.Kreate Lights

SMART SECURITY POLE

Light up tomorrow with today's smartness!!

01 Smart LED Street Light

- Automatic monitoring, controlling and analysis through remote location
- Programmable schedulers for ON/OFF and dimming operation
- Energy meter integration for real time monitoring of electrical parameters
- Cloud based server
- Instant SMS & Web alerts

02 Cellular GPS Device

- Inbuilt GPS for location mapping

03 Environmental Sensor

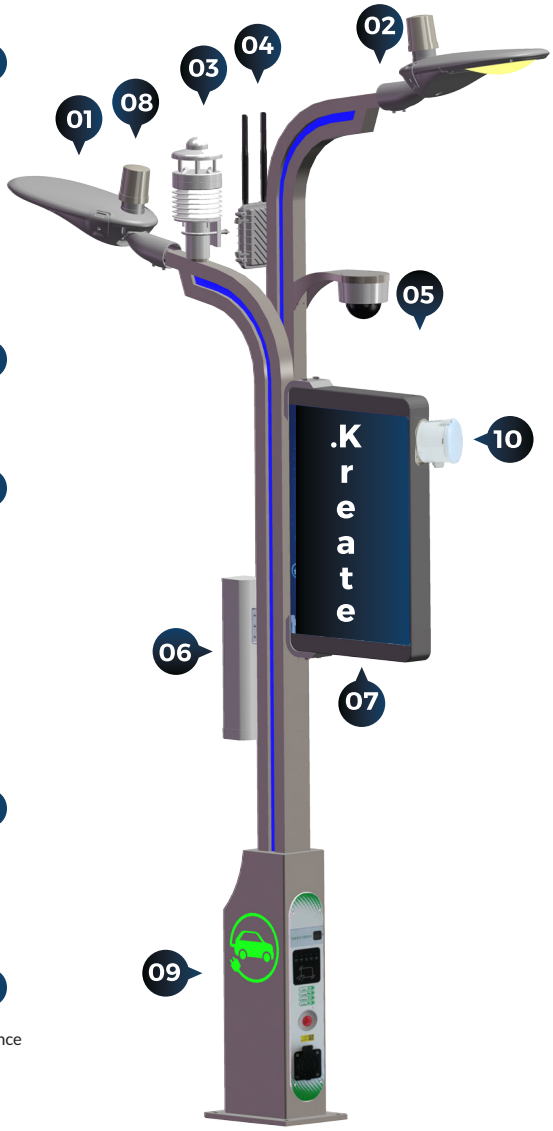
- Outdoor Temperature and Humidity analysis and monitoring
- Air Pressure (Barometric measurement)
- Detect Wind Speed and Wind Direction
- Noise level detection (Decibel)
- PM2.5: Fine particulates for air quality monitoring (equals to 2.5 microns in size)
- PM10: Detects air particulates smaller than 10 microns in size

04 Wireless System

- Hotspot to connect 80-100 clients
- Control and customize speed using software

05 Camera

- 360° PAN , Tilt and Zoom with HD real time surveillance
- Controlled Through Software



06 Public Address System

- Two Way Voice Communication alongwith Sound column for entertainment

07 Digital Signage

- LED full color display
- Customized advertisements, a source of revenue generation
- Can be converted into signage system for Parking Lot.

08 Artificial Intelligence

- Complete system control, monitoring and data interpretation/reporting
- 2G/3G/4G, Wifi (IOT) devices/modem for communication with server

09 Electric Vehicle Charging Station

- 7kW vehicle easy charging facility
- Environment friendly solution

10 Motion Sensor

- Output of Motion Sensor is integrated with Luminaire Controller
- Control Brightness of Luminaire automatically.

Additional Augmentation

- Device to detect non-semiconductor & materials

7 AFFORDABLE AND CLEAN ENERGY

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

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Electric Vehicle Charging Solutions

Electric Vehicle Charging Stations Business Models for India

Product Specification

1KW EV CHARGER (60V/15Amp) Lead acid battery

Customer: Multiple

System Description:

Input/Output Product Ratings for each Individual LED Lamp

	Conditions	Specification	Unit
Product	---	EV Charger 60V/ 15A	DC
Battery Type	---	Lead-Acid- 48V-120Ah	Ah
Battery Full/Charge Cut off Voltage	230V, 50Hz, 25±2°C	58V ±1	Vdc
Battery Charging Methodology		Half Bridge LLC	
Input Voltage Range		(180V -280V) ± 10Vac	Vac
Input Current Range		4.0A ±5%	Amp
Input Frequency		48-51Hz	Hz
Input High Voltage Cut		280V ± 10Vac	Vac
Input Low Voltage Cut		180V ± 10Vac	Vac
Input High Voltage Recovery		275V ± 5V	Vac
Input Low Voltage Recovery		185V ± 5V	
Out Put Current (Max.)	230V, 50Hz, 25±2°C	15Amp ± 1A dc	Amp
Out Put Voltage (Max)	230V, 50Hz, 25±2°C	60 Vdc	Vdc
Efficiency of Charger	230V, 50Hz, 25±2°C	>85%	%
Battery Low Voltage Alarm	230V, 50Hz, 25±2°C	38V ±1	Vdc
Short Circuit Shutdown with Buzzer		"No feedback" Audio	
FULL Battery Cut--- Bip	230V, 50Hz, 25±2°C	56V ± 1V	Vdc
No Load Current	230V, 50Hz, 25±2°C	< 0.200	Amp
Charger Mode Fan On	230V, 50Hz, 25±2°C	Continuous	
Charging Cut due to Thermal	230V, 50Hz, 25±2°C	Buzzer	
Technology		Microcontroller Based LLC &PFC	
Protections	Audio	Mains Low Cut & High Cut Protection	
	Fuse	Mains Over Current Protection	
		Battery Over Charging Voltage Protection	
		Battery Over Charging Current Protection	
	Audio	Battery Low Cut Protection	
	Audio	Short Circuit Protection	
	Audio	High Temperature Protection	
	Audio	Open circuit Protection	
	Audio	Battery Reverce Protection	
Indications	Visual	4 stages battery charging led display	
	Visual	Mains Connect Indication	
	Visual	Charging Start Indication	
Net Weight (Kg)*	< 10 kg		
Gross Weight (Kg)*	< 11 kg		
Opearting Temperature (without Derating)	0-40 deg celcius	0-40 °C	°C
Humidity (Non-Condensing)		85% Non condencing	
Battery Cable Entry		4 Sqmm	Sqmm
Cable Termination Type (Type with ring type lugs)		RING	

	Conditions	Specification	Unit
Product	---	EV Charger 60V/ 18A	DC
Battery Type	---	LiFePo4- 48V-80Ah	Ah
Battery Full/Charge Cut off Voltage	230V, 50Hz, 25±2°C	54V ±1	Vdc
Battery Charging Methodology		Half Bridge LLC	
Input Voltage Range		(180V -280V) ± 10Vac	Vac
Input Current Range		5.0A ±5%	Amp
Input Frequency		48-51Hz	Hz
Input High Voltage Cut		280V ± 10Vac	Vac
Input Low Voltage Cut		180V ± 10Vac	Vac
Input High Voltage Recovery		275V ± 5V	Vac
Input Low Voltage Recovery		185V ± 5V	
Out Put Current (Max.)	230V, 50Hz, 25±2°C	18Amp ± 1A dc	Amp
Out Put Voltage (Max)	230V, 50Hz, 25±2°C	60 Vdc	Vdc
Efficiency of Charger	230V, 50Hz, 25±2°C	>85%	%
Battery Low Voltage Alarm	230V, 50Hz, 25±2°C	40V ±1	Vdc
Short Circuit Shutdown with Buzzer		"No feedback" Audio	
FULL Battery Cut--- Bip	230V, 50Hz, 25±2°C	54V ± 1V	Vdc
No Load Current	230V, 50Hz, 25±2°C	< 0.200	Amp
Charger Mode Fan On	230V, 50Hz, 25±2°C	Continuous	
Charging Cut due to Thermal	230V, 50Hz, 25±2°C	Buzzer	
Technology		Microcontroller Based LLC &PFC	
Protections	Audio	Mains Low Cut & High Cut Protection	
	Fuse	Mains Over Current Protection	
		Battery Over Charging Voltage Protection	
		Battery Over Charging Current Protection	
	Audio	Battery Low Cut Protection	
	Audio	Short Circuit Protection	
	Audio	High Temperature Protection	
	Audio	Open circuit Protection	
	Audio	Battery Reverce Protection	
Indications	Visual	4 stages battery charging led display	
	Visual	Mains Connect Indication	
	Visual	Charging Start Indication	
Net Weight (Kg)*	< 10 kg		
Gross Weight (Kg)*	< 11 kg		
Opearting Temperature (without Derating)	0-40 deg celcius	0-40 °C	°C
Humidity (Non-Condensing)		85% Non condencing	
Battery Cable Entry		4 Sqmm	Sqmm
Cable Termination Type (Type with ring type lugs)		RING	

Product Specification

1.2KW EV CHARGER (60V/18Amp) LiFePo4

Customer: Multiple

System Description:

Input/Output Product Ratings for each Individual LED Lamp

Electric Vehicle Charging Stations Business Models for India

Electric Vehicle Supply Equipment (EVSE) or charging equipment are prerequisite for electric vehicle (EV) adoption by vehicle owners. Various countries adopted different approaches and business models for creation of EVSE ecosystem with mixed success. As India is gearing up to unleash an EV revolution, few key questions related to EVSE continues to haunt the stakeholders in the EV space:

- What are the standards for EVSE in India?
- Who will own, operate and maintain EVSE? Utilities? Franchisees of the Utilities? Or third parties - fleet operators, parking lot operators and entrepreneurs?
- What will be the electricity tariff for EV charging? Will there be capacity charges (minimum monthly fee per kW of capacity) or only energy charges?
- Who will pay for the electric grid upgrade charges (higher capacity distribution transformers and new cables where ever required) – EVSE owner or that cost will be passed on to regular grid upgrade capex of the utility?
- Where will the public EVSEs be located and land for the same be allotted free, at concessional rates or at market value?

This Paper attempts to put together the summary of considerable work already done by various stakeholders on the above issues and look at sustainable business models for creation of EVSE ecosystem that will enable rollout of EVs on fast track.

Introduction to Electric Vehicle Supply Equipment (EVSE)

The EVSE or charging equipment can be broadly classified as AC charging and DC charging devices. The battery in the EV require direct current (DC), which a DC charger can supply directly to the EV battery. Alternatively, an AC-DC convertor on-board the EV can convert the AC supply from the AC charger and supply DC to the EV battery. For AC charging the vehicle should have an AC-DC convertor on-board which would add to the cost and weight of the EV. However, almost all EVs have a small size AC-DC convertor so that the EV can be charged from any AC supply. In case of AC charging, the charging speed depends on the DC output from the on-board AC-DC convertor. For example a single phase 220V AC, 15 Amps supply (AC output- 3.3 kW) connected to an EV with a 10 kWh battery and on-board AC-DC convertor with an output of only 1 kW DC could take 10 hours to fully charge the battery. AC chargers with high power output are available which can fast charge the batteries depending on the battery chemistry and battery management system (BMS) in the EV.

DC Fast Chargers (DCFC) with high power output can supply DC power to the battery and can charge the EV battery much faster. A 50 kW DCFC can charge an EV with a 25 kWh battery in 30 minutes (theoretically). DCFCs are more economical as AC-DC conversion takes place in the EVSE itself rather than inside the vehicle. When an EV is connected to the EVSE a hand-shake is established between the EV and EVSE; and the BMS in the EV takes control over the charging process.

EVSE Standards for India

In 2016, on the request of ISGF, Bureau of Indian Standards (BIS) setup ETD 51 Committee for preparing the Indian Standards for EVSE. The EVs need to be connected to the electric grid for charging the battery and hence must comply with electricity grid code like other electrical equipment. Characteristics of the Indian power system is similar to that of Europe – 230V and 50Hz (unlike America: 110V and 60Hz) and we follow IEC standards.

Who Can Own EVSE?

Per Electricity Act 2003, resale of electricity require electricity distribution licence. Hence, strictly going by the present law, anyone other than DISCOMs require a licence to setup EVSE which is not feasible. This point was brought to the attention of both Ministry of Power (MoP) and Forum of Regulators (FOR) by ISGF way back in 2016. After several stakeholder consultations, MoP has issued an order in

April 2018 clarifying that EVSE's buying electricity from DISCOMs and selling to EVs is not considered as resale or trade of electricity. This has given much needed relief to potential EVSE entrepreneurs. Now anyone can apply for new connections for EVSE and commence the business.

Electricity Tariff for EVSE

For the first time in the country, Delhi Electricity Regulatory Commission (DERC) in its tariff order in 2017 introduced a separate tariff for EV charging which is substantially lower than the commercial tariff – Rs 5/kWh for charging from HT supply and Rs 5.5/kWh for charging from LT supply. Also there is no minimum monthly charges for capacity. This was intentionally kept lower in order to promote EV rollout as well as creation of EVSE ecosystem. In 2018, Karnataka and Maharashtra State Electricity Regulatory Commissions have also introduced separate tariffs for EVs while DERC retained the 2017- 18 tariff for 2018-19. We expect separate tariffs for EVs all across the country in the coming years which will be variable based on time of use (ToU).

Grid Upgrade Cost for EVSE

In most parts of India, the distribution transformers (DT) and overhead wire/underground cables are generally overloaded. When large number of EVs are connected to the low voltage lines from one particular DT, the DT might burn. Since buying behavior of EVs is influenced by friends and neighbors, initial trials with EVs in almost all geographies have experienced creation of pockets of EV concentration where grid equipment needed upgrade. ISGF study in Kolkata in 2016-17 noticed that 8 months in a year (except November to February when air conditioners are seldom used) the existing DTs may not be able to accommodate DC Fast Chargers. If the grid upgrade cost which will run in to millions of rupees is passed on to the EVSE establishment, the cost of electricity will be so high that e- mobility will not take-off.

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