# Sustainable Developments?

## An energy assessment of new housing developments in the UK

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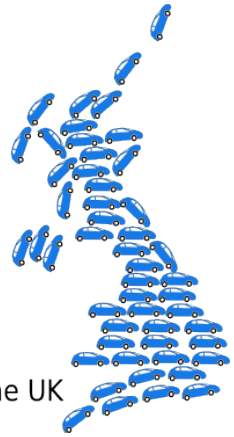
UWE Bristol University of the West of England

# MOT

Motoring and Vehicle Ownership Trends in the UK



http://MOTproject.net

Department for Transport

Department of Energy & Climate Change

UNIVERSITY OF LEEDS

UWE Bristol University of the West of England

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TRL

UCL

## UK Centre for Research on Energy Demand

£19.5million
40 academics at
13 institutions
across the UK

# EXCESS

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# UK Apparently has a ‘Housing Crisis’


Motoring and Vehicle Ownership Trends in the UK

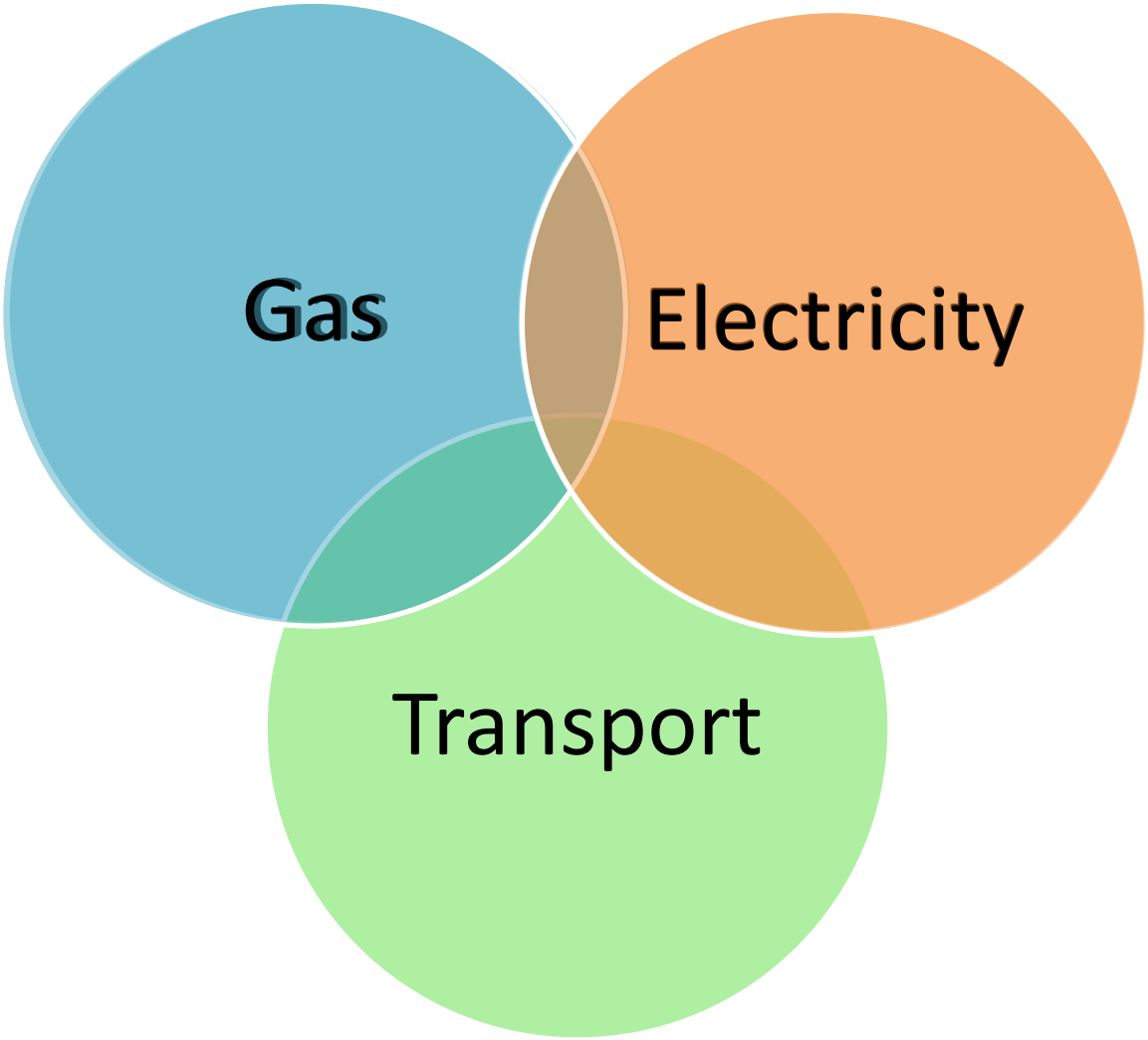
# The size of the problem

- In 2004 the Barker Review calculated the UK needs to build 250,000 new homes every year.
- Since 2014 it has risen to 300,000 new homes/year.
- ~120,000 new homes are being delivered annually <50% of the desired target.
- Each year we fail to deliver the required number of new homes, there is an even greater shortfall of homes required in order to keep up with growing demand, and hence a housing crisis results.
- **~ 5.3 million new homes needed by 2040**

# Is that the crisis?

- 27 million households in UK
- 80% of the homes we live in today will still be in use by 2050 ➔ retrofit a big challenge
- But new homes are still important...especially if we are going to building lots of them.
- UK Government were previously committed to introducing “zero-carbon” new homes from 2016
- This ambition was abandoned in 2015 despite being widely supported by industry and the third sector.
- **But is the housing itself even the problem?**

# What makes a development sustainable (in energy terms)?



# Raised 10-years ago about ‘Eco-Towns’

## Transport in the eco-towns: Government must think again

**24 April 2009**

As the consultation deadline nears on the framework for the Government’s controversial eco-towns [1], the proposal has come under further criticism from Campaign for Better Transport and a group of other leading environmental NGOs. Far from being a plan for eco-towns, as it stands the Government’s draft planning policy statement (PPS) will merely encourage car-dependent development.

Campaign for Better Transport

“The Government needs to rethink its eco-town ideas at least as far as transport is concerned. Otherwise **the eco-towns will simply be high-powered engines of traffic growth in the middle of the countryside** and the eco-town label will be a poor joke”

https://www.bettertransport.org.uk/media/apr09-eco-towns-consultation

# So…. Are new developments 'sustainable?

## Methods:

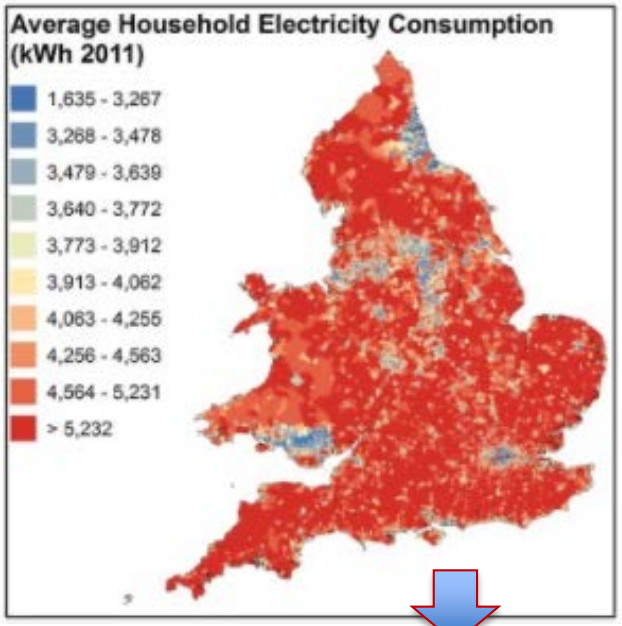
- Annual data from **24.5 million electricity meters** and **21 million gas meters**, and the car usage data from odometer readings for over **30 million vehicles**
- Data is aggregated to "Lower-Layer Super Output Area" of around 700 households and 1600 people
- Increase in number of domestic energy meters used to identify significant new housing developments
- Focus on new developments in 2008-10, prior to census data on new residents in 2011, energy assessed 2012

Chatterton, T. J., Anable, J., Barnes, J., & Yeboah, G. (2016). **Mapping household direct energy consumption in the United Kingdom to provide a new perspective on energy justice**. *Energy Research & Social Science*, *18*, 71-87. https://doi.org/10.1016/j.erss.2016.04.013

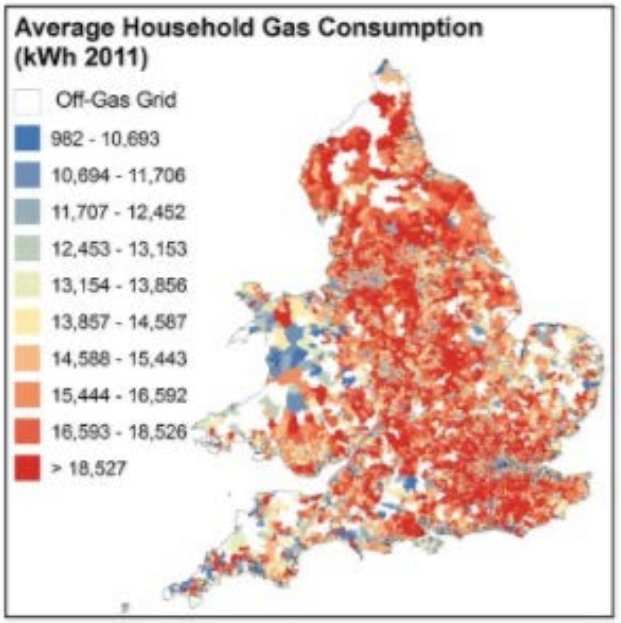
# Maps of Average Household Energy Use at LSOA level

UWE Bristol | University of the West of England

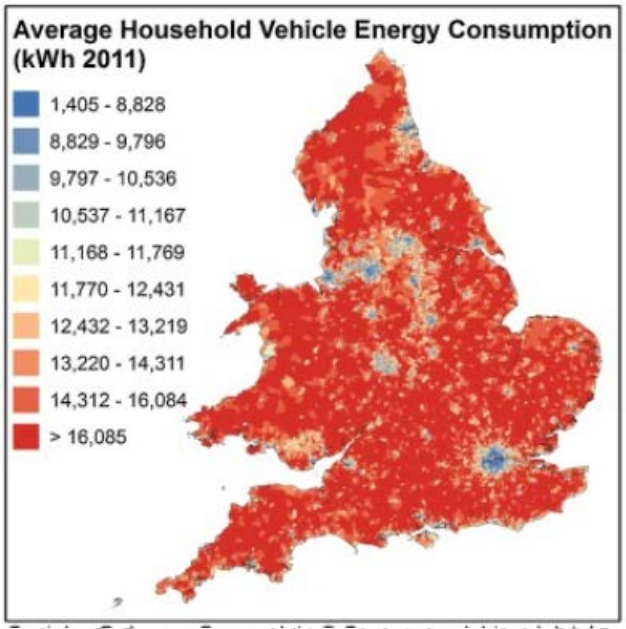
Electricity



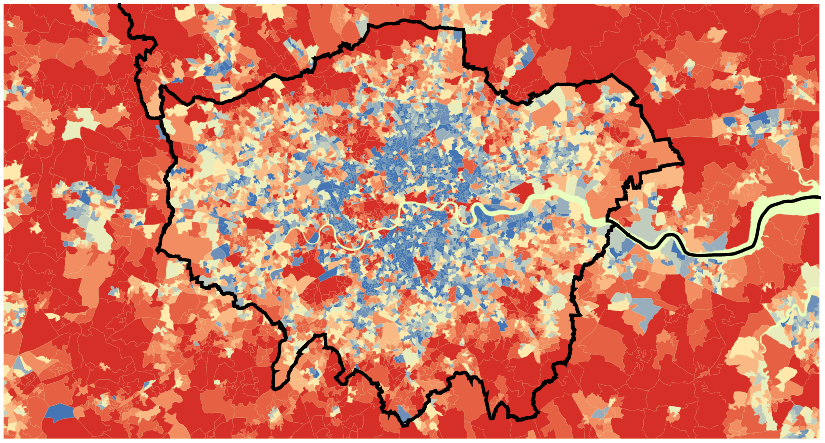

Gas




Car Use





34,753 areas in England and Wales

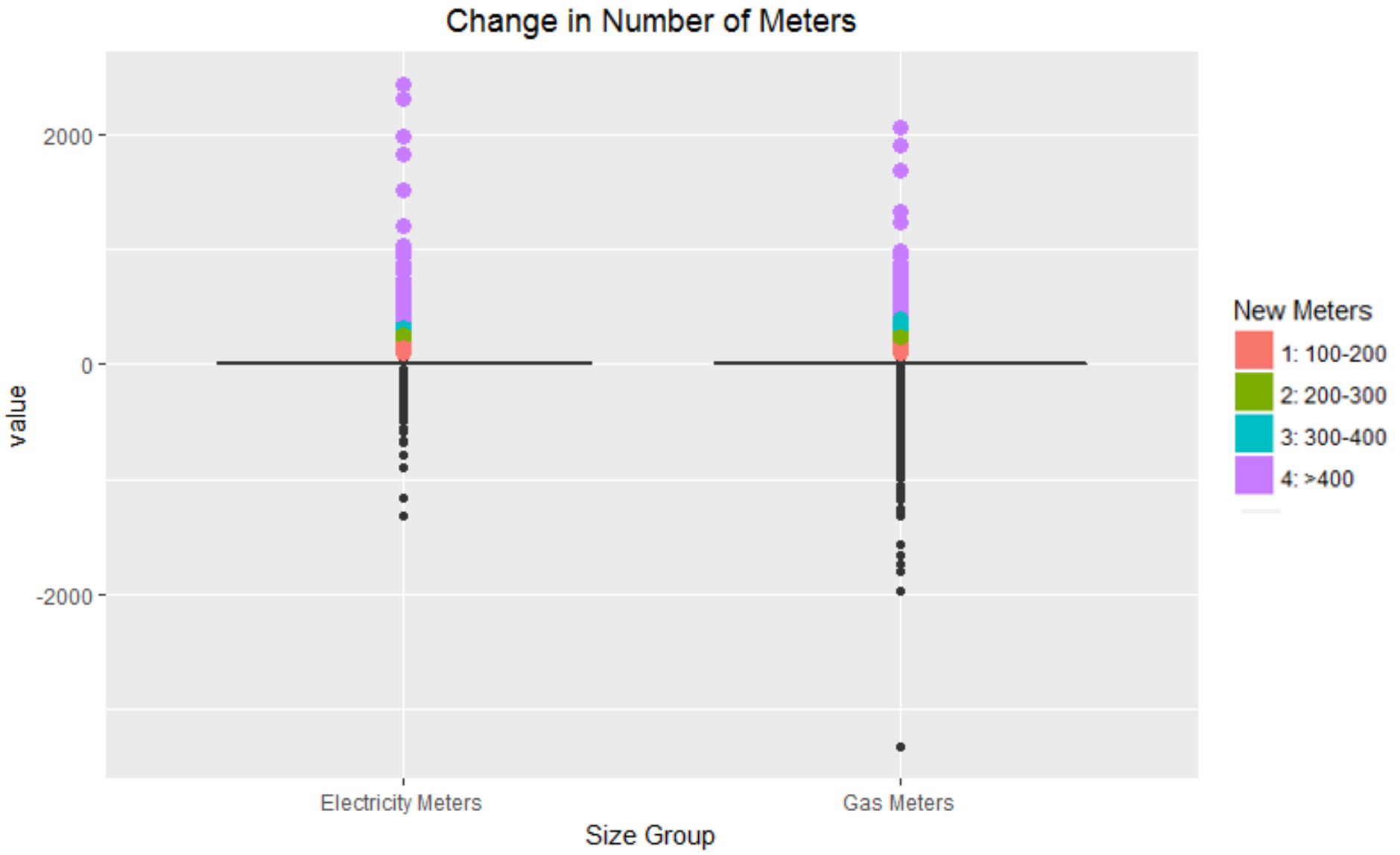
An average of:

~700 households

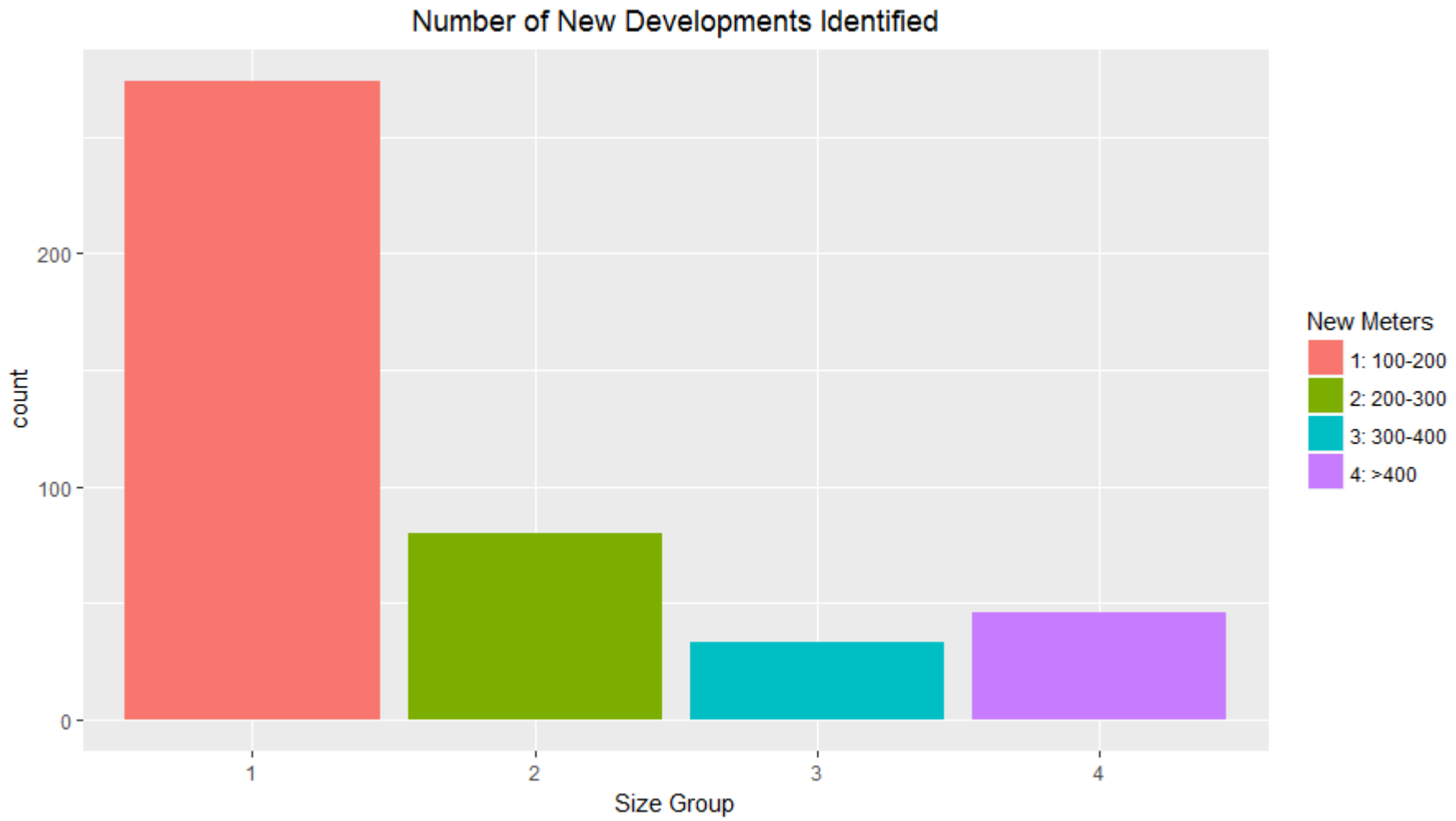
~600 people

MOT
Motoring and Vehicle Ownership Trends in the UK

# Changes in Number of Meters (2008-10)

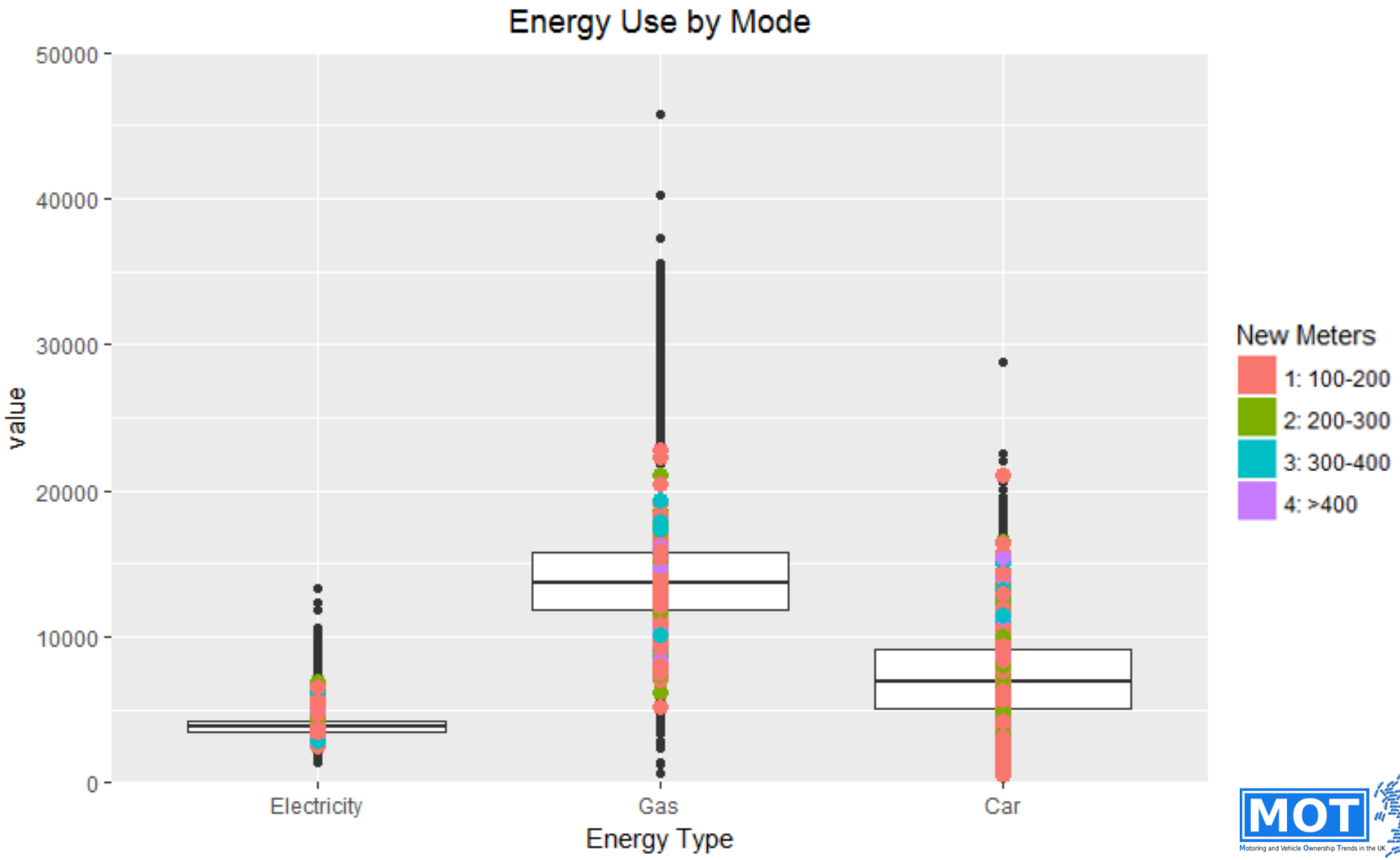


# Numbers of New Developments

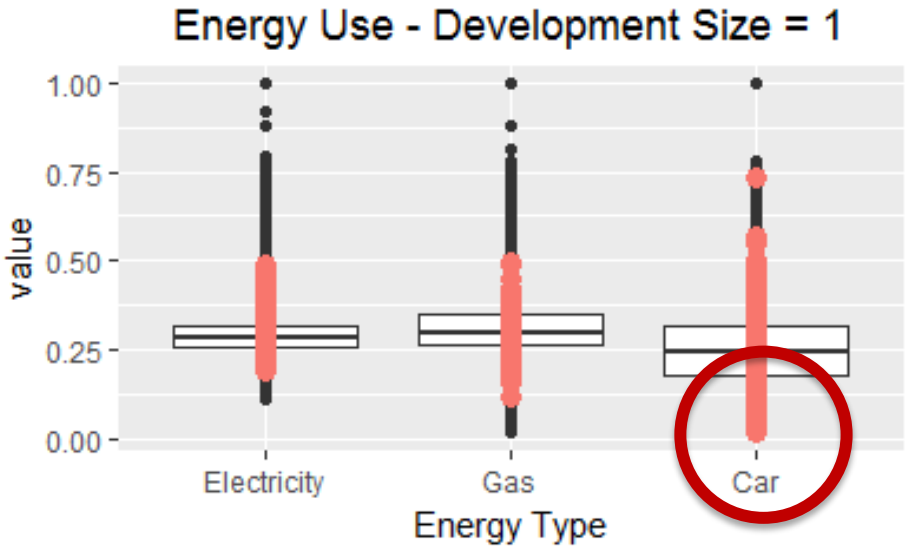


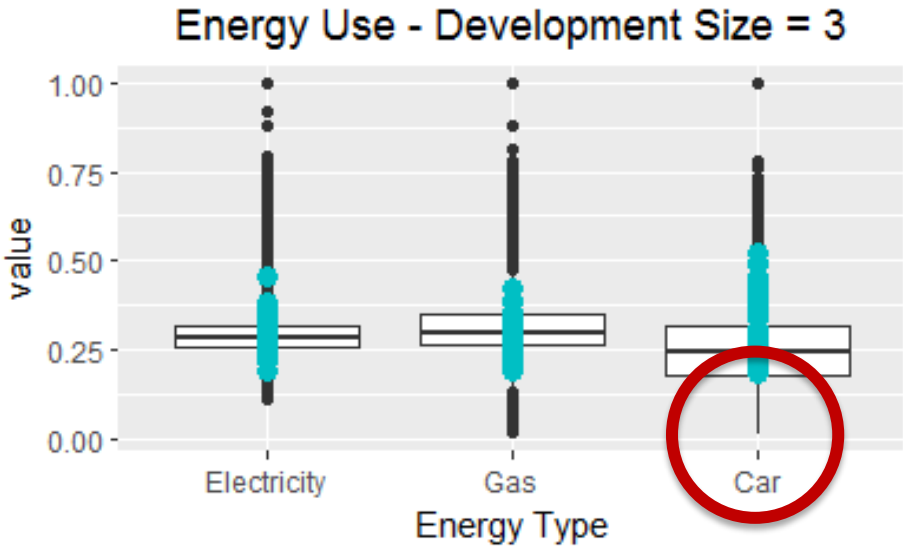

1.3% of LSOAs

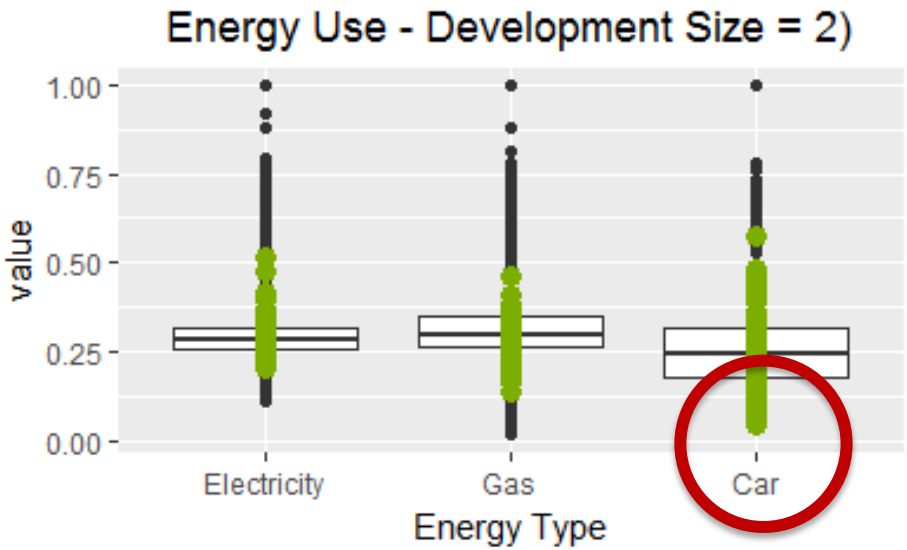
# Average Household Energy Use by Mode (All LSOAs)

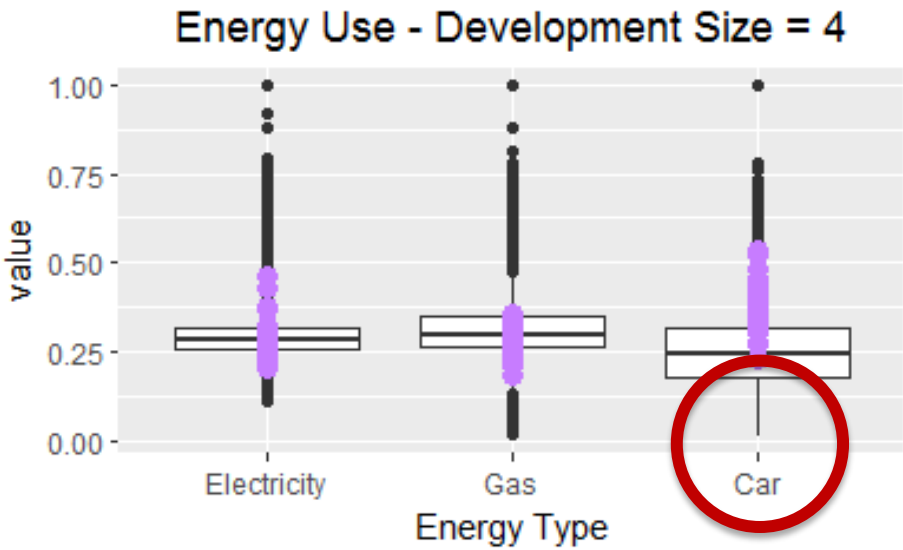


# Usage by Development Size

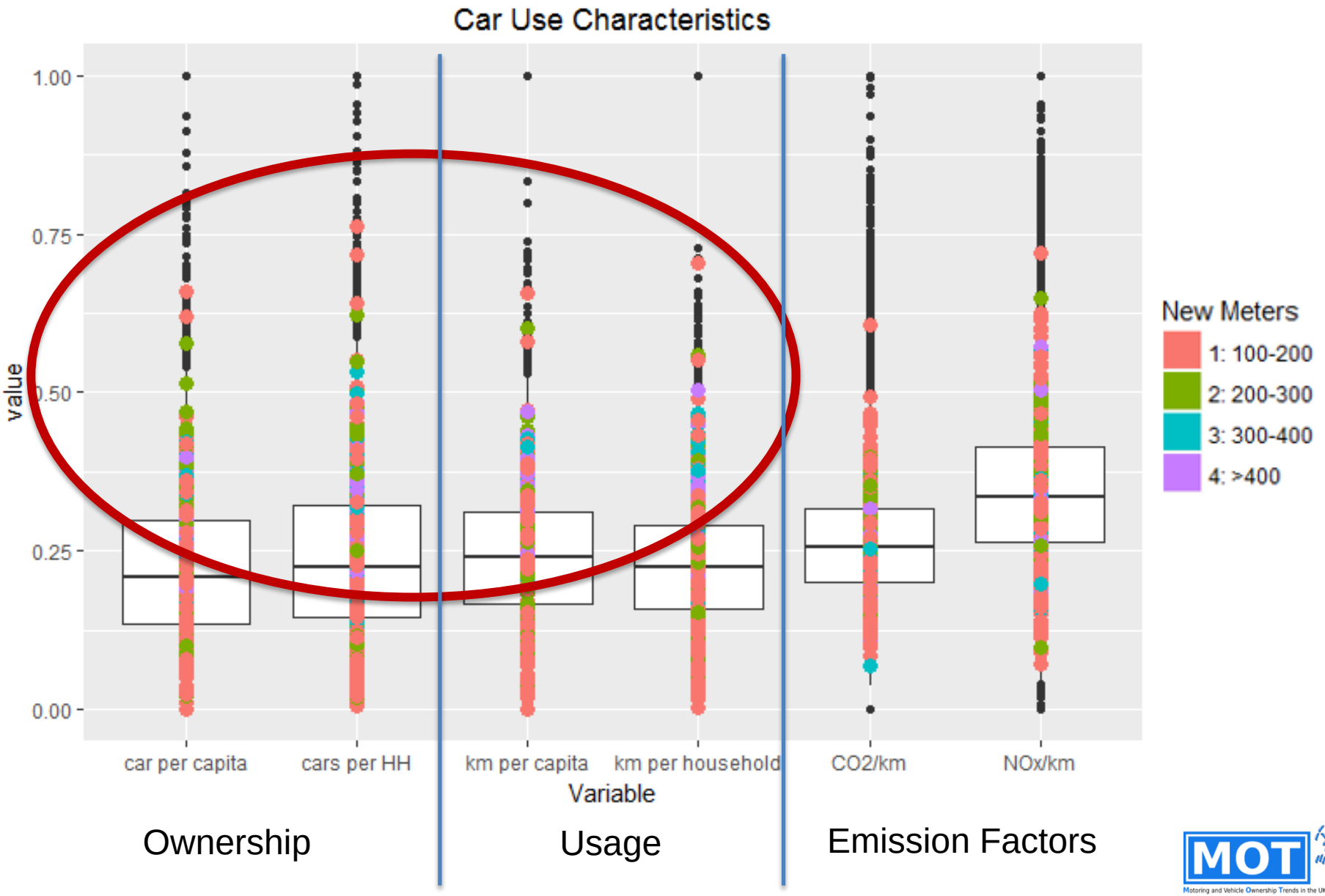


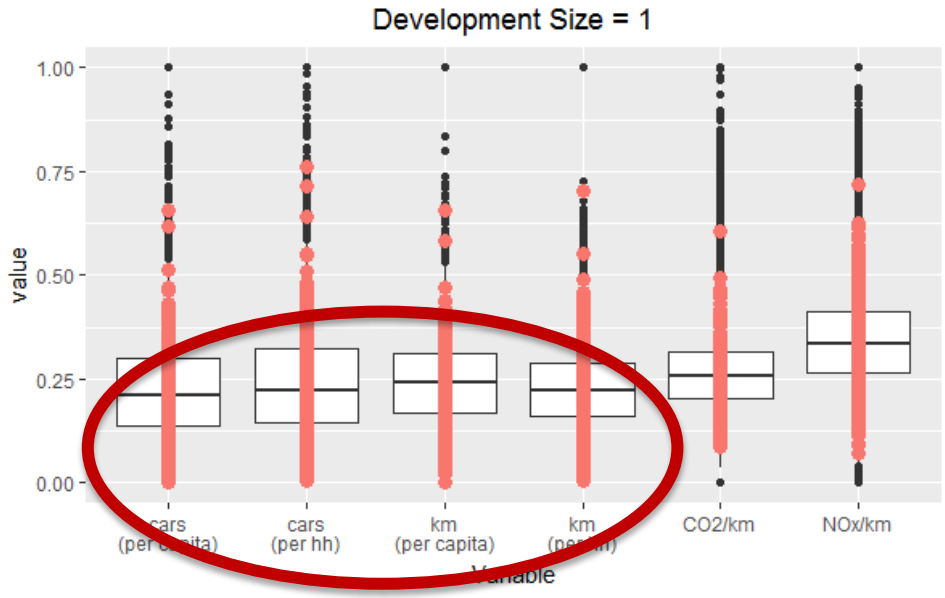



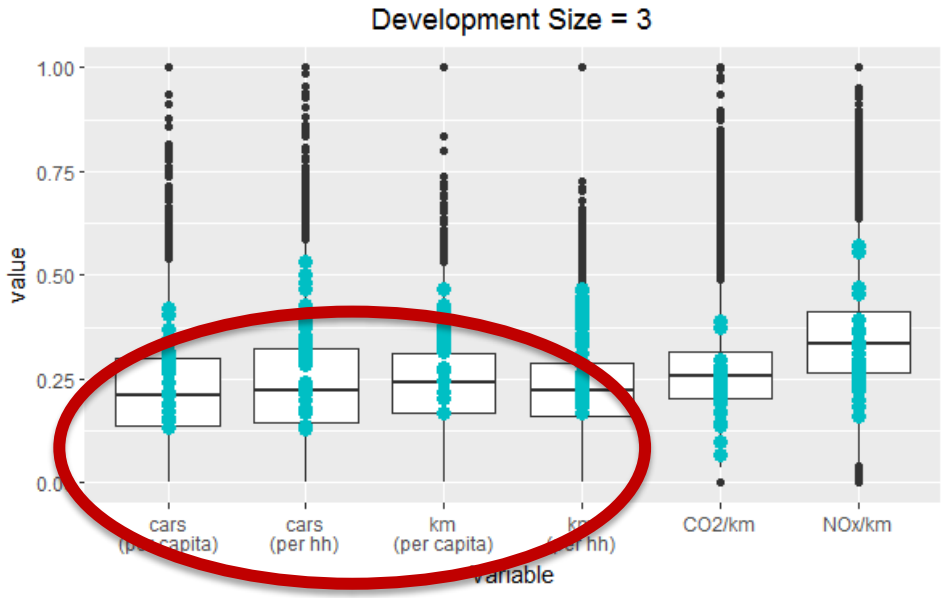



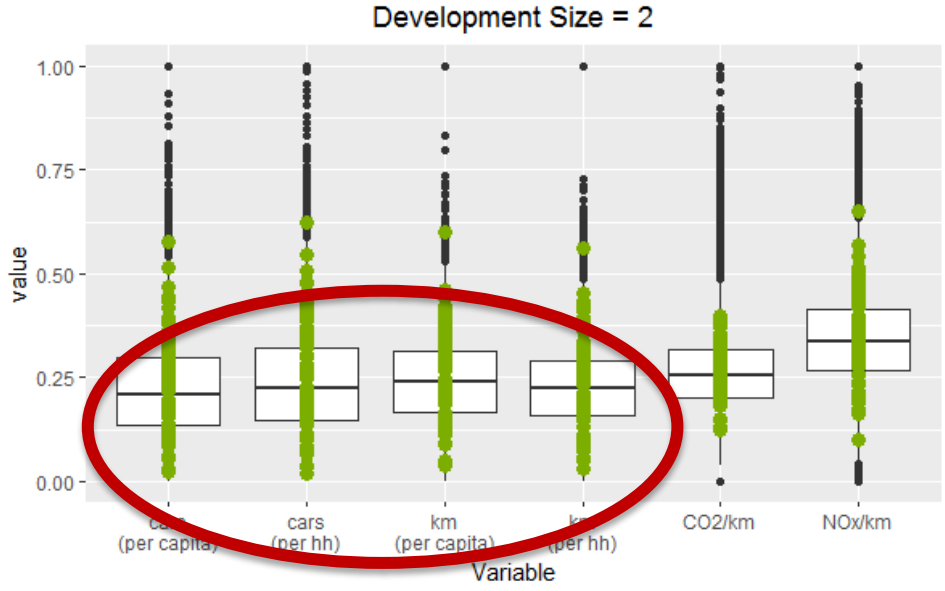
# Car Ownership, Mileage and Emissions (1)

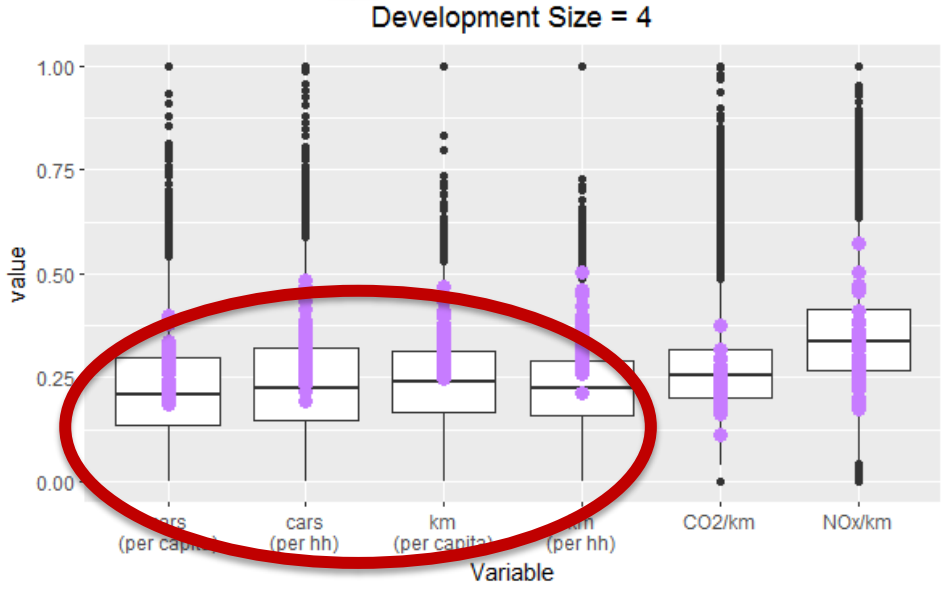


# Car Ownership, Mileage and Emissions (2)

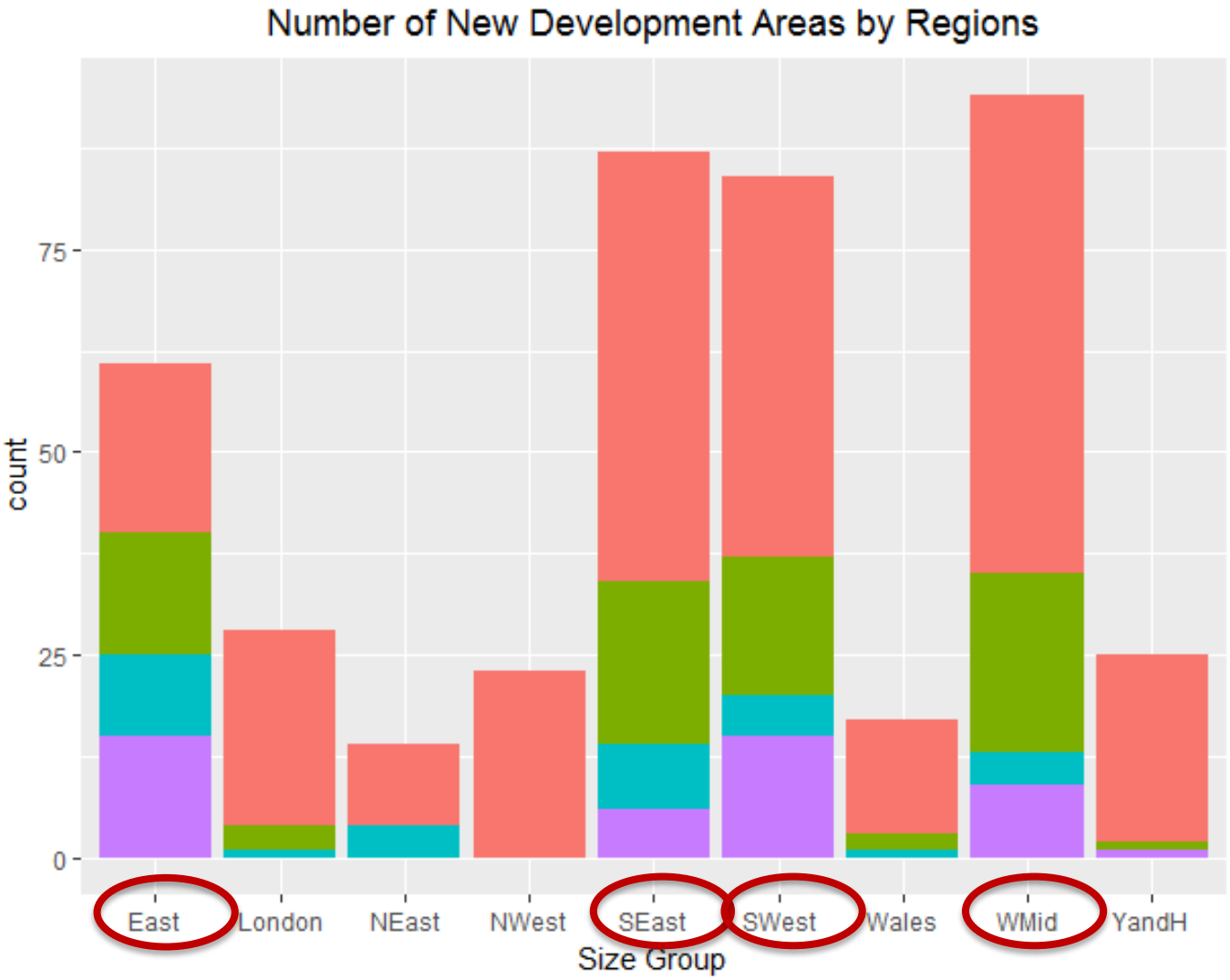


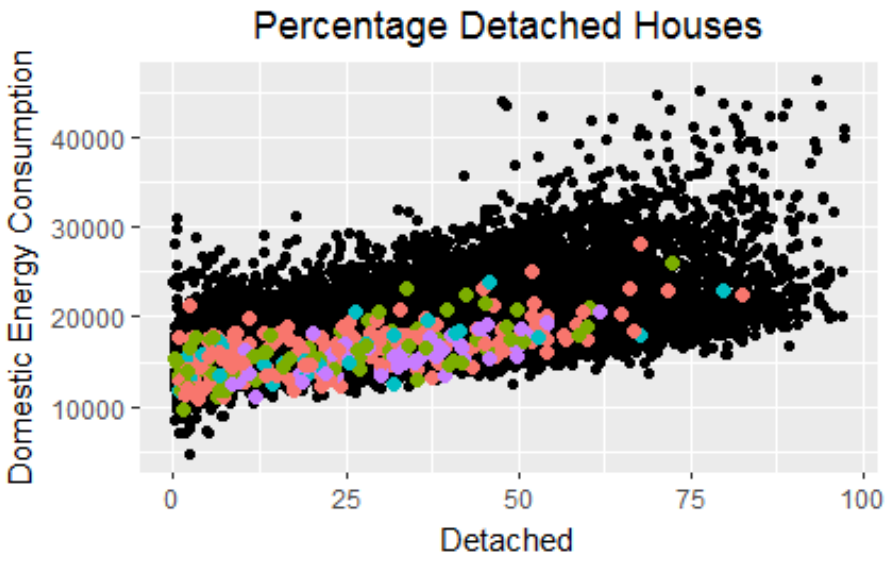



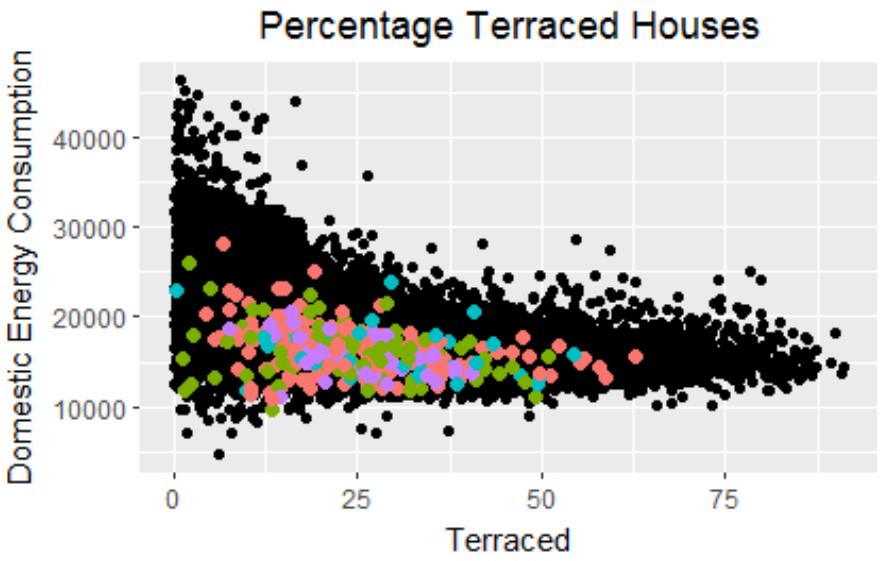



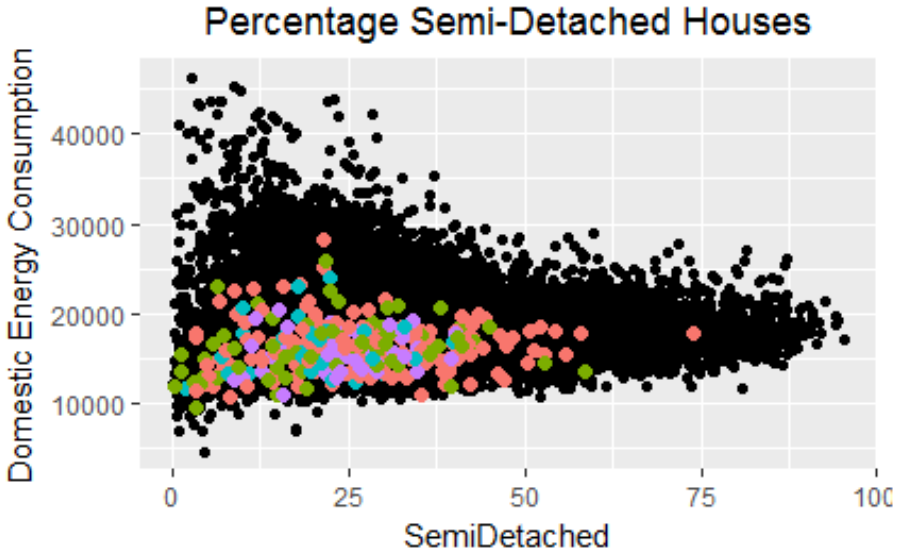
# Developments by Region

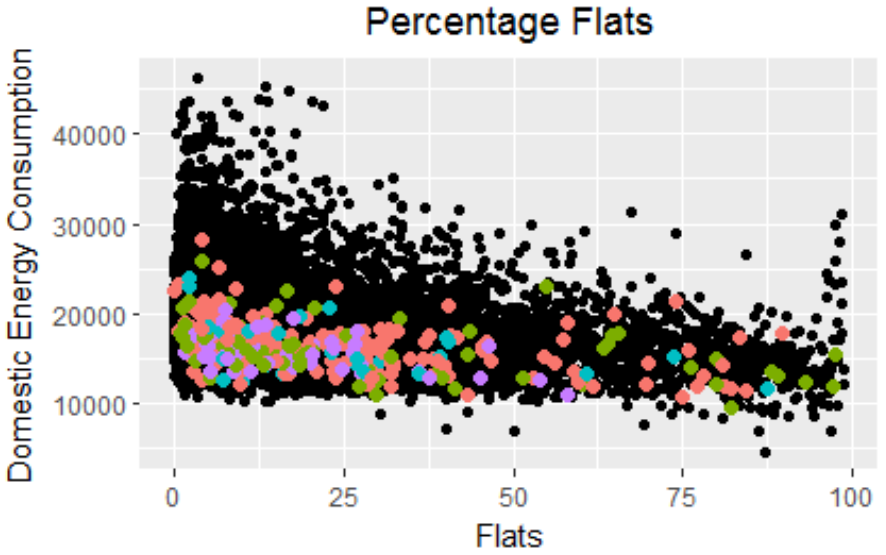



# Domestic Energy Consumption by Dwelling Type



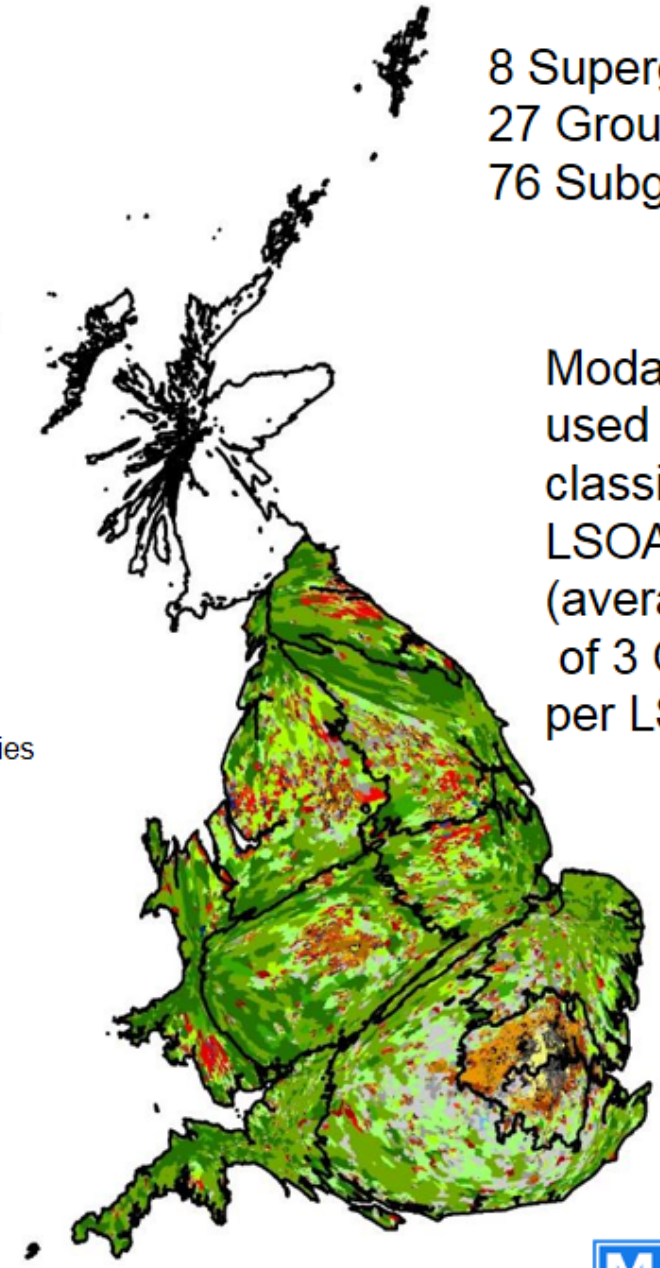




South East/East/South West/West Midlands only

# Office for National Statistics Output Area Classifications

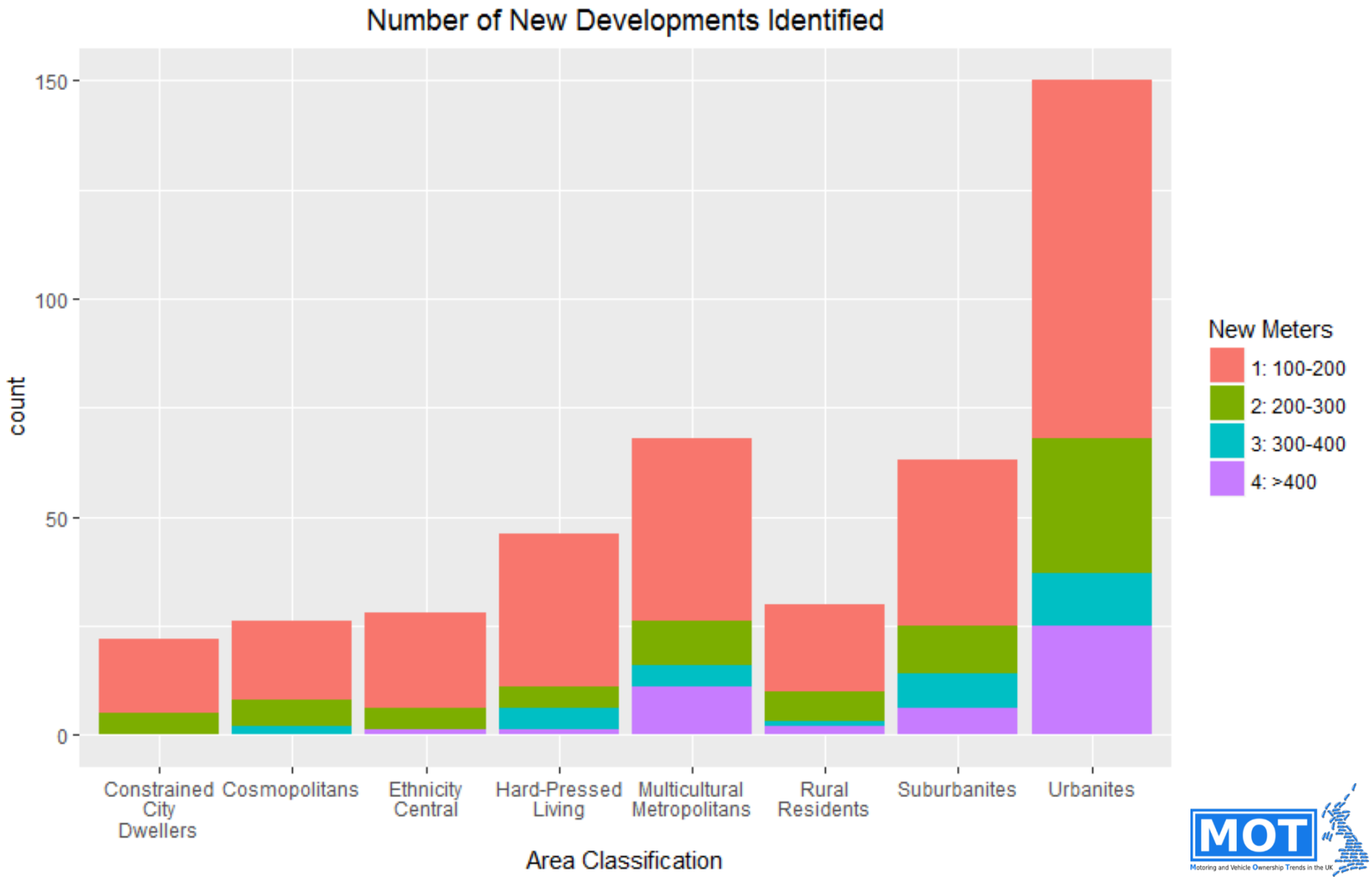
| OAC Supergroup | Dominant OAC Group per LSOA | |
|---|---|---|
| Rural Residents | 1a | Farming Communities |
| | 1b | Rural Tenants |
| | 1c | Ageing Rural Dwellers |
| Cosmopolitans | 2a | Students Around Campus |
| | 2b | Inner-City Students |
| | 2c | Comfortable Cosmopolitans |
| | 2d | Aspiring and Affluent |
| Ethnic Central | 3a | Ethnic Family Life |
| | 3b | Endeavouring Ethnic Mix |
| | 3c | Ethnic Dynamics |
| | 3d | Aspirational Techies |
| Multicultural Metropolitans | 4a | Rented Family Living |
| | 4b | Challenged Asian Terraces |
| | 4c | Asian Traits |
| Urbanites | 5a | Urban Professionals and Families |
| | 5b | Ageing Urban Living |
| Suburbanites | 6a | Suburban Achievers |
| | 6b | Semi-Detached Suburbia |
| Constrained City Dwellers | 7a | Challenged Diversity |
| | 7b | Constrained Flat Dwellers |
| | 7c | White Communities |
| | 7d | Ageing City Dwellers |
| Hard Pressed Living | 8a | Industrious Communities |
| | 8b | Challenged Terraced Workers |
| | 8c | Hard-Pressed Ageing Workers |
| | 8d | Migration and Churn |



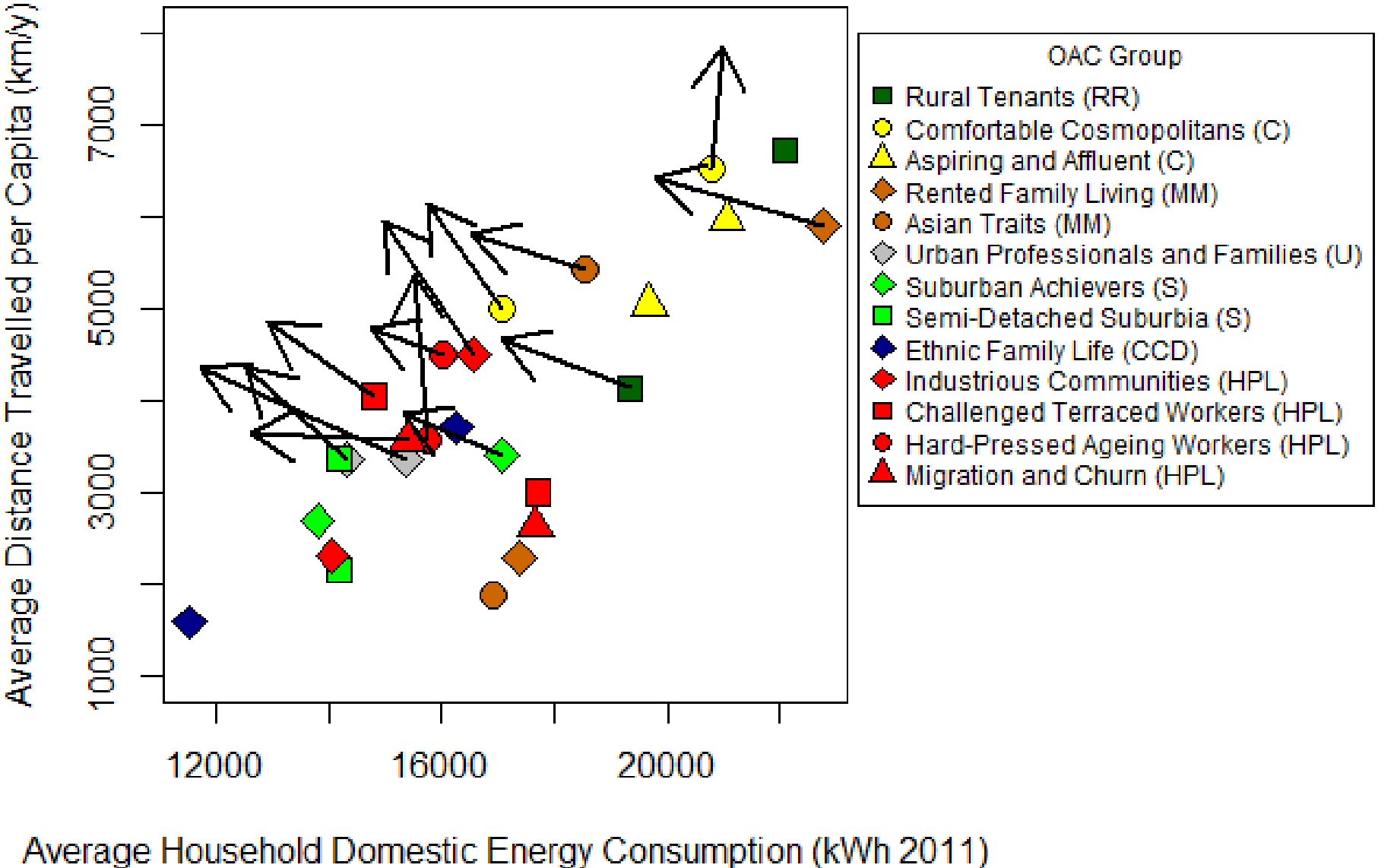
8 Supergroups
27 Groups
76 Subgroups

Modal OAC used to classify LSOA (average of 3 OAs per LSOA)

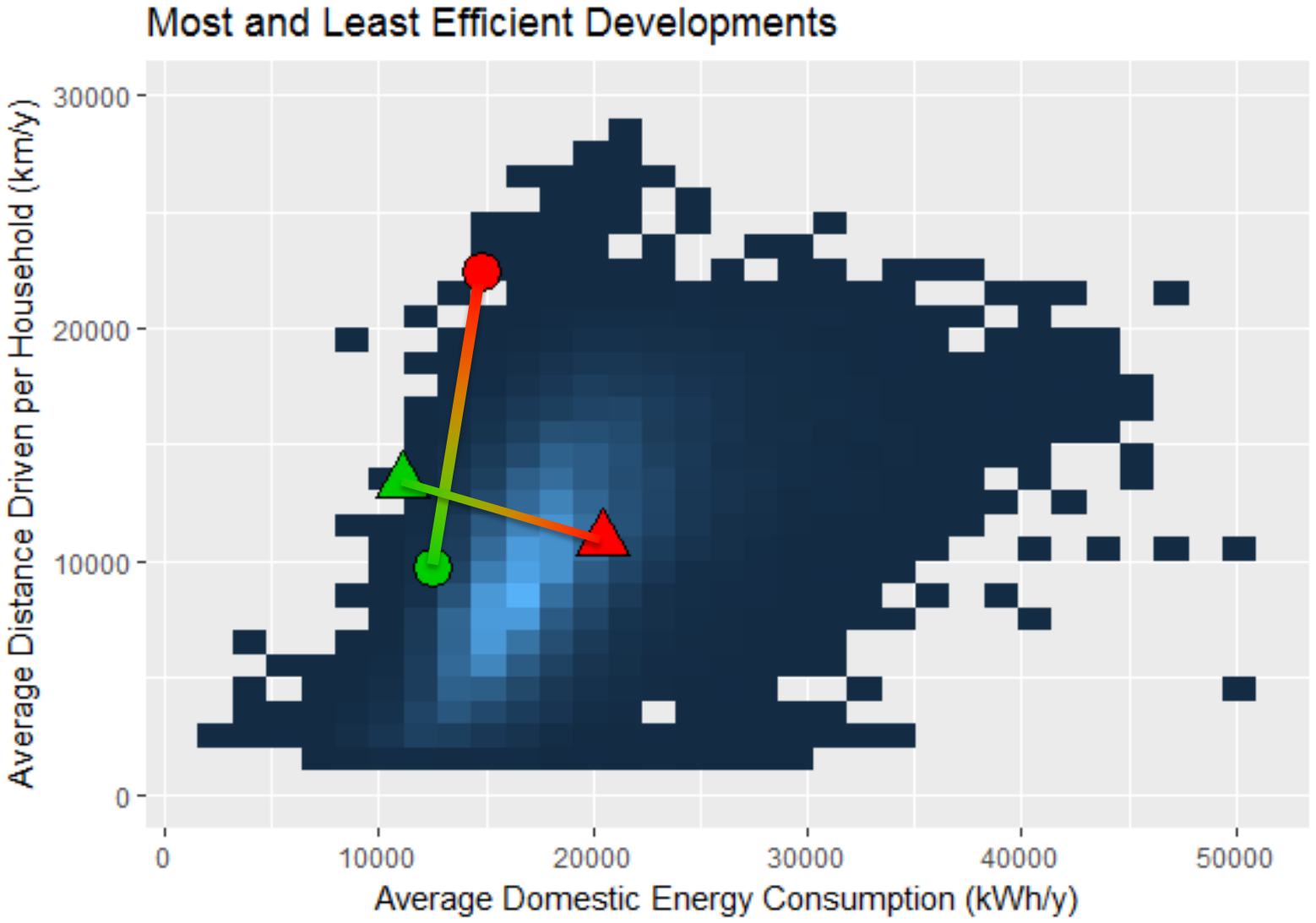
# New Developments by Area Classification



# Average Developments vs New Developments (4 regions – Devs >300)



# Virtual Flaneurie



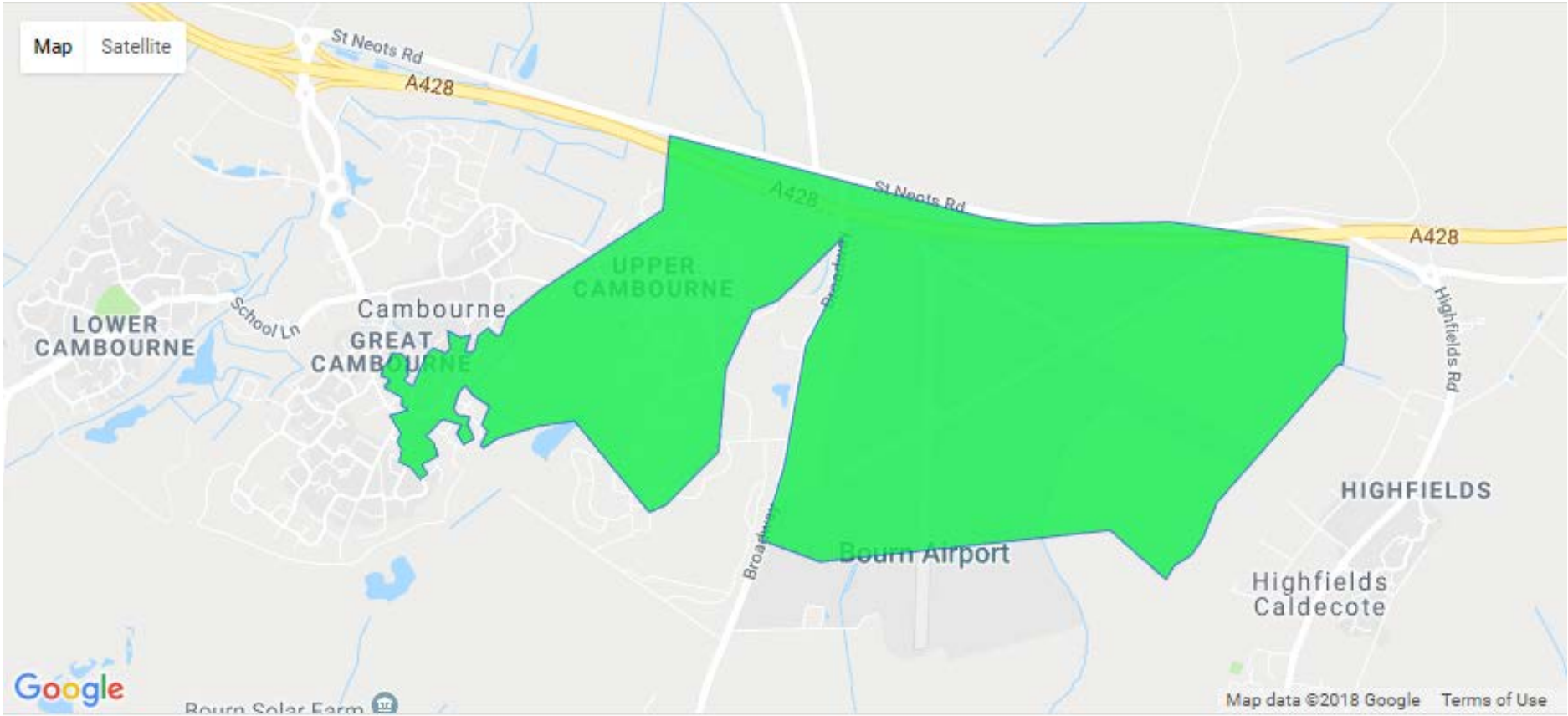

High -> Low Domestic

High -> Low Car Use

# Key Info on Areas

| | Vehicle Mileage ● | Domestic Energy ▲ |
|---|---|---|
| **High** | **E01033119**<br>South Cambridgeshire 020E<br>Residential Population: 3,148 (mid-2015 estimate)<br>Males: 1,584<br>Females: 1,564<br>Occupied Households: 668<br>Population Density: 12.23 Persons per Hectare<br>Land Area: 257.33 Hectares<br>Daytime Population: 1,033<br>**Population Density: 4.01 Persons per Hectare** | **E01010756**<br>Bradford 058D<br>Residential Population: 1,428 (mid-2015 estimate)<br>Males: 702<br>Females: 726<br>Occupied Households: 607<br>Population Density: 15.86 Persons per Hectare<br>Land Area: 90.01 Hectares<br>Daytime Population: 1,172<br>**Population Density: 13.02 Persons per Hectare** |
| **Low** | **E01033174**<br>Peterborough 022C<br>Residential Population: 1,555 (mid-2015 estimate)<br>Males: 736<br>Females: 819<br>Occupied Households: 494<br>Population Density: 9.63 Persons per Hectare<br>Land Area: 161.42 Hectares<br>Daytime Population: 2,029<br>**Population Density: 12.57 Persons per Hectare** | **E01033511**<br>Milton Keynes 017I<br>Residential Population: 1,683 (mid-2015 estimate)<br>Males: 901<br>Females: 782<br>Occupied Households: 604<br>Population Density: 49.08 Persons per Hectare<br>Land Area: 34.29 Hectares<br>Daytime Population: 942<br>**Population Density: 27.47 Persons per Hectare** |

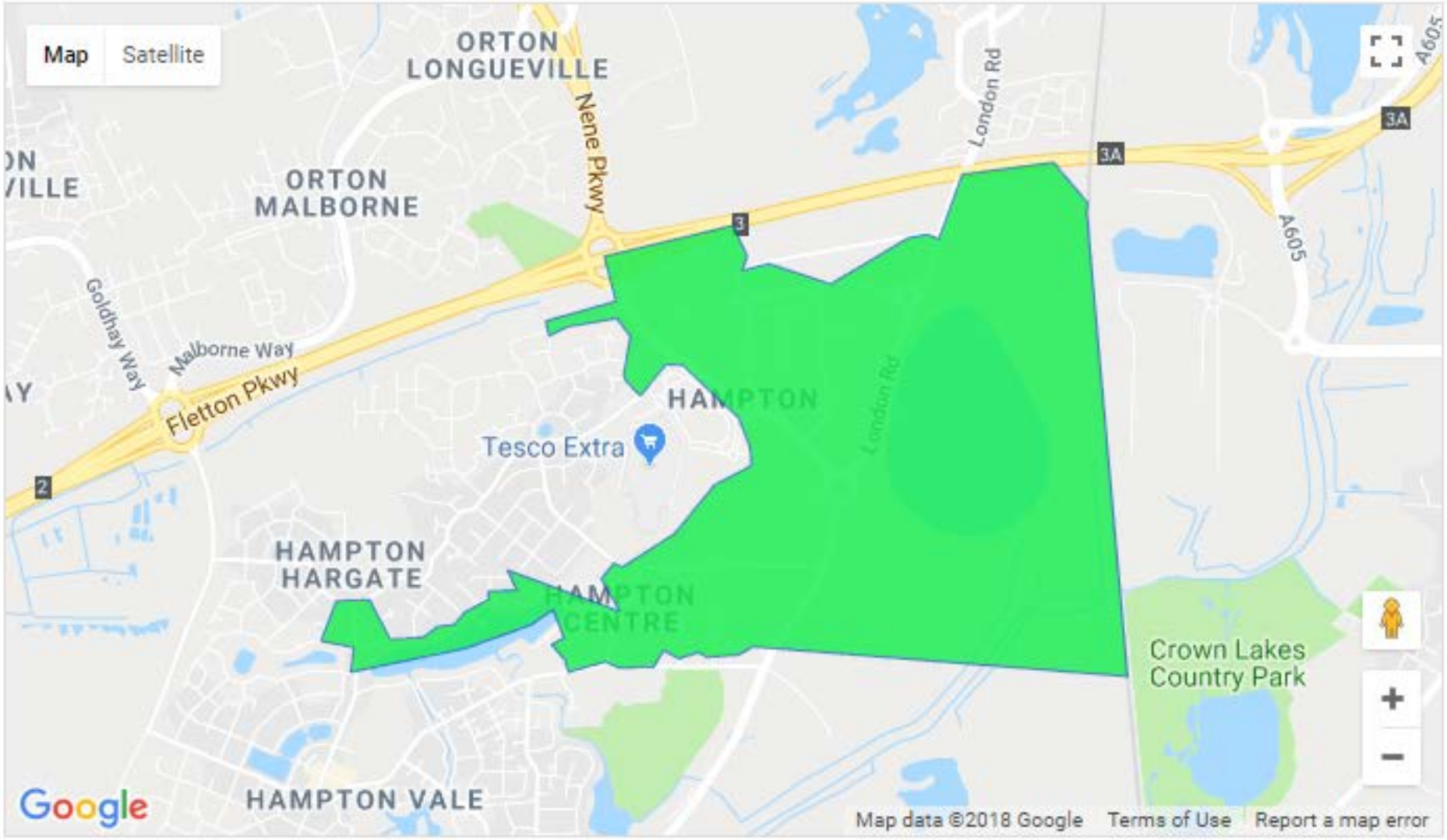
# High Mileage – Upper Cambourne



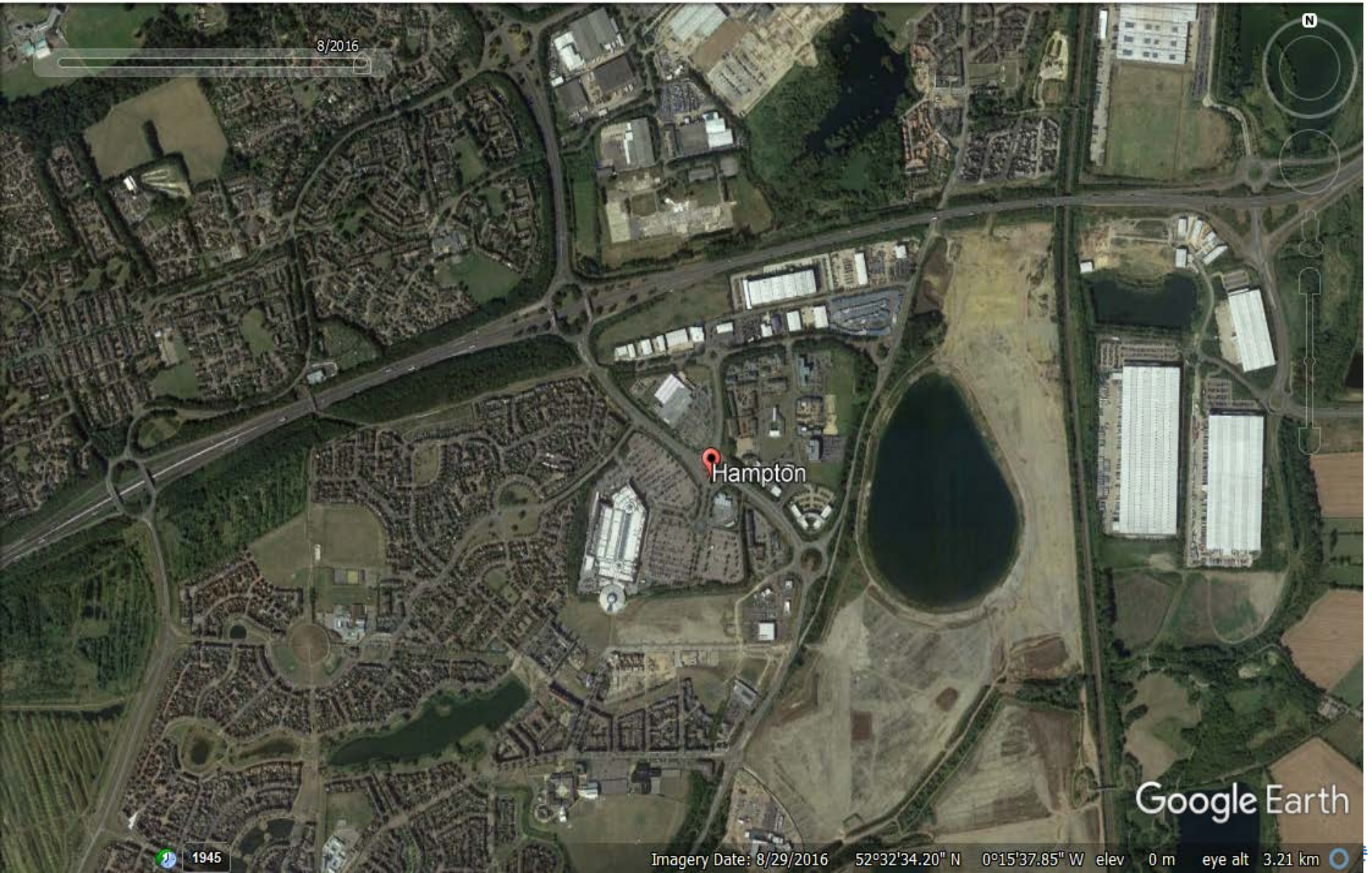
# High Mileage – Upper Cambourne


Welkin Way

# Low Mileage - Hampton

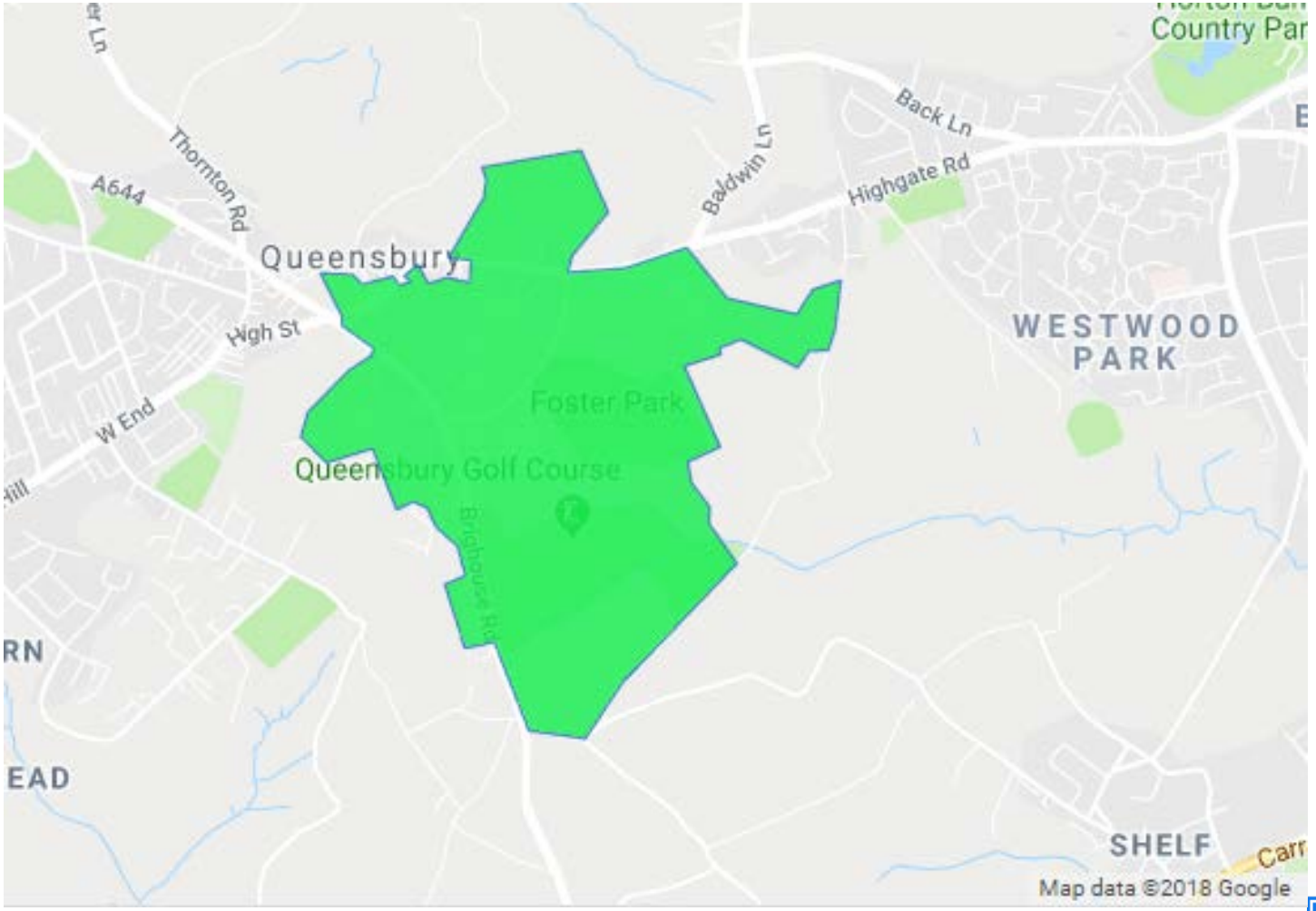


# Low Mileage - Hampton




Lake Ave
Water Cres

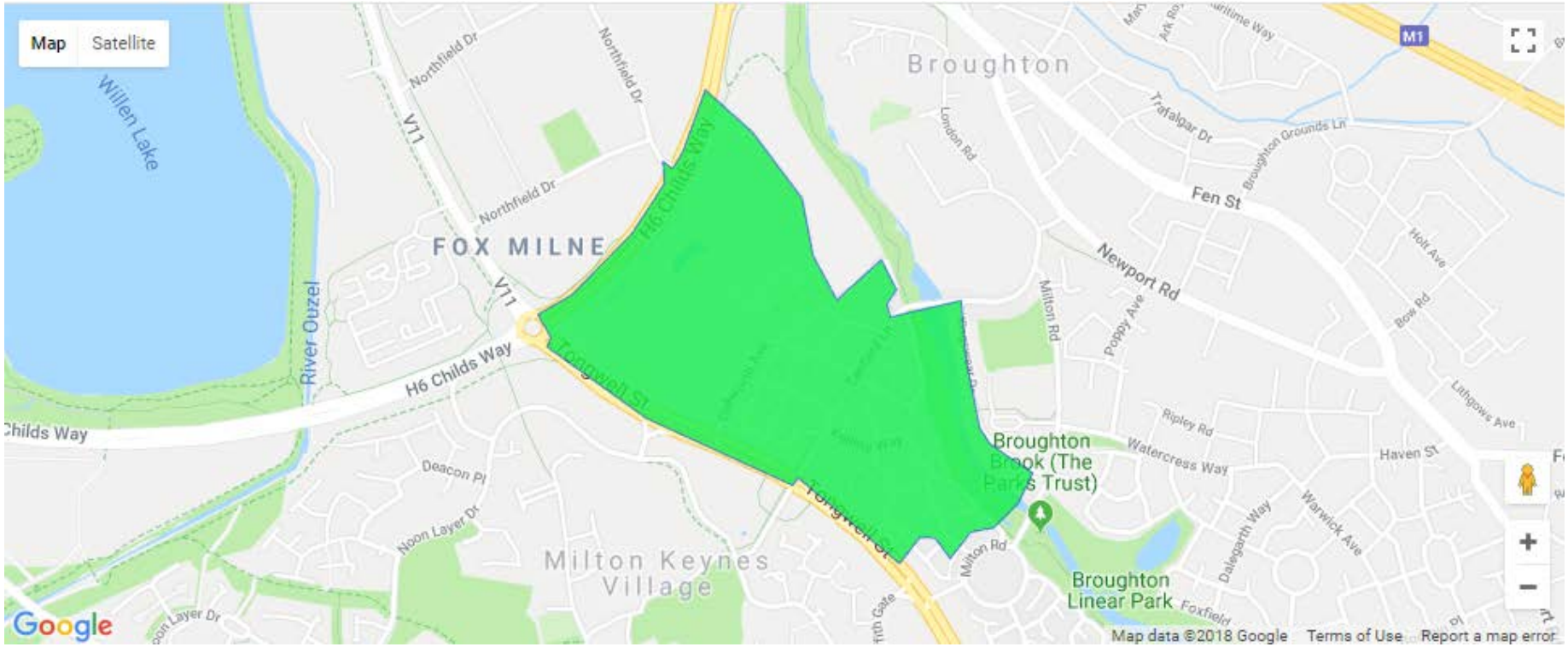
# High Domestic Energy - Queensbury



# High Domestic Energy – Queensbury, Bradford


Naseby Rise

# Low Domestic Energy – Broughton, Milton Keynes



# Low Domestic Energy – Broughton, Milton Keynes

# Conclusions

- Sustainability of new developments is about more than building energy performance
- We have got better at that – but worse on transport impacts
- Quantitative data is excellent at providing an overview and general patterns but....
- ...it can miss unmeasurable, or hard to measure, features
- Remote viewing of areas can provide significant support in understanding of variations

# Thank you!

MOT
Motoring and Vehicle Ownership Trends in the UK

## Any Questions?

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http://www.MOTproject.net

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Grateful thanks to members of DfT, VOSA, DVLA and DECC, who have provided advice and support for this work, and to other members of the project team: Prof. Jillian Anable at University of Leeds, Prof. Eddie Wilson at University of Bristol, Simon Ball and Paul Emmerson at TRL Ltd, and Dr Jo Barnes at the University of the West of England.



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RESEARCH COUNCILS' energy PROGRAMME

Department for Transport

Department of Energy & Climate Change