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## Why energy efficiency is needed in Rwanda

Perspective on the benefits of energy efficiency and cost savings on energy was changed by the experience of working with the Nebraska Industrial Assessment Center. Visiting various industrial locations in Nebraska to see how different energy-saving techniques are employed to save money on energy costs and reduce energy waste. Rwanda can put several ideas into action to lessen the energy loss, which is too much now.

The government's Ministry of Infrastructure (MININFRA) and other departments are crucial to Rwanda's energy sector. The primary ministry in charge of developing renewable energy is MININFRA (methane, peat, geothermal, solar and wind energy). The Ministry of Natural Resources (MINIRENA), the Ministry of Agriculture and Animal Resources (MINAGRI), and the Ministry of Industry, Science, and Technology (MINALOC), in coordination with MINALOC and local government structures, have significant policy control over the biomass and production of energy from solid waste landfills, which is a very important energy sub-sector.

Biomass accounts for over 85% of Rwanda's primary energy use; the remaining 11% and 4% are made up of electricity and gasoline, respectively. Despite its small role in the current energy mix, the electrical industry is seen as a crucial enabler of socioeconomic growth and as the key to energy diversification.

CFLs and fluorescent tubes are more affordable. These results Encourage others to utilize them. Additionally, too much heat is produced while utilizing too much electricity. The non-white light produced by incandescent bulbs used in reading rooms may be harmful to people's eyes. The role of incandescent bulbs is replaced by fluorescent lamps, which produce excellent white light that is more like sunshine during the day. Fluorescent lighting predominates in public utilities. As a result of advancements in light source technology, compact fluorescent lamps (CFLs), the third type of light source used in Rwanda, are now largely replacing fluorescent bulbs and incandescent bulbs in residential settings.

The first suggestion is to switch to LED lightbulbs from fluorescent ones. Traditional 25-watt and 40-watt T8/T10/T12 fluorescent tubes can be replaced by these LED tubes. T-8 LED Tubes are superior to fluorescent lights in many ways, making them the perfect replacement. LED-based light sources are environmentally friendly and have a far longer lifespan than fluorescent bulbs. T-8 LED Tube also produces stunning pure white light, colors that are brighter, and viewing that is gentler on the eyes than regular fluorescent lights.

LED bulbs may take the place of incandescent, CFL, and fluorescent tube illumination without requiring any changes to the electrical system. It would save 743.35 USD as a consequence. if

50,000 hours of LED bulbs were used in place of incandescent lights. A 35.05 USD savings would result from switching from CFL to LED lighting over the period of 50,000 hours. When LED tubes are used in place of fluorescent tubes for a 40,000-hour period, savings of 61 USD are expected. The ministry of infrastructure is being urged to make LED lights widely available on the market and to inform and educate Rwandans about their advantages.

To reduce air leaks, fix compressed air leaks in industrial settings. Integrate a leak prevention effort into the facility's routine operations. This needs to include staff involvement, supervision, upkeep, identification, and tagging. • After leaks are corrected, reevaluate the supply of your compressed air system. • Establish a reasonable goal for reducing expense leaks; for industrial facilities, 5%–10% of the total system flow is typical. Work with a compressed air systems specialist to change the compressor controls. In order to accommodate the lowered need for energy savings, compressor running duration must be decreased.

using occupancy sensors. Occupancy sensors trigger automatic responses in a building system. These technologies are for the visible portrayal of a body and include infrared, ultrasonic, microwaves, radar, or micro-vibration patterns.

PIR sensors monitor heat variations using pyroelectric sensors. People radiate heat, hence these sensors recognize the presence of people as a difference in heat from a static place, like the wall the sensor is mounted to. Because individuals can change the ambient conditions due to their bodies' natural emission processes, occupancy sensors can also be used as environmental sensors that measure temperature, humidity, and CO<sub>2</sub>. Occupancy sensors use ultrasonic technology to send high frequency sound waves into a space—waves that people cannot hear—and monitor the patterns of reflection. The amount of energy wasted on power could be reduced by installing sensors in homes, public buildings, and bathrooms.

Last recommendation would be putting incentives in place that allow people to invest in energy saving bulbs like LED. Not only LED, but also sensors and leak detectors to save more and use efficiency tools. From the information that I have so far, anybody who is going to invest in energy sector like solar is tax exempted.

In conclusion, implementing the above recommendation is really the responsibility of government ministries like the Ministry of Infrastructure (MININFRA), Ministry of Natural Resources (MINIRENA), Ministry of Agriculture and Animal Resources (MINAGRI), and Ministry of Industry, Science, and Technology (MINALOC). Having this will enable the private sector and people to follow them from the comfort of their own homes.

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