

Liveable Cities

City Analysis Methodology
7 December 2012
Royal Society

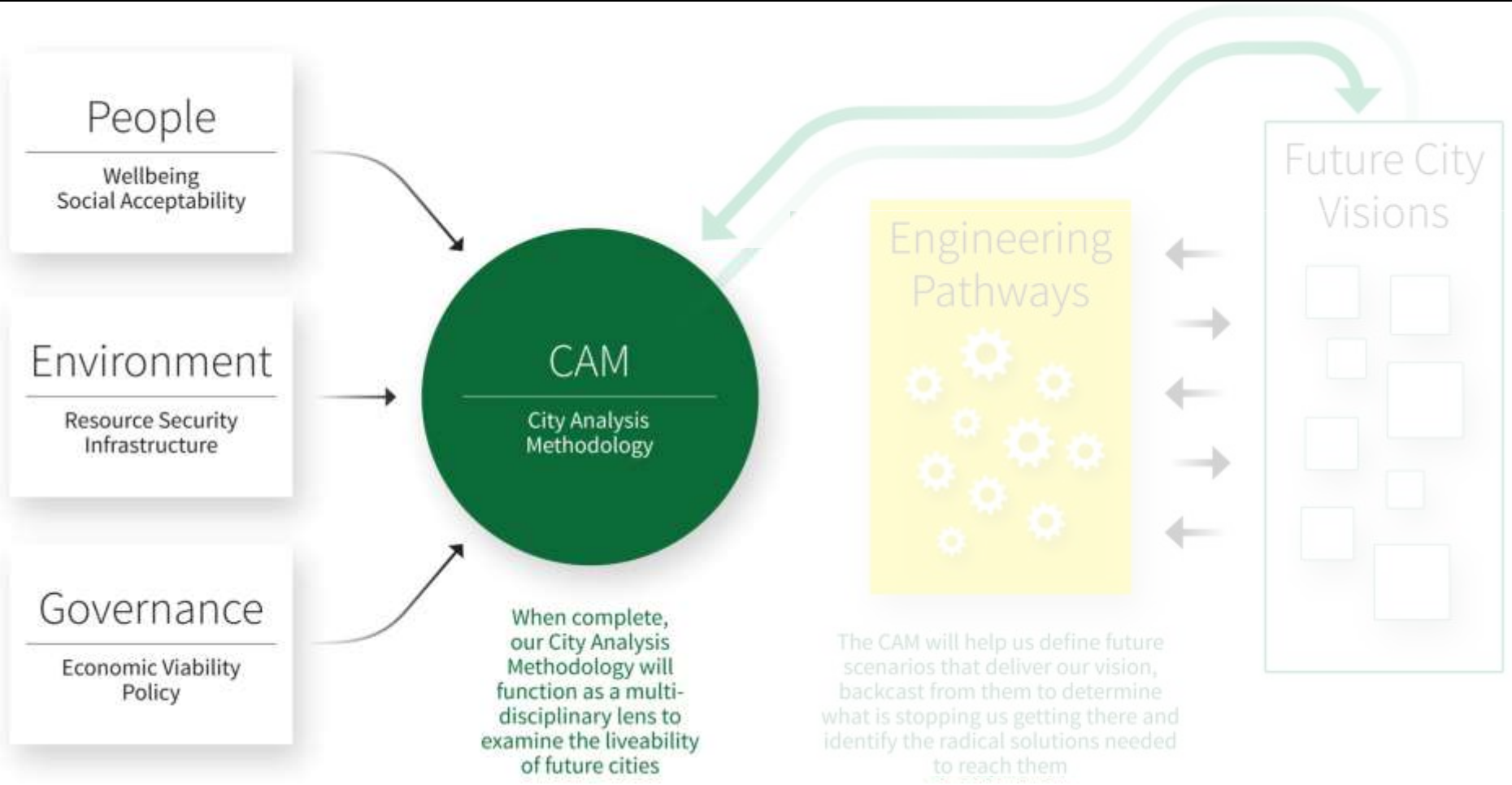
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RC1: City Analysis



The City System



There are many ways of defining a system and it often depends upon what is being measured

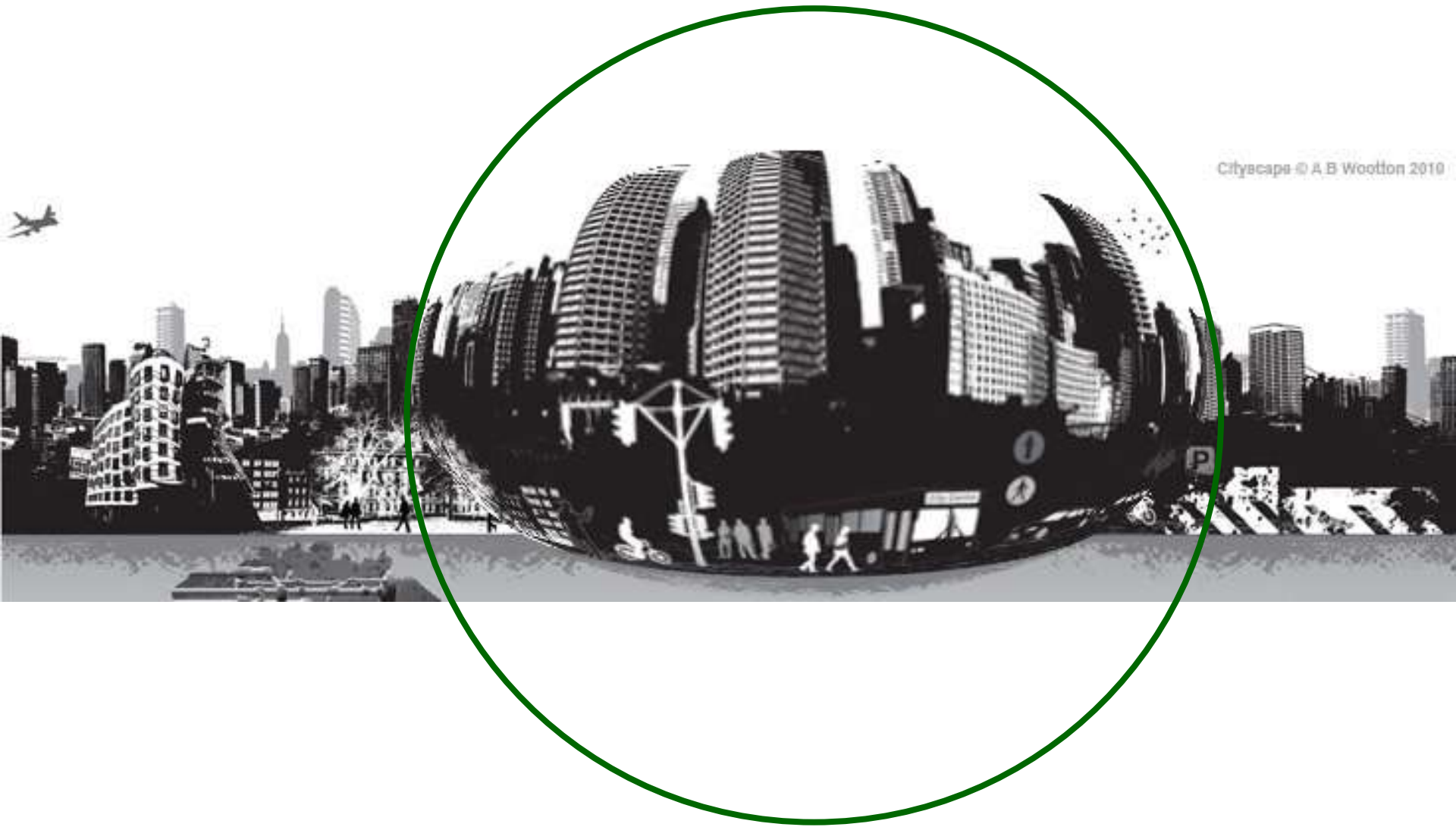
Geographical boundaries

Social boundaries

Political boundaries

Economic boundaries

Defining a System



Measuring a System



Dominant ways of measuring, monitoring and conceptualising city systems

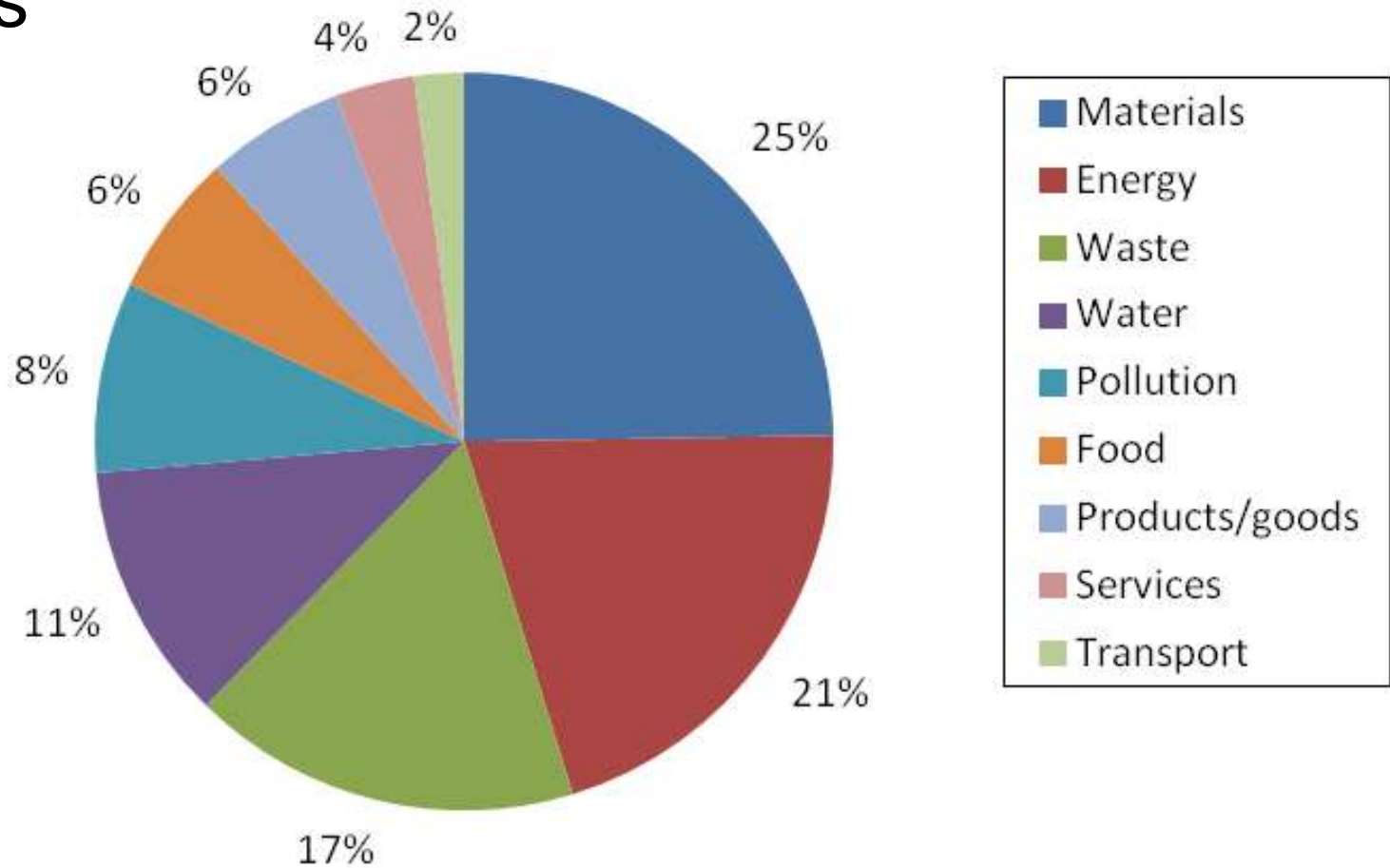
Systems thinking – understanding the interactions of a system. These may or may not be physical

Material flows – understanding how physical things move through a system

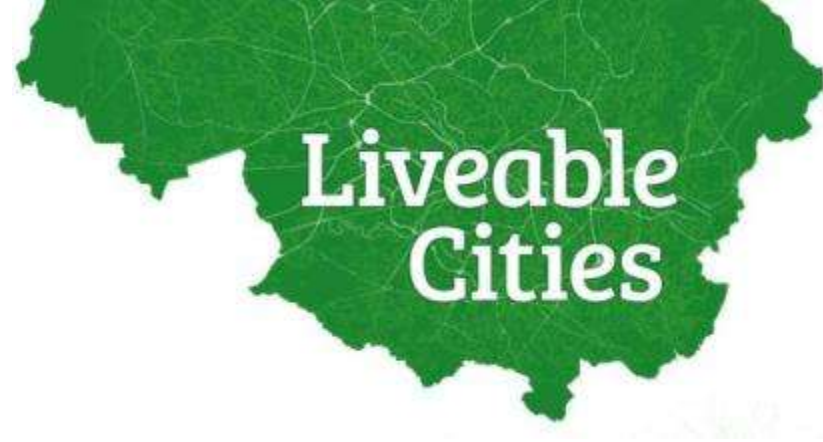
Indicators – measuring and predicting elements within a system

Material Flows

Review of 150 journal and other articles and reports



Indicators



Review of 76 indicator initiatives and tools
(containing thousands of individual indicators)

42 are considered relevant to the Liveable
Cities City Analysis Methodology

Work is underway to further refine the list

The CAM

Combining systems thinking, material flows and indicators to elucidate low carbon, resource secure, liveable cities

How does the UK meet the following three targets

1. Energy efficiency – 80% carbon emission reduction on 1990 levels by 2050
2. Water efficiency – less than 80 litres per person per day
3. Resource management – zero waste

Whilst ensuring

- Resource security – improvement upon current levels
- Wellbeing – maintenance or improvement upon current levels
- Ecology and ecosystem services – maintenance or improvement upon current services
- Economic viability – maintenance or improvement upon current levels

Energy



80% carbon emission reduction
on 1990 levels by 2050

Identify relevant energy sources

Nuclear

Coal

Gas

Wind

Solar

Oil ...

Whilst not ruling out future innovations

Electrons and protons

Understanding
the
interactions,
flows and
measures

*Questions
related to
statistics and
processes*

How much energy is supplied to
the city from outside the city?

From where is it supplied?

How is it generated?

Who is generating it?

What resources are used in
generation?

What waste is produced and what
happens to it?

What are the physical attributes
of the system (infrastructure)?

What is the distribution network
and how does it work?

Understanding
the
interactions,
flows and
measures

*Questions
related to
costs*

What is the cost of
generating the supply?

Where does the money for
the cost come from?

Where does the money for
the cost go to?

Understanding
the
interactions,
flows and
measures

*Questions
related to
demand*

Where is it used?

By whom is it used?

What is it used for and why?

What is the cost of use?

Where does the money go?

Understanding
the
interactions,
flows and
measures

*Questions
related to
contexts*

What are the legal and policy
contexts?

What are the governance
contexts?

Drilling Down

Supply of energy – oil

Demand

Where is it used?

By whom is it used?

What is it used for and why?

What is the cost of use?

Where does the money go?

Drilling Down

Supply of energy – oil
Demand

Where is it used?

By whom is it used?

What is it used for and why?

What is the cost of use?

Where does the money go?

Drilling Down

Supply of energy – oil

Demand

What is it used for and why?

To make plastic

To fuel our transportation

And so on...

Drilling Down

Supply of energy – oil

Demand

What is it used for and why?

To make plastic

To fuel our transportation

And so on...

Drilling Down

Supply of energy – oil

Demand

What is it used for and why?

To fuel our transportation

Of cars

Of buses

Of trucks

Of trains

Of planes

And so on...

Drilling Down

Supply of energy – oil

Demand

What is it used for and why?

To fuel our transportation

Of cars

Of buses

Of trucks

Of trains

Of planes

And so on...

Drilling Down

Supply of energy – oil

Demand

What is it used for and why?

To fuel our transportation

Of cars

How often do we travel by car?

Why do we travel by car?

Where do we travel by car?

And so on...

Drilling Down

Supply of energy – oil

Demand

What is it used for and why?

To fuel our transportation

Of cars

How often do we travel by car?

Why do we travel by car?

Where do we travel by car?

And so on...

Drilling Down

Supply of energy – oil

Demand

What is it used for and why?

To fuel our transportation

Of cars

Why do we travel by car?

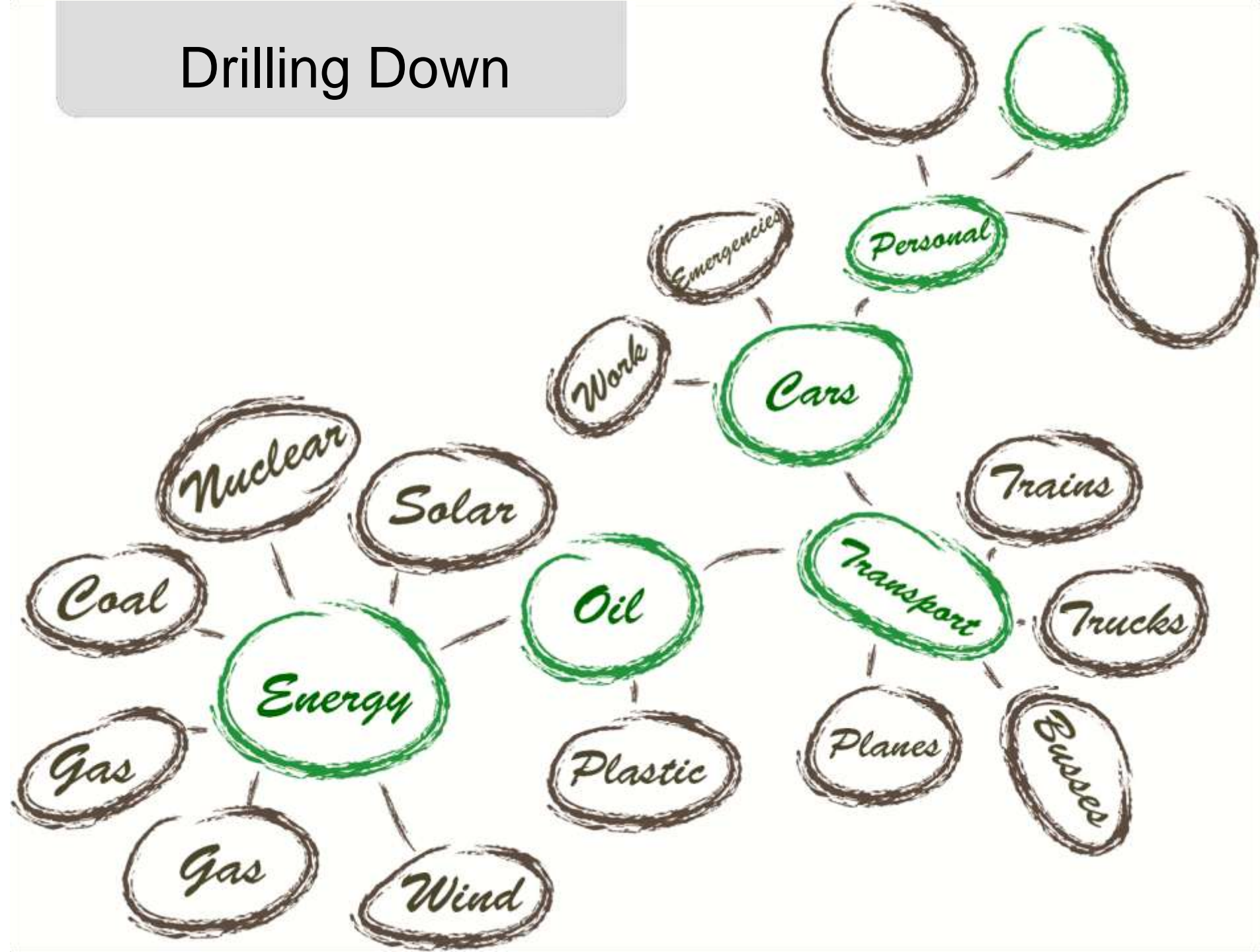
Work

Personal reasons

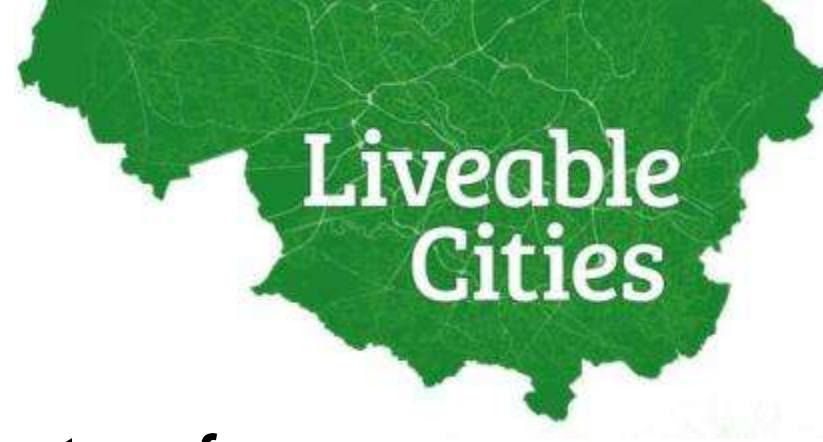
Emergencies

And so on...

Drilling Down



Impacts of Energy



What are the current impacts of energy (waste, water) upon...

Carbon emissions?

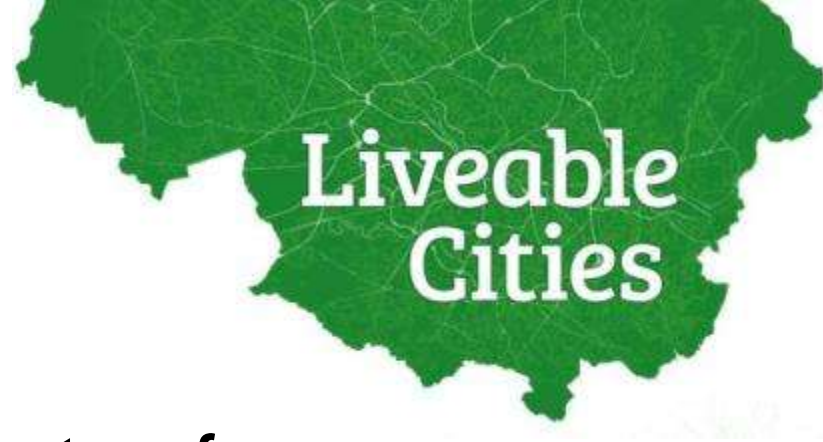
Resource security?

Wellbeing?

Ecology and ecosystem services?

Economic viability?

Impacts of Energy



What are the current impacts of energy, waste and water upon...

Carbon emissions?

Resource security?

Wellbeing?

Ecology and ecosystem services?

Economic viability?

Questions

What other methods and measures should we be using to understand low-carbon cities?

What impacts will a low-carbon city have on resource security (and how can we quantify them)?

How might these impacts be avoided or mitigated?

liveablecities.org.uk



Transforming the Engineering
of Cities to deliver Societal
and Planetary Wellbeing

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