

Giacomo Marangoni

PhD in Management Engineering

*Integrated Assessment Modelling
Robust Decision Making*

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Research Interests

- Topics: Climate change risk management, mitigation and adaptation policies, tradeoffs and co-benefits between multiple environmental and economic objectives.
Long-term scenarios of energy system decarbonization, innovation in clean energy technologies, energy conservation through behavioral change.
- Methods: Integrated assessment modelling (WITCH, DICE)
Multi-objective evolutionary optimization (BORG)
Optimization under uncertainty (Direct Policy Search, Approximate Dynamic Programming)
Sensitivity analysis (global, scenario-based decomposition)
Unsupervised machine learning

Education

- 2012 – 2017 **PhD**, *Department of Management and Applied Economics Engineering*, Polytechnic of Milan, Italy.
2015 **Visiting Scholar**, *Department of Electrical Engineering and Computer Sciences*, University of California, Berkeley, USA.
2008 – 2010 **Master's**, *Control Systems Engineering*, University of Padova, Italy.
2005 – 2008 **Bachelor's**, *Information Engineering*, University of Padova, Italy.

Working Experiences

- 2018 – **Researcher**, *Department of Management, Economics and Industrial Engineering*, Politecnico di Milano, Italy.
2018 – **Researcher**, *Sustainable Earth Modelling Economics Programme*, RFF-CMCC European Institute on Economics and the Environment, Milan, Italy.
2017 – 2018 **Post Doctoral Scholar**, *Earth and Environmental Systems Institute*, Penn State University, University Park, USA.
2011 – 2017 **Junior Researcher**, *Mitigation, Innovation and Transformation Pathways Programme*, Fondazione Eni Enrico Mattei (FEEM), Milan, Italy.
2011 – 2017 **Junior Researcher**, *Economic analysis of Climate Impacts and Policy Division*, Euro-Mediterranean Center on Climate Change (CMCC), Milan, Italy.

Publications

Selected Refereed Journal Articles

- 2016 **G. Marangoni**, M. Tavoni, V. Bosetti, E. Borgonovo, P. Capros, O. Fricko, D. Gernaat, C. Guivarch, P. Havlik, D. Huppmann, N. Johnson, P. Karkatsoulis, I. Keppo, V. Krey, E. Ó Broin, J. Price, D. P. van Vuuren, "Sensitivity of projected long-term CO₂ emissions across the Shared Socio-economic Pathways", *Nature Climate Change*. DOI: [10.1038/nclimate3199](https://doi.org/10.1038/nclimate3199)
- 2016 E. De Cian, A. F. Hof, **G. Marangoni**, M. Tavoni, D. P. van Vuuren, "Alleviating inequality in climate policy costs: an integrated perspective on mitigation, damage and adaptation", *Environmental Research Letters*. DOI: [10.1088/1748-9326/11/7/074015](https://doi.org/10.1088/1748-9326/11/7/074015)
- 2016 J. Jewell, V. Vinichenko, D. McCollum, N. Bauer, K. Riahi, T. Aboumahboub, O. Fricko, M. Harmsen, T. Kober, V. Krey, **G. Marangoni**, M. Tavoni, D. P. van Vuuren, B. van der Zwaan, A. Cherp, "Comparison and interactions between the long-term pursuit of energy independence and climate policies", *Nature Energy*. DOI: [10.1038/nenergy.2016.73](https://doi.org/10.1038/nenergy.2016.73)
- 2015 V. Bosetti, **G. Marangoni**, E. Borgonovo, L. Diaz Anadon, R. Barron, H. C. McJeon, S. Politis, and P. Friley, "Sensitivity to energy technology costs: A multi-model comparison analysis", *Energy Policy*. DOI: [10.1016/j.enpol.2014.12.012](https://doi.org/10.1016/j.enpol.2014.12.012)
- 2015 M. Tavoni, E. Kriegler, K. Riahi, D. P. van Vuuren, T. Aboumahboub, A. Bowen, K. Calvin, E. Campiglio, T. Kober, J. Jewell, G. Luderer, **G. Marangoni**, D. McCollum, M. van Sluisveld, A. Zimmer, and B. van der Zwaan, "Post-2020 climate agreements in the major economies assessed in the light of global models", *Nature Climate Change*. DOI: [10.1038/nclimate2475](https://doi.org/10.1038/nclimate2475)
- 2014 H. McJeon, J. Edmonds, N. Bauer, L. Clarke, B. Fisher, B. P. Flannery, J. Hilaire, V. Krey, **G. Marangoni**, R. Mi, K. Riahi, H. Rogner, and M. Tavoni, "Limited impact on decadal-scale climate change from increased use of natural gas", *Nature*. DOI: [10.1038/nature13837](https://doi.org/10.1038/nature13837)
- 2014 **G. Marangoni** and M. Tavoni, "The clean energy R&D strategy for 2°C", *Climate Change Economics*. DOI: [10.1142/S201000781440003X](https://doi.org/10.1142/S201000781440003X)

Other Refereed Journal Articles

- 2018 J. Rogelj, A. Popp, K. Calvin, G. Luderer, J. Emmerling, D. Gernaat, S. Fujimori, J. Strefler, T. Hasegawa, **G. Marangoni**, V. Krey, E. Kriegler, K. Riahi, D. P. van Vuuren, J. Doelman, L. Drouet, J. Edmonds, O. Fricko, M. Harmsen, P. Havlik, F. Humpenöder, E. Stehfest, and M. Tavoni, "Scenarios towards limiting global mean temperature increase below 1.5°C", *Nature Climate Change*. DOI: [10.1038/s41558-018-0091-3](https://doi.org/10.1038/s41558-018-0091-3)
- 2018 A. Vinca, M. Rottoli, **G. Marangoni**, and M. Tavoni, "The role of carbon capture and storage electricity in attaining 1.5 and 2°C", *International Journal of Greenhouse Gas Control*. DOI: [10.1016/j.ijggc.2018.07.020](https://doi.org/10.1016/j.ijggc.2018.07.020)
- 2016 K. Riahi, D. P. van Vuuren, E. Kriegler, J. Edmonds, B. C. O'Neill, S. Fujimori, N. Bauer, K. Calvin, R. Dellink, O. Fricko, W. Lutz, A. Popp, J. C. Cuaresma, S. KC, M. Leimbach, L. Jiang, T. Kram, S. Rao, J. Emmerling, K. Ebi, T. Hasegawa, P. Havlik, F. Humpenöder, L. A. D. Silva, S. Smith, E. Stehfest, V. Bosetti, J. Eom, D. Gernaat, T. Masui, J. Rogelj, J. Strefler, L. Drouet, V. Krey, G. Luderer, M. Harmsen, K. Takahashi, L. Baumstark, J. C. Doelman, M. Kainuma, Z. Klimont, **G. Marangoni**, H. Lotze-Campen, M. Obersteiner, A. Tabeau, and M. Tavoni, "The Shared Socioeconomic Pathways and their energy, land use, and greenhouse gas emissions implications: An overview", *Global Environmental Change*. DOI: [10.1016/j.gloenvcha.2016.05.009](https://doi.org/10.1016/j.gloenvcha.2016.05.009)

- 2016 N. Bauer, K. Calvin, J. Emmerling, O. Fricko, S. Fujimori, J. Hilaire, J. Eom, V. Krey, E. Kriegler, I. Mouratiadou, H. S. de Boer, M. van den Berg, S. Carrara, V. Daioglou, L. Drouet, J. E. Edmonds, D. Gernaat, P. Havlik, N. Johnson, D. Klein, P. Kyle, **G. Marangoni**, T. Masui, R. C. Pietzcker, M. Strubegger, M. Wise, K. Riahi, and D. P. van Vuuren, "Shared socio-economic pathways of the energy sector — quantifying the narratives", *Global Environmental Change*. DOI: [10.1016/j.gloenvcha.2016.07.006](https://doi.org/10.1016/j.gloenvcha.2016.07.006)
- 2016 S. Carrara, **G. Marangoni**, "Including system integration of variable renewable energies in a constant elasticity of substitution framework: The case of the WITCH model", *Energy Economics*. DOI: [10.1016/j.eneco.2016.08.017](https://doi.org/10.1016/j.eneco.2016.08.017)
- 2015 P. L. Lucas, J. Nielsen, K. Calvin, D. McCollum, **G. Marangoni**, J. Strefler, B. C. C. van der Zwaan, D. P. van Vuuren, "Future energy system challenges for Africa: Insights from Integrated Assessment Models", *Energy Policy*. DOI: [10.1016/j.enpol.2015.08.017](https://doi.org/10.1016/j.enpol.2015.08.017)
- 2013 D. McCollum, Y. Nagai, K. Riahi, **G. Marangoni**, K. Calvin, R. Pietzcker, J. Van Vliet, and B. Van Der Zwaan, "Energy investments under climate policy: A comparison of global models", *Climate Change Economics*. DOI: [10.1142/S2010007813400101](https://doi.org/10.1142/S2010007813400101)
- 2013 S. Carrara and **G. Marangoni**, "Non-CO₂ greenhouse gas mitigation modeling with marginal abatement cost curves: Technical change, emission scenarios and policy costs", *Economics and Policy of Energy and the Environment*. DOI: [10.3280/EFE2013-001006](https://doi.org/10.3280/EFE2013-001006)
- 2013 M. Tavoni, E. Kriegler, T. Aboumahboub, K. Calvin, G. De Maere, M. Wise, D. Klein, J. Jewell, T. Kober, P. Lucas, G. Luderer, D. Mccollum, **G. Marangoni**, K. Riahi, and D. Van Vuuren, "The distribution of the major economies' effort in the durban platform scenarios", *Climate Change Economics*. DOI: [10.1142/S2010007813400095](https://doi.org/10.1142/S2010007813400095)
- 2013 B. C. C. Van Der Zwaan, H. Rösler, T. Kober, T. Aboumahboub, K. V. Calvin, D. E. H. J. Gernaat, **G. Marangoni**, and D. Mccollum, "A cross-model comparison of global long-term technology diffusion under a 2°C climate change control target", *Climate Change Economics*. DOI: [10.1142/S2010007813400137](https://doi.org/10.1142/S2010007813400137)
- 2013 C. Carraro, M. Davide, V. Barbi, and **G. Marangoni**, "Science advancements, policy immobility: The two faces of climate (in)action", *Economics and Policy of Energy and the Environment*. DOI: [10.3280/EFE2013-003001](https://doi.org/10.3280/EFE2013-003001)
- 2013 F. Bonenti, G. Oggioni, E. Allevi, and **G. Marangoni**, "Evaluating the EU ETS impacts on profits, investments and prices of the italian electricity market", *Energy Policy*. DOI: [10.1016/j.enpol.2013.03.026](https://doi.org/10.1016/j.enpol.2013.03.026)

Other Publications

- 2018 R. Lempert, **G. Marangoni**, K. Keller, and J. Duke, "Is Climate Restoration an Appropriate Climate Policy Goal?", RAND Corporation research report. DOI: [10.7249/RR2442](https://doi.org/10.7249/RR2442)
- 2017 **G. Marangoni**, "Strategic investment decisions in the energy supply and demand sectors under uncertain technical change and sustainability concerns". PhD Thesis
- 2017 **G. Marangoni**, G. de Maere, V. Bosetti, "Optimal Clean Energy R&D Investments Under Uncertainty". SSRN
- 2017 A. Vinca, M. Rottoli, **G. Marangoni**, M. Tavoni, "The Role of Carbon Capture and Storage Electricity in Attaining 1.5 and 2°C". SSRN
- 2016 J. Emmerling, L. Drouet, L. A. Reis, M. Bevione, L. Berger, V. Bosetti, S. Carrara, E. De Cian, G. De Maere D'Aertrycke, T. Longden, M. Malpede, **G. Marangoni**, F. Sferra, M. Tavoni, J. Witajewski-Baltvilks, P. Havlik, "The WITCH 2016 Model-Documentation and Implementation of the Shared Socioeconomic Pathways". SSRN

- 2015 D. A. Raitzer, F. Bosello, M. Tavoni, C. Orecchia, **G. Marangoni**, J. N. G. Samson, "Southeast Asia and the Economics of Global Climate Stabilization", *Asian Development Bank Report*
- 2013 C. Carraro, T. Longden, G. Marangoni, M. Tavoni, "The Optimal Energy Mix in Power Generation and the Contribution from Natural Gas in Reducing Carbon Emissions to 2030 and Beyond". *SSRN*

Main Collaborations under Research Grants

- 2017 – *SCRiM* (National Science Foundation cooperative agreement GEO-1240507) "Sustainable Climate Risk Management"
- 2015 – 2017 *COBHAM* (European Union ERC-2013-StG Grant N° 336155) "The role of consumer behavior and heterogeneity in the integrated assessment of energy and climate policies"
- 2013 – 2016 *ADVANCE* (European Union FP7/2007-2013 N° 308329) "Advanced Model Development and Validation for Improved Analysis of Costs and Impacts of Mitigation Policies"
- 2015 *ECOCEP* (European Union FP7-PEOPLE-2013-IRSES Grant N° 609642) "Economic Modeling for Climate-Energy Policy"
- 2011 – 2014 *LIMITS* (European Union FP7/2007-2013 Grant N° 282846) "Low climate IMPact scenarios and the Implications of required Tight emission control Strategies"

Awards

- 2017 PhD degree with honors
- 2010 Master's degree with honors
- 2008 Bachelor's degree with honors

Teaching Experiences

- 2015/2016 Support lessons for the course *Energy Modelling And Scenarios* (Energy Engineering Dpt., Polytechnic of Milan, Italy)

Professional Services

Contributing Author

IPCC, "Assessing transformation pathways" [Clarke et al.]. Chapter 6 of "Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change" [Edenhofer et al.]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

Reviewer of Journals

Energy Economics
 Energy Policy
 European Journal of Operational Research
 Technological Forecasting and Social Change

Computer Languages

- Main: Python, GAMS, Bash, \LaTeX
- Secondary: R, MATLAB, Java, C/C++, SQL, AMPL, Lisp, HTML, JavaScript
- Coding *gdxcompare*
- Examples: *gdxpy*