Transport decarbonisation over the West Midlands: Clean air co-benefits

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Introduction

- The WM-Air: Clean Air Science for the West Midlands project from the University of Birmingham is working with the West Midlands Combined Authority to quantify and illustrate the air quality co-benefits of net zero policy options, aligned with the WMCA's commitment to achieve Net Zero by 2041.
- A key aspect of regional decarbonisation is transport strategy, including bus, car and light vehicle electrification – as transport accounts for 36% of West Midlands carbon emissions.
- In parallel, many areas in the region experience elevated nitrogen dioxide (NO_2) concentrations (leading to significant health and economic impacts, and driving policy responses, e.g. the Birmingham Clean Air Zone).

Methodology

- The WM-Air model (ADMS-Urban, a quasi-Gaussian plume air dispersion model) has been developed in collaboration with Cambridge Environmental Research Consultants (CERC).
- It explicitly models the full range of source types occurring in an urban area at high resolution.
- Model predictions for key pollutants have been evaluated using the measurement data of 32 monitoring sites from local authorities within West Midlands and Defra's Automatic Urban and Rural Network (AURN).
- The WM-Air model is now being applied to a range of intervention scenarios (e.g. Net Zero policies).

Results and Discussion

- The air quality (for NO_2) co-benefits of an achievable vehicle electrification scenario focussing on service vehicles (electrification of the region's buses, and 50 % of light delivery vehicles) are shown in Figure 1.
- Transport PM (Particulate Matter) emissions will not reduce so much with electrification (still with brake, tyre and road wear non-exhaust emissions).
- This highlights one aspect of the air quality-climate interchange, emphasising the local pay-off in terms of air pollution and health from actions which effectively tackle the climate challenge.

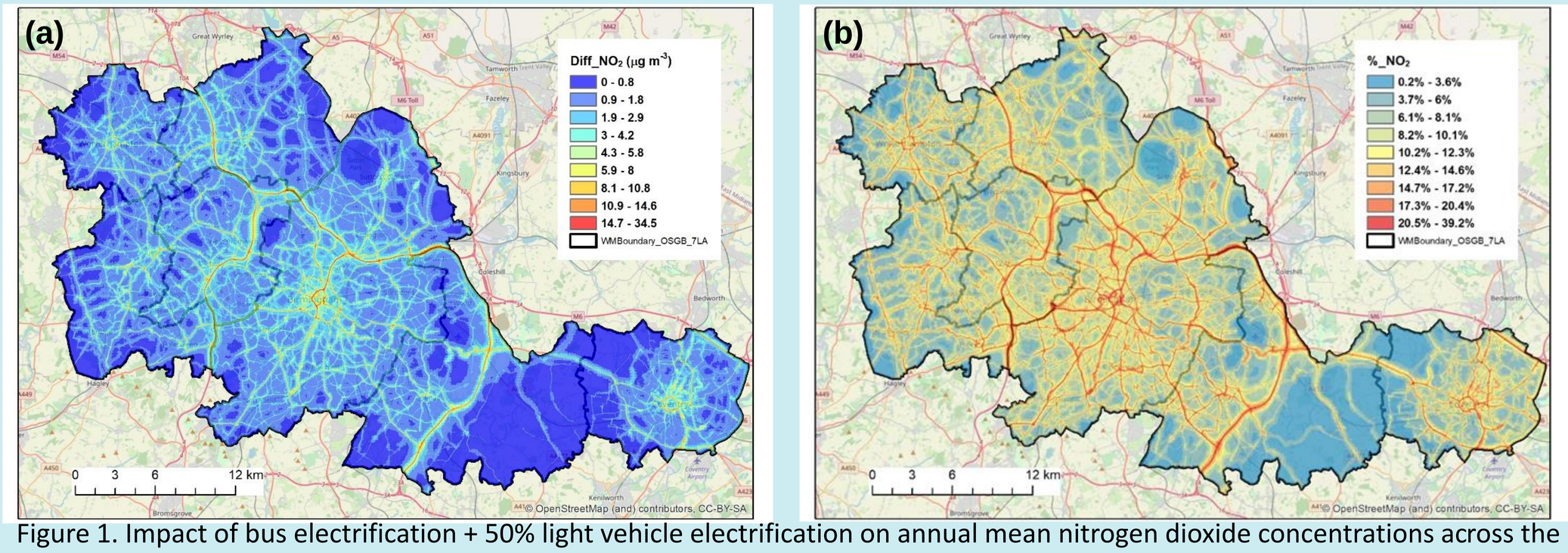

Figure 1. Impact of bus electrification + 50% light vehicle electrification on annual mean nitrogen dioxide concentrations across the West Midlands, (a) Reduction in annual mean nitrogen dioxide and (b) Percentage change vs Business-as-Usual scenario.

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