Chapter 6
Green Energy Supply to Pre-School Cluster for Sustainable Anganwadi Educational Transformation

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ABSTRACT

An innovative initiative for sustainable Anganwadi education transformation uses renewable energy sources like wind energy to transform early childhood education. This concept provides Anganwadi centres a reliable and environmentally friendly power supply through the use of wind turbines. The use of wind energy not only lowers carbon footprints but also gives kids a practical educational chance to understand the advantages of renewable resources. By establishing a sustainable learning environment, this innovative approach hopes to improve student attendance and academic results. For all the children and communities, the authors see a cleaner, brighter future and wind power is a key component of this shift. In the study the electricity produced is 16,959,313kW/year. The extra energy produced is sold to the grid. The return on investment is 60.2% and the simple payback year is 1.53 years. The annual energy sold to the grid is 16,956,392 kWh.

DOI: 10.4018/979-8-3693-2865-1.ch006

INTRODUCTION

The Indian government supports Anganwadi centres through the Ministry of Women and Child Development. They get money, training and monitoring to assure high-quality service delivery and program execution. Pre-school cluster for sustainable Anganwadi education transformation is essential. This innovative study's only goal is to install wind turbines in Anganwadi facilities in order to take advantage of the region's abundant wind energy. These wind turbines, which offer kids educational opportunities in along with electricity, are a symbol of growth and sustainability. This project seeks to install in young minds, an interest for sustainability, in addition to electricity. A steady electricity supply from wind turbines improves the educational atmosphere. Additionally, it significantly lowers these institutions' carbon impact, saving the environment for all. This Darbhanga project is a step toward a cleaner, brighter future rather than just a technological change. By developing a foundation for a generation that appreciates and protects our world, it represents a dedication to education, sustainability and community empowerment.

Paper Layout: The remaining work is divided into the following sections: problem statement, research gap and contribution, mathematical modeling, potential access for energy harvesting, system modelling for Anganwadi center, results and discussion and conclusions. The Conclusion Sections mark the end result of the present study.

Potential for Sustainable Anganwadi Electricity Supply

Wind turbines are positioned carefully in open, elevated spaces to capture wind energy in the Darbhanga district of Bihar. With the rotation of the blades, these turbines transform the kinetic energy of the wind into mechanical energy. A generator of turbine subsequently transforms this mechanical energy into electrical energy. The generated AC electricity is incorporated into the nearby power system, providing clean, renewable energy to homes and businesses. In Darbhanga, wind energy boosts the region's economic and energy independence by lowering carbon emissions, promoting sustainable development and reducing dependency on fossil fuels. Its energy access location mapping is shown in Figure 1. In the Indian state of Bihar, Darbhanga is considered as a significant city in North Bihar and is the state's fifth largest city and Municipal Corporation. The Anandbagh Palace was located inside the Darbhanga Raj, the 16thcentury estate that had the city as its capital. The climate of Darbhanga is humid subtropical. There are three distinct seasons that it experiences: winter, summer and rainy seasons. The hottest month is May, when highs of 43°C are recorded. The district of Darbhanga experiences an average of 1142.3 mm of rainfall annually, with the monsoon season contributing to about 92% of this total. As wind turbine technology continues to progress, even regions with moderate wind speeds can now produce energy. This provides Darbhanga an opportunity to increase the amount of renewable energy production. By utilizing these advantages, Darbhanga could grow into a centre for wind energy production, helping the state meet its energy needs while achieving its goals for sustainable development.