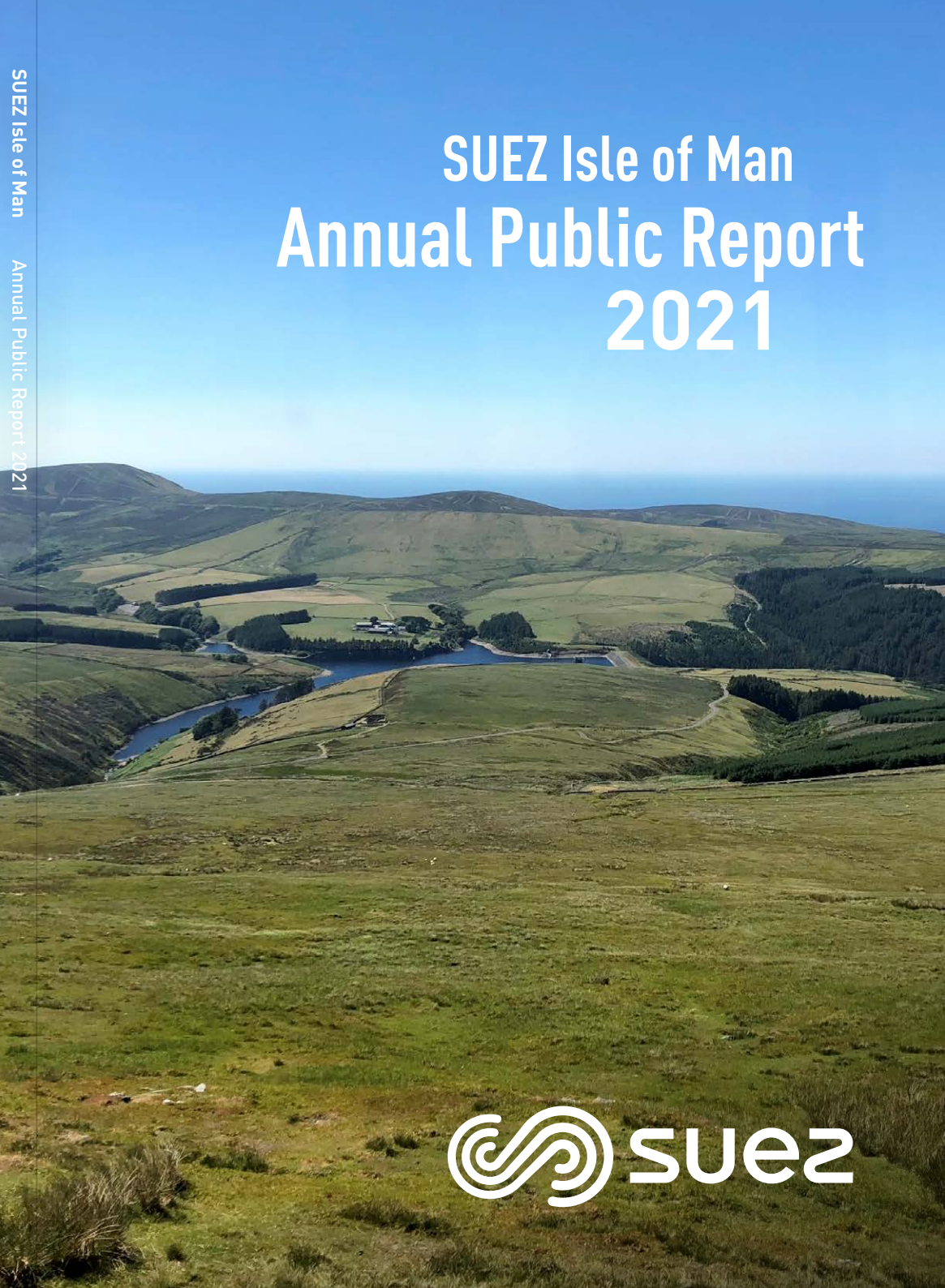
SUEZ Isle of Man
Annual Public Report 2021



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Foreword

It is our great pleasure to introduce this report and, for the second year running, thank the team at SUEZ Isle of Man for maintaining continuity of its essential services to the island in trying circumstances.

The pandemic and the restrictions required to combat the spread of COVID-19 again impacted waste flows, ways of working and the opportunity to carry out some of our scheduled maintenance activities. It is a great credit to our people and their adaptability that they delivered both the improvised programme and continually high levels of effectiveness across the facility's operations.

Despite an enforced shutdown due to disruption of waste deliveries during the island's third lockdown, the energy-from-waste facility processed more waste than in recent years, including a higher tonnage of clinical waste.

Electricity output was affected by a major routine planned overhaul of the turbine. It was crucial to complete this work, which was delayed from 2020.

Several unplanned stoppages were due to non-conforming waste. As a responsible operator, it has been necessary to extend spot checks on incoming waste to include inspection of all skip loads until this problem can be resolved.

As before, these and other challenges have been overcome without compromising the exceptional safety and environmental record of the Richmond Hill facility.

This report also outlines the other actions being taken to live up to the wider sustainability commitments of SUEZ recycling and recovery UK, including pledges to protect and promote biodiversity – a running theme through 2021 and this report.

We hope that a less uncertain 2022 will see postponed maintenance works completed, and we also trust that our dedicated team will again welcome school groups and other people from across the community and beyond to the facility's revamped visitor centre.

John Scanlon
Chief Executive Officer
SUEZ recycling and recovery UK

Jon Garrad
Plant Manager
SUEZ Isle of Man

Introduction

This report covers the operations of SUEZ Isle of Man during the calendar year of 2021.

We aim to be accountable to the community we serve, as well as our client, the Manx Government. This comprehensive review of our performance includes critical environmental data for the year and a comparison with previous years, as well as a commentary on the main activities and developments at the island's energy-from-waste facility.

The report's contents have been verified by SGS, an independent inspection and certification company.

We hope that you find our annual public report informative and welcome any feedback.

SUEZ recycling and recovery UK

SUEZ began operating in the UK in 1988. Since then, SUEZ has provided environmentally responsible solutions for waste generated by households and businesses across the country. Over the last decade or more, our group has been in the vanguard of change in the waste management industry.

SUEZ is helping customers make the transition from a linear economic model – extracting, using and disposing of materials – to the circular economy. This requires that waste is instead treated as a valuable resource that can be put to good use, whether by re-use, recycling or recovery as energy.

The Richmond Hill facility is one of 10 operated by the UK energy division. Our staff in the Isle of Man are part of this network, sharing world-leading specialist expertise.

A sustainable business

We live in a world of depleting raw materials, water stress and threatened ecosystems, all overshadowed by the climate crisis.

Sustainability is the only business case – for our company, and ultimately, for the Earth, economy and everyone. We've long recognised this. We reinvented our business in the UK to support the transition to a circular economy and we will measure and report our performance against this triple test for the planet, people and prosperity.

We do this by helping our customers make best possible use of their material and water resources, while reducing their carbon footprints, protecting the environment and driving efficiency.

A resource and energy revolution is underway as industry and society move from a linear model to the new circular economy. That means no longer extracting, consuming and discarding residual or contaminated materials and water. Instead, we must optimise our use of materials and the entire water cycle, while recovering resources (including energy) from waste flows and avoiding environmental harm.

UK operations

SUEZ recycling and recovery UK employs more than 5,700 people and handles more than 11 million tonnes of material a year[1]. The company serves 78 local authority contracts and 28,000 businesses – recovering significant value for the UK economy and the environment:

The value recovered each year is significant, as these latest figures[1] show:

Emissions

Helped our customers avoid **1,672,974 TeqCO$_2$** (tonnes of carbon dioxide equivalent) of emissions through the provision of recycled materials, and electricity and heat generated from waste

Electricity

1,635,150 megawatt hours generated (enough to power 438,261 homes)

Thermal energy

390,595 megawatt hours generated

Solar energy

235,000 kilowatt hours generated at 11 sites

Compost

75,991 tonnes produced from green and food waste

Alternative fuels

457,000 tonnes produced from waste materials

[1] 2020 sustainability report – The triple bottom line

Developments in 2021

As an industry leader, SUEZ recycling and recovery UK collaborates with various partners to champion the circular economy. This includes work with trade and professional bodies, investment in original research, and thought leadership.

The COP26 conference in November was a focal point of 2021 as the world looked to the proceedings in Glasgow for a plan of action to limit global heating.

Although resource use drives half of the world's climate emissions, resource efficiency was absent from the COP26 agenda. To address this oversight, SUEZ recycling and recovery UK co-hosted four fringe events at the conference with partner organisations (the Chartered Institution of Wastes Management, Aldersgate Group, Green Alliance, and ReLondon). These hybrid sessions – open to an online audience as well as COP26 attendees – debated the role of the circular economy in reaching net zero and tackling the global climate crisis.

- In the run-up to the event, we also published research on the environmental, social and governance (ESG) policies and practice of UK businesses. Our joint study with the British Chambers of Commerce showed high awareness of the importance of environmental sustainability among 1,000 companies surveyed. However, two thirds have no environmental sustainability policy.

  "Businesses are looking to government for a supportive regulatory framework that will help accelerate a green recovery and promote business growth that not only benefits our economy and jobs, but that also enriches local communities and protects the environment." observed John Scanlon, Chief Executive Officer of SUEZ recycling and recovery UK.

- The business survey also revealed a lack of understanding about social value, and its wider benefits for the environment as well as local communities and economies. Only 40% saw social value policy as a priority.

- In March 2021, SUEZ recycling and recovery UK published new research[2] highlighting how social value can be harnessed to tackle climate change while also supporting a sustainable economic recovery.

[2] Increasing the social value delivered by environmental services contracts: A guide for local authorities was researched and produced by Eunomia Research & Consulting.

- The company's ongoing research and public affairs programme drew attention to two other concerns in April – recycling levels and microplastics pollution.
- An interactive digital map was released to show recycling performance by UK local authority area. The overall trend shows that England and Scotland have fallen behind Wales as recycling rates plateaued for the fifth consecutive year in 2019/20 after a decade of rapid improvement.
- Recommendations to address the challenge of microplastics in UK waters were set out in a report co-authored with SOENECS (Social, Environmental & Economics Solutions Ltd)[3]. As car and truck tyres wear, they release particles that could account for up to a third of microplastics pollution of oceans and rivers. Factors that could curb this problem range from tyre design and driver training to technologies that capture particles on vehicles and in-road drainage systems.

UK infrastructure

SUEZ recycling and recovery UK operates a diverse network of facilities[4] for handling and processing resources – including other advanced technologies, such as gasification and anaerobic digestion.

111 household waste recycling centres

83 transfer stations

5 operating landfills

13 materials recycling facilities

10 energy-from-waste facilities

6 wood processing facilities

25 re-use shops

6 composting facilities

13 refuse derived fuel facilities

2 solid recovered fuel facilities

3 street sweepings recycling facilities

1 mechanical biological treatment facility

1 anaerobic digestion facility

1 gasification facility

[3] The Insight Report: 2030, Invisible Ocean Pollutants from our Roads
[4] 2020 sustainability report – The triple bottom line

Signposts to sustainability

Themes and headline commitments of SUEZ recycling and recovery UK

Lead by example

Embed the environment and social value at the core of how we do business, to make an increased difference year-on-year.

Employees

Create a network of sustainability champions to empower and support employee action and develop our understanding of the key issues we face.

Carbon

Reduce the carbon emission intensity for each tonne of waste we handle for our customers and our own activities per employee year-on-year.

Re-use

Expand our network of re-use facilities to increase the volume of items reused, repaired or repurposed.

Supply chain

Improve the environmental, social and economic impact of our supply chain year-on-year.

Communities

Continue to be a good neighbour in the local community, taking part in local events and increasing what we spend with local suppliers.

Biodiversity

Take action at every SUEZ location to improve its natural environment.

Education

Share our knowledge and expertise to develop the resources sector, influence public behaviour and build a future workforce as part of our sustainable future.

Isle of Man waste management

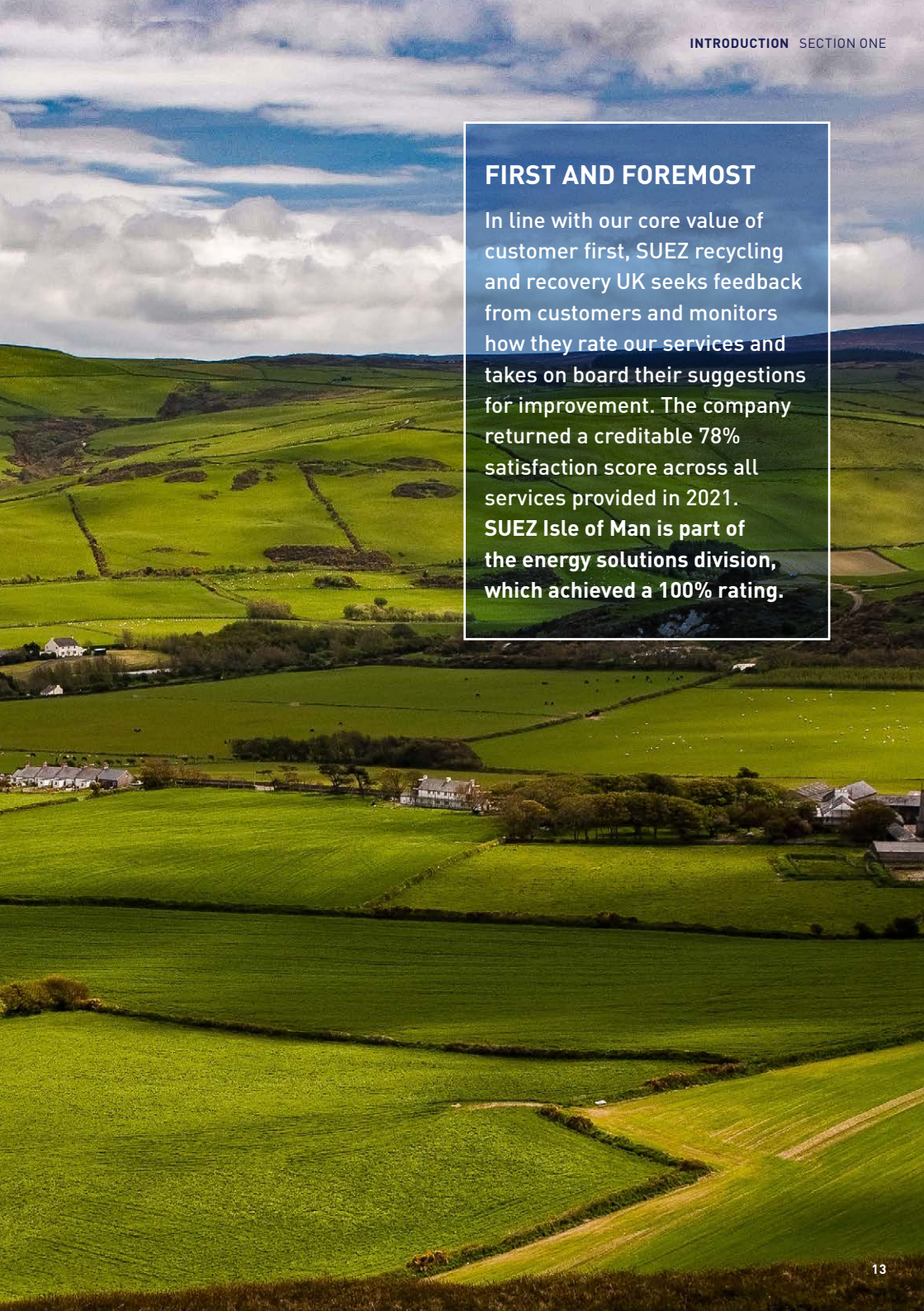
Richmond Hill's energy-from-waste facility operates as part of the Department of Infrastructure's Waste Strategy, approved by Tynwald in 2018.

The strategy seeks to optimise sustainability and self-sufficiency in waste management within the constraints of a small island economy. Challenges include the economies of scale required for viable specialist treatment facilities, inability to access take-back schemes for imported goods, and uncertainty around access to off-island markets for recyclables, waste electrical and electronic equipment (WEEE) and hazardous wastes.

As well as processing residual waste from households and businesses, our facility safely disposes of clinical wastes from hospitals and other healthcare settings, bio-pellets from the island's sewage treatment plant, waste mineral oil, meat and bone meal from the animal waste processing plant, and end-of-life tyres. This increases the island's self-sufficiency in managing its wastes.

Energy-from-waste also contributes to the island's energy security.

The current operating contract for the facility expires in August 2029. The facility will remain a key part of the Isle of Man's waste management infrastructure, subject to its ongoing compliance with emission standards and operational efficiency requirements.



FIRST AND FOREMOST

In line with our core value of customer first, SUEZ recycling and recovery UK seeks feedback from customers and monitors how they rate our services and takes on board their suggestions for improvement. The company returned a creditable 78% satisfaction score across all services provided in 2021. **SUEZ Isle of Man is part of the energy solutions division, which achieved a 100% rating.**

Managing waste

As the disruptive impacts of the pandemic on the island abated, the tonnage of material arriving on Richmond Hill recovered. More residual waste was delivered during 2021 than in any of the previous five years. However, less electricity could be generated due to an essential overhaul of the facility's steam-powered turbine.

This section of the report covers our operations over the year, but it begins with an explanation of the energy-from-waste process. We then describe the maintenance work done to keep the facility operating safely and efficiently. This is followed by a breakdown of the materials received, resources used, and outputs, including energy.

The energy-from-waste process

The technology used in the facility, and our management regime, are designed to ensure it operates efficiently and, above all, safely.

The Richmond Hill facility has two lines for treating waste. The primary line can process up to 60,000 tonnes per year of municipal and commercial waste. The secondary line – designed for animal, clinical and waste oils – has an annual capacity of 5,000 tonnes. The secondary line, however, no longer processes animal waste, as this is processed in the dedicated animal waste processing plant operated by the Isle of Man Government's Department of Infrastructure.

Waste is burned at temperatures of over 850°C in the furnace of the primary line, while on the secondary line, the minimum operating temperature rises to 1,000°C in its secondary chamber, where volatile gases are incinerated. These thresholds are set out in the EU Industrial Emissions Directive, which is designed to ensure the safe operation of processing facilities and destruction of waste.

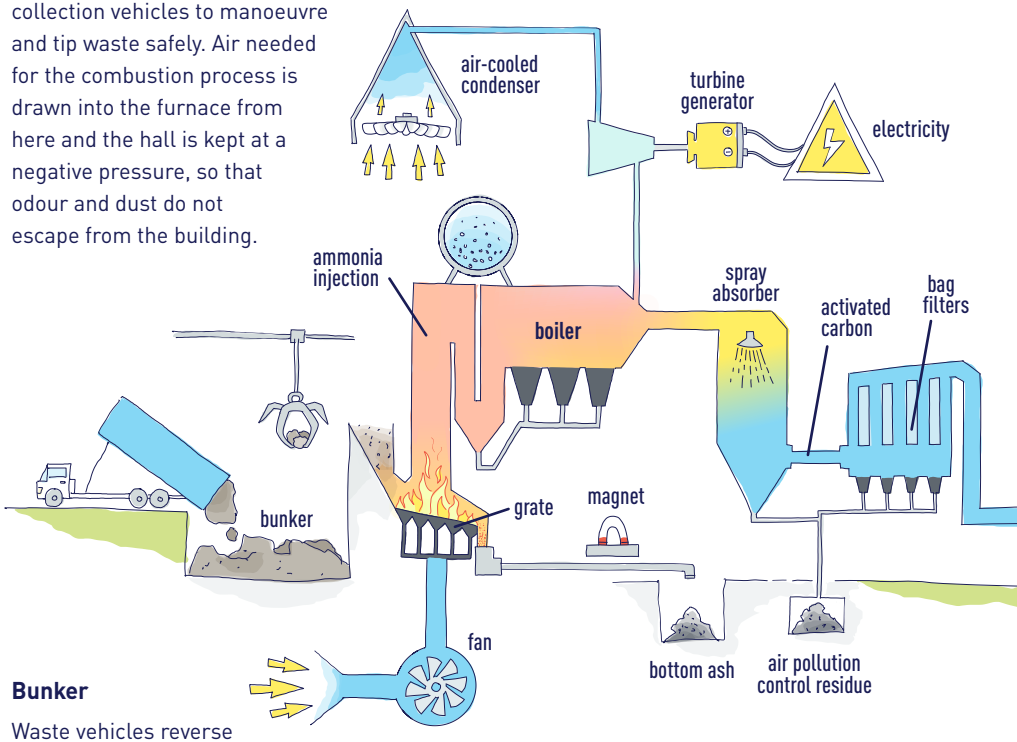
On arrival at Richmond Hill, waste vehicles use an automatic weighbridge set back from the site entrance, so that vehicles do not have to queue on the public highway. Waste type and amount, as well as customer details, are recorded and the driver is directed to the appropriate delivery bay.

Reception hall

A large reception hall allows refuse collection vehicles to manoeuvre and tip waste safely. Air needed for the combustion process is drawn into the furnace from here and the hall is kept at a negative pressure, so that odour and dust do not escape from the building.

Control room

The facility's control room centralises the operation of all equipment, including the grab crane used to mix and load waste into a hopper that feeds the furnace. All on-site functions are monitored both automatically and manually. Control systems verify in real time that equipment is functioning properly, continuously monitor the combustion gas and maximise the efficiency of the entire energy-from-waste process.



Bunker

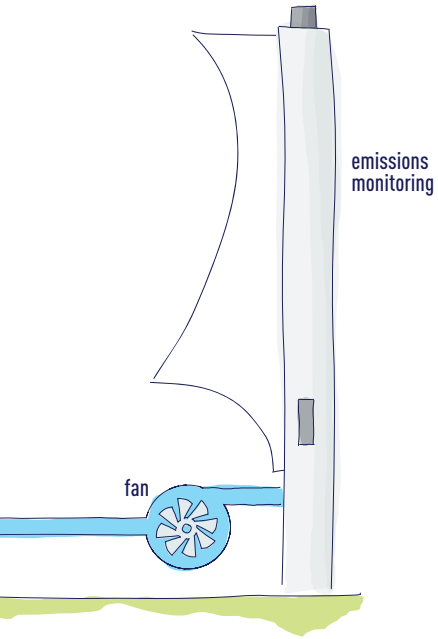
Waste vehicles reverse to a wheel-stop and tip their loads into a large concrete bunker. At 60,000 tonnes of waste delivered per year, this is big enough to hold 16 days' waste, so that tipping can continue when the facility is shut down for maintenance. A shredder, for bulky items such as mattresses, also discharges material directly into the bunker.

Grate and boiler

Combustion air is blown up into the bottom of the water-cooled grate through five computer-controlled zones. The thermal energy released from the burning is used to convert water into super-heated steam. At high pressure, this steam drives a turbine-alternator to generate electricity.

Electricity generation

Electricity is generated at 11kV. At full capacity, around 1.5 megawatts is used to power the facility, leaving up to 5.5 megawatts for export to the Manx Utilities Authority, which distributes it around the island. The facility's switchgear is designed to protect the island's supplies from interruption.



Bottom ash

Ash left on the grate after incineration is carried by conveyor, after quenching, to a storage bunker. A magnet above the conveyor extracts ferrous material for recycling. The remaining bottom ash is sampled for contaminants before being removed for disposal to landfill.

Air-cooled condensers

After exiting the turbine, the steam is cooled and condensed back into water through air condensers. This recovered water is treated and reused in the boilers to produce more steam.

Emission control

The gases from the furnace are subject to a rigorous cleaning process involving selective non-catalytic reduction, spray absorbers and active carbon injection. This removes oxides of nitrogen, acidic gases, dioxins and heavy metals from the gas stream.

Air pollution control residue

The cleaned gas is passed through fine-fabric bag filters to remove solid particles before it is emitted through the stack. The resultant air pollution control residue, or fly-ash, contains particles from the incineration process, lime used in the spray absorbers, salts and carbon dust. It is analysed for contaminants and stored in a sealed silo or bags (approved under international rules for the carriage of dangerous goods) until it is collected for disposal in specialist, authorised facilities.

Emissions monitoring

As they pass through the stack, the residual flue gases from the process are continuously monitored before release. This data is relayed automatically to the control room and to a secure recorder.

Emissions data for 2021 can be found in the tables at the end of this report, while the systems for controlling emissions are described in the next chapter (section three).

Our operations

Maintaining the company's essential services through the pandemic, and our high environmental performance – while also managing the health risks to our people – was a continuing focus in 2021.

Apart from an unplanned lack of waste outage caused by the COVID-19 lockdown, there were nine unplanned shutdowns during 2021. These were caused by waste crane faults, a high-voltage protection fault, turbine turning gear failure, mechanical failure of the spray absorber that scrubs flue gases and four deslagger blockages.

A recurrent problem with non-conforming waste required a change in our procedures for waste deliveries. During the year, the facility experienced a series of high sulphur dioxide readings attributed to plasterboard buried within waste skips. Plasterboard is on our well-publicised list of prohibited waste materials, a fact which is also highlighted during driver inductions. Gypsum within the material releases sulphur dioxide (SO_2) when plasterboard is burned. This gas combines with water moisture in the atmosphere and contributes to acid rain, which harms plants, trees and the environment in general.

There is a three-party approach to ensuring only conforming waste is treated at the facility. Firstly, the Department of Environment, Food and Agriculture conduct audits at waste facilities to ensure they are operating within their waste disposal licences and in accordance with relevant legislation.

The Department of Infrastructure is responsible for working with both the civic amenity sites and third-party companies to ensure that only conforming waste is delivered to the facility. Finally, SUEZ conducts spot checks to ensure, as far as possible, that no non-conforming waste enters the waste bunker.

It is imperative that plasterboard and other non-conforming wastes are disposed of responsibly in order to protect our island environment. Plasterboard should be disposed of either through a licensed waste transfer station or at the Department of Infrastructure's licensed landfill site. Questions or queries relating to the proper disposal route for different waste types should be directed to the Department of Infrastructure's waste management team.

Having previously carried out random spot checks, we began inspecting all skip waste towards the end of the year and will continue doing so until we are confident that the facility's users are not delivering plasterboard and other non-conforming items.

This more intensive inspection regime will also help prevent blockages in the deslagger. A large sheet of metal was responsible for a blockage in November. Under the current policy, any hauliers delivering non-conforming waste to the facility have their loads rejected. A ratcheted fee is also charged for reloading the vehicle, dependent on the number of non-conforming loads they have delivered in a rolling six-month period. Hauliers could face a period of exclusion from the site if they are found to deliver plasterboard repeatedly in that time.

Scheduled maintenance

Our plans for scheduled maintenance were again disrupted by COVID-19 and other external factors. A failure of the gas scrubbing system's absorber in August also prompted changes in shutdown timings.

The island's second-wave lockdown, which began in January, impacted waste arisings, leading to a 17-day outage in February due to lack of waste. We took the opportunity to carry out minor works involving in-house personnel and local contractors.

We were informed in February that crane manufacturer Kone could not perform the overhaul of the waste crane, planned for May, until later in the year. This first scheduled shutdown was to have lasted an unprecedented four weeks, simultaneous with the planned major overhaul – of the steam turbine generator – postponed from 2021.

The 04–25 May outage still saw a series of works completed involving boiler tube replacement, repairs to the ash extractor and feed hopper, furnace grate servicing, and a new roof for the air pollution control residue silo. A full annual boiler thickness survey was also completed along with a large number of statutory inspections of the pressure system.

In July, we were notified that the already postponed major overhaul of the waste crane's electrical systems and hoist unit would be postponed again when many of the new parts were destroyed in flooding of the Kone factory in Germany.

This work is now scheduled for June/July 2022. We do not have any concerns of failure of the crane due to these delays.

An extra shutdown from 05 to 14 August was enforced by a failure of part of the flue gas treatment system's spray dry absorber. Repairs were made to the atomiser support ring and inlet shrouds. The opportunity was taken during this outage to replace the 2nd/3rd pass boiler ash screw.

Also, following the August hiatus, high waste pit volumes did not allow for an extended September shutdown, the second scheduled for the year. This was reduced to five days to prepare for the removal of the turbine and replace some cabling on the waste crane. The facility was restarted without the turbine.

A further shutdown was required on 12 November to reinstall the turbine following the major off-site overhaul of the steam turbine rotor, gearbox and generator. The turbine was offline for longer than expected due to the extent of remedial work required. This included repairs on site to remedy erosion of the turbine casing and off-site repairs to the steam inlet nozzle, wiring on the turbine rotor and stator cables on the generator.

Operational efficiency

Over the years, our maintenance regime has evolved as we strive to optimise the operation of the facility, which is now approaching the end of its second decade.

All maintenance works and repairs are tracked on our Mainsaver computer system, including proactive interventions. Using portable devices to measure vibration in pumps, motors and fans, we monitor critical plant and equipment for deterioration with a view to pre-empting failures.

In addition to this condition monitoring, there were ISO 55001 pre-audits on combustion air, the low-voltage and emergency diesel generator, the waste pit and ash cranes. These were followed at the end of the year by an independent ISO 55001 asset management audit by SGS, which confirmed that the lifecycle of plant was being effectively managed.

Each year, targets are set to benchmark performance in terms of overall equipment effectiveness (OEE) and the balance between reactive and preventative maintenance.

The availability – as opposed to downtime – of critical items of plant and equipment is measured by the overall equipment effectiveness score. For 2021, the target was increased to 62.43% (from 61.88% the previous year). This was achieved, with an outcome of 65.95%.

For preventative maintenance, a target of 80% preventative versus reactive work orders was set. The proportion of preventative work completed fell short of this mark as travel restrictions during the pandemic affected both our use of specialist engineering contractors from the UK and the supply of parts needed for our own scheduled maintenance. The final figure for the year was 78.2%.

Continuous improvement

Our company policy challenges the team to continue striving to improve all aspects of performance.

'Lean' principles developed in the manufacturing sector are central to this effort. Our people are trained in lean thinking and its methodology for identifying and removing inefficiencies and any wasteful aspects in our ways of working.

Independent assessments have shown that SUEZ Isle of Man is one of the company's leading lean practitioners, with two successive Gold awards in previous years following lean maturity audits of the site.

Each year, we set a target for completing lean continuous improvement projects – five in 2021. These included a system for processing machine oil in the clinical plant, two visual alarm systems to alert operators to equipment failures – in the boiler cleaning system and the flue gas treatment cabinet's cooling system – and replacement of the first pass hatch with Inconel wound tubes.

The fifth project improved our waste baling process. During extended shutdown periods when waste levels build up in the pit, it is necessary to bale municipal waste. Retaining walls were installed in the reception hall to make the baling operation easier when waste is instead tipped in this area by the delivering refuse collection vehicles.

In addition to these lean continuous improvements, a target was set to improve the sustainability and biodiversity of the site through projects inspired by the SUEZ sustainability principles. These included tree planting and bird feeders (see section three), and a charging point for electric vehicles and upgrading of the site's visitor centre (see section four).

A faster forward reverse

Another notable improvement was achieved with the installation of a reverse osmosis plant for purifying water used in the boiler. This equipment – due to be commissioned in early 2022 – replaces an ion-exchange system for demineralising water.

The reverse osmosis process is superior, as it not only produces ultra-pure water, but does so at a much faster rate. This allows us to replenish stocks quickly after a plant shutdown or pressure test. Also, its production method offers another advantage. Employing filtration rather than chemical ion exchange, the new plant reduces our consumption of chemicals.

What we processed

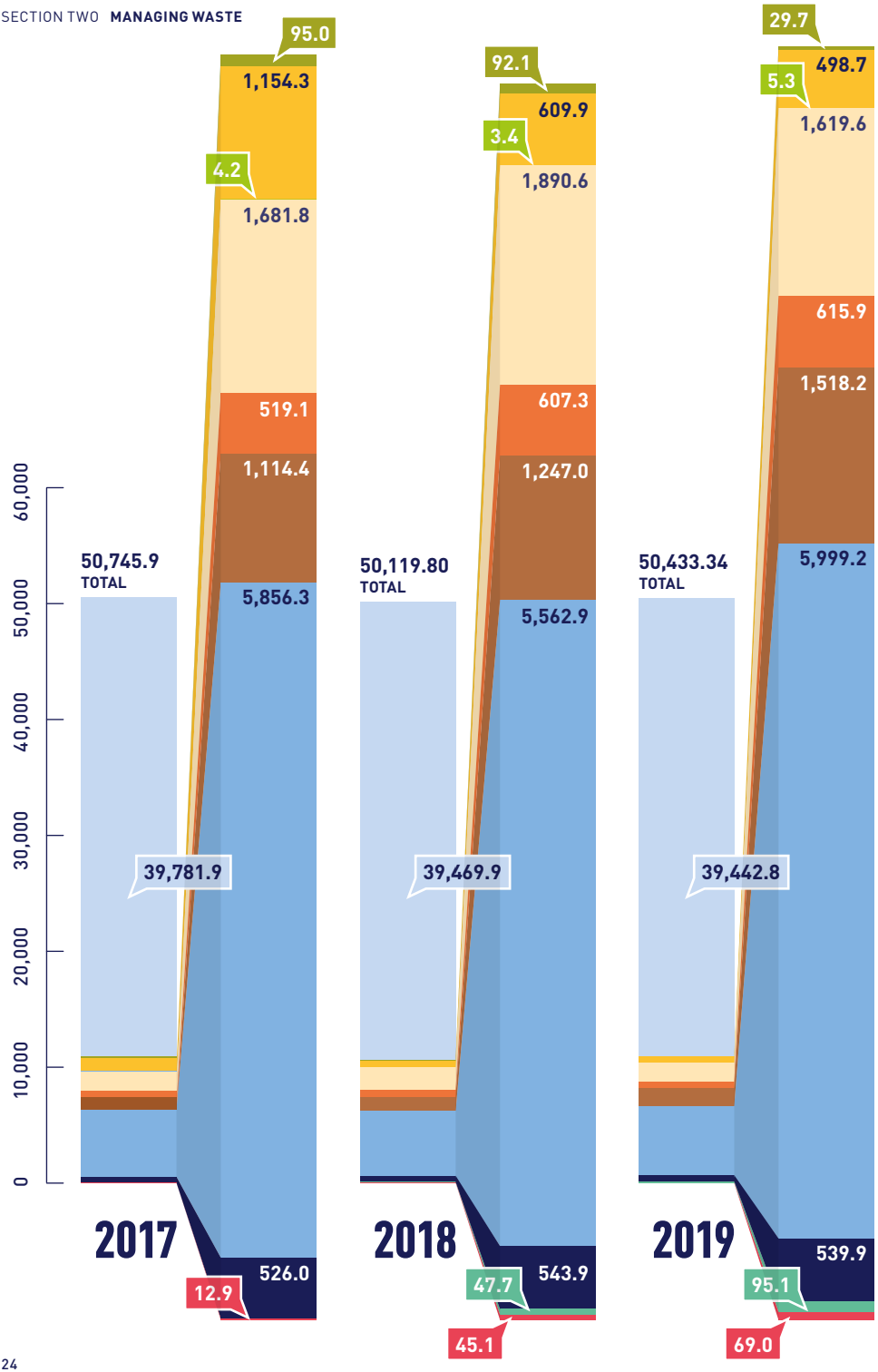
More than 41,000 tonnes of municipal waste were delivered to the facility in 2021 – the first time since 2016 that the island's municipal waste has exceeded 40,000 tonnes. This may reflect a rise in the local population of 0.9% since 2016, as well as other pandemic effects such as restrictions on the freedom to travel during COVID-19.

Despite the enforced shutdown in February due to insufficient waste levels during lockdown, residents generated just under 1,900 tonnes of extra waste – an increase of 4.78% over the year before.

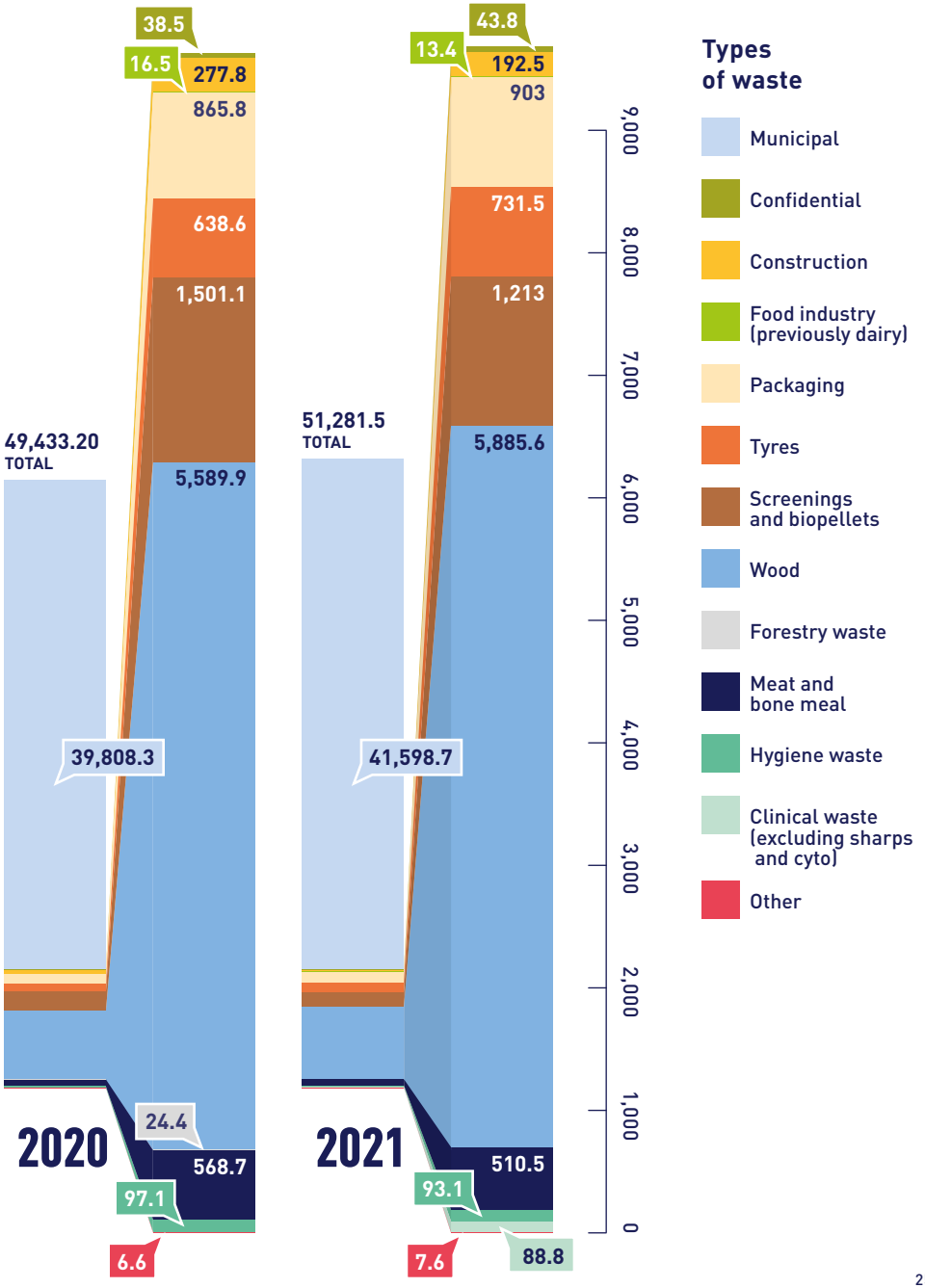
Overall tonnage, including most types of materials, rose by a similar proportion, as did waste wood and packaging. Waste tyres produced the biggest increase, of 14.5%, equivalent to 93 tonnes.

As activity in the building sector remained below previous levels due to the COVID-19 lockdown, construction waste shrank by 30% to 192 tonnes.

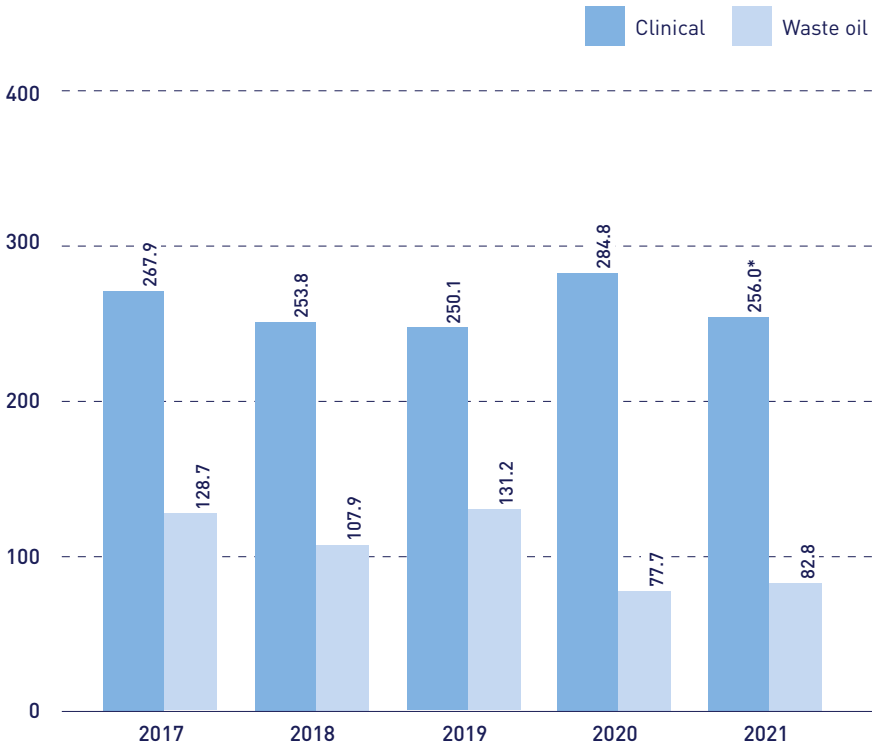
The tonnage of clinical waste rose again for the fourth consecutive year, to 345 tonnes. Of this, fewer than 90 tonnes were destroyed in the primary line, in between batch operations on the secondary line.


0
10,000
20,000
30,000
40,000
50,000
60,000
2017
50,745.9
TOTAL
39,781.9
95.0
1,154.3
4.2
1,681.8
519.1
1,114.4
5,856.3
526.0
12.9
2018
50,119.80
TOTAL
39,469.9
92.1
609.9
3.4
1,890.6
607.3
1,247.0
5,562.9
543.9
47.7
45.1
2019
50,433.34
TOTAL
39,442.8
29.7
498.7
5.3
1,619.6
615.9
1,518.2
5,999.2
539.9
95.1
69.0

Waste delivered to the primary line (tonnes)



Waste incinerated in the secondary line (tonnes)

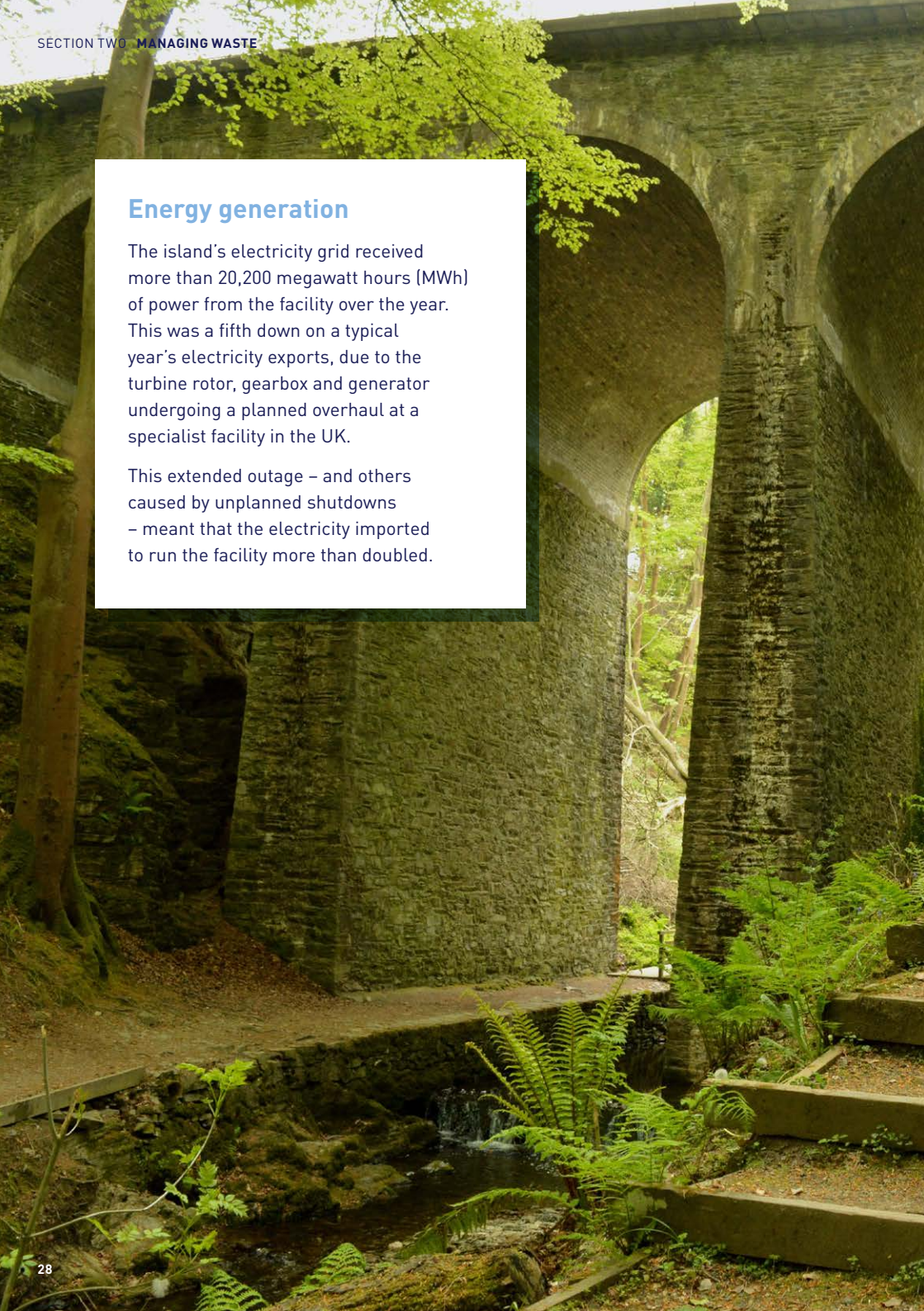


* In 2021, 88.8 tonnes of clinical waste were processed through the primary line and a total of 345 tonnes was processed in the year.

Energy generation

The island's electricity grid received more than 20,200 megawatt hours (MWh) of power from the facility over the year. This was a fifth down on a typical year's electricity exports, due to the turbine rotor, gearbox and generator undergoing a planned overhaul at a specialist facility in the UK.

This extended outage – and others caused by unplanned shutdowns – meant that the electricity imported to run the facility more than doubled.



Other outputs and inputs

The largest by-product of the energy-from-waste process is bottom ash, while the main resources consumed are gas oil, water and the chemicals used to clean gases before they are emitted from the stack.

Bottom ash

The ash that remains after incineration is transported to the Turkeylands Old Quarry for maturation and then storage/disposal in Turkeylands New Quarry. This material is sampled quarterly at the energy-from-waste facility and analysed for contaminants in accordance with the site's waste disposal licence. Silica – essentially sandy soil – is the main component of bottom ash. Other naturally occurring compounds make up the remaining 4-5%.

Less than 9,800 tonnes of bottom ash were disposed of in 2021. This equates to 20.7% of the total tonnage processed, in line with previous years.

Air pollution control residue

Fly-ash, or air pollution control residue, is formed by particles in the flue gas that are encapsulated by chemicals during the gas scrubbing process.

The amount generated rose slightly to more than 1,580 tonnes from 1,539 tonnes. This reflects a rise in sulphur dioxide produced as plasterboard was processed. The ratio per tonne of waste increased from 3.21% in 2020 to 3.36% in 2021.

Due to air pollution control residue containing contaminants from the flue gas, such as heavy metals and dioxins, this residue is categorised as hazardous waste. Air pollution control residue also contains salts and carbon dust from the activated carbon injected into the flue to capture heavy metals such as lead, chromium, and arsenic. Samples are taken and analysed each quarter. The concentrations vary with the types of waste processed and, in particular, the presence of batteries within household waste.

The fly-ash is held in sealed UN-approved bags and shipped to specialist facilities in the UK that are equipped for its safe disposal.

Ferrous metals

Mixed waste loads delivered to Richmond Hill may contain pieces of steel and iron. As bottom ash from the furnace grate passes along a conveyor, ferrous metals are recovered by an overhead magnet.

The amount of metal per tonne of waste increased by a half in 2021 (from six to nine kilogrammes per tonne of waste processed). As a result, 466 tonnes were sent to reprocessors for recycling – an increase of 180 tonnes on the year before.

A more powerful magnetic separator, installed in 2019, is more effective at recovering these metals. The material still has value, but it reduces after incineration. Iron and steel would be better diverted from the residual waste stream and sent directly for recycling by the island's residents.

Gas oil

Minimum furnace temperatures must be achieved and maintained during the start-up and shutdown phases on each line to ensure that waste materials are processed safely. This involves burning gas oil. A drop in operating temperature due to waste with a low calorific value or interrupted loading of the grate also triggers the oil burners.

Efforts to limit consumption of gas oil were frustrated by several factors beyond our control in 2021. In the early part of the year, a series of faults with the waste pit crane had to be repaired. When waste cannot be fed to the furnace, the plant maintains temperature by using the oil burners until either the fault is rectified, or a decision is made to shut the plant down. A series of spikes in sulphur dioxide emissions (see section three) also necessitated their use to suspend processing of waste for a period to bring the emission levels down.

Due to these and other problems, such as the year's three deslagger blockages, usage increased by 55 tonnes to more than 390 tonnes on the primary line. A slight reduction in operating hours of the secondary line saw a reduction of 10 tonnes in gas oil use compared to 2020.

Water

Town's water is mainly used to produce demineralised water for the production of steam within the water tube boiler. More water is used following a maintenance outage when the water tube boiler needs to be drained if repairs are being carried out.

Consumption fell significantly in 2021 – by 12% or 1,268 tonnes – mainly due to the primary water tube boiler repairs carried out in 2020 following multiple tube leaks in that year. Their repair involves draining the boiler completely and refilling afterwards for a pressure test.

The facility is designed to conserve water and protect this resource from contamination. As well as recycling water within the energy-from-waste process, the site is equipped to harvest and store rainfall for use.

Chemicals

Three chemicals are used in the gas scrubbing process to keep emissions within our site licence's strict limits – lime, carbon and ammonia.

Consumption is dictated by the continuous emissions monitoring and control system, but also reviewed for resource efficiency.

Usage fluctuates with the mix of wastes processed, but it can also be affected by operational and mechanical issues. There were increases for lime and carbon in 2021, while less ammonia was required.

- An alkaline lime solution is sprayed in the flue to neutralise acidic gases such as sulphur dioxide and hydrogen chloride. A series of exceedances caused by the burning of non-conforming waste (plasterboard), which had been delivered to the facility undetected, led to an increase in usage of 18.4%.
- Activated carbon adsorbs dioxins and trace metals. A 12.4% rise in consumption reflects an over-statement by the programming calculation, which is to be addressed in 2022.
- Injecting ammonia into the boiler controls the oxides of nitrogen that form when nitrogen in the waste is released into the air. A 15% reduction in measured usage over the year is attributable to the fitting of improved flow meters.

Our other activities

SUEZ Isle of Man is contracted to deliver some of the other services that our parent company provides across the UK. These involve confidential materials and hazardous waste.

Confidential waste

Businesses and other organisations with a duty to protect potentially sensitive information need to ensure that files and records no longer required cannot be accessed. This confidential waste is destroyed securely in the primary line.

We disposed of just over 43 tonnes in 2021.

Hazardous waste

Strict international rules apply to the transportation and disposal of waste materials that are deemed hazardous.

SUEZ provides a hazardous waste service which supports local industry, as well as private households who can request the removal of any potentially dangerous chemicals from their homes.

We collect hazardous wastes from the island's producers, analyse and classify the substances involved, and specify the most appropriate treatment or disposal option. The wastes are held in a purpose-built store on site, pending shipment off-island in consolidated loads for efficiency. A transfrontier shipment notice must be raised for each load.

In 2021, there were eight shipments – comprising acids, alkalis, flammables and DMF, a solvent used in chemical reactions.

Managing environmental performance

Designed and managed to protect the environment and people's safety, the energy-from-waste facility continued to operate to the highest performance standards in 2021.

This section of the report focuses on how we manage the environmental impacts of energy-from-waste, and covers our policies and procedures, management systems, licence requirements, emissions data and auditing.

All the associated performance figures are set out in the data tables at the end of this report.

SUEZ environmental policy

All operational activities on Richmond Hill are governed by a policy framework defined by SUEZ recycling and recovery UK. This applies to the management systems and procedures at all its energy-from-waste facilities.

As a minimum, SUEZ policy requires complete compliance with the terms of our site licence and all relevant legislation and regulations. It also challenges us to exceed those standards. Objectives and targets are set to drive continuous improvement, and performance is monitored and audited, internally as well as by external agencies.

We have an integrated management system that sets out clear guidelines for assuring quality of service and health and safety as well as protecting the environment. This means that all activities undertaken by our people are governed by one unified set of procedures.

Our integrated policy statement for environment, health, safety and quality

SUEZ Recycling and Recovery UK Ltd recognises that how we manage our customers' and our own waste has an impact on the environment, the health and safety of our employees, persons working on our behalf, and the public. From a position of leadership in the UK's recycling and waste management industry, SUEZ is fully committed to the effective management of all such issues associated with our activities.

Management responsibility

The Management Board will ensure that responsibility for environmental, health and safety, and quality issues is clearly defined and understood throughout the company. All activities will be conducted in a manner designed to: protect the health and safety of our employees, persons working on our behalf and the public; to protect the environment from risk of pollution; and ensure a high quality of service for our customers.

Managers should be aware that a European Health and Safety agreement exists. This sets out the standards that the Company expects in respect of securing the health, safety and welfare of our employees and all other persons that could be affected by our business activities. A copy of the agreement can be found in the policy statement section of the SUEZ policies and procedures.

Legislation

SUEZ will comply with and wherever possible exceed existing environmental, health and safety, fleet and other pertinent legislative requirements at all stages of our business activities and operations.

Stakeholder relations

SUEZ recognises the importance of our relationship with stakeholders: employees, the public, contractors, customers and shareholders. We will communicate this Policy to them, report annually on performance and engage with stakeholders so as to understand and consider their expectations in the way we manage our business.

Continual improvement

SUEZ will monitor and measure progress by setting improvement objectives and targets to ensure continuous improvement in performance.

In order to mitigate the impact on the environment, enhance health and safety management and performance, and ensure delivery of service to all our customers, SUEZ will:

- Commit to eliminate hazards and reduce occupational health and safety risks in order to prevent injury and ill health and promote a positive health and safety culture.
- Ensure all of our facilities are managed in such a way as to prevent and minimise pollution and commit to providing safe and healthy working conditions for the prevention of work-related injury and ill health.
- Seek to minimise the environmental impact of transport use.
- Seek to reduce the amount of energy obtained through non-renewable resources, use energy efficiently and reduce greenhouse gas emissions.
- Seek to minimise the volume of waste generated and to maximise re-use, recycling and energy recovery from waste.
- Use suppliers or contractors that have environmental and health and safety standards compatible with our own wherever possible, and maintain good customer and supplier relationships.
- Continually reassess all the above in light of changing technology, legislation, the precautionary principle, business requirements and best practice.
- Ensure adequate resources are provided to meet specified customer and company requirements.
- Ensure personnel working for and on behalf of SUEZ are aware of their responsibilities and comply with our policies and procedures.
- Regularly evaluate and review company performance and service provision.
- Commit to consultation and participation of workers and where they exist, workers' representatives.
- Evaluate the incident and crisis preparedness, response and recovery protocols to mitigate risk.
- Drive forward the promotion of health and wellbeing programmes, providing resources to support our employees.

The Management Board will periodically review this policy to ensure that it continues to meet the needs and aims of the business.

Management systems

All aspects of operating the energy-from-waste facility are governed by our integrated quality and environmental system, which meets the relevant international standards.

For every activity – from marshalling of delivery trucks on site through emissions control to disposal of bottom ash – there are clear procedures to ensure compliance by following best practice. The requirement for reporting on our performance to the island's regulator and our parent company are also clearly defined.

Our operations undergo regular internal and external audits to verify that procedures are followed. Each year, the management system and its operation are also independently assessed. Certification to the environmental requirements of ISO 14001 has been maintained continuously since the facility was commissioned. Our system also meets the corresponding standard for quality management – ISO 9001:2008.

Environmental compliance

As well as SUEZ internal controls and the terms of our site operating licence, our company is bound by local, UK and European legislation and regulations.

Relevant Manx legislation includes:

- **The Public Health Act 1990**
- **The Collection and Disposal of Waste Regulations 2000**
- **The Import and Export of Waste Regulations 2001**
- **The Town and Country Planning Act 1934-1991 (as amended 1999)**

The Environmental Protection Unit – which reports to the Department of Environment, Food and Agriculture – is responsible for local regulation.

Compliance audits

Our operations are audited to ensure compliance with the operating licence, our management system and regulations.

In December, we gained accreditation to the ISO 55001 Asset Management Standard for the first time. This accreditation confirms the high standards of asset management in place at the facility.

Internal checks and audits by our parent company cover adherence to procedures for managing health, safety, environmental protection and quality – and other aspects of our operations, such as preventative maintenance.

The last quarter of the year saw a series of site visits by the SUEZ Health and Safety Regional Advisor, the Isle of Man Government's Health and Safety Inspectorate, and the Environmental Protection Unit.

Environmental impacts

All industrial processes have environmental impacts. Our management system is designed, and our specialist personnel are trained, to minimise all negative effects arising from the treatment of customers' waste.

We have identified all material risks, along with potentially positive impacts, and recorded them in the site's Significant Environmental Impacts Register. This is reviewed regularly for the purposes of risk management and continuous improvement.

The register includes noise, odour, delivery and storage of fuel and chemicals, and potential impacts on biodiversity, as well as emissions to air, water and land, hazardous waste and ash residues.

Emergency planning

Risk management requires that we test and rehearse our people's response to emergencies. Our target for the year was to carry out at least four emergency drills, but the team managed to stage 11 in total.

In each case, the team on duty – who receive no advance warning – had to respond to various scenarios. The emergencies simulated were:

- Two types of fire event – evacuation of the building in response to an alarm (which was arranged to coincide with the usual fire alarm testing time) and a fire in the steam turbine.
- Spillage of granular active carbon in a new site container.
- Rescue of a person who has fallen into the waste pit.
- Deslagger blockage – this drill was postponed in March due to lockdown restrictions, but an actual blockage in April provided the opportunity to appraise the response of the operations team.
- Missing person alarm triggered by the 'man down' function on a worker's radio.
- A personal injury involving a burn to a colleague's hand.

Four other drills were carried out as desktop exercises, where staff on duty discussed their priorities in the situation and the actions they would take. These involved:

- Site flooding.
- Unauthorised persons on site.
- A telephone bomb threat.
- The loss of compressed air – which could compromise the levels of water in the boiler and combustion air.

The drills confirmed that shift teams had a clear understanding of the procedures to be followed in every scenario and they made sound decisions where judgements were required.

Lessons learnt from drills are acted on. A bomb threat checklist has been added to the emergency response file in line with SUEZ company policy and consideration will be given to whether the evacuation muster point should be reviewed.

Following the hand injury simulation, the suitability of specialist burn dressings in the site's first aid kits is being re-assessed in light of different advice in a St John's Ambulance video, which was shown at a subsequent health and safety meeting.

Biodiversity

The design and operations of the energy-from-waste facility respect our rural setting and duty to protect the local environment.

As with emissions to air, discharges to watercourses are controlled and measures are in place to manage the risks associated with on-site storage of wastes, chemicals and oil.

The biodiversity action plan for the Richmond Hill site goes beyond protection, outlining ways in which we can promote flora and fauna, and enhance wildlife habitats.

SUEZ Isle of Man's 2021 Sustainability Action Plan – overseen by Sustainability Champion Mike Valerga – inspired a total of 44 activities to promote sustainability and generate social value. These included measures to enhance biodiversity:

- Bird boxes have been mounted on trees around the site. Maintenance Technician Neil Gibson and Paul Millichip, an Operations Technician, volunteered their time to complete the first phase in March. Following a sustainability audit earlier in the year, more boxes are to be installed in 2022.
- On Earth Day in April, our volunteers made the most of a sunny afternoon and the end of another lockdown by planting trees around the site. The three apple trees and two plum trees are bee-friendly species. They are a boost to local biodiversity and another food source for our resident bees.
- In November, our Hazardous Waste Manager came up with the great idea of collecting as many crisp packets as possible through the month for a novel cause. Colleagues were encouraged to place the used bags in a special box so they could be sent on to a charity that 'irons' them together to make blankets for homeless people.
- The site's bees did well over winter and exploited the warm spring weather, drawing some comb up into their winter food supply. Our volunteer beekeepers added new frames to the hive for the bees to fill with honey. They duly obliged and, in August, passed a health check by the island's Bee Inspector. Ours was one of 12 apiaries selected for inspection. The hives showed no signs of disease and a honey sample was analysed. The bee experts also marked our queen, which will make her easier to find in future.


STOP

Our environmental performance

The EU Industrial Emissions Directive sets a strict regulatory framework for energy-from-waste, making it one of Europe's most closely monitored industrial processes.

This monitoring regime covers all emissions to air, land and water – including solid residues. Its requirements are also enshrined in our site licence and the measurements from monitoring must be reported to the Environmental Protection Unit.

Emissions

The limits set in the operating licence cover a range of parameters.

After gases are scrubbed, they are analysed in the flue by the facility's continuous emissions monitoring system. This measures:

- **Particles**
- **Carbon monoxide**
- **Sulphur dioxide**
- **Hydrogen chloride**
- **Oxides of nitrogen**
- **Volatile organic compounds**
- **Ammonia**

Some compounds cannot be measured continuously. They are still subject to emission limits and must be tested periodically. Dioxins and furans are monitored each quarter. Heavy metals are monitored biannually.

Half-hourly limits apply under our site licence to certain compounds, while the limit for carbon monoxide has a 10-minute interval. The facility may continue to operate in full compliance with its licence conditions when these limits are exceeded, but a shutdown is required if the emission is not brought back under control within a specified time.

We are required to report all exceedances to the Environmental Protection Unit and investigate the causes. Our staff inform the Environmental Protection Unit of the outcome of each investigation and the corrective action, where appropriate, before closing the event.

Daily emission data for the continuously monitored parameters are published on our website (**www.suez.co.im**) along with other updates. Graphs show the daily readings for each parameter and emission limit, and the emissions profile for the previous 90 days for both lines. We also report the quantity of electricity exported.

Licence emissions limits

Emissions to air

	Half-hour average	Daily average	Other limit
Particulate matter	30 mg/m^3	10 mg/m^3	
VOCs as Total Organic Carbon	20 mg/m^3	10 mg/m^3	
Hydrogen chloride	60 mg/m^3	10 mg/m^3	
Hydrogen fluoride			2 mg/m^3
Carbon monoxide		50 mg/m^3	150 mg/m^3 95 per cent of all 10-minute averages in any 24-hour period
Sulphur dioxide	200 mg/m^3	50 mg/m^3	
Oxides of nitrogen	400 mg/m^3	200 mg/m^3	
Cadmium and thallium (and their compounds)			0.05 mg/m^3
Mercury (and its compounds)			0.05 mg/m^3
Sb, As, Cr, Co, Cu, Pb, Mn, Ni and V (and their compounds)			0.5 mg/m^3
Dioxins and furans			0.1 ng/m^3
Ammonia			*
Polyaromatic hydrocarbons			*
Dioxin-like PCBs			*

Emissions to water

Surface water	Limit
pH minimum	6
pH maximum	10
Conductivity	*
Temperature	30˚C
Flow duration	*
Suspended solids	*
Chemical oxygen demand	*
Sulphides	*
Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, Ti and V	*
Visible oil	Nil
Ammonia (N)	0.6 mg/l

* Parameter does not have a limit stated in the waste disposal licence, but is required to be measured and reported to the Environmental Protection Unit.

Sewage treatment facility	Limit
pH minimum	6
pH maximum	9
Visible oil	Nil
Suspended solids	60 mg/l
Biochemical oxygen demand	50 mg/l

Licence variations

Over the years, the terms of the site operating licence have been amended, mainly to permit new waste streams to be processed. Such variations require proof that treatment of the material will be safe, cost-effective and would not detract from the compliant and efficient operation of the facility.

Fibreglass and bio-waste are examples of otherwise problematical wastes for the island that are processed safely following licence variations granted by the Department of Environment, Food and Agriculture.

In 2021, there was a licence amendment to allow the processing of waste oil in the primary line. This change was necessary to ensure the island has a disposal route for waste oil during periods where the clinical line is not available.

Measuring our performance

Since operations began on Richmond Hill, emissions management has been exemplary – a track record sustained through 2021.

Cumulative emissions remained well below the operating licence's annual limits, as in every previous year of operation. There were seven incidents over the 12 months when half-hourly or other limits were exceeded. These involved sulphur dioxide, hydrogen chloride and dioxin levels on the primary line, and particulates from the secondary.

Particulates

In mid-January, the concentration of particulates on the secondary line rose above the half-hourly limit three times and triggered a daily exceedance. The bag filters were being bypassed due to a fault traced to the lime metering pump. A split in its pipework was allowing lime to bypass the pump, injecting additional lime into the atomiser. This cooled the absorber outlet, which tripped the bag filter house into bypass mode. Stopping the pump allowed the exit temperature to rise and the bag filter to be put back online, so dust readings remained within specification. Lime dosing was controlled manually until the pump could be repaired.

Dioxins

On 09 June, there was a (0.12 ng/m3) spike in dioxin levels during six-hour spot sampling. The carbon dosing rate had been manually adjusted as a result of a high carbon usage reading being reported by the control system. Further investigation revealed that these readings were overstated. When the speed of the carbon feeding screw was 'corrected', actual dosage fell below the specified range. Pending a visit the following month by the manufacturer's original commissioning engineer, the team manually maintained a higher level of dosing based on calculating the actual carbon usage by extracting the weight data from the weigh scales and dividing by the waste processed. The dosing rate was then adjusted accordingly.

Hydrogen chloride and sulphur dioxide

Five of the year's seven emission incidents involved exceedances of the sulphur dioxide half-hourly limit, with excessive hydrogen chloride levels also on two of those occasions.

In early August, when the facility was offline, an investigation found that elevated concentrations of both gases a week earlier had been caused by a failure of the spray dry absorber atomiser housing, which was repaired. On 28 and 29 July, there were two and a half hours of abnormal operation before sulphur dioxide and hydrogen chloride emissions were brought back into specification.

Our investigations of the other four incidents – which occurred between 27 May and 22 December – pointed to the presence of waste containing high levels of sulphur, most likely plasterboard. The operations team use various tactics to mitigate the impact on emissions, including intensive mixing of waste in the pit, and adjusting the flow of lime, and also the steam setpoint. Spot checks on incoming waste loads were also stepped up and then extended to all deliveries (see section two). However, future exceedances of these licence limits are unavoidable unless all non-conforming wastes high in sulphur are diverted away from the facility's waste stream.

Climate change

SUEZ is committed to leading in the transition to a low-carbon, circular economy and following the science on climate change. Our aim is to decrease our emission intensity whilst increasing the emissions we avoid for our customers.

Calculating carbon emissions

To manage and minimise emissions, it is essential to understand and measure them. We continue to improve how the carbon emissions associated with the energy-from-waste facility are calculated and have made some important changes to the methodology.

The 2021 calculation still accords with the Waste Sector GHG Protocol, with exception of direct emissions released from combustion.
This calculation is now based on readings from the continuous monitoring system in the stack – rather than using conversion factors – to provide a more accurate estimate of emissions released to the atmosphere. We have also extended our calculations to include Scope 3 emissions – upstream and downstream in our supply chain – to ensure transparency with our complete emissions profile. These are indirect emissions associated with the consumption of chemicals, gas oil and water, as well as the disposal of bottom ash.

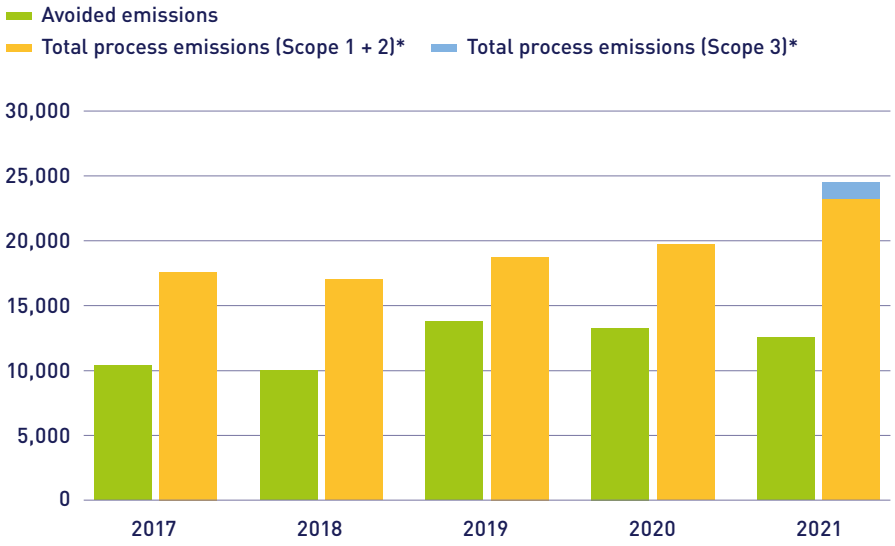
Based on a new analysis of the waste feedstock processed on Richmond Hill, the biogenic and carbon content were measured, replacing the UK average figures used in previous years. The biogenic content of the waste (wood and other organic matter) on the Isle of Man is slightly lower than the UK average, and the carbon content is slightly higher, reflecting the presence of tyres and plastic in the waste stream.

The impact of accounting for the actual flue gas composition at the facility is an increase compared with previously calculated carbon emissions. Inclusion of Scope 3 emissions – in addition to the previously reported Scopes 1 and 2 – has the effect of further increasing the facility's reported carbon footprint.

This calculation is comprehensive – now embracing Scopes 1, 2 and 3 – and also takes account of the emissions we avoid by generating power (replacing fossil fuel sources) and recycling materials (thus avoiding extraction of virgin materials for manufacturing).

For 2021, these calculations give total process emissions of 25,477 $TeqCO_2$ (tonnes of carbon dioxide equivalent) and avoided emissions of 12,591 $TeqCO_2$.

Total process emissions and avoided emissions ($TeqCO_2$)



	2017	2018	2019	2020	2021
Avoided emissions	10,438	10,014	13,820	13,318	12,591
Total process emissions (Scope 1 + 2)*	17,667	17,106	18,818	19,803	23,359
Total process emissions (Scope 3)*					1,287

*Scope 1 – All direct emissions from the activities of an organisation or under their control, including fuel combustion on site.

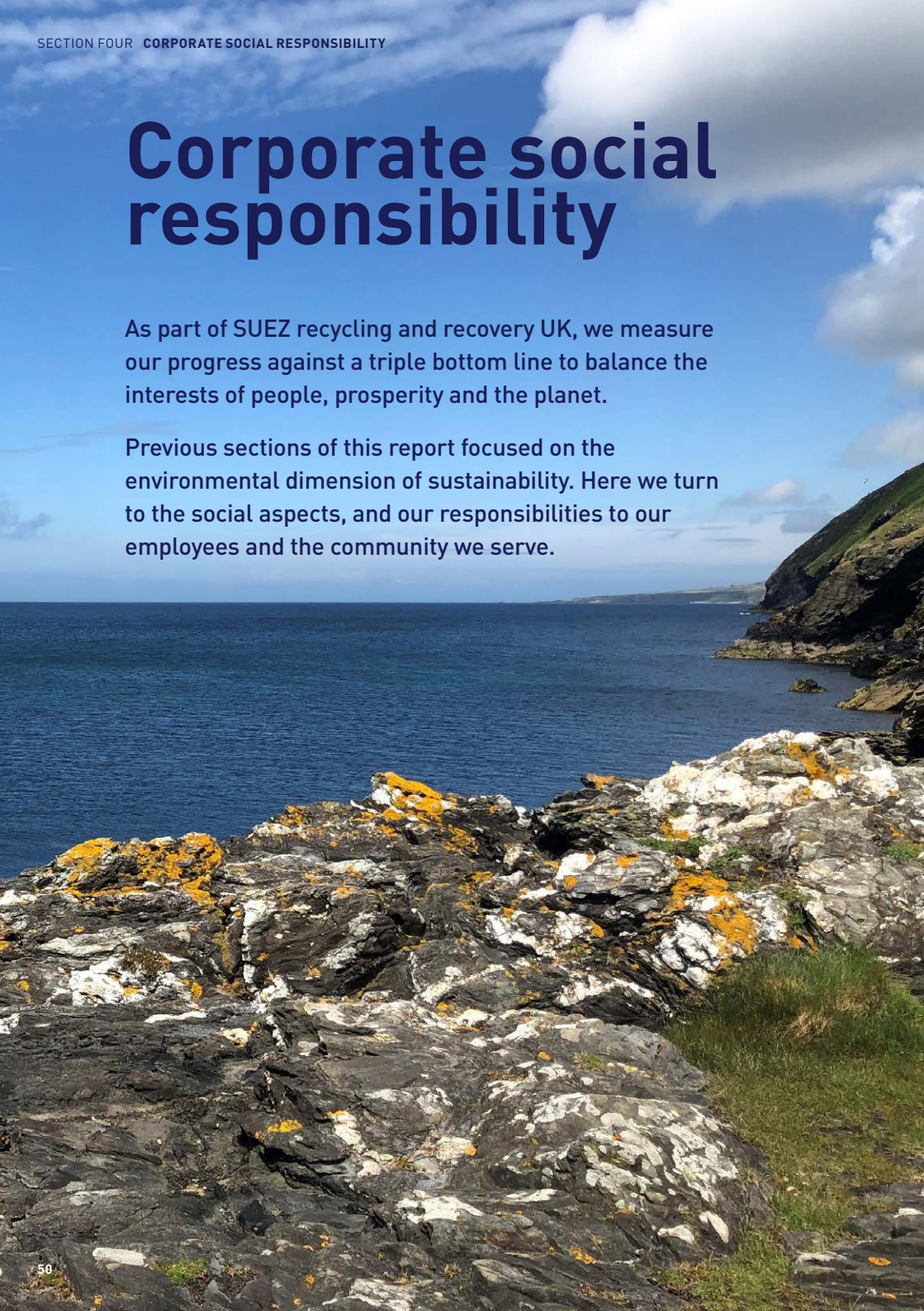
*Scope 2 – Indirect emissions from electricity, purchased and used by the organisation. Emissions are created during the generation of the energy and eventually used by the organisation.

*Scope 3 – All emissions associated, not with the company itself, but that the organisation is indirectly responsible for, upstream and downstream in the supply chain.

Corporate social responsibility

As part of SUEZ recycling and recovery UK, we measure our progress against a triple bottom line to balance the interests of people, prosperity and the planet.

Previous sections of this report focused on the environmental dimension of sustainability. Here we turn to the social aspects, and our responsibilities to our employees and the community we serve.



Our people

SUEZ Isle of Man has a small but highly committed and competent workforce. Through the pandemic and its additional challenges, our people have demonstrated their dedication to maintaining the essential services we provide.

This was true again of the second lockdown, which began in January 2021. As key workers, our front-line operations and maintenance personnel followed our COVID-secure procedures, while office staff once again worked remotely from home.

Our primary duty to our employees is to provide a safe working environment. Training plays a crucial role in fostering our safety culture as well as enhancing competence and career prospects. We remain committed to a comprehensive training and development programme, and to encouraging our people to contribute to decision-making through team meetings and consultations.

Health and safety

Throughout our business, health and safety is recognised as a high priority.

Safety is at the heart of everything we do. SUEZ employees across the UK, and the Isle of Man, developed our award-winning Safety in Mind behavioural programme, which is designed to sustain the highest levels of safety awareness at work.

Elements include refresher training for employees in all roles and Safety in Mind conversations. These give team members another opportunity to raise any concerns or suggestions for safer ways of working directly with their managers – in addition to discussions with their colleagues who volunteer as nominated safety representatives.

There were over 900 recorded conversations over 12 months.

Our integrated management system (described in section two) sets out the safety precautions to be taken when carrying out operational activities. Repair and maintenance works – including those undertaken by external contractors – require a risk assessment. When a permit is issued for work to go ahead, the issuer visits the location with the person who will carry out the task to discuss any risks and necessary precautions. We call these Vigiminutes – a note is signed and attached to the permit.

Regular health and safety auditing help ensure these procedures are followed. Our senior managers – and regional managers when visiting from the UK – also tour the site. There were 35 managerial safety visits during the year, which confirmed that high standards of safety were being maintained, with few minor actions required to tidy up areas or address risks.

Incidents in 2021

The strong safety culture on Richmond Hill is reflected in the low incidence of injuries.

All incidents are investigated and any necessary action is taken before reports are closed. We encourage our people and contractors' teams to report 'near misses', which are also tracked and reviewed.

Eight personal injuries were sustained on site in 2021. These mostly involved bruises or sprains due to trips or mishandling heavy equipment. None were sufficiently serious to be reportable to the authorities under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations).

Over the last three years, the annual total of injuries (all non-RIDDOR) has not exceeded 10.

The three-year trend in near misses is downward – from 57 in 2019 to 29 over this latest 12-month period. Most tend to be reported during the two annual shutdowns for scheduled maintenance, when the number of people working on site peaks. This drop in near misses reported corresponds to the reduction in maintenance activities undertaken during the year and the reduced numbers of contractors on site, along with fewer maintenance outages. Staff working from home during COVID-19 lockdowns also meant there were fewer staff on site to report near misses.

We cannot afford to be complacent about the fall in reported near misses, nor the low injury rate, not least because major maintenance activity will intensify again after being curtailed during the pandemic. Also, we aim to ensure that all near misses are reported so that our Safety Manager can investigate and revise our procedures where appropriate.

Heightened risk

An initiative to prevent incidents involving objects falling from height was launched ahead of the shutdown scheduled for May.

Banners and posters alerting personnel to the danger were installed around the site in advance and contractors were required to attend our toolbox talks on the issue. Tool lanyards were issued and edge protection boards installed in areas of increased risk. Mats on Kennedy grate floors and tubs to hold nuts and bolts were also deployed.

We also encouraged Safety in Mind conversations where colleagues could see a risk of an object falling from height and where good practice was being used.

Training and development

We provide in-house competency training and assess all operations and maintenance staff. Our comprehensive training and development programme is also designed to enhance skills, personal development and career progression.

Training needs are tracked using a training and competency matrix covering all employees.

Over the 12 months, we logged just over 720 hours of training. This was significantly more training than we were able to deliver in 2020 due to COVID-19, but still lower than the annual average pre-COVID due to continuing restrictions, not least on travel.

Courses ranged from first aid at work and cybersecurity to manual handling and boiler operation and maintenance. Our annual programme now also includes new courses developed by SUEZ recycling and recovery UK covering infection prevention and control, and awareness of unconscious bias.

Senior staff now also receive coaching on mental health first aid. A programme of webinars developed by our parent company in 2020 to support employees on all aspects of wellbeing is continuing. Ranging from mindfulness and stress management to healthy eating and exercise, the topics covered address the priorities identified by employees in the Wellness for All charter they drew up in 2019. Employees and their families can access the presentation videos at any time on YouTube, as well as a suite of downloadable guides.

Our team

The dedication, skills and loyalty of our team on the island are well recognised.

Employees are consulted on their views. In between the company's bi-annual employee surveys, we invite people to share their thoughts through quarterly Net Promoter surveys. These showed that engagement on Richmond Hill is among the highest in the UK's energy division. Discussing the results with people from each department, it was agreed to introduce a suggestion box as a way of improving communication and generating ideas to strengthen relationships between teams and raise morale amid the pandemic's restrictions. The box was set up in March.

SUEZ Isle of Man employed a total of 34 people at the year end.

Aaron Crane was appointed as an Operations Technician in December. Aaron studied GCSEs at King Williams College and Ramsay Grammar before joining the army aged 20. He served in Light and Armoured brigades and picked up various related qualifications as well as welding skills. After the army, he lived in Asia, working for telecoms companies as an operator, before returning to the island. Aaron then spent four years with cleaning contractor Blastaway, acquiring qualifications in grit and ultra-high-pressure blasting, among other specialist skills.

Kris Cyran also joined the team after working at the site as an industrial cleaning contractor for a number of years. When the opportunity arose to become a Day Operator, on a fixed-term contract, Kris was only too keen to join us.

The team said goodbye to Jack Kaighen, our beloved tour guide for some 17 years. Since the facility opened its visitor centre doors, Jack has welcomed countless groups and showed them around the facility. After months of delay due to the pandemic, we were finally able formally to thank Jack – who will always remain a member of the SUEZ family – for his service. As a token of our gratitude, our very own Stuart Storie made a beautiful plaque, which was presented to Jack in May.

Sustainability in practice

The SUEZ sustainability headline commitments have not only helped inspire efforts to boost biodiversity on Richmond Hill, they also encourage other measures and activities on and off site.

A charging point for electric vehicles was installed in the facility's car park following the launch of SUEZ recycling and recovery UK's sustainable business travel policy and a new policy on company cars. This now offers only electric car options, or the alternative of a hybrid where the driver cannot charge the vehicle at home. The travel policy aims to reduce mileage to 50% of pre-COVID levels, reducing the associated carbon emissions by 2,000 tonnes per year.

Our people carried out a series of litter picks during the year. Teams – socially distanced when necessary – volunteered in March, June and November. They concentrated on the roads leading to the facility, collecting an array of discarded items in addition to bags of paper wrappers and plastic. Finds ranged from a Jon Bon Jovi CD to an old roadworks sign.

Local charity Beach Buddies, which has been keeping our shores tidy since 2006, provided litter picking equipment.

In return, colleagues and family members joined forces with Beach Buddies in beach cleans. The first took place on a May weekend at Glen Wyllin. Large quantities of plastics and cans were collected, potentially saving the lives of many native birds and fish. The charity holds around 200 events each year to keep 100 miles of coastline clean. So far, about 15,000 volunteers have contributed to this worthy cause.

Macmillan fundraising

Macmillan Cancer Support has long been the national charity partner of SUEZ in the UK. Every year, employees organise a main event along with various other fundraising activities.

In 2021, our people staged the first SUEZ Isle of Man Golf Day. Despite some unseasonable August weather, it proved a highly enjoyable day as nine staff and eight guests competed for a tournament trophy.

Plant Manager Jon Garrad was runner-up to the winner, John Hyland, an Operations Technician, and one of our longest-serving employees. The day raised more than £400 for the charity.

Lip service

Four of our men didn't bristle at the quips of colleagues or friends as they grew moustaches in aid of the annual Movember movement.

Their sponsored upper lips raised more than £500 for men's health, suicide prevention, and raising awareness of prostate and testicular cancer.

The four 'moustacheers' were Jon Garrad, Chris Hawke, Mike Spiers and Mike Valerga.

The main fundraiser for Macmillan in 2021 was The Big Climb, a series of sponsored hikes up hills and mountain peak challenges.

By the end of June, the first month of the campaign, colleagues around the UK and Isle of Man had climbed more than 450,000 metres – higher than the International Space Station – and raised £43,000 for Macmillan.

Our contribution was a trek from Laxey Beach up to Snaefell Summit in August. More than a dozen enjoyed the beautiful climb in lovely weather, apart from mist at 2,000 feet. Luckily, the group avoided the afternoon's thunder and lighting.

After 18 months away, Tim Otley, Regional Director - Energy South, took the opportunity to join in – contributing 621 metres to his 'Everest Challenge' to climb the equivalent height of Mount Everest (8,849m) in the month of July. Tim successfully completed his challenge on the final day of the month!

Our colleagues in Energy South clocked up the highest distance of the SUEZ teams. By the end, the fundraising total from all our efforts was £160,000.

Our community

Service to our community starts with a reliable and safe waste solution for the island that also creates energy, but it does not end there. SUEZ Isle of Man strives to be a good neighbour, a supporter of good causes and an active participant in our society.

Our parent company is committed to maximising the social benefits that derive from its service to the public and involvement in community activities. We measure these as part of an effort to create and manage social value, and employees company-wide are encouraged to contribute.

Our neighbours

As well as controlling emissions, we make every effort to limit odours, noise and any other nuisance for islanders living or working around Richmond Hill.

The reception hall for waste is kept under a slight negative pressure to contain dust and smells, and a member of the operations team walks the perimeter of the site each day to check for any abnormal noises from our plant and equipment.

We have procedures in place for complaints, which are logged and investigated, and the outcome is reported back to the complainant.

There was one complaint, received in September 2021, concerning noise from mobile plant operating after 8pm. Our Plant Manager discussed the problem with the complainant, and it was agreed that processing higher volumes of COVID-related waste was the most likely cause. This now takes place mostly during the day, but there are periods when mobile plant has to be used at night to load metal skips and when the secondary line is operating.

Members of the public can also raise concerns via their local authority, community representatives on the statutory Richmond Consultative Committee, or the Department of Environment, Food and Agriculture.

Our visitors

Tours of the facilities had to be curtailed again in 2021 due to COVID-19 controls. As these were lifted towards the end of the year, four tours went ahead. In October and November, we hosted groups from the Brownies, RBS International, Ramsey Grammar School and 1st Ramsey Scouts.

These groups were able to enjoy our upgraded visitor centre, which we completed in the spring. The improvements are designed to make visits more comfortable and interesting, especially for the young and disabled. A ramp for wheelchair users and additional handrails have been installed, along with a replica of the entrance to the primary line's furnace standing on steel grating from the facility.

A highly realistic copy despite being made of wood, the furnace wall and door are inset with real viewing hatches that reveal a live stream from the furnace camera. We think the result – designed and built by a local company, Good with Wood – is amazing and makes for a far richer experience, especially for young children who are no longer permitted to tour the facility since safety rules were tightened several years ago.

A 3D visual tour has also been created, which will be launched in 2022.

Another improvement for visitors is the new storage area for personal protective equipment. The wooden frame from our old isolation lock box storage system was cleaned and re-painted to store vests, gloves and glasses for children, as well as hard hats and personal protective equipment for adults.

Our objectives

Each year, we set objectives and targets to spur performance in a range of areas, including compliance, efficiency and continuous improvement.

The table here summarises how we performed in 2021 and the corresponding goals for 2022 are listed overleaf. All the data supporting the commentary in other sections is set out for easy reference on the final pages of the report.

How we did in 2021

Our strategic objectives	Targets set for end of 2021
Emergency preparedness	Carry out four emergency preparedness procedures.
Biodiversity	Implement biodiversity action plan, as required.
Hazardous waste management	Complete hazardous waste shipments, as required.
Compliance and communication	Conduct safety, health, environment and quality meetings.
Environmental protection and compliance	No daily emission breaches during normal operating conditions.
Oil usage	Maintain oil usage at 2019 level.
Staff competency	Maintain competency matrix.
Management systems	Maintain certification to ISO 14001 and IS0 9001.
Reporting	Meet SUEZ internal reporting and carbon monitoring requirements.
Operational efficiency	Meet operational equipment efficiency and preventative maintenance targets.
Continuous improvement	Conduct five continuous improvement projects.

Achieved?	How we performed
✔	11 drills completed, including missing person, chemical spill, fire.
✔	Biodiversity action plan in place. New trees planted around the site.
✔	Eight loads shipped.
✔	12 meetings held throughout the year.
✖	One daily emissions breach for particulates occurred on the second line.
✖	Not achieved due to running of the secondary line more frequently to process COVID-related clinical waste.
✔	Matrix updated and applied.
✔	ISO certifications maintained.
✔	All reports completed.
✔	Operational equipment efficiency target of 62.43% met, with 65.95% outcome
✖	Achieved 78.2% as the planned maintenance programme was disrupted by COVID-19.
✔	Five projects completed.

Objectives and targets for 2022

Our strategic objectives	Targets set for end of 2022
Emergency preparedness	Carry out four emergency preparedness procedures.
Biodiversity	Implement biodiversity action plan, as required.
Hazardous waste management	Complete hazardous waste shipments, as required.
Compliance and communication	Conduct safety, health, environment and quality meetings.
Environmental protection and compliance	No daily emission breaches during normal operating conditions.
Oil usage	Reduce oil usage to 2019 level.
Staff competency	Maintain competency matrix.
Management systems	Maintain certification to ISO 14001, ISO 9001, ISO 45001 and ISO 55001.
Reporting	Meet SUEZ internal reporting and carbon monitoring requirements.
Operational efficiency	Meet operational equipment efficiency and preventative maintenance targets.
Continuous improvement	Conduct five continuous improvement projects.

Performance data

All the performance data supporting the previous chapters are collated in the following tables. Figures for past years have been corrected or amended for consistency, where appropriate.

Waste delivered

Wastes delivered to the primary incinerator (tonnes)	2017	2018
Confidential	95.0	92.1
Construction	1,154.3	609.9
Food industry (previously dairy)	4.2	3.4
Municipal	39,781.9	39,469.9
Packaging	1,681.8	1,890.6
Tyres	519.1	607.3
Waste screenings and biopellets	1,114.4	1,247.0
Wood	5,856.3	5,562.9
Forestry	0	0
Meat and bone meal	526.0	543.9
Hygiene waste	-	47.7
Clinical waste (excluding sharps and cyto)	-	-
Other	12.9	45.1
Total	**50,745.7**	**50,199.8**

Wastes incinerated in the secondary incinerator (tonnes)	2017	2018
Clinical	267.9	253.8
Waste oil	128.7	107.9
Total	**396.6**	**361.7**

* In 2021, 88.8 tonnes of clinical waste were processed through the primary line and a total of 345 tonnes was processed in the year.

Exceedances	2017	2018
Number of exceedances of licence emission limits	0	3

2019	2020	2021
29.7	38.5	43.8
498.7	277.8	192.5
5.3	16.5	13.4
39,442.8	39,808.3	41,598.7
1,619.6	865.8	903.0
615.9	638.6	731.5
1,518.2	1,501.1	1,213.0
5,999.3	5,589.9	5,885.6
0	24.4	0
539.9	568.7	510.5
95.1	97.1	93.1
-	-	88.8
69.0	6.6	7.6
50,433.3	**49,433.2**	**51,281.5**

2019	2020	2021
250.1	284.8	256.0*
131.2	77.7	82.8
381.3	**362.5**	**338.8**

2019	2020	2021
7	6	7

Consumption of raw materials

	2017		2018	
	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage
Gas oil (primary)	6.1	288	4.5	213.6
Gas oil (secondary)	780.9	211.1	647.1	185.3
Water	229	10,977	181	9,063
Lime	9.5	453.2	8.9	444.6
Activated carbon	0.4	18.1	0.4	21.1
Ammonia	0.8	39.3	0.6	27.5

Energy consumption and generation

	2017		2018	
	MWh per tonne of waste	Total MWh	MWh per tonne of waste	Total MWh
Electricity consumed	0.024	1,132.0	0.016	816.7
Electricity exported	0.536	25,663.0	0.501	24,966.3

Waste recovery and disposal

	2017		2018	
	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage
Bottom ash (landfill)	219.6	10,522.8	209.7	10,462.0
Air pollution control residue (landfill)	35.3	1,690.5	32.1	1,599.0
Ferrous metal (recycled)	5.7	274.0	10.3	514.6

2019		2020		2021	
Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage
3.9	190.8	7.0	343.8	8.4	398.9
565.1	141.3	1,260.1	319.1	1,153.2	308.9
216	10,775	271.2	10,479	194.4	9,211
8.4	416.9	8	382.8	9.6	453.3
0.4	19.8	0.5	22.9	0.5	25.7
0.5	25.3	0.7	32.9	0.6	28.0

2019		2020		2021	
MWh per tonne of waste	Total MWh	MWh per tonne of waste	Total MWh	MWh per tonne of waste	Total MWh
0.012	598.4	0.018	861.5	0.044	2,078.4
0.505	25,151.0	0.530	25,556.0	0.426	20,228.0

2019		2020		2021	
Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage
205.7	10,237.1	205.7	9,926.6	206.3	9,799.4
34.5	1,717.3	32.1	1,538.7	33.6	1,587.3
3.2	160.4	5.9	286.7	9.8	466.8

Air emissions

	2017		2018	
	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage
Particulate matter	0.015	0.70	0.004	0.19
Volatile organic compounds	0.0045	0.22	0.005	0.25
Hydrogen chloride	0.046	2.21	0.048	2.40
Hydrogen fluoride	0.00082	0.039	0.001	0.055
Carbon monoxide	0.057	2.72	0.054	2.66
Sulphur dioxide	0.160	7.6	0.121	6.01
Oxides of nitrogen	1.216	57.9	1.070	53.0
Ammonia	0.029	1.38	0.01	0.42
Cadmium and thallium	4.2×10^{-06}	0.0002	5.1×10^{-06}	0.0002
Mercury	2.3×10^{-06}	0.00011	9.5×10^{-05}	0.0047
Sb, As, Cr, Co, Cu, Pb, Mn, Ni and V	7.3×10^{-04}	0.035	1.4×10^{-04}	0.007
PAH	1.2×10^{-05}	0.00057	2.3×10^{-05}	0.0012
Dioxins and furans	8.3×10^{-11}	4×10^{-09}	1.2×10^{-11}	6×10^{-09}
Dioxin-like PCBs	9.4×10^{-12}	4×10^{-10}	2.5×10^{-12}	1×10^{-10}

* Tonnages allowed under licence conditions calculated using the waste disposal licence limit, flue flow rate based on actual waste to flue gas ratio and hours the facility can operate in the year (excluding two-week maintenance outage).

Water emissions

	2017		2018	
	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage
Suspended solids*	0.010	0.49	0.009	0.48
Biochemical oxygen demand*	0.0008	0.04	0.0008	0.04
Chemical oxygen demand*	0.015	0.75	0.035	1.78

* Calculated from estimated flow rate.

2019		2020		2021		Tonnes allowed under waste licence*
Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage	
0.003	0.17	0.004	0.18	0.002	0.09	4.567
0.005	0.25	0.004	0.18	0.005	0.22	4.567
0.044	2.19	0.044	2.12	0.044	2.09	4.567
0.001	0.034	0.000	0.0072	0.005	0.23	0.913
0.047	2.3	0.069	3.31	0.054	2.56	22.835
0.125	6.2	0.120	5.77	0.119	5.61	22.835
1.059	52.3	1.077	51.7	1.133	53.58	91.342
0.00	0.03	0.00	0.03	0.001	0.030	-
5.1×10^{-06}	0.00025	4.8×10^{-06}	0.00023	4.9×10^{-06}	0.00023	0.023
1.8×10^{-06}	0.000087	4×10^{-06}	0.00019	3.8×10^{-06}	0.00018	0.023
1.3×10^{-04}	0.0064	6.8×10^{-04}	0.033	2.8×10^{-04}	0.0132	0.023
2×10^{-05}	0.00097	2.5×10^{-05}	0.0012	7.5×10^{-05}	0.00036	-
9.1×10^{-11}	4.5×10^{-09}	2.6×10^{-11}	1.3×10^{-09}	7.8×10^{-11}	3.7×10^{-09}	4.6×10^{-08}
7.2×10^{-12}	4×10^{-10}	2.3×10^{-12}	1×10^{-10}	5.9×10^{-12}	3×10^{-10}	-

2019		2020		2021	
Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage	Kg per tonne of waste	Total tonnage
0.006	0.30	0.006	0.32	0.008	0.41
0.0012	0.06	0.0015	0.07	0.0010	0.06
0.005	0.24	0.005	0.26	0.003	0.16

Glossary

Anaerobic digestion
The process by which organic matter is broken down by bacteria in the absence of oxygen.

Air Pollution Control Residue (APCR)
Particles from combustion gases, heavy metals and dioxins, carbon dust, salt and lime used in the gas-cleaning process, also known as fly-ash.

Biodegradable
Capable of being decomposed by bacteria or other biological means.

Bottom ash
The residue formed on the furnace grate when waste materials are incinerated.

Circular economy
Within a circular economy, the role of resource and waste management is to help prevent waste throughout the whole system, to target materials for harvesting, to manage their logistics in efficient ways, and to treat and return the recovered secondary resources back into the cycle of production and consumption in a compliant and economic manner.

Climate change
The process in which man-made gases are building up in the atmosphere, trapping the sun's heat, causing changes in weather patterns on a global scale.

Deslagger
The system that removes the bottom ash from the incinerator. It comprises a drop-off chute from the final grate, a water filled chamber, a hydraulic pusher and an inclined discharge chute. Also called an ash-extractor.

Dioxins and furans
A large family of compounds – including some of high toxicity – that are by-products of uncontrolled burning, incineration and certain industrial processes, as well as volcanoes and forest fires.

Energy-from-waste (EfW)
The incineration (burning) of waste at high temperatures to reduce its weight, volume and toxicity. The energy from the incineration process is used to generate electricity.

Environment Agency
The UK's waste industry regulator. A non-departmental government public body, set up under the Environment Act 1995 to take an integrated approach to environmental protection and enhancement in England and Wales.

EU Industrial Emissions Directive
Issued by the European Union, the directive commits European Union member states to control and reduce the impact of industrial emissions on the environment. It takes an integrated approach to controlling pollution to air, water and land, and sets challenging industry standards for the most polluting industries. The directive aims to prevent and reduce harmful industrial emissions, while promoting the use of techniques that reduce pollutant emissions and that are energy and resource efficient.

Fly-ash
See Air Pollution Control Residue.

Furans
See dioxins.

Gasification
Gasification is a method for extracting energy from different types of organic material through thermal treatment.

Greenhouse gas
Natural and man-made gases that contribute to the 'greenhouse effect' and climate change, including carbon dioxide, methane, ozone and chlorofluorocarbons (CFCs).

Hazardous waste
Defined by EU legislation as the wastes most harmful to people and the environment.

ISO 14001
The international standard for environmental management.

ISO 9001
The international standard for quality management.

ISO 45001
The international standard for occupational health and safety management.

ISO 55001
The international standard for asset management.

Landfill
The deposit of waste into or onto land in such a way that pollution or harm to the environment is minimised or prevented and, through restoration, reclaims land which may then be used for another purpose.

Landfill Directive
The Landfill Directive (Council Directive 1999/31/EC) aims to prevent, or to reduce as far as possible, the negative environmental effects of landfilling.

Mainsaver
A Computerised Operation and Maintenance Management System (COMMS). Used for the management of maintenance and operational tasks, including scheduling of preventative and planned maintenance activities, asset health recording, electronic shift log, raising and recording work requests and detailed maintenance costs.

Methane
An odourless gas and principal component of natural gas and landfill gas, produced as biodegradable waste breaks down in a landfill site. Over 20 times more potent as a greenhouse gas than carbon dioxide.

Municipal waste
Household waste, as well as other industrial and commercial waste similar in nature or composition, such as wastes collected by a waste collection authority or its agents (i.e. wastes from municipal parks and gardens, beach cleansing, and fly-tipped materials).

MWh
Megawatt-hour, equivalent to one million Watt-hours, and a unit of energy (one Watt is equivalent to one Joule of energy per second).

OHSAS 18001
The international standard for health and safety management.

Recycling
The direct reintroduction of a waste type into the production cycle from which it originates as a total or partial replacement for new material.

RIDDOR
The UK's Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995, which require the reporting of work-related accidents, diseases and dangerous occurrences.

Science-based targets
Science-based targets show companies how much they need to reduce their greenhouse gas emissions by, and how quickly, to keep these in line with worldwide reductions required to keep global temperature increase below those outlined in the 2015 Paris Agreement.

VOCs
Volatile organic compounds: carbon-based compounds that easily evaporate into the atmosphere, commonly used in industry for de-greasing, thinning and dissolving, and found in paint, inks and adhesives.

WEEE
Waste electrical and electronic equipment. The WEEE Directive was introduced in the UK in January 2007 and aims to reduce the amount of electrical and electronic equipment being produced, and to encourage re-use, recycling and recovery.

The external verifiers' verdict

"Further to consideration of the documentation, data and information resulting from the organisation's internal procedures examined on a sampling basis during the verification process, it is evident that the environmental policy, programme, management system, review (or audit procedure) and environmental statement meet the requirements of the Isle of Man Government in providing an annual report and reflects the commitment of SUEZ Isle of Man to satisfy and surpass the standards set in the relevant UK and European legislation as well as local laws and regulations."

Signed: 

Date: 30th May 2022

SGS United Kingdom Limited
Rossmore Business Park
Ellesmere Port
Cheshire CH65 3EN

Verifier number UK – V – 0007

SUEZ Recycling and Recovery Isle of Man Ltd
Energy-from-waste facility
Richmond Hill, Douglas
Isle of Man IM4 1JH

01624 695260
isleofman.uk@suez.com

www.suez.co.im