MATTHIAS FRIPP

University of Oxford, Environmental Change Institute, Oxford, OX1 3QY, UK *(until June 2012)*
University of Hawaii, Department of Electrical Engineering, Honolulu, HI 96822 (*after June 2012)*

(a) Professional Preparation

Lewis & Clark College, Environmental Studies (Summa Cum Laude), B.A., 1999
University of California, Berkeley, Energy and Resources, M.S., 2003
University of California, Berkeley, Energy and Resources, Ph.D., 2008

(b) Appointments

Research Fellow in Renewable Energy, University of Oxford (UK), 2008–present
Consultant, Union of Concerned Scientists, Berkeley, California, 2008–2009
Graduate Student Instructor (teaching assistant), University of California, Berkeley, 2007
Research Assistant, Energy, Markets and Policy, Lawrence Berkeley National Laboratory, 2003–2006
Information Systems Consultant (volunteer), Sarvodaya Shramadana Movement, Sri Lanka, 2005
Chief Modeler, Trexler and Associates, Inc., Portland, Ore., 2000–2001
Researcher and Writer (volunteer), 1000 Friends of Oregon, Portland, Ore., 1999
Summer Researcher, Renewable Northwest Project, Portland, Ore., 1999
Membership Director, Information Systems Manager, Best Friends Animal Sanctuary, 1991–1997

(c) Publications

(i) publications closely related to proposed work:

Matthias Fripp (in review), "Least-cost planning for power systems with large shares of wind and solar power."

James Nelson, Josiah Johnston, Ana Mileva, Matthias Fripp, Ian Hoffman, Autumn Petros-Good Christian Blanco, and Daniel M. Kammen (accepted for publication), "High-resolution modeling of the western North American power system demonstrates low-cost and low-carbon futures," *Energy Policy*.

Matthias Fripp (2011), "Greenhouse Gas Emissions from Operating Reserves Used to Backup Large-Scale Wind Power," *Environmental Science & Technology* 45(21): 9405-9412.

Matthias Fripp and Ryan H. Wiser (2008), "Effects of Temporal Wind Patterns on the Value of Wind-Generated Electricity at Sites in California and the Northwest," IEEE Transactions on Power Systems 23(2): 477-485.

Matthias Fripp (2008), *Optimal Investment in Wind and Solar Power in California,* Ph.D. Dissertation, U.C. Berkeley, Energy & Resources Group.

(ii) other selected publications:

Matthias Fripp and Brian Krohn (in review), "Life-Cycle Greenhouse Gas Emissions from Renewable, Nuclear and Carbon-Capture Power Plants." (Earlier version published as Matthias Fripp (2009), "Life-Cycle Greenhouse Gas Emissions From Clean Coal, Clean Gas and Wind Generators," Environmental Change Institute, Oxford University.)

Brian Krohn and Matthias Fripp (2012), "A Life Cycle Assessment of Biodiesel Derived from the 'Niche Filling' Energy Crop Camelina in the USA," *Applied Energy* 92: 92–98.

Asher Ghertner and Matthias Fripp (2007), "Trading Away Damage: Quantifying Environmental Leakage through Consumption-Based, Life-Cycle Analysis," *Ecological Economics* 63: 2-3: 563-577.

Diana Poputoaia and Matthias Fripp (2008), *European Experience with Tradable Green Certificates and Feed-In Tariffs for Renewable Electricity Support,* Environmental Change Institute, Oxford University.

Matthias Fripp (2003). *Now You See It, Now You Don't: The Metastable Defect in Czochralski Silicon*, Master's Project, U.C. Berkeley, Energy and Resources Group, May 2003.

(d) Synergistic Activities

(i) **Long-term power system planning model (Switch)**
Developed "Switch," the first open-source power system investment planning model to incorporate enough detail spatial and temporal detail to optimize deployment of renewable and conventional generators and transmission capacity in large power systems. I used this model to study California's emission-reduction options for my Ph.D. dissertation and colleagues have subsequently used it to model the development of the whole western-U.S. power system.

(ii) **Intermittent Generation Operating Reserves model (IGOR)**
Developed a new algorithm for modeling the probability distribution of forecast errors for wind farms dispersed across large areas. This algorithm is much more accurate than previous methods, and makes it possible to estimate how much fossil-powered reserve capacity must be kept online to compensate if wind power production drops off unexpectedly. I have published a paper describing IGOR and presented the model by invitation to industry professionals at the Utility Wind Integration Group's annual technical workshop.

(iii) **Power plant life-cycle emissions meta-model**
Developed a new "meta-model" for the life-cycle greenhouse gas emissions from electricity generating technologies. This model identifies all the steps in the electricity life-cycle (e.g., plant construction, preparation of pollution-control materials, etc.), and estimates emissions during each step using data from previously published but less-complete life-cycle studies. This provides a transparent and consistent comparison of all generation technologies and more complete emission estimates than have previously been available, allowing better planning of future very-low-emission power systems. A paper describing the model and data is currently under peer review.

(iv) **Public domain wind speed database**
Built a temporo-spatial database of all available public domain anemometer-based wind speed measurements in California and the Pacific Northwest, synthesizing data collected by the Department of Energy, Kenetech and the Bonneville Power Administration. Built a similar database using modeled, gridded wind speed data prepared by TrueWind, Inc., for the California Energy Commission and a number of Northwestern environmental groups. Both databases were used at Lawrence Berkeley National Laboratory to assess the effect of timing on the value of wind power. Data from these databases have been shared with several other researchers, and are expected to be shared on a larger scale in the future.

(v) **Interdisciplinary energy teaching**
Developed new methods to teach interdisciplinary energy courses (covering engineering, economics and policy) to students at U.C. Berkeley and Oxford University with backgrounds ranging from English to Electrical Engineering.

(e) Collaborators & Other Affiliations

(i) Collaborators: Asher Ghertner (U.C. Berkeley), Brian Krohn (Univ. of Michigan), Daniel Kammen (U.C. Berkeley); Kamal Kapadia (Oxford University); Ryan Wiser (Lawrence Berkeley National Lab).

(ii) Graduate and Postdoctoral Advisors: Daniel Kammen (U.C. Berkeley), Nick Eyre (Oxford Univ.)

(iii) Graduate Students and Postdoctoral Scholars Sponsored (3): Daniel Curtis (Oxford University); Brian Krohn (University of Michigan), Dominic Hofstetter (Hudson Clean Energy Partners)