Description of the program of proposed research and experimentation

HEVO Power is going to pilot and demonstrate the Alpha prototype of its proprietary wireless charging system for electric vehicles with commercial fleet partners such as [redacted]. These prototype units wirelessly deliver 1.5kW of power from the wireless power transmitter to a wireless vehicle receiver. Successful demonstration of the Alpha technology will allow HEVO to develop its Beta prototype and ultimately commercialize its technology.

HEVO Power Products:

HEVO Power Network (HPN)

HEVO is currently developing a ubiquitous wireless power product solution to ameliorate commercial fleets' range issues and limited access to plug-in charging stations. HEVO's solution will merge both magnetic resonance and magnetic induction technologies into one easy-to-use interoperable, embeddable and universal opportunistic charging solution to mitigate range limitation and optimize commercial EV fleet operations. The **HEVO Wireless Power Network** (HPN) consists of the **HEVO Power Station** (HPS) (Wireless Power Transmitter) and the **HEVO Receiver** (HR) (Wireless Power Receiver). These two devices communicate and interface with the end user via the **HEVO Mobile** (HM) telematics.

HEVO Power Station (HPS)

The HEVO Power Station will be durable wireless power unit that is embeddable in pavement and asphalt, and capable of providing full interoperability with any EV up-fitted with a corresponding on-board HEVO Receiver. Embedded like a manhole cover, the HPS is seamlessly integrated into the pavement and avoids the vulnerabilities associated with plug-in charging stations. The HEVO Power Station is shown in the Figure 1.

[redacted]

[redacted]

HEVO Vehicle Receiver (HVR):

The electric vehicle's battery will receive power from the HPS and charge the vehicle's onboard lithium-ion battery pack via the car's Battery Management System (BMS). The HEVO Receiver will manage the charging process and make voltage corrections as required by the vehicle's BMS.

Figure 2 Illustration of HEVO Wireless Power System charging an EV truck equipped with a Wireless Vehicle Receiver.

Working principle of the HEVO System:

The HEVO Power System works on the principle of resonant magnetic coupling. Magnetic coupling occurs between two objects by exchanging the energy through their varying or oscillating magnetic fields. To make the system efficient, our system operates at the high frequency, which we call resonant frequency. This system is connected to [redacted] with the help of power electronics device. This power electronics device comprises of PFC/ Inverter. The PFC/ Inverter will convert the low frequency into high frequency system. The frequency is in the [redacted] (according to pending SAE standards). These high frequency cables from the power electronics inverter is connected to the coils embedded in the station. The energy is transferred from the transmitting coil (HPS) that produces the field to the coils on which the fields impinge (HVR). The High frequency coils of HVR is connected to the rectifier (to convert high freq AC to DC) and then connected to the batteries.