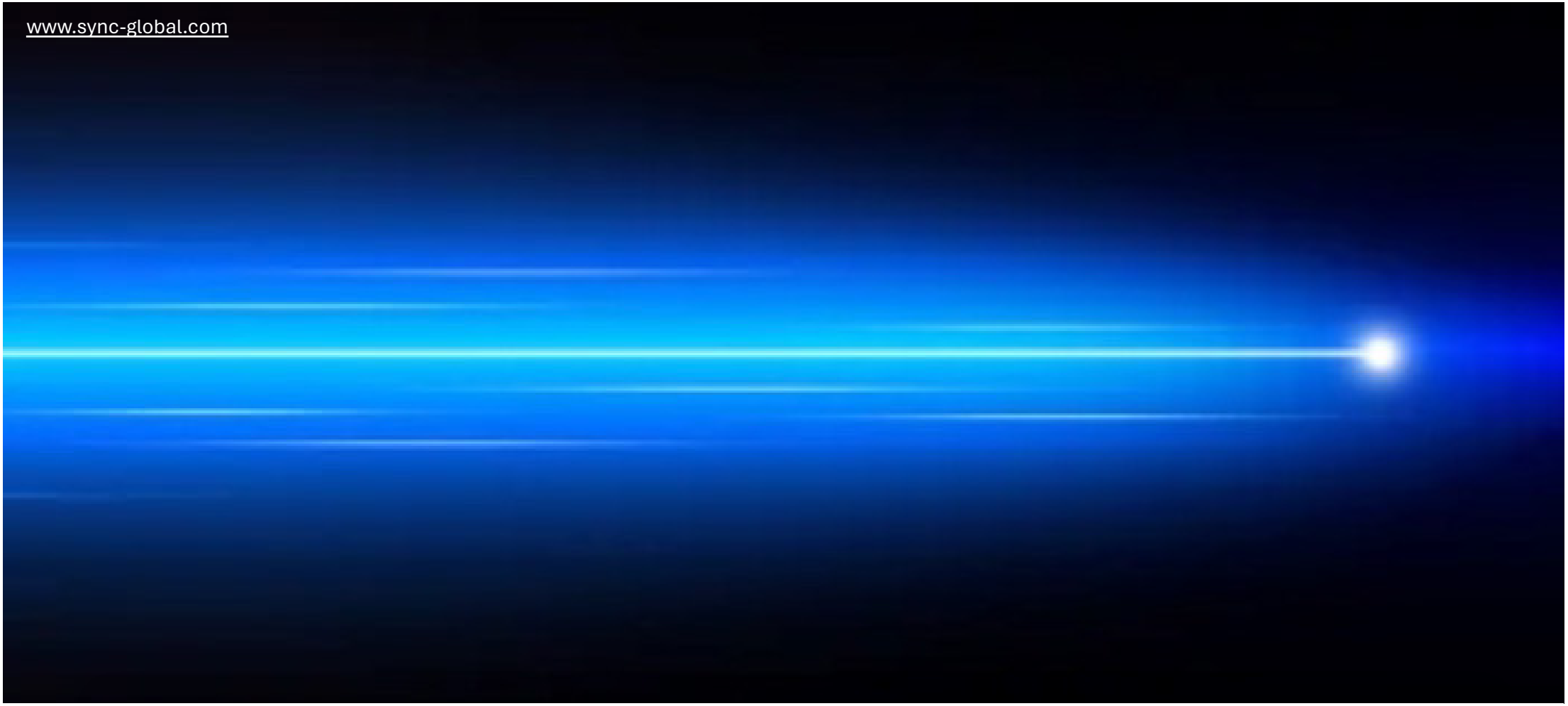
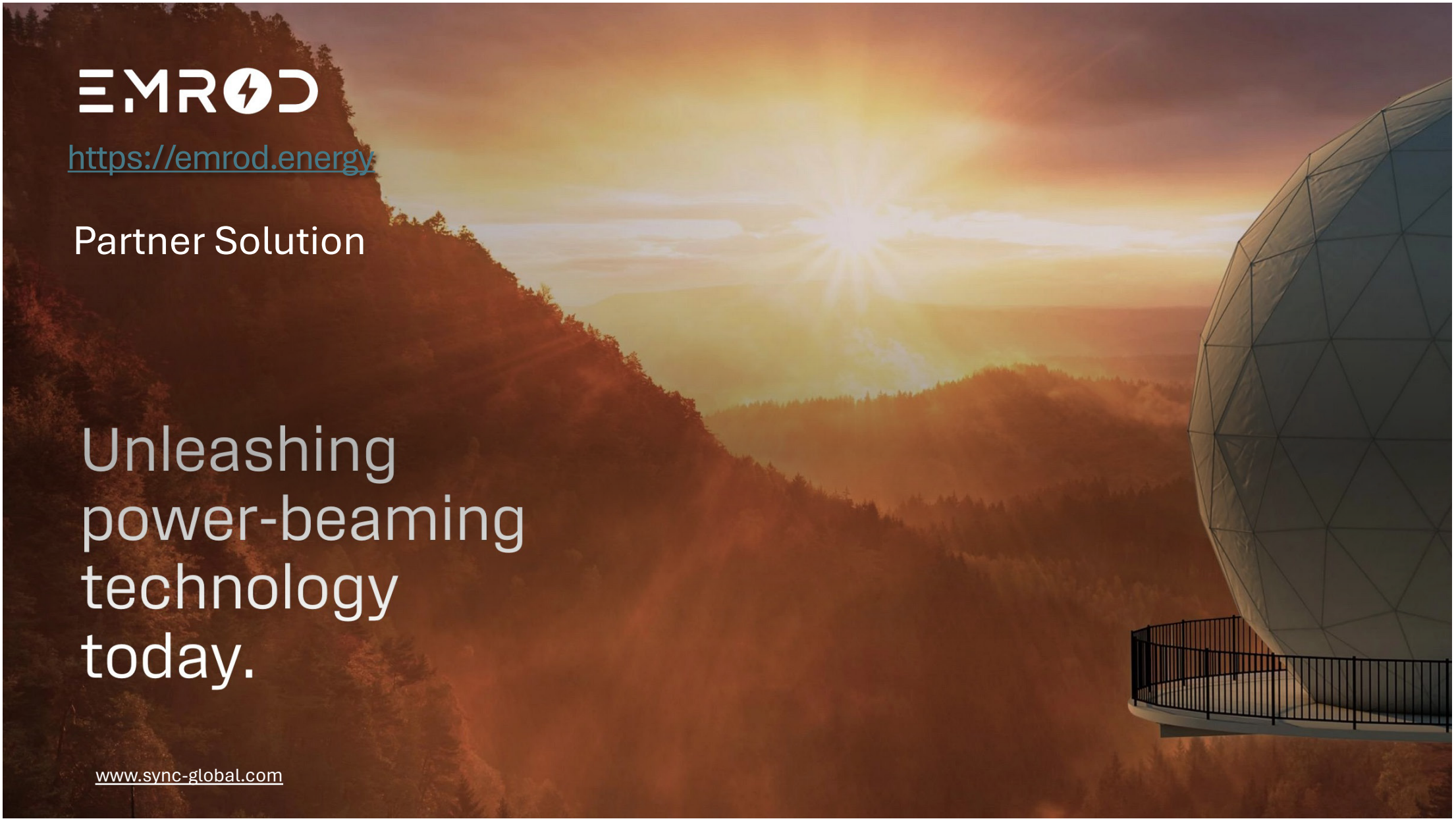


Wireless Power Transmission

IN-Region

Partner, Emrod


EMROD
https://emrod.energy
Partner Solution
Unleashing power-beaming technology today.
www.sync-global.com

EFFICIENT

EMROD's beam shaping technology minimizes energy lost through diffraction or atmospheric conditions.

SAFE

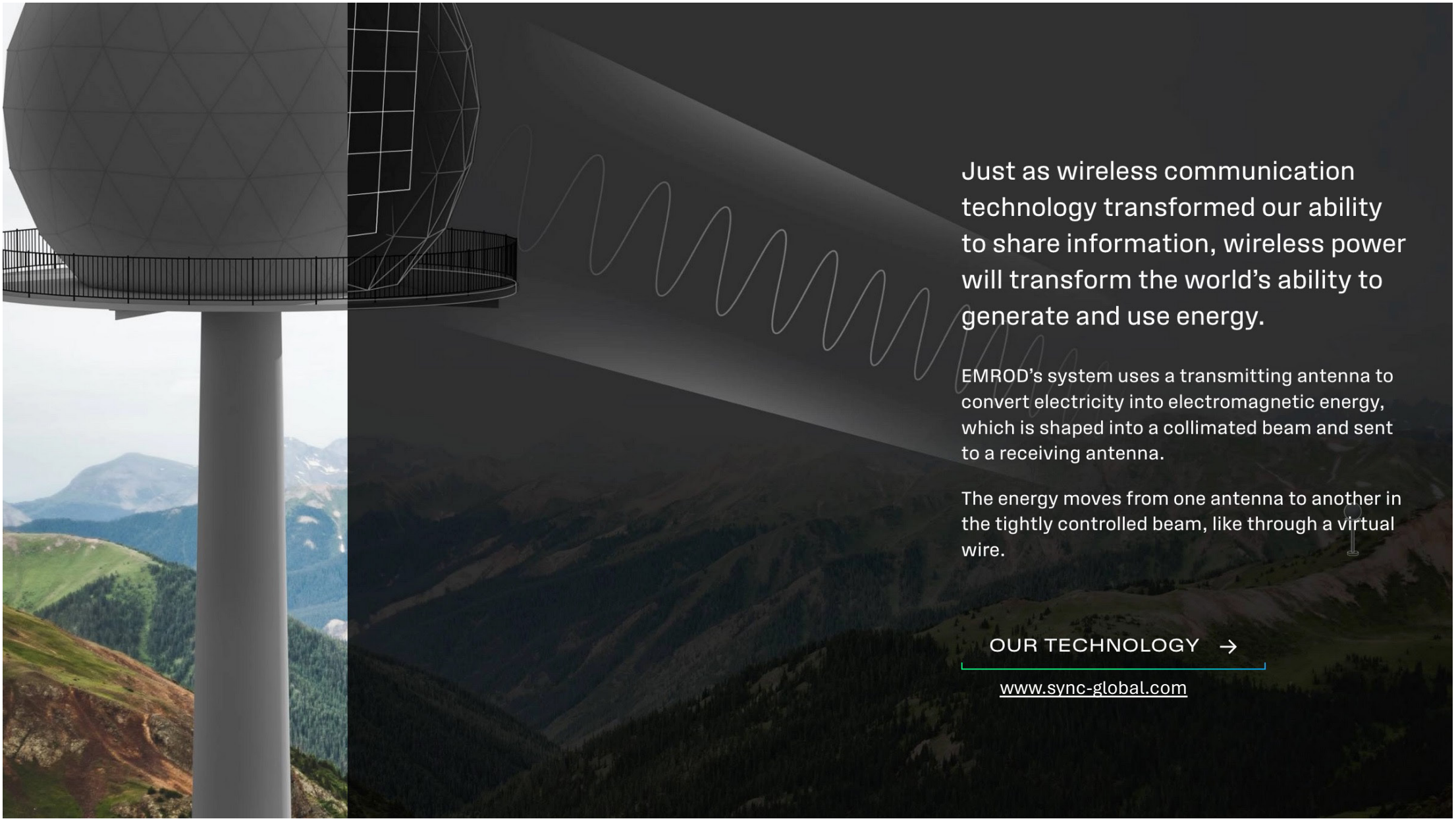
Built-in safety mechanisms make EMROD's technology completely safe for public use.

SCALABLE

The system is scalable in distance and power levels based on the antenna size and use of EMROD's relays.

RELIABLE

The system uses highly reliable electronics with built in redundancy and is easily interfaced with clients' systems.



Just as wireless communication technology transformed our ability to share information, wireless power will transform the world's ability to generate and use energy.

EMROD's system uses a transmitting antenna to convert electricity into electromagnetic energy, which is shaped into a collimated beam and sent to a receiving antenna.

The energy moves from one antenna to another in the tightly controlled beam, like through a virtual wire.

OUR TECHNOLOGY →

www.sync-global.com


TECHNOLOGY
Imagine a world where renewable energy can be generated and sent anywhere.
www.sync-global.com

WHY NOW?

The energy industry is undergoing a huge transformation to replace fossil fuels with renewable energy.

Vast electrification, distributed generation and the intermittency of renewables all put major pressure on existing energy infrastructure.

The challenge is no longer how much solar or wind we can install. It's how do we upgrade our electric grids to bring renewable energy projects online quickly, improve energy access, and ensure resiliency in the face of climate change.

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USE CASES

EMROD’s system unlocks a wide range of commercial uses for wireless power transfer, especially where existings solutions must rely on power lines and cables.

Wireless power transfer is easier to deploy, has a smaller environmental footprint, and greater flexibility in how, where, and when power is generated and used.

HISTORY

EMROD was first incorporated as a company in 2019, following a feasibility study to research and confirm the economic and technological viability of long range wireless power.

Greg Kushnir, the visionary behind EMROD, was motivated to pursue the development of this technology after recognizing the immense environmental and economic benefits of wireless power transfer and, after extensive research, realizing that the key components of the technology had progressed to a stage where such a system could be possible and commercially viable.

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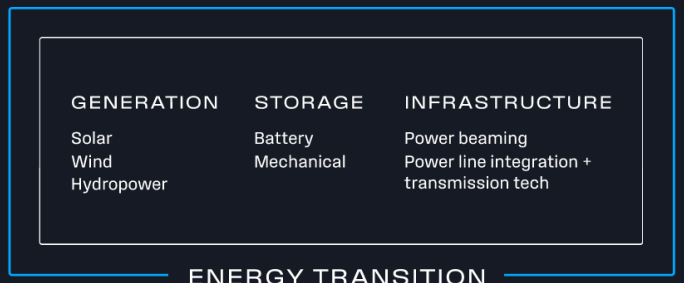
Greg Kushnir + Dr. Ray Simpkin next to EMROD's first indoor demonstration system, Auckland, New Zealand, 2021

Auckland, New Zealand

Munich, Germany

Boston, USA



Power-beaming is a new tool in the sustainable energy transition toolbox.

We are addressing energy distribution challenges and future-proofing electricity grids. EMROD's technology makes it possible to wirelessly send large amounts of energy over long distances.

Commercially viable power-beaming speeds up the transition to sustainable energy, supports the decarbonization of industries, and makes clean energy more accessible.

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How It Works

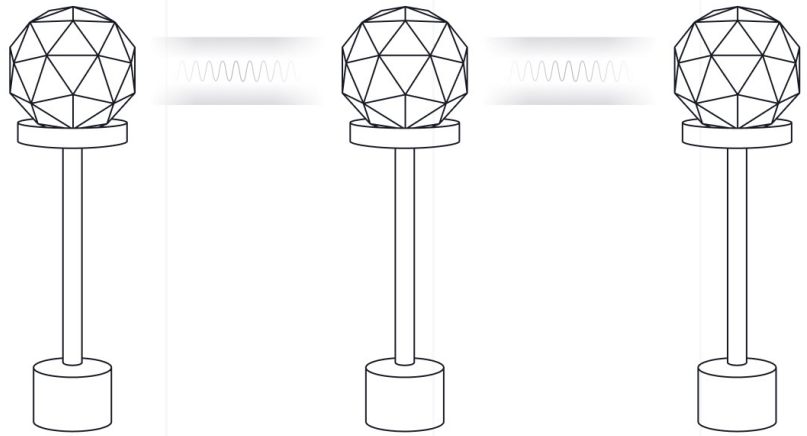
Efficiency

EMROD's technology has three key elements: a transmitting antenna, a rectifying (receiving) antenna and the beam of electromagnetic energy that exists between the two antennas.

At the transmitting side, electricity is converted into electromagnetic energy.

EMROD's proprietary technology shapes electromagnetic energy into a beam that minimizes atmospheric and dispersion loss. This has been a major challenge with other long-range wireless power transfer systems to date.

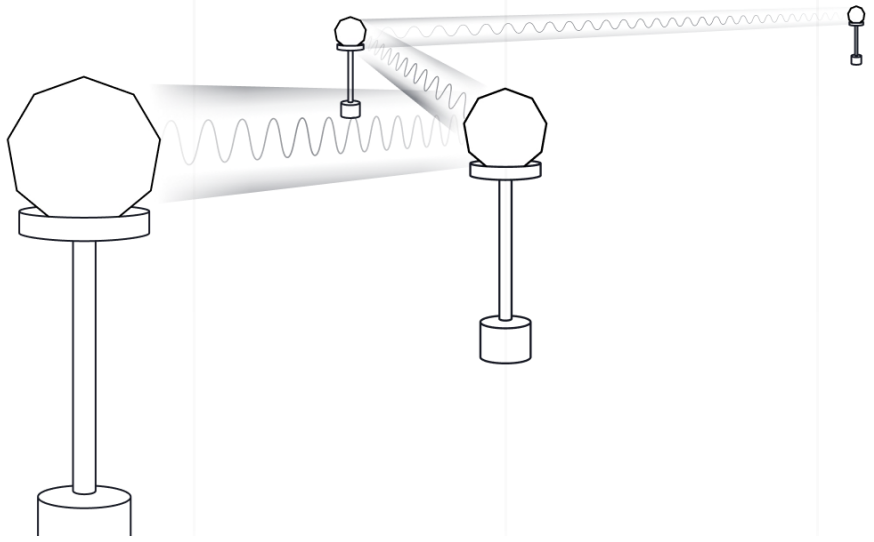
The beam collection efficiency of EMROD's technology is over 97%. Our current R&D efforts are focused on improving efficiency at the transmitting antenna and rectifying antenna.



Scalability

The technology is scalable in both distance and power levels. The range over which such a collimated beam can be maintained is governed by diffraction physics, which relates the range, antenna diameter, and wavelength to the optimum beam collection efficiency.

Highly-efficient relays can be placed between the transmitting and receiving antennas to redirect the beam and scale up the distance of transmission.



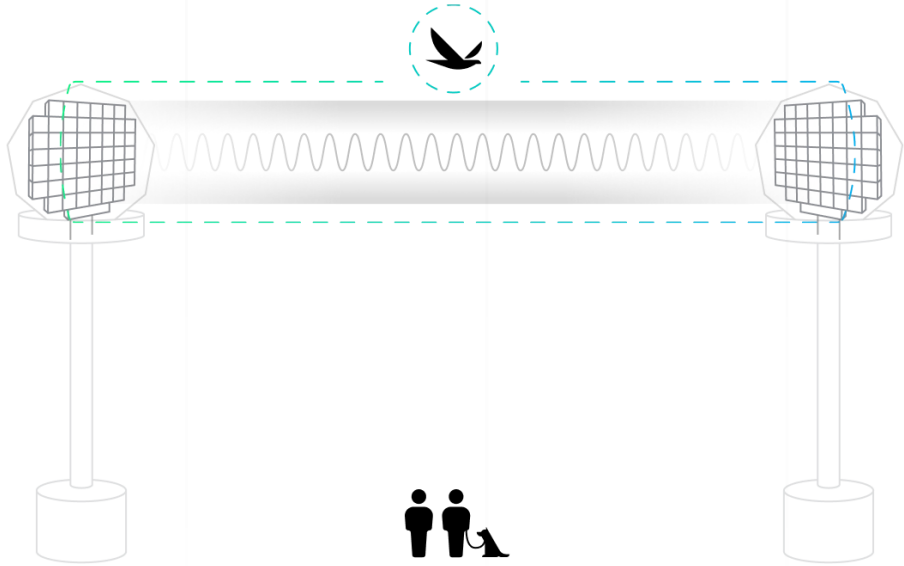
Safety & Reliability

A collimated formation allows the beam to be precisely electronically controlled. The antennas are positioned in a way to avoid anything on the ground passing through the beam.

The built-in safety system temporarily shuts down or douses the beam if any object is about to cross the beam. Collimated, tightly controlled, point-to-point transmission means minimal radiation around the beam, less than there is with high voltage wire transmission.

Modular architecture makes maintenance easy and reduces potential downtime.

Fewer failure points; no lines reduces weather and other physical interference related outages. Weather or atmospheric conditions such as rain, fog, or dust have a negligible impact on the efficiency of the beam.



https://newatlas.com/energy/long-range-wireless-power-transmission-new-zealand-emrod/


EMROD
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https://www.mercomindia.com/this-wireless-new-zealand-transmission-system

MERCOM
clean energy insights

SOLAR GRID ENERGY STORAGE WIND OTHER VIDEO MAGAZINE

This Wireless Power Technology Could Change New Zealand's Transmission System

The technology uses electromagnetic waves to transfer power over long distances without the use of copper coils

www.sync-global.com

Information weblinks:

- https://www.eit.edu.au/world-first-wireless-electricity-supply-headed-for-consumers/
- https://www.ventureradar.com/keyword/Wireless%20power%20transfer

How it all works

The company has patents pending for its technology, so the more proprietary technology the company is using is mostly under wraps for the time being. However, they do say they are working in frequency ranges in the ISM (Industrial, Scientific, and Medical) band – which are typically used in WiFi, Bluetooth, and RFID.

The prototype point-to-point transmission system Emrod engineered, along with Callaghan Innovation, impressed Kiwi government funders. To further demystify the tech the startup is working on, Kushnir spoke to New Atlas.

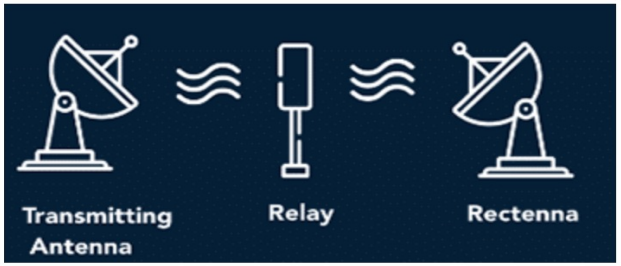
"Transferring energy with microwaves has been around for decades. In the 70s, NASA showed it could support a helicopter drone in the air, charging it with microwaves from the ground. It's been around for a while. What's changed in the last few years is mostly metamaterials technology. New materials that allowed us to convert the energy back into electricity very, very efficiently. That was what made it viable for commercial use. Before that, it's been around, but mostly used for military purposes," he said.

IT is the proprietary beam shaping, metamaterials, and rectenna technology that Emrod is keeping under wraps for now.

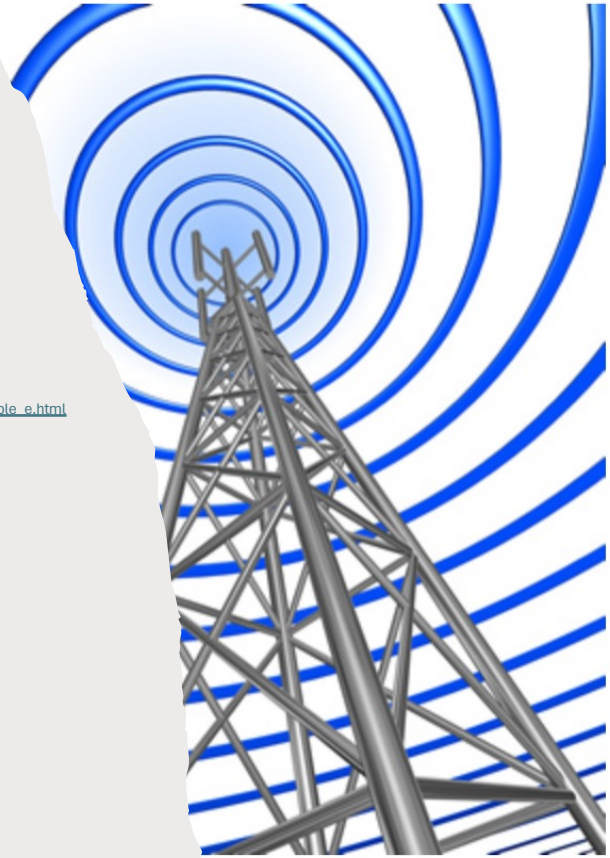
Kushnir goes on to say, "Electromagnetic metamaterials can absorb electromagnetic radiation and turn it into heat, or electricity, or make it go away. It's essentially stealth technology, that's what it's been used for in the military."

The startup assures critics that their system will produce no waves, no radiation, and no environmental impact. They have been testing their tech, sending 'a few watts' between two points spaced 130 feet from each other. The startup ultimately has faith that they are on the right track:

"The statistics are pretty compelling. We are talking about a potential 50 percent increase in sustainable energy uptake, up to 85 percent reduction in outages and up to 65 percent reduction in electricity infrastructure costs due to the Emrod solution," Kushnir concluded.



Product that are closely related to our everyday life.



https://www.b-plus-kk.jp/en/BPLUS_wireless_e/wireless_principle_e.html

【Home】

・Bathroom and kitchen, Wireless supply to household electrical appliances.

・Portable electrical appliance including a Laptop and the digital camera are now wireless.

・Charge your smart phones without putting them out from your pocket or your bag. Whereever you are in your house, you can charge wirelessly.

・Feeding of the household electrical appliance (TV or cleaning Robo).

・Feeding an outdoor apparatus through glass and a wall.

【Office】

Combine data communication such as WIFI or Bluetooth, USB connection device and neither the cable nor the battery are needed and can be feeding wirelessly.

【The medical welfare】

Wireless power supply to a capsule camera or a micromachine, and wirelessly supply power to medical robot. Also can burden reduction of the patient and the electric motion of the stretcher can motorized and wirelessly supplied.

In addition, using the physical point of contact connector repeatedly can cause damage. It can be solved the problem using wireless feeding. Also be able to improve by using a robot operation in factories and adopting it to a line. Can lower the maintenance cost and prevent work loss by the damage.

As for the wireless power supply, introduction has already advanced in the field of many electricity field. By expanding the use of wireless supply in many fields, how will the future change? Let's introduce example….

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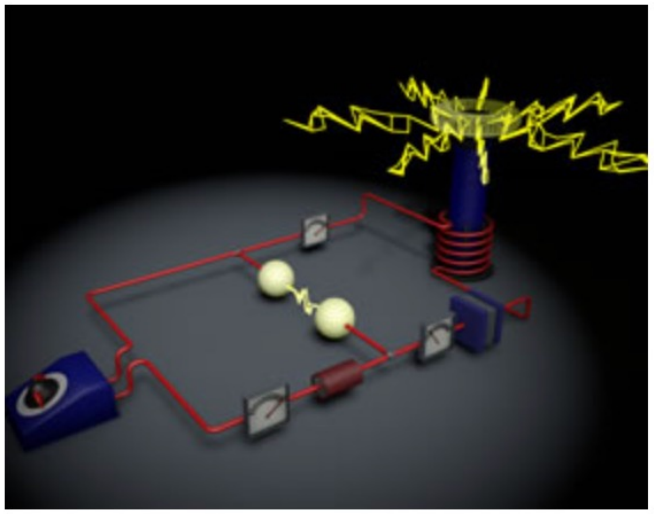
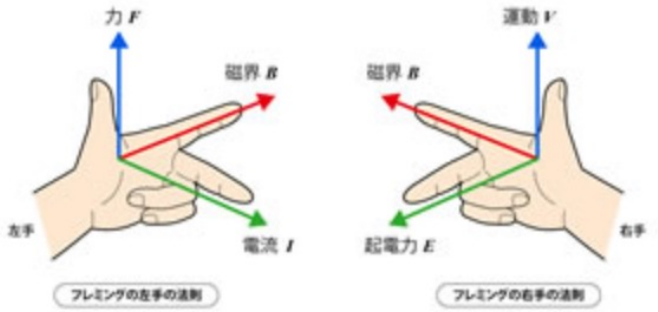
Electromagnetic induction

How can the electricity flow through the space and not ony through the metal? A principle of "electromagnetic induction" discovered more than 180 years ago. Have you tested in science class the magnet which stuck strongly when you canceled electricity to the coil, "the electromagnet" This is an entrance of the electromagnetic induction. The electromagnet converts "electricity" into "the magnetic field" by canceling electricity to a coil. And it is possible to drain "the magnetic field" into the space (release).



Principle of electricity and magnetic conversion / electromagnetic induction

The wireless power supply can be possible by using two coils. At first a magnetic field occurs when it carries away electricity to coil (1) (the Fleming right-hand rule). When coil (2) in a far place catches the magnetic field, an induced current transmits, and electricity is generated. This is a principal of the wireless power supply.



There is no electrical metal point of contact!

It is not only metalthat can carry the electricity!

The metal point of contact and conducting wire are indispensable to carryl electricity. The plug to add into the outlet is two metal, for example, smartphone the connector is also metal. To carry electricity other than metal is "water". The water can be not very suitable for an electric appliance to have the metal point of contact toward. It can cause the short-circuit and can cause to be broken.

However, wireless feeding does not have the metallic point of contact. Therefore it does not need to disturb a product to short-circuit even if it takes water. A wireless feeding technology is adopted in many things. For example, with an electric toothbrush or the electric shaver. In addition, in high industrial facilities such as a clean room or the fire strict prohibition, in the metal point of contact, outbreak of the metal powder by the electrical contact is brought into question. Because the wireless feeding without the metal point of contact can hold outbreak of the metal powder in check, it is the technique that can be adopted as quality improvement and safety measures of facilities.

The wireless power market that is accelerating

When it is in 8,500 million US dollars, an approximately 1 trillion yen scale in 2018, according to the data which IHS Technology which is an American research company announced in 2014, I expect the wireless feeding market. Wireless feeding is finished on a theme as one of the growth strategy in the country, and Ministry of Internal Affairs and Communications moves for standardization, too. The wireless feeding is the worldwide up-and-coming technique that a study is pushed forward as the project that I nominated a country for at various makers or universities.

The wireless power supply has been moving toward formalizing practical use.

The wireless power supply has already been adopted in the small electricity products such as an electric toothbrush and the electric shaver. The system which they can feed in the large apparatus　smoothly (e.g., an electric car or an industrial instrument) the companies including us, we are continue developing.Also, the country promotes this movement and in Ministry of Internal Affairs and Communication already studying for the practical use of the wireless power supply.The wireless power supply that is continuing to expand and spreads out more and more in future.What is the next thing we want?

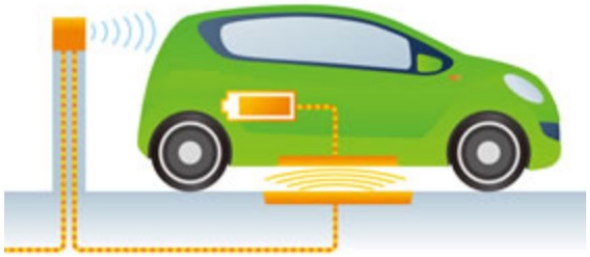
The Future change by Wireless Power Supply!

Power supply cord disappears by a next-generation power supply system! ?

For example, you can feed your phone without a charger at the coffee shop, charge with wireless power supply just by putting the smartphone on the table. Or while you are shopping at the grocery store, without connecting to the cord, you can charge your car.The biggest merit of the wireless power supply is to not be able to tie a battery charger and a feeding cord. Save lots of space and avoid the problem by the direct wiring and it is automatise and efficient.

There is not the physical point of contact!

Can utilize "space! Wireless feeding! "



Wireless feeding with the transmission side, and electric side, can be no physical point of contact. Also if it is water, glass, acrylic, resin, nonmetal including the wood, these materials can sandwich it between. Can be realize to wireless feeds a sealed container having high wireless vacuum degree feeding over glass in the water and a clean room.

In addition, using the physical point of contact connector repeatedly can cause damage. It can be solved the problem using wireless feeding. Also be able to improve by using a robot operation in factories and adopting it to a line. Can lower the maintenance cost and prevent work loss by the damage.

Wireless Power Supply around the location using water.

Wireless Power Supply without removing your smart phone from your bag.

Wireless Power Supply to a medical robot.

There is no electrical metal point of contact!

It is not only metalthat can carry the electricity!

The metal point of contact and conducting wire are indispensable to carryl electricity. The plug to add into the outlet is two metal, for example, smartphone the connector is also metal. To carry electricity other than metal is "water". The water can be not very suitable for an electric appliance to have the metal point of contact toward. It can cause the short-circuit and can cause to be broken.

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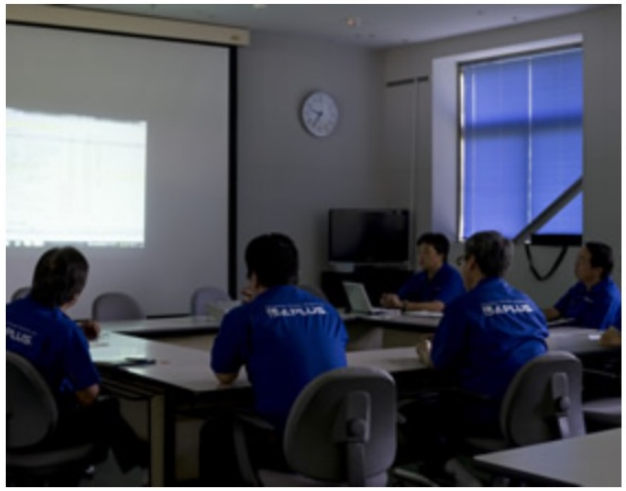
The future and the advanced wireless feeding technology

Wireless feeding includes the technique using the magnetic field and the technique using the electric field.It is also divided with a non-emission type,perform in a near field. And an emission type to perform in a distant.Non-emission type ... electromagnetic induction, magnetic field resonance,Emission type ... electric wave method including the inductive coupling, laser method, solar power generation To make the wireless feeding technology possible, a design to a purpose of use and environment is required. Transmission ranges, distance or the axis gap and the electricity that can feed a design method are all different. In manufacture, a circuitry, a housing design to perform heat radiation efficiently is necessary in addition to a delicate coil design technology and design technology of the circuit to perform electricity transmission. The wireless power supply is a still new technology, and laws and regulations and the standardization are in progress now.



Study and the proof experiment of the wireless power supply.

Wireless power supply to an electric car

A charge station is necessary for the charge of the electric car, and it is necessary to connect an exclusive plug at the time of the charge. To put on and off of this plug takes time.Wouldn't it be great to charge, just by leave it in the parking lots?Therefore, the automotive paid attention to install in the pariking lot. The car only has to face to the parking lot which the transission side has been installed. And the charge can be complited using wireless power supply.Now, American WiTricity company, Toyota and Mitsubishi Motors Corporation, Audi Japan, Qualcomm, and Rolls Royce and RENAUL have been experient on a study to proof and appriaching in the future electric car equipped with a Wireless Power Supply technology. And we will be seeing in town in near future.In addition, Mt. main village wide professor of Tokyo University studies the wireless electricity transmission technology by the electromagnetic field resonance-binding method to apply a wireless feeding technology to an electric car and household electrical appliance in the research organization including the university and aims at the social realization that there is not of the cable.

The University of Tokyo　Mr.Hori・Mr.Fujimoto Laboratry

【The place where a people can not enter. (water, stricken area,)Space】

The wireless feeding to a special robot playing an active part at a place such as (in the water, basement, space) where a human being cannot enter.

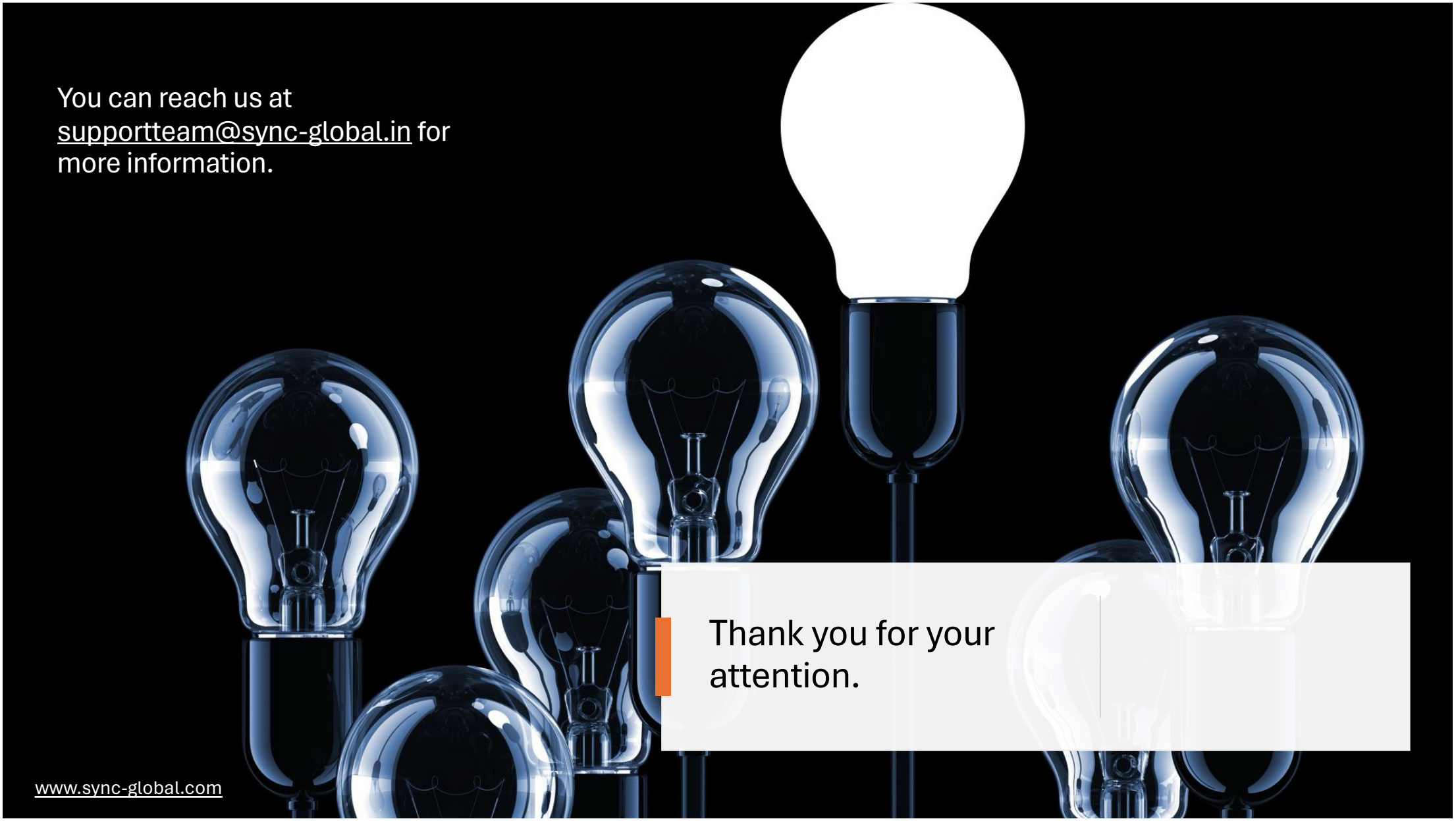
【Space】

Anywhere of the face of the Earth can receive electricity by converting the light of the sun that a man-made satellite caught into an electric wave or a laser, and receiving it on the earth.

The special robot which works underwater

The special robot which works at a strickenarea

Receive the light of the sun that a man-made satellite caught on the earth



You can reach us at supportteam@sync-global.in for more information.

Thank you for your attention.

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