



**AUGUST 2023**

# **Magnetic Resonance Technology – Extended**

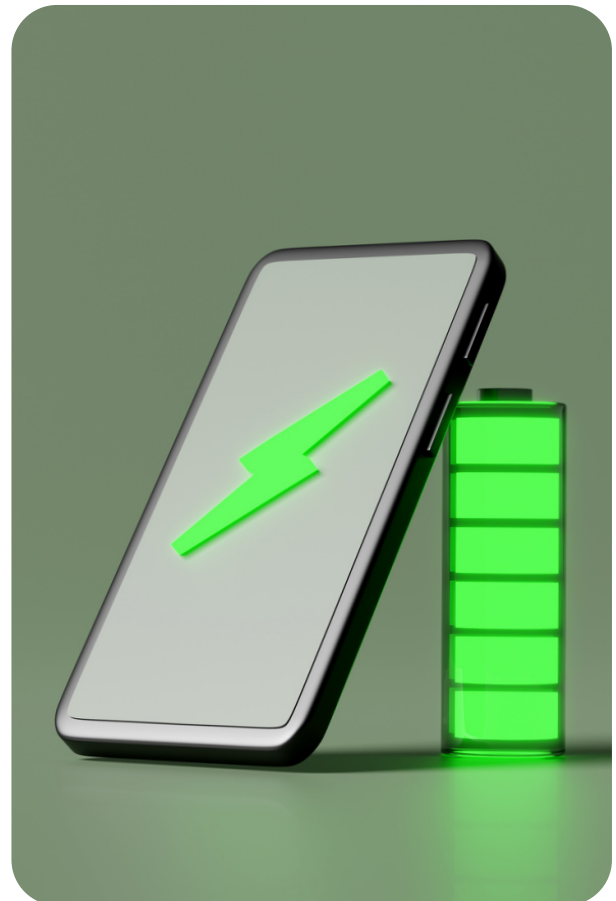
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A Revolutionary Approach to Wireless Charging

# Introduction

Magnetic Resonance Technology - Extended (MRT-E) is an advanced wireless charging solution that enables the transfer of electricity between a transmitter and a receiver without the need for cables, adapters, or batteries.

In this whitepaper, we explore the principles and benefits of MRT-E, focusing on biaNergy™, a company that has successfully addressed three major challenges associated with wireless charging technology.



## THE 3 KEY CHALLENGES

- Bridging the Wattage Gap
- Minimizing Power Loss
- Ensuring Safety and Harmlessness:

## UP TO 5.5 WATTS

The flexibility of MRT-E allows biaNergy™'s technology to cater to a diverse range of devices.

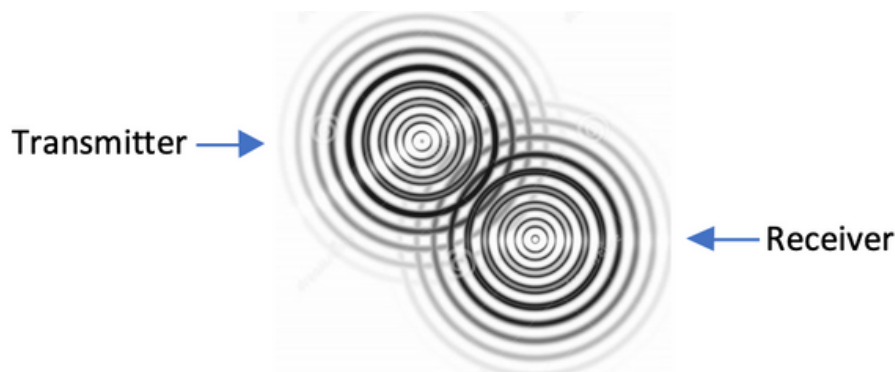
# biaNergy™'s technology

biaNergy™ ground-breaking technology enables wireless transfer of electricity by coupling the Magnetic Resonance Technology - Extended (MRT-E) with Radio Frequency technology (RF or RFT).

## **What is Magnetic Resonance Technology - Extended (MRT-E)?**

Magnetic Resonance Technology - Extended (MRT-E) is inspired by the principles of magnetic resonance, where an object is made to oscillate at its natural frequency. This is the same principle that allows a singer (or a tenor in the example) to shatter a wine glass. In the case of the glass, it's sound waves that cause the oscillation. For wireless power transfer, we use electromagnetic waves.

In wireless electricity transfer using MRT-E, two coils are designed to resonate at the same frequency. One coil (the transmitter) sends energy, while the other coil (the receiver) absorbs it. When these coils resonate at the same frequency, the efficiency of energy transfer is maximized, similar to the tenor matching the resonant frequency of the glass.



*Figure. 1. The resonance of the transmitter and receiver finally find each other with the help of RFT and MRT-E implemented as bridging medium.*

# biaNergy™'s technology

## Oscillation and Transfer by Radio Frequency

Radio Frequency (RF) is a range within the electromagnetic spectrum that is used for many wireless communications applications. The term "oscillation" here refers to the changing electric and magnetic fields that comprise electromagnetic waves. To transfer power wirelessly using RF:

- **Generation of RF Waves.** The transmitter coil is supplied with electrical energy, which is then converted into electromagnetic waves, specifically RF waves.
- **Resonance Matching.** Just as the tenor finds the resonant frequency of the wine glass, the transmitter coil must be "tuned" to the same frequency as the receiver coil. This ensures efficient energy transfer.
- **Reception of RF Waves.** The electromagnetic waves travel through the air and are captured by the receiver coil. Here, the electromagnetic energy is converted back into electrical energy.
- **MRT-E as a Bridging Medium.** MRT-E ensures that the energy transfer is highly efficient by using the principles of resonance. By tuning both the transmitter and receiver to the same frequency and using materials that can sustain the resonant oscillations, energy losses during transmission can be minimized. As shown in figure 1.

# Three key challenges

As the world embraces a wireless lifestyle, there is an increasing demand for convenient and flexible charging solutions. Magnetic Resonance Technology- Extended (MRT-E) presents a promising approach to wireless charging, enabling efficient power transfer over short distances without the need for physical connections.

## The three key challenges:

Before diving into biaNergy™'s achievements, it is crucial to understand the primary challenges faced by wireless charging technologies:

- **Bridging the gap**

The first challenge lies in delivering sufficient power to a wide range of devices, from small IoT devices to power-hungry laptops and TVs. biaNergy™ successfully bridged this gap, offering lower wattage solutions (up to 5.5 Watts) for IoT devices, smartwatches, smartphones, etc., and mid-wattage options (up to 60 Watts) for laptops, TVs, and other higher-power devices.

- **Minimizing power loss**

Wireless charging inherently incurs energy loss during transmission, which affects efficiency and sustainability. biaNergy™ achieved remarkable results by reducing power loss to as little as 3%-5% for low-wattage devices and currently 14% for mid-wattage devices.

Their ongoing efforts aim to further reduce this figure to an impressive 5%, significantly outperforming traditional wireless charging technologies.

- **Ensuring safety for people and the environment**

Wireless charging technologies need to be safe for both living beings and objects. With the endorsement of the U.S. Federal Communications Commission (FCC), biaNergy™ confirms that their MRT-E based solution poses no harm to humans, animals, or surrounding objects.

The success of biaNergy™ lies in its innovative application of Magnetic Resonance Technology - Extended (MRT-E), which facilitates wireless power transfer. By leveraging MRT-E, biaNergy™ revolutionized the wireless charging landscape, providing unparalleled convenience, spatial freedom, and enhanced safety.

### **Safe for people and environment**

biaNergy™'s MRT-E based solution not only ensures low power loss at 3%-5% for low-wattage devices but also boasts a current maximum of 14% for mid-wattage devices, with future plans to reduce this to an unprecedented 5%. This significantly outperforms conventional wireless charging technologies, enhancing overall energy efficiency.

Additionally, biaNergy™'s technology has received the approval of the U.S. FCC, attesting to its harmlessness to living beings and objects. This safety validation underscores the company's commitment to responsible and sustainable technology.

# Flexibility and distance

The flexibility of MRT-E allows biaNergy™'s technology to cater to a diverse range of devices. Their lower wattage solution (up to 5.5 Watts) effectively powers devices like IoT devices, wearables, and displays, operating seamlessly at distances of up to 30 meters (100 meters in MASHable mode).

The forthcoming mid-wattage devices (up to 60 Watts) will further expand the application range to include laptops, smart mobile phones, TVs, and more, still within the same distance.



## Our UNIQUENESS:

- Devices charged in motion
- Non-line-of-sight capabilities
- Energy and data transmission

**Up to 100 meters**

And further opportunities by creating an energy mesh network to secure distances

# Comparative research

In summary, Magnetic Resonance Technology combined with Radio Frequency transmission offers a way to wirelessly transfer electricity with high efficiency. The key lies in tuning both the transmitter and receiver to resonate at the same frequency, thus allowing for optimal energy transfer, similar to how a tenor can shatter a wine glass with sound waves by matching its resonant frequency.

Comparative studies highlight the technical edge of this approach. It's tailored for all IoT and IIoT devices, setting it apart from other market alternatives.

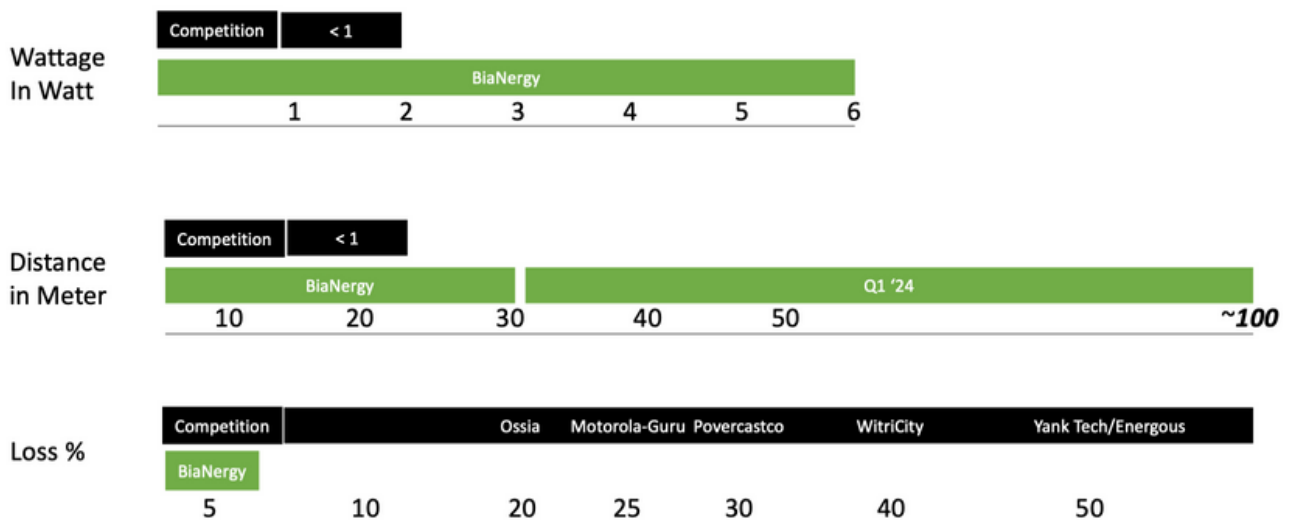


Figure. 2. The comparative research between other wireless energy transfer solutions available in the market and biaNergy™



# Awards

## biaNergy™ received Solar Impulse Label

The Solar Impulse Efficient Solution Label is a certification that applies to products, processes and services which combine economic profitability and environmental sustainability

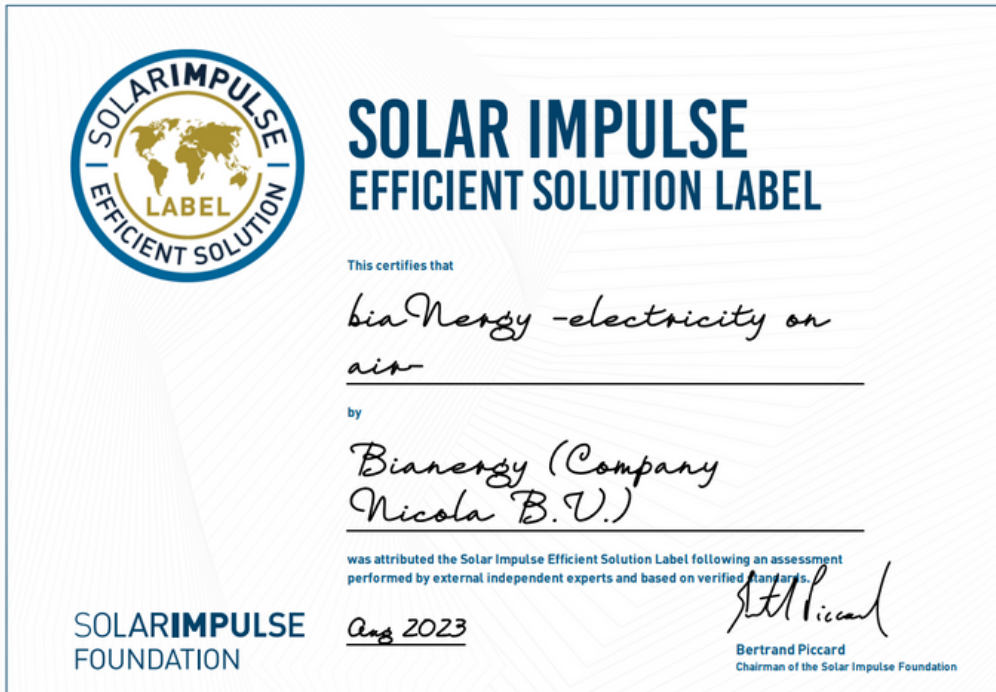


Figure. 3. Efficient solution label Solar Impulse

## Solar Impulse Foundation

We are honored that our technology has undergone rigorous evaluation by one of the most esteemed organizations on behalf of EuroQuity of the EU, covering Technical feasibility, Environmental compliance, and Profitability: the Solar Impulse Foundation (SIF).



**Contact us  
for further  
inquiries**

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