Energy efficiency and demand-response in renewable energy systems

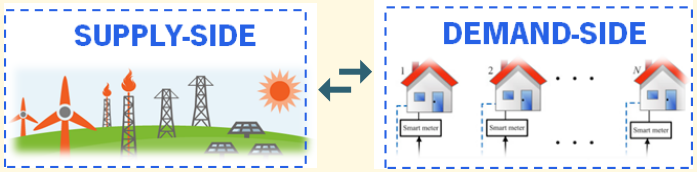
Highlights

- The analysis is focused on the Brazilian power system.
- Deferring capacity upgrades can be achieved through demand-response and energy efficiency implementation.
- Demand-response and energy efficiency seem to decrease the future natural gas capacity.
- Uncertainties related to future weather conditions might affect the cost-effective demand-response potential.
- The spot prices might significantly affect the optimal scenarios with demand-response.

Introduction

- Integration of **DEMAND-SIDE** resources

HIGHER FLEXIBILITY



RESEARCH QUESTION

What is the potential contribution of energy efficiency and demand-response in a renewable based energy system?

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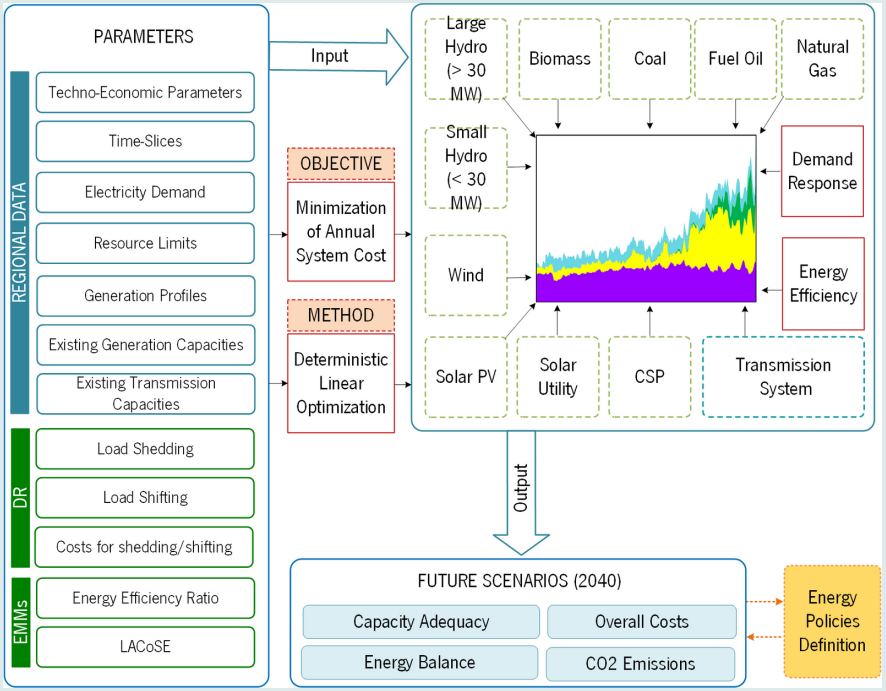
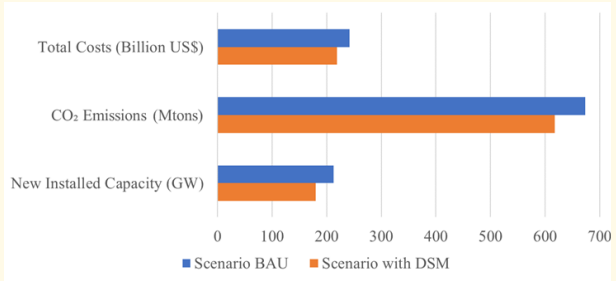
Methodology

- General methodological approach



Results and discussion

- Scenario with demand response and energy efficiency (DSM)



Total costs, CO2 emissions and new installed capacity

Small-Hydro	↓ 74%
Natural Gas	↓ 37%
Wind Power	↓ 17%
Run-of-river	↓ 14%
Nuclear	↓ 9%
Biomass	↓ 1%

Reduction of the installed capacity with demand response and energy efficiency

Conclusion & Outlook

1. The economic impacts of energy efficiency measures and demand-response when implemented together are positive;
2. Results may provide supportive information to governments and policy-makers.

FUTURE RESEARCH

- The use of new methodologies to evaluate overlapping effects between demand-response and energy efficiency.
- Inclusion of the externalities costs.

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