WWF IND 2020

CLIMATE SOLVER 2019 AWARDEE

GHG REDUCTION: CARBON CUTTER- RETROFIT DEVICE FOR JAGGERY UNITS AND DG SETS

Developed by: Pi Green Innovations Private Limited

INNOVATION

Air pollution is the cause for a serious environmental health crisis in India. Diesel generators are widely used for supplying round the clock power, or as back up for large residential, commercial as well as industrial sectors. The Central Pollution Control Board (CPCB) has notified various emission norms for manufacturers of diesel generators, although there is no regulation for generators in-use after commissioning (except the 800 KW and above category). This is regardless of the fact that particulate matter (PM) is the major source of air pollution in our country and DG sets contribute significantly to ambient air pollution.

Carbon Cutter, developed by Pi Green Innovations, is a 'filterless' retrofit device for diesel gensets and jaggery units that helps in PM reduction at source. It has been tested (development test) by Automotive Research Association of India (ARAI) that reports over 90% PM reduction. The Carbon Cutter's filterless technology (capture of exhaust particles is done without the use of any solvent or physical filters) ensures no choking thereby, requiring lower maintenance as compared to existing filter or solvent-based products. The solution is a simple plug-in installation onto the exhaust of a diesel generator and designed to efficiently capture $PM_{2.5}$ and PM_{10}. The captured PM is stored in a separate chamber at the bottom of the device and the collected powder can be used as a raw material for manufacturing paints or inks.

Pi Green Innovations has installed Carbon Cutters in 5 diesel generator sets in Maharashtra and is actively exploring business opportunities in South and North India considering the large number of diesel genset operators in these regions. The company has also developed products for outdoor air purification and for pollution caused by jaggery processing units. In jaggery units, the exhaust is passed through the capturing device which uses Pi Green's proprietary technology. This charges the exhaust particles, captures them and stores the unburnt black carbon particles from the exhaust in a collection chamber. Pi Green aims to set up a full-fledged manufacturing unit with end-to-end capabilities, from fabrication to assembly and plan to explore technology-licensing opportunities with OEMs for retrofitting to reduce emissions from older heavy vehicles and diesel gensets.

Carbon Cutter installation for DG set in Barmati, Pune

Before & After emission scenario from installation in a jaggery unit in Nandgaon, rural Pune

BENEFITS

Pi Green Innovations' Carbon Cutter is an effective solution to reduce emissions in the atmosphere and improve the quality of air. It helps to capture unburnt carbon particles from being released into the atmosphere which cause pollution and are also climate forcing agents. The estimated GHG reduction by global adoption of this technology is likely to be 8 million tonnes by 2029.

ABOUT THE COMPANY

PI GREEN INNOVATIONS PVT. LTD.

Pi Green Innovations Pvt. Ltd. is a technology company with a mission to make clean air accessible to everyone. Pi Green Innovations has been recognized as one of the best technologies in air purification category at Smogathon, Poland in 2018. Being shortlisted as part of the "Solution for Air Pollution" innovation challenge by United Nations Development Programme (UNDP) , Pi Green will now work with UNDP to provide sustainable solutions for air pollution in India and across other countries. The patents for the technology have been filed globally, including in India, USA, UK, Europe, China, Japan and Singapore after a positive Patent Cooperation Treaty (PCT) search.

CLIMATE SOLVER 2019 AWARDEE

GHG REDUCTION: MINION-SMART METER

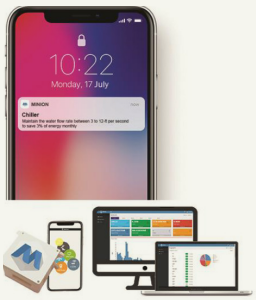
Developed by: MinionLabs India Private Limited

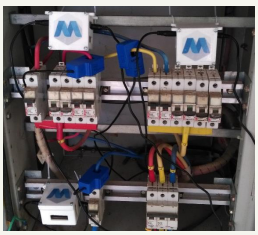
INNOVATION

In India, 32 percent of the country's total electricity is consumed in residential and commercial spaces[1]. India is undergoing rapid urbanization and this figure is expected to rise over the coming years. Niti Aayog, as part of its India Energy Security Scenarios[2], estimates that in a 'Determined Effort Scenario', there will be approximately 860 percent increased electricity consumption in buildings (from 238 TWh/year to 2,287 TWh/year) by 2047. This use includes residential and commercial lighting, appliances, heating and cooling. The overall building energy use consumes 37% (i.e. 213 mtoe) of India's total annual primary energy consumption.

Minion Smart Meter, developed by MinionLabs India, is a hand sized energy-auditing device with the ability to analyze the recorded data captured by the smart meter, and provides non-intrusive energy management solutions to reduce energy consumption in buildings. An easy to install device, Minion-Smart Meter senses each appliance, device and tool turning ON and OFF inside the building and gives a comprehensive report on predictive analytics and maintenance. It is based on a machine learning approach that uses automation to train its state-of-the-art algorithm. The algorithm captures voltage and energy signature at 4 million data points per second to identify the individual assets used and study patterns of their consumption. It is powered by more than 1000 million data points, has a database of over 100,000 hours of energy signatures and currently monitors more than 100 different kinds of assets in real-time.

The energy management solution enables energy transparency and energy efficiency by more than 20% savings, predictive maintenance and asset health monitoring, as well as ensures safety through recognition of any anomalies like high & low voltages and power fluctuations. MinionLabs has installed around 240 devices in 52 facilities. There are two different business models under which the Minion-Smart Meter is either sold or rented for a predetermined time period on a subscription model. Renting is preferred by short-term users, while purchasing is suitable for long-term users. The Minion-Smart Meter can be rented for 12, 18 or 24 months. The long-term scheme provides data storage for up to 3 years, lifelong data analytics and 3 years device protection. The major target market for Minion-Smart Meter consists of buildings with high-energy consumption, such as hospitals, malls, IT-BPOs, etc. Furthermore, the innovation being hardware independent can also be applied to any existing energy monitoring device.





Installation at Greenwood High International School, Bangalore

BENEFITS

The Minion- Smart Meter has potential to reduce energy consumption in a building by more than 20%. It is a plug & play device, which makes it easier to install and maintain. The technology is cheaper than other solutions available in the market, making it affordable for the masses. The estimated GHG reduction by global adoption of this technology is likely to be 9 million tonnes by 2029.

ABOUT THE COMPANY

MinionLabs

MinionLabs helps businesses reduce their electricity costs and improve productivity by providing real-time device level electricity consumption insights. MinionLabs has been granted a patent for its technology. The company has been recognized as the winner of the WhatsApp India Grand Challenge-2019, Best energy efficient technology in Inspire 2018 by EESL and, Star Burst Award from Cisco Systems India for helping Cisco to achieve potential energy savings at their facilities. MinionLabs has been accelerated by Cisco Launchpad Accelerator and WRI India's CityFix Accelerator.

1 http://www.mospi.nic.in/sites/default/files/publication_reports/Energy_Statistics_2017r.pdf.pdf
2 http://iess2047.gov.in/pathways/22202222222222202222222201222220222222222220222022202222/primary_energy_overview_chart

CLIMATE SOLVER 2019 AWARDEE

GHG REDUCTION: AI FOR BUILDINGS TO REDUCE POWER CONSUMPTION

Developed by: P8Sense Technologies Private Limited

INNOVATION

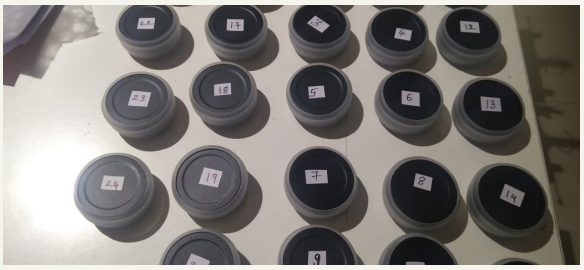
India's cooling demand is estimated to increase eight-fold from 2018 to 2038; and space cooling represents a large proportion of this demand (57 per cent in 2018 and 74 percent in 2038). The rapid expansion of India's building sector will add more than two billion m² of residential and commercial floor area to the country's building stock in the next two decades (2018 to 2038). Air conditioning use may rise from 8 per cent to 40 per cent in residential buildings and from 26 per cent to 54 per cent in commercial buildings, increasing space cooling demand by 11-fold.[1]

P8Sense's AI for buildings is designed to reduce power bills with the help of a centralized dashboard, which monitors the real time data on different assets in a building, such as HVAC Chillers, Air Handling Unit (AHU), Fan Coil Unit (FCU), BMS, and Smart Meters. It also captures data and insights on temperature, occupancy, humidity and power consumption. It automates cooling and heating systems by its cloud-based AI and proprietary algorithms that work as a function of thermal dynamics of the building in real-time. The technology also controls several other parameters such as compression cycles and motor speeds in the chillers, pumps, AHUs etc. Identifying every equipment's signature, the system captures millions of signals, create a unique signature for the equipment, and detects any variation from those signatures using their machine learning models. This way, it is able to predict significant insights, including system failure and down times using this technology.

P8Sense has completed more than 20 installations with 10 clients including, Inox, Shoppers Stop etc. The three types of business models offered by the company are:

Capex model: Client pays upfront capex cost for the equipment and gets the 70% savings in terms of cost

Controllers to control various AHUs, Fans



Sensors for monitoring various parameters

from the energy bill and remaining 30% savings is retained by the company.

Shared model: Client pays 50% of the upfront capex cost for the equipment and a subscription charge per square feet which depends on the scale/size of the project. For instance the client pays Rs.0.50/square feet monthly; or the client pays half the hardware cost.

Opex model: Client pays no capital cost for the equipment and gets a 20% share of energy saving from the baseline energy consumption and 80% is shared between P8Sense and the financier of the project.

P8Sense assures the reduction in energy cost by more than 15% while, at an average, the existing client base has saved more than 20% on their energy bills.

BENEFITS

P8Sense provides end to end implementation of energy efficiency measures to ensure savings of more than 15% on energy consumption. Innovative business models by the company would help enhance uptake of energy efficiency measures in the building sector. The estimated GHG reduction by global adoption of this technology is likely to be 7 million tonnes by 2029.

ABOUT THE COMPANY

POWER8

P8Sense has developed an Artificial Intelligence (AI)-based technology platform to reduce power consumption in buildings. The technology is built on five pillars of data capture analysis, active modelling, measurement and verification, closed loop predictive control and expert human analysis. P8Sense is presently operating in Mumbai, Delhi-NCR, Jaipur, Goa and have expansion plans for UAE, Singapore and Canada.

1 Low carbon cooling solutions for buildings in India, WWF- India 2020

WWF IND 2020

CLIMATE SOLVER 2019 AWARDEE

GHG REDUCTION: SMART PUBLIC ELECTRIC VEHICLE (EV) CHARGING ECOSYSTEM

Developed by: Sharify Services Private Limited

INNOVATION

Rapid urbanisation stimulates mobility needs and augments travel demand, creating a surge in the demand for vehicles. Rising number of vehicles impacts air quality and increases the country's dependence on crude oil leading to higher import bills. However, economic development often involves judicious trade-offs and thus arises a need for green mobility solutions. Given that, India has pledged to reduce carbon emission intensity by 33-35% by 2030 (compared to 2005 levels), the emerging automotive technologies seem to be the way forward.

Sharify Services has developed the Statiq Smart EV Charger, which is a cost-efficient smart public charging infrastructure for parking places such as those at offices, shopping malls, residential apartments, restaurants etc., which would help promote the uptake of EVs.

Statiq Smart EV charger is a 7.2kW type-2 AC charger with charging stations comprising of industry-leading features at an affordable price. The charging ecosystem includes both AC as well as DC chargers; however, the company installs only type-2 smart AC chargers, which are developed in-house. The DC chargers by other OEMs are aggregated, as well as the chargers installed by the government are listed in the mobile and web application. Hence, users using this ecosystem have access to both the type of chargers. While the smart AC charger requires around 2-2.5 hours to completely charge an average EV available in the Indian market, a foreign DC charger does it in around 1.5 hours. While there is some difference in the time however, the cost has been brought down by more than 1/10th. In addition, the cost of running an EV from the company's charger is around ₹ 1.5/km, whereas it is more than ₹ 6/km in case of a petrol vehicle.

Different business models have been adopted in setting up these charging stations and based on the ownership of the station, the percentage of revenue sharing is decided. The most widely adopted business model is the "Smart Model", in which the cost of the charger and the infrastructure required to setup the EV station is borne by the person who wishes to setup the charging station, similar to a franchise. In this case, the company is liable for the maintenance of the charger.

EV charging at Hartron, Udyog Vihar Phase-1, Gurgaon

Sikanderpur metro station, NCR

EV station at Civic Centre New Delhi

Users are able to locate the station on the Statiq Mobile/Web Application and have to pay ₹ 11/unit of electricity used while charging the vehicles. The profit is generated by the difference in unit electricity cost used for charging the vehicle. By using the mobile application, anyone interested can become a charger host and share their charger on the network. Hence, the chargers have wider reach and can be found at various places such as shopping malls and workplaces. These charging stations are not just limited to highways or petrol pumps, thereby improving the scalability of this technology. Sharify has installed more than 150 chargers in and around NCR, which are mostly used by four-wheelers.

BENEFITS

Sharify helps customers find charging points for their 4- Wheelers seamlessly. Quick charging feature offered by Sharify completely charges the battery of a vehicle in less than 3 hours making it convenient to use. The charging rates offered by the company are quite competitive. The estimated GHG reduction by global adoption of this technology is likely to be 9 million tonnes by 2029.

ABOUT THE COMPANY

Statiq.

Sharify Services is an electric vehicle infrastructure company setting up EV chargers at homes, offices, restaurants, parking lots and other public areas. The company has developed Statiq Smart EV Charger, which is a cost-efficient smart public charging infrastructure for parking places. Statiq has been incubated by NASSCOM with the support of Haryana State Electronics Development Corporation Limited (Hartron). Statiq has also partnered with Meru Cabs to provide EV charging for their fleet. Recently in August 2020, they were selected for Y-Combinator based out of Silicon Valley and have raised $1.3 million for undisclosed share of equity.