## MANCHESTER AND THE SIXTH WAVE

## GREATER MANCHESTER'S CHALLENGE

From the first days of the Industrial Revolution, the towns and cities of Greater Manchester have played a critical part in five distinct waves of global innovation. Each of these waves featured disruptive new technologies that transformed the way we live and the way we do business. Our challenge now is to take our place at the crest of the sixth wave: an age where resource efficiency, sustainable technologies, zero waste and the race to curb carbon emissions will be the true driving forces of commerce and enterprise.

## SIXTH WAVE VALUE

Disruptive, innovative solutions that make better use of natural resources and offer a cleaner or less wasteful alternative are often referred to as 'cleantech'. The current global market for cleantech products and services is about £177 billion, growing to over £800 billion in 2017. Of this amount more than one-third (£290 billion) is attributable to renewable energy sources, such as biofuels, solar, tidal, and wind power. Together these segments are expected to grow from a current value of £64 billion to approximately £290 billion in 2017. The cleantech market is the third largest venture-capital investment category, behind only biotech and software.

## GREATER MANCHESTER CLEANTECH

Greater Manchester's cleantech sector in 2009 was judged to be worth £4.2 billion across 1,900 companies and employing 34,000 people. It also showed strong annual growth of 4.3%.

HE SIX WAVES	1ST WAVE	2ND WAVE	3RD WAVE	4TH WAVE	5TH WAVE	6TH WAVE		
	Iron	Steam	Electricity	Petrochemicals	Digital networks	Sustainability		
	Water power	Railroad	Chemicals	Electronics	Biotechnology	Radical resource productivity		
	Mechanisation	Steel	Internal combustion engine	Aviation	Software	Whole system design		
	Textiles	Cotton		Space	Information technology	Biomimicry		
	Commerce					Green chemistry		
						Renewables Green nanotech		
						Future Internet		
	<b>O</b>					6		
CHESTER INNOVATIONS  '33 John Kay invents the 'flying shuttle' for weaving					1 Manchester-led Spinnaker project aims to model			
1783 Arkw	right builds the first steam driven	textile mill	1		201	1 Manchester researchers develop solar nanotech	at Photon Science Institute	
				1951 Kilburn and Williams deve	lop the the Ferranti Mark 1 Comp	puter		
'	1803 John Dalton unveils his atomic theory		•	2008 Professor Brian Cox joins team searching for the 'God Particle' at CERN				
	·		i i	1957 The Lovell telescope at	Iodrell Bank identifies maiden fli	ight of Sputnik, the space race is launched		
	I		i i				_ 1.t d	
			1	'		graduate course in Computer Science, the first of it		
	1830 First ever pass	enger steam railway, betwee	n Manchester and Liverpool	1984	Manchester's Ocean Software la	aunches, to become one of the world's biggest gam	es software companies	
			1903 Henry Royce builds	first Rolls Royce automobile	2005 Europe's larges	t vertical solar array, on Manchester's CIS Tower, is	switched on for the first time	
·	1838	Cobden and others begin mo	ves towards free trade		1990 Poptel launches the worl	d's first digital co-operative in Manchester		
ļ.			1908 The first British plane is de	esigned and flown by A V Roe	1998 TeleCity open	in Manchester and goes on to become one of Eur	one's leading network of data centr	
	1044	'h a Dagh dala Dianaara laungh					spe s reading network or data certific	
l	1844	ne kochdale Ploneers launch	the world's first successful co-operative,		· ·	2 Green digital charter for Manchester		
	!	1	1919 Ernest Rutherford di	scovers how to split the atom at	Manchester University			
'		1	894 Opening of the Manchester Ship Car	nal	1997 Manchester Networ	k Access Point, Britains second internet hub, was fo	unded	
			·		2004 Graphen	e discovered at the University of Manchester		
					·			