



A Dynamic Characterization of Energy Flexibility

Junker, Rune Grønberg; Relan, Rishi; Azar, Armin Ghasem; Lopes, R. A.; Madsen, Henrik

Published in:
Book of Abstracts, Sustain 2017

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Junker, R. G., Relan, R., Azar, A. G., Lopes, R. A., & Madsen, H. (2017). A Dynamic Characterization of Energy Flexibility. In Book of Abstracts, Sustain 2017 [S-2] Technical University of Denmark (DTU).

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



A Dynamic Characterization of Energy Flexibility

R. G. Junker^{*1}, R. Relan¹, A. G. Azar¹, R. A. Lopes², H. Madsen¹

1: Technical University of Denmark, DTU Compute

2: Faculdade de Ciências e Tecnologia / Universidade Nova de Lisboa

*Corresponding author email: rung@dtu.dk

The large penetration rate of renewable energy sources leads to potential challenges in controlling the energy production. This necessitates moving from a paradigm of supply control to demand control for buildings and districts. To do so, a formal and robust characterization for the energy flexibility on the demand side is needed. The most common way to characterize the energy flexibility is by considering it as a static function at every time instant. The validity of this approach is questionable because energy based systems are never at steady-state. To account for this, we characterize the energy flexibility as a dynamic function. The dynamic characterization of energy flexibility allows a natural quantification of flexibility and enables the demand control through penalty signals (e.g. price, CO₂ etc.). Here, a test case study of indoor swimming pools is presented to show the advantages of characterizing the flexibility as a dynamic function over the static description.