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Abstract. This study examines the alignment between the European Union's climate policy rhetoric and the actual fossil fuel consumption behaviours of its Member States. By combining long-term and short-term time-series data with machine learning classification techniques, the analysis captures dynamic national energy trends and decarbonisation signals. Key innovations include the use of slope acceleration metrics and the identification of label reversals to detect volatility, acceleration, or stagnation in transition trajectories. This study concludes that ongoing empirical monitoring and targeted diagnostics are essential to prevent conflating symbolic commitments with material change, and provides practical insights for improving climate policy accountability and adaptability across the EU.

Keywords: EU climate governance; fossil fuel transition; machine learning; slope acceleration; energy consumption trends; policy implementation gap; label reversals; energy transition monitoring