

Achieving 60% renewable and low carbon energy in the UK by 2030



Expert briefing note for Labour on
wind, solar and energy efficiency

September 2018

In the 2017 General Election, the Labour Party committed to ensuring that 60% of the UK's energy demand in electricity and heating came from zero carbon or renewable sources by 2030. The commitment prompted a group of industry specialists and professionals to begin a research project addressing the following questions: Can it be done? How? And with what consequences for our climate and economy? This briefing sets out some of the high-level findings of that research, covering the technologies needed to achieve that target, and the top line implications for jobs and energy poverty. It focuses on four key areas: energy efficiency, offshore wind, onshore wind and solar power. The full findings, which set out decarbonisation pathways across the energy system, will be published in a full report later in the year.

This work is the first stage of the project, and analyses 'the what': the scale and scope of technologies required for Labour to meet the 60% target. The second stage will analyse 'the how': the skills, investment and government action needed to ensure the energy transition is delivered at best value, while maximising economic opportunities across the UK – protecting existing and creating new energy workers.

The purpose of this research is to help inform Labour Party policy, and contribute to the wider debate on the UK's future energy mix. It was conducted independently from the Labour Party and does not represent Labour Party policy.

The team

Authors / project team: This project is the product of a working group of industry professionals and experts, with inputs from right across the energy sector, over a six-month period. Those contributing authors are listed below. The authors have contributed in a purely personal capacity:

- Alexander Schamroth-Green
- Archie Luxton
- Christina Lumsden
- Donal Brown
- Ewan Frost-Pennington
- Lewis Fox-James
- Sara Dethier
- Tom Bailey
- William Bailey
- Jaspreet Singh

Research Expert Oversight

The work has also been reviewed and contributed to by a group of the UK's leading energy researchers, academics and thought leaders. This has taken place through a workshop in midsummer 2018, and then review input to the final strategy document. Further details of this group will be published alongside the full report.

Foreword

Rebecca Long-Bailey, Shadow Secretary of State for Business, Energy and Industrial Strategy

Tackling climate change will be one of Labour's most important tasks in government. The evidence is unequivocal, the timeframes are urgent, and the opportunities are unmissable.

That is why we are backing a target of net zero emissions before 2050, and are committed to ensuring that 60 per cent of the UK's energy comes from renewable and low carbon sources within twelve years of coming to power.

As set out in Labour's *Green Transformation* pamphlet, we will take on environmental challenges according to three principles:

1. Our ambition is based on science
2. Our interventions are transformational, bringing about the structural change needed to address drivers of environmental degradation
3. Our interventions will advance our Labour values – justice, equality, solidarity, and democracy – both at home and abroad

This means addressing climate change in a way that ensures that the huge benefits of transitioning to a sustainable economy – and the benefits are huge – are both realized and widely shared. We know we can only do this by working closely with trade unions representing energy workers, and that's what we are already doing.

I warmly welcome this independent research undertaken for the Labour Party, and pay tribute to the working group of industry professionals and experts behind it.

Labour's mission is about more than carbon. It is about creating hundreds of thousands of new jobs reviving whole areas of the UK, and ending fuel poverty, boosting the fundamental quality of life for millions of people. Forget climate pessimism. We are excited, inspired, and itching to get started.

With that in mind, I look forward to welcoming the full research later in the year.

Rebecca Long-Bailey,

Shadow Secretary of State
for Business, Energy and
Industrial Strategy



Achieving 60% renewable and low carbon energy in the UK by 2030

A briefing note

Introduction

Labour's manifesto commitment is to deliver in one decade an energy transition that will transform Britain's prospects for generations – a commitment that 60% of all the non-transport electricity and heat demand across the UK will be supplied by means that are either renewable or low-carbon. Making good on that pledge is not just an opportunity to create high quality jobs, eliminate fuel poverty, and develop skills and industries that Britain can export around the world, it is also a moral imperative, to reduce the growing risk from climate change that threatens everyone's future prosperity.

The programme outlined by our research shows that investing to provide at least 60% of our energy from renewable and low carbon sources by 2030 is not a pipe dream. As energy industry professionals and experts, we believe that Britain has the best opportunities for renewable energy of almost any country in the world. If we move quickly, in the first parliament of a Labour government, it is still possible to catch up the ground lost under the Tories and become a leader in the global clean energy revolution.

This briefing note sets out four key elements of that energy revolution – energy efficiency, offshore wind, onshore wind and solar power – the scale that we propose these technologies are rolled out across the UK, and how that mission will transform lives for the better, providing a massive jobs dividend and transforming local economies. We will publish our full recommendations for delivering the 60% target, along with a detailed research paper later in the autumn. This will set out the four elements covered here in more detail, as well as the wider changes required to meet the target, including the role of other generation technologies such as nuclear and tidal, as well as introducing renewable hydrogen and electricity for heating.

This work is the first of two research projects, and analyses 'the what': the scale and scope of technologies required for Labour to meet its target. The second research stage will analyse 'the how': the skills, investment and government action needed to ensure the energy transition is delivered at best value, while maximising economic opportunities across the UK – protecting existing and creating new energy workers.

But one thing is evidently clear: the faster Britain shifts to a low-carbon economy, the quicker and greater will be the rewards. The longer we prevaricate, the more expensive will be the transition that we must inevitably make later.

The short-term benefits of providing at least 60% of our energy from renewable and low carbon sources are as impressive as the long-term. By raising every home and public building in Britain to the highest energy efficiency standards, by 2030 Labour will have been able to end fuel poverty, eliminate mental and physical illness caused by poor housing, and raise productivity and wellbeing from schools, hospitals, and care homes that are designed to keep people comfortable with the minimum necessary of clean energy.

Millions of people will be able to breathe more easily, rather than suffering needlessly with polluted air which currently kills one thousand people across Europe every day.

The next Labour government will have made an investment that puts Britain on a good footing for the long-term too, cutting out the obscene wastefulness of our current, high-polluting energy system, and making our economy ultra-efficient to cope with the demands of a challenging century.

Once the initial investment is made, Britain will have the comfort of energy security for decades to come, benefiting from the near-free supply of solar, wind and tidal energy, and protected from the ups and downs of fossil fuel prices.

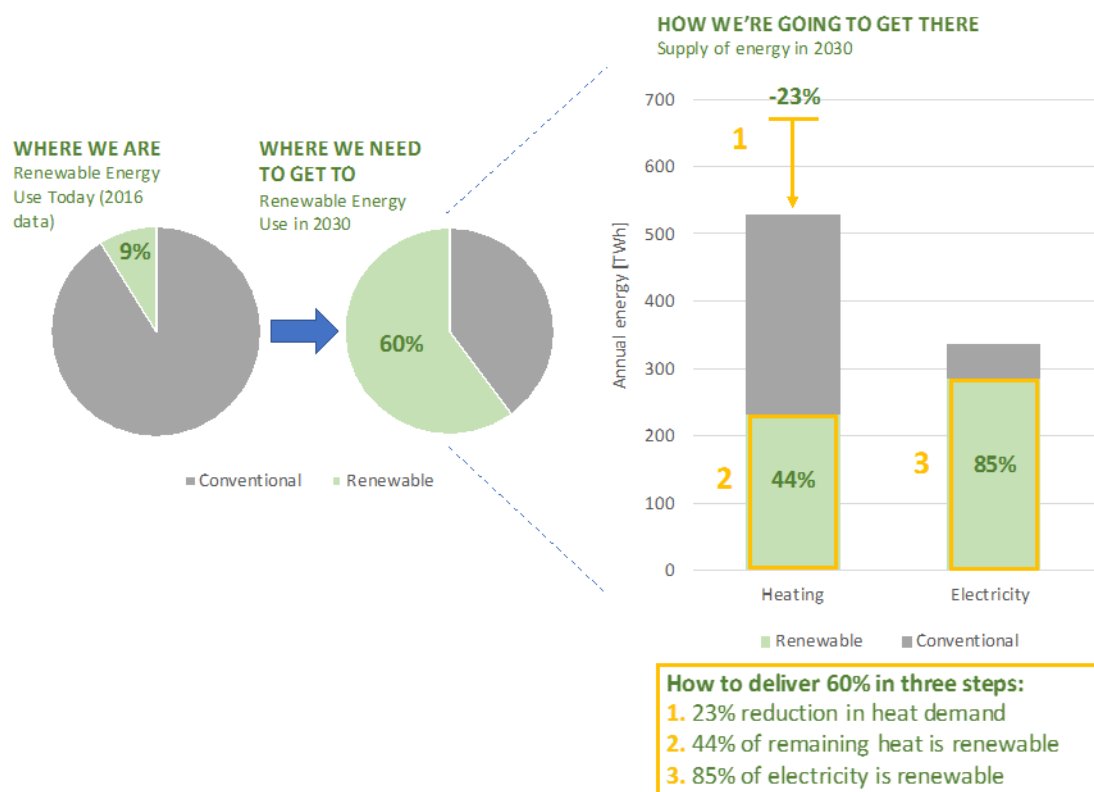
Moreover, we have a moral duty to switch to clean energy. We are the first generation with the data and science to properly understand the full implications of the damage that two centuries of industrialisation has done to the

fragile eco-system that makes all life possible on Earth. And we are probably the last generation that is able to prevent run-away climate change from threatening the very existence of human civilisation. If we don't cut pollution, nothing else that a Labour government delivers will survive as a legacy.

We have to deliver this in the context of an economy still recovering from the impact of the bankers' crisis and a decade of the sector being undermined by Tory policy. The Labour government of 1945 was in a similar position after the Second World War. And, just as Nye Bevan was determined that the National Health Service Labour created would not only to deliver immediate improvements to everyone's lives but also be a beacon to the world of what socialism could deliver, so the next Labour government can show how a twin focus on equality and environmental sustainability offers a way forward for the whole of humanity.


Headlines

The pathway we recommend as the most practical and realistic to achieve the 60% target is comprised of three main components: reducing heat demand from buildings by almost one quarter; providing 85% of electricity demand from renewable and low carbon sources; and providing 44% of heating demand from renewable sources.



While the policy interventions required to meet the target are significant, we are confident that under our recommended pathway:

- **60% renewable or low-carbon energy is feasible in 12 years** – It is entirely possible to deliver the 60% target over three full parliaments, and so with a Labour government no later than early 2019, the target can be achieved by 2030. If a Labour government came later, the feasibility of achieving the target by 2030 would have to be assessed based on technical and real-world progress made in the meantime.
- **This transition will deliver huge benefits across the UK** – The large-scale update to UK building stock and energy infrastructure will be a huge stimulus to the economy, create new, quality jobs and drive



investment, particularly into areas that have suffered since de-industrialisation. Taken together, we estimate that our proposed rollout of offshore wind, onshore wind, solar PV and home retrofitting would generate 410,000 new full time equivalent jobs. It will also improve the lives of tens of millions of people through better quality homes and work environments.

- **Achieving 60% renewable and low carbon energy will involve extensive updates to UK energy infrastructure, homes, transport and industry** – The target will require a new approach to generating, transporting and using energy, with updates to outdated infrastructure across the UK to bring it into the 21st century. This will have profound effects on, and require careful coordination with, almost all other sectors, but achieving it will also bring enormous benefits.
- **The target will put the UK on track meet its climate change commitment through the Paris Agreement** – The Paris climate agreement requires all nations to take action to reduce their own greenhouse gas emissions to the levels needed to keep global average temperature rises below 1.5 degrees. This is crucial to avoiding the huge negative impacts of climate change. Achieving at least 60% renewable energy by 2030 will not only make the UK a pioneer, but without it we would renege on this international commitment.
- **The lights will stay on** – Much has been made of the challenges in ensuring energy is always available when relying on sources like the wind and sun. Technology has advanced quickly and this paper shows that, at 60% renewable and low carbon energy, even a limited selection of the cost-effective technical solutions available today to balance energy supply and demand, would be more than sufficient to ensure the lights, and crucially heaters, stay on whenever they are needed.

This preliminary briefing note focuses on four areas: energy efficiency, offshore wind, onshore wind and solar power. The sections below summarise our proposals for each of these four areas, our rationale for focusing on these areas, and the jobs dividend associated with each.

These four areas are just part of what it will take to deliver 60% renewable and low carbon energy in 2030. The full report, to be published later in the year, will set out our intended pathways for upgrading the whole energy system, including other electricity generation technologies, UK heating and our approach for non-domestic buildings. It will also include a regional breakdown of economic benefits, and outline how these bold plans for renewable and low carbon energy will be managed to ensure the lights and heaters stay on all year round.

1. Harness the largest offshore wind resource in Europe



By 2030:

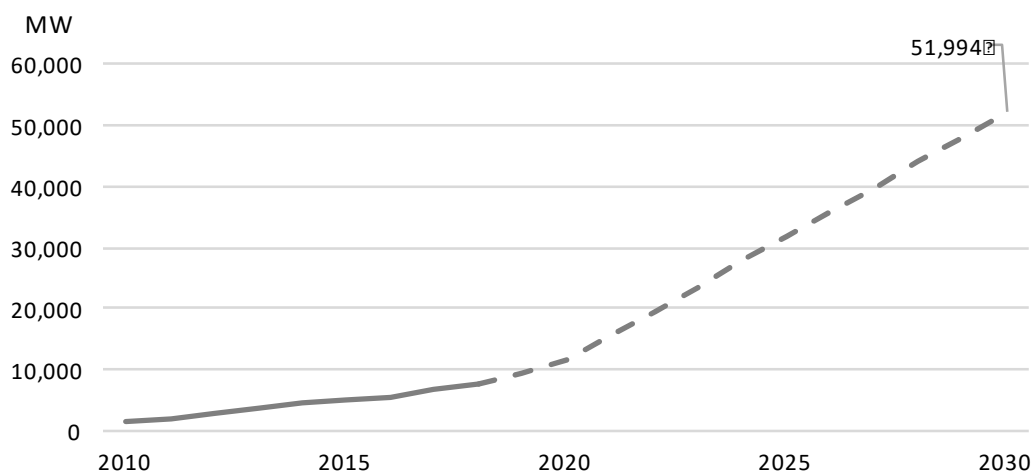
- 7500 turbines
- 12m homes powered
- 120,000 jobs
- 52GW capacity

The proposal

Increase the UK's installed offshore wind capacity seven-fold by 2030 to 52GW, trebling the current rate of deployment, with year on year increases of 4GW through the 2020s.

This would create huge demand for turbine components, high voltage cables and the large supply chain of goods required, from lifting gear to electric control equipment. Meeting this demand through UK manufacturing would offer enormous opportunities for skilled jobs in regional industries.

Installed wind capacity: historical and future projections



The rationale

With the largest wind resource in Europe, the UK has a unique opportunity to be a world leader in offshore wind technology. Offshore wind benefits from higher and more consistent wind speeds compared to onshore wind, can be located near densely populated areas, and works well to offset lower solar power in winter creating a stable production profile.

The deployment of offshore wind on the scale envisaged has been made possible by plummeting costs, developments in turbine technology allowing for greater size, and major breakthroughs in the development of installation and foundation technologies.

Jobs created

We estimate that increasing offshore wind capacity to 52GW by 2030 would generate 120,000 total new jobs – direct, indirect and induced.¹ This would include 8,000-12,000 direct jobs in the north east of England and more than 12,000 direct jobs available in the Humber region. Both areas have suffered significantly since de-industrialisation.

¹ Preliminary and indicative figure, based on analysis set out in upcoming full report

2. Reviving the UK's onshore wind industry



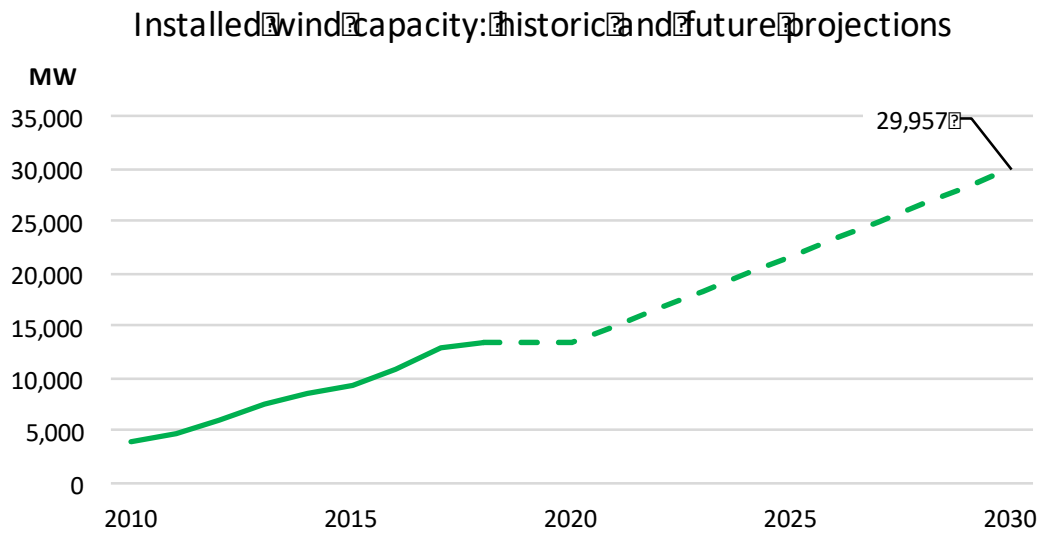
By 2030:

- 6000 turbines
- 5m homes powered
- 60,000 jobs
- 30GW capacity

The proposal

Double the UK's installed onshore wind capacity by 2030 to 30GW.

This would require a 25% increase in the rate of deployment that was seen up to 2017, when the current government's policy barriers halted the expansion of onshore wind, costing 12,000 jobs in one year. As with offshore wind, this would transform the UK into a global hub of wind power manufacturing, with enormous economic opportunities.



The rationale

Onshore wind currently offers one of the cheapest ways to generate renewable energy, with costs continuing to fall. It is a well-established technology that is relatively straightforward to install, and has a very low footprint compared to other forms of energy generation, with minimal impacts on ground wildlife.

Jobs created

We estimate that increasing onshore wind capacity to 30GW by 2030 would generate 60,000 total new jobs – direct, indirect and induced.

3. Unleash the UK's solar power potential



By 2030:

- 2.5m homes powered

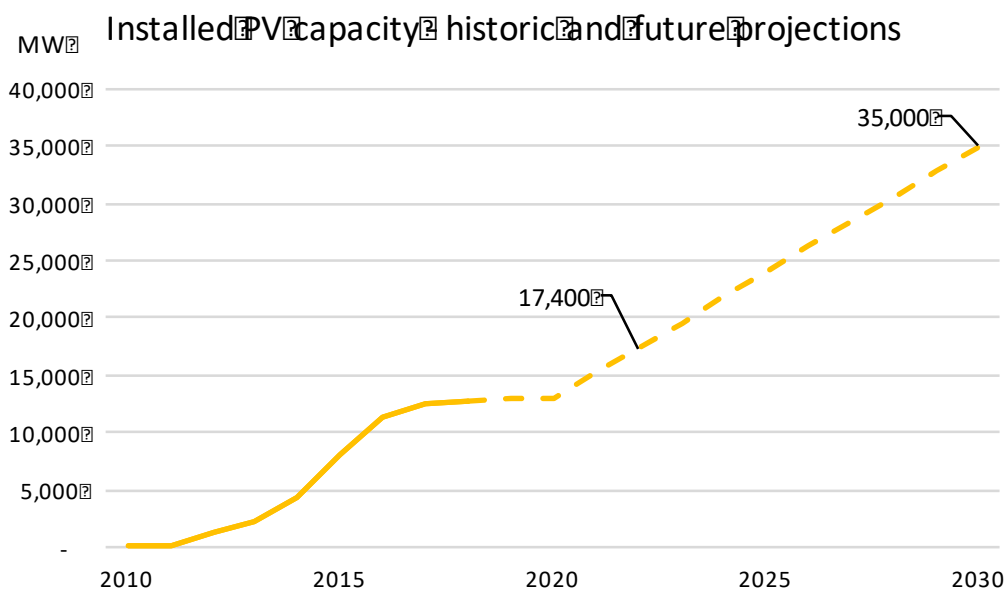
- 70,000 jobs

- 35GW capacity

The proposal

Almost triple the UK's installed solar PV capacity by 2030 to 35GW, with a combination of large and small-scale installations, installing solar PV on all viable UK roofs.

This could be achieved with average annual growth of 2.2GW per year, only slightly above the historic 2GW per year before the current government's policies slowed solar power's expansion.



The rationale

Solar PV has been an incredibly successful renewable energy technology in the UK, with generation capacity increasing from just 32 MW in 2010 to 12.8GW in 2018. However, in recent years the development of solar has stalled drastically due to actions of the Tory government.

Solar has been driven by falling costs and public enthusiasm. Initially driven by small scale installations of less than 4KW, larger scale installations now dominate installed capacity. Given this historic basis, there is significant potential for growth of solar PV capacity in the UK.

Jobs created

We estimate that increasing solar PV capacity to 35GW by 2030 would generate 70,000 total new jobs – direct, indirect and induced.

4. Make every house a warm, dry and cheap to power home

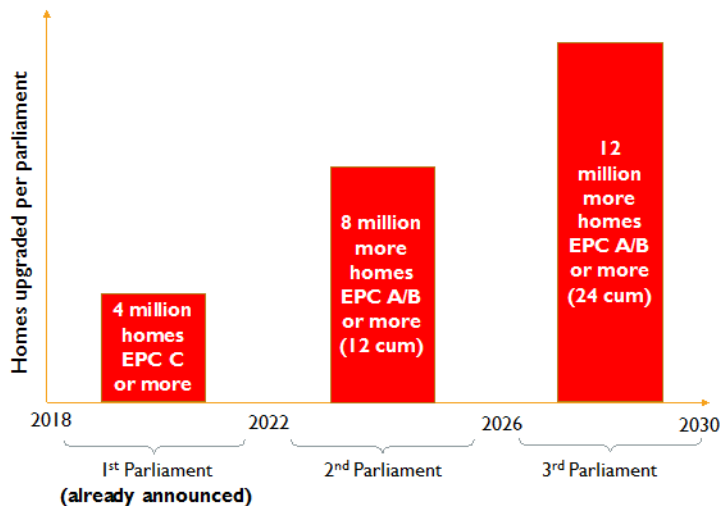


By 2030:

- All homes energy efficient
- 160,000 jobs
- 26% less energy
- End energy poverty

The proposal

Cut domestic heat demand by approximately one quarter by 2030. This would require a huge number of skilled energy assessors, engineers, technicians, trainers and ancillary workers, with jobs spread evenly across the country through the lifetime of the programme.



The backbone of the strategy is a nationwide building upgrade programme with the aim of bringing all homes in the UK up to the highest energy efficiency standards, bringing improvements to lighting, damp, draughts, security, safety and community spaces by 2030. The immediate priority will be areas with high fuel poverty and low quality housing. The second priority will be homes with lowest energy performance. In addition to a concerted retrofit programme, we propose codes for all new buildings requiring EPC A/B from the start of a Labour government, and then a low-carbon requirement from half way through the first parliament.

The rationale

Reducing heat demand will transform the UK's poor housing stock into homes that are warmer, more livable and energy efficient. It is a way to tackle climate change, tackle energy poverty and boost quality of life.

Energy savings must be maximized if the 60% target is to be achievable. That is because heat is considerably larger over the year than any other energy use in the UK. Further, the peak demand for heat is six times larger than electricity, and it is generally more complex to shift to renewable heat.

This level of ambition represents an unprecedented transformation of the UK's housing stock and will require a scale of investment, supply chain capacity building and innovation as yet unseen in post-war Britain. However, if executed correctly, the social, environmental and economic benefits that such a transformation program could bring to the country will more than justify the interventions needed.

Jobs created

We estimate that a domestic retrofit programme for homes would result in 160,000 more jobs per year in 2030 than there are today – direct, indirect and induced.