



## Prospecting urban rooftop solar farm potential in Dublin, Ireland

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The development of a sustainable and renewable energy system is a significant challenge for Ireland. In line with UN and EU policies, Ireland aims to transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050 (Project Ireland 2040 National Planning Framework). Ireland is committed to an aggregate reduction in CO<sub>2</sub> emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors. Renewable energy can help Ireland reduce GHG emissions and carbon footprint as energy demands grow. It also reduces dependencies on fossil fuels as well as increases energy supply security.

According to the Sustainable Energy Authority of Ireland's "Energy in Ireland 2020" report, 36.5% of electricity demand was met by renewable energy sources in 2019. Wind energy contributes 32% while solar energy contributes to <1%. Significant investment has been made in Ireland's wind sector; however, the solar energy sector is relatively new. Ireland has the second-lowest total installed and cumulated solar photovoltaic (PV) capacity in the EU with just 36 MW or 7.3 W per inhabitant. (EurObserv'ER 2019).

Solar prospecting is necessary to identify optimum locations where solar farms can be established. Commercial and industrial building rooftops in urban areas offer a suitable location for establishing rooftop solar farms due to good connectivity with the electricity grid and proximity to users. Here we present an urban solar prospecting study in Dublin, Ireland.

A very high-resolution geospatial dataset was acquired for 47 industrial areas covering 53.3 km<sup>2</sup>. The data comprises of very high-resolution aerial images (12.5 cm/pixel) and digital surface model (DSM) (25 cm/pixel).

The high-resolution DSMs were used to model solar irradiation on building rooftops in ArcGIS Pro using the area solar analyst tool. These models were optimised for Irish conditions using Met Éireann solar radiation data for Dublin. The maximum solar insolation received in Dublin is 1000-1050 kWh/m<sup>2</sup>. The results demonstrate that there is potentially a large amount of commercial and industrial rooftop surface area available for PV installation in Dublin. These rooftops can generate a significant amount of electricity and help to offset CO<sub>2</sub> emissions.

