



LARGE-SCALE INVESTMENT IN RENEWABLES



Renewable energy sources are fundamental to the Green New Deal.

Large-scale investment in renewables will be essential to the decarbonisation of **electricity generation, buildings, industry and transport**. Renewables produce no GHG emissions during operation and provide opportunities for **good green jobs**. They also greatly increase energy autonomy by allowing for decentralised, community-based energy production. Renewables have a much lower environmental impact than fossil fuel based power. Recent years have seen the costs of renewables plummet, falling below new fossil fuel or nuclear power plants.

WHICH RENEWABLES?

Rapid transformation of the economy and infrastructure in the manner called for by the Green New Deal will require a massive investment in **mainstream renewable technologies**, predominantly on- and offshore wind and solar PV for power production. Buildings, and in part industry, can then be decarbonised using renewable powered electric heat pumps or zero-carbon hydrogen gas, made using renewables. It is not considered [feasible](#) to sustainably develop additional large scale hydropower in the UK, due to environmental and social impacts.

A Green New Deal will prioritise **proven technologies** to minimise the risk of delays and unforeseen wider impacts. Alternative technologies are likely to be required in some areas, such as transformation of industry, where processes such as Carbon Capture and Storage (CCS) are not yet proven at scale.

The technologies best suited to regions, cities and communities should be **determined locally**, with a clear national framework to guide rapid, sustainable investment in renewables while ensuring energy security and tackling energy poverty to transform the UK economy while improving communities' welfare and autonomy.

MOVING TO AFFORDABLE, GREEN, RENEWABLE ENERGY

This section discusses a kWh: a unit of energy that's roughly [equivalent](#) to that used by a laptop in a day, a dishwasher in an hour, or an oven for half an hour.

Despite historic warnings to the contrary, **renewables are incredibly affordable, both in terms of construction and energy prices**, and the costs continue to [plummet](#). Off and onshore wind, large scale solar and rooftop solar are all anticipated to have electricity generation [costs](#) lower than 10p/kWh within the short term. New fossil fuel plants with CCS are expected to have slightly higher generation [costs](#). These costs exclude system costs – for example in balancing supply and demand in the network – but also exclude wider carbon and environmental costs which are high for fossil fuels.

Developing renewable technologies such as **wave and tidal** are [projected](#) to be over 30p/kWh in the short term, but as demonstrated with wind and solar PV, the costs are likely to drop far faster than projections when deployed at scale. However, the feasibility of sufficiently reducing the costs of these less widely used technologies within the Green New Deal's 2030 decarbonisation window need to be further considered.

RENEWABLES AND 'LIFE-CYCLE EMISSIONS'

It's useful to talk of different energy technologies' carbon intensities, which relates to the amount of carbon emissions per unit of electricity produced. On and offshore wind, hydro, solar PV and nuclear power have whole life-cycle **carbon intensities less than 50 grams GHG/kWh – much lower** than fossil fuels (500-1000 grams), or indeed even lower than lower bound estimate for fossil fuels using carbon capture and storage (likely over 150 grams) – a technology as yet unproven at scale.

The upfront capital works required for renewables and nuclear are often higher than for fossil fuels, but this [does not](#) mitigate the life-cycle benefits gained from energy harvested from wind and sunshine.

The **materials needed** for renewable infrastructure, such as steel, are often sourced from countries with more carbon intensive energy production than the UK. While materials can and should be domestically sourced, UK industry will also take time to decarbonise, so locally sourced materials will also have a carbon footprint in the near term.

As a result, our estimates (based on the graph above, scaled to future electricity generation) suggest decarbonisation of our power, heating and transport sectors via mass conversion to renewables by 2030 could produce a residual carbon footprint of around 50 million tonnes of GHG – **a fraction of annual emissions from burning fossil fuels.**

However, it is important to highlight that as the UK and global industry is decarbonised, the future construction, replacement and maintenance of renewables will have a continually decreasing carbon footprint.

Biofuels or bioenergy/biomass are [classified](#) by some as a renewable alternative to fossil fuels. Biofuels can be used in electricity generation or in surface transport, for example biofuel buses. There are high uncertainties around the carbon intensity of biofuels. The [CCC](#) note that sustainable low-carbon bioenergy is possible, but that this can only be achieved in certain circumstances, if certain practices and criteria are applied. There are risks that biomass production and use could in some circumstances be worse for the climate than using fossil fuels. Recent use of biofuels in the UK has reported carbon intensities [more than double](#) those associated with solar PV and wind power. The use of biomass as a fuel can displace more sustainable use of biomass such as timber used to displace steel and concrete. A Green New Deal should **move away from the use of biomass.**

RENEWABLES AND THE ENVIRONMENT

The use of wind and solar renewables has a significantly [lower environmental impact](#) than fossil fuel based technology. Further, even 'carbon efficient' fossil fuel sources contribute to air pollution through particulate matter and harmful gases; a shift to renewable energy will therefore also allow us to tackle our air quality crisis. Emissions of toxic byproducts from fossil fuel energy production into the world's ecosystems will also be significantly reduced.

The environmental impact of development of renewables will nonetheless require assessment, reduction and mitigation. The use of technologies with the potential for a higher environmental impact, such as **new hydro and ground mounted solar should be limited** to instances where sustainability over the whole-lifespan of the project can be demonstrated and monitored.

Biofuels, as well as having the potential for high carbon emissions, if not managed properly [can](#) have **severe environmental impacts**, destroying ecosystems. Increased demand for biofuels [can](#) displace food production to previously non-agricultural land such as forests, worsening their environmental impact. This furthers the case that a Green New Deal should move away from biofuels.

Development of renewables, particularly solar PV, is reliant on the extraction of rare earth metals which are, at present, often sourced in an environmentally and socially unjust manner. Further, the demand for rare earth minerals that would result from a transition to green energy under the current rates of energy consumption will [exceed known global reserves](#). Thus, In order to ensure a Green New Deal is internationally just and environmentally sound, the mass deployment of renewable energy must be done without contributing to environmental degradation or, critically, to human exploitation in the supply chain. For a full discussion of how this will be achieved, refer to our briefing on internationalism: 'Supporting developing countries' climate transitions'. Some key principles are outlined below:

- The Green New Deal **must work with international partners to develop sustainable and secure renewable supply chains**.
- The Green New Deal will **bring the energy system into public, democratic control** [as proposed](#) by Rebecca Long-Bailey, Labour's Shadow Secretary of State for Business, Energy & Industrial Strategy, enabling control of procurement in the interest of people, rather than profit.
- The Green New Deal will drive lower overall energy consumption by transforming the existing model of [high private energy consumption by the wealthy few](#) to a model of **public luxury and private sufficiency** that recognises energy as a right, as well as through **collective provisioning** such as free public transport.

SECURITY OF SUPPLY

There are challenges involved with generating electricity predominantly from **intermittent wind and solar renewables**. These involve: the high installed capacity required (compared to nuclear), meeting demand during short term fluctuations and also during meeting demand during long periods of low sun and wind. The CCC ([p71](#)) notes evidence supporting the feasibility of renewables supplying 65% of generation by 2030. Furthermore the [National Infrastructure Commission](#) presents a future scenario for the UK for 90% of electricity generated by renewables noting that this looks a safer bet than new

nuclear power or fossil fuels with CCS. [Recent reductions](#) in battery storage costs support the feasibility of higher renewable energy use.

FROM MODEST PROGRESS TO HIGH AMBITION

The UK's electricity system has significantly reduced its carbon emissions since 2010. This has resulted from reductions in electricity use, deployment of renewables and the continued phasing out of coal. Last year [42%](#) of our electricity was generated from renewables or nuclear power. Nonetheless, **a huge amount of the UK's electricity ([39% in 2018](#)) still comes from carbon intensive natural gas**, and the UK has also become one of the world's [biggest importers](#) of biomass, which contributes significant carbon emissions and has a number of negative environmental impacts.

The deployment of renewables in the UK at increasingly reduced costs has set the scene for **more ambitious and radical change**. However, renewables have not been evenly deployed around the UK; in particular, Wales and Northern Ireland have been left behind. A Green New Deal will ensure that all regions, cities and communities have equitable renewable investment to tackle fuel poverty and reduce inequality across the UK.

Rapid investment in renewables is also required to make up for the rapid removal of fossil fuels from the economy in heating, transport and industrial processes. **Electricity generation will need to more than triple** to enable deep decarbonisation of these sectors. The UK has deployed renewable energy capacity at up to around 8 GW/year, a Green New Deal will expand this to over 25 GW/year - e.g. including over 1000 large wind turbines a year - to decarbonise by 2030.

DECENTRALISED, DEMOCRATICALLY OWNED COMMUNITY ENERGY

Large scale investment in renewables, in particular onshore wind, roof mounted solar PV and localised energy storage, provides an unprecedented opportunity for a step change from bloated, wealth extracting private energy companies to **decentralised, community-led and democratically owned energy systems**.

A distributed system also allows people to benefit from demand-side response - saving money by using less electricity or selling their stored energy at peak times. Electric Vehicles can also act as decentralised energy storage units, supplying to the grid when demand is high. There are further opportunities for community-owned low-carbon hydrogen and large-scale energy storage facilities. Where appropriate, communities could work with local businesses to link district heating systems with heat capture from industry or use solar generated electricity from local public buildings out of operational hours.

This new decentralised, community-owned system could have a [host of benefits](#), including the reduction of fuel poverty, improved resilience, reduced transmission and distribution costs, and a boost in high quality green jobs across the UK. To ensure a sustainable and equitable future energy mix, the Green New Deal will also balance the need for a national energy strategy with local determination and autonomy.

Critical to a national strategy will be the determination of the best energy mix to deliver **carbon-free, secure energy** throughout the UK while **eliminating fuel poverty**. The Green New Deal must therefore urgently establish a **national energy strategy** which has the lowest barriers to a rapid and just transformation of our energy system.

Nine years of Conservative government has lost valuable time and undone much of the existing infrastructure for renewable energy. A Green New Deal under a Labour government would seek to overthrow current policy. In its place, there would be rapid expansion and investment in renewables, committing to energy that is democratically-owned and locally determined. Rather than a private burden, energy will be a public good that greens our cities, brings an end to fuel poverty and offers fresh opportunity for decarbonised and secure power across the country.