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CLIMATE EMERGENCY COLLABORATION PROJECT

Jamie Brogan

Head of Innovation & Skills
Edinburgh Centre for Carbon Innovation

29th October 2020

Sustainable Construction Topic Support Network

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PCAN PLACE-BASED CLIMATE ACTION NETWORK

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EDINBVRGH THE CITY OF EDINBURGH COUNCIL

Partnership with City of Edinburgh Council, setting a city target for Net Zero by 2030.

Established the Edinburgh Climate Commission, an independent body both challenging and supporting the city to reduce climate impact, and published recommendations for a Green Recovery in Edinburgh.

Created a city *Road Map to Net Zero:*

- Quantified city **footprint by emissions source**
- Mapped the range of **measures needed to achieve net zero**
- **Cost/benefit analysis** of mitigation measures

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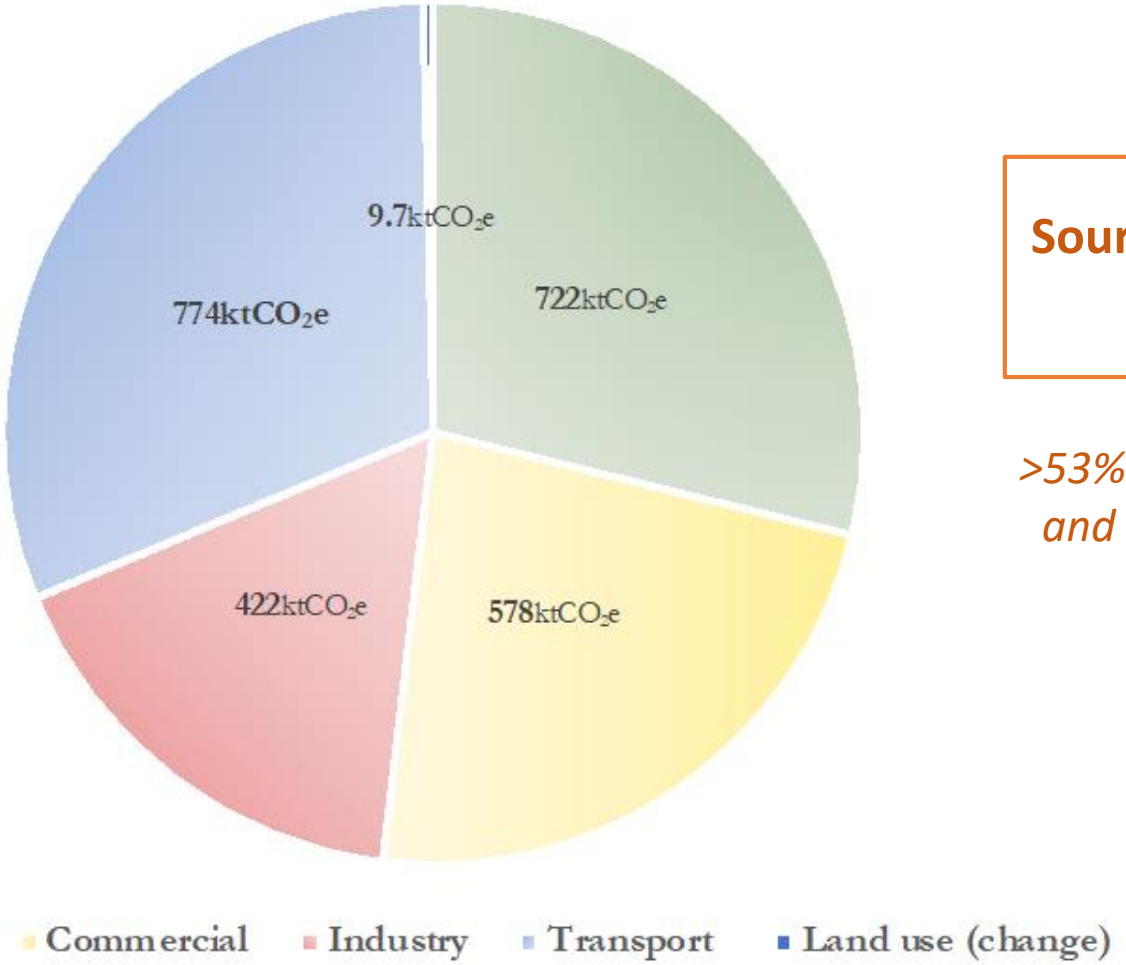
Edinburgh's Emissions Footprint



Source of Emissions in 2019 by Sector

>53% from Edinburgh's domestic and commercial building stock

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Most Carbon Effective Measures

Carbon Effectiveness	Potential Aggregated Carbon Savings	Category	Measure
Highly Effective	>2.4 Mt CO_2	Domestic Insulation Improvements	Cavity-Wall
			External Wall
			Floor & Suspended Floor
			Internal Wall
			Loft & Loft Top-Up
		Domestic Heating Provisions & Controls	High-Efficiency Combination Boilers
			Air-Source Heat Pumps
			Thermostatic Radiator Valves
			Thermostat Controls
		Commercial Cooling Mechanisms	SFP2.0l/s
			Passive Chilled Beams
			Chiller CoP5.4
		Office Building Stock Fabric Condition	Fabric Improvements
			Air Tightness Improvements
		Transport Electrification	Private-EV Penetration (100% in 2037)
Very effective	880kt to 2.3Mt CO_2	Domestic Electricity/Heat Demand Reductions	Turning Unnecessary Lighting Off
			Reducing Internal Temperature by 1C
			A++ Rated Cold Appliances
			A+ Wet Appliances
		Commercial Heating Provisions	Air-Source Heat Pumps
		Domestic Lighting	Low Energy Lighting

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Most Cost Effective Measures

Cost Effectiveness	Potential Cost Savings	Category	Measure
Highly Effective	>250 £2018M	Domestic Building Stock Insulation	Cavity-Wall
			Loft & Loft Top-Up
		Domestic Demand Reductions	A++ Rated Cold Appliances
			A+ Wet Appliances
			A Rated Ovens
			Induction Hubs
			Low Energy Lighting
		Commercial Building Stock Improvements	SFP2.0l/s
			Chiller CoP5.4
			Air Tightness
			Fabric Improvements
			Low Energy Retail & Office Cooling Systems
		Domestic Heating Provisions & Controls	High-Efficiency Combination Boilers
			Heat Pumps
			Thermostatic Valve Controls
			Tank Insulation
Moderately Effective	<25 £2018M	Domestic Electricity/Heat Demand Reductions	Turning Unnecessary Lighting Off
			Reducing Internal Temperature by 1C
			A++ Rated Cold Appliances
			A+ Wet Appliances
		Commercial Building Stock Heating Provisions	Air-Source Heat Pumps
		Domestic Lighting	Low Energy Lighting
		Transport Electrification	Private-EV Penetration (100% in 2037)
			Electric Bus Penetration
		Industrial Processes & Equipment	Pumping Equipment Upgrades
			Compressed Air Systems
			Fan Improvements
			Boilers and Steam Piping Upgrades
		Commercial and Domestic Fabric	Draught Proofing Measures

Cost-Effective Measures

56% of Net Zero
in Edinburgh by 2030

Climate Impact	55.91% Reduction in Overall Emissions
Return on Investment	Economic Return on Commercial Terms £550M/year in Energy Cost Savings across the city Payback in 7.5 years
Economic Opportunities	7,291 Jobs Created Savings for Individuals, Businesses & Communities
Social, Environmental and Economic Benefits	Improved Public Health Reduced Fuel Poverty Improved Economic Productivity

Investment Required £3.796 Bn

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Cost-Neutral Measures

62% of Net Zero
in Edinburgh by 2030

Climate Impact	61.83% Reduction in Overall Emissions
Return on Investment	Economic Return on Commercial Terms £566M/year in Energy Cost Savings across the city Payback in 12.5 years
Economic Opportunities	16,054 Jobs Created Savings for Individuals, Businesses & Communities
Social, Environmental and Economic Benefits	Improved Public Health Reduced Fuel Poverty Improved Economic Productivity

Investment Required £7.492 Bn

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Strategy 2030: Social and Civic Responsibility

https://www.ed.ac.uk/about/strategy-2030

Objective 1:

We will become a zero carbon and zero waste university.

Developing and pioneering approaches to deliver a zero carbon and circular economy and protecting and enhancing biodiversity.

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We are one of the largest investors in city Edinburgh's built environment:

- We should leverage our investment to drive down city emissions
- Can use Tier 1 supplier relationships to drive change through supply chains
- University estate can be a living lab for innovation

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Phase 1: Building Capacity for Better Building Performance

Phase 2: Developing Post-Construction Emission Reduction Tools

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Building efficiency can and should be better optimised in the context of a climate emergency.

The **building performance** delivered at the end of a project often **doesn't match the original ambition** or intent.

The performance gap **doesn't arise because technologies and materials to deliver better performance don't exist**.

It primarily arises from **decisions** made at various stages in the project lifecycle, **without the right skills and knowledge** at the right time to support them.

AGREEING THE REAL CHALLENGE

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DEVELOPING SHARED COMMITMENT

How we've gone about it. Series of workshops:

- **Contractor:** to confirm construction sector capability and commitment to deliver building performance.
- **Client:** to test our assumptions on how current processes and priorities affect project outcomes.
- **Shared Commitment:** to propose new approaches to future projects and open these for discussion.

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Likely outputs from emerging findings are the need to:

- **Prioritise different outcomes** and embed these throughout the project lifecycle.
- **Change contracting processes** to support more effective and timely input and engagement.
- **Build knowledge, skills and capacity <u>at all levels</u>** to ensure climate impact is embedded in decision making, through concept, design and delivery to occupancy.

INNOVATING OUR APPROACH

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