

Group 8

# Energy Policy and Markets

*A perspective on the changing energy landscape*

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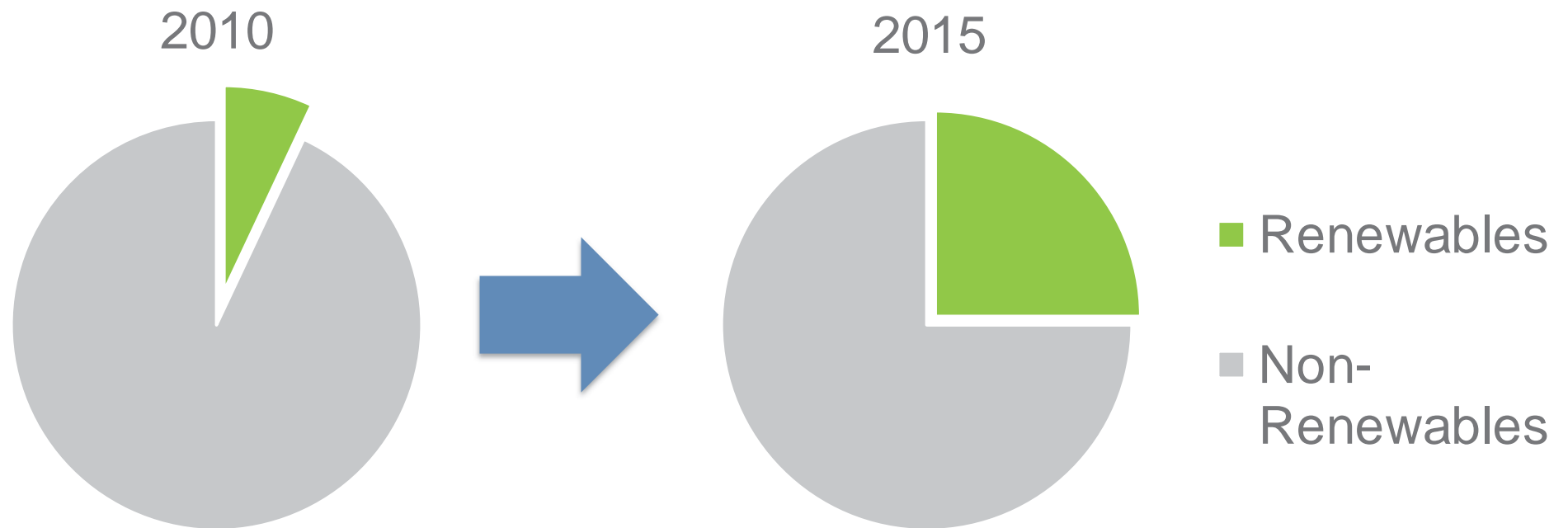
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# Presentation Structure



# We are in the middle of the energy transition

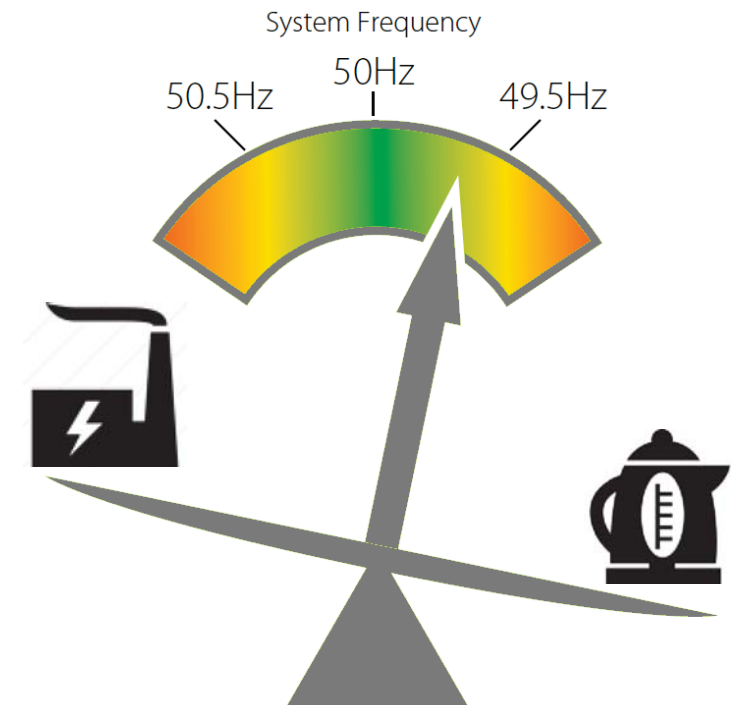


Share of renewables increased 4x over the last 5 years

# More Renewables means higher need for flexibility

Reason: "grid-balancing"

- Supply and demand always need to be in balance
- Hence, flexible technologies are needed



Flexibility needs will increase fourfold by 2030

# There is a variety of flexible technologies available



Flexible Generation



Demand Side  
Response (DSR)



Energy Storage



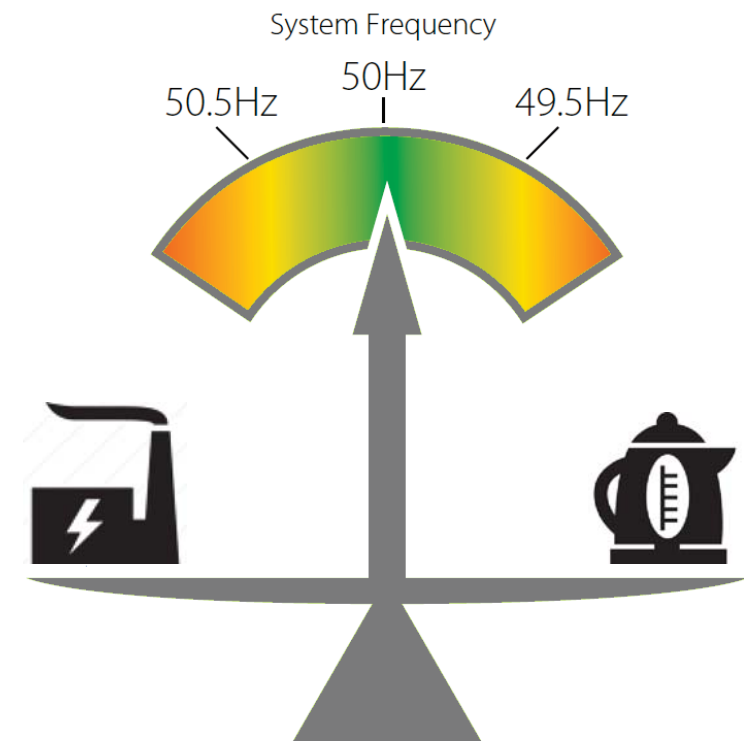
Interconnection

Storage and Demand Side Response are essential for low cost flexibility provision

# Policy should be adapted to incentivise the deployment of these technologies

Faster frequency response services

Enabling variable renewables to provide frequency response



# Summary



More Renewables means higher need for flexibility



Storage and Demand Side Response are essential for low cost flexibility provision



Policy should be adapted to incentivise the deployment of these technologies

# Energy transition

Electricity system is changing

What does this mean for businesses across the UK?

- Higher electricity prices
- New opportunities to participate in the electricity market



## Goal

Understand the electricity  
bill

Identify all the components  
of a commercial electricity  
bill

Inform investment  
decisions on energy  
savings



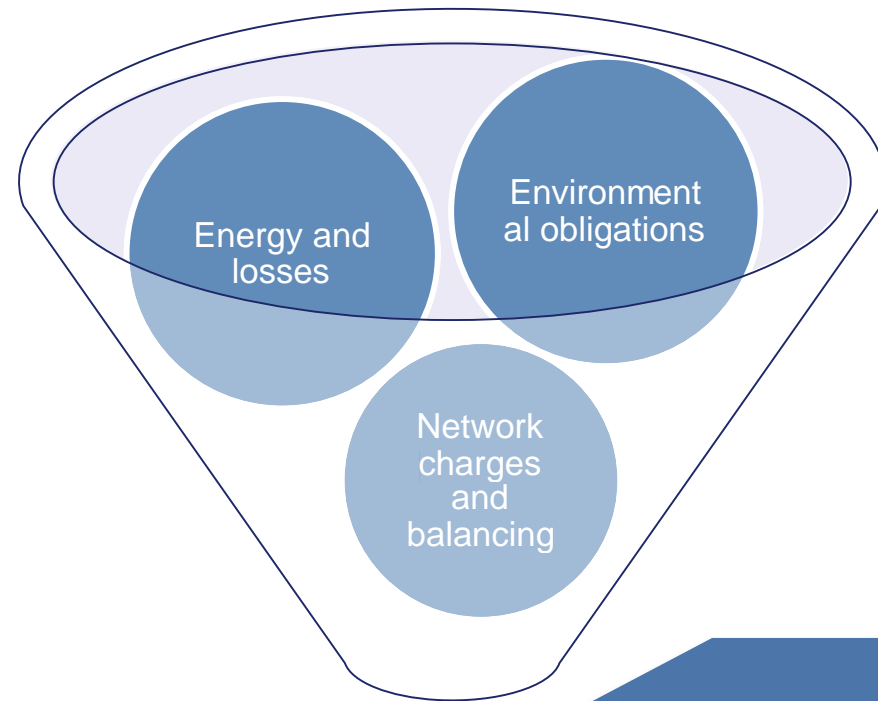


2 day types ✕ 12 months ✕ 5 years

3 connection type ✕ 14 regions

**5040 DAILY PRICE CURVES**

Energy	DUoS	RO
	TNUoS	FiT
	BSUoS	CM



Model

# Half-hourly electricity price

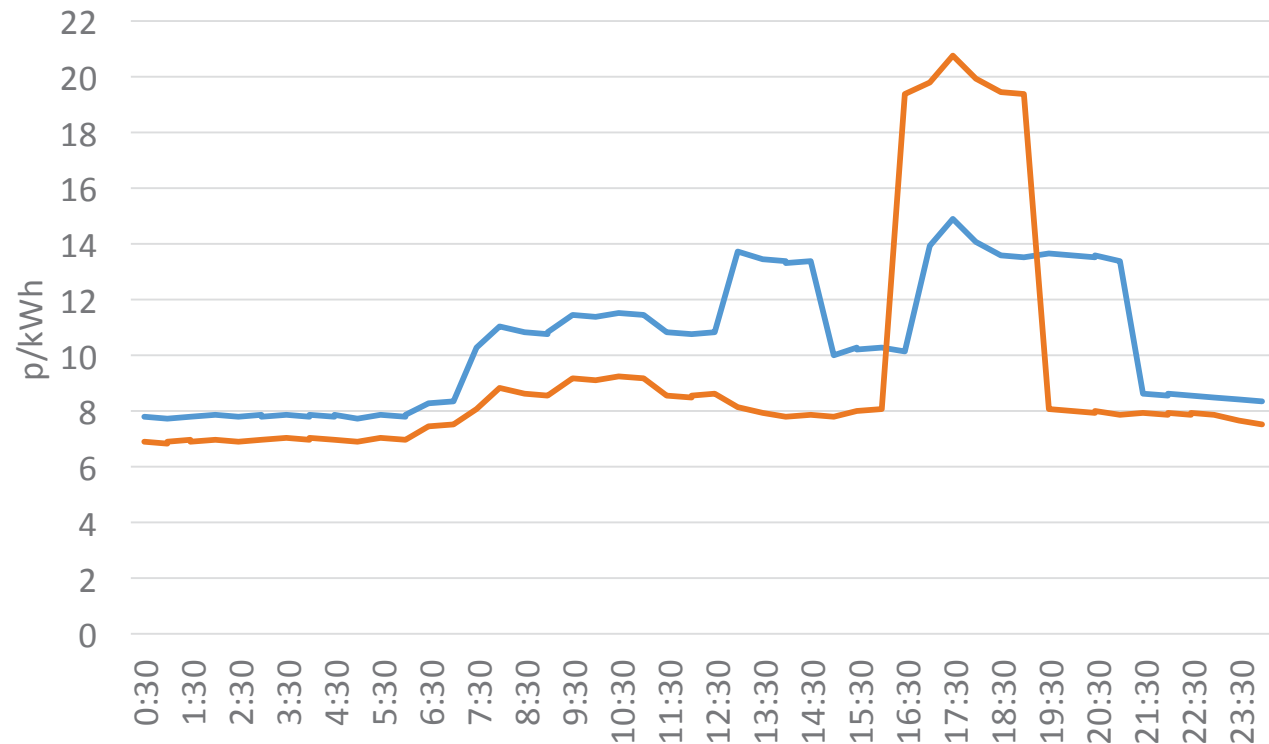
Weekday

June

2016-17

Low Voltage

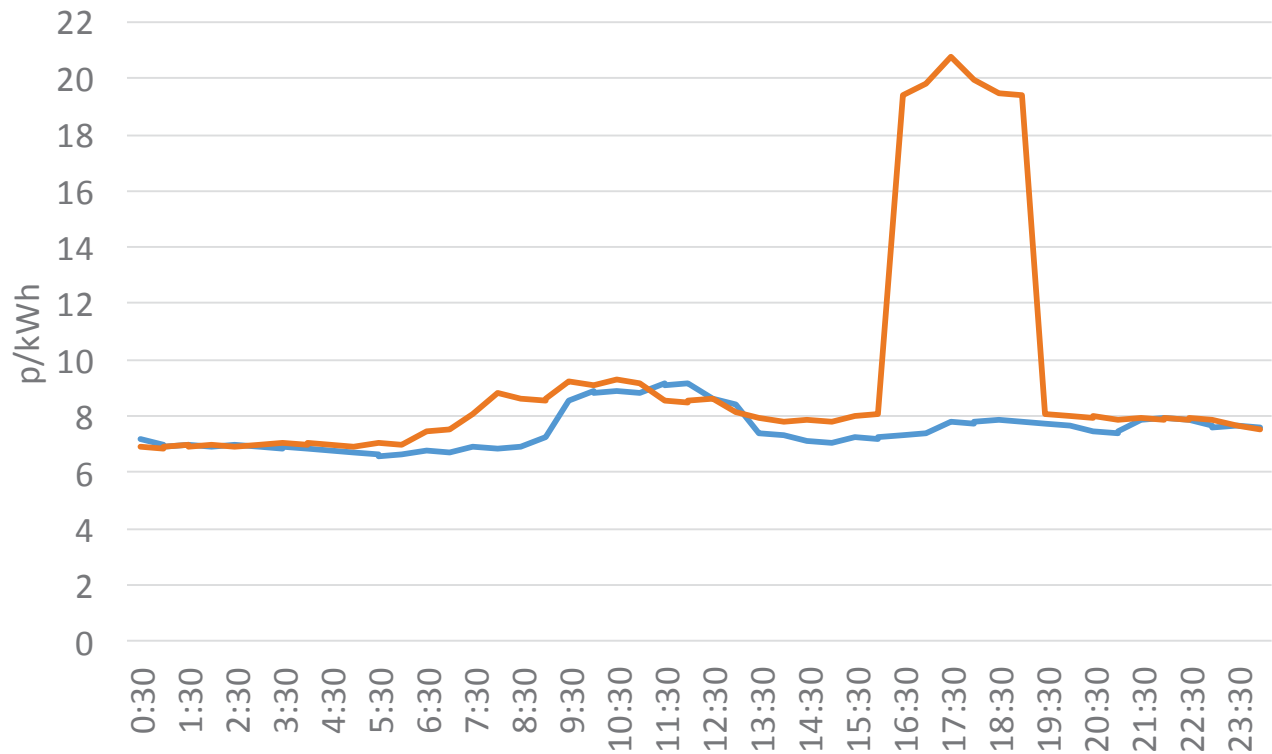
— Northern Scotland — South East



# Half-hourly electricity price

— WE — WD

June  
2016-17  
Low Voltage  
South East



# Half-hourly electricity price

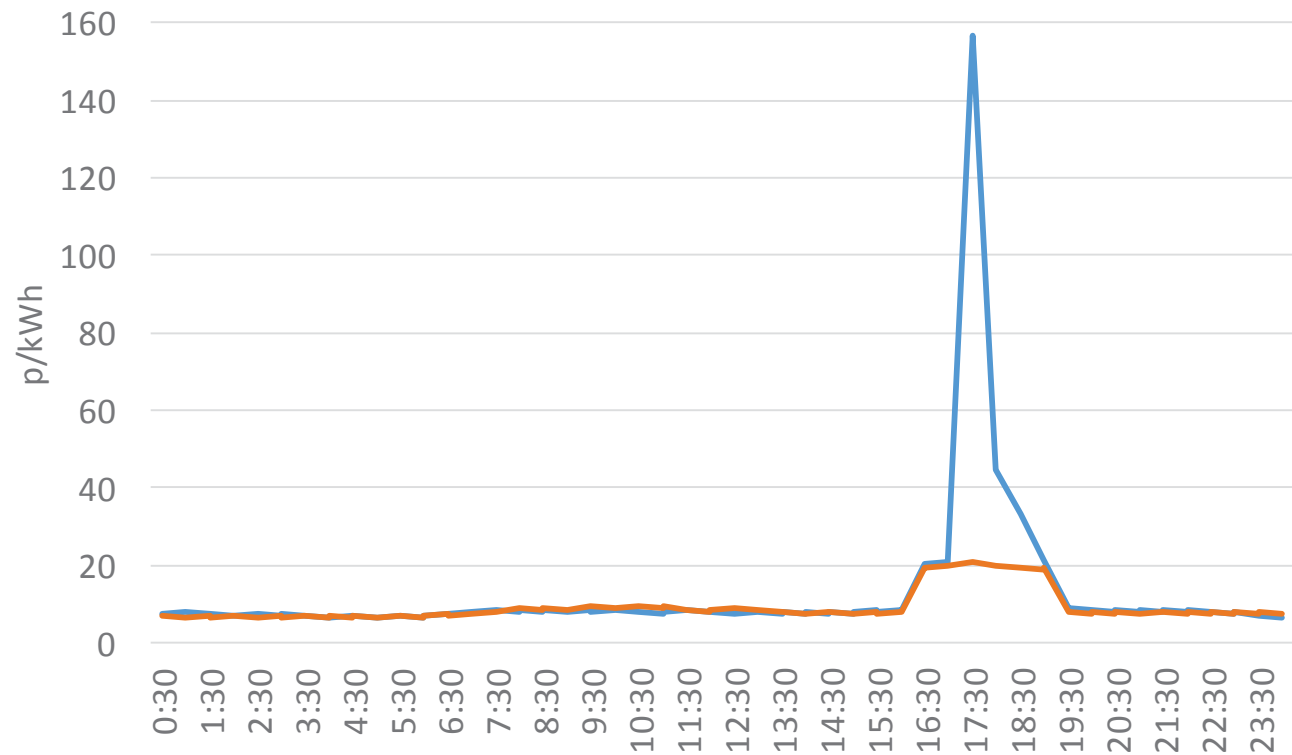
Weekday

— January — June

2016-17

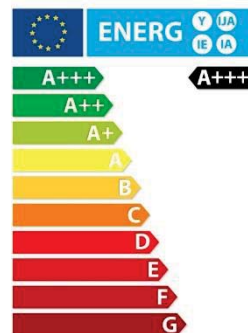
Low Voltage

South East

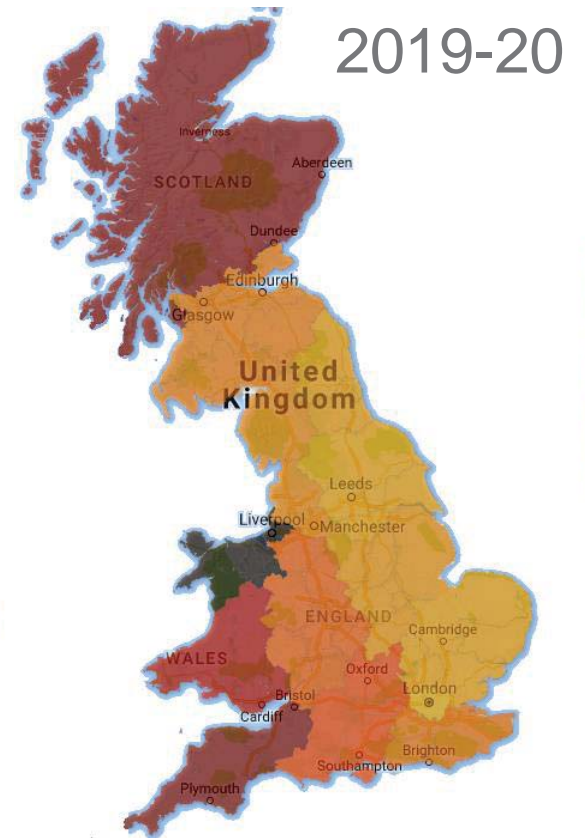
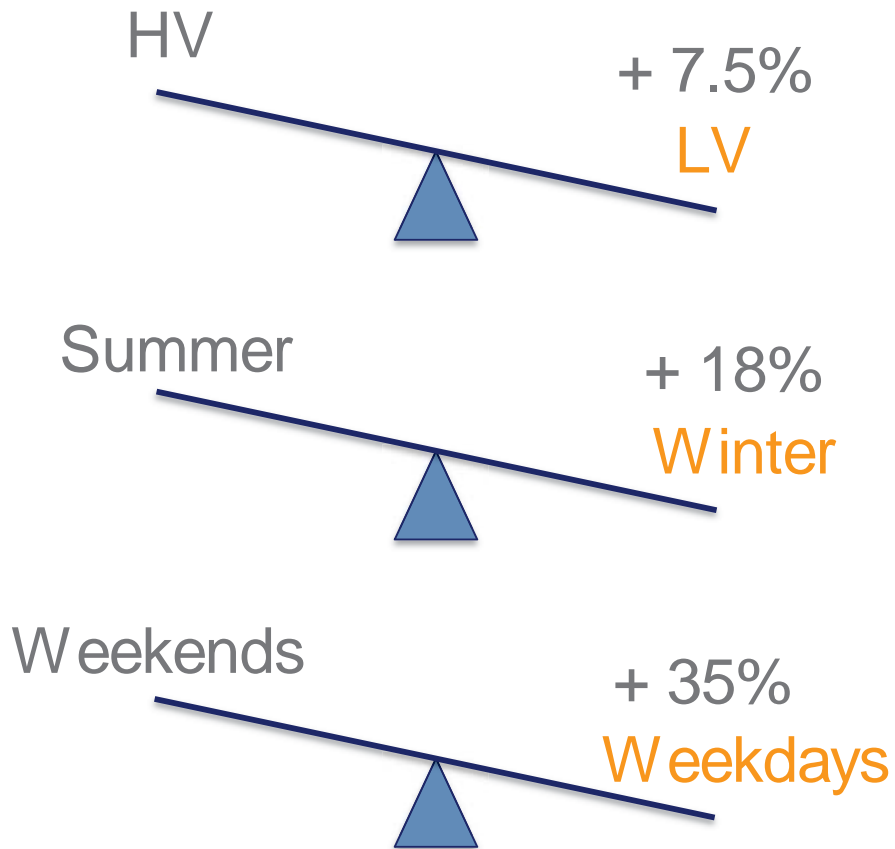


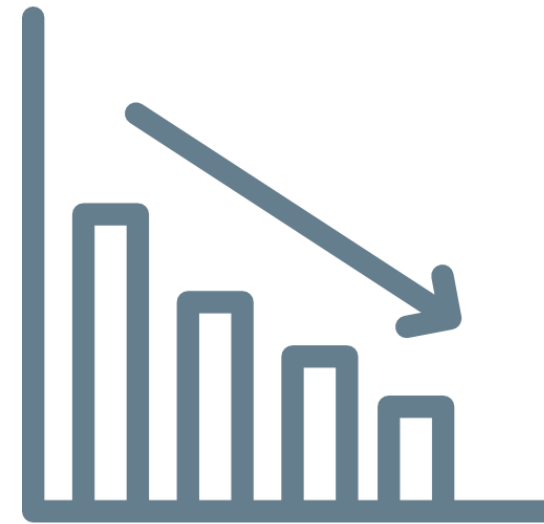
# Motivation

- 1,200 buildings across the UK
  - Supermarkets
  - Distribution centres
  - Petrol stations
- Emission reduction target
  - 20% by 2020 vs 2005
  - 50% by 2030 vs 2005



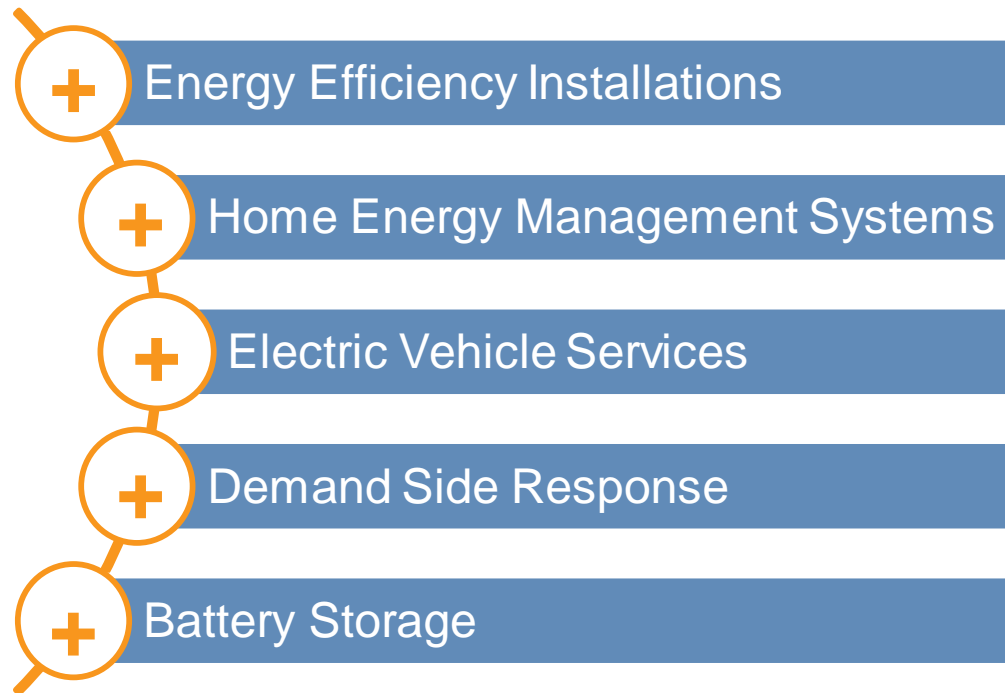
# Average electricity prices



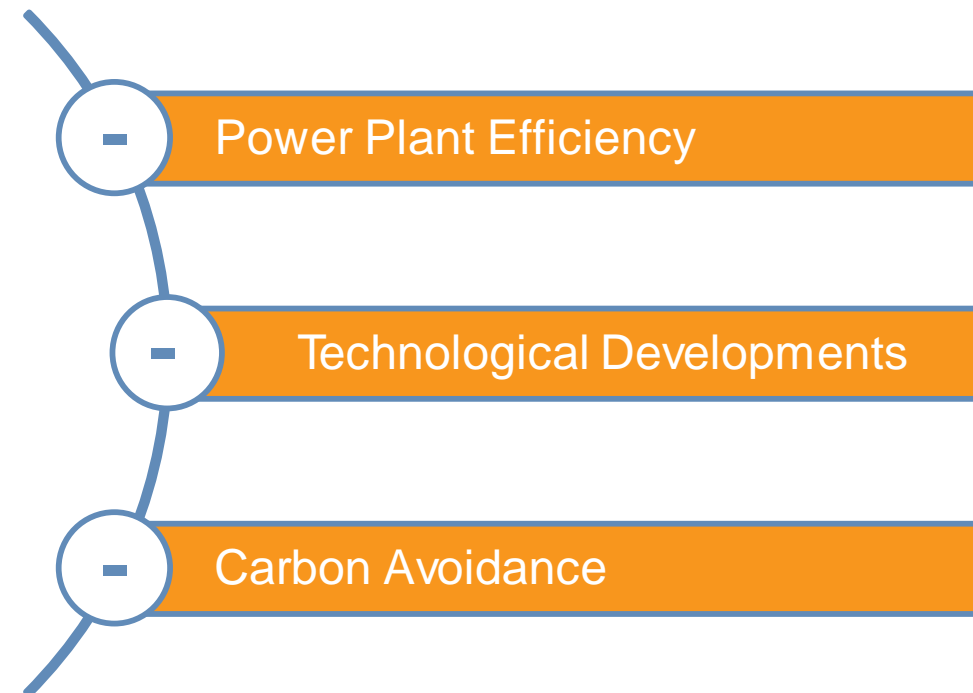


**traditional  
centralised  
utilities  
like  
'Big 6'  
in UK**

## new revenues



## avoided costs



The Energy Transition provides new Value Streams



By 2050, the Energy Transition can enable

new revenues

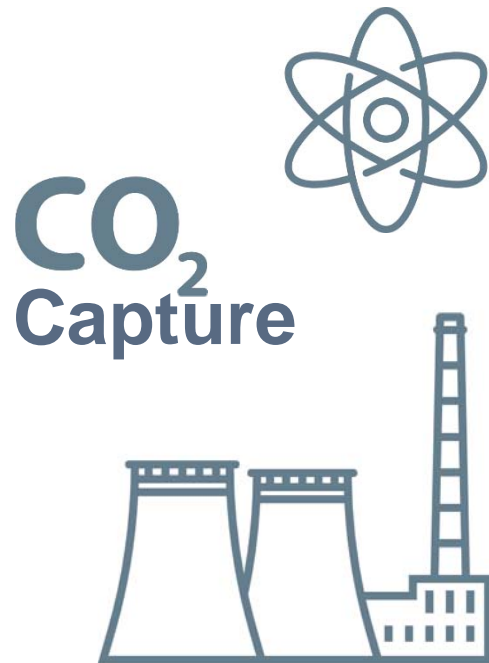
up to £12.8bn

avoided costs

up to £10.9bn

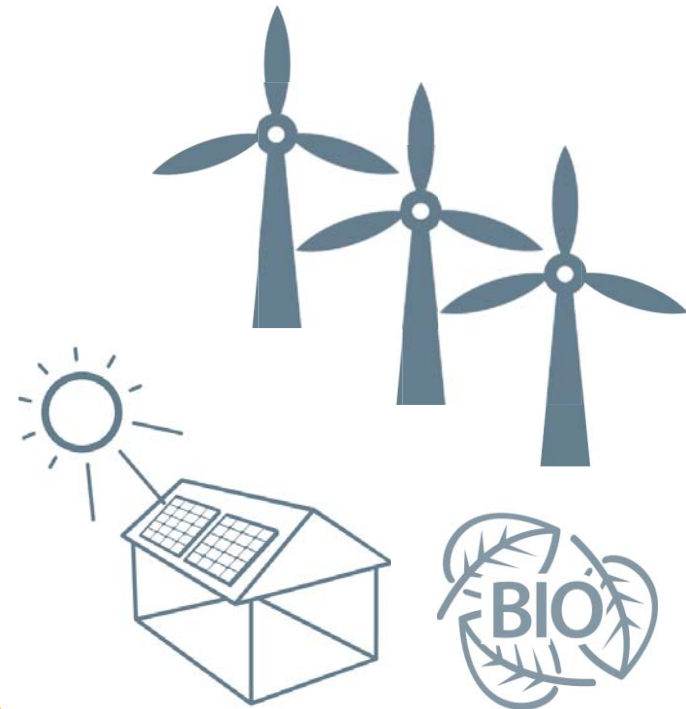
for the UK Power Sector

### Centralised Power System



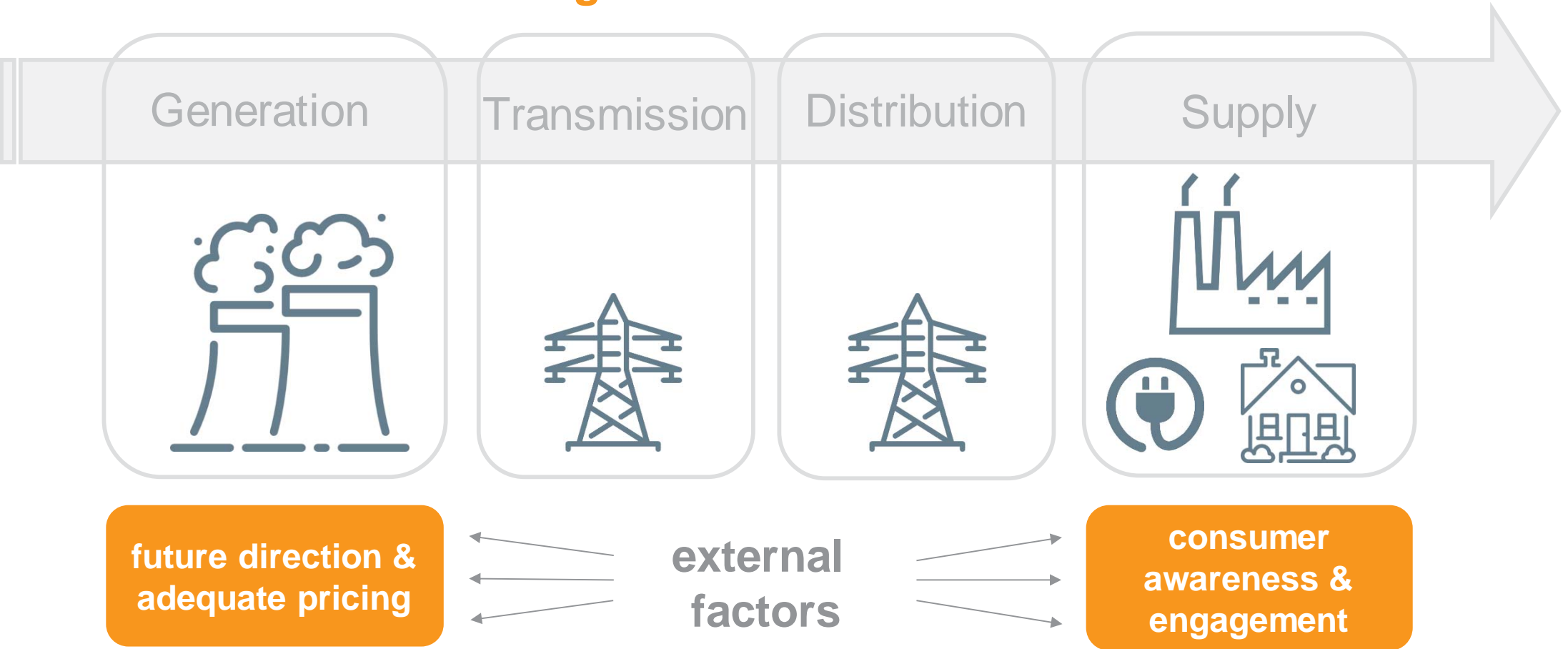
VS

### Decentralised Power System

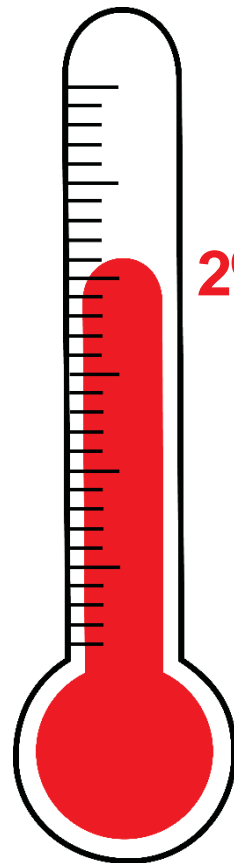


However, these results are very sensitive to future system developments

## New Business Models along the Power Sector Value Chain

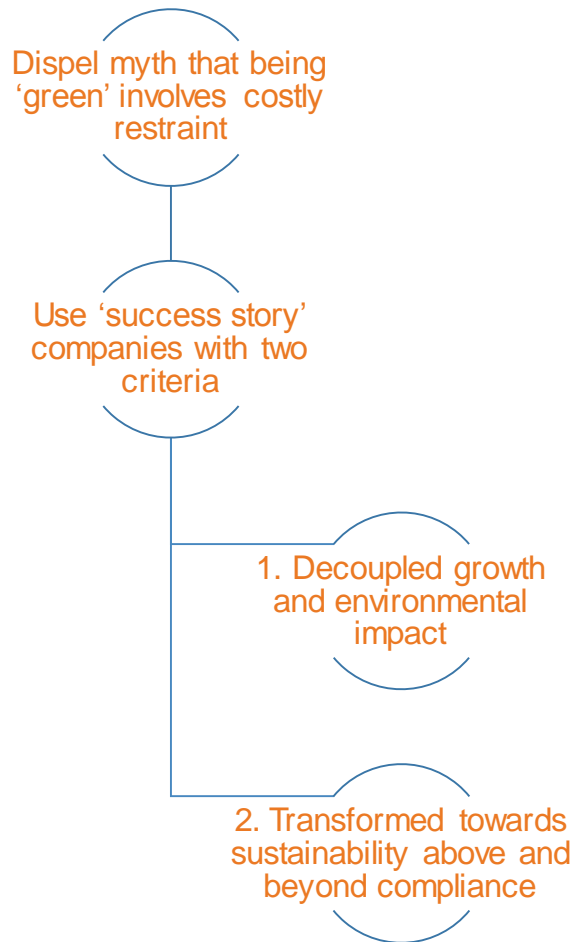


# WHY BUSINESS?

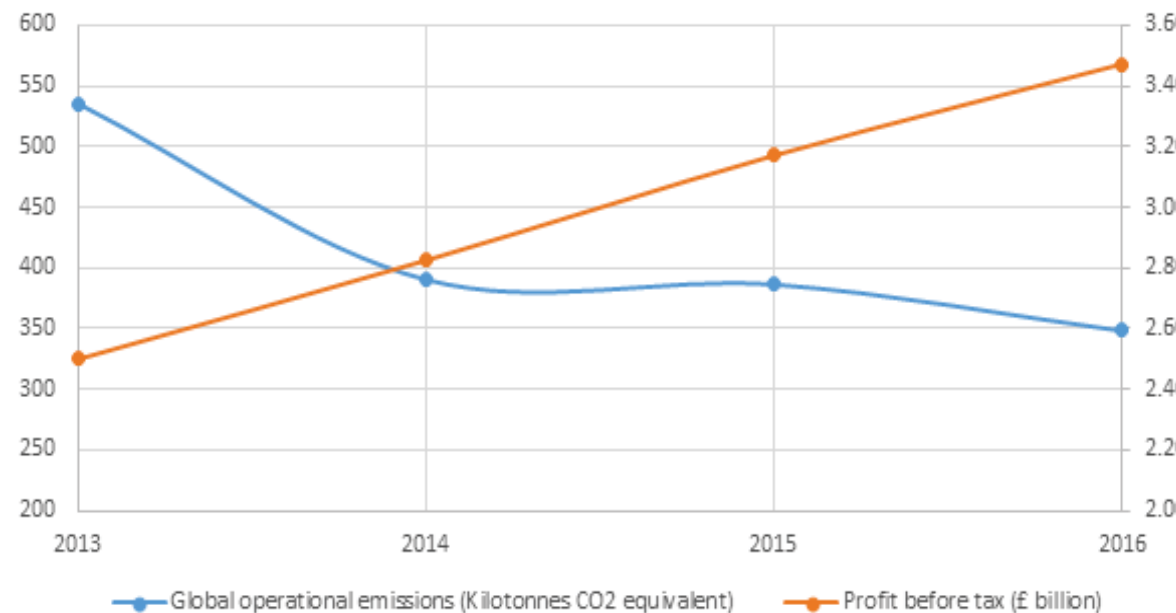


“If you’re not part of the problem, how can you expect to be part of the solution?” *Amory Lovins*

# DISPELLING THE MYTH



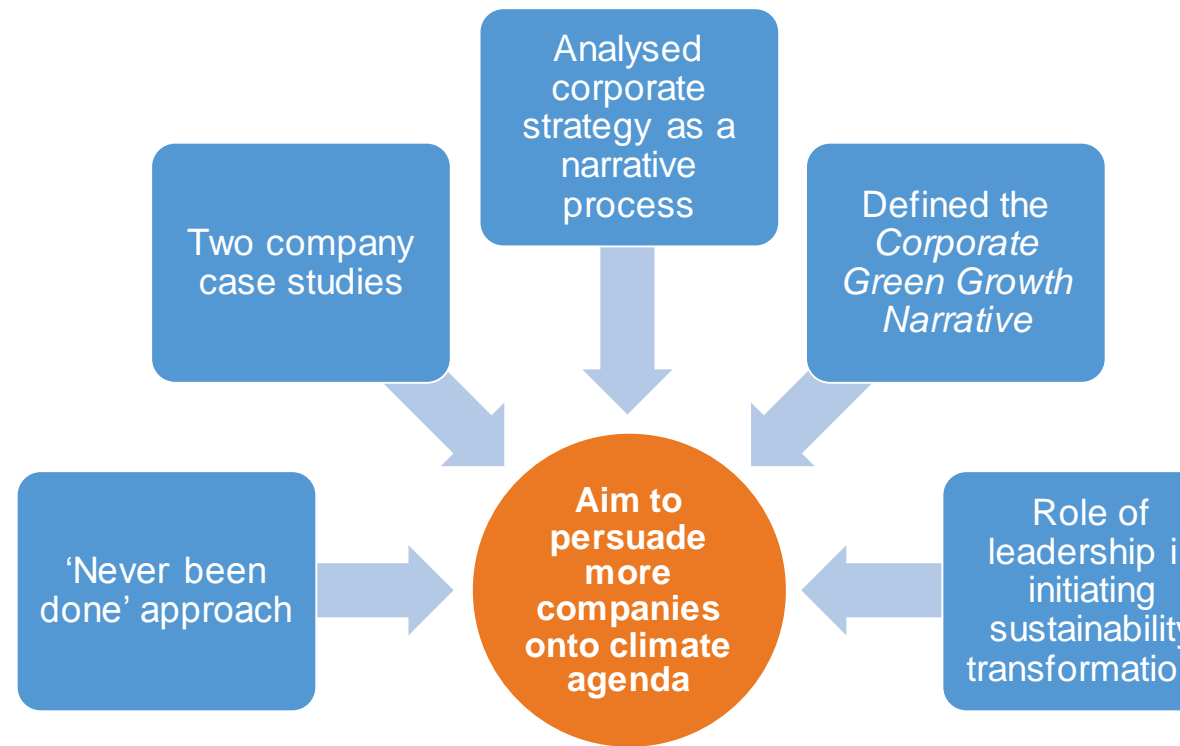
BT: Decoupling Emissions and Growth



BT helped its customers avoid **7.6 million tonnes CO<sub>2</sub>e** in 2015/16, whilst generating **£3.6 billion** revenue from the products and services that are helping them do it

# APPROACH

# Interface®



# FINDINGS

Tried and tested *Green Growth Narrative* framework

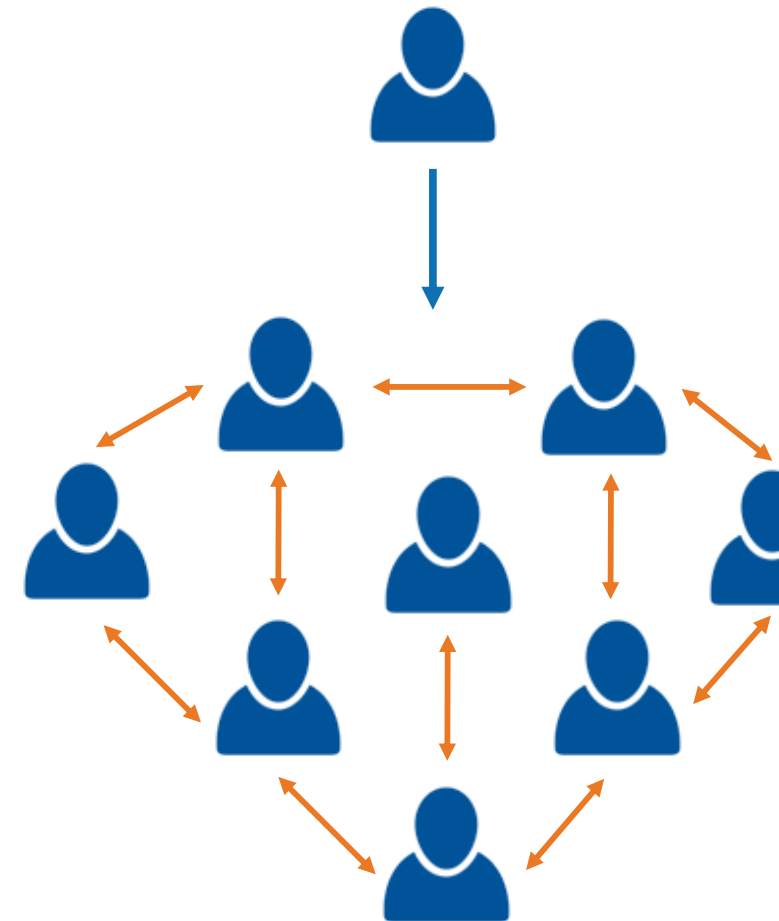
- Communication tool anyone can use

Visionary leaders are necessary

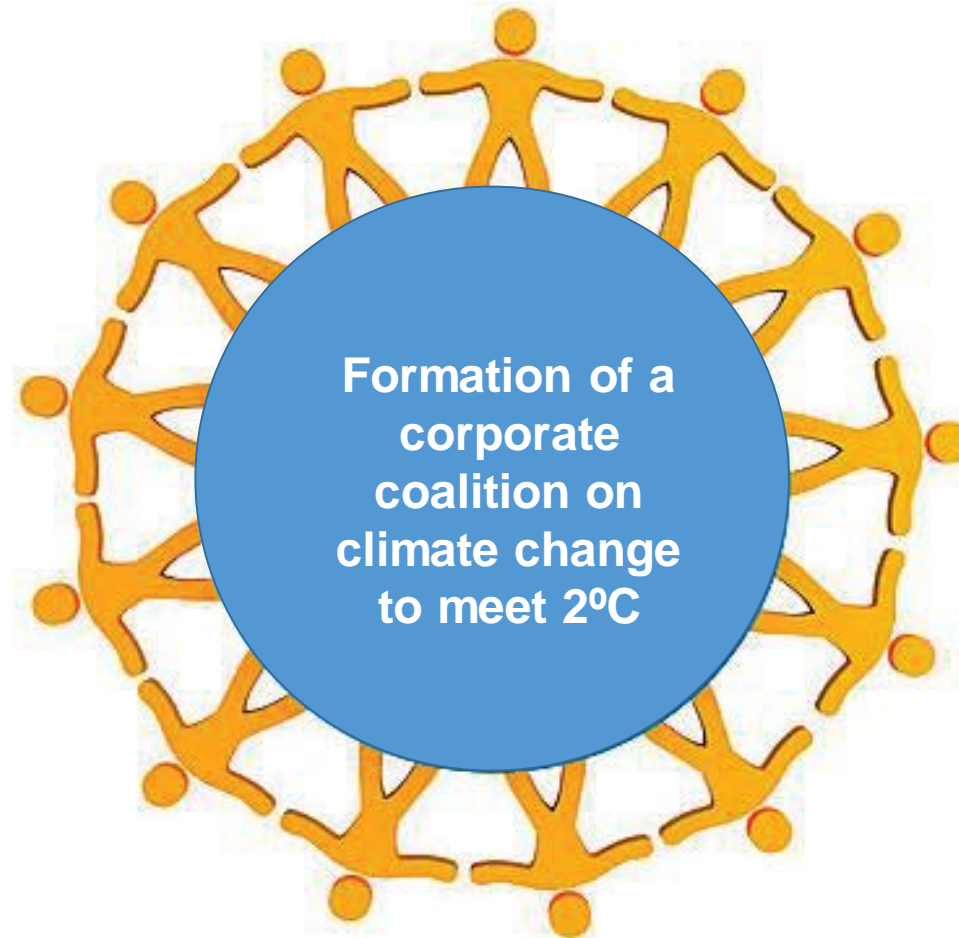
- Driven by personal 'epiphany' moment
- Can have inordinate impact causing 'chain reaction' of *GGN* development

Advice for business leaders globally

- Leaders can structure field of action based on success stories
- Narrative continues affecting change without leader

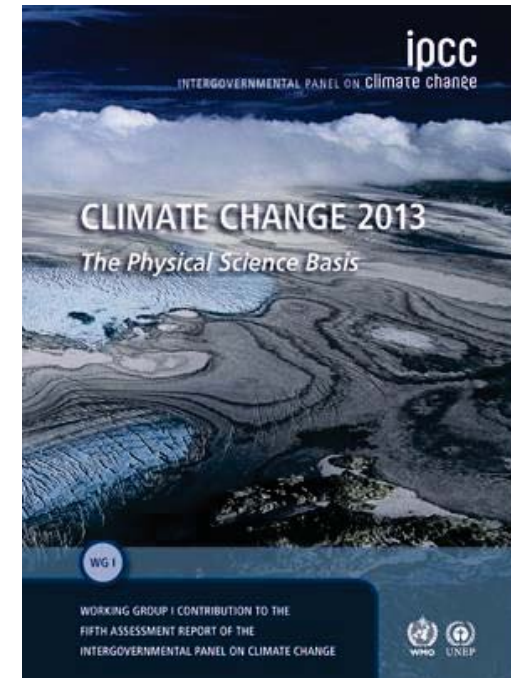


# RECOMMENDATION





# What is the IPCC?



# Two Communications Goals

~~Communicate the Science it produces~~

Communicate the Functioning of the Organisation

Coherent purpose

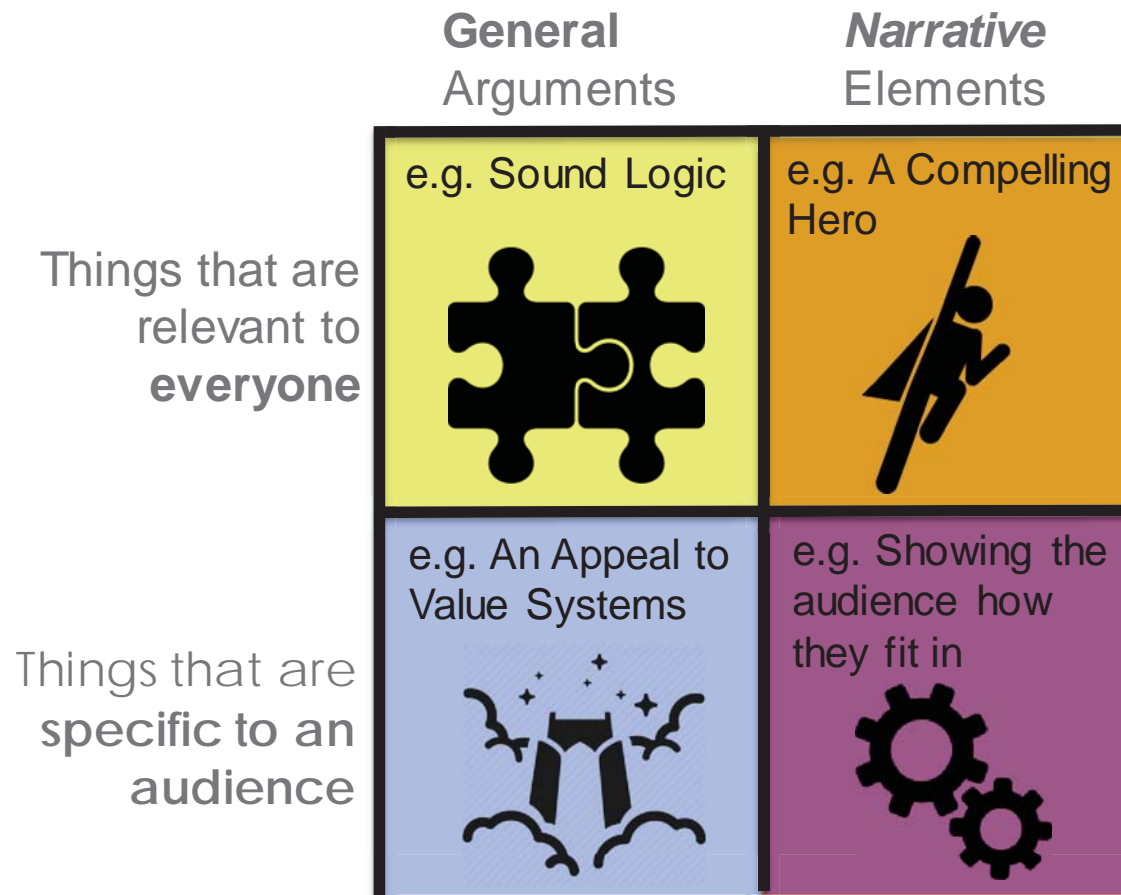
Comprehensible Process

Credible Character

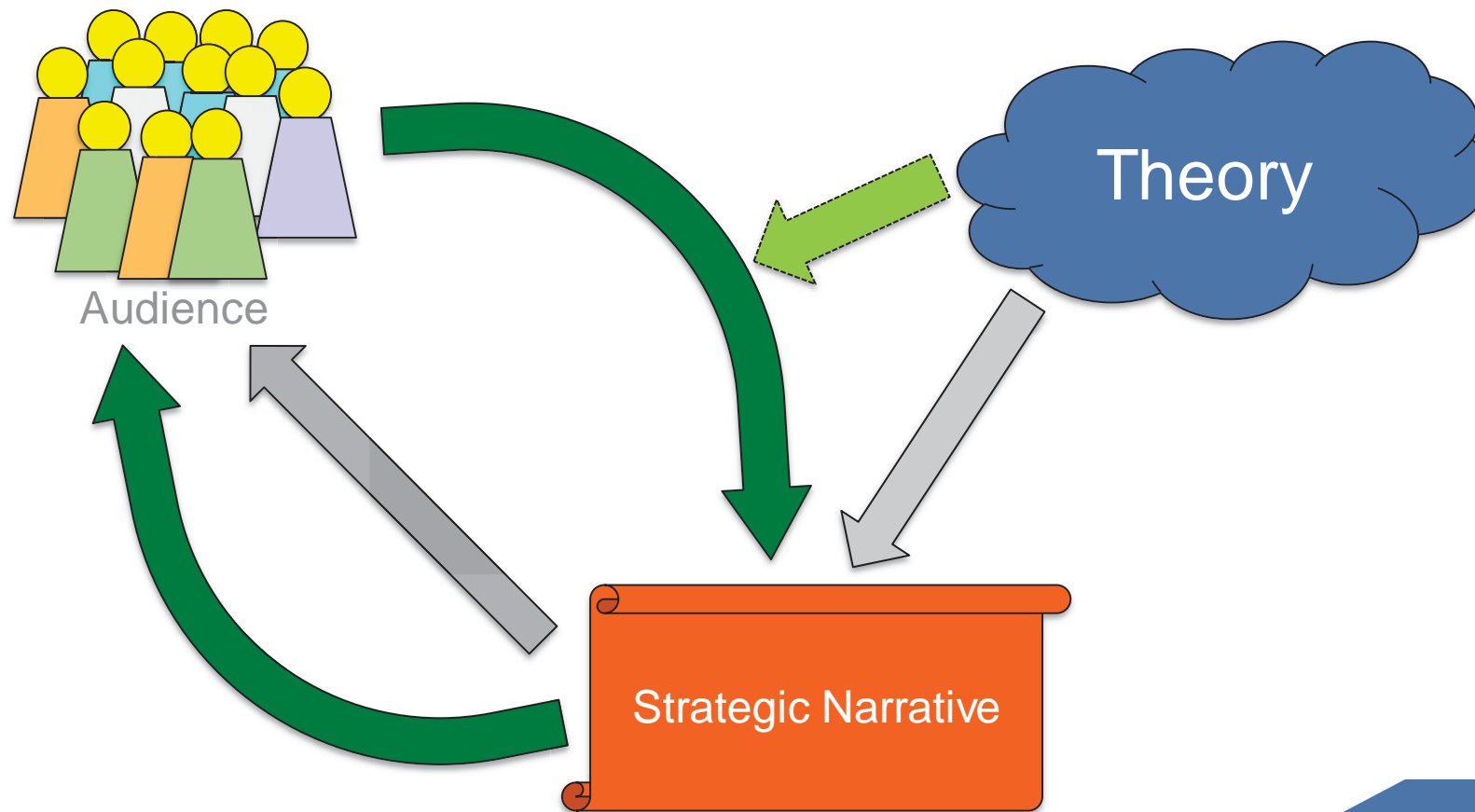
# What are Strategic Narratives?

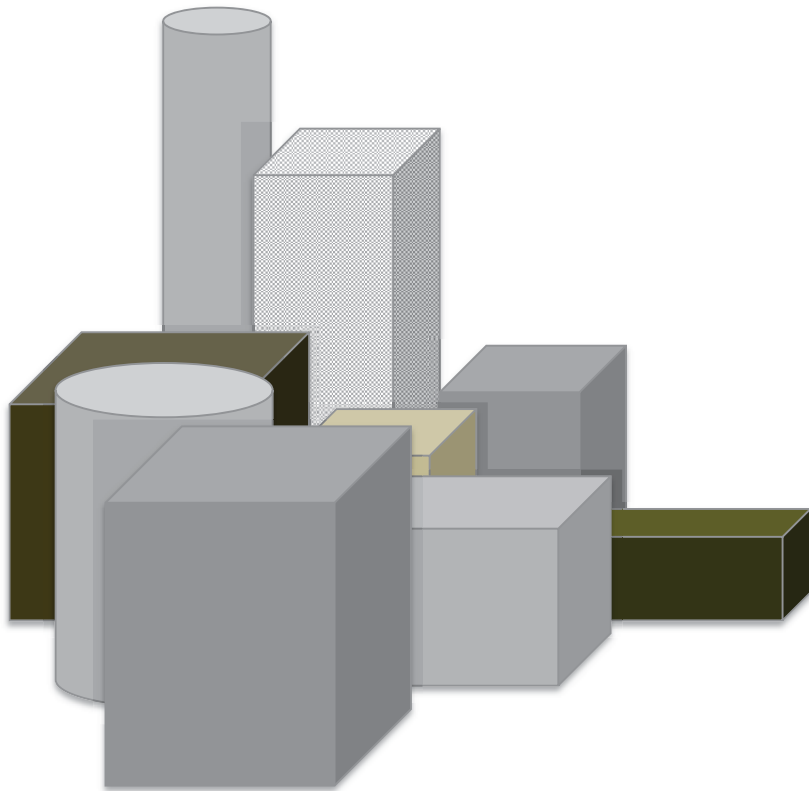
Smart Stories that give **meaning to action**  
designed to **coordinate and persuade**

# Why are we persuaded by stories?

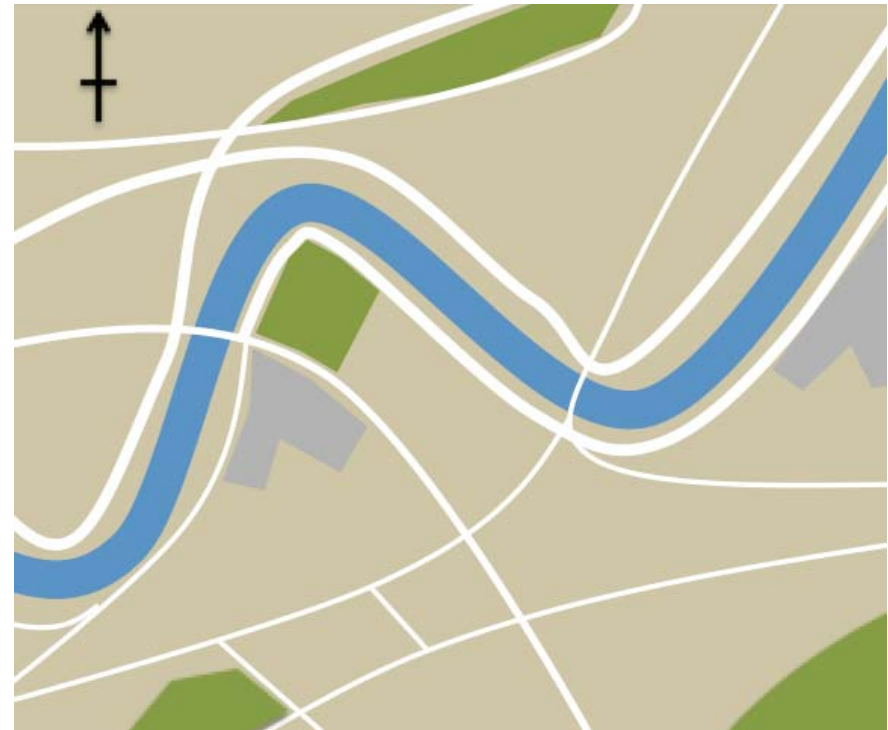


# How can you start with the audience?



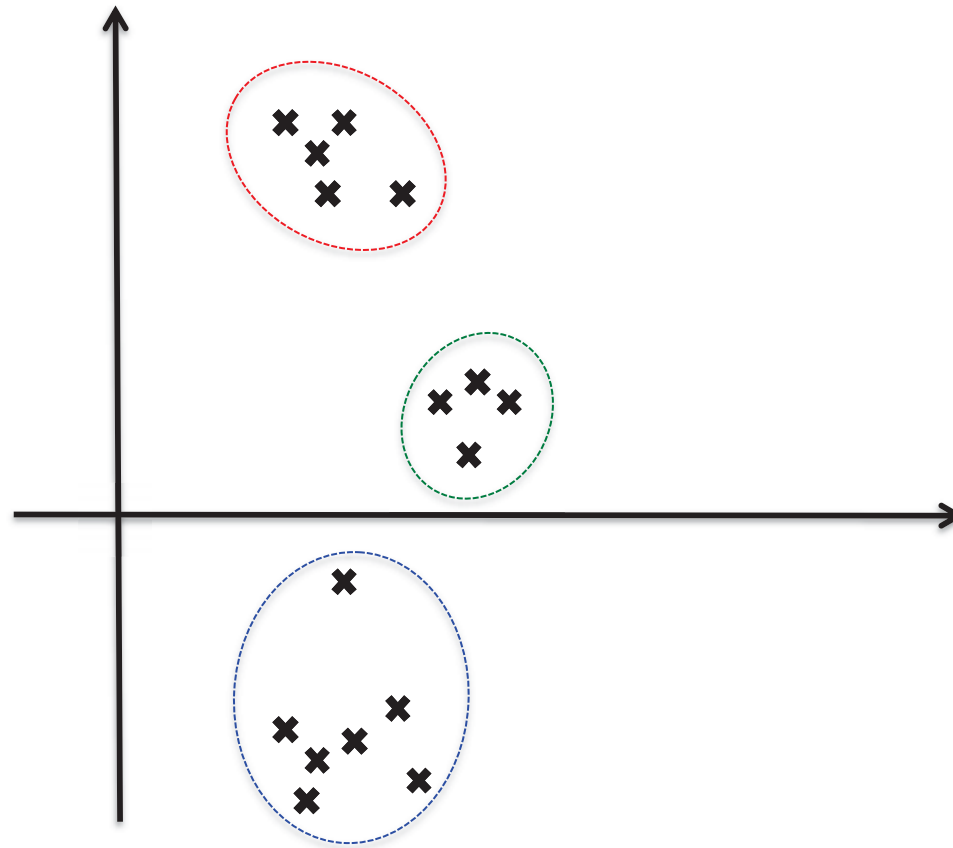


Vs.



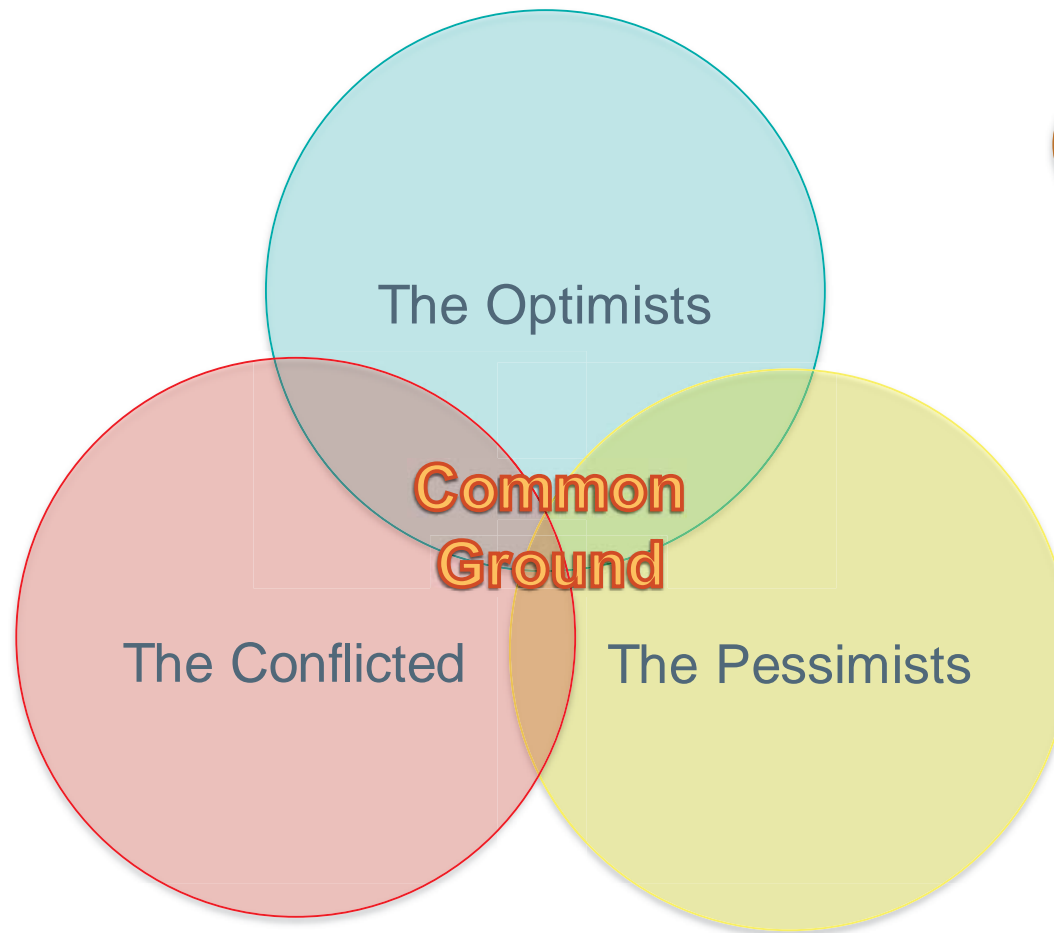
# Methodology

Opinion on **Statement A**



Opinion on **Statement B**

# The Three Opinion Groups



 = Range of Opinion



# A Narrative for the IPCC



The IPCC **facilitates** decision-making with climate science

# One Belt One Road



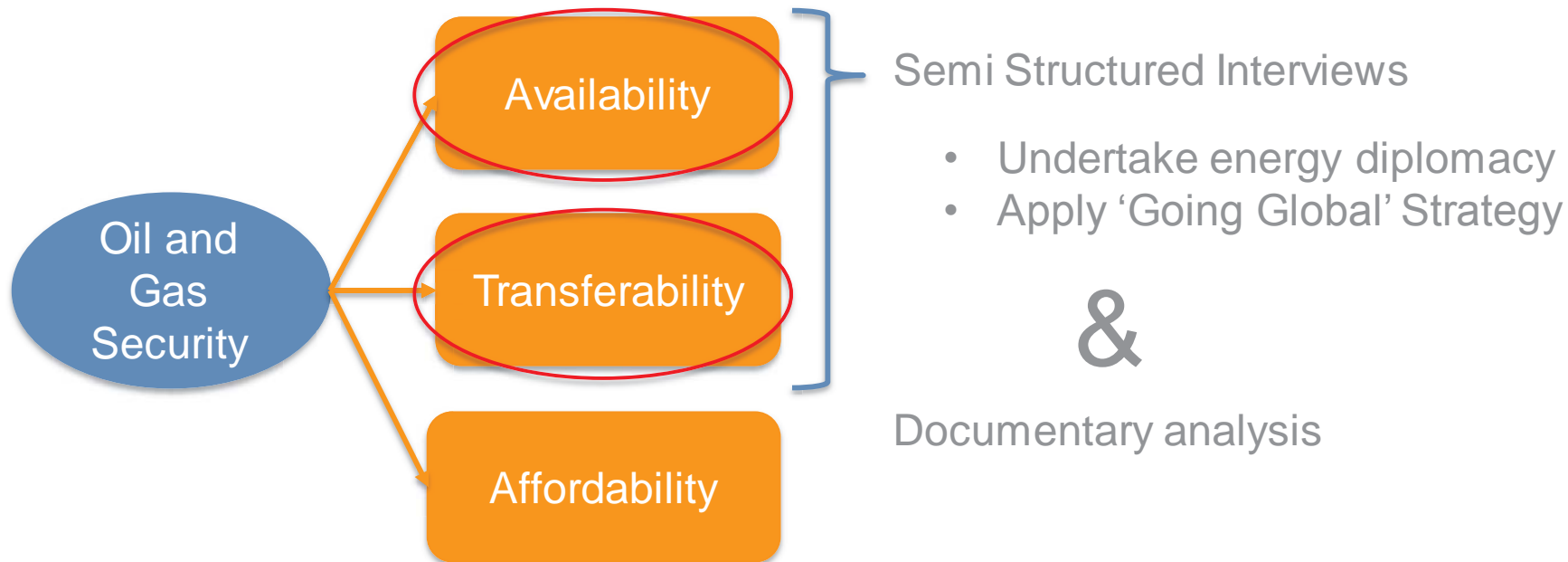
- Belt → Contemporary Physical Road
- Road → Maritime Silk Road

Energy Security: *the uninterrupted availability of energy sources at an affordable price (IEA)*

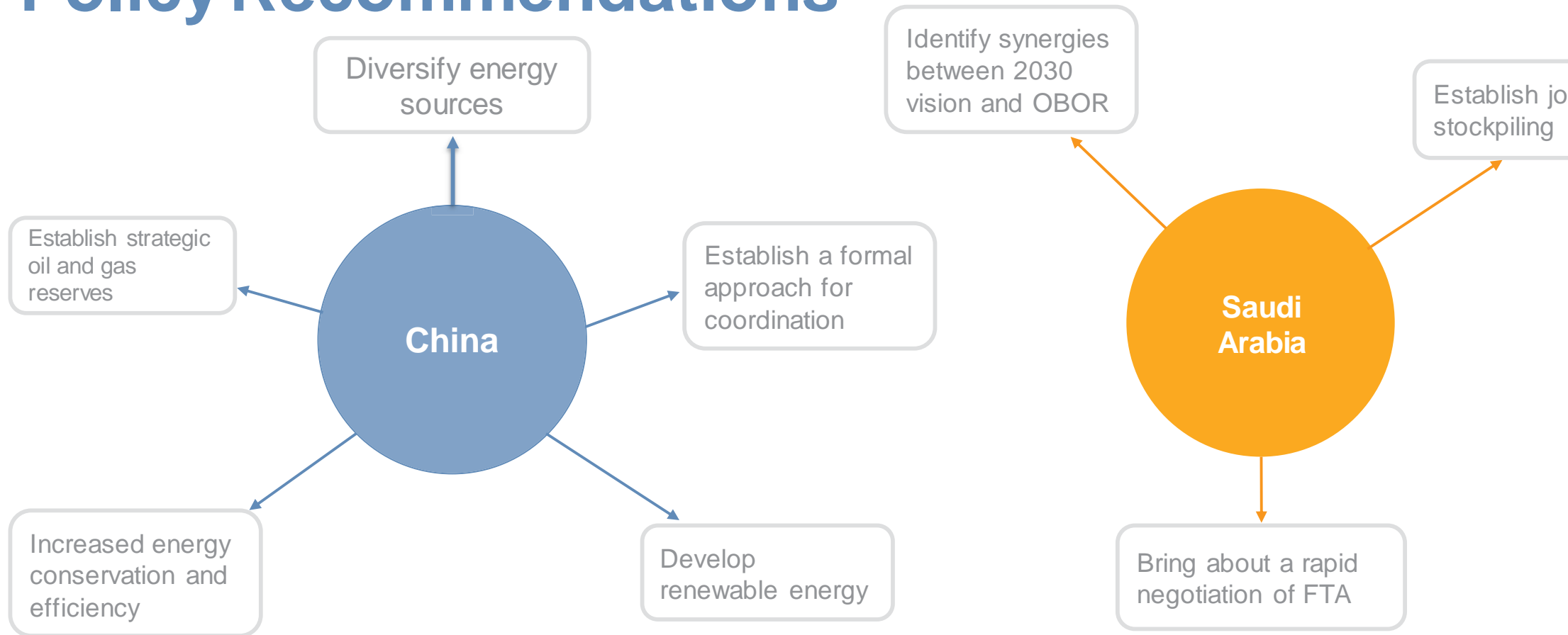
Key Objective:

*To ensure Middle Eastern oil and gas flow into china to meet the energy demand*

# Developing Policy Insights



# Policy Recommendations



# Evaluation of Recommendations



## A Quick Review of Conclusions:

How OBOR helps secure China's energy supply?

- **Strengthen** the complementarity of resources
- **Diversify** energy sources

How China's Energy Strategy will develop?

- **Reduce** consumption and reliance on conventional fossil fuels
- **Encourage** more renewables

How Middle Eastern energy producers engage with China?

- **Shift** its economic structure
- **Bring about** a rapid negotiation of FTA
- **Provide** a more commercial and strategic energy trade scheme

## Why is this relevant today?



### Situation

- Energy systems
- Energy trilemma
- Energy transition



### Problem

- Different actors
- Conflicting objectives
- Uncertainty

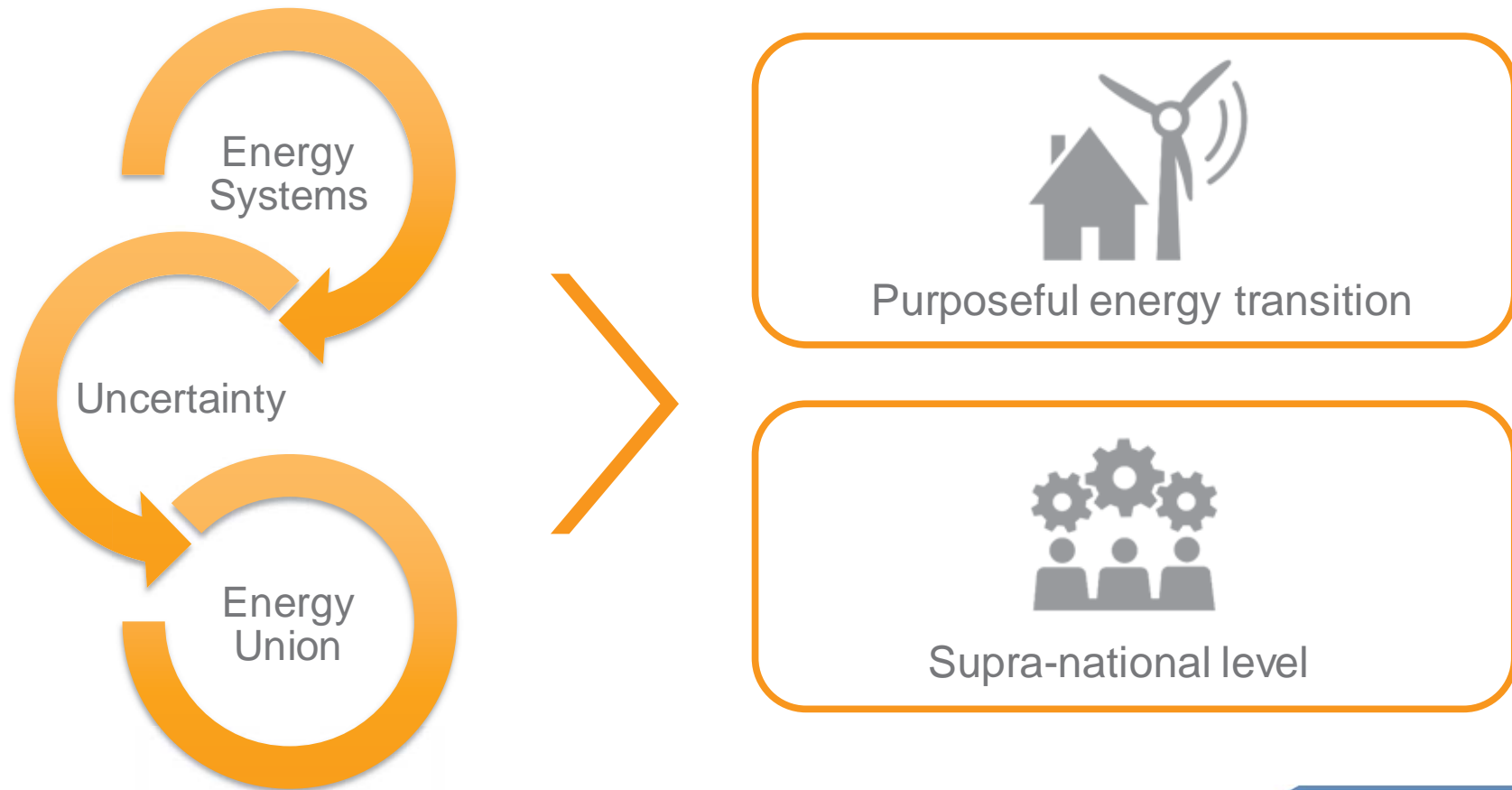


### Solution

- Purposeful transition
- Supra-national cooperation
- Energy Union

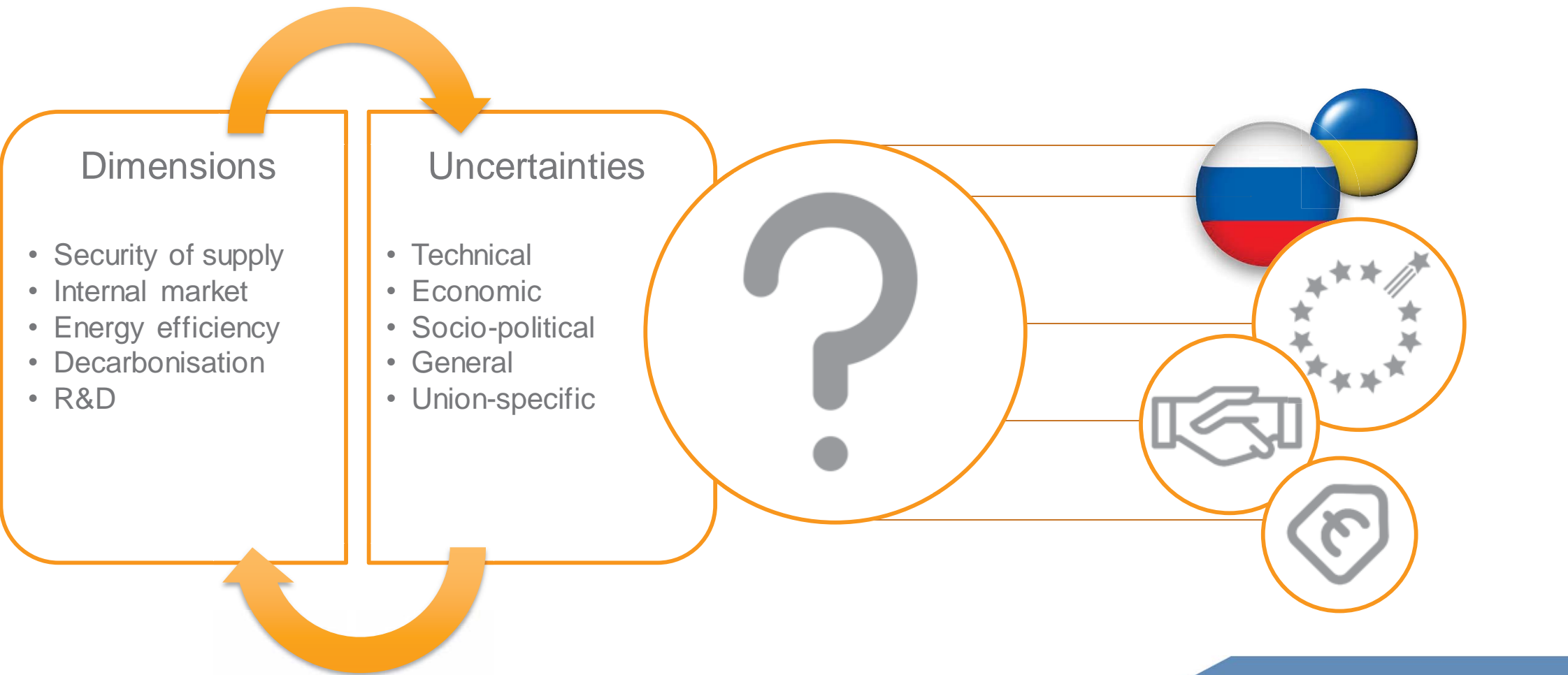


## Unique nature of the Energy Union policy initiative





## Assessment of uncertainty impact on policy dimensions



## The need for increased cooperation

### Uncertainties

Address, quantify and monitor

Soft/non-rational uncertainties

Develop strategies

### Energy transitions

Increase best practice sharing

Reduce transition cost

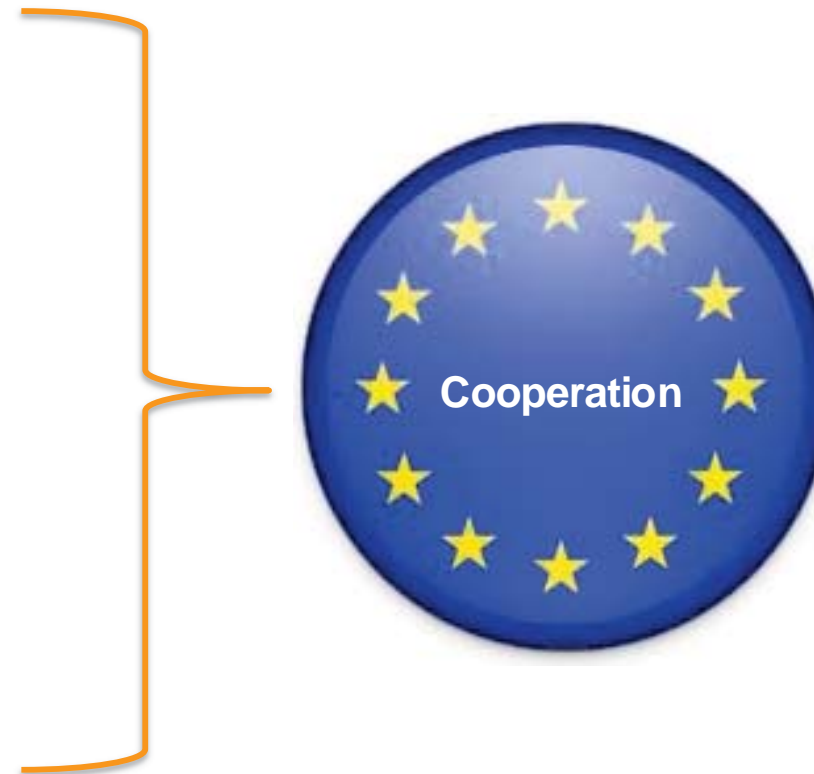
Avoid path-dependency

### Energy Union

Reduce ambiguity - nature of the Union

Reduce ambiguity – agenda of the Union

Avoid regressing to “re-packaging”



# Potential for competition

## Cooperative approach

1997



- Harsh enforcement
- Ambitious targets
- Annex B
- Results uncertain
- 2 degrees maximum

2015

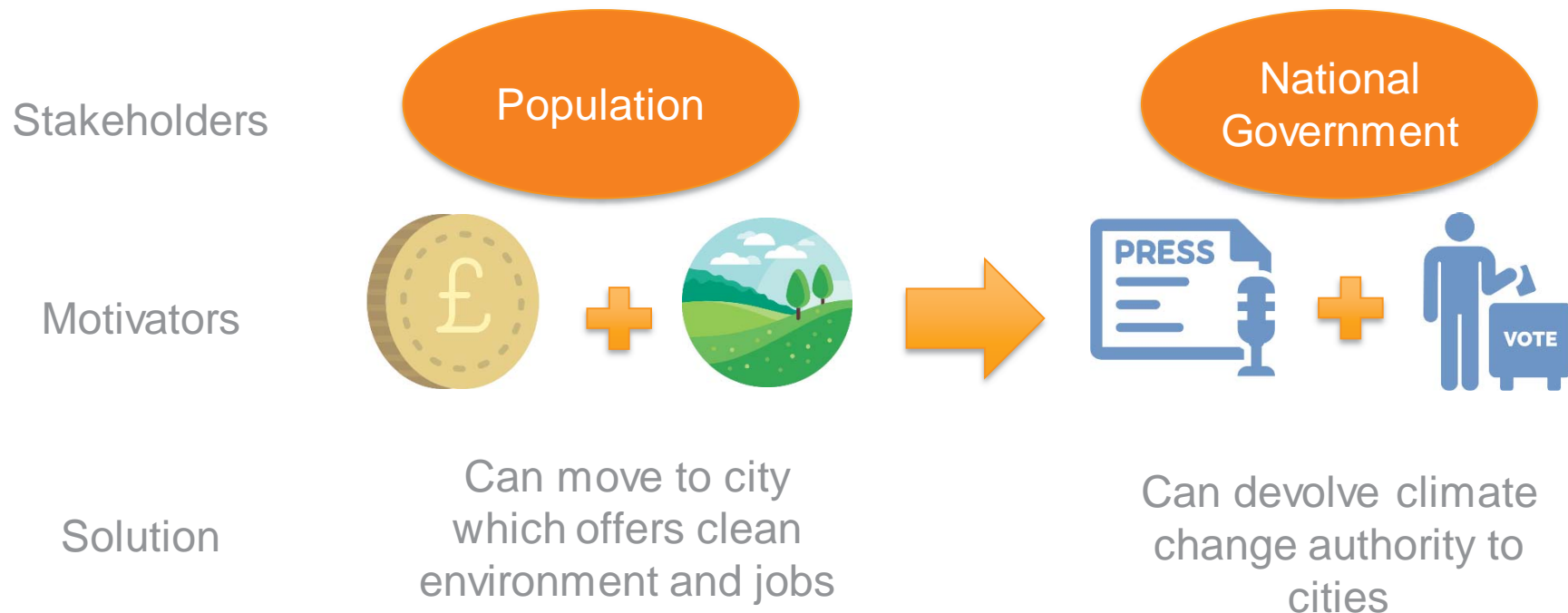


- No enforcement
- No targets
- \$100bn fund
- No results available
- 2 degrees maximum

Results and speed not guaranteed

## Competitive approach

# Competition of cities



Cities compete to satisfy population motivators

## Mostly successful



**Sustainability**  
of devolution



Different city  
scenarios

Mostly, but with  
variable failure risk



**Effectiveness**  
of devolution



Always, but with  
decreasing effect

- Highly dependent on assumptions of city structure
- City and national governments have to bargain over pollution



**Clemens Tepel**

**Poster #5**

What are the least regret technology options to provide 'flexibility' in increasingly intermittent power markets, and do existing policy designs sufficiently incentivise these?



**Aitor Soler Garcia**

**Poster #6**

Electricity price for commercial end users in the UK



**Marie-Sophie Wegner**

**Poster #7**

Future electricity utilities: influence of energy system developments on business model innovation



**Shaunagh Duncan**

**Poster #8**

Strategic narratives on climate change: How to persuade companies they can be 'green' and grow



**Luke Bevan**

**Poster #2**

The hero, the dragon and the Intergovernmental Panel on Climate Change: How can strategic narratives help the IPCC explain its purpose?



**Yichen Qian**

**Poster #4**

Forecasting the impact of Middle East geopolitics on China's energy security: A case study in the context of 'One Belt One Road'



**Krisztina Szabó**

**Poster #3**

What are the uncertainties of the Energy Union implementation? An energy transition perspective



**John Zepos**

**Poster #1**

Climate change action in the authority of devolved subnational actors: the case for devolution

**Thank you for your attention.  
We are looking forward to meeting you during the poster session.**

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