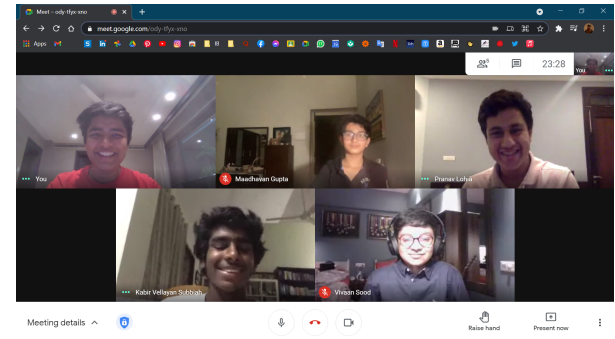




What is the Problem?

We have learned about the disadvantages of non-renewable energy sources, and how renewable energy is a better alternative to fossil fuels. However, the consumption of fossil fuels is only increasing, this is leading to climate change. Greenhouse gases are being emitted into the environment even faster leading to global warming. The effects of which are becoming visible extreme weathers, dirtier air, and higher death rates are just a few of the examples. Secondly, toxic materials such as plastics are being released into the environment after just a few uses, this pollutes environments, rivers, generates infections and kills animals and humans.



What are we doing to Solve the Problem?

Our urban approach was made to incentivize fitness by making it more productive. You could charge your electronic devices by using elliptical machines, stationary cycles or rowing machines. We came up with a working model for a dynamo that can be easily attached to one of these machines in a gym. The dynamo converts the energy produced into electrical energy that is used to charge your phone or your laptop. Even though this is a small impact, we contribute to the larger effort because less dirty energy is needed to charge your devices. More importantly, by coming up with the plans and publicly releasing them, we made it possible for everyone, wherever you are, to access one of these dynamos and use it. We have created a brochure and an instruction manual for gyms to understand the working behind the idea, and how to install the dynamo and the circuit charger such that the gym cycle charges the phone. This means that our urban approach is extremely scalable, and this small impact is easily compounded. Our rural approach takes into account the disparity that exists between urban and rural areas in terms of opportunity, standard of living, and other factors. There is a lack of artificial light, which means any and all work must be completed during the day in some rural areas. To tackle this problem, we built solar-powered lamps which reuse plastic bottles as a light source and are currently manufacturing them for distribution in rural areas.

Highlights

We have discussed how to optimise the design of the lamp, created a podcast and interviewed people to spread awareness about the current situation and how other people are helping the situation around us, distributed 400 lamps in Thakurpur, distributed upwards of 150 lamps to the inhabitants of Chandigarh's footpaths, and formed the Ideation of the Gym Charger and reaching out to local gyms for the same.

Our Aim

We plan on reaching out to more and more people and spread awareness regarding the issues of plastic pollution and green energy. We plan to collect enough funds to produce lamps for everyone under the poverty line in Chandigarh, or about 2.35 lakh people. Furthermore we plan to spread this project across several states, including Gujarat, West Bengal, Tamil Nadu, Maharashtra etc. to start, and our solar lamp leaflets are already available in seven different languages. We also aim to empower women through our project by providing them employment opportunities. We also aim to reach out to more gyms to implement our project

Donation

We required funding to manufacture the solar powered lamps. Each lamp costs Rs. 300 plus taxes and we have received a donation of Rs. 600000 from our corporate sponsor.



Sustainable Development Goals

1. Affordable and clean energy- Our energy should be renewable, and should be easily accessible to all.
2. Climate action- Climate change is a grave reality and one where we need to take urgent action on. We need to turn away from sources which emit greenhouse gases.
3. Responsible consumption and production- The current way we dispose of our toxic materials such as plastic is a major problem. We need to recycle and reuse them as many times as we can.

Our projects target all three of these development goals. Our 'Gym charger' project aims to provide cleaner energy by using sustainable energy to charge mobiles rather than chargers. Our 'Litre of light' project reuses plastic bottles to create affordable lamps which can provide light to households through solar power.

Our Impact on the Society

If used daily, one solar-powered lamp has a lifespan of one year, saving in totality more than 1 GJ (10^9 Joules) of energy. We have distributed upwards of 500 lamps and we have illuminated a complete village named Thakurpur which has a population of 1664 people. We donated lamps to people in Chandigarh. In all, we have saved 140000 KWh of energy so far, and this is just the beginning. Our lamp is highly efficient and is cost-competitive with the other lighting products in the market. It just requires one time installation and functions for years without replacement. Also, it runs on solar energy so it is practically free. Had COVID not stalled us we would have easily impacted the lives of at least 10000 as we were manufacturing 1700 more lamps by the funding received. We would have saved thousands of rupees of electricity and converted a city into a green city, by providing them with renewable energy. For the urban solution, we are using gym cycles to power gadgets like mobile phones and laptops. Each cycle will save nearly 72 kWh of electricity every year, as that is nearly the amount of electricity it takes to charge a laptop throughout the year. It will be very fast too as it will charge a typical phone that takes 4.5 to 5.5 watts to charge in an hour.

What did we learn?

This project has been productive and has helped us understand the importance of a lot of things when it comes to working in a team, but more significantly, it made us realize the effort and dedication required to make real, lasting change in the world, and we think that is something that everybody can stand to benefit from while learning how to effectively implement our project in the real world, while applying our learnings. As a direct result of participating in GSL we have learned how to think creatively, and most importantly how to help others through any means possible. Properly understanding the problem, and the full scope of it was a skill that we had to learn, and that skill can be used in a number of different applications.



EFFICACY OF A DYNAMO

1. Different types of dynamos have different types of efficiency.
2. An average phone takes 4.5 to 5.5 watts to charge.
3. Watts produced by a dynamo depends on the voltage and current.
4. While the voltage is constant the current depends on the rate of pedalling.
5. So a dynamo that produces 5 watts of energy can charge the entire battery in an hour if it is 100 percent efficient.

SCIENCE BEHIND THE DYNAMO

1. Dynamos work on the principle of electromagnetism.
2. The battery gets the dynamo running as it provides an initial current to the dynamo which creates a magnetic field.
3. The field coil when the current passes through it makes the outer iron frame into an electro-magnet.
4. The iron armature completes the magnetic circuit.
5. When the magnetic field is created the dynamo spins with the movement of the cycle, this converts the kinetic

RECHARGE

Operating a Bottle-Lamp

USING A LAMP

1. Keep the lamp out in sunlight while making sure its top is under direct sunlight. This has to be done to charge the lamp.
2. Turn the knob on the side in a clockwise direction. It has seven different levels of luminosity, therefore there are seven clicks to a full turn.
3. Enjoy 8 hours of green energy light.



PRECAUTIONS



1. Do not leave in sun for too long as it may lead to the battery getting overheated and spoiled.
2. Avoid using the lamp in rain as direct exposure to water may damage some of its components, even though it is water-resistant, it cannot bear large amounts of water contact.
3. Remember to turn off the lamp while it is not in use because the battery has a lifespan of a particular time and it reduces with more and more load.

SCIENCE

The lamp has a simple circuit that includes a battery, an LED bulb, a 7-step switch, a couple of diodes, a voltage regulator, a charging indicator LED, and a solar panel.

