Leading The Wales

ISWA National Committee member **Ian Williams**, and researcher **David Turner**, outline how Wales is leading the way in terms of using research evidence to address greenhouse gas emissions arising from the waste management sector

There is overwhelming scientific consensus that climate change is occurring and that it poses a serious threat to the health of the biosphere. The primary cause of climate change is increased emissions of anthropogenic greenhouse gases (GHG) linked to rising standards of living and population growth.

The solid waste management (SWM) sector is a relatively minor contributor to anthropogenic global warming, accounting for less than three percent of global GHG emissions, or around 700Mt CO_2 equivalent (CO_2e) per year. However, the SWM sector is recognised as occupying a unique position as a potential net reducer of GHG emissions. The traditional view of waste as a pollutant has evolved into one that regards it as a resource and the recovery of value in the form of secondary material and energy resources can help SWM make a significant contribution towards the global GHG mitigation effort, an opportunity that is yet to be fully exploited. Furthermore, improving SWM can contribute to other sustainable development goals, such as resource efficiency and sustainable employment and economic growth.

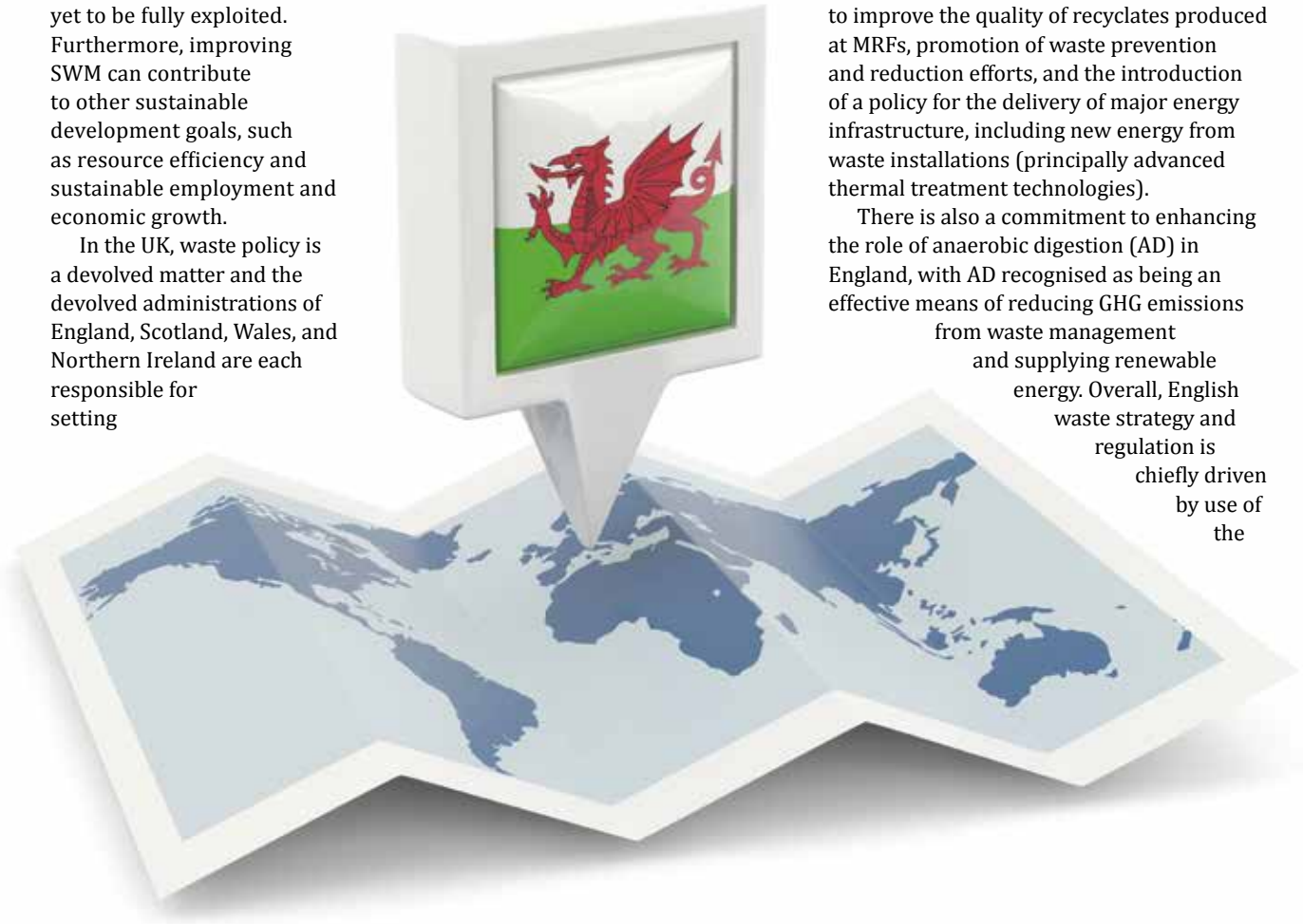
In the UK, waste policy is a devolved matter and the devolved administrations of England, Scotland, Wales, and Northern Ireland are each responsible for setting their own waste strategy and policy. Whilst the core focus of these strategies is on ensuring national compliance with EU directives, Scotland and Wales have chosen to be bolder than England and Northern Ireland by taking ambitious approaches that often exceed the EU's requirements.

National Strategies

ENGLAND AIMS to move to a "zero waste economy" by 2020 by recognising waste as a resource, in line with the waste hierarchy and to reduce GHG emissions. However, whilst the *Waste Management Plan for England 2013* aims to establish a path towards a "zero waste economy", it does not include any new waste management policies for England.

The Government has adopted a relatively laissez-faire approach to waste regulation and policy in England and only a small number of government-led initiatives have been introduced. These include a plan to improve the quality of recyclates produced at MRFs, promotion of waste prevention and reduction efforts, and the introduction of a policy for the delivery of major energy infrastructure, including new energy from waste installations (principally advanced thermal treatment technologies).

There is also a commitment to enhancing the role of anaerobic digestion (AD) in England, with AD recognised as being an effective means of reducing GHG emissions from waste management and supplying renewable energy. Overall, English waste strategy and regulation is chiefly driven by use of the



Landfill Tax escalator and government-issued recycling targets for local authorities, which are given flexibility in deciding how to meet their targets and the government have stated that it will only intervene in waste matters where necessary or where there are is a clear market failure.

Similarly, the national waste strategy for Northern Ireland, *Delivering Resource Efficiency,* was also published in 2013 and sets a policy framework for sustainable management of waste. The strategy emphasises the need to view waste as a resource, with landfill diversion recognised as the key driver and contains specific targets for municipal solid waste (MSW) management by 2015 and 2020. Recycling targets for specific waste streams are in line with those of the EU Directive on Packaging and Packaging Waste (94/92/EC).

In September 2014, the Northern Ireland Executive released its National Waste Prevention Programme, *The Waste Prevention Programme for Northern Ireland – the Road to Zero Waste,* which outlines a strategy to reduce waste arisings, improve resource efficiency and emphasises the need for a whole life cycle approach in evaluating resource management solutions.

Scotland's Zero Waste Plan, published in June 2010, is Scotland's overarching, long-term policy document for resource efficiency and sustainable waste management. The document outlines the Scottish Government's long-term vision for a "zero waste" Scotland. Measures promoted in the document include a ban on landfilling of certain recyclable materials, a requirement for local authorities to separately collect certain wastes (eg, food waste) restrictions on thermal treatment feedstocks and the establishment of a 25 percent cap on local authority collected waste (LACW) sent for thermal treatment and measures to reduce GHG emissions from waste management.

The document sets a series of targets for recycling, preparation for reuse, or composting (or AD) of LACW and a target for a maximum landfill rate of five percent of LACW by 2025. These policies and targets are legally established by the Waste (Scotland) Regulations 2012. The regulations also include a number of provisions that impact on both local authorities and businesses.

In June 2010, the Welsh Government published its ambitious long-term waste strategy, entitled *Towards Zero Waste*. It sets out a framework for improving resource efficiency and the sustainability of waste management in Wales until 2050. Measures promoted include waste prevention (a target of an annual 1.5 percent reduction in national waste arisings until 2050 is set), separate collection of food waste, the provision of information on the destinations of recyclate, kerbside sort for household dry recyclables collection (this measure is currently under review).

The document also sets a series of targets for recycling, preparation for reuse, or composting (or AD) of LACW and stipulates that, at a minimum, 80 percent of waste sent for recycling, preparation for reuse, or composting (or AD) must come from source separation. Further targets include maximum levels of landfill of municipal waste, 10 percent in 2019/20 and five percent in 2024/25, and maximum levels of thermal treatment of MSW for individual local authorities. These policy measures and targets are legally established by the Waste (Wales) Measure 2010. Implementation of the strategy is to be achieved through six key Sector Plans that describe the role of each sector in delivering the outcomes, targets, and policies in *Towards Zero Waste*.

In December 2013, the Welsh Government introduced the Waste Prevention Programme for Wales, which addresses waste prevention in fulfilment of the requirements of the EU Waste Framework Directive. The strategy supports *Towards Zero Waste* and outlines policies and targets to encourage waste prevention action from households, businesses, and the public sector. The Welsh Government has also established a broad and ambitious cross-sectoral sustainable development scheme, which is outlined in *One Wales: One Planet*, published by the Welsh Government in May 2009. After years of consultation, the bold policies outlined in this were legally established through the Well-being of Future Generations (Wales) Act 2015.

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Research Supports Wales' Decisions

AT THE Centre for Environmental Science at the University of Southampton, we have recently published three core research papers each of which make a linked yet distinctive contribution towards providing evidence-based support for SWM decision-making.

The research presented in the third paper was undertaken in partnership with the Welsh Government and Natural Resources Wales. As part of the study, a comprehensive life cycle inventory for SWM processes was compiled, using best available, up-to-date data. This inventory was used to support the development of a practical, scientifically robust systematic framework, comprising the combination of materials flow analysis (MFA) and life cycle assessment (LCA) methodologies, for quantitatively evaluating the life cycle climate impacts of complex SWM systems for the purpose of decision support.

The approach utilises publicly-available data on waste mass flows collected by local authorities and available from WasteDataFlow in a completely novel way by combining it with process inventory data and, through data reconciliation, using it as input data to a MFA to establish a mass balance of waste for the local authority waste management system. Once the system mass balance is defined, the environmental performance of the system can be quantitatively evaluated using MFA performance indicators; GHG emissions performance can be evaluated via a "partilal" LCA.

To demonstrate its ability to provide decision-makers with valuable information about the environmental performance of their SWM systems, the developed methodology was applied ➥

to a case study using the city of Cardiff for the reporting year 2012/13. The main results and policy recommendations of the paper can be summarised as follows:

- the dominant source of GHG burdens from the existing SWM system was found to be from residual waste management, principally through landfilling. This finding supports the Welsh Government's ambitious aim of eliminating landfilling by 2050
- material preparation for reuse, reprocessing (recycling) and AD were found to be the greatest sources of GHG benefits, supporting the Governments' efforts to promote reuse and recycling where waste cannot be avoided
- GHG burdens from transport were found to be generally minor, except with regards to the management of source segregated garden waste and exported recyclate
- Wales is unlikely to achieve its ambitious 70 percent recycling target by 2025 given current waste arisings. Rather, the research suggests that in order for the targets to be achieved, policies that promote reuse and recycling must be combined with others that focus on waste prevention. This finding adds further weight to the Welsh Government's approach of targeting waste reduction as a priority action. This evidence provides broad confirmation of the ambitious polices outlined in *One Wales: One Planet* although some changes may need to be made. The evidence from this study could feed directly into supporting policy- and strategic decision-making at a national and sub-national scale.

A Way Forward?

THE EVIDENCE generated and framework developed via these studies could enable local authorities to better understand the flows of waste materials from their point of collection until their end destinations and the environmental performance of their SWM systems. The combined MFA and LCA approach enables the modelling of complex SWM systems to provide local authorities with valuable information that can assist in decision making. As we have started to demonstrate for Wales, the framework could provide a standardised approach for national governments to benchmark local authorities against key performance indicators, such as GHG emissions, recycling rate, and landfill rate, and appraise existing and potential waste policies in the context of complex, real-world SWM systems.

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The framework has been developed to support the UK and its devolved authorities in achieving their ambitious targets concerning improving SWM practice and reducing GHG emissions. Whilst the framework has been developed and applied in a UK context, it could also be adapted for application to other countries. However, for the outputs of the framework's application to be of most value to decision makers, accurate and detailed data on waste flows are required.

In the UK, such data are only available at present for Welsh and Scottish local authorities, who are obligated to record the physical flows of wastes from collection until end destination (known as Question 100) and report this information to government via the publically-available WasteDataFlow system. However, it was announced in early 2015 that England would be adding Question 100 to their WasteDataFlow system, which will enable the application of the framework to English local authorities.

Given the potential value of the information provided by Question 100 to local and national governments from a decision support perspective, its introduction in other European or international countries may be highly advantageous and would enable wider application of developed analytical framework. ■