



## Master Thesis

# Energy expenditure, economic growth and minimum EROI: An analysis for Germany

The relationship between energy use and economic growth has gained renewed attention as countries face rising energy prices, the ongoing energy transition and concerns about long-term economic resilience. Fizaine & Court (2016) show for the United States that economic systems display thresholds in energy expenditure beyond which growth becomes constrained. Their findings indicate that rising energy costs and declining energy-return-on-investment (EROI) can exert macroeconomic pressures on productivity and structural change. Complementary evidence from Lambert et al. (2014) links lower societal-level EROI to reduced living standards and economic constraints, underscoring the need to understand minimum EROI levels.

Germany provides a relevant case due to its industrial structure, import dependence and energy transition. This thesis should apply the framework of Fizaine & Court (2016) to German data to estimate energy expenditure shares, identify threshold effects and determine a minimum societal EROI for Germany.

## Key tasks and objectives of the thesis

- Review and summarize the methodological framework of Fizaine & Court (2016).
- Collect and prepare long-run German energy and macroeconomic data.
- Apply the empirical analysis to Germany, including energy expenditure and EROI indicators.
- Identify potential expenditure thresholds and assess their impact on German economic growth.
- Compare the results with the original study and discuss implications for Germany's energy transition.

## Your profile

- Student of economics with a strong interest in energy and sustainability topics
- Motivation to work with quantitative and empirical methods
- Ability to think analytically and conduct independent academic research

## Literature

- **Fizaine, F. and Court, V. (2016):** Energy expenditure, economic growth and the minimum EROI of society. *Energy Policy*, 95, pp. 172–186. <https://doi.org/10.1016/j.enpol.2016.04.039>
- **Lambert, J.G., Hall, C.A.S., Balogh, S., Gupta, A. and Arnold, M. (2014):** Energy, EROI and quality of life. *Energy Policy*, 64, pp. 153–167. <https://doi.org/10.1016/j.enpol.2013.07.001>

## Contact



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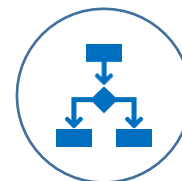
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## Topics



- Energy expenditure
- Economic growth
- EROI and energy transition

## Methods



- Literature review
- Empirical replication