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# Solar power projects on former peat extraction areas

Ecological and land-use considerations

Baltic Peat Producer's Forum  
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# WHY IS THIS SUBJECT TOPICAL?

- Many peat production areas have already transitioned, or are now transitioning, to new forms of land use.
- The Corona pandemic and Russia's invasion of Ukraine led to an energy crisis in Europe. Electricity has been less available, and it has been sometimes expensive.
- At the national level, there is a lot of talk about energy self-sufficiency and required investments in energy production.
- EU-level climate policy works as a guiding factor in the background. Investments in clean energy are highly desired.
- This creates a need for clean energy solutions that are economically viable and socially acceptable.

**Solar power on former peat production areas is one potential solution.**

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**Experience:** 13 years in wind and 5 years in solar development.

# NEOVA'S SOLAR AND WIND DEVELOPMENT

## Strategy

- Developing solar and wind projects on suitable former peat production areas.
- Managing project development until the Ready-to-Build stage.
- Remaining the landowner and lessor of Neova-owned sites.
- Generating income from project sales and long-term land leases.

## The significance of peat areas in the projects

- Extensive land ownership enables large-scale project development.
- Solar development focuses particularly on Neova's former peat production areas.
- These sites can also provide a foundation for larger wind power projects.



# NEOVA'S SOLAR AND WIND POWER PROJECTS

## Key figures

- Wind power in permitting: approximately 1 000 MW
- Solar power in permitting: approximately 1 500 MW
- Ready-to-Build solar projects: approximately 100 MW

**Partnership with the Swedish energy company Rabbalshede Kraft AB covering nine projects.**

**Several other projects in the early stages of planning.**

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# SUITABILITY FOR SOLAR POWER

## Peat production areas:

- Large, open and flat areas. No need for tree felling and no shading to solar panels.
- Nature values are generally low due to peat production activity.
- Sensitive receptors, such as residential areas, are usually not too close.
- Existing good road infrastructure from the peat production phase.
- Water management systems for peat production also serve the needs of solar power.

**As previously modified land, former peat production areas offer clear advantages for solar development.**



# AREA CLASSIFICATION

**There is variation between sites:**

- Thickness of the peat layer.
- Subsoil type and layer thickness.
- Water conditions and possibilities of water management.
- Nature values (moor frogs, birds, etc.).
- Proximity of high-voltage grid and possibility to connect the project.
- Geographical variation in the amount of solar radiation.

**Location-specific suitability assessment is extremely important.**

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# PERMITTING ENVIRONMENT

Solar projects are still relatively new, especially if located on former peat production areas.

- Typically no clear policy on permitting requirements, as national practices are still evolving.

Adverse effects are however mostly minor.

- Landscape impacts are generally local and site-specific.
- Operational noise impacts are typically limited.
- Bird impacts can usually be managed through appropriate siting and design.
- Water impacts require site-specific planning and mitigation.

**Unclear regulation is a significant risk. Need to be prepared for changes and delays.**



# SOLAR CONSTRUCTION

- 1 MWac of solar capacity requires approximately 1.2-1.5 hectares of suitable area.
- Selecting the appropriate foundation method is critical on peatland.
  - Typical foundation options include screw piles, driven piles and various floating systems.
  - Piling is most cost-effective, but it requires sufficient load-bearing subsoil.
- A solar power plant typically has an operational life of more than 30 years. Foundations must therefore remain durable under demanding ground and frost conditions.

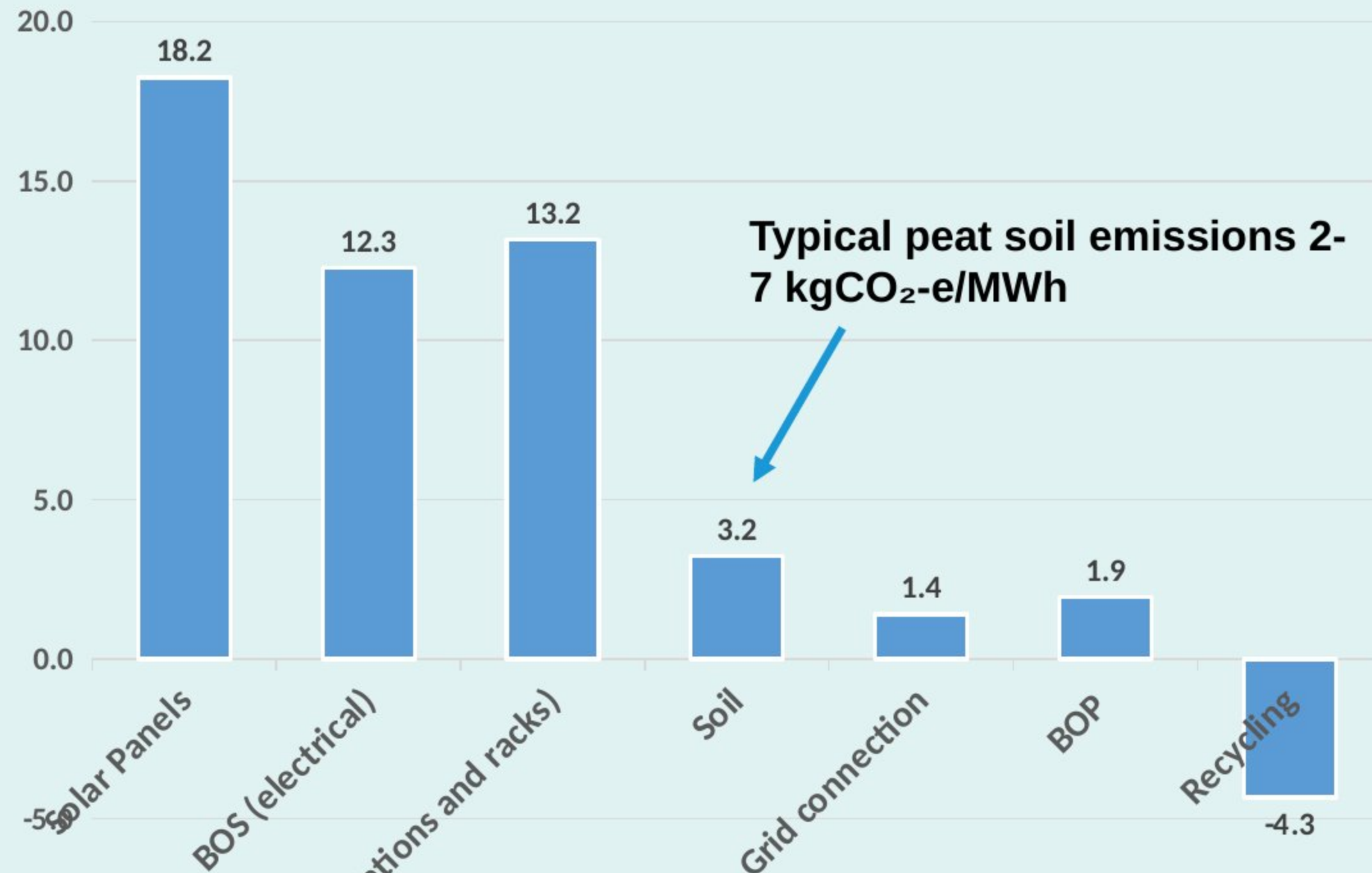
**Knowledge of peatlands is a clear competitive advantage for solar project developers.**

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## Life-cycle emission factors of an example Solar PV plant on peatland (kgCO<sub>2</sub>-e/MWh)

Total life-cycle emissions 45,9 kgCO<sub>2</sub>-e/MWh\*



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\*Results calculated using Neova's internal life-cycle assessment model.

## CARBON BALANCE

- Solar panels, electrical components and steel structures are the biggest factor in carbon emissions.
- Ways to reduce soil emissions:
  - Raising the water level
  - Surface vegetation
- Differences in ground elevation can prevent rewetting.
- Possible rewetting must be integrated into foundation and electrical design.

**Peat soil emissions matter, but the largest carbon impacts come from materials and structures.**



# WATER MANAGEMENT

- Impacts on runoff water occur mainly during the construction and decommissioning phases.
- During the operational phase, which typically lasts more than 30 years, waterborne loads are generally minor.
- Existing water protection structures from peat production can often be utilized in solar projects.
- In Finland, authorities often apply the precautionary principle because practical experience with peatland solar construction remains limited.
- More empirical information will be gained, as some solar projects have already been built in Finland on former peat production areas.

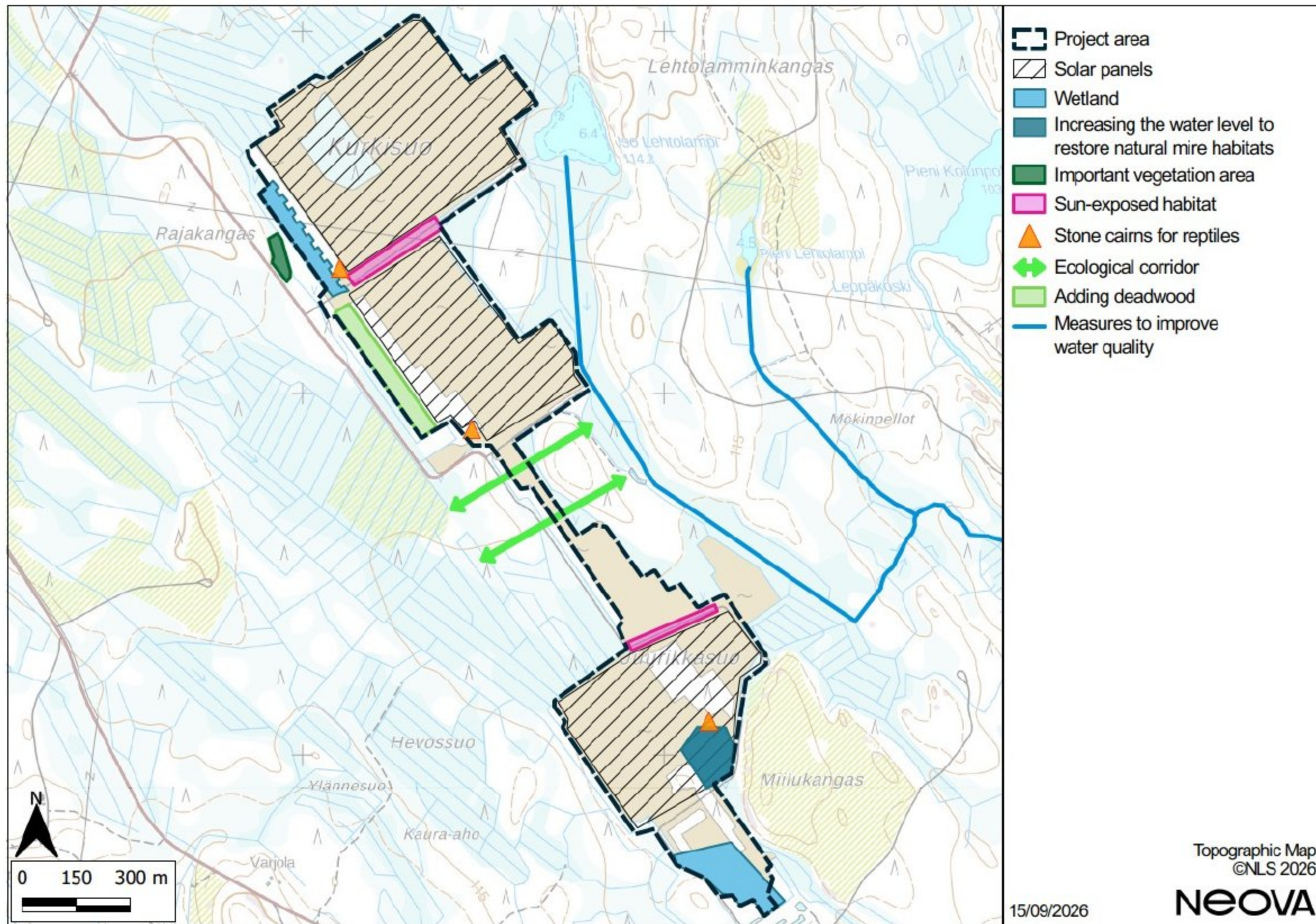
**Water regulation may vary between countries.  
Early discussion with authorities is recommended.**

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# BIODIVERSITY IN SOLAR FARMS

## Example biodiversity plan



- Former peat production areas often have limited existing biodiversity values, creating opportunities for ecological enhancement.
- Only part of the available area is typically needed for solar infrastructure.
- The remaining areas can be used for targeted biodiversity measures.
- Conditions differ if vegetation and young trees have already become established.

**Biodiversity enhancement can be integrated into solar project planning, particularly outside the panel areas.**



# NEOVA'S APPROACH TO SUSTAINABILITY PLANNING

- Identifying the potential impacts on nature.
- Applying the mitigation hierarchy: avoidance, mitigation and restoration.
- Identifying voluntary biodiversity enhancement measures.
- Collaborating with landowners, hunting clubs, authorities and other stakeholders to identify local natural values and target biodiversity measures.
- Prioritizing measures within or near the project area.
- Monitoring and reporting throughout the project life cycle.

## Examples of possible measures to improve nature and biodiversity:

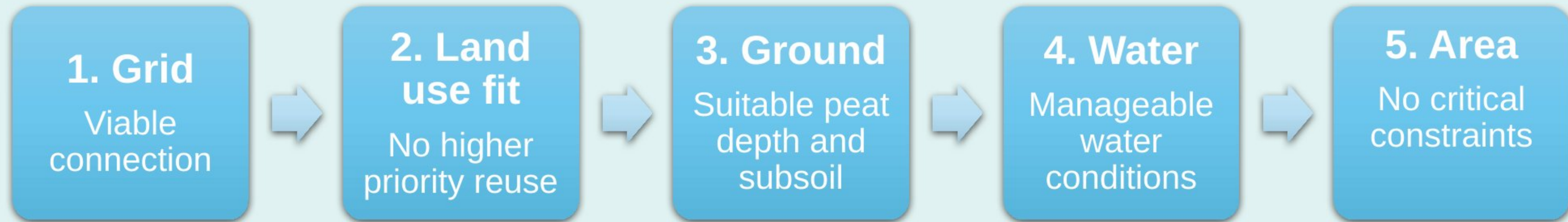
- Improving existing wetlands
- Creating new wetlands
- Controlling invasive species
- Creating sun-exposed environments
- Restoration of streams
- Creating new habitats for moor frogs
- Adding decaying wood
- Building stone cairns for reptiles

# LANDOWNER PERSPECTIVE

A landowner can choose between two different approaches:

|             | Leasing the site to a solar power project developer                                                                                                                                                                                                                                      | Developing a solar power project independently                                                                                                                                                                                       |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pros</b> | <ul style="list-style-type: none"><li>• Simple and easy solution. No project development expertise or project financing required.</li><li>• A low-risk option.</li></ul>                                                                                                                 | <ul style="list-style-type: none"><li>• The landowner retains greater control over project development and design.</li><li>• Potential to maximize total returns. Income from the sale of project rights and lease income.</li></ul> |
| <b>Cons</b> | <ul style="list-style-type: none"><li>• Less opportunity to influence how the project progresses and is implemented.</li><li>• Lower potential return, with income starting typically at beginning of construction, although development-phase payments may also be available.</li></ul> | <ul style="list-style-type: none"><li>• Requires project development expertise, resources and funding.</li><li>• Higher risk profile.</li></ul>                                                                                      |

# WHEN IS SOLAR A GOOD NEXT USE FOR A PEAT PRODUCTION AREA?



**When these conditions are met, former peat production areas can offer suitable sites for responsible solar development.**

**Success requires local knowledge, early authority dialogue and integrated technical and environmental planning.**

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