Abstract

In today's world, the scarcity of electrical energy has become a Pressing concern. The ever-increasing demand for energy. Coupled with the depletion of fossil fuel reserves, has highlighted the need for sustainable and environmentally friendly alternative sources of energy. Therefore, we exploited wind and hydroelectric power (as a renewable energy source) to produce energy sustainably.

Challenges

Improve the use of alternative energies.

How can we create a sustainable future? The challenge lies in enhancing alternative energy technologies, reducing their costs, and developing robust infrastructure to transition from fossil fuels to clean and safe energy sources."

Material and cost

1. Pipes: To install the fan and the generator (40 pounds).

2. Box: Used to store water for the process (500 pounds)

3. Motor: To stir and move the water efficiently (Recycling).

4. Generator: Converts the movement of the blades caused by wind or water into electrical energy (100 pounds).

Energy House

Energy House is a sustainable system that harnesses natural resources like wind and water to generate electricity, promoting renewable energy solutions and environmental conservation.

How the project works

Our project harnesses renewable energy from wind and wave motion to generate electricity. The design includes two interconnected systems:

Lower System: A wooden box with a water pipe where fans are driven by water movement. These fans generate electricity via a generator.
Upper System: Fans installed on a pipe are moved by wind to generate power through another generator.
This dual-source system ensures clean, unpolluted energy generation..

Project specifications

Wooden box.

Water pipe.

Various fans (3-blade, 6-blade).

Generators and connecting wires.

A dual-source energy generator utilizes wind and water, featuring lightweight fan blades and optimized small-scale generators. It efficiently powers small devices and charges batteries, with blade designs tested for optimal output.

Work Team

Prepared by: Group 5
Salma Khaled
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Amany Abdelhakeem
Mariam Atef
Mahmoud Mustafa
Maryam Abdelazeez
Menna Gamal
Jakleen Ayman

Project benefits

Environmental Benefits:

Produces clean energy with no pollution. Reduces reliance on fossil fuels, lowering greenhouse gas emissions.

Economic Growth:

Promotes the use of sustainable energy technologies. Potential for job creation in renewable energy sectors.

Innovation and Education:

Combines engineering, physics, and environmental science to create a practical solution. Encourages a multidisciplinary approach to tackling energy challenges.

Under supervision

Dr. Omar Abdelgaber
Dr.Zaniab Elotifi

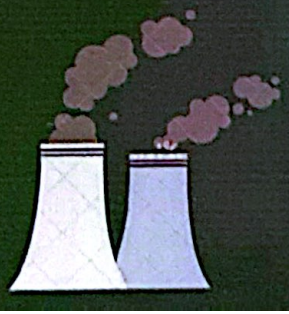
Abstract

Vehicle exhaust emissions are a major contributor to air pollution and also cause health problems.This problem was solved by the team through an air purification filter using natural activated carbon, a car air filter, and a sensor to induce polluted air.

Challenges

Deal with urban congestion & its consequences.

Pollution threatens our lives! The challenge is to reduce pollution in air through innovative solutions to protect our environment and ensure the health of future generations."



Materials and costs

Wood: Used to create the structure (box) of the system (Recycling).

Fan: Responsible for suctioning polluted air into the filtration system (Recycling).

Sensor: Monitors pollution levels to activate the system when needed (100 pounds).

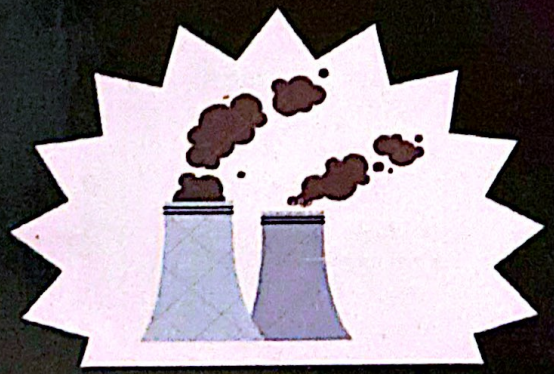
Battery: Powers the system and turns on the relay for operation (20 pounds).

Life Line

Life line is an innovative air filtration system that uses natural materials to purify the air, promoting a healthier and cleaner environment by removing pollutants and allergens.

How the project work

First, a metal mesh with thin pores was placed on all sides of the box from the inside, and it was fixed with pressure nails, then the first stage, which is the active carbon, was placed, then another layer of the metal mesh was placed on the active carbon, after that a layer of cellulose fibers was placed, and a layer was placed on top of it Another metal mesh, and after finishing the lining stage, the extractor fan was connected to the electrical circuit that contains the smoke sensor, after that, the extractor fan was installed on the box and another box was made to put all the components of the sensor circuit in it, and the last stage was tomake a holder for the entire filter



Project benefits

1. Improvement of Air Quality: Helps reduce air pollution from vehicle emissions, leading to better air quality in urban areas.

2. Public Health Protection: Reduces health risks associated with air pollution, such as respiratory diseases and cancers.

3. Use of Natural Materials: Utilizes activated carbon and cellulose fibers, making it environmentally friendly.

4. Advanced Sensing Technology: Employs sensors to detect pollution, allowing the system to operate only when necessary.

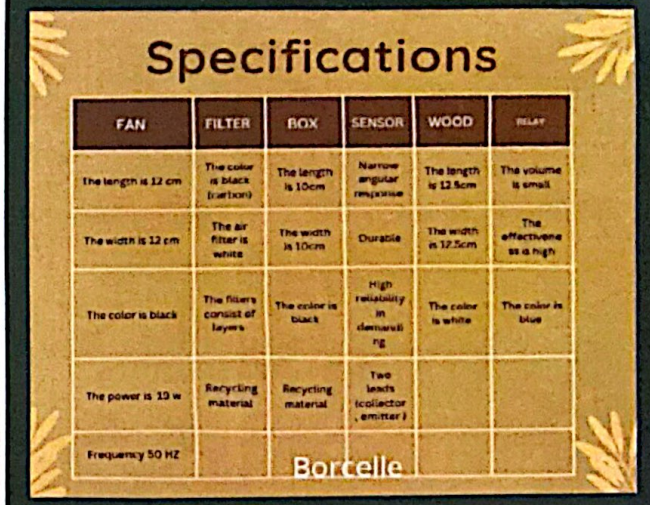
5. Polluted Air Direction: Works to pull in contaminated air and treat it, thereby reducing pollutant concentrations in the environment.

6. Efficiency Enhancement : Allows for increasing the number of filter layers and the size of the prototype to boost purification effectiveness.

7. Comniunity Awareness: Contributes to raising awareness about air pollution issues and the importance of environmental solutions.

8. Innovative Solutions: Provides an innovative solution to an ongoing problem related to air pollution from transportation.

Project Specifications



Work Team

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Under supervision

Dr. Waleed Abo El-Wafa
Dr. Ashraf
Dr. Hamada

The Team

Basmala Medhat Saad

Mohamed Hesham Mohamed

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Malak Elsayed Soliman

Mohamed Samir Mohamed

Mohamed Yasser Abdo

Marney Basem Adly

Rovana HanyHelmy

PROJECT SPECIFICATION

The water filter uses a three-stage purification process. In the first stage, it removes large impurities using cotton, gauze, sand, and gravel. The second stage eliminates bacteria and improves water quality using activated carbon and sidr leaves. The final stage confirms the purification. Materials used include natural elements like cotton, sand, gravel, and wood. The filter is compact, easy to assemble, and works efficiently, filtering 250 ml of water in 3 minutes. Total cost is 150 LE.

Under supervision

PROF / MANSOUR AHMED

DR / AMANY ABD ELSHAKOUR

ENG / OSAMA MOHAMED

HOW THE PROJECT WORKS

The water filter consists of three stages for effective purification:

1. Stage 1: The first stage filters out large impurities using cotton, gauze, sand, and gravel.

2. Stage 2: In this stage, the water is further purified using cotton, gauze, sand mixed with Sidr leaves, and activated carbon, which help remove bacteria and improve the water's quality by adjusting its pH, TDS, and EC levels.

3. Stage 3: The final stage ensures additional purification, confirming the water is clean and safe to drink.

PROJECT BENIFITS

Environmentally Friendly: Made from natural, recyclable materials.

Low-Cost: Affordable, especially for resource-limited communities.

No Electricity Needed: Can be used in off-grid areas.

Easy to Use & Maintain: Simple to operate and maintain.

Multi-Stage Purification: Effectively removes contaminants.

Health Improvement: Provides safe, clean drinking water.

Abstract

This project aims to design an affordable and sustainable water filter using eco-friendly materials like activated carbon, sand, and sidr leaves. It efficiently removes impurities and bacteria, is easy to use and maintain, and is ideal for areas with limited resources, promoting health and sustainability while offering a low-cost water purification solution.

Challenges

"We faced challenges in selecting eco-friendly materials that are effective in water purification while keeping costs low. Additionally, the design needed to be compact and easy to maintain. To overcome these challenges, we chose effective, low-cost materials and created a three-tiered wooden filter that is easy to assemble and disassemble, making it suitable for both individual and communal use, especially in resource-limited areas."

Materials and cost

The materials used for the water filter were carefully selected to balance efficiency and low cost:

Sidr leaves: 5 LE

Cotton: 15 LE

Gauze: 10 LE

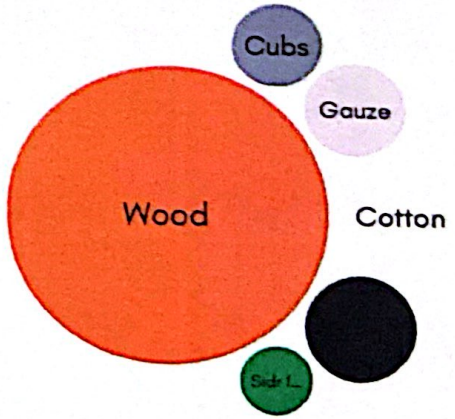
Activated carbon: 12 LE

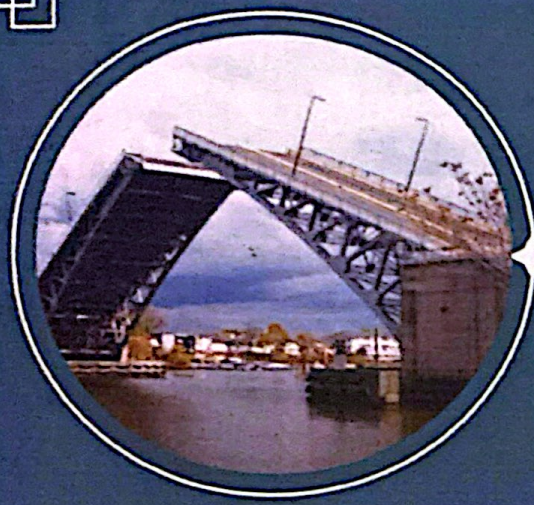
Sand & Gravel: ---

Cubs: 8 LE

Wood: 100 LE

Total Cost: 150 LE





Work Team:
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Mariam Atef
Radwa Rabea
Merna Mohammed
Omnia Ashraf
Mohammed Moemen
Mohammed Salah

Mind Studio

M.O.R.G bridge

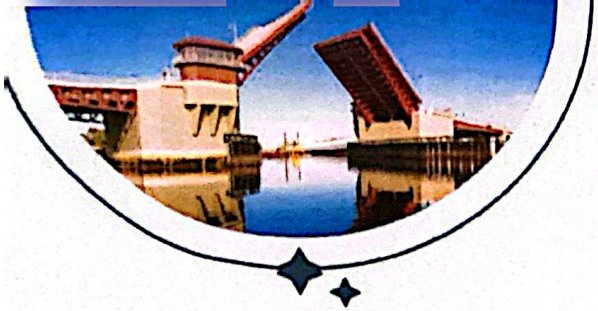
(Bascule Bridge from palm wood)

Under Supervision:
Dr. Waleed Abu Elwafaa
Dr. Hamada Saeed
Dr. Ashraf Abd Elmeim

Abstract

A hydraulic bridge has been developed based on Pascal's Law, where pressure is applied to a fluid within a closed system to transmit force evenly. This allows for smooth lifting and lowering of the bridge. This solution provides higher efficiency compared to traditional mechanical systems, offering excellent load-bearing capacity, reduced maintenance needs, and ease of operation.

Project Specifications:
Bridge length: 90 cm
Bridge width: 22 cm
Materials used: Palm wood, glue, wax, hinges, hydraulic syringesBridge height: 10 cm (with adjustments)Truss design: Height between 10-15 cm, thickness 0.5 cm



How the project works:

1. **Structural Framework:** The bridge consists of a fixed part and a movable part connected by strong hinges.

2. Hydraulic System: A hydraulic syringe is installed beneath the movable section.When oil is pumped into the system, the syringe extends, lifting the movable section.When the oil is withdrawn, the bridge gradually returns to its original position.

3. Control Mechanism: The oil flow is regulated through valves to ensure precise lifting and lowering.

Materials and costs:

Palm wood: 0 EGP
Glue: 50 EGP
Welding: 25 EGP
Hydraulic syringe: 60 EGP
Hydraulic oil: 50 EGP
Hinges: 40 EGP
Drecor tools: 75 EGP
Connector hose: 10 EGP

Project benefits:

1. High load-bearing efficiency.
2. Easier operation compared to traditional gear systems.
3. Reduced need for frequent maintenance.
4. Minimized manual effort required for bridge operation.
5. Increased lifespan due to lower wear and tear.

Challenges:

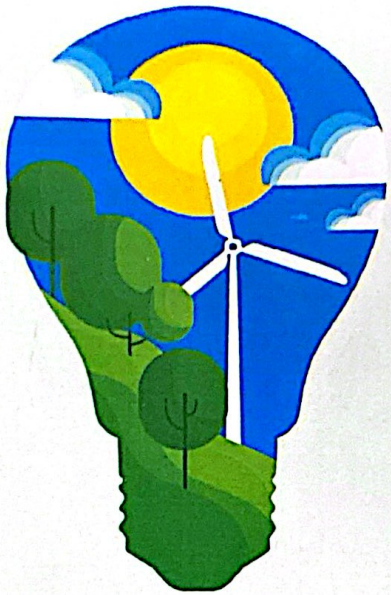
Urban CongestionThe project aims to address urban traffic congestion by constructing a hydraulic bridge that improves traffic flow and reduces bottlenecks in crowded areas.

How the project works

1. Wind Propels the Fan → Converts kinetic energy to mechanical energy
2. Motor Activation → Mechanical energy turns into electricity
3. Current Flow → Through diodes and capacitors
4. AC to DC Conversion → Using a regulator circuit
5. Energy Storage → Powerbank board and batteries store electricity

Project specifications

- Material: Wood, plastic, aluminum, iron
- Blade Configuration: 3 or 4 blades
- Motor: Water filter motor
- Output Voltage: 28.8V
- Tested Wind Speeds: 3 levels

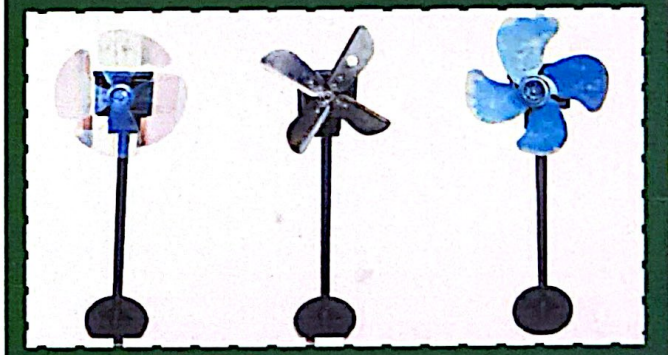


work team

- Gerges Wiliam
- Engy Hany
- Shahd Elnemary
- Shahd Ahmed
- Shahd Sherif
- Manar Taha
- Basma Mohamed
- Heba Ahmed
- Mohamed Sayed

Project benefits

- Sustainable: Uses renewable wind energy
- Eco-friendly: Reduces carbon footprint
- Low Cost: Uses recycled parts
- Efficient: Generates usable electricity



Under supervision

Assoc. Prof. Dr.waleed abu elwaffa
Prof.Dr. Ashraf abd elmenam
Dr. Hamada said
Dr. Omar Ali
Dr. zenab Mohammed

Abstract

In recent years, the demand for renewable energy sources has surged due to the increasing concerns over climate change and fossil fuel depletion. Wind energy, harnessed through wind turbines, has emerged as a viable solution. This research aims to provide insights into optimizing wind energy systems and analyze various turbine models and their operational efficiencies. The results indicate that modern wind turbines can significantly contribute to energy needs.

Challenges

High carbon emissions: Reliance on fossil fuels leads to an increase in greenhouse gases and their negative impact on the environment.

Inefficient energy systems: Many current systems consume energy inefficiently, leading to waste.

Reliance on non-renewable sources: The depletion of natural resources threatens energy sustainability in the long term.

Materials and cost

Material	Price (EGP)
Water filter motor	Recycled
Diodes	4
Condenser	3
Charging board	60
Wood box	150
Plastic fan (3-blade)	50
Plastic fan (4-blade)	65
Aluminum fan (4-blade)	65
Iron fan (4-blade)	180

WIND ENERGY

Climate Change:

Climate change is a long-term change in temperatures, precipitation patterns, winds, and other elements of the Earth's climate system.

How the project works

We will make two molds for two purposes:

Normal mold :We will convert plastic bottles from PET type into molds for pavements like it will substitute cement .

Lumious mold :The luminous molds is to decorate the streets ,tourism villages and tourist paths to give an aesthetic appearance to the place.

Project specifications

Dimensions: Thickness is 6 cm, height is 200 mm, and width is 227 mm.
Weight: The product weighs 4 kg.
Sales Price:
Price per meter of regular tiles: 100 pounds
Price per meter of illuminated tiles: 850 pounds
Light Duration:The product has a light duration of 2 hours.
Melted Bottles: It is made from 100 big melted bottles.
People to use it: Suitable for all ages.
Efficiency Rating: Less than 95%.

Project benefits

The solution that we have reached to solve the problem of public health is to melt the plastic and make a mold because plastic is harmful to humans, animals and aquatic life also burning plastic leads to the emission of gases that harm the environment.

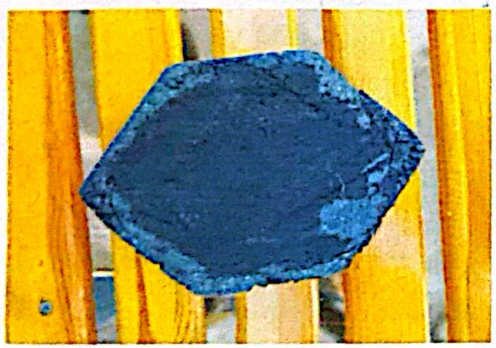
work team

Sandy Gamal
Demiana Emad
Yasmine Mohamed
Arwa Said
Sahar Shaban
Mahmoud Alaa
Omar Abdelkareem

Under supervision

Prof: waleed abu elwaffa
Prof. Ashraf abd elmenam
Dr. Hamada said

From plastic to path (from p to p)



Abstract

The world faces a massive problem which is plastic spreading that effects humans public health and animals and marine life so the project solves this problem by converting the plastic waste into molds for Pavements

Challenges

Our challenge is (Public Health) Public health is the science of protecting and improving the health of people and their communities. This work is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases.
Overall, public health is concerned with protecting the health of entire populations. These populations can be as small as a local neighborhood, or as big as an entire country or region of the world.

Materials and cost

- A meter of tiles is about 25 square tiles 20 x 20 with a thickness of 2 cm. You need 2 tenths of a cubic meter of sand and 5 kg of plastic

- Sand: 20 pounds

- Plastic: The price per kilo is about 15 pounds

- 5 kilos = about 80 pounds

- Epoxy (for tourist areas): about 745 pounds

- Price per meter of regular tiles: 100 pounds

- Price per meter of illuminated tiles: 850 pounds

- Note: These prices include the cost only

Team Work

- Abanoub Farid
- Asmaa Farghaly
- Kholoud Mohamed
- Nada Mohamed
- Rana Mohamed
- Rawda Hamada
- Persis Baheg

Scan me!

6 Project Specifications

The bridge consists of three parts: two fixed parts, each 30 cm long, and a movable part 40 cm long.
Truss Design: Palm fronds are cut. into 12 cm pieces and assembled into a ."Warren Truss" pattern for strength
Bridge Surface: Strips of palm fronds, 22 cm wide, are glued together to form .the bridge's surface
Hinges: Hinges are installed to connect the movable part with the fixed sections, .allowing easy lifting and lowering
Glue is used to secure all parts, ensuring .the structure's stability and durability

7 Under supervision

Dr. Waleed Abo Al-Wafa
Dr. Hamada saaed
Dr. Ashraf Abd- ElMoneim

4 Materials and Cost

- Palm leaves (recycled)
- Glue (65 EL)
- Motor (80 EL)
- Hinges (20 EL)
- Rollers (10 EL)
- Sling (25 EL)
- cartoon (recycled)
- Artificial grass (recycled)
- screws (5 EL)

5 Project Benefits

1.Reduce urban congestion by providing an effective crossing for vehicles and pedestrians.
2. Facilitate maritime navigation using a vertical lifting mechanism.
3. Supporting local industries and handicrafts through the use of newspapers.
4. Reducing construction costs compared to traditional steel or concrete bridges.

1 Abstract

This project proposes a sustainable Bascule bridge made from palm fronds to reduce urban congestion in Egypt.
The bridge features a vertical lift for ship passage and uses a Warren Double Truss system for strength and efficiency.

2 Challenges

"urban congestion"

Traffic congestion is a condition where vehicle movement on roads becomes slow and overcrowded, occurring when the number of vehicles exceeds the road's capacity, leading to delays and increased fuel consumption.

3 How The Project Works

1. As part of the design and operation of the mobile bridge, we used a small TY-50A AC motor, as this motor is characterized by its ability to move slowly and the ability to rotate in both directions, which makes it very suitable for this purpose.
2. The motor is connected to an operating switch that allows controlling the timing of opening and closing the bridge. Next, the motor was installed in the fixed part of the bridge, while rollers were installed in the moving part. We passed a rope through these pulleys and attached it to the engine on one side and to the first moving part of the bridge on the other side.
3. When the engine is running, it twists the rope, gradually raising the bridge. When the specified height is reached to open the bridge to allow ships to pass, the engine is stopped using the start switch. The motor is then operated in reverse to gradually close the bridge and return it to its original position.

PARKN Bridge

work team

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Rana Abd El Moniem
Rehab Ahmed
Zeyad Badr
Taemor Refat
Walaa Edris
Mohamed Ashraf
Madona Remin

Under supervision

Dr. Omer Aly
Dr. Zainab Mahmoud

Project benefits

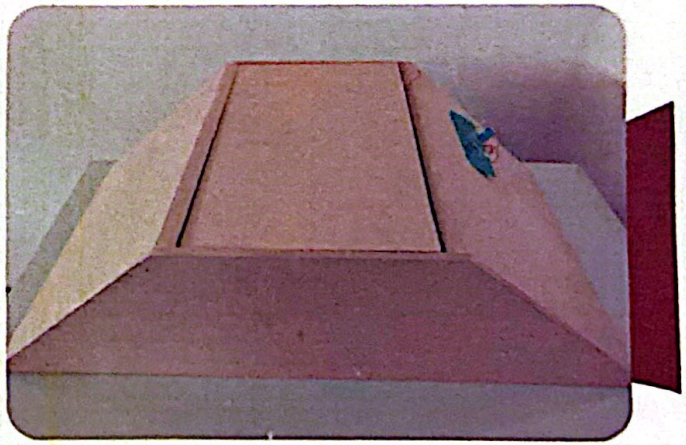
1. Reducing carbon emissions
2. Utilizing wasted energy
3. Reducing fossil fuel consumption
4. Promoting sustainable infrastructure
5. Reducing environmental pollution
6. Encouraging innovation in renewable energy

Recommendations

1. using more sensors with a heavy spring to generate more electricity .
2. Reduce the Height of the hump, to be easy and safe for cars.
3. Manufacturing of specialized piezoelectric sensors for electricity generation.

Project specifications

We installed piezoelectric sensors on a wooden base, connected in series, generating 2.3 V per press. To ensure proper pressure and protect the sensors, we added sponge and wooden pieces coverings. The sensors were linked to a circuit with a diode bridge and capacitor to convert AC to DC, lighting an LED as a test. The stored energy was then directed to charge a 3.3V lithium battery for later use in streetlights and traffic signals.



Materials and cost

Product	Price
Piezoelectric sensors.	35
Heavy-duty springs.	10
LED	5
Psb board	30
capacitor	15
Diode bridge	5
battery charging circuit	35
3.3V lithium battery with 1cell holder .	90

How the project works

This project uses a road hump to convert the kinetic energy from cars into electricity. As vehicles pass over the hump, vibrations are generated and converted into electrical energy by a piezoelectric sensor. The resulting 2.3V of electricity is then transformed from AC to DC and stored in a 3.3V lithium battery, which can later be used to power street lighting and traffic signals.

Abstract

This project generates electricity from vehicle movement using piezoelectric sensors embedded in speed bumps. By harnessing kinetic energy, it sustainably powers streetlights and traffic signals, reducing reliance on conventional energy sources. Experiments show that increasing the number of sensors and spring thickness boosts voltage generation, demonstrating how everyday infrastructure can produce clean energy.

Challenges

This project addresses the issue of energy scarcity by utilizing alternative energy sources. Alternative energy comes from renewable resources like solar and wind, offering a cleaner, more sustainable option compared to traditional fossil fuels like oil and coal. By harnessing the kinetic energy from vehicles passing over the road hump, this project contributes to the use of renewable energy, reducing reliance on conventional energy sources and promoting a more sustainable future.

Generating Electricity by Road Hump

Project Benefits:

1.Low-Cost Solution:

The project provides a water purification system using readily available and inexpensive natural materials such as banana peels and activated carbon.

2.Simple and Easy to Implement:

It can be easilyapplied in rural areas or places lacking advanced water treatment technologies.

3.Environmentally Friendly:

It relies on biodegradable natural materials and produces no harmful waste, thereby preserving the environment.

Project Specifications

Objective: Purify polluted water using low-cost natural materials.

Materials:

Banana peels, activated carbon, sand, gravel, cotton, and gauze.

Dried Banana Peels:
Absorb impurities and contaminants from the water. Activated Carbon:
Removes organic pollutants, odors, and enhances water clarity effectively.

Clean Sand:
Acts as a filtration layer to remove fine particles and impurities.

Small Gravel:
Reduces water flow speed and improves filtration efficiency through the layers.

Cotton and Gauze:
Traps large dirt particles and suspended solids as a primary filter.

Process:
4 filtration phases to gradually improve water clarity. Efficiency: Phase 3 was the most effective due to the use of large amountsof activated carbon.
Cost: Low (e.g., 20 grams of activated carbon costs 10 EGP). Results:
Water becomes progressively clearer with each phase. Significant reduction in yellowish color, indicating improved purity.

Under Supervision

Dr-Amany Abdelshakou
Dr-Mansour Ahmed Mohammed

Team work

Esraa Hemaya
Basmala Hassan
Sandy Peter
Margaret Lorans
Fares Osama
Mina Mamdouh

Natural 1.Boosting Local Banana

Abstract:

The project exp
a low-cost water purification system using natural materials such ,dried banana peels ,activated carbon, sand and gravel.It aims to address water pollution challengesthrough simple accessible, and environmentally friendly .methods

Hereare 11 major challenges facing Egypt:

1.Population Growt
2.Water Scarcity
3.Food Security
4.Climate Change
5. Poverty and Unemployment
6. Infrastructure Development
7. Improving Education Quality
8. Healthcare System Challenges
9.Environmental Sustainability
Materials and cost
10.Boosting Local Production and Reducing Imports
11. National and Regional Security

Materials and cost

Cotton	5 L.E	
Gauze	5 L.E	
Activated carbon	10 L.E	
Banana peel	0 L.E	
sand	0 L.E	
gravel	0 L.E	

H1-Add layers of cotton, gauze, sand, and gravel-
2-Passthe pollutedwater throughthe layers andobserve theresults-
Phase 2:
1-Repeat the same layers and add small amounts of banana peels and activated carbon-
Phase 3:
1- Use the same setup but with large amounts of activated carbon only- Phase 4:
1- Add anextra layerof cottonand gauze ontop ofthe Phase1 setup-

Materials and cost

Product	Price
CD &LED5mm	0
Arduino-uno board + cable	250
SG90 servo moto	90
LDR sensor	14
10k resistor	2
Jumper wires	10
Wood & bolt and nut	0
3.3V lithium battery with 1cell holder .	20

How the project works

The project works by using a solar cell, a wooden model, and an Arduino system. The solar cell is a cylinder divided into 16 radii, each with three bulbs, all electrically connected. The wooden structure supports the cell and components. An Arduino is programmed to control a motor and sensors, adjusting the system's movement based on the highest detected light intensity for optimal performance.

Abstract

The Arid area are considered one of the biggest problems in Egypt, and to solve this problem we need many projects to rehabilitate arid areas . In our attempt to solve this problem and take advantage of the heat of the Attic sun and its arid areas , we made a solar cell with a tracking system And we got 24 volts.

Challenges

This project addresses the issue of energy scarcity in arid areas by utilizing alternative energy sources. Renewable energy solutions such as solar and wind power provide a sustainable and cleaner alternative to traditional fossil fuels, which may be scarce or difficult to access in these regions. By harnessing abundant natural resources like sunlight and wind, this project reduces dependence on conventional energy sources and promotes a more sustainable and self-sufficient energy system for arid areas, contributing to environmental conservation and long-term energy security.

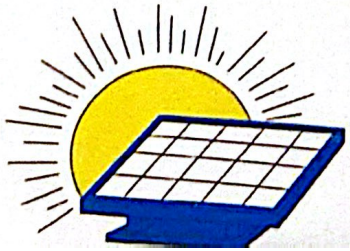
Automatic Direction Solar Cell (ADSC)

work team

Noran Mamdoh Mahmoud
Aya Gamal Ramadan
Rana Abdel Moneim Ali
Malak Waleed Ahmed
Rehab Ahmed Fathallah
Zeyad Badr Sayed
Taemor Refat Sayed

Under supervision

Dr. Osama Sayed
Dr. Amany Abd Al Shakor.

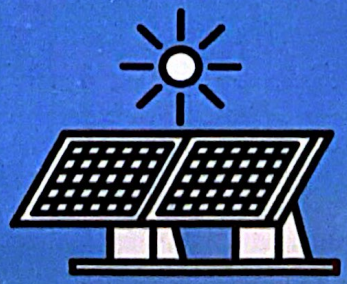


Project benefits

1. Reduces e-waste by Uses recycled components, lowering pollution.
2. Can be upgraded with better batteries or other energy sources.
3. Affordable renewable energy.
4. Utilizes recycled materials.
5. Efficient energy production in arid regions.

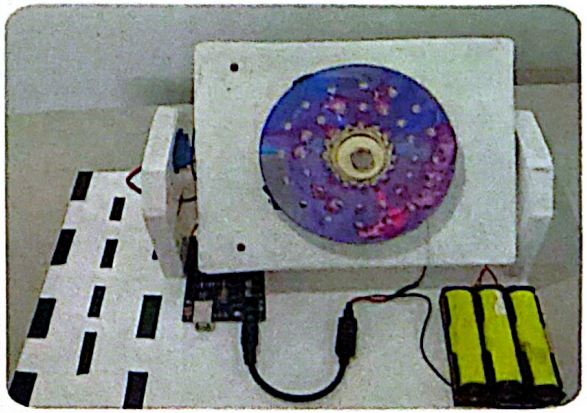
Recommendations

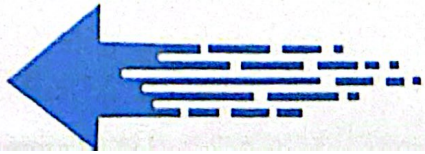
connect 6 or more cells in Parallel in order to increase the ampere so that energy can be stored to be used when needed.



Project specifications

The prototype consists of three main parts. First, the solar cell, where a cylinder is divided into 16 radii, each containing three holes with bulbs placed and welded, and the electrodes are connected accordingly. Second, the project model, which is built using four wooden pieces (20x15 cm, 20x30 cm, and two 10 cm pieces) to support the cell, with the bulb from the cell placed in a column. Finally, the Arduino system is programmed and connected to a motor and sensors to adjust movement based on the highest light intensity.





GENERATING ELECTRICITY USING SAND

ABSTRACT

Arid regions suffer from a lack of sustainable energy sources, which affects development and stability. This project aims to generate electricity with available and cheap materials, such as sand, coal, lime, citric acid, and graphite from batteries, through an innovative electrochemical system. The solution is characterized by its low cost and ease of implementation, making it a promising option for providing clean and sustainable energy, reducing dependence on traditional sources, and improving the quality of life in remote areas.

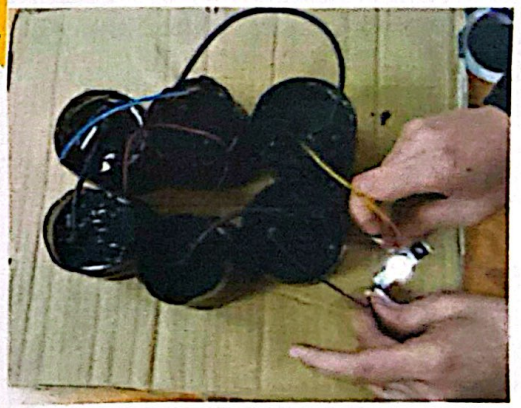
CHALLENGES

Arid areas

Egypt faces major challenges regarding the arid areas that constitute an important part of its terrain. The arid regions of Egypt are a challenge due to the lack of precipitation and high temperatures, which leads to soil degradation and the difficulty of providing natural resources necessary for agriculture and human life. These conditions increase the challenges facing local people with regard to agriculture, water, and economic development.

MATERIALS AND COST

TOOL	COST
Acetic acid	6
Lemon salt	10
Remote stones	—
Wires	—
Sand	—
Water	—
Coal	5
LED	1
Wood and cardboard	—
Final cost	22



HOW THE PROJECT WORKS

1. Preparing the electrochemical mixture: Sand is mixed with salt and graphite to create a conductive medium that enhances the transfer of electrons.

2. Adding catalysts: Water and acid (such as lemon juice or dissolved citric acid) are added to activate the electrochemical reaction inside the cells.

3. Arranging the cells: The cells are arranged in suitable containers, with graphite acting as the positive electrode and charcoal or battery metal as the negative electrode.

4. Electrical conduction: The cells are connected in series using conductors to improve the potential difference and the resulting current.

5. Electricity production: An electrochemical reaction occurs between the electrodes and the acidic medium, which leads to the flow of electrons and the generation of an electric current.

6. Energy use: The resulting electricity can be used directly to operate small devices or stored in batteries for later use.

PROJECT BENEFITS

- **Producing electricity at almost zero cost using a clean and sustainable energy source.**
- **Providing a sustainable energy source for arid areas, reducing dependence on traditional and expensive energy sources.**
- **The possibility of using wastewater instead of regular water, which enhances environmental sustainability.**
- **Utilizing available and cheap materials, which makes the system economical and easy to implement.**
- **The possibility of developing the idea in the future to increase the efficiency of energy generation and expand the scope of its use.**

PROJECT SPECIFICATIONS

Portability and Application:

- Light weight and can be easily assembled at any location.
- It does not require advanced technologies or special equipment, making it suitable for application in various environments.
- It can be developed to increase its efficiency and produce more energy in the future.

Energy storage or use:

-The resulting electricity can be directed directly to operate low-consumption devices

-The energy is stored in small batteries for later use when needed.

Project efficiency and capabilities in difficult conditions:

- It works in arid environments due to its reliance on readily available materials.
- It does not require an external power source, making it ideal for remote areas.
- It can withstand high temperatures due to the nature of the materials used.

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Dr. Mansor

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Under supervision

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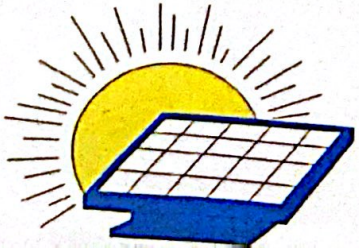
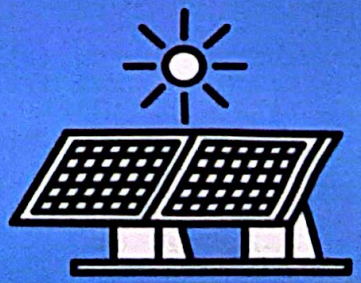


Project benefits

1. Reduces e-waste by Uses recycled components, lowering pollution.
2. Can be upgraded with better batteries or other energy sources.
3. Affordable renewable energy.
4. Utilizes recycled materials.
5. Efficient energy production in arid regions.

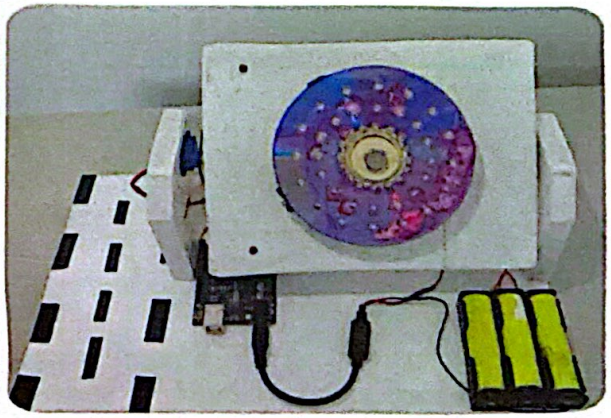
Recommendations

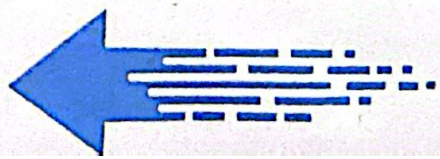
connect 6 or more cells in Parallel in order to increase the ampere so that energy can be stored to be used when needed.



Project specifications

The prototype consists of three main parts. First, the solar cell, where a cylinder is divided into 16 radii, each containing three holes with bulbs placed and welded, and the electrodes are connected accordingly. Second, the project model, which is built using four wooden pieces (20x15 cm, 20x30 cm, and two 10 cm pieces) to support the cell, with the bulb from the cell placed in a column. Finally, the Arduino system is programmed and connected to a motor and sensors to adjust movement based on the highest light intensity.





Materials and cost

Product	Price
CD &LED5mm	0
Arduino-uno board + cable	250
SG90 servo moto	90
LDR sensor	14
10k resistor	2
Jumper wires	10
Wood & bolt and nut	0
3.3V lithium battery with 1cell holder .	20

How the project works

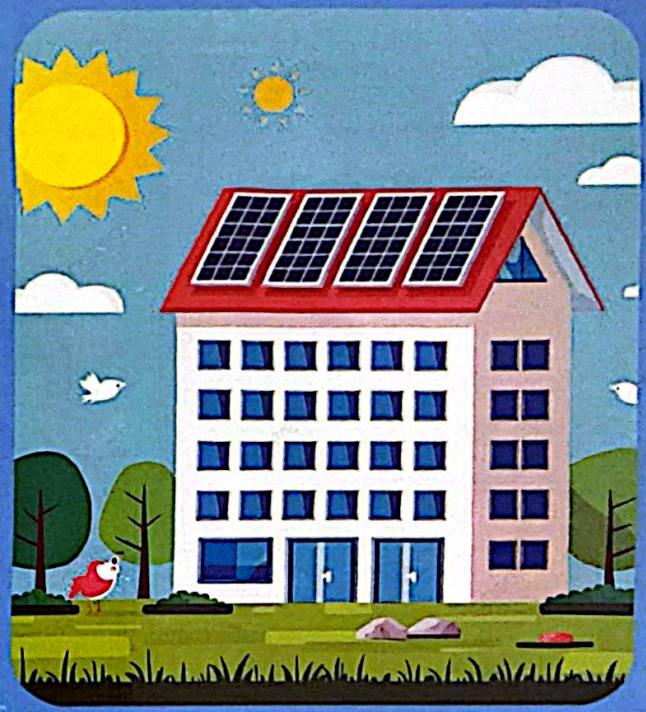
The project works by using a solar cell, a wooden model, and an Arduino system. The solar cell is a cylinder divided into 16 radii, each with three bulbs, all electrically connected. The wooden structure supports the cell and components. An Arduino is programmed to control a motor and sensors, adjusting the system's movement based on the highest detected light intensity for optimal performance.

Abstract

The Arid area are considered one of the biggest problems in Egypt, and to solve this problem we need many projects to rehabilitate arid areas . In our attempt to solve this problem and take advantage of the heat of the Attic sun and its arid areas , we made a solar cell with a tracking system And we got 24 volts.

Challenges

This project addresses the issue of energy scarcity in arid areas by utilizing alternative energy sources. Renewable energy solutions such as solar and wind power provide a sustainable and cleaner alternative to traditional fossil fuels, which may be scarce or difficult to access in these regions. By harnessing abundant natural resources like sunlight and wind, this project reduces dependence on conventional energy sources and promotes a more sustainable and self-sufficient energy system for arid areas, contributing to environmental conservation and long-term energy security.



Automatic Direction Solar Cell (ADSC)

E-Irrigation

Abstract

The arid region is considered one of Egypt's biggest problems. To solve this problem, we need many projects to rehabilitate arid areas. In our attempt to solve this problem and benefit from existing wells in arid areas, we decided to create a project to raise well water, use it for irrigation, and organize this water for irrigation using technology.

Challenges

1)Water depth.
2) Motor power.
3) Programming correctness.

Materials and cost

1) wooden box (200LE)
2) Two plastic boxes
3) Soil moisture sensor(50LE)
4) Water hoses
5) DC Motor(75LE)
6) 24-volt battery(100LE)
7) Fan(175LE)
8) Mint plant
9) Dry and wet sand
10) Wires
11) Relay
12) Arduino Nano

How the project works

1) Design a wooden box size (50*35*15).
2) Cover the box with wallpaper.
3) Design and make a 3D fan.
4) Connect the impeller to the motor to form the pump.
5) To implement the project idea, the pump and sensor must be connected to the Arduino.

*Connecting the sensor to the Arduino:
-VCC > 5v.
-Ground -------> Ground.
-AO -------> A0.

*Connecting the relay to the Arduino:
-VCC -------> 5v.
-Ground -------> Ground.
-IN2 -----> A3.

*Motor and battery with relay:
-Motor positive----- > NO2.
-Battery negative-------- > COM2.
-The negative of the motor---->The positive of the battery

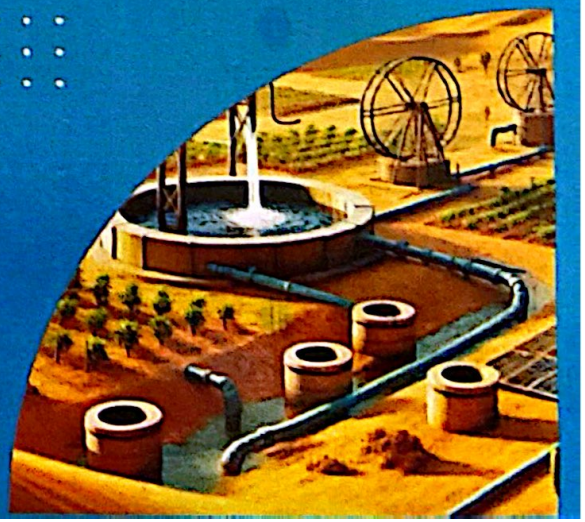
6) Arduino programming.
7) Make a hole in the top of the box to connect the hose and sensor to the soil, and a hole for the Arduino wire.
8) Place the two soils in two boxes on top of the wooden box, one dry and the other wet.

Project benefits

1) Water saving: By measuring the moisture content of the soil, the pump is operated only when needed, reducing water waste.

2) Automated irrigation: reduces the human effort required to water plants manually.

3) Improving agriculture in dry areas: The project contributes to providing sustainable irrigation solutions, which helps in growing plants in areas that suffer from water shortages.



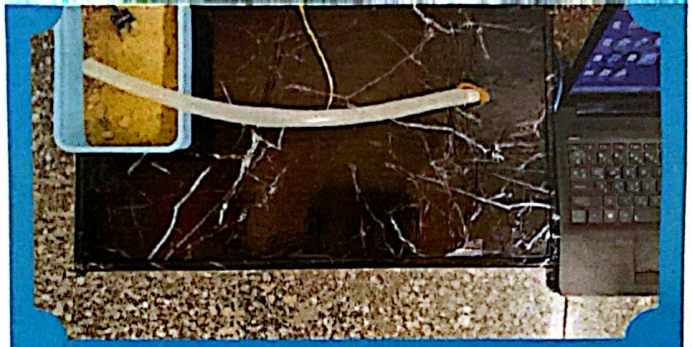
Project specifications

***Physical design:**

-Use a wooden box covered with wallpaper.
-Add a 3D fan and design a pump using a fan and motor.

***Electronic components:**

-Arduino: to control the project.•
-Moisture sensor: To measure the moisture level in the soil.
-Relay: To connect and disconnect the electrical current to the pump.•
-Battery: To supply power to the project.
-Motor: To operate the pump.



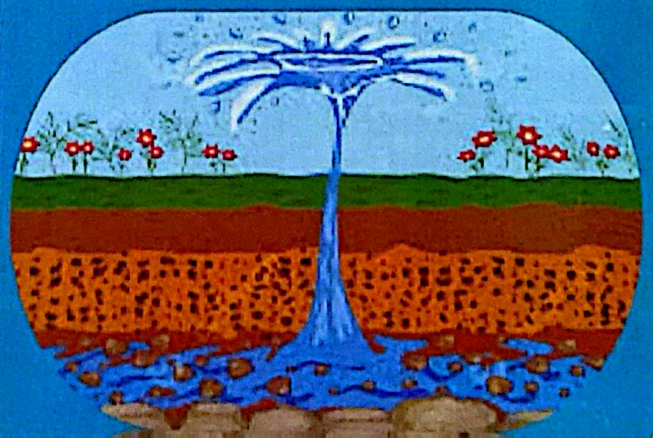
***Electrical connections:**

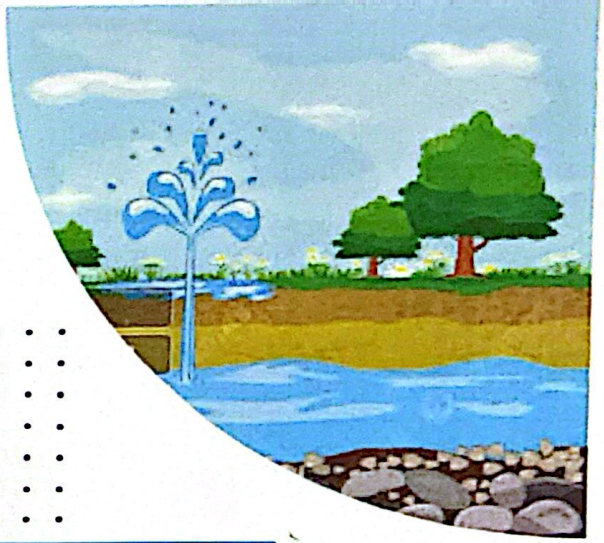
-Connecting the humidity sensor to the Arduino.
-Connecting the relay to the Arduino and the pump.
-Connect the battery and motor via the relay.

***Programming:**

-Use Arduino programming to control pump operation based on humidity sensor reading.

-Set up software to turn on the pump if the humidity is below 500 and turn it off if it exceeds 700.





work team

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Basmala Abd El-Nasser
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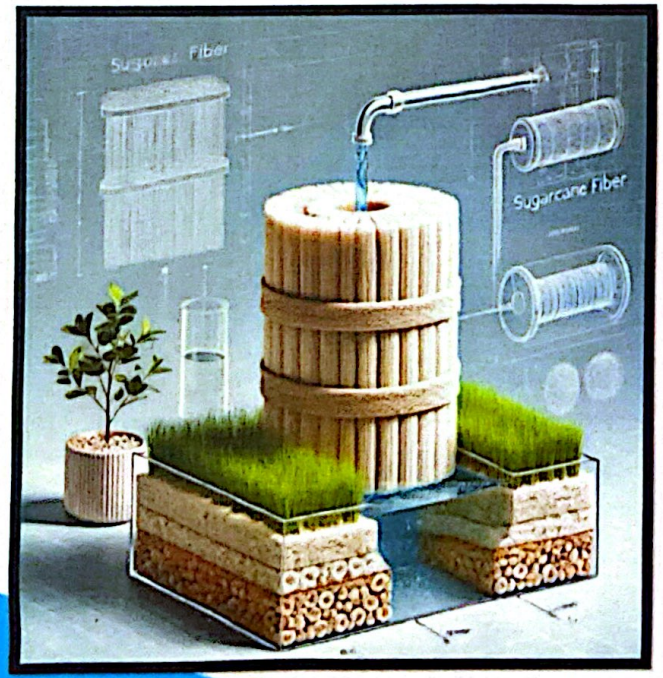
Mena Allah Ali
Nouran Abd El-Halem

Under Supervision

Dr. Mansour
Dr. Amany
Engineer. Fatma

project benefits

1. Affordable clean water: For underserved communities.
2. Environmental protection: Less plastic, more natural materials.
3. Green economy: Jobs in reed harvesting, filter design, and recycling.



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Dr: Amany Abd-Elsakour

Eng: Osama Mohamed

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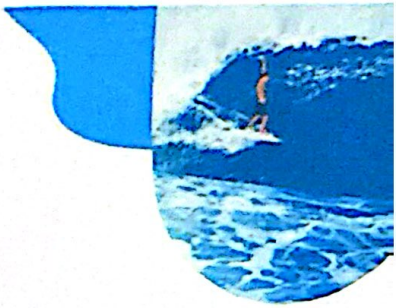
5. Mariam Sayed
6. Rahma Mohamed
7. Menna Ayman



Project specifications

1. **Material:** Natural reed, eco-friendly and biodegradable.
2. **Efficiency:** Removes 99% of impurities keeps essential minerals.
3. **Design:** Compact, portable, and easy to maintain.
4. **Capacity:** Filters 10-20 liters/day.
5. **Lifespan:** Lasts 3-6 months.
6. **Recyclability:** Fully recyclable; reed can be composted.
7. **Affordability:** Cost-effective for low - income communities.
8. **Eco-Friendly:** Chemical-free, low carbon footprint.

SUGAR CANE FIBER FILTER

Abstract

This project introduces an innovative approach to water purification using natural resources. By utilizing sugarcane fibers combined with alum, this method ensures efficient, cost-effective, and environmentally sustainable water treatment. The design employs multiple filtration layers, leveraging materials like cotton, sand, and activated carbon to achieve optimal results.

challenges

Water pollution is one of the biggest environmental challenges facing the world, directly affecting human health and the ecosystem. Industrial, agricultural, and plastic waste contribute to the deterioration of water quality, leading to a shortage of clean water resources and an increase in waterborne diseases. The water filter project using reed aims to address this challenge by providing a natural and innovative solution for water purification, contributing to pollution reduction and improving water quality.

Materials and cost

Materials used:

Alum: Settles impurities.

Sugarcane Fibers: Natural and eco-friendly.

Cotton & Gauze: For fine filtration.

Sand & Gravel: Removes larger particles.

Activated Carbon: Absorbs odors and pollutants.

Cost Breakdown:

Recycled Materials: Alum, sugarcane fibers, sand, gravel.

Purchased Materials: Cotton (7 EGP), Gauze (5 EGP) Activated Carbon (20 EGP), Plastic Cup (10EGP).

Total Cost: 42 EGP (Affordable and efficient).

How the Project Works

1. Pre-treatment: Add alum, let impurities settle (30min).
2. Filtration:

Sugarcane fibers: Large impurities.

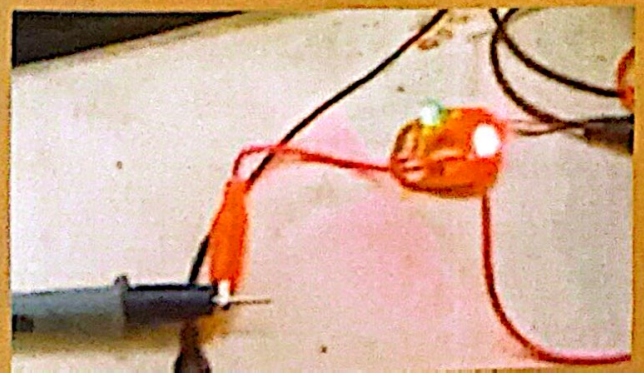
Cotton & gauze: Fine particles Gravel & sand: Debris.

Activated carbon: Odors and chemicals.

3. Result: Clean, odor-free water.

How the Project Works

1. Identify non-recyclable waste (e.g., instant coffee cups).
2. Burn the waste in a controlled setup.
3. Use a cooling box filled with water or ice to create a temperature difference.
4. Convert this temperature difference into electric potential via the thermoelectric effect.
5. Transfer generated electricity through capacitors to charge a battery and power a lamp.



Project Benefits

1. Reduces landfill waste.
2. Produces electricity sustainably.
3. Lowers greenhouse gas emissions compared to traditional waste disposal.
4. Ash residue can be repurposed in construction.

Specifications

- Burns 10 coffee cups to generate 5 volts of electricity.
- Uses thermoelectric conversion for energy extraction.

UNDER SUPERVISION

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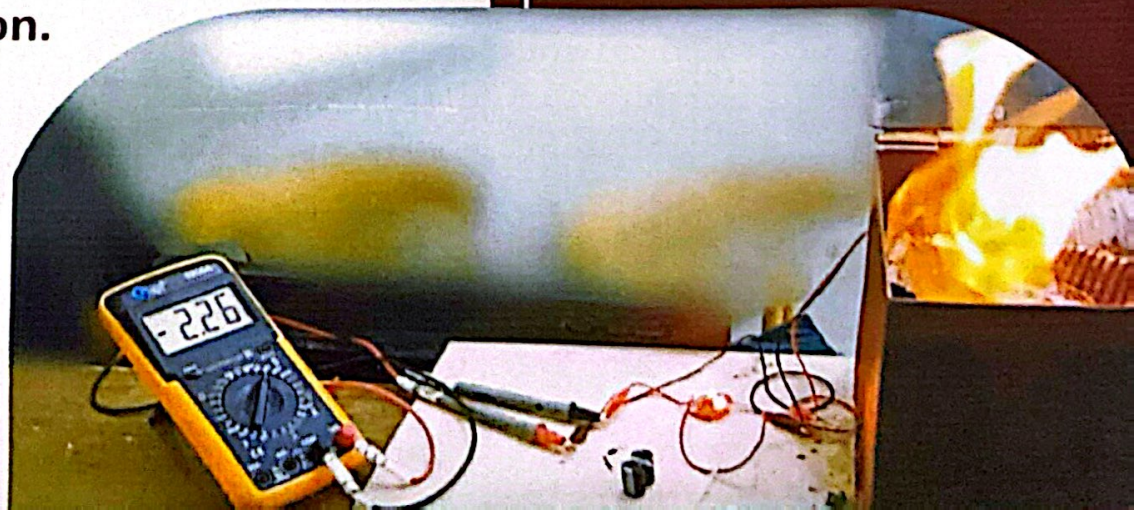
Dr. Ashraf Abdel Minim
Dr. Hamada Said

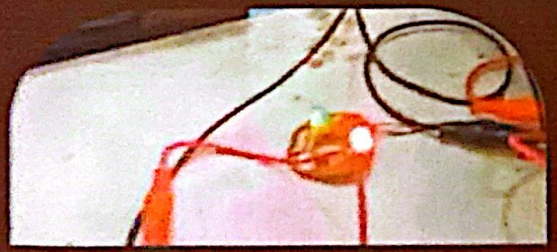
Team work

1. Shehab Mohamed
2. Ziad Abdelfatah
3. Nourán Sharaf El din
4. Nadia Mostafa
5. Marian Emad



Abstract

The project aims to convert waste into energy through incineration, reducing environmental pollution while generating electricity. The process helps dispose of non-recyclable waste efficiently, contributing to a cleaner environment.

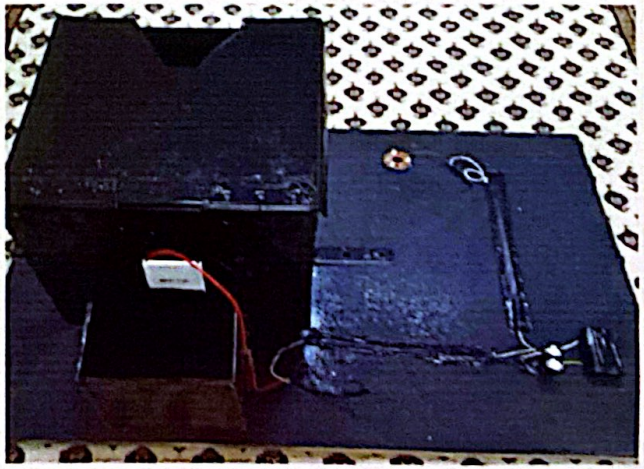


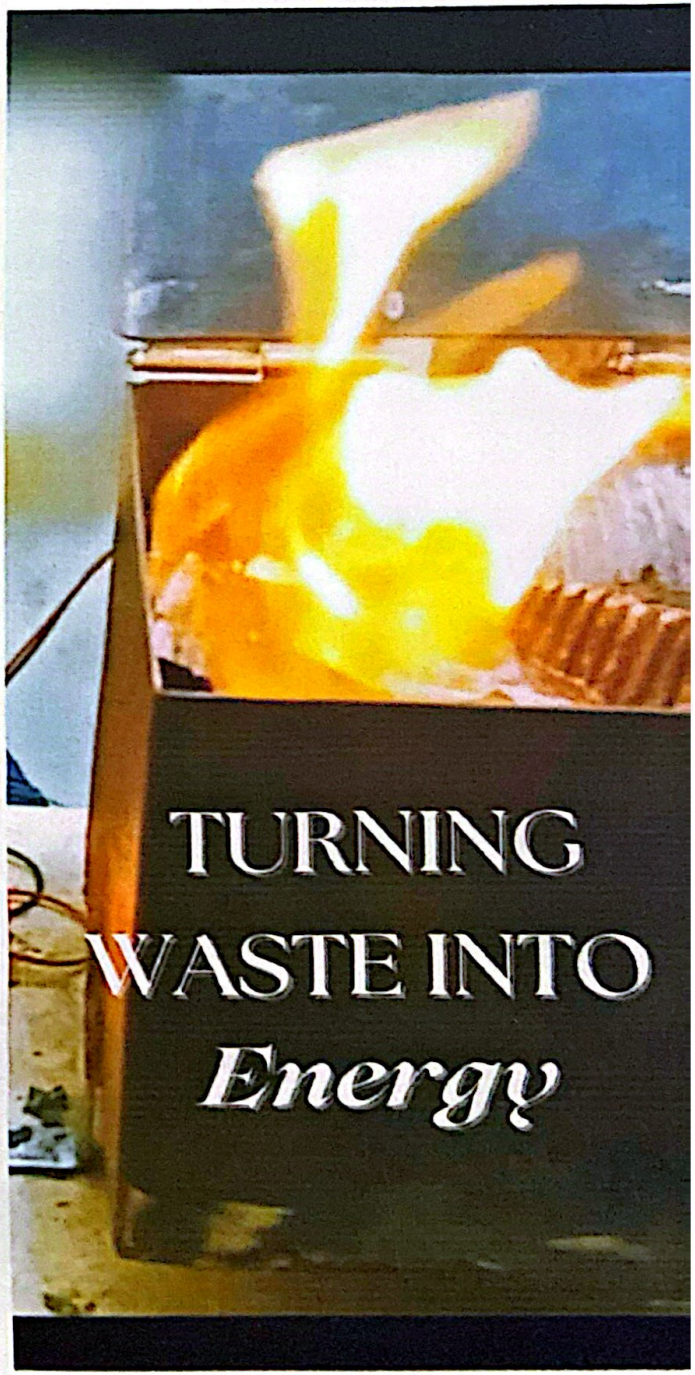
Challenges

Egypt struggles with excessive waste accumulation, leading to pollution and health issues. Landfill space is scarce, and traditional waste disposal methods contribute to greenhouse gas emissions. Energy extraction from waste offers a sustainable solution.

Materials & Cost

Materials Used: Instant coffee cups (as waste), fire source, cooling box (water/ice), thermal cell, capacitors, battery, lamp.
Cost Consideration: Low-cost setup leveraging waste as a resource for energy generation.





Abstract

The project aims to improve and increase agriculture in Egypt through the implementation of vertical farming, which helps reduce water consumption and efficiently utilize space. This approach addresses challenges such as limited agricultural land and water scarcity by growing plants in vertically stacked layers under controlled conditions.

Challenges of Agriculture in Egypt

Egypt faces several agricultural challenges, including limited arable land due to urban expansion, severe water scarcity, soil degradation from overuse of chemicals, and the impact of climate change on crop yields. Additionally, rapid population growth increases food demand, putting further strain on natural resources.

Materials Used

- 1.25-meter plastic pipe
- 7 planting cups
- Small water pump
- Water bottle as a water source
- Organic soil
- Arugula seeds

Project Specifications

- **Plant Selection:** Arugula was chosen as it is well-suited for vertical farming.
- **System Design:** A 1.25-meter-long pipe with 7 staggered holes for seedlings.
- **Irrigation:** A water pump connected to a water tube, filtering and evenly distributing water to each plant.
- **Lighting:** Relies on natural light with climate considerations.
- **Soil:** High-quality, well-draining soil rich in organic matter.

How the Project Works

- Seedlings are placed in cups inside a vertical farming pipe.
- Irrigation is controlled by a pump connected to a water bottle.
- Water flows through a filtration system to ensure even distribution.
- The system can be controlled manually or via remote control.
- Growth progress is monitored weekly to assess project success.

Project benefits

- **Increased Crop Productivity:** Higher plant density in a small area.
- **Water Conservation:** Saves 70-95% of water compared to traditional farming.
- **Improved Food Safety:** Reduces pesticide use due to controlled conditions.
- **Climate Resilience:** Less affected by extreme weather conditions.
- **Sustainability:** Supports resource efficiency by recycling water and using clean energy sources.

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Lamees Mohamed
Sarah Najah
Nouran Sharaf El-din
Sohila Mohamed
Sara Ahmed
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Vertical agriculture

Under supervision:
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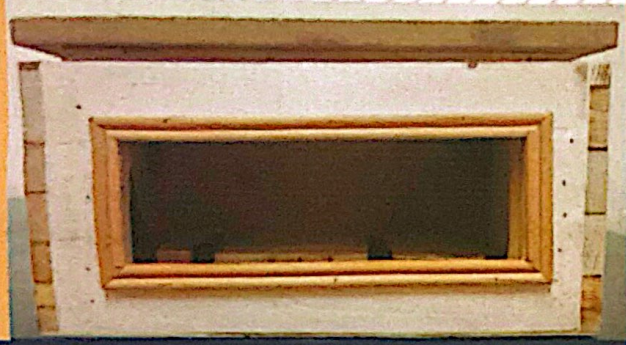
Dr. Zainab M. Otiefy
Eng. Fatma



Abstract:

The project focuses on addressing urban congestion and energy generation through sustainable development. It proposes smart stairs that convert movement and pressure into electrical energy to help mitigate energy issues caused by overpopulation and high consumption.

Materials & Cost:

• Wood stairs step	80
• Piezoelectric sensors	140
• Sponge	10
• Diodes	-
• LED bulbs	-

How the Project Works:

The smart stairs prototype uses piezoelectric sensors placed between sponges at the step corners. When pressed, these sensors generate electricity. The setup includes a wooden box, a circuit for current unification, and a lighting system to display the output.

Project Specifications:

- Prototype made of wood with a glass face to show LED lighting.
- Generates 9 volts of energy when pressed.
- Uses parallel wiring for higher efficiency and output.

Challenges:

- Urban congestion and energy generation due to overpopulation.
- Strain on fossil fuels and aging infrastructure.
- Lack of renewable energy utilization and efficient energy distribution.

Project Benefits:

- Provides sustainable and low-cost energy generation.
- Addresses energy shortages in remote or underserved areas.
- Simplifies the solution with readily available tools.

Work Team:

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- Sohila Mohamed
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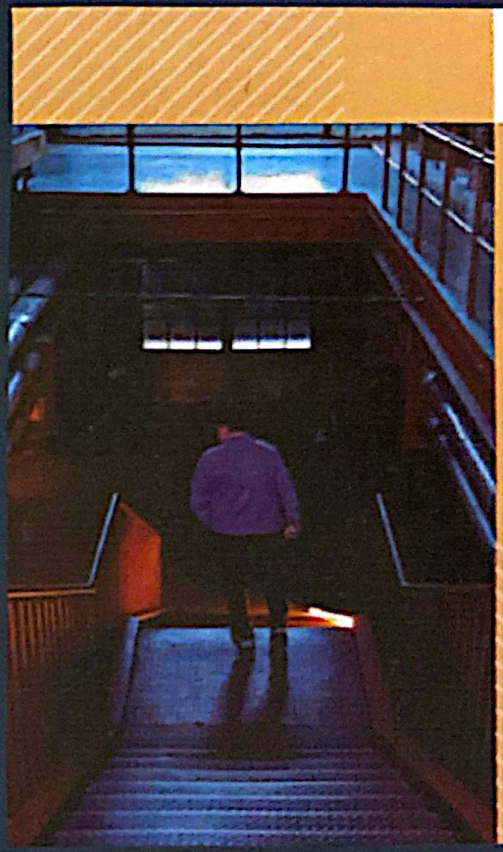
- Shehab Mohamed
- Ziad Abdelfattah
- Nouran Sharaf
- Alaa Mohy

Under Supervision:

- Dr. Waleed Abo El Wafa
- Dr. Ashraf Abdelmenaem
- Dr. Hamada Said

"Step into the future of sustainable energy and join us in lighting the way forward!"



The Glory Stairs of Avengers

From Steps To Power