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On-site floral resources and surrounding landscape characteristics impact pollinator biodiversity on solar parks

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As solar photovoltaic make a greater contribution to the energy mix, there will be increasing land use change for solar parks. Land use change can affect biodiversity across spatial scales and opportunities to incorporate biodiversity benefits into the energy transition are increasingly being recognised. For example, solar parks could support insect pollinators through providing critical resources such as flowering plants. However, understanding of pollinator response to solar park developments is currently limited and empirical data are lacking. To address this knowledge gap, we surveyed bumble bees, butterflies and flowering plants between July and September across 15 solar parks in the UK. We also investigated the composition and connectivity of the landscapes surrounding each solar park using landcover data and a GIS, allowing us to explore the impacts of on-site floral resources and surrounding landscape characteristics on bumble bee and butterfly abundance and diversity. We found that bumble bee and butterfly biodiversity varied across solar parks, but overall butterflies were more than five times more abundant than bumble bees. Pollinator biodiversity was impacted by both on-site resources and landscape characteristics. However, characteristics of the floral resources on site appeared to be the most important factors, with increases in floral diversity, floral cover and vegetation height associated with increases in pollinator abundance and diversity. Our findings suggest that local and landscape scale factors affect pollinator biodiversity on solar parks, but solar parks that provide diverse and abundant flowering plants may be best placed to support pollinators. Incorporating this knowledge into existing and future solar park developments could promote benefits to insect pollinators alongside the energy transition.