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## CASE STUDY

# Waterford Kamhlaba United World College – 2015 Zayed Future Energy Prize Winner

Swaziland and United Arab Emirates

**CONTRIBUTOR**

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GEEP is a partnership of the U.S. Environmental Protection Agency, the Environmental Protection Administration of Taiwan, and the North American Association for Environmental Education.



## Waterford Kamhlaba United World College

2015 Zayed Future Energy Prize Winner



### Overview

This case study describes the successful work of Waterford Kamhlaba United World College, a high school in Swaziland, to develop and implement a sustainability and renewable energy plan.



The project was supported by \$100,000 in funding awarded by the Zayed Future Energy Prize (ZFEP), an organization based in the United Arab Emirates that encourages the global development of innovative energy solutions, including in schools and amongst youth.

#### This case study illustrates how:

- It became crucial to attend to the school's cultural and socio-economic diversity throughout the sustainability and renewable energy project
- A key concept was that the climate change problem would impact everyone; storytelling became a useful approach for communicating this idea
- Dedicating resources to long-lasting environmental programs and student-led awareness campaigns helped to elevate the environment as a community priority

# Background

## **The Zayed Future Energy Prize, United Arab Emirates**

The Zayed Future Energy Prize (ZFEP) is the UAE's global awards for renewable energy and sustainability pioneers. It represents the vision of sustainability advocated by the nation's founding father, Sheikh Zayed bin Sultan Al Nahyan. Since 2008, the Zayed Future Energy Prize (ZFEP) has been empowering, recognizing, and rewarding innovators who are working toward solutions and technologies for a sustainable energy future. Each year, the ZFEP recognizes achievements in renewable energy by a large corporation (recognition award), a small and medium enterprise (U.S. \$1.5M award), a non-profit organization (U.S. \$1.5M award), a lifetime achievement recipient (U.S. \$500,000 award), and up to five high schools from five different world regions (up to U.S. \$100,000 each).



The Zayed Future Energy Prize has awarded more than \$25 million in funding to 48 organizations, individuals and high schools for deploying disruptive technologies and creating societal impact that benefits more than 202 million people worldwide. There have been a combined total of more than 10,000 entries to the Zayed Future Energy Prize from more than 100 countries worldwide over its nine cycles.

A key contribution of the ZFEP to the field of environmental education rests in its encouragement of young energy innovators through its Global High Schools prize category. This prize category was introduced in 2012 as a commitment to the UN's Sustainable Energy for All (SE4All) initiative and its three 2030 objectives: ensure universal access to modern energy services, double the global rate of improvement in energy efficiency and double the share of renewable energy in the global energy mix.

Each year, schools may submit proposals for up to \$100,000 in funding to support projects that promote sustainability and deliver tangible improvements. Proposals require the inclusion of educational outcomes for students, such as new skills in monitoring or operating energy systems.

## **Waterford Kamhlaba United World College, Swaziland**

Like many sub-Saharan African countries, Swaziland's electrification rates are low. According to the World Bank, less than a third of the country's population is connected to the grid. Urban areas enjoy a 40% electrification rate compared to just 3% in rural areas. Many Swazis, therefore, rely on kerosene, charcoal and other fossil fuels for heating, cooking and lighting.

Toward the goal of becoming energy secure and carbon neutral, Waterford Kamhlaba United World College, a high school outside of Swaziland's capital of Mbabane, submitted a sustainability and renewable energy plan to the Global High Schools category of the Zayed Future Energy Prize.

# Approach

Waterford Kamhlaba United World College's project proposal requested \$100,000 to achieve its sustainability goals. The proposal requested funding for the installation of an 800 W wind turbine, fitted energy-efficient appliances, and a 22kW solar photovoltaic plant that would become part of a larger 700 kW energy generation and storage project.

*In addition to the wind turbine and micro solar power plant, the proposal included:*

- Installation of a 10 m<sup>3</sup> biodigester for turning food waste, grass cuttings, and other bio-refuse into gas to heat water
- Replacement of outdated hot water heaters with solar powered units and fitting each with timers to reduce energy consumption
- Installation of 13 smart energy monitors
- Replacement of all fluorescent bulbs and spot lights with super-efficient LEDs to reduce energy consumption
- Insulation of 300 m of hot water piping to reduce heat loss

## Evaluation Plan

The Zayed Future Energy Prize evaluates submissions to its Global High Schools category according to four criteria: [1\) Impact](#); [2\) Innovation](#); [3\) Leadership](#), and [4\) Long-Term Vision](#). The components of these criteria are described below.

<p><b>IMPACT</b></p>	<ul style="list-style-type: none"> <li>• <b>Clean energy or sustainability content:</b> Projects must show at least one clear improvement in energy usage and sustainability, for example a reduction in energy or water consumption, or in carbon emissions.</li> <li>• <b>Measurable progress:</b> There should also be a way of measuring progress towards these goals. For example, if the project will improve energy efficiency, we want to know how much energy will be saved (compared to existing levels), and how you will make sure that this has been achieved.</li> <li>• <b>Educational benefit:</b> The project should show how it fits into sustainability and energy education at the school, for example what new skills or understanding in sustainability does it build? Or, how will students learn new skills to monitor or run energy systems?</li> <li>• <b>Realistic financial and technical plan:</b> Projects should be feasible, and the Prize money must make a significant contribution toward the project's costs.</li> </ul>
<p><b>INNOVATION</b></p>	<ul style="list-style-type: none"> <li>• <b>Innovative idea:</b> The project should be inventive and resourceful, and should make use of the school's particular strengths.</li> <li>• <b>Creative solution:</b> You should consider using creative, perhaps even unconventional, methods to maximize the benefit of the project.</li> </ul>
<p><b>LEADERSHIP</b></p>	<ul style="list-style-type: none"> <li>• <b>Student participation:</b> The project should involve students and staff, with students planning and putting the project into action if possible, and staff providing their time and guidance in support.</li> <li>• <b>Student leadership:</b> Students should take or help take the important decisions in the project.</li> <li>• <b>Community engagement:</b> The project should engage parents and the wider community and should raise awareness of the importance of sustainability issues.</li> </ul>
<p><b>LONG-TERM VISION</b></p>	<ul style="list-style-type: none"> <li>• <b>Long-term impact:</b> The project should improve the school's environmental sustainability and these effects should last for several years after the project is finished.</li> <li>• <b>Long-term management plan:</b> There is a plan for managing the project in the long term.</li> <li>• <b>Global awareness:</b> The project should educate students and promote an on-going commitment to sustainability and global environmental stewardship.</li> </ul> <p><a href="#">Source: Zayed Future Energy Prize – Global High Schools Category</a></p>

## Outcomes

After winning the 2015 Zayed Future Energy Prize in the Global High Schools category, the school used the \$100,000 prize-money to successfully install renewable energy generating capacity and introduce energy efficiency measures.

Waterford's eco-estate manager Mike Doyle says, "We want to be carbon-neutral and completely off the grid by the year 2025, maybe 2020. Whilst our PV plant allows us to go off-grid, we will remain connected to ensure adequate power supply no matter what and because we have been allowed to pump surplus energy back into the grid, for which we will be reimbursed. This creates an additional source of income during holiday periods, when everyone is away and our energy usage is low."

Commenting on the new solar water heaters, Doyle says, "The result is that 5,200 litres of water amounting to 20% of our hot water usage is being heated passively and without using electricity. We have deployed thirteen energy monitors across the campus to monitor our electricity consumption. These results are sent to our Energy Hub wirelessly. This increases all stakeholders' awareness around their energy use and allows us to identify potential efficiency and savings opportunities."

The ongoing priority is to encourage students to be climate change ambassadors. As part of their final year, the students are required to perform community service. One of the programmes on offer is the Green Paradigm Shift, which aims to create awareness around issues like climate change and renewable energy.

Doyle says, "Lectures take place in the new Energy Hub and at local Swazi schools. We are also working towards changing the behaviour of our students, to make them more aware of how their actions can hurt or help the environment. This is challenging sometimes, but they have been successful."

During its five-year strategic plan, the school was able to establish the environment as one of its core principles, and sustainability became an integral part of the teaching curriculum. The school has been able to allocate both human and financial resources towards developing an awareness program, as well as a technology program aimed at carbon neutrality. A further initiative has been the cultivation of partnerships with international organizations such as Alliance Francais and the European Union to develop a Climate Change COP simulation, with several days in the teaching calendar being allocated to this activity.



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— Mike Doyle, Waterford's eco-estate manager

## Lessons Learned

While environmental education was always included at Waterford Kamhlaba United World College, the school's work to develop and enact the sustainability and renewable energy plan has further elevated sustainability within the school's education agenda. Key lessons learned included:



- **It was crucial to attend to the school's cultural and socio-economic diversity.** Being an international boarding school with a resident staff and student population representing over 60 nationalities and vastly differing socio-economic backgrounds made cultural diversity very relevant. The renewable energy projects undertaken were very new ideas to many staff and students. Further, socio-economic circumstances appeared to play a major role in attitudes towards the climate change problems faced. Culturally responsive explanations and awareness campaigns helped to promote greater understanding of the issues the sustainability and renewable energy projects were addressing.
- **A key concept was that the climate change problem will impact everyone; storytelling became a useful approach for communicating this idea.** Geographically diverse communities may not necessarily feel a direct climate impact, but they will possibly start seeing social and economic impacts (e.g., climate change refugees). Developing an understanding of this—especially where audiences have a NIMBY (“not in my back yard”) view—can be a challenge. Storytelling by students is a very effective way of overcoming this challenge.
- **Dedicating resources to long-lasting environmental programs and student-led awareness campaigns helped to elevate the environment as a community priority.** A major initial challenge was the lack of awareness across the whole food-energy-water nexus. When a community is so busy on other education programs, the environment is often relegated to the background. These challenges are slowly being overcome through awareness campaigns and initiatives led by students, and the allocation of resources from senior management to implement long lasting environmental programs. With perseverance, as time progresses and programs take hold, there comes a slow groundswell movement that develops.

# Resources

- [Zayed Future Energy Prize](#)
- [Waterford Kamhlaba United World College of Southern Africa – Zayed Future Energy Prize Winner – 2015 Global High Schools Category](#)

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