

# Smart Cities

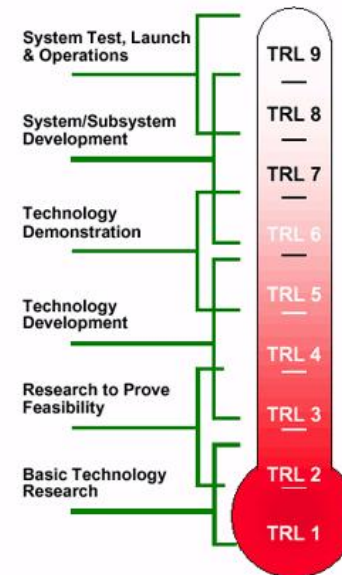
Keith McCabe

# KAM Futures

## Collaborative research

- ▶ BT
- ▶ Cardiff University
- ▶ CH2MHill
- ▶ Cenex
- ▶ Imtech
- ▶ InfoHub
- ▶ Manchester Science Partnerships
- ▶ Moixa
- ▶ Potenza
- ▶ Transport for Greater Manchester
- ▶ University of Warwick
- ▶ University of Huddersfield

## Technology readiness levels



Source - NASA technology readiness levels

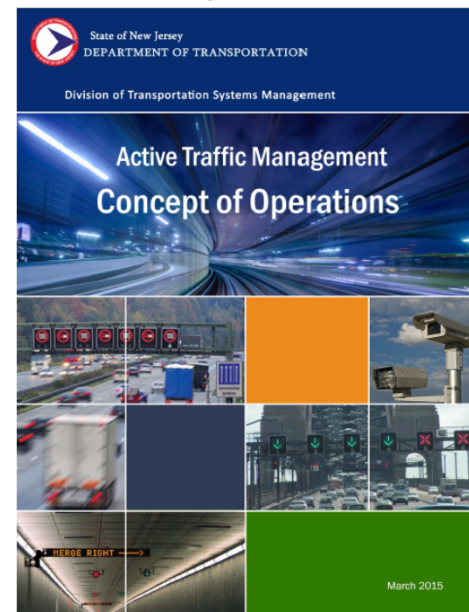


# Background

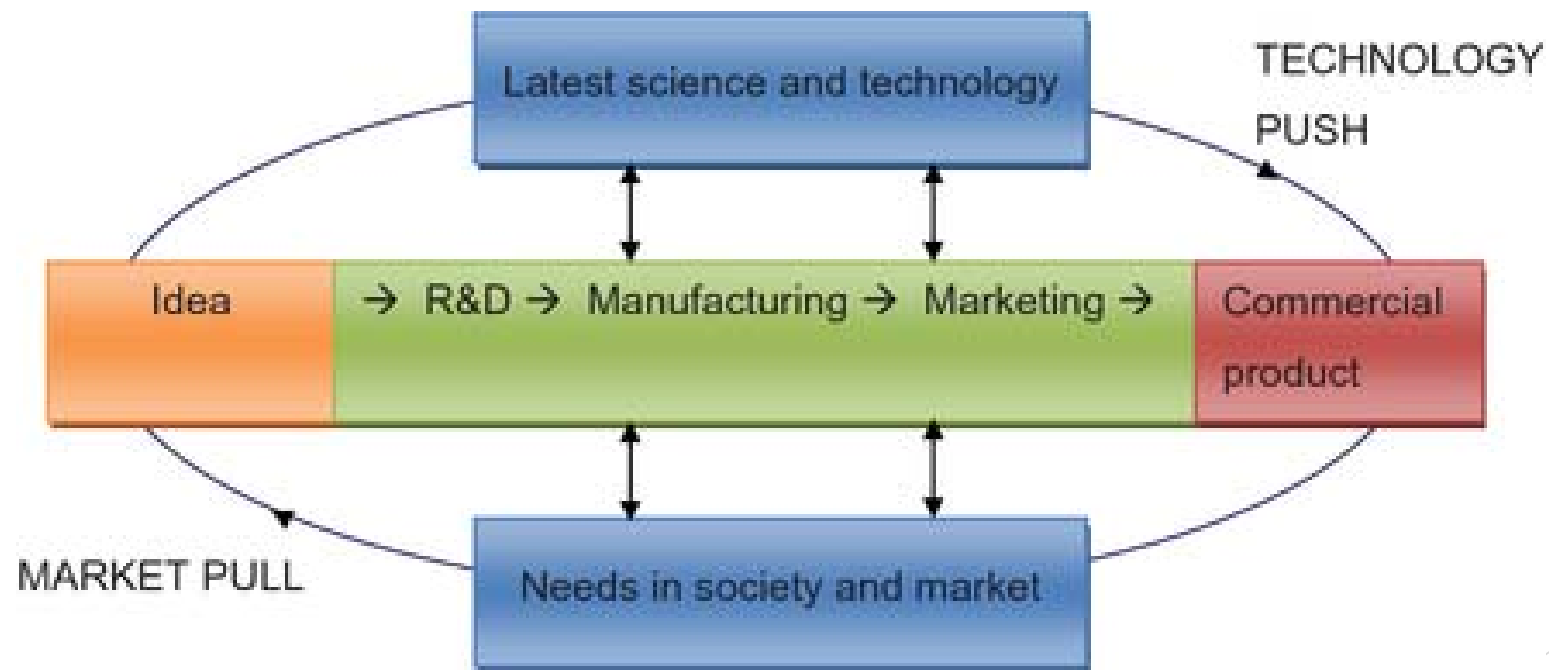
## Industry and professional bodies

- ▶ IET automotive and road transport committee
- ▶ Manchester IET transport technical group
- ▶ ITS UK smart environment interest group
- ▶ Autonomic road transport systems
- ▶ US TRB RTSMO committee

## Market facing



# Innovation

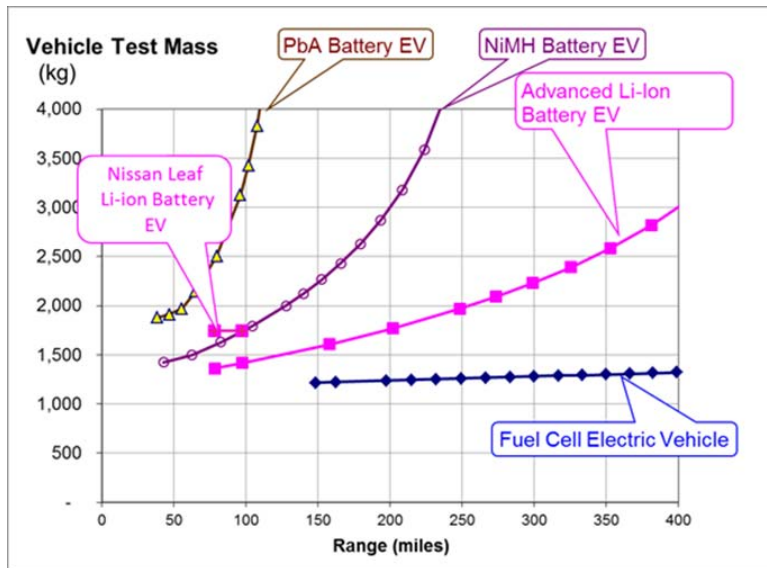


Source: (adapted) Trott (2005): Innovation Management and New Product Development.  
page 25

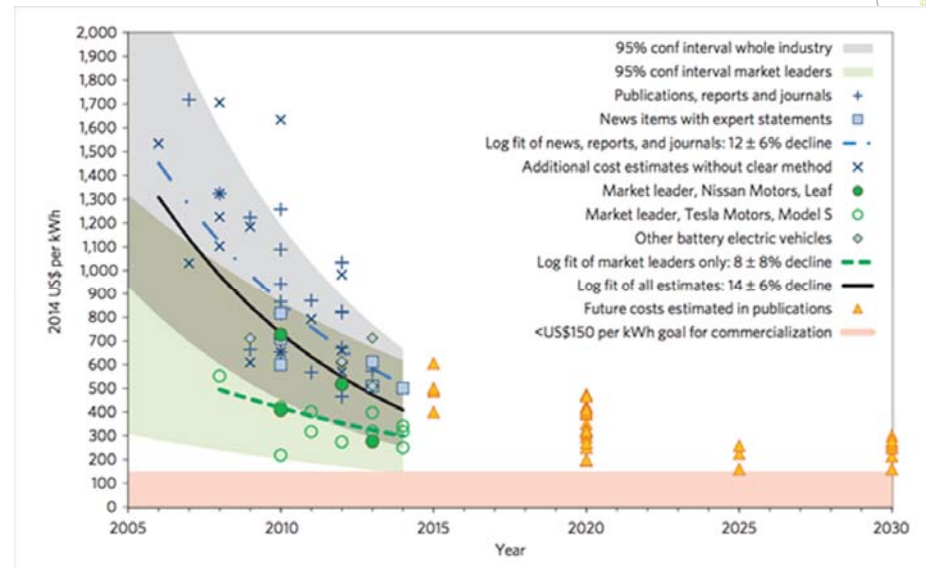


# Electrification of transport

## Technology

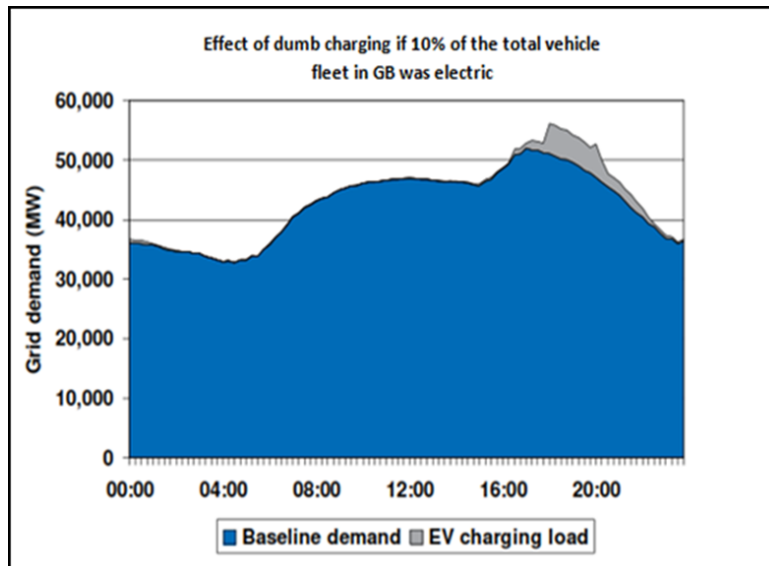


## Costs

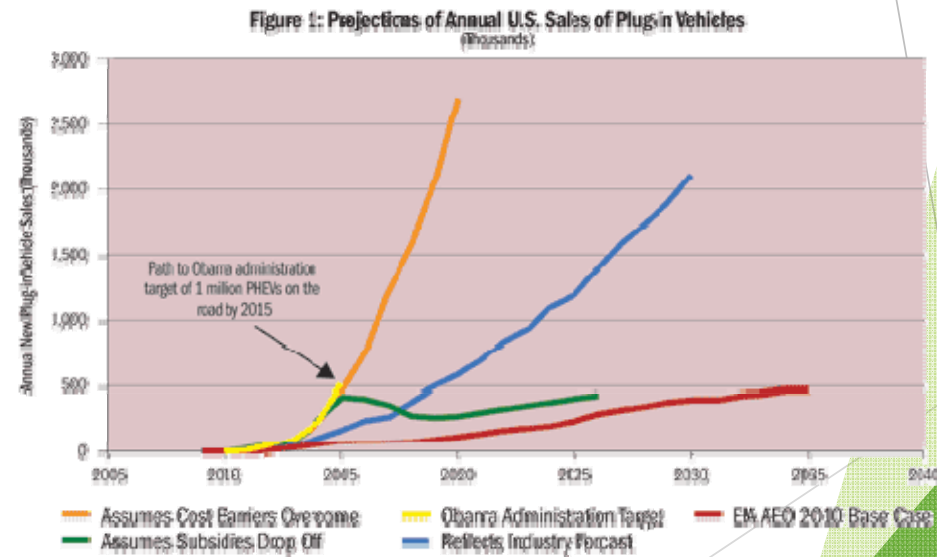


# Energy grid

## National load



## Sales predictions



<http://www.elp.com/articles/print/volume-89/issue-1/sections/the-reality-of-electric-vehicles-and-the-grid.html>

# EFES Project Partners



## Partners



## Sub-Contractors



## Demonstration Sites



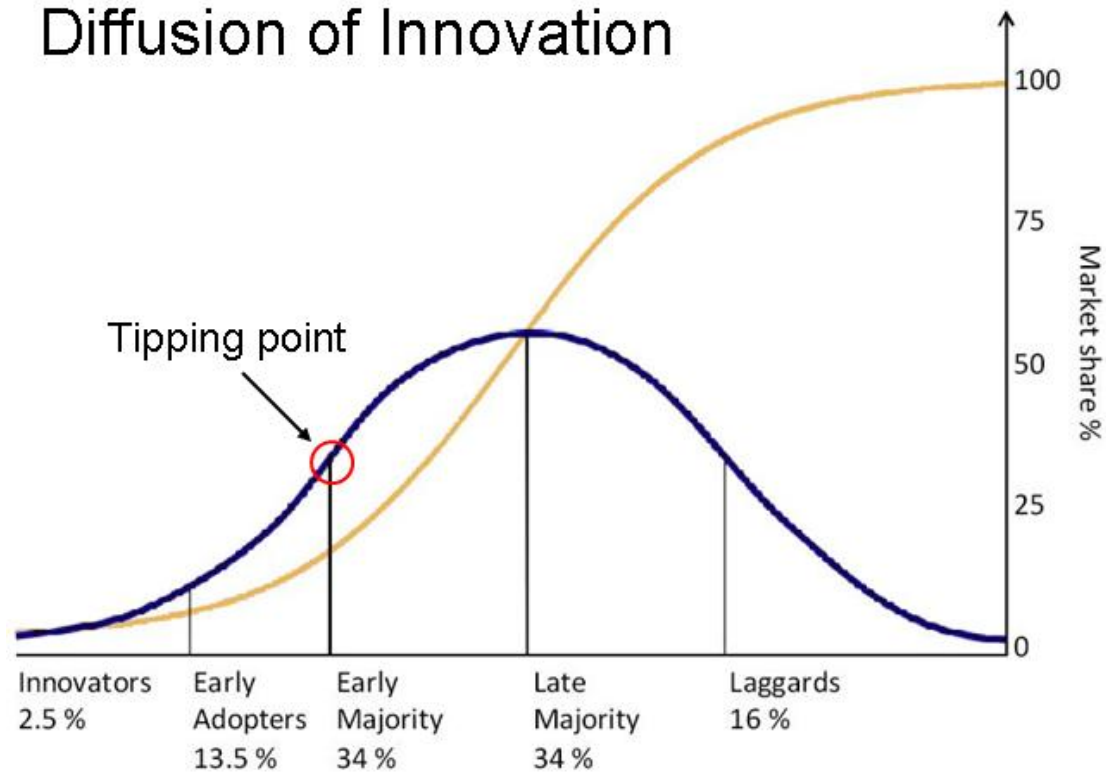
## Advisory Board





# Innovation

## Diffusion of Innovation



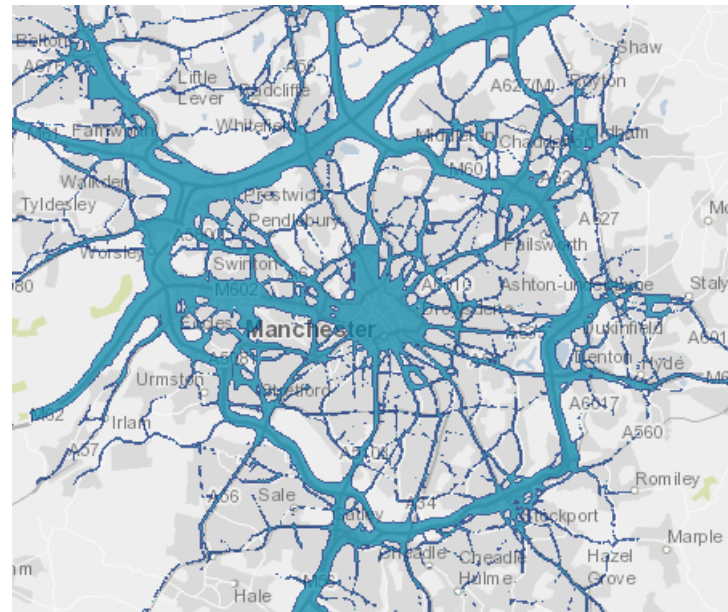


# Air quality

## Low emissions



## Localised issues



"Paris Autolib 06 2012 Bluecar 2905" by Mariordo (Mario Roberto Durán Ortiz) - Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons - [https://commons.wikimedia.org/wiki/File:Paris\\_Autolib\\_06\\_2012\\_Bluecar\\_2905.JPG#/media/File:Paris\\_Autolib\\_06\\_2012\\_Bluecar\\_2905.JPG](https://commons.wikimedia.org/wiki/File:Paris_Autolib_06_2012_Bluecar_2905.JPG#/media/File:Paris_Autolib_06_2012_Bluecar_2905.JPG)

# Air quality

## SimplifAI

- ▶ University of Huddersfield
- ▶ InfoHub
- ▶ BT
- ▶ TfGM

## Equalise

- ▶ University of Huddersfield
- ▶ Imtech
- ▶ TfGM
- ▶ Zagreb
- ▶ Bucharest
- ▶ Dublin

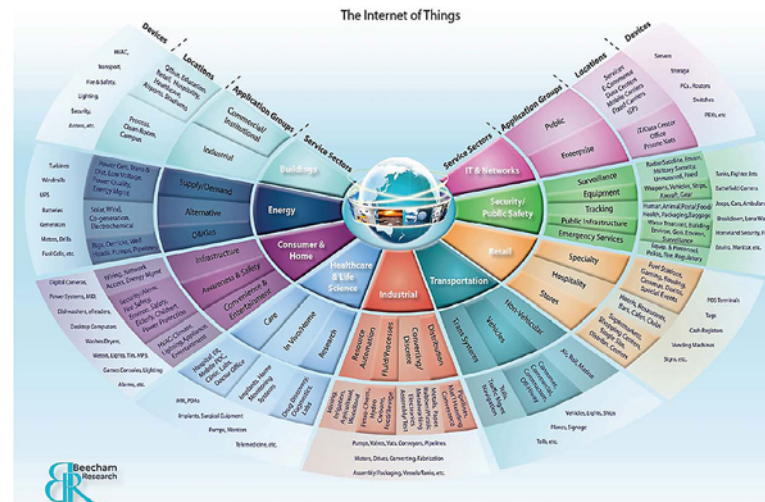


# Data

# People



# Things



<http://firstmonday.org/ojs/index.php/fm/article/view/4366/3654>

<http://www.wfs.org/blogs/thomas-frey/empowering-%E2%80%9Cthings%E2%80%9D-for-our-internet-things>



# Things that move

## Connected vehicles



## Autonomous vehicles



# Stopping

## Typical Stopping Distances



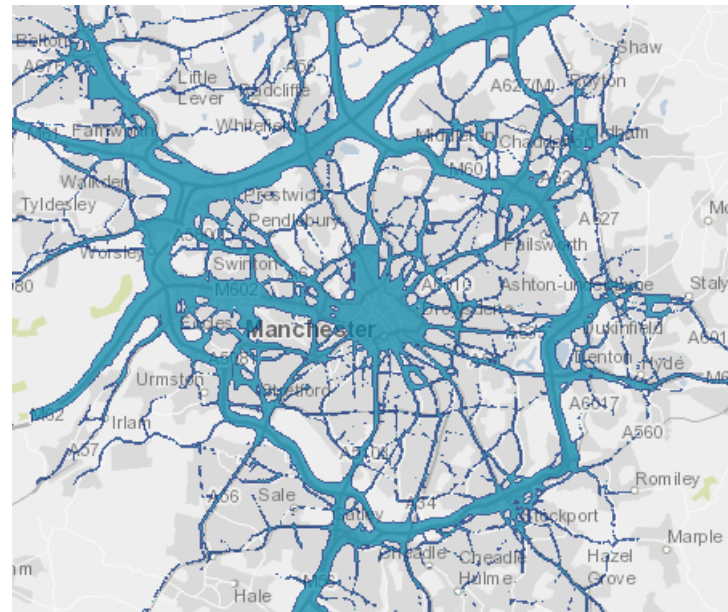


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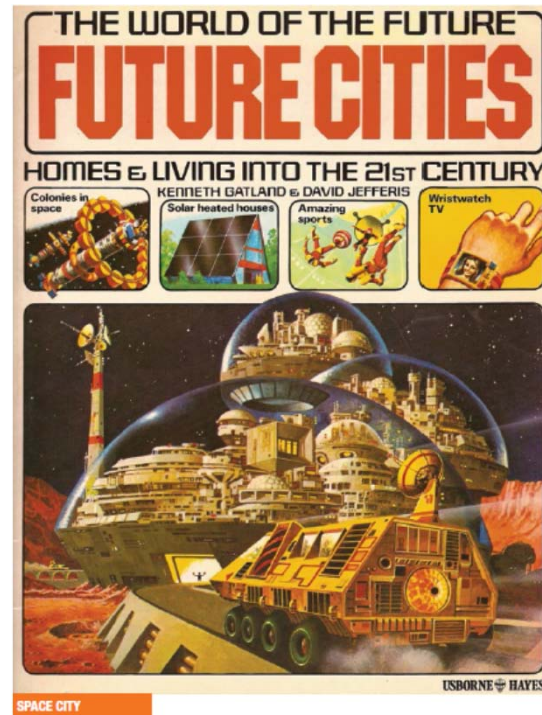


# Intelligent infrastructure

**Figure 1: The axes of uncertainty and the four scenarios defined by combinations of those axes**



# Technology change





# Collaborations

- ▶ Autonomic Road Transport Support Systems
- ▶ Western European dissemination event - Manchester 9<sup>th</sup> September 2015
- ▶ Final conference 6-7<sup>th</sup> October 2015 Bordeaux to coincide with ITS World congress





# Final thoughts

- ▶ Social pulls for change
- ▶ Technological pulls driving change
- ▶ Collaborative cross sector approaches
- ▶ Skills and leadership
- ▶ Public engagement





Keith McCabe

[Keith.mccabe@kamfutures.co.uk](mailto:Keith.mccabe@kamfutures.co.uk)