

**GO
ZERO!**
NEWCASTLE



**Modelling Net Zero
interventions using a
spatial planning tool**

**David Trousdale
February 2026**

Introduction: David Trousdale

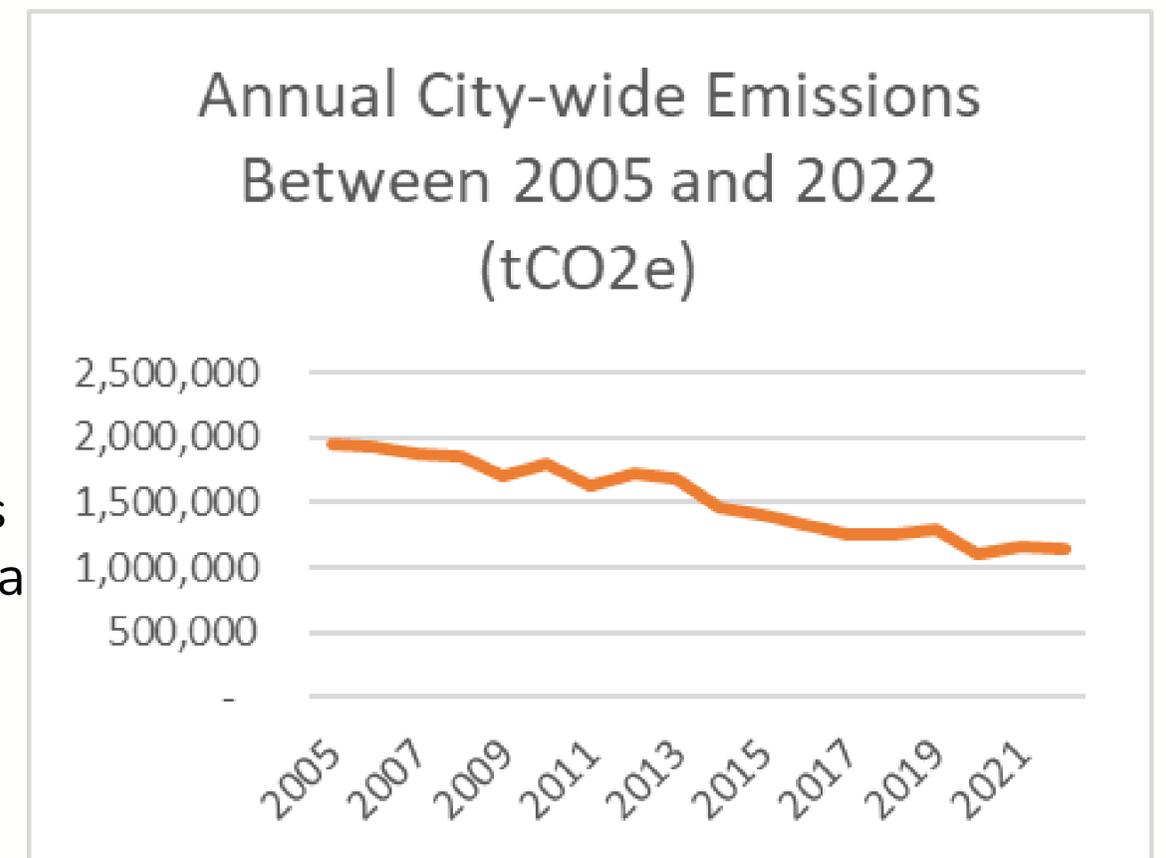
- Principal Advisor – Climate Change & Sustainability
- Areas of responsibility:
 - Measuring progress against the 2030 Net Zero Action Plan
 - Providing strategic direction on all things climate related
 - Managing the quarterly Net Zero Board
 - Coordinating the Climate Change Forum
 - Providing targeted capacity and capability focused on delivery in key areas including heat networks and community engagement
- Also a specialist in EV charge point infrastructure



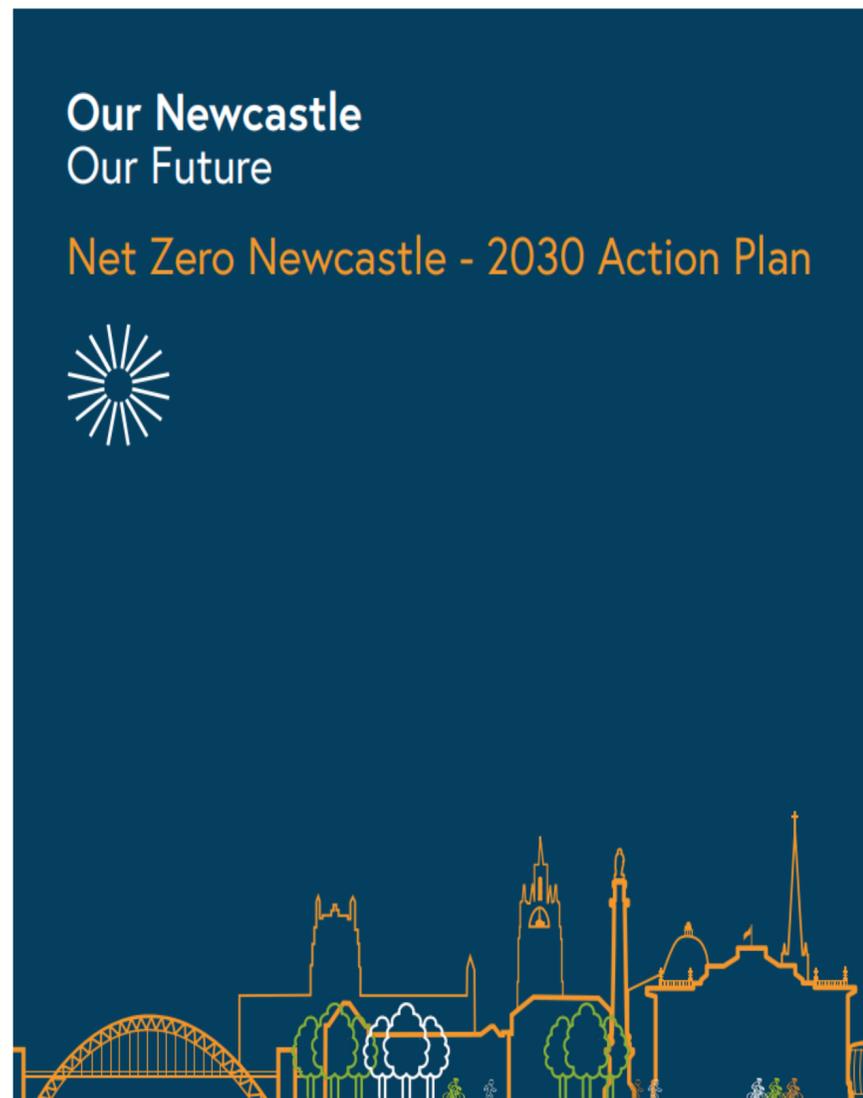
Climate change and Net Zero – Newcastle context

- Newcastle, alongside the city's anchor institutions, declared a climate emergency in 2019 and launched its Net Zero 2030 Action Plan in 2020.
- Newcastle emissions can be broken down into three categories. Energy makes up 65% of the city's emissions, followed by Transport at 30%. Waste and other industrial process, land use and livestock makes up the remaining 5%.
- Since 2019, when the city declared a Climate Emergency, Newcastle has reduced its city-wide scope 1 & 2 emissions by 11% from 2019 - 2022, this is a reduction of 146,918 tonnes of CO₂e, which would be equal to driving a car for 652,541,907 miles.
- The city recognises that there are a number of challenges and that more needs to be done to achieve Net Zero by 2030.

**Newcastle has been recognised internationally as a leader
in Net Zero**



Our Net Zero 2030 Action Plan



Three key thematic areas



Energy



Transport



Adaptation &
Sustainability

93 key actions

68% of actions completed, transitioned to business as usual or superseded

11% citywide emissions reduction since 2019

42% citywide emissions reduction since 2005

2023/4 corporate emissions inventory

28% Scope 1

7% Scope 2

65% Scope 3

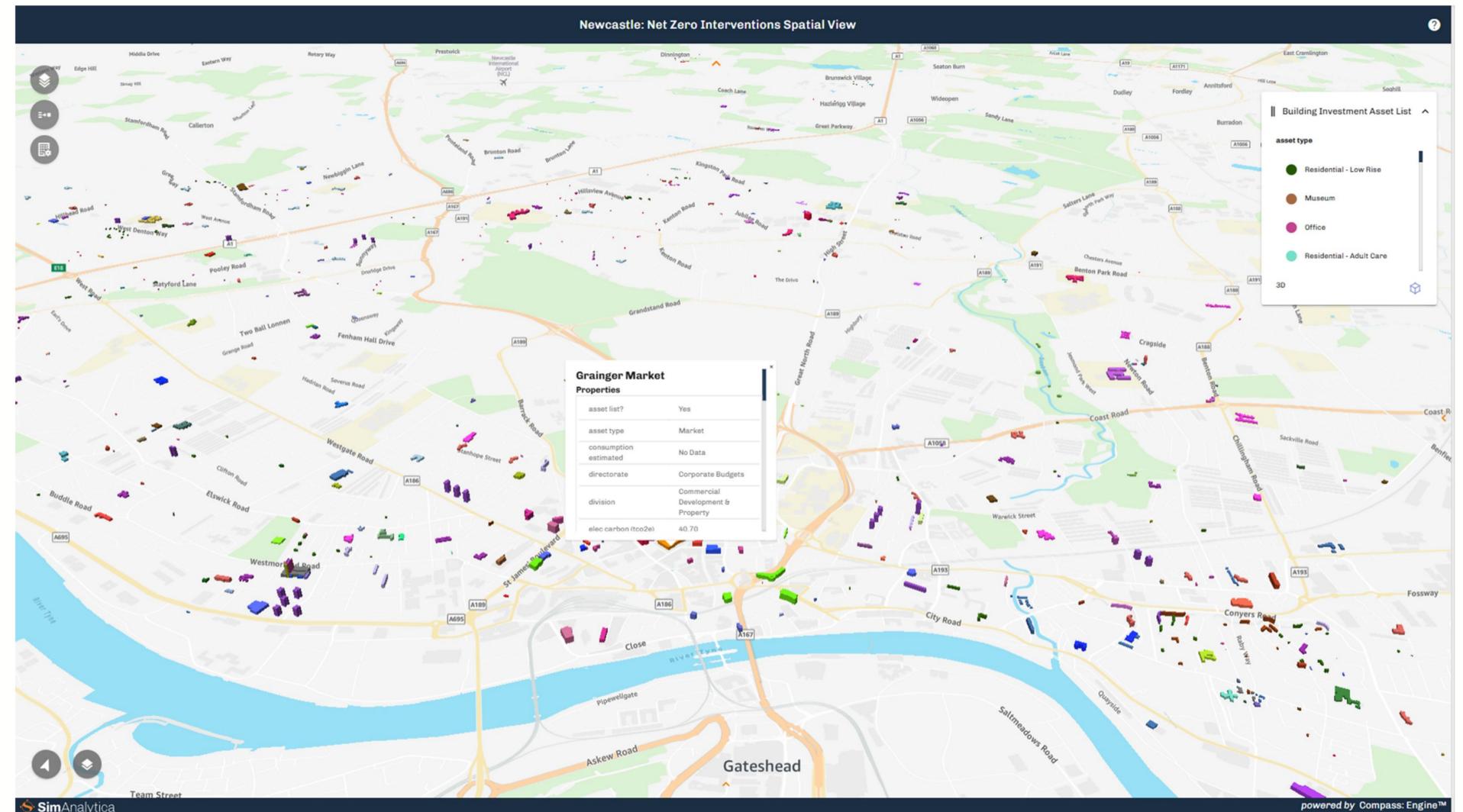
A key gap in our capabilities

- As a city we conduct two carbon inventories: citywide and corporate.
- The key challenge is marrying up – how does a decarb intervention at a building level feed into a citywide inventory.
- A further challenge is how do we evidence interventions can deliver cost and emissions savings **AT PACE.**
- Even delivering an outline business case and the preamble to that is resource intensive.

Is there a tool that can ingest our bottom up energy and emissions data, assigned to buildings, and enable us to run different interventions to demonstrate the impact and ultimately make better quicker decisions?

The Net Zero interventions spatial planning tool – proof of concept

- Models different Net Zero interventions in the built environment.
- Involves taking buildings and other stationary assets and then combining with different data sources
- Enables decision makers to understand the impact of interventions on cost, energy and emissions.
- 19 interventions are included (solar pv, heat pumps, BESS and heat networks).
- Tool is able to calculate the cost to decarbonise based on the interventions.
- Scalable to other LAs.



How did we set it up

Determine assets, interventions, other base data

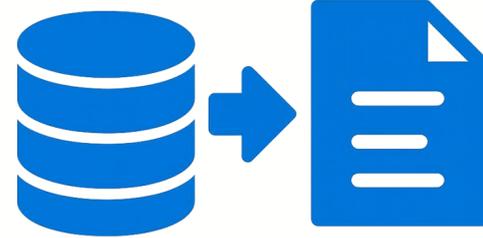
Parents	Column1	Street Name	Rank	Post	Date of Service	Start of Year	Date of B	Column8
Mr & Mrs Carl H. Bell	Bath Street	Tech Sgt		U.S. Army Air Forces, 44th Bombard	September 1941	9/1/1941		
Mr & Mrs John Boulton	Monmouth	Bobbin Street	Put	Ship's Cook St.	July 1942	7/1/1942		
Colonel Frank Edwards	Wards St	Edgmont Street	Put	U.S. Army, Headquarters Company	April 1944	4/1/1944		
Miss Helena Gaskie	Gaulka Street	PH		U.S. Army, 328th Infantry Regiment	January 1944	1/1/1944		
	Herring Street	PH		U.S. Army, 328th Infantry	January 1943	1/1/1943		Passenger on boat
Mr & Mrs Ben Herring	Herring Street	Put		PH, FLD ARTY BN	April 1942	4/1/1942	29-Jan-35	
Mr & Mrs William Mirook	Wilkes Street	PH		Col. M 120th Infantry	November 1941	11/1/1941	15-Oct-35	
Mr & Mrs Ernest Munsterman	Munsterman Street	Staff Sgt			February 1942	2/1/1942		
Mr & Mrs Edward Nelson	Black Bath County, MN	Put			November 1943	11/1/1943		
Mr & Mrs Hans Nelson	Big Stone County, MN	Nelson Street	Put		May 1943	5/1/1943		
Mr & Mrs Hans Nelson	Big Stone County, MN	Nelson Street	Put	U.S. Army, 28th Infantry Battalion	December 1942	12/1/1942		
Mr & Mrs Charles Paul	Paul Street	Sgt, Technician 4th Class		U.S. Army, 81st Tank Destroyer B	July 1942	7/1/1942	19-Apr-21	
Mr & Mrs Ed Patrick	Patrick Street	PH		Col. G. 382 Infantry	February 1941	2/1/1941		
Mr & Mrs Paul Pridel	Pridel Street	Sgt		Col. M 120th Infantry	February 1941	2/1/1941		
Mr & Mrs Martin Reuss	Reuss Avenue	PH		183 Inf, 98 Inf Div	September 1944	9/1/1944	27-Jun-26	
Mr & Mrs Elven Robertson	Robertson Avenue	Sgt		U.S. Army Air Forces, 43th Bombard	January 1944	1/1/1944		
Mr & Mrs Ole Rønning	Rønning Avenue	Corp		Col. M 120th Infantry	February 1941	2/1/1941	22-Aug-37	
Mr & Mrs George Rooney	Rooney Avenue	Staff Sgt		Col. M 120th Infantry	February 1941	2/1/1941	18-Feb-35	
Mr & Mrs Albert Schlemmer	Schlemmer Avenue	PH		U.S. Army, 28th Infantry Btl	February 1942	2/1/1942	1944	
Mr & Mrs John Seefling	Smelling Avenue	PH			October 1942	10/1/1942		
Mr & Mrs Jane Stevenson	Big Stone County, MN	Sgt		U.S. Army	January 1942	1/1/1942	4-Feb-34	

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Identify data



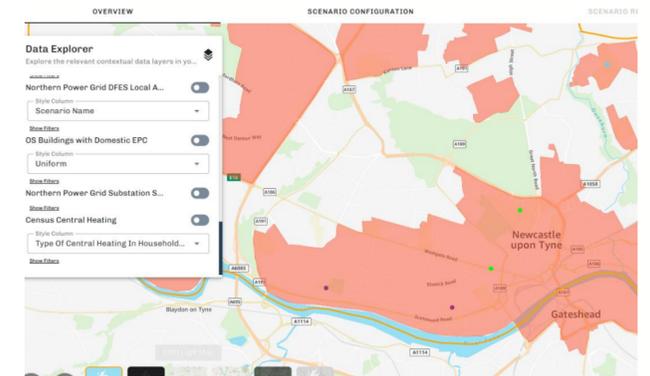
Clean data



Ingest data



Refine data



Visualise data

Automate and auto-refresh where possible

How does it work?

City overview

OVERVIEW

Data Explorer
Explore the relevant contextual data layers in yo...

Buildings and Landuse
Building Investment Asset List

Style Column
Ward

Show Filters

Investment Asset List

Style Column
Ward

Show Filters

NGD Land Use Site

Show Filters

Listed Buildings and Sites

Show Filters

Demographic

Scenario configurator

← **Energy Scenario £1M Budget**

8 assets with interventions

ASSETS	COST PROFILES
<input checked="" type="checkbox"/> Benfield School 1/7 interventions applied.	
<input type="checkbox"/> Benfield Sports Centre No interventions available.	
<input type="checkbox"/> Blackfriars 0/7 interventions applied.	
<input type="checkbox"/> Brunton First School No interventions available.	
<input type="checkbox"/> Chillingham Road Primary School 0/8 interventions applied.	
<input checked="" type="checkbox"/> Connie Lewcock House 1/8 interventions applied.	
<input type="checkbox"/> Elswick Park & Pool 0/7 interventions applied.	
<input checked="" type="checkbox"/> Excelsior Academy 1/7 interventions applied.	
<input checked="" type="checkbox"/> Gosforth Academy 1/7 interventions applied.	
<input checked="" type="checkbox"/> Grange First School 1/8 interventions applied.	

Scenario review

SCENARIO CONFIGURATION SCENARIO REVIEW

Newcastle upon Tyne

Summary Figures
From the interventions applied to assets within this scenario, we can see the following overall figures:

Installation Cost £ 995k ^

Installation Cost per intervention

Install Cost (Electric):	£ 789k
Install Cost (Gas):	£ 207k
Install Cost (Total):	£ 995k

Report

REPORT

Summary Report

Project Overview
This report aims to provide a comprehensive overview of the findings for the configured scenarios, exploring the overall impact of the interventions applied to assets. There are **1** scenarios ready for comparison. Those being:

- Energy Scenario £1M Budget**
This scenario applies interventions to **8** assets. Across those assets, a total of **8** interventions are applied. Of these interventions, **5** unique interventions are applied.

Energy Scenario £1M Budget

Energy Costings
In order to calculate the operational cost saving from the applied interventions, the cost per kWh of each utility are specified:

- Electricity**
The Electricity costing is provided by the HM Treasury Green Book. It uses the costings for 2025 that fall within the category of Commercial/ Public sector assets. It uses the Central profile for this year which works out to be **18.82p per kWh**.
- Gas**
The Gas costing is provided by the HM Treasury Green Book. It uses the costings for 2025 that fall within the category of Commercial/ Public sector assets. It uses the Central profile for this year which works out to be **4.84p per kWh**.

Asset Interventions
Below notes the interventions applied per asset

Benfield Sc...	Connie Lew...	Excelsior A...	Gosforth A...
• Cavity wall insulation	• LED - new fitting	• Solar PV	• Cavity wall insulation

An example

You've £1.5million of funding (grant, borrowed etc.) to spend on solar PV in schools.

Scenario configurator

State whether you want to prioritise energy, carbon or installation cost

Budget Based Scenario Configuration

I would like to build a scenario that prioritises **Energy**. The budget for the interventions applied should be **£0**. The scenario should consider **all** assets. The scenario should consider **all** interventions.

GENERATE SCENARIO

Determine the interventions

Budget Based Scenario Configuration

I would like to build a scenario that prioritises **Energy**. The budget for the interventions applied should be **£1500000**. The scenario should consider **some** assets. The assets to consider are:

Assets
Benfield School Brunton First School (+8 others)

The scenario should consider **some** interventions. The interventions to consider are:

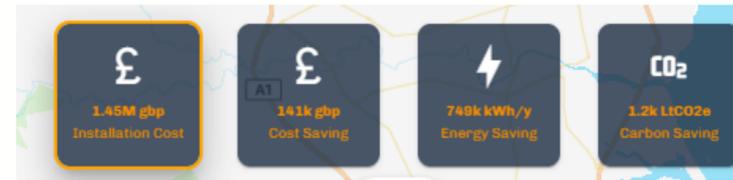
Interventions
Solar Photovoltaic (PV)

GENERATE SCENARIO

Determine your assets

State the budget

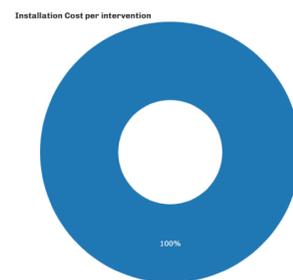
Scenario review



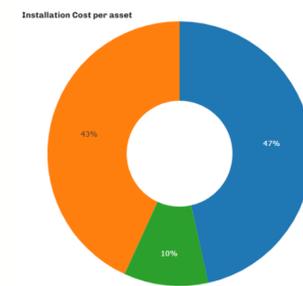
Summary Figures

From the interventions applied to assets within this scenario, we can see the following overall figures:

Installation Cost £1.45M



Install Cost (Electric): £1.45M
Install Cost (Total): £1.45M



Install Cost (Electric): £1.45M
Install Cost (Total): £1.45M

Cost Saving £141k

Energy Saving 749 MWh

Carbon Saving 1.2k LtCO2e

Report

Summary Report

Project Overview

This report aims to provide a comprehensive overview of the findings for the configured scenarios, exploring the overall impact of the interventions applied to assets. There are 1 scenarios ready for comparison. Those being:

- **Energy Scenario £1.5M Budget**
This scenario applies interventions to 3 assets. Across those assets, a total of 3 interventions are applied. Of these interventions, 1 unique interventions are applied.

Energy Scenario £1.5M Budget

Energy Costings

In order to calculate the operational cost saving from the applied interventions, the cost per kWh of each utility are specified:

- **Electricity**
The Electricity costing is provided by the HM Treasury Green Book. It uses the costings for 2025 that fall within the category of Commercial/ Public sector assets. It uses the Central profile for this year which works out to be **18.82p per kWh**.
- **Gas**
The Gas costing is provided by the HM Treasury Green Book. It uses the costings for 2025 that fall within the category of Commercial/ Public sector assets. It uses the Central profile for this year which works out to be **4.84p per kWh**.

Asset Interventions

Below notes the interventions applied per asset

- Chillingham Road Primary School
• Solar PV
- Excelsior Academy
• Solar PV
- Gosforth Academy
• Solar PV

Key Figures

Assets Impacted 3	Total Interventions Applied 3	Unique Interventions Applied 1
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Total Installation Cost
£1.45M

Annual Cost Saving £141k	Annual Energy Saving 749 MWh	Lifetime Carbon Saving 1.2k LtCO2e
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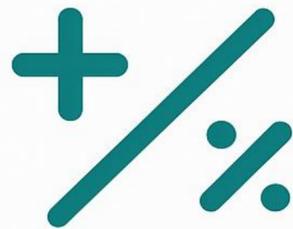
Annual Cost Saving per £ spent 0.097 £/£ spent	Annual Energy Saving per £ spent 0.52 kWh/£ spent	Lifetime Carbon Saving per £ spent 0.00083 LtCO2e/£ spent
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Regional Carbon Impact 0.000045 % reduction in carbon	Council Assets Carbon Impact 0.0014 % reduction in carbon
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What are its strengths



Layering of different data sources to understand interactions between data sets



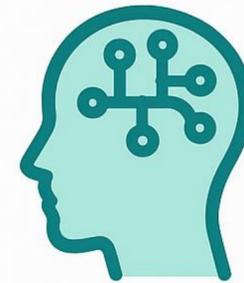
Mix and match different interventions and then model the impact of these



Calculated cost of interventions vs potential energy and carbon savings



Enables high level business case development based on analysis provided by the tool



Use of AI in interrogating the data as well as running scenarios



Visualisations to aid understanding

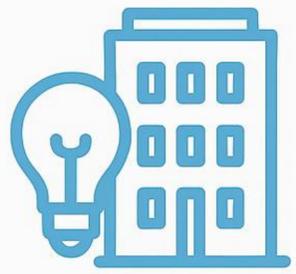


Production of easy to review reports



Scalable to other local authorities

What could it do better



Develop and apply interventions for buildings without pre-defined data



Factor in cost to borrow when financing interventions



Bringing our internal teams on the journey with us

Future development plans



Secure additional funding



Scale up solution to include all Newcastle buildings



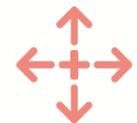
Expand to cover whole of North East



Develop AI capabilities



Enhance ability of tool to feed directly into business cases



Expand interventions



Explore including other decarbonisation thematic areas (e.g. Transport)

Summary

- The city recognises that there are a number of challenges and that more needs to be done to achieve Net Zero by 2030.
- The Net Zero interventions spatial planning tool models different Net Zero interventions in the built environment and involves taking buildings and other stationary assets and then combining with different data sources.
- The tool has been demonstrated to add value in accessing the viability of certain interventions.
- The future of the tool is expanding it to include more buildings, more interventions and over a greater area.
- We'll look to develop the tool further in 2026.



**GO
ZERO!**
NEWCASTLE

Thank you!

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Newcastle
City Council 



IET The Institution of
Engineering and Technology

**Electric Vehicle Charge Point
Infrastructure**
From planning to operation

Edited by
David Trousdale



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book!**

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