

**POWERSTICK
BY PLANT-E
MAINTENANCE-
FREE REMOTE
SENSING**

PowerStick by Plant-e

PowerStick provides maintenance-free remote monitoring for a multiple of your environmental measurements.

Plant-e's PowerStick is powered by a unique power source that generates electricity with living plants.

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

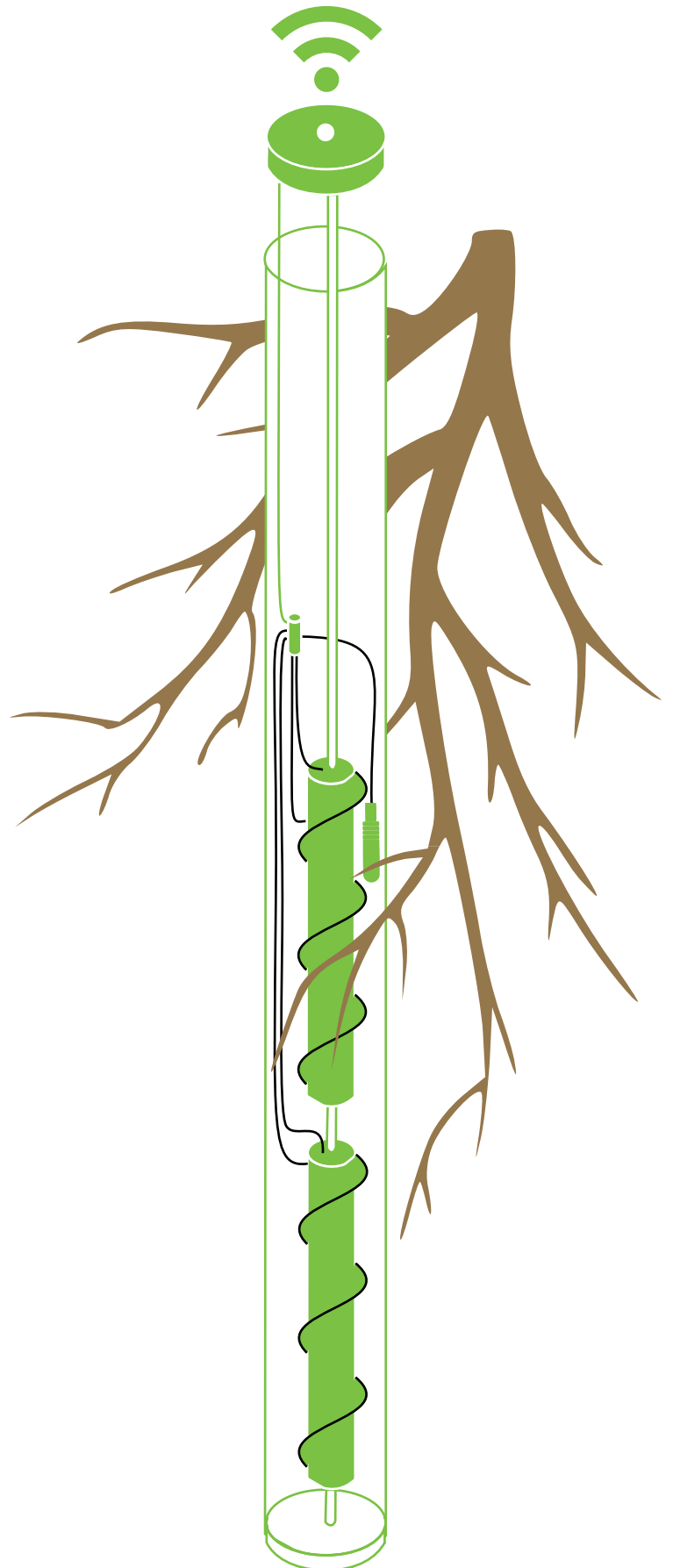
PowerStick includes a unique power source that generates electricity with living plants.

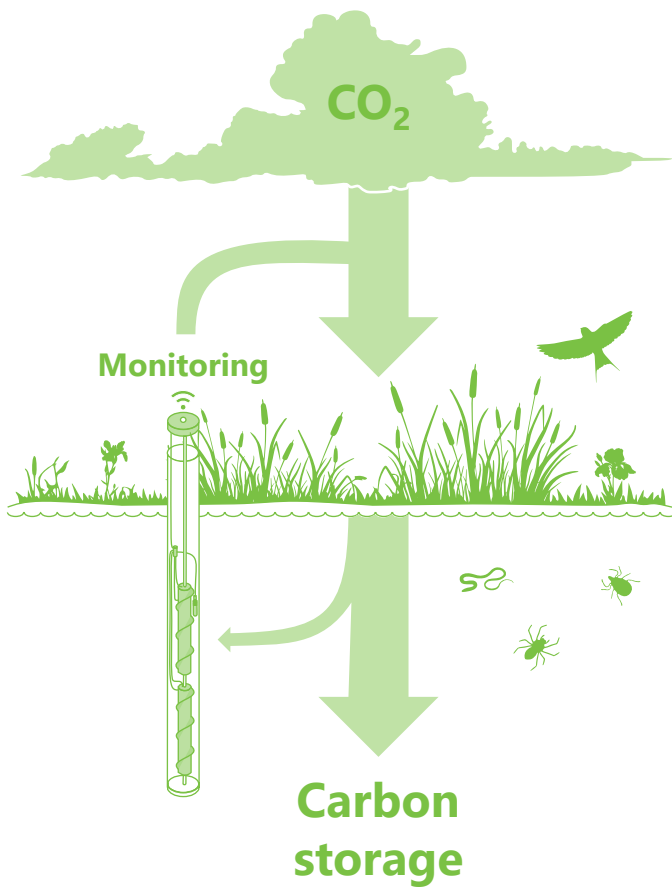
Based on unique patented technology, PowerStick relies on microorganisms naturally present in all wetlands to generate electricity.

PowerStick connects to a diverse portfolio of low-power IoT sensor types (soil moisture, temperature, pH, water level, rain fall, etc.), providing electricity for sustained operation.

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

No waterlogged soil available? No problem! We provide you with a casing that provides the perfect situation for your power source.





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

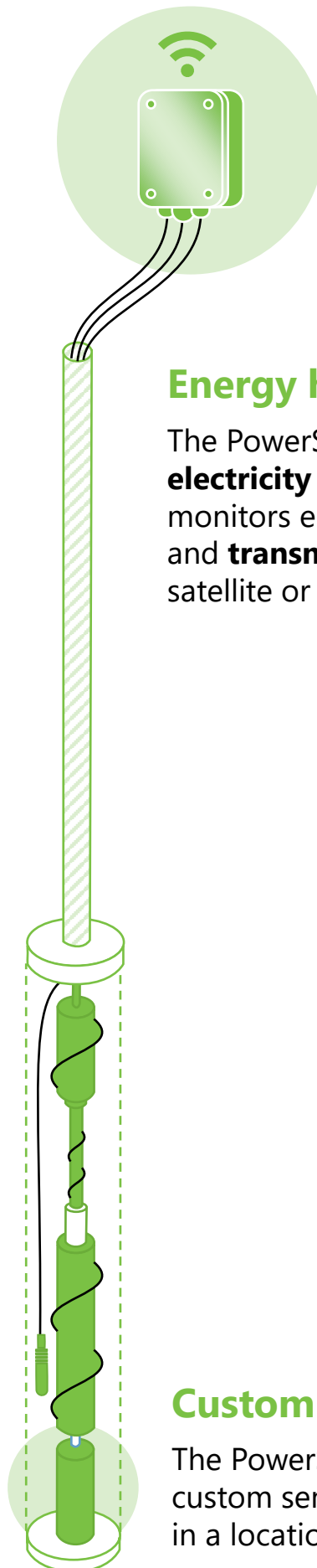
To ensure their health, it is important to monitor wetlands with remote environmental wireless sensors. With the global count of IoT devices already in the billions, it is important to be mindful of the environmental impact of batteries used.

PowerSticks are a unique solution for powering remote wireless sensors in wetlands by harmlessly harvesting energy from the environment. They offer an alternative to traditional battery-powered applications, thereby reducing the environmental impact of wetland monitoring.

Product

The PowerStick 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 PowerStick in wetlands using a simple auger



Energy harvester

The PowerStick **harvests electricity** from living plants, monitors environmental data, and **transmits the data** over satellite or gateway.

Power source

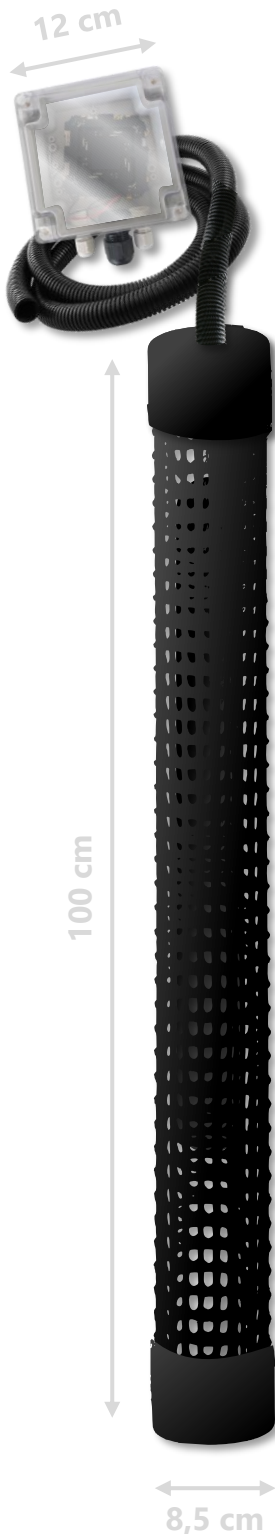
The underground power source is Plant-e's patented technology. It is capable of **generating electricity from plants**.

Custom sensor

The PowerStick includes a custom sensor to be placed in a location of choice.

Spec sheet

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



The PowerStick is a stand-alone and autonomous solution. It provides both power generation and remote data transmission.

PowerStick Electrical Specifications

General information

Dimensions (cm)	∅ 8,5 x 100 (SensorStick) 12 x 12 x 9 (electrical box)
Lifespan	> 50 years
Voltage <small>(direct from storage element or regulated)</small>	3.6 V

Measurements & data transmission

Measurement frequency	Daily / Weekly / Monthly <small>(custom)</small>
Transmission frequency	Weekly / Monthly <small>(depending on the protocol)</small>
Available sensors	<ul style="list-style-type: none"> • Water-level • Temperature • Soil moisture • Rainfall • Conductivity & more
Protocol	<ul style="list-style-type: none"> • LoRa • Satellite
Format	.csv / .xlsx
Data dashboard	Custom
Data available	<ul style="list-style-type: none"> • Sensor data • Power source status

Installation

The PowerStick's "all-in one stick" design allows for quick and easy installation in wetlands using an earth auger.

#1 Wetland assessment

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

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

No wetland? No problem! We'll provide a casing.



#2 Transport

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

#3 Installation

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



#4 Startup and operation

The PowerStick starts measuring data right away.

A green-tinted photograph of a forest. The image shows a path or road winding through a dense forest of trees. The lighting is soft, and the overall color palette is dominated by various shades of green. The text 'Power source' is overlaid in the center in a white, bold, sans-serif font.

Power source

#1 Organic matter

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

#2 Microorganisms

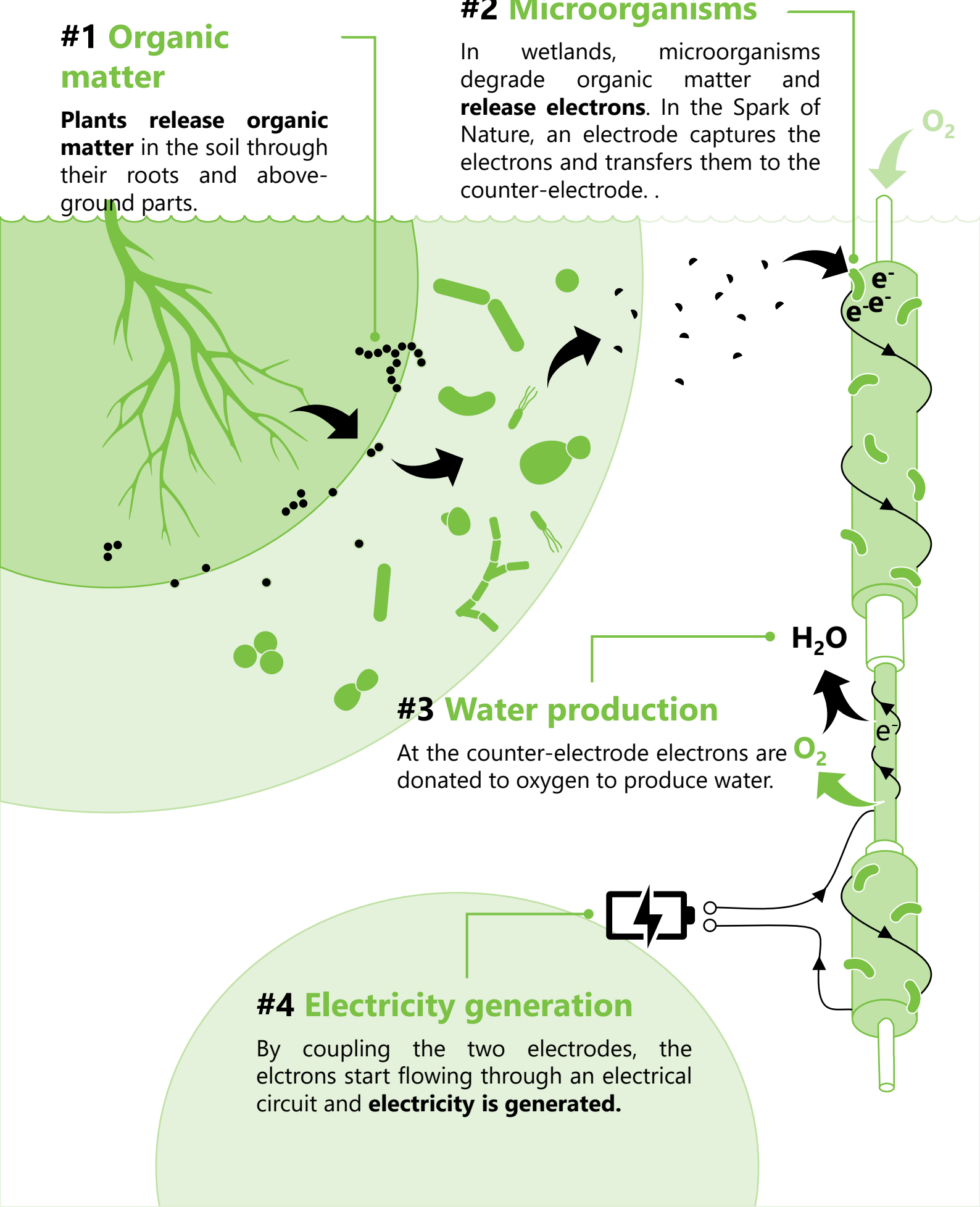
In wetlands, microorganisms degrade organic matter and **release electrons**. In the Spark of Nature, an electrode captures the electrons and transfers them to the counter-electrode. .

#3 Water production

At the counter-electrode electrons are donated to oxygen to produce water.

#4 Electricity generation

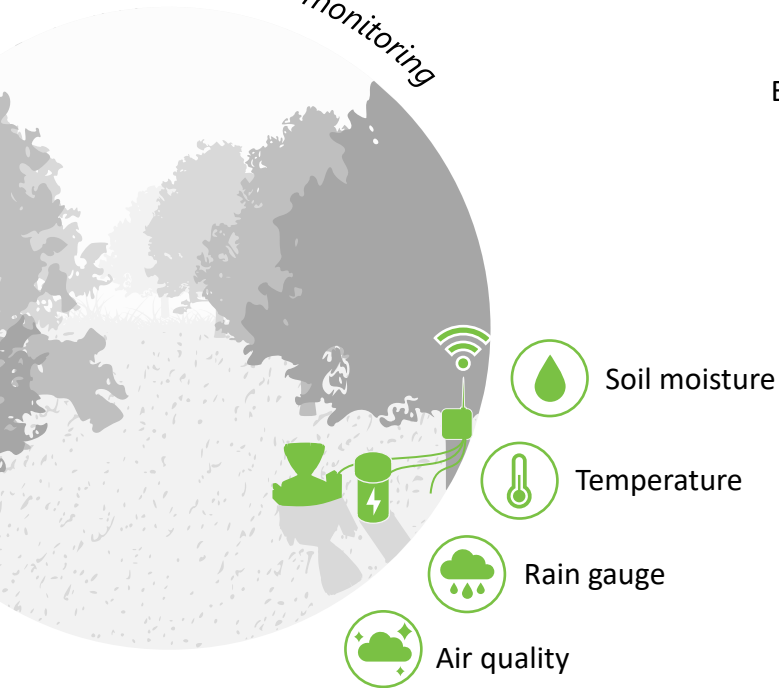
By coupling the two electrodes, the electrons start flowing through an electrical circuit and **electricity is generated**.





Portfolio

Our PowerStick was validated with customers in different usecases and under divergent circumstances.

Environmental monitoring



Electrical conductivity 


Water level 




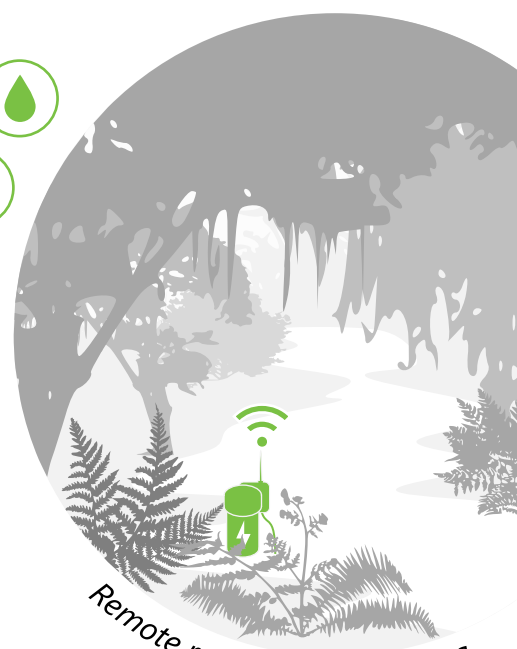
Wetland water control



Soil moisture 

Temperature 

Water level 



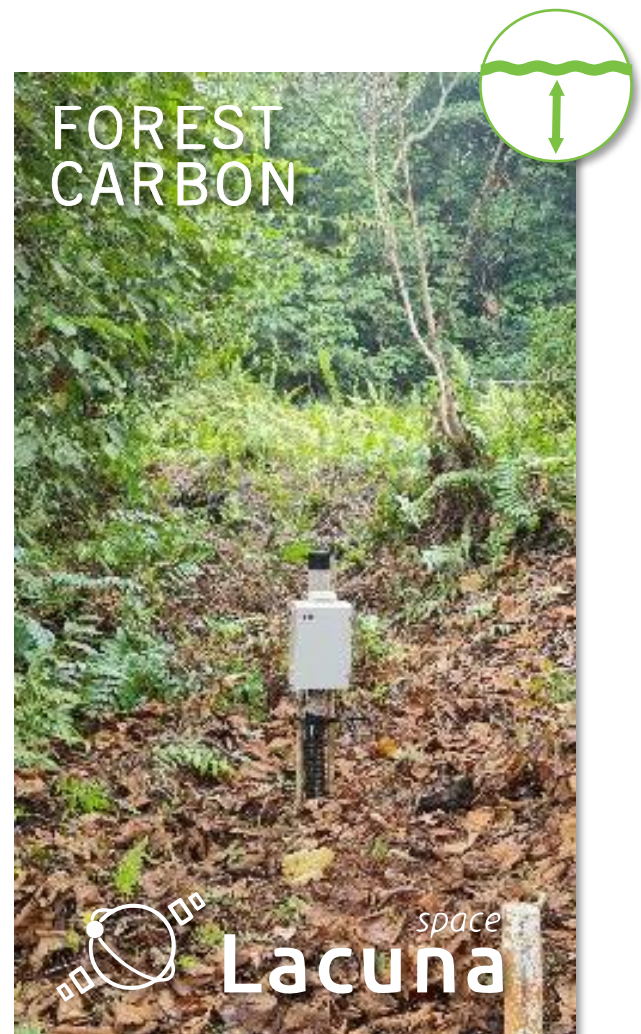
Remote rainforest monitoring

“ *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 PowerSticks 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 PowerSticks on the Dommel river in cooperation with international semiconductor manufacturer NXP and Waterboard De Dommel.



“ *Plant-e has installed soil-moisture sensors on two golf courses under our maintenance in 2023. Since then, the natural battery works as expected and data is uninterrupted delivered to our dashboard.* ”

De Enk Groen en Golf

Plant-e has equipped two golf courses with Plant-e’s remote **soil moisture** sensors. Plant-e’s project with De Enk Groen & Golf showcases the potential for significant water savings and a more sustainable future for golf courses.



Get in touch

sales@plant-e.com

office@plant-e.com

