

Transition towards a renewable European electricity system

Citation for published version (APA):

Falcan, I. E. (2021). *Transition towards a renewable European electricity system*. [Doctoral Thesis, Maastricht University]. ProefschriftMaken. <https://doi.org/10.26481/dis.20210831if>

Document status and date:

Published: 01/01/2021

DOI:

[10.26481/dis.20210831if](https://doi.org/10.26481/dis.20210831if)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

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 the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Propositions Accompanying the Dissertation

Transition Towards a Renewable European Electricity System

What are the Implications for the Power Technology Mix,
Pan-European Power Trade and the Electricity Market?

By Iulia Falcan

1. The electricity and heat sector is the largest contributor to greenhouse gas emissions. At the same time, it benefits from the most mature clean energy technologies, which may support its relatively rapid transition towards a low-carbon alternative.
2. Due to the wide variation in weather patterns across Europe, relying on unrestricted power trade can reduce by almost half the total system cost of an entirely renewable European power system, compared to a case of autarky. (Thesis, Chapter 2)
3. Most of the cost reduction associated with a pan-European power system occurs in the early stages of the integration of different power systems. (Thesis, Chapter 2)
4. In a cost-optimal, pan-European electricity system, most of the installed capacity of wind and solar power generation technologies are located in only just a few countries. (Thesis, Chapter 2)
5. An increasing share of wind power in the electricity mix is associated with a decrease in day-ahead electricity prices. (Thesis, Chapter 3)
6. The volatility of wholesale electricity prices increases, as the share of wind power in the electricity mix increases. Furthermore, the magnitude of this effect increases, with a growing share of wind power in the electricity mix. (Thesis, Chapter 3)
7. The downward effect of electricity from renewable power technologies on domestic prices spills over to the prices of neighboring countries, only in the presence of a sufficiently well-developed cross-border electricity interconnector. In the opposite case, the uptake of renewable energy in one country may lead to increased price divergence. (Thesis, Chapter 4)
8. At the EU level, the two separate goals of an Energy Union – whereby electricity flows unrestricted and consumer welfare is increased - and increased share of renewable energy, have historically been addressed separately. A coordinated approach would greatly benefit both. (Thesis, Chapter 4)