Solar air-condition tool – a pedagogic scaling component

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Solar air-conditioning sizing tool

In the remote locations where Médecins Sans Frontières (MSF) deliver medical aid, access to grid electricity is limited and most facilities must depend on diesel generators. One of the main drivers of their fuel use is air-conditioning (AC), which is estimated to account for 35-55% of MSF's total fuel use. Beyond providing more comfortable living and working conditions, it is critical where medical needs call for controlled temperatures, such as in pharmacies, operating theatres and laboratories.

MSF sees solar power as the way forward to reduce their dependence on diesel and decrease the carbon footprint of their operations. However, while they have identified certain models of AC units which could be powered using solar energy, challenges around defining exactly what is needed in different contexts has led to energy wastage and limited uptake within the organisation.

Arup developed the web-based Solar Air-Conditioning Sizing tool in collaboration with MSF France and the innovation unit which is part of MSF Sweden to help them assess their solar AC requirements. **The purpose of the tool is to speed up the scaling, dissemination and overall usage of solar AC units, at the same time as promoting conscious and data-driven decisions.**

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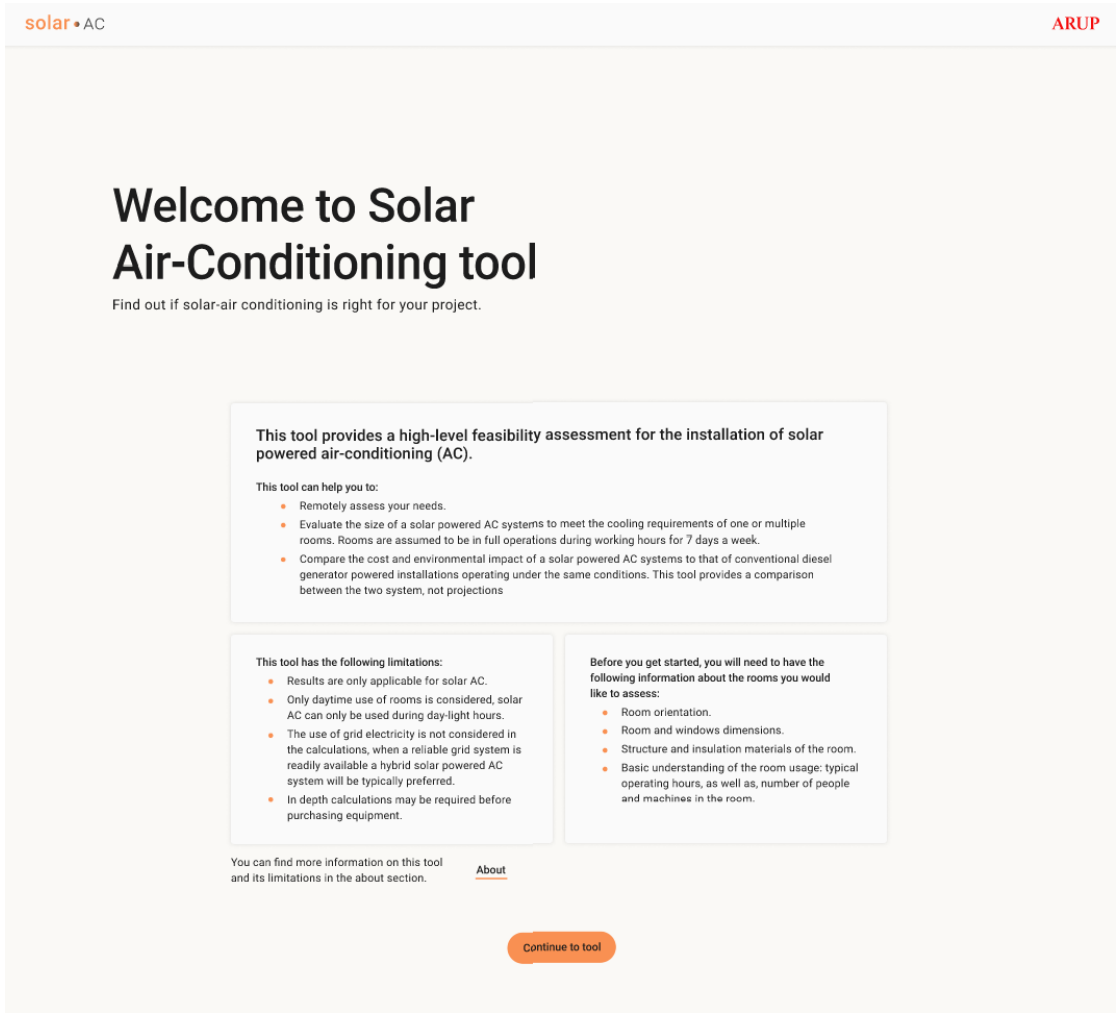
The tool provides a high-level feasibility assessment for the installation of solar powered AC systems. Project-specific information is inputted, such as location, external temperature, relative humidity and diesel costs, as well as information about the room including desired temperature, operating hours, size, orientation and the wall build-up. The tool then calculates the equipment need, the return on investment compared with traditional AC, and the environmental impact.

Through a pedagogic and intuitive approach, the tool enables users to quantify the advantages of a solar AC solution in financial and environmental terms. It also allows them to learn more about related parameters that affect energy consumption related to temperature control such as building composition (insulation, material and thickness of walls), orientation of the building, as well as PV installation best practices such as angle of solar panels, and so forth. By providing a structured method throughout MSF, it helps to streamline the process and enhances the overall learning on this topic.

We believe, and hope, that the Solar Air-Conditioning Sizing tool will further catalyse the usage within MSF and beyond. Each solar air-conditioning unit is estimated to reduce between 1-2.5tons/CO_2 emission/year if used within contexts similar to MSF operations.



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