A biodiversity-friendly Energy Transition for Austria

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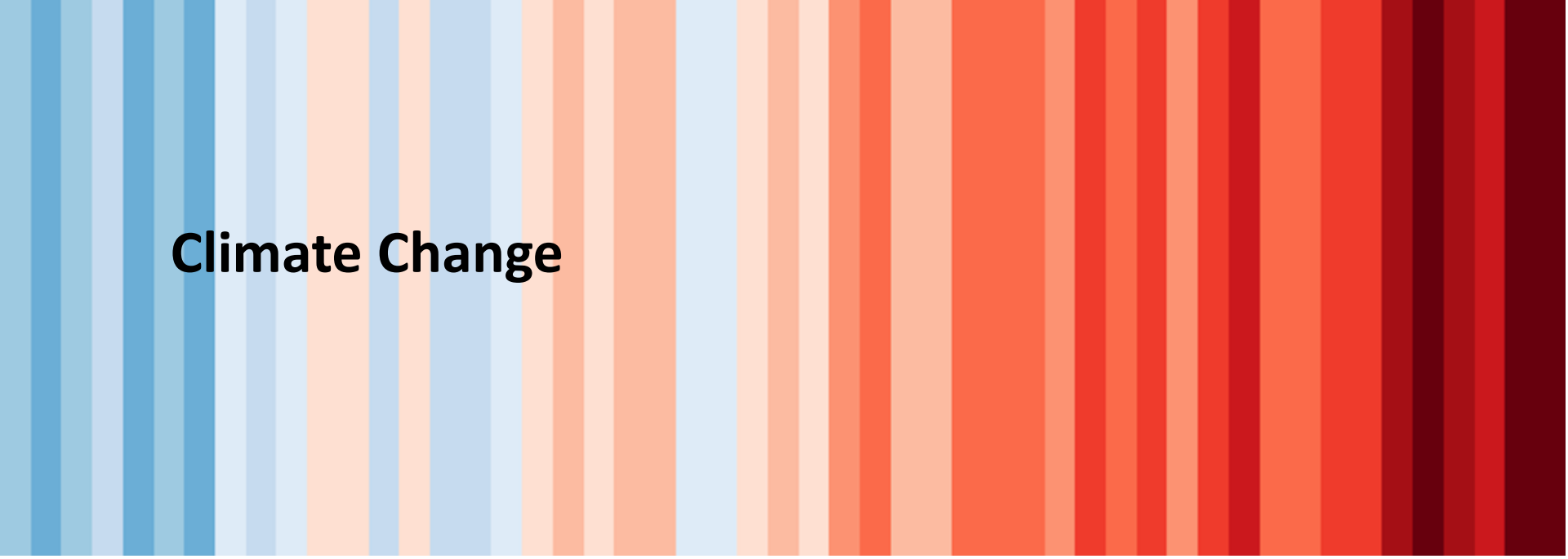
What`s Energy Transition got to do with Biodiversity?

- Ambitious **climate, energy and biodiversity targets** (climate neutrality, expansion of renewable energies, simultaneously reverse biodiversity decline)
- **Main drivers** for biodiversity loss: intensive land use, habitat fragmentation and loss
- Expansion of renewable energies further exacerbates existing land use pressures
- **Energy transition MUST create synergies between energy-, biodiversity- and climate objectives**



Biodiversitystripes.info

Environmental Change & Crisis

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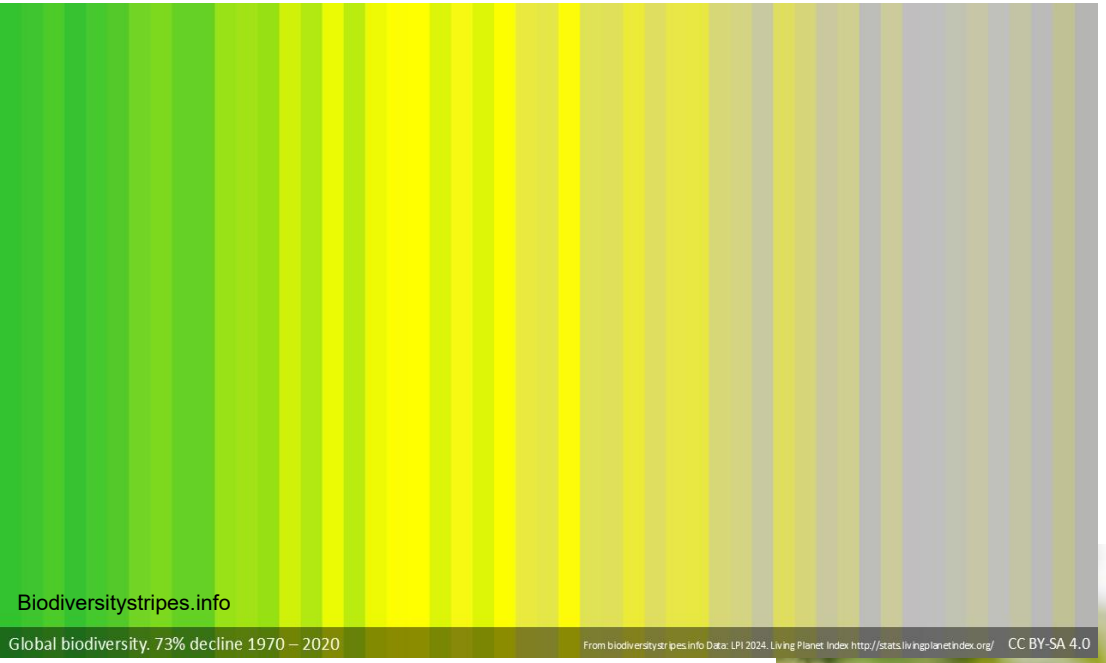
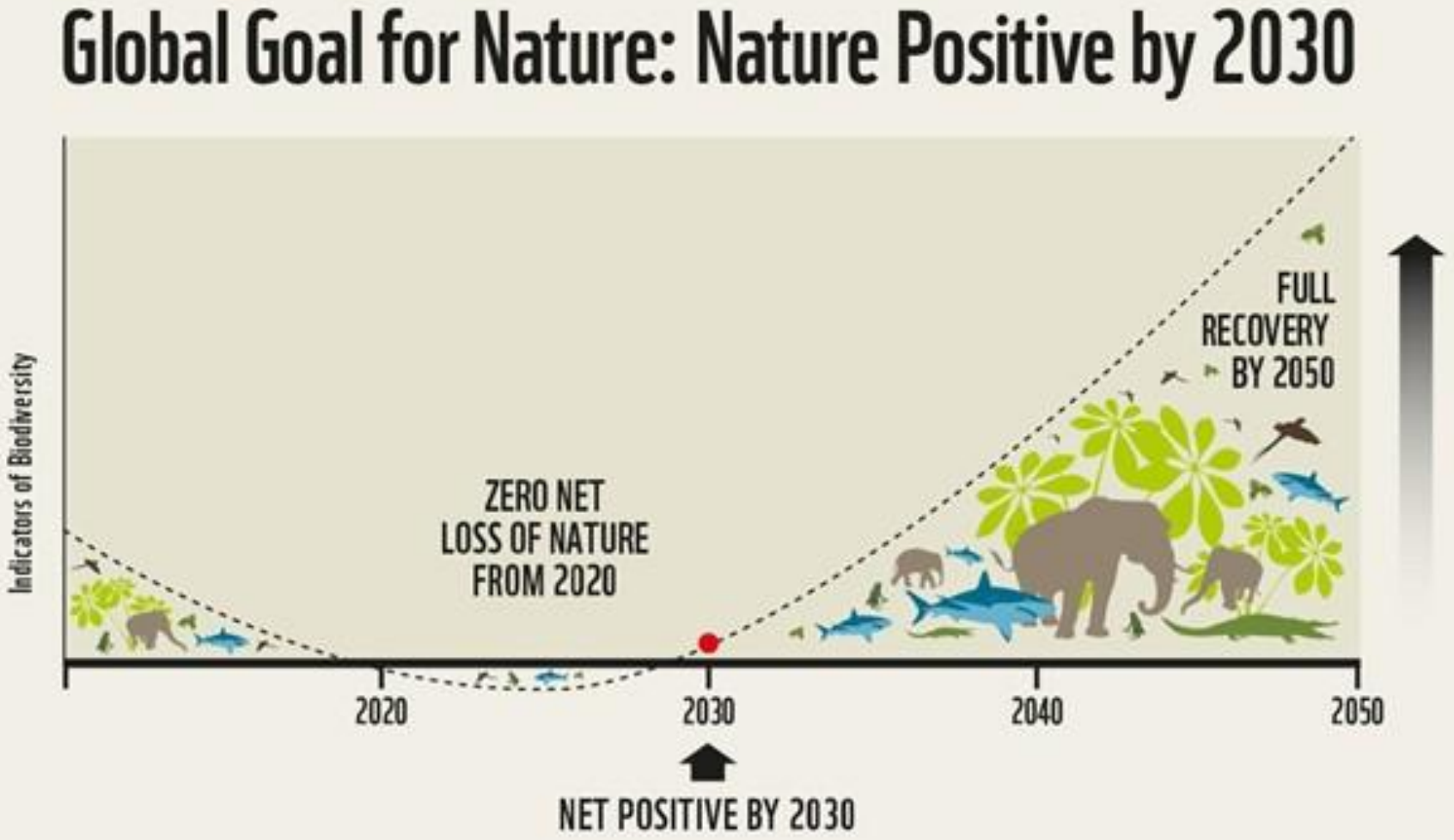


Biodiversity decline also still in Austria

Bombus alpinus – a threatened high-elevation bumble bee and pollinator

Picture: W Wallner

Stop Decline & Recovery



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Biodiversity
Why does it matter - in a nutshell?

- ***Foundation of our very existence***
- ***Foundation for > 10 M other species of plants, animals, fungi, microbes***
- Essential **ecosystem services** - food, clean water, pollination, soil fertility, recreation, regulation of climate, functioning water balance, mitigation of extreme weather events
- Natural **carbon sinks** (woodland, forests moors, grasslands, soils)

➢ **Loss of biodiversity poses a long-term threat to human health, food security and any future modern economy**

Biodiversity Commitments (Austria, EU & global CBD)

Energy type	Ecosystems affected	Biodiversity commitments	Relevance for Austria
Wind power	Alpine ridges, forests, bird & bat habitats	**≥ 30 % protected land; ≥ 10 % strict protection; no further deterioration**	High conflict risk in mountains and protected landscapes
Open space Photovoltaics	Grasslands, farmland, open landscapes	Protect value of farmland; **restore ≥ 30 % degraded ecosystems**	Large PV systems increase biodiversity conflicts on grasslands
Hydropower (new & expanded)	Rivers, floodplains, freshwater habitats	River restoration; **good ecological status (WFD)**	New ecosystem barriers, conflicts with restoration goals
Bioenergy	All, Forests and cultural landscapes	**Forests & agricultural ecosystems:** Increase trend for biodiversity indicators	Increased land use pressures on agricultural lands and forests
Other renewable energy infrastructure	All ecosystems & habitat connectivity	Avoid net biodiversity loss; **maintain ecosystem integrity & connectivity**	Increased sealing and land consumption

Conflicting Objectives
All deserve high priority!

It is the job of scientists and planners to find solutions – **This is what we will present:**

- **Literature research**: Analysis of the impact of renewable energies on biodiversity
- Identification of **trade-offs** and synergies between energy-, climate- and biodiversity goals Austria has committed to
- **Expert assessment**: Evaluation of various renewable energy sources and technologies
- **Practical recommendations for a biodiversity-friendly energy transition**

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Photovoltaics - Chances and Risks

- Main potentials for Austria: **Open space PV**
- Biodiversity effects strongly **depend on location, implementation and site-management**
- Barrier effects (like “fences”), disturbances and habitat loss is possible
- On ecologically degraded land: potential for ecological enhancement
- Promotion of insects, small mammals and ground-nesting birds with site adapted management measures
- On species-rich habitats: usually significant loss of biodiversity

Recommendations for Open-Space PV

- **Prioritisation** of **roof areas, sealed and degraded areas**
- Exclusion of moors, high value grassland (wet meadows, rough pastures), high-quality fallow land
- Binding **minimum ecological standards for open-space PV** (like extensive grassland between panels, flower strips, structurally rich vegetation, wildlife friendly fencing,…)
- Additional **site-specific environmental planning**
- Ongoing research, monitoring & evaluation

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Wind Power - Strategic Planning is needed and will be successful

- Collision **risks for birds and bats**
- Habitat loss, avoidance behaviour, disturbances
- Barrier effects along migration routes
- Cumulative effects of multiple turbines in a region
- Infrastructure also contributes to fragmentation
- On ecologically degraded land with integrated environmental planning: potential for ecological enhancement

Recommendations for Wind Power

- **Exclusion of sensitive areas** (protected areas, migration routes, breeding areas)
- Standardised, technically sound site assessment
- **Safety distances** from sensitive species and habitats
- **Demand-oriented shutdowns**, monitoring and optimisation
- Regional overall assessment to avoid **cumulative effects**

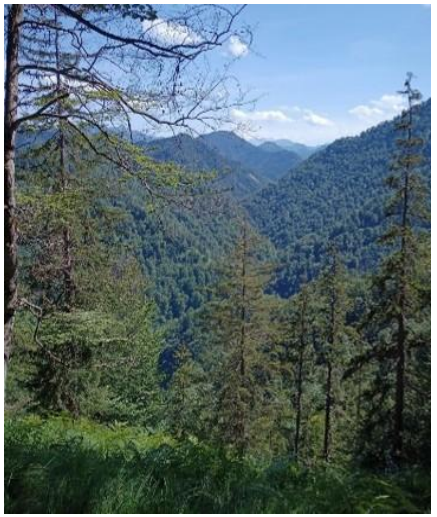
Foto: Junger Seeadler, Benni Dötterl

Bioenergy - Limits to Expansion

- Increasing frequency of damaging events in forestry
- **Threats to old, structurally rich forests and deadwood habitats** due to intensification and shorter rotation periods
- Risk of **further intensification of land use in agriculture**
- Energy crop cultivation increases land use intensity on agricultural landscapes
- Competition with food production
- Possible reduction in long-term carbon storage (trade-offs often in line with intensity of use)

Recommendations for Bioenergy

- Building renovation, heat pumps and efficiency improvements
- **Prioritisation of residual and waste materials**
- **Timber utilization should respect the level of regrowth** (under consideration of increased damaging events)
- Additional biomass potential due to ongoing shift in society's diet towards more plant-based nutrition -> large-scale availability of fodder areas
- Avoidance of additional intensification of land use
- Forest management that promotes biodiversity



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Hydropower - Ecological Situation

- Austrian **streams** are **already heavily regulated and utilised**
- Hydropower leads to **fragmentation, barriers for fish migration**
- Loss of natural flow and sediment dynamics
- Particularly critical: small hydropower
- Long-term **biodiversity losses due to lack of connectivity of ecosystems**

Recommendations for Hydropower

- No new development potential compatible with biodiversity
- Focus on **technical and ecological optimisation** of existing plants
- Improvement of passability and residual water flow and reduction of hydropeaking effects
- **Improved efficiency and national coordination of existing pump storage capacities**, additional expansion of decentralised battery storages and other storage possibilities

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Governance & Planning

- A **national analysis of needs and economic optimisation** of the energy mix determine the upper limit for natural resources needed (land, biomass, water), and thus **set benchmarks for national strategic planning**
- Energy **efficiency** and energy sufficiency as a priority
- **Optimization** of existing energy-facilities and technologies before new construction
- **National strategic spatial planning** and zoning are crucial
- **Site-specific environmental planning** for new constructions of energy infrastructure
- Consideration of cumulative effects

Take Home

- **Energy transition can only be sustainable** with integration of biodiversity protection and strategic **transdisciplinary planning**
- It is essential to consider all levers for energy efficiency in the national planning process and to utilize them for implementation
- **PV & wind are potentially biodiversity compatible** (if managed appropriately)
- **Biomass & hydropower** are more **conflict-prone – but there are options**
- **Technological research and biodiversity research are needed**
- **Intact ecosystems are the basis for climate protection and a resilient future economy**

A biodiversity-friendly Energy Transition is possible !!!

- Key factors: Energy efficiency, national strategic planning & site-specific environmental planning
- Exploit synergies to **avoid new damages for biodiversity**

May the force be with us!