in carbon emissions driven by interventions at James Fintan Lalor/Lyster Square;
- re-balance the existing circa 3,600 car parking spaces;
- 40% increase in bicycle usage by 2040;
- 300-500 trees planted in the town centre; and,
- reduction in dereliction by re-purposing existing buildings.

PROJECT DETAILS:

Local authority project contact

Donal Brennan
Director of Services
Laois County Council

Timeframe/timescale

The Council will be investing an estimated €2.7 million over the next three years to make the Low Carbon Town Centre a reality. The project represents an instrumental step forwards in realising the vision for Portlaoise as outlined in *2040 and Beyond; A Vision for Portlaoise*. The demonstration project based on a community-driven approach is subject to formal reporting on a six-month basis.

Further information

https://laois.ie/departments/environment/environmental-protection/climate-change/

Background

The World Health Organisation estimates that the health effects of air pollution result in approximately 4.2 million premature deaths annually.[10] City residents experience this most significantly given the high levels of air pollution concentrated in urban areas. In addition, as populations in cities grow, many global cities are trying to effectively respond to increased traffic congestion. Consequently, the increased risks associated with the use of private cars and other vehicles have resulted in many global cities seeking transport solutions that improve both health and environmental prospects for city dwellers, as well as reducing traffic congestion.

Solution

In 2009, Dublin City Council launched dublinbikes, a city-wide bicycle sharing scheme to address health, environmental, and traffic congestion issues across the city. 'Just Eat dublinbikes' is now regarded as one of the most successful bicycle-sharing initiatives undertaken worldwide. The scheme has expanded from 450 bicycles across 40 stations in 2009 to 1,600 bicycles across more than 110 stations in 2019, each of which have been strategically distributed throughout the city centre to enable easy access and optimal use (Figure 5.20).

Benefits of solution

Environmental

Over 27.6 million journeys[11] have been taken on dublinbikes bicycles since the scheme was launched in 2009. Cycling journeys now represent over 14% of all traffic in the city centre, many of which occur through the dublinbikes bicycle network. Specifically, the scheme has attracted 67,136 annual subscribers, with 96% of individuals availing of free journeys in 2019 Since its introduction, dublinbikes has helped Dublin City Council to encourage a modal shift away from short distance car journeys, with the knock-on benefits of reduced traffic congestion, lower greenhouse gas emissions, and improvements to population health and the environment. The success of the dublinbikes scheme, when compared with other cities, can be attributed to several factors, including the fact that there are over 100 stations across the greater city centre region, a low annual fee, and the ongoing maintenance of bikes, stations, and associated equipment.

Figure 5.20: dublinbikes bicycle station.

PROJECT DETAILS:

Local authority project contact

Céline Reilly
Executive Manager
Dublin City Council

Timeframe/timescale

2009 – present.

Further information

www.dublinbikes.ie

10 WORLD HEALTH ORGANISATION. 2019. *Air Pollution* [Online]. Available from:https://www.who.int/airpollution/en/ [Accessed 19/7/2019].

11 DUBLINBIKES.IE. 2019. *Just Eat dublinbikes - latest figures!* [Online]. Available from: http://www.dublinbikes.ie/Magazine/Reports/Just-Eat-dublinbikes-latest-figures [Accessed 19/07/2019].

Background

County Offaly comprises 199,981 hectares. The topography of the county is generally flat and undulating except for the Slieve Bloom Mountains in the south west. Peatlands are found extensively around the county and these extend to approximately 32,400 hectares or 16% of the total area.

The road network in County Offaly consists of 2,164km of roads, with regional roads accounting for 392km. The county has historically experienced difficulty maintaining roads over peatlands with issues such as distortion and transverse cracking arising. However, harsh weather conditions in winter 2017-2018 followed by a significant drought period during summer 2018 resulted in a significant increase in the level of cracks and distortion of roads, including severe longitudinal cracking on many bog roads (Figure 5.21). In some locations, the surface of the road was good but required intervention because of cracking and distortion. Interventions on bog roads were outside the local authority's roads programme and were carried out under emergency works.

Solution

In 2019, Offaly County Council received €165,000 from the Department of Transport, Tourism and Sport under the 2019 Regional and Local Road Grant Allocations to carry out a pilot scheme to determine the extent of peatlands situated under regional roads in the county. Offaly County Council initially carried out a desktop study of the extent of peat under regional roads in the county to establish the routes for site investigation with high and recurring maintenance costs for each of the three municipal districts. Site investigation works on the identified routes determined the extent and depth of peat underlying key regional routes. A report and drawings have been prepared for the Department of Transport, Tourism and Sport, and the results will be used by Offaly County Council in making grant applications and prioritising future schemes.

Benefits of solution

Economic

The site investigation work will better inform Offaly County Council of the scale of the peat under the regional roads in the county and the level of investment that will be required to improve the road network by various methods.

Figure 5.21: Road cracking following drought in 2018.

PROJECT DETAILS:

Local authority project contact

Jean Ryan
A/Senior Engineer, Roads

Timeframe/timescale
2019

Background

The following issues are those which the Carrick-on-Shannon Smarter Travel Programme aimed to address:

- There was a high dependency on private car transport in Carrick-on-Shannon. This is due to the lack of a realistic alternative.
- Encouraging more people to use bicycles and to walk will improve levels of fitness and result in improvements to health and quality of life in the population.
- The provision of linked cycle and pedestrian paths throughout the town will make it more attractive to visitors. Carrick-on-Shannon is very reliant on tourist income to sustain its economy.

Cycle lanes and walking paths existed around Carrick-on-Shannon but were not linked to one another and so they did not experience the level of use that they otherwise might have. It was envisaged that by completing a network around the town and outside it, much more use would be encouraged.

This would allow residents in the hinterland of Carrick-on-Shannon and all visitors to the town to cycle and walk safely to and from the town centre.

The council also foresaw that the provision of this walking and cycling infrastructure would further enhance tourist development and help to promote tourist sites in Carrick-on-Shannon and surrounding villages.

Solution

The Smarter Travel Programme aimed to deliver significant elements of the Leitrim County Council Walking and Cycling Strategy through the following provisions:

- 18km of cycle lanes throughout the town; these varied from off-road dedicated lanes to on-road advisory lanes to on-road mixed/shared-use lanes (Figures 5.22-5.24);
- a Safer Cycling School programme, which was delivered in all schools in Carrick-on-Shannon and included the following activities:
  - the delivery of Level 1 and Level 2 training in the schools' premises and on selected roads adjacent to the schools by three cycling instructors facilitating sessions for up to 18 children on the schools' premises at one time (after each level of training an assessment of training was carried out);
  - organising a cycle to school day;
  - a Bike for Life course, which involved a two-day workshop, offering cycling skills enhancement and a spin, along with

Figure 5.22: Segregated cycling lanes, Carrick-on-Shannon.

discussions and learning points for adults and local cycling club members; and,
- a Sprocket Rocket cycling skills programme designed for children/teenagers delivered in three-hour workshops; and,

- bicycle shelters located throughout the town.

Benefits of solution

Social

Leitrim County Council conducted a research project in conjunction with the Smarter Travel Programme. A baseline questionnaire was carried out before the project commenced and then repeated after the project's completion.

The study concentrated on three target groups – primary school children, secondary school children, and adults. A summary of the results is as follows:

- 89% of primary school children use their bicycles for fun;
- 25% of primary school children use their bicycles most days;
- while there was a slight decrease in the number of primary school children who cycled to school over the lifetime of the project (10% down to 5%), 44% of this group have used the new cycle lanes around town;
- there was an increase in use of cycle helmets by primary school children;
- there was an increase (11% up to 19%) of secondary school children who walk to school over the life of the project;
- there was an increase in the perception of safety for cycling among secondary school students – up from 45% to 61%; and,
- 84% of secondary school students consider the town safe for walking.

Adults proved the target group with the least change over the life of the project. Distance and safety are the factors which prevent parents from allowing their children to walk/cycle to school. There was a high level of recognition of the improvements that were made around the town among adults.

They recognised and appreciated the fact that Leitrim County Council had provided safe, well-lit places to walk/cycle, but they stated that motorists' behaviour needed to improve.

There were concerns that motorists do not respect pedestrian crossings and drive at excess speed along the routes with pathways/cycle lanes. The enhanced usage of these areas by the public heightened their awareness of the problems of speed and driver behaviour.

Figure 5.23: Integrated mandatory cycling lanes, Carrick-on-Shannon.

Figure 5.24: Integrated shared cycling lanes, Carrick-on-Shannon.

PROJECT DETAILS:

Local authority project contact

Timeframe/timescale
2011 – 2014.

Further information
Available from Leitrim County Council

Background

During 2017, significant challenges faced Ireland's waste sector including: the closure of the Chinese markets to Irish exporters of recyclable material; high levels of contamination presenting in segregated waste collected at kerbside; confusion on what material was accepted for recycling; and, the continued and increasing use of single use items within Irish society.

The need to engage with the general public and provide clear, consistent information was recognised as critical to address the existing challenges, as was the need to connect stakeholders with their audience, promote policy, progress waste targets and prepare for future challenges. To address these issues, a source of information was required – a 'one stop shop' for all waste queries in Ireland. From this need, the MyWaste initiative was conceived.

Solution

MyWaste.ie – Ireland's Official Guide to Waste Management was developed to provide a trusted source of information for Irish residents (Figure 5.25). Not only was the provision of a relevant and accurate waste-based information portal an integral component of the work undertaken, but it was imperative that the presentation of material was clear and visually appealing, thus encouraging and enabling citizens to actively engage in more sustained waste practices, foster behavioural change, and contribute to carbon reduction.

MyWaste.ie contains detailed Irish-based content on waste management, resource use, and the circular economy, in addition to maps, videos, blogs, and news, and is continuously monitored and updated. A strong social media presence on Twitter, Facebook, and Instagram also enhances the levels of engagement of MyWaste.ie.

Benefits of solution

Environmental

MyWaste.ie – as the trusted waste information portal in Ireland – can have a significant impact on the Irish public as society faces many challenges in the areas of sustainable resource use and climate action.

A framework has been developed and established that will not only allow the dissemination of relevant information, but will allow the purposes of MyWaste.ie, which are to encourage and engage public participation in sustained environmental practices, to continue and strengthen.

Through the continued use of MyWaste.ie to educate, inform, and create awareness, the public will be provided with the knowledge required for a sustainable future.

Figure 5.25: Waste disposal resources – MyWaste.ie.

Social

The development of MyWaste.ie in its first year has been very well received. Not only have the various platforms been a success, but the brand developed around MyWaste.ie has been well received and is now being used by local authorities and stakeholders throughout the country.

PROJECT DETAILS:

Local authority project contact

Kevin Swift
Regional Waste Coordinator
Connacht-Ulster Regional Waste Office

Timeframe/timescale

MyWaste is an ongoing project by the Regional Waste Management Offices.

Further information

www.mywaste.ie

Figure 5.26: Flood damages, Inishowen, 2017.

Background

On Tuesday 22nd August 2017, an extreme pluvial rainfall event (one in 100 years) occurred in Donegal, which caused extensive damage and disruption, particularly to communities in the Inishowen peninsula. Both the immediate response and the subsequent actions to deal with the damage and disruption caused by the event were led and co-ordinated by Donegal County Council with 106 incidents responded to by the fire service.

It became clear at an early stage in the response that the damage to communities, particularly in Inishowen, was widespread and severe (Figures 5.26-5.28). Households were flooded suddenly and to great depths. The damage to road infrastructure was extensive, and many bridges and culverts were badly damaged.

Solution

The fire service responded to the emergency with nine different brigades and 85 firefighters deployed in conjunction with Donegal Civil Defence and the Irish Coast Guard, prioritising rescue and life-saving operations.

Donegal County Council's roads services were deployed in the affected areas, initially responding to reports of flooding on roads, then erecting signage and applying road closures and diversions as the event developed. There was also widespread disruption to water services as a result of the event and Council staff, working under a Service Level Agreement with Irish Water, were deployed to address the disruption.

Services worked with An Garda Síochána and Donegal County Council

Figure 5.27: Road damages – flooding, Inishowen, 2017.

Figure 5.28: Aerial view damages – flooding, Inishowen, 2017.

to maintain ambulance services in areas where roads were severely damaged. Several families were assisted by Donegal County Council's housing section to arrange and relocate to temporary accommodation.

The Council's Communications Office commenced an advisory service through social and traditional media, and liaised with the incident managers in both the fire and roads services to ensure that up-to-date information was provided.

Benefits of solution

Environmental

Work is ongoing to agree on an approach to deal with debris in rivers that could cause problems at a later date.

Economic

Costs for the initial emergency response and clean-up were in the region of €1-1.5m.

Post-event questionnaires identified in excess of 600 locations (roads and bridges) under Council responsibility that required repair or reconstruction at an estimated cost of €15.3m for roads infrastructure alone.

In addition, substantial repair and replacement costs are being incurred for other infrastructure such as housing stock, parks, etc.

Social

The Council's Communication's Office was crucial in providing key information to the public via local media outlets, its own website, Facebook, and Twitter in the days and weeks following the event. Key information included updates on road conditions; closures and openings; housing supports and assistance; financial assistance schemes; clean-up supports and assistance available; Health Service Executive supports; and, contact telephone numbers including an out-of-hours number.

A press release on the flood recovery was issued each day in the week following and social media posts were posted regularly on each of the items above. The Council also responded to queries from the public via Facebook and Twitter.

An information leaflet with useful contact numbers was also circulated via An Post to each household in the Inishowen peninsula to facilitate those without Internet access.

PROJECT DETAILS:

Local authority project contact

Éadaoin Healy
Tel: 074 915 3900
Email: eadaoin.healy@donegalcoco.ie

Timeframe/timescale

The flooding event occurred on 22nd and 23rd August 2017. The subsequent repairs and remedial works took place over the subsequent weeks, months, and years.

Background

Following severe winter storms in January and February 2014, extensive damage was caused along the Clare coastline, which resulted in damage to sea defences and coastal flooding at Kilcredaun on the Loop Head peninsula. Because of the coastal flooding over an area of approximately 25 hectares, the local Irish college and 10 properties were isolated on the peninsula with no road access (Figure 5.29). This isolation of the community prompted the local authority to act and restore connectivity.

Solution

An initial temporary roadway that allowed limited access was established, suitable for four-wheel drive vehicles and tractors. The flooding was relieved by removing sections of the damaged sea defence at low tide and allowing the flood water to return to sea and then temporarily damming the breach before high tide. This procedure was adopted for approximately one week to relieve the flooding. A temporary rock armour wall and new sluice gate were also constructed in the damaged sections of sea defences (Figure 5.30).

Benefits of solution

Social

The flooding was alleviated, and the land restored to its agricultural use ready for the summer agricultural season. Access was also restored to the Irish college, which facilitated its preparations for the summer school. By restoring road access, it also removed the potential risks in the event of a medical emergency on the peninsula. The local authority was active in informing residents of what works they were undertaking and the likely timescales involved.

Figure 5.29: Flooding – Kilcredaun Peninsula, Co. Clare, 2014.

Figure 5.30: Construction of rock armour wall – Kilcredaun, Co. Clare.

PROJECT DETAILS:

Local authority project contact

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Clare County Council
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Timeframe/timescale

It took approximately four to six months to alleviate flooding and complete repairs.

Further information

www.clarecoco.ie

Figure 5.31: Snowploughing during Storm Emma, 2018.

Background

Given the diversity of services often affected when an extreme weather event arises, and the need for co-ordination across multiple local authority departments, local authorities often find it difficult to quantify the financial cost of dealing with such events (**Figure 5.31**). This results in making any claims to various Government departments or analysis of the event more difficult.

Solution

To overcome this problem, Cavan County Council identified a comprehensive list of all departments affected by extreme weather events, including its machinery yard, civil defence, fire services and municipal districts. The costs were sub-categorised into labour, plant, material and subcontractor costs. This allowed for a template for the allocation of resources for future extreme weather events.

Benefits of solution

Economic

The economic benefits of this study allow for:

- claims to be made more easily to relevant Government departments;
- transparency of costs; and,
- prediction of allocation of costs for similar climate events.

PROJECT DETAILS:

Local authority project contact

Colm O'Callaghan
A /Senior Engineer

Timeframe/timescale
The time it took for this project to be completed was minimal.

Further information
Report and tables available in Cavan County Council Climate Change Adaptation Strategy 2019-24.

Background

Dublin City Council initiated the Environmental Improvement Scheme for Crumlin Village in 2018. This included realignment of footpaths and road resurfacing works, while also taking into consideration road safety, flood risk and amenity issues. The design included the management of surface water runoff in a sustainable way, rather than using a conventional piped system. This approach was taken to meet the requirements of the current City Development Plan and provide resilience to climate change, through implementing a nature-based solution for managing surface water. A softer, greener, 'engineered' approach was considered from preliminary design stage, in order to manage surface water at source in accordance with best SuDS practice and to provide flood resilience.

Solution

The proposed solution included managing surface water runoff to eliminate discharge to an overloaded combined sewer system, and significantly reducing discharges to the surface water system. This included the construction of localised porous surfaces, filter drains with 'engineered' filtration zones and tree pits to drain water from hardstanding areas (**Figures 5.32-5.33**). This resulted in the removal of surface water during normal rainfall events from the conventional piped system, through direct discharge to ground and for use by trees/vegetated areas. Excess flows in extreme events are drained to the conventional piped system through catch pits/silt traps and a filter drain system that provide improved water quality and attenuation.

This sustainable surface water system increased the capacity to deal with extreme rainfall events in an urban setting, whilst achieving greater flood resilience by removing surface water discharges from the combined system that ultimately would discharge to Ringsend Treatment Plant.

The use of SuDS has led to a significant decrease in surface water discharges, thereby creating capacity in the existing network, improving water quality, and enhancing the amenity value for the area through the use of localised permeable surfacing, vegetated areas, filter drains and tree pits, while implementing a design that aligns with the vision for the area.

Benefits of solution

The approach to provide a nature-based, 'engineered' solution to manage surface water runoff from the preliminary design stage, has produced a cost-effective and climate-resilient design for this scheme. This development at Crumlin village provides better flood management, climate resilience, biodiversity and enhanced landscaped areas, thereby enhancing the area for residents and visitors.

Figure 5.32: Green engineered flood defences – Crumlin Village.

Environmental

The approach taken for management of surface water runoff for the scheme has removed the need to discharge surface water to the existing combined network through the implementation of this sustainable 'engineered' solution. The solution encompassed several sustainable and climate action policies currently being implemented by Dublin City Council.

The benefits from implementing the nature-based solution to manage surface water runoff include:

- removal of surface water discharges from the public combined system and significantly reducing the requirement to discharge to the surface water system;
- Improved resilience to flooding during extreme rainfall events through use of an 'engineered' sustainable response to surface water management;

- improvements to water quality through filtering out pollutants, prior to discharge to ground or to conventional piped systems during extreme rainfall events (and ultimately to rivers and the Ringsend Treatment Plant); and,
- the introduction of tree pits to manage surface water runoff has also enhanced biodiversity and increased the tree canopy for the area, providing shade in times of increased temperatures.

Economic

The total catchment area of the scheme was 2,400m². The overall cost for the Environmental Improvement Scheme was €693,663 of which 9% of the costs can be attributed to the implementation of SuDS, thereby providing value for money for this flood resilient solution for managing surface water.

Social

Through public engagement with Dublin City Council Area Office, local councillors and public displays, the scheme had 'buy in' from design stage. Feedback from the local community has been positive and indicated that a greater sense of place has been created. The creation of green spaces and benches has enhanced the 'sense of place' for residents and visitors while delivering on the aims of the scheme.

Figure 5.33: Tree pits for draining surface water.

PROJECT DETAILS:

Local authority project contact

Céline Reilly
Executive Manager
Dublin City Council

Timeframe/timescale

The construction phase was nine months.

Figure 5.34: Portavolla flood defences, Co. Offaly.

Background

Portavolla Housing Estate is a development of 44 houses in West End, Banagher, and is built partially on a flood plain. It was flooded in November 2009 and December 2016, and 35 houses were evacuated.

Solution

Working with the OPW, a clay embankment 460m long and up to 1.6m high was constructed around the estate (**Figure 5.34**).

Benefits of solution

Social

Reduction in the risk of flooding and the need for residents to evacuate their homes.

PROJECT DETAILS:

Local authority project contact

Pat Pilkington
Executive Engineer
Environment Section
Offaly County Council

Timeframe/timescale
July 2017 – September 2018.

Figure 5.35: Flooding – Athlone, Co. Westmeath.

Background

Extensive flooding has occurred in Athlone over many years, the most significant being in 1954, 2009 and 2015, all of which were record floods (Figure 5.35). The Athlone Flood Alleviation Scheme has been progressed to address this issue, with an appropriate allowance for climate change impacts.

Solution

Flood barriers to the required height with flood gates, pumping infrastructure, and scheme management plans were implemented as solutions to flooding in the town.

Benefits of solution

Economic

This solution has an excellent cost–benefit ratio due to the urban environment and impact of flooding on residential and commercial property, as well as the functioning of the town as a regional centre (Figure 5.36). The overall costs are likely to be in the region of €12m. As well as the flood protection improvements, significant public realm enhancement works will be undertaken in high-amenity areas adjacent to the River Shannon.

Figure 5.36: Aerial view, flood-prone areas – Athlone, Co. Westmeath.

PROJECT DETAILS:

Local authority project contact

Barry Kehoe
Director of Service
Westmeath County Council

Timeframe/timescale

This project commenced in 2018 and is due to be completed in 2021.

Further information

http://athlonefas.ie/

Background

Garrettstown beach is a 2km stretch of sandy beach located approximately 9km south of Kinsale, County Cork. The beach has sea walls, gabion baskets, rock armour and embankments, all performing as coastal protection measures. During the storms of 2014 in Ireland the gabion baskets suffered severe damage, demanding the consideration of implementing alternative coastal protection measures.

Any method considered needed to allow for the protections of the adjacent regional road R604 from overtopping. Overtopping resulted in sand and other beach debris being strewn across the road, thereby limiting traffic movements in the area. During winter months this was a common occurrence and the road was cleared repeatedly by Cork County Council at considerable expense.

Solution

In June 2017, an erosion control armour block protection system was installed by Cork County Council to address the issues with coastal erosion and flooding at this location (Figure 5.37).

The erosion control armour block is an interlocking concrete armour system, which is manufactured from a blend of ordinary Portland cement and ground granulated blast furnace slag. It is considered an innovative, sustainable and cost-effective solution to coastal erosion.

The system allows the concrete to achieve a lighter colour finish and is a more environmentally friendly, stronger, and more durable solution to managing flood risks.

Benefits of solution

Environmental

These units have two direct environmental benefits:

- they are lighter in colour to match the local sands and the voids allow indigenous vegetation such as marram grass to grow between the blocks to enhance their aesthetic and biodiversity appeal; and,
- They allow for the effective protection of the adjacent R604 road from overtopping in storm events.

Economic

The Erosion Control Armour Block system has multiple economic benefits that provide pay-off in both the immediate and long term. They are regular in shape, and are therefore easy to manufacture, transport and place on site. From transport through installation, the sturdiness of the units ensured that they have a high structural strength and can withstand a range of loading types. In addition, the interlocking system exhibits good hydraulic stability.

As a result of its implementation, the erosion control armour block is expected to reduce Cork County Council's clean-up costs associated with previous wave overtopping on the nearby regional road.

Figure 5.37: Erosion control armour block – Garrettstown Beach, Co. Cork.

PROJECT DETAILS:

Local authority project contact

Kevin Costelloe
Senior Engineer
Coastal & Flooding Section
Water Services
Cork County Council

Timeframe/timescale

On-site construction was programmed to coincide with low tides and was finalised on site within a four-week period. The works were completed in June 2017.

Background

The increased loss of biodiversity and wildlife habitats along roads, in bogs, rivers, woodlands, and the loss of wildlife corridors and decline in key wildlife indicator species has led to a nationwide call for wildlife and biodiversity preservation. Coupled with this is the increase in invasive species across Ireland. In light of this, Longford County Council is currently undertaking projects to reverse the loss of bogland habitats in SAC's such as Lough Forbes SAC, Ardgullion Bog SAC, and Brown Bog , which have received European LIFE funding through the National Parks and Wildlife Service.

Solution

Longford County Council, in response to increasing loss of wildlife habitats and key indicator species, has funded numerous projects to the value of €20,000 ranging from planting for pollinators, biodiversity talks in schools, and the production of booklets and signage to help educate the public in identifying and preserving local wildlife habitats (Figure 5.38). With these projects it is planned to protect and preserve wildlife habitats and endangered species across the county.

Longford County Council is working closely with the National Parks and Wildlife Service on preserving and protecting SACs and Natural Heritage Areas across County Longford. The Council has also created several new habitats across the county, which include the Pallas Project in Ballymahon, the Memorial Garden in Longford Town, The Wildlife Garden in the Mall, and the N4 Pollinator and Wildlife Corridor Project. Longford County Council has also signed up to the National Pollinator Project with the National Biodiversity Data Centre and is currently in the process of developing a number of pollinator and wildlife projects throughout County Longford. The Council has also committed to reducing the number of times it cuts roadside verges and is now leaving large stretches uncut over the spring and summer period to help pollinators and allow for the establishment of a wildlife corridor.

Longford County Council has a very strong programme currently in place for the treatment of invasive species across the county and has identified over 250 sites where invasive species are located. All of these sites have been treated successfully over the last three years using stem injection at a cost of €48,000, and new sites are identified as they arise for inclusion in the treatment programme.

Benefits of solution

Environmental

With a greater emphasis on climate change and biodiversity now taking place across all sections of society, Longford County Council is committed to doing all it can to help conserve all wildlife habitats, bogs, wetlands, rivers, and forests. This will help to contribute to an improvement in biodiversity in the county. Increasing wildlife habitats and biodiversity across the county, while ensuring sustainable development, is a priority for Longford County Council. From an environmental, economic and social perspective the current biodiversity, habitat and wildlife conservation projects ongoing in County Longford are having a positive effect on the environment. A number of the projects have been highly commended and commented upon in Tidy Towns reports, citing the projects as being of high environmental and socio-economic benefit to the communities they are situated in. The N4 Longford Pollinator By-pass project has received praise from both Transport Infrastructure Ireland and Longford County Council. Longford County Council, in conjunction with Transport Infrastructure Ireland, is planning on expanding this project to include other locations along the N4 and N5 in Longford.

Figure 5.38: Pollinator-friendly garden – Ardagh, Co. Longford.

Economic

National figures show that the most important pollinators in Ireland are insects; particularly bees, hoverflies, butterflies, moths and other flies. In Ireland, crops such as apples, strawberries, clover and oilseed rape all benefit from pollination and the value of this service to the economy has been estimated at €53 million per year.

PROJECT DETAILS:

Local authority project contact

Gary Brady E.A.O.
Longford County Council
Great Water Street, Longford, Co. Longford, N39 NH56
Tel: 043 334 3451

Timeframe/timescale
2018 – 2025

Further information
https://www.longfordcoco.ie

Background

Many non-native species have been intentionally or unintentionally introduced into Ireland from around the world. Some of these non-native species have become invasive species and, by definition, their introduction and/or spread threatens biodiversity. Once established, invasive species are extremely difficult and costly to control and eradicate, and their ecological effects are often irreversible.

The four main species which affect County Galway include Japanese knotweed, giant hogweed, giant rhubarb and Himalayan balsam. In addition, there are other invasive species which include Himalayan knotweed and rhododendron.

Solution

Galway County Council's Invasive Alien Species Strategy is an important step forward in its efforts to tackle the threat posed by invasive species. A working group was set up by Galway County Council to deal with the environmental threats posed by non-native plants.

Phase one of the process to deal with invasive species is to make the public aware of the threat of such species. This is being done through the issuing of information leaflets, making information available on www.galway.ie, and by providing training for each community warden. Many leaflets are available outlining the treatment methods for managing the spread of the various invasive plants (Figure 5.39).

A dedicated phone number (091) 509 309 and email (invasivespecies@galwaycoco.ie) have also been set up to allow for the reporting of invasive species sites for investigation. The working group liaises with Transport Infrastructure Ireland and a four-year programme for the treatment of invasive species on national roads is currently in its final year.

More recently Galway County Council hosted a workshop for the general public on "Invasive Species; Practical things you can do…." in May 2019.

Benefits of solution

Economic

Invasive species create significant economic impacts wherever they become established, including increased control costs as well as loss of resource productivity of grazing lands and fish habitats. Increased prevention, detection and improved management of invasive species can provide significant economic benefits to provincial and local governments, businesses, industry, and citizens.

Figure 5.39: Information flyer on preventing spread of giant rhubarb, Galway County Council.

Social

Invasive species can have large impacts on society as a whole, affecting everything from the use of our private and public spaces to human health and safety concerns. Invasive plants such as giant hogweed are considered high risk and can have serious health implications due to toxic sap that can cause burns, blisters and scarring. Other species such as cheatgrass, if left to overgrow, can severely increase the risk of fire, impacting on public safety and property. Preventing new invasions and effectively managing established invasive species can help maintain property values and infrastructure and can minimise impacts to land- and water-based recreation.

PROJECT DETAILS:

Local authority project contact

Marie Mannion
Heritage Officer
Rosina Joyce
Community Warden

Timeframe/timescale

This strategy is ongoing.

Further information

https://biodiversity.galwaycommunityheritage.org/content/category/invasive-species
https://records.biodiversityireland.ie/record/invasives#7/53.455/-8.016

Background

Limerick City & County Council has been engaged in the collection of data and awareness raising in relation to invasive alien species in the city and county for a number of years. This work has highlighted the serious problem of giant hogweed in the River Maigue Catchment. This infestation has its origins in the River Loobagh, which is one of the tributaries of the Maigue. A comprehensive exercise has been undertaken by Limerick City & County Council to map the extent of giant hogweed in the River Loobagh catchment. This has shown the infestation to be more widespread than previously thought. This data was captured in the field using geospatial applications, including both a QGIS field app and a "Report Invasive Plants" smartphone app, which was developed by Limerick City & County Council in 2016.

Solution

In order to tackle the infestation, Limerick City & County Council successfully applied to the Department of Culture, Heritage and the Gaeltacht under National Biodiversity Action Plan funding for biodiversity projects to undertake a three-year control programme for giant hogweed on the Loobagh Catchment. The overall objective of the programme is to achieve complete control and possible long-term eradication of giant hogweed in the Loobagh Catchment. Limerick City & County Council highlighted the need to engage experts in invasive alien species whose methodology would move away from the more conventional approach to control, which is to spray with herbicide up to four times a year. This approach is different from conventional eradication programmes in several respects: herbicide will not be used unless there are no other options; habitat restoration to prevent colonisation by secondary plant invaders (e.g., Japanese knotweed) will be prioritised; and, the community will be encouraged to engage through citizen science and active participation (Figure 5.40).

The eradication programme has two main phases:

1) reduce the seed bank by cutting seeds from the plants before they ripen and disperse, and,

2) dig up the tap roots in early spring.

The success of this approach is dependent on systematic removal of seeds and plants from the top of the catchment downstream: even one plant left in the upper catchment could lead to recolonisation along the entire length of the catchment.

Benefits of solution

Environmental

Conventionally, herbicide spraying is repeated year on year until the seed bank is exhausted and it could lead to unacceptable levels of chemicals in the environment. When giant hogweed is treated with herbicide the plant is killed, along with some of the surrounding vegetation, and this leaves bare, exposed soil, which is subject to erosion and is therefore vulnerable to colonisation by other invasive alien species. For example, giant hogweed is frequently replaced by hybrid butterbur, and this leads to a continued degradation of habitat and loss of biodiversity. It is for these reasons that a non-herbicide approach is being taken in this eradication programme. The eradication programme methodologies being undertaken by the contractors vastly reduces the amount of herbicide introduced to the environment and the reseeding of exposed areas prevents colonisation by other invasive plants.

Figure 5.40: Removal of giant hogweed in Co. Limerick.

Economic

Remediation to mitigate erosion of riverbanks will be reviewed and discussed with individual landowners.

Social

Giant hogweed represents a serious risk to public health. Contact with the plant's toxic sap can cause painful burns/blisters. Eradication of giant hogweed from the Loobagh catchment will prevent members of the public from accidental exposure to the plant.

In addition, a number of public meetings throughout the project will help educate local stakeholders in relation to the identification and control of giant hogweed.

PROJECT DETAILS:

Local authority project contact

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Timeframe/timescale

The programme commenced in Q3 2019 and will be completed by 30th September 2021.

Background

Malahide Demesne Castle and the remaining 265 acres of the estate were sold to Dublin County Council in 1976, following which it was opened to the public. In 1994, property ownership passed to Fingal County Council.

Solution

The castle and courtyard underwent major repair and conservation work in 2012 and visitor facilities were enhanced. The walled botanical gardens and glasshouses, containing Lord Milo Talbot's collection of plants from around the world, were also restored and conserved.

The 10 hectares (25 acres) of Talbot Botanic Gardens is made up of 1.6 hectares (four acres) of walled garden and 8.5 hectares (21 acres) of parkland botanic collection. The plant collection features predominantly tender and rare southern hemisphere plants from Australia, New Zealand, and Chile, amongst other countries.

Its position on the outskirts of greater Dublin means the castle is heavily visited by the general public. It also hosts several events and activities throughout the year, and provides a range of sporting facilities for use by the general public. Combined with this, the previous use of the site as a farm has led to degradation of the green fabric of the park, some loss of biodiversity, and loss of a secure wildlife area due to public use.

To counter this, the management plan has actively promoted biodiversity in all areas of park management. Questionnaires have also been undertaken to set a baseline for wildlife and biodiversity in the park. This highlighted issues with biodiversity in the meadows, lack of age range in woodlands, and the potential loss of habitat for birdlife, bats, and mammals.

Benefits of solution

Environmental

The Buddlia Garden is a way of providing a habitat for local butterfly species and the meadow encompasses 37 acres for wildlife habitats.

Social

The Butterfly House is a chance for all visitors to see butterflies up close and to learn about their lifecycle (Figure 5.41). The Buddlia Garden is useful in educating the public on the types of garden plants that can help to rejuvenate insect pollinator populations. The meadow is also a means of educating the public on Fingal County Council's approaches to the management of open spaces in supporting biodiversity.

Figure 5.41: Tropical butterfly house, Malahide Demesne, Co. Fingal.

PROJECT DETAILS:

Local authority project contact

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Timeframe/timescale
Works are ongoing as part of the Malahide Demesne Development Plan.

Further information
https://m.facebook.com/story.php?story_fbid=2175506455838385&id=1019082498648 93&__tn__=%2As%2As-R
https://mobile.twitter.com/Fingalcoco/status/1121465178523086850
https://www.rte.ie/news/2019/0319/1037383-fingal-county-council-giving-away-free-trees/

Background

South Dublin County Council was aware that many of its parklands had potential for species-rich meadowlands, which would benefit from changed mowing regimes and promote biodiversity. Regular mowing (on a typical two-week cycle) was encouraging the growth of a mainly grass sward, which then out-performed the slower-growing meadowland species. Regular mowing also prevented meadowland species from flowering (which provides food for pollinators).

Solution

Altered mowing regimes have been put in place over several years in South Dublin County Council's larger parks for the benefit of pollinators and biodiversity. The implementation of meadowlands was underway on an informal basis within the parklands over many years. However, in 2017 South Dublin County Council's Heritage Officer carried out botanical and insect questionnaires that demonstrated the enormous biodiversity potential of the parkland sites. A formal project commenced in 2017 with 13 separate areas in Tymon Park totalling 18 hectares, and three areas along the Dodder Valley Park totalling five hectares. These areas were chosen for their soil types, the nature of their botanical composition, and their contribution to the amenity enjoyment of these parks. In 2019, these areas of wildflower meadowland have been increased to 90 hectares over various locations within South Dublin County Council parks (Figure 5.42). Increased signage highlighting the presence of the meadowlands and benefits to pollinators was also erected at these locations in 2019, which was of benefit from a public engagement point of view. Friends of Tymon Park (a local community group) worked with Council staff on several initiatives within the park and assisted South Dublin County Council's Heritage Officer in quantifying the number of orchids present in 2019. This has proven to be a popular and highly successful climate change action with thousands of orchids being counted in 2019 and much positive comment and feedback being received from members of the public via social media and other channels. Following this, it is the Council's intention to carry out ecological questionnaires in 2020 in these meadows and document their success to date in terms of supporting insects and wildlife. This will allow the Council to evaluate other locations for this reduced mowing approach. These wildflower meadows are highly important for pollinators as a significant number of meadowland species are native or naturalised and support local pollinators. For instance, the mowing regime in Tymon Park over many years has supported an annual flowering of cowslips – an early food source for insects.

Benefits of solution

Environmental

The environmental benefits of this solution include:

- increased biodiversity within parklands and the development of Priority I habitats (under Annex I of the *Habitats Directive*) at several locations;
- increased support for pollinators – an insect questionnaire found the presence of a very rare species that had not been recorded in Ireland since the 1920s;
- a decreased carbon footprint through reduced maintenance regimes as in-cut meadows act as improved carbon sinks over grassland; and,
- fauna protection shelter and food for a wide range of animals such as amphibians, birds (particularly ground-nesting species) and mammals, e.g., hedgehogs.

Figure 5.42: Wildflower meadows, South Dublin County Council.

Economic

Less machinery wear and tear and decreased fuel costs contribute to economic benefits for South Dublin County Council.

Social

A positive public perception of the work of South Dublin County Council, including positive feedback from the public and the media.

PROJECT DETAILS:

Local authority project contact

Suzanne Furlong
Senior Parks Superintendent
Leo Magee
Senior Engineer
Rosaleen Dwyer
Heritage Officer

Timeframe/timescale
2017 onwards

Figure 5.43: Kinsale Road Landfill Site.

Background

This historic Kinsale Road Landfill Site (opened in 1962), now known as Tramore Valley Park, had reached its allowable capacity of over three million tonnes of non-hazardous municipal waste by 2009, when it closed to further landfilling (**Figure 5.43**). The future use of the site, only 3km south of the centre of Cork City, became an issue in terms of future development for a number of reasons. There were restrictions in terms of any future above-ground buildings due to the nature of the ground conditions and the existing underground infrastructure still required to comply with the EPA licence.

Solution

Cork City Council developed a masterplan for the reuse of the site. The aims of the masterplan were to develop the site into a public park, thus providing a range of activities to foster health and well-being and providing a more natural habitat (to encourage increased biodiversity) compared to other city centre parks. These aims were achieved by providing a circular walking/running/cycling path, together with a BMX facility, playing pitch and pavilion, and other nature walks to semi-wild sections of the park (**Figure 5.44**). Further plans include specific pollinator-friendly locations and flora, and physical connectivity to neighbouring facilities and population centres, encouraged by the recent Cork City Council boundary extension.

Benefits of solution

Environmental

The continuing recovery and converting to electricity of the existing landfill gasses (specifically methane) mitigates climate change, and

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Local authority project contact

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Timeframe/timescale

The former Kinsale Road Landfill Site, now the Tramore Valley Park, has been remediated on a phased basis. The majority of the civil and environmental engineering works were complete by 2010 and entailed placement of an impermeable geomembrane over the waste, which was then covered with soil and a vegetated cover layer. Additional environmental control technologies such as leachate collection sumps and pumps, as well as gas collection wells and manifolds, were also constructed during this period. The final phase prior to the site opening as the Tramore Valley Park in May 2019 involved the construction of the green elements of the park such as tree planting, flower beds, and setting out formal grass areas as well as paths and trackways. Further development of the park will occur as future funding becomes available.

Figure 5.44: Aerial view – Tramore Valley Park, Cork City.

further plans are being developed to replace this energy project with other renewable energy projects when the gas source is exhausted. Another mitigation project has been the development of a 'park-and-ride' facility on the site, which not only reduces traffic volumes further into the city but also reduces the greenhouse gas, NOX and particulate emissions associated with current vehicles.

Social

The solutions provide a new, large public park on the doorstep of Cork City. This is beneficial on many levels, including further opportunities for leisure, fitness, and health, as well as improving biodiversity.

As future funding becomes available, it is hoped to add to the existing offerings at the Tramore Valley Park by the development of activity trails, connecting to local communities through more path and bridge infrastructure, as well as a native tree-planting programme.

Background

Recent flood events across Dún Laoghaire Rathdown, particularly as a result of intense summer rainfall, have resulted in hundreds of properties being flooded and key road/rail infrastructure being impacted. In addition to riverbanks bursting and the resultant overland flows flooding homes/businesses, many properties were impacted from pluvial flooding caused by 'monster' rainfall events. Whilst work is underway in many key locations on river-based flood alleviation schemes, there is a clear need to seek to minimise the risk of localised flooding during these intense downpours. SuDS are a key tool in tackling the effects of increased stormwater runoff. However, often in urbanised areas, some SuDS measures are not practicable (e.g., swales, ponds, etc.) and thus other measures are required. Green (and/or blue) roofs are one approach to SuDS that can be incorporated into the majority of new (and in some cases existing) developments given that most developments have roofs. Thus, these can be readily modified/adapted to store rainfall either in vegetated areas (green roofs) or simply in 'open basins' (blue roofs).

Solution

Dún Laoghaire Rathdown County Council has been very proactive in the area of green roofs, and is the first local authority with a mandatory policy on green roofs embedded within its County Development Plan. This policy has a requirement for green roofs on the majority of larger developments. Green roof types range from simple 'sedum moss' type roofs, to intensive green roofs, which can be planted with shrubs, flowers, and lawn areas (Figure 5.45).

Benefits of solution

Environmental

The primary benefit to Dún Laoghaire Rathdown County Council is the attenuation effect that green/blue roofs have on rainwater runoff from large developments. This significantly reduces the effects of localised flooding (up to 80% in some cases).

Other benefits include biodiversity enhancement, particularly if the green roof is designed with this in mind. A wide range of planting material can be utilised including wildflower meadows, etc.

Other benefits can include reducing the 'heat island' effect by cooling the upper floor of a building in summer and reducing the amount of reflected heat. Equally, a green roof can provide an element of insulation during freezing conditions.

Social

Amenity benefits are often overlooked with green roofs, yet they can provide significant mental and emotional well-being benefits as is similar to other nature-based environments.

Figure 5.45: Green roof – Dún Laoghaire Rathdown County Council.

PROJECT DETAILS:

Local authority project contact

Austin Baines
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Dún Laoghaire Rathdown County Council

Joe Craig
Senior Engineer
Dún Laoghaire Rathdown County Council

Timeframe/timescale

The installation of green roofs will continue to be a core element of SuDS in Dún Laoghaire Rathdown County Council.

Background

The EPA and M Co., in collaboration with the Eastern and Midlands CARO and Kildare County Council, facilitated a workshop at Solas Bhríde, Kildare Town, on climate impacts/issues local to County Kildare and potential solutions/initiatives which could be considered as part of the rollout of the National Dialogue on Climate Action. This workshop was attended by representatives from local business communities, local voluntary and community organisations, local authority staff, the Eastern and Midlands CARO, the Department of Communications, Climate Action and Environment, and climate action NGOs. At this workshop, engagement with young people was discussed and one of the initiatives suggested was a climate camp, which could be run over the summer holidays to educate young people about climate change in a positive, fun and interactive way. The Eastern and Midlands CARO, Kildare County Council, The Irish National Stud & Japanese Gardens, Kildare Tidy Towns, The Hive Youth Hub, and Met Éireann, together with the EPA & M Co., worked together to facilitate a Climate Camp for 11-14 year olds, hosted at the Irish National Stud in Kildare over three days in July 2019, with a total of 30 participants.

Solution

Day 1 focused on weather and climate, facilitated by Met Éireann. It included presentations to and discussion with the participants about the various components of weather and climate, as well as the setting up of a mobile weather station, which was monitored over the three days of the camp.

Day 2 focused on biodiversity (including ecosystem mapping) and climate change adaptation measures, both locally and nationally. The day was facilitated by Dr. Mary O' Connor, ecologist and Chairperson of Kildare Tidy Towns, and by Paul Regan from the Eastern and Midlands CARO, who used the Kildare County Council Climate Change Adaptation Strategy and National Climate Action Plan for reference.

Day 3 included presentations and interactive games dealing with climate change, the Sustainable Development Goals and the positive climate actions that individuals can take. The first part of the day was facilitated by Marianne Creyf, Cool Planet Champion, and Sorcha O'Neill, a local climate ambassador. At the end of the third day, participants presented to a panel of elected members from the Kildare/Newbridge Municipal District and Kildare County Council's Director of Service for Environmental and Water Services, on what they believe the urgent issues are, based on what they learned over the three days. They also discussed their solutions/ideas and had an opportunity to ask questions and discuss with the panel what the local authority and its elected members can and are doing about climate change (Figure 5.46).

Figure 5.46: Children's drawings, climate action camp.

Benefits of solution

Social

The camp represented collaboration between local business, the local authority, local community, and voluntary and State organisations, who pooled their resources and worked together to facilitate engagement of young people, helping to educate them about climate change, how it can impact at global and local levels, and their contribution to the impacts/solutions, in a positive, interactive and fun way.

PROJECT DETAILS:

Local authority project contact

Claire Moran
Eastern & Midlands CARO

Further information

A summary of the camp, lessons learned, a resource template and further photographs will be available to share in Q3/Q4 2019.

Background

It was recognised by the Eastern and Midlands CARO that in order to encourage behavioural change in communities, climate-related training for those active in the community would be essential. This training would educate them about the impacts of climate change and on how to climate proof/build resilience/build environmental sustainability into their activities both as an individual and community member. Small-scale training has been carried out in the past, focused either on specific groups (e.g., Tidy Towns), or specific topics only, and such training can be costly for groups to undertake.

Solution

The Eastern and Midlands CARO worked with the Coordinator of the Rural Environment Pillar of County Kildare LEADER Partnership to develop a tender for the preparation and delivery of a 100% LEADER-funded pilot training programme entitled "Communities 4 Climate Action" open to individuals in community groups and clubs in the county.

The successful bidder, ESD Training, will be required to tailor the course so content is relevant to the types of individuals that take part in the training programme and their activities in the community. Three modules on 'Climate Change Mitigation and Adaptation', 'Teamwork & Engagement' and 'Green Procurement' will be provided to all participants. Other modules available, based on the participants' activities in the community, will include 'Growing & Groundskeeping', 'Waste & the Circular Economy', 'Energy Use & Renewable Energy', 'Water & Climate Change', and 'Transport'. The 10-week course will be free to participants and includes two field trips, as well as a competition to win €1,000 for a new climate action project in a community group or club. The pilot course commenced on 28th September 2019.

Benefits of solution

Social

There are two main objectives:

1. To build awareness and capacity within communities by equipping individuals and representatives from voluntary organisations and/or clubs in County Kildare with knowledge and skills which they can apply to their activities in order to make their communities more climate resilient and environmentally sustainable.
2. To encourage groups and small-medium enterprises to apply for LEADER funding under the Rural Environment theme in order to undertake new climate action-related projects that may emerge from their training in the 2019-2020 period.

PROJECT DETAILS:

Local authority project contact

Claire Moran
Eastern and Midlands CARO
Maeve Howe
Rural Environment Pillar Coordinator, CKLP

Timeframe/timescale

This is a 10-week training programme.

Further information

The first pilot course commenced on 28th September 2019; the tender awarded includes provision for outcome reporting and feedback, which will be reviewed.

Background

Meath County Council was approached by Batterstown Sustainable Energy Community to partner with it to progress its energy masterplan given that the group did not have financial resources or procurement expertise to appoint energy consultants to deliver the plan. After engagement with the Sustainable Energy Community, Meath County Council considered it an exemplar initiative, which could share its story and experience with others and set a high but realistic standard for other Sustainable Energy Community groups.

A Sustainable Energy Community launch was planned for the 6th June 2019 with a view of showcasing its work and to encourage other potential groups into the system. The SEAI and Future Fits (mentors) also participated in the event.

Solution

The event was expanded to include climate action and to reinforce the Council's climate action message of 'BUY LOCAL FOR CLIMATE ACTION'. Several local energy suppliers, EV dealerships, local food producers, and climate-friendly or sustainable businesses were invited to attend the event. The event consisted of two parts: first, a display area highlighting the products and services as outlined above; and second, the official launch of the Sustainable Energy Communities in Meath.

Several food producers provided free samples and catering was also supplied using locally sourced foods. The addition of food was well received and helped to reinforce the 'buy local' element.

The launch event included an opening address by Jackie Maguire, Chief Executive of Meath County Council, and presentations were made by Caroline Corrigan of Meath County Council, Gavin Harte of Future Fit, Gillian Gannon of SEAI and the Batterstown Sustainable Energy Community group.

Benefits of solution

Social

The event encouraged public engagement and delivery of the climate action and Sustainable Energy Community message. It also facilitated knowledge sharing of both the Sustainable Energy Community process and climate action, and allowed potential groups to talk directly with the Batterstown community group. It also had the benefit of raising climate awareness with Meath County Council staff. This event also acted as a trial run for the Council's Climate Action Strategy launch events where the climate action team will bring similar events to its six municipal districts.

PROJECT DETAILS:

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Timeframe/timescale

This was an afternoon event from 3.30 – 7.00pm, taking approximately two weeks to organise.

Background

Dublin City Council recognises that while emissions from flights are a small element of the carbon emissions of the City Council, they are a major contributor worldwide to climate change. Dublin City Council is a signatory to the Covenant of Mayors. Consequently, to demonstrate exemplary leadership and to offset aviation travel of staff, the Council is working with an Irish NGO, Vita, to offset its carbon emissions from its business flights. The City Council is the first local authority in Ireland to partner with Vita on their Vita Green Impact Award, which won the Environmental Finance 2018 Award for best individual carbon offset project. Vita invested €2m in eco stoves, the repair of pumps, and solar lights in Ethiopia and Eritrea. The use of these stoves reduces local deforestation by 60%. Every tonne of carbon saved generates a carbon credit that can then be sold. Vita calculated the carbon footprint of all Dublin City Council business flights taken in 2017 and 2018, and the Council subsequently purchased credits to offset these emissions.

Solution

The solution that Dublin City Council adopted to offset carbon emissions generated from business air travel is the first of its kind by a local authority nationally.

Benefits of solution

Environmental

The Council has offset approximately 250 tonnes of CO_2 over the past two years, directly impacting on the lives of people that are at the front line of the impacts of climate change.

Economic

This programme costs the Council approximately €1,350.

Social

The benefits of this voluntary emissions trading arrangement extend beyond just the cancellation of the Council's CO_2 emissions. The scheme is also a model of climate justice.

It reduces eye and lung disease in the many families who now use eco stoves; they reduce the heavy burden of cutting and carrying firewood by women and girls, allowing girls in many instances to attend school and study; and, they promote sustainable industries in Ethiopia and Eritrea in the manufacture of stoves.

They deliver on specific United Nations Sustainable Development targets and indicators relating to energy, water and health (Sustainable Development Goals 3, 6 and 7).

PROJECT DETAILS:

Local authority project contact

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Timeframe/timescale

It is intended that Dublin City Council will continue with this partnership on an ongoing basis.

Further information

www.VitaGreenImpactFund.com
www.vita.ie

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APPENDICES

7. Appendices

Appendix 1: Climate action questionnaire

1. Local authority climate change actions

Context

This research is undertaken by the LGMA in partnership with the Climate Action Regional Offices (CAROs) on behalf of the County and City Management Association (CCMA) Environment Climate Change and Emergency Planning (ECCEP) Committee. The following questionnaire should assist local authorities in developing a baseline assessment of local climate change actions. Although local authorities are developing Climate Adaptation Strategies in 2019, the request by the ECCEP indicated that mitigation, adaptation and emergency response (remediation) following extreme weather events should form part of the baseline assessment to facilitate a thorough understanding of all climate change actions local authorities are currently engaged in.

Once the questionnaire has been completed, we will supplement the findings with a variety of case studies to demonstrate examples of best practice across local authorities relating to mitigation, adaptation and emergency response.

Methodology

- Questionnaire structure

There are nine sections in the questionnaire, including this introduction section (Section 1).

Sections 2-4 of this questionnaire focus on adaptation only and are structured to align to Local Authority Adaptation Strategy Development Guidelines (DCCAE, 2018). This enables local authorities to demonstrate the processes in place for developing their adaptation strategies.

- Section 2: Convening adaptation team (4 questions)
- Section 3: Assessing current adaptation baseline (4 questions)
- Section 4: Identifying future climate impacts, vulnerabilities and risks (3 questions)

Sections 5-8 expand to focus on mitigation, emergency response and adaptation. There are four themes identified, three of which (natural and cultural capital, critical infrastructure, and water resources and flood risk management) align to those identified in The National Adaptation Framework (DCCAE 2018b). A fourth theme in the Framework, 'public health' has been substituted (as it is the responsibility of the Department of Health) with the theme 'services' to capture services relevant to local authorities.

- Section 5: Natural and cultural capital (25 questions)
- Section 6: Critical infrastructure (45 questions)
- Section 7: Water resources and flood risk management (24 questions)
- Section 8: Services (30 questions)

Section 9 provides an opportunity to include additional case studies of best practice relating to climate change action.

The questionnaire has been designed by the LGMA Research Unit, CARO offices and academic staff from the Centre for Marine and Renewable Energy (MaREI).

Local authority

Local authority contact person

Contact person email address

2. Convening the adaptation team

The first key issue in preparing an adaptation strategy baseline is ensuring the participation of the right people at key stages of the process. This is likely to require the inclusion of different sectors/departments/personnel at different times to guide the strategy from development to implementation (DCCAE, 2018).

2.1 Is there a 'core team'/core department/core person(s) assigned within the local authority to develop an adaptation strategy as defined in the Local Authority Adaptation Strategy Development Guidelines?

- ○ Yes
- ○ No
- ○ Work in progress

2.1.1 If not, when do you expect 'core team'/core department/core person(s) to be assigned?

DD /MM/YYYY

2.2 Is there a 'climate planning team'/climate planning department/climate planning person(s) within the local authority to support and implement the adaptation strategy as defined in the Local Authority Adaptation Strategy Development Guidelines?

- ○ Yes
- ○ No
- ○ Work in progress

2.2.1 If not, when do you expect the 'climate planning team'/climate planning department/climate planning person(s) to be assigned?

DD /MM/YYYY

3. Assessing current adaptation baseline

Understanding how well adapted an authority is to current weather extremes and climatic trends is a crucial step in developing an adaptation strategy. The focus should be on identifying the complete range of hazard events to have affected your local area and authority rather than limiting the assessment to a defined time period, e.g., the preceding 30 years (DCCAE, 2018).

3.1. Have you identified the full range of extreme weather events to have affected your local authority?

- ○ Yes
- ○ No
- ○ Work in progress

3.1.1. If yes, have you developed an understanding of the local level impacts and vulnerabilities to these hazards?

- ○ Yes
- ○ No
- ○ Work in progress

3.1.2 If yes, have you assessed the consequences for the delivery of local authority services and functions from the impacts of extreme weather events and periods of climate variability?

- ○ Yes
- ○ No
- ○ Work in progress

3.1.3 If yes, have you identified a list of external actors relevant to the management of identified climate impacts? E.g., NPWS, DCHG, Coillte, DTTAS, NRA, HSE, An Garda Síochána, Fire services.

- ○ Yes
- ○ No
- ○ Work in progress

4. Identifying future climate impacts, vulnerabilities and risks

Completion of this section is relevant if the local authority has completed an adaptation baseline assessment identified in Section 3 above.

Understanding how the impacts of climate hazards are likely to evolve in the future is a crucial element of adaptation strategy development. The climate risk register should summarise information gained through the baseline assessment and future impact and vulnerability assessment through a series of climate risk statements, associated time frames and projections of future changes in these risks (DCCAE, 2018).

4.1 Have you examined available climate projection data from the EPA and/or Climate Ireland and developed an understanding of the frequency and intensity of extreme weather events and how climate variability might change in the future?

- ○ Yes
- ○ No
- ○ Work in progress

4.2 Have you developed a climate risk register, as recommended in the Local Authority Adaptation Strategy Development Guidelines, summarising information gained from the adaptation baseline assessment?

- ○ Yes
- ○ No
- ○ Work in progress

4.2.1 If yes, does the climate risk register measure future local authority impact and vulnerability assessment through a series of climate risk statements, associated time frames, projections of future changes and relevant policies associated with these risks as defined in the Local Authority Adaptation Strategy Development Guidelines?

- ○ Yes
- ○ No
- ○ Work in progress

5. Natural and cultural capital

This theme focuses on current climate actions relating to agriculture, the environment, biodiversity, heritage, climate action and tourism.

BIODIVERSITY

5.1 Do you have a Biodiversity Action Plan?

- ○ Yes
- ○ No
- ○ Work in progress

5.1.1 If so, does your Biodiversity Action Plan detail actions related to climate change?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.1.1.1 If so, does the plan contain baseline assessments, which would enable measurable evaluation of biodiversity climate action programmes?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.2 Do you have an invasive alien species plan?

- ○ Yes
- ○ No
- ○ Work in progress

5.2.1 If yes, how often is the invasive alien species plan reviewed?

5.2.2 If yes, does your invasive alien species plan detail actions related to climate change?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.2.3 If yes, does the invasive alien species plan contain data on scale/extent/location of invasive species?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.3 Do you have a tree management policy?

- ○ Yes
- ○ No
- ○ Work in progress

5.3.1 If so, does your tree management policy detail actions related to climate change?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.4 Number of trees planted by local authority in

2017

2018

5.5 Do you have tree trials within your local authority?

- ○ Yes
- ○ No
- ○ Work in progress

5.5.1 If yes, number of current tree trials in local authority?

5.6 Do you have an urban woodland strategy/guidelines?

- ○ Yes
- ○ No
- ○ Work in progress

5.6.1 If so, does your urban woodland strategy/guidelines detail actions related to climate change?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

ENVIRONMENT

5.7 Do you have a green infrastructure strategy/guidelines?

- ○ Yes
- ○ No
- ○ Work in progress

5.7.1 If so, does your green infrastructure strategy/guidelines detail actions related to climate change?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.8 Do you have a public open space and parks strategy?

- ○ Yes
- ○ No
- ○ Work in progress

5.8.1 If so, does your public open space and parks strategy detail actions related to climate change?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.9 Does your LA include landscape classification assessments or other similar assessments as part of its development plan?

- ○ Yes
- ○ No
- ○ Work in progress

5.9.1 If so, have these been incorporated into local authority sustainability/conservation policies?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

5.10 Do you incorporate 'green roofs' in council buildings as part of new builds or upgrades? (i.e., roof that is partially/completely covered with vegetation and soil, or a growing medium, planted over a waterproof membrane?

- ○ Yes
- ○ No
- ○ Work in progress

5.11 Do you have a policy/plan on pesticide/herbicide reduction use measures?

- ○ Yes
- ○ No
- ○ Work in progress

5.12 Please list all designations/awards that you are managing or indirectly engaged in, which require you to demonstrate climate actions, e.g., An Taisce Green Flag, UNESCO Biosphere, RAMSAR Wetlands sites, Natura 2000 sites, NHA, Nature Reserves, Special Area of Amenities

6. Critical infrastructure

This theme is concerned with the core infrastructure and critical buildings local authorities are primarily responsible for, including roads, social housing, planning, coastal and marine infrastructure, and waste services.

ENERGY PLANNING

6.1 Does an energy agency exist within your local authority? E.g., Codema, Tipperary Energy Agency, Meath Energy Agency, Kerry Energy Agency, DEAT.

- ○ Yes
- ○ No
- ○ Work in progress

6.2 Has an energy management team been established in the LA?

- ○ Yes
- ○ No
- ○ Work in progress

6.3 Do you currently hold ISO 50001 accreditation related to energy management efficiencies?

- ○ Yes
- ○ No
- ○ Work in progress

6.4 Has an energy master plan showing building ratings, energy use, and renewable energy technologies in all local authority owned buildings been developed?

- ○ Yes
- ○ No
- ○ Work in progress

6.4.1 If yes or work in progress, has the Energy Master Plan prioritised areas/buildings for retrofits and potential energy projects?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

6.5 In accordance with Energy Efficiency Directive SI 426, do local authority buildings display energy certificates?

- ○ Yes
- ○ No

6.5.1 If yes, what % of local authority buildings display energy certificates?

6.6 Has a near zero energy buildings (NZEB) pilot been undertaken in the local authority?

- ○ Yes
- ○ No
- ○ Work in progress

6.7 % of social housing stock with BER rating at 2018 year end

A:
B:
C:
D:
E:
F:
G:

PUBLIC LIGHTING

6.8 Has a public lighting plan/guide or equivalent been developed by the LA?

- ○ Yes
- ○ No
- ○ Work in progress

6.8.1 If so, does the public lighting plan/guide mandate the use of LED lights in all new public lighting installations?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

6.8.2 If yes, what % of public lighting uses LED bulbs at 2018 year end?

LOCAL AUTHORITY VEHICLE FLEET

6.9 Does the local authority own/lease electric vehicles (EVs) or hybrid vehicles for its day-to-day operations?

- ○ Yes
- ○ No
- ○ Work in progress

6.9.1 If yes, what is the % of the total council fleet which is EV based, whether owned or leased?

6.9.2 If yes, what is the % of the total council fleet which is hybrid vehicle based, whether owned or leased?

PLANNING AND PUBLIC REALM

6.10 Do any pedestrian prioritisation schemes exist in public spaces?

- ○ Yes
- ○ No
- ○ Work in progress

6.10.1 If so, number of pedestrian prioritisation schemes implemented in public spaces in the last five years (2014-2018)?

6.11 Number of road and street design schemes planned and implemented in the last two years (2017-2018)?

6.12 Does a walking or cycling strategy exist within the local authority?

- ○ Yes
- ○ No
- ○ Work in progress

6.13 Total number of council-installed bike parking facilities in public spaces at 2018 year end?

6.14 Number of kilometres of **integrated cycle lanes** which have *specific designated cycle lane marking* in LA?

6.15 Number of kilometres of **segregated cycle lanes** in LA, including cycle tracks, cycle trails and cycle ways (blueways/greenways)?

6.16 Number of electric vehicle (EV) charging points on local authority property available for public use?

6.16.1 Does the LA provide designated EV car parking spaces?

- ○ Yes
- ○ No
- ○ Work in progress

OTHER INNOVATIVE TRANSPORT INITIATIVES

6.17 Are you developing or involved in innovative transport initiatives for uptake by the general public? E.g., Smarter Travel Programme, Car Free Day, Cycle2Work Day, Last Mile Delivery, autonomous vehicles

RENEWABLE ENERGY AND ENERGY EFFICIENCY

6.18 Have you applied for funding for renewable energy and energy efficiency projects in the last five years (2014-2018)?

- ○ Yes
- ○ No

6.19 Have you received funding for renewable energy and energy efficiency projects in the last five years (2014-2018)?

- ○ Yes
- ○ No

6.19.1 If yes, please list each project name and amount of funding received for each project

6.20 Have you funded/part funded renewable energy and energy efficiency projects in the last five years from own resources (2014-2018)? E.g, installation photovoltaic (PV) panels on council buildings, retrofitting buildings.

- ○ Yes
- ○ No

6.20.1 If yes, number of renewable energy and energy efficiency projects successfully completed by local authority in the last five years (2014-2018) funded/part funded from own resources

WASTE MANAGEMENT

6.21 Does the LA have a waste management system in place?

- ○ Yes
- ○ No
- ○ Work in progress

6.22 Are you currently monitoring waste generated in council-operated buildings?

- ○ Yes
- ○ No
- ○ Work in progress

6.22.1 If yes, recycling rate in council-operated buildings as a % of all waste in

2017

2018

6.23 Do you provide support for reuse/upcycling facilities within the LA for public use?

- ○ Yes
- ○ No
- ○ Work in progress

6.24 Number of bring centre/civic amenity sites in LA at 2018 year end

6.24.1 % of civic amenity sites that include waste reuse facilities at 2018 year end

6.25 Have you collaborated with the EPA 'Stop Food Waste' campaign or have you run similar food waste projects in the past two years (2017-2018)?

- ○ Yes
- ○ No
- ○ Work in progress

6.25.1 If you ran similar food waste projects over the past two years (2017-2018), please list each project

LITTER MANAGEMENT

6.26 Number of anti-dumping initiatives/anti-litter campaigns initiated by local authority, e.g., Conscious Cup campaign, gum litter campaign, cigarette disposal campaign, Don't be Dick campaign, use of drones, use of CCTV in

2017

2018

OTHER INNOVATIVE CRITICAL INFRASTRUCTURE AND BUILDINGS INFRASTRUCTURE INITIATIVES

6.27 Are you developing or involved in any other innovative critical infrastructure and buildings infrastructure initiatives?

7. Water resource and flood risk management

Local authority responsibilities for water resources and flood risk management include, but are not limited to, waste water services, group water schemes, water quality and flood risk management.

WATER CONSERVATION/QUALITY

7.1. Do you measure water use in local authority buildings?

- ○ Yes
- ○ No
- ○ Work in progress

7.2 What year end (e.g., 31/12/2018) were water conservation measures rolled out to

Council-owned buildings

Social housing stock

General public

7.3 Number of identified beaches in local authority area

7.3.1 Number of identified beaches in LA with 'Excellent' water status in 2018

7.3.2 Number of identified beaches in LA with 'Poor' water status in 2018

FLOOD RISK MANAGEMENT

7.4 Is your flood emergency response plan updated annually?

- ○ Yes
- ○ No
- ○ Work in progress

7.4.1 Does your flood emergency response plan take Catchment Flood Risk Assessment and Management (CFRAMs) flood maps (where available) into account?

- ○ Yes
- ○ No
- ○ Not applicable

7.4.2 Number of times flood emergency response plan has been enforced in LA in the last five years (2014-2018)

7.5 Have you undertaken a strategic flood risk assessment for your County/City Development Strategy/Plan?

- ○ Yes
- ○ No
- ○ Work in progress

7.6 Have you undertaken a strategic flood risk assessment for all your Local Area Plans?

- ○ Yes
- ○ No
- ○ Work in progress

7.7 Does your strategic flood risk assessment take Catchment Flood Risk Assessment and Management (CFRAMs) flood maps (where available) into account?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

7.8 Is there a Strategic Development Zone (SDZ) in your local authority?

- ○ Yes
- ○ No

7.8.1 If yes, is the strategic flood risk assessment of all strategic development zones (SDZs) up to date?

- ○ Yes
- ○ No
- ○ Work in progress
- ○ Not applicable

7.9 Have you converted local authority land to wetlands for flood control/water quality improvement measures in the last five years (2014-2018)?

- ○ Yes
- ○ No
- ○ Work in progress

7.9.1 If yes, please provide additional details of each wetland conversion project

7.10 Have you designated a specific policy within your local authority County/City Development Plan for inclusion of sustainable drainage systems (SuDS) in new/existing developments?

- ○ Yes
- ○ No
- ○ Work in progress

7.11 Is there a dedicated person within the LA responsible for reviewing flood risk assessments submitted as part of planning applications?

- ○ Yes
- ○ No
- ○ Work in progress

FLOOD DEFENCE

7.12 Have you developed or implemented a surface water management plan? (e.g., drain clearage, etc.)

- ○ Yes
- ○ No
- ○ Work in progress

7.13 Total number of major flood defence schemes completed in partnership with OPW in the last five years (2014-2018)

7.14 Total number of OPW Minor Flood Mitigation Works/Coastal Protection Schemes undertaken by local authority in the last five years (2014-2018)

7.15 Total investment in € (OPW and LA) in all major flood defence schemes/Minor Flood Mitigation Works/Coastal Protection Schemes in the last five years in LA (2014-2018)

7.15.1 Of this investment, total local authority investment in € in all major flood defence schemes/Minor Flood Mitigation Works/Coastal Protection Schemes in the last five years in LA (2014-2018)

OTHER INNOVATIVE WATER RESOURCE AND FLOOD RISK MANAGEMENT INITIATIVES

7.16 Are you developing or involved in any other innovative water resource or flood risk management initiatives?

8. Services

Services provided by local authorities include both external customer-facing services and internal organisational services. External services may include fire services, emergency response, civil defence, library services, municipal districts, economic services (e.g., Local Enterprise Offices), community/sports partnerships, community support, public communications/training, etc. Internal services comprise, but are not limited to, human resources, information systems, internal communications/training, finance and procurement.

EDUCATIONAL AWARENESS

8.1 Has the local authority held events/training/initiatives related to climate change actions (mitigation/adaptation/weather-related emergency response) in the last two years (2017-2018) for:

	Please choose
Local authority employees	
Citizens/communities	
Social housing residents, e.g., HAP recipients	

8.1.1 Please list all climate change educational programmes local authority is/was indirectly engaged in or sponsored in the last two years (2017-2018)? E.g., Green Schools Programme, ECO-Week, ECO-UNESCO, Local Agenda 21, International Biodiversity Day, Science Week, World Wetland Day, Earth Day, Tidy Towns/Tidy Neighbourhoods, etc

8.2 Has the local authority held events/training/initiatives related to waste management/recycling practices (e.g., Adopt a Patch, Cleaner Communities) in the last two years (2017-2018) for:

	Please choose
Local authority employees	
Citizens/communities	
Social housing residents, e.g., HAP recipients	

8.2.1 If yes, number of events/training/initiatives related to waste management/recycling practices undertaken in the last two years (2017-2018) for

Local authority employees	
Citizens/communities	
Social housing residents, e.g., HAP recipients	

COMMUNITY INITIATIVES

8.3 Does your LA run Community Climate Action or Environmental Award Programmes?

- ○ Yes
- ○ No
- ○ Work in progress

8.4 Does your LA support Green Business initiatives, e.g., Green Hospitality Programme, SMILE Resource Exchange, Green Healthcare

- ○ Yes
- ○ No
- ○ Work in progress

8.5 Do you provide allotments for public use?

- ○ Yes
- ○ No
- ○ Work in progress

8.5.1 If so, number of allotments owned by local authority at 2018 year end which are provided for community use

8.5.2 If so, % of allotments in use at 2018 year end

8.6 Do you provide community gardens for public use?

- ○ Yes
- ○ No
- ○ Work in progress

8.6.1 If so, number of community gardens owned by local authority which are provided for community use

8.7 Number of participant towns involved in Tidy Towns/Tidy Neighbourhoods initiatives in

2017

2018

EMERGENCY RESPONSE MANAGEMENT

8.8 Number of times the local authority emergency plan has been activated in the past five years in response to extreme weather events (2014-2018)?

8.9 Number of times local authority intervened to provide drinking water supplies because weather events had impacted on water quality in the last five years (2014-2018). (If LA has not intervened in any year, please enter '0' for that year)

2014

2015

2016

2017

2018

8.10 Number of times local authority issued beach closure notices because weather events had impacted on water quality in the last five years (2014-2018). (If no beaches in LA, please enter '0' for that year)

2014

2015

2016

2017

2018

8.11 Annual LA spend on emergency response following extreme weather events for

2014	
2015	
2016	
2017	
2018	

LOCAL AUTHORITY STAFF COMMUTING

8.12 Does the LA participate in the Smarter Travel Programme?

- ○ Yes
- ○ No
- ○ Work in progress

8.13 Does the local authority measure modes of transport used by employees commuting to work?

- ○ Yes
- ○ No
- ○ Work in progress

8.13.1 If so, % of staff

Walking to work	
Cycling to work	
Using public transport to travel to work	
Availing of Cycle-to-Work scheme	
Using private transport, e.g., car, motorcycle	
Other	

8.14 Please provide a list of all LA transport initiatives for staff, e.g., Staff Walkathon, Employee Car Free Day, Employee Cycle2Work Day, use of council EVs

8.15 Do you have any initiatives relating to home-working/remote working/hub working (please specify each initiative)?

OTHER INNOVATIVE SERVICE INITIATIVES

8.16 Are you developing or involved in any other service provision initiatives related to climate change?

9. Case studies

Details of any case studies in your local authority highlighting innovative climate actions across natural and cultural capital, critical infrastructure, water resource and flood risk management or services, which you have not already provided.

9.1 **Have you examples of successful climate action case studies across natural and cultural capital, critical infrastructure, water resource and flood risk management or services?**

Appendix 2: Climate action case study template

Climate action case study title

Thematic area
[INSERT TEXT HERE]

Local authority
[Insert text here]

Background (3-4 sentences)
- Identify the key problems/issues that resulted in the local authority acting
- Background information, relevant facts, and the most important issues that resulted in local authority action

[INSERT TEXT HERE]

Solution (3-4 sentences)
- Brief description of solution (with 2-3 images)

[INSERT TEXT HERE]

Benefits of solution (3-4 sentences)
- Environmental; (quantify CO_2 reduction, flood reduction, waste reduction etc.)
- Economic; € (if costed)
- Social; public engagement, etc.

[INSERT TEXT HERE]

Local authority project contact
- Please provide contact person details (if applicable)

[INSERT TEXT HERE]

Timeframe/timescale
[INSERT TEXT HERE]

Further information
- Website/other

[INSERT TEXT HERE]

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