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There is a long stretch between a laboratory discovery and a practical demonstration. For a potentially useful energy technology, many further strides must be taken before a societally meaningful scale is reached. In this work we have, based on many past experiences, brought the fully roll-to-roll printed polymer solar cell to a realistic scale across the entire value chain. The materials synthesis, the manufacture, the installation, the failure modes, and the operation have all been covered and addressed. We demonstrate outdoor operation for 2 years through a large-scale, grid-tied, high-voltage system and show that thin plastic foil can be operated as an energy-producing technology. Critical to the demonstration was the identification of the drying method during printing, and we show how this development relates to the scaling lag (the period between the point in time for a laboratory demonstration and the point in time for scaled manufacture) and allows for closure of the scaling gap.

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