



MANAGING CARBON  
AT SITA UK



Climate change has been described as ‘the biggest challenge facing the world today’. Our Government has pledged to address this challenge, asking for stringent reductions in the greenhouse gas emissions that cause climate change.

Along with the rest of industry, the waste management sector must play its part in combating climate change. As a significant company in this sector, we have an obligation to our staff and to our customers to lead by example.

That means managing the climate change impact of our own operations - examining how we travel and communicate on company business, how we run our offices, and how we control our waste management activities.

It also means helping our customers reduce their own climate change impacts, offering tailored solutions built around our recycling and energy recovery services.

At SITA UK, achieving our vision of ‘no more waste’ by engaging in the circular economy goes hand-in-hand with combating climate change.

In partnership with our staff and our customers, we are committed to working towards a more sustainable future.

“There is still time to avoid the worst impacts of climate change, if we take strong action now.”

— Lord Stern

## HOW DOES GLOBAL WARMING LEAD TO CLIMATE CHANGE?

Global warming is caused by the release of heat-trapping **greenhouse gases** from human activities — such as the burning of fossil fuels for power generation and transport — and the operation of energy-intensive industrial processes — such as steel making and cement manufacture. These gases have been released in such quantities that their accumulation in the earth’s atmosphere has caused average global temperatures to rise and, if left unchecked, could destabilise the earth’s climate. The consequences are potentially catastrophic — extreme weather events, loss of habitats and ecosystems, scarcity of food and water, and political instability.

The scientific consensus is that the average global warming temperature rise should be pegged to no more than 2°C to limit these impacts. Cuts in greenhouse gas emissions must be made in order to achieve this objective.

## CUTTING GREENHOUSE GAS EMISSIONS

The UK has enacted the Climate Change Act 2008, committing to cut UK greenhouse gas emissions by a third by 2020 and by at least 80 per cent by 2050. In July 2009, Government released the UK Low Carbon Transition Plan, setting out an agenda for change over the coming decades.

The waste management sector will play its part. The transition plan to 2020 requires the sector to cut greenhouse gas emissions by a further one million tonnes of carbon dioxide equivalent. Together with current measures to reduce greenhouse gas emissions, this equates to a 13 per cent emissions cut on 2008 levels.

## GREENHOUSE GASES

Carbon dioxide is the principal greenhouse gas, but other gases with heat-trapping properties also contribute to global warming — for example, methane and nitrous oxide.

The global warming potential of greenhouse gases is expressed as tonnes of carbon dioxide equivalent.

The total set of greenhouse gas emissions caused directly or indirectly by an individual, organisation, event or product is commonly called their carbon footprint.

## WASTE MANAGEMENT AND CLIMATE CHANGE

Waste management activities and processes release emissions to atmosphere, some of which are of greenhouse gases.

### INDIRECT EMISSIONS

Waste management processes can be associated with **indirect greenhouse gas emissions**.

Operators draw on electricity from the national grid to power their processes and to heat and light their offices. The production of this grid electricity from coal or natural gas itself releases carbon dioxide at the power plant. These emissions are counted as **indirect emissions** by the waste management operator.

Carbon dioxide released from power plants is the most common **indirect emission** associated with the waste management sector.

### DIRECT EMISSIONS

**Direct greenhouse gas emissions** are emissions that arise directly from waste management activities and processes.

Carbon dioxide, methane and nitrous oxide are the most common **direct emissions** released by the waste management sector.

**CARBON DIOXIDE  
NITROUS OXIDE  
METHANE**

### DIRECT EMISSIONS



LOGISTICS



ENERGY FROM WASTE



EMPLOYEE TRAVEL



TREATMENT



LANDFILL

**CARBON DIOXIDE**

### INDIRECT EMISSIONS



ELECTRICITY



PURCHASED GOODS AND SERVICES

### AVOIDED EMISSIONS

The waste management sector also contributes in a positive way.

**Avoided greenhouse gas emissions** are emissions that are avoided when secondary materials and energy recovered by the waste management sector are reintroduced into the production process.

Generally, this process takes place at sites owned by other operators.

### AVOIDED EMISSIONS



RECOVERED MATERIALS



COMPOST



RECOVERED ENERGY



BIOFUEL



### For example

For the same amount of energy as it takes to make one new aluminium can from raw materials, we can make 20 cans from recycled aluminium.

Using less energy to produce a can means that the can manufacturer emits less greenhouse gas emissions per can produced than if the can were made from raw materials.

Using less energy to produce a can also means that the power plant need not produce as much electricity and more greenhouse gas emissions are 'avoided'.

## CLIMATE CHANGE AND THE CIRCULAR ECONOMY

At SITA UK, our vision is to reach a stage where there is no longer any 'waste' because we recognise the intrinsic value of the materials we handle as a reusable resource.

To achieve this vision, SITA UK applies the concept of the circular economy. Within the circular economy, the role of waste management is to collect, treat and return secondary resources and recovered energy back into the cycle of production and consumption.

Returning secondary materials and recovered energy to productive use helps combat climate change by contributing to avoided emissions.

Greenhouse gas emissions are avoided when virgin materials used in production processes are replaced by waste-derived resources such as paper, metals, plastics or glass which are recycled back into industry.

The same is true when energy generated from waste displaces an equivalent amount of energy produced from fossil fuels.

For every tonne of municipal waste we combust to generate energy in an energy-from-waste facility, we avoid the burning of half a tonne of coal, which is both a fossil fuel and a non-renewable natural resource.

“Reusing and recycling lead to less resources being required to produce new goods and a reduction in associated emissions. Technologies such as energy-recovering incinerators also help to reduce [greenhouse gas] emissions.”

— The Stern Review, 2007



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## Did you know?

Recycling one tonne of...	Saves...	Compared with manufacture from raw materials this avoids the emission of...
Newsprint	The felling of 12 trees	0.2 – 1.7 tonnes of carbon dioxide equivalent
Office paper	The felling of 24 trees	0.2 – 1.7 tonnes of carbon dioxide equivalent
Aluminium	5 tonnes of bauxite ore	10.4 tonnes of carbon dioxide equivalent
Steel	1.5 tonnes of iron ore	1 tonne of carbon dioxide equivalent
Copper	10 tonnes of copper ore	10 – 20 tonnes of carbon dioxide equivalent
Glass	1.2 tonnes of raw materials	0.02 tonnes of carbon dioxide equivalent
Plastics	2 tonnes of oil	0.73 tonnes of carbon dioxide equivalent
Biowaste as compost	200 kilogrammes of peat	0.03 tonnes of carbon dioxide equivalent

\* Calculated using Environment Agency LCA model WRATE v1.0.1.0. Includes emissions from sorting / recycling facilities, and construction and maintenance impacts.

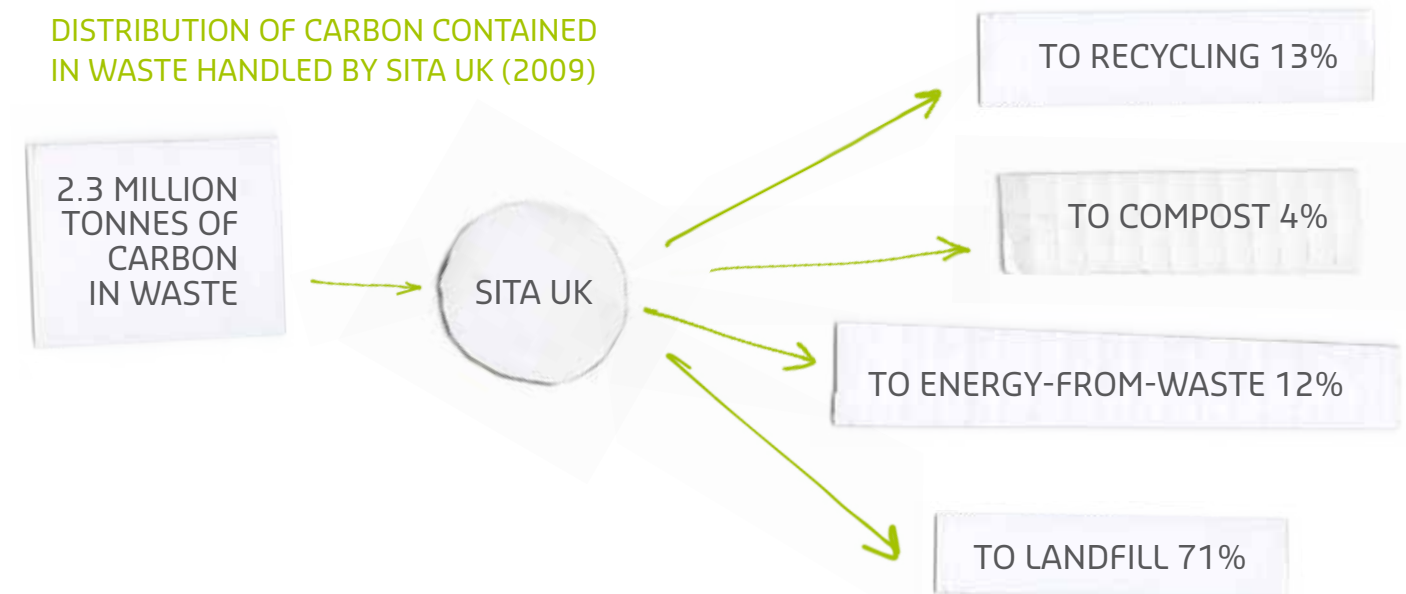
## CARBON AND SITA UK

SITA UK handled approximately nine million tonnes of waste in 2009. Many components of this waste – such as paper, plastics, wood and organic material like food waste – contain carbon.

Of the 2.3 million tonnes\* of carbon entering SITA UK in the waste we handled in 2009:

- 71% was deposited in our landfills, some of which was converted to electricity and some to fuel
- 17% was contained within the recycled materials and compost we produced
- 12% was converted to electricity in our energy-from-waste facilities

### DISTRIBUTION OF CARBON CONTAINED IN WASTE HANDLED BY SITA UK (2009)



Some of the carbon is released in **direct emissions** of greenhouse gases during handling and treatment:

- as carbon dioxide when the waste is combusted in an energy-from-waste facility. Nitrous oxide, another greenhouse gas, can also be released.
- as carbon dioxide and methane in landfill gas released through biological degradation when the waste is landfilled.
- as carbon dioxide (along with nitrous oxide) when landfill gas is combusted in a flare or in a gas engine to generate power.

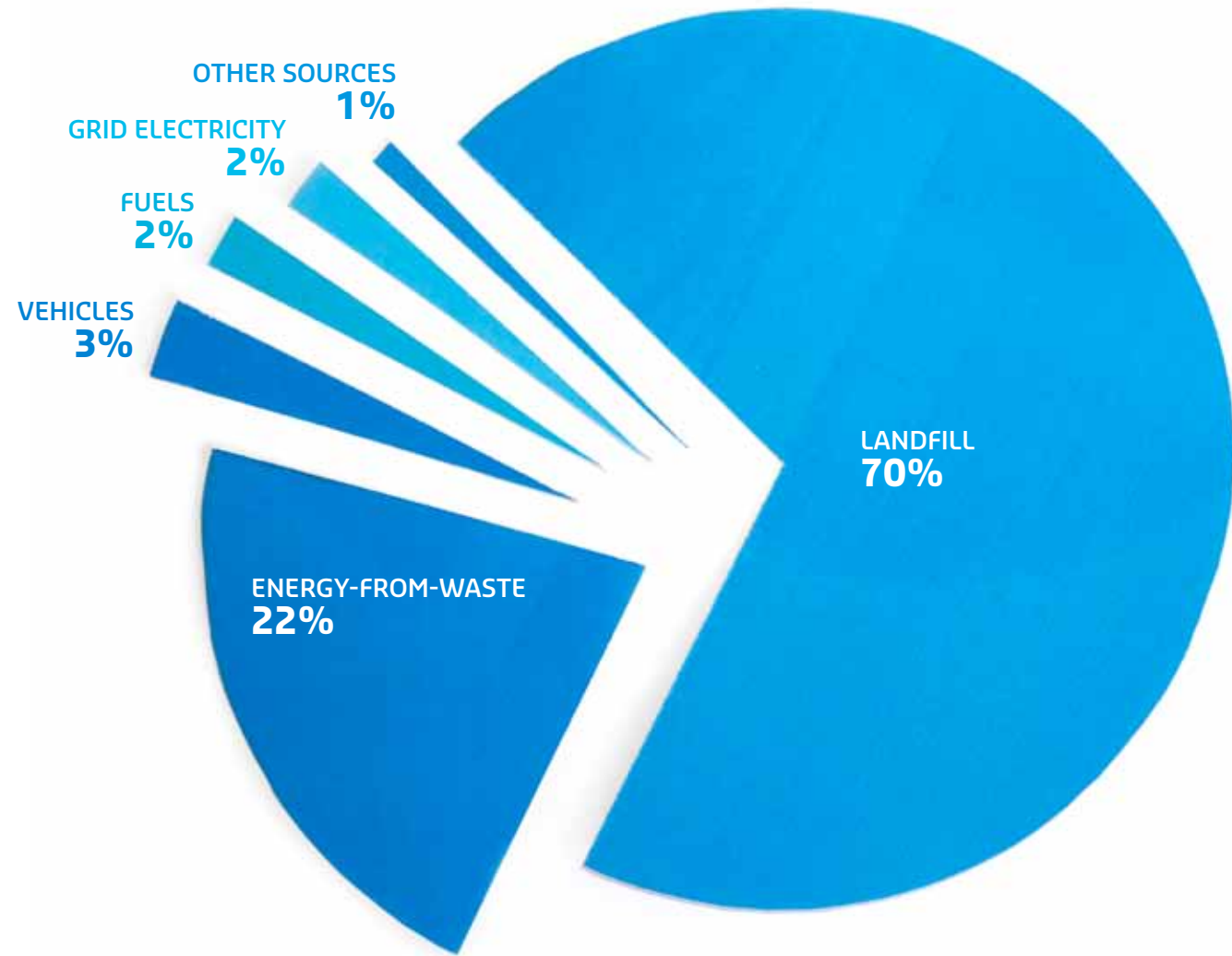
We also take **indirect emissions** associated with the energy we import as counting towards SITA UK's emissions.

Importantly, we return recycled materials and recovered energy to the wider economy. These contribute to **avoided greenhouse gas emissions** and help reduce greenhouse gas emissions elsewhere in the economy.

\* Calculated using Environment Agency LCA model WRATE v1.0.1.0.

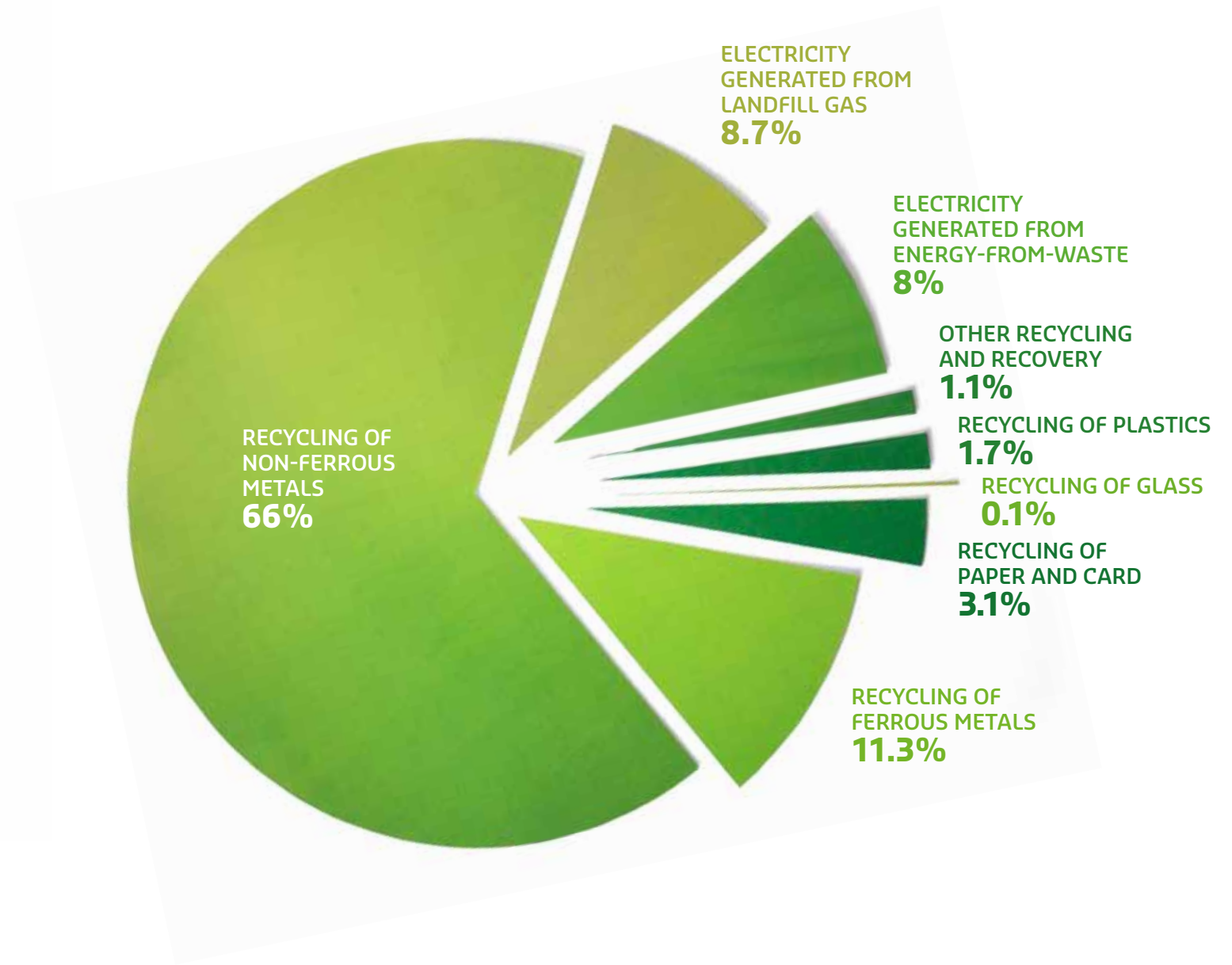
SITA UK'S DIRECT AND INDIRECT GREENHOUSE GAS EMISSIONS (2009)

Total emissions = 880,300 tonnes of carbon dioxide equivalent



SITA UK'S AVOIDED GREENHOUSE GAS EMISSIONS (2009)

Total saving = 2,065,000 tonnes of carbon dioxide equivalent



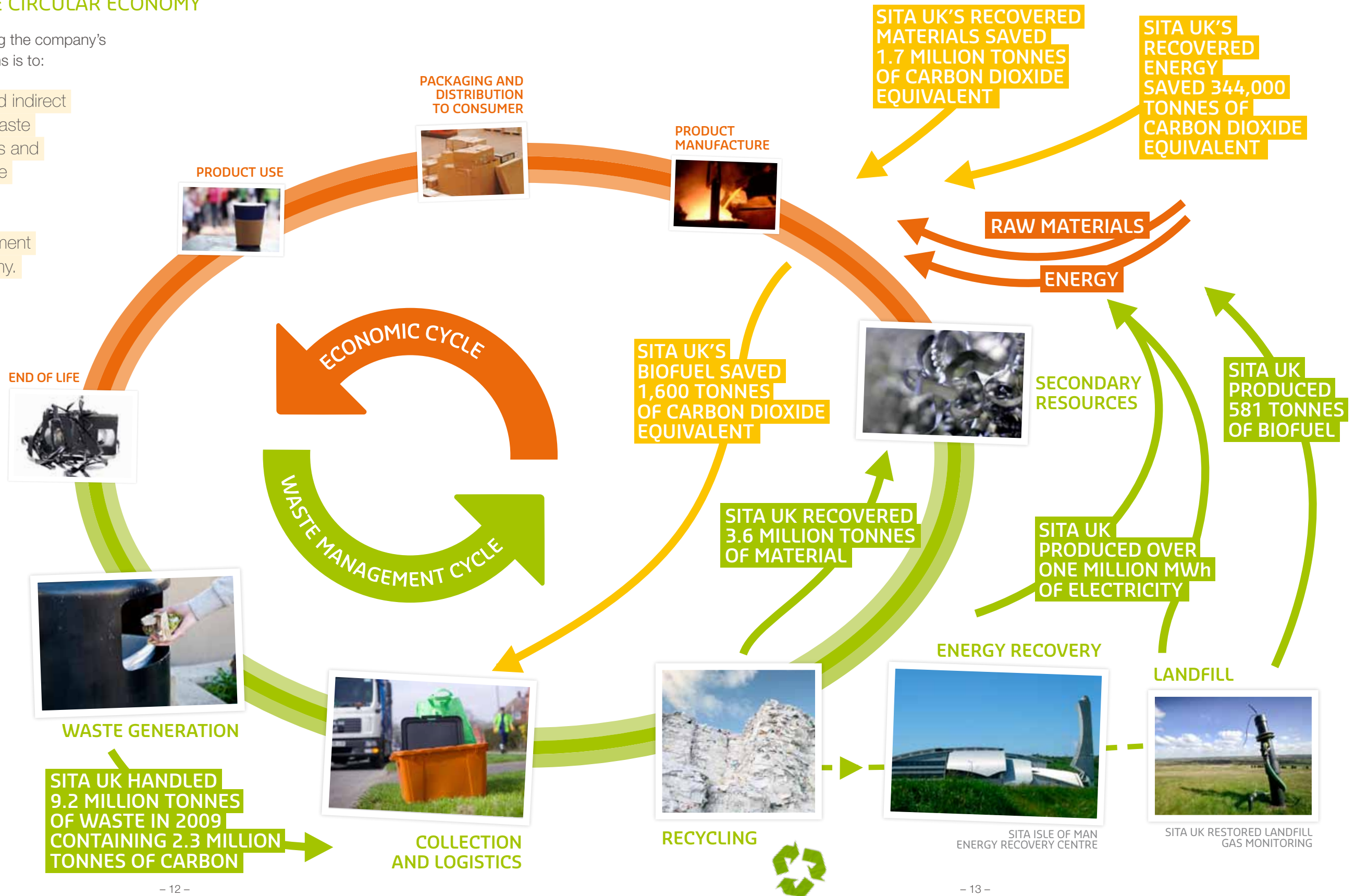
# CARBON AND THE CIRCULAR ECONOMY

Our strategy for managing the company's greenhouse gas emissions is to:

Reduce our direct and indirect emissions from the waste management activities and processes we operate and control.

Increase our engagement in the circular economy.

Further implement our vision of 'no more waste' so that we can increase our contribution to avoided emissions.



## WHAT WE ARE DOING

### REDUCING THE CARBON FOOTPRINT OF SITA UK

SITA UK employs over 5,500 staff, working out of over 300 operational sites and administrative offices. SITA UK's greenhouse gas emissions and consumption of resources relate to the day-to-day activities connected with running our business:

- Fuel consumption for car travel releases direct emissions of greenhouse gases.
- Heating, lighting and providing power to our premises releases direct and indirect emissions of greenhouse gases.
- We generate waste from our premises, in the form of paper, cans, plastics and food.

We are working to reduce our greenhouse gas emissions by becoming more energy-efficient, by reducing waste, and by procuring our goods and services more sustainably.

### Did you know?

- The typical energy bill from computers and monitors can be reduced by 70 per cent by enabling standby mode, or by switching them off when not in use.
- The heating bill for a typical office increases by eight per cent for every one degree celsius increase in thermostat temperature.
- Switching off lights in unused areas and in empty rooms can cut lighting costs by 15 per cent.
- The energy bill of a typical office could cost 65 per cent more than that of an energy-efficient office.

(Source: Carbon Trust website)

### Green Steps

Green Steps is SITA UK's programme designed to reduce our carbon footprint and make our company more resource-efficient. The project started in 2007. Since then, we have introduced a number of changes to our working methods.

### Greener offices

SITA UK's head office at Maidenhead introduced a recycling scheme as one of the steps towards better office resource management. This involved the removal of personal waste baskets, replaced by general waste bins in specific locations only. It also included the introduction of food waste caddies in kitchens and recycling containers in communal areas.

In 2009, we recycled 60 per cent of our waste arisings at Maidenhead – almost four tonnes of paper, cardboard, cans, plastics and food waste.

We also collect for recycling items such as batteries, old mobile phones and used light bulbs. Larger electrical equipment – such as printers and PCs – are collected separately for recycling and re-use.

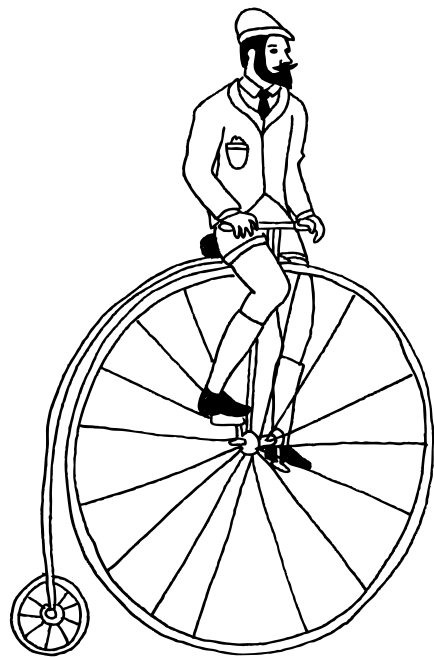
The programme is active at various locations – including our administration centre in Weston-super-Mare where the scheme was introduced in late 2007 – and is being rolled out further at SITA UK's principal regional offices.



### Improving energy efficiency

Working with Cofely (part of GDF SUEZ Energy Services), we are reducing energy consumption within our offices. Improvements carried out include:

- Installing equipment which ‘soft starts’ the air conditioning system.
- Separate metering on equipment with the highest energy consumption.
- Replacement of light switches with motion detectors.
- Using energy-efficient lighting.
- Installing low-energy hand dryers and water heaters.



### Managing staff travel and meetings

To reduce transport-related emissions, SITA UK offers alternatives to business travel through virtual meeting tools, such as telephone and web conferencing. Our principal regional administrative hubs are linked by tele or video-conferencing facilities.

An employee bike scheme was set up in 2008 through a tax sacrifice scheme to encourage green commute for employees. Employees are also encouraged to car-share and to use public transport in lieu of car journeys whenever possible.

### Green energy

At our Teesside facility we have a wind turbine generating 16 kilowatts of power. The turbine offsets some of the facility’s electricity consumption, helping to maximise its carbon-saving exports to the national grid.

We are exploring the feasibility of installing wind turbines and solar panels at other selected operational sites and administrative offices.

### Did you know?

- 100 km travelled in a petrol or diesel car emits on average 20 kg of carbon dioxide. (Source: BT Savings Calculator)
- Smarter driving can result in a 20 per cent reduction in fuel consumption and reduce maintenance costs significantly. (Source: Energy Saving Trust)
- Managing work-related travel and promoting sustainable travel alternatives can reduce commuter car travel by 10-30 per cent. (Source: Department for Transport)

### Sustainable procurement

Procurement decisions can have major environmental implications for a company of SITA UK’s size. Our Sustainable Procurement Policy took effect from December 2009 and includes the following commitments:

- We will source recycled materials wherever possible, particularly in relation to our office supplies.
- For employees using company cars, we have refreshed our procurement criteria, offering a choice of low-emission diesel models or a hybrid model.
- We will work with our key suppliers to improve their sustainability performance, and train internal purchasers on how they can reduce consumption and procure more sustainably.
- We will award new contracts to the most economically and sustainably advantageous offer, balancing quality and price against set sustainability criteria.
- We will source green energy wherever possible.

## WHAT WE ARE DOING

### REDUCING EMISSIONS FROM OUR ACTIVITIES

In 2008, SITA UK commenced a review of the carbon impact of each stage of our operations.

We assessed the way in which we collect our waste, the transport fuel we buy to run our vehicles, the source of the power we bring to our offices and treatment plants, and the way in which we control emissions from our activities and process operations.

We first estimated the greenhouse gas emissions associated with each of our activities. We then assessed how we could reduce these emissions – by changing the way in which we operate, by changing our procurement policies, or by improving emission controls.

We put this all together in a company plan containing reduction targets and milestones against which we can plan our strategy for carbon management.

Our aim is to offer year-on-year reductions in greenhouse gas emissions from our operations, allowing for potential growth in the business.



#### Alternative fuel in Kensington

Liquid biomethane, a renewable fuel SITA UK produces from the landfill gas collected at our Albury site in Surrey, is being trialled in a dual-fuel refuse collection vehicle in Kensington. This vehicle, which went into service in September 2009, is able to switch between diesel and liquid biomethane, potentially substituting up to 65 per cent of the diesel used by normal engines with this renewable alternative.

Switching to liquid biomethane in place of diesel has a number of environmental advantages:

- Carbon dioxide emissions can be reduced by 14 per cent.
- Carbon monoxide emissions can be reduced by up to 98 per cent.
- Nitrogen oxides produced by the engine can be reduced by 35-65 per cent.
- Noise levels can be reduced by up to three decibels.



#### North East Energy Recovery Centre

In 2009, the North East Energy Recovery Centre – a £70 million extension to our Tees Valley energy-from-waste facility – opened for business. The centre is part of Northumberland County Council's 28-year Private Finance Initiative contract for the management of the Council's municipal waste. The extension gives us the ability to handle 640,000 tonnes of waste and generate 50 MW of electricity at the centre – making it SITA UK's largest energy-from-waste facility in the country.

The centre has provided significant community benefits, creating 41 new jobs, while also having the capability to deliver recovered heat and power to local businesses, reducing both their energy needs and carbon footprint.

#### Energy recovery at landfills and energy-from-waste facilities

SITA UK is a significant generator of recovered energy, from landfill gas as well as from the combustion of waste. Our landfill sites alone account for about three per cent of the UK's renewable electricity generation.

In 2009, more than a million megawatt-hours (MWh) were generated at our landfill sites and energy-from-waste facilities – enough to power nearly 215,000 homes for a year.\*

Harnessing the methane present in landfill gas not only produces recovered energy for export to the national grid, but also delivers significant environmental benefits by cutting emissions – methane is a greenhouse gas 21 times more potent than carbon dioxide.

\* Based on average annual domestic usage of 4,700 kWh, BERR Digest of UK Energy Statistics 2006.

### Landfill restoration

Planting of trees and hedgerows is widely recognised as an effective way of enhancing the natural environment by restoring habitat for recreational use by local communities and encouraging biodiversity, while at the same time combating climate change by removing carbon dioxide from the atmosphere. As trees and other plants grow, they incorporate the carbon dioxide in the atmosphere into their roots, branches and leaves.

SITA UK maintains an ongoing landfill management and restoration programme that commences as soon as a landfill comes to the end of its active life. The landfill is first secured by capping it with a flexible membrane, on top of which is placed sub-soil and compost. After the landfill has stabilised, a programme of planting commences.

Over the past five years we have restored over 1,000 hectares of land. During 2009 alone, we planted more than 7,500 trees and 150 metres of hedgerow.



### Did you know?

One hectare of newly created native woodland will eventually lock up at least 400 tonnes of carbon dioxide from the atmosphere over a rotation (approximately 100 years).

(Source: Woodland Stewardship Company Limited)

### Carbon counting

With our support, our parent company SUEZ ENVIRONNEMENT worked with France's Entreprises pour l'Environnement (EpE) and two other member companies to develop a greenhouse gas emissions reporting protocol for the European waste management industry. The UK's Environmental Services Association adopted the protocol in 2009.

A common approach to quantifying and reporting our carbon footprint will provide a solid technical base for our sector as we prepare for the new low-carbon era. The EpE protocol is intended not just for waste management companies, but also for local authorities and companies managing their own waste. Its calculation tools are designed to be consistent with existing greenhouse gas reporting protocols for other sectors.

SITA UK will report its annual greenhouse gas emissions on the basis of the EpE protocol.



### Engine management project

During 2009, we trialed a number of in-cab monitoring systems. These systems constantly monitor the driver's driving style and the engine's performance, then provide feedback with ways to improve driving and save fuel. Staff are given a series of briefings and trained in techniques to reduce behaviour that unnecessarily uses fuel.

Further trials held in Warwick in early 2010 revealed an immediate ten per cent increase in miles per gallon. These fuel saving results are encouraging and it's hoped they will improve further once engines have been adjusted.

## WHAT WE ARE DOING

### CREATING LOW CARBON OFFERS FOR OUR CUSTOMERS

As a company committed to the principles of sustainable development, we build affordable environmental improvements into our service offers for customers.

Through our waste management activities, we reduce the net emissions of greenhouse gas associated with the management of our customers' waste. We do this by recycling or recovering value from as much of the waste as is economically feasible – applying the optimum environmental solution appropriate for the waste material.

We design each stage of the waste management chain – from the mode of collection to the most appropriate form of treatment – such that, overall, our proposed service offer results in lower greenhouse gas emissions than the customer's present management route.

We can estimate the net environmental savings our service provides, which can be claimed by our customers as a net benefit against their own greenhouse gas emissions.



### New resource parks

SITA UK has concluded an agreement with Cyclamax to develop six resource parks, which will treat in excess of 600,000 tonnes of commercial and industrial waste. This agreement is one of the biggest-ever commitments to developing gasification capacity in the UK and will produce enough electrical power to supply the needs of over 85,000 homes. The resource parks will use gasification technology distributed in the UK by Planet Advantage Limited.

The first four facilities have either received planning permission or are in the planning process. Each resource park has been designed at community scale and will provide the local area with modern, efficient facilities for materials recycling and energy recovery. For example, the resource park proposed at Sheepbridge could provide power for around 38 per cent of the homes in its host town of Chesterfield.

### Food waste in Calderdale

Early in 2009, we started a new food waste collection service for Calderdale Council. By collecting this waste separately, we can divert it from landfill and use it to produce compost.

The scheme exceeded all expectations during the first few weeks, with our recycling crews collecting around 120 tonnes of biodegradable food waste from across Calderdale each week – around 30 tonnes more than was expected.

The food waste is taken to an in-vessel composting facility, where it is processed into a product that can be used in agriculture, horticulture, or in domestic gardens.



### 99% recycling rate

When we began work with the award-winning Caledonian Brewery in May 2009, the majority of their waste was being sent to landfill. We introduced large mixed recycling bins, more regular collections, and special training and education sessions for staff. Within the first month the brewery successfully recycled 99 per cent of their waste.

Further improvements to the brewery's environmental performance were made, for example, by replacing around 10,000 plastic cups with biodegradable cups made from vegetable starch, and by introducing metal recycling and hazardous waste collections.

### Carbon calculator

Developed in-house and launched in 2007, SITA UK's carbon calculator allows customers to see the real value of their recycling efforts. The customer's carbon savings are converted into equivalent numbers chosen by the customer – whether car or flight miles, number of trees saved, or days in the life of a person.

Expressed in this way, the customer's carbon footprint is more readily understood, helping inform employees of the value of recycling and supporting sustainable decision making.

The carbon calculator uses the Environment Agency's life-cycle assessment software for comparing different waste management solutions.



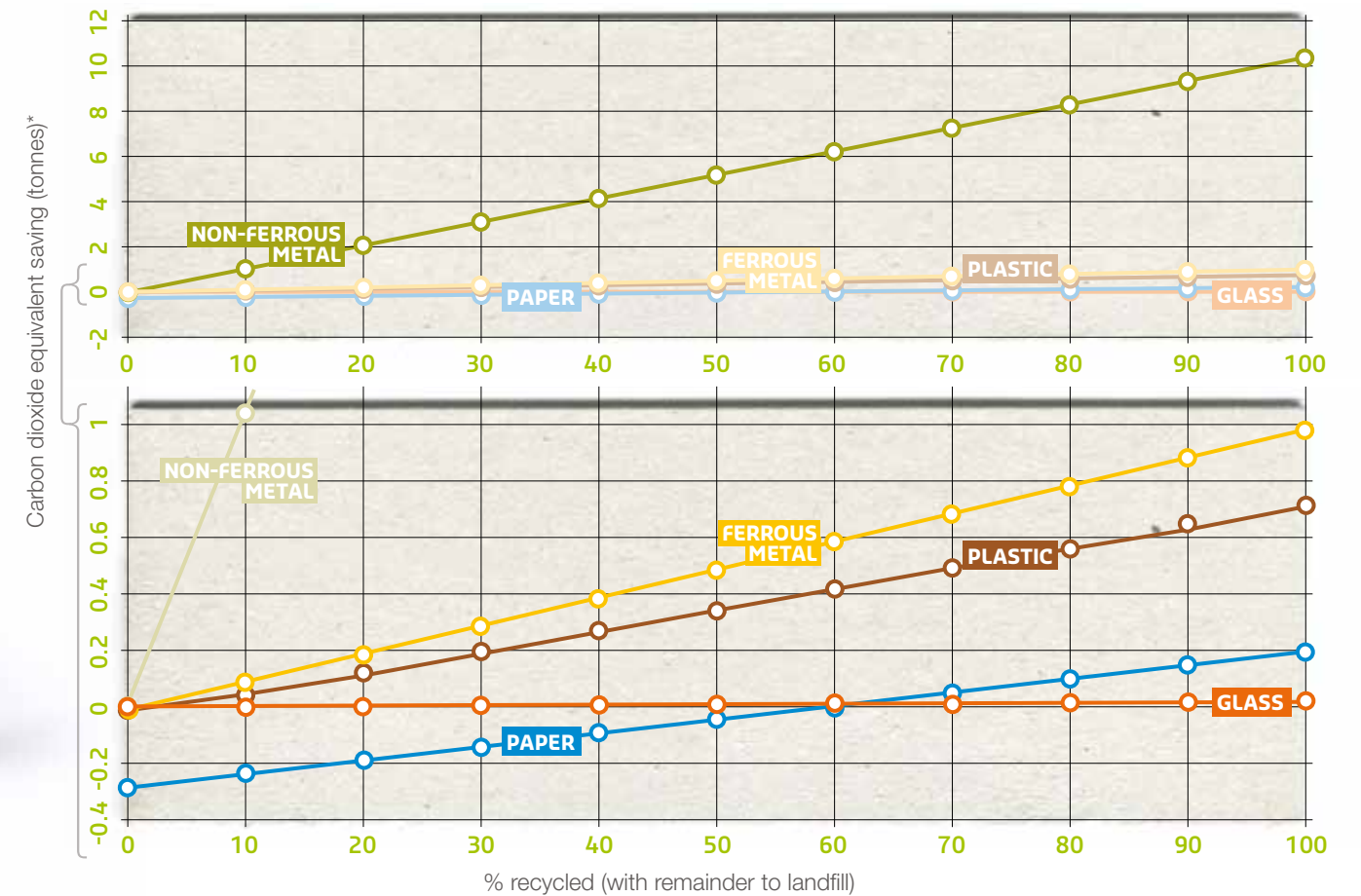
### Avoided emissions for customers

When a customer's waste is recycled, greenhouse gas emissions are 'avoided' or 'saved' because the recycled material replaces virgin raw materials in the production process. These avoided emissions can be taken as a credit by the customer and subtracted from their direct emissions.

However, when the same waste is landfilled, the customer cannot claim these avoided emissions. Landfilled materials such as paper might even add to the customer's overall emissions because when they degrade they generate methane and carbon dioxide. Methane is 21 times more potent a greenhouse gas than carbon dioxide.

Reading from the graph, if 50 per cent of a customer's non-ferrous waste was recycled rather than landfilled, then for every tonne of this material diverted from landfill the customer could claim a saving of 5.2 tonnes of carbon dioxide equivalent. For plastics, if 70 per cent was diverted from landfill, then for every tonne diverted the saving would be 0.5 tonnes (500 kg) of carbon dioxide equivalent.

Carbon dioxide equivalent savings for recycling one tonne of material relative to landfill



\* Calculated using Environment Agency LCA model WRATE v1.0.1.0.

## MOVING FORWARD

We at SITA UK are committed to reducing our company's and our customers' impact on climate change. We are transforming our business in order to:

- Promote separate collection of key materials to help us to maintain product quality.
- Develop new markets (for example for food waste collection and wood recycling).
- Develop more recycling facilities.
- Improve recycling rates for local authorities and private sector customers.
- Increase our recovery of energy from waste.
- Increase the production of green energy or green fuel from landfill gas.

By delivering high quality services designed to lower their climate change impact, our customers can take the benefit of the greenhouse gas emissions that we 'avoid' on their behalf.

The need for businesses to take steps to cut carbon emissions has never been greater.

We are committed to reducing our own emissions and assisting our customers with theirs, together doing all we can for a lower carbon future.

### CONTACT SITA UK

To learn more about our low-carbon offers and how we can help you reduce your direct emissions, email us as [enquiries@sita.co.uk](mailto:enquiries@sita.co.uk).

## ABOUT SITA UK

SITA UK is a recycling and resource management company. We deliver sustainable and increasingly innovative solutions for the public, local government, industry and commerce, enabling our customers to minimise the impact of their waste on the environment.

SITA UK serves over 12 million people and handles more than nine million tonnes of domestic, commercial and industrial waste through a network of recycling, composting, energy-from-waste and landfill facilities.

SITA UK, a subsidiary of SUEZ ENVIRONNEMENT, employs over 5,500 staff and has an annual turnover in excess of £750 million.

## SUEZ ENVIRONNEMENT

SUEZ ENVIRONNEMENT is a global provider of environmental services that supplies drinking water to 68 million people, provides wastewater treatment services for 44 million people and collects the waste produced by 46 million people.

SUEZ ENVIRONNEMENT has 62,000 employees and, with its presence on a global scale, is the world's number one group exclusively dedicated to environmental services.

## SITA UK AT A GLANCE

In 2009, SITA UK managed more than nine million tonnes of waste. We recycled over two million tonnes of this waste. We generated over one million MWh of electricity from our landfill gas and energy-from-waste facilities. All this electricity is enough to power approximately 215,000 homes for a year.\*

\* Based on average annual domestic usage of 4,700 kWh, BERR Digest of UK Energy Statistics 2006.

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