NEXT GENERATION

The path to a sustainable school.

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Introduction

It is well known that climate change, pollution and other environmental issues will have a lasting impact on the world we live in. People are becoming more aware of these problems and the responsibility we have to solve and rebuild for future generations.

The following document will outline some of the most influential changes a school can make on their path to becoming more sustainable. Some of these changes require financial support and we understand that not every school has these resources. As a result the changes that are impacted by financial ability in this document also include resources and resolutions that aid in the financial burden. However not all of these changes need financial support to be implemented, giving every school the opportunity to begin making small steps in the right direction to change and a more sustainable future.

When schools implement these practices this contributes to the movement towards sustainability and ensures less harm is done to the environment. In becoming a more environmentally conscious school this will set an example for its students. During middle and high school students are greatly impacted by their surroundings and what they are taught. Having the school implement and teach sustainable practices to their students plants a seed in their minds about the importance of sustainability. This will teach the students that they have a responsibility to make choices that take care of the environment.

Change 1: Solar Panels (renewable energy)

As an introduction to the types of programs available to institutions, this section will act as a strategic introduction for implementing cost effective renewable energy solutions to your institution, specifically solar. With the advent of solar energy becoming increasingly viable due to government incentives and public-private partnerships, there are far more options when it comes to solar power compared to a decade ago.

A Power Purchase Agreement (PPA) is a system optimal for institutions that are not able to put down a large sum of capital, but are interested in both utility savings and green energy. Power Purchase Agreements allow for a

company to come in and build a solar array, then you buy the electricity these panels generate directly from the company. In this scenario, the institution will not be the owner of the panels, but will get the benefits of solar without the high price tag.

Very often, the rate of purchased electricity within a Power Purchase Agreement is locked in with a value known as an escalator, so you will be obligated to pay a certain rate per kWh of generated electricity for the duration of the contract with the panel operator. In a scenario where an institution has ample funding available, buying your own renewable energy systems may prove to be a sound investment. Since the electricity generated by the array is free when you own the panels, the amount saved on utility bills over the lifetime of the panels can be significantly more than the price paid for the panels.

Depending on the location of an institution, other renewable options such as geothermal energy or wind energy may be deployable alternatives. However, given the significantly larger infrastructure commitment associated with these sorts of renewable options, small districts and institutions should stick to solar as their renewable energy of choice.

By having solar on-site, students, parents and faculty are all inspired to live more sustainably. Most importantly, getting students to think about green practices from a young age sets us up to succeed as a society that does not rely heavily on fossil fuels. With over 7,000 K-12 schools using solar power nationwide, over 5.5% of all K-12 public and private schools in the United States are equipped with solar in some capacity (irecusa).

With the sheer number of programs available and plenty of companies looking to help install solar across the country, all that's needed is the proper staffing to facilitate the transition. Creating a sustainability management committee is one route that has potential to oversee the work done on a project without the need for a new hire, which can be straining on districts with low funding. Allowing students to work alongside this committee also fosters a real-world learning experience that is particularly beneficial to high school and university students.

Sources for this section include information pages from a wide variety of solar companies doing work specifically with K-12 school programs. This provides ample information that this is a popular system for schools to utilize, allowing them to access energy that is more sustainable and frequently more economical.

Change 2: LED Lighting

The Solid-State Lighting Program (SSL) is an organization that brings together researchers, universities, standard organizations, energy efficient programs, building owners, and lighting designers to drive SSL technological advances. This group works with the Department of Energy (DOE) in order to fund and competitively award projects that align with their plan to identify and solve priority challenges in the area of research and development. Part of the DOE's course of action is to leverage private funds while driving innovation to create efficient lighting products that support productivity, health, and wellness.

According to the Department of Energy, advanced lighting systems are predicted to save 6.9 trillion kWh of electricity by 2035. This comes to an accumulated total of $710 billion worth of energy saved which is equivalent to 2.1 billion metric tons of avoided carbon dioxide emissions.

The SSL provides LED lighting rebates for schools at little to no cost nationwide.

What is a rebate?
A rebate is a sum of money that is credited or returned to a customer on completion of a transaction.

How it works...
Your school would partner up with the Solid-State Lighting Program to have the LED lights installed in the school. The investment for these lighting changes would then be refunded back to the school. With the installed LED lights significantly reducing the price of electricity, schools would then be able to pocket more money that they could then potentially invest in other environmentally sustainable projects.

Change 3: Compost & Recycling

The list of environmental benefits that come from composting and recycling is long. For recycling a few of these include the fact that it aids in conservation of natural resources and prevents excess pollution of greenhouse gasses. For composting some of the benefits include preventing soil erosion, promoting plant growth, and combating climate change by reducing greenhouse gas emissions. When materials that can be recycled or composted are sent to the landfill, they contribute to the production of methane (a greenhouse gas).

Implementing a recycling and composting program in middle and high schools will also have educational benefits. The students of the school will learn about the recycling and composting processes thus encouraging these habits to continue outside of the classroom and into their home lives. These sustainable practices will continue to influence the choices that students and members of the school community make on a daily basis. Therefore having a greater impact on the environmental benefits of recycling and composting.

The implementation of composting and recycling is relatively simple. First is to find out what the nearest recycling center is and begin a program with them. Implementing a composting program is similar as the first step would be to find a facility near you that accepts compostable materials. Another option schools have is to use this compost in a school garden. There are many benefits to this which will be described further in “Change 4: Green Spaces/ Gardens”. It is also important to understand what materials and items the recycling centers and compost facilities will accept and share this information with the members of the school community.

An effective way to do this would be putting signs above the recycling bins and compost containers in every classroom, lunchroom, or wherever these bins are located.

Starting a composting and recycling program at a school is an affordable change that has the potential to contribute to the schools sustainability. In some cases implementing these practices will actually be cheaper than sending all the school's waste to the landfill. This is mainly because the cost to recycle is usually cheaper than the cost of transporting trash.

Change 4: Green Spaces/Gardens

Creating green spaces around school has a number of benefits as it can improve mental well-being for students while also providing environmental benefits like increasing biodiversity, trapping CO2 and retaining water. Implementing green spaces can be done in a variety of ways that may not require a lot of finance. Schools could consider working with people who specialize in this field and from this they may be able to get some financial support. It is still important to know that schools can still take the initiative implementing green spaces on their own with the help of students.

Along the lines of working with a company, **Project Learning Tree (PLT)** is an example of a good and reliable company that works with schools and looks at how they can involve students as much as possible in the process of making schools greener. They give grants to schools that are able to meet certain requirements where “applicants must have attended a PLT workshop, either in-person or online, that provides training, lesson plans, and other resources to help integrate these projects and environmental education into your curriculum or youth programs.” Their goal is to encourage sustainability in a forest-focused lens as they work with the sustainable forestry initiative which has been successful in showing how green spaces in urban environments are very important.

Like mentioned above, another option for schools would be to make small steps by starting with small gardens around the school if they may not be eligible for these grants and if they do not have much financial support to implement green spaces on a large scale. It could be as simple as having a couple of plants in classes that everyone the students can take care of.

Change 5: Education

Implementing education on sustainability in a school's curriculum is extremely important as students are greatly impacted from what they are taught and when there are constant lessons on sustainability, students can begin to make better decisions in their everyday lives. Having the school implement and teach sustainable practices to their students plants a seed in their minds about the importance of sustainability. This will teach the students that they have a responsibility to make choices that take care of the environment.

The first step a school could take would be to look at working with a curriculum resource center. This ensures that education on sustainability is integrated across a wide range of subjects that the students take. A good example of a curriculum resource center would be **Creative Change Educational Solutions**. Their approach to changing a curriculum "places food systems, revitalization, and other sustainability issues at the center of innovation and reform." They focus on different concepts of sustainability and apply it to different subjects and this can be seen in the image below.

Concept	Sciences/Math	Social Sciences/Law	Humanities/Language	Business/Economics	Arts/Communication
Beauty *Beauty enhances life and contributes to wellbeing.*	Elegance and beauty in the patterns connecting math, sound, music, and nature. The science behind the beauty of natural phenomenon: Northern Lights, autumn, snow crystals, etc. Nature's role in wellness.	Cultural and psychological factors affecting perceptions & expression of beauty. Representations of beauty in media and popular culture. Environmental law and the rights of nature/animals.	Representation of beauty and aesthetics in literature, linguistics, religion and philosophy. Environmental psychology and the human need for nature and beauty.	Beauty as a culturally determined commodity. Cost, price, and value of beauty. Ex: How do we account for the value of a beautiful view in a development decision?	Arts for the sake of beauty. Making beauty accessible to all.
Change *Change and adaptation are conditions of life.*	Applying math and science to understand, explain or quantify changes. Ways scientific and mathematical knowledge changes.	Social change and its impacts on sustainability. Changes notions of justice. Legal history.	The changing nature of language and its impacts on sustainability: How does the way we talk about sustainability impact progress towards it?	Business cycles. Mechanisms for changing economic thinking, models, and policies.	How changes in the arts impact society. How changes in society impact the arts.
Community *Humans are part of ecological & cultural/ social communities.*	Applying sciences/math to the design of sustainability communities: land use, water systems, transportation, remediating contaminated sites, green roofs, renewable energy, etc.	History of land use policies on current community conditions. Political science/law: Advancing democracy through political processes, restorative justice, etc.	Community history, oral histories and traditions. Local culture and folklore (agricultural history, indigenous cultures, etc.) Human need for community.	Strengthening local economies. Community currencies. Microlending. Fair global trade. Historic economic patterns and their impacts on sustainability.	Architectural history. Communication and arts as a form of social change and community-building. Role of arts in environmental and human rights movements.

The table only displays 3 of their concepts however they do have 10 other sustainability concepts they look at. Working with a curriculum resource center is a very effective way as students are constantly learning about sustainability regardless of the class. Their problem solving skills as well as application skills will also improve significantly as they are going beyond the topics of a particular subject and they are applying it to the hurdles of trying to implement a sustainable future.

Another option other than using a curriculum resource center would be to invite guest speakers to the school as much as possible. The guest speakers can encourage sustainability and give examples of what they are currently working on. This helps students know how to take action which could result in environmental clubs/organizations becoming stronger, or if there was not one to begin with, it could encourage a group of students who want to make changes in the school that help with sustainability.

Students thinking about sustainability at this age as well as making changes is very important as they are the future and it is also important for them to be aware of the hurdles that are going to come or hurdles that are already here as a result of past generations.

Works Cited Page

"About the Solid-State Lighting Program." *Energy.gov*, Office of Energy Efficiency and Renewable Energy, www.energy.gov/eere/ssl/about-solid-state-lighting-program. Accessed 11 May 2023.

"Benefits of Compost - US Composting Council." *Www.compostingcouncil.org*, US Composting Council, www.compostingcouncil.org/page/CompostBenefits. Accessed 11 May 2023.

"Benefits of Solar Panels for Schools." *Duke Energy Sustainable Solutions*, 21 Oct. 2020, sustainablesolutions.duke-energy.com/resources/benefits-of-solar-panels-for-schools/. Accessed 11 May 2023.

"Blog | Imperial Dade." *Www.imperialdade.com*, Imperial Dade, 19 May 2022, www.imperialdade.com/blog/how-to-start-a-school-recycling-program. Accessed 11 May 2023.

Integrating Sustainability across the Curriculum: Disciplinary Connections and Rubrics to Assess Courses Prepared for Lorain County Community College (LCCC) with Support from the Oberlin Project.

Lee, Evie. "Recycling in Schools." *CPD Online College*, CPD Online Learning, 8 Sept. 2021, cpdonline.co.uk/knowledge-base/safeguarding/recycing-in-schools/. Accessed 11 May 2023.

Reynandez, Rebecca. "Innovative Ways to Create More Urban Green Spaces." *Project Learning Tree*, www.plt.org/educator-tips/urban-green-spaces/. Accessed 11 May 2023.

"School Waste Reduction." *Minnesota Pollution Control Agency*, www.pca.state.mn.us/business-with-us/school-waste-reduction. Accessed 11 May 2023.

"Solar for Schools PPA or Power Purchase Agreements, Solar School Programs and Solar Fundraising, PPA and Solar Leases." *Www.k12solar.com*, www.k12solar.com/solar-for-education/solar-for-schools-ppa.php#:~:text=What%20is%20a%20PPA%3F.

"The U.S. Recycling System." *Www.epa.gov*, United States Environmental Protection Agency, 17 Apr. 2019, www.epa.gov/circulareconomy/us-recycling-system. Accessed 11 May 2023.

"Solar Schools" *www.irecusa.org*, IREC USA, 1 September. 2020, https://irecusa.org/our-work/solar-schools/. Accessed 12 May 2023.