

Historically, central plants have represented a fundamental part of the electric grid. Most often, these large generating facilities have been located specifically either close to resources or otherwise far from populated centers. These were developed when the costs of transportation of fuel and integrating generating technologies into populated areas far exceeded the cost of developing traditional transmission and distribution (T&D) facilities and tariffs. However, by the start of the 21st century, Central Plants could hardly continue to deliver competitively cheap and reliable electricity to remote customers through the grid as this had become the main driver of remote customer's power costs and power quality problems. Efficiency gains no longer come from generating capacity, but from smaller units located closer to sites of demand.

Diesel generators have been increasingly used for their portability, reliability and relative affordability by non-governmental organizations (NGOs), governments and municipalities, and individual customers to suffice the electric energy need in remote areas and emergency situations. On the other hand, these have also shown to require frequent refueling at possibly inconvenient costs of fuel given the upward trending, produce heavy carbon emissions affecting the environment, health and safety of users, require frequent maintenance, and have a lower efficiency at their total load capacity.

Jayhawk Windustries is proud to present to the Inaugural Collegiate Wind Competition hosted by the DOE and NREL, its portable and environmentally friendly wind turbine; a product developed targeting high efficiency and performance. The small-scale 400 W wind turbine rated at 12 m/s is portable, durable, and reliable, providing an energy offset to diesel generators and the expense associated with acquiring, refueling and repairing these. Jayhawk Windustries provides a singular but scalable turbine solution with broad applications for NGOs and with high emphasis on user safety that was developed as a result of the combined expertise and efforts of students of the School of Engineering and School of Business at the University of Kansas.

1 Business Overview

1.1 Mission

Jayhawk Windustries seeks to develop innovative solutions to the challenges of small-scale wind energy by cultivating a diverse and multi-disciplinary team of forward thinking, aspiring student engineers in the belief that we, as the next generation of engineers will, through education and application, develop into the technical leaders who will solve the greatest challenges of the future.

1.2 The Existing Problem

- High costs of central plant generation (complexity, regulatory oversight, and others)
- Increasing age, deterioration, and capacity upon T&D for bulk power
- Increasing relative economy of mass production of smaller appliances over heavy manufacturing of larger units and on-site construction
- Unpredictable and upward trending cost of diesel fuel
- High emissions of greenhouse gasses by diesel generators
- Endanger of health by production of carbon monoxide by diesel generators
- Safety concerns with flammability of fuel
- Noise disturbances caused by diesel generators
- Decreased lower power capacity at generator's total load capacity
- High potential for damage and maintenance if not stored and handled properly (diesel generators)

1.3 The Solution

Jayhawk Windustries provides *affordable, portable, and easily deployable* green energy to non-governmental organizations (NGOs) operating across the globe in the form of a self-contained 400 W wind turbine generator. In combination with a *durable rechargeable battery*, the generated energy can

be used to power various *life-saving instruments*. By providing electricity through these turbines, NGOs have access to much needed electricity in a more *environmentally friendly* manner than diesel powered generators most commonly used today. With rising fuel prices, Jayhawk Windustries' turbines can provide electricity at a *reduced cost* in modest to high-wind environments. Jayhawk Windustries delivers a *one-size-fits-all* solution by providing a modular system in which *additional turbines can be combined to fit any power requirement*.