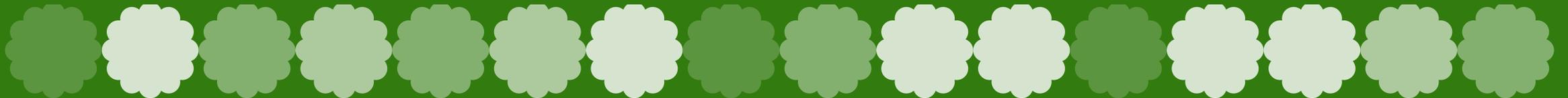


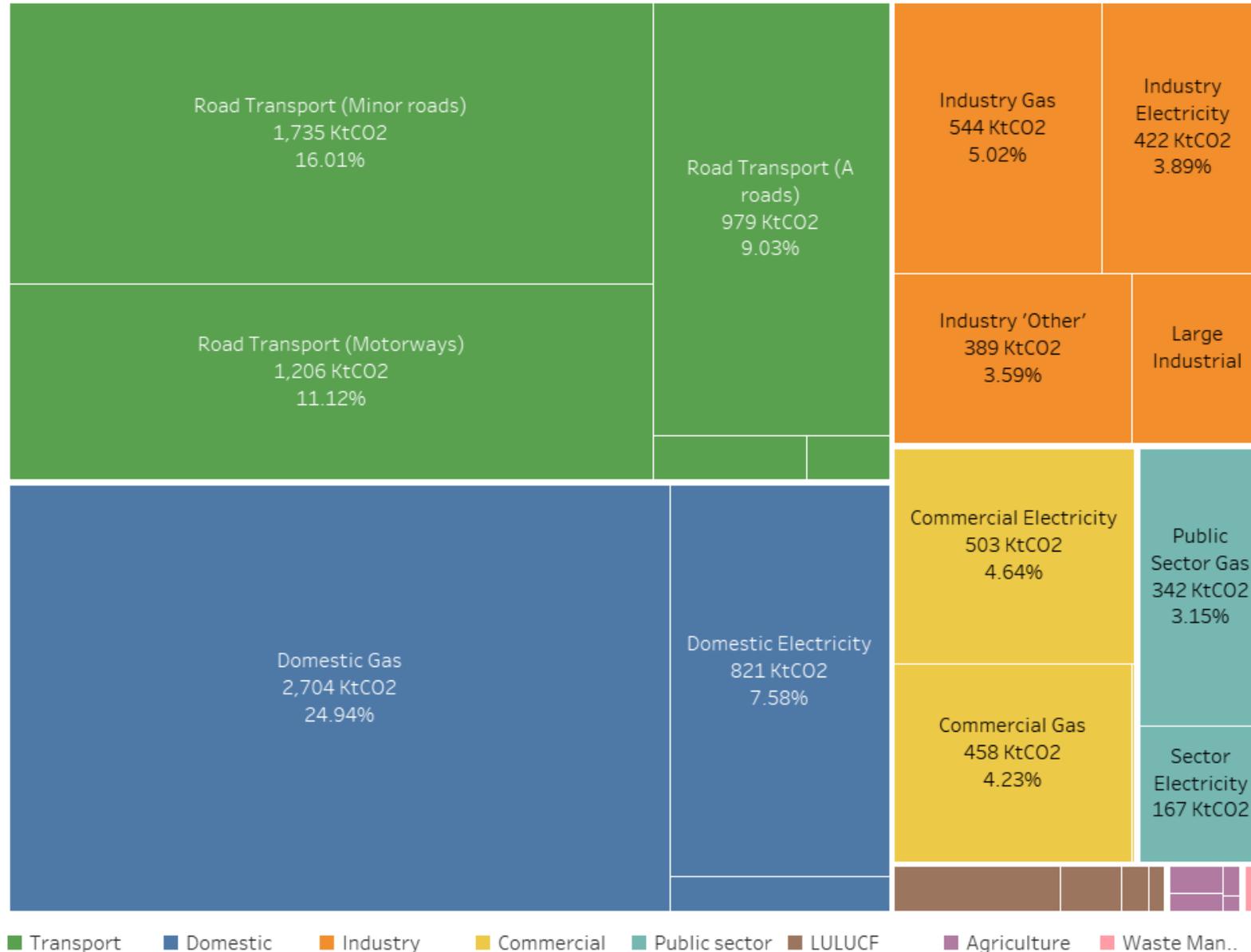
Delivering Net Zero - The Greater Manchester opportunity

Local Green Hydrogen Opportunity

Amer Gaffar, Director, Manchester Fuel Cell
Innovation Centre, Manchester Met University



The Mission: Carbon Neutral by 2038



- Transport and domestic gas remain our two largest sources of carbon emissions and the two areas where we are failing most significantly to make the progress we need.
- We need to transition away from the use of fossil fuels, towards zero emission solutions.
- This will require the region to electrify its heating and local transport and move heavy haulage and industry towards hydrogen
- To enable this the region will need to generate more renewable energy locally that can meet our increasing demands (including **green** hydrogen production)
- **A whole system approach needs to be adopted.**

Greater Manchester Green City Region

-  Innovate
-  Research Institutes
-  Low Carbon Buildings
-  Public Building Retrofit
-  Low Carbon Transport
-  Low Carbon Energy Generation
-  Growth Areas
-  Natural Capital Green Space
-  Peatland Restoration



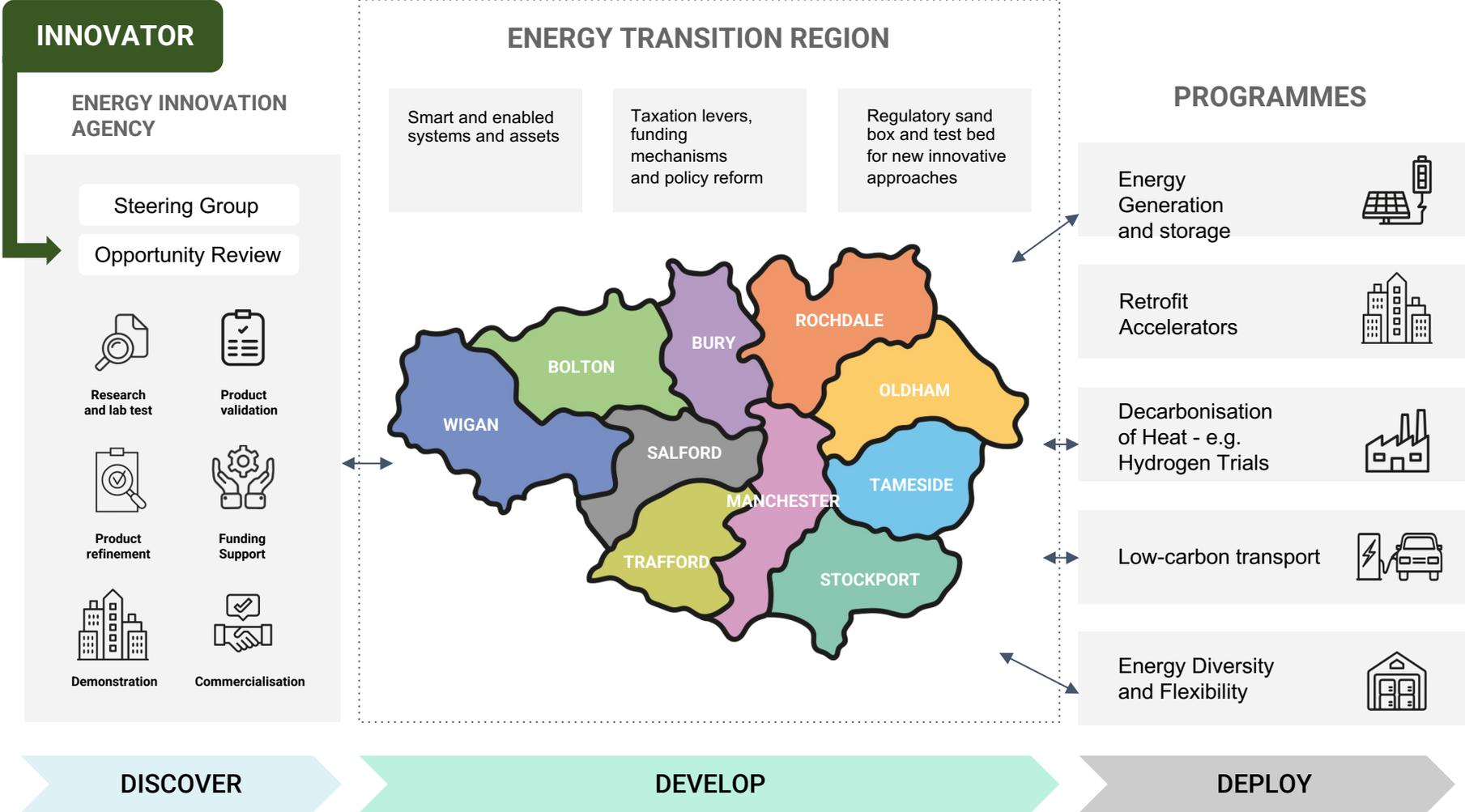
← HyNet North West

Energy Innovation Agency

Utilising Greater Manchester as an innovation test bed

-  University of Salford
-  University of Manchester
-  Manchester Metropolitan University
-  GMCA Greater Manchester Combined Authority
-  HITACHI Inspire the Next
-  bruntwood
-  SSE Energy Solutions

Energy Innovation Agency

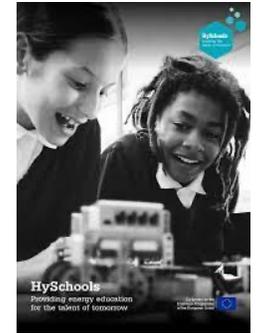
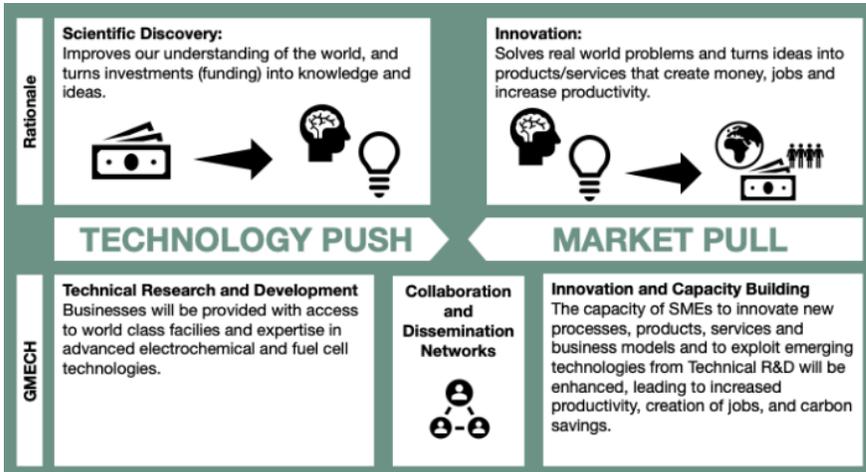


Manchester
**Fuel Cell
Innovation**
Centre

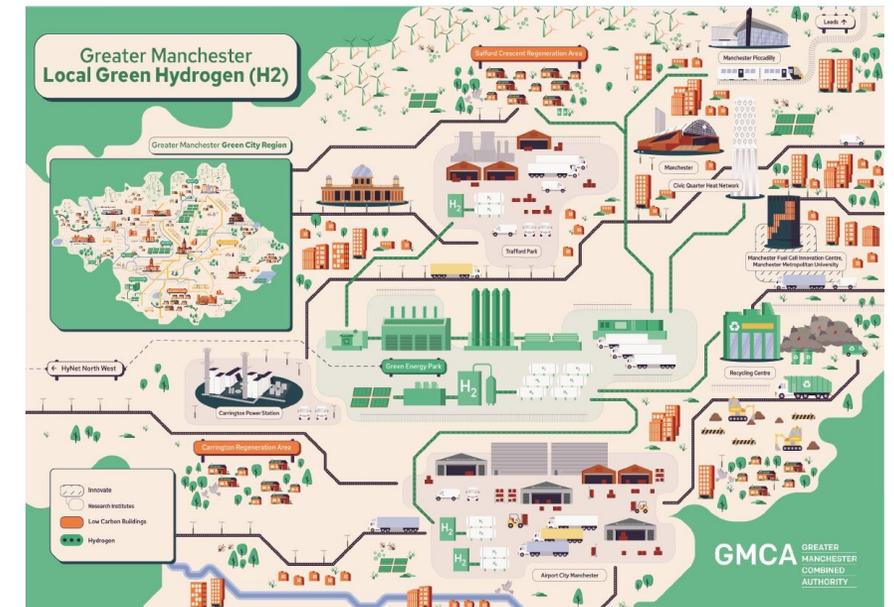
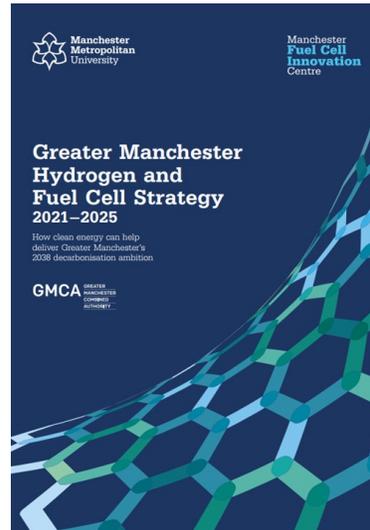


- A world class, £4.1m facility with world-leading academics
 - Advancing electrochemical (**Green**) hydrogen technologies
 - Leading the development of a new Hydrogen Open Innovation Programme to accelerate supply chains
 - Helping industrial partners to test their new technologies
 - We are supporting over 100 SMEs and many industrial partners working in the hydrogen value chain
- Developing novel and economically impactful catalysts components for green hydrogen technologies (fuel cell, electrolyser)
 - Developing novel materials and coatings that can replace and reduce expensive iridium and platinum components
 - Developing advanced coatings to improve the performance of fuel cell and electrolyser components including end plates, current collectors, bipolar plates and porous transport layers.
 - These processes used widely used in industry, meaning technological developments will be readily transferable to large scale manufacturing.

Hydrogen Open Innovation Programme



- Collaborations between businesses investing in R&D and those looking to collaborate with academic, industry and policy strengths of the region
- Creation of an accessible, sustainable Electrochemical (green) hydrogen cluster, centered in region with UK-wide partner expertise
- Leading to the development of new Fuel cell and Electrolyser projects
- Supporting business case for Greater Manchester Green H2 investment
- Leading to further R&D investment within the region.
- Greater Manchester becomes part of an overall national hydrogen programme
- Focus on electrochemical hydrogen technologies



Skills for Net Zero

4 headline objectives:

- **Net Zero literacy** – Giving the workforce an understanding of the role of Net Zero within the business
- **New and emerging** jobs that relate directly to the transition to net zero
- Jobs affected by the **transition to net zero** that will need enhanced skills or competencies
- **Existing jobs** that will be needed in greater numbers as the result of the transition to net zero

Industry	Education	Implement
1	2	3
<small>Phase 1</small>	<small>Phase 2</small>	<small>Phase 3</small>



Knowledge



Soft Skills



- **For the private sector**, engagement with the hydrogen programme at Manchester Met can bring:
 - Access to R&D facilities and expertise within the academic partnership of the programme led by Manchester Met
 - Access to new customers across markets – industrial, commercial, transport, heat
 - Access to skills, know-how and market intelligence
- **For UK local and national government** support for electrochemical hydrogen technologies in Manchester is:
 - Underpinning delivery of city, regional, and national climate targets
 - Attract inward investment and catalyse export opportunities
 - Expand the supply chain, economic growth and creation of new jobs and specialisms
 - Accelerate skills development and capacity building, research and innovation
- **For international collaboration**, collaborating on the green hydrogen vision in Manchester can:
 - Increase exports and attract inward investment
 - Provide a testing ground for new technologies and business models
 - Lead to reciprocal Manchester/UK support for domestic hydrogen projects
 - Create practical and political connections to wider networks and opportunities elsewhere

