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Environmental Impacts of Replacing Conventionally Fuelled Vehicles with Electric Vehicles in Scotland: A University Case Study

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A biennial transport survey conducted by the University of Aberdeen (UoA) collated information of staff commuting habits to and from the campus between 2006 and 2016. A case study analysis of UoA staff was completed to predict the effect of replacing conventionally fuelled vehicle (CFVs) with electric vehicles (EVs) on ecosystem services by comparing carbon dioxide (CO_2) estimations. The effects of this may have significant implications for land use due to the construction of new renewable energy infrastructure, coinciding with a reduction in fossil fuels.

Impacts on ecosystem services from electrifying transportation will be highly varied. The extent of this demand is reliant on several factors such as daily charging time, vehicle type and manufacturing processes. Switching to EV's from CFV's will have an impact on land use, for example construction of charging points and the required infrastructure. Development of renewable energy sources also need to be accounted for when establishing the true impacts on provisioning services.

Over this ten-year period, 52% of staff used a CFV as their main mode of transportation. CO_2 emissions produced from CFVs by staff decreased, with staff driving increasing. The decrease in emissions was potentially linked to the vehicle age under EU legalisation to improve vehicle efficacy. This would suggest that current measures to reduce CO_2 emissions are effective and should continue.

Land use changes could result in new conflicts between transport, energy demand and ecosystem services before and after construction phases. To minimise the environmental damages of additional electricity infrastructures within the case study, a city-wide focus and collaborative approach needs to be considered by city planners. This would allow minimal degradation of land, water and soil within these urban environments.