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Is it possible to embed the ecosystem impacts of solar parks into industry practice?

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The energy sector is the largest contributor to global greenhouse gas emissions. Therefore it is imperative that we take steps to de-carbonise energy supplies if we are to meet the 2°C goal of the Paris Agreement. Of the existing renewable energy technologies, Photovoltaic (PV) capacity has seen exponential growth in the past decade, with 508.1 GW of PV currently installed globally and predictions that it will become the dominant renewable energy source by 2050. A large proportion of this capacity is deployed as ground-mounted solar parks. Despite the rapid growth of solar parks, little research has been conducted into the ecosystem impacts. Here we use a systematic literature review of the available evidence to show that the main ecosystem impacts of solar parks can be grouped into five themes: microclimate, land-use change, soil and vegetation, wildlife impacts and pollution. Impacts can be positive or negative, and vary according to site location, former land use and management practices throughout the construction, operational and decommissioning phases of the solar park life cycle. The most widely reported impacts associated with the construction phase were habitat loss and fragmentation, with subsequent effects on fauna, flora, and soil. Commonly reported operational impacts included changes to local microclimate, pollution, mortality of wildlife and disturbance due to site maintenance. Decommissioning impacts depended largely on the site management objectives; sites continued to be managed to deliver ecosystem service co-benefits or returned to their original state prior to construction. The review also revealed significant knowledge gaps. Understanding the ecosystem impacts of solar parks is pivotal, both for informing site management that maximises ecosystem co-benefits and avoids detrimental impacts, and for quantifying the potential ecosystem costs and gains as required by policy, for example the upcoming mandatory biodiversity net gain requirement for UK planning applications.