

The impact of lifestyle and social change on the UK energy system

Sustainable lives?

The challenges of low-carbon living in a changing economic climate

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The Energy Lifestyles Scenario

The project:

- One scenario in the UK Energy Research Centre project “Energy 2050”

The aim:

- To understand the potential impact of ‘lifestyle change’ on the UK energy system on 2050, in particular carbon emissions and system resilience

The team:

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What are lifestyles?

Various definitions

- Consumption patterns
- Preferences
- Use of time and space
- Social values and norms
- Public acceptance of technology and policy change

Our focus

- Decisions that affect energy demand



The lifestyle scenario

Storyline:

- Socially led change in energy use
- Re-evaluation of 'consumption'
- 'Green housing'; 'community living'; 'accessibility', not 'mobility'
- Policy consistent with social norms

Which behaviours:

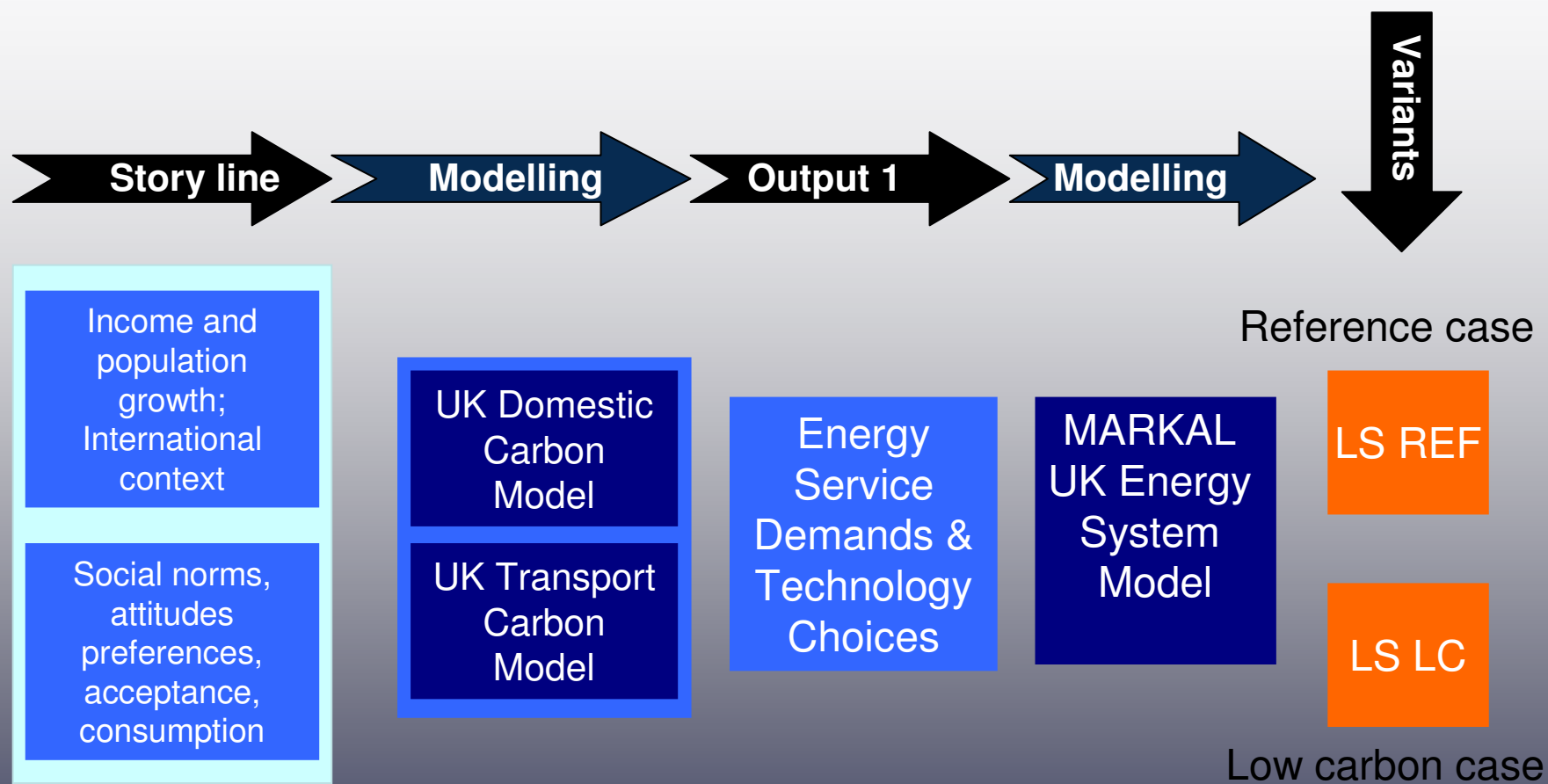
- Household energy & personal transport
- Technology choice & use

Scale of change:

- End points consistent with observed behaviour somewhere in OECD today
- Rates of change based on historically observed rates

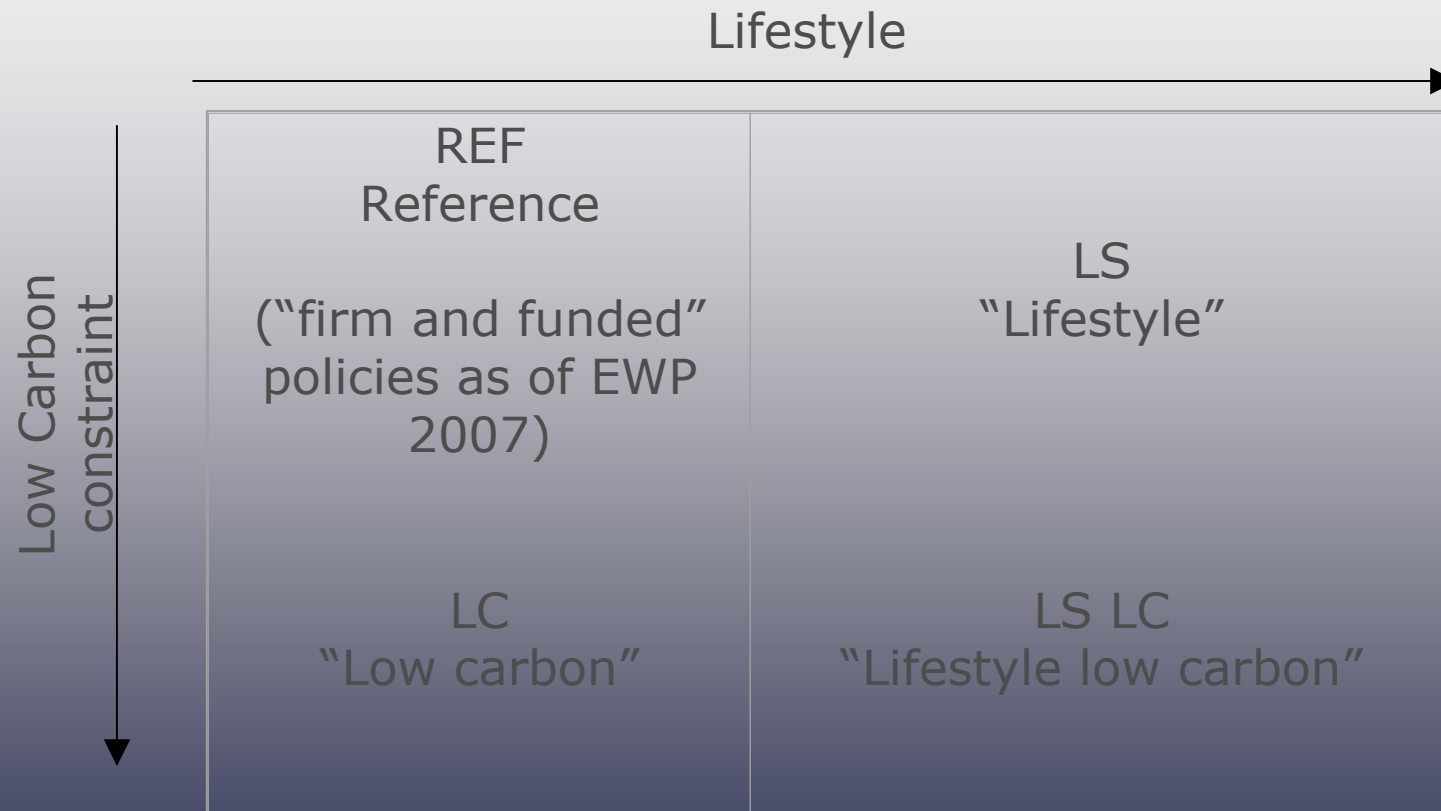


Lifestyle scenario - methodology



The Scenarios

ENERGY SYSTEM ATTRIBUTES

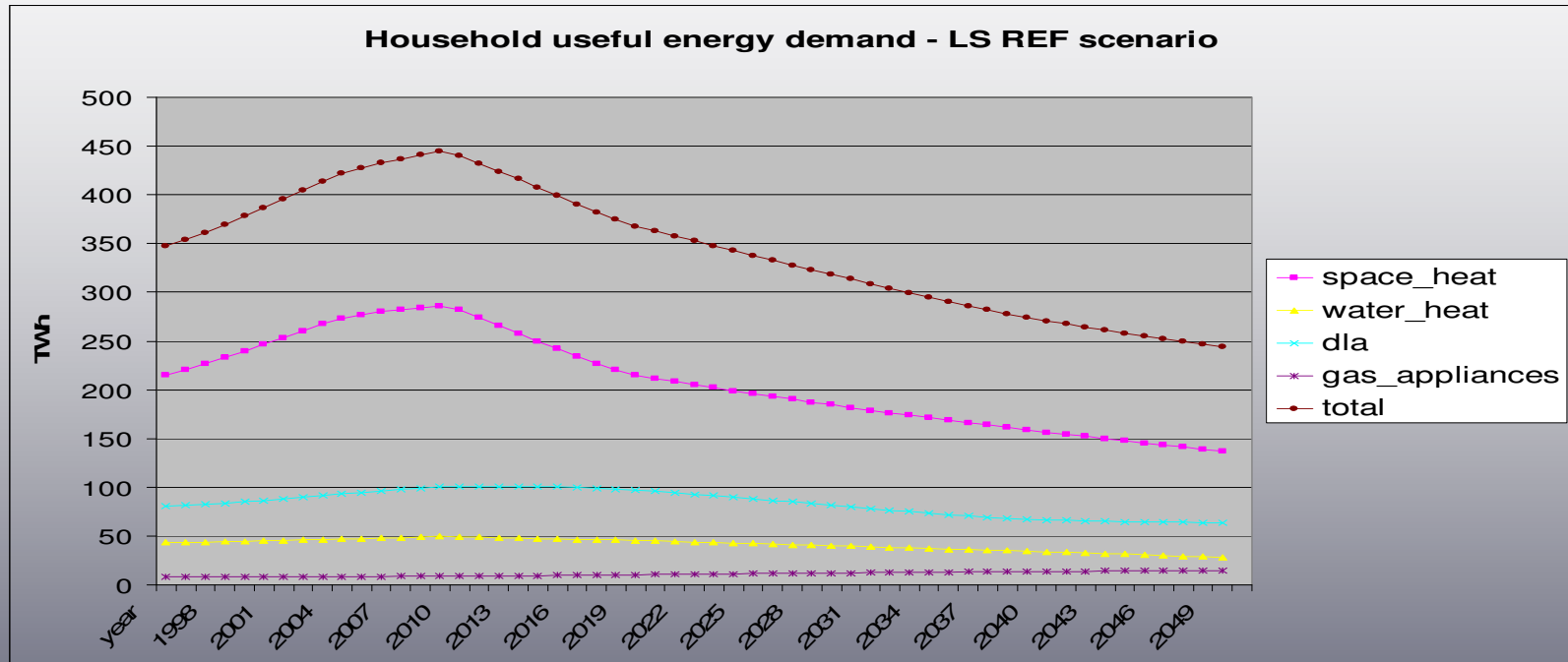


Household energy use - lifestyle driving forces

- Drivers of energy service demand:
 - internal temperature
 - consumption of hot water
 - use of lighting and appliances
- Choice of energy technology in the home:
 - Retrofit insulation decisions
 - Replacement heating systems
 - Lighting and appliance numbers and efficiency
 - Energy generation in the home

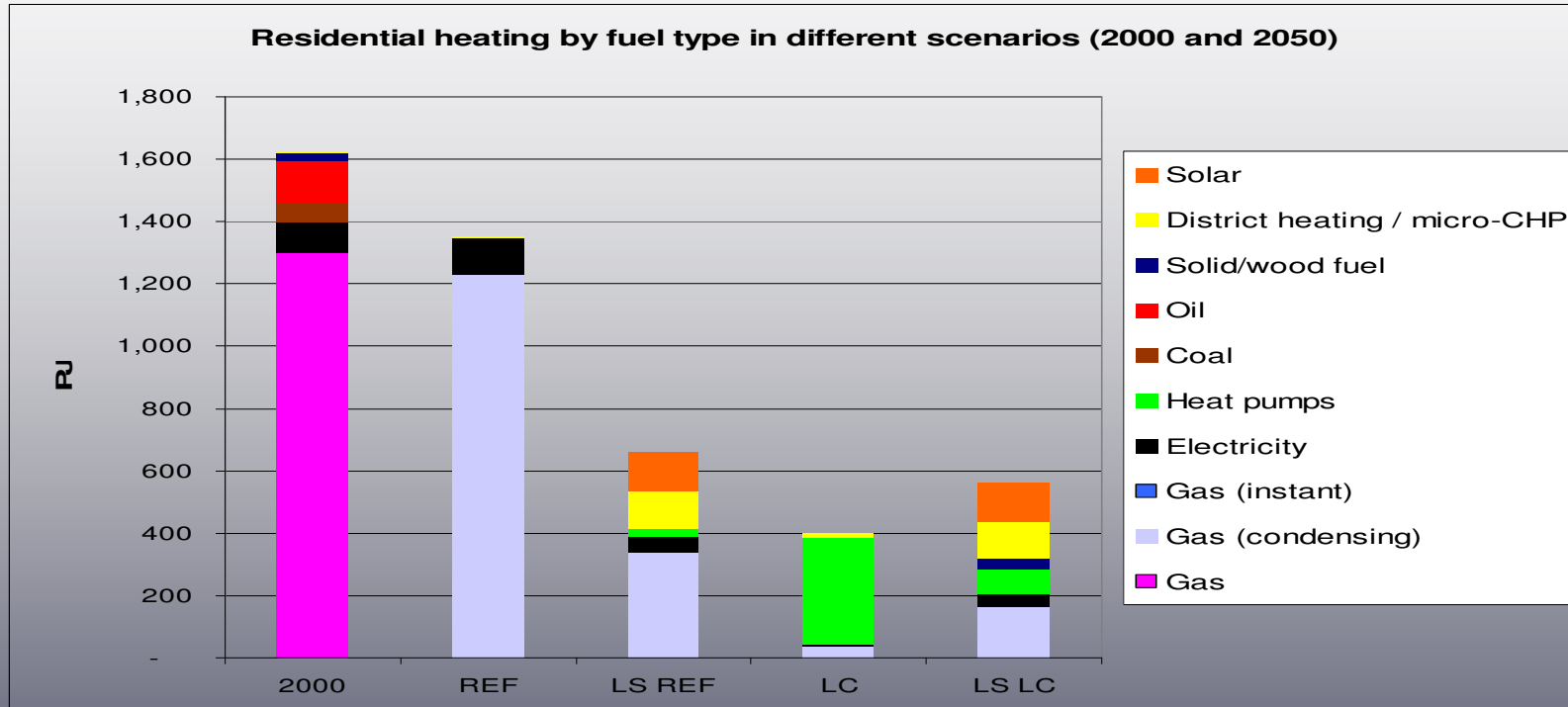


Household sector – impacts on energy demand



A combination of energy service demand reduction and efficiency improvement reduces energy demand by more than 50% from baseline levels by 2050.

Household sector – impacts on heating systems



Up to 2025, the major change is market penetration of condensing boilers. By 2050 the sector is transformed in different ways

Transport sector – lifestyle and mobility changes

Accessibility

Localism

Slower speeds

Compact cities

Car-free zones

Car clubs

ICT

Tele-working

Tele-shopping

Less air travel

Policy acceptance

Total
distance

Down 21%

Mode
choice

Car from 67 - 38% distance
Cycle from 1 - 13% distance

Vehicle
choice

Electric and hydrogen
vehicles 77% vkms in 2050

Driving
Style

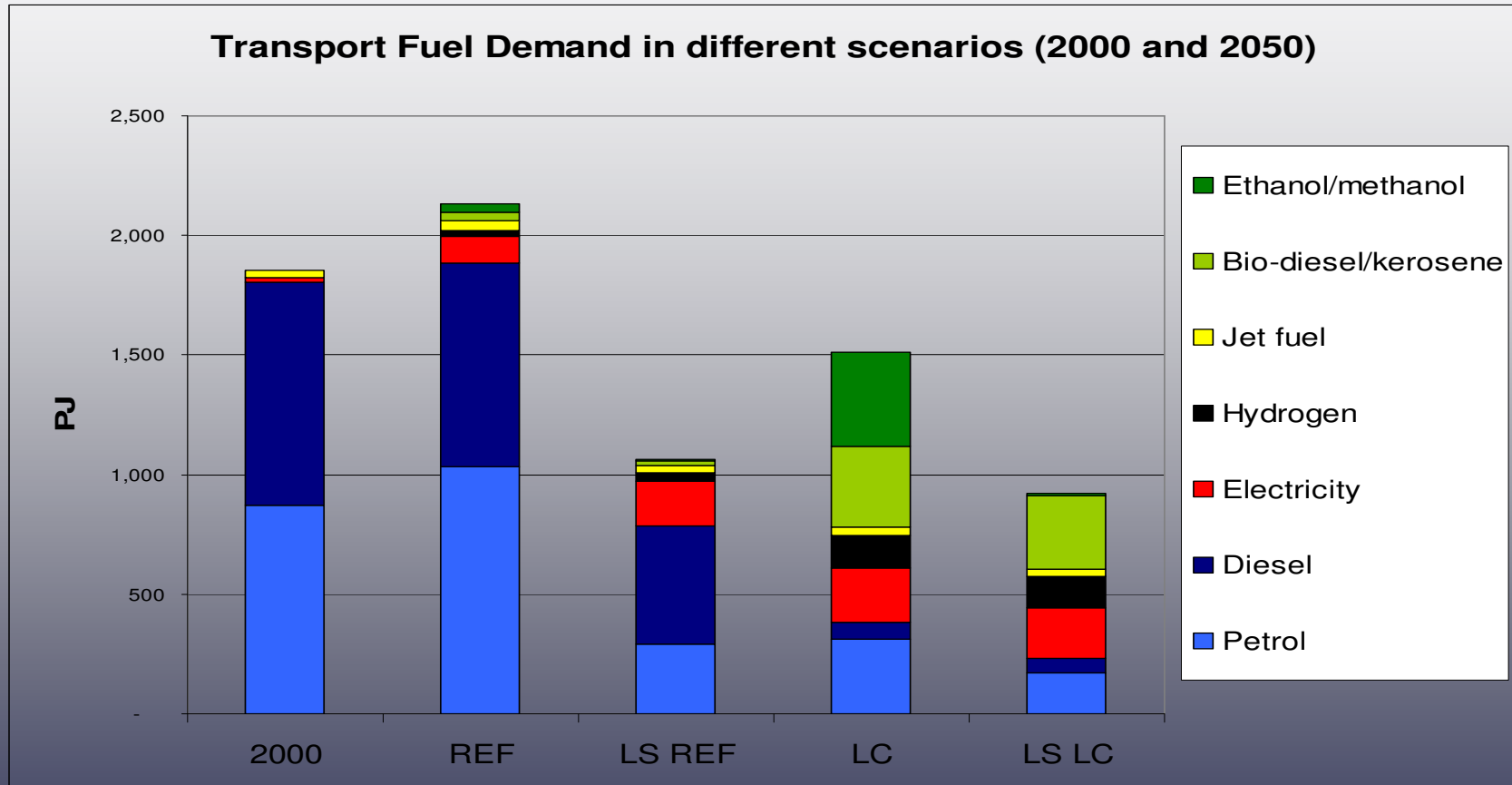
Ecodriving = 5% reduction in
CO₂ per km by 2025

Car
Occupan
cy

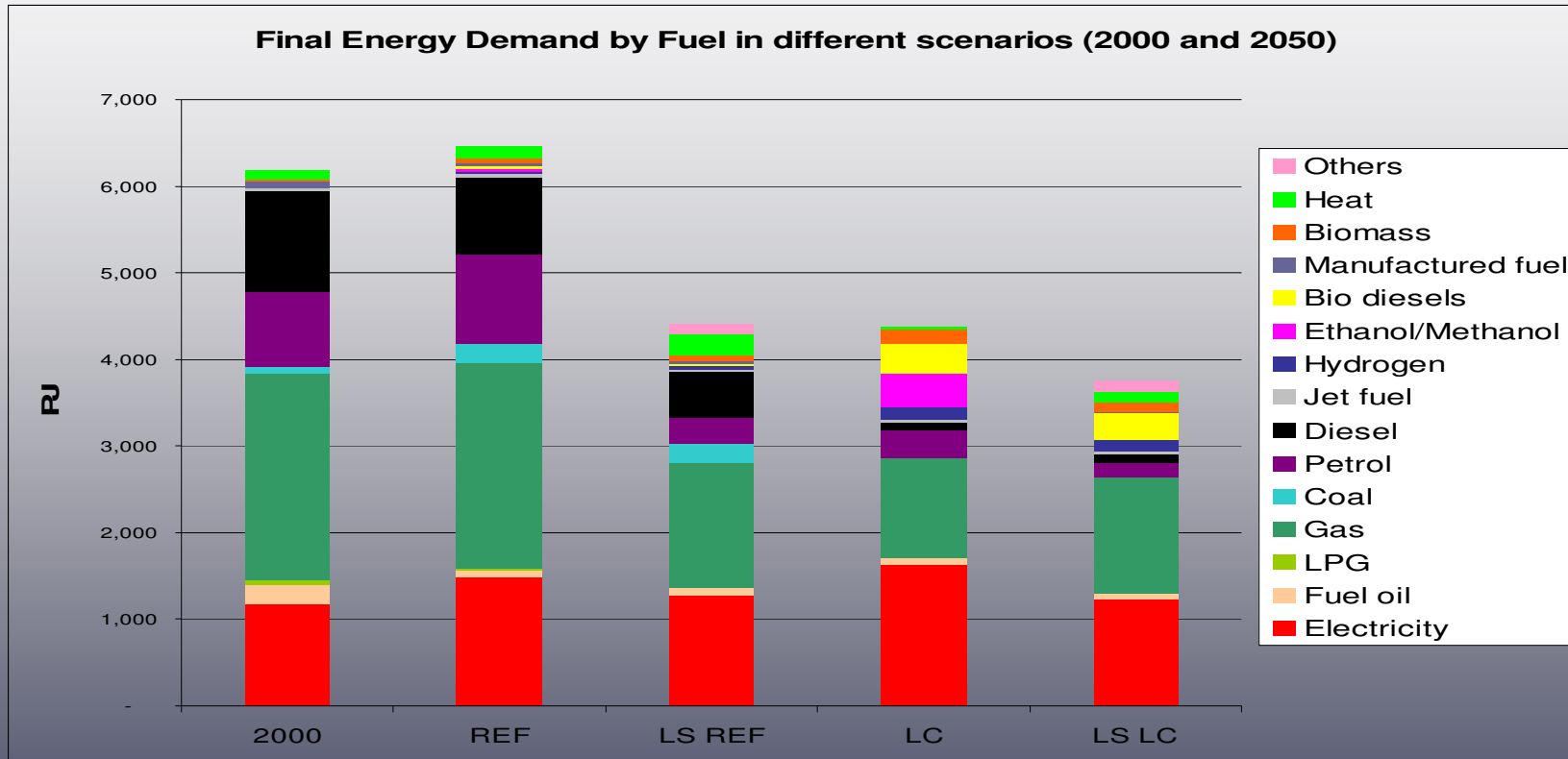
Car occupancy up 23% by
2050



Transport sector – impact on fuel demand

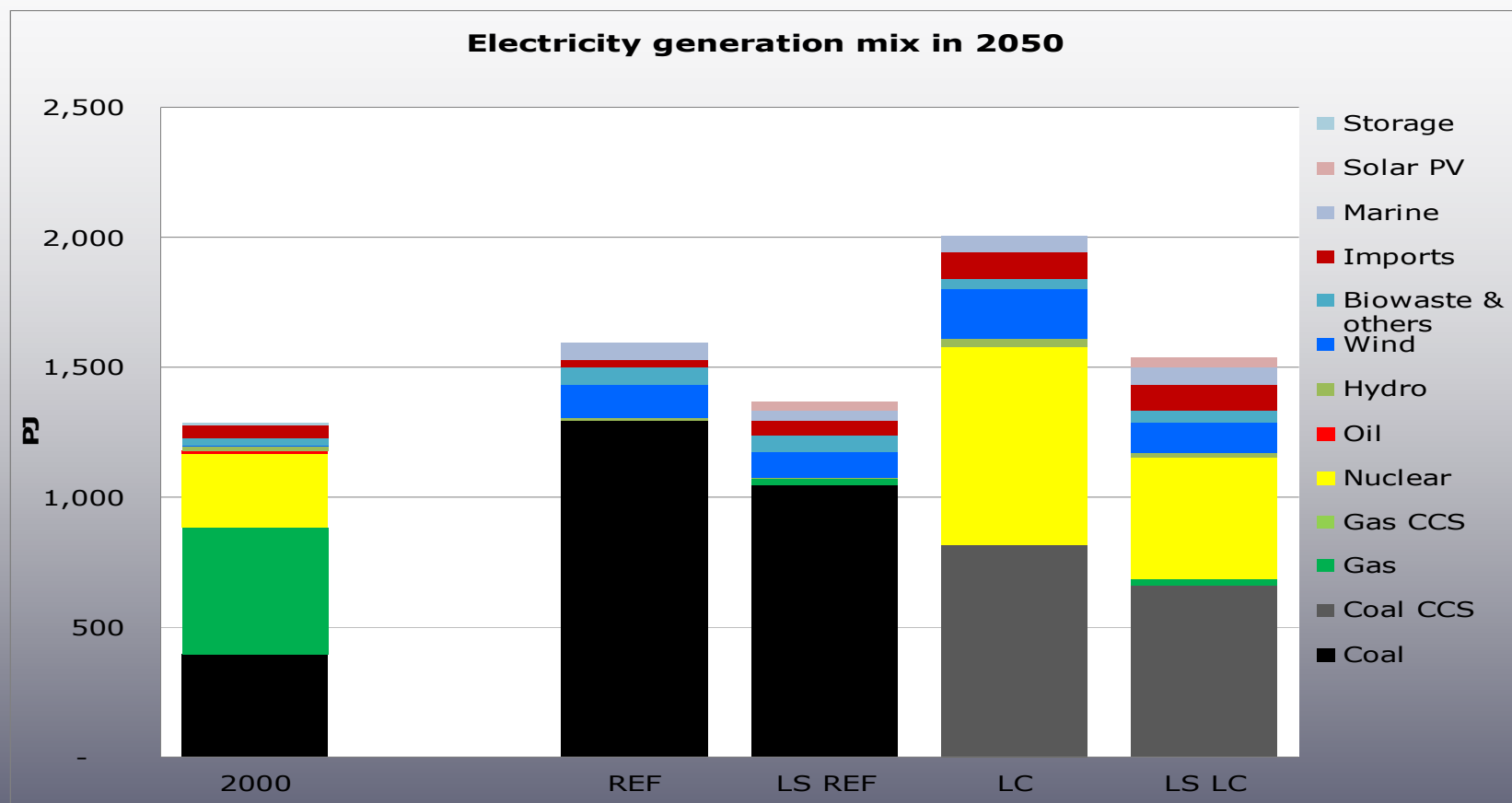


Impacts of lifestyle on the wider energy system



Lifestyle reduces energy demand by ~30% by 2050

Implications for electricity supply



Lifestyle change increases the share of electricity in final demand, but it limits the scale of electrification to meet tough carbon targets.

Cost implications

- Cost benefit comparison between scenarios with different lifestyle is not appropriate as preferences differ
- Increased investment in insulation ~£2bn per year
- Reduced energy supply system costs of £90bn per year in 2050
- A low carbon energy system with lifestyle change is ~£90bn per year cheaper – 2.5% of projected GDP - in 2050



Conclusions

Lifestyle change can produce a combination of energy service demand and technology change that:

- reduce energy demand in homes and transport by more than 50% below baseline levels by 2050
- reduce national energy use and carbon emissions by ~30% below baseline
- change end use technologies to increase the share of electricity, but reduce the absolute increase in electricity demand
- reduce the cost of delivering a low carbon energy system by ~ £90 billion

