Marta Victoria
Assistant Professor (tenure track)
Department of Mechanical
and Production Engineering
Aarhus University
mvp@mpe.au.dk

Complete List of Publications

I have co-authored 32 peer-reviewed journal articles, 1 book chapter and 4 patents. My h-index is 17 and the total number of citations of my publications is 1244 according to Google Scholar (July 2021).

ORCID: http://orcid.org/0000-0003-1665-1281
Google Scholar: https://scholar.google.es/citations?user=ZMH8qNYAAAAJ&hl=es

Four selected publications are indicated by * and a brief description is provided.

PEER-REVIEWED PUBLICATIONS

J.32. C. del Cañizo et al., Promoting citizen science in the energy sector: Generation Solar, an open database of small-scale solar photovoltaic installations, Open Research Europe 1, 21 (2021) https://doi.org/10.12688/openreseurope.13069.2.

J.31. G. Vallerotto, **M. Victoria**, N.Jost, S. Askins, C. Domínguez, R. Herrero, I. Antón, Comparison of achromatic doublet on glass Fresnel lenses for concentrator photovoltaics, Optics Express 29(13),20601-20616 (2021), Impact Factor: 3.894 https://doi.org/10.1364/OE.428160

J.30. L. J. Schwenk-Nebbe, **M. Victoria**, G. B. Andresen, Dataset: A proxy for historical CO2 emissions related to centralised electricity generation in Europe, Data in Brief 36, 107016 (2021) https://doi.org/10.1016/j.dib.2021.107016

*J.29 **M. Victoria**, N. Haegel, I. M. Peters, R Sinton, A. Jäger-Waldau, C. Cañizo, C. Breyer, M. Stocks, A. Blakers, I. Kaizuka, K. Komoto, A. Smets, Solar photovoltaics is ready to power a sustainable future, Joule 5, 1-16 (2021), **Impact Factor 27.054** https://10.1016/j.joule.2021.03.005

Most Integrated Assessment Models (IAMs) have underestimated the role that solar PV can play in future low-carbon energy systems. This is critical as IAMs results constitute the main scenarios included in the Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC). In this review, we discuss the main reasons behind the underestimation of solar PV and compare IAMs results with those provided by energy models using high spatial and temporal resolution. We include a call for action for improving IAMs and changing the paradigm regarding the role that solar PV can play to mitigate climate change. We also identify the challenges for a sustained scaling up of solar PV in the next decade and provide recommendations.

J.28. T. T. Pedersen, **M. Victoria**, M. G. Rasmussen, G. B. Andresen, Modelling all alternative solutions for highly renewable energy systems, Energy 234, 121294 (2021), https://doi.org/10.1016/j.energy.2021.121294 Open version: https://arxiv.org/abs/2010.00836

J.27. L. J. Schwenk-Nebbe, **M. Victoria**, G. B. Andresen, M. Greiner, CO_2 quota attribution effects on the European electricity system comprised of self-centred actors, Advances in Applied Energy 2, 100012 (2021) 5-year Impact Factor: 8.848 https://doi.org/10.1016/j.adapen.2021.100012

J.26 C. Gallego-Castillo, M. Heleno, **M. Victoria**, Self-consumption for energy communities in Spain: a regional analysis under the new legal framework, Energy Policy 150, 112144 (2021) 5-year impact factor: 5.693 https://doi.org/10.1016/j.enpol.2021.112144 Open Version: https://arxiv.org/abs/2006.06459

J.25 C. Gallego-Castillo and **M. Victoria**, Improving energy transition analysis tool through hydropower statistical modelling, Energies 14, 98 (2021) 5-year Impact Factor: 2.822 https://dx.doi.org/10.3390/en14010098

*J.24 **M. Victoria**, K. Zhu, T. Brown, G. B. Andresen, M. Greiner, Early decarbonisation of the European energy system pays off, Nature communications 11, 6223 (2020) 5-year **Impact Factor: 13.610** https://www.nature.com/articles/s41467-020-20015-4

Transition paths are traditionally analysed using coarse models with annual resolution and neglecting transmission grids, while power system models with detailed network representation miss other sectors and the existence of a limited carbon budget. In this work, we combine the two approaches to unveil two significant results. First, we show that it is cost-effective to use solar photovoltaics and wind as the cornerstone of a future decarbonised European Energy system. This contradicts the traditional energy transition narrative that comprises mostly scenarios requiring a significant contribution from biomass and/or nuclear. Second, the myopic modelling approach implemented here for the first time enables us to identify that following an early and steady path in which emissions are strongly reduced in the first decade is more cost-effective than following a late and rapid path in which low initial reduction targets quickly deplete the carbon budget and require a sharp reduction later.

J.23 K. Zhu, **M. Victoria**, T. Brown, G. B. Andresen, M. Greiner, Impact of climatic, technical and economic uncertainties on the optimal design of a coupled fossil-free electricity, heating and cooling system in Europe, Applied Energy 262, 114500 (2020). https://doi.org/10.1016/j.apenergy.2020.114500 5-Year Impact Factor: 8.558 Open version: https://arxiv.org/abs/1910.03283

J22. **M. Victoria**, K. Zhu, T. Brown, G. B. Andresen, M. Greiner, The role of photovoltaics in a sustainable European energy system under variable CO_2 emissions targets, transmission capacities, and costs assumptions, Progress in Photovoltaics 28, 483–492 (2020) 5-Year Impact Factor: 7.776 https://doi.org/10.1002/pip.3198 Open version: https://arxiv.org/abs/1911.06629

*J21. **M. Victoria**, K. Zhu, T. Brown, G. B. Andresen, M. Greiner, The role of storage technologies throughout the decarbonisation of the sector-coupled European energy system, Energy Conversion and Management 201 (1) 111977, (2019) https://doi.org/10.1016/j.enconman.2019.111977 Journal **Impact Factor: 8.208** Open version: https://arxiv.org/abs/1906.06936

The analysis included in this paper overcomes the previous common understanding ("storage is needed in highly renewable energy systems") by showing the emergence of two different kind of storage technologies and the requirement to combine both to ensure feasible operation of the system. The two storage technologies show fundamentally different characteristics (energy and power capacities) and operation patterns, ensuring the balancing of renewable fluctuations at different timescales.

J20. K. Zhu, **M. Victoria**, T. Brown, G. B. Andresen, M. Greiner, Impact of CO_2 prices on a highly decarbonised coupled electricity and heating system in Europe, Applied Energy 236, 622-634 (2019). https://doi.org/10.1016/j.apenergy.2018.12.016 Impact Factor: 8.558 Open version: https://arxiv.org/abs/1809.10369

*J19. **M. Victoria**, G. B. Andresen, Using validated reanalysis data to investigate the impact of the PV system configurations at high penetration levels in European countries, Progress in Photovoltaics (27), 576-592 (2019) (Selected for the Issue cover) https://doi.org/10.1002/pip.3126 Impact factor: 7.776
Open version: https://arxiv.org/abs/1807.10044

Here, we proposed a method to convert irradiance data from reanalysis into solar generation time series and validated them using historical data. The model was used to produce long-term time series for 30 European countries that are used by myself and others as input for energy models. The time series were released under an open license 10.5281/zenodo.2613651. The article was **selected for the cover** of the July 2019 issue of Progress in Photovoltaics which is the main journal in the field of solar photovoltaics. https://onlinelibrary.wiley.com/toc/1099159x/2019/27/7

J18. **M. Victoria**, C. Gallego-Castillo, Hourly-resolution analysis of electricity decarbonization in Spain 2017-2030, Applied Energy 233, 674-690 (2019) Impact Factor: 8.558 https://doi.org/10.1016/j.apenergy.2018.10.055

J17. R. Nuñez, **M. Victoria**, S. Askins, I. Antón, C. Domínguez, R. Herrero, G. Sala, Spectral impact on multi-junction solar cells obtained by means of component cells of a different technology, IEEE Journal of Photovoltaics 8, 646-653, https://doi.org/10.1109/JPHOTOV.2017.2782561 Impact Factor: 3.398

J16. G. Vallerotto, **M. Victoria**, S. Askins, I. Antón, G. Sala, R. Herrero, C. Domínguez, Indoor Experimental Assessment of the Efficiency and Irradiance Spot of the Achromatic Doublet on Glass (ADG) Fresnel Lens for Concentrating Photovoltaics, J. Vis. Exp. (128), 2017, https://doi.org/10.3791/56269 Journal Impact factor: 1.351

J15. R. Herrero, I. Antón, **M. Victoria**, C. Domínguez, S. Askins, G. Sala, D. De Nardis, K. Araki, Experimental analysis and simulation of a production line for CPV modules: Impact of defects, misalignments, and binning of receivers. Energy Science & Engineering **5**, 257-269 (2017) https://doi.org/10.1002/ese3.178 Journal Impact factor:2.893

J14. **M. Victoria**, S. Askins, R. Herrero, I. Antón, and G. Sala, "Assessment of the optical efficiency of a primary lens to be used in a CPV system," Solar Energy **134**, 406–415 (2016). https://doi.org/10.1016/j.solener.2016.05.016 5-Year Impact Factor: 4.807

J13. R. Núñez, J. Chen, **M. Victoria**, C. Domínguez, S. Askins, R. Herrero, I. Antón, and G. Sala, "Spectral study and classification of worldwide locations considering several multijunction solar cell technologies," Prog. Photovolt. Res. Appl. 24, 1214–1228 (2016). https://doi.org/10.1002/pip.2781 5-Year Impact Factor: 7.776

J12. R. Núñez, C. Domínguez, S. Askins, **M. Victoria**, R. Herrero, I. Antón, and G. Sala, "Determination of spectral variations by means of component cells useful for CPV rating and design," Prog. Photovolt. Res. Appl. **24**, 663–679 (2016). https://doi.org/10.1002/pip.2715 5-Year Impact Factor: 7.776

J11. G. Vallerotto, **M. Victoria,** S. Askins, R. Herrero, C. Domínguez, I. Antón, and G. Sala, "Design and modeling of a cost-effective achromatic Fresnel lens for concentrating photovoltaics," Opt. Express **24**, A1245–A1256 (2016). https://doi.org/10.1364/OE.24.0A1245 Journal Impact Factor: 3.561

J10. C. J. Gallego-Castillo and **M. Victoria**, "Cost-free feed-in tariffs for renewable energy deployment in Spain," Renew. Energy **81**, 411–420 (2015). https://doi.org/10.1016/j.renene.2015.03.052 5-Year Impact Factor: 5.257

J9. **M. Victoria**, C. Domínguez, S. Askins, I. Antón, and G. Sala, "Experimental analysis of a photovoltaic concentrator based on a single reflective stage immersed in an optical fluid," Prog. Photovolt. Res. Appl. **22**, 1213–1225 (2014). https://doi.org/10.1002/pip.2381 5-Year Impact Factor: 7.776

J8. J. Cubas, S. Pindado, and **M. Victoria**, "On the analytical approach for modeling photovoltaic systems behavior," J. Power Sources **247**, 467–474 (2014). https://doi.org/10.1016/j.jpowsour.2013.09.008 5-Year Impact Factor: 6.823

J7. **M. Victoria**, R. Herrero, C. Domínguez, I. Antón, S. Askins, and G. Sala, "Characterization of the spatial distribution of irradiance and spectrum in concentrating photovoltaic systems and their effect on multi-junction solar cells," Prog. Photovolt. Res. Appl. **21**, 308–318 (2013). https://doi.org/10.1002/pip.1183 5-Year Impact Factor: 7.776

J6. **M. Victoria**, S. Askins, C. Domínguez, I. Antón, and G. Sala, "Durability of dielectric fluids for concentrating photovoltaic systems," Sol. Energy Mater. Sol. Cells **113**, 31–36 (2013). https://doi.org/10.1016/j.solmat.2013.01.039 5-Year Impact Factor: 5.105

J5. **M. Victoria**, C. Domínguez, I. Antón, and G. Sala, "Antireflective coatings for multijunction solar cells under wide-angle ray bundles," Opt. Express **20**, 8136 (2012). https://doi.org/10.1364/OE.20.008136 Journal Impact Factor: 3.561

J4. R. Herrero, **M. Victoria**, C. Domínguez, S. Askins, I. Antón, and G. Sala, "Concentration photovoltaic optical system irradiance distribution measurements and its effect on multi-junction solar cells," Prog. Photovolt. Res. Appl. **20**, 423–430 (2012). https://doi.org/10.1002/pip.1145 5-Year Impact Factor: 7.776

J3. **M. Victoria**, C. Domínguez, S. Askins, I. Antón, and G. Sala, "Characterizing FluidReflex Optical Transfer Function," Jpn. J. Appl. Phys. 51, 10ND06 (2012) http://dx.doi.org/10.1143/JJAP.51.10ND06 Journal Impact factor: 1.471

J2. I. Antón, C. Domínguez, **M. Victoria**, R. Herrero, S. Askins, and G. Sala, "Characterization Capabilities of Solar Simulators for Concentrator Photovoltaic Modules," Jpn. J. Appl. Phys. 51, 10ND12 (2012). http://dx.doi.org/10.1143/JJAP.51.10ND12 Journal Impact factor: 1.471

J1. **M. Victoria**, C. Domínguez, I. Antón, and G. Sala, "Comparative analysis of different secondary optical elements for aspheric primary lenses," Opt Express 17, 6487–6492 (2009). Journal Impact Factor in 2009: 4.49 https://doi.org/10.1364/OE.17.006487

BOOKS AND BOOK CHAPTERS

B1. I. García, **M. Victoria**, and I. Antón, Chapter V: Temperature Effects and Thermal Management. Handbook of Concentrator Photovoltaic Technology (John Wiley and Sons, Ltd, 2016).

M. Victoria and R. Herrero, Colección de problemas de concentración fotovoltaica, Fundación Rogelio Segovia para el Desarrollo de las Telecomunicaciones., 2015 (ISBN: 9788474024128)

PATENTS

PAT4. PCT/ES2018/070303, WO2019197689, S. Askins, J. Caselles, **M. Victoria**, I. Antón, Tracking Device, 2020. The patented technology is currently being exploited by the company Solar Rays Energy www.solaraysenergy.com

PAT3. PCT WO 2015/101626A1, I. Antón, G. Sala, S. Askins, **M. Victoria**, Lens having limited chromatic aberration for photovoltaic concentrators and method for manufacturing said lens, 2015.

PAT2. EP 2984497 B1, PCT WO2014/167086A1, Method and device suitable for characterizing photovoltaic concentration modules, R. Herrero, I. Antón, G. Sala, **M. Victoria**, S. Askins, 2014.

PAT1. EP 3005422 B1, PCT WO 2014/181975A1, Solar cell receiver suitable for reflective solar concentrator modules, I. Antón, G. Sala; C. Domínguez, S. Askins, **M. Victoria**, 2014.