

Netting Net Zero – West Midlands’ Challenges and Opportunities

By Beverley Nielsen

In my last piece for Centre for Brexit Studies, I highlighted the ‘WMCA Five Year Plan’ and some of the challenges and opportunities arising as we transition to net zero.

It’s a sophisticated document, recently receiving [89% score from Climate Emergency UK](#), the highest achieved by any Combined Authority, and second place in a league table of the country’s 408 local and combined authorities. So is it all as good as it seems?

It’s admirable to see this [Five Year Plan](#) referencing the need to deliver a ‘just transition’ and an alignment with UN Sustainable Development Goals. It highlights 21k new jobs predicted by 2026, as well as a further 76k new jobs by 2041.

Whilst a precise figure of likely job losses is not mentioned, the plan (p. 83) does mention 140,000 jobs that will need to “re-skill as result of transition” (11.1% of the WMCA workforce). This is especially relevant to the West Midlands which has a 33% employment exposure to automotive, or 54,000 people employed in this sector in 2020 (De Ruyter et al, Enabling a Just Transition in Automotive, 2022) exposed as we transition to EVs.

The [2041 Five Year plan](#) identifies key priorities:

1. Domestic energy efficiency measures and heating retrofit across 1.1m homes including installation of 830MWp of rooftop solar.
2. Commercial energy efficiency measures in 73,400 buildings and 705MWp rooftop solar
4. Industrial measures including 16.7% deployment of H2, 40% of CCS for high temperature processes with 100% electrification for low temperature processes and 96 MWp of PV
3. Modal shift towards active travel measures including private car use reduced from 60% of all journeys to 35%, with public transport up to 27%;
4. Increased uptake of electric vehicles: 100% electric taxis, buses, 50% of HGVs
5. Planting 19m trees and enhancing natural capital including 59 MW Wind and 448 MWp of solar PV.

WMCA claims our region will be able to make 94% reductions through this plan by 2041, with 33% reductions due by 2026 against a 2016 baseline.

Gross investment costs are estimated at around £4.3bn by 2026 and £15.3bn over the 20-year period to be accessed from a variety of sources with no significant additional funding yet secured. Given the large scale of sums and ambitions outlined, the £5.1m initial funding to meeting this workplan allocated by WMCA seems very modest. Of this £2.1m is due to be allocated to a net-zero neighbourhood pilot, £0.7m to developing a Sustainable Market for Affordable Retrofit Technologies (SMART) hub, £1.4m to Energy & Environment Core Capacity enhancements and £1m to a Natural Capital Programme.

My concerns relate to the fact that there is no apparent:

- Audit of existing West Midlands energy assets
- Impact of Scope 1, 2 and 3 emissions
- Whole life carbon emissions
- Mention of security of supply chains and energy sources anticipated

- Alternative locally-generated renewable energy opportunities, including biomethane (or renewable natural gas) with the UK producing just 20% of its potential given the 140mT on organic waste available, and with geothermal estimated as capable of producing 20% of UK energy needs.

Whilst a 'West Midlands Carbon Calculator' has been developed by WSP, it's not clear that this takes the above issues into account, especially 'production-related' carbon footprint (as opposed to 'consumption-related' carbon footprint). For example, there is no reference in the report as to where Solar PV, heat pumps, hydrogen and EVs would be produced in order to implement the identified priorities and no mention of recycling precious metals involved in EV battery production including cobalt, lithium and rare earths.

Having discussed the West Midlands' opportunities for alternative fuels such as biomethane in my previous blog, I intend to review some of the supply chains currently responsible for solar PV and heat pumps production, with a focus on EV and electric battery supply chains and recycling in my next piece.

Solar

The West Midlands intends to install 830 MWp of rooftop solar across our 1.1m homes over the next 8 years up to 2030.

Of the world's top 10 solar panel manufacturers, seven are based in China with only First Solar based in the USA. The two remaining manufacturers on the [list](#) are from South Korea and Canada, although much of this production is based in China too.

As the [diagram shows](#) solar panels are made up from smaller components manufactured from primary materials coming from a number of countries. In 2020, the United States imported roughly 86% of new solar PV modules capable of producing 26.7 gigawatts (GW) of electricity, compared to its own capacity producing just 4.4GW.

Solar modules are made of solar cells consisting of [silicon wafers](#) – the thin slices of silicon used as semiconductors in all electronics, including solar panels, with China controlling at least 60% of wafer manufacturing. One company alone, Longi Green Energy Technology Co., the largest solar company in the world, produces 25% of these silicon wafers.

Silicon wafers are manufactured from solar-grade polysilicon with 45% of this produced in Xinjiang, known as the Uyghur Region of western China, with recent reports suggesting clear evidence of forced migration and a near 100% evidence of forced labour of the indigenous Uyghur population.

The vast majority of the remaining components are also sourced in China with some German production of [glass, encapsulants and backsheets](#).

This leaves the West Midlands confronted with some big challenges in implementing this strategy, especially in terms of environmental and social governance (ESG) considerations.

Back in April 2021, Secretary of State Antony Blinken, [condemned](#) China for its "acts of genocide" against Muslim Uyghurs and in June 2021 the Biden administration issued US Customs and Border Protection (CBP) orders restricting imports from Hoshine Silicon Industry Company as well as banning US exports to five Chinese companies including Hosine, Xinjiang Daquo New Energy

Company, Xinjiang East Hope Nonferrous Metals Company, Xinjiang GCL New Energy Material Technology Company and Xinjiang Production and Construction Corps. But the US has itself been caught in something of a bind as it struggles to reprimand China for human rights abuses whilst also seeking to expand the use of clean energy.

The UK has also taken steps against the Chinese firm, Huawei, in removing it from our 5G networks by 2027, banning the purchase of new Huawei 5G equipment after December 2020 and banning this firm from the most sensitive 'core' parts of our 5G network. The Digital Secretary noted: "By the time of the next election we will have implemented in law an irreversible path for the complete removal of Huawei equipment from our 5G networks", with his [statement](#) to the House of Commons following advice produced by the National Cyber Security Centre (NCSC) on the impact of US sanctions against the telecommunications vendor.

With the EU launching its own [Chip Act](#) in February 2022, given semiconductor shortages which have beset the world economy in recent years and articulating concerns about gaining control of their semiconductor supply chains, the West Midlands needs to start examining its own supply chains and energy security strategies in more detail too.

Heat Pumps

The amount of heat pumps in operation in the United Kingdom has increased continuously with both aerothermal and ground source heat pumps available and further information on the different types available [here](#).

In the West Midlands this technology is seen as a central strand in reaching net zero with 100% low-carbon heating system retrofit anticipated across 1.1m homes. It is not clear how much of this could be provided by UK-based producers.

According to [Statista](#), between 2013 and 2019, heat pump installations increased by roughly 137,000. In this period aerothermal heat pump installation far outpaced that of ground source heat pumps. In 2019, the UK had approximately 239,000 heat pumps in operation, of which, roughly 202,000 (84.5%) were aerothermal heat pumps.

With 35 UK-based manufacturers and suppliers of heat pump technologies listed by the [Heat Pump Association](#), there are a number of well-recognised brands including [Baxi Heating based in Warwick](#) and [Bosch Thermotechnology](#) based in Worcester employing several thousand people and producing 250k boilers a year. This company has taken an active approach to environmental and social governance, announcing full compliance with Scope 1, 2 and 3 emissions as far back as 2019.

Forecasts anticipate the UK heat pump market doubling in size by 2025. However this will require a very considerable leap in the West Midlands from perhaps 10% of the current heat pump installations at around 24,000 to around 1.1m. To ensure that we do not import all these heat pumps with the carbon footprint associated with this, we'll certainly need to develop a clearer plan identifying appropriate local supply chain partnerships that satisfy vital ESG considerations. At least in this case we have some highly esteemed local suppliers to work with.