U.S. Department of Energy

HelioCon
Heliostat Consortium for
Concentrating Solar-Thermal Power

Prof Michael E. Cholette
michael.cholette@qut.edu.au

Associate Professor,
Queensland University of
Technology

Host: Dr. Jeremy Sment

Title: Soiling Losses for
Concentrating Solar Power –
Prediction, Assessment, and
Mitigation

When: June 29th
3-4 PM MDT

Zoom:
https://nrel.zoomgov.com/j/1
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Abstract:

Maintaining high reflectance of a CSP solar field is of paramount importance for the plant economics. One of the key degradation modes is the loss of reflectance due to the accumulation of dust on the surface of the heliostats. Reports have indicated that these soiling losses can vary significantly from site to site — from a few tenths of a percentage point to a few percentage points per day, depending on the site characteristics. These losses have led CSP operators to periodically clean heliostats using a number of different cleaning devices, but these operations can be expensive and have been identified as a key opportunity to reduce costs. Moreover, the disparity in soiling rates across different sites has made the planning of soiling mitigation measures (e.g. cleaning resources, schedules) difficult, particularly at the time of site selection.

This seminar will provide an overview of the research on understanding and mitigating soiling losses for CSP plants, including measurement systems, assessment of losses, reflectance loss modelling, and cleaning optimisation. The talk will conclude with some identified research gaps and suggestions for research directions for HelioCon.

Bio:

Dr. Michael E. Cholette received his PhD from the University of Texas at Austin in 2012 in Mechanical Engineering. He is currently an Associate Professor at the Queensland University of Technology (QUT) in Brisbane, Australia. Michael has broad experience in a number of engineering disciplines related to dynamic systems, reliability, and engineering optimization. His primary expertise lies in asset management, particularly in in reliability modelling and Condition-Based Maintenance (CBM), and maintenance optimization. Since 2019, he has co-led the Operations & Maintenance (O&M) project of the Australian Solar Thermal Research Institute (ASTRI). He and his team have been developing O&M strategies for Concentrating Solar Power (CSP) systems, including developing models for predicting heliostat soiling and optimal cleaning for solar fields.