

## Michael Carbajales-Dale

---

CONTACT INFORMATION	Clemson University Rich Lab, Rm 160 Computer Court Anderson, SC 29625	<i>email:</i> madale@clemson.edu <i>voice:</i> (864) 656-0523 <i>fax:</i> (864) 656-0672 <i>skype:</i> mikdale
PROFESSIONAL PREPARATION	<ul style="list-style-type: none"><li>• University of Bristol, UK, <i>Physics &amp; Philosophy</i></li><li>• University of Canterbury, NZ, <i>Mechanical Engineering</i></li><li>• Stanford University, CA <i>Energy Systems Analysis</i></li></ul>	<b>MSci</b> , 2006 <b>PhD</b> , 2011 <b>Post-doc</b> , 2011-2013
APPOINTMENTS	<ul style="list-style-type: none"><li>• <b>Assistant Professor</b> Environmental Engineering &amp; Earth Sciences, <i>Clemson University</i>, SC</li><li>• <b>Research Associate</b> Environmental Assessment &amp; Optimization Group, <i>Stanford University</i>, CA</li><li>• <b>Teaching Fellow</b> Thinking Matters: Energy, <i>Stanford University</i>, CA</li><li>• <b>Post-doctoral Researcher</b> Global Climate and Energy Project, <i>Stanford University</i>, CA</li></ul>	Aug 2014 to Present Feb 2014 to Jul 2014 Aug 2013 to Jan 2014 Feb 2011 to Aug 2013
RELATED PUBLICATIONS	<ul style="list-style-type: none"><li>• Heun, M; <b>Carbajales-Dale, M.</b>; Haney, B. (2013) Beyond GDP: National Accounting in the Age of Resource Depletion <i>Springer</i></li><li>• <b>Carbajales-Dale, M.</b>; Barnhart, C. J.; and Benson, S. M. (2014) Can we afford storage? A dynamic net energy analysis of renewable electricity generation firmed by energy storage, <i>Energy &amp; Environmental Science</i>, DOI:10.1039/C3EE42125B.</li><li>• Barnhart, C. J.; <b>Dale, M.</b>; Brandt, A. R. and Benson, S. M. (2013) The energetic implications of curtailing versus storing solar- and wind-generated electricity, <i>Energy &amp; Environmental Science</i>, 6, 2804-2810</li><li>• <b>Dale, M.</b> (2013) A comparative analysis of energy consumption by renewable energy technologies, <i>Applied Sciences</i>, 3, 325-337</li><li>• <b>Dale, M.</b> and Benson, S. M. (2013) The Energy Balance of the Photovoltaic (PV) Industry — Is the PV Industry a Net Energy Provider? <i>Environmental Science &amp; Technology</i>, 47(7), 3482-3489</li></ul>	
OTHER PUBLICATIONS	<ul style="list-style-type: none"><li>• Brandt, A. R.; <b>Dale, M.</b> and Barnhart, C. J. (2013) Calculating systems-scale energy efficiency and net energy returns: A bottom-up matrix-based approach <i>Energy</i>, 62, 235-247</li><li>• Brandt, A. R.; and <b>Dale, M.</b> (2011) A general mathematical framework for calculating systems-scale efficiency of energy extraction and conversion: Energy return on investment (EROI) and other energy return ratios <i>Energies</i>, 4, 1211-1245</li><li>• <b>Dale, M.</b>; Krumdieck, S. and Bodger, P. (2011) A Dynamic Function for EROI, <i>Sustainability</i>, 3 (10), 1972-1985</li><li>• <b>Dale, M.</b>; Krumdieck, S. and Bodger, P. (2011) Global energy modelling—A biophysical approach (GEMBA) Part 2: Methodology, <i>Ecological Economics</i>, 73, 158-167</li></ul>	

## SYNERGISTIC ACTIVITIES

- Developed the *Global Energy Modeling - a Biophysical Approach* (GEMBA) methodology and model, which is currently being used by researchers worldwide to explore the impact of resource depletion on future energy scenarios.
- Undertook meta-analysis of energetic costs of photovoltaic (PV), concentrating solar power and wind electricity generating technologies.
- Developed model to track changes in cumulative energy demand for manufacture of PV systems.
- Developed curricula for several classes including:
  - EES 8200: *Environmental Systems Analysis*, Clemson University
  - EES 4860/6860: *Environmental Sustainability*, Clemson University
  - Freshman: *Energy? Understanding the challenge, developing solutions*, Stanford University
  - Energy 101: *Energy and the environment*, Stanford University

## COLLABORATORS AND CO-EDITORS

- Mr. Jim Baldauf, *Association for the Study of Peak Oil*
- Prof. Charles Barnhart, *Western Washington University*
- Prof. Pat Bodger, *University of Canterbury*, New Zealand
- Prof. Adam Brandt, *Stanford University*
- Prof. Cutler Cleveland, *Boston University*
- Prof. Chris Field, *Stanford University*
- Dr. Nathan Hagens, *Institute for Integrated Economic Research*
- Prof. Charles Hall, *SUNY, Syracuse* emeritus
- Prof. Becky Haney, *Calvin College*, Michigan
- Prof. Matthew Heun, *Calvin College*, Michigan
- Prof. Michael Jefferson, *University of Buckingham*, United Kingdom
- Mr. Rembrandt Koppelaar, *Imperial University*, United Kingdom
- Dr. Carey King, *University of Texas at Austin*
- Prof. Susan Krumdieck, *University of Canterbury*, New Zealand
- Dr. Hannes Kunz, *Institute for Integrated Economic Research*
- Mr. Jean Laherrere, *Oil Depletion Analysis Centre*
- Prof. David Lobell, *Stanford University*
- Dr. Kerry Mulligan, *University of Canterbury*, New Zealand
- Dr. David Murphy, *Northern Illinois University*
- Mr. Chris Nelder, *SmartPlanet*
- Dr. Shannon Page, *Lincoln University*, New Zealand
- Prof. Sujith Ravi, *Temple University*
- Dr. Stacy Rendall, *University of Canterbury*, New Zealand

## GRADUATE ADVISERS & POSTDOCTORAL SPONSORS

- Prof. Pat Bodger, *University of Canterbury*, New Zealand
- Prof. Susan Krumdieck, *University of Canterbury*, New Zealand
- Dr. Keith Morrison, *Lincoln University*, New Zealand
- Prof. John Peet, *University of Canterbury* emeritus, New Zealand
- Prof. Sally Benson, *Global Climate and Energy Project*, Stanford University

## GRADUATE STUDENTS

- Total: 6 graduate students (3 Masters, 3 PhD)