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TulipaProfileFitting.jl: a Julia package for fitting renewable energy time series profiles

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Abstract-

This paper introduces the TulipaProfileFitting.jl package, a tool developed in Julia to generate renewable energy profiles that fit a given capacity factor of full load hours. It addresses the limitations of naive methods in adjusting existing profiles to match improved technology efficiency, particularly in scenarios lacking detailed weather data or technology specifications. By formulating the problem mathematically, the package provides a computationally efficient solution for creating realistic renewable energy profiles based on existing data. It ensures that the adjusted profiles realistically reflect the improvements in technology efficiency, making it an essential tool for energy modelers in analyzing future energy systems.

Index Terms- Renewable energy profiles; Capacity factors; Energy modeling; Availability profiles; Full load hours; Renewable source potential

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