

Gireesh Shrimali Vitae

## Gireesh Shrimali

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### Research Interests

Economics, finance, business, and policy of energy, environment, and sustainable development

- Development of finance instruments for increasing flow of attractive capital to renewable energy.
- Ex-ante economic analysis of renewable energy policy, using optimization and cash flow models.
- Ex-post analysis of renewable energy policy, using empirical as well as case-based methods.
- Business models and policy for diffusion of rural energy solutions.

### Education

- **PhD:** Electrical Engineering, *Stanford University*, Stanford, CA, January 2008
- **MS:** Electrical Engineering, *University of Minnesota*, Minneapolis, MN, June 1993
- **BTech:** Electrical Engineering, *Indian Institute of Technology*, Delhi, India, June 1991

### Work Experience

- *Stanford University*, USA (9/18 –): Precourt Scholar, Sustainable Finance Initiative, Precourt Institute of Energy
- *Climate Policy Initiative*, India/USA (7/10 – 8/18): Senior Advisor; Director, India-office; Fellow; Senior Analyst-Policy;
  - Secretariat, India Innovation Lab for Green Finance, a regional Lab in the consortium of Labs for innovative financial instruments that has raised approx. \$1 billion so far;
  - Secretariat, US-India Clean Energy Finance Initiative, a \$20 million project preparation facility for distributed renewable energy based on US-India collaboration.
- *Middlebury Institute of International Studies*, a Graduate School of *Middlebury College*, USA (8/12 – 8/15): Assistant Professor, Energy Economics and Business.
- *Indian School of Business*, India (12/07 – 7/11): Assistant professor, Department of Information Systems and Center for Emerging Markets Solutions.
- *Rambus Inc.*, *Abrizio Inc.*, *Intel Corp.*, USA (06/93 – 09/02): System Architect and Design Engineer.

### Professional Activities

- Research Fellow: Center for Climate Finance and Investment, *Imperial College Business School*, 2018+
- Scientist: International Energy Studies Group, *Lawrence Berkeley National Lab*, 2018+
- Director: *Climate Policy Initiative*, India, 2015-2019
- Research/Faculty Fellow: Steyer-Taylor Center for Energy Policy and Finance, *Stanford University*, 2014-2018
- Executive Fellow: Center for Science, Technology, and Society, *Santa Clara University*, 2013-2017
- Fellow: *Salzburg Global Seminar*, 2013.
- Member: *International Association of Energy Economists*, *Association for Public Policy Analysis and Management*, *Institute for Operations Research and Management Sciences*, *Institute of Electrical and Electronics Engineers*.
- Referee: *Energy Policy*, *Renewable and Sustainable Energy Reviews*, *Energy and Sustainable Development*, *Climate Policy*, *Global Environment Change*, *Policy Sciences*, *Information Systems Research*, *Management Information Systems Quarterly*, *IEEE Infocom*.
- Organizing committee member: *Workshop on Information Technology and Systems*.

### Journal Publications/Book Chapters

1. Gireesh Shrimali, 2019, "Scaling Reliable Energy Access in India: A Public-private Partnership Model," submitted to Energy for Sustainable Development.
2. Gireesh Shrimali, 2019, "Making India's Power System Clean: Retirement of Expensive Coal Plants," submitted to *Energy Policy*.
3. Gireesh Shrimali, Divjot Singh, 2019, "Do Clean Energy (Equity) Investments Add Value to a Portfolio?," *Green Finance*, 1 (2): 188-204.
4. Gireesh Shrimali, Vaibhav Singh, Vinit Atal, 2019, "A Payment Security Mechanism for Off-taker Risk in Renewable Energy Projects in India," *Journal of Structured Finance*, Summer.
5. Gireesh Shrimali, 2018, "Renewable Energy in India: Solutions to the Financing Challenge," *Asia Visions*, 98, IFRI.
6. Divita Bhandari and Gireesh Shrimali, 2018, "The Performance, Achieve and Trade Scheme in India: An Effectiveness Analysis," *Renewable and Sustainable Energy Reviews*, 81 (1): 1286-1295.
7. Gireesh Shrimali, 2017, "Renewable Energy Policy and Finance in India," Book Chapter in *Advances in Solar Energy Science and Engineering*, Today and Tomorrow's Printers and Publishers, New Delhi, India.
8. Gireesh Shrimali, Shreya Pusalra, Saurabh Trivedi, 2017, "Did Accelerated Depreciation Result in Lower Generation Efficiencies for Wind Plants in India," *Energy Policy*, 102: 154-163.
9. Rahul Tongia, Varun Rai, Gireesh Shrimali, 2017, "Data Management: India Needs Agency for Energy Data," *Nature*, 541 (30).
10. Gireesh Shrimali, Sandhya Srinivasan, Shobhit Goel, and David Nelson, 2017, "The Effectiveness of Federal Renewable Policies in India," *Renewable and Sustainable Energy Reviews*, 70: 538-550.
11. Gireesh Shrimali, Rituraj Borah, 2016, "Financing India's Renewable Energy Targets," *Journal of Responsible Finance*, 3: 25-34.
12. Gireesh Shrimali, Charith Konda, Arsalan Farooquee, 2016, "Designing Renewable Energy Auctions for India: Managing Risks to Maximize Deployment and Cost-Effectiveness," *Renewable Energy*, 97: 656-670.
13. Gireesh Shrimali, Saurabh Trivedi, Sandhya Srinivasan, Shobhit Goel, David Nelson, 2016, "Cost-effective Policies for Reaching India's 2022 Renewable Targets," *Renewable Energy*, 93: 255-268.
14. Arsalan Farooquee and Gireesh Shrimali, 2016, "Making Renewable Energy Competitive in India: Reducing Financing Costs via a Government-Sponsored Hedging Facility," *Energy Policy*, 95: 518-528.
15. Roopali Raghavan and Gireesh Shrimali, 2015, "Forest Cover Increase in India: Role of Policy and Markets," *Forest Policy and Economics*, 61: 760-766.
16. Gireesh Shrimali, 2015, "Impact of Renewable Portfolio Standards on In-state Renewable Deployment in the US," Book Chapter in *Delivering Energy Law and Policy in the EU and US*, Edinburgh University Press: Edinburgh, Scotland, UK.
17. Gireesh Shrimali, 2015, "Impact of Policy on Renewable Finance: Case Studies from the U.S. and India," Book Chapter in *Renewable Energy Finance: Powering the Future*, Imperial College Press.
18. Gireesh Shrimali, Melissa Lynes, and Joe Indvik, 2015, "Wind Energy Deployment in the U.S.: An Empirical Analysis of the Role of Federal and State Policies," *Renewable and Sustainable Energy Reviews*, 43: 796-806.
19. Gireesh Shrimali, Gabe Chan, Steffen Jenner, Felix Groba, and Joe Indvik, 2015, "Evaluating Renewable Portfolio Standards for In-state Renewable Deployment (in the US): Accounting for Policy Heterogeneity," *Economics of Energy and Environmental Policy*, 4 (2).
20. Gireesh Shrimali, 2014, "A Low Carbon Electricity System Roadmap," *Stanford Energy Journal*, 5, October 21.

21. Gireesh Shrimali and Vijay Nekkhalapudi, 2014, "How Effective Has India's Solar Mission Been in Reaching its Deployment Targets?" *Economic and Political Weekly*, XLIX (42), 54-63.
22. Gireesh Shrimali and Anshuman Sahoo, 2014, "Has India's Solar Mission Increased the Deployment of Domestically Produced Solar Modules?" *Energy Policy*, 69: 501-509.
23. Mark Thurber, Himani Phadke, Sriniketh Nagavarapu, Gireesh Shrimali, and Hisham Zerriffi, 2014, "Oorja in India: Assessing a Large Scale Commercial Distribution of Advanced Biomass Stoves to Households," *Energy for Sustainable Development*, 19: 138-150
24. Gireesh Shrimali, David Nelson, Shobhit Goel, Charith Konda, and Raj Kumar, 2013, "Renewable Deployment in India: Financing Costs and Implications for Policy," *Energy Policy*, 62: 28-43.
25. Gireesh Shrimali and Sumala Chetty, 2013, "Renewable Energy Certificate Markets in India: A Review," *Renewable and Sustainable Energy Reviews*, 26: 702-716.
26. Anshuman Sahoo and Gireesh Shrimali, 2013, "The Effectiveness of Domestic Content Criteria in India's Solar Mission," *Energy Policy*, 62: 1470-1480.
27. Gireesh Shrimali and Steffen Jenner, 2013, "The Impact of State Policies on Deployment and Cost of Solar PV in the US: A Sector Specific Empirical Analysis," *Renewable Energy*, 60: 679-690.
28. Santosh Harish, Shuba Raghavan, Milind Kandlikar, and Gireesh Shrimali, 2013, "Assessing the impact of the transition to LED-based solar lighting systems in India," *Energy for Sustainable Development*, 17 (4), 363-370.
29. Carrie Armel, Abhay Gupta, Gireesh Shrimali, and Adrian Albert, 2013, "Disaggregation: The Holy Grail of Energy Efficiency?" *Energy Policy*, 52, 213-234.
30. Gireesh Shrimali and Giri Tayi, 2012, "Existence of Market Equilibria for Grid Computing," *Applied Mathematics*, 3, 1763-1778.
31. Gireesh Shrimali and Sunali Rohra, 2012, "India's Solar Mission: A Review," *Renewable and Sustainable Energy Reviews*, 16, 6317-6332.
32. Andrea Sarzynski, Jeremy Larrieu, and Gireesh Shrimali, 2012, "The impact of state financial incentives on market deployment of solar technology (in the US)," *Energy Policy*, 46, 550-557.
33. Gireesh Shrimali and Erin Baker, 2012, "Optimal Feed-in Tariff Schedules," *IEEE Engineering Management*, 59 (2), 310-322.
34. Gireesh Shrimali, Xander Slaski, Mark Thurber, and Hisham Zerriffi, 2011, "Improved Stoves in India: A Study of Sustainable Business Models," *Energy Policy*, 39 (11), 7543-7556.
35. Gireesh Shrimali and Joshua Kneifel, 2011, "Are Government Policies Effective in Promoting Deployment of Renewable Electricity Resources (in the US)?" *Energy Policy*, 39 (9), 4726-4741.
36. Gireesh Shrimali, 2010, "Competitive Resource Sharing among Service Providers", *Netnomics*, 11 (2), 149-179.
37. Gireesh Shrimali, Aditya Akella, and Almir Mutapcic, 2010, "Cooperative Interdomain Traffic Engineering using Nash Bargaining and Dual Decomposition", *IEEE Transactions on Networking*, 18 (2), 341-352.
38. Gireesh Shrimali, 2008, "Surplus Extraction by Network Providers: Implications for Net Neutrality and Innovation", *Telecommunications Policy*, 32 (8), 545-558.
39. Gireesh Shrimali and Sunil Kumar, 2008, "Bill-and-Keep Peering", *Telecommunications Policy*, 32 (1), 19-32.

### Working Papers

1. Jolly Sinha, Sagar Joshi, Gireesh Shrimali, 2018, "Drivers and Challenges to Rooftop Solar Loans to Small and Medium Enterprises," *Climate Policy Initiative Report*.
2. Vaibhav Pratap Singh, Gireesh Shrimali, et al., 2018, "Credit Support Pathways for Rooftop Solar Projects in India," *Climate Policy Initiative Report*.

3. Vinit Atal, Dhruva Purkayastha, Gireesh Shrimali, 2018, “Transitional Foreign Exchange Debt Platform: Paths to Enable Foreign Currency Debt to the Rooftop Solar Sector in India,” *Climate Policy Initiative Report*.
4. Vinit Atal, Gireesh Shrimali, 2018, “An Assessment of India’s Energy Choices: Financial Performance and Risk Perception,” *Climate Policy Initiative Report*.
5. Vivek Sen, Saurabh Trivedi, Gireesh Shrimali, 2018, “An Assessment of India’s Energy Choices: Managing India’s Renewable Energy Integration through Flexibility,” *Climate Policy Initiative Report*.
6. Vinit Atal, Gireesh Shrimali, Vaibhav Singh, 2018, “Addressing Off-taker Risk in Renewable Projects in India: A Framework for Designing a Payment Security Mechanism as a Credit Enhancement Device,” *Climate Policy Initiative Report*.
7. Labanya Jena, Chavi Meattle, Gireesh Shrimali, 2018, “Getting to India’s Renewable Targets: A Business Case for Institutional Investment,” *Climate Policy Initiative Report*.
8. Saurabh Trivedi, Labanya Jena, Gireesh Shrimali, 2018, “Scaling up Rooftop Solar Power in India: The Potential of Solar Municipal Bonds,” *Climate Policy Initiative Report*.
9. Gireesh Shrimali, Dan Reicher, 2017, “Instruments to Mitigate Financial Risk in Indian Renewable Energy Investments,” *Stanford University Working Paper*.
10. Dan Reicher, Jeffrey Brown, David Fedor, Jeremy Carl, Alicia Seiger, Jeffrey Ball, Gireesh Shrimali, 2017, “Derisking Decarbonization: Making Green Investments Blue Chip,” *Stanford University Working Paper*.
11. Charith Konda, Kuldeep Sharma, Gireesh Shrimali, 2017, “Decarbonization of Indian Railways: Assessing Balancing Costs and Policy Risks,” *Climate Policy Initiative Report*.
12. Vivek Sen, Kuldeep Sharma, Gireesh Shrimali, 2016, “Getting to India’s Renewable Energy Targets: The Role of Institutional Investors,” *Climate Policy Initiative Report*.
13. Sandeep Gupta, Jai Sharda, Gireesh Shrimali, 2016, “The Drivers and Challenges of Third Party Financing for Rooftop Solar Power in India,” *Climate Policy Initiative Report*.
14. Charith Konda, Saurabh Trivedi, Gireesh Shrimali, 2016, “Decarbonization of Indian Railways,” *Climate Policy Initiative Report*.
15. Arsalan Farooquee, Gireesh Shrimali, 2016, “Driving Foreign Investment to Renewable Energy in India: A Payment Security Mechanism to Address Off-Taker Risk,” *Climate Policy Initiative Report*.
16. Anil Jain, Rajnath Ram, Ashwin Gambhir, Anshu Bharadwaj, Deepak Gupta, Gireesh Shrimali, 2015, “Report of the Expert Group on 175GW RE by 2022,” *Niti Aayog Report*.
17. Varun Sivaram, Gireesh Shrimali, Dan Reicher, 2015, “Reach for the Sun: How India’s Audacious Solar Ambitions Could Make or Break its Climate Ambitions,” *Stanford University Working Paper*.
18. Arsalan Farooquee, Gireesh Shrimali, 2015, “Reaching India’s Renewable Targets Cost-effectively: A Foreign Exchange Hedging Facility,” *Climate Policy Initiative Report*.
19. Gireesh Shrimali, Charith Konda, Arsalan Farooquee, David Nelson, 2015, “Reaching India’s Renewable Targets Cost-effectively: Effective Project Allocation Mechanisms,” *Climate Policy Initiative Report*.
20. Gireesh Shrimali, Sandhya Srinivasan, Shobhit Goel, Saurabh Trivedi, David Nelson, 2015, “Reaching India’s Renewable Targets Cost-effectively,” *Climate Policy Initiative Report*.
21. Gireesh Shrimali, Shobhit Goel, Sandhya Srinivasan, David Nelson, 2014 “Solving India’s Renewable Financing Challenge: Which Federal Policies can be Most Effective?” *Climate Policy Initiative Report*.
22. Gireesh Shrimali, Charith Konda, Sandhya Srinivasan, 2014 “Solving India’s Renewable Financing Challenge: Instruments to Provide Low-cost, Long-term Debt,” *Climate Policy Initiative Report*.
23. David Nelson, Gireesh Shrimali, 2014, “Finance Mechanisms for Lowering the Cost of Renewable Energy in Rapidly Developing Countries,” *Climate Policy Initiative Report*.

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24. David Nelson, Gireesh Shrimali, Shobhit Goel, Charith Konda, and Raj Kumar, 2012, "Meeting India's Renewable Targets: The Financing Challenge," *Climate Policy Initiative Report*.
25. Gireesh Shrimali, Sumala Tirumalachetty, and David Nelson, 2012, "Falling Short: An Evaluation of the Indian Renewable Energy Certificate Market," *Climate Policy Initiative Report*.
26. Anshuman Sahoo, Gireesh Shrimali, and Lei Zhang, 2012, "An Analysis of Industrial Policy Support for the Indian Solar PV Manufacturing Sector," *Asian Development Bank South Asia Working Paper Series*.
27. Gireesh Shrimali, 2012, "Game Theoretic Analysis of Research Consortia for Developing Technologies to Tackle Climate Change," *US Association of Energy Economics Working Paper* 13-133.
28. Gireesh Shrimali and Petra Sonderegger, 2011, "Indian Innovation Systems for Low Carbon Technologies: A Review from the Entrepreneur's Perspective," *World Wildlife Fund Report*.
29. Gireesh Shrimali and Sunil Kumar, "Paid Peering by Internet Service Providers: Endogenous Access Prices and Strategic Routing," *Stanford University Working Paper*

### Peer Reviewed Conference Publications

1. Gireesh Shrimali, Aditya Akella, Almir Mutapcic, "Cooperative Interdomain Traffic Engineering using Nash Bargaining and Decomposition", Proceedings of *IEEE Infocom*, Anchorage, May 2007.
2. Gireesh Shrimali and Sunil Kumar, "Paid Peering among Internet Service Providers", Proceedings of *IEEE Workshop on Game Theory for Networks*, Pisa, Italy, October 2006.
3. Gireesh Shrimali and Sunil Kumar, "Can Bill-and-Keep Peering be Mutually Beneficial?" Proceedings of *Workshop on Internet and Network Economics*, Hong Kong, December 2005.
4. Gireesh Shrimali and Nick McKeown, "Building Packet Buffers using Interleaved Memories", Proceedings of *IEEE Workshop on High Performance Switching and Routing*, Hong Kong, May 2005.
5. Gireesh Shrimali, Isaac Keslassy, and Nick McKeown, "Designing Packet Buffers with Statistical Guarantees", Proceedings of *IEEE Hot Interconnects*, Stanford, CA, August 2004.
6. Gireesh Shrimali and K. K. Parhi, "Fast Arithmetic Decoder Architectures", Proceedings of *International Conference on Acoustics, Speed, and Signal Processing*, Minneapolis, April 1993.
7. K. K. Parhi and Gireesh Shrimali, "A Concurrent Lossless Coder for Video Compression", Proceedings of the *IEEE VLSI Signal Processing Workshop*, Napa Valley, CA, October 1992.

### Teaching Experience

- *Monterey Institute of International Studies*, Monterey, CA
  - Energy and Environmental Markets, 2012-13, 2013-14, 2014-15.
  - Energy and Natural Resource Finance, 2012-13, 2014-15.
  - Business Models for Sustainable Development, 2013-14.
  - Sustainable Rural Energy Solutions, 2012-13.
  - Managerial Economics, 2012-13, 2013-14, 2014-15.
  - Quantitative Methods for Environmental Science and Policy, 2013-14, 2014-15.
- *Indian School of Business*, Hyderabad, India
  - Green Technology and Sustainable Business, 2008-09, 2009-10, 2010-11.
  - Mobile Policy and Mobile Commerce, 2007-08, 2008-09, 2009-10, 2010-11.
- *Stanford University* (as a teaching assistant), Stanford, CA
  - Environmental Entrepreneurship, 2007-08.
  - Technology Concepts for Managers, 2006-07.
  - Operations, 2006-07.
  - Digital Systems Design Lab, 2004-05.

## Conference Presentations

1. Gireesh Shrimali, Ansu Sahoo, "Assessing the Effectiveness of the Domestic Content Requirement in India's Solar Mission," *APPAM Annual Conference*, Washington DC, November 2014.
2. Gireesh Shrimali, Melissa Lynes, Joe Indvik, "The Role of Federal and State Policies in Wind Energy Deployment in the US," *USAEE Annual Conference*, New York, NY, June 2014.
3. Gireesh Shrimali, Steffen Jenner, "Impact of State Policies on Deployment of Solar PV in the US: An Empirical Analysis," *USAEE Annual Conference*, Anchorage, AK, June 2014
4. Gireesh Shrimali, David Nelson, Shobhit Goel, Charith Konda, and Raj Kumar, "Financing of Renewable Energy in India: Implications for Policy," *IEW Annual Workshop*, Paris, June 2013.
5. Gireesh Shrimali, Steffen Jenner, Felix Groba, Gabriel Chan, Joe Indvik, "Have State Renewable Portfolio Standards Really Worked in the US?" *USAEE Annual Conference*, Austin, TX, November 2012.
6. Andrea Sarzynski, Jeremy Larrieu and Gireesh Shrimali, "Impact of State Financial Incentives on Market Deployment of Solar Technology in the US", *APPAM Annual Conference*, Washington DC, November 2011.
7. Gireesh Shrimali, Joshua Kneifel, "Impact of US States' Policies on Deployment of Non-Hydro Renewable Electricity Sources", *USAEE Annual Conference*, Washington DC, October 2011.
8. Gireesh Shrimali and Erin Baker, "Optimal Feed-in Tariff Schedules", *INFORMS Annual Meeting*, Austin, November 2010.
9. Gireesh Shrimali, "Research Consortia for Clean Technologies", *IAEE Annual Conference*, Rio de Janeiro, June 2010.
10. Gireesh Shrimali, "Research Consortia for Tackling Climate Change", *INFORMS Annual Meeting*, San Diego, October 2009.
11. Gireesh Shrimali and Giri Tayi, "Grid Computing as an Exchange Economy", *INFORMS Annual Meeting*, Washington DC, October 2008.
12. Gireesh Shrimali and Sunil Kumar, "Competitive Resource Sharing among Service Providers", *INFORMS Annual Meeting*, Washington DC, October 2008.
13. Gireesh Shrimali and Sunil Kumar, "Paid Peering Among Internet Service Providers", *INFORMS Annual Meeting*, Pittsburgh, October 2006.
14. Gireesh Shrimali and Sunil Kumar, "Paid Peering among Internet Service Providers", *IEEE Workshop on Game Theory for Networks*, Pisa, Italy, October 2006.
15. Gireesh Shrimali and Sunil Kumar, "Can Bill-and-Keep Peering be Mutually Beneficial?" *Workshop on Internet and Network Economics*, Hong Kong, December 2005.
16. Gireesh Shrimali and Nick McKeown, "Building Packet Buffers using Interleaved Memories". *IEEE Workshop on High Performance Switching and Routing*, Hong Kong, May 2005.
17. Gireesh Shrimali, Isaac Keslassy, and Nick McKeown, "Designing Packet Buffers with Statistical Guarantees", *IEEE Hot Interconnects*, Stanford, CA, August 2004.
18. Gireesh Shrimali and K. K. Parhi, "Fast Arithmetic Decoder Architectures", *International Conference on Acoustics, Speed, and Signal Processing*, Minneapolis, April 1993.
19. K. K. Parhi and Gireesh Shrimali, "A Concurrent Lossless Coder for Video Compression", *IEEE VLSI Signal Processing Workshop*, Napa Valley, CA, October 1992.

## Awards and Honors

- *Indian Institute of Technology, Delhi, India*: 2<sup>nd</sup> rank in the Electrical Engineering class of 1991; IIT merit award: 1988- 91.
- *Rajasthan State, India*: 4<sup>th</sup> position in statewide board examinations, 1986; State Merit Scholarship, 9/86-9/89.