

BEVISONNEERS

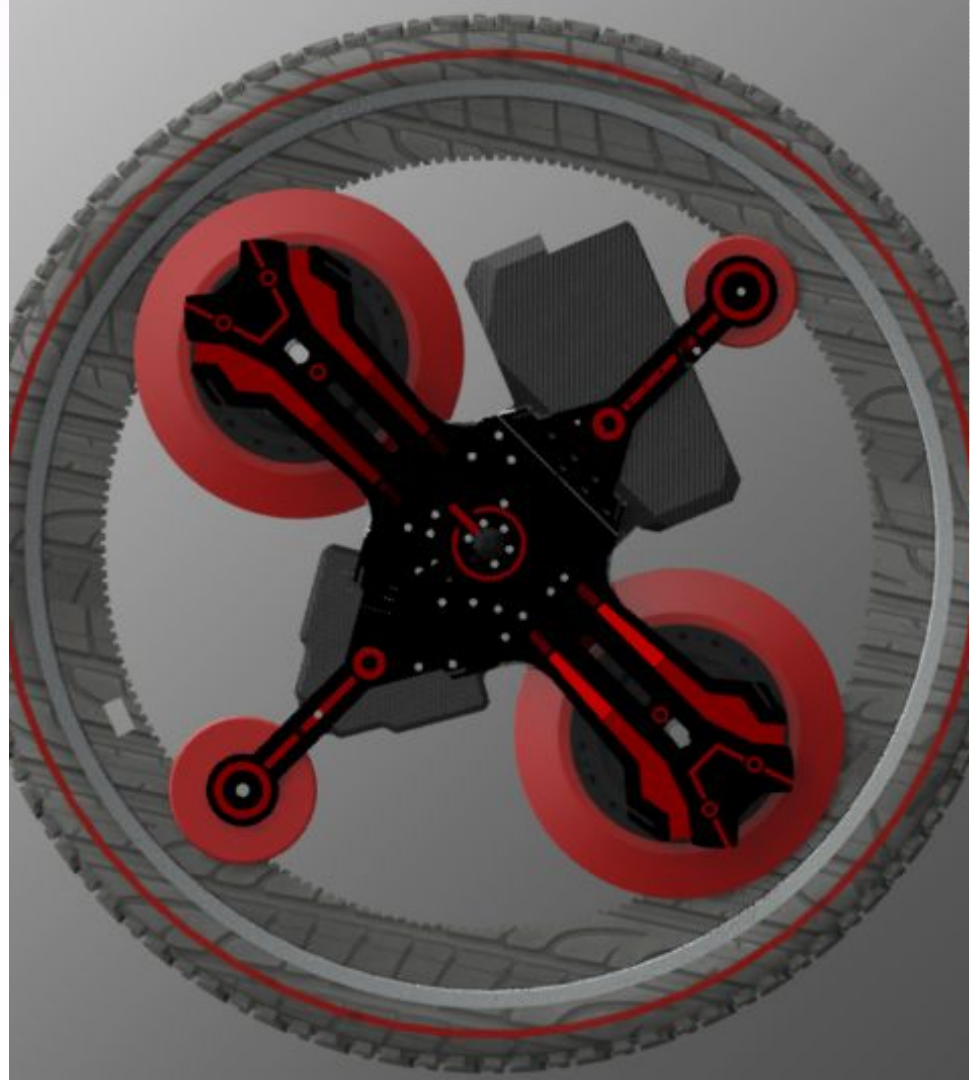
THE MERCEDES-BENZ FELLOWSHIP

Planet-positive Project Portfolio
Enerdrais ⚡

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Vision Statement

Our Vision is to transform fitness activities, such as those performed in gyms and public bicycle systems, into hubs of sustainable energy generation by capturing the mechanical energy currently wasted in everyday workouts, converting human effort into valuable electrical power to help the environment while keeping our privileged lifestyles.



Design Plan

My project addresses challenges within **Affordable and Clean Energy**, focusing on **Harnessing wasted human energy generated from fitness activities**. It leverages **Human Well-being** (such as exercising on public bike systems or in gyms), **Science and Technology Tools** (like AI, IoT, mechatronic or robotics), and **Sustainable Cities and Communities** (targeting urban residents aged 18-44 who commute daily, engage in fitness activities, or utilize clean transportation methods like biking).



Prototyping Envisioning

What I learned from my project is that it doesn't have to be only about bicycle transportation systems, our project has evolved to focus on harnessing wasted human mechanical energy on gyms as well. We're refining our pitch and continuing electrical trials while leveraging existing mechanical simulations and 3D prints where possible.

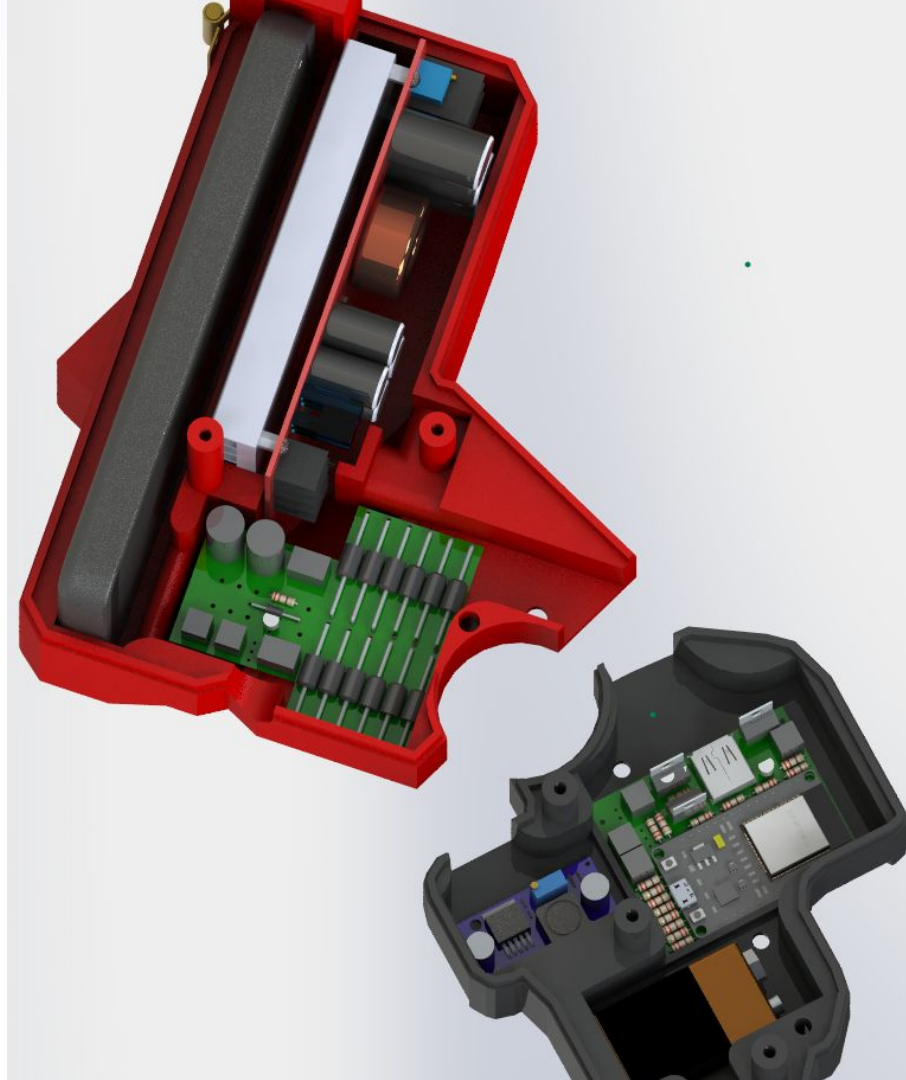
Value Proposition: After finishing electrical trials and knowing the electrical bill gyms pay, we can add tangible value to the prototype and provide the ROI (Return Of Investment) to potential buyers. Also learned that there's no current service or product that tackles this issue.



Prototyping Chronicles ⚡

- **What we hoped to achieve.**
 - In this part the collection and conditioning system for electrical energy was created.
- **Why didn't the attempt work?**
 - It's function was to collect, convert and maintain the level of voltage and current from the electrical energy generator. It worked, but the main energy generation feature can be improved.
- **Key lessons learned from each failure.**
 - What we learned from this failure was not to try to cover 10 solutions in one go, but to focus on one and move forward from there.

Refinement Process: The failure of this was to try to achieve controlling 2 type of energy output by an Android application, in the next iteration, will first focus only on 5VF/1A energy generation.



Prototyping Chronicles

- **What we hoped to achieve.**
 - In this part we tried to calculate and test if mechanical structure could support a maximum weight of 120 kg (264.5 pounds), considering impact situations.
- **Why didn't the attempt work?**
 - Because we simulated the mechanical design with CAD like SolidWorks and COMSOL Multiphysics, it worked, this will remain.
- **Key lessons learned from each failure.**
 - The mechanical design can be very well made with software but the manufacture has to be tested with cardboard or physical models first.

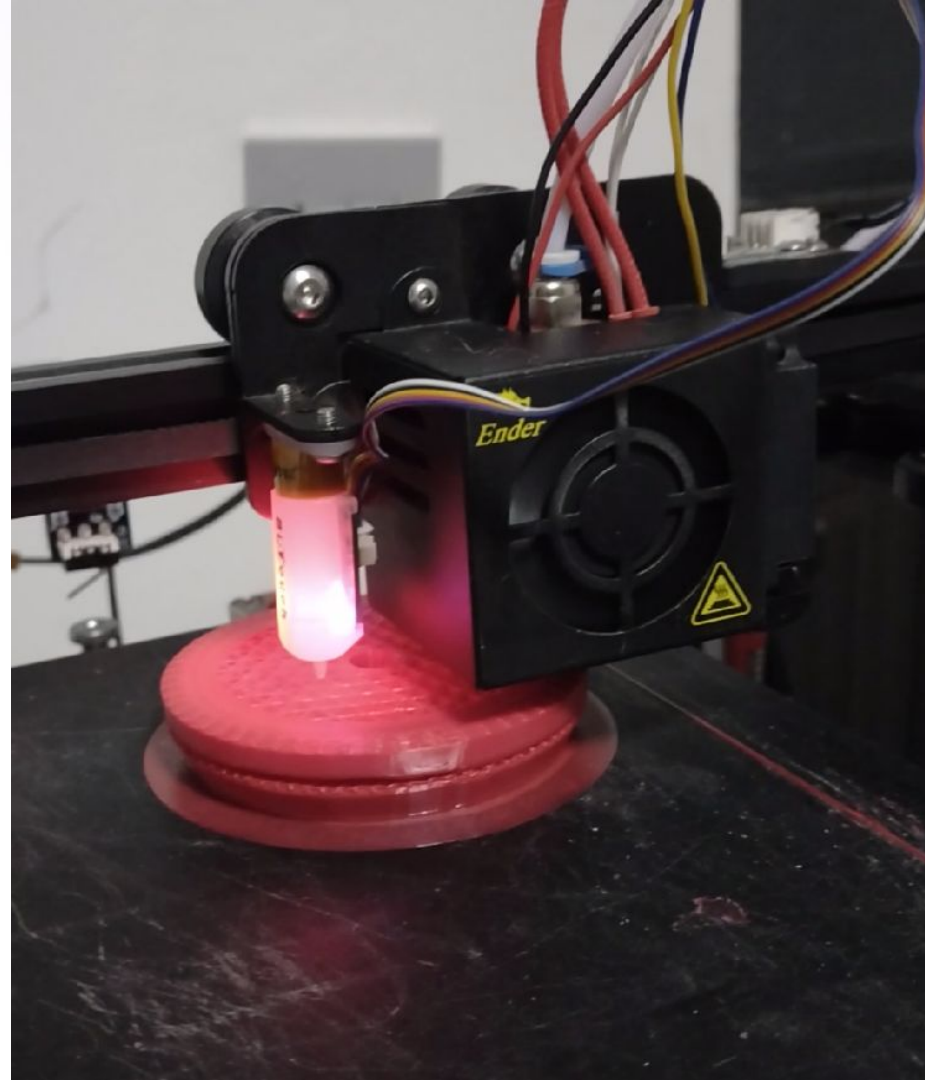
Learnings: The design plan was great, the programs used helped us to choose the right material, although when it came to manufacturing, we should have first built a first sketch in cardboard or metal and modified the CAD measurements.

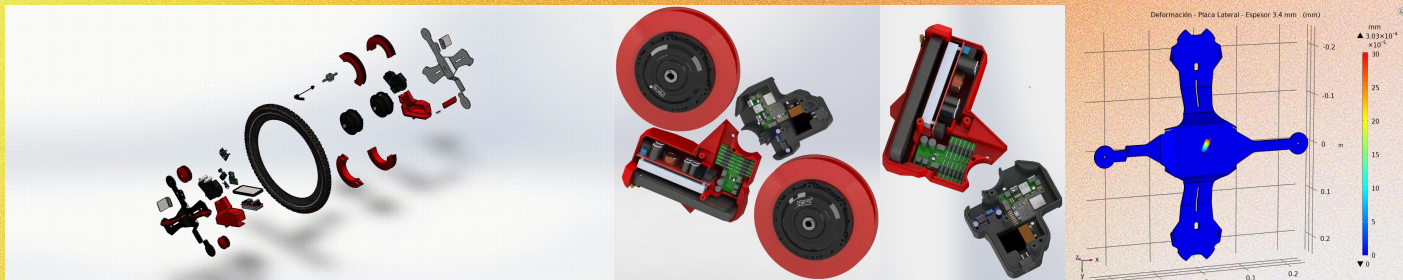


Prototyping Chronicles

- **What we hoped to achieve.**
 - This was a very fulfilling but difficult part of the development because we had to learn to use a 3D printer in record time.
- **Why didn't the attempt work?**
 - It didn't work at first because we broke down, tested, bought materials, add ons, and watched tutorials in a very persistent way until we succeeded, but this wasn't achieved in a first try.
- **Key lessons learned from each failure.**
 - To 3D print (depending on the kind of printer) sometimes is necessary to buy some add ons like the automatic bed leveling sensor like the B1Touch.

Closing Reflection: Persistence and research is key to create something new.





Minimum Viable Solution

Weaving all the findings together

<https://dicer0.com/GitHub repository>

In summary

I got to prototype a project that **addresses challenges within affordable and clean energy** and focuses on **harnessing wasted human energy generated from fitness activities** by leveraging **human Well-being** (encouraging regular exercise on public bike systems and in gyms), **science and technology Tools** (AI, IoT, and mechatronics to optimize energy capture and storage), and **Sustainable Cities and Communities** (targeting urban residents aged 18-44 who commute daily, engage in fitness activities, or utilize clean transportation methods like biking) to test solutions.

The prototyping approach involved **conducting initial electrical trials, designing and 3D printing key components, and building a functional prototype to test energy generation and storage capabilities**. While the initial prototype demonstrated the concept, we encountered challenges in optimizing energy efficiency and durability.

I learned from my coach and users that **prioritizing user experience and focusing on scalability** are crucial for a successful solution.