POWER PLANT

POWER PLANT

1. WHY POWER PLANT NOW?

2. Vision & Objectives
3. Methodology
4. Looking at RES projects through the lens of an integrated approach
    - 4.1. Solar Power
    - 4.2. Onshore Wind
    - 4.3. Offshore Wind
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81% of EU habitats are in poor or bad condition due to intensive agriculture, urban sprawl, pollution and unsustainable forestry practices.

The EU Biodiversity Strategy has an ambition to enlarge existing Natura 2000 areas, put in place binding nature restoration targets, and restore 25,000 km of rivers, 30% of land and 30% of seas.

State of nature in the EU, https://www.eea.europa.eu/publications/state-of-nature-in-the- eu-2020

European Commission, 2022

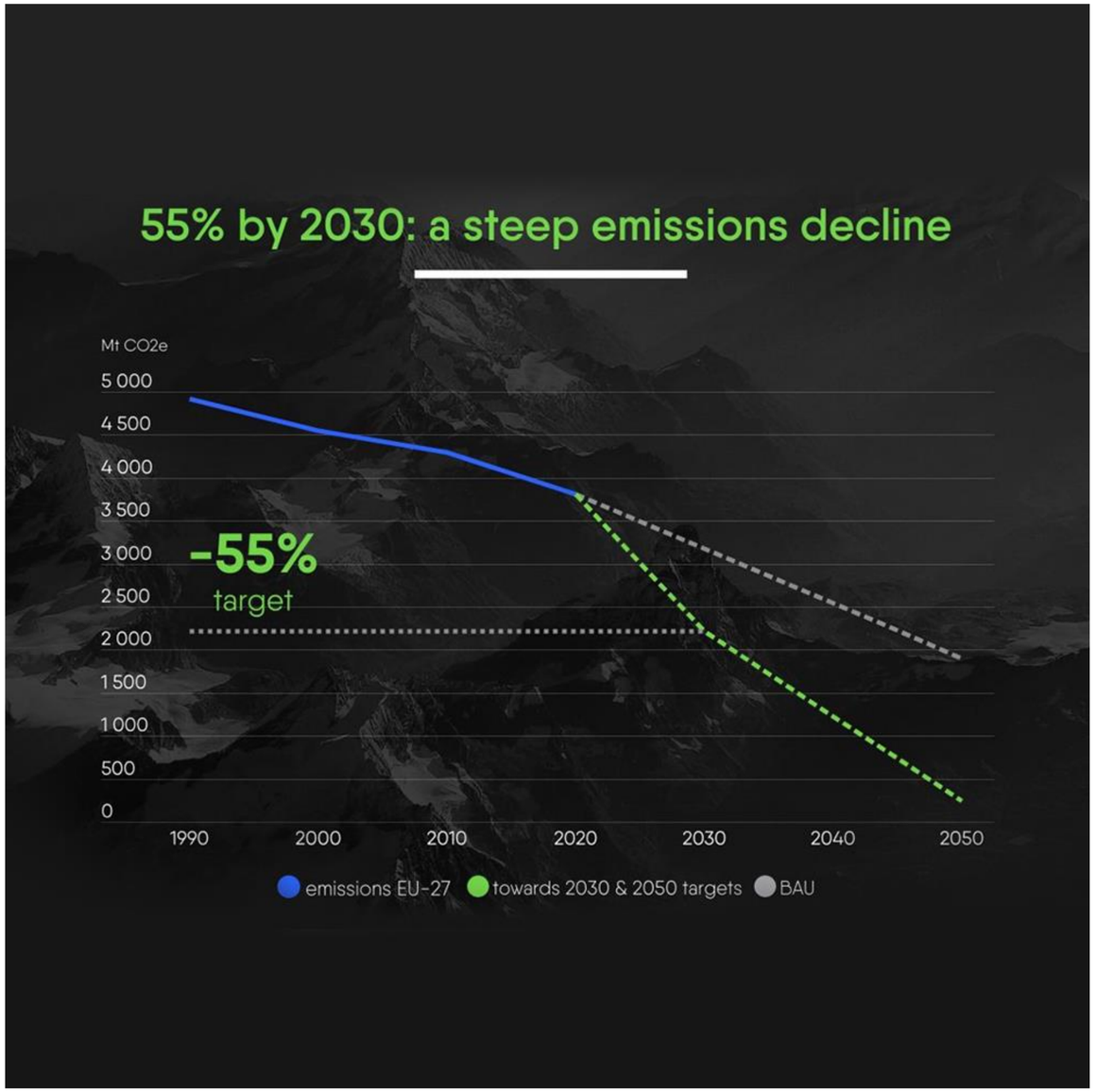
Despite strong efforts to electrify our societies, energy use and production are currently responsible for 75% of EU greenhouse gas emissions.

With climate change expected to become the leading driver of biodiversity loss by mid-century, European habitats will face increasing pressure.

A Clean Planet for all A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018), https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2018)773&lang=en

Dr Anne Larigauderie, Executive Secretary IPBES, 2021

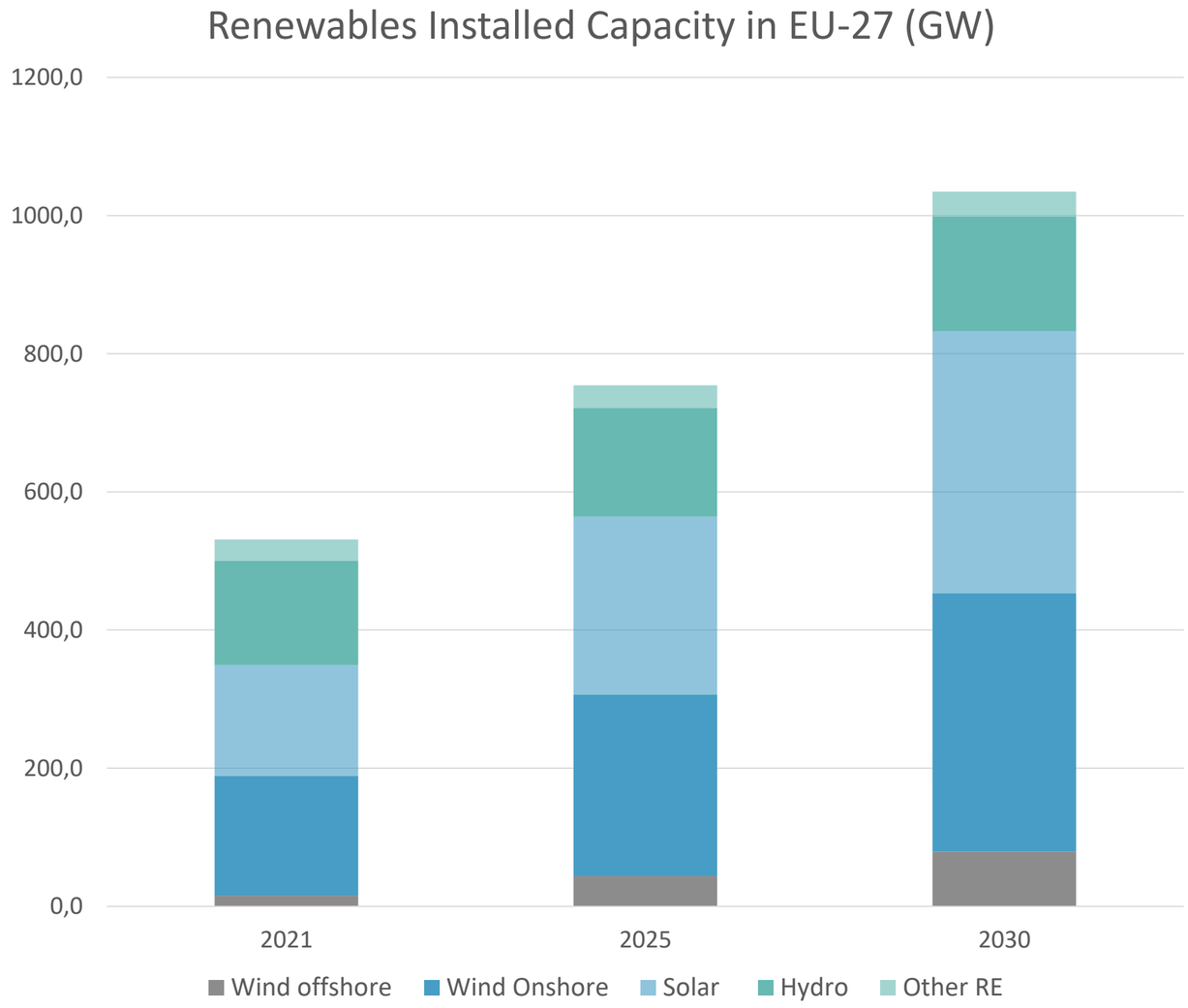
For this reason, the EU has raised its 2030 climate ambition, committing to cutting emissions by at least 55% by 2030*.



* compared to 1990
Fit for 55, https://www.consilium.europa.eu/en/policies/green-deal/eu-plan-for-a-green-transition/

What we need to deploy to achieve a 55% carbon reduction by 2030:

Offshore Wind: 64 GW
Onshore Wind: 201 GW
Solar: 220 GW
Hydro: 15 GW
Other RE: 5 GW



ENTSO-E, Wind Europe, Solar Power Europe, Eurostat and Eurelectric for 2021, EC's 2030 Climate Target Plan Impact Assessment for 2025 & 2030, https://www.consilium.europa.eu/en/policies/green-deal/euplan-for-a-green-transition/

SPACE NEEDED FOR WIND AND SOLAR* TO DELIVER ON 2030 TARGETS

OFFSHORE WIND
8,900 km²*

94 x 94 km

ONSHORE WIND
10,152 km² *

101 x 101 km

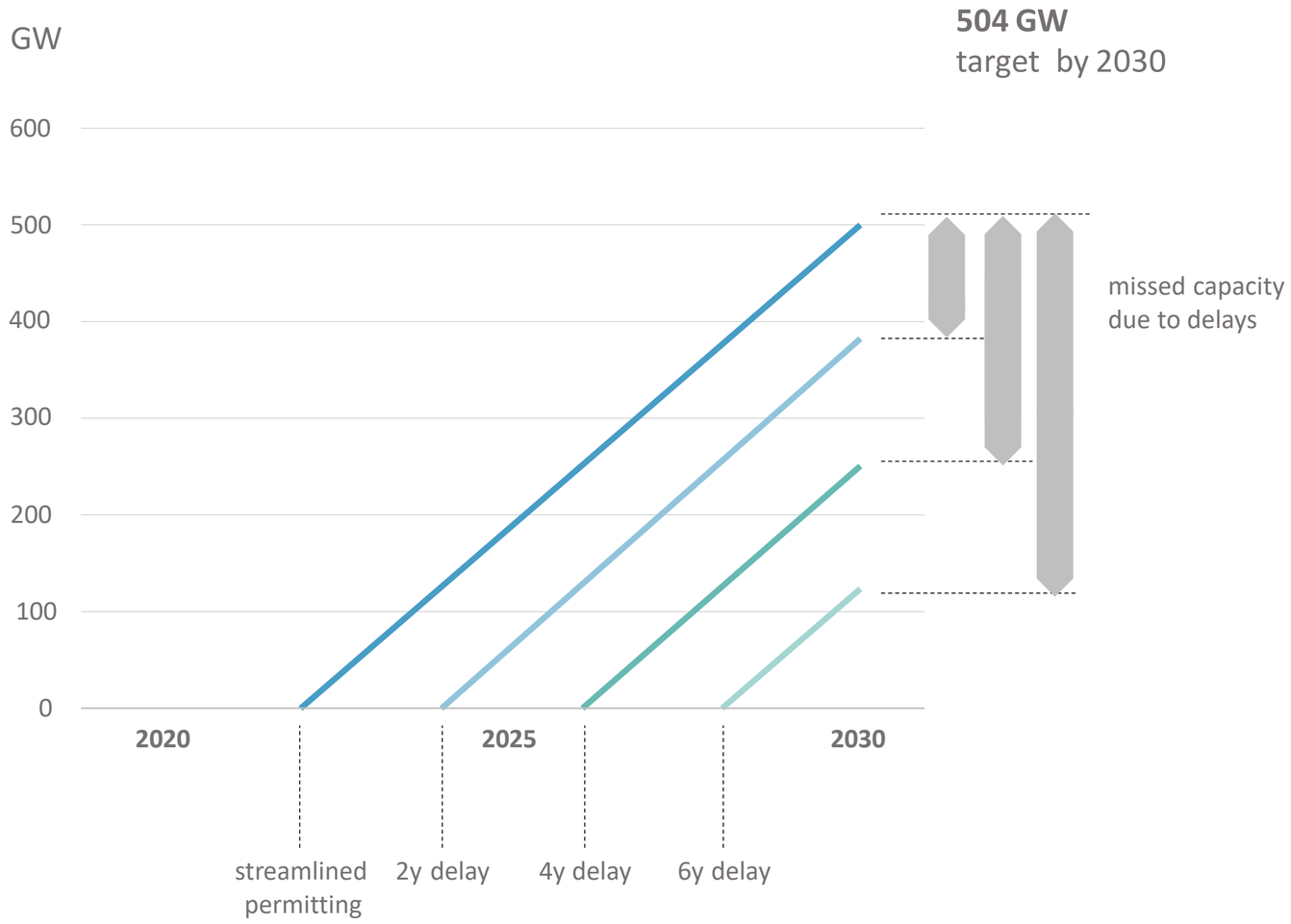
SOLAR
2,028 km²

45x45km

* Area needed to deploy the Eurelectric Power Barometer capacity

However, average permitting time for new installations is 4 to 6 years.

Shortening these lead times is a must to reach the 2030 goals.



Indicative figures

Eurelectric Power Barometer 2021, https://www.consilium.europa.eu/en/policies/green-deal/eu-plan-for-a-green-transition/

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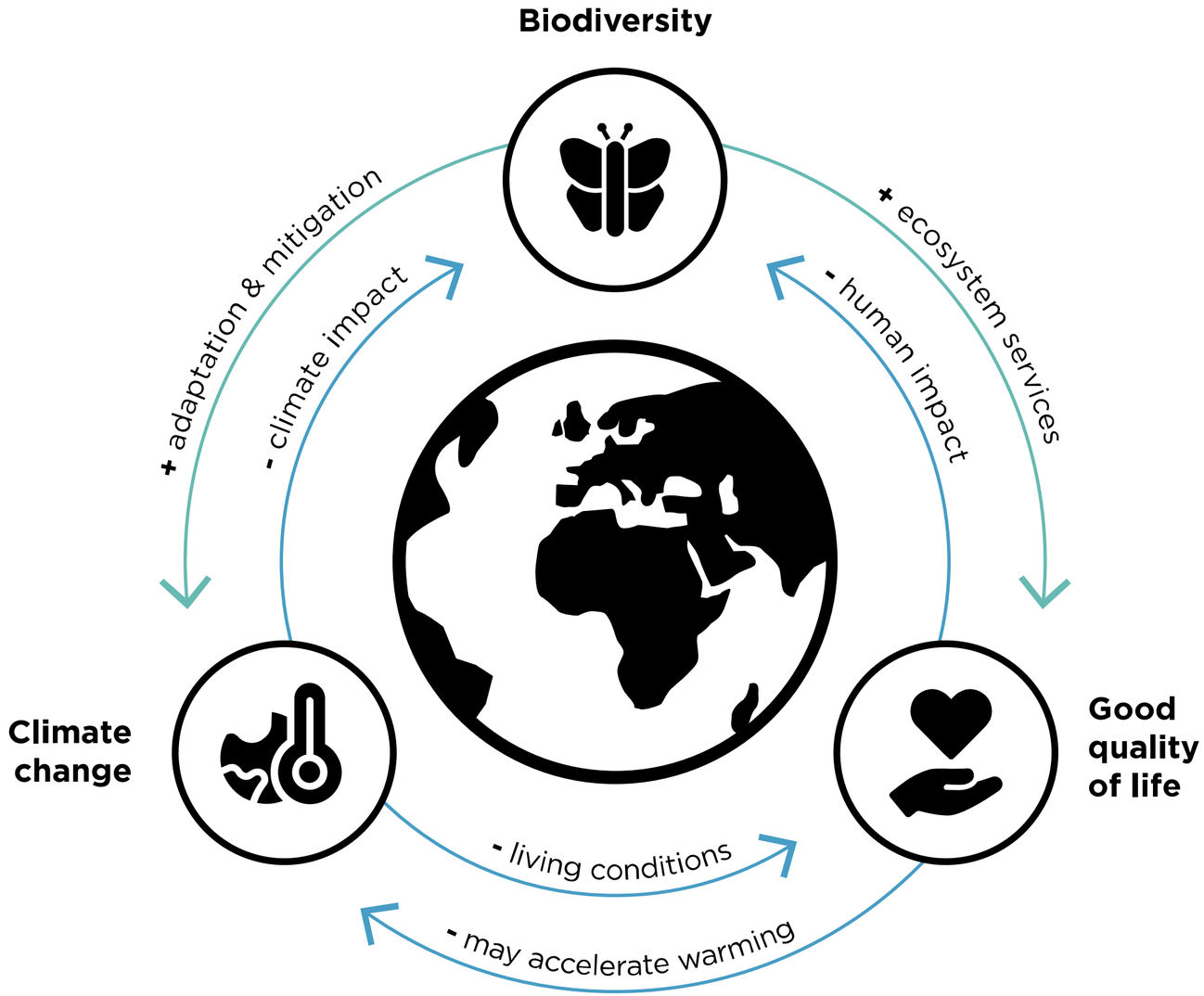
Climate and biodiversity are inextricably connected with each other and with human wellbeing.

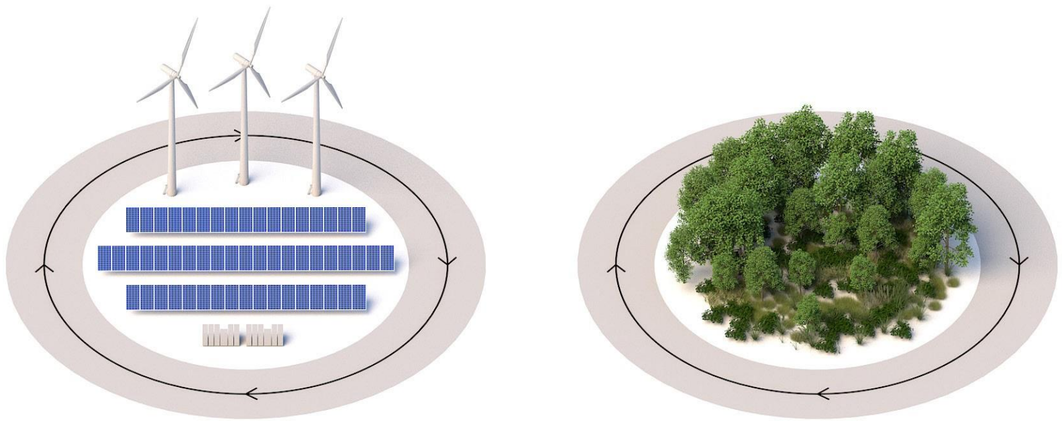


Scientific Outcome of the IPBES-IPCC co-sponsored workshop on biodiversity and climate change, https://www.adaptecca.es/sites/default/files/documentos/2021_ipcc-ipbes_scientific_outcome_20210612.pdf

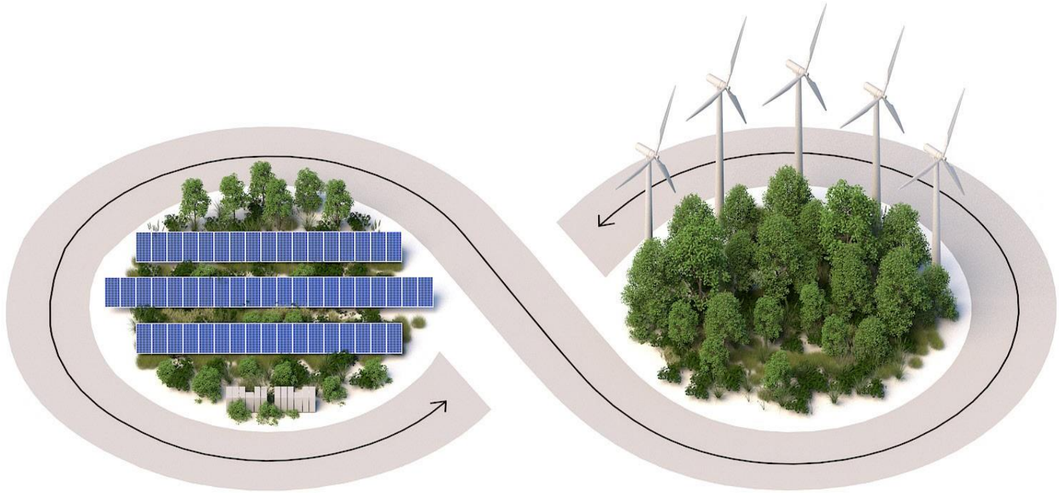
Renewable energy generation and ecological restoration are critical tools to combat climate change.

Climate change and biodiversity loss should be tackled together.

VISION:
There is a need to move beyond silos and design an integrated approach to the biodiversity and climate crises.



From a siloed approach for energy and biodiversity



To power projects as net contributors to biodiversity

OBJECTIVE:
Develop & nuance societal and political debate on integrated RES deployment & biodiversity-positive projects

Debate & Report

- Formulate vision
- Provide recommendations on accelerating RES deployment in a nature-positive manner
- Build a space for co-creation & debate

Policy Change

- Develop a blueprint for integrated RES projects
- Act on opportunities for policy change
- Increase funding for integrated projects

System Change

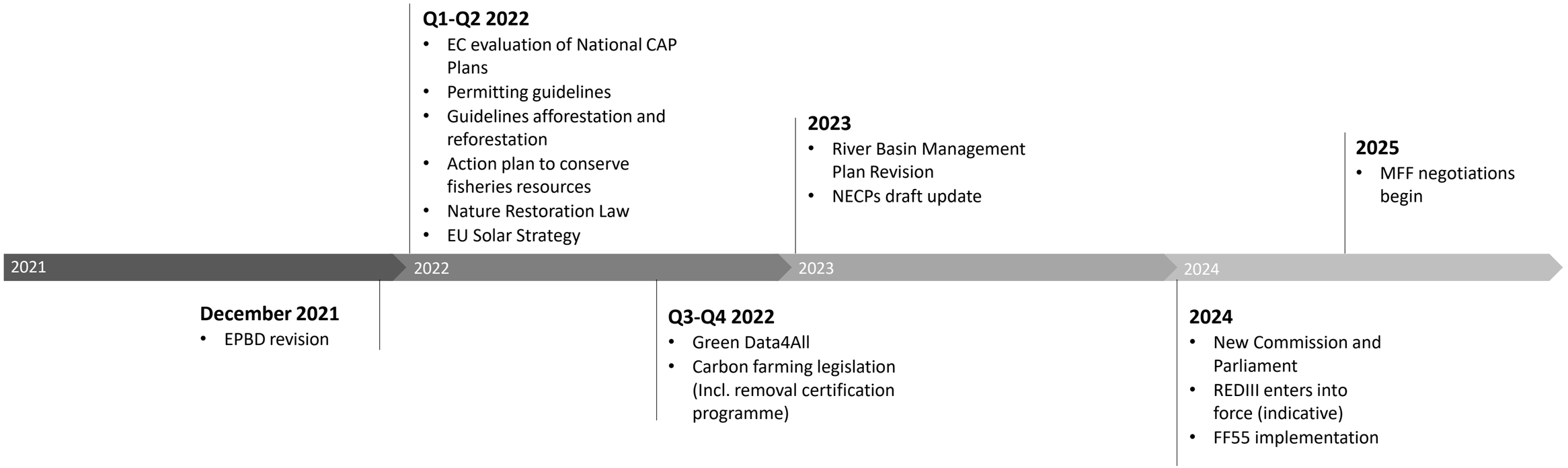
- Mainstream an integrated approach to RES
- Use science-based targets to measure the positive impacts of these projects

OBJECTIVE:
A new model for RES deployment

Define a new model for RES deployment: Integrated RES projects that contribute to regenerating nature and optimising the benefit to society and the economy, in a spirit of collaboration and community ownership.

Accelerate RES deployment in line with EU targets (for climate and biodiversity) and energy independency needs by tapping into streamlining permitting, working across boundaries, stakeholder involvement and funding.

POLICY CHANGE:
A holistic perspective required



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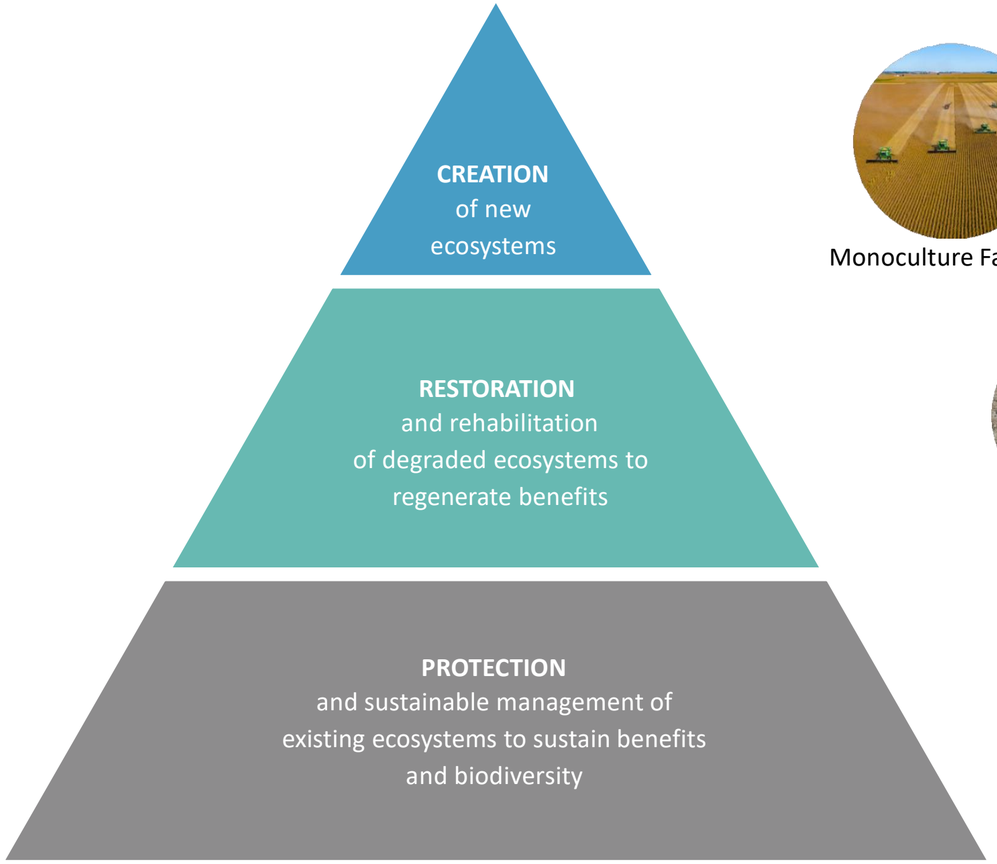
IDENTIFY POTENTIAL AREAS FOR DEPLOYING RENEWABLES AND ENHANCING BIODIVERSITY



Monoculture Farmland


Industrial Sites


Landfill


Desertification


Degraded Seascapes


Protected
Natural Areas

Degraded ecosystems

High potential for enhancing biodiversity

Simplified permitting for power projects

Pristine ecosystems

Low potential for enhancing biodiversity

Case-by-case assessment for power projects

IDENTIFY POTENTIALS FOR ECOLOGICAL RESTORATION AND DEPLOYMENT OF RENEWABLES IN DIFFERENT BIOREGIONS

Peatlands
- Protect peatlands
- Rewetting / Carbon storage
- Onshore wind

Farmland
- Carbon farming
- Organic agriculture
- New diets
- Indigenous species
- Green Corridors
- Protect / Clean groundwater
- PV and onshore wind

Oceans and Coasts
- Restore marine vegetation
- Artificial reefs
- Offshore wind

Rivers and lakes
- Restore ecosystems
- Create new habitats
- Recreation & tourism
- Flood control / irrigation
- Hydropower
- Floating PV

Artificial Land & Cities
- Green public spaces
- Micro-ecosystems in industrial landscapes
- Mines and landfills
- Infrastructural areas
- Former mines
- Integrated PV
- PV and onshore wind

Forests
- Plant trees
- Assist natural regeneration
- Forest landscape restoration
- Grid / Forest fire prevention
- Carbon sequestration

Ecosystem Restoration Playbook (EU Environment)


FARMLAND
FARMLAND
IN ARID AREAS
ARTIFICIAL LAND
CITIES
RIVERS
& RESERVOIRS
OCEANS
& COASTS
LAKES
FORESTS

4 RENEWABLE ENERGY TECHNOLOGIES

Solar

Wind

Hydro

Grids & Storage

TOOLBOX OF POSSIBLE SYNERGIES:

Biodiversity:

Bird and Habitat Protection
reducing bird collisions by installing neutral-coloured deflectors at regular intervals along cables

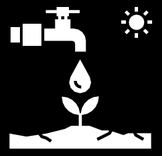
Native Wildflowers
provide pollen and nectar for pollinators

Ecological Corridors
connecting green areas by planting native shrubs and trees

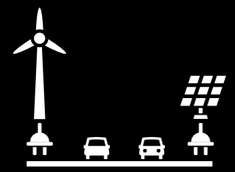
Restocking Endangered Aquatic Species
promotes the recovery of declining populations

Beekeeping
plays an essential role in maintaining biodiversity, ensuring the pollination of plants and crops

Land Use:



Rewetting of Drained Peatlands
can significantly reduce methane emissions



Integration with Existing Infrastructure
already affected by noise and pollution can reduce the need for renewables in more pristine landscapes

Floating Solar
reduces the use of sensitive habitats, while limiting algae blooms and evaporation, as well as cooling PVs

Solar Shading
reduces evapotranspiration and keeps moisture in the ground longer, thereby helping revegetate arid areas

Cattle Farm Conversions
can reduce methane emissions, and provide higher yields in combination with PV or wind

Human Perspective:

Plant-Based Protein
for food production replaces imported animal meat and soy, reducing land clearing, fertiliser use, burping cattle and GHG

Urban Farming
ensures local jobs, provides high-quality products and reduces transport distances

Tourism
potential created by hydro-reservoirs can be integrated as part of the planning

Increased Recreational Spaces
and new possibilities to explore biodiversity

Green Jobs
hiring local labour, awareness programmes on renewable energy

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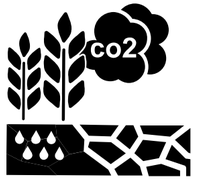
SOLAR / POSSIBLE SYNERGIES

Solar Shading
keeps moisture in the ground longer, thereby helping revegetate desertified land



Perennial Staple Crop
reduces soil erosion, increases moisture retention and sequesters carbon

Regenerative Annual Cropping
planted between solar panels increases biodiversity and minimises the need for pesticides and herbicides

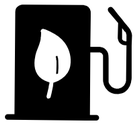
Managed Grazing
increases carbon sequestration up to 80%, while also benefiting fixation of soil nutrients under solar panels

Intercropping
produces a greater yield on a given piece of land

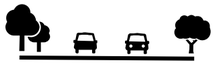
Keyline Agriculture
rapidly accelerates soil biological activity, thus increasing the total organic matter content within the soil

Native Wildflowers
provide accessible pollen and nectar for bees and pollinators

Sun Tracking Panels
maximise production by using solar tracker devices to detect and follow the sun's pathway



Biogenic Powerfuels
and Power-to-X based biogas production can replace fossil fuels use in heating and transportation



Green edges
can minimise the visual impact of solar panels and create new habitats

Green Jobs
hiring local labour through training courses on renewable energy and offer environmental awareness programmes to local schools

Plant-Based Protein
for food production replaces imported animal meat and soy, thereby reducing land clearing, fertiliser use and GHG emissions

INTEGRATED RES PROJECTS: SOLAR POWER
Positive Practices from Industry

Nature-friendly practices

1. **Solar shading** – PVs placed in areas with intense sun reduce evapotranspiration, keeping moisture in the ground longer, thereby helping to revegetate desertified land.

2. **Biodiversity restoration** between PV rows, coupled with sustainable management practices to improve soil oxygenation, avoid undesirable grass and facilitate nesting for birds.

3. **Integration of agro-zootechnical activities in ground-mounted PV plants** with no or minor layout adaptations - for instance, adding beekeeping within the PV plant, while growing dedicated plant types to foster pollinators' habitat. Hives act as sensors to get real-time information on the health status of the surrounding ecosystem.

Practices optimising resource use

1. **Restore degraded areas** – PVs installed on degraded and industrial sites make use of space that would be otherwise deserted, create job opportunities and ensure a just transition.

2. **Floating PVs** allow for integration with existing water bodies and reduce the use of sensitive habitats, while also providing new habitats for marine life under the panels.

3. **Sun-tracking panels** maximise RES production by using solar tracker devices to detect and follow the sun's movements throughout the day.

4. Place **PVs on existing large infrastructure**, like highways, and couple them with noise-reduction capabilities to allow for optimised use of space (RES generation, asphalt protection, noise reduction).

INTEGRATED RES PROJECTS: SOLAR POWER
Barriers

Policy and regulatory barriers

1. Lack of definition of “agrivoltaics” at EU level.
2. Long and largely undigitised permitting procedures.
3. Retroactivity of laws affecting the business case of existing investments and discouraging further investments.
4. Lack or low availability of environmental information critical for the completion of environmental studies.
5. Lack of national cadaster and of (digital) mapping of suitable locations for renewable projects.

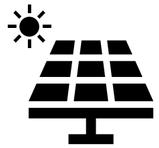
Policy Change

1. Public opposition to having PVs on the landscape.

System Change

1. Lack of incentives for famers and RES developers to deploy agrivoltaics (specifically siloed agricultural policies which preclude farmers from optimising the use of their fields for multiple forms of production).

INTEGRATED RES PROJECTS: SOLAR POWER
Recommendations



Recommendations – technology specific

1. Provide a definition for “agrivoltaic” plants at EU level.
2. Propose tax reductions for landowners hosting solar panels.
3. Introduce public tenders supporting projects that aim to requalify a degraded / abandoned area through PV deployment.
4. Allow for co-financing of integrated solar projects - for instance, by combining agricultural subsidies, PV support schemes, and innovation grants.
5. Support mechanisms/incentives for both RES developers and farmers.
6. Exempt PV projects in degraded / industrial areas from Environmental Impact Assessment and local utility charges.
7. Solar power plants under a certain threshold (e.g. 1MW in Slovenia) could be considered small power plants and should not require a building permit to be installed.

AGRIVOLTAICS

Livestock grazing can help sequester carbon, maintain the land and enhance biodiversity in future solar plants

Managed Grazing
increases carbon sequestration and benefit the fixation of soil nutrients under solar panels

Native Wildflowers
serve as a refuge for pollinators and maintain the reserves of seeds of guaranteed local origin

Intercropping
produces a greater yield on a given piece of land by making use of resources that would otherwise not be utilised by a single crop

Sun Tracking Panels
maximise production by using solar tracker devices to detect and follow the sun's pathway as it moves throughout the day

AGRIVOLTAICS

If solar panels are located in areas prone to desertification, the shade from panels can help improve biodiversity

Plant-Based Protein
for food or fodder production
replaces imported animal meat and soy, thereby reducing land clearing, fertiliser use, and GHG emissions

Perennial Staple Crops
reduce soil erosion, increase moisture retention and sequester carbon

Regenerative Annual Cropping
planted between solar panels
increases biodiversity and minimises the need for pesticides and herbicides

Solar Shading
reduces evapotranspiration and keeps moisture in the ground longer, thereby helping revegetate arid areas

SOLAR IN LOWLYING AREAS

If we combine energyproduction and rewetting of lowlying areas we can reduce CGH emissions

Country: Denmark, proposal

Native Wildflowers serve as a refuge for polinating insects and maintain the reserves of seeds of guaranteed local origin

Rewetting of Wetlands can significantly reduce Methane emissions

Europen Energy AS and Kirt x Thømsen

A method for producing solar energy from lowland soil which has the potential to reduce green house gas emissions from such lands and strengthen biodiversity

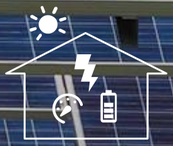
COMBINED WIND & SOLAR

In many cases wind and solar can be combined at the same time as improving biodiversity. Supplementing an existing energy plant might also benefit from existing grid access and easier permitting

Perennial Staple Crops
reduce soil erosion, increase moisture retention and sequester carbon

Synergies
combining wind and solar will often be favourable, as wind resource is often low when sun resource is high and vice versa

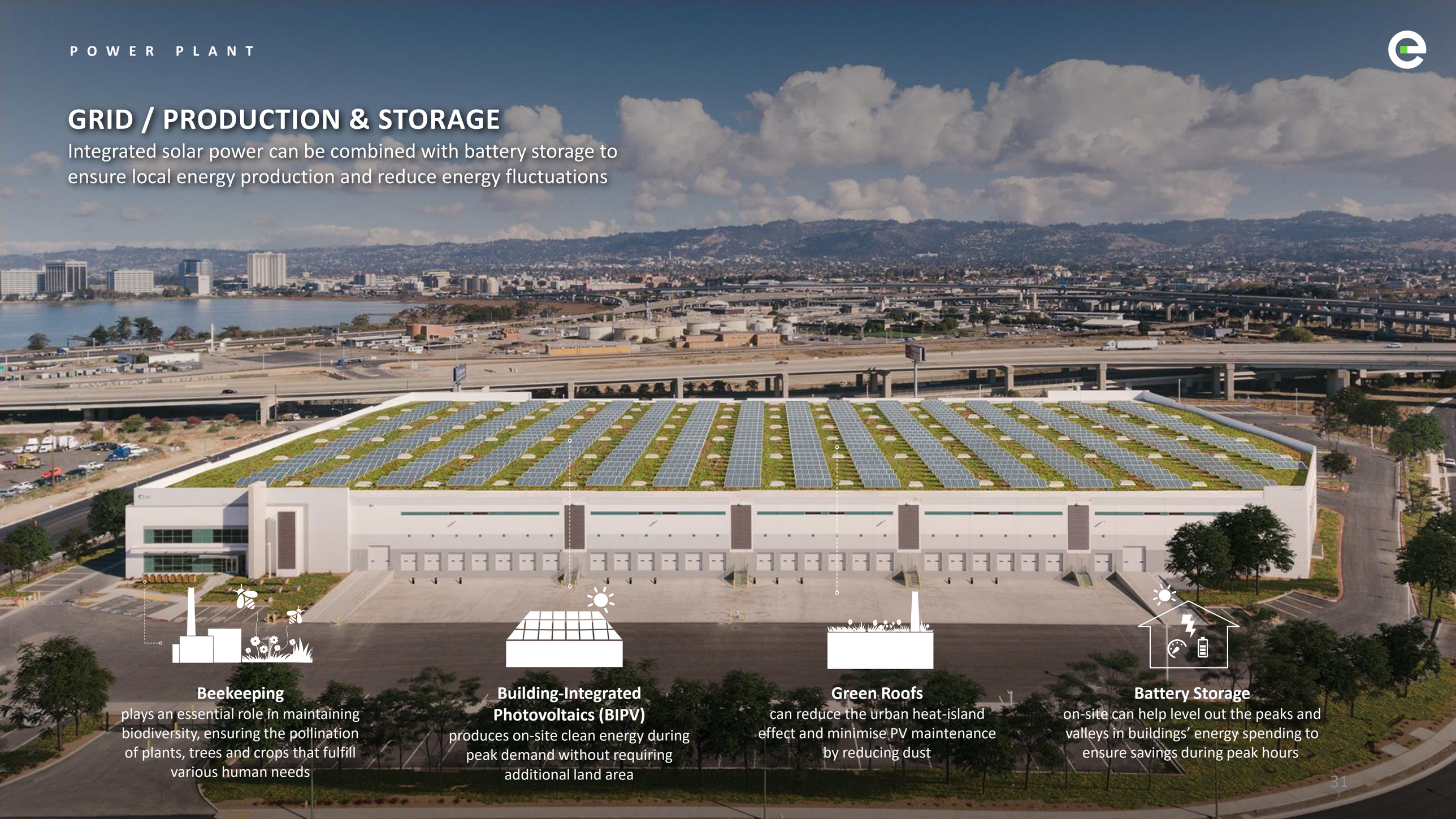
Solar Shading
reduces evapotranspiration and keeps moisture in the ground longer, thereby helping revegetate arid areas



Battery Storage
can help level out the peaks and valleys in energy consumption and production

GRID / PRODUCTION & STORAGE

Integrated solar power can be combined with battery storage to ensure local energy production and reduce energy fluctuations



Beekeeping
plays an essential role in maintaining biodiversity, ensuring the pollination of plants, trees and crops that fulfill various human needs

Building-Integrated Photovoltaics (BIPV)
produces on-site clean energy during peak demand without requiring additional land area

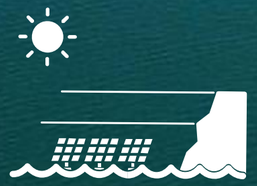
Green Roofs
can reduce the urban heat-island effect and minimise PV maintenance by reducing dust

Battery Storage
on-site can help level out the peaks and valleys in buildings' energy spending to ensure savings during peak hours

FLOATING SOLAR

(O´Mega1, Existing case, France)

Using floating solar to create energy can have multiple benefits for local industries and existing water bodies



Integration with Existing Water Bodies
such as flooded gravel pits and mines, eutrophic lakes and wastewater treatment plants to reduce the use of sensitive habitats

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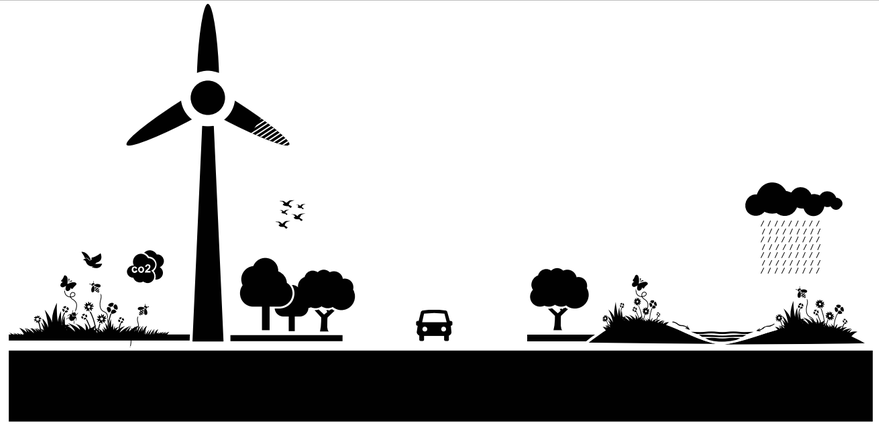
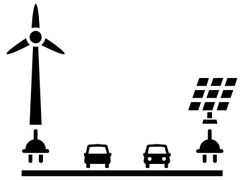
ONSHORE WIND / POSSIBLE SYNERGIES



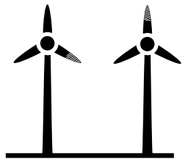


Integration with Existing Infrastructure
already affected by noise and pollution can reduce the need for renewables in more pristine landscapes

Solar Noise Barrier
can reduce noise levels in adjacent neighborhoods

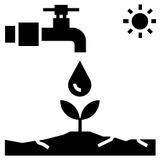
Insect hotel
Reed barriers are a sustainable material for noise mitigation and can function as insect hotels

Siting
Choosing the optimal location by mapping migratory routes before construction is the important strategy to reduce bird collisions



Visual deterrent
Painting one blade in a clearly visible colour can make them more visible

Agriculture
can easily be maintained and / or converted to organic agriculture



Rewetting of Drained Peatlands
can significantly reduce methane emissions

Battery Storage
on-site can help level out the peaks and valleys in buildings' energy spending to ensure savings during peak hours

Sonar bird protection
Ultrasonic sound generation systems can help deter bats and birds from wind turbines

Digital detection
GPS and radar systems can be used to detect bats and birds and temporarily curtail production if needed

INTEGRATED RES PROJECTS: ONSHORE WIND
Positive Practices from Industry

Nature-friendly practices

1. Bird monitoring & protection programmes, based on use of radar detection systems and on-site visits of ornithologists.
2. Financial contribution to research / species restoration programmes.
3. Limit light signals, either by orienting them towards the sky or using them only when a plane approaches.
4. Paint a part of the blade in a different colour than white.

Practices optimising resource use

1. Place onshore wind farms in already built-in places (e.g. highways, railways etc.) in order to avoid occupying more pristine lands and optimise space use.
2. RESport tourism: In the Somme department (FR), wind power has allowed the creation of a 20 km hiking trail around the wind turbines, with information boards on biodiversity.

Addressing public / political acceptance

1. Collaborate with local stakeholders from the early stages of the project.
2. Organise on-site visits, informative sessions on the functioning of a wind farm and decarbonisation.
3. Contribute to public consultations on legislative changes needed for supporting RES projects.

INTEGRATED RES PROJECTS: ONSHORE WIND
Barriers

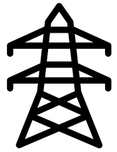
Policy and regulatory barriers

1. Legal uncertainty entailed by regulations applied retroactively.
2. Lack of clear provisions regarding the possibility of continuing / extending the support system after repowering.
3. Inconsistent approaches by bodies issuing environmental decisions.
4. Public financial participation (e.g. of the local communities) in projects is sometimes hindered by legislative / administrative constraints.
5. Complex permitting procedures for both new plants and repowering existing plants, although this reduces the need for new spaces.
6. A lack of clarity around the sharing of competences between different permitting authorities.

Land-use barriers

1. Lack of visibility over areas suitable for wind power deployment. In some cases, where identification is done, the criteria used for designated RES suitable areas are not transparent.
2. Unclear status of the land leading to changes in the plan / study.
3. Complex spatial planning rules with many constraints and differences among administrative levels. This is an issue especially for large RES projects that need to undergo spatial planning at multiple levels, entailing overlapping studies, decisions and increased likelihood of court procedures.
4. Land conflicts with other uses.
5. High density of protected areas and species in some countries with limited land, and lack of solutions to develop integrated RES projects without impacting nature.

INTEGRATED RES PROJECTS: ONSHORE WIND
Barriers



Grid-related barriers

1. Lack of dedicated framework where, provided there is no change in connection capacity, a wind-only RES project that is transformed into a combined-technology RES project is not required to obtain a new grid connection agreement, but an update of the existing one.

2. Limited grid capacity and availability.

3. Unclear procedure for reserving capacity for the projects being developed.

4. Complex permitting procedures for building new transmission power lines for wind projects.

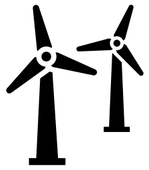
Social barriers

1. Public opposition towards onshore wind projects.

2. Lack of awareness raising / educational campaigns describing the benefits and impacts of wind power.

3. Disproportional media focus on obstruction actions directed towards RES projects, without an equivalent level of attention to expert opinion.

INTEGRATED RES PROJECTS: ONSHORE WIND
Recommendations



Recommendations – technology specific

1. Spatial planning: mapping the areas suitable for wind projects development, based on a prior consultation with local communities and taking into account biodiversity and landscape.

2. Develop a comprehensive recycling strategy and value chain for wind blades at EU level to ensure a responsible deployment of wind projects, with a circular-economy view embedded by design.

3. Support projects that allow for co-ownership of wind farms and take into account the needs of the local communities through dedicated contributions.

4. In case of land-use conflicts, encourage dialogue with other authorities involved: e.g. Estonia streamlined military restrictions impacting wind power expansion, resulting in a vast part of the territory being now potentially usable for RES projects.

5. Combine technology-based monitoring systems for biodiversity with on-site visits of experts to ensure that biodiversity is preserved, and preventive actions are taken.

6. Develop joint grid feed-in points for combined wind and PV projects.

7. Give priority for grid connection to repowering projects and those that are installed in RES go-to areas.

ONSHORE WIND / REGENERATION

Stopping extraction of peat and using rewetted areas for wind farms can significantly reduce methane emissions and improve biodiversity.

Siting
Choosing the optimal location by mapping migratory routes before construction is the most important strategy to reduce bird collisions

Visual deterrent
Painting one blade in a clearly visible colour can make them more visible

Rewetting of Drained Peatlands
can significantly reduce methane emissions

Sonar bird protection
Ultrasonic sound generation systems can help deter bats and birds from wind turbines

Digital detection
GPS and radar systems can be used to detect bats and birds and temporarily curtail production if needed

ONSHORE WIND / MAPPING

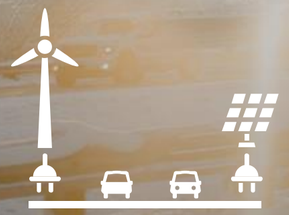
If areas suitable for windfarms were mapped strategically to avoid conflicts with migratory birds and biodiversity, permitting times could be reduced.

Bird protection and habitat

Reducing bird collisions by mapping areas suitable for renewable energy to avoid conflicts with biodiversity and wildlife.

ONSHORE WIND / INFRASTRUCTURE

If renewable energy is combined with major infrastructural facilities like highways and railways, where landscapes are already disrupted and affected by noise and pollution, more pristine landscapes can be preserved.



Integration with Existing Infrastructure
already affected by noise and pollution can reduce the need for renewables in more pristine landscapes

Battery Storage
can help level out the peaks and valleys in energy consumption and production. Possible use for charging stations along highways

Solar Noise Barrier
can reduce noise levels in adjacent neighbourhoods

Insect hotel
Reed barriers are a sustainable material for noise mitigation and can function as insect hotels

POWER PLANT

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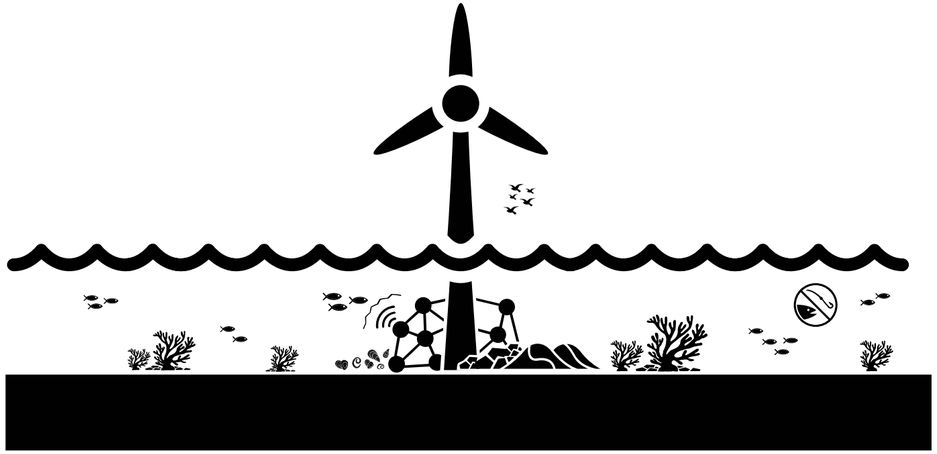
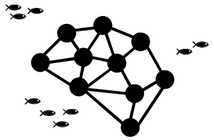
OFFSHORE WIND / POSSIBLE SYNERGIES

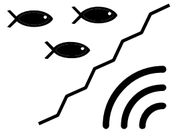




Artificial Reefs
provide new habitats for marine species

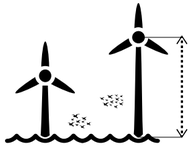
3D Underwater Farming
of seaweeds and shellfish requires zero inputs and minimise acidification while sequestering CO2

(Re)introducing Reef Building Species
for example, oysters or Ross worms (Sabellaria spinulosa)



Noise Reduction
from installation of wind turbine foundations, to protect marine mammals

Scour Protection
using materials such as rock and sand to protect cables and structures to prevent local seabed deepening



Bird Protection
Elevated nacelle height can reduce bird collisions by providing migratory paths between water surface and swept wind area

INTEGRATED RES PROJECTS: OFFSHORE WIND

Positive Practices from Industry

(*those included already for onshore wind have not been restated)

Nature-friendly practices

1. Adapt the functioning of the wind farm based on site-specific considerations to choose the most value creating initiative for the local context. In terms of project design, this includes considering blade tip height, ensuring nature inclusive design of foundations, micrositing, shutting down turbines during specific times for a limited number of hours based on available scientific evidence. In terms of activities, this could include improving habitat and feeding ground for birds elsewhere (e.g., nesting facilities, seagrass, wetland), developing marine mammal monitoring programmes, using bubble curtains etc.
2. Work with other users of sea area to maximise the use of space, to facilitate the expansion of offshore wind in a manner compatible with other uses and biodiversity protection.
3. Identify opportunities where wind farms can contribute to localised biodiversity positive impacts such as artificial reefs through colonisation of wind farm structures.
4. Use digital technologies to perform distant maintenance and surveillance of wind farms, hence avoiding pollution of waters (via shipping) and other disturbances to marine life.

INTEGRATED RES PROJECTS: OFFSHORE WIND

Positive Practices from Industry

(*those included already for onshore wind have not been restated)

Practices optimising resource use

1. Simultaneous use of marine areas for different activities, e.g., for research projects and operation of offshore wind turbines, possibility to allow some fishing activities etc.

2. Wind farms can contribute to the restoration of degraded coastal areas.

Addressing public / political acceptance

1. Create from the outset a “stakeholders committee” comprising fishermen, mayors, cities, representatives of local wildlife, NGOs, employment agencies, in order to co-create the project taking into account all stakeholders’ concerns.

2. Governments reinvesting a part of the revenues obtained from sea-bed auctioning in improving local community life and biodiversity.

INTEGRATED RES PROJECTS: OFFSHORE WIND
Barriers

Policy and regulatory barriers

1. The competences of different permitting authorities are not clearly defined, revealing the non-implementation of the REDII provisions on the single contact point.

Land-use barriers

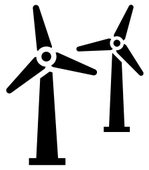
1. Insufficient spatial planning to identify suitable areas and facilitate permitting.

2. Land-use conflicts with other activities (e.g., defence, fisheries, tourism).

Social barriers

1. Public opposition towards offshore wind projects e.g., concerns related to losing touristic potential, NGOs opposition for reasons related to biodiversity loss.

INTEGRATED RES PROJECTS: OFFSHORE WIND
Recommendations



Recommendations – technology specific

1. Maritime spatial planning (MSP) is a key tool to promote sustainable development and optimal use of the maritime space, while encouraging national governments to declare nature and species conservation sites and protected areas in their MSPs. Member States should finalise their MSPs as soon as possible to further facilitate the co-existence of different activities at sea, such as offshore wind power and nature conservation.
2. Favouring projects that allow for simultaneous use of marine areas for different activities, e.g. for research projects and operation of offshore wind turbines.
3. Earmark Member State RES tender revenues for biodiversity. Where applicable, part of the revenue that Member States earn from tenders for seabed space for offshore projects could be earmarked for biodiversity purposes related to the project.

OFFSHORE WIND

Wind parks can help restore degraded marine-coastal areas

(Re)introducing Reef Building Species
for example, oysters or ross worms (Sabellaria spinulosa)

3D Underwater Farming
of seaweeds and shellfish requires zero inputs and minimises acidification while sequestering CO2

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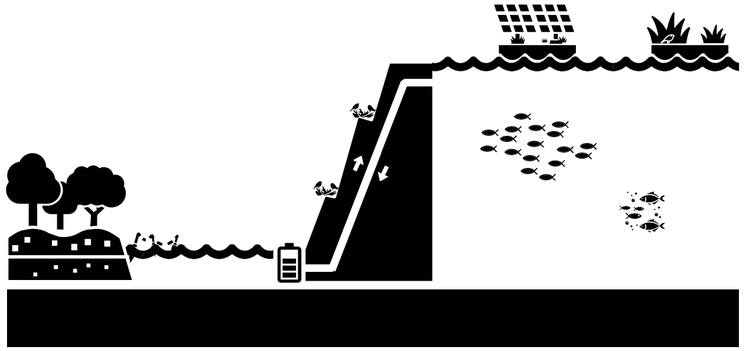
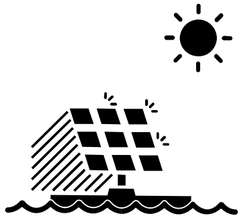
HYBRID HYDRO / POSSIBLE SYNERGIES



Pumped-storage hydroelectricity
stores power and release it during periods of higher demand

Restocking Endangered Aquatic Species
promotes the recovery of declining populations

Gravel riverbanks
and riparian areas can provide new breeding grounds and habitats for fish and birds



Floating Solar
on hydro and other reservoirs can reduce the use of sensitive habitats, reduce evaporation and cool PVs for higher efficiency

Afforestation
on the banks of reservoirs sequesters carbon, reduces the risk of landslides and creates new habitats for wildlife

Recreational qualities
can be improved as part of the project design

Fish ladders
can ensure migration of fish to upstream breeding grounds

Flood protection
reservoirs can provide protection of biodiversity by controlling the waterflow in rivers

INTEGRATED RES PROJECTS: HYDROPOWER

Contribution of Hydropower to the European power system

1. Hydropower provides renewable flexibility within milliseconds up to a year, enabling the transition to a renewable-based electricity system and the associated massive expansion of solar and wind.

2. With 97% of storage in the EU, hydropower contributes to and ensures a resilient and independent European power system.

3. In 2030, hydropower will comprise 13% of installed capacity and provide 15% of annual electricity production in the EU[1] - an increase of 15 GW[2].

Contribution of Hydropower to Biodiversity

1. Improve biodiversity: Through measures at existing plants such as organism migration facilities and accompanying measures establishing continuity.

2. Increase biodiversity: In the vicinity of hydropower plants, due to the changed conditions, special ecosystems can evolve, which are even put under protection due to their unique nature.

3. Avoid possible adverse effects on biodiversity: Through well-considered design and implementation, the impact on the biodiversity can be significantly reduced or avoided. For example, hydropower ensures e-flows in river below storage reservoirs in dry or hot periods.

[1] European Commission impact assessment on the 2030 target, 2020
[2] Compared to EU27, Eurostat, 2020

HYDROPOWER: IMPROVING BIODIVERSITY
Europe’s biggest fish bypass

- The run-of-river HPP Ottensheim-Wilhering in the Danube, located near the Austrian city of Linz, was built in 1974. Its 9 Kaplan turbines with an installed capacity of 179 MW generate more than 1150 GWh annually, providing power to approx. 250,000 households and saving nearly 850,000 tonnes of CO2 annually.

- In Ottensheim, VERBUND and its partners, and with the support of the EU LIFE+ programme, built Europe’s biggest fish bypass in just two years: a 14.2km bypass arm via the Innbach-Aschach channel with seasonally adjusted water supply from the Danube and its tributaries. This bypass meets the high ecological and technical requirements to ensure continuity for fish. The natural design of the channel with deep sections (potholes), fords and bays also creates habitats for fish and other animals.

- The bypass arm is an important link between the Natura 2000 areas along the Danube and their tributaries. As well as linking these areas, important steppingstone biotopes are being created, providing important support for interaction between populations in the protected areas.

HYDROPOWER:
IMPROVING BIODIVERSITY
Regulated Lake became Natura 2000 protected area

- The regulation of Finland's Lake Kiantajärvi began in the early 1960s and is operated by the Ämmä power plant in Suomussalmi, owned by Fortum. The average regulation amplitude of Lake Kiantajärvi is 3.3 m per year.

- Despite the relatively high regulation of the lake, it attracts numerous migratory birds to its floodplains. Surveys have recorded 105 species. Due to its special importance for eight species listed in the Birds Directive, the so-called Kokkosuo area of the lake (85 ha) was included in the N2000 network.

- The high natural value of the floodplains is due to the increased water level caused by water regulation for hydropower generation. Without this regulation, these areas would not exist today. This example shows that the operation of hydropower plants near Natura 2000 areas is not just feasible; it can even increase the natural and recreational value of certain areas.

INTEGRATED RES PROJECTS: HYDROPOWER
Recommendations

Recommendations – technology specific

1. Create a level playing field with other renewables (Taxonomy, Biodiversity, …)

2. The Hydropower sector supports the removal of obsolete dams (hydropower counts for approx. 2.5% of all dams in Europe). When assessing dam removal, all benefits of a dam have to be considered.

3. Avoid siloed thinking and foster policy alignment as well as cross-sectorial thinking, including by ensuring that biodiversity protection requirements allow for the deployment of renewable generation and associated flexibility services in an environmentally friendly manner.

4. Make use of the environmentally friendly feasible potential of hydropower across Europe and seek to maximise its positive impact on increasing biodiversity.

HYDRO

Hydro plants can mitigate the effects of climate change, create new habitats for fish and birds and increase recreational possibilities for the local population

Fish ladders
Can ensure migration of fish to upstream breeding grounds

Restocking Endangered Aquatic Species
can promote the recovery of declining populations

Recreational qualities
can be improved as part of the project design

Climate Change Mitigation
Reservoirs regulate the waterflow in rivers providing protection from both flooding and droughts

Gravel riverbanks
and new riparian areas can provide new breeding grounds and habitats for fish and birds

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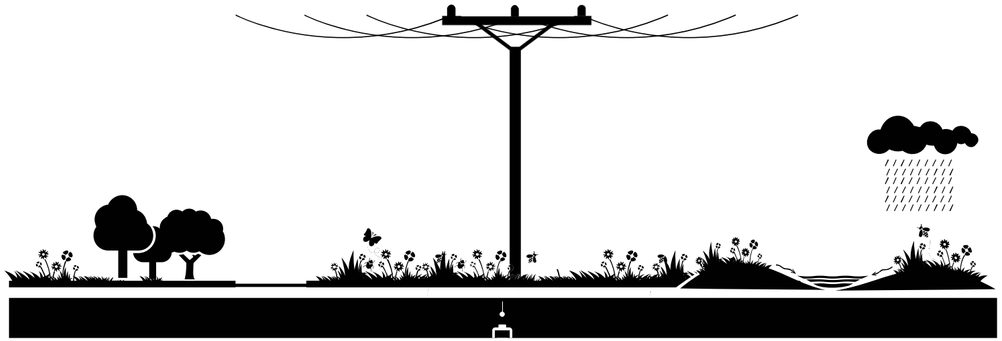
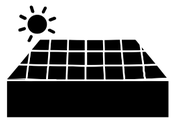
GRID / POSSIBLE SYNERGIES





Building-Integrated Photovoltaics
produces on-site clean electricity during peak demand without requiring additional land area

Battery Storage
on-site can help level out the peaks and valleys in buildings' energy spending to ensure savings during peak hours

Power-to-X
converting surplus electric power to other forms of energy for storage and reconversion

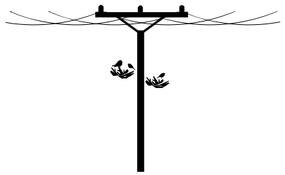
Green Roofs
can reduce the urban heat- island effect and minimise PV maintenance by reducing dust

Beekeeping
plays an essential role in maintaining biodiversity, ensuring the pollination of plants, trees, and crops that fulfill various human needs

Bioremediation
using microorganisms, plants and fungi to remove contaminants, pollutants, and toxins from soil, water, and other environments

Agroforestry
(e.g., hazelnut) supports agricultural production, while improving water and air quality, soil health, and wildlife habitat

Ecological corridors
connecting green areas separated by human activities by planting native shrubs and trees



New targeted nesting
possibilities can bring back native bird species and inhibit invasive species

Native Wildflowers
provide accessible pollen and nectar for pollinators

Bird and habitat protection
reducing bird collisions by installing neutral-coloured deflectors along cables

Ponds
enable rare species to colonise the restored environments and prevent populations from becoming isolated

GRIDS & STORAGE
Positive Practices from Industry

Nature-friendly practices

1. Ecological corridors along overhead distribution lines bring diversification to monocultural zones by planting shrubs and a variety of height-limited vegetation.

2. Neutral-coloured deflectors installed at regular intervals along overhead distribution lines enhance habitat protection by reducing bird collisions.

3. Bioremediation practices (e.g., beekeeping, planting wildflowers, fungi and microorganisms) ensure the removal of contaminants and the pollination of plants fulfilling various human needs.

Practices optimising resource use

1. Building-Integrated Photovoltaics (BIPV) and connected power storage units enable the on-site production and consumption of clean electricity without requiring additional land usage.

2. Green roofs reduce urban heat-island effects, positively impact energy efficiency, and create miniature biotopes that might not naturally occur, thus adding biodiversity value.

3. Ecological corridors provide multiple land-use cases - for instance, recreation spaces for activities such as cross-country skiing.

GRIDS & STORAGE
Barriers

Policy and regulatory barriers

1. Lengthy permitting procedures.
2. Lack or low availability of information critical for the completion of environmental impact assessments studies.
3. Lack of national cadastres to map suitable locations grid & storage projects.
4. Uncertainty over the cost and ownership of the land for project developers (e.g. compensation costs for neighbours, price/km).

Social barriers

1. Public opposition to including power lines and storage units in the landscape.
2. Public opposition to the development of distribution grids near residential areas, despite proven safety from harmful radiation of low voltage lines

GRIDS & STORAGE
Recommendations

Recommendations – technology specific

1. Incentivise proximity to end-users, minimising transmission costs through tax reductions for landowners.
2. Incentivise BIPV and connected power storage units limiting land usage.
3. Enable further exploration of the different potentials of grid projects in other regions of Europe.
4. Introduce public tenders supporting projects that aim to requalify a degraded / abandoned area through spatial mixed use (e.g., for urban farming, beekeeping).
5. Exempt projects in degraded / industrial areas from Environmental Impact Assessment and local utility charges.
6. Allow for co-financing of integrated projects, for instance, by combining agricultural subsidies, support schemes, and innovation grants.

GRIDS

Power lines corridors can serve as ecological corridors increasing local biodiversity

Ecological corridors
connecting green areas separated by human activities by planting native shrubs and trees

Ponds
enable rare species to colonise the restored environments and prevent populations from becoming isolated

Agroforestry
(e.g. hazelnut) supports agricultural production, while improving water and air quality, soil health, and wildlife habitat

Native Wildflowers
provide accessible pollen and nectar throughout spring and summer for bees and pollinators

Bird and habitat protection
by installing neutral-coloured deflectors at regular intervals along cables reducing bird collisions

New nesting possibilities
can bring back native bird species and inhibit invasive species

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5. CROSS-CUTTING RECOMMENDATIONS

6. Appendix – About EFFEKT

CROSS-CUTTING RECOMMENDATIONS
Permitting & spatial planning

1. The REDII rules on permitting, including the single contact point and clear start and end dates for the permitting process must be implemented where not already done.

2. Digitalisation of permitting is key to improve efficiency and transparency and should be mainstreamed across Member States.

3. The Commission should put in place clear Key Performance Indicators on which MSs shall report on a bi-annual basis. Data should be collected at EU level and used to inform about the implementation of permitting rules on the ground and recommend concrete areas of improvement.

4. RES priority zones, identified via spatial mapping on low biodiversity areas, shall support the development of a “fast track” in terms of grid connection and further contribute to a more balanced and a cost-effective approach of RES deployment.

5. Fast-track permitting procedures (e.g., exemption / simpler Environmental Impact Assessment) should be enabled for integrated and strategically important, low-impact RES projects (i.e., proving benefits for RES deployment, for the community, protecting biodiversity and minimising land-use), especially those being developed in degraded and just transition areas, in industrial facilities, or for those proving multiple synergies with other uses, as well as for repowering ones.

6. In order to reach the RES targets, spatial planning complemented with sensitivity maps will be key. A coordinated spatial planning for generation sites, grids and the related project infrastructure should be ensured at Member States level, informed by the latest science. The Commission, in cooperation with the relevant authorities and with input also from civil society organisations, shall adopt guidelines to establish a methodology and indicators for the low-impact spatial planning assessment.

CROSS-CUTTING RECOMMENDATIONS
Nurturing synergies between biodiversity and RES deployment

1. Create an internal director-level coordination group to improve the transversal working arrangements on biodiversity and energy transition inside the European Commission.

2. Policy coherence must be ensured across the board. At Member State level, legislation across sectors (e.g., infrastructure, agriculture) should be adapted to take into account the potential synergies (e.g., multi-use of space, reduction of noise etc.) with RES project development. In this process, collaboration with all relevant stakeholders and public authorities on the project should be ensured from the outset.

3. The Commission should commit to evaluating how existing legislation supporting biodiversity and climate preservation ambitions can be aligned to facilitate the integrated approach needed to reach both - for instance, by streamlining implementation of legislation and by following on its recommendation related to spatial planning in the Nature Restoration Law, as outlined in the RePowerEU Communication.

4. Where technically and economically justified, companies could be incentivised and supported to retrofit existing RES projects with a “by default” requirement to integrate features that allow them to improve biodiversity and minimise the environmental impact of these installations on the surrounding environment. The Commission should issue guidance on this.

5. Examine how the Common Agricultural Policy (CAP) can better support deployment of renewables. Agricultural lands are the biggest opportunity for biodiversity / climate gains. As the support is currently designed, farmers risk losing their Pillar 1 support under the CAP if their RES installations are too big. Instead, the CAP should actively encourage the combination of integrated energy and agricultural production.

CROSS-CUTTING RECOMMENDATIONS
Funding RES-integrated projects

1. The Commission should apply a “show-it-don’t-tell-it” approach for how to integrate RES with biodiversity - tender 27 massive RES projects across technologies that demonstrate best practices for how to integrate biodiversity with modern energy production, with the help of a stakeholder advisory panel / group to inform the call for tender and guide the selection process.

2. Under the next MFF, allocate €20bn for integrated lighthouse projects and for scaling up practices that have proven to work in specific environments and their implementation at regional and sea-basin level selected by a stakeholder advisory panel / group.

3. Investments in low-risk, integrated RES projects deployed on low-biodiversity risk lands should be accelerated via a system of economic rewards or incentives. The Commission should consider launching an independent study to investigate and identify scope for these. For example, such projects could be exempted from paying certain charges / fees (e.g., utility charges). Member States should publish guidelines for such exemptions, to avoid unfair treatment at the local / regional level. Another example could be reduced or waived costs at auctioning of permits.

4. Designing funding opportunities in a way that maximises opportunities for integrated RES projects to be eligible for financing, thereby avoiding reliance on RES-support schemes and maximising the benefits derived from the use of those funds.

5. A Technical Support Instrument should be established to support Member States facing issues related to lack of expertise, human resources etc.

CROSS-CUTTING RECOMMENDATIONS
Increasing public support for RES projects

1. Ensure publicity of benefits of installing RES projects, especially in previous coal / degraded areas, including the revival of landscapes, job creation potential, extra revenues for communities / land-owners etc.

2. Co-ownership programmes where communities have concrete stakes in RES projects should be encouraged to favour citizens' "buy-in", where relevant.

3. Transparency and adequate stakeholder involvement should be ensured. As biodiversity loss affects multiple communities and economic activities, holistic approaches should be developed through broad stakeholder engagement which start with transparent and early information provision to ensure equity and trust between local communities, project developers, stakeholders involved in environmental protection and relevant authorities. An overall 'value chain perspective' is important to capture full impacts on biodiversity from activities stemming from the power sector. Engagement with regulators, environmental NGOs, and other important stakeholders across all renewables and distribution grid projects to find the best solutions to manage the impact on biodiversity must be sought.

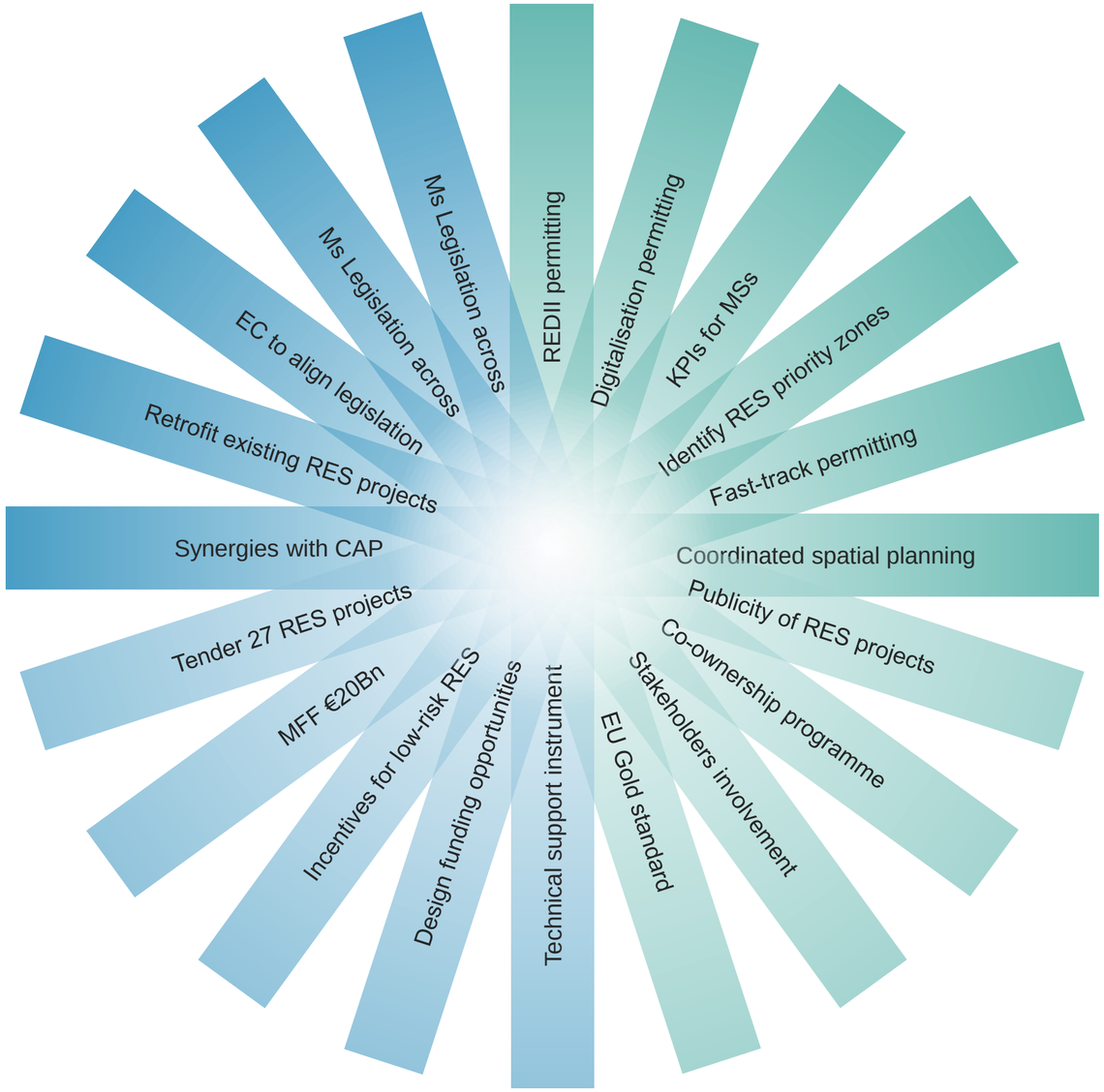
4. The Commission should consider creating an EU-wide 'gold' standard for integrated RES projects, which mainstreams best practices such as spatial mapping of low biodiversity risk areas, collaboration with specialists (e.g., ornithologists, biologists), early consultation with local community stakeholders, and other best practices at the very beginning of project planning phases, to reduce costs and investment uncertainty and to scale up responsible deployment of renewables. This standard should be connected to a system of rewards and incentives (see Rec.3 on previous slide) and its development should be informed by a stakeholder advisory group/panel comprising representatives from academia, civil society, industry, and government.

NURTURING SYNERGIES BETWEEN BIODIVERSITY AND RES DEPLOYEMENT

- Align legislation to support renewables deployment and biodiversity considerations
- Integrated energy and agricultural policy through changes in the CAP

FUNDING RES-INTEGRATED PROJECTS

- Prioritise funding for integrated RES projects (20Bn MFF)
- Rewards for integrated RES projects



PERMITTING & SPATIAL PLANNING

- Pin-point RES Go-To Areas
- Offer fast-track permitting procedures for projects that address both challenges

INCREASING PUBLIC SUPPORT FOR RES PROJECTS

- Community engagement, co-ownership programmes
- Provide early information

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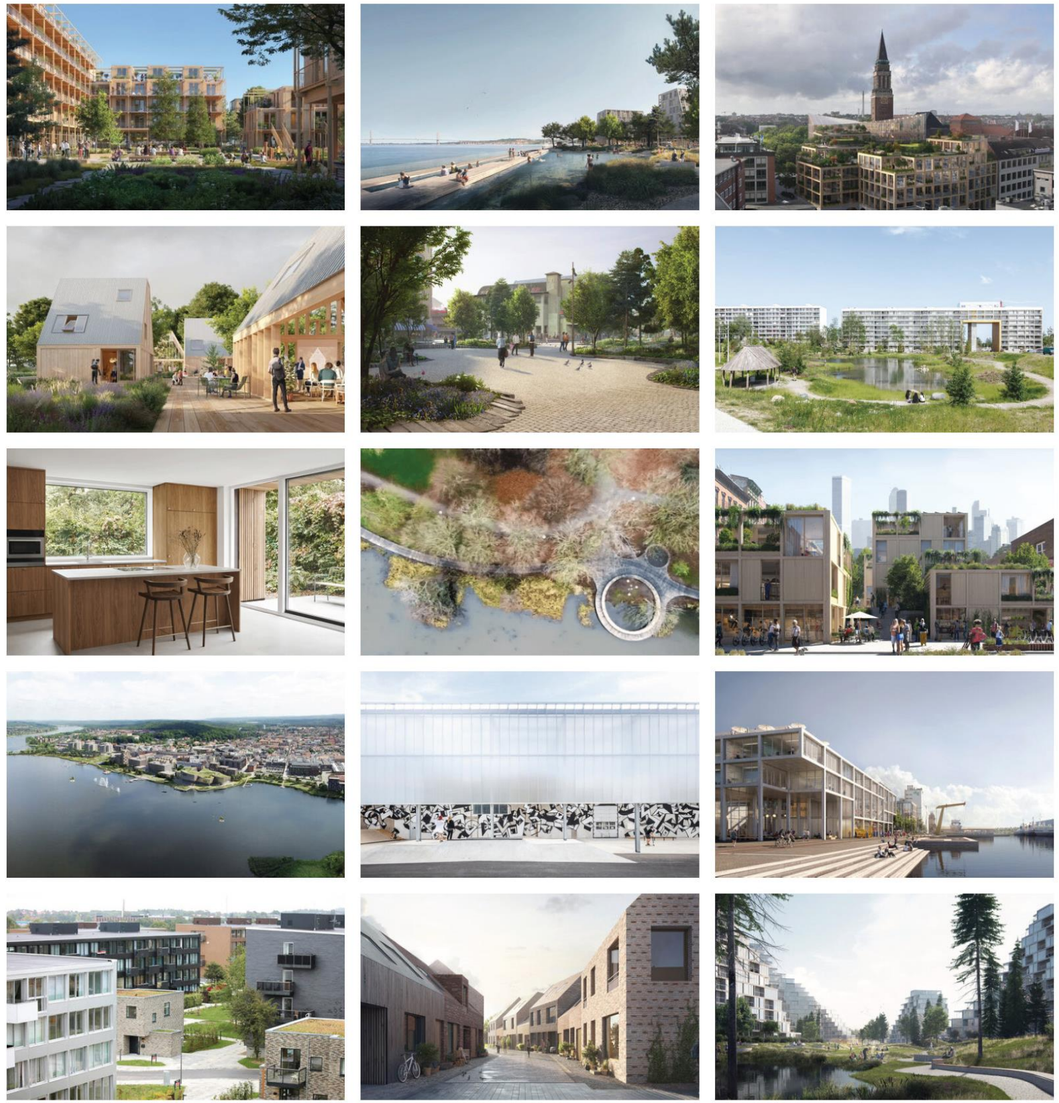
6. APPENDIX – ABOUT EFFEKT

This study was conducted together with Copenhagen-based design and research studio EFFEKT to investigate synergies between RES deployment and biodiversity protection and regeneration.

EFFEKT's team includes designers, architects, urban planners and landscape architects. All of them are **thinkers and builders.** Their projects range in size from urban plans to landscapes, public spaces, buildings, and objects.

EFFEKT combines **a holistic and systemic design** approach with human-scale design sensitivity.

EFFEKT is Danish for **impact.**



POWER PLANT

eurelectric

EFFEKT