

Technical, economic and environmental assessment of energy storage technologies via scenarios of penetration into Italian electric(power) grid

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Achieving net zero CO₂ emissions in the energy sector by 2050 requires a deep transformation of energy system, based on a massive integration of renewable energy sources and storage systems. The path through this energy transition can be represented by a multitude of possible scenarios, which may differ significantly in terms of possible penetration level of intermittent sources and therefore different techno-economic feasibility for batteries' development.

To accurately analyze these potential evolutions, appropriate methods and models are required. The present discussion addresses the ratio of model analysis in assessing the role of storage in future power systems, in particular with TIMES model. The methodology for a soft link between TIMES and electrical system dispatch model will also be presented, which allows a detailed exploration of various system scenarios.

Finally, special attention is given to the electrical module of TIMES-Italy for scenario processing, recently updated for a specific link with dispatching models (Saint).