

Four primary schools benefit from Clean Energy Programme

Four Sharpeville schools, Emmanuel, Kgomoco, Lehlasedi and Seliba Primary Schools have benefitted from a R1.7 million Clean Energy Programme, instituted by a partnership between the South African National Energy Development Institute (SANEDI) and the Gauteng Department of Infrastructure Development (GDID).

The following green technologies were implemented – two solar water heaters, a bio-digester that produces biogas and bio slurry from food waste and animal waste, energy efficient LED lighting per school. In addition, in two of the schools the Cool Surfaces paint was applied. This special paint regulates temperature of the surface on which it is applied by reflecting the heat away from such surface, leaving it (the surface) cooler. In the event of extreme temperatures, the indoor temperatures of painted rooms is significantly reduced. Kgomoco and Emmanuel had suitable roofs and two blocks were applied at Emmanuel, with some blocks left undone for reference purposes.

“What all the schools had in common were high electricity bills, dysfunctional lights and electric geysers, high water bills, functioning, food gardens, feeding schemes and therefore availability of food waste, proximity to animal waste, lack of thermal comfort in the classrooms and food gardens,” explains David Mahuma of SANEDI.

“The initial audit indicated that the schools rarely switched on the geysers, preferring to use LPG to boil water, the lights were not all working and the disposal of food waste was poor. The classrooms were fitted with double T8 fluorescent tubes lights and the exterior lighting was high-pressure sodium lights. The schools mostly used LPG stoves, with 4-plate electric stoves for staff.

“We began construction of the biogas digester system in March 2017, just as the drought broke with very high rainfall. We found that a variety of factors such as layout of the biogas system, feedstock, temperature, acidity of the slurry and water/solids ratios could affect the rate of production of the biogas.

“Also critical is that food waste needed to be chopped into very small pieces of approximately 2 cm³. Large pieces of food did not digest fast enough and could block the inlet pipes, decay and cause maggots. The aerobic decay (in oxygen) causes the pH of the digester to drop (become acidic) thus killing the bacteria responsible for the anaerobic digestion.

“The resultant biogas enable the schools to reduce their dependence on LPG, The digestate allows the schools to fertilize their food gardens and improve their own food production. Schools can sell the excess digestate to local community gardens to generate income from selling. However, we noted the need for staff re-training on the process, including feeding and extraction from the digesters, otherwise the system could fail.

“The replacement of high-energy lights with LEDs lowers electricity costs and enhances safety. Lights can be kept on overnight while burning brighter but consuming less electricity. As an example, schools received floodlighting, using 30W LEDs, classrooms received T8 22W LED double tubes and the exteriors got 10W bulkheads.

“SABS-accredited high pressure solar water heaters are still expensive in South Africa and there are few competent installers. In addition, the schools need to ensure a regular maintenance programme is initiated and implemented. “

“The greening of the schools programme provided the beneficiary schools with a number of benefits, such as saving money, as the biogas system produces gas for more than one hour of cooking every day. Preliminary research results indicate that electricity bills of the schools were reduced. The usage of LPG gas had also been reduced. In some instances, in the case of Kgomoco Primary School, the LPG usage had been reduced to zero.”

In schools where the cool roofs were implemented successfully, it was found that the temperature of the classrooms was more comfortable and conducive to a favourable learning environment. The classrooms were cool during hot days and warmer during cold days.

“We hope to replicate this model in clinics, places of care, boarding schools, correctional facilities and military bases across South Africa,” concludes David Mahuma

Ends 580 words

About SANEDI

The South African government established the South African National Energy Development Institute (SANEDI) to direct, monitor and conduct applied energy R&D, demonstration and deployment, as well as to undertake specific measures to promote the uptake of green energy and energy efficiency in South Africa. Its mission is to use applied and energy research and resource efficiency to develop innovative, integrated solutions that will catalyse growth and prosperity to meet its vision of sustainable living for growth and prosperity in Africa.