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Title: Leveraging Data Science & Machine Learning to Characterize PV O&M Issues

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Abstract: With the dramatic drop in hardware costs (particularly for photovoltaic modules) over the last decade, the relative costs for in PV operations and maintenance (O&M) as a percentage of total cost has increased. Over the last few years, Sandia National Laboratories has been working with industry partners to collect and analyze PV failure records in a PV Reliability Operations & Maintenance (PVROM) database. During this talk, we will describe how we are using this data to: 1) identify common failure modes in PV systems, 2) develop distribution parameters for failure rates, and 3) characterize environmental influences (e.g., weather). Our team uses a combination of data science techniques, including text analytics and machine learning, to process the diverse O&M data. The processed data is then analyzed to characterize common patterns, including prevalence of failure modes and relative rates of failure based on climate zone. We will also discuss incorporation of these findings in ongoing discussions and updates to data standardization and O&M cost model estimations, which are also critical for reducing O&M costs.