Research Capstone Project Portfolio

12-STEM G

GROUP #2

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PenVironment Machine

Product Composition

PLYWOOD

2 pieces – 25 in. x 20 in.
4 pieces – 48 in. x 20 in.
1 piece – 20 cm x 30 cm
2 pieces – 26 cm x 20 cm

PVC PIPE

2 pieces :
1 pc. – 25 cm
1 pc. – 20 cm

NAILS

60 pieces (estimated)

WOOD GLUE

1 pack – 250g

“1x1” GOOD LUMBER

4 pieces – 48 in.

8 pieces – 18 in.

Benefits of the Product

• Environmental Benefits:
- Reduces plastic waste, thereby decreasing pollution.
- Promotes a sustainable waste management system.

• Community Impact:
- Creates cleaner communities.
- Increases awareness and participation in recycling.

• Educational and Economic Benefits:
- Provides students and low-income individuals with affordable or free writing materials.
- Encourages personal responsibility in environmental care.

• Corporate Advantages:
- Enhances brand image for companies providing machine parts.
- Supplies a steady source of recycled materials for production.

• Collaboration Opportunities:
- Local governments and NGOs can support sustainability efforts and waste reduction goals.

• Long-term Goal:
- Contributes to a circular economy for greener societies in the future.

• STEM Contributions:
- Promotes innovative solutions in waste management and recycling through engineering and technology.
- Inspires STEM-based projects focused on sustainability and environmental responsibility.

Beneficiaries of the Product

This vending machine that gives pens for plastic bottles is useful in different ways to several sectors. As part of the STEM (Science, Technology, Engineering, and Mathematics) field, particularly in engineering and technology, this project encourages sustainability and environmental responsibility. Our machines encourage the environment because they reduce plastic, thereby decreasing pollution, and it leads to a sustainable waste management system. Clean communities and the greater attention given to the concept of recycling can bring benefits to people as well. Students and low-income individuals obtain cheaper to free access to writing materials while being more personally responsible in caring for their environment. Companies we will get the machine parts from can benefit in the form of brand image and a reliable source of recycled materials for production. Local governments and NGOs can also be part of this project in encouraging sustainability and achieving the goal of waste reduction. Altogether, this goes into creating and contributing towards a circular economy for greener societies in the future.

Product as the Solution

The plastic-bottle-for-pen vending machine provides a straightforward way of practically dealing with the research problem, which is the increase in plastic waste and the absence of accessible recycling systems. It directly tackles pollution, promoting sustainable waste management by incentivizing people to recycle. This product embodies the principles of engineering and technology in making a system that can turn waste into valuable resources. It does so by not only creating information but also fostering an environmental sense, which is more likely to appeal to students and lower income individuals who would be likely to patronize the provision of low-cost or free writing materials.

In the future, it can revolutionize waste management in the STEM fields of technology and engineering by serving as a model for integrating smart technologies such as automated sorting, data tracking, and resource distribution. The vending machine can later transform into a networked solution where data is harvested to optimize recycling efforts and production. Such a step spurs the development of the circular economy to promote sustainable innovations as well as smarter resource use. With this product coming with scalability and adaptability, this one indeed opens up the door for greener cities and the further development of environmentally friendly technologies.