Complete List of Publications

ORCID: <u>http://orcid.org/0000-0003-1665-1281</u> Google Scholar: <u>https://scholar.google.es/citations?user=ZMH8qNYAAAAJ&hl=es</u> h-index: 25

Six selected publications are indicated by *****. A brief description of my role in those publications and the most significant results is provided.

PEER-REVIEWED PUBLICATIONS

- J46. P Rahdan, E Zeyen, C Gallego-Castillo, **M Victoria**, Distributed photovoltaics provides key benefits for a highly renewable European energy system, Applied Energy (accepted for publication). Open version: <u>https://arxiv.org/abs/2307.09872</u>
- J45. K Ali Khan Niazi and **M Victoria**, Comparative analysis of photovoltaic configurations for agrivoltaic systems in Europe, Progress in Photovoltaics: Research and Applications 31, 2023. Impact factor: 8.5 <u>https://doi.org/10.1002/pip.3727</u> Open version: <u>https://arxiv.org/abs/2211.00331</u>
- J44. N. M. Haegel, P. Verlinden, **M. Victoria**, Photovoltaics at multi-terawatt scale: Waiting is not an option, Science, 2023, <u>https://www.science.org/doi/10.1126/science.adf6957</u> Open version: <u>https://www.ise.fraunhofer.de/en/publications/featured-publications/science-vol-380.html</u>
- J43. E. Zeyen, M. Victoria, and T. Brown, Endogenous learning for green hydrogen in a sector-coupled energy model for Europe, Nature Communications, 2023. Impact Factor: 16.6 <u>https://www.nature.com/articles/s41467-023-39397-2</u> Open version: <u>https://arxiv.org/abs/2205.11901</u>
- J42. F. Neumann, E. Zeyen, M. Victoria, and T. Brown, The potential role of a hydrogen network in Europe, Joule, 2023. Impact factor: 46 <u>https://doi.org/10.1016/j.joule.2023.06.016</u> Open version: <u>https://arxiv.org/abs/2207.05816</u>
- J41. E. K. Gøtske, G. B. Andresen, and **M. Victoria**, Cost and Efficiency Requirements for Successful Electricity Storage in a Highly Renewable European Energy System, PRX Energy, 2023, Impact Factor: 14.3 <u>https://doi.org/10.1103/PRXEnergy.2.023006</u> Open version: <u>https://arxiv.org/abs/2208.09169</u>
- J4o. T. T. Pedersen, M. S. Andersen, M. Victoria, and G. B. Andresen, Using Modeling All Alternatives to explore 55% decarbonization scenarios of the European electricity sector, iScience 2023, Impact factor: 6.9 https://doi.org/10.1016/j.isci.2023.106677
- J39. T.T. Pedersen, E.K., Gøtske, A.J. Dvorak, G. B. Andresen, **M. Victoria**, Long-term implications of reduced gas imports on the decarbonization of the European energy system, Joule (6), 2022 Impact factor: 46 <u>https://doi.org/10.1016/j.joule.2022.06.023</u>
- J38. L. J. Schwenk-Nebbe, J. E. Vind, A. J. Backhaus, **M. Victoria**, M. Greiner, Principal spatiotemporal mismatch and electricity price patterns in a highly decarbonized networked European power system iScience (25), 2022 Impact factor: 6.9 <u>https://doi.org/10.1016/j.isci.2022.104380</u>
- J37. M. Victoria, E. Zeyen, T. Brown, Speed of technological transformations required in Europe to achieve different climate goals, Joule (6) 2022 Impact factor: 46 <u>https://doi.org/10.1016/j.joule.2022.04.016</u> Open version: https://arxiv.org/abs/2109.09563

- J36. C. Breyer et al, On the History and Future of 100% Renewable Energy Systems Research, IEEE Access (2022) <u>https://doi.org/10.1109/ACCESS.2022.3193402</u>
- J35. A. Aliana, M. Chang, P. A. Østergaard, **M. Victoria**, A. N. Andersen, Performance assessment of using various solar radiation data in modelling large-scale solar thermal systems integrated in district heating networks, Renewable Energy 190 (2022) <u>https://doi.org/10.1016/j.renene.2022.03.163</u>
- J34. P. Tapetado, M. Victoria, M. Greiner, and J. Usaola, Exploring backup requirements to complement wind, solar and hydro generation in a highly renewable Spanish power system, Energy Strategy Reviews (38) 100729 (2021) <u>https://doi.org/10.1016/j.esr.2021.100729</u>
- J33. Ebbe K. Gøtske and **M. Victoria**, Future operation of hydropower in Europe under high renewable penetration and climate change, iScience 24(9) 102999, (2021) <u>https://doi.org/10.1016/j.isci.2021.102999</u> Open version: <u>https://arxiv.org/abs/2105.07756</u>
- J.32. C. del Cañizo, Ana B. Cristóbal, L. Barbosa, G. Revuelta, S. Haas, M. Victoria, M.Brocklehurst, Promoting citizen science in the energy sector: Generation Solar, an open database of small-scale solar photovoltaic installations, Open Research Europe 1, 21 (2021) <u>https://doi.org/10.12688/openreseurope.13069.2</u>.
- 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 <u>https://doi.org/10.1364/OE.428160</u>
- 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) <u>https://doi.org/10.1016/j.dib.2021.107016</u>
- *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 29.155** <u>https://10.1016/j.joule.2021.03.005</u>

Most Integrated Assessment Models (IAMs) have underestimated the role that solar PV can play in future lowcarbon 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

This paper presents a new methodology to map the polyhedron representing the space of near-optimal solutions in an energy system optimization problem. First, the boundaries of the polyhedron are determined by successively expanding the volume in directions that increase the capacity of different technologies while only producing an epsilon increase in the system cost. Second, the bounded volume is efficiently sampled to identify thousands of near-optimal solutions.

- J.27. L. J. Schwenk-Nebbe, M. Victoria, G. B. Andresen, M. Greiner, CO₂ quota attribution effects on the European electricity system comprised of self-centered actors, Advances in Applied Energy 2, 100012 (2021) 5-year Impact Factor: 8.848 <u>https://doi.org/10.1016/j.adapen.2021.100012</u>
- 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 <u>https://doi.org/10.1016/j.enpol.2021.112144</u> Open Version: <u>https://arxiv.org/abs/2006.06459</u>

- 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 ground-breaking 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. Both aspects are highly relevant in the current scientific discussion on the field of large-scale energy modelling.

- 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). <u>https://doi.org/10.1016/j.apenergy.2020.114500</u> 5-Year Impact Factor: 8.558 Open version: <u>https://arxiv.org/abs/1910.03283</u>
- J22. M. Victoria, K. Zhu, T. Brown, G. B. Andresen, M. Greiner, The role of photovoltaics in a sustainable European energy system under variable CO₂ emissions targets, transmission capacities, and costs assumptions, Progress in Photovoltaics 28, 483–492 (2020) 5-Year Impact Factor: 7.776 <u>https://doi.org/10.1002/pip.3198</u> Open version: <u>https://arxiv.org/abs/1911.06629</u>
- *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) <u>https://doi.org/10.1016/j.enconman.2019.111977</u> Journal Impact Factor: 8.208 Open version: <u>https://arxiv.org/abs/1906.06936</u>

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.

- J2o. K. Zhu, M. Victoria, T. Brown, G. B. Andresen, M. Greiner, Impact of CO₂ prices on a highly decarbonised coupled electricity and heating system in Europe, Applied Energy 236, 622-634 (2019). <u>https://doi.org/10.1016/j.apenergy.2018.12.016</u> Impact Factor: 8.558 Open version: <u>https://arxiv.org/abs/1809.10369</u>
- *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) <u>https://doi.org/10.1002/pip.3126</u> Impact factor: 7.776 Open version: https://arxiv.org/abs/1807.10044

In this paper, 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/zenod0.2613651

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 multijunction solar cells obtained by means of component cells of a different technology, IEEE Journal of Photovoltaics 8, 646-653, <u>https://doi.org/10.1109/JPHOTOV.2017.2782561</u> 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, <u>https://doi.org/10.3791/56269</u> 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) <u>https://doi.org/10.1002/ese3.178</u> 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). <u>https://doi.org/10.1016/j.solener.2016.05.016</u> 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). <u>https://doi.org/10.1002/pip.2781</u> 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). <u>https://doi.org/10.1002/pip.2715</u> 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). <u>https://doi.org/10.1364/OE.24.0A1245</u> 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). <u>https://doi.org/10.1016/j.renene.2015.03.052</u> 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). <u>https://doi.org/10.1002/pip.2381</u> 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). <u>https://doi.org/10.1016/j.jpowsour.2013.09.008</u> 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 multijunction solar cells," Prog. Photovolt. Res. Appl. 21, 308–318 (2013). <u>https://doi.org/10.1002/pip.1183</u> 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). <u>https://doi.org/10.1016/j.solmat.2013.01.039</u> 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). <u>https://doi.org/10.1364/OE.20.008136</u> 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). <u>https://doi.org/10.1002/pip.1145</u> 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) <u>http://dx.doi.org/10.1143/JJAP.51.10ND06</u> 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). <u>http://dx.doi.org/10.1143/JJAP.51.10ND12</u> 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 <u>https://doi.org/10.1364/OE.17.006487</u>

BOOKS AND BOOK CHAPTERS _____

- B2. Editor of the MSc-level textbook **Fundamentals of Solar Cells and Photovoltaic System Engineering** to be published by Elsevier in June 2024. Co-author of Chapters 1, 2, 10, 11, 12, 13, and 14.
- 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).

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 <u>www.solaraysenergy.com</u>
- 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.