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Energy Strategy

Thames Valley Berkshire Local Enterprise Partnership

On behalf of **Thames Valley Berkshire Local Enterprise Partnership**



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Executive Summary

Introduction

Thames Valley Berkshire generates the UK's largest gross value added (GVA) per annum outside of London and the economy continues to expand through strong economic governance provided by the Thames Valley Berkshire Local Enterprise Partnership (THAMES VALLEY BERKSHIRE LEP).

Since 2005, Berkshire has achieved a 20% reduction in carbon emissions¹ at the same time as growing its economy by 18%². This demonstrates success in decoupling growth from greenhouse gas emissions. The LEP recognises that this is just the start of the journey towards reducing the area's greenhouse gas emissions and associated impact on climate change.

Tackling climate change is a national priority, and the decarbonisation of energy use is at the heart of that challenge. The economy of Thames Valley Berkshire needs to respond further to this challenge from its existing starting point.

Nearly three decades of UK energy policy has successfully sought to deliver low cost, secure energy supplies to support economic growth across the nation. This policy structure has been the backbone to enabling growth in Thames Valley Berkshire.

The UK clean growth plans place an emphasis on the need for increasing investment in, and use of intermittent, higher cost distributed renewable energy sources to replace petroleum and natural gas consumption with renewable electricity.

This national policy and investment context have created an energy trilemma. Investment into energy infrastructure needs to balance the needs for secure, affordable and sustainable energy.

The UK Industrial Strategy is looking to resolving this trilemma through investing in innovation and smart technology to produce, manage and distribute energy in a more effective way.

THAMES VALLEY BERKSHIRE LEP identified through its Strategic Economic Plan (SEP) that Thames Valley Berkshire will require appropriate energy infrastructure in place to underpin economic growth. As part of the SEP a study into utility infrastructure capacity highlighted that the success and speed of economic growth in Thames Valley Berkshire is likely to out-pace energy infrastructure provision as currently planned.

In short, network operators' investment follows growth rather than precedes it. The risk to Thames Valley Berkshire is where accelerated growth is achieved, the gap in energy infrastructure will be greater. This presents a significant risk to growth.

This energy strategy builds on the existing work undertaken as part of the SEP to provide evidence for the LEP to define its objectives in promoting clean growth in Thames Valley Berkshire.

Energy Use in Thames Valley Berkshire

The largest source of energy consumed in Thames Valley Berkshire is fossil fuels and is a combination of natural gas and petroleum. Together these make up 70% of all energy sources consumed. With the electrification of transport and heating being targeted by Government's decarbonisation strategy, a new large power demand will be shifted onto the existing grid infrastructure.

¹ Data.gov.uk

² Gross Value Added (GVA) per head, TVB LEP Economic Update March 2017

The national strategy has already been targeting decarbonisation of power through a range of large scale measures such as offshore wind and nuclear. The conversion of natural gas and petroleum use to renewable electricity will enable significant inroads towards decarbonisation in the Thames Valley.

This, coupled with OFGEM's Energy Company Obligations, which require and enable investments in energy efficiency, will realise significant greenhouse gas reductions over the next 10 years in alignment with the Government's targets for the decarbonisation of electricity. The LEP's role will be to support this transition.

Energy Infrastructure in Thames Valley Berkshire

The capacity for the delivery of large-scale (gigawatts) of renewable energy infrastructure within the Thames Valley is restricted by its geography and available natural resources. However, there is great potential for the delivery of microgeneration to cumulatively generate a significant proportion of renewable energy needs. There is currently no Government fiscal support for such approaches. Innovation will therefore be needed to secure new investment models for microgeneration aligned to growth needs.

Thames Valley Berkshire already has success in implementing renewable power infrastructure to enable economic growth. As an example, the power infrastructure that underpins the Slough Trading Estate has enabled its successful growth. This includes the 50MW SSE Biomass Power Station which provides renewable power back into the power infrastructure. The Slough Trading Estate is a key asset which underpins the UK digital strategy, with a range of data centres benefiting from the security of the power infrastructure in the area. This success will need to be built on by further supporting Thames Valley Berkshire's industrial and commercial clusters.

From engagement with energy providers in Thames Valley Berkshire there appears to be an intrinsic risk to growth associated with new power demands that are currently not accounted for in energy infrastructure investment plans.

Understanding and predicting the changing nature of the Thames Valley economy and how it will impact utility infrastructure will need consideration. This will need engagement with existing industrial sector organisations to understand how their sectors will evolve and how infrastructure can be prioritised to meet their needs. This will be key when understanding where strategy priorities should lie between cheap, secure, and low carbon utility provision.

The conversion of transport and heating energy to low carbon electricity will decarbonise these demands. Conversely these new power demands will impact future power supply and places traditional growth at risk, which in turn will have significant economic impact. The transition period for the uptake of these new power demands needs planning to ensure the economic impacts are not passed directly to consumers, especially vulnerable people and low-income households.

THAMES VALLEY BERKSHIRE LEP is already engaged with the statutory energy infrastructure providers in Thames Valley Berkshire and maintains dialogue with them on growth needs. Through this engagement, THAMES VALLEY BERKSHIRE LEP will support both Scottish and Southern Energy (SSE) Networks and Southern Gas Networks to implement smart infrastructure strategies and support Scottish and Southern Energy Networks' transition to becoming a Distribution Service Operator (DSO). This will include supporting the DSO in the local and spatial narrative on growth needs for their infrastructure investment.

Delivering Clean Growth

The LEP's role in enabling the low carbon transition is mandated in its mission to promote productivity in Berkshire.

The LEP's role will be fulfilled through developing a clean growth strategy within the Berkshire Local Industrial Strategy (BLIS), establishing funding routes to support clean growth, coordinating and

facilitating stakeholder collaboration including between SSEN and SGN, and providing advocacy for Thames Valley Berkshire.

There is a great opportunity to continue expanding Thames Valley Berkshire's role in being part of the solution to balance the three energy trilemma goals. This will be progressed by building on the LEP Energy and Environment Sector Proposition within the Berkshire Local Industrial Strategy. This will be achieved through the LEP's role in supporting businesses to tackle the clean growth agenda in the Thames Valley through its four primary roles.

The LEP is currently funding the Thames Valley Berkshire Smart City Cluster and supporting the Living Labs project, which involves a number of local businesses based in the Thames Valley. The Cluster and Living Labs projects look to reduce energy consumption from transport and enable the transition from petroleum to electric vehicles effectively.

The LEP is also supporting funding for low carbon infrastructure projects to resolve issues with potential shortfalls in renewable energy provision and energy efficiency in the area, through its ESIF Strategy.

Thames Valley Berkshire's local authorities already have strong local plans that target energy demand reductions and the provision of renewable energy in the context of land development projects. There will be a continual need for these policies to be updated as the nature of energy consumption changes over the next decade, especially in relation to electric vehicles and heating.

To deliver low carbon growth, strong leadership is required. THAMES VALLEY BERKSHIRE LEP has identified a structure to monitor low carbon growth. Through the LEP's activities it will monitor the three main energy infrastructure challenges based on the evidence within this strategy namely:

- Managing the energy trilemma linked to the nature of growth;
- Closing the gap between the pace of growth with the pace of energy infrastructure delivery; and
- Delivering energy efficiency and renewable energy within the Thames Valley geography.

These challenges are defined into four objectives:

- Objective One: Clean Growth Strategy within the Berkshire Local Industrial Strategy (BLIS);
- Objective Two: Funding Clean Growth;
- Objective Three: Coordinating Stakeholders to Deliver Clean Growth; and
- Objective Four: Advocating Place.

1 Introduction

1.1 Background

- 1.1.1 Thames Valley Berkshire has a successful, growing economy. It provides the UK's largest GVA per annum outside of London and the economy continues to expand through strong economic governance provided by THAMES VALLEY BERKSHIRE LEP.
- 1.1.2 As part of the Thames Valley Berkshire Strategic Economic Plan (SEP), THAMES VALLEY BERKSHIRE LEP identified the need to ensure Thames Valley Berkshire has appropriate energy infrastructure in place to underpin economic growth.
- 1.1.3 In April 2018³ the LEP undertook an assessment of future energy needs relating to economic growth. The study assessed both the impacts of the future energy needs of existing communities and businesses and the potential impact of new growth.
- 1.1.4 The study showed that the success and speed of economic growth in Thames Valley Berkshire is likely to out-pace energy infrastructure provision as currently planned. This presents a significant risk to growth.
- 1.1.5 Coupled with this infrastructure risk, the LEP identified through its Energy and Environment Sector Proposition⁴ that Thames Valley Berkshire's economy is responding to the challenges of climate change through business growth in the environment and energy sectors.
- 1.1.6 Since 2005, Berkshire has achieved a 20% reduction in carbon emissions⁵ at the same time as growing its economy by 18%⁶. This demonstrates success in decoupling growth from greenhouse gas emissions. The LEP recognises that this is just the start of the journey towards reducing the area's greenhouse gas emissions and associated impact on climate change.
- 1.1.7 In 2019 the UK Climate Change Committee (CCC), identified that a greater urgency is needed in delivering carbon emission reductions in the UK, in its report entitled 'Net Zero the UK's contribution to stopping global warming' (referred to here as the CCC Net Zero report)⁷. The report identifies the need for economic regions to consider resource and energy efficiency, societal choices, electrification, a hydrogen economy and carbon capture and storage within economic growth.
- 1.1.8 The LEP is ready to take on this challenge and to deliver associated opportunities for the area. It is anticipated that this challenge will be delivered by building on the existing SEP and Sector Propositions into creating the Berkshire Local Industrial Strategy (BLIS). The BLIS will align Berkshire's energy infrastructure needs with an approach to enabling the Government's climate change strategy. This is the starting point for THAMES VALLEY BERKSHIRE LEP's energy strategy.
- 1.1.9 The purpose of the strategy is to ensure that THAMES VALLEY BERKSHIRE LEP has an adequate evidence base to support its role in delivering economic growth. The strategy will also inform the need for investment from public and private sectors in terms of energy infrastructure provision to enable economic growth.

³ TVB LEP Utility Infrastructure Study 2018

⁴ Thames Valley Berkshire Sector Proposition: Energy and Environment, 2015

⁵ Data.gov.uk

⁶ Gross Value Added (GVA) per head, TVB LEP Economic Update March 2017

⁷ UK Climate Change Committee: Net Zero the UK's contribution to stopping global warming May 2019

1.2 Approach to THAMES VALLEY BERKSHIRE LEP's Energy Strategy

1.2.1 The LEP has undertaken a series of activities to develop the evidence base that informs this document. These activities have been directed by a steering group consisting of the CEO, Head of Infrastructure, Research Manager and a representative from the GSE Energy Hub, and development and infrastructure consultants Peter Brett Associates, now part of Stantec.

The THAMES VALLEY BERKSHIRE LEP Energy Strategy has been informed by the following activities:

- A literature review of National and Local Policy and Strategy;
- Energy modelling of new growth;
- Energy infrastructure capacity assessment;
- Workshop(s) with energy infrastructure providers; and
- Interviews with the University of Reading and engagement with commercial estate owners, such as SEGRO.

1.2.2 The outcomes of these activities provide the evidence for this Energy Strategy.

1.3 Report Structure

1.3.1 This Energy Strategy aligns itself to the overarching Government direction of travel for the low carbon transition. It starts with setting out Government's policies and strategies relating to low carbon growth, before identifying the current risks to growth related to energy infrastructure in Thames Valley Berkshire. It then sets out the role of the LEP in promoting clean growth through the low carbon transition period and how this will be achieved.

1.3.2 This report is structured as follows:

- **Section 2 National and Local Policy and Strategy:** providing an overarching background to the direction of travel associated with the UK Industrial Strategy, energy regulation and local authority planning policy;
- **Section 3 Energy Demand and Growth:** providing an overview of energy usage in Thames Valley Berkshire and findings of the energy infrastructure appraisal;
- **Section 4 Energy Infrastructure Review:** providing the findings of the energy capacity appraisal where these align to the economic needs of Thames Valley Berkshire;
- **Section 5 Low Carbon Transition in Thames Valley Berkshire:** outlining the opportunities for the LEP to engage in managing the potential risks that threaten economic growth; and
- **Section 6 Governance and Objectives:** setting out how the LEP will support the transition to clean growth through the BLIS.

2 National and Local Policy and Strategy

Section Summary

UK energy policy has successfully sought to deliver low cost secure energy to support economic growth across the nation. The UK low carbon transition strategy places a reliance on the use of intermittent higher cost distributed renewable energy generation and the need to replace petroleum and natural gas consumption with renewable electricity. This will add more demand to our aging electricity infrastructure.

This national position has created an energy trilemma. Investment into energy infrastructure needs to balance the needs for secure, affordable and sustainable energy.

The UK Industrial Strategy proposes to resolve this energy trilemma through investment in innovation and smart technology.

2.1 Introduction

- 2.1.1 The UK Government is committed to the climate change agenda and transition to a low carbon economy and society through the UK Low Carbon Transition Plan (2009). The legally binding international Kyoto Protocol agreement is core to the Government's commitment to reducing carbon dioxide emissions. This requires the UK to reduce greenhouse gas emissions by 12.5% below 1990 levels by 2008, increasing to an 80% reduction by 2050.
- 2.1.2 These commitments have triggered a series of national acts, plans, and regulations relating to energy infrastructure, in addition to statutory regulatory acts that control our energy provision.
- 2.1.3 Since 2017 the UK has been a signatory to the Paris Climate Change Accord. As a result, the UK Government is now looking towards delivering a net zero carbon economy by 2050.
- 2.1.4 This transition to a low carbon economy sits alongside over 30 years of energy policy and regulatory instruments that have sought to provide secure and affordable energy to consumers. The policies in place that have delivered progress towards the provision of affordable and secure energy are often at odds with strategies defined in the low carbon transition agenda. Low carbon strategies place a heavy reliance on intermittent and higher cost energy generation and an increased reliance on electricity.
- 2.1.5 The following section sets out a high-level review of the national energy policy regime in relation to economic growth. Further details of policy are provided in **Appendix A**.

2.2 Climate Change Committee: Net Zero - The UK's Contribution to Stopping Global Warming

- 2.2.1 In May 2019 the CCC released their recommendations for the UK to achieve its requirements as a signatory to the Paris Climate Change Commitments.
- 2.2.2 The report highlights a broad spectrum of strategies that need to be implemented by Government to make a national transition and achieve a Net Zero goal by 2050. The starting point in the CCC report is to ensure a comprehensive overhaul of national policy that aligns to both business and community needs.
- 2.2.3 The report backs previous government commitments to deliver a national renewable energy strategy that looks to deploy major offshore wind energy, a transition of transport and heating energy usage to electricity, and the need for leadership from business to make this happen. A review of the CCC report is provided in **Appendix A**.

2.3 National Policy for Energy and Planning

- 2.3.1 The UK has over 30 years of energy related policy starting with the Electricity and Gas Acts created in 1989 and 1986 respectively. The evolution of energy policy over this 30-year period adds significant complexity to how energy infrastructure is delivered, operated, regulated and decommissioned.
- 2.3.2 Over recent years this has included significant delivery of new low carbon infrastructure as part of the UK's low carbon strategy. This national strategy has already targeted decarbonisation of power through a range of large-scale measure such as offshore wind and nuclear. The Department for Business, Energy and Industrial Strategy (BEIS) has predicted the carbon intensity of electricity will drop from 520g/kWh in 2013 to 41g/kWh by 2035 based on this existing strategy. This represents a 90% reduction in emissions relating to electricity alone, over this period.
- 2.3.3 The implementation of energy policy has created a highly regulated industry that is managed by the Office of Gas and Electricity Markets (OFGEM). OFGEM is the primary regulator for the gas and electric industry and manages economic and regulatory policies whilst monitoring customer service performance. OFGEM is governed by the Gas and Electricity Market Authority (GEMA) to protect consumers.
- 2.3.4 Through OFGEM, Government have established a range of fiscal measures to deliver energy demand reduction and the delivery of renewable energy. These included:
- Energy Company Obligations (ECO)⁸ including a range of domestic energy efficiency initiatives;
 - Non-domestic energy demand reduction through fiscal measures such as Climate Change Levies (CCL), CRC Energy Efficiency Scheme, and Energy Saving Opportunity Scheme (ESOS);
 - Enhancing energy efficiency in new buildings through step changes to Part L of the Building Regulations;
 - Renewable energy subsidies such as Contract for Difference (CfD), Feed in Tariffs (FITs) and Renewable Heat Incentives (RHI); and
 - Delivery of new generation through the regulated capacity.
- 2.3.5 The gas and electric companies are regulated to develop 5-year business plans (RIIOs - Revenue=Incentives + Innovation + Outputs) focusing on future asset investments and performance measures, while developing innovative strategies to overcome future challenges relating to climate change, population growth and renewable energy.
- 2.3.6 OFGEM have placed the financial responsibility for reducing energy demands back onto UK energy companies.
- 2.3.7 As a heavily regulated industry, the energy sector's ability to transition to the needs of economic growth is often hindered by the regulatory regime itself.
- 2.3.8 Energy generation and supply is also impacted by a range of market and sector strategies beyond the governance of OFGEM.

⁸ <https://www.ofgem.gov.uk/environmental-programmes/eco>

- 2.3.9 The Department for Transport, for example, has set out plans for all cars and vans to be zero emission by 2050. Within this statement there is national view that electric vehicles will be a predominant technology to achieve this reality.
- 2.3.10 Initial estimates suggest this may add over 30GW to National Grid capacity needs, all of which will be distributed through local network provision. This has not been accounted for within national energy policy to date. This has the potential to create a disconnect between the UK's electrification strategies and how new power demands can be practically delivered.
- 2.3.11 Without guidance on how such gaps will be accommodated for within a national strategy, local approaches may be necessary to manage shortfalls in new infrastructure provision.
- 2.3.12 These broad national positions have created an energy trilemma. The energy trilemma requires consideration of how cost-effective low carbon energy can be provided without interruption to consumer needs. This is the basis of the Clean Growth narrative of the UK Industrial Strategy.

2.4 UK Industrial Strategy

- 2.4.1 The UK Government's Modern Industrial Strategy (2017) aims to boost productivity and increase the earning power of people throughout the UK.
- 2.4.2 It seeks to capitalise on the current digital and technological revolution known as the Fourth Industrial Revolution. The revolution will disrupt every sector and, due to the pace and breadth of innovation, the outcomes are difficult to predict.
- 2.4.3 The UK Industrial Strategy focuses on four key themes, described as Grand Challenges:
- Putting the UK at the forefront of the artificial intelligence (AI) and data revolution;
 - Maximising the advantages for UK industry from the global shift to clean growth;
 - Becoming a world leader in shaping the future of mobility; and
 - Harnessing the power of innovation to help meet the needs of an ageing society.

2.4.4 The breadth and depth of the Grand Challenges creates significant overlap between each challenge area, not least the impact of how big data drives innovation, as represented in Figure 2.1.

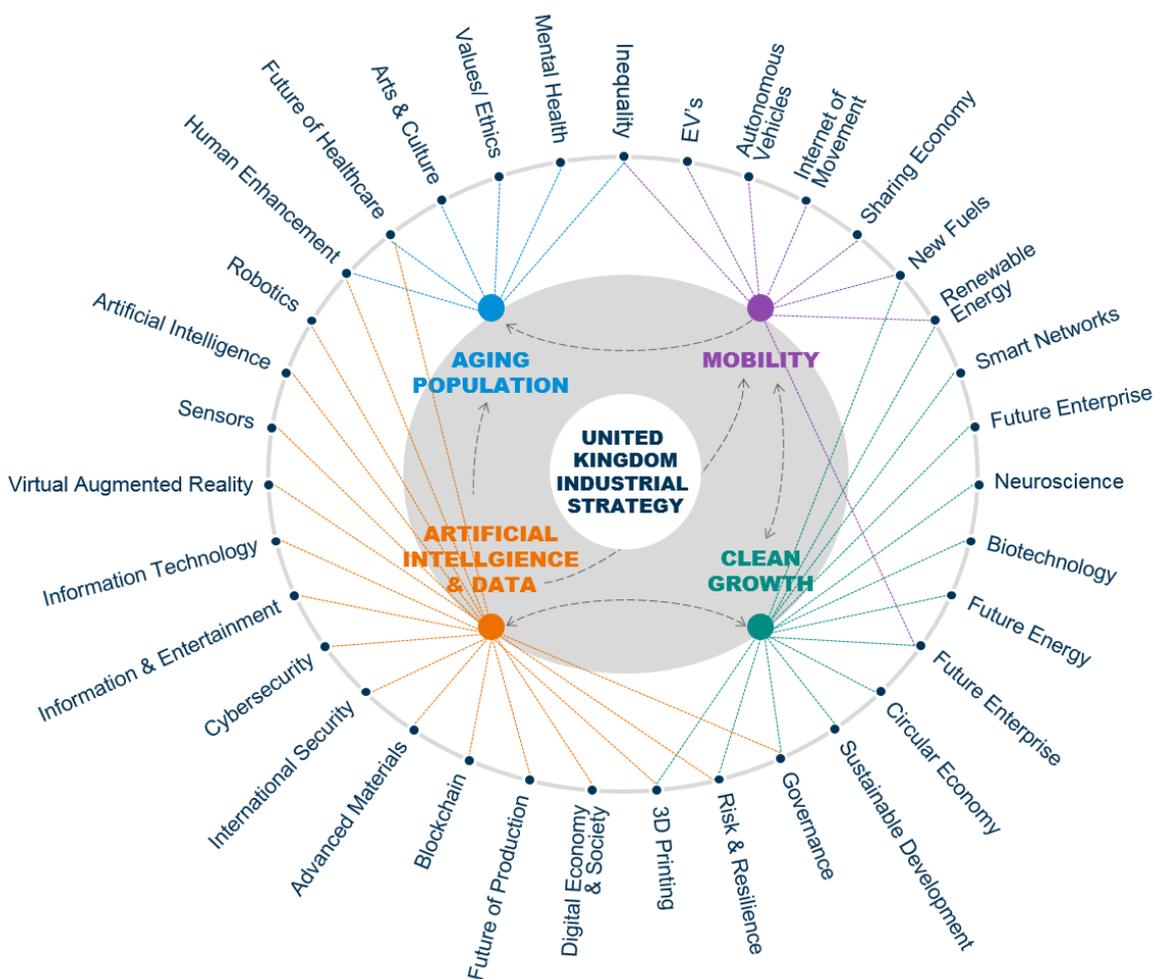


Figure 2.1 Complexity in Building a Local Industrial Strategy

2.4.5 Energy infrastructure underpins all aspects of these Grand Challenges, from powering data transfer, providing for clean growth, enabling mobility and providing security for our ageing society.

2.4.6 In October 2017, the Government published the Clean Growth Strategy setting out its proposals to accelerate the pace of “clean growth” in the UK, i.e. deliver increased economic growth and decreased emissions for decarbonising all sectors of the UK economy through the 2020s.

2.4.7 The Clean Growth Grand Challenge is, though, a far more complex web of interactions that links all parts of industrial growth and societal needs. We are now in a digital revolution, where data transactions are at the heart of our economy and needs. This digital transformation will need to be underpinned by an energy infrastructure that is secure, available and delivers no detriment to our planet. However, the UK starting point is an ageing infrastructure that is predominantly based on fossil fuels and intermittent renewable power, which is the basis of the existing energy trilemma.

- 2.4.8 The BLIS will consider these challenges in the context of economic growth within the Thames Valley Berkshire economic geography.

2.5 Impacts of National Policy in Thames Valley Berkshire

- 2.5.1 In the context of the UK's legal requirements under the Climate Change Act, the UK's approach to reducing emissions has two guiding objectives: 1) to meet domestic commitments at the lowest possible net cost to UK taxpayers, consumers, and businesses; and 2) to maximise the social and economic benefits for the UK from this transition.
- 2.5.2 To meet these objectives, the UK will need to nurture low carbon technologies, processes and systems that are as cheap as possible.
- 2.5.3 The UK Industrial Strategy aims to create the best possible environment for the private sector to innovate and invest in technological breakthroughs. It sets out over £2.5 billion of investment to support low carbon innovation from 2015 to 2021, whilst more broadly the National Productivity Investment Fund will provide an additional £4.7 billion, with an extra £2 billion a year by 2021-21, representing the largest increase in public spending on UK science, research, and innovation since 1979⁹.
- 2.5.4 This presents a clear opportunity for Thames Valley Berkshire, which is already home to a strong low carbon research and innovation sector, including the Thames Valley Vision £30 million energy efficiency project, and approximately 110 core energy and environment businesses¹⁰. These existing business clusters could become a focal point for innovators and new businesses to start up and grow.
- 2.5.5 In addition to supporting innovation and encouraging growth, the National Industrial Strategy presents several policy proposals which will have a direct impact on utility demands. For instance, it plans to end the sale of new conventional petrol and diesel cars by 2040, spend £1 billion on supporting ultra-low emission vehicles (ULEV), and to develop "one of the best electric vehicle charging networks in the world". Furthermore, it plans to further encourage the roll-out of low carbon heating, build and extend heat networks across the country, whilst phasing out high fossil fuel heating in new and existing homes currently off the gas grid.
- 2.5.6 The six unitary authorities in Thames Valley Berkshire have already acted towards delivering the goals set in the UK Clean Growth Strategy by establishing low carbon planning policies, specialist energy projects and undertaking Government funded heat network assessments. These are discussed further in **Section 5.5**.
- 2.5.7 This baseline of activity provides a platform for the unitary authorities to continue to tackle and address the utility impacts of the electrification of heating and transport within their local plan making.
- 2.5.8 The Thames Valley Berkshire Utility Infrastructure Study noted the electrification of transport and heating will add new power demands onto the existing electricity network. This will take existing spare capacity and trigger the need for grid reinforcements. In turn, traditional growth will be impacted due to the lack of available power taken by these new forms of demand. This is discussed further in **Section 4.5**.

⁹ HM Government (October 2017) The Clean Growth Strategy.

¹⁰ Thames Valley Berkshire Sector Proposition: Energy and Environment.

3 Growth and Energy Consumption in the Thames Valley

Section Summary

The largest proportion (40%) of energy consumed in Thames Valley Berkshire is associated with domestic heat and power, with commercial and industrial energy consumption using nearly 30% of energy used in the area. Transport energy consumption also represents 30% of energy used in the area.

Based on this energy usage, over 70% of energy consumed relates to fossil fuel, natural gas and petroleum products.

UK power infrastructure is on a targeted trajectory to decarbonise by over 90% in the next 10 years, from 2013 levels.

In simple terms, the conversion of natural gas and petroleum use to electricity will enable significant inroads to decarbonisation in Thames Valley Berkshire. This, coupled with OFGEM's ECO process, will see significant greenhouse gas reductions. THAMES VALLEY BERKSHIRE LEP's role will be to support this transition.

3.1 Introduction

- 3.1.1 As noted in the THAMES VALLEY BERKSHIRE Utility Infrastructure Study, the energy infrastructure has provided a secure supply of power and gas at prices that have enabled economic growth.
- 3.1.2 This section provides a short appraisal of local growth and the impact on energy consumption, which was undertaken as part of the THAMES VALLEY BERKSHIRE Utility Infrastructure Study.

3.2 Summary of Existing Energy Demand Across Berkshire

3.2.1 Thames Valley Berkshire energy consumption by source is presented in **Figure 3.1** below and compared to the national consumption statistics.

Thames Valley Berkshire Energy Consumption 2016

National Energy Consumption 2016

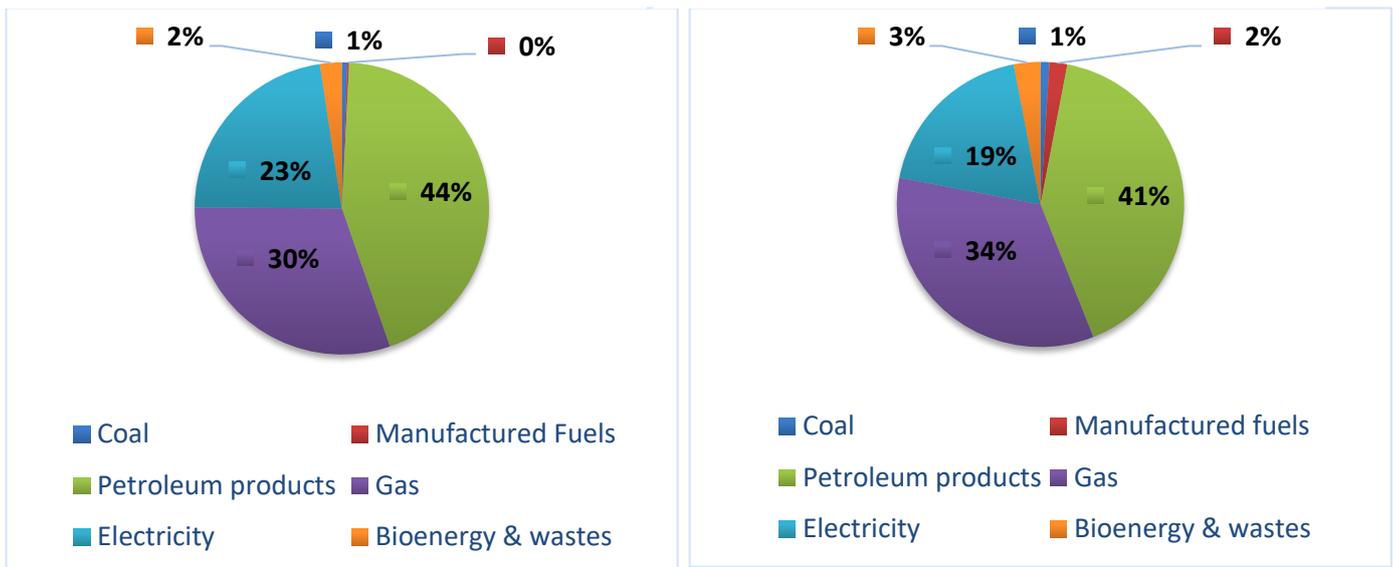


Figure 3.1: Thames Valley Berkshire Energy Consumption 2016 compared to national consumption (%)

3.2.2 Energy consumption is dominated by petroleum for transport and gas for commercial, industrial and residential uses. Together these energy demands make up 70% of energy consumption. This is typical of the wider UK energy consumption statistics.

3.2.3 Energy usage by sector is summarised in **Figure 3.2** below.

Thames Valley Energy Consumption by Sector 2016

National Energy Consumption by Sector 2016

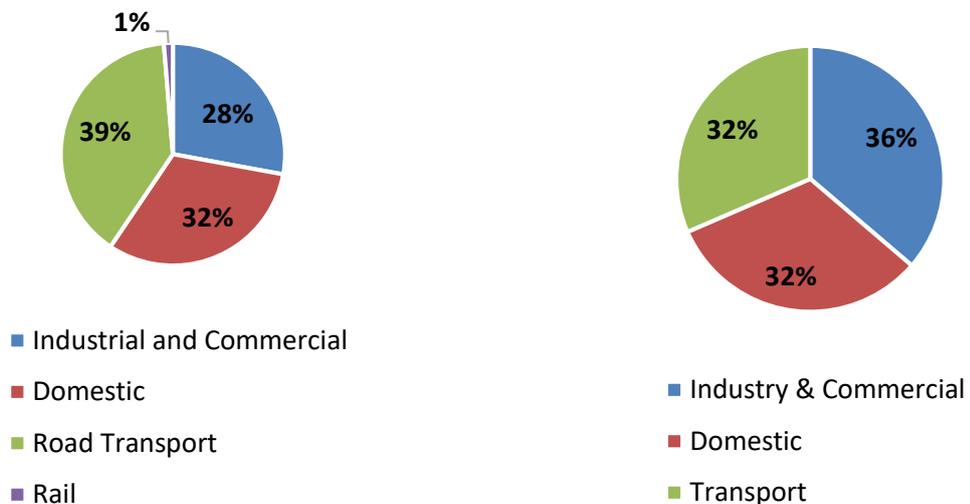


Figure 3.2: Consumption per Sector in the Thames Valley compared to National perspective (excluding rail), 2016

-
- 3.2.4 Road transport energy usage is the largest proportion of energy use at 39% in the area, whilst industrial and commercial, and domestic sectors are similar at 28% and 32% of total energy consumption respectively. Compared with the national perspective transport energy has a greater dominance in usage. This is likely to relate to the road infrastructure and population density compared with a lower national average. Commercial and industrial energy usage has a lower dominance in the Thames Valley compared to the national figures. This is likely to be due to the comparative small number of high energy intensive industrial areas in the region.
- 3.2.5 Figures 3.1 and 3.2 show that a large proportion of energy consumption in the Thames Valley relates to transport fuels and heating.
- 3.2.6 By converting transport and heating (i.e. stopping our usage of petroleum and natural gas) to electrical forms of energy, there will be a greater ability to leverage the benefits of the national renewable energy generation strategy.
- 3.2.7 As noted in Section 2, the current trajectory for electricity emissions will be 90% lower than in 2013. This, coupled with ECO to drive energy demand reductions, will provide meaningful reductions in greenhouse gas emissions in Thames Valley Berkshire.
- 3.2.8 THAMES VALLEY BERKSHIRE LEP's role in enabling this transition is discussed further in **Section 4** and **Section 5** below.

3.3 Impact of Thames Valley Berkshire's Economic Growth Projections on Energy Infrastructure

- 3.3.1 Three Economic Development Needs Assessments (EDNAs) for Berkshire establish the future economic development needs of the area over the period 2013-2036. They set out the requirement for over 4million m² of commercial growth covering a range of commercial and industrial use classes.
- 3.3.2 The 2016 Berkshire Strategic Housing Market Assessment (SHMA) considers the overall need for housing, although not including issues relating to land supply, development constraints and infrastructure. The Objectively Assessed Need (OAN) for housing is likely to be 4,870 per annum up to 2036.
- 3.3.3 The assessment of both gas and power capacity (**Appendix B**) has shown that whilst there is current capacity for immediate growth needs within the energy networks, future energy needs, beyond the next five years, will require further investment in energy infrastructure. The impact of this is discussed further in **Section 4**.

4 Energy Infrastructure Review

Section Summary

The capacity for delivery of large-scale renewable energy (gigawatts) within Thames Valley Berkshire is limited by both urban areas and protected landscapes. Whilst there is great potential for the delivery of microgeneration to cumulatively generate a significant proportion of renewable energy needs, the Government's fiscal support for such approaches has now been largely removed.

THAMES VALLEY BERKSHIRE LEP is already engaged with the statutory energy infrastructure providers in Thames Valley Berkshire and maintains dialogue with them on growth needs. Through this engagement, THAMES VALLEY BERKSHIRE LEP will support both Scottish and Southern Energy Networks and Southern Gas Networks to implement smart infrastructure strategies and support Scottish and Southern Energy Networks' transition to becoming a Distribution Service Operator (DSO). This will include supporting the DSO in the local and spatial narrative on growth for their infrastructure investment.

Thames Valley Berkshire has already been successful in implementing spatial benefits of combining renewable power infrastructure and enabling economic growth. The SSE Biomass Power Station in Slough supports the successful growth of the Slough Trading Estate in underpinning the UK digital strategy, with a range of data centres benefiting from the security of the power infrastructure in the area.

From engagement with energy providers in Thames Valley Berkshire, there is an intrinsic risk to growth from new power demands that are currently not accounted for in energy infrastructure investment plans. Whilst the conversion of transport and heating energy to electricity, to benefit from the future projected decarbonisation of power, meets the needs of the low carbon agenda, the impact on supplying these new demands needs consideration. This will be important to ensure all parts of Thames Valley Berkshire's communities have access to low cost and secure power for transport and heating needs.

There is a great opportunity to continue to expand Thames Valley Berkshire's role in being part of the solution to meeting these disconnects, through building on the THAMES VALLEY BERKSHIRE LEP Energy and Environment Sector Proposition. Within the BLIS there will be the need to consider support for further jobs and business growth in the environment and energy sectors.

4.1 Introduction

- 4.1.1 This section reviews the implications of the energy trilemma identified in national policy (**Section 2**) and the impacts on energy infrastructure from growth (**Section 3**). The outcomes of this review focus THAMES VALLEY BERKSHIRE LEP's objectives based on the national actions and interventions needed in the Thames Valley. (**Section 5**).

4.2 Decarbonisation of Energy in Thames Valley Berkshire

- 4.2.1 In 2009 and 2012 reports were produced by TV Energy, titled Climate Berkshire, analysing the potential for renewable energy development in Berkshire. In 2012 the evidence showed the total amount of energy generated from renewable sources in the UK was 3.8%. and Berkshire was slightly ahead of this with 4% of energy from renewable sources¹¹.
- 4.2.2 The report showed that this picture was heavily influenced by landfill gas and SSE's Biomass Facility but there was a larger potential most notably with wind energy, solar and biomass.
- 4.2.3 Berkshire now has over 109MW of renewable energy generation capacity installed, of which the majority relate to 51MW of solar arrays and the 50MW SSE Biomass Facility¹². This is a

¹¹ <http://www.tvenergy.org/climate-berkshire.htm>

¹² BEIS, Renewable Energy Planning Database quarterly extract, online, available at: <https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract>

small proportion of Thames Valley Berkshire's energy demand and significantly below the Government's targets of 30% of electricity by 2020.

- 4.2.4 A large proportion of Berkshire's land use is associated with urban uses, or alternatively rural areas which are protected under statutory environmental designations. This is coupled with limited natural energy resources (wind, high head rivers, and wave/tidal) when compared to other UK regions.
- 4.2.5 The physical geography of Thames Valley Berkshire does not lend itself to large opportunities for onshore renewables, when compared to other UK regions. Wind regimes across the sub-region offer limited power potential for large scale onshore wind investments and opportunities for hydropower are limited to smaller community scale projects. The capacity for Berkshire to deliver the gigawatts of renewable power to achieve Government's targets is therefore limited.
- 4.2.6 This is reflected in that a number of renewable energy projects over the last five years have been rejected at planning or withdrawn. It is now a requirement under the NPPF for Local Authorities to plan for onshore wind within the local plan making process, to help support the delivery of renewable energy.
- 4.2.7 Whilst the deployment of micro generation, such as roof top solar, plays a role in decarbonising electricity in Thames Valley Berkshire, the recent removal of Feed-in-Tariffs (the subsidy regime for micro generation) has hindered further uptake.
- 4.2.8 Future renewable energy development does, though, have the capacity to unlock growth and development, if this is factored into Local Plans and to align with growth needs. The deployment of new technology will need to look beyond just the simple internal rate of return (IRR) of selling power and receiving subsidies. This is the basis for THAMES VALLEY BERKSHIRE LEP area's ERDF Low Carbon Funding Call, June 2019.
- 4.2.9 With this backdrop, Thames Valley Berkshire benefits from excellent connections to the National Grid. Whilst opportunities for development of renewable energy are limited in the sub-region, the national grid decarbonisation projections will support the overall decarbonisation of power and are aligned to Government's own projections.
- 4.2.10 As noted in **Section 2.3**, with the National Grid power emissions reducing by nearly 90% by 2030, access to the national power infrastructure will decarbonise most of the energy demands in the future in the Thames Valley. Securing access to this power will be important to enabling growth in the area.

4.3 Enabling New Growth

- 4.3.1 As evidenced in the THAMES VALLEY BERKSHIRE LEP Utility Infrastructure Study, work is already underway with the key core statutory undertakers for energy, Scottish and Southern Energy Networks (SSEN - electricity) Southern Gas Networks (SGN - gas) and Scotia Gas, to ensure strategic infrastructure is delivered to enable growth.
- 4.3.2 Through this process, both SSEN and SGN cited their ability to provide infrastructure in advance of growth is limited by rules set out by OFGEM and within the UK Electricity Act 1989 and Gas Act 1986.
- 4.3.3 In short, network operators' investment follows growth rather than precedes it. The risk to Thames Valley Berkshire is where accelerated growth is achieved, the gap in energy infrastructure will be greater.
- 4.3.4 This impact has a spatial form and local outcome. For example, there are particular pressures on housing growth in south Reading. The growth in demand will have a spatial link to the successful industrial campuses of Aldermaston and Thames Valley Science Park. This will be

explored further through the BLIS to ensure the overlaps between existing needs and new growth are met.

- 4.3.5 SSEN have identified the need to deliver on this spatial and local need through investments into smart infrastructure. This is becoming their statutory duty under their transition from being a network operator to a system operator.

4.4 Changing Nature of Existing Industrial Demands

- 4.4.1 As discussed in **Section 2**, the UK Industrial Strategy sets out the Government's agenda to embrace a new digital age with a range of fiscal measures that promote industrial technology growth.
- 4.4.2 This industrialisation is intrinsically disruptive by nature as the outcomes of its success will require secure energy at a price that will attract growth.
- 4.4.3 There is already evidence of this successful transition occurring within existing business clusters in the Thames Valley. For example, Slough Trading Estate is home to one of the UK's largest biomass power stations delivering 50MW of green power and district heating to businesses within the Estate. SSE Plc continue to operate the facility providing local benefits on renewable energy provision to a range of customers.
- 4.4.4 The wider power infrastructure associated with Slough Trading Estate, including the recent upgrades to the Ivor primary substation by SSEN, makes it a major economic hub for digital commerce with four data centres established within the last two years alone. This places the Slough Trading Estate at the heart of the Government's mission for zero carbon industrial clusters. The Slough Trading Estate exemplifies the Government's mission to establish zero carbon industrial clusters.
- 4.4.5 Future industrial growth in the Thames Valley Berkshire economy is likely within existing business clusters. THAMES VALLEY BERKSHIRE LEP has identified three sectors in which the area has a competitive advantage (either in terms of business stock or research expertise):
- Digital Technology;
 - Energy and Environment; and
 - Life Sciences and Healthcare.
- 4.4.6 As with new growth, the impact of changing commercial and industrial growth has a spatial form. The greatest impact on utility capacity from industrial growth is, therefore, likely to be seen in existing business clusters and their geographic relationship with each other. In Thames Valley Berkshire, this spatial form is illustrated in the infographic presented in Figure 4.1 on the following page.
- 4.4.7 Thames Valley Berkshire is a leading sub-region of global investment and home to brands such as Nokia, Microsoft, Ericsson, Telefonica O2, Fujitsu, PepsiCo, Bayer and Vodafone. Many of these global businesses are attracted to Berkshire's existing Industrial Clusters. Large and high growth firms are described in THAMES VALLEY BERKSHIRE LEP's Business in Berkshire 2018 report¹³.

¹³ Thames Valley Berkshire Local Enterprise Partnership, Business in Berkshire 2018.

28

industrial network groups

4

major industrial clusters

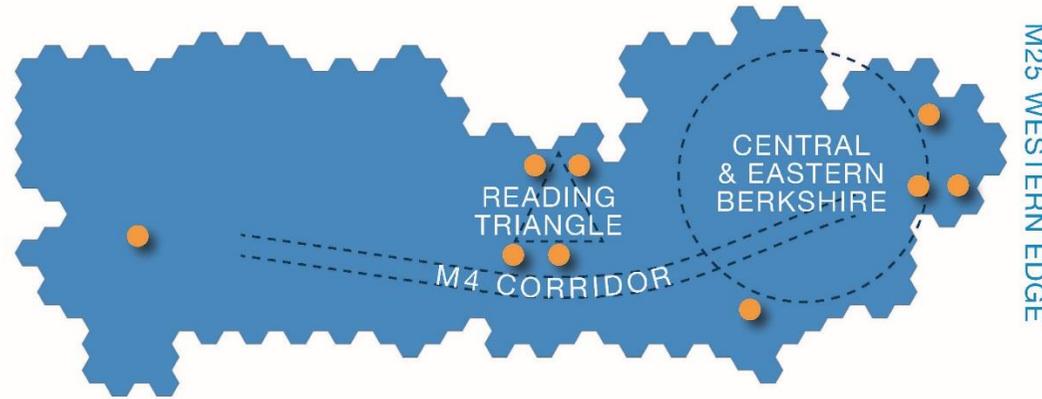
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minor industrial clusters

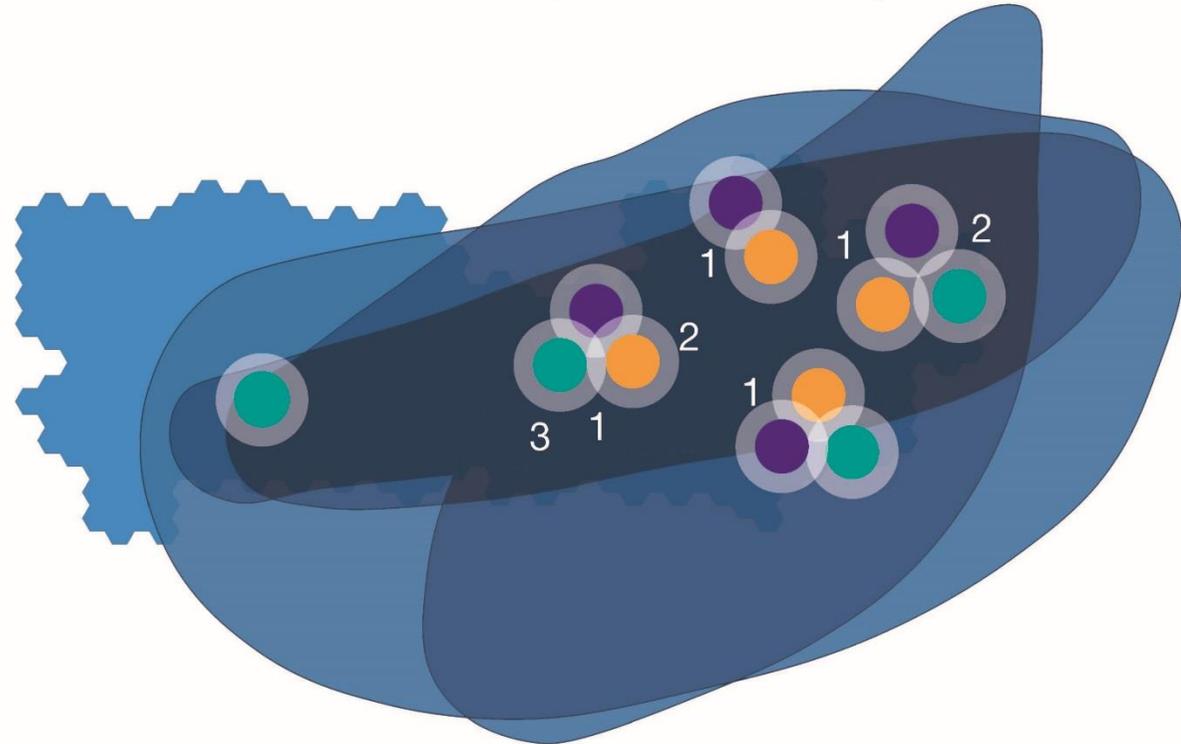
6

industrial sectors

Thames Valley Berkshire Key Clusters



Potential for Cluster Overlap in Thames Valley Berkshire



Small geography clusters

Utility demand risk
Level of impact

- Three sector cluster overlap
- Two sector cluster overlap
- Single sector cluster
- No major sectors

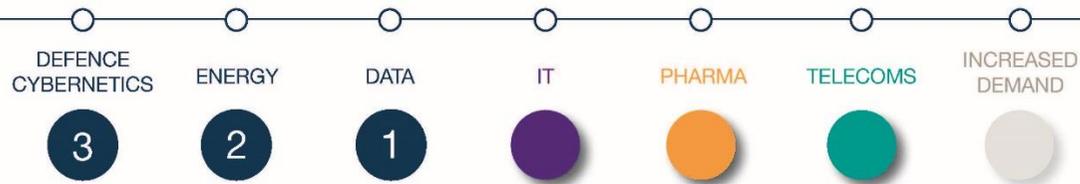


Figure 4.1 Industrial and Commercial Clusters in Berkshire

- 4.4.8 The wider Thames Valley is the number one region, outside of London, for securing foreign direct investment into the UK.¹⁴ Capitalising on the opportunities that clean growth can deliver, two leading Berkshire Commercial Clusters are delivering the Government's low carbon and near zero carbon growth mission. These are the Slough Trading Estate, Slough combining 50MW of biomass power within the estate and Green Park, Reading, integrating a 2MW wind turbine.
- 4.4.9 In order to achieve growth, there must be a focus on meeting the utility demands of all commercial and industrial growth. This will need to include consideration of the transition of existing business operations to new activities.
- 4.4.10 Through consultation with both SSEN and SGN, the changing nature of commercial and industrial demand is typically not factored into utility growth plans.
- 4.4.11 Understanding and predicting what these new activities are and how they will impact utility infrastructure will need consideration. This will need engagement with existing industrial sector organisations to understand how their sectors will evolve and how infrastructure can be prioritised to meet their needs. This will be key when understanding where strategy priorities should lie between cheap, secure, and low carbon utility provision.

4.5 Impact of New Sector Demands on Power Infrastructure

- 4.5.1 As highlighted in Section 3.2, the transition of over 70% of Thames Valley Berkshire's energy demand from petroleum and gas to electricity over the next few decades will have a marked impact on power demands and infrastructure.
- 4.5.2 An example of these risks to Thames Valley Berkshire can be seen in the disconnect between existing electrical power provision compared with car ownership and the future need for power infrastructure to provide energy for vehicles.
- 4.5.3 Currently the locations of petroleum refuelling infrastructure in the Thames Valley are defined by traffic flow (or footfall) and the potential value of retail convenience.
- 4.5.4 This infrastructure has no relationship with electricity capacity or access to bulk power supply. This creates a large disparity in that Thames Valley Berkshire's existing road network and fuel facilities are currently not ready to provide Electric Vehicle (EV) charging infrastructure.
- 4.5.5 A large proportion of car owners also do not have access to off street parking and therefore the potential for private charging infrastructure. This alone suggests major investment is needed in either centralising charging facilities to have direct access to grid electricity or for a major investment into distributed charging facilities (i.e. every car has access to a charging point).
- 4.5.6 The capacity to provide a charging point for every vehicle that does not have off street parking has obvious engineering challenges but importantly major social equality implications. The current public EV charging infrastructure offers a price of electricity that is significantly greater than the cost of domestic electricity (i.e. the cost of charging at home).
- 4.5.7 As such, car owners who do not have access to off street parking are unable to charge their EVs using normal, relatively low cost, domestic electricity tariffs. They must instead use the public EV charging infrastructure, which currently costs up to three times more than domestic rates. This is in addition to having to pay 'membership' charges to the various charging schemes currently provided in Thames Valley Berkshire.

¹⁴ Thames Valley Chamber of Commerce, Inward Investment Results 2017/2018.

DISPARITY BETWEEN CAR OWNERSHIP AND POWER INFRASTRUCTURE

27,000 CARS

10,000 on-street parking permits

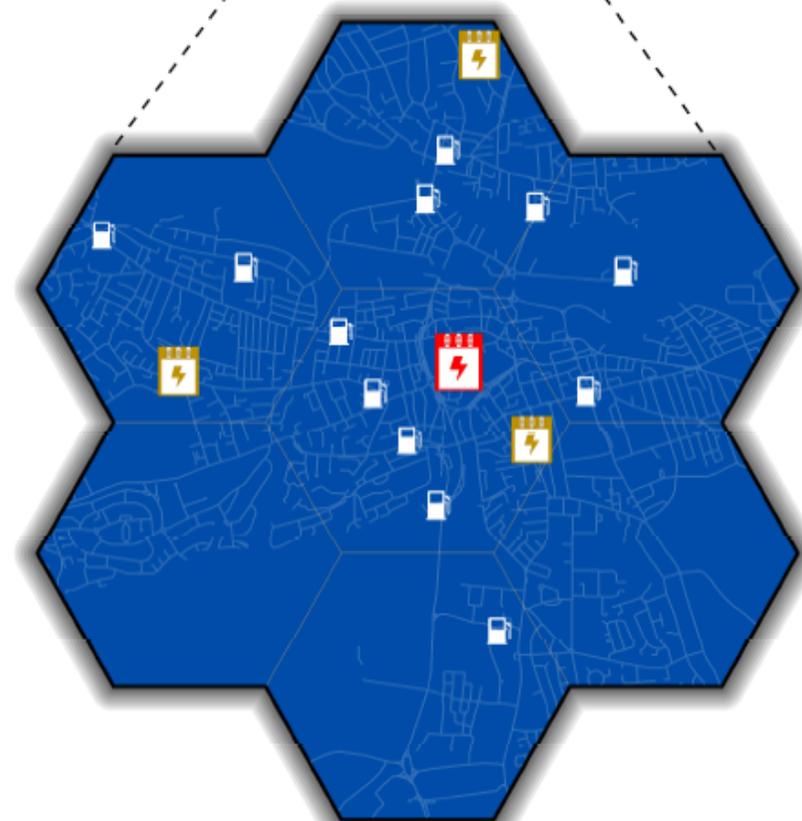
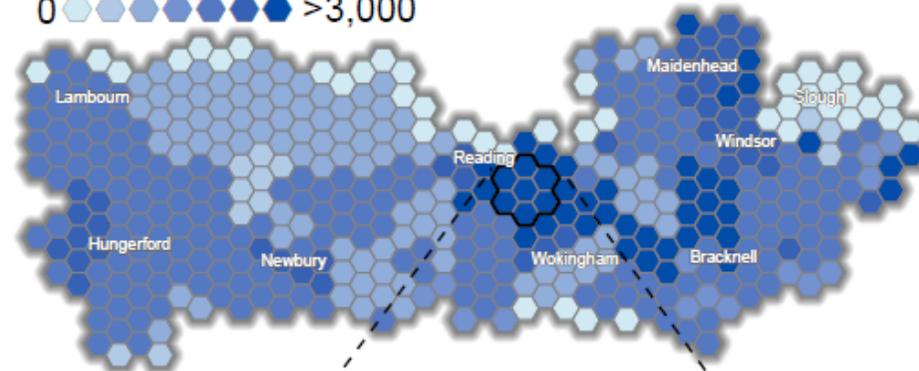
80% streets have on-street parking

12 Petrol filling stations

4 substations

1 substation on a major road

Car Ownership
0 >3,000



- 4.5.8 This inequality in access to ‘cheap’ electricity for those without domestic connection points has the potential to limit the travelling ability of the labour force, with associated negative impacts on growth and the environment.
- 4.5.9 More vulnerable members of the community, such as the elderly, may also have difficulty using complicated payment systems and mobile applications, thereby further exacerbating inequalities.
- 4.5.10 The impact of charging infrastructure must therefore be considered beyond simply the infrastructure provision of charging points.
- 4.5.11 Currently, the regional energy providers do not have a fixed approach regarding how these new demands will affect the future network investment plans. This will therefore be a key point of collaboration between THAMES VALLEY BERKSHIRE LEP and the Thames Valley Berkshire stakeholders.

4.6 Growth in the Energy and Environmental Sectors in Berkshire

- 4.6.1 Running parallel to the physical provision of infrastructure to meet economic growth, the CCC Net Zero report clearly demonstrates the economic value to businesses in capitalising on the low carbon agenda.
- 4.6.2 The LEP has already identified that this opportunity for business growth in the energy and environment business sector is key to the continued economic success of Thames Valley Berkshire.
- 4.6.3 The Thames Valley Berkshire Energy and Environment Sector Proposition identifies five specialisms in the sub-region:
- Smart Grids;
 - Environmental Analytics;
 - Renewables;
 - Climate Change; and
 - Built Environment.
- 4.6.4 THAMES VALLEY BERKSHIRE LEP is already engaging with businesses in the Thames Valley to look at resolving risks to economic growth from a lack of energy provision. This is explored further in **Section 5**.

5 Enabling the Low Carbon Transition in Thames Valley Berkshire

Section Summary

The role of THAMES VALLEY BERKSHIRE LEP in enabling the low carbon transition is mandated in its mission to promote productivity in Berkshire.

The LEP's role will be fulfilled through developing the clean growth strategy within the BLIS, establishing funding routes to support clean growth, continuing to coordinate and facilitate stakeholders such as SSEN and SGN, and providing advocacy for Thames Valley Berkshire.

The LEP is currently funding the Thames Valley Berkshire Smart City Cluster and supporting the Living Labs project. These projects aim to reduce energy consumption from transport and enable the transition from petroleum to electric vehicles effectively.

The LEP is also supporting funding for low carbon infrastructure projects to resolve issues with potential shortfalls in renewable energy provision and energy efficiency in the area.

Local authorities in the Thames Valley already have strong local plans that target energy demand reductions and the provision of renewable energy in the context of land development projects. There will be a continual need for these policies to be updated as the nature of energy consumption changes, especially as they relate to electric vehicles and electrification of heating over the next decade.

5.1 Introduction

5.1.1 As noted in **Section 4**, changes occurring as a result of the Fourth Industrial Revolution are unpredictable and will result in a shift in energy demand. It has been identified that growth in energy demand is predominantly associated with three societal trends for Thames Valley Berkshire (although noting there are other contributing drivers):

- General employment growth of an incremental nature;
- Population and housing growth (including through major new developments and urban densification); and
- Structural and sectoral economic changes which result in industrial restructuring within the sub-region (for example, data centre provision in B8 warehouses and distribution use classes; or provision of electric vehicle charging infrastructure).

5.1.2 These three trends are competing with each other in terms of future energy provision. Whilst employment and population growth follow a well-trodden “predict and provide” approach, fundamental structural and sectoral industrial change is “hidden from view” and difficult to anticipate.

5.1.3 Understanding traditional sector growth and demands is of equal importance to understanding additional “hidden” demands.

5.1.4 The challenge will be to ensure enough energy infrastructure is in place to meet traditional growth and development needs and demands from new sectors through low and zero carbon infrastructure.

5.1.5 This section sets out how the LEP will support the delivery of this transition.

5.2 Role of THAMES VALLEY BERKSHIRE LEP

5.2.1 The LEP's mission is to promote economic productivity in Berkshire. To achieve this, it has four primary responsibilities:

- Developing the economic growth strategy for Thames Valley Berkshire;
- Establishing funding routes to support economic growth;
- Coordinating and facilitating stakeholders; and
- Providing advocacy for Thames Valley Berkshire.

5.2.2 These responsibilities are currently being delivered through the SEP and will be built on within the BLIS. How these responsibilities relate to the energy sector is presented on the following page.

5.2.3 Objectives have been set against each of these responsibilities in **Section 6** to support the clean growth needs of Thames Valley Berkshire.

5.3 Role of the Berkshire Local Industrial Strategy

5.3.1 It is anticipated that the BLIS will look to set actions against the “bottlenecks” across “traditional growth” and “industrial restructuring” processes.

5.3.2 This will allow the BLIS to provide a framework for appropriate solutions over time. These will need to be developed in partnership with major utilities companies and sector partners. Technology will be a key part of the solution.

5.3.3 Through engagement with a range of stakeholders, especially SSE, it has been noted that there is no technological “silver bullet” that will fix all of Thames Valley Berkshire's energy infrastructure deficit. Lessons have already been learnt in backing one single approach too early.

5.3.4 This issue needs to be considered by the public sector when establishing planning policy relating to energy, including electric vehicle infrastructure.

5.3.5 For example, local authorities are starting to plan for requiring EV charging points in every new home. This may preclude options for alternatives such as electric vehicle forecourts that could have a benefit for wider communities.

5.3.6 The role of the LEP in funding or supporting innovating will need to be technology agnostic. The outcomes of project supported by the LEP will need to target the energy trilemma and support managing the future impacts of growth on energy infrastructure across the region.

PRODUCTIVITY ↑

CLEAN GROWTH STRATEGY

CLEAN GROWTH IN THE THAMES VALLEY

JOBS

SMART MOBILITY

CLEAN GENERATION **NEW FUELS FOR TRANSPORT**

FINDING FUNDING

£5 MILLION

INVESTMENT INTO SMART ✓
LOW CARBON TRANSPORT

& ENERGY

ADVOCATING PLACE

SUPPORTING INDUSTRIAL GROWTH SECTOR PLAN

UNIVERSITY OF READING

NATIONAL GRID

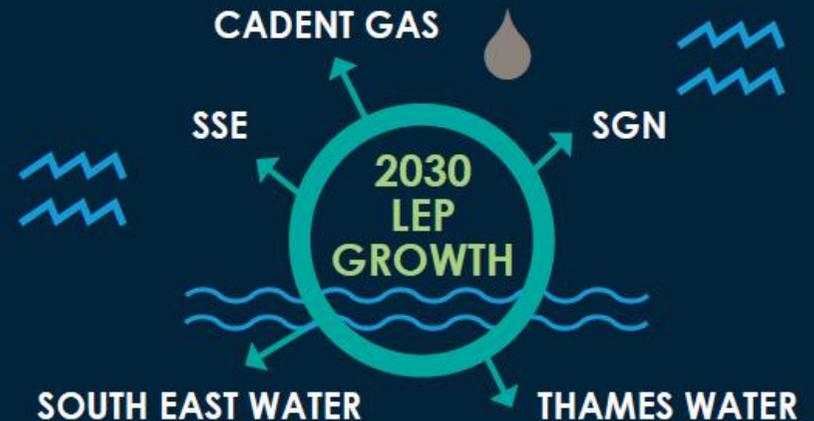
SYNGENTA **SSE** **COSTAIN**

SITA **CENTRICA**

HITACHI **JACOBS**

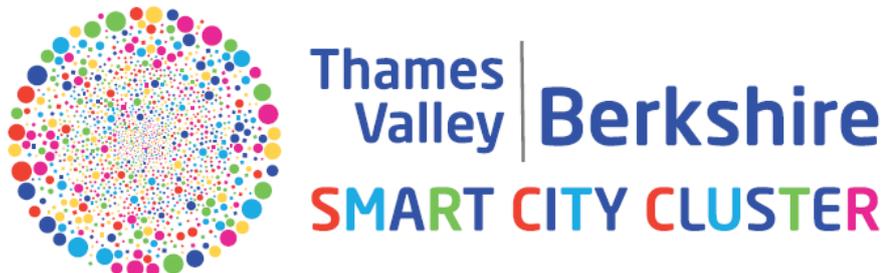
COORDINATING STAKEHOLDERS

BERKSHIRE UTILITY WORKING GROUP



5.4 Thames Valley Berkshire LEP's Role in Enabling Innovation and Smart Infrastructure

- 5.4.1 As noted in **Section 5.2** the LEP's role is to provide advocacy for Thames Valley Berkshire
- 5.4.2 As noted in **Section 3**, 39% of energy consumed in the Thames Valley Berkshire relates to road transport.
- 5.4.3 The LEP is supporting the DfT-funded ADEPT Thames Valley Living Labs project, which uses a smart communication network (LoRaWAN) to tackle energy consumption in the transport sector.



- 5.4.4 The technology analyses real-time data to enable optimisation of traffic flow to tackle congestion, energy use, air quality, road surface problems, and other transport-related issues. The real-time data is collated from existing infrastructure and data sources. In the future, new infrastructure will also be provided by O2 and Siemens.
- 5.4.5 One of the many smart benefits of the Living Labs project is that it can monitor and predict electric vehicle usage and can be used to track when vehicles will need to be charged, in order to balance charging needs and peak energy demands. Another transport management benefit of the Living Labs is a more targeted and effective pothole repair system, which will lead to smoother network flow and reduced fuel use.
- 5.4.6 The LEP is also investing in other smart networks through the Superfast Berkshire Project Board. This is a Joint Committee established by the six local authorities and the LEP to oversee the delivery of improved broadband infrastructure across the sub-region. The ambition is for this to develop into a Digital Infrastructure Group, which will take a leading role in wide-ranging digital infrastructure provision.
- 5.4.7 The aim is to incorporate several innovative concepts such as smart cities, big data, 5G and superfast broadband to create an internationally competitive digital infrastructure in Thames Valley Berkshire.
- 5.4.8 The LEP has also led the co-ordination of stakeholders to advocate for a Western Rail Link to Heathrow (WRLtH). This project will provide a new direct rail link from the West to Heathrow, improving journeys to Britain's busiest airport and helping increase economic productivity in the Thames Valley Berkshire sub-region and beyond. It is anticipated that the rail link will remove over 5,100 tonnes of CO₂ per year in avoided-road related vehicle emissions.
- 5.4.9 The LEP has invested £40,000 to support a project team and Stakeholder Steering Group, to make the case for WRLtH and work together to ensure Government supports the scheme. It includes stakeholders from British Airways, Network Rail, Parliament, Heathrow Airport Ltd, Great Western Railway and the Department for Transport.

5.5 Delivering Clean Growth through Local Plan Making

- 5.5.1 The unitary authorities of Berkshire have already acted towards delivering the goals set in the UK Clean Growth Strategy by establishing low carbon planning policies, specialist energy projects and undertaking Government funded heat network assessments.
- 5.5.2 Under the Energy and Planning Act 2008, and through deployment of planning policies and Building Control, it is the local authorities' statutory duty to ensure that energy efficiency is delivered in new buildings. All authorities have ambitious targets to drive clean growth in their adopted development plans:
- Bracknell Forest Council currently requires all major development proposals to reduce carbon dioxide emissions by at least 10% and provide a least 20% of their energy requirements from on-site renewable energy provision (Policy CS12 of the Core Strategy 2008);
 - Reading Borough Council requires all new developments to maximise energy efficiency and conservation measures in their design, layout and orientation to reduce overall energy demand, and to incorporate energy from renewable sources to reduce carbon emissions (Policy CS1 of the Core Strategy 2008 with 2015 alterations);
 - Slough Borough Council requires all development to minimise the consumption and unnecessary use of energy, particularly from non-renewable sources, and generate energy from renewable resources where feasible (Policy 8 of the Core Strategy 2008);
 - West Berkshire District Council requires development to reduce carbon dioxide emissions by at least 10% from renewable energy or low / zero carbon energy generation on site or in the locality of the development (Policy CS15 of the Core Strategy 2012);
 - The Royal Borough of Windsor and Maidenhead has a dedicated Sustainable Design and Construction Supplementary Planning Document (2009) setting out specific design requirements for new development to reduce energy consumption; and
 - Wokingham Borough Council requires development proposals to contribute to the goal of reaching zero-carbon development as soon as possible through energy consumption reduction and by including on-site renewable energy features (Policy CP1 of the Core Strategy 2010).
- 5.5.3 As of May 2019, all authorities are developing emerging Local Plans or reviewing existing Local Plans, all of which aim to promote the clean growth agenda further.
- 5.5.4 In its Carbon Plan 2015-2020, Reading Borough Council (RBC) has set ambitious targets to drive clean growth. RBC will aim to reduce its carbon footprint by 50% by 2020, and aim for 100% by 2030, against a 2008 / 09 baseline. This includes provision of 15% renewable energy by 2020 (15% of total energy consumed).
- 5.5.5 Where appropriate and possible, the LEP will support the local authorities by championing good practice and encouraging effective energy policy.
- 5.5.6 For example, THAMES VALLEY BERKSHIRE LEP is currently encouraging the area's Small Medium Enterprises (SMEs) to apply for cash from a £6 million Government energy efficiency fund: the BEIS boosting access for SMEs to energy efficiency (BASEE) competition.

5.6 Closing the Gap for Traditional Energy Infrastructure Delivery

- 5.6.1 In today's energy markets, zero carbon energy does not provide security of supply without expensive interventions, especially at a local scale. As mentioned in Section 2, this creates an energy trilemma that will need to be unlocked, especially due to the constantly changing balance of competing priorities and drivers.
- 5.6.2 The Government's Industrial Strategy also signals the net benefits of new technology on the UK's ability to manage growth.
- 5.6.3 For example, advancement in digital technology will enable our energy systems to operate more efficiently through use of better demand prediction modelling allowing network owners to actively manage their systems.
- 5.6.4 This offers the potential for the planning and development of a range of possible distributed renewable energy provision projects to support utility operators' growth plans.
- 5.6.5 Examples of such infrastructure may include battery storage and power generation to meet short term power needs, or small-scale sewage treatment facilities located within areas of growth.
- 5.6.6 Further innovation is required to embed new renewable generation and energy efficiency projects following the last 10 years of experience. This will be done through a call for European Regional Development Fund (ERDF) low carbon investment projects in June 2019. This aims to maximise the benefits of placing the right technology into the area, rather than forcing existing technology into the wrong place.

6 Objectives for Clean Growth

Section Summary

Three geographic challenges have been identified in Thames Valley Berkshire that will be incorporated into the LEP's roles to promoting growth.

The challenges relate to disconnect between the speed of growth and the speed of delivering new energy infrastructure; the impact of the energy trilemma; and the ability to support renewable energy generation.

Four objectives that define the LEP's role have been established which will integrate these challenges into the existing SEP and the future BLIS. These objectives relate to: delivering the Clean Growth Strategy through the BLIS; enabling funding for Clean Growth; coordinating stakeholders to deliver clean growth; and further advocating place within the LEP's sector propositions and the BLIS.

These objectives will be used to monitor progress in achieving clean growth in Thames Valley Berkshire.

6.1 Introduction

6.1.1 It is recognised that there are wide number of challenges in decarbonising the energy sector and reducing energy demands across the UK. As noted in **Section 2**, Government has, over the last 30 years, established a regulatory structure to deliver this transition. This includes targeting:

- Domestic and commercial energy demand reduction through ECO and fiscal measures such as CRC Energy Efficiency Scheme, ESOS and CCL;
- Enhancing energy efficiency through step changes to Part L of the Building Regulations;
- Renewable energy incentives through CfD, FiTs and RHI;
- Delivery of new generation through the regulated energy markets; and
- Delivery of new power infrastructure through the RIIO framework.

6.1.2 Thames Valley Berkshire does not differ from any other area in the UK in how these national interventions are delivered within its economy. The role of THAMES VALLEY BERKSHIRE LEP will be to continue to support stakeholders in meeting these national regulations, where necessary.

6.1.3 The evidence generated through the SEP and this study has shown the Thames Valley has defined three specific energy infrastructure challenges that relate to its growth and geographical position within the UK, beyond the national requirements set out above.

6.1.4 These three challenges are defined as:

- Managing the energy trilemma linked to the nature of growth in Thames Valley Berkshire;
- Closing the gap between the fast pace of growth within Thames Valley Berkshire with the slow pace of energy infrastructure delivery; and
- Delivering renewable energy within the Thames Valley geography.

6.1.5 These challenges will require direct response to ensure continued successful economic growth within the area.

- 6.1.6 As noted in **Section 5**, the LEP's role is based on four primary responsibilities. These responsibilities define the approach to managing the challenges above to enable clean growth in Thames Valley Berkshire.
- 6.1.7 Four objectives aligned to the primary responsibilities have been set by the LEP to ensure the energy infrastructure challenges are monitored and delivered against.

6.2 Objectives for Clean Growth

- 6.2.1 The following growth objectives respond to the three specific geographic challenges that relate to Thames Valley Berkshire. It is recognised that there are many wider challenges that relate to the national energy grand challenges and infrastructure needs. These will continue to be addressed and supported by THAMES VALLEY BERKSHIRE LEP in line with Government direction.

Objective One: Deliver the Clean Growth Strategy through the BLIS

- 6.2.2 The BLIS will establish further evidence on the nature of growth within the Thames Valley. This will allow the BLIS to clearly target closing the gap between the growth, both in form and speed, with delivering the new energy infrastructure that will underpin it.
- 6.2.3 The BLIS will provide the framework for meeting Thames Valley Berkshire's Clean Growth Grand Challenges. Through early identification of the nature of industrial growth in the area early interventions will be planned that will target the delivery of lower cost clean energy to meet end users' economic needs. This will target reducing the impact of the energy trilemma.
- 6.2.4 The outcomes of this approach will be monitored through Key Performance Indicators (KPIs) for Berkshire that links economic growth to good environmental and social outcomes. The KPI will be used as a tool and metric to show the success of economic growth in Berkshire. This will allow the LEP to link this KPI to funding projects.
- 6.2.5 An example of a KPI will be to link economic growth to both energy consumption and greenhouse gas emissions. These will be key metrics to measure the successful delivery of the SEP and the future BLIS.

Objective Two: Funding Clean Growth

- 6.2.6 Closing the gap between growth and infrastructure delivery will require investment that falls outside the ability for statutory undertakers to deliver. Where the private sector cannot close this gap public sector funding will be critical. For example, forward funding energy infrastructure linked to strategic growth will require access to central funding routes such as the Housing Infrastructure Funding.
- 6.2.7 In addition, an obvious route to reducing the risks of the energy trilemma will be public sector funding to reduce the economic risks in favour of the environmental and social outcomes.
- 6.2.8 THAMES VALLEY BERKSHIRE LEP is already committed to funding Clean Growth projects in Berkshire. For example, the £5 million ADEPT smart cities project targets significant direct emissions from both transport and energy infrastructure. THAMES VALLEY BERKSHIRE LEP will require all future LEP-funded projects to provide evidence demonstrating how they contribute to the Clean Growth of Berkshire and are aligned with the KPI requirements.
- 6.2.9 Funding will target the identified challenges which have a relationship between the business sectors in Berkshire, its geography and its growth needs. These will form the core of the response to the Clean Growth Challenge for the Thames Valley within the BLIS.

Objective Three: Coordinating Stakeholders to Deliver Clean Growth

- 6.2.10 The THAMES VALLEY BERKSHIRE Utility Infrastructure Study (2018) identified that SSEN and SGN are not aligned to strategic growth established through the local planning process nor do they make allowance for new infrastructure at a local level relating to changing nature of energy demands (such as electric vehicles and electric heating).
- 6.2.11 THAMES VALLEY BERKSHIRE LEP is engaged with the major energy utility providers in the sub-region, acting as a conduit for information on development and economic growth in Thames Valley Berkshire. THAMES VALLEY BERKSHIRE LEP will continue this role in the future, ensuring that these energy utility providers are aware of the rate and nature of growth, to help inform their asset management plans.
- 6.2.12 In addition, by requiring LEP-funded projects in Berkshire to provide evidence of Clean Growth outcomes (Objective Two), THAMES VALLEY BERKSHIRE LEP can gather the evidence-base of the collective benefits of Clean Growth on productivity.
- 6.2.13 Partnering with the regulated providers of energy within Berkshire is critical. Both SSEN and SGN have stated their preference to establish investment projects and partnerships based on the Industrial Strategy's evidence base.
- 6.2.14 This preference is based on their experience of a legacy of 'technology first' energy projects not aligning to their actual needs and / or the commercial reality of providing power distribution services. Examples were cited by SSEN through previous innovation projects relating to 'Constrained Management Zones'. In these early innovation project calls for partnerships in demand management often resulted in single large solution offers from the private sector¹⁵ not necessarily meeting the wider social requirements defined by SSEN.
- 6.2.15 As a result of this SSEN are now looking to establish community led projects where communities and community organisations can receive payments for helping ease constraints on the local electricity network, as an alternative to upgrading cables and substations¹⁶.

Objective Four: Advocating Place

- 6.2.16 Berkshire is home to some leading energy and environment companies which are helping deliver the aims and objectives of the UK's Climate Change Strategy as defined with the Thames Valley Berkshire Environment and Energy Sector proposition.
- 6.2.17 THAMES VALLEY BERKSHIRE LEP will continue to promote the Thames Valley as a location for businesses delivering solutions for clean growth through its existing functions. This can be seen in partnerships established in the Smart City ADEPT project where local business such as O₂ are already engaged with the Berkshire unitary authorities.
- 6.2.18 It is likely that future growth will be accelerated in geographies that combine energy security, access to zero carbon power and have established colocation benefits of finance sector and a skilled work force.
- 6.2.19 THAMES VALLEY BERKSHIRE LEP will continue to promote Berkshire as a place to do business through its Sector Propositions (<http://www.thamesvalley.co.uk/resource-library/>) and through development of the BLIS.

¹⁵ <https://www.ssen.co.uk/Innovation/>

¹⁶ <http://news.ssen.co.uk/news/all-articles/2019/may/could-you-be-paid-to-reduce-electricity-usage-ssen-reading-event/>

Appendix A Policy Review

Introduction

The UK Government is committed to the climate change agenda and a transition to a low carbon economy and society. The legally binding international Kyoto Protocol agreement is core to the Government's commitment to reducing carbon dioxide emissions, and this requires the UK to reduce greenhouse gas emissions by 12.5% below 1990 levels by 2008, increasing to 80% cut by 2050. These commitments have triggered a series of national acts, plans and regulations relating to utility infrastructure that impact regional growth on top of the statutory regulatory acts that control our utility provision.

The following section sets out the national planning policy regime that relate to energy.

National Policy Statements

The delivering of energy, water and communication infrastructure is of national importance. To ensure an appropriate planning framework the Government developed, in 2011, a series of National Planning Statement (NPSs). The NPSs define projects of national significance that require determination by the Secretary of State. They also provide material consideration for local planning authorities in the forming of Local Plans.

For energy infrastructure, there are six NPSs as follows:

- Overarching Energy (EN-1);
- Renewable Energy (EN-2);
- Fossil Fuels (EN-3);
- Oil and Gas Supply and Storage (EN-4);
- Electricity Networks (EN-5); and
- Nuclear Power (EN-6).

National Policy for Energy Infrastructure

There are a wide range of regulations in place for controlling and managing utility assets and managing the markets they supply. The Gas Act 1986 and Electricity Act 1989 are primary legislative instruments for energy utilities which were brought together through the Utility Act 2000 and Energy Act 2004 (and subsequent acts).

Both the Climate Change Act 2008 and Energy Act 2008, as amended, have sought to deliver on all-party commitments to reducing carbon emissions throughout the UK.

The future approach of utility services in the UK was described in the Low Carbon Transition Plan (2009), with the primary focus on reducing carbon emissions associated with resource use. This also sets targets for the delivery of emission cuts of 18% on 2008 levels by 2020 (and over one third reduction on 1990 levels).

The Low Carbon Transition Plan also sets out the Government's aim to decarbonise resource use through a mixture of the decarbonisation of energy generation, the development of a more efficient energy supply and distribution system, reducing consumption and, where consumption is unavoidable, ensuring that it is used as efficiently as possible.

A key policy initiative following the overarching plan was the Energy Act 2013, which established measures to attract the £110 billion investment to replace current generating capacity, to upgrade the grid by 2020, and to cope with a rising demand for electricity.

There are also several fiscal mechanisms and measures that have been established through the Electricity Market Reform (EMR), which are available to support energy generation deployment. Key mechanisms of the EMR includes:

- **Capacity Market:** A key mechanism to ensure power capacity is maintained within the UK at the lower price to the consumer. The market is open to new and existing power stations, energy storage plant and interconnections to 'bid' for supply capacity contracts through the National Grid. The suppliers in this market guarantee supply capacity in return of Capacity Payments. Included within the capacity market is also voluntary energy demand reduction. The Capacity Market works through an auction mechanism which is held four years ahead of the delivery to allow for new project development;
- **Renewables Obligation (RO) Certificates (2002-2017):** This OFGEM scheme places an obligation on licensed electricity suppliers to source a proportion of electricity from renewable sources. Renewable electricity generators are given RO Certificates, which they can then sell to electricity suppliers;
- **Contracts for Difference (CfDs) (2014):** Low carbon electricity generation projects can apply for a CfD and may have to compete in an auction to receive a contract. The long-term contract is based on a Feed-in Tariff and if the market price is lower than the agreed 'strike price', the Government pays that difference per kWh, and if the market is above the strike price the generator pays the Government;
- **Feed in Tariffs (FiTs) (2010):** FiTs are available to anyone installing a supported renewable energy technology up to 5MW in size. The tariff is paid to the generator per kWh of electricity they generate and for a period of 20 years for most technologies and 25 years for solar photovoltaic technology; and
- **Renewable Heat Incentive (RHI) (2014):** This scheme is available for renewable heat technologies amongst householders, communities, and businesses through financial incentives. RHI cash payments are made quarterly over seven years.

The EMR programme contains a large amount of complexity, including; rapid change in subsidy support for renewable energy projects and ambiguity on guaranteeing investment returns (especially associated with the CfD).

In addition to energy specific national regulation, there are a wide-range of national strategies that impact energy utilities (specifically electricity). The recent announcements by the Department for Transport, for example, plans for all cars and vans to be zero emission by 2050¹⁷. Within this statement there is national view that electric vehicles will be a predominant technology to achieve this reality.

Initial estimates suggest this may add over 30GW to National Grid capacity, all of which will be distributed through local network provision. This will need to be considered from a national perspective in the first instance, but it is noted the greatest constraint on networks will be in large urban areas reliant on vehicle movement.

¹⁷ Department for Transport – UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633269/air-quality-plan-overview.pdf (July 2017)

OFGEM

The Office for Gas and Electricity Markets (OFGEM) is the primary regulator managing economic and regulatory policies whilst monitoring customer service performance in the gas and electric industry. The gas and electric companies are regulated through the RIIO Network Pricing Model, which allows the companies to develop 5-year business plans focusing on future asset investments and performance measures, while developing innovative strategies to overcome future challenges in Climate Change, Population Growth and Renewable Energy.

OFGEM is governed by the Gas and Electricity Market Authority (GEMA). GEMA's role is to regulate the gas and electricity networks to protect consumers. Other bodies include The National Grid and the Department for Business, Energy & Industrial Strategy (BEIS) focuses on identifying long term challenges and developing policies to encourage companies to incorporate innovative technologies in future investments and infrastructure.

National Planning Policy Framework

The NPPF 2012 was updated in July 2018 and again in February 2019. The updated NPPF supports the role of the local plan process and maintains the "presumption in favour of sustainable development" concept. **Paragraphs 148-154** of the NPPF explain that planning system should help to shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability, and improve resilience.

Plans should provide a positive strategy for renewable and low carbon energy sources, that maximises the potential for suitable development, and identifies suitable areas for renewable and low carbon energy sources, and opportunities for development to draw its energy supply from decentralised, renewable, or low carbon energy supply systems.

When determining planning applications, local planning authorities should expect new development to comply with any development plan policies on local requirements for decentralised energy supply.

One of the points that the NPPF states that should be taken into account is the availability and capacity of infrastructure and services. The planning system should support the transition to a low carbon future, such as through supporting renewable and low carbon energy and associated infrastructure. Strategic policies should set out an overall strategy for the pattern, scale, and quality of development, with sufficient provisions for telecommunications, water supply, wastewater, flood risk, and energy.

The updated NPPF also states that to meet the challenge of climate change, flooding and coastal change, plans should have regard to the cumulative impacts of flood risk.

Net Zero – The UK's contribution to stopping global warming (2019)

In May 2019 the Committee on Climate Change published 'Net Zero – The UK's contribution to stopping global warming'. This report was in response to a request by the Government to reassess the UK's long-term emissions targets. The key overarching advice from the report is that a new target should be established of net zero greenhouse gas (GHG) emissions by 2050. This would replace the existing target to reduce GHG emissions by 80% from 1990 levels to 2050.

The target is in line with the 2015 Paris Agreement. This agreement also includes the target of limiting global temperature rises to well below 2°C. A UK net zero target is beyond that necessary for achieving this target, however it is reliant on international action as well. Current pledges across the world would lead to warming of approximately 3°C by 2100. The UK has the potential to lead the way in meeting the Paris Agreement target.

The cost of this target is estimated as 1-2% of GDP, which is the same as the predicted costs of the current 80% reduction target by 2050. This is largely due to the rapid cost reductions in key

technologies that contribute to GHG emissions, such as renewable energy and electric vehicles. The costs however must be shared fairly between businesses, households, and the Exchequer. This should be managed through a Government framework. Many of the changes have limited additional costs, such as energy efficiency measures, which have upfront costs but throughout their life cycle result in fuel savings. However, overall the increased cost of achieving net zero from an 80% reduction appear relatively expensive, with high cost processes including carbon capture and storage, switching to hydrogen fuel, and installing heat pumps.

Achieving net zero GHG emissions will require a large magnitude of change throughout the country, in terms of economy and infrastructure. A number of scenarios are set out in the report which are based on current consumer behaviours and known technologies. A mix of these scenarios are likely in the future and include:

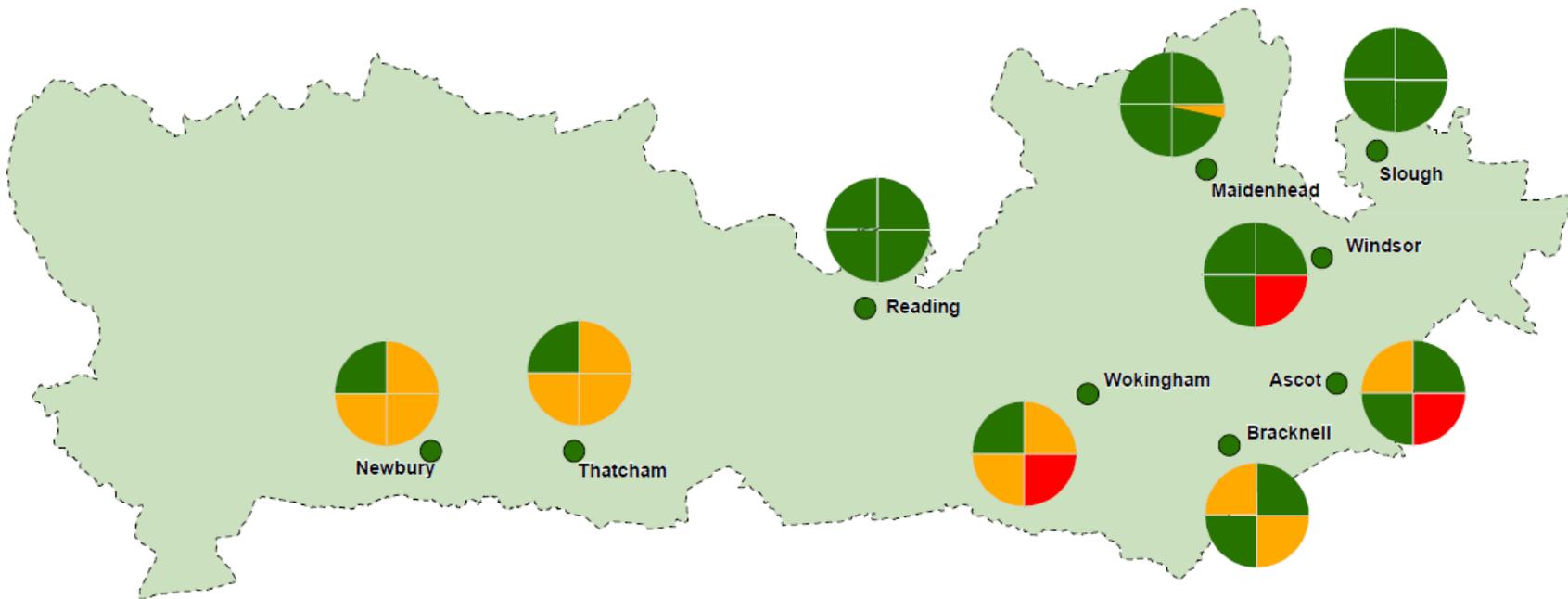
- Resource and energy efficiency that reduce demand for energy;
- Changes in societal choices that result in reduced demand for carbon intensive activities, such as meat consumption, and increased active travel;
- Extensive electrification, especially of transport and heating systems. This will need to be supported by major growth in renewable and low carbon energy generation;
- Development of hydrogen economy for energy dense applications, and heating and electricity demand during peak periods;
- Carbon capture and storage; and
- A carbon sequestration and biomass production emphasis within farming and land use development.

As well as the benefits in relation to climate change and the subsequent impacts of climate change (increased flooding), there are other significant positive impacts. Improvements in quality of life could be seen as a result of better air quality, and a healthier, more active lifestyle. Quality of life could also be improved through the enjoyment of increased biodiversity and recreational benefits from changes in land use (through afforestation).

The next steps towards meeting a net zero GHG emissions future is for the Government to adopt the target and for the most cost-effective path to be determined. Existing foundations will need to be built on in order to achieve this. The UK has the opportunity to lead and support a net zero future across the globe.

Appendix B Energy Capacity Assessment

Thames Valley Infrastructure RAG Assessment (2012 - 2037)



Electricity	Gas
Drinking Water	Foul Water
	No requirement for strategic reinforcement
	Some reinforcement may be required
	Network reinforcement/upgrades required

