How Siemens Integrates Biodiversity into Own Operations

SIEMENS

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The value of biodiversity is that it makes our ecosystems more resilient, which is a prerequisite for stable societies; its wanton destruction is akin to setting fire to our lifeboat.

Johan Rockström
Professor in Global Sustainability and Director of the Stockholm Resilience Centre at Stockholm University

Key Terms

CSRD: European Union Corporate Sustainability Reporting Directive

DEGREE Ambitions for 2030: Siemens' "Decarbonization, Ethics, Governance, Resource efficiency, Equity and Employability" Sustainability Framework

GBF: Kunming-Montreal Global Biodiversity Framework

SBAT: Siemens Biodiversity Assessment Tool

SESIS: Siemens Environmental and Safety Information System

Index

1 **Biodiversity** as an Imperative

Biodiversity – the variability among living organisms – underpins the healthy functioning of ecosystems that life on Earth depends upon. From soil fertility, water purification and pollination to disease regulation and protection against climate change impacts, biodiversity is critical for ensuring the health and longevity of societies at large.

However, biodiversity is in crisis, driven by human–induced pressures including habitat destruction, resource overexploitation, and climate change. Up to one million[1] species are threatened with extinction and ecosystems are facing severe degradation and destruction – including wetlands, of which 85%[2] have disappeared.

The crisis demands urgent and coordinated action from governments, industries, and society. Without intervention, continued biodiversity loss and ecosystem degradation could create global economic shocks that could cost up to $5 trillion[3]. Addressing this economic risk requires integrating biodiversity assessments into decision-making processes, investing in nature-based solutions, and fostering collaboration across sectors worldwide.

A global response geared towards building a nature positive future is gaining momentum. In 2022, 196 countries adopted the landmark Kunming-Montreal Global Biodiversity Framework (GBF)[4], committing to halt and reverse biodiversity loss by 2030. This framework underscores the critical link between biodiversity, ecosystem services, and economic resilience, and provides directional impetus behind countries' efforts on biodiversity through 23 agreed-upon targets and four overarching goals, set for 2030 and 2050, respectively.

Non-state actors, including companies, are encouraged to contribute to national implementation efforts through setting their own targets – supported by initiatives like the Taskforce on Nature-related Financial Disclosures[5], which developed a framework to guide companies' understanding of nature and biodiversity-related impacts, risks, and opportunities in their operations. To further realize the GBF, world leaders committed in February 2025 to a breakthrough $200 billion annually by 2030, to establish a permanent financing mechanism for biodiversity protection.

At the national and regional level, stricter regulations and reporting frameworks are both necessitating and supporting action. The EU's Corporate Sustainability Reporting Directive (CSRD)[6], for example, mandates companies to disclose their biodiversity impacts, risks, overall footprint, and mitigation efforts under the European Sustainability Reporting Standards (ESRS E4), in cases where this is deemed material. These reporting requirements provide a myriad of opportunities, including enhancing credibility through transparency and, in turn, offering the potential to attract additional investment from informed stakeholders.

The global developments on biodiversity are complemented by an overarching trend of greater interest in environmental accountability from investors, customers, and other stakeholders, reinforcing the need for structured and science-based approaches to biodiversity management.

Understanding and addressing biodiversity impact within a corporate framework requires a multi-dimensional approach – one that integrates data-driven insights with sustainable business practices and considers the full value chain.

By conducting comprehensive assessments, businesses are able to identify areas of high biodiversity impact and develop targeted strategies to minimize negative effects. The outcomes allow organizations to quantify their impact, identify KPIs, and prioritize actions for improvement.

As a global leader in technology and innovation, we recognize the critical challenges posed by biodiversity loss, as well as the opportunities that proactive environmental stewardship presents. That is why in 2021, we took a significant step forward by conducting a landmark science-based biodiversity footprint assessment – the first of its kind for our company. Undertaken in collaboration with the UK-based The Biodiversity Consultancy[7], this evaluation provided critical initial insights into biodiversity-related risks, dependencies, and opportunities for impact mitigation activities within our upstream value chains and operational sites.

To further contribute meaningfully to conservation efforts, we have, as of 2025, embedded biodiversity into our foundational DEGREE (Decarbonization, Ethics, Governance, Resource efficiency, Equity and Employability) sustainability framework and Eco Efficiency program, heightening accountability across our operations. Within the "R" of DEGREE, we now have a biodiversity-specific ambition, centered on **aiming to drive biodiversity protection by implementing a conservation program at 100% of our environmentally relevant sites by 2030**.

Siemens team planting trees in Chippenham, United Kingdom

Through our site-level biodiversity impact assessments, we are now able to screen, assess and define measures to promote biodiversity at each of our environmentally relevant sites.

We have prioritized further action by providing internal guidelines on reporting requirements and training for all environmentally relevant sites. Alongside this, numerous sites have voluntarily embarked on biodiversity initiatives led by internal working groups.

Our approach is tailored to the unique characteristics of each site, ensuring our actions effectively preserve and enhance local ecosystems, mitigating the impacts and risks on biodiversity while promoting opportunities throughout. Not only are we mitigating our impact on biodiversity within our own operations, but we also recognize its powerful social benefits. As the World Economic Forum[8] highlights, access to nature reduces stress, boosts mental well-being, and enhances workplace productivity. That is why we actively involve our people in biodiversity initiatives – through hands-on experiences, awareness programs, and opportunities to connect with nature.

We have already seen the positive impact; however, we are committed to strengthening our efforts, ensuring biodiversity remains a pivotal focus in how we support our people and the environments we operate in.

This white paper offers a comprehensive overview of how we have integrated biodiversity into our global operations following our initial assessment in 2021. It details our approach to evaluating biodiversity impacts at site level, the implementation of targeted strategies, relevant case studies, and our commitment to collaboration and partnerships. Additionally, it highlights the importance of technological innovation and engagement of Siemens people in advancing and maintaining biodiversity conservation across all locations, underscoring our commitment to a sustainable future by embedding biodiversity considerations into our overall business model and operations.

Tree planting in Chippenham, United Kingdom, as part of the Tiny Forest Project

2 Our **Biodiversity** Standard

Our Biodiversity Standard describes the objectives and scope of our biodiversity conservation efforts, as well as the underlying regulatory requirements and motivation. It conveys the details of the process, defines the roles and responsibilities within it, as well as the tools to be used.

This process is facilitated through the Siemens Biodiversity Assessment Tool (SBAT) – including screening for proximity to biodiversity-sensitive areas and assessment of potential pressures on biodiversity – and the Siemens Environmental and Safety Information System (SESIS), used to define targets and report on measures.

Istanbul's Kartal Region, Turkey, our gardening prioritizes drought-resistant plants, complemented by birdhouses for avian visitors

Biodiversity Conservation Program

At the center of our Biodiversity Conservation Program is the Site Impact Assessment, a comprehensive framework designed to evaluate and mitigate the impacts of our operations on local biodiversity. The new Global Environmental Protection Standard emphasizes our commitment to conserving biodiversity and is in line with the requirements of international and EU regulations[11], including the EU Taxonomy and the EU CSRD.

It contains the following methodologies and criteria:

1. **Screening:** The initial step involves screening the site to identify any protected areas or biodiversity – sensitive areas within a specified proximity. This is done using the SBAT, which helps to assess the biodiversity conditions of the site.
2. **Impact Assessment:** The next step is to evaluate the site's impacts on local biodiversity, caused by facility management and activities. This involves answering a series of questions classified into general questions and specific types of pressure on biodiversity, such as land use, natural resources exploitation, pollution, and the introduction of invasive species. These impact categories are identified by the IPBES framework[9]. The magnitude of the impact is evaluated as "low", "medium", or "high", and comments are provided to explain the answers.
3. **Mitigation Measures:** Based on the results of the impact assessment, mitigation measures are defined, implemented, and documented in our internal reporting tool. If the impact assessment results in a "medium" or "high" impact, mitigation measures must be implemented to reduce the impact.
4. **Mitigation measures are identified in three categories:** legally binding measures due to local or regional requirements; necessary measures identified through the SBAT; and measures executed on sites on a voluntary basis.
5. **Reporting:** The results of the Biodiversity Site Impact Assessment are used to fulfill reporting obligations and ensure compliance with international and EU regulations[12]. This includes fulfilling the reporting requirements within the EU Taxonomy and the EU CSRD, which emphasizes the importance of conserving biodiversity.

3 Biodiversity Activation

Siemens office in Frankfurt, Germany operates vertical farming for its own use

We have developed a comprehensive approach to integrating biodiversity KPI considerations and relevant Do No Significant Harm (DNSH)[10] reporting into our operational processes. This approach is designed to ensure biodiversity is a key factor in decision-making in support of biodiversity at Siemens sites.

Ongoing monitoring is a critical aspect of our approach to biodiversity conservation. The company continuously evaluates the effectiveness of implemented measures and makes necessary adjustments to improve outcomes. This involves regular assessments of biodiversity, water stress, and waste management practices at operational sites. Siemens also engages in strategic evaluations.

Our approach to biodiversity implementation includes the following:

1. Own Operations

In our own operations, we aim at identifying and mitigating pressures that our sites have on biodiversity, due to their facility management and design, as well as because of our activities. For this reason, we use the SBAT. With this assessment tool, we first screen the proximity of each site to biodiversity hotspots, such as protected areas, and then assess the presence of any impact on the local biodiversity. In accordance with the results of the assessment, we define mitigation measures on site that aim at mitigating the impacts. We then track and report these measures' implementation.

2. Ongoing Monitoring

We implement ongoing monitoring to track the effectiveness of biodiversity conservation measures. The results of these assessments are documented and used to inform future decision-making as well as fulfill reporting requirements.

3. DEGREE Ambition for 2030

Siemens' DEGREE stands for Decarbonization, Ethics, Governance, Resource efficiency, Equity and Employability. The "R" in DEGREE (Resource Efficiency) emphasizes the efficient use of natural resources and the reduction of environmental impacts. By integrating biodiversity considerations into our DEGREE framework, we ensure our operations contribute to the conservation of biodiversity while also enhancing resource efficiency.

DEGREE aims to enhance resource efficiency and sustainability across various environmental aspects, including biodiversity, water, and waste management. For biodiversity, the ambition means to implement a conservation program at 100% of environmentally relevant sites by 2030. This involves screening and assessing biodiversity at sites, followed by defining and implementing measures that are related to the previously identified impacts.

We are also protecting biodiversity through our commitment to the circular economy, which reduces natural resource extraction and thereby mitigates impacts on biodiversity. Waste management for DEGREE aims to achieve zero waste to landfill by 2030 and halve waste to landfill by 2025. This involves implementing a holistic and circular waste management program, focusing on reducing, reusing, recycling, and recovering waste.

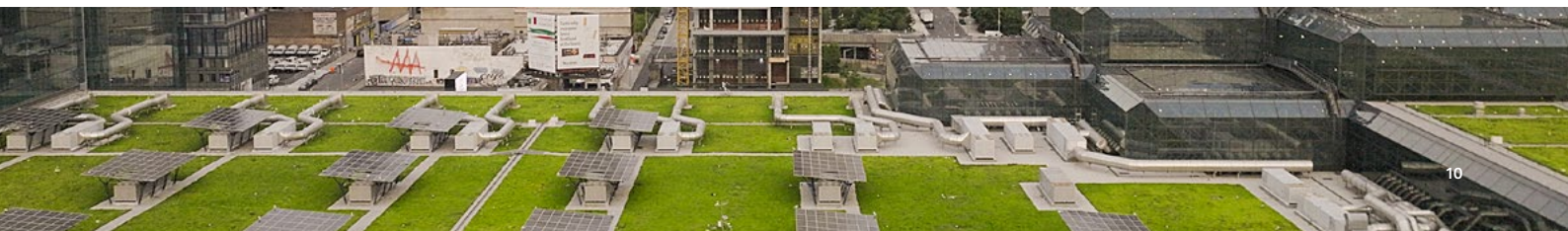
The integration of biodiversity considerations into our operational processes is a critical component of our commitment to sustainability. By incorporating biodiversity assessments into site selection, project planning, and ongoing monitoring, we ensure that our operations have a positive impact on local ecosystems. DEGREE further reinforces this commitment by promoting resource efficiency and ecosystem protection throughout our operations.

4. Biodiversity in Action

The selected environmentally relevant sites which fulfil reporting criteria and respective thresholds such as space, energy source, waste, and CO2e emissions.

Data can be used to refine the understanding of impacts and identify opportunities. Site biodiversity action plans are a valuable tool to compile baseline data, set local targets and develop actions to address impacts and maximize opportunities. Potential actions may include establishing biodiversity areas within sites, such as beetle banks, wildflower meadows or hedgerows and trees. They can contribute to a more biodiversity site. This not only has benefits for biodiversity, but also for people's wellbeing and happiness.

In addition, we support nature protection or restoration programs in the landscape near to facilities to further support biodiversity near our premises.



Case Study

Regensburg, Germany

The site Regensburg as part of Siemens Germany has created KPIs and developed a catalog of measures to improve biodiversity independently at its site. The scope of the project is limited to flora, excluding fauna.

The methodology used includes the identification and numbering of green spaces through Open Sources Geographic Information System (QGIS), and the creation of a flora register that documents the species and counts the number of individuals per area.

The Biodiversity Site Impact Assessment includes measures of alpha, beta, and gamma biodiversity, with alpha biodiversity referring to species richness within a specific green space, beta biodiversity measuring the variation in species composition between different areas, and gamma biodiversity representing the total species diversity in a larger region.

The results of the Assessment are categorized into different scales, with green spaces classified based on the number of species present. It also highlights the presence of invasive species and their impact on native flora.

Recommendations for improving biodiversity include planting native species, avoiding invasive species, and considering endangered species and those that provide ecosystem services.

The project emphasizes the importance of regular monitoring and the use of KPIs to evaluate the effectiveness of biodiversity measures.

Overall, the Regensburg site provides a comprehensive overview of Siemens' efforts to enhance biodiversity at its sites, outlining the methodology, results, and recommendations for future implementation.

Improving biodiversity through planting carefully selected native flora

Key Terms:

- **Alpha biodiversity** refers to the species diversity within a specific area or green space. It can be measured in three ways: species richness (the number of different species in each green space planted by the company), the Shannon Index (which measures species diversity in a community, considering both species richness and evenness), and the Simpson Index (which measures the probability that two randomly selected individuals from a sample belong to the same species, with a lower value indicating higher diversity).
- **Beta biodiversity** refers to the degree of variation in species composition between different areas within a region. It can be understood as the ratio of gamma biodiversity (the total diversity of a region or large area) to alpha biodiversity (the diversity within a specific area or sample unit). Simply put, beta biodiversity measures the differences in species diversity between different areas of a landscape.
- **Gamma biodiversity** is the total species diversity in a larger region, encompassing all analyzed areas. It is a measure of the overall diversity at the company site and the total number of species in the studied region.
- **Invasive species** are non-native plants that spread rapidly and displace native flora.
- **Green space ratio** refers to the proportion of a property that is not covered by buildings, traffic, or parking areas. To assess the current state of biodiversity at the site, a comprehensive survey was conducted, recording all species in each green area and counting the number of individuals.

Case Study

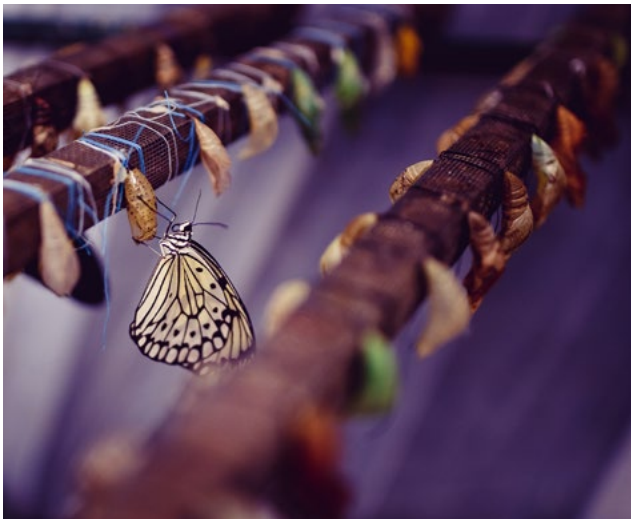
Goa, India

Our Biodiversity Enrichment program, focusing on the Goa location, was officially launched on June 14, 2023. The program aims to understand and conserve biodiversity at the site through a series of targeted initiatives. Running from June to December 2023, the program set five key objectives: identifying green zones and potential areas for new plantations; preparing a comprehensive campus biodiversity register; designing and developing a butterfly garden; creating an herbal garden; and establishing a pond ecosystem complete with a water fountain.

On Siemens India sites, hands-on employee engagement initiatives are transforming industrial spaces into thriving ecosystems that support biodiversity

To measure the success of the biodiversity enrichment, three KPIs were established: the diversity of native or indigenous species; the diversity of native or indigenous fruit-bearing trees; and the presence of indicator, endemic, and invasive species. Notable examples of such species include the Wayanad Grey Striped Moth, the Giant African Land Snail, and the Burmese Rosewood.

The proposed site developments included the identification of potential zones for new plantations and the creation of ecological features, such as an herbal garden, a fountain or pond ecosystem, and a gazebo or butterfly garden. Biodiversity observations conducted at the site have recorded 594 individual flora specimens, 56 bird species, 28 butterfly species, 7 moth species, 3 reptile species, and 2 amphibian species. Additionally, various other forms of biodiversity, including millipedes, fungi, dragonflies, and butterflies have been noted within the campus environment.



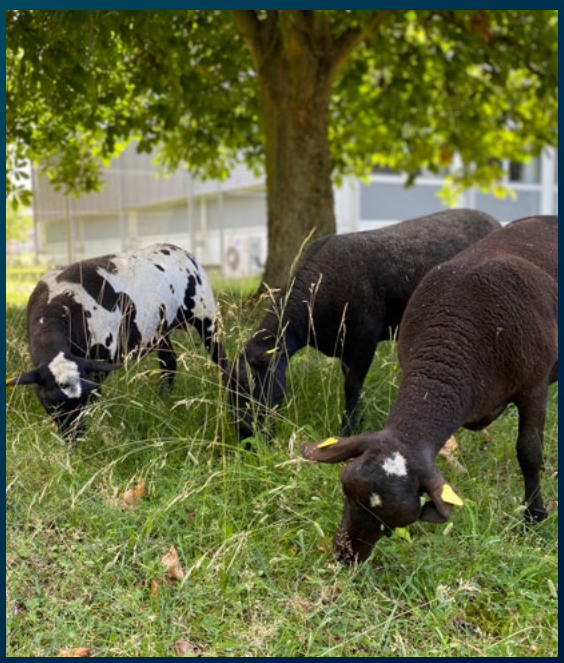
Case Study

Karlsruhe, Germany

At our Karlsruhe location, a series of biodiversity measures have transformed the site into a vibrant habitat that supports both nature and people.

To protect delicate ecosystems, sheep and donkeys are used as natural lawnmowers. Their grazing helps preserve habitats for insects and small animals that would otherwise be disturbed by mechanical mowing.

Several traditional lawns have been converted into wildflower meadows, creating colorful sanctuaries for pollinators and enriching the local biodiversity.



In addition, stone walls, deadwood piles, and earth mounds have been integrated to provide shelter for insects and lizards.

The site is also home to its own bee colony, contributing to pollination and offering a hands-on example of ecological stewardship. For employees, snack corners featuring raspberry and blackberry bushes offer a sweet connection to nature during the workday.

To support local birdlife, nest boxes for songbirds have been installed, turning the site into a welcoming refuge for the local avian population.

4 Collaborations and **Partnerships**

We actively collaborate with various environmental organizations, local communities, and other stakeholders to enhance biodiversity conservation efforts. These partnerships are integral to Siemens' strategy for promoting environmental sustainability and preserving biodiversity.

The Biodiversity Consultancy[7] helps businesses integrate nature positive practices into their operations by offering a range of services. These include due diligence to assess biodiversity-related risks and opportunities, nature assessments to evaluate the impact of business activities on nature, and impact and dependency screening to identify key areas for action. They also assist with target setting and strategy development to create long-term visions and science-based targets, and help businesses prepare for nature-related disclosures in alignment with frameworks like Taskforce on Nature-related Financial Disclosures (TNFD)[5]. Additionally, they promote responsible procurement by encouraging sustainable sourcing and circularity. Their goal is to bridge the gap between business and biodiversity, ensuring both can thrive together.

This partnership highlights Siemens' commitment to leveraging external expertise to enhance its biodiversity ambitions.

We also engage with local communities through grassroots biodiversity projects implemented at various sites. These projects aim to showcase exemplary practices aligned with the EU Biodiversity Strategy, empowering local initiatives to promote conservation and minimize effects on species diversity.

By involving local communities, such as Siemens Egypt where initiatives have contributed to turning challenges into solutions by empowering holistic sustainability solutions within the community. We ensure that biodiversity efforts are tailored to regional and site-specific characteristics, fostering a sense of ownership and active participation among community members.

By leveraging our technological expertise, we enhance the effectiveness of their conservation measures and contribute to the broader goal of preserving biodiversity.

Overall, our collaborations and partnerships with environmental organizations, local communities, and other stakeholders are crucial for driving biodiversity conservation efforts. These partnerships enable Siemens to implement effective measures, share best practices, and continuously improve environmental sustainability initiatives.

5 Technological Innovations for **Biodiversity**

We are leveraging our technological expertise to develop innovative solutions that support biodiversity, focusing on eco-friendly infrastructure and sustainable resource management. One of the key technologies utilized is Geographic Information Systems (GIS), which plays a crucial role in environmental monitoring and reporting. We use it to assess and manage biodiversity impacts at various sites, ensuring that conservation measures are effectively implemented and monitored.

Additionally, we are exploring the potential of Artificial Intelligence (AI) tools, particularly within our Corporate Environmental Protection Data framework, to enhance biodiversity conservation efforts. These AI tools can analyze large datasets to identify patterns and trends, enabling more informed decision-making and proactive measures.

By integrating these technological innovations, we aim to create a sustainable future where biodiversity is preserved and enhanced through cutting-edge solutions and strategic resource management.

Siemens Campus in Zug, Switzerland

6 Taking Everyone **Along**

We have implemented a comprehensive employee engagement and training program aimed at educating and involving people in biodiversity conservation efforts. The program includes various initiatives designed to raise awareness and foster a culture of environmental stewardship among people.

Training sessions are conducted to educate the environmental health, and safety community on the importance of biodiversity and the role they can play in its conservation. These sessions cover topics such as enabling use of the new Biodiversity Standard to our global Environmental Protection Standard, the benefits of biodiversity, and practical steps employees can take to contribute to conservation efforts.

Additionally, we also promote volunteer opportunities, allowing employees to engage in hands-on conservation projects and community activities. Through these programs, we aim to empower our people to become advocates for biodiversity, driving positive change within the organization and beyond. By fostering a sense of responsibility and providing the necessary tools and knowledge, we ensure that our people are well-equipped to support and contribute to biodiversity conservation initiatives.

7 Our Commitment

Our inclusion of a biodiversity ambition within our DEGREE marks a pivotal milestone in our long-standing commitment to environmental sustainability, adding a critical layer of impact assessment to our global operations. In taking this action, we are additionally contributing to global and regional goals on biodiversity and nature protection.

Protecting, restoring and conserving biodiversity requires a comprehensive and scientifically grounded approach. Our pioneering methodology enables us to identify sites of concern and opportunities, assess localized biodiversity-related impacts, and implement targeted strategies that drive measurable impact.

Understanding our environmental footprint at each site paves the way for heightened awareness and the provision of specialized training initiatives for our people. Not only will site-specific assessments promote transparency in reporting and disclosure, but they will also encourage a more collaborative and holistic solution for addressing biodiversity challenges across our entire company.

We have already started to see the positive impact of our efforts at sites worldwide, and we remain committed to continuous improvement and strengthening of our biodiversity initiatives, ensuring we support our people and the environments in which we operate.

The scale of biodiversity loss and nature degradation being witnessed worldwide demands a concerted global effort. We urge businesses, policymakers, and stakeholders to adopt robust biodiversity assessment frameworks, integrate nature and biodiversity considerations into strategies, and collaborate to protect, conserve, and restore the world's ecosystems.

By continuing to set new benchmarks for corporate biodiversity stewardship, and with the technologies within the Siemens portfolio that can support customers to improve their own biodiversity footprint, we remain dedicated to shaping a more sustainable and resilient future—one where biodiversity is safeguarded for generations to come.

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