Liz Wachs is originally from Reston, Virginia. She completed a BA in Ancient History and Classical Civilization from University of Texas at Austin and an MA in Desert Studies from Ben-Gurion University of the Negev before returning to school to complete a BSChE from Purdue University, where she is currently a PhD candidate. Along the way she also worked for five years in the non-profit sector. Her research is focused on the sustainable energy transition. She is the mother of three children, the youngest born in the first year of her PhD. They can all roller-skate now thanks to coronavirus.

Agricultural & Biological ENGINEERING

Dissertation Defense

Speaker: Elizabeth Wachs

Title: Market Acceptance of Renewable Energy Technologies for Power Generation

Major Professor(s): Bernard Engel

Date: Tuesday, July 21, 2020

Time: 10:00 a.m.

Location or link to join: Zoom

Abstract:

Concerns about global warming have spurred large-scale investments in renewable energy, yet progress has been slower than needed due to barriers to social acceptance of required systemic changes. Optimal power generation portfolios are considered from different perspectives in order to identify and quantify market barriers to desirable technologies. In the regional transmission organization for the Mid-Atlantic region of the US (PJM) and the California Independent System Operator (CAISO), offshore wind faces the strongest market barrier. Solar thermal and geothermal face moderate market barriers in CAISO. No evidence was found for market barriers for nuclear or coal with carbon capture and storage. Consideration of variability and cost correlations favors biomass, coal and hydropower. Constraints on variable renewable energy (VRE) favor natural gas combined cycle plants from a market perspective, and to a limited extent from a sustainability perspective in PJM only. Solar photovoltaic and onshore wind display market barriers if VREs are not constrained.

Application:

The sustainable energy transition may cause a large increase in electricity demand, which must then be met by carbon-neutral technologies. This thesis examines which technologies should comprise the electric power grid. It can be used to see where policies will or should be enacted to foster a cleaner grid, and what kinds of obstacles renewables face in the marketplace. Renewables generally require a large land footprint, a particular focus in the study.