



Group C 1.1
Human Powered Lights

Our Client

ENVIRONMENTALIST

Our client is an environmentalist who is looking for a sustainable way to power grow lights for plants

INNOVATOR

Did not want to use solar panels or other traditional methods due to high environmental cost

NEW TO GARDENING

System is suitable for beginner gardeners

MOBILITY LIMITED

Client struggles with mobility issues



What is Our Client Looking for ?

01

**INDOOR
GROWING**

02

**LED
LIGHTS**

03

**SUSTAINABLE
ENERGY**

04

ACCESSIBILITY

What Currently Exits?



Makeup Mirror Pedal Generator

[2]



TEC1-12730 Thermoelectric Cooler

[3]



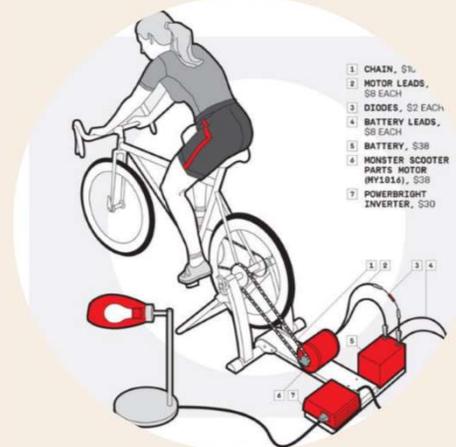
Garosa Hand Crank Generator

[4]



K-Tor power Box

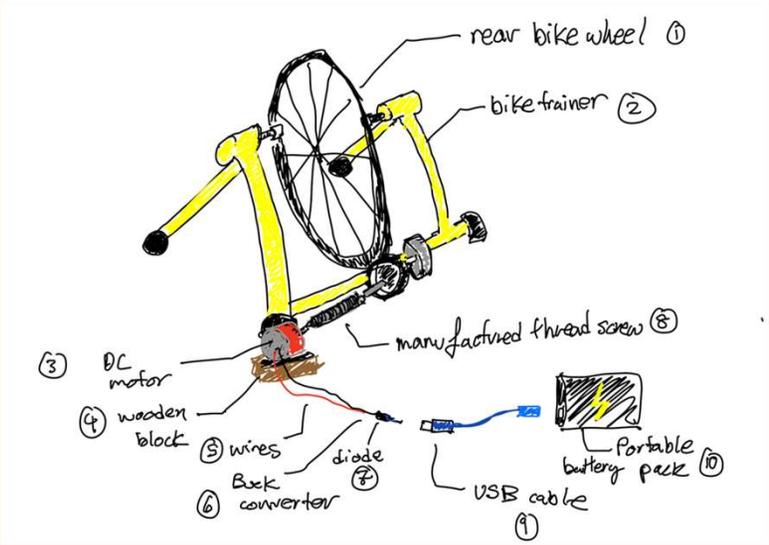
[5]



DIY Bike system

[6]

Our Final Concept



[9]



[7]



[8]



[10]

How did we Decide?



[11]

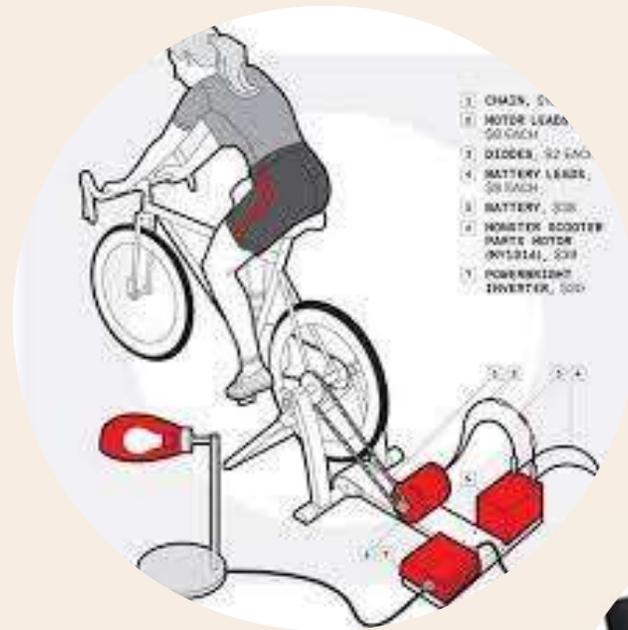
TARGET SPECIFICATIONS

- Footprint (ft²)
- Light (lumens)
- Speed (rpm)
- Time-Lights (Hr)
- Time-Power (min)
- Cost (CAD)
- Weight (kg)

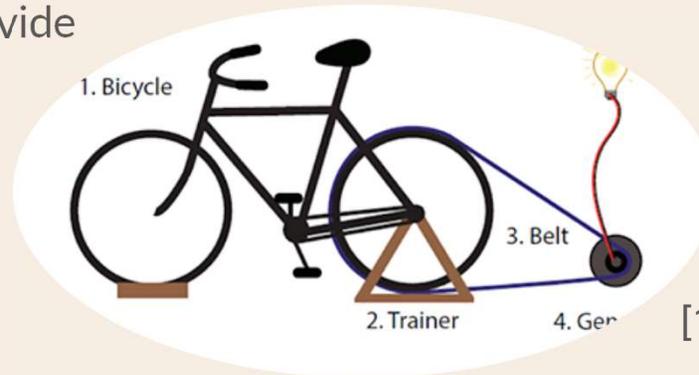
Pedal system	Footprint	Light	Speed	Time (lights)	Time (power)	Cost	Weight	TOTAL
Unicycle	5	3	1	2	1	3	5	20
Sewing Pedal	5	3	2	2	2	3	5	22
Recumbent cycle	2	4	3	3	4	2	2	20
Stationary bike	2	4	4	3	4	4	2	23

Is it Feasible?

- Similar products on the market
- Sourced materials within budget
- Sample calculations provide theoretical evidence



[6]

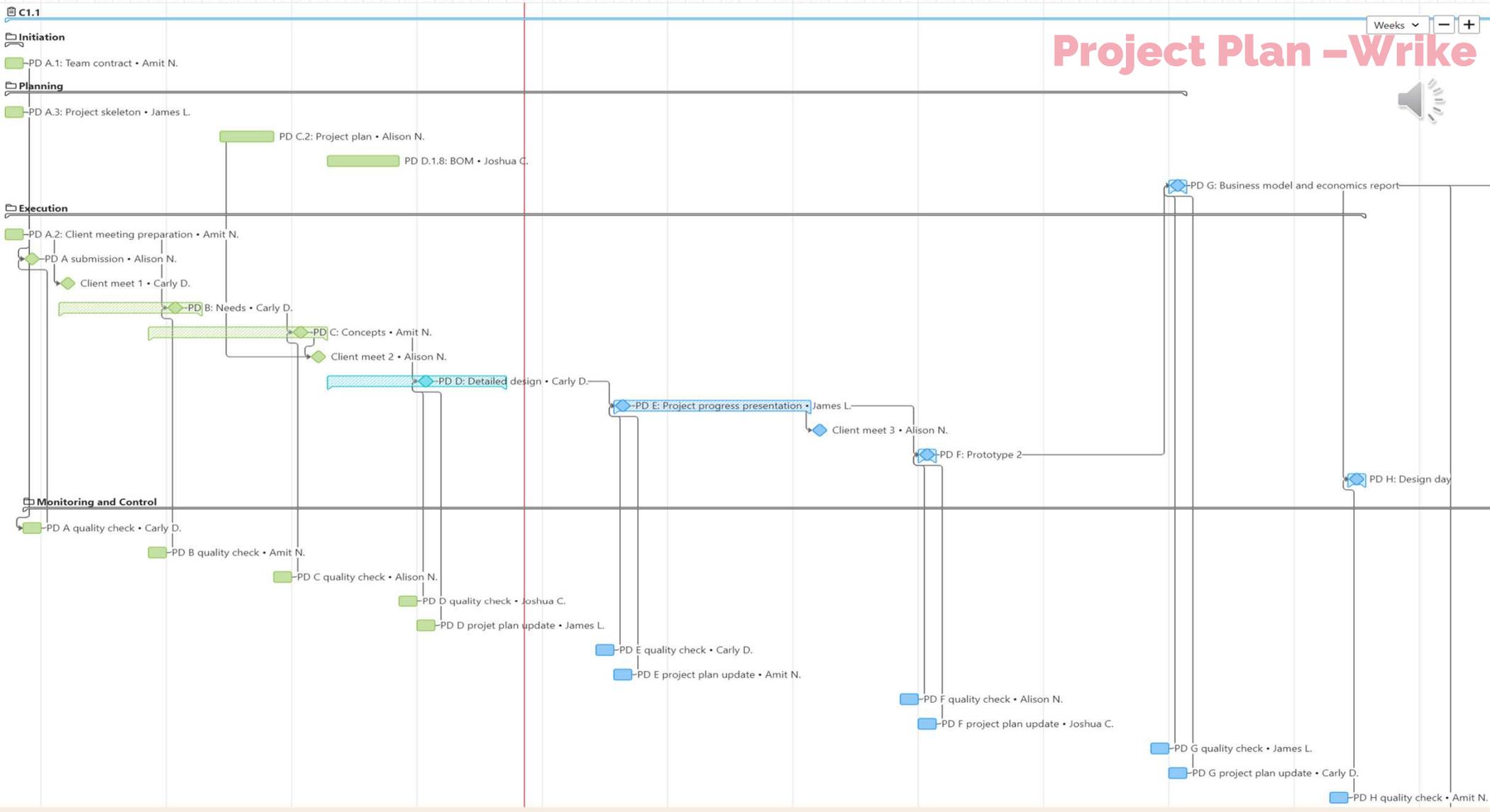


[12]



[13]

W 2 16-22 Jan W 3 23-29 Jan W 4 30 Jan - 5 Feb W 5 6-12 Feb W 6 13-19 Feb W 7 20-26 Feb W 8 27 Feb - 5 Mar W 9 6-12 Mar W 10 13-19 Mar W 11 20-26 Mar W 12 27 Mar - 2 Apr W 13 3-9 Apr

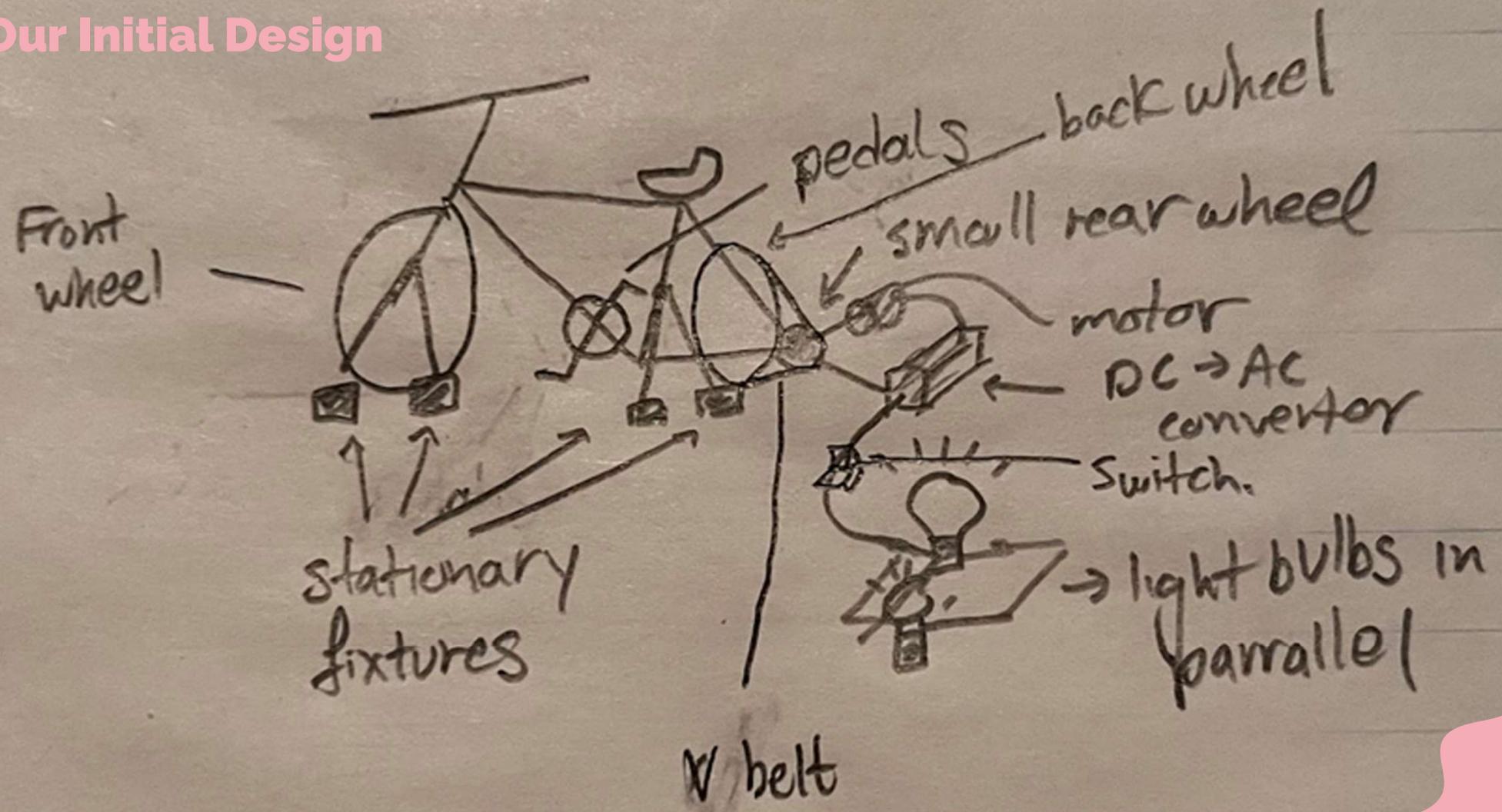


Project Plan - Wrike

Weeks - +



Our Initial Design



What did the client think?

Will the lights be able to turn on when I'm not biking?

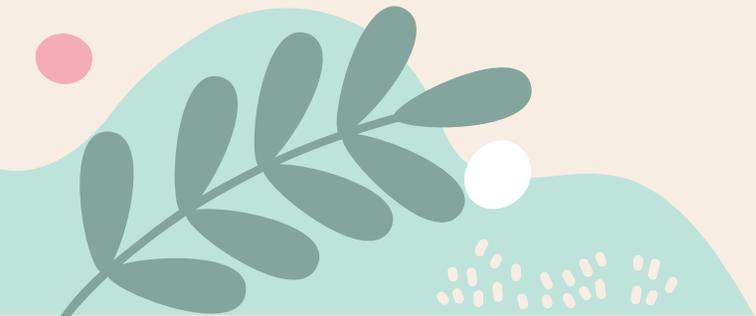


Power can be stored in a battery or power bank

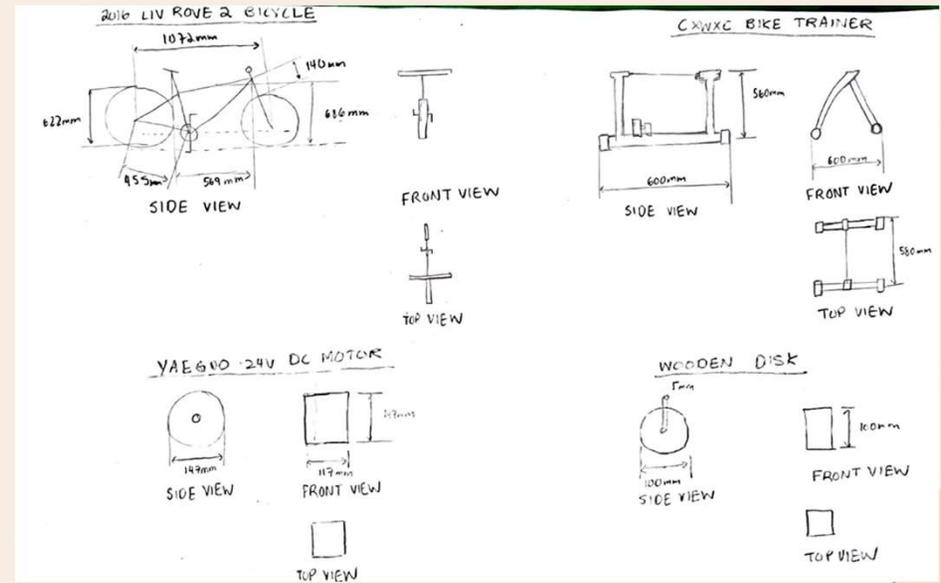
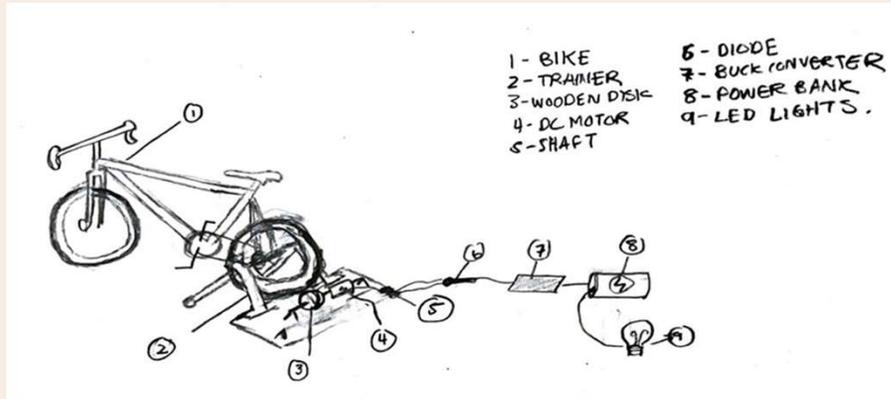
I can't remove the rear wheel

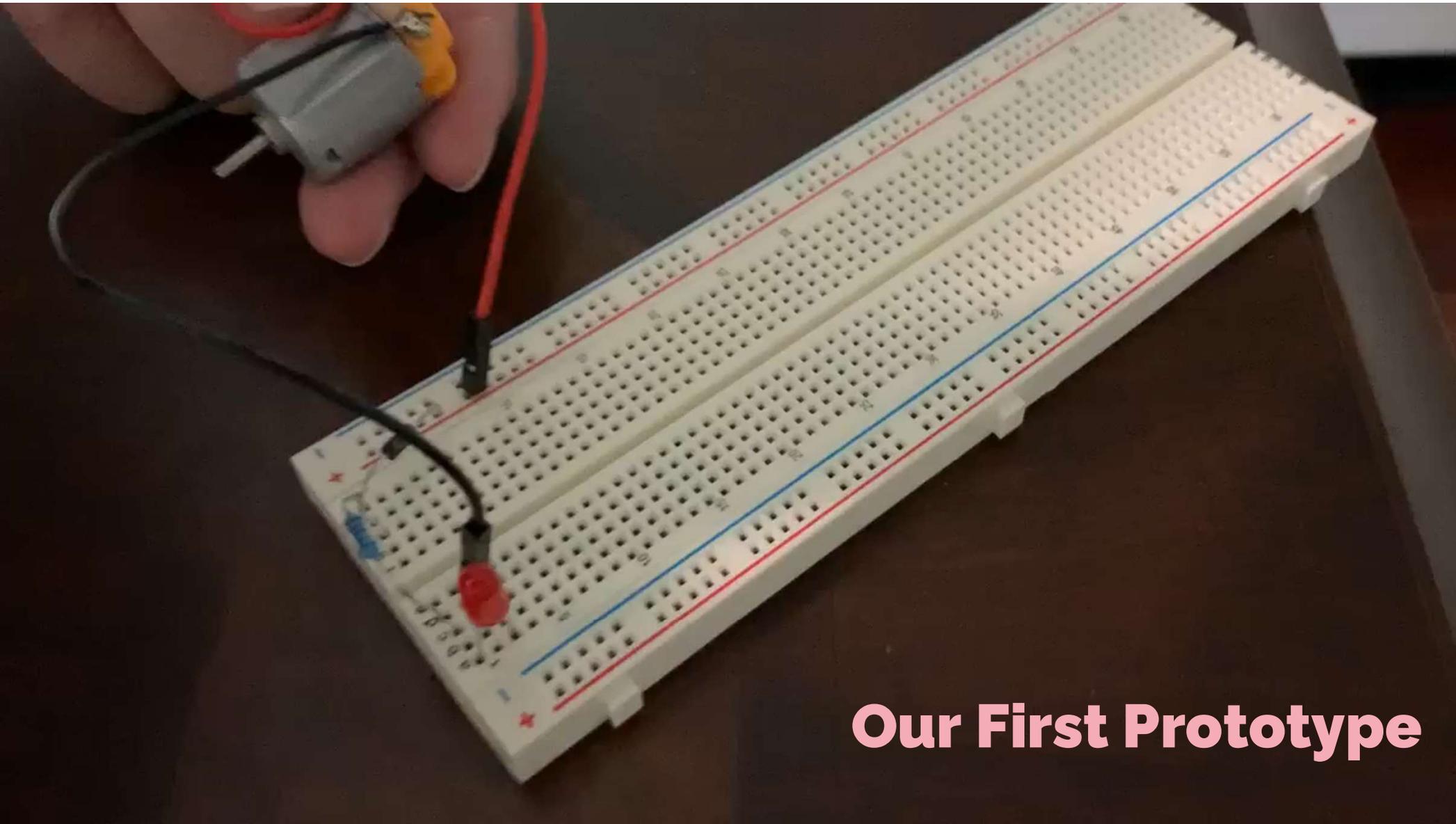


We needed to find an alternative method of driving a motor.



Our Second Design





Our First Prototype

What did the client think of the second design?

Change from Belt Drive to Wooden Disk

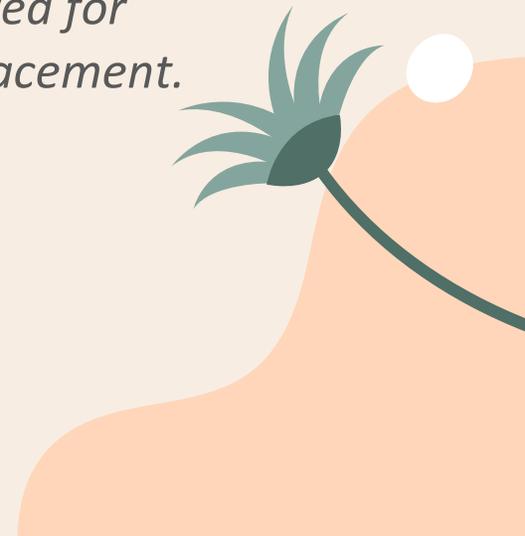


This allows for easier assembly and disassembly

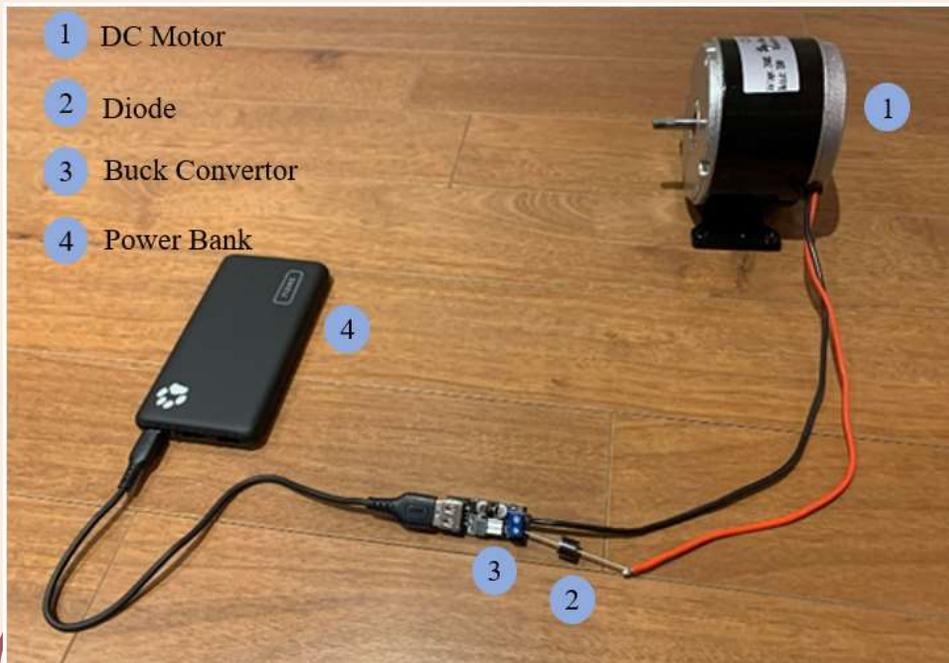
The grow light



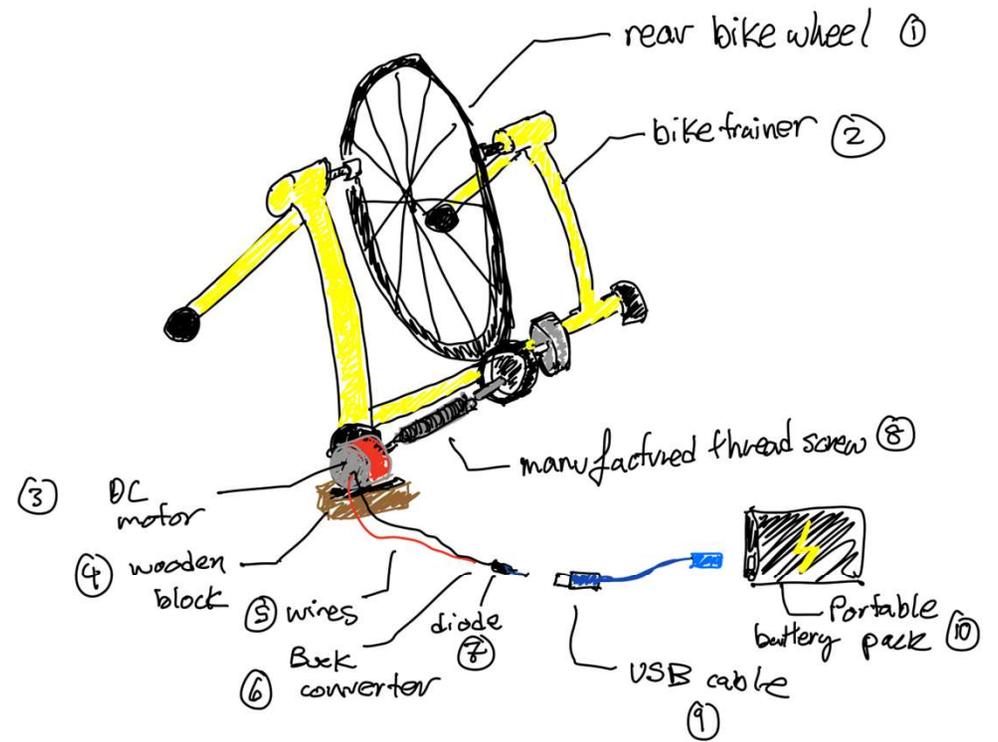
Clamps allowed for adaptable placement.



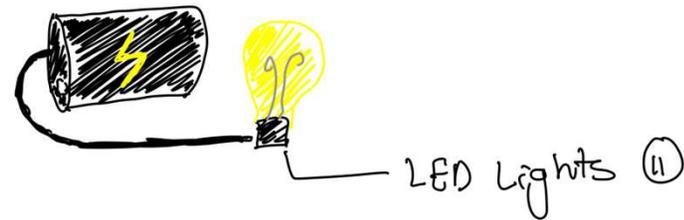
Prototype - Electromechanical



Our Final Design

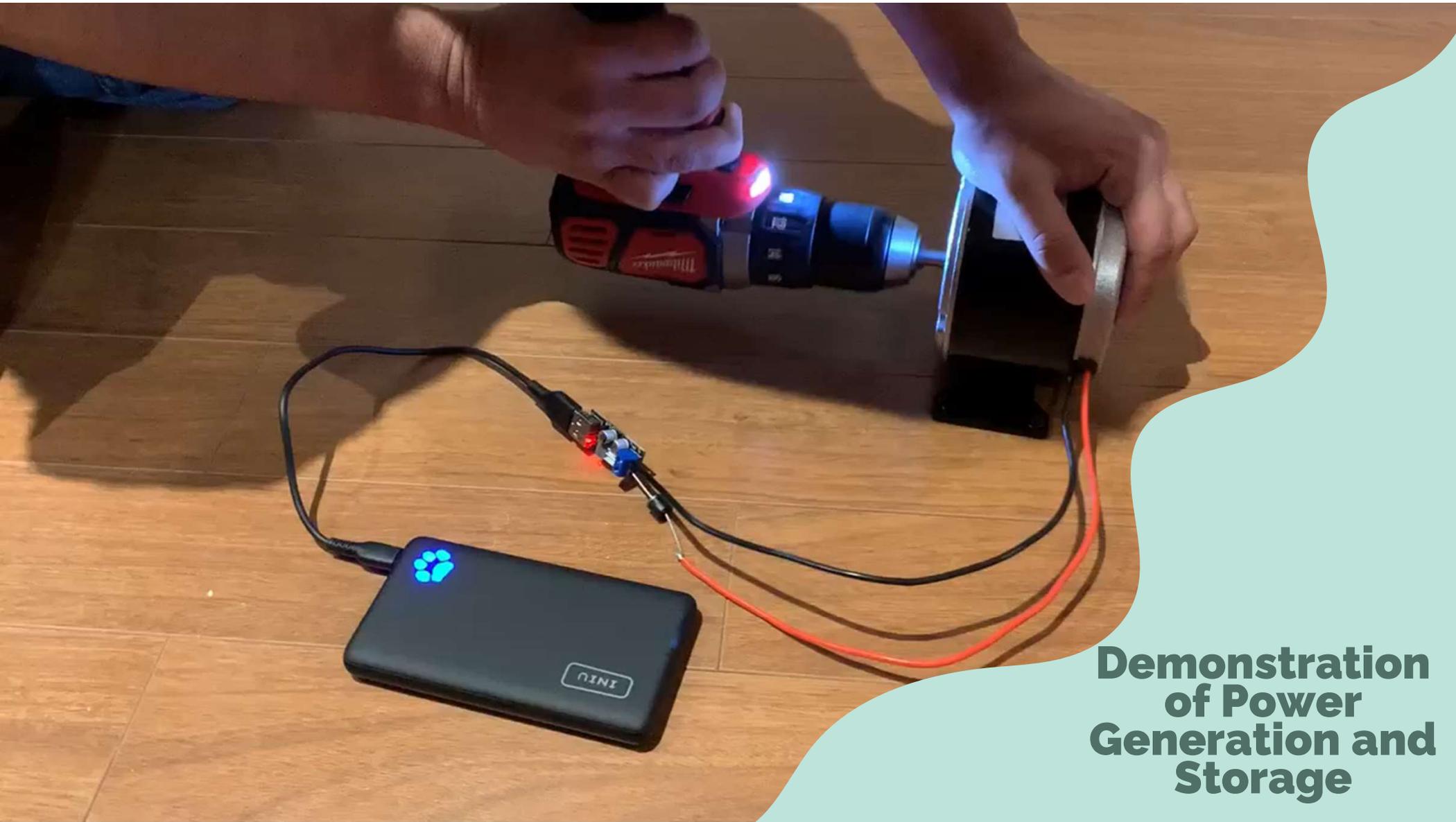


Electrical system



Prototype 3 – Human Drivetrain

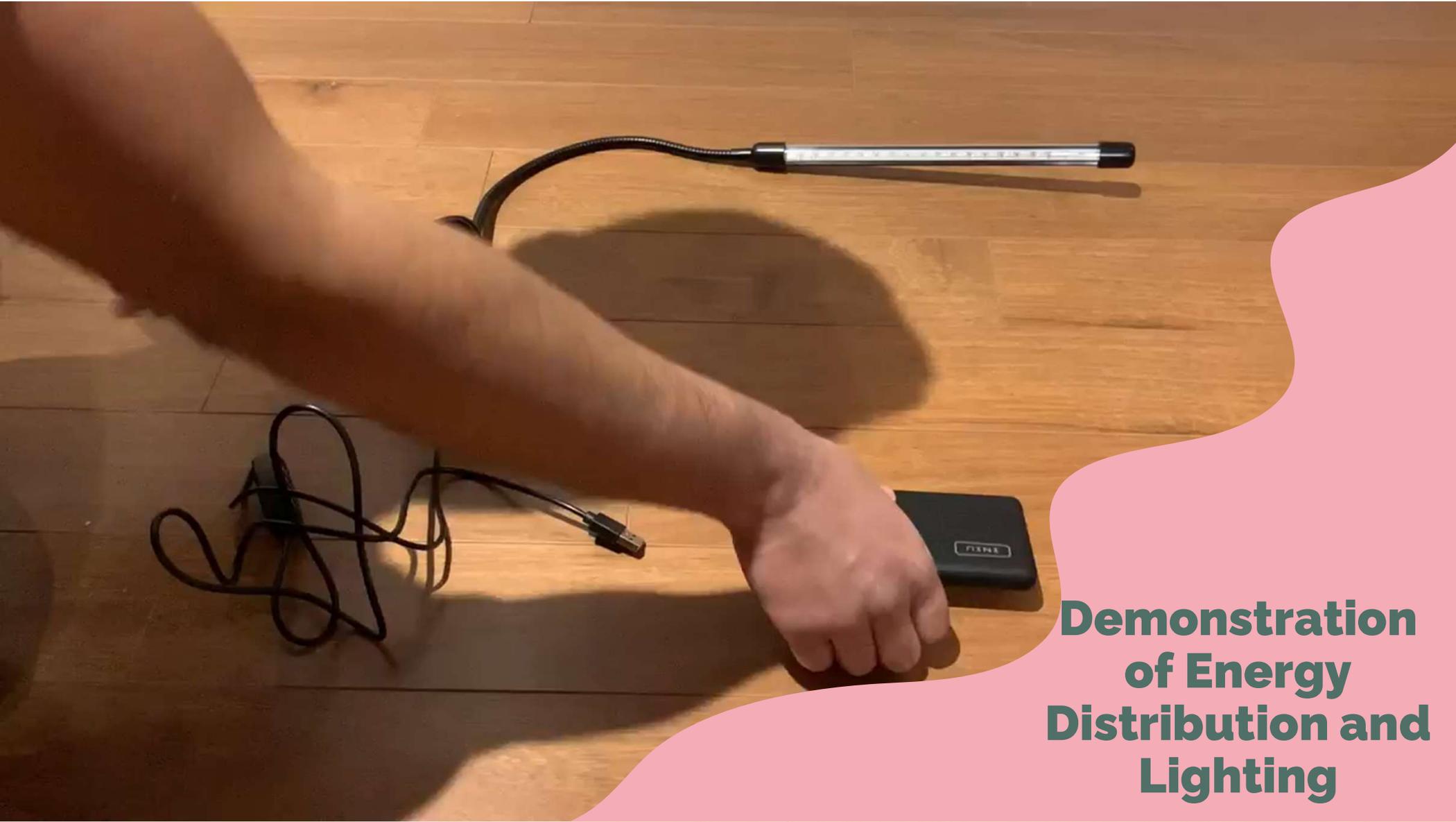




**Demonstration
of Power
Generation and
Storage**

Demonstration of Human Drivetrain





**Demonstration
of Energy
Distribution and
Lighting**

<p>Key Partners</p> <ul style="list-style-type: none"> • Courier (perform delivery of product): Canada Post <ul style="list-style-type: none"> ◦ Canadian company • Electronic manufacturers (deliver electronic components): Alibaba <ul style="list-style-type: none"> ◦ Best for wholesale purchases • Steel suppliers (deliver steel): Aesteiron Steels LLP <ul style="list-style-type: none"> ◦ Inexpensive 	<p>Key Activities</p> <ul style="list-style-type: none"> • Production • Distribution channels: via Canada Post • Customer relations: limited interaction except for advertising • Revenue streams: sale of the product 	<p>Value Propositions</p> <p>Values: Something that will work with an existing bike, provide an outlet for exercise with benefits aside from the exercise itself, good for the environment</p> <p>Solutions: Providing customer an alternative source of green energy</p> <p>Needs: Eco-friendly, human-powered, accessible for bike users, versatile</p>	<p>Customer Relationships</p> <ul style="list-style-type: none"> • Customer service feature (limited): for assistance with using the product • Sales service: especially for customers who wish to purchase in bulk 	<p>Customer Segments</p> <ul style="list-style-type: none"> • A diversified market <ul style="list-style-type: none"> ◦ Fitness enthusiasts ◦ Eco-friendly enthusiasts ◦ Travellers ◦ Preppers
  	<p>Key Resources</p> <ul style="list-style-type: none"> • Physical resources to construct the product: steel, electronic components, batteries • Human resources: for manufacturing • Financial resources: to fund the business 		<p>Channels</p> <ul style="list-style-type: none"> • Online: website, email, social media • Peak customer service hours at times where customers might be using the product  	

Economics

\$400

UNIT PRICE

\$50 lower than our competitors

18000

UNITS SOLD

420 units must be sold every month in order to break even

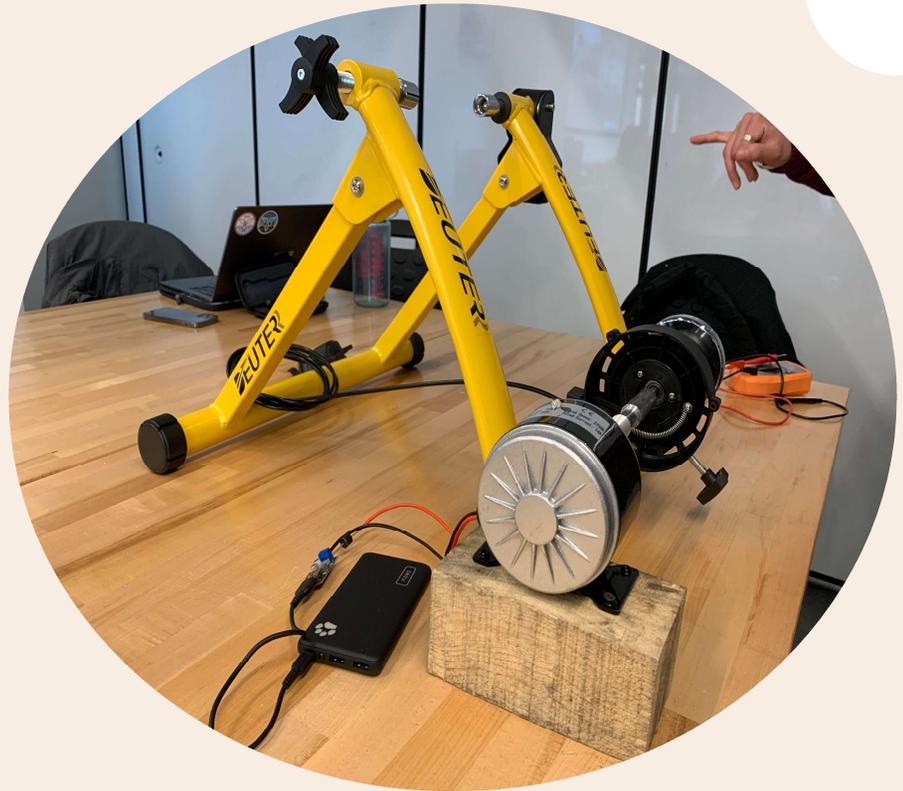
1,261,774.68

TOTAL PROFIT

Over 3 years

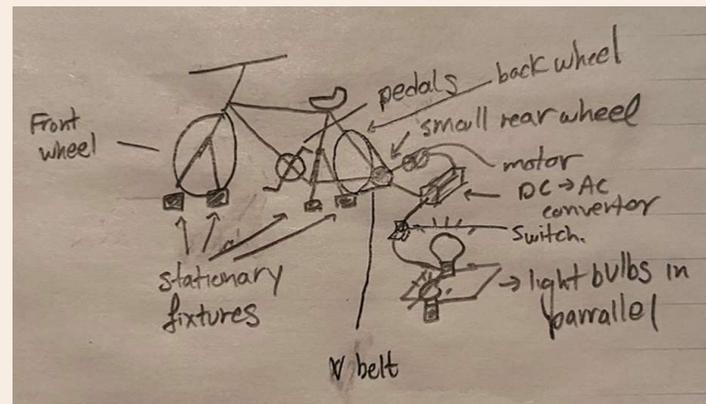
Next Steps

- Reduce vibrations from the coupling shaft to the motor
- Perform an efficiency analysis



Conclusion

- Original concept iterated, tested and modified over 3 prototypes
- Client feedback was considered at all stages, and she was happy with the final
- Business model and economics report show that this is feasible transform our ideas to a start up



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