Environmental impacts and planning implications of wind park development

Oskars Beikulis

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Impacts of wind energy development on environment

There are many myths related to the impacts of wind turbines:

- Vibrating lips, heart attack, infertility (humans);
- Reduced wool quality (sheep)
- Aggression (dogs, cows);
- Extinction of soil micro-organisms;
- Impact on water quality.

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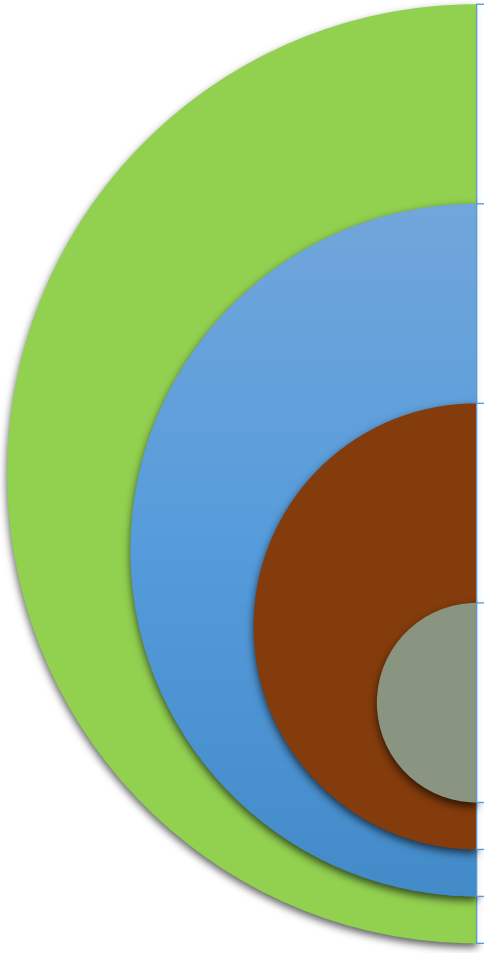
The most important impacts related to the wind power development!



Nature	• **Birds** • **Bats** • **Habitats** • **Mammals**
Human health	• **Noise** • **Low frequency noise** • **Flickering**
Safety & Communication systems	• **Ice throw** • Radar systems • Communication networks
Visual	• **Landscapes** • **Cultural heritage** • **Recreational areas**

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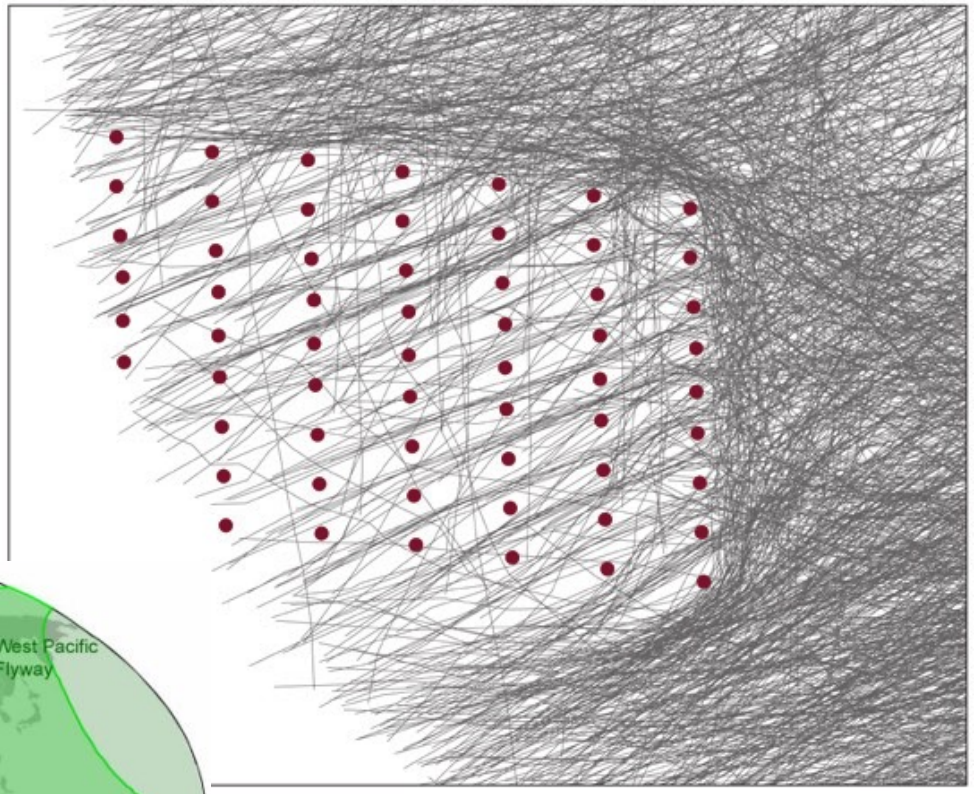
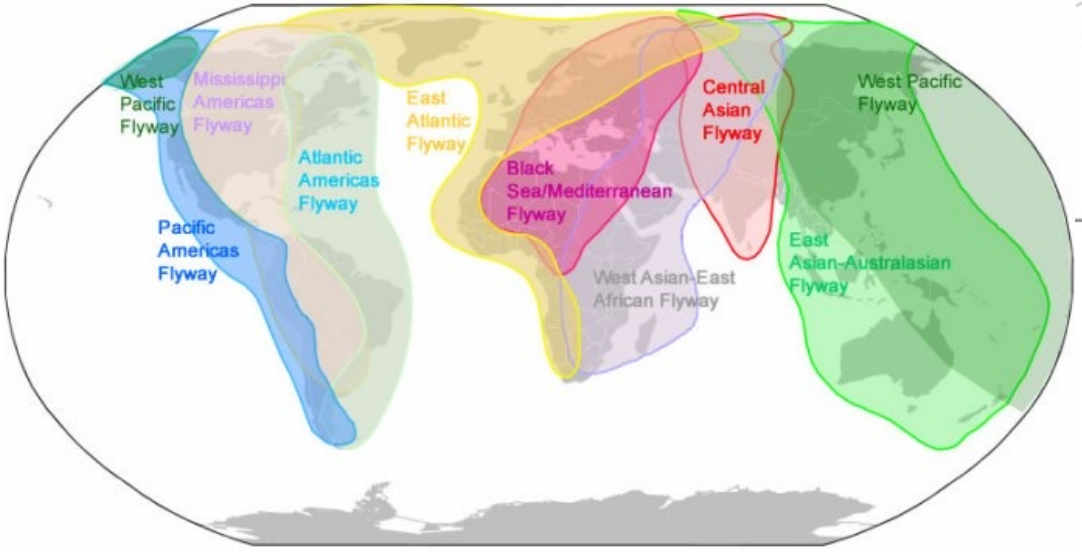
Impact on birds: *migratory birds*

- Collision risk
- Habitat loss
- Displacement of migration routes





Fox, A. & Petersen, Ib. (2019). Offshore wind farms and their effects on birds.

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Impact on birds:
local bird populations

- Collision risk
- Habitat loss

The most affected areas are mountainous areas and wetlands

The most affected species are birds of prey

It is important to know not only where the birds' nests are, but also where their feeding areas are!!

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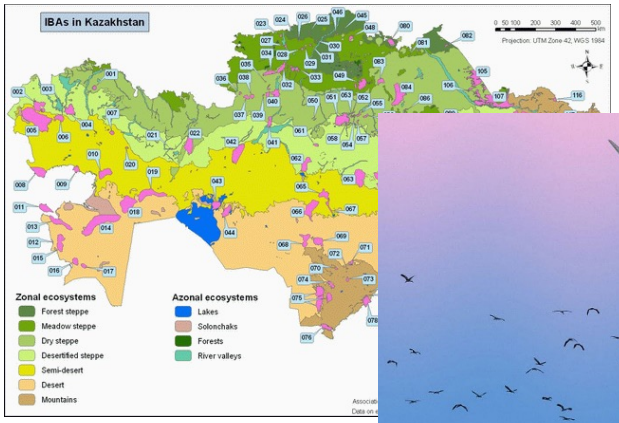
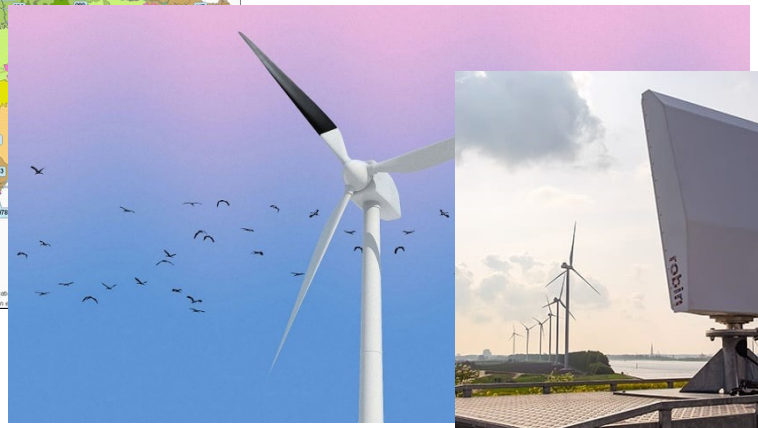
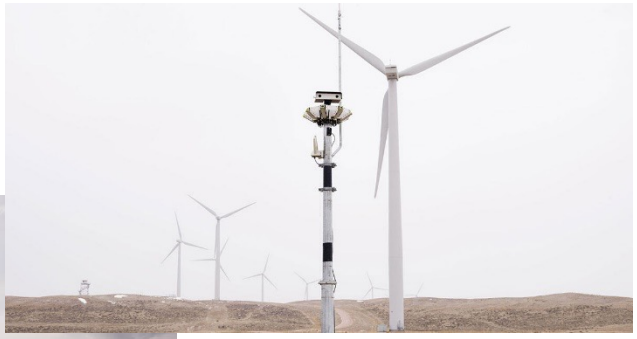
Impact on birds: *mitigation strategies*

1. Avoidance of the most important areas for birds;
2. Land use planning - making certain areas unattractive or attractive to birds;
3. Repelling birds or on-demand shutdown







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Impact on bats

- Collision risk (local and migratory species)
- Habitat loss (local species)

<u>Mitigation strategies:</u>

Avoidance of high concentration areas (wetlands);

On-demand shutdown of wind turbines (specific meteorological conditions).

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Impact on mammals

There are some evidence that large mammals are avoiding wind farm areas during migration.

The amount of research is not sufficient to call this a significant risk, but it would be desirable to carry out post-construction monitoring.

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Impact on habitats and rare plant species

The real impact area of the wind farm is significantly larger than the construction sites of the wind turbines.

The main threats to valuable habitats and rare plant species are the construction of related infrastructure - road network, power transmission lines.

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Impact on human health

The wind farms are considered as important noise sources, but it is sufficient to move the wind farm 500-600 m away from residential areas. At this distance noise level will be lower than recommended threshold of WHO.

Flickering is not considered as health effect, but many countries have set a limit value to reduce disturbance

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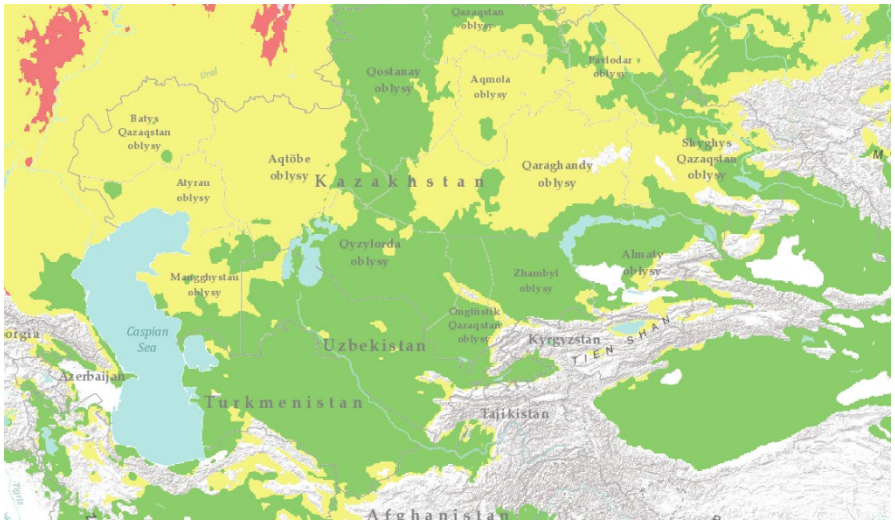
Ice throw

Icing wind turbines can pose a serious threat to human safety. In the areas with higher icing risk wind turbines should be placed away from major roads or equipped with ice detection and de-icing systems



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Impact on landscapes

Wind farms cause landscape changes in large areas around them.

Although these changes could be seen as typical of the 21st century, it would be desirable to avoid placing stations in aesthetically high-value landscapes.

In the planning process, it would be desirable to create visualizations to identify the expected impact before building the wind farm.

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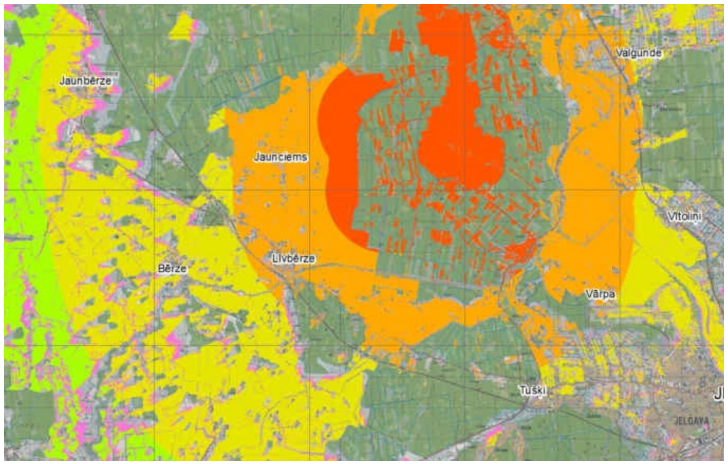
Visualisations of wind farms

It is hard to imagine how a wind farm with 250 m high wind turbines will look like. Especially for those people who have not seen wind turbines of similar size.

At present, it is possible to create visualizations of the planned wind farms before they are built and to determine the impact areas of wind power plants.



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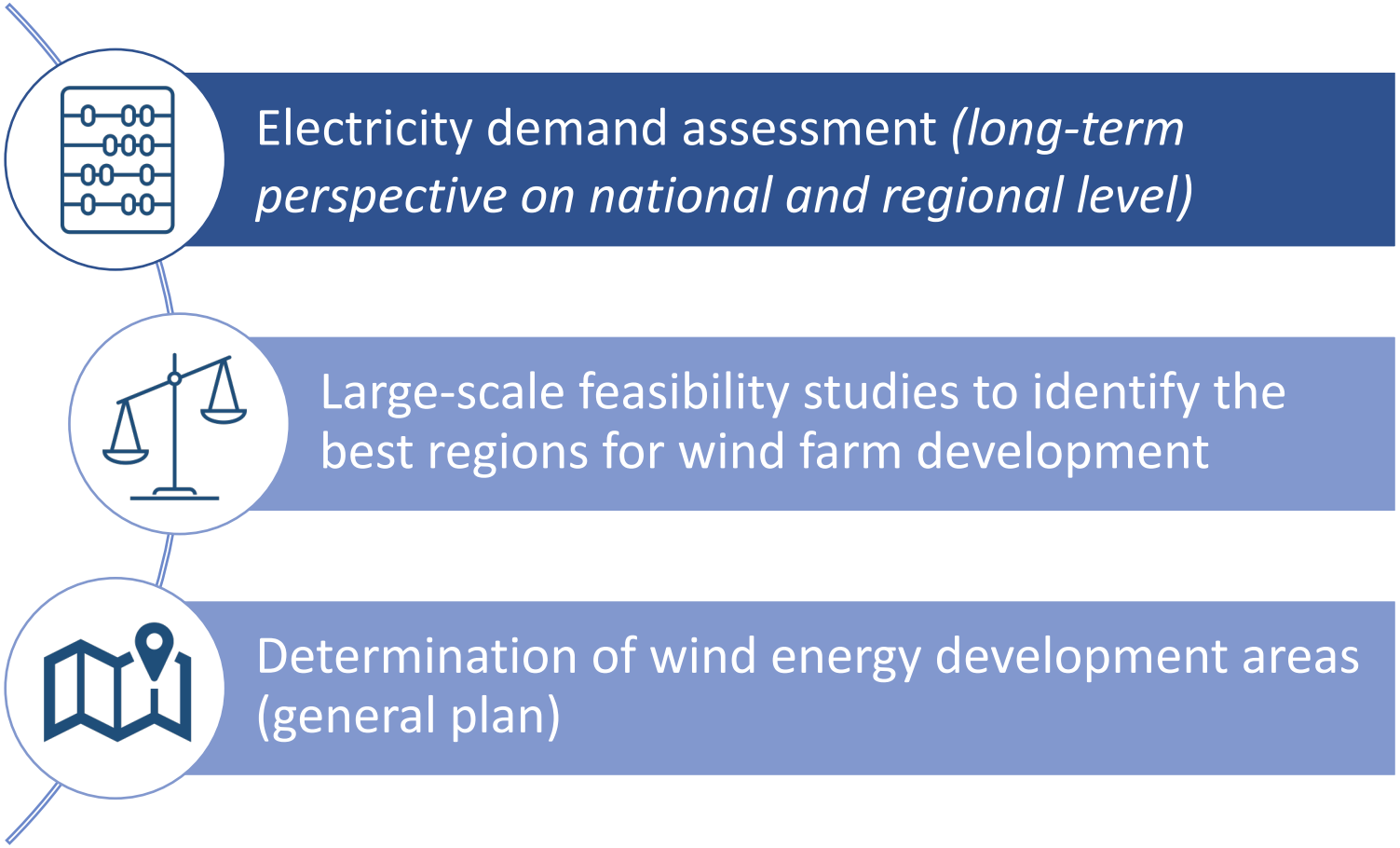
Good practice - wind farm planning



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Good practice - wind farm planning

Detailed evaluation of the development area.
Environmental impact assessment, planning of mitigation and compensatory measures.

Technical design and construction process

Post-construction monitoring. Adjustment of mitigation and compensatory measures

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Thank you!

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