Glasgow Climate Plan – 2030 & a Climate Neutral Innovation District

Gavin Slater – Head of Sustainability, GCC

Where did we start

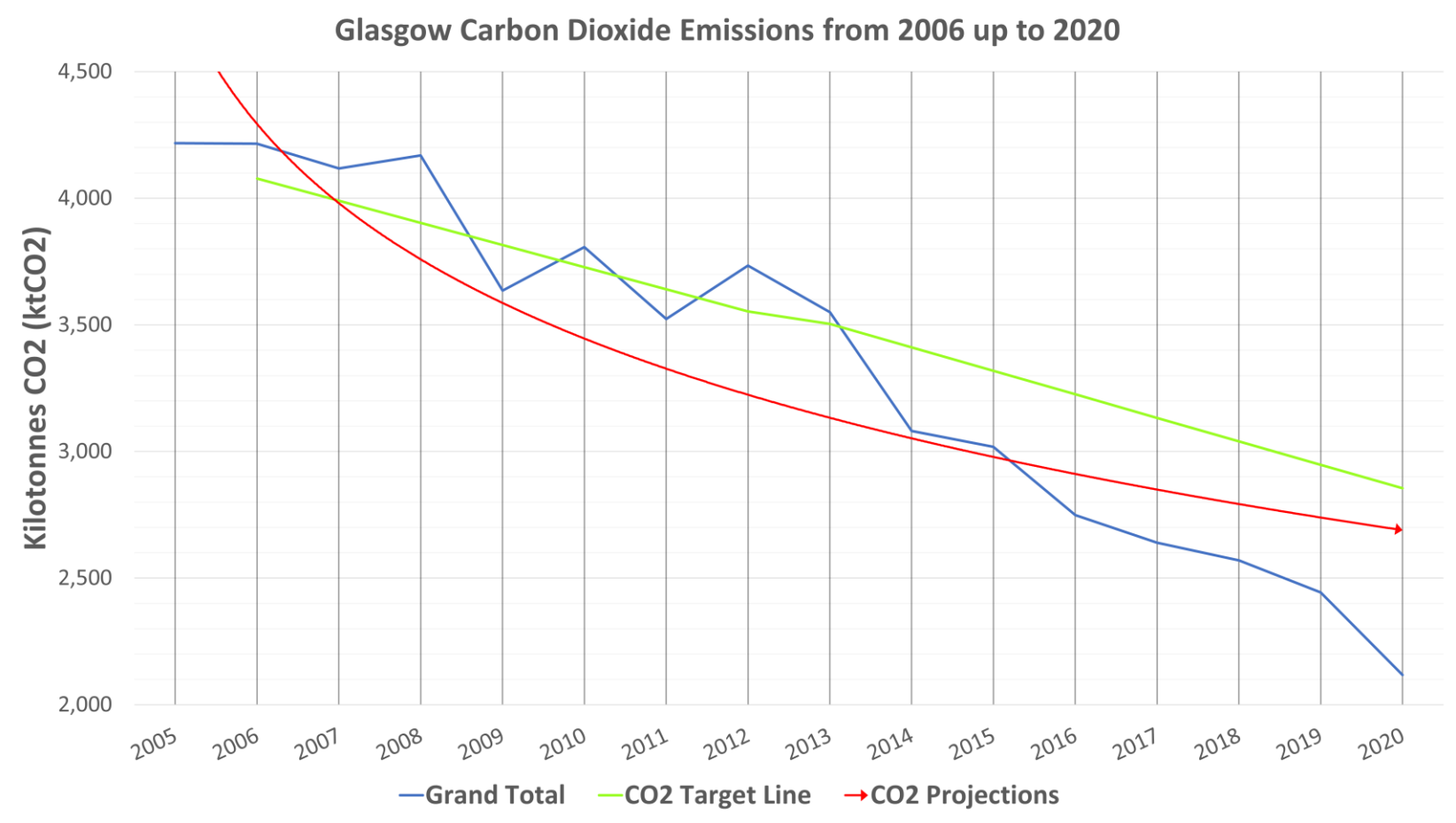
- Sustainable Glasgow established in 2010
- Sustainable Glasgow report published
- Target set to reduce CO_2 emissions by 30%
- 33 Actions set out
- Predicted to cost the city in excess of £1B

Sustainable Glasgow

Where did we start

- EU FP7 STEPUP project 2012-15
- Sustainable Glasgow report updated to become Glasgow Energy & Carbon Masterplan
- Target to reduce CO_2 emissions by 30% 33 Actions retained
- More sophisticated data analysis and mapping

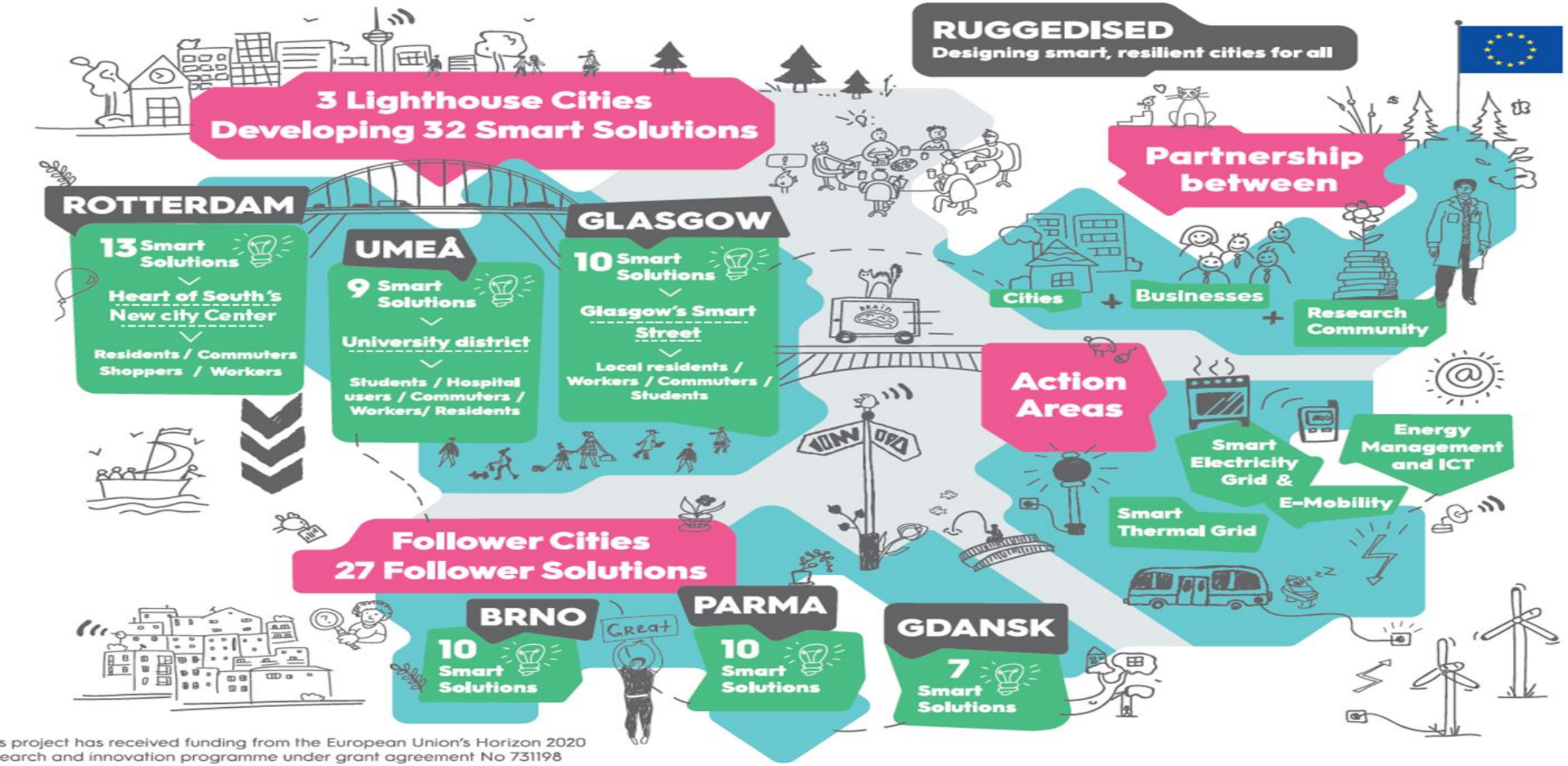
2020 – How did we do?



How did we hit our target?

Glasgow City Council

Neighbourhoods, Regeneration and Sustainability



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Glasgow City Council

Neighbourhoods, Regeneration and Sustainability

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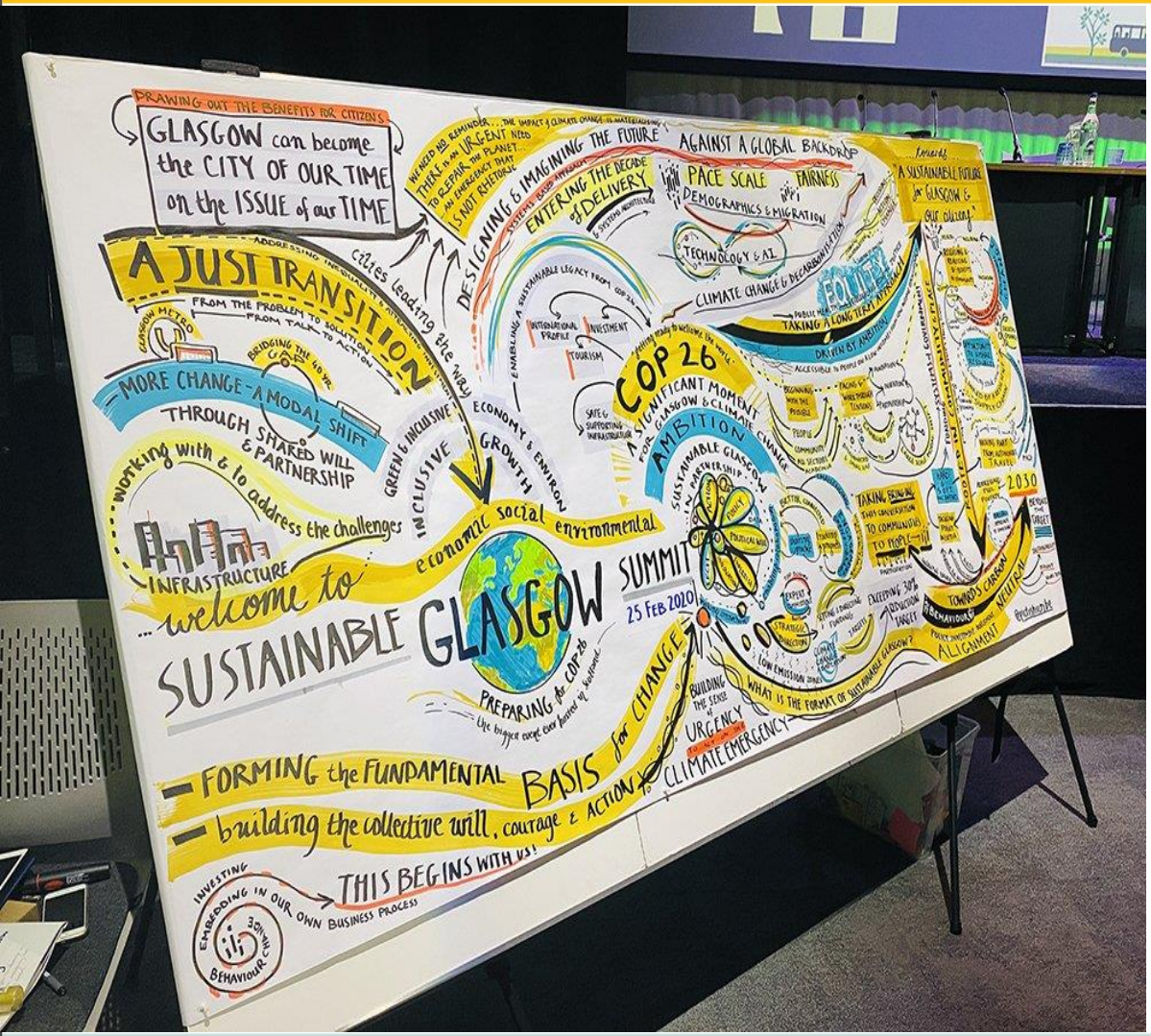
Net Zero Carbon by 2030

- GCC declared a state Climate and Ecological Emergency
- Recommended 60 actions across 5 thematic areas.
- Sustainability and social justice at the heart of its delivery.
- Recommendations translated in Glasgow's Climate Plan
- Delivery of a Net Zero action plan one of the core actions



2020 Relaunch of Sustainable Glasgow

- Sustainable Glasgow partnership reconfigured
- Focussed on the broader city agenda
- Four new thematic hubs created (under review)
  - Heating and Housing
  - Greening the City and Rewilding
  - Green Infrastructure and Transport
  - Green Economy & Private Sector
- Board and hubs meet monthly and progressing new action to support journey to NZC by 2030

Sustainable Glasgow

Net-Zero Carbon by 2030

Sustainable Glasgow Charter

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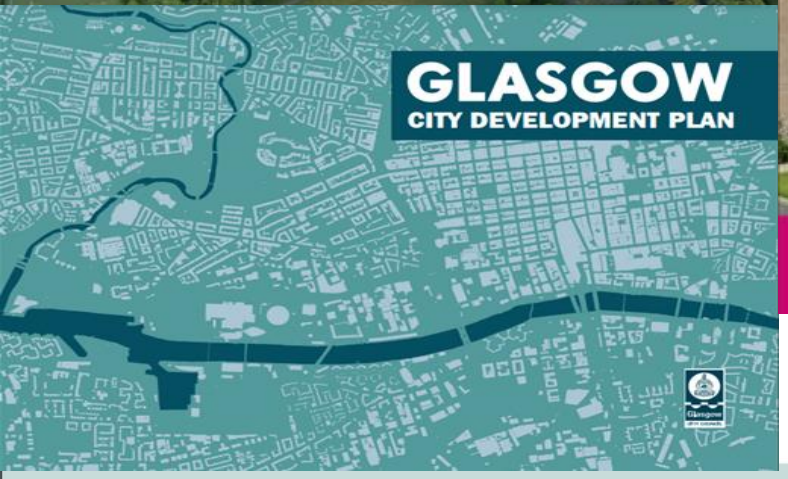
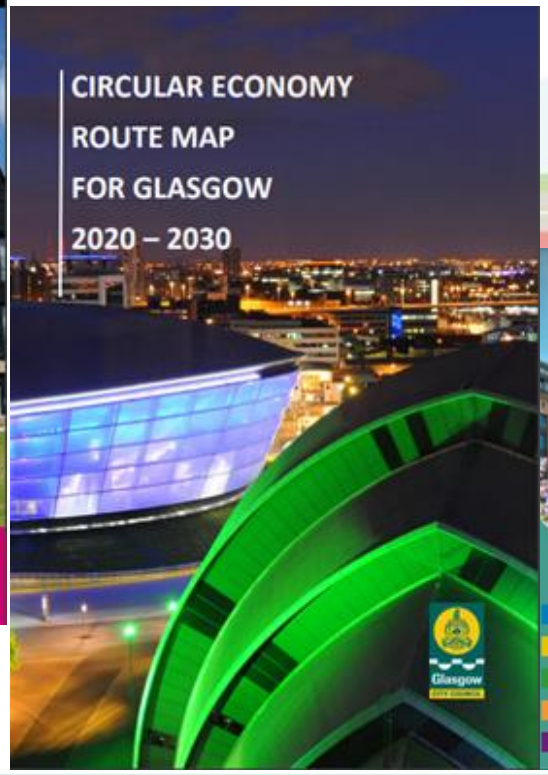
SUPPORTING PLANS AND POLICIES





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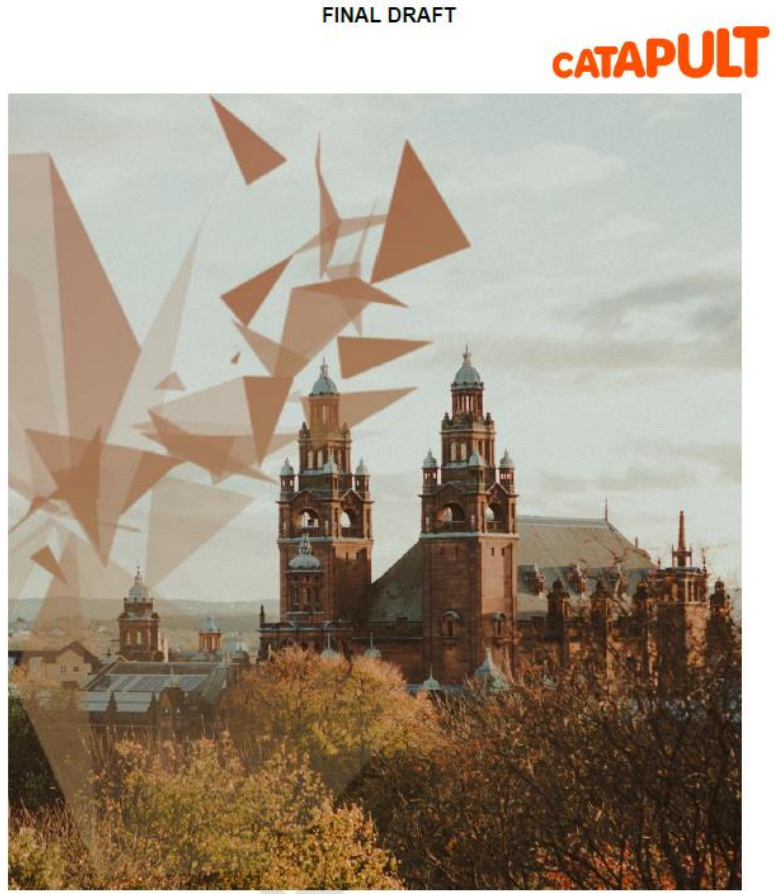
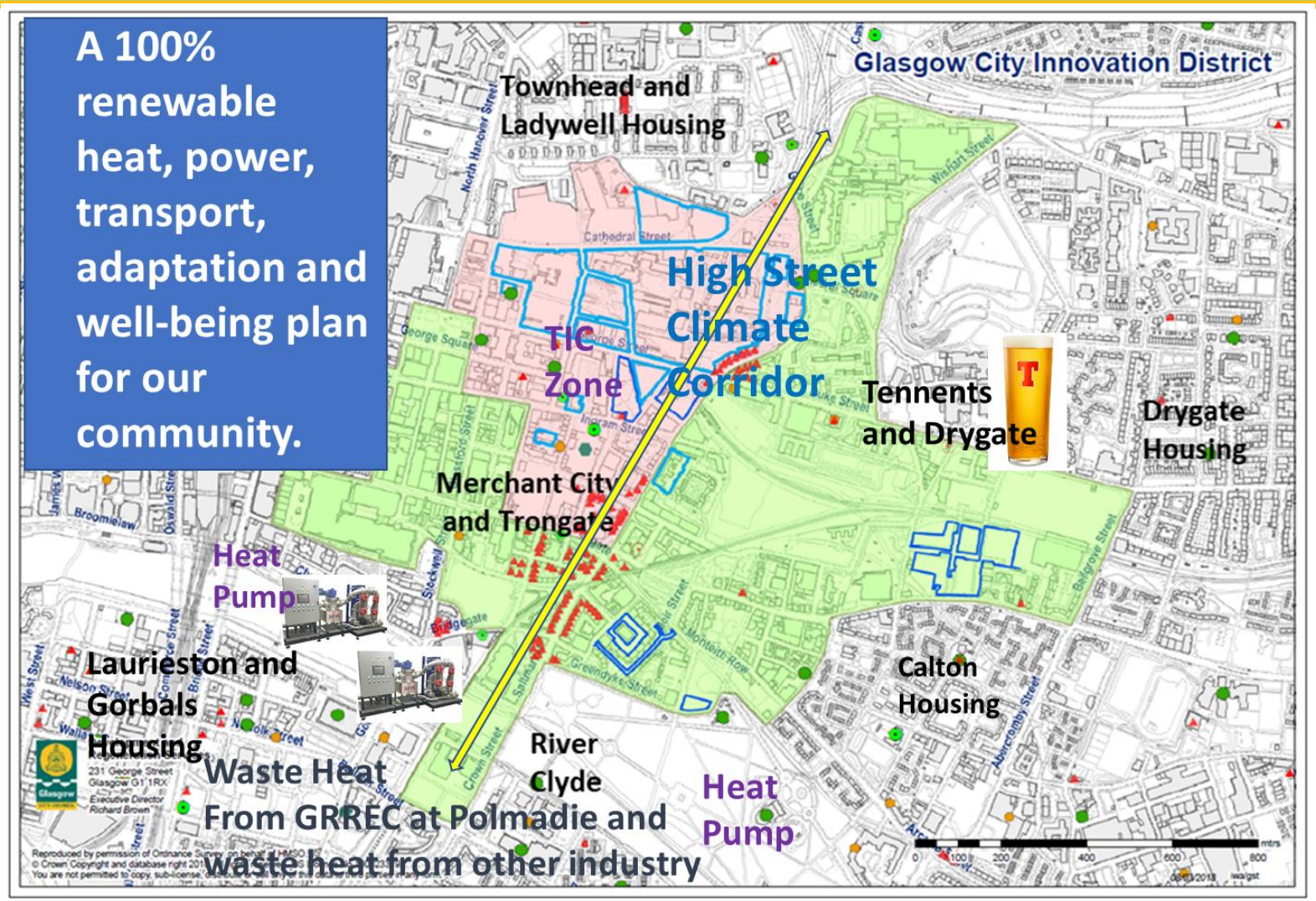
Moving Forward to NZC 2030

- Delivery of technical Net Zero Feasibility Study
- Deliver on Climate Plan & Green New Deal for Glasgow
- Finalise and Publish LHEES
- Growth in renewables and district heating
- Massive investment in retrofit
- Sustainable Glasgow & work with networks (CNCA, C40)
- Development of Climate Neutral Innovation District



A Climate Neutral Innovation District for Glasgow



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Neighbourhoods, Regeneration and Sustainability

Technical Design Team

- University of Strathclyde
- Glasgow City Council
- Atkins (Lead consultant)
- UK Energy Systems Catapult
- The Weegie Board
  - Star Renewable Energy
  - Comsof
  - Mini Bems
- Ikigai Capital
- Smarter Grid Solutions

Steering Group

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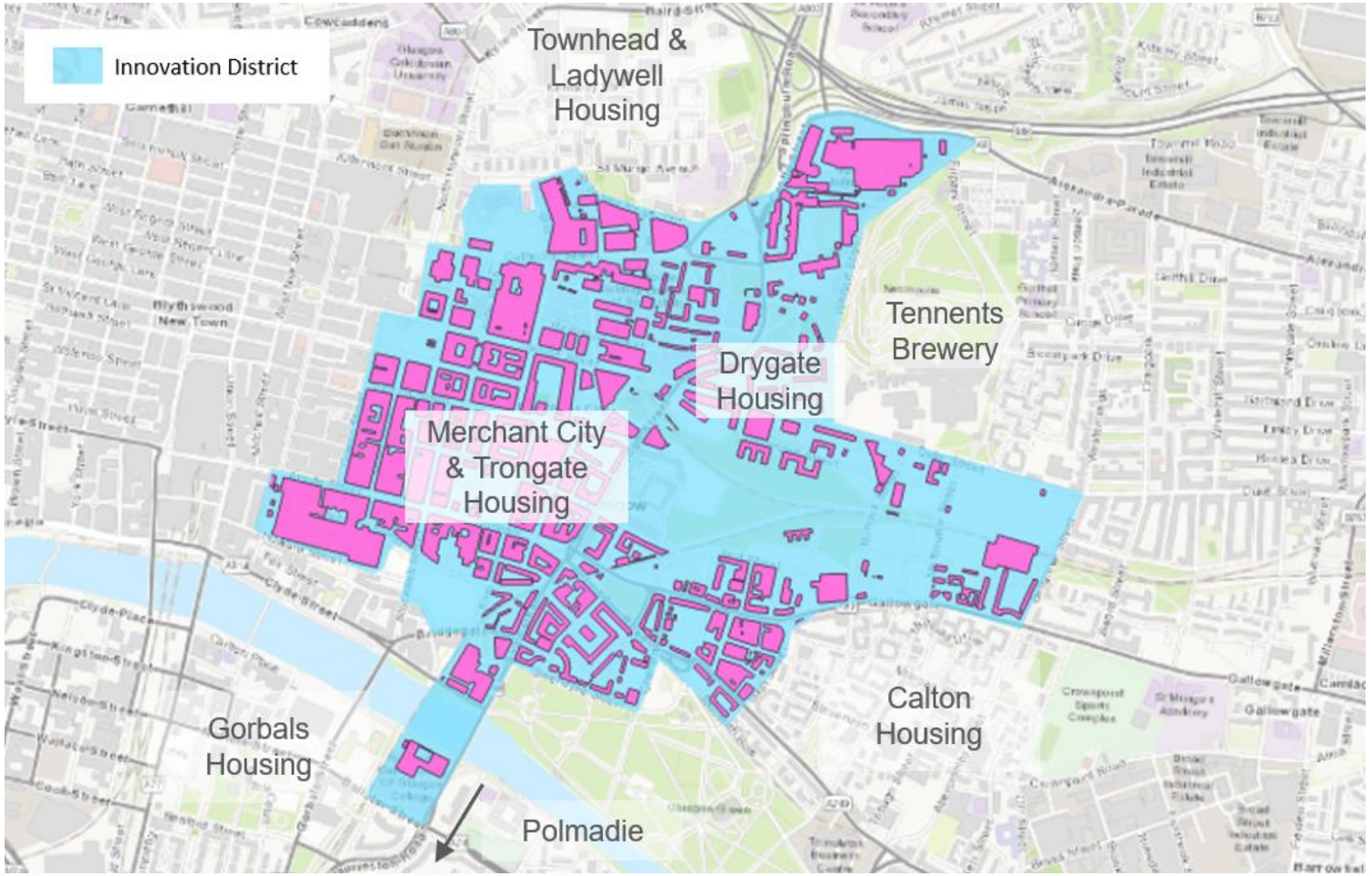
Climate Neutral District Vision

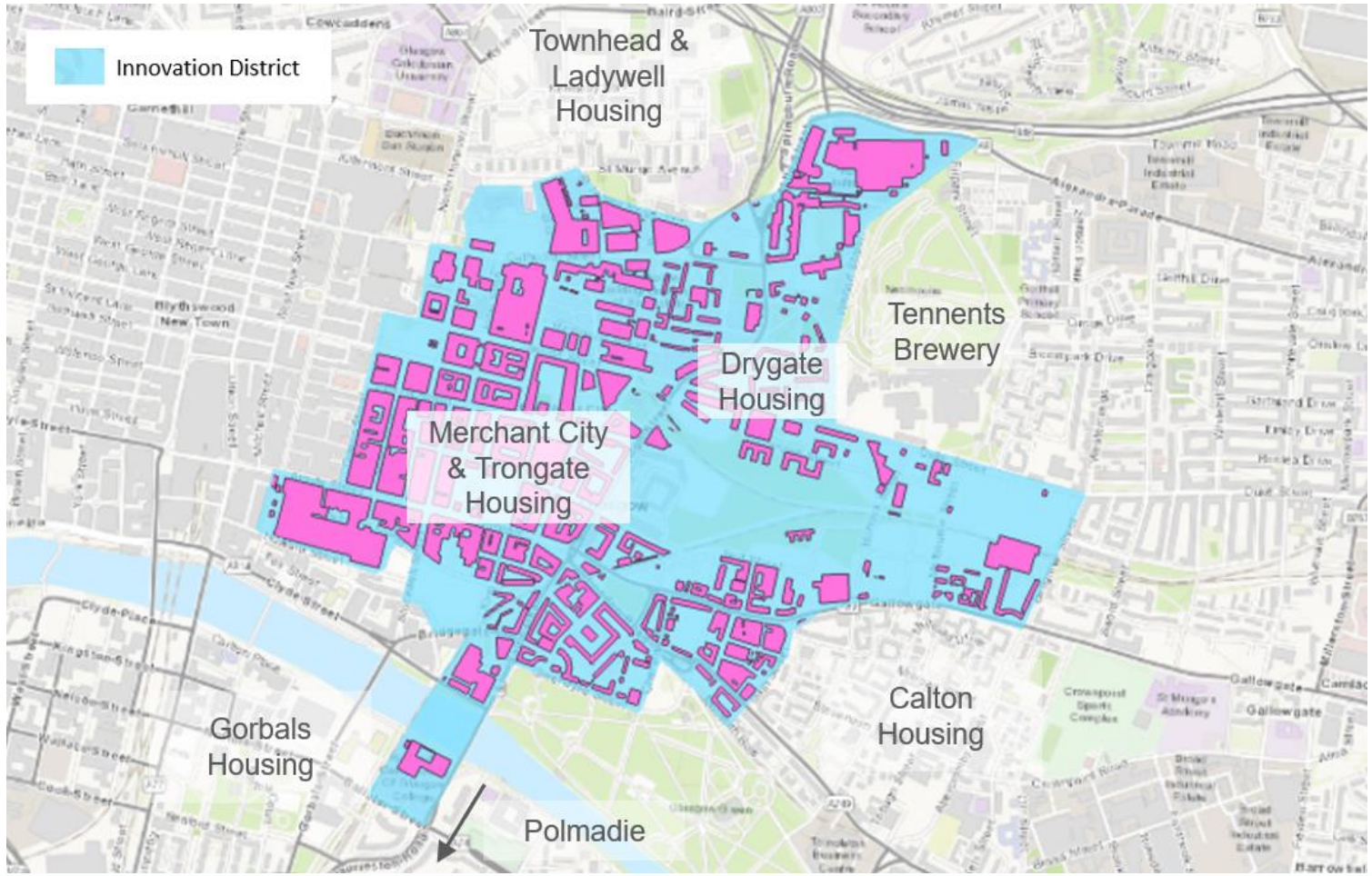
- To sustainably deploy built and natural environmental assets that respond to the Climate Emergency and our targets
- To develop energy, transport and green infrastructure that aligns with city and region plans e.g. active travel corridors; district energy; climate resilient interventions; nature based solutions
- To adopt a whole systems and place based approach
- To develop and signal a series of investible solutions that reduce emissions, create climate resilience, deploy skills and create jobs



- Distillery

Climate Neutral District Objectives

- Technical and financeable solutions to achieve energy carbon neutral operation;
- Targeting 100% renewable heat, power, transport and sustainable ‘places’ with well being a central theme;
- Adapted to the impact of assessed climate change for the city; and
- Socially inclusive.



- Distillery

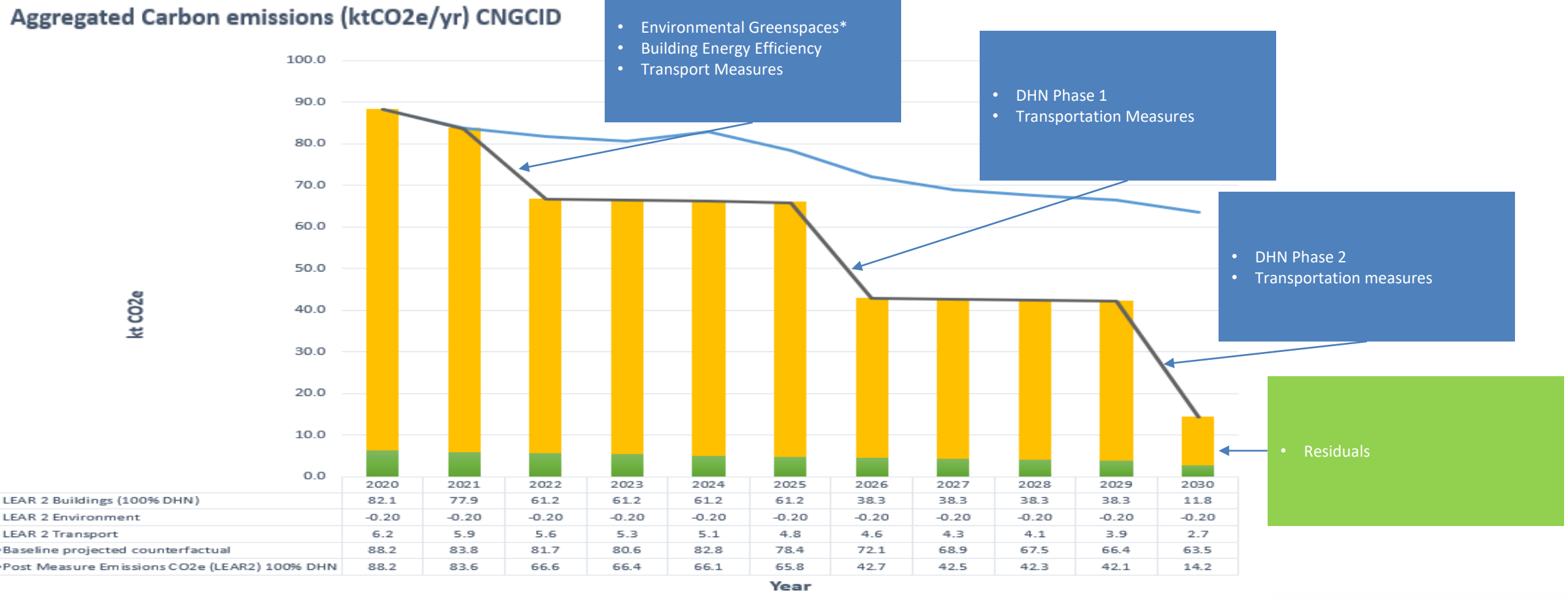
What we know….

- **93% reduction in heat, power, transport emissions is achievable**
- **We can reimagine and create a sustainable and resilient ‘place’ in the District.**
- **We can deploy solutions that respond to people’s needs and is socially inclusive.**
- **Vision is included in the city’s £30BN Greenprint Investment Prospectus (Nov 2021)**

Key Facts & Figures

- **73.9kt** CO_2e emissions reduction achievable (**84%** from current baseline)
- **£210m** for total cost of transition
- Approx. population of **17,000** permanent residents within district
- **35 km** of pipework needed
- Up to approximately **1,200 trees** to be planted
- **137,350 m²** of roof mounted PV potential within district
- River Clyde capable of providing more than **2,000 GWh** annually, **~8%** used in GCID
- **53 GWh** electricity required for the DHN annually

What this means – Emissions Reduction

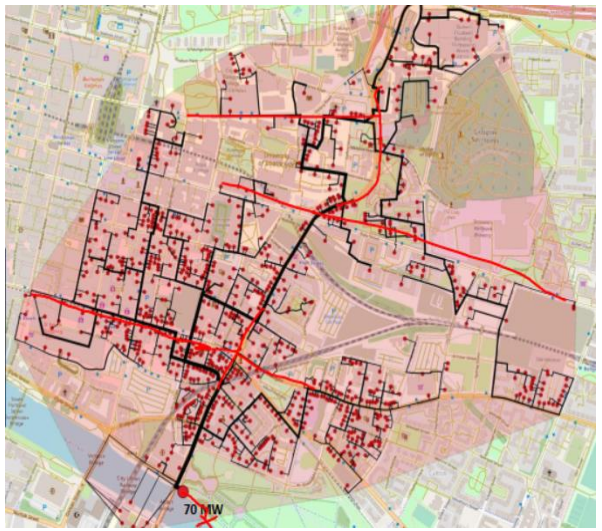


	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
LEAR 2 Buildings (100% DHN)	82.1	77.9	61.2	61.2	61.2	61.2	38.3	38.3	38.3	38.3	11.8
LEAR 2 Environment	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
LEAR 2 Transport	6.2	5.9	5.6	5.3	5.1	4.8	4.6	4.3	4.1	3.9	2.7
Baseline projected counterfactual	88.2	83.8	81.7	80.6	82.8	78.4	72.1	68.9	67.5	66.4	63.5
Post Measure Emissions CO2e (LEAR2) 100% DHN	88.2	83.6	66.6	66.4	66.1	65.8	42.7	42.5	42.3	42.1	14.2

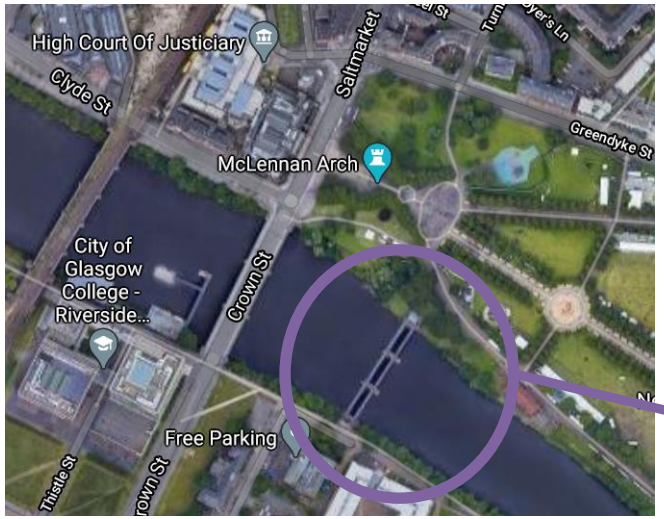
What this means - Energy (Buildings)

To get to -93% of the baseline 2020 emissions, a step change approach is required:

- A phased city wide DHN is credible and most effective
- Phase 1 equivalent to 50% of district's annual heating demand.
- Enabled by building energy efficiency measures – fabric upgrades
- Unique opportunity to utilise existing Avenues programme as a DH enabler.
- Further 9% reduction available through innovative grid management. (PV, VPP and BES)
- Stakeholders have to play their part in deep decarbonisation deployment



Heat Potential in the River Clyde



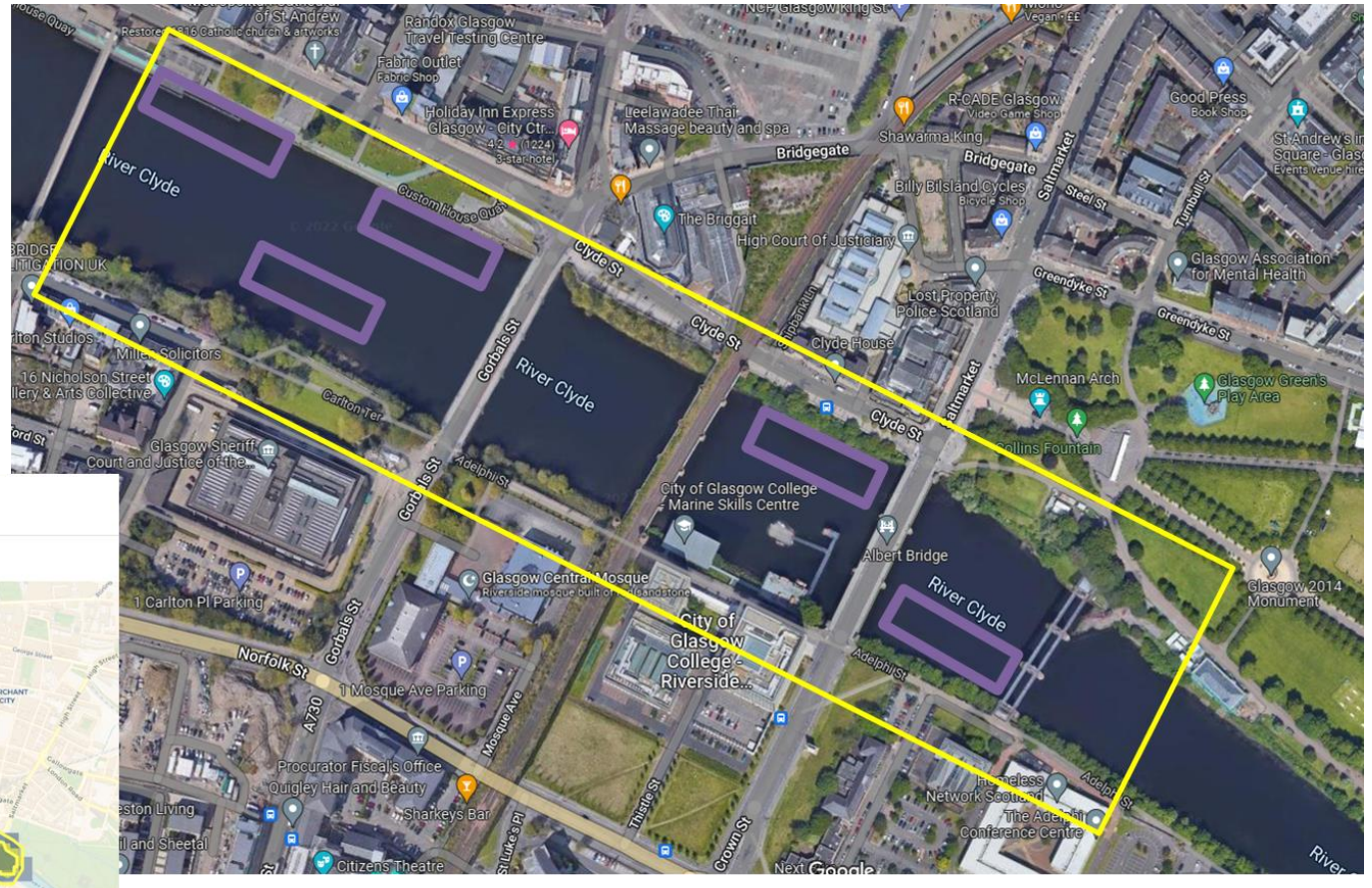
- 175km long
- 3,250km2 catchment
- 10m3/s flow rate over the weir (95%)
- 200MW potential at the weir and pipe bridge
- Heat discharges added from industry (circa 20MW)

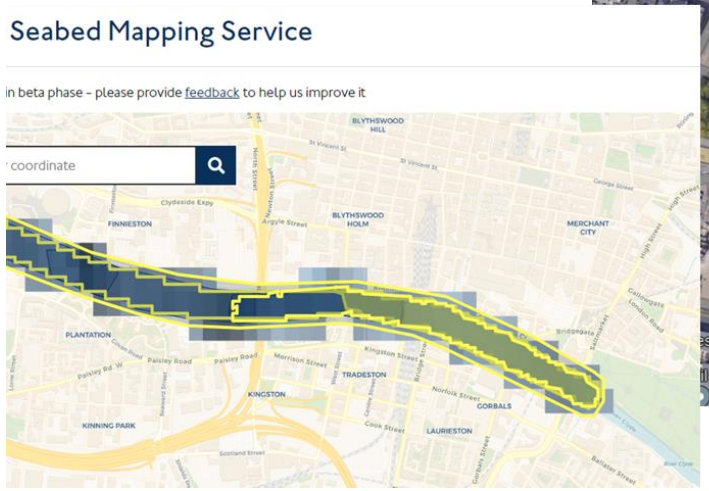
Scoping Exercise for River Clyde Heat Pump Infrastructure Now Underway

Heat pump zone

Potential locations

- Customs House Quay
- Clyde Street
- Floating/fixed barges
- South bank (using previous planning permission)

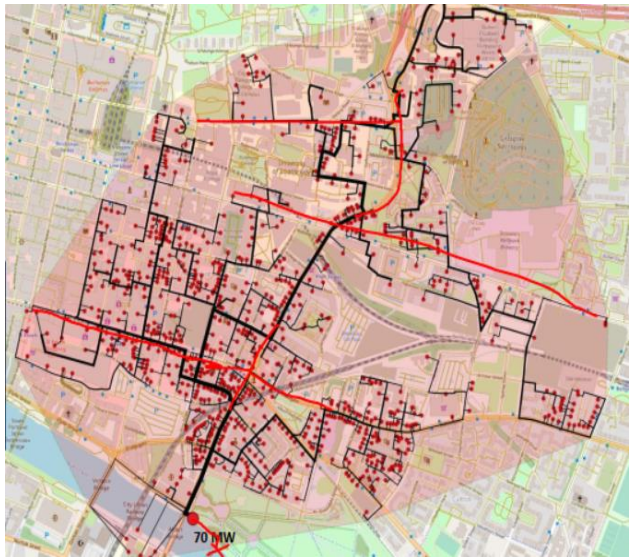




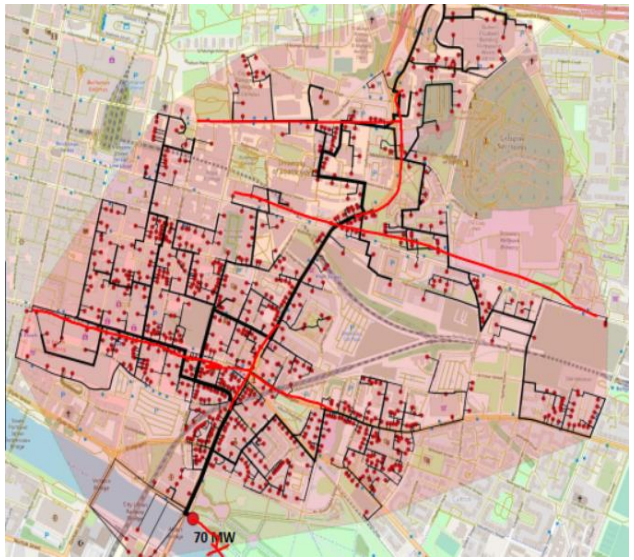
Transportation Key Findings

Transportation is the second major contributor. The approach to decarbonising transport must be implemented consistently across the city

- Avoid, Switch & Improve approach.
- Freight consolidation: Last mile delivery hubs including e-mobility and required infrastructure.
- Provide Urban Realm & priority for pedestrians and wheelers.
- Integration where possible with the Avenues programme is a key component to making the decarbonisation measures a success.



Environmental & Resilience Key Findings



There is strong potential for developing a highly effective urban environmental improvement programme for the district, based on a *climate corridors* concept centred on the multi-function, multi-benefit features of green infrastructure.

- The climate change related risk of increased flooding, both river and surface flooding, urgently needs to be addressed
- There is scope for enhancing the planned interventions with a more fully integrated sustainable outcomes led approach across all key sectors.
- Strong potential to increase vegetation cover with additional indirect benefits e.g. improved city image, tourism, and improved health and wellbeing.
- Integration with the Avenues programme is a key to enable delivery and to complimentary benefits.

Climate corridor vision (Example of High St. Transformation)

Ref – Visual courtesy of Gillespies Architects

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Reflections

- CNID represents a visionary and systemic approach to dealing with the climate emergency and net-zero carbon at a district level
- Closely linked to LHEES & wider net-zero study
- Depends heavily on Local Authority, may require a new legal entity
- Vision needs to link in closely with local and national policy
- Communication with local community crucial
- Project needs to be broken down in deliverables and delivery plans
- Project boundary needs to be reviewed
- Linkages with other developments, especially DH, needs to strengthened
- Phase 2 should be shaped by how the project lands at strategic level

Phase 2

- Integration of the CNID scope with city and region plans
- River Clyde and Associated DH Data, Design and Modelling
  Includes discussion about Avenues scope and inclusion of climate neutral objectives
  Customs House Quay Development Design Data and viability
- Confirm Energy Data for buildings; heat sources; heat and coolth demands
- Green Infrastructure – need to assess the potential for green roofs and green walls and parklets to add nature based systems into the street fabric of High Street and related streets. Transport and Travel Planning for the District (GTS, LEZ, DRFs, High Street Regeneration etc)
- Revisit Grid constraints; renewable energy cost; source and update these from Phase 1
- Funding and initiation of site specific surveys to determine the nature of services below ground to enable rapid transition and to develop understanding of ground conditions and minimise execution contract risk. Screening assessment work for planning related infrastructure such as energy infrastructure (energy/pumphouse centre(s), construction sites; pipeworks storage, survey works,
- Development of a detailed whole network decarbonisation plan aligned with Glasgow's Climate Plan. This will include detailed analysis of each stakeholder's building stock in order to inform how it will be made ready to transition to city wide district heating.
- Preparation of a long term stakeholder engagement plan including identification of potential anchor 'offtakers' and quantification of the scale and timing of firm demand. Preparation of a high-level financial model by the end of 22/23.
- Advice on construction procurement and contract negotiations with anchor offtakers and relevant landlords.

Thank You

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