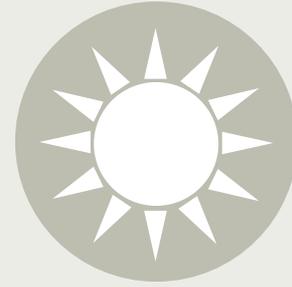


## The Energy Transition

**The world is transitioning away from an economy powered by fossil fuels to one dominated by low carbon sources of energy distributed through decentralised networks that incorporate storage and smart management systems.**



Since the Industrial Revolution society has harnessed fossil fuels to drive engines and produce heat and power. This has resulted in rapid economic growth and technological progress, and facilitated dramatic increases in population.

There are major inequalities in fossil fuel distribution and consumption around the world, with the majority consumed in developed countries. A lack of access to electricity and a reliance on traditional biomass in the least developed nations is linked to poor economic growth and health.

Reserves of fossil fuels are finite and the costs of production have risen significantly. Volatile energy markets and geopolitical instability are a concern, particularly for oil and gas supplies, putting our ability to access reliable, affordable energy at risk. Greenhouse gases and pollution resulting from their use are also having a considerable impact on the climate, the environment and human health.

At the same time, a determined shift towards low carbon and renewable sources of energy is taking place, fuelled by rapid reductions in cost. Various technologies are available to make use of local resources and suit needs and at different scales. Various approaches are being developed to capture and store carbon emissions from fossil fuel power stations. In the transport sector, progress is being made with electric and hybrid vehicles, fuel cells and advanced biofuels. Together, these are leading to the transformation of our energy system.

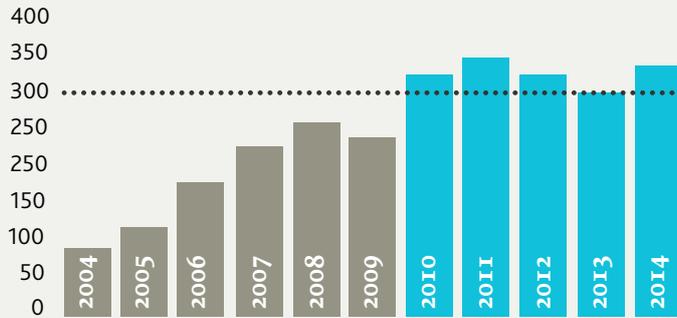
### Challenges

- ★ Can we transition to a low carbon energy system fast enough to avoid the worst impacts of climate change and peak fossil fuel production?
- ★ Can the substantial scale of investment required be mobilised and how should this be targeted, spatially and technologically?
- ★ Is a fully renewable energy system technically and economically feasible?
- ★ How will society and our environments cope with such a fundamental transition?
- ★ How will decentralisation of energy supplies affect the way people manage energy consumption, and how can this be planned for?

### Key Facts:

- 1. Global energy demand is likely to increase roughly 40% by 2030, with the majority of growth in non-OECD nations<sup>1,2</sup>.**
- 2. Over three billion people in the developing world rely on traditional biomass for cooking and heating, while 1.5 billion are without electricity<sup>2</sup>.**
- 3. As of 2011, the world has used over a third of a 50-year carbon budget that cannot be breached if the world is to have a reasonable chance of staying below 2°C of warming<sup>3</sup>.**
- 4. The poorest quarter of humanity consumes just 3% of total primary energy supply, while the US alone demands some 27%<sup>2</sup>.**
- 5. Global emissions of carbon dioxide from the energy sector stalled in 2014, for the first time in 40 years<sup>4</sup>.**
- 6. Global investment in renewable and low carbon technologies reached \$310 billion in 2014<sup>5</sup>.**

€M



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## LDA Design Insights:

The UK is undergoing an energy transition, driven by legally binding carbon emissions reductions and renewable energy targets and rapid technology change. While traditional fossil fuel or nuclear power stations tend to be very large and centralised, low carbon technologies are available at many scales and offer distributed, local energy generation close to the point of use, with ownership in the hands of the many rather than the few.

★ This transition will have a profound impact on our landscapes, places, communities and economy. It will shape a different approach to how and where we build, how we regenerate urban areas, the combinations of infrastructure, property and energy and their integration into landscapes and townscapes.

★ Competition for land between food production and energy generation, along with potential conflicts with cherished landscapes, heritage assets or habitats, is inevitable. Planning must manage the process of change, maximising the benefits while minimising impacts on the environment and communities.

★ Security of supply necessitates reducing demand through efficiency and behaviour change and managing the variable nature of some renewable generation through smart technologies and networks that include demand management and energy storage.

★ Electricity grid capacity and the viability of new generation assets, whether renewable, nuclear or fossil fuel, without subsidies are major challenges facing developers. In response we can expect to see technology and infrastructure combine in new ways.

★ The scalable nature of many low carbon technologies means that communities, businesses and local governments are now able to engage with energy in new ways. Each can develop, own and operate energy assets and networks and participate in energy markets. This challenges traditional utility business models and comes with risk but presents opportunities for new sources of revenue and approaches to development.

★ Decentralised low carbon energy is an increasingly important set of asset classes for investors and some technologies have seen significant reductions in cost of capital. This is likely to spread across large parts of the emerging energy system, bringing with it opportunities for developers and installers.

## What is LDA Futures?

The world is changing in response to a set of environmental, economic, social and technological drivers, and these are shaping the types of infrastructure and development we need and the way we use land.

*LDA Futures* explores these drivers and their implications to enable us to make appropriate responses through our projects and the advice we give to clients.



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