

SENSORSTICK BY PLANT-E

YOUR SOLUTION FOR WETLAND RESTORATION

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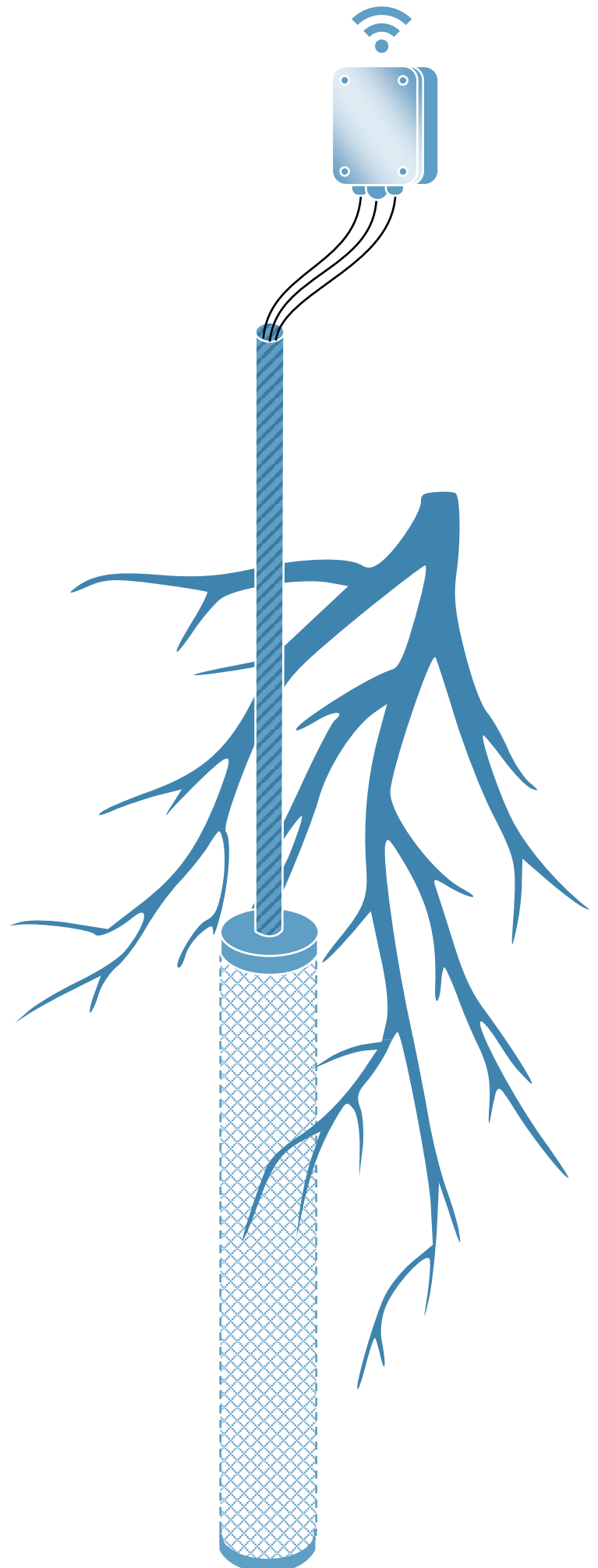
The SensorStick is an autonomous and self-powered water-level and temperature sensor. It harvests natural energy from plants and delivers reliable data year-round without interventions or maintenance.

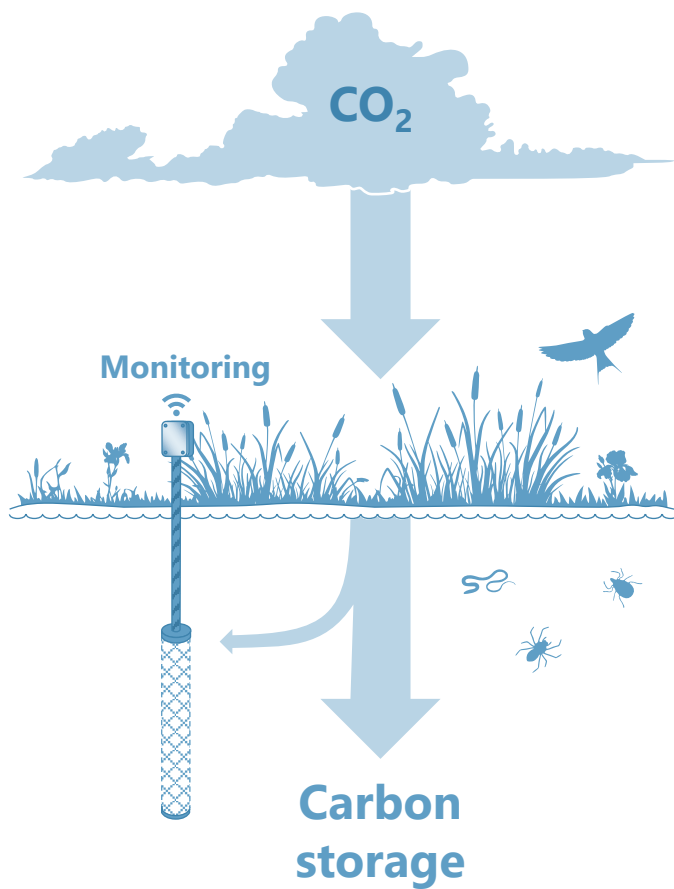
Wireless water-level sensors can be powered indefinitely by the SensorStick and outlast conventional battery-powered solutions by decades. The SensorStick increases the reliability and reduces the cost, maintenance and environmental footprint of remote sensing projects.

The SensorStick includes an innovative power source that harvests energy from plants.

Based on unique patented technology, the SensorStick relies on microorganisms naturally present in all wetlands to generate electricity.

After quick and easy installation in waterlogged soil, the SensorStick powers up and starts measuring right away.



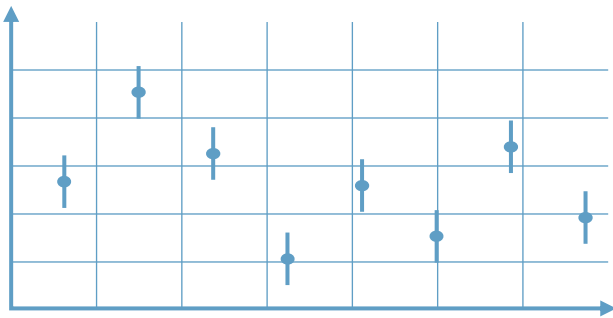


Wetlands are the most potent land-based carbon sinks in the world and highly productive ecosystems, providing wildlife habitat, flood control, and many more benefits

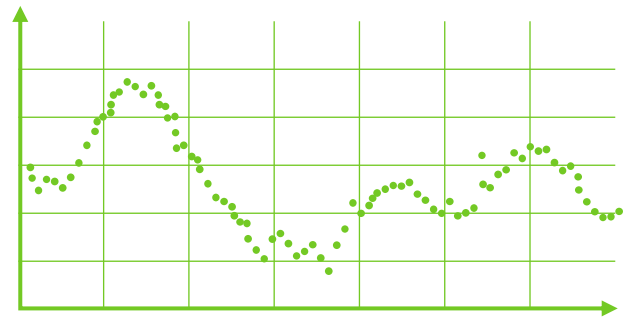
A proper control of the water table is key to the success of wetland restoration projects. Manual water level monitoring is labor-intensive, prone to human error, and restricts the overall monitoring capacity. The use of remote sensors addresses this challenge, providing a cost-effective, high quality, time-efficient solution that minimizes ecosystem disturbance.

SensorSticks are a unique solution for powering remote wireless sensors in wetlands. They offer an alternative to traditional battery-powered applications, thereby reducing the environmental impact of wetland monitoring.

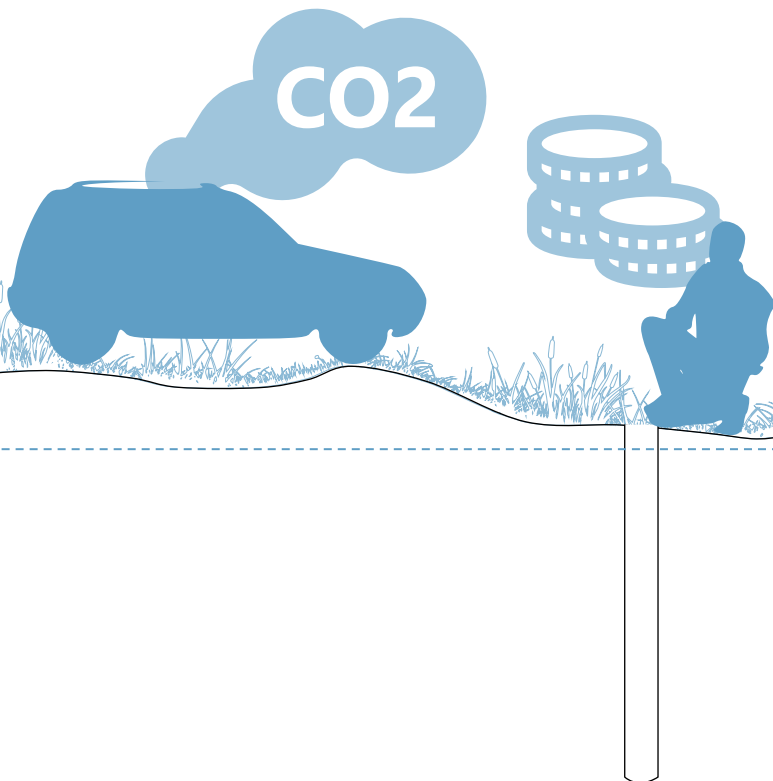
Manual dipwells require regular on-site interventions, extensive costs and causing avoidable CO₂ emissions and disturbances to protected ecosystems.



The SensorStick offers high definition measurements available from home with minimal investments and no on-site interventions.



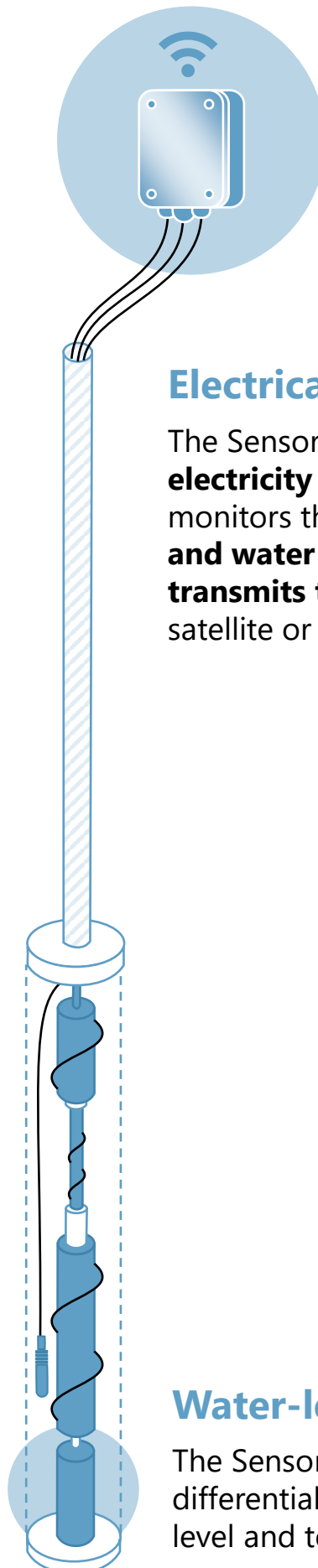
+ Advanced hydrology modelling



Product

The SensorStick operates fully remote and offers three unique features: decades of lifetime, no maintenance, and unprecedented sustainability.

The all-in-one design allows for quick and easy installation of the SensorStick in wetlands using a simple auger



Electrical box

The SensorStick **harvests electricity** from living plants, monitors the **temperature and water level**, and **transmits the data** over satellite or gateway.

Power source

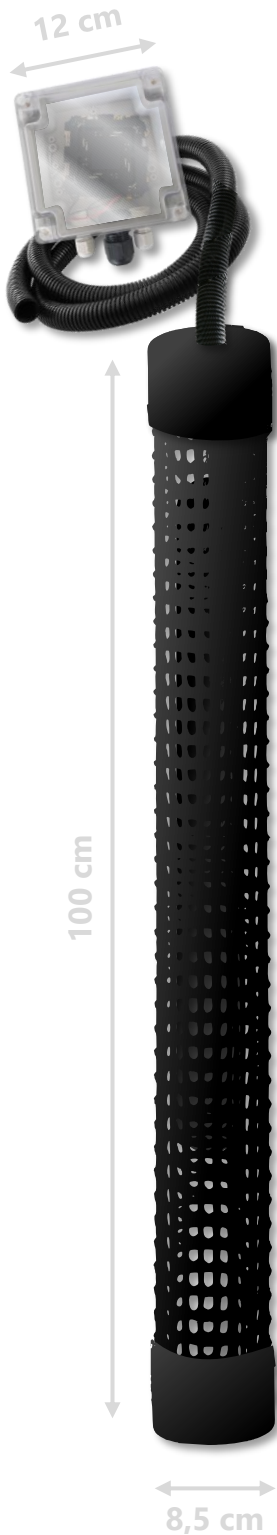
The underground power source is Plant-e's patented technology. It is capable of **generating electricity from plants**.

Water-level sensor

The SensorStick includes a differential pressure water-level and temperature sensor.

Spec sheet

An overview of the material and electric features of Plant-e's SensorStick.



The SensorStick is a stand-alone and autonomous solution. It takes charge of its own power generation, sensing, and remote data transmission.

SensorStick Specifications

General information

Dimensions (cm)	∅ 8,5 x 100 (SensorStick) 12 x 12 x 9 (electrical box)
Lifespan	> 50 years

Water-level measurements

Measurement frequency	Daily / Weekly / Monthly <small>(custom)</small>
Precision	± 1 cm ± 0.1°C
Measurement type	Differential pressure

Data transmission

Transmission frequency	Weekly / Monthly <small>(depending on the protocol)</small>
Protocol	<ul style="list-style-type: none"> • LoRa • Satellite
Format	.csv / .xlsx
Data dashboard	Custom

Data available	<ul style="list-style-type: none"> • Water level • Soil temperature • Power source status
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Installation

The SensorStick's all-in one design allows for quick and easy installation in wetlands using a simple auger.

#1 Wetland assessment

The conditions of the chosen site are essential for SensorSticks to function properly. The main requirements are:

- ✓ High and stable water level
- ✓ Mild below-ground temperatures

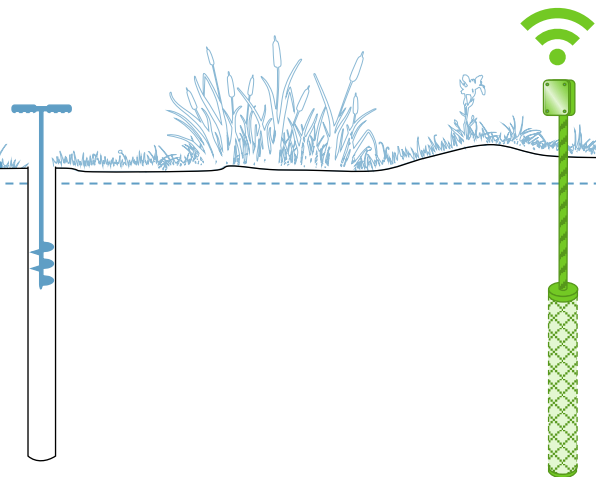


#3 Installation

Drill a hole at the chosen location and insert the SensorStick with the top about 30 cm above ground.

#2 Transport

The SensorStick is a lightweight handheld tube that is easy to ship and carry.



#4 Startup and operation

The SensorStick starts measuring data right away.

An aerial photograph of a forest with a road, overlaid with a blue gradient. The text "Power source" is centered in white.

Power source

#1 Rhizodeposits

Plants release **organic matter** in the soil through their roots and above-ground parts.

#2 Electrical bacteria

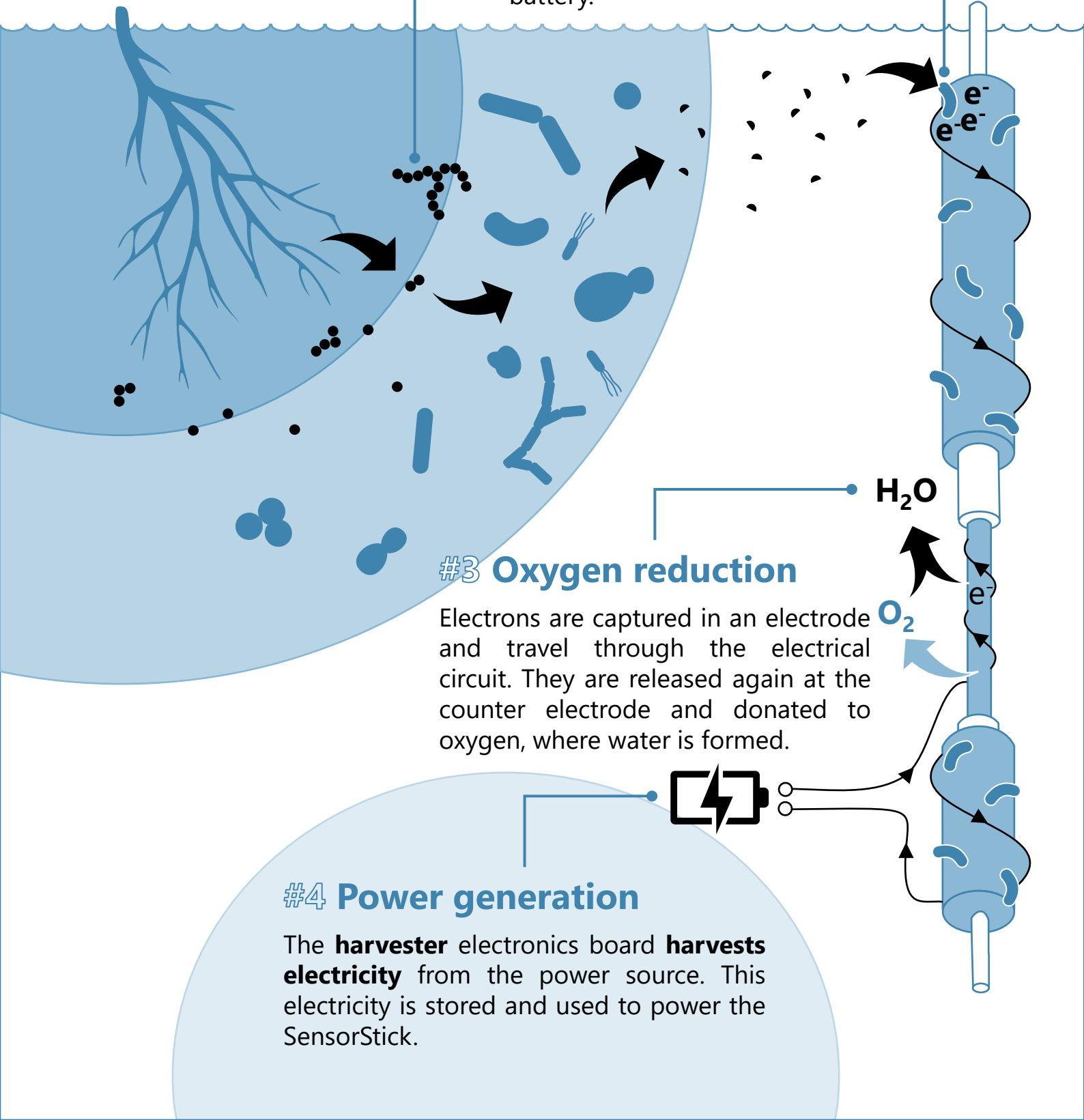
In wetlands, some microorganisms degrade organic molecules and **generate electricity**. In the SensorStick, an electrode harvests this electricity. It is the \ominus pole of the battery.

#3 Oxygen reduction

Electrons are captured in an electrode and travel through the electrical circuit. They are released again at the counter electrode and donated to oxygen, where water is formed.

#4 Power generation

The **harvester** electronics board **harvests electricity** from the power source. This electricity is stored and used to power the SensorStick.



An aerial photograph of a forest with a road, overlaid with a blue gradient. The word "Portfolio" is written in white, bold, sans-serif font in the center of the image.

Portfolio

Plant-e's SensorStick operates in a range of remote ecosystems where long-time water-table monitoring is a must.

**REWETTED
BOGS & FENS**



PEAT FORESTS



WATER BODIES



RICE PADDIES



“ *An amazing advance in renewable energy.*

Forest Carbon ”

The Sumatra Merang Peatland Project is a **peatland restoration project** aiming at converting a former palm oil plantation into a rainforest.

Plant-e’s network of SensorSticks are monitoring the water level and temperature in a remote and hardly accessible area of the project.



“ *The Plant-e system has proven to be not only very durable, but also very reliable.* ”

Waterboard de Dommel

Plant-e carried out a successful program of its SensorSticks on the Dommel river in cooperation with international semiconductor manufacturer NXP and Waterboard De Dommel.



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