Towards more desirable solar power: A proposal and practical implementation of nature-inclusive solar PV that are desirable for local communities

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Institute for Sustainable Energy Policies (ISEP)

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“Renewable Energy and Biodiversity in Synergy: Practices and Promotion in Japan”

DAY 1 | JULY 14 2026, Room C1 13:00-14:00

Introduction

In Iida City, Nagano Prefecture, Ohisama Shinpo Energy Co. (おひさま進歩エネルギー株式会社), hereby OSE, observed native flowers growing within their solar power plant (Figure 1). One flower (the *Kazaguruma,* or Japanese Clematis) was a listed endangered species, but selective mowing practices introduced by OSE enabled native flowering plants to grow healthily (Image 2).

Figure 1: The Orange Daylily spotted growing with the OSE solar power development.

Figure 2: The Kazaguruma flower in bloom within OSE's solar development.

The author, through recent observations like these and his work in regional renewable energy policy for over 20 years, argues that renewable energy can serve a dual purpose of reducing carbon emissions and contribute to local communities and biodiversity. “Nature-inclusive solar power” is one model of a desirable renewable energy.

Renewable energy: The current global context

Despite political changes and increasing opposition to a once more favoured green transition, renewable energy expansion continues worldwide. In 2025, according to EMBER, renewable energy generated more electricity worldwide than coal for the first

time with 33.8% electricity production, largely driven by a rapid growth in solar power. New technologies, including plug-in solar systems, falling battery prices, and advanced grid-scale storage, are making renewable energy more accessible and reliable.

This growth has also been observed in Japan and must be continued to be supported, as renewable energy expansion is not only essential to address climate change, but also to strengthen energy security and independence.

Opposition to solar power in Japan

In Japan, renewable expansion came largely as a reaction to the 2011 Tohoku natural disasters and subsequent Fukushima Daiichi Nuclear Accident. The Feed-in-Tariff (FIT) system introduced in the following year enabled rapid expansion of solar power but also resulted in more than 221 reported local disputes by 2025 (Figure 3). These disputes involve concerns regarding natural disaster safety (自然災害), landscape impacts (景観), living conditions(生活環境), biodiversity conservation (自然保護), and others (その他).

Public concern intensified when large-scale solar developments near Kushiro Wetland raised environmental objections in 2025 (Figure 4). While both national and local governments reacted with varied restrictions and strengthened regulations, this author argues that Japan still lacks a shared vision of what 'desirable renewable energy' looks like. The policies in place today emphasise restriction and limitation, rather than promoting better projects to be built.

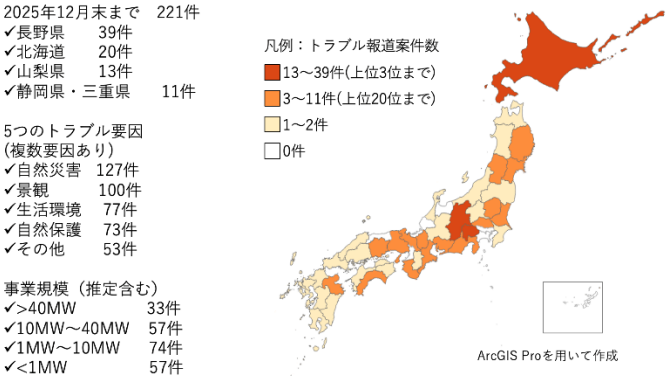

Figure 3: Regional disputes over solar power developments (Yamashita, 2025)

Figure 4: Initially intended location for large-scale solar developments near Kushiro Wetland.

Towards defining 'desirable renewable energy'

To address these issues, ISEP established a study group on desirable renewable energies in 2021. This task force relies on the principles of action research, as defined by Kurt Lewin.

Following discussions, a checklist was published in 2025 which aims at aiding developers, local governments, residents, and other stakeholders to evaluate

renewable energy projects. The checklist acts as a communication tool to be adapted to regional contexts, not a list of restrictions.

The checklist has since been utilised by many localities. For instance, during a 'Future Designs of Kushiro Town' workshop, Kushiro Town residents consulted the checklist and proposed additional criteria that better reflect local priorities (Figure 5). This ongoing collaboration and practical experience of local communities allows the checklist to be continuously revised and improved. Today, ISEP is working to develop a Ver 2.0 of this checklist, which integrates the concept of nature-inclusion (自然共生).

Figure 5: 'Future Designs for Kushiro Town' workshop.

The intersection of Solar Power and Biodiveristy

Several international examples and frameworks are reflected in the nature-inclusive theory underlining the Ver 2.0 checklist. Examples of cooperation between energy companies and conservation organisations observed in England and Germany prove the possibility of solar facilities which not only do not disturb but bring benefit to surrounding native habitats (Figures 6, 7). The International Renewable Energy Agency's (IRENA) Nature Positive Energy Principles are also key principles for ISEP's conception of nature-coexistence.

Figure 6: Flowers growing at a solar power site in southern Germany.

Figure 7: Biotope for Lizards established in solar projects producing over 187 MW in northern Germany.

Successful examples have also been recorded in Japan, the earlier introduced OSE being just one of many (Figures 8, 9, 10, 11).

Figure 8: A nature-inclusive, solar-sharing solar development in Toyooka city.

Figure 9: A mulch mound built next to a rice paddy at the sight of a nature inclusive solar project to support growth of aquatic organisms.

Figure 10: Trial usage of a smartphone application which surveys growth of plants within the solar development site.

Figure 11: Selective mowing practices are employed at the OSE nature inclusive solar power site to promote the growth of local vegetation.

Nature-inclusive solar power (自然共生型太陽光)

The author therefore proposes redefining solar power in a way that not only minimises environmental damages but actively improves biodiversity over time. Nature-inclusive solar power, a desirable renewable energy, can be defined as solar developments that contribute simultaneously to decarbonization and biodiversity through continuous ecological improvement.

Unlike conventional conceptions of trade-offs between renewable energy development, biodiversity health, and climate mitigation, nature-inclusive renewable energies promote long term assessments that transform developments into desirable and sustainable projects for municipalities (Figure 12).

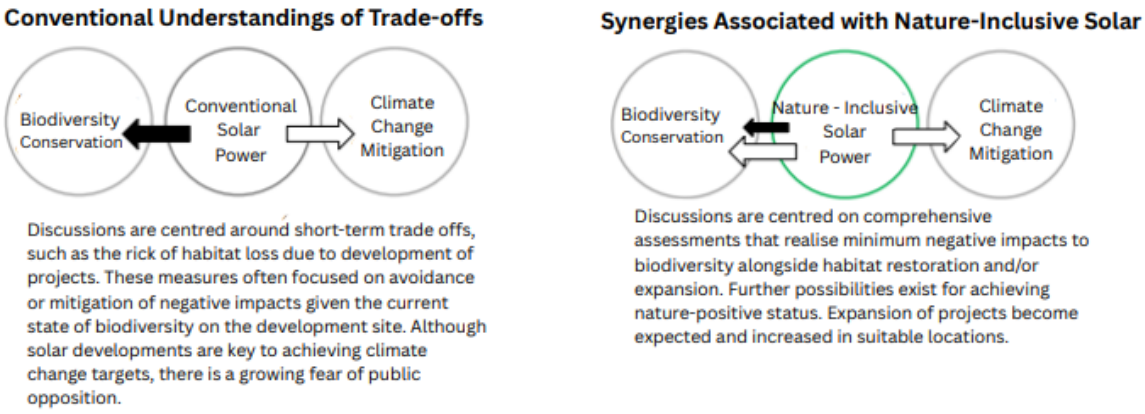

Figure 12: A comparison of trade-offs and benefits between conventional and nature-inclusive renewable energy projects.

Borrowing from the framework outlined in IRENA, CREEI, and IUCN's work entitled 'Local environmental impacts and benefits of large-scale solar PV plants' (2026), this author presents nature-inclusive projects as those which apply appropriate mitigation and preservation measures, continuous monitoring of impacts on biodiversity, and thorough environmental protection (Figure 13). In acknowledgement that not all projects can immediately meet nature positive standards, this framing emphasises incremental improvement and concerted efforts on behalf of developers and producers to implement conservation measures (Figure 14).

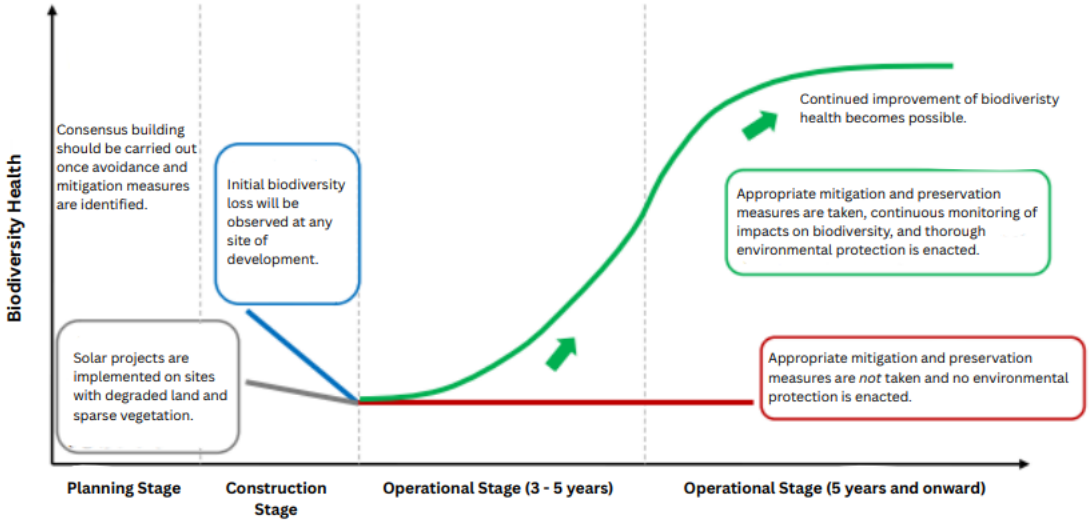

Figure 13: The trajectory of nature-inclusive renewable energy projects.

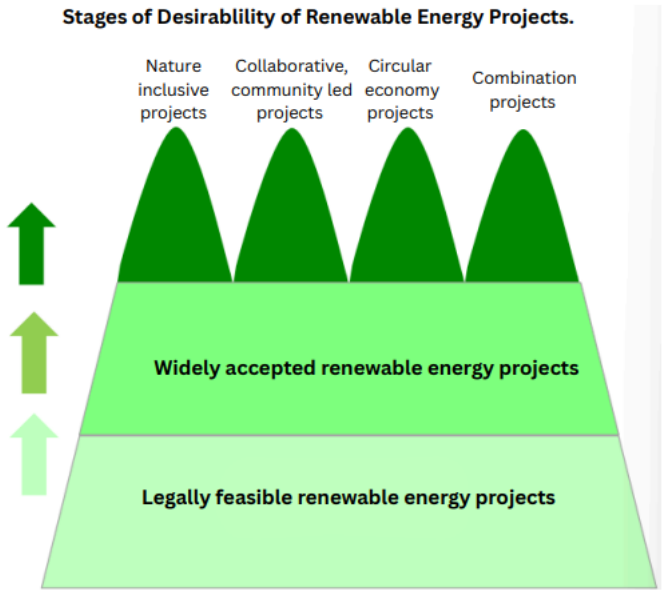

Figure 14: Incremental increase of desirability of renewable energy projects.

Important questions that the author and ISEP continue to work toward answering include tools for measuring biodiversity, how to establish ecological baselines, and how to prevent greenwashing as a result of superficial conservation measures.

Practice and Policy

Moving forward, there are three priorities to promote nature-inclusive solar power:

First, participation should be expanded to include renewable energy companies, local communities, governments, financial institutions, conservation organizations, researchers, and electricity purchasers

Second, practical experience and scientific knowledge should be widely shared through collaborative information networks.

Third, accumulated experience should eventually support certification systems and public policies that encourage biodiversity-friendly renewable energy development.

Renewable energy and biodiversity should not be treated as opposing goals. Through cooperation, experimentation, and continued learning nature-inclusive solar power can become and important model for sustainable regional development in Japan.

Through the Global Positive Nature Summit in 2026, ISEP and this author hopes to grow their collaborative network and promote discussion on these topics.