

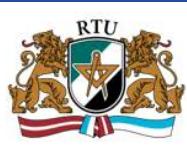


Flex4RES

Flexible Nordic Energy Systems

Flex4RES publications

2015 - 2019



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Nordic Energy
Research

Flex4RES project summary

The Flex4RES project investigated how an intensified interaction between coupled energy markets supported by coherent regulatory frameworks can facilitate the integration of high shares of variable renewable energy (VRE) into Nordic-Baltic energy systems ensuring stability, sustainability, and cost-efficiency.

Through a holistic system approach based on coupled energy markets, the potential costs and benefits of achieving flexibility in the Nordic-Baltic electricity market from the heat, gas and transport sectors, as well as through electricity transmission and generation were identified. Flex4RES developed and applied a multidisciplinary research strategy that combined the technical analysis of flexibility needs and potentials; the economic analysis of markets and regulatory frameworks; and the modelling of energy systems, which quantifies impacts.

Flex4RES identified transition pathways to sustainable Nordic energy systems through the development of coherent regulatory frameworks and market designs that facilitate market interactions which are optimal for the Nordic-Baltic conditions in an EU context. Flex4RES will comprehensively discuss and disseminate the recommended pathways and market designs for achieving a future sustainable Nordic-Baltic energy solution with a variety of stakeholders from government, industry and civil society.

WHY: To ensure that a future decarbonised energy system is possible, in line with climate concerns, national decarbonisation targets, and the UN SDGs.

HOW: By increasing flexibility to accommodate the needs of a decarbonised system with high shares of variable renewable energy.

WHAT: Identifying and assessing regulatory and technical pathways towards coherent Nordic energy systems.

More information regarding the Flex4Res project can be found at www.Flex4RES.org or by contacting project manager Klaus Skytte at klsk@dtu.dk

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Flex4RES
Flexible Nordic Energy Systems

Flex4RES publication report, August 2019

Flexible Nordic Energy Systems

Flex4RES publications

Within Flex4RES the following papers/documentations are available:

- 33 published journal articles and book chapters,**
- 22 peer reviewed, published conference papers,**
- 11 reports,**
- 15 forthcoming journal articles under review**

on subjects related to the transition to flexible, decarbonised energy systems based increasingly on variable renewables. If you do not have direct access to the articles, please do not hesitate to contact the authors that would be pleased to send you a copy.

Reports

- K. Skytte, C. Bergaentzlé, F. Fausto, P.A. Gunkel, ***Flexible Nordic Energy Systems. Summary Report***, 2019. 120 p. Nordic Energy Research, <https://www.nordicenergy.org/article/act-fast-and-nordic-while-paving-the-way-for-carbon-neutrality/> ISBN: 978-87-93458-65-9
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- S. Bolwig *et al.*, **Transition pathways to a flexible and carbon-neutral energy system in the Nordic-Baltic region: Coupling techno-economic modelling and socio-technical analyses**, *Submitted for publication*.
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- J. Jasiūnas, J. Mikkola, P.D. Lund, **Review on energy system resilience**. *Submitted for publication*.
- J. G. Kirkerud, N. O. Nagel, and T. F. Bolkesjø, **The role of demand response in the future renewable Northern European energy system**, *Submitted for publication*.
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- P. D. Lund, V. Arabzadeh, J. Mikkola, and J. Jasiunas, **Deep decarbonization of urban energy systems through renewable energy and sector-coupling flexibility strategies**, *Submitted for publication*.
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Podcasts (<https://www.nordicenergy.org/flagship/flex4res/flex4res-podcasts/>)

Energy Policycast, Flex4RES results disseminated in a straightforward (and geeky) way. With host D. M. Sneum. Available: <https://energypolicycast.podbean.com/> or <https://www.nordicenergy.org/flagship/flex4res/flex4res-podcasts/>

Available episodes:

- F. Fausto, D.M. Sneum, **Power Purchase Agreements - Good for the energy system – and for old ladies.**
- P. Lund, D.M. Sneum, **Policies for flexibility: A Flex4RES perspective. What have violins to do with flexibility and sector coupling?**
- K. Skytte, D.M. Sneum, **The future Nordic energy system. Water as storage and flexibility provider - flushing batteries away.**

Other dissemination metrics

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Vimeo: <https://vimeo.com/user99822174>

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Hopefully, you or your colleagues can use some part of it for future work or references



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