Smarter Regulation of Waste in Europe (LIFE13 ENV-UK-000549) LIFE SMART Waste Project

Action D2:

Progress on technical actions

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AN EU LIFE+ PROJECT FOR 2014–2019

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Foreword

By the LIFE SMART Waste project

Since the inception of the LIFE SMART Waste project in 2014, waste crime has endured as a significant issue for regulators, enforcement agencies and legislators in Europe and beyond.

At an EU level, issues relating to poor waste management continue to frustrate the achievement of the European Commission's waste reduction targets. Amongst these issues, waste crime is acknowledged as a factor that adversely affects waste policy implementation and constrains the move towards a circular economy. The illegal management and illegal trade of waste cause significant damage to the environment, undermine public health and distort fair competition.

The potential for illegal activity exists at all stages of the waste chain, from production to final disposal, enabling criminals to profit at the expense of legitimate operators in the waste management industry. Waste crime has proven to be attractive to organised crime groups and is not constrained by national borders, making it a significant threat that will require innovative, transnational partnership work to identify and prevent it.

The hidden, and rapidly-evolving, nature of illegal practices has created significant gaps in our understanding of how such illegal markets behave and how best to respond. This poses major challenges, but also creates opportunities for innovation.

As a response, the LIFE SMART Waste project has been working closely with a range of partner organisations and industry experts to identify and develop new tools, techniques and approaches to help enable environmental regulators to identify and tackle the issues which facilitate either criminal behaviours or the criminalisation of the market itself.

The work of the LIFE SMART Waste project is ongoing and we are making progress in a broad range of areas as outlined in this interim report. Our work continues during 2019 and, upon completion, I am confident that our work will make a significant contribution towards achieving, 'Smarter Regulation of Waste in Europe'.

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Chairperson of INTERPOL Environmental Compliance and
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Chairperson of LIFE SMART Waste Project Board

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List of abbreviations

Term	Definition
ACR+	Association of Cities and Regions for Sustainable Resource Management
CI	Competitive Intelligence
EA	Environment Agency
ECHR	European Convention on Human Rights
edoc	Electronic duty of care
EU	European Union
EUROPOL	The European Police Office
HMRC	HM Revenue & Customs
BE-LB	Brussels Environment (Bruxelles Environnement – Leefmilieu Brussel)
IMPEL	EU Network for the Implementation and Enforcement of Environmental Law
INTERPOL	The International Criminal Police Organization
LIFE	EC Financial Instrument for the Environment
LSW	LIFE SMART Waste
NEST	(INTERPOL) National Environmental Security Task Force
NIEA	Northern Ireland Environment Agency
NRW	Natural Resource Wales
OECD	Organisation for Economic Co-operation and Development
RIPA	Regulation of Investigatory Powers Act 2000
RIP(S)A	Regulation of Investigatory Powers (Scotland) Act 2000
RS	Remote sensing
SBRC	Scottish Business Resilience Centre
SEPA	Scottish Environment Protection Agency
TFS	Trans Frontier Shipment
UK	United Kingdom of Great Britain and Northern Ireland

List of LIFE SMART Waste project technical actions[1]

No.	Description
B1	Design innovative intelligence communication hub
B2	Develop waste crime intelligence gathering strategy
B3	Design and demonstrate innovative methods to understand and analyse competitive behaviour in waste businesses and market trends ('Competitive Intelligence')
B4	Build innovative emerging threat and predictive analysis approach ('Horizon Scanning')
B5	Develop innovative waste flow audit approaches
B6	Develop innovative financial investigation approaches
B7	Develop innovative ways to use waste flow tracking devices
B8	Develop, pilot and evaluate Remote Sensing techniques
B9	Deploy and test intelligence communication hub
B10	Undertake investigation to fill intelligence gaps and pilot innovative investigatory tools
B11	Produce intelligence reports including recommendations for interventions
B12	Scope out barriers to joint working between agencies nationally and trans-nationally on interventions to tackle waste crime
B13	Specify how to set up group structures to overcome barriers and deliver joint interventions
B14	Create innovative interventions menu and design manual for selecting interventions
B15	Set up cross-agency intervention groups and deliver interventions to tackle waste crime issues associated with 'challenging' waste streams
B16	Produce recommendation reports for policy and legislative interventions

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[1] As per the project's EC Grant Agreement for LIFE funding, key project deliverables are denoted by alphanumeric actions throughout the report (e.g. Actions B1, B2, B3, etc.).

1.0   Executive Summary

LIFE SMART Waste is a multi-agency project co-funded by the EU LIFE programme. It aims to develop and demonstrate innovative ways of understanding, tackling and reducing waste-related crime. The project is led by the Scottish Environment Protection Agency working in partnership with three co-beneficiaries: Natural Resources Wales; ACR+; and Brussels Environment. A proposal to extend the project (originally scheduled to run from June 2014 until May 2019) by one-year is currently being considered by the European Commission.

Collaboration is key to the LIFE SMART Waste project's innovative approach. At the outset, the project considered barriers to joint working and recommended that agencies adopt an amended version of INTERPOL's NEST approach to optimise their collaborative activity.

A communications 'Hub' was developed and piloted to provide a web-based platform for agencies and expert groups to collaborate and share non-sensitive information in virtual communities. As a supplement to the Hub's capabilities, the potential for using an online platform to share Official (Sensitive) intelligence between national agencies, initially within the UK, is currently being assessed.

LIFE SMART Waste has been researching, developing and piloting a range of analytical tools, approaches and techniques. The aim is that these could enable environmental regulators to identify and tackle the issues which facilitate criminality. To date:

- A **Competitive Behaviours Toolkit** has been developed, providing a collection of core tools to help with the analysis of information from diverse sources and achieve a better understanding of market and/or industry behaviours.
- A **Horizon Scanning Toolkit**, to help build an early warning system for emerging waste sector developments and their potential for criminal enterprise, has been piloted.
- **Waste flow audit approaches** that could potentially identify illegal disposal activity were investigated (but will not be piloted due to a lack of robust information and evidence of regulatory resource limitations).
- A **Waste Crime Indicators Toolkit** has been developed, to provide practical indicators of waste crime using simple analysis of waste operator data.
- A **Financial Risk Assessment Tool**, to help identify those operators and activities that need to be subject to a more detailed appraisal as part of the permitting process, has been developed.
- **Waste flow tracking devices** with the potential to identify illegal disposal activity were investigated (but will not be piloted in a live UK deployment, in acknowledgement of legal and expert advice received).
- **Remote Sensing techniques**, to help in the detection of both unknown (illegal) waste sites and different waste types, are being assessed in two independent pilot studies.
- An **Intervention Design Manual**, to provide a framework for choosing and designing collaborative interventions, has been piloted in the project's intervention bundles.

To conclude development, the project is planning to test the Competitive Behaviours Toolkit, Waste Crime Indicators Toolkit and Financial Risk Assessment Tool. Further pilots are being planned by SEPA with support from partner agencies in the UK and other EU Member States.

A key LIFE SMART Waste project goal is to set up cross-agency intervention groups to design three intelligence-led interventions that use the project's insights and tools. To inform these

interventions, and to fill intelligence gaps, the project has undertaken a range of investigations and prepared four intelligence reports:

- A survey of the Waste industry in Scotland provided baseline perceptions of the scale and causes of waste crime;
- A review of SEPA and NRW waste intelligence for 2015-2016 helped to identify priorities for intervention and investigation, including the exploitation of unregulated rented warehousing units and use of waste hauliers for illegal activities;
- A study of Scotland's waste tyre sector identified a range of 'vulnerabilities' and recommended possible measures to combat them;
- An intelligence report provided an assessment of waste hauliers' involvement in (UK) cross-border transportation and depositing of waste at illegal sites;
- A vulnerability study provided a better understanding of the role of brokers operating within the waste management industry;
- In the wake of China's ban on foreign waste imports commencing in 2018, and as an adjunct to the project, LIFE SMART Waste is currently working with INTERPOL to scope a research study to better understand the threat of waste crime arising as a result of the ban.

In consultation with cross-agency intervention groups, LIFE SMART Waste delivered two of the project's three intelligence-led interventions in 2018, using project insights and tools:

i. The **illegal waste warehousing intervention** featuring an educational campaign in collaboration with Crimestoppers (Scotland) and a range of partner organisations to highlight the exploitation of unregulated rented warehousing units for illegal waste storage.
ii. The **illegal waste haulage intervention** highlighted the consequences of waste hauliers' involvement in illegal movements of waste (within the UK) through high-profile multi-agency road check points, site visits and a 'Drive out waste crime' awareness-raising campaign supported by key industry bodies.

The project's third intervention will focus on **illegal waste brokerage**. This is currently being designed in collaboration with industry experts, using the Intervention Design Manual, with the aim of practically addressing key vulnerabilities that affect the brokerage of waste.

At the conclusion of the project, LIFE SMART Waste aims to make recommendations for policy and legislative changes to help tackle waste crime related to challenging waste streams. To date, the project's work has provided early indications of possible recommendations for policy and legislative interventions. These include, for example, granting additional powers to environmental regulators in the UK to facilitate the use of waste tracking devices and for intelligence gathering.

2.0 Introduction

LIFE SMART Waste is a European collaborative project that aims to develop and demonstrate innovative ways of understanding, tackling and reducing waste-related crime.

2.1 Project background

Waste crime is a serious and persistent issue that is widely recognised as a major threat to our ambitions of a circular economy in Europe. Waste criminals are elusive and persistently profit at the expense of our environment, economies and communities.

The LIFE SMART Waste project recognises there are significant gaps in our collective understanding of the causes, dynamics and triggers for criminal activity in challenging waste streams. The project's premise is that closing these gaps offers opportunities to identify and develop practical indicators, deterrents and remedies for such criminal behaviour.

2.2 Project objectives

The LIFE SMART Waste project objectives are:

   i.   To develop and demonstrate innovative intelligence gathering and analytical approaches to identify and understand waste crime issues associated with 'challenging' waste streams, problem waste operators and illegal waste activities

   ii.   To design innovative intelligence-led interventions, and demonstrate how these can be used to tackle waste crime issues and reduce their impacts in targeted areas

   iii.   To communicate the project results and learning to others, advocating the benefits of the approach in tackling waste crime, and to influence European policy and legislation.

2.3 Project funding and beneficiaries

The LIFE SMART Waste project (LIFE13-ENV/UK/000549) has been made possible with the support of EU LIFE+ funding. The project commenced in June 2014 and is scheduled to run until May 2019 under the leadership of the Scottish Environment Protection Agency (SEPA) working with three partner agencies who are also contributing resources:

- Association of Cities and Regions for Sustainable Resource Management, Belgium
- Brussels Environment, Belgium
- Natural Resources Wales, United Kingdom

A proposal to extend the project by one-year extension is currently being considered by the European Commission[2]:

2.4 Purpose of the report

The purpose of this report is to provide the project beneficiaries' existing environmental and industry networks with:

- A summary of the project's approach to gathering intelligence and interventions;
- A preliminary summary of the project's methods, tool development and approach to designing interventions with the aim of reducing waste-related crime.

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[2] A proposal to extend the project until May 2020 was submitted to the European Commission in February 2019 (decision pending).

3.0   Collaborative approaches

Collaboration is key to the project's innovative approach and LIFE SMART Waste has worked closely with a range of partner organisations (environmental and non-environmental bodies) and expert suppliers to design and develop innovative intelligence-gathering tools, techniques and intelligence-led waste crime interventions.

3.1   Barriers to joint working (B12)

In consultation with a range of external stakeholders, LIFE SMART Waste considered barriers to joint working between agencies on interventions to tackle waste crime.

In the subsequent report (Gay M. , 2015), a variety of barriers and over-arching themes were identified. It was concluded that not all of these were common to all the partner types and that different experiences exist between and within EU member states. However, three common barriers of significance were noted:

   i.   Data exchange and sharing of intelligence;
   ii.   Lack of understanding of partner organisations (roles, powers and responsibilities);
   iii.   Organisational priorities and their fluidity.

3.2   Setting up group structures (B13)

As a follow-up to the project's assessment of barriers to joint working (Gay M. , 2015), LIFE SMART Waste published a further report which reviewed and evaluated the requirements for designing effective intervention group partnerships (Gay M. , 2017b).

It was concluded that there is no 'one size fits all' approach to partnership working and that effective partnerships need to be designed at the inception of intervention designs. The adoption of an amended NEST approach (INTERPOL, 2013) was recommended as a primary means for designing intervention group partnerships.

3.3   Communications Hub (B1 / B9)

3.3.1   Hub design (B1)

LIFE SMART Waste developed a web-based communications 'Hub' to provide a platform to allow participating enforcement agencies to collaborate in secure, virtual communities that transcend traditional boundaries and borders.

Although the Hub was not developed as a system for sharing sensitive criminal intelligence, it does offer the potential for online collaborative activity - and the sharing of non-sensitive information on challenging waste streams and related waste crime issues - on a daily basis.

3.3.2   Hub deployment (B9)

To date, participants in the extended pilot for the Hub have included representatives from: UK environmental regulators (SEPA, NRW, EA and NIEA); INTERPOL's Pollution Crime Working Group; Associated Beneficiaries; the project's External Steering Group; DEFRA's multi-agency Waste Tracking Service project; and other industry experts.

Wider deployment of the Hub will be linked to specific collaborative activities to ensure that participants can invest their time efficiently.

3.3.3 Cross-border Flagging Database (above 'OFFICIAL' level[3])

As a supplement to the capabilities of the Hub, the potential for using an online platform to enhance the sharing of intelligence of mutual interest between national agencies – classified at "Official (Sensitive)" level - is currently being explored by the project. The objective is to design a database that can identify if other environmental regulators hold intelligence on entities of mutual interest, related to cross-border movement of waste (e.g. suspected cross border criminals or those suspected of enabling such activity). Online platforms are being assessed for this purpose with the expectation that a suitable platform will be piloted by environmental regulators within the UK. Although initially outside the scope of the proposed project trial, in the future such a web-based tool may also offer the potential for sharing of classified intelligence between agencies in the UK and Europe.

How to collaborate with the LIFE SMART Waste project

LIFE SMART Waste project is open to enquiries from potential new partners and stakeholders interested in getting involved with the project and helping us to achieve *smarter regulation of waste in Europe*.

To further expand the pool of stakeholders participating in the project, we would particularly welcome the support of enforcement agencies, industry representatives, policymakers, legislators and those offering expertise in waste management or waste crime.

The project offers opportunities for environmental regulators to help us pilot newly-developed tools and techniques, and to train in their use.

Figure 1 - LIFE SMART Waste project workshop, Glasgow (UK)

For further information, visit www.lifesmartwaste.com or contact us by e-mailing lifesmartwaste@sepa.org.uk.

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[3] UK Government Security Classifications (UK Government, 2018)

4.0   Innovative tools, approaches & techniques

LIFE SMART Waste has been engaging with stakeholders and external contractors to scope and develop a range of analytical tools, approaches and techniques. These are intended to enable environmental regulators to identify and tackle the issues which facilitate either criminal behaviours or the criminalisation of the market itself.

4.1   Understanding and analysing competitive behaviours (B3)

4.1.1 Review of Competitive Intelligence tools and techniques

LIFE SMART Waste commissioned a report to assess the feasibility of applying or adapting existing Competitive Intelligence (CI) tools and techniques for use in an environmental regulatory environment (C. Bisson, 2017).

Development of insights about competitive behaviours, widely known as 'Competitive Intelligence', is a recognised discipline and activity in the commercial business world. CI tools and techniques are commonly used by businesses to identify and analyse actionable information about competitors and the marketplace, in turn informing strategic decision-making. However, the use of CI techniques would be a new activity for many environment protection agencies.

The report's review of academic and professional literature (C. Bisson, 2017) considers a suite of techniques that could potentially help regulatory agencies gain enhanced intelligence and insights regarding criminal groups and the waste crime market.

4.1.2 Development of Competitive Behaviours Toolkit

Recognising an opportunity for innovation, LIFE SMART Waste is currently developing a Competitive Behaviours Toolkit for use by intelligence officers and analysts tackling waste crime.

As illustrated in **Error! Reference source not found.** it is envisaged that the initial version of t he LIFE SMART Waste Competitive Behaviours Toolkit will provide a collection of core tools which can help us to analyse information from diverse sources and develop a better understanding of market/industry behaviours.

Figure 2 - LIFE SMART Waste Competitive Behaviours Toolkit (draft)

Such insights can potentially provide an early indication of threats, challenges, opportunities and changes within waste and recycling markets, highlighting critical vulnerabilities. In addition to improving decision-making processes, this could enhance the ability of regulators to design and implement effective interventions.

4.2   Horizon Scanning Toolkit (B4)

4.2.1 Development of Horizon Scanning Toolkit

One of the objectives of the LIFE SMART Waste project is to identify how environmental regulators can use horizon scanning processes to build an early warning system for emerging developments in the waste sector to protect the industry from future criminal enterprise.

Following the project's initial research, in the form of a literature review (Cranfield University and Waverley Consultants, 2017), LIFE SMART Waste commissioned the development of a suite of tools to achieve that objective. The resultant Horizon Scanning Toolkit (Cranfield University, 2018) is a practical guide that regulatory bodies and their partners can use to:

  i.   **Build intelligence about waste crime** by gathering, organising and sharing weak signals of change;
 ii.   **Create insight into changing criminal behaviours and patterns of crime** through assessing, ranking and deepening their understanding of the implications of those weak signals;
iii.   **Work together to research, plan and deliver action to protect consumers and the industry** (now and in the future).

The toolkit provides a structured approach to horizon scanning that builds a clear, consistent and shared perspective of emerging developments in the waste sector and their potential for criminal enterprise.

Figure 3 - Horizon Scanning Toolkit '9-step model'

It is envisaged that by using the toolkit, regulatory bodies will learn to spot newly emerging trends quickly and to assess what the emerging opportunities for future waste crime are likely to be. They will then be able to act together to minimise the impact of those crimes on the environment, society and business.

4.2.2 Pilot of Horizon Scanning Toolkit (B10)

During September and November 2018, representatives from EU Member State environmental regulators and enforcement bodies from throughout Europe attended LIFE SMART Waste workshops in the Netherlands to take part in a European pilot for the project's Horizon Scanning Toolkit.

The workshops were held to familiarise participants with the Toolkit and to jointly review and analyse the results of scans undertaken by the group. The preliminary scanning activity resulted in the identification of a number of unknown trends, illustrating the benefits of the approach. The workshops provided useful insights about the needs of practitioners using the tools, information on open source research and discussions on best practice.

A pilot evaluation report is currently being prepared and it is anticipated that this will recommend that regular EU Member State scanning workshops are undertaken. This could potentially help regulators to identify emerging trends in the waste sector and their potential for criminal enterprise.

4.3 Waste flow audit approach (B5)

4.3.1 Research and progress

The LIFE SMART Waste project set out to develop and design an innovative, practical waste flow audit approach that would help environmental authorities to locate illegal disposal activity by tracking waste movements, and more specifically leakages, from the point of production to the final destination. Specifically, the goal was for this approach to be 'less complex, less time consuming and less labour intensive'.

Figure 4 – Waste flow audits may identify leakages, indicating illegal disposal

During an extended phase of research and investigation, however, LIFE SMART Waste identified a range of major barriers to development (Evans & Fowler, 2017), including:

i.   lack of robust information in current paper-based data collection systems;
ii. legislative and funding frameworks which do fail to resource the waste flow audit approach.

Supporting the conclusions of other regulatory agencies, LIFE SMART Waste concluded that a more advanced, electronic approach to data collection and analysis is required. This is beyond the scope of the project and is an approach already being developed by a DEFRA-led waste tracking project to find digital solutions for tracking waste movements in real time (DEFRA, 2019)[4].

4.3.2 Waste Crime Indicators Toolkit (B10)

Although unable to develop a waste flow audit approach as originally envisaged, LIFE SMART Waste identified an opportunity to design a toolkit to provide practical indicators of waste crime using simple analysis of waste operator data.

The resultant Waste Crime Indicators Toolkit (Fuller, 2019) was developed by SEPA in consultation with Natural Resources Wales to help environmental regulators - or equivalent Member State bodies - to:

- **Identify sites which may require investigation** to determine if they are involved in waste crime;
- **Build evidence to support investigations** into sites already suspected of involvement in waste crime;
- **Target environment agency resources** by supporting site inspection programmes and prioritising sites;
- **Support decision-making on site investigations** (used in conjunction with regulatory knowledge).

It is envisaged that the Toolkit will be used by practitioners with responsibility for data analysis, monitoring waste management sites, enforcement and intelligence functions.

The newly-developed Toolkit provides four easy-to-use indicator methods for analysing data and includes a strategy for using the indicators. The indicators use core information typically collected by environment agencies from waste management operators. Significantly, the indicators are transferable to environment agency data across Europe and are adaptable as they can be applied to a wide range of potential waste crime enquiries. The four methods are supported by case studies which demonstrate how to use the indicators.

There are plans to pilot the Waste Crime Indicators Toolkit in EU Member States during early 2019.

4.4 Financial investigation approaches (B6)

4.4.1 Development of Financial Risk Assessment Tool

In recognition that bad or unsustainable business models may provide an indication of existing or potential illegal activity in waste management companies, LIFE SMART Waste commissioned experts from Cranfield University to consider the extent to which financial indicators could be used in regulatory practice and developed to detect waste crime (Cranfield University, 2016).

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[4] Furthering the work of the LIFE-funded edoc project (The Environment Agency, 2015).

Figure 5 - Financial risk assessment can support regulatory decision-making

A Financial Risk Assessment Tool was subsequently designed and developed to help environmental regulators to identify those operators and activities that need to be subject to a more detailed appraisal as part of the permitting process. The tool incorporates an initial qualitative screening phase followed by a quantitative risk assessment. An assessment of the operator in terms of financial, market, business and technology related criteria is used to produce a 'risk profile' that can support the regulator's decision-making process.

4.4.2 Pilot of Financial Risk Assessment Tool

The project's plans to pilot the Financial Risk Assessment Tool in the UK has been frustrated and delayed by a lack of regulatory powers or regulations to compel waste management companies to provide environmental regulators with the necessary financial information. However, SEPA is continuing with the process of identifying waste management companies who are willing to participate in the pilot on a voluntary basis.

4.5   Waste flow tracking devices (B7)

In support of the project's work on waste flow audits, LIFE SMART Waste investigated the potential for using tracking devices in innovative ways to follow the movements of waste and to help prevent and detect criminal activity (Evans, 2019). The investigation examined the types of tracking devices available, how the systems operate, potential application in the waste industry and the associated risks and challenges.

In scoping pilot studies for device evaluation purposes (originating in Scotland and Wales), a range of practical and legal challenges and risks were foreseen for environment agencies deploying such devices. It was noted, for example, that international collaboration to enable cross border tracking of waste would be a critical success factor for such a pilot.

Following legal advice and consultation with experts, it was noted that the processing of personal data - which would inevitably accompany the live deployment of a tracking device(s)

- would necessitate careful consideration of areas of legislation which cover Article 8 of the European Convention on Human Rights, and the Data Protection Act 1998. It was also acknowledged that there are data security risks that need to be considered should the tracking device(s) be intercepted by third parties. It was concluded that UK environment agencies could lawfully use tracking devices in certain circumstances to assist in specific criminal investigations if based upon current and reliable intelligence and authorised under a RIP(S)A/RIPA 2000 directed surveillance authorisation.

Taking into consideration the legal and expert advice, along with the legislative limitations for environment agencies in respect of their intelligence gathering capabilities, LIFE SMART Waste will not pilot a live deployment of tracking devices. Rather, the project's findings will be shared with complementary projects - such as the UK waste tracking service discovery project (DEFRA, 2019) - and recommendations for legislative change at a UK and international level will be advocated at the final stage of the project.

4.6   Remote Sensing techniques (B8)

4.6.1 Remote Sensing research

LIFE SMART Waste has published the results and conclusions of preliminary research commissioned to examine the potential for using Remote Sensing (RS) data to gain intelligence on illegal activities associated with 'challenging' waste streams (Air & Space Evidence and Cambrensis, 2017).

The research provides case studies of practical RS applications in Australia, the USA, Europe, Brazil and Chile before considering RS technical capabilities, data sources, access and costs from a regulatory perspective. It was concluded that there is a significant opportunity for innovation in the waste crime sector by integrating RS data as a key component of a joined-up intelligence capability. RS techniques can help with the identification of waste management licence breaches, as well as more serious waste crime (such as illegal stockpiling, land application and land-fill). RS could provide important evidence in both a historical context and in a dedicated and targeted monitoring programme.

Figure 6 – RS techniques could enhance intelligence on illegal activities

It was recognised that much more work is needed to examine the role of RS data in an operational context. Evidence is needed that such data will be operationally effective and result in positive outcomes, whilst at the same time being affordable and cost-effective.

Four potential RS pilot studies were identified during the research phase and two of these were initiated by LIFE SMART Waste (Section 4.6.2).

4.6.2 Remote sensing pilots

In Quarter 3, 2018 LIFE SMART Waste initiated two pilots to run concurrently in Scotland:

i. **Detection of unknown waste sites**

LIFE SMART Waste commissioned Gavia Environmental Ltd to develop and pilot a suitable Remote Sensing technique for detecting unknown (illegal) waste sites.

The aim of the pilot was to develop an innovative system that incorporates Remote Sensing imagery and image analysis techniques within a geo-information environment to tackle the problem of detecting unknown illegal waste sites.

ii. **Detection of waste materials**

LIFE SMART Waste commissioned Pixalytics Ltd to develop a suitable Remote Sensing system for detecting waste materials - including waste tyre piles and other challenging waste types - within complex environments.

Waste materials in urban and semi-rural environments are often hidden from view, stored next to other materials, buildings or amongst vegetation. They may also be difficult, and sometimes hazardous, to detect and quantify on foot by field officers. Determination by Remote Sensing techniques could, therefore, provide environmental regulators with a tool to investigate potentially illegally-stored waste materials, and allow larger areas of a country to be inspected objectively.

In each case cost-effectiveness was a key consideration and the pilots tried - as far as possible - to use free, existing and low-cost data to produce useable results. The pilots also aimed to integrate the proposed detection systems with SEPA's current data management and visualisation systems.

The intention was that the resulting detection system would also be transferable and applicable to various environments, other geographical areas and suitable for use by other agencies.

The results of these experimental pilots were insightful and, notably, the pilot to detect unknown waste sites undertaken by Pixalytics Ltd was considered to be particularly successful, with potential for further development.

4.7   Interventions Design Manual (B14)

LIFE SMART Waste has developed an innovative Intervention Design Manual for tackling waste crime. The aim of the manual is to provide environmental authorities in EU Member States with a framework for choosing and designing interventions, and making intervention agreements with partners.

4.7.1 Literature review

As part of the development of the manual, a literature review[5] (Cambrensis, 2016) was commissioned. The review examined methods for characterizing the targets of interventions and considered where and how interventions have been applied. A comprehensive assessment of decision-making tools that could be used to support the choice of appropriate

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[5] https://www.sepa.org.uk/media/340370/lsw-b14-literature-review.pdf

interventions according to circumstances concluded that the iDEPEND problem solving system is potentially the most helpful approach for field inspectors.

4.7.2 Intervention Design Manual 'mini guides'

Building upon this research, LIFE SMART Waste developed and published an [Intervention Design Manual](#) (Cambrensis, 2017)[6] to provide regulators with a method to plan, test and evaluate the use of waste crime interventions.

The manual provides a practical guide for designing interventions and, for ease of use, is published in three parts:

    i.   Mini guide 1 – Analysing the situation and problems
    ii. Mini guide 2 – Dependency modelling with iDepend
    iii. Mini guide 3 – Identifying and selecting interventions

Figure 7 - Dependency modelling with iDepend (illustration)

To date, the Intervention Design Manual has been piloted by SEPA in the project's first two interventions (Section 6.0) to help create packages of interventions unique to specified problems.

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[6] https://www.sepa.org.uk/regulations/waste/life-smart-waste/publications/intervention-design-manual/

5.0   Investigations and intelligence

5.1   Intelligence Gathering Strategy (B2)

LIFE SMART Waste is undertaking a series of investigations to fill gaps in understanding and generating waste crime intelligence reports.

An Intelligence Gathering Strategy (Hope, 2015) was prepared to provide a high-level vision of the project's approaches to information collection, research and analysis. The strategy, which emphasises the importance of inter-agency collaboration, is currently being reviewed.

To date, LIFE SMART Waste has undertaken a range of investigations and prepared four intelligence reports to inform the project's cross-agency interventions.

5.2   Waste industry perceptions of waste crime in Scotland (B10)

To fill gaps in our understanding, LIFE SMART Waste completed a survey of the Waste industry in Scotland to gauge perceptions of the scale and causes of waste crime (Gay M. , 2017c). The investigation revealed that waste crime is perceived by the Waste industry as a serious issue that is not being comprehensively tackled.

Unsurprisingly, disposal costs (including higher landfill tax rates) and the industry's low barriers to entry were acknowledged as significant causal factors for waste crime. To remedy this, the need for more robust, and visible, regulatory investigation and enforcement actions was highlighted.

5.3   Review of SEPA and NRW waste intelligence (B11)

The first LIFE SMART Waste intelligence report (Gay M. , 2017a) reviews SEPA and NRW waste intelligence for 2015-2016. In addition to providing agency-specific recommendations for SEPA and NRW to fill gaps discovered in their current intelligence, the report identified top priority issues for intervention and investigation relating to the exploitation of unregulated rented warehousing units and use of waste hauliers for illegal activities.

Figure 8 – Unregulated warehousing is a recognised waste industry vulnerability

Notably, the waste tyre sector was identified as the highest priority waste stream in Scotland, but was not deemed problematic in Wales.

5.4   Vulnerability Study - Waste Tyres (B11)

The second LIFE SMART Waste intelligence report (Gay M. , 2018) identifies factors that contribute to criminality – or 'vulnerabilities' – in Scotland's waste tyre sector. This study tested the value of the vulnerability approach on a challenging waste stream in an effort to move beyond the traditional analysis and investigation of criminal acts and offenders.

Figure 9 – Scotland's waste tyre sector is highly vulnerable to criminality

The study identified a range of vulnerabilities in the waste tyre sector – including the regulatory and enforcement environments; economic and market structure; and the quality of monitoring – and recommended a series of possible measures to combat them.

5.5   Waste haulier involvement in UK cross-border criminality (B11)

The third LIFE SMART Waste intelligence report (Gay M. , 2018) was undertaken to provide an assessment of the involvement of waste hauliers in cross-border criminality within the UK, and specifically the transportation and depositing of waste at illegal sites.

Figure 10 - Haulage of waste for illicit disposal is a recognised industry vulnerability

Although constrained by the limited quality and quantity of intelligence sources, the results provided a valuable starting point for subsequent intervention actions. The main findings indicated that rogue hauliers were collecting waste from various points in England and transporting their loads to illegal sites in Scotland. There was no indication that the illicit waste was being transported into the UK.

Although the intelligence report recognised that a number of intelligence gaps still exist, the findings provided the basis for designing one of the project's intervention bundles to tackle the involvement of hauliers in waste crime (Section 6.2).

5.6   Vulnerability study – Waste brokers (B11)

A fourth LIFE SMART Waste intelligence report has been drafted to provide a better understanding of the role of brokers operating within the waste management industry.

Initial intelligence indicates that waste brokers represent a significant vulnerability in the waste management industry due to the lack of regulatory oversight. Although waste brokers need to be registered, they never take possession of waste and so do not fall into the remit of most waste legislation that is the concern of regulators. This lack of regulatory oversight means that some unscrupulous brokers are in a unique position of being able to identify and exploit gaps in the regulatory framework.
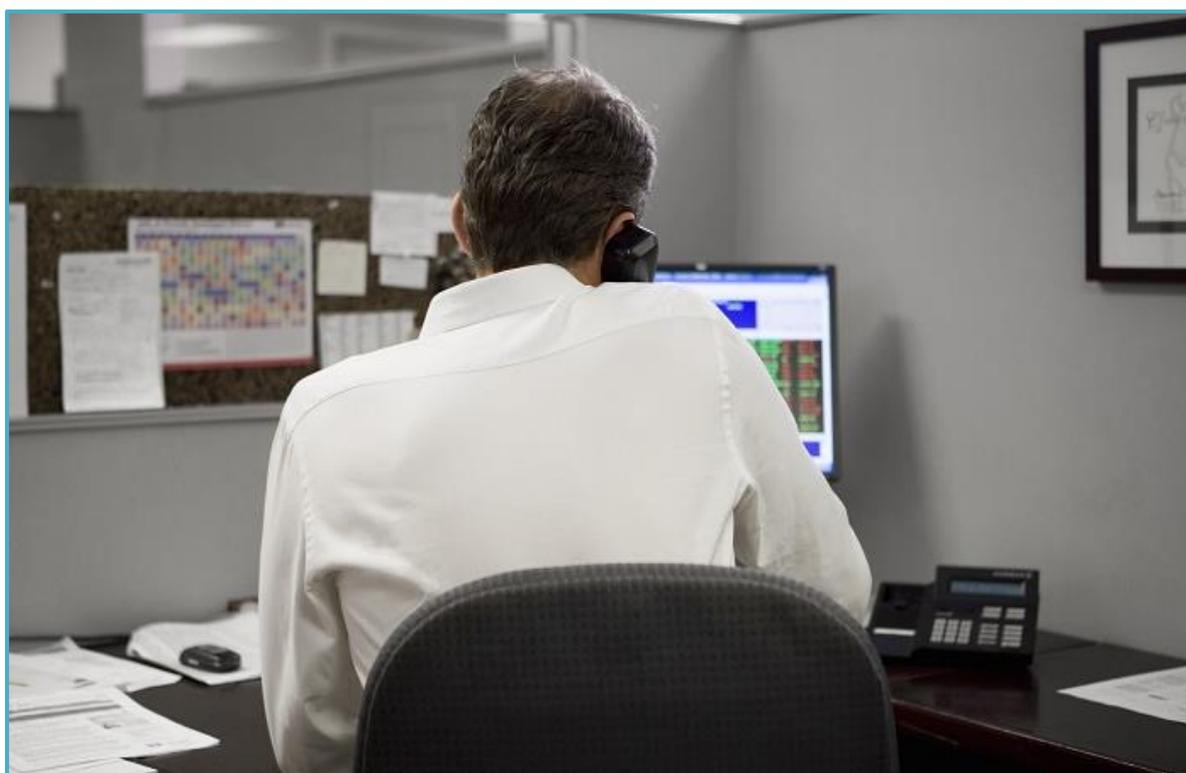
Figure 11 - Waste brokers typically operate without regulatory oversight

The study aims to identify the characteristics and points of weakness within this area of the industry, in turn helping environmental regulators to develop intervention strategies that tackle those conditions that create criminal opportunities.

Due to limitations in accessing European intelligence, the results of the investigation focus primarily on the UK waste management sector (with references to the European position). It is anticipated that the findings will provide the basis for designing the project's final intervention bundle to tackle the involvement of brokers in waste crime (Section 6.3).

5.7 Assessment of the criminal impact of waste import restrictions (B10)

In the wake of China's ban on foreign waste imports commencing in 2018, and as an adjunct to the project, LIFE SMART Waste is currently liaising with INTERPOL to scope research to better understand the threat of waste crime arising as a result of the ban.

The underlying premise is that there is a risk of waste crime and environmental harm following this ban given the high volume of displaced waste[7], its drop in value and lack of infrastructure to deal with the displaced waste. The situation potentially provides opportunities for illicit waste crime to prosper within the EU and may encourage illicit Trans Frontier Shipment activities to non OECD countries.

Figure 12 - China's ban on waste imports commenced in January, 2018

This work has the potential to provide Regulatory Agencies with valuable insight that could support investigation and intervention activity.

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[7] It is estimated, for example, that 111 Million Metric Tonnes of plastic waste will be displaced if current trends continue to 2030 (Brooks, Wang, & Jambeck, 2018).

6.0 Cross-agency interventions (B15)

A key LIFE SMART Waste project goal is to set up cross-agency intervention groups, building on existing collaborations with enforcement agencies and industry bodies, to design three intelligence-led interventions that use the project's insights and tools.

6.1 Illegal waste warehousing intervention

The first cross-agency intervention (Wright & Rowatt, 2018) aimed to pilot and test the project's newly-developed Intervention Design Manual (as described in Section 4.7). The intervention focused on the issue of unregulated rented warehousing units in Scotland being exploited for illegal waste activities, as identified in the project's first intelligence report (Gay M. , 2017a).

An expert group was established and it recommended the launch of an educational campaign targeting both industry and the public to reduce the incidence of warehousing in waste crime. The recommendation was implemented by SEPA in collaboration with partner organisations, including Crimestoppers (Scotland).

Illegal warehousing intervention – collaboration and engagement

LIFE SMART Waste's first intervention, to tackle illegal warehousing in Scotland, illustrates the project's approach to multi-agency collaboration and industry engagement.

An 'Expert Group' - comprising representatives of Police Scotland, Crimestoppers Scotland, SBRC, Scottish Fire and Rescue, West Dunbartonshire Council, North Lanarkshire Council and Neighbourhood Watch Scotland - was formed to jointly assess the issue of illegal warehousing and to set the direction of a suitable intervention. SEPA was assigned to lead the intervention and, where possible, these partner organisations supported the implementation.

A key objective set by the Expert Group was to educate the public and industry about the issue of illegal warehousing of waste. SEPA successfully partnered with Crimestoppers Scotland to deliver a public-facing campaign that reached a cumulative audience in excess of 640,000 through the press, community groups and digital channels, generating almost 23,000 clicks through to the Crimestoppers campaign website.

Figure 13 – Intervention partners at Crimestoppers launch

SEPA also engaged extensively with key industry stakeholders through interviews, meetings and member briefings to extend the awareness-raising campaign. These industry stakeholders included the National Farmers Union Scotland, Road Haulage Association, Fleet Transport Association, Forth Ports, commercial property agents, the Royal Institution of Chartered Surveyors, insurance companies and the British Insurance Brokers Association.

Although no new intelligence on illegal warehouses was generated during the campaign, it was concluded that the campaign succeeded in raising awareness of the problem and that the intervention was a successful application of the project's Interventions Design Manual.

6.2   Illegal waste haulage intervention

The second cross-agency intervention (Wright I. , 2018) aimed to reduce the involvement of waste hauliers in illegal movements of waste within the UK.

The decision to target the threat posed by waste transportation recognised that most, if not all, illegal waste sites receive waste transported by road. Haulage firms may be used by criminals to transport waste to illegal disposal sites and hauliers may not realise that their complicity could leave them liable to fines, prosecution and operational sanctions.

During September-October 2018 LIFE SMART Waste, brought together the Scottish, English, Welsh and Northern Irish environment protection agencies and key enforcement agencies[8] to deliver high-profile road check points and site visits as part of an awareness-raising campaign.

Figure 14 - LIFE SMART Waste multi-agency road check point (Gretna, UK)

The 'Drive out waste crime' campaign was designed to highlight the issue of illegal waste haulage by reminding waste hauliers of their waste Duty of Care obligations and appealing to the public to report suspicious activity.

To launch the campaign, the intervention's multi-agency road checks were highlighted through social media activity and in a joint news release (SEPA, 2018) that attracted extensive national, regional and online media interest.

Figure 15 - 'Drive out waste crime' industry message

Significantly, the campaign was endorsed and supported by key UK transport associations, and related industry bodies, who helped to distribute campaign materials and participated in subsequent trade advisory group meetings.

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[8] Police Scotland, British Transport Police, Driver and Vehicle Standards Agency (DVSA), Office of the Traffic Commissioner for Scotland, HM Revenue and Customs and the Scottish Business Resilience Centre.

6.3   Illegal waste brokerage intervention

Building on previous intelligence-led interventions which focused on the illegal transportation and warehousing of waste, LIFE SMART Waste is collaborating with industry experts to consider how to practically address key vulnerabilities that affect the brokerage of waste.

Figure 16 – Expert group workshop on illegal waste brokerage (February 2019)

Based on the emerging intelligence, and using the project's Intervention Design Manual, NRW are currently working with SEPA to design and plan a suitable intervention.

7.0 Recommendations for policy & legislative change (B16)

At the conclusion of the project, LIFE SMART Waste aims to identify and recommend policy and legislative interventions and changes to help tackle waste crime related to challenging waste streams. To date, the project's work has provided some early indications of possible recommendations in the current policy and legislative landscape.

As outlined in Section 4.3, for example, the project's examination of waste flow audit approaches (Action B5) unequivocally concludes that a more advanced, electronic approach to data collection and analysis (an EDOC system) is required. This endorses the ongoing collaborative work of environmental regulators in the UK as they jointly consider how best to track waste movements across the UK (DEFRA, 2019).

Similarly, in considering the use of waste tracking devices (Section, 4.5), LIFE SMART Waste has identified data protection considerations which suggest a need for specific amendments to the existing powers of environmental regulators in the UK, namely:

- UK environment agencies should be added to Part 3 of the Police Act 1997 to make the deployment of tracking devices a more feasible tactic;
- UK environment agencies should be added to Part 1 of RIPA/RIPSA to allow authorities improved intelligence gathering capabilities.

Figure 17 - LIFE SMART Waste aims to influence policy and legislative changes

On completion of the project's intelligence gathering, cross-agency interventions and tool development, LIFE SMART Waste will publish a comprehensive report on key recommendations for policy and legislative change

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