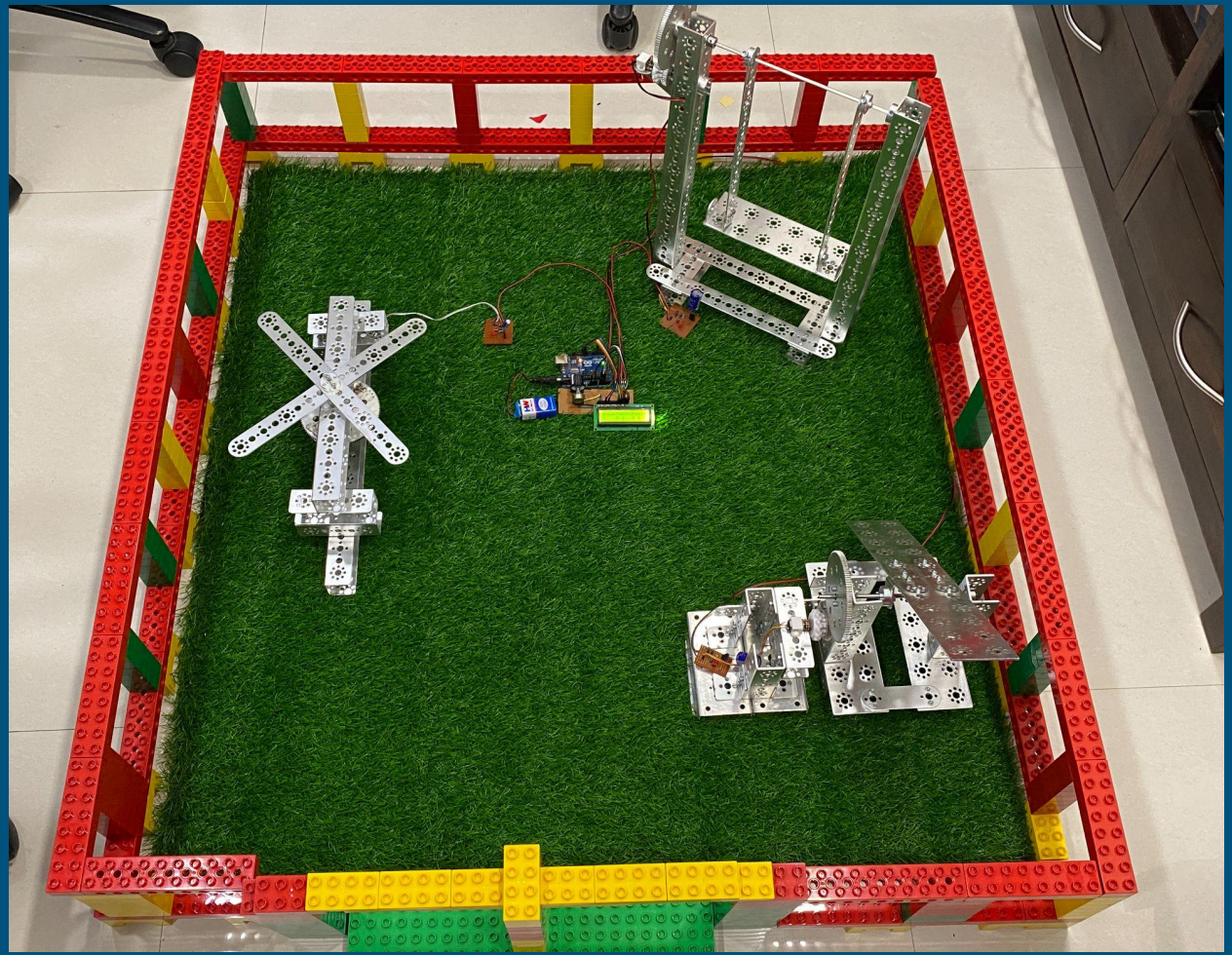


SMART ECO PARK

TEAM JUHU TECHNOBOTS

Team Members

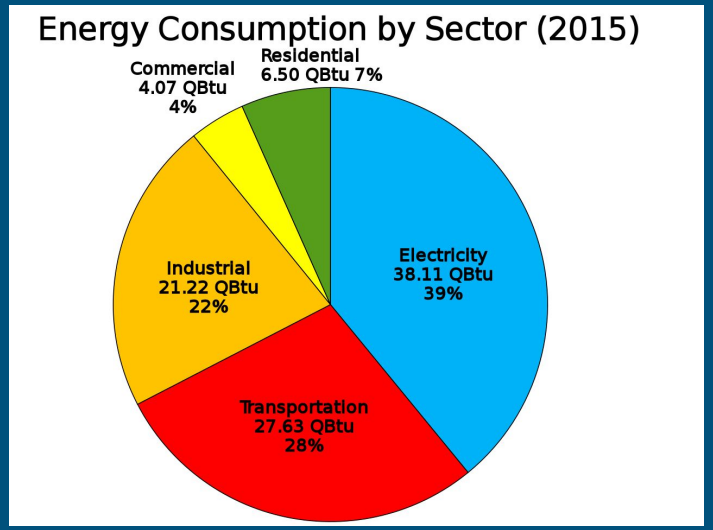
- Shubhan Anchan
- Raunak Dhoot
- Azhaan Noorani

Coaches

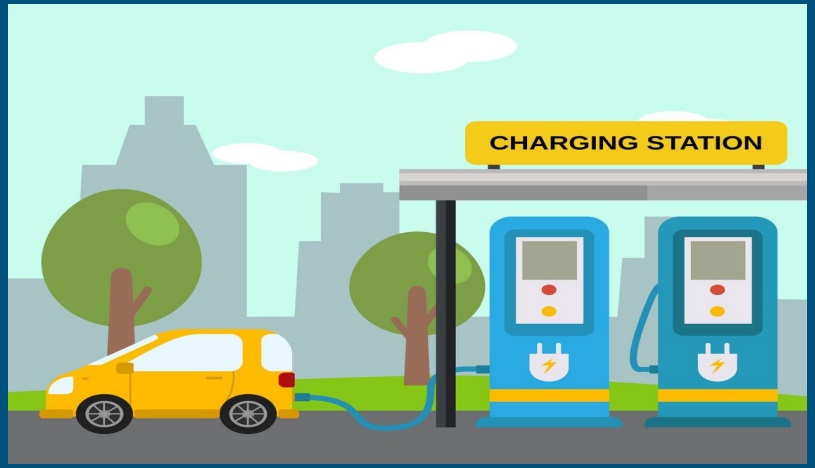
- Mrs. Reetu Jain
- Ms. Madhavi Bait

INTRODUCTION

- This year challenge defined in WRO is to identify the problem faced by current energy usage and to find sustainable ways to generate and renew energy .
- As we researched on this topic we found that currently "**Transportation**" is the second most sector in usage of non-renewable energy.Non-renewable energy sources are diminishing everyday
- To overcome this problem we have Electric vehicles as solution but the biggest problem in front of this industry is to charge the vehicles.



PROBLEM STATEMENT



- Increase in Electric vehicle will demand more charging points
- EV charging stations need a reliable and sustainable energy source
- It also require a lot of capital investments, large areas of space
- Electric vehicles require more charging time.People cannot spend valuable time waiting for vehicles to get charged
- Also too many charging station with the people in queue will clutter the city

OUR RESEARCH

-Charging stations are not growing with the same rate as Evs:

- No of vehicle in Mumbai city :38293
- No of charging station 22

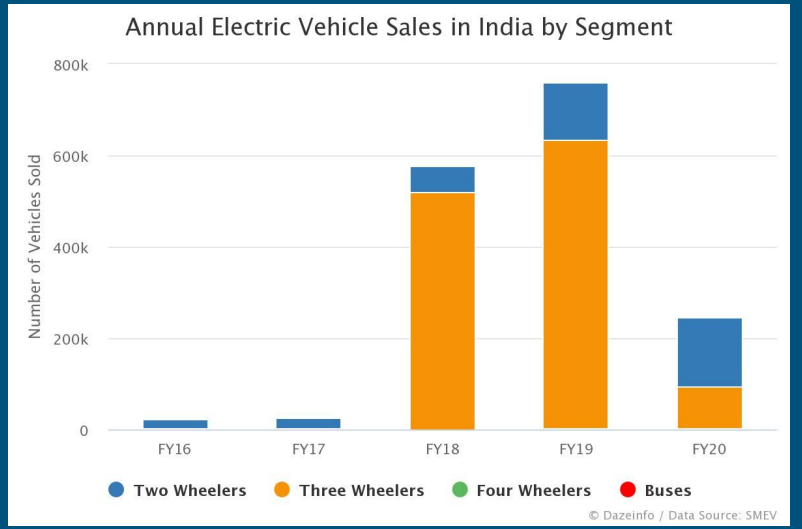
- Ev takes more time to charge:

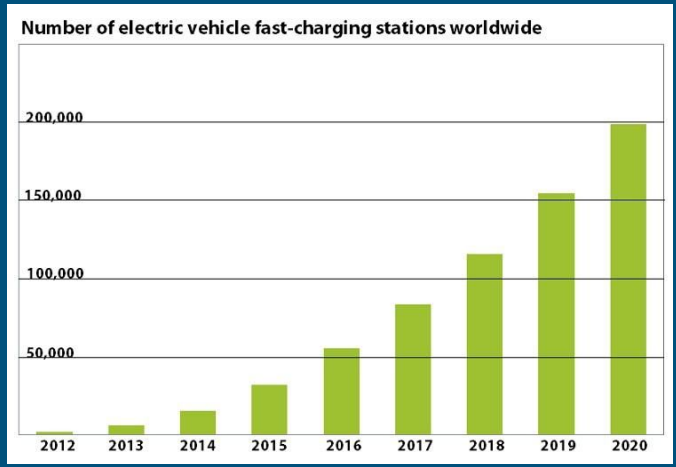
- Average Time taken : 6-7 hours with slow charger

1-2 hour with fast charger

-Infrastructure Need : 300 - 500 sq ft for 2 -3 cars

Above Statics dragged us to think about Space which will be outdoor , convenient and does not occupy road space





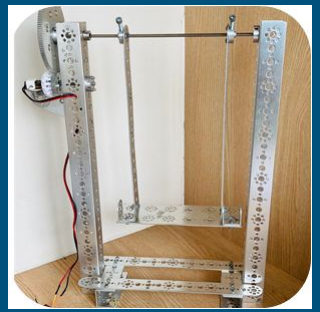
OUR SOLUTION

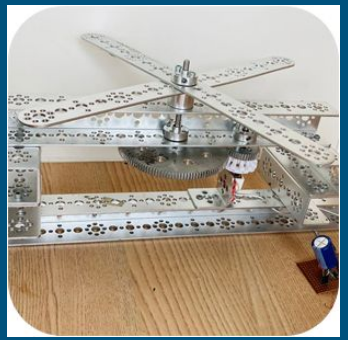
Our solution “ Smart eco park” is : -

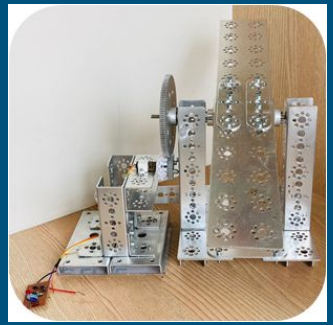
Mechanical Modification in park equipment

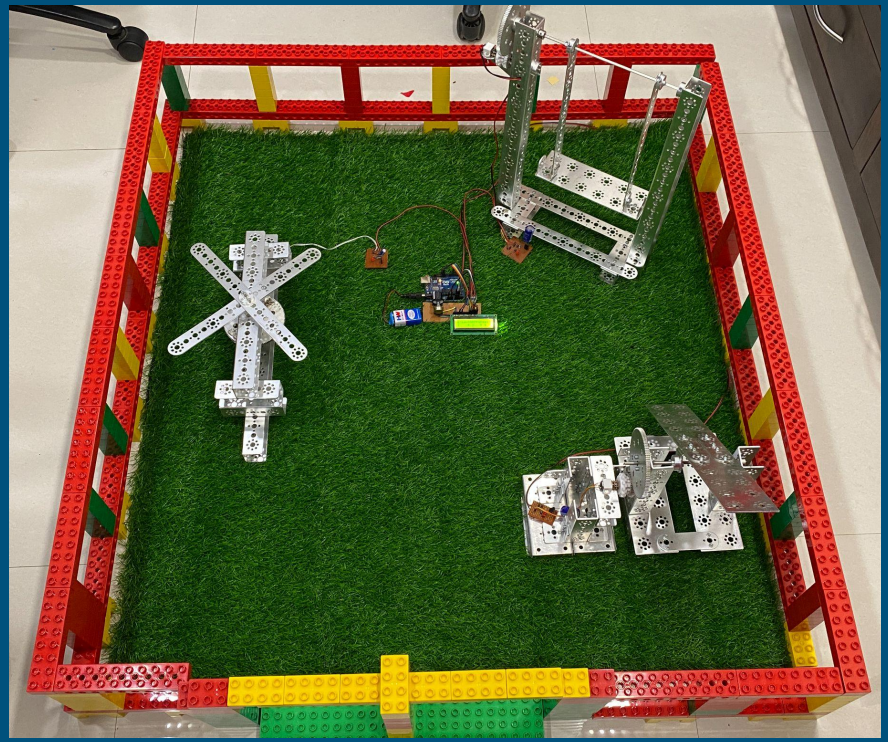
Harness energy from moving equipment

Installing Charging point in park

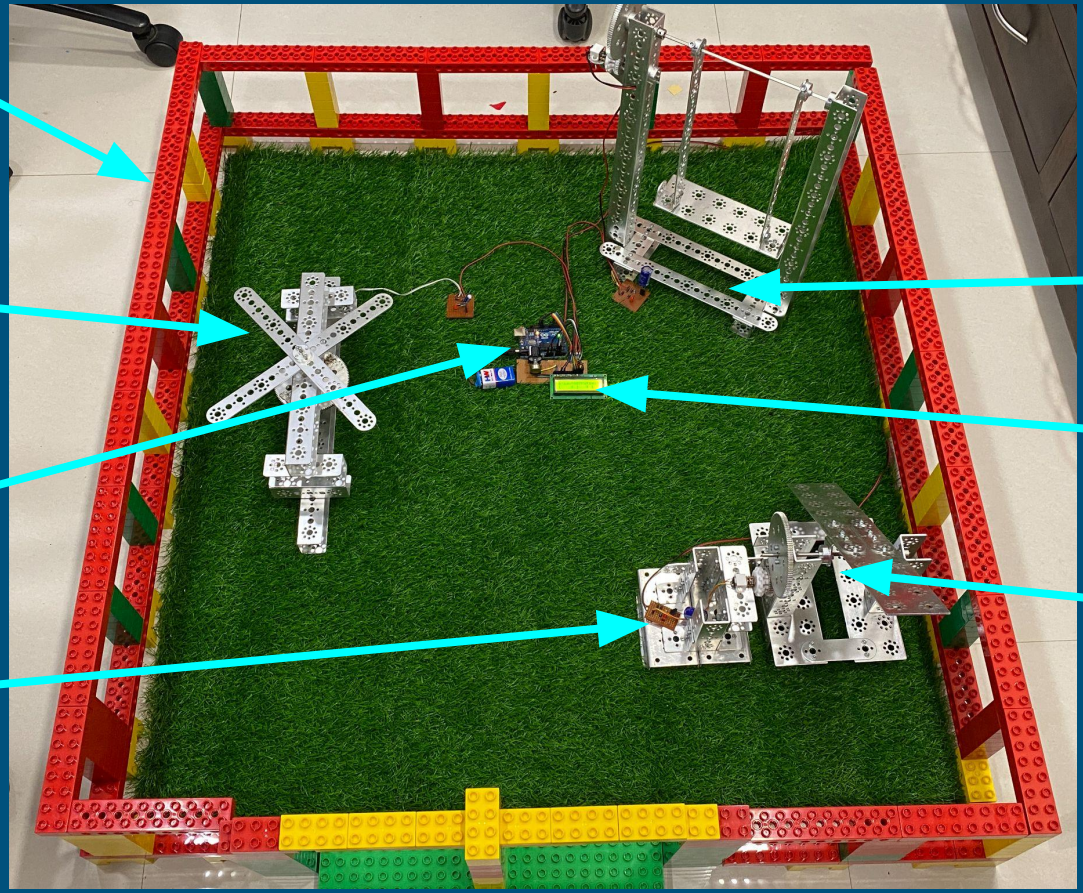








PROTOTYPE MODEL OF OUR SOLUTION



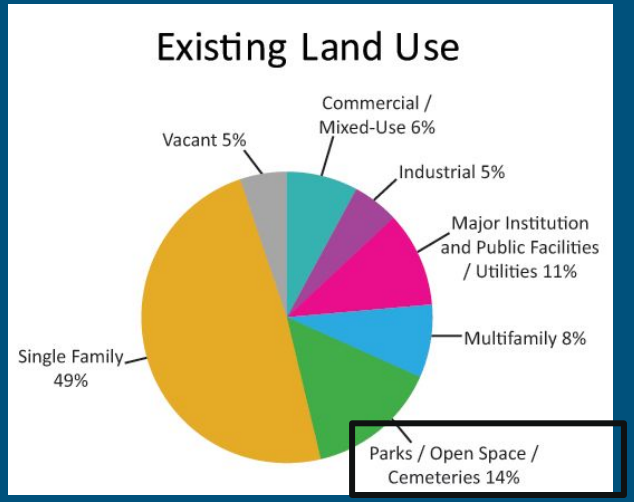
STATISTICS BEHIND PARK

SURE PLACE:
Every city has to always allocate certain percentage of the land for parks and playground as per the city infrastructure norms.

PRE BUILT INFRASTRUCTURE:
Infrastructure of parks is good for accessible charging point for small scale vehicles.
Inside of park will generate electricity whereas outside will distribute electricity.

EQUIPPED WITH ELEMENTS :
All park elements performs certain motion when they are in use can be converted into energy generation.

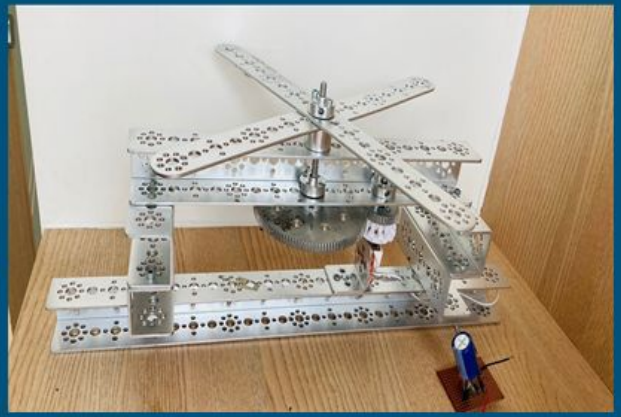
OUTDOOR SPACE :
Parks are common spaces where citizens come to relax/ rewind/ for recreation .This can be used to provide convenient, time-bound access to charge EVs.

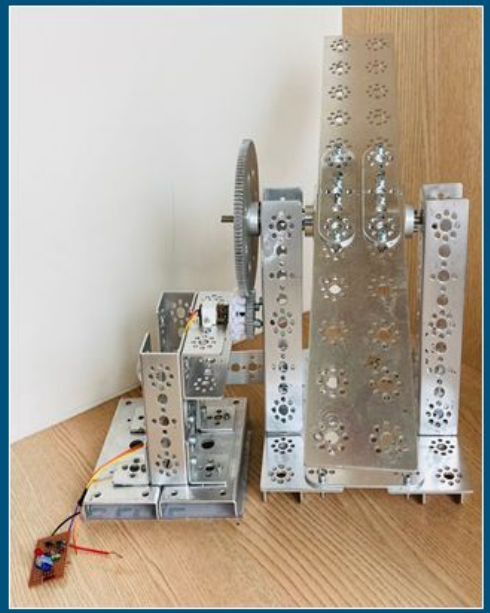


AVERAGE PLAYGROUND ELEMENTS

MERRY GO ROUND

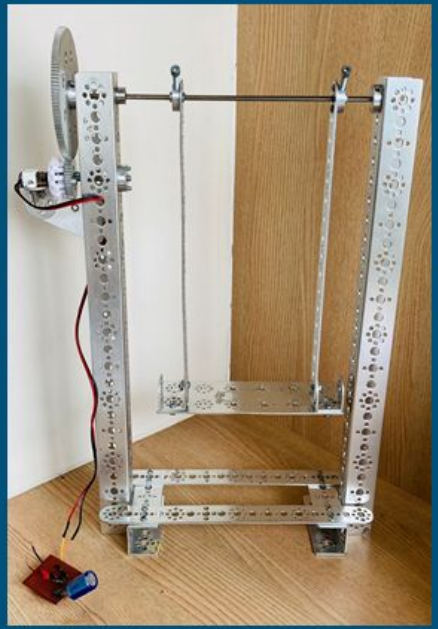
converts circular motion to energy





SEE SAW

Converts up and down motion into energy



SWING

Converts Back forth motion to energy

MECHANICAL ASSEMBLY

- Mechanical modeling of the elements is done by Tetrix parts.

-Tetrix pats are attached to hold the shape of different elements with the help of screws and nuts.

-Moving part of the elements are attached with 120tooth gear which again meshed with 40tooth gear

-Gear assembly is then attached with generator motor .

-Mechanical modification is done from the outer side of the elements by considering the kid's safety while playing

ELECTRONICS COMPONENTS

ARDUINO UNO
controller for the system

DIODE
Allows current to flow
in one direction

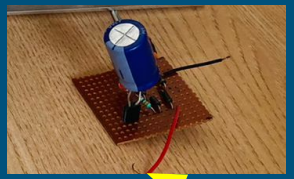
CAPACITOR
Stores energy

RECTIFER CIRCUIT

LED
Used as indicator

LCD : Display voltage

WORKING OF OUR MODEL



Attachment of gear to motor

Energy generation by motor

Generated power is passed by rectifier circuit

Gear assembly – Gear meshing

Devices

Motion transferred to gear assembly With moving part

Motion from different elements

PROTOTYPE RESULT

-Based on prototype model , every elements has generated :

ELEMENTS	VOLTAGE	CURRENT
SEE SAW	2V	10mA
SWING	2.5 V	7.5mA
MERRY GO ROUND	5V	10mA

Total power generated : 9.5v ,10mA ,
: 95 mWatt

-Total power generated by prototype elements is transferred to charge the smart watch battery .
Battery content : 210 Milliampere Hour(mAh)

-Average time required to charge smart watch battery : 1 hour

REAL IMPLEMENTATION OF PROTOTYPE

On an average every park has 3 swing ,1 merry go round and 1 see saw.

If calculate the energy generated by this combination of all elements we will land up to :

ELEMENTS	AVERAGE COUNT	VOLTAGE	CURRENT	TOTAL VOLTAGE	TOTAL CURRENT
SEE SAW	1	2V	10mA	2V	10mA
SWING	3	2.5 V	7.5mA	7.5V	22.5mA
MERRY GO ROUND	1	5V	10mA	5V	10mA

Total power generated : 14.5v ,22.5mA ,
: 326.25 mWatt

ACTUAL IMPLEMENTATION

- Real life implementation of Smart Eco Park with metallic structure will :

Generate more Torque + Increase Rotation of motor = More power generation

- In actual implementation of every element AC generator will fit .Ac generator produces 230vAC which can be transferred to any devices

- Parks can also use trees , walls , lamp -posts and other elements to install renewable energy sources

THANK YOU