



Ecovolt Battery Recycling

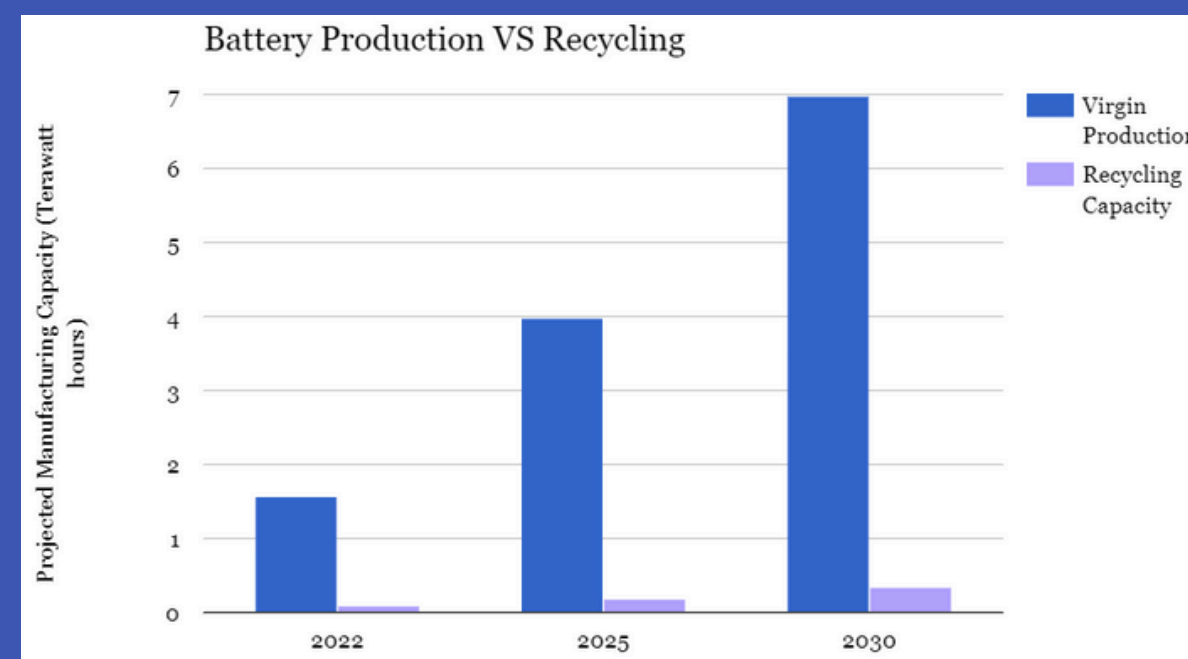
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Acknowledgements:

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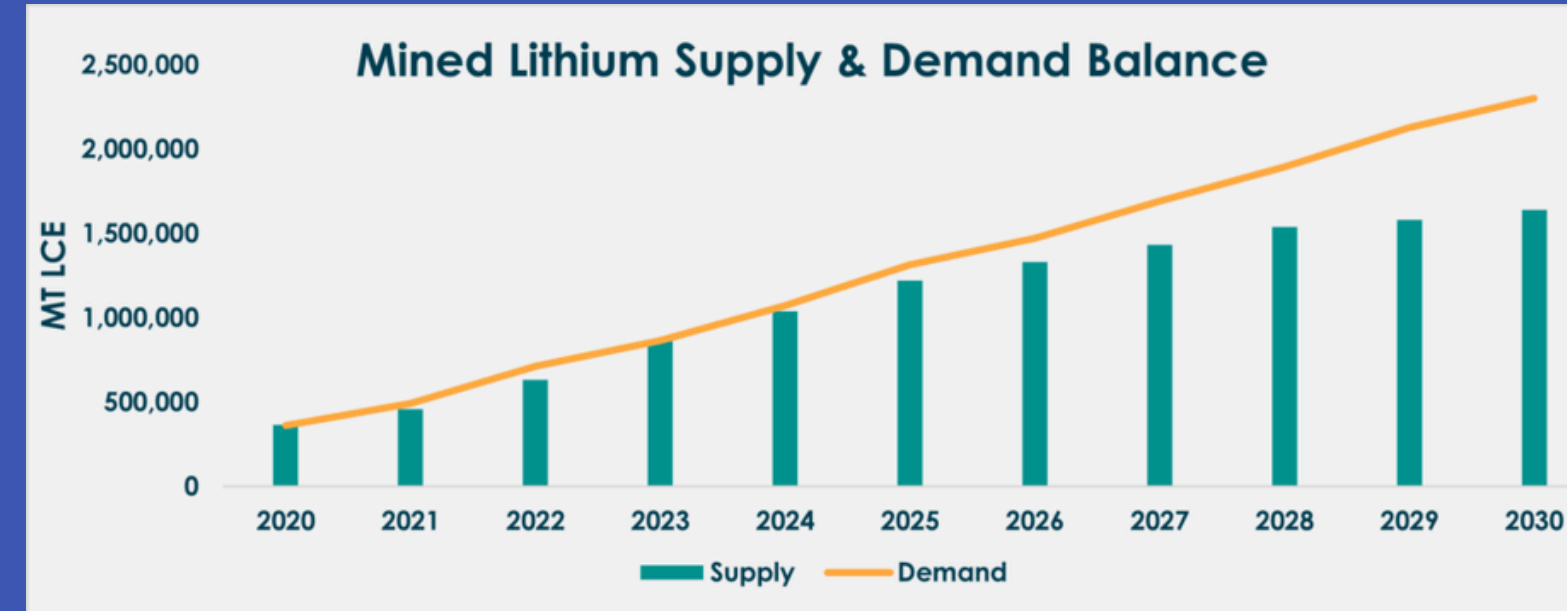
The Problem:

- Pennsylvanians lack easy access to battery and electronic recycling or they don't understand how to recycle.
- Globally, only about 5% of lithium batteries are recycled, leading to a projected 8 million tons of waste.
- Rechargeable lithium-ion batteries contain valuable metals that can be hazardous if improperly disposed of.
- Mining the virgin materials used in lithium-ion batteries is energy, water, and resource intensive.



Benefits of Battery Recycling:

- Over 95% of the materials in lithium-ion batteries can be recycled.
- Reduced reliance on foreign countries for battery materials - Energy Independence.
- More sustainable
- Battery cost reductions
- Demand for lithium is growing faster than the available supply (see graph), recycling could bridge the gap.

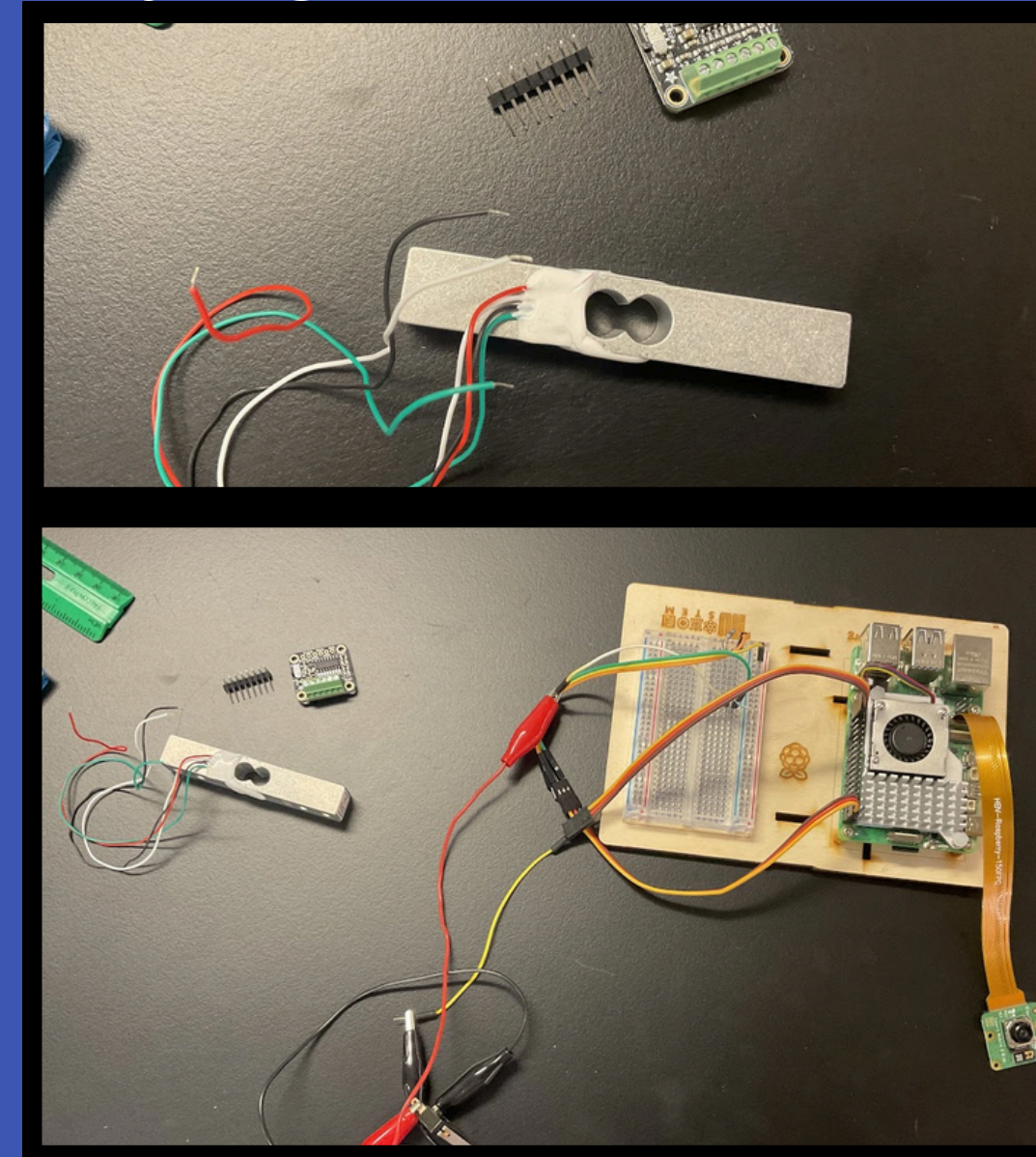


[Resource Link](#)

Solution:

Create an easy to access system that:

- Provides education on recycling
- Catches people's eyes
- Financially incentivizes battery recycling



Raspberry Pi 5 and Load Cell

Prototype Development:

1. Brainstormed ideas for the system
2. Decided to focus on an automated kiosk that would be easily accessible and could work with legislation that incentivizes recycling.
3. Submitted proposal for a battery recycling depository system to Senator Fetterman's office
4. Created rough sketches of the design.
5. Developed a graphical user interface (GUI) on a Raspberry Pi 5 that includes large buttons and easy-to-navigate menus that functions on a touch display.
6. Created a scale using a load cell and HX711 chipset to collect data on the total amount of materials collected that integrates into our GUI.
7. Programed a servo motor to effectively move batteries.
8. Constructed the kiosk using wood and metal.
9. Placed electronics inside the cabinet.
10. Decorated the kiosk with eye-catching neon LED lights.



Constructing the Kiosk

Universal Design

- Large, easy-to-read buttons on the kiosk's touchscreen.
- Easy to understand interface.
- Clear information on battery chemistries accepted and how to identify them.
- Clear instructions.
- Spoken directions
- Wheelchair accessible
- Future iterations could include a brail keypad and headphone jack for the visually impaired or hard of hearing.
- Can be used by anyone.

Art

When building our prototype, we wanted to create an eye-catching and unique visual theme.

- Eye catching neon LED lights outline the silhouette of the kiosk and create a battery-like shape.
- Recycled batteries also are incorporated into the design of the kiosk to showcase how the materials can be repurposed, while also adding unique design elements.
- The user interface includes high definition photographs.

Budget

- Total:
\$500.33



Finished Prototype

[Prototype Demonstration Video](#)

[Resources](#)

[EcoVolt YouTube](#)

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