# Protecting Biodiversity **Commitments and Actions**

TotalEnergies

“As a major player in the energy transition, TotalEnergies puts sustainable development in all its dimensions at the heart of its projects and operations to contribute to the well-being of people.

On the occasion of the preparation of the United Nations Plan for Biodiversity, TotalEnergies reasserts its commitments to protect biodiversity.”

**Patrick Pouyanné,**
**Chairman and Chief Executive Officer**

# Biodiversity Threatened

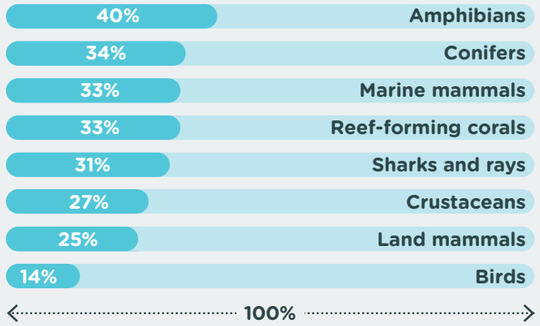
**290 million** hectares of primary forests

**85%** of natural wetlands

... HAVE ALREADY DISAPPEARED

**1,000,000** animal and plant species

ARE THREATENED WITH EXTINCTION




**75%** of land-based environments

**66%** of marine environments

... HAVE BEEN ALTERED BY HUMAN ACTIONS

**68%**

Forests now cover only 68% of their pre-industrial area and primary and tropical forests continue to disappear steadily.

**23%**

Land degradation has reduced the productivity of 23% of the global land surface.

**9%**

of all domesticated breeds of mammals used for food and agriculture had become extinct by 2016 and 1,000 more breeds are still threatened.

**100 to 300 million**

people are at increased risk of floods and hurricanes because of loss of coastal habitats and protection.

Source: IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), 2019

# Our Ambition

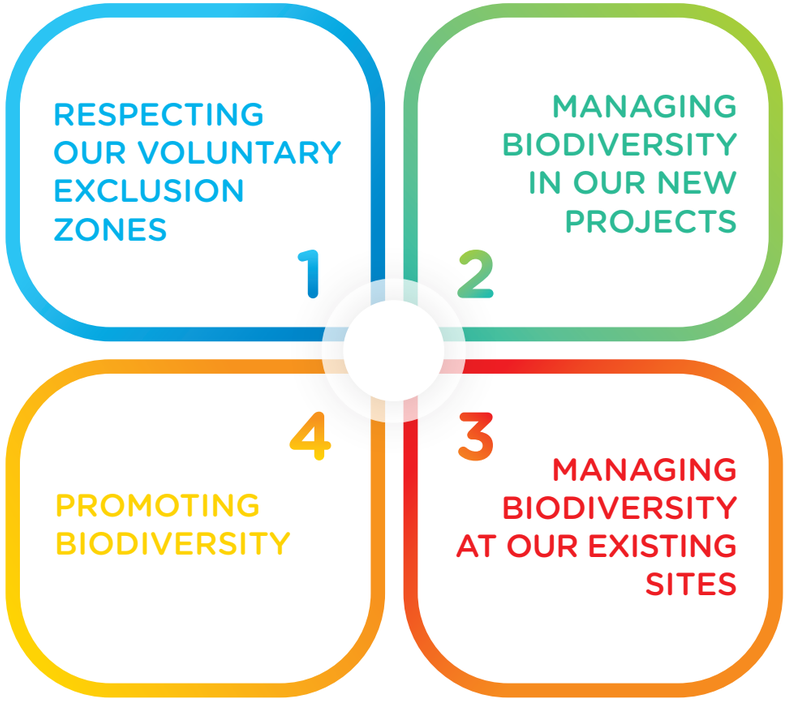
As a major player in the energy transition, TotalEnergies puts sustainable development in all its dimensions at the heart of its projects and operations to contribute to the well-being of people.

The Company has pledged to contribute to the United Nations Sustainable Development Goals (SDGs), including those related to the conservation of biodiversity.

Aware of the challenges related to environmental management and the use of the planet's natural resources, TotalEnergies strives to manage the environmental effects of all its projects and operations according to the Mitigation Hierarchy principle of avoidance, minimisation, restoration and offsetting.

On the occasion of the preparation of the United Nations Plan for Biodiversity, TotalEnergies reasserts its commitments to protect biodiversity.

# Our Commitments



## 1 Respecting Our Voluntary Exclusion Zones

- We commit, in recognition of the universal value of UNESCO World Natural Heritage sites, not to conduct oil or gas exploration or extraction operations in these areas.
- We commit not to conduct any oil field exploration operations in Arctic sea ice areas.
- We commit to publicly report on the implementation of these commitments.

### HOW?

- **By annually publishing a map of our licenses in the Arctic sea ice areas, on totalenergies.com.**
- **By annually updating an internal atlas of UNESCO World Natural Heritage Sites, based on UNESCO public data and comparing the list of new sites to that of our operations.**

## 2 Managing Biodiversity In Our New Projects

- We commit to developing biodiversity action plans for each new project on sites located on an area of interest for biodiversity, that is, IUCN (International Union for the Conservation of Nature) Protected Area Categories I to IV and Ramsar areas. The action plan shall be in place, at the latest, at the time of commissioning of the site.
- We commit to producing a net positive impact on biodiversity, confirmed by a third-party institution, for each new project on sites located in an area of priority interest for biodiversity, that is, IUCN (International Union for the Conservation of Nature) Protected Area Categories I to II and Ramsar areas.

### HOW?

- **By annually publishing the number of biodiversity action plans in place or under preparation and reporting on implementation.**
- **By annually reporting on the implementation of our net positive impact plans.**
- **By publishing certificates of net biodiversity gain for these projects.**

## 3 Managing Biodiversity At Our Existing Sites

- We commit to putting in place a biodiversity action plan at each of our environmentally significant sites[1] which are ISO 14001:2015 certified, and to report on the implementation of this plan to our stakeholders.
- For sites which are ceasing operations, we commit to considering the development of a dedicated area rich in biodiversity (e.g. rare species habitats, biodiversity sanctuaries, etc.) as one of the options for their rehabilitation.

### HOW?

- **By deploying biodiversity action plans in three stages over the period 2021-2025: biodiversity surveys, design of the action plan, implementation and communication of results.**
- **By raising awareness of biodiversity within teams on each site.**
- **By assessing the possibility of redeveloping our closed sites into areas favorable to biodiversity.**
- **By communicating progress and results of the programs publicly, locally and on totalenergies.com.**

## 4 Promoting Biodiversity

- As part of TotalEnergies Foundation's Climate, Coastal and Oceans program, we commit to supporting biodiversity related awareness programs, youth education and research actions concerning the ocean and coastal environments.
- As part of TotalEnergies Foundation's Action! program, we commit to offering our employees dedicated workdays to conduct action in favor of biodiversity to promote the civic engagement of the Company's employees.
- We commit to sharing biodiversity data, collected as part of our environmental studies, with the scientific community and the general public.

### HOW?

- **By annually publishing the list of projects supported and partners funded, in France and internationally, and results.**
- **By evaluating and publishing our performance indicators (e.g. number of youths made aware and trained, number of employees involved on these issues in France and internationally).**
- **By annually sharing biodiversity data from five projects or sites on the international biodiversity data sharing platform Global Biodiversity Information Facility (GBIF) and reporting on this.**
- **By collaborating with the United Nations World Conservation Monitoring Center (UNEP-WCMC) on the mapping of sensitive and priority areas.**

[1] All operated exploration-production sites in production, refineries, petrochemical and polymer sites, gas-fired power plants.

David Ochanda, TotalEnergies Biodiversity Coordinator in Uganda, helps place a collar on Murchison Falls elephants to track their movements by satellite.

# Our Actions

We implement specific and concrete actions on site to manage the impacts of all our operations on biodiversity. The approach that underpins our actions: avoid foremost, minimise what cannot be avoided, and as a last resort, offset impacts when necessary. We strive to protect biodiversity wherever we operate and throughout the life cycle of our facilities.

# TotalEnergies: no exploration in the Arctic sea ice areas

**Steven Dickinson,**
**Biodiversity Specialist**
**TotalEnergies**

### THE PROTECTION OF VOLUNTARY EXCLUSION ZONES IS PART OF YOUR FOUR COMMITMENTS TO PROTECT BIODIVERSITY. CAN YOU TELL US ABOUT IT?

**S.D.** The Company has pledged to voluntarily exclude certain oil and gas exploration or extraction activities in particularly sensitive areas. These include natural sites listed as UNESCO World Natural Heritage sites. Arctic sea ice areas are also included in our voluntary exclusion zones, unlike our peers who have not made any pledges in this regard. We reaffirmed these decisions in 2018 when we signed the Act4Nature biodiversity initiative, then again in 2020 as part of the Company's biodiversity ambition.

### IN CONCRETE TERMS, WHAT DOES THIS IMPLY IN THE CHOICE OF THE PLACES WHERE YOU OPERATE?

**S.D.** The voluntary exclusion zones defined by UNESCO represent a total of 3.6 million square kilometers and therefore possibilities of interaction with our exploration or extraction activities. We've developed an in-house atlas which is updated every year to reflect UNESCO data and to compare the list of new registered sites with the sites of our operations. We make sure that exploration and production licenses are not acquired on UNESCO identified sites. If a license is acquired before the site is listed, we make a public statement to acknowledge this interaction. With respect to the Arctic sea ice, we update and publish an annual map of the Company's licenses. Up to today, we do not conduct any oil and gas exploration or production operations in UNESCO listed zones.

### WHAT KIND OF RELATIONSHIP DOES THE COMPANY HAVE WITH ORGANIZATIONS SUCH AS UNESCO? DO YOU HAVE THE OPPORTUNITY TO WORK TOGETHER?

**S.D.** We do try to work hand in hand with United Nations bodies for an increasingly strong contribution to biodiversity protection. We have numerous, productive exchanges. For instance, I was appointed expert to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystems Services (IPBES), which is linked to the United Nations Environment Program (UNEP).

I'm also regularly in contact with the UN general secretary of the Convention on Biological Diversity (CBD) as a representative of our industry. We participate in the consultation process for the preparation of the Global Biodiversity Plan presented at the COP (Conference of the Parties). With our Ambition, we wish to contribute, at our level, to the UN Global Biodiversity Plan.

## IN 2021

**1,154**
**properties are listed as UNESCO World Heritage sites.**

**The list includes**

**218**
**natural sites,**

**897**
**cultural sites,**

**39**
**mixed sites.**

# Tilenga Project: a tailored action plan to generate a net gain in biodiversity

The Tilenga project developed by TotalEnergies in Uganda, is located in a sensitive area in terms of biodiversity and ecosystem services. TotalEnergies seeks to ultimately generate a net gain in biodiversity, in other words, improve biodiversity in the region with respect to its state at the start of the project, in particular at the Murchison Falls national park.

## AN ENGAGEMENT BASED PROJECT

From the project's start, TotalEnergies chose to engage intensely with stakeholders, giving them a strong voice, as part of a consultative and conciliatory based approach.
Four years and the consultation of nearly 10,000 people were required to carry out the environmental and societal impact study.
The Company also works in close coordination with key government stakeholders, as well as with local and international NGOs to benefit from their expertise.

## BEYOND COMPENSATION

The Tilenga Net Gain program seeks to protect 10,000 hectares of natural forest threatened with deforestation or fires, to restore 1,000 hectares of tropical forest, and to achieve a 25% increase in the populations of animal species such as lions or elephants in the Murchison Falls national park.
Other priority species are also concerned: giraffes, Ugandan cobs, Jackson's Hartebeest, chimpanzees, as well as birds and aquatic animals. The net gain will be verified by a third-party institution.

> **Not only do we conserve the region's biodiversity, but we strive to enrich and develop it.**
>
> **David Ochanda,**
> **TotalEnergies Biodiversity Coordinator in Uganda**

### THE FOUR KEY PILLARS OF THE TILENGA NET GAIN PROGRAM

1. **Reduce human pressures and strengthen the ecological resilience of the Murchison Falls protected area, of which only 0.1% of the surface is concerned by our operations.**
2. **Implement conservation and restoration measures for forests and their connectivity*.**
3. **Protect and maintain the connectivity of habitats in the savannah and proximity of the Bugungu natural reserve.**
4. **Work with local communities to manage and restore wetlands along the southern bank of Lake Albert, a Ramsar site.**

*Ecological connectivity is the unimpeded exchange or movement of species, individuals or genes through patches of the landscape. These exchanges are necessary to ensure functioning, stable and resilient ecosystems.

# Protection of wildlife and flora near our new wind farm located at Réunion Island

The solar and wind power plants of La Perrière on Réunion Island are located close to the heart of the Island's park, a category II, IUCN (International Union for Conservation of Nature) listed area. To avoid and minimize their impact on this fragile ecosystem, TotalEnergies has set up a biodiversity action plan.

## A PLAN DESIGNED TO PROTECT ENDANGERED SPECIES

This plan is required given the context of the installation of a new wind farm in the northwestern part of Réunion Island. This region is home to mid altitude wetlands, remarkable plant species and several endangered species of animals. These include the Bourbon green gecko, a reptile that is native to Réunion Island and the Réunion harrier, both listed as endangered by the IUCN.

The biodiversity action plan seeks to protect these species with specific measures such as the relocation of geckos to specific sanctuaries. An environmental monitoring program for birds and bats will also be conducted during the first two years of the operations in order to adjust the measures if necessary.

**34**

**The IUCN has listed Réunion Island among the 34 biodiversity hotspots in the world. A hotspot is an area with an extremely rich biodiversity, that is threatened by human activity.**

## Facilitating decision making with Marine LEFT

TotalEnergies uses its Marine LEFT[1] tool to acquire precise information on a marine environment and act efficiently on biodiversity.

This decision-support tool analyzes biophysical, environmental, societal, economic and ecosystem geo-referenced global databases. The tool can quickly generate a complete, referenced report on the study area. It also helps to identify the biodiversity challenges of our projects and our sites and assess the risks associated with acquisitions. The data used are obtained from known sources and are subject to strict quality control.

[1]Marine LEFT (Local Ecological Footprinting Tool) was developed under a collaboration between the University of Oxford, Equinor and TotalEnergies. This tool is freely available to the scientific community, the private and public sector (www.marineleft. ox.ac.uk).

## Improving knowledge of the impact of solar power plants on biodiversity

Since 2014, TotalEnergies has teamed up with ADEME[1], Eco-Med[2] and IMBE[3] experts and researchers to conduct a scientific experiment on several of its solar power plants. The findings were published in two guides in September 2020: a technical ecodesign guidance document for on-shore solar power plants helping to Avoid, Reduce or even Offset the impacts of projects and an ecological monitoring protocol for solar power plants in order to improve knowledge on the impact of projects.

[1]ADEME: Ecological transition agency (France). [2]Eco-Med: ecological design firm (France).
[3]IMBE: *Institut Méditerranéen de Biodiversité et d'Ecologie* (France).

# Saving protected species at Carling-Saint-Avold

## The polymer production unit at the Carling-Saint-Avold site (France) is established near protected amphibian species' habitats.

TotalEnergies implemented a biodiversity management plan further to conducting a herpetological assessment (a study on amphibians and reptiles) and an impact analysis on wildlife and flora of its new installations. This plan has been approved by the Lorraine natural heritage regional scientific council *(Conseil scientifique régional du patrimoine naturel* - CSRPN).

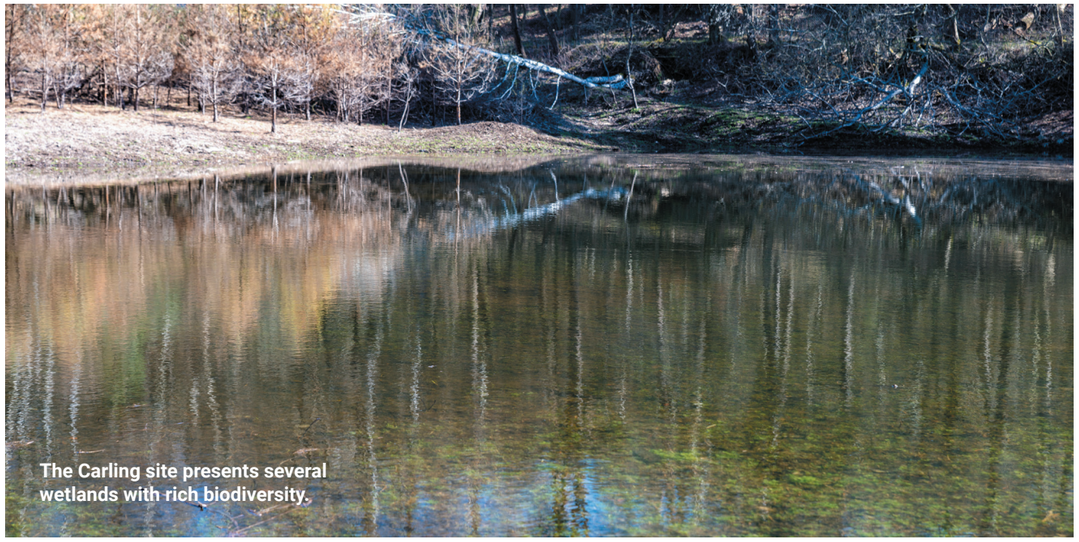
### SPECIAL ATTENTION FOR PELOBATES FUSCUS

Several endangered species have been identified at the site, such as the pelobates fuscus, one of the rarest and most endangered species in France. A management plan for land and aquatic habitats has been implemented to enable the conservation of this species and its habitat.

The Carling-Saint-Avold site arranged for the creation and flooding of ponds to expand reproduction areas.
It is currently the leading reproduction site for pelobates fuscus in France.

**38**

**The pelobates fuscus is included among the 38 species of protected vertebrates in France. The IUCN has classified it as endangered due to a decline in populations and uncertainty about its survival in France.**



The Carling site presents several wetlands with rich biodiversity.

### HIGHLAND CATTLE TO MANAGE THE SITE

In an effort to increase biodiversity, the Carling-Saint-Avold site has developed conservation grazing to maintain its natural areas. Highland cattle, a very ancient and tough cattle species, have been chosen for their ability to graze on the heathlands or wetlands found at the site.

# Restoring peat at our Shetland Islands industrial site

Peatlands are natural wetlands with an extremely rich biodiversity. Made up of several layers, they sustain remarkable wildlife and flora on their surface. They provide invaluable lessons on past vegetation, evolution of climates and some human activities. In addition, they play a key role in carbon capture and sequestration, helping to combat climate change.

## PEATLAND RESTORATION: A FIRST FOR THE COMPANY

During the construction works of the Shetland Islands gas plant in Scotland, the peat, which covered the site, was excavated and stored in two huge reservoirs equipped with cutting-edge technology. It will be stored there in perfect condition without releasing $CO_2$. When the plant is dismantled in 40 years, the peat will be replaced in its initial natural state. TotalEnergies has pledged to restore the site at the end of its operation.

**$100M**
**invested to excavate and store the peat**

On the right, the peat reservoirs during the plant construction phase.

# Sharing best practices at our service stations and fuel depots

A best practice guide has been published to help the TotalEnergies 15,000 service stations and 800 fuel depots to act at their level to protect the environment and promote biodiversity.

## A CUSTOMISED APPROACH

A biodiversity expert consultancy has helped TotalEnergies identify and prioritize issues and then define a set of actions. These include decreasing the use of herbicides, the creation of animal passages so that the facilities do not act as barriers and ensure the continuity of habitats, the construction of shelters for birds and reptiles, or the implementation of awareness raising actions for the general public. The actions are compiled in a best practice guidance document and are gradually being implemented on ten pilot sites before their extension to the entire network.

## SPECIFIC GUIDELINES FOR SENSITIVE ENVIRONMENTS

The Company issues specific guidelines for its fuel depots and service stations located in sensitive environments, such as national parks or ecologically sensitive areas. This specifically concerns a hundred or so service stations, close to IUCN or Ramsar areas. Progressively, each will include a dedicated study in order to implement targeted actions.

# Fitting our wind farms with bird protection detection devices

TotalEnergies is progressively fitting its wind farms with image analysis-based bird detection devices to protect birds from the risks caused by wind farms.

## REAL-TIME ANALYSIS

Installed on the wind turbine, the system analyzes the trajectory of birds in real time and triggers an audible alarm when a collision risk is detected. If the sound does not scare off the bird, the turbine stops for ten seconds or more and then restarts when the bird is out of the danger zone.

## AN EFFECTIVE SYSTEM

The Les Buissons Sud wind farm in the Ardennes region (France) was equipped with such a device when commissioned. The impact studies conducted during the project design phase have indeed helped to identify the presence of protected species such as red kites, gray cranes or black storks. Today, the environmental monitoring has proven the avoidance measure to be effective as no collisions have been observed.

END 2021

**5 WIND FARMS**

**of TotalEnergies are fitted with or are being fitted with a bird flight detection device based on image analysis.**

## Biodiversity conservation during rehabilitation

Measures were implemented for the conservation of protected species such as the natterjack toad and the great raven and meadow flora, in connection with the rehabilitation of the former oil depot Oberhoffen-sur-Moder (France). A partnership was signed with the French bird protection league (*Ligue de protection des oiseaux* - LPO) and the Ecolor engineering firm to establish daytime and wintering shelters and reproduction ponds to install certain species.

## Understanding the biodiversity challenges of the Mayotte Badamiers fuel depot

The Badamiers mud flat area on the island of Petite-Terre in the Mayotte archipelago, is an important Ramsar wetland area for several endangered species such as the Lesser Crested Tern, the green turtle, the great blue heron or the gecko lizard. TotalEnergies has performed a study to understand the environmental and societal risks of its nearby oil depot, and implement if necessary, measures to mitigate the effects and promote societal actions aimed at generating a positive effect on biodiversity in the region.

# Community engagement, rewilding and conservation actions at Feyzin: a common goal for biodiversity

A biodiversity management plan has been implemented at the Feyzin refining and petrochemical complex located in the Auvergne-Rhône-Alpes region (France) to ensure the conservation of wildlife and natural areas. This plan also helps to secure a trust-based relationship with the local community.

## A DEDICATED SPACE FOR NEW IDEAS

The city of Feyzin and TotalEnergies organize regular conferences with local residents. Four times a year, local residents, municipal officials, TotalEnergies and Rhône-Gaz representatives meet to exchange ideas, prepare proposals and define progress actions to improve the local quality of life. These conferences offer a stimulating space for thinking and selecting actions to improve the site for all parties.

## CLOSE COLLABORATION WITH THE SMIRIL ASSOCIATION

In addition to conferences with local residents, TotalEnergies has forged a close relationship with SMIRIL (*Syndicat Mixte du Rhône des Iles et des Lônes**), the joint association for Rhone river islands and lakes or "*lônes*", in charge of managing and enhancing natural areas, through a three-year agreement. Firstly, SMIRIL supported TotalEnergies in rewilding the island of Ile de la Chèvre, a protected area that belongs to the Feyzin site, along the Rhône river. One of the actions consists in using tarps to contain the spread of Japanese knotweed, an invasive herbaceous plant native to Asia that threatens the presence of other plant species.

Nearby, on the island of Ile de la Table Ronde, SMIRIL also proposes nature projects to TotalEnergies employees. These actions have enabled the development of a dry stone wall for reptiles (garter snakes and wall lizards), a pond dedicated to biodiversity education purposes and insect shelters.

Today, the Feyzin site is seen as an example to follow. A best practice guidance document has been published for the Company's other industrial sites.

**"We rarely uproot goldenrods, a local plant, as we don't have enough people for the job. Thanks to the help from TotalEnergies employees, we have been able to contain their spread and obtain greater floral diversity. We really appreciate their participation in our nature projects."**

**Julie Déplace**
**Coordinator of SMIRIL educational projects**

**"Lônes"* are river lakes cut off from the main riverbed. The Rhône has more than 250 *"lônes"*. *"Lônes"* contain stagnant water and are therefore home to highly diverse ecosystems and are particularly conducive to biodiversity.

## A PEREGRINE FALCON NEST ON THE SITE

In 2004, a nature expert partner observed the presence in Feyzin of a peregrine falcon couple, an endangered species. A nesting box was installed on the refinery where eleven chicks were born. The nesting box was recently improved to welcome future broods.

## Supporting academic research to promote biodiversity in Angola

TotalEnergies has signed a multi-year agreement with CIBIO* from the University of Porto (Portugal) and the Mandume University of Lubango (Angola). Under the agreement, TotalEnergies will work with scientists to study the conservation of endangered species and biodiversity in several Angolan national parks. TotalEnergies has also pledged to support the Lubango museum and science center. In addition, it will also award grants and provide training to Angolan students and lecturers.

**Centro de Investigação em Biodiversidade e recursos genéticos*
(Center for Biodiversity Research and Genetic Resources).

## Oil platforms and tankers: on the front lines to observe the marine environment

TotalEnergies teams in Denmark, who work on deep sea oil platforms are well placed to observe the rich biodiversity of the marine world. They publish their collected data on the Global Biodiversity Information Facility (GBIF), a publicly accessible website, thus helping to enhance scientific knowledge. They also use social media to share their observations (photos, videos, information) with the general public.

In addition, some of TotalEnergies staff have decided to share the marine observation data collected by oil and gas tanker crews that roam the seas. They have teamed up with *Souffleurs d'Ecumes,* a French NGO, to set up a data collection protocol and have engaged with willing tanker captains for this data gathering experiment. Since the launch of this initiative, the latter publish regular updates about their observations of dolphins, whales, sperm whales, but also nets, waste and piles of plastic bags, etc.

## Taking action to protect biodiversity with TotalEnergies Foundation

The Company supports concrete actions to preserve the services provided to communities by coastal areas and oceans against the backdrop of climate change. This support is provided through the Climate, Coastal and Ocean program of its TotalEnergies Foundation. The Company works with grassroots organizations and environmental institutions to achieve this goal.

The Foundation's objectives include developing and sharing knowledge on interactions between the climate, coastal areas and oceans, including biodiversity, by working with research stakeholders, youth and the general public, and organizing youth educational activities linked to the coastal environment.

For instance, TotalEnergies supports Polar Pod, the expedition led by Jean-Louis Étienne to study the Antarctic Circumpolar Current in order to gain more knowledge about air/ocean exchanges, confirm satellite measurements, observe biodiversity and the impact of human activities in the region. The knowledge gained will be shared in particular with youth through an educational project in collaboration with the IUCN (International Union for the Conservation of Nature).

TotalEnergies also encourages employee involvement in biodiversity projects. The Company's Action! citizen program provides employees with the opportunity to devote three days of their working time every year towards public interest initiatives. Employees can participate in actual field initiatives such as restoring mangroves in Angola or Biolit, a participatory science project aimed at collecting data on the biodiversity of coastal areas in France.


**Otchiva, an association dedicated to mangrove conservation and restoration in Angola. TotalEnergies employees participate in its projects through the Action! program.**

ZOOM...

# Leveraging R&D For Biodiversity Conservation

Thomas Merzi,
Biodiversity and Environmental Genomics R&D Leader
TotalEnergies

### WHY THE NEED FOR BIODIVERSITY-SPECIFIC R&D?

**T. M.** The loss of biodiversity, due to human activity, is the sixth mass extinction event in the history of humanity. In the light of the emergency, TotalEnergies has decided to devote more human and financial resources to R&D to promote biodiversity in order to better understand the challenges, assess interactions with the ecosystems in which we operate, measure the potential impact of our actions and introduce positive biodiversity gains. This is a vital approach for our current activities but also for our future developments in renewable energies.

### HOW DO YOU IMPLEMENT THIS APPROACH?

**T. M.** We have a very solid roadmap. It entails implementing an intelligence gathering system to identify new technologies in biodiversity, acquiring field tools to map the biodiversity of our sites and developing new tools to assess, model and anticipate the impacts of our activities. In this way, we are able to ensure effective monitoring and continuously improve the relevance of our actions.

### CAN YOU GIVE US CONCRETE EXAMPLES?

**T. M.** We use breakthrough technologies such as bioacoustics (study of animal sounds), environmental genomics (study of DNA traces left by animals) or molecular biology to carry out this monitoring in quasi real time. Another example is our new Mitigation Hierarchy Tool (MIHIETO) used to improve the management of the potential impacts of our operations on biodiversity while applying the Mitigation Hierarchy approach. The tool also improves our integration of ecosystem services as a full-fledged component of our activities and projects.

## In action

### THE ISSUE

Using traces of **DNA** to compile an inventory of species and describe the biodiversity around our industrial sites in order to detect and protect sensitive species.

### THE SOLUTION

Genomics and environmental DNA (eDNA) analysis, processes used in the medical world, are more pertinent, faster and less expensive to implement than classic techniques. This new method has been tried and tested on marine sediments and on the monitoring of white sharks (Qatar).

### OUR PARTNERS

The Norwegian Research Centre (NORCE), ID-GENE (Switzerland), Centre for Environmental Genomics Applications (Canada), eDNATec (Canada), University of Qatar.

### THE ISSUE

Knowing the impact of our industrial sites on the **connectivity** of an ecosystem, in other words, the ecosystem's ability to exchange or allow the unimpeded movement of species, individuals or genes. These exchanges are vital for a functioning, stable, resilient ecosystem.

### THE SOLUTION

Develop tools to measure the connectivity of an ecosystem for one or several specific species, assess the potential risks related to the presence of our sites and identify improvement areas. Two application cases are under study in the Qatar sea and on shore in the Lacq area (France).

### OUR PARTNERS

University of Qatar, Biotope.

### THE ISSUE

Identify **technologies** to improve the monitoring of biodiversity and biomonitoring.

### THE SOLUTION

Test new technologies such as remote detection, eco-acoustics, photo traps or the BEEcam, a combination of a camera and image processing solution to identify, for instance, interactions between insects and plants.

### OUR PARTNERS

*Conservatoire des espaces naturels de Nouvelle-Aquitaine* (CEN-France), Wavely.

### THE ISSUE

Conservation and restoration of damaged **mangroves.**

### THE SOLUTION

ROOT, a tool that uses biomimecry to promote the growth of mangrove trees has been installed in mangroves. These tropical trees can be found along marine shorelines and are subject to ebbing tidal flows. The trees are part of the mangrove and are vital for the balance of the mangrove ecosystem as they stabilize the ground and provide shelter for wildlife.

### OUR PARTNERS

Seaboost.

# At TotalEnergies, **more than 80 biodiversity initiatives** implemented worldwide in 2020

**NORTH AMERICA**
Canada,
United States

**SOUTH AMERICA**
Argentina, Bolivia,
Brazil, Venezuela

**EUROPE**
Belgium, Czech Republic,
Denmark, France, Germany, Italy,
Norway, United Kingdom

**AFRICA**
Angola, Burkina Faso,
Republic of Congo,
Gabon, Kenya, Madagascar,
Mozambique, South Africa,
Tanzania, Tunisia, Uganda,
Zimbabwe

**ASIA**
India, Myanmar,
Pakistan, Qatar, Russia

**OCEANIA**
Fiji

# Partners and Collaborations

**Our partners include both local and global biodiversity protection organizations and programs such as:**

ipieca

Cross Sector Biodiversity Initiative

WCS

CEM

UN environment

WCMC

afnor

act4nature
Les entreprises pour la biodiversité

Oxford Long-term Ecology Laboratory

GBIF
Global Biodiversity Information Facility

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