



GHG REDUCTION:

GORILLA ENERGY EFFICIENT CEILING FANS

DEVELOPED BY: ATOMBERG TECHNOLOGIES PRIVATE LIMITED

Innovation

Energy efficiency has been identified as the key to affordable and sustainable energy systems and is a highly cost-effective way to address rising energy demands. However, while energy efficiency measures require a large capital outlay upfront, it also ensures payback in the form of reduced energy expenditure within a short span of time. Hence, energy conservation through efficiency improvements is seen as an attractive starting point to help reduce global carbon emissions.

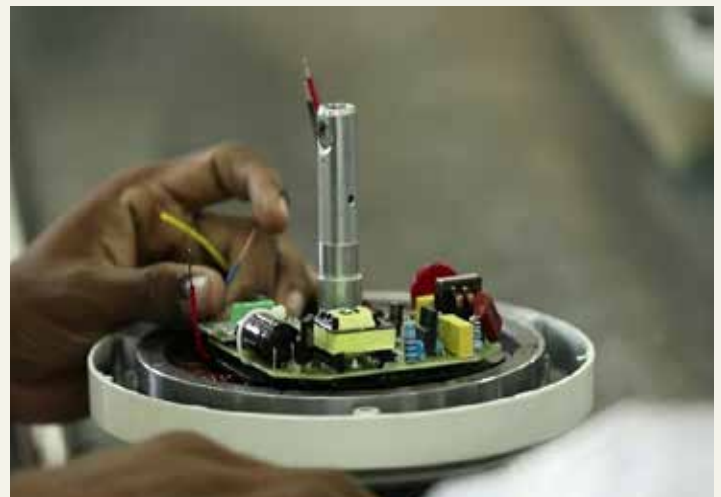
In regions with a hot and humid climate, the use of ceiling fans is common. This electrical product traditionally uses an AC power-based induction motor but with various inefficiencies caused due to rotor copper losses, iron or core losses, etc. The recent DC technology uses a Commutator and Brush that not only require high maintenance due to wear and tear, but also causes sparking due to switching action, voltage drop due to resistance caused during sliding contacts – all leading to electrical losses, and heating, in turn reducing the life of the items like bearings.

Brushless Direct Current (BLDC) motors, alternatively, use an electronic-based commutation, which eliminates the use of mechanical commutation and brushes by deploying a hall-effect sensor that sense the magnet rotor position with respect to stator and controls the motor driving switches. This, in return, leads to efficiency improvement, along with a longer life and low maintenance requirement for parts.

The BLDC motor, developed by Atomberg, and used in the fans called the Gorilla, has improved the electronic switching even further through a proprietary algorithm called AtomSENSE. This helps measure the back Electromotive Force (EMF) induced in the windings to sense the precise rotor position in place of hall effect sensors, thus improving the overall motor reliability. This, in turn, leads to increased efficiency resulting in a lower power consumption of 28W for air delivery of 230m³/min (maximum set point), as compared to a conventional and 5-star BEE labeled fan that consumes 75-80W and 50-55W, respectively.

The company sources superior quality components from established and reliable manufacturers and conducts stringent testing on the final product before dispatch. As a result, more than 0.1 million made-in-India fans have been sold with a reported cumulative failure of less than 1%.

For the Business to Business (B2B) sector, Atomberg has a dedicated marketing team to address the requirements of the market and a strong network with leading ESCOs, green building architects and electrical contractors. Business to Customer (B2C) sales are achieved through Atomberg's own website in addition to other e-commerce platforms like Amazon, Flipkart and PayTM where the products are listed.



BLDC technology used in Gorilla fans

Benefits

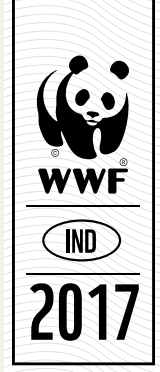
The Gorilla ceiling fan is an excellent example of energy efficiency measures where technological intervention has led to substantial reduction of energy use without compromising on air delivery. If used for commercial and industrial applications where the ceiling fans run up to 24 hours in a day, energy wastages can be reduced to a large extent, leading to an early payback. The estimated GHG emission reduction by wide adoption of this technology is likely to be 4 million tonnes by 2026.

About the company

Atomberg Technologies Private Limited is a Mumbai based company that offers energy efficient ceiling fans. Its innovative solution based on BLDC technology, called Gorilla ceiling fans, consumes 65 per cent less electrical energy compared to conventional motor technologies. Atomberg has installed Gorilla fans at IIIT, Park Hyatt Maldives, Tata Power, IIT-Mumbai, Aditya Birla Industries, etc. and is the winner of 2016 UNIDO's Global Cleantech Innovation Awards in the Energy Efficiency category.

Key technical interventions include:

- Electronics used over mechanical commutation, leading to lower maintenance needs and energy efficient operation
- AtomSENSE help in continuous tuning and calibration, required for driving motor in closed loop for eliminating power losses.
- Remote control as against commonly used stand-alone regulator for a ceiling fan
- Optimized motor design and material selection to reduce eddy current loss
- Stator and rotor design optimization to reduce cogging torque and mechanical vibrations
- Low temperature rise due to selection of appropriate copper wire gauge leading to longer motor life
- Low humming noise due to intervention in lead wires to motor etc.



GHG REDUCTION:

RENEWABLE ENERGY-BASED SMART MICRO-GRID USING DC APPLIANCES

DEVELOPED BY: BASIL ENERGETICS PRIVATE LIMITED

Innovation

Renewable energy is the need of the hour. As per the Climate & Sustainability Energy Finance report, nearly half of global renewable energy investments in 2016 are in the solar sector, with a majority focusing on building photovoltaic power plants. However, the focus on power generation and pricing needs to be coupled with effective dispatch and management of the supplied power against demand in order to balance the electrical grid and avoid disproportionate stress on the grid infrastructure.

De-centralized electricity management hence can play a key role in managing in-firm power through renewable sources to reduce pressure on the electrical grid.

Basil Energetics offers a solution to manage green power at the tail end of the grid or at the load end, to help cater to both urban and rural areas through its decentralized approach. The offered solution is provided in the form of a package, consisting of not only standalone solar panels, but also includes a range of innovative hybrid household electrical appliances such as a ceiling fan, LED lights, air conditioner, refrigerator etc. The demand and supply is managed using a smart micro-grid (SMG) controller, called an iGrid. This scheme eliminates the requirement of electrical conversions, particularly DC to AC in hybrid appliances, to a large extent. Solar power can now be used directly to run hybrid equipment and offers increased functionality as compared to standalone AC equipment, besides being more energy efficient.

iGrid ensures that power requirements are met, either through the solar power pack, the electricity grid source or the battery packs. This means that the iGrid tracks the available power from the solar pack as a primary source, against the load demand. In instances where the solar supply is insufficient, like on a rainy or cloudy day, iGrid dispatches the required power after importing it from the grid or battery packs or other renewable energy sources, as applicable. The iGrid is smart enough to manage supply also from other renewable energy sources, such as small hydro, small wind turbine, gasifier, etc., and dispatch the power to cater to the load in a way that the extra generated electricity can either be stored in batteries, or transmitted to the electrical grid using government notified net metering arrangements. This ensures that the user also benefits from the sale of electricity to utility.

The system can be installed in green or brown-field projects. In case of a brown field project, the system can be set-up on top of the existing infrastructure. However, the electrical equipment needs to be replaced with the hybrid equipment. The hybrid equipment can receive DC or AC and needs to be fitted with a smart controller that can sense the supply and trigger a rectifier, installed within, to convert the AC supply to DC. This will ensure that only DC is used for running equipment and will help save electricity due to efficiency in operation. For example the offered hybrid ceiling fans can save 65 per cent electricity as compared to induction based fans and a 300L refrigerator called iFreez consumes only one fourth power compared to 5-star BEE labeled refrigerator.

All the DC appliances are based on the patented motor control developed by Basil.

Based on user requirements and usage patterns, Basil offers services through four models, each comprising of a solar panel, electrical equipment, iGrid and installation. The number of equipment offered or their capacities vary across models, which further decide the cost of the set-up. For example, a 1.7 kWp power project consisting of single one tonne air-conditioner, a 300L refrigerator, three ceiling fans, LED tube lights and LED lights will cost around INR 3.6 lakh.



Smart micro-grid and hybrid electrical appliances

Benefits

Power packs developed by Basil Energetics present a complete decentralized energy solution for urban and rural areas. The implementation leads to not only reduced stress on the electricity grid by means of on-site generation using renewable sources, but also regulates energy losses that occur during transmission and distribution. The estimated GHG emission reduction by wide adoption of this technology is likely to be 27 million tonnes by 2026.

About the company

Basil Energetics Private Limited is a technology start-up that deploys smart micro-grid (SMG) along with hybrid electrical appliances. Started in 2013, Basil Energetics has installed around 50 rooftop solar-based systems in Tamil Nadu, Karnataka and Kerala and plans to expand it to other states. Basil Energetics also has business interests through channel partners in selected regions of Iran. The offered system capacities range from 1.5 to 18 kWp.