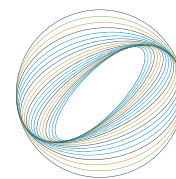




# Managing waste safely and sustainably

THE TEES VALLEY ENERGY RECOVERY FACILITY



**TEES VALLEY**  
ENERGY RECOVERY FACILITY

# The Tees Valley Energy Recovery Facility

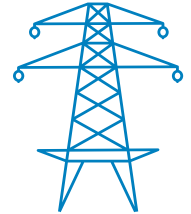
Treat up to **450,000 tonnes** of waste each year from **2029** under a **29-year** contract



Serve **1.5 million** people living and working across the Tees Valley, Durham and Newcastle



Generate nearly **50MW** of electricity - enough to power **60,000** homes



Share waste treatment costs between **7 partner authorities** – reducing costs for each council



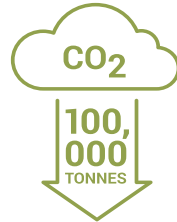
Create up to **50 permanent jobs**



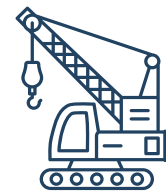
Provide opportunities for local suppliers to potentially be involved with, and benefit from, the development



Save nearly **100,000 tonnes** of greenhouse gas (GHG) emissions each year compared with landfill



Support **hundreds** of jobs during construction



Deliver social value and benefits to the community including apprenticeships, training and supporting local education



Help the partner authorities meet their long-term goal of sending **ZERO** waste to landfill



Offer a **safe, reliable, sustainable and affordable solution** for treating waste left over after recycling





# Foreword

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The Tees Valley Energy Recovery Facility (TV ERF) is an essential infrastructure project being developed by a partnership of seven councils representing Darlington, Durham, Hartlepool, Middlesbrough, Newcastle, Redcar & Cleveland and Stockton.

Together, the partner councils have a legal responsibility for safely managing the waste produced by one and a half million people living and working across the region.

Our responsibility is to put as much of our region's waste to good use as possible, which means offering extensive recycling services, and helping residents to recycle, reuse, repair and repurpose all they can. For the waste left over after recycling – which amounts to approximately 450,000 tonnes each year across the region – our job is to manage this safely, reliably and sustainably.

Using the waste left over after recycling to generate energy is the best use for it, in accordance with UK Government guidance, and this is the important role of the **Tees Valley Energy Recovery Facility**.

Once operational, from 2029, the TV ERF will treat up to 450,000 tonnes of waste each year and generate enough electricity to power the equivalent of 60,000 homes. It will help avoid the need to send this waste to landfill in future and, in doing so, save considerable greenhouse gas emissions by comparison.



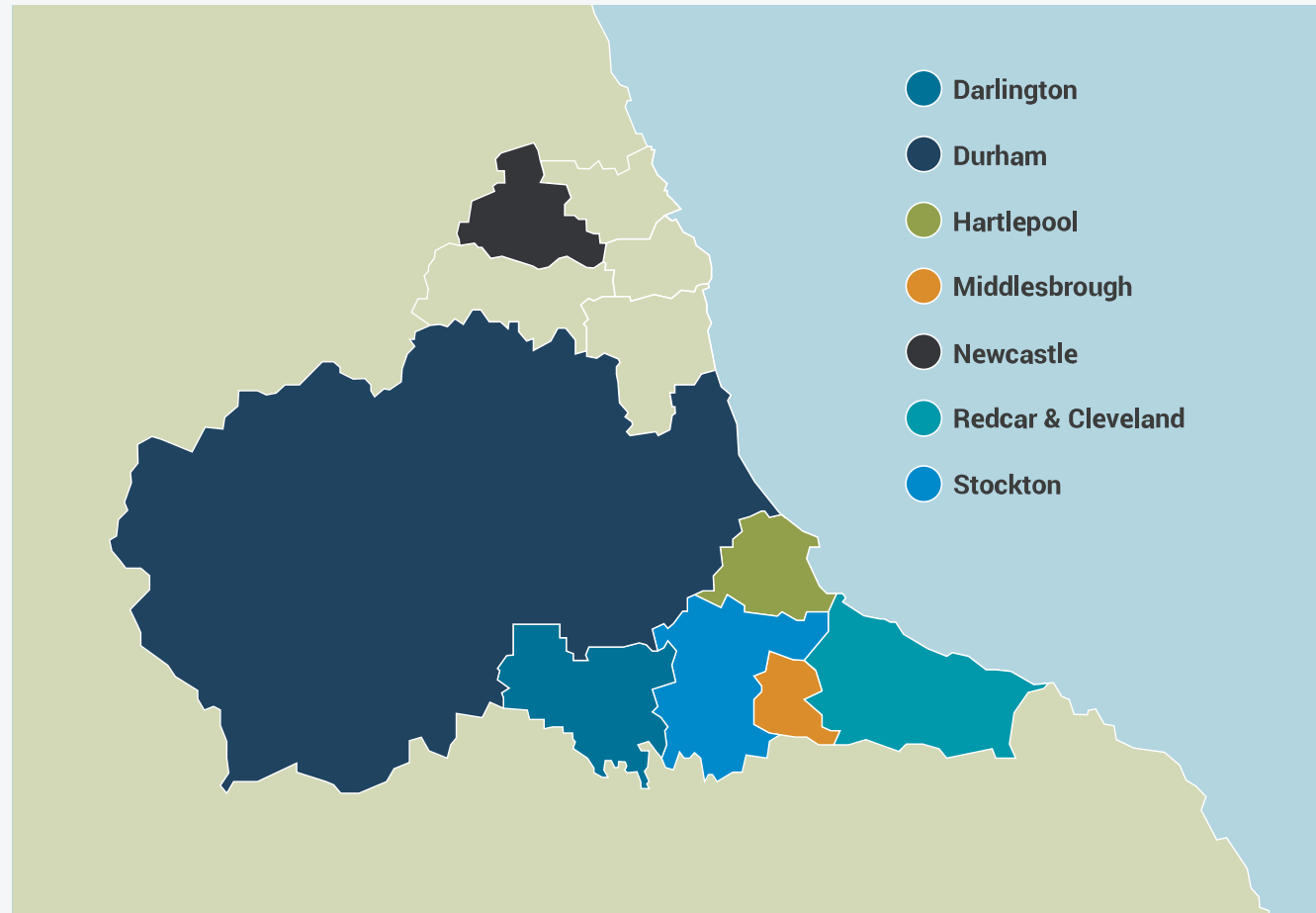
Furthermore, this forward-looking project could also provide a low-carbon source of heat to other nearby businesses and deploy carbon capture technology – actively contributing to net-zero carbon emissions goals both locally and nationally.

It is the only proven solution at scale for managing the region's waste that is **safe, reliable** and **sustainable**. Subject to final commercial evaluation, it is also likely the most **affordable** solution too.

On behalf of the seven partner authorities, we hope you find this short guide informative. You can find out more about the Tees Valley Energy Recovery Facility project, and follow its progress, online at [www.tverf.co.uk](http://www.tverf.co.uk)

### Denise McGuckin

TV ERF Project Sponsor



# Project background

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We want to decrease overall waste volumes, increase recycling rates and send as little as possible to landfill. But even under the most ambitious future recycling and waste-reduction scenarios, there will still be a significant volume of general rubbish left over after recycling (known as *residual waste*) that needs to be managed.

The UK Government hopes to halve the amount of residual waste we all produce by 2042 compared with current levels. However, even if it meets that ambitious target, that still leaves 287kg of residual waste per person, per year, that will need to be dealt with (equivalent to more than 430,000 tonnes of residual waste per year generated by the residents from the seven partner authorities). In addition, due to chemicals present from the manufacturing process, some waste cannot be recycled and must, by law, be incinerated. The requirements around this are going to expand in the future and the TV ERF provides a safe route for the disposal of these items.

In recent years, recovering energy from residual waste, by using it as a fuel in specialist energy recovery plants, has replaced landfill as the main method for treating residual waste in the UK. This mature technology has been widely used across the UK and Europe for decades and, in fact, waste from the region has been processed safely on Teesside this way for nearly thirty years.

But, the facilities currently fulfilling this role are getting a bit older and contractual arrangements for each of the TV ERF project partner councils are coming to an end in the near future. This has allowed the councils to partner together to develop their own new energy recovery facility which will:

- Provide a reliable, proven and sustainable waste treatment solution
- Save each council money through economies of scale, as well as providing long-term clarity on costs
- Secure the best operational expertise at the best value for local tax-payers
- Allow the councils to have full governance and control over their own facility
- Deploy the best available technology and techniques to safely process waste, reduce emissions and recover recyclable materials
- Put the region's waste to best use – helping meet the goal of sending zero waste to landfill
- Provide opportunities for local suppliers to potentially be involved with, and benefit from, the development
- Create social value and benefits for the community including apprenticeships, training and education.

A procurement process to find an experienced operator to design, finance, build and operate the TV ERF has been running since 2020 and is due to conclude in 2025 with the appointment of a contract partner, subject to final review and approval by the project partner councils. Construction will begin shortly thereafter, and the facility is expected to enter full service from 2029.





# Location and planning

The *Outline Business Case* for the project was agreed in 2019 and included a comprehensive Site Selection process, which considered **176 different potential sites** for the TV ERF against key criteria.

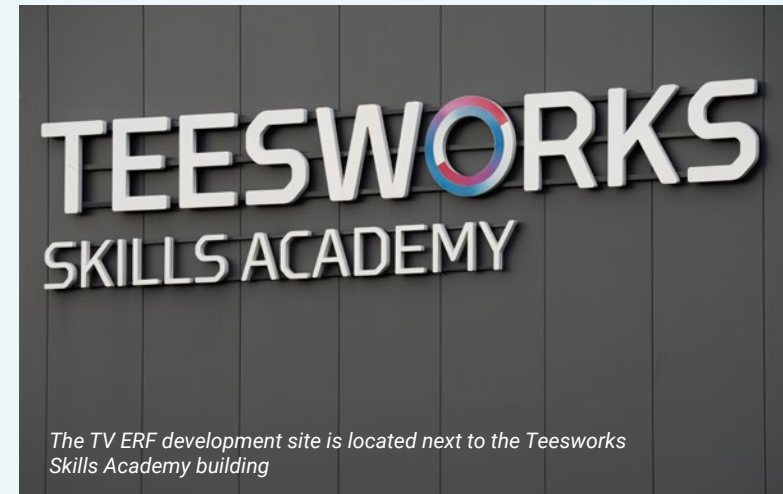
Following this process, the site chosen for the TV ERF is located on industrial brownfield land which formed part of the former steel works near Grangetown in Redcar. This vacant industrial land is now owned by Teesworks and provides excellent infrastructure links to local road and electricity grid networks, as well as being ideally situated to make use of emerging carbon transport and storage infrastructure.

Developing the TV ERF here regenerates a disused industrial brownfield site and the facility could, in future, export heat to other new neighbouring businesses on Teesworks and the wider local area – acting as a catalyst for further regeneration.

Outline Planning Permission for the TV ERF was granted in July 2020. The application was supported by a comprehensive Environmental Impact Assessment and was subject to full public consultation. Following further community and stakeholder consultation, the site was granted Full Planning Permission by Redcar and Cleveland Borough Council in July 2023.



*The former steel works at Redcar prior to being demolished in 2022 to 2023*

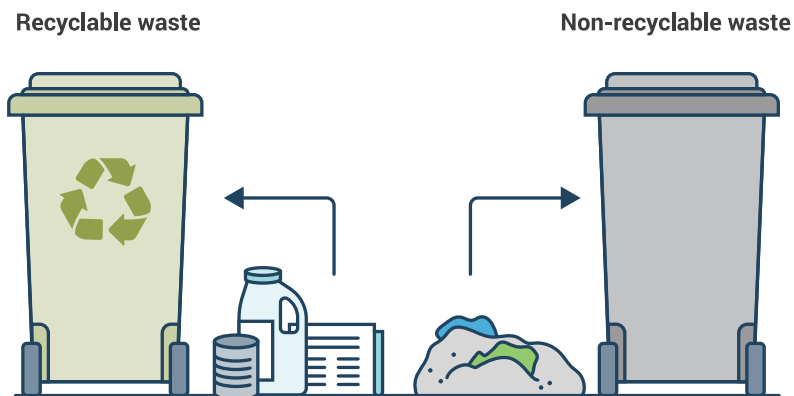


*The TV ERF development site is located next to the Teesworks Skills Academy building*

# The energy recovery process

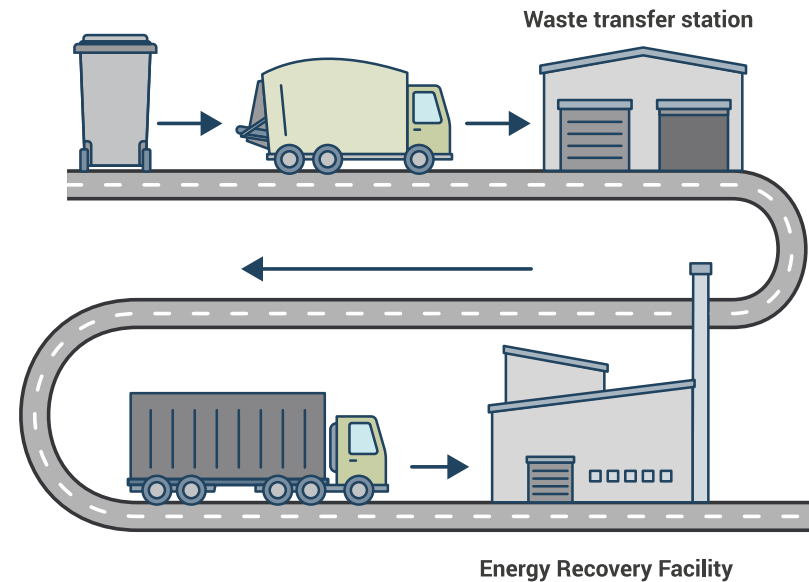
**1** Using kerbside and other recycling services, local householders and businesses are encouraged to recycle and compost as much of their waste material as they can by separating garden waste for composting, cans, glass, paper, cardboard and plastics for recycling and from 2026, separate food waste collections will be brought in.

However, whatever cannot be recycled, composted or re-used is placed in a general rubbish bin and put out for collection.



**2** Recycling containers and general rubbish bins are collected separately and the recycling typically goes to sorting and reprocessing plants to be made into new things.

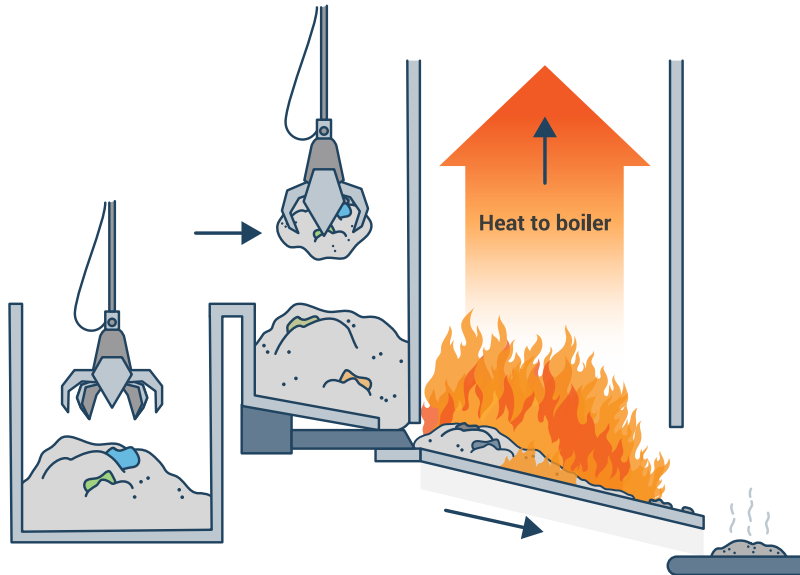
The contents of general rubbish bins are collected and will be transported either to the TV ERF directly or via a local transfer station first. Once the waste arrives at the TV ERF it will be tipped into a large bunker capable of holding several thousand tonnes of waste at a time.



# The energy recovery process

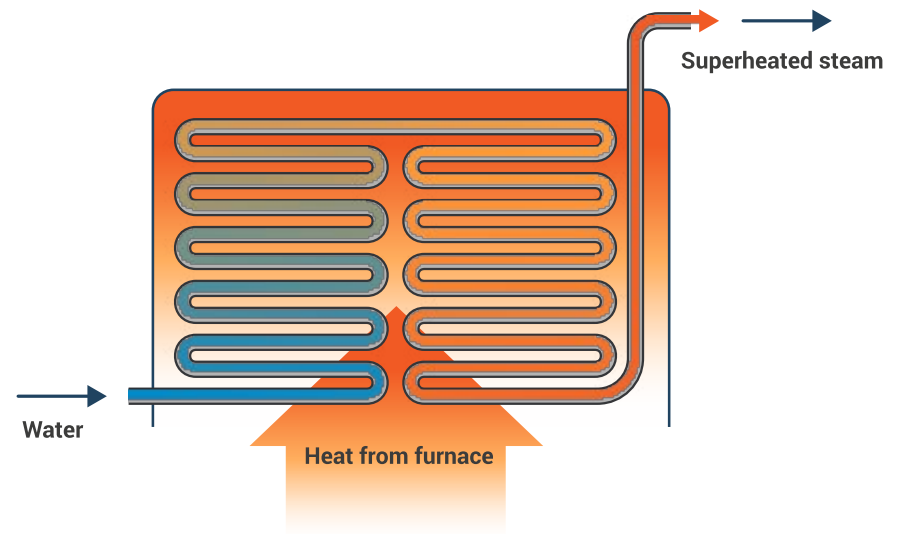
3

Grab claws suspended from cranes will mix the waste and then load it into a furnace, where it is burned to generate lots of heat. A moving grate transports burning waste material through the furnace until only ash remains – ensuring that the waste material is fully combusted.



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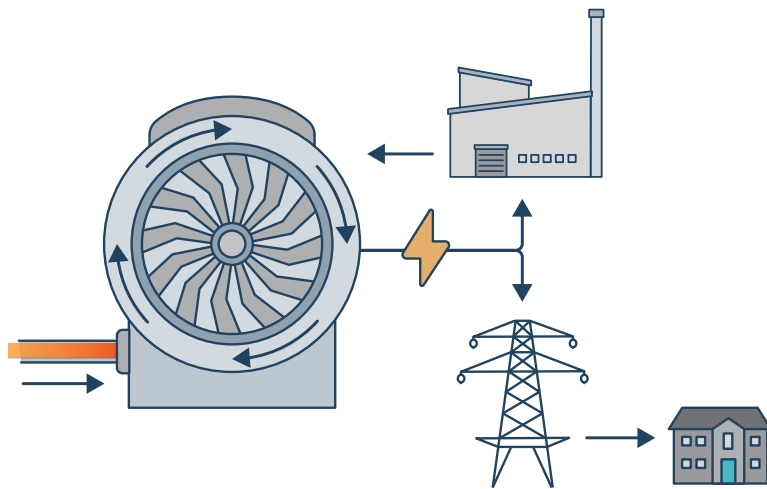
The heat produced by the waste in the furnace heats water in a boiler to produce steam, which then passes through a superheater to heat it even further and remove moisture.



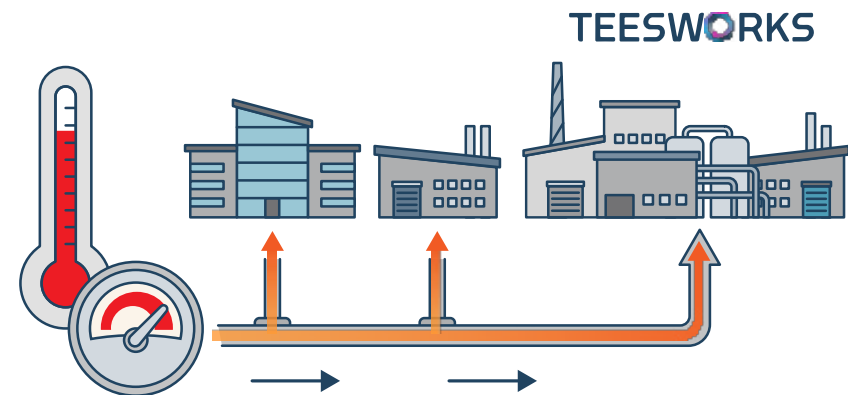


# The energy recovery process

5 The dry superheated steam is then used to drive a turbine, much like most other conventional power stations. The turbine produces electrical power which is used to power the electrical processes in the plant itself while the remaining balance is exported off-site to electricity networks – powering other homes and businesses.



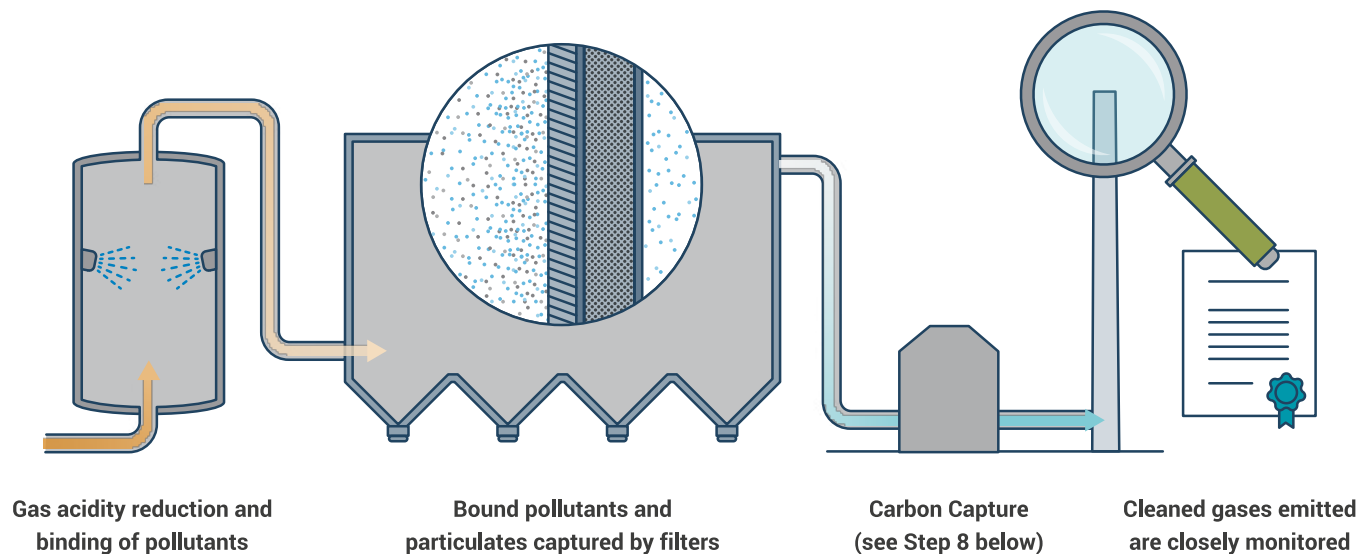
6 This process generates lots of heat and excess heat can be used for district heating networks – similar to the boiler heating your home. The heat can be transferred through pipe networks to heat neighbouring businesses and the project partners hope that new businesses at the Teesworks site will be able to make use of this heat in future.



# The energy recovery process

Much like your gas boiler at home, when fuel is burned to generate energy, it creates exhaust gases. At the TV ERF, like all energy recovery plants, the gases from the combustion process will be cleaned and filtered to remove particulates and potentially hazardous elements before being released to the atmosphere via the chimney stack.

To do this, the TV ERF will employ a range of proven, industry-standard, technologies that reduce the acidity of the gas and bind potential pollutants and particulate matter. The gases then pass through very fine filters which capture the bound pollutants. The filters are regularly cleaned and replaced, and the material captured in them, known as Air Pollution Control Residue (APCR) is collected for treatment or secure storage. Emissions from the plant are constantly monitored and are subject to strict regulation.

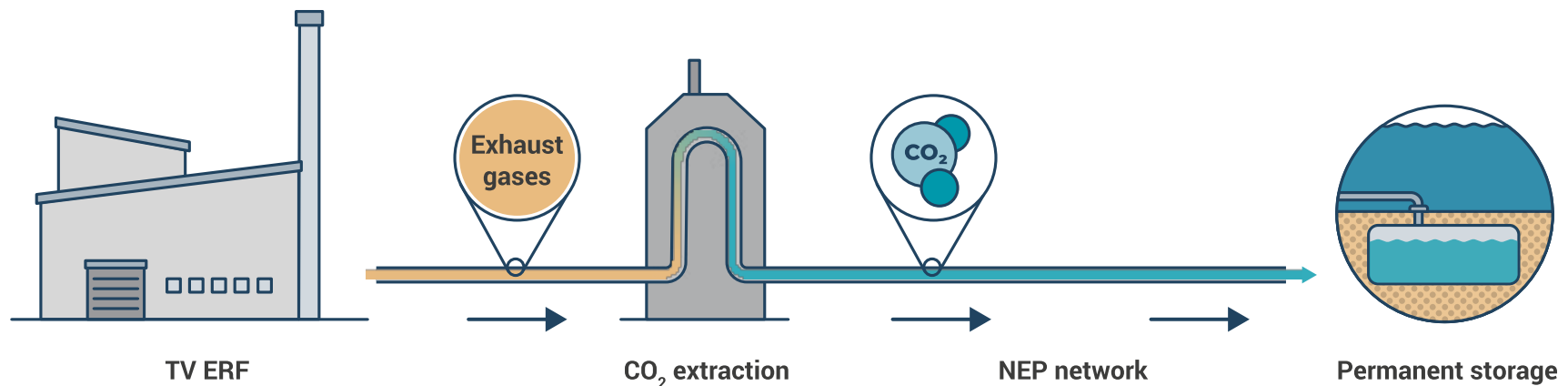


# The energy recovery process

8 Situated within the East Coast Cluster, the TV ERF could make use of Carbon Capture and Storage (CCS) technology in future.

This technology would capture carbon emissions before they are released from the stack and condense them into a liquid so that they can be transported in pipes to the new Northern Endurance Partnership (NEP) underground storage facility in the North Sea.

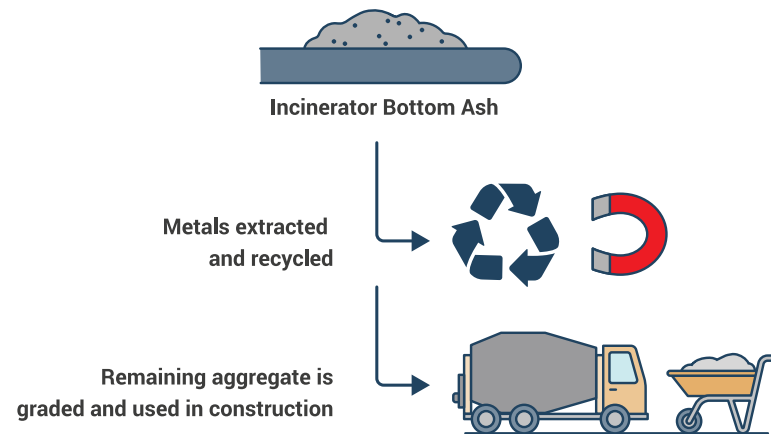
A proportion of the waste treated is organic, rather than fossil based, therefore capturing all of the carbon emissions from the plant means that the TV ERF could actively remove carbon from the atmosphere, rather than contributing to atmospheric carbon emissions. The project partners remain interested in pursuing funding from central Government to help deliver CCS for the TV ERF.





# The energy recovery process

At the very end of the process, the ash left over from the furnace is recovered, graded and processed to be used as an aggregate in construction (for example, road foundations or breeze blocks), thereby directly displacing virgin aggregate materials. Any metal remaining in the ash is extracted and sent for recycling – ensuring as little is sent to landfill as possible.



# Future-proofing waste management

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Every single thing we consume and throw away has a carbon emissions impact.

As a general rule, products that are designed to be used over and over again, or that can be widely and easily recycled, will have a lower emissions impact than products and packaging that become general rubbish after just one use, but everything we throw away ultimately has a climate change impact.

All around the world, treating general rubbish left over after recycling (known as residual waste) is done by either burying it or burning it. Recovering energy by burning this waste as a fuel is the preferable alternative to landfill (which can release emissions and pollutants to air, land and water for many decades after waste has been buried) – and the majority of general rubbish produced in the UK is now treated utilising energy recovery. But, managing waste produces greenhouse gas and our goal is to reduce these emissions as much as possible.





# Future-proofing waste management

Landfill produces methane (a potent greenhouse gas) but using waste as a fuel in energy recovery releases carbon dioxide instead.

However, the equivalent of 200kg of carbon dioxide (CO<sub>2</sub>) is saved for every tonne of waste treated in energy recovery instead of landfill. The Tees Valley Energy Recovery Facility could process up to 450,000 tonnes of waste a year, which means it could save nearly 100,000 tonnes of CO<sub>2</sub> a year compared with landfill. Additionally, the chosen operator for the TV ERF is required to reduce carbon emissions year-on-year throughout the lifetime of the facility through a range of measures, and the plant will use the best available equipment and techniques to reduce emissions from the outset.

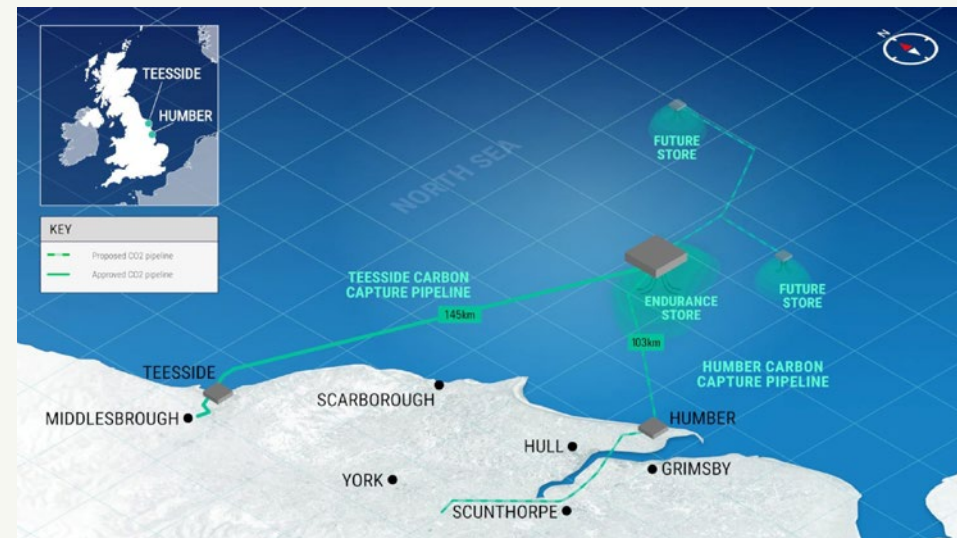
## DID YOU KNOW?

The Tees Valley Energy Recovery Facility could **save nearly 100,000 tonnes of CO<sub>2</sub> a year** compared with landfill.

The TV ERF will be built ready to deploy carbon capture technology should the opportunity to do so arise in future – and the project partners are **actively pursuing** this outcome. In fact, because general rubbish is partly organic, capturing and storing all of the carbon emissions from the facility would actively remove carbon dioxide from the atmosphere. It will also be capable of exporting heat to a district heating network providing low-carbon heat to future neighbouring businesses.

This makes the TV ERF different from the vast majority of existing energy recovery facilities in operation today and is possible because of its unique location on **Teesworks** and within the **East Coast Cluster** – which will be served by the **Northern Endurance Partnership** carbon storage infrastructure.

You can find out more about carbon capture and the TV ERF on [our website](#).





# A safe and reliable solution for managing your waste

The process of recovering energy from waste has been used in the UK and on Teesside for decades now and is a **mature, safe and reliable technology**.

Having a reliable waste treatment solution is essential for ensuring we can continue to meet our legal obligation to safely dispose of waste from our region – **helping to protect the environment, keep our streets clean and prevent a public health hazard**.

There are more than 60 energy-from-waste (EfW) plants like the Tees Valley Energy Recovery Facility currently in operation across the country and this process has been used to manage waste in the North-East for many years.

Energy recovery facilities are among the most highly regulated industrial facilities in Europe and must comply with strict emissions limits as well as other permit conditions. They are subject to constant measurement and monitoring to ensure continual compliance, and their regulatory records are public documents.

The TV ERF will use proven technology to clean and filter emissions to the point that what is released through the plant's chimney stack is mostly steam.

In addition to constant monitoring by the Environment Agency, which is the primary regulator, the seven partner authorities will also play an active governance and scrutiny role in the facility, ensuring permit, planning and contractual compliance at all times throughout the lifetime of the facility.

The UK Health Security Agency (previously Public Health England) regularly reviews the use of energy recovery, and all associated scientific literature, and continues to **permit its use in the United Kingdom**.

## DID YOU KNOW?

Thanks to strict emission limits and controls, **energy recovery facilities account for just 0.03% of particulate matter** in the air. By comparison, the wood burners and stoves in peoples' homes account for around 30% - or around 1,000 times more.

(Source: [Environment Agency, 2018](#))



# Creating social value

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The Tees Valley Energy Recovery Facility is a vital project for the North-East and will serve one and a half million residents – ensuring their waste is safely treated and put to good use.



But, as well as delivering this clear benefit, the TV ERF project will create additional economic and social value for the communities it serves, creating up to 50 new green jobs; apprenticeships and supporting hundreds more jobs during the 3-4 year construction process.

As part of the procurement process, the partner authorities have also placed considerable weighting on the creation of Social Value.

Social Value is additional economic value for the local community beyond the core service – for example, by creating training, and education opportunities, or investing in wider community initiatives or infrastructure. The companies bidding to operate the TV ERF have been challenged to demonstrate how they will put value back into the local community to create new opportunity and improve the quality of life of residents.

Locating the site on Teesworks, as the first major project on this part of the vacant brownfield site, could also entice other new businesses to the area, particularly as the TV ERF can offer low-carbon heating to otherwise energy-intensive businesses. As well as heat, the TV ERF will produce and export electricity to the National Grid, and the money made doing this helps to further offset the cost of essential waste management to the councils.





# Find out more

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If you have questions about the Tees Valley Energy Recovery Facility (TV ERF) project, you can read our regularly updated list of [Frequently Asked Questions](#) online.

You can follow the project, read our latest news, and find out more at [www.tverf.co.uk](http://www.tverf.co.uk)



**Denise McGuckin**  
TV ERF Project Sponsor