Supplementary Materials

Long-Duration Energy Storage - A Literature Review on the Link Between Variable Renewable Energy Penetration and Market Creation

File S1. Outline of the analysed literature

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Source	Type	Title	Author(s)	Published	Publication
[1]	M, P	Preliminary analysis of long-term storage requirement in enabling high renewable energy penetration: A case of East Asia	Ershun Du, Haiyang Jiang, Jinyu Xiao, Jinming Hou, Ning Zhang, Chongqing Kang	2021	IET Renewable Power Generation
[2]	M, P	Flexible electricity generation, grid exchange and storage for the transition to a 100% renewable energy system in Europe	Michael Child, Claudia Kemfert, Dmitrii Bogdanov, Christian Breyer	2019	Renewable Energy
[3]	R, P	Comprehensive Overview of Power System Flexibility during the Scenario of High Penetration of Renewable Energy in Utility Grid	Ekata Kaushik, Vivek Prakash, Om Prakash Mahela, Baseem Khan, Adel El-Shahat, Almoataz Y. Abdelaziz	2022	Energies
[4]	T, M	Net-zero power - long duration energy storage for a renewable grid	LDES Council, McKinsey & Company	2021	LDES Council
[5]	M, P	Optimal energy storage portfolio for high and ultrahigh carbon-free and renewable power systems	Omar J. Guerra, Joshua Eichman, Paul Denholm	2021	Energy & Environmental Science
[6]	M, P	The value of energy storage in decarbonizing the electricity sector	Fernando J. de Sisternes, Jesse D. Jenkins, Audun Botterud	2016	Applied Energy
[7]	T, R	The Value of Long-Duration Energy Storage: Policy and Perception	Clifford K. Ho, Joseph W. McNamara	2021	Sandia National Laboratories
[8]	T, R	The Challenge of Defining Long-Duration Energy Storage	Paul Denholm, Wesley Cole, A. Will Frazier, Kara Podkaminer, Nate Blair	2021	NREL
[9]	R, P	Smart Storage the Key factor of Energy Transition	Antonio Zingales	2022	IOP Conference Series: Earth and Environmental Science
[10]	R, P	A review at the role of storage in energy systems with a focus on Power to Gas and long-term storage	Herib Blanco, André Faaij	2018	Renewable and Sustainable Energy Reviews
[11]	R, P	Electricity Storage and the Renewable Energy Transition	Wolf-Peter Schill	2020	Joule
[12]	R, P	Long-Duration Electricity Storage Applications, Economics, and Technologies	Paul Albertus, Joseph S. Manser, Scott Litzelman	2020	Joule
[13]	T, R	The Role of Long-Duration Energy Storage in Deep Decarbonization: Policy Considerations	Heidi Bishop Ratz, Robi Robichaud, Lori Bird, Norma Hutchinson	2020	World Resources Institute
[14]	M, P	Flexibility in Europe's power sector — An additional requirement or an automatic complement?	Joachim Bertsch, Christian Growitsch, Stefan Lorenczik, Stephan Nagl	2016	Energy Economics
[16]	M, P	Benefit Analysis of Long-Duration Energy Storage in Power Systems with High Renewable Energy Shares	Jiazi Zhang, Omar J. Guerra, Joshua Eichman, Matthew A. Pellow	2020	Frontiers in Energy Research
[17]	T, M	Long Duration Energy Storage for California's Clean, Reliable Grid	Erin Childs, Maria Roumpani, Sergio Dueñas, Pedro Sanchez, Jennifer Gorman, Melanie Davidson, Lily Backer	2020	STRATEGEN
[18]	M, P	Energy storage needs for the substitution of fossil fuel power plants with renewables	Matthew D. Leonard, Efstathios E. Michaelides, Dimitrios N. Michaelides	2020	Renewable Energy
[19]	M, P	Role of Long-Duration Energy Storage in Variable Renewable Electricity Systems	Jacqueline A. Dowling, Katherine Z. Rinaldi, Tyler H. Ruggles, Steven J. Davis, Mengyao Yuan, Fan Tong, Nathan S. Lewis,Ken Caldeira	2020	Joule
[20]	M, P	Storage Requirements and Costs of Shaping Renewable Energy Toward Grid Decarbonization	Micah S. Ziegler, Joshua M. Mueller, Gonc¸alo D. Pereira, Juhyun Song, Marco Ferrara, Yet-Ming Chiang, and Jessika E. Trancik	2019	Joule
[21]	M, P	Integration of Renewable Energy Sources in future power systems: The role of storage	Stefan Weitemeyer, David Kleinhans, Thomas Vogt, Carsten Agert	2015	Renewable Energy
[22]	M, P	Geophysical constraints on the reliability of solar and wind power in the United States	Dan Tong, David J. Farnham, Lei Duan, Qiang Zhang, Nathan S. Lewis, Ken Caldeira, Steven J. Davis	2018	Nature Communications
[28]	M, P	Long-run power storage requirements for high shares of renewables: Results and sensitivities	Wolf-Peter Schill, Alexander Zerrahn	2018	Renewable and Sustainable Energy Reviews
[29]	T, R	The Four Phases of Storage Deployment: A Framework for the Expanding Role of Storage in the U.S. Power System	Paul Denholm, Wesley Cole, A. Will Frazier, Kara Podkaminer, Nate Blair	2021	NREL
[34]	M, P	A novel framework for development and optimisation of future electricity scenarios with high penetration of renewables and storage	Carlos Gaete-Morales, Alejandro Gallego-Schmid, Laurence Stamford, Adisa Azapagic	2019	Applied Energy
[35]	T, M, P	Possible role of power-to-gas in future energy systems	Andreas Belderbos, Erik Delarue, William D'haeseleer	2015	IEEE International Conference on the European Energy Market
[36]	M, P	The Value of Seasonal Energy Storage Technologies for the Integration of Wind and Solar Power	Omar Guerra, Jiazi Zhang, Joshua Eichman, Paul Denholm, Jennifer Kurtz, Bri-Mathias Hodge	2020	Energy & Environmental Science
[37]	M, P	Techno-economic analysis of long-duration energy storage and flexible power generation technologies to support high-variable renewable energy grids	Chad A. Hunter, Michael M. Penev, Evan P. Reznicek, Joshua Eichman, Neha Rustagi, Samuel F. Baldwin	2021	Joule
[42]	T, M	The Role of Solar Energy towards 100% Renewable Power Supply for Israel: Integrating Solar PV, Wind Energy, CSP and Storages	Dmitrii Bogdanov, Christian Breyer	2015	Sede Boqer Symposium on Solar Electricity Production
[49]	M, P	Low-cost solution to the grid reliability problem with 100% penetration of intermittent wind, water, and solar for all purposes	Mark Z. Jacobson, Mark A. Delucchi, Mary A. Cameron, Bethany A. Frew	2015	PNAS
[50]	M, P	The peaking potential of long-duration energy storage in the United States power system	Cole W, Denholm P, Carag V, Frazier W	2023	Journal of Energy Storage
[51]	M, P	The role and value of inter-seasonal grid-scale energy storage in net zero electricity systems	Ganzer C, Pratama YW, Mac Dowell N	2022	International Journal of Greenhouse Gas Control
[52]	M, P	Analysis of Long-Term Variable Renewable Energy Heavy Capacity Plans Including Electric Vehicle and Hydrogen Scenarios: Methodology and Illustrative Case Study for Turkey	Nikolakakis T, Broekman EB, Chattopadhyay DM, Merino AM	2023	IEEE Access
[53]	M, P	Modeling and design optimization of carbon-free hybrid energy systems with thermal and hydrogen storage	Bryan J, Meek A, Dana S, Islam Sakir MS, Wang H	2023	International Journal of Hydrogen Energy

P *Academically peer-reviewed*
M *Conducts modelling or simulation*
R *Review article/study or explains a phenomenon based on research (no modelling)*
T *Conference paper or other technical report or study*