TRANSITIONING TO SUSTAINABLE ENERGY AT ACADEMIC INSTITUTIONS

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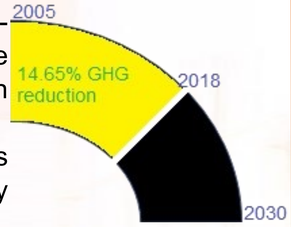
Introduction — In the past several decades alone, American universities have distinguished themselves as leaders and pioneers in the realm of sustainable energy. In a world that will increasingly require us to embrace sustainable energy use, given their level of power draw, and the variety of their energy needs, universities provide effective working examples of how energy use can be made "clean and affordable". Panning out globally, this is particularly of note for smaller or more isolated communities across the world, as often universities will sit on a grid separate from the larger electric grid of the city or municipality they reside within.

Clark University's Climate Action Plan

Established in 2009, detailing mitigation strategies to combat greenhouse gas (GHG) emissions has two main goals:

- Interim goal of reducing emissions to 20% below the 2005 baseline by 2015
- Reach **net neutrality by 2030**



Cleaner systems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The **Cogeneration Plant** produces electricity for the central campus and reuses waste heat to heat water and buildings which is more energy-efficient and sustainable.

The **solar roof** system designed as a smart grid produces electricity for usage at the ASEC building. In 2018, the solar output totaled 150,836 kWh. However, the total output did not meet its consumption demand with a deficiency of 263,212 kWh. Clark purchases supplemental electricity from National Grid to supply a demand gap and to supply buildings that are not connected to either of the systems.


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Colorado State University's Climate Action Plan

Completed first in 2009, followed by the signature of the Climate Reality Pledge in 2017 with two major commitment:

- **100% renewable electricity by 2030**
- All the new buildings follow the U.S. Green Building Council's (LEED) Gold Standard.

Cleaner systems


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18 solar arrays accros the campus with 28,286 panels overall. The total output is about 10,505 MWh, providing 1/3 of the overall electricity demand of the Foothills Campus.

1.5 MW of Solar PV are located on the rooftops of campus buildings, representing 3% of the total electricity use including cell phone charging and lighting. The campus solar capacity works with the concept of Bloom under a Power Purchase Agreement. It has a goal of getting over 50% in Fort Collins. The campus is investing in **building energy efficiency** to complement renewabe energy.


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Clean Energy Transfer projects

Colorado State University Microgrid in Rwanda


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The Mahama Project were launched by Master's student Arthur Santos, the Energy Institute of CSU, Mesh Power and other development partners. They are setting up battery-fed 1**-2 KW-nano grids** and **smart metering systems** to provide life line electricity suppy to 50-100 refugee camp households in Rwanda. Currently, the power is generated using diesel generators, but the clean energy will be generated through community solar networks called **base station**. Each household is connected with an individual billing unit and live monitoring of energy consumption is possible via GSM connection. Customer can pay based on their needs.

Learn, scale up and replicate

Project Idea in Madagascar


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While Colorado State University is Ranked #8th amongst top 50 Green colleges in the USA, Clark's case shows that deficiency has left it non-neutral yet. Also, case study at Michigan Technological University (MTU) is not yet available as MTU's microgrid system is in its initial stage. These findings have sparked us to encourage institutions that are still relying totally or partially on fossil fuels as energy source on campus to **extend climate action plan to participation in the voluntary carbon trading in order to achieve GHG emission reductions goals**. Clark Master's student, Tsanta Rakotoarisoa is developing a project idea to transfer renewable energy systems for a village living in the borders of the Ranomafana National Park in Madagascar which represents 6.5 Mt of carbon sink where local communities are exclusively dependent on deforestation for energy and livelihood.

Conclusion — Let's imagine all academic institutions worldwide are engaged in transitioning to sustainable energy; we believe the SGD7, access to clean and affordable energy, will become a reality for all nations. **The development of partnerships within academia and with private stakeholders is a key strategy that can help scale up Climate Technology Action.**