Eine Zukunftsaufgabe in guten Händen

Bundesamt für Naturschutz

Renewable energy sources and landscape transformation: challenges from a nature conservation perspective

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Background on nature conservation

§ 1 Federal Nature Conservation Act (BNatSchG) → Purposes of nature conservation and landscape management:

Biodiversity	**Performance and functioning of the natural balance**	**Diversity, characteristic features and beauty of nature and landscape + their recreational value**


Gesetz über Naturschutz und Landschaftspflege
(Bundesnaturschutzgesetz - BNatSchG)

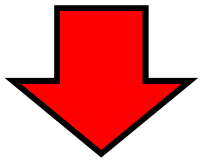
25 YEARS Convention on Biological Diversity
SAFEGUARDING LIFE ON EARTH

Source: https://www.cbd.int/

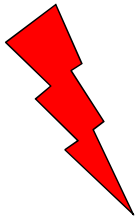
Age of renewable energies - technological development

Worldwide promotion of RES, climate change mitigation

Efficiency gains + cost reductions



- Strong increase in plant installations (biomass, wind, photovoltaics) especially in Germany



➢ Implications to several concerns of nature and landscape conservation

Age of renewable energies - landscape changes

- RES have a comparably high land demand (low energy density).
  - ➢ Land use and associated effects are crucial!
- Germany is a highly populated country with very restricted (land) ressources.
- The main RES (electricity) in Germany are wind power bioenergy and photovoltaics (PV).

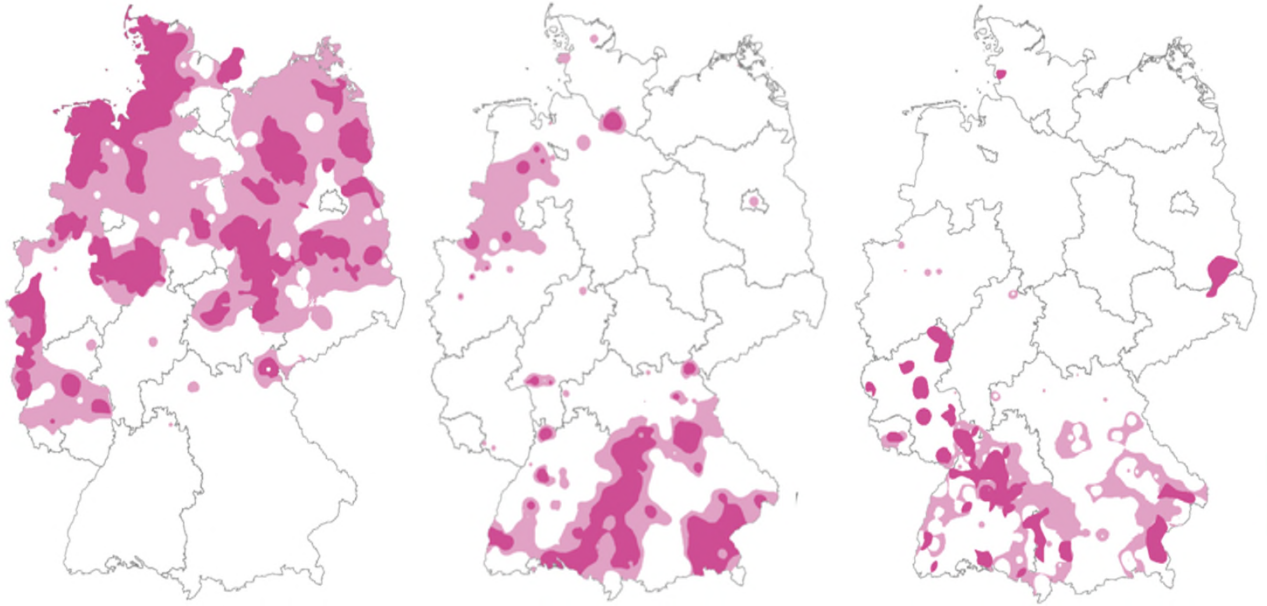


➢ Within 1996 to 2016 measurable landscape changes occurred.

Pictures: © U. Hauke and K. Ammermann

Age of renewable energies - landscape changes

- Landscapes with high and very high RES induced landscape changes (Schmidt et al. 2016):



Wind Biomass PV

Source: Schmidt et al. (2016)

Source: Schmidt et al. (2016): Monitoring Kulturlandschaft Deutschland ; Pictures: © U. Hauke and K. Ammermann

Age of renewable energies - future development

- There are numerous scenarios to 2030 and 2050 with very different technology preference depending on the assumptions.

- With respect to the German RES expansion targets an increase of plants and impacts on nature conservation and landscapes will likely occur!

- Technical infrastructures → degradation or interference with the landscape
- Risk of loosing characteristic landscapes or adversely affecting them.

Effects on nature and landscape

Changes in landscapes and landscape perception:

- Land and landscape - important ressource with different interests
- Landscape perception is very individual and subjective.
- Human induced, dynamic transformation of esp. historic cultural landscapes

→ Changes in familiar scenery and „home“
→ Invasion into the „private environment“
→ Aesthetic quality and value

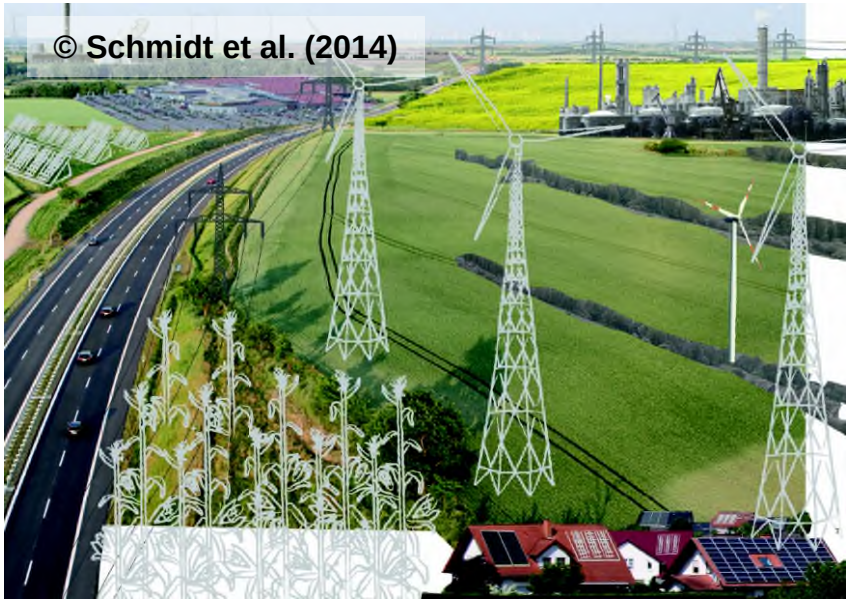
Challenges:

- Preserve (historical) landscapes,
- Consider individual concerns,
- Actively organize the transformation

Picture: Schmidt et al. (2014): Den Landschaftswandel gestalten! Band 1

Effects on nature and landscape

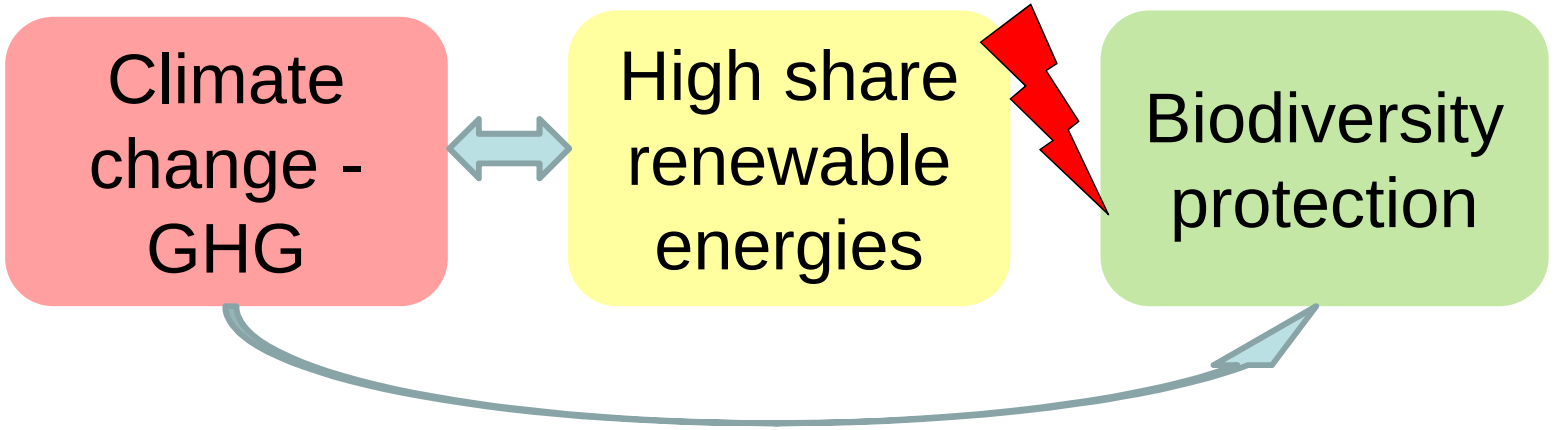
- Impacts on different species and habitats!
- Within planning and approval procedures effects on nature conservation are addressed but need to be further improved.



- ➢ Holistic and transdisciplinary approaches for the consideration of nature and landscape on different levels and scales are needed.

Pictures: Schmidt et al. (2014): Den Landschaftswandel gestalten! Band 1; © N. Köcher

Research and development



- Three main questions that need to be answered and addressed from a nature and landscape conservation point of view:

1. How can the effects of RES on nature and landscape be measured and monitored?
2. What are the future trends and areas that will probably be occupied?
3. Which protection or steering measures need to be taken?

Research and development

- Key topics:

- ENERGY LANDSCAPE
- NATURAL ENVIRONMENTS AND HABITATS
- SPECIES PROTECTION
- METHODS AND MANAGEMENT APPROACHES
- RECORDING AND MONITORING

→ BfN priority research: "Nature conservation and renewable energies"

Source: https://www.natur-und-erneuerbare.de/

Summary

- Dynamic growth of RES in densely populated Germany led to conflicts with nature conservation and landscape transformation.
- Nature and landscape conservation issues need to be early communicated and addressed within the political framework, governance and financial funding.
- The reduction in energy consumption is of great importance.
- R+D already addresses nature conservation and landscape aspects, but further research is needed because of the complex system, lack of data and knowledge gaps.
- Results need to be translated into practicable concepts for steering and planning.

Bundesamt für Naturschutz

Thank you!

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