

Utility and Style: A Cargo E-Bicycle for the Waste Reduction and Resource Awareness Program

Austen Thibault, at201@humboldt.edu

Student: Biology: Ecology & Biodiversity (Fall 2019)

Compost Operator at WRRAP

Jay Ryan, jmr1019@humboldt.edu

Student: Environmental Science and Management: Ecological Restoration (Spring 2019)

Bicycle Learning Center Director at WRRAP

Morgan King, morgan.king@humboldt.edu

Staff: Climate Action Analyst

The Waste Reduction and Resource Awareness Program (WRRAP) is a student-led program at Humboldt State University which embodies the university's culture of sustainability while providing numerous free services to students and employees. But we have a problem. WRRAP does not have a consistent way to transport its materials, causing a bottleneck effect on operations of every branch of WRRAP. For instance, Compost Squad has had to delay or even cancel compost pickups across campus due to the unavailability or failure of the current transportation borrowed from Facilities. The Zero Waste branch struggles to find suitable locations for clothing swap events due to the limitation of having to manually haul all clothing to and from our base of operations at the Warren House. Therefore, to gain sustainable transportation independence and increase the success of our mission, we submit the proposal to purchase a cargo electric bicycle for WRRAP. This e-bike would solve transportation issues, while also serving as a highly visible and attention-grabbing presence on campus, encouraging conversation and participation around sustainable practices. Further, this purchase synergizes with the recent absorption of the Bicycle Learning Center under WRRAP's umbrella. The Bicycle Learning Center would use this e-bike as an educational tool for students and could assist in its maintenance.

Project Description

We request the purchase of an electric motor-assisted cargo bicycle or tricycle to accomplish the tasks of the Waste Reduction and Resource Awareness Program. The use of cargo e-bikes for compost operations is a proven concept (see Appendix A). In fact, the Campus Recycling Program, prior to becoming WRRAP, conducted its collection of recycling, compost and other materials with the use of a utility bike (Need Statement and Appendix B). We currently use borrowed electric carts from Facilities Management, which has led to several problems (Need Statement). To make this switch would require few adjustments to operations and little to no additional resources.

The e-bikes, being smaller and supported by driver pedalling, represent some of the lowest energy costs possible for this level of operation. Additionally, we could easily track the number of miles the bike travels as well as its kilowatt-hour consumption for metrics to demonstrate energy savings.

We are excited to point out the great publicity potential of this vehicle. The bike itself and its activities on campus will be a spectacle, and we could easily include direct advertisement of WRRAP, HEIF, and HSU on the vehicle itself. Those in the bike compost industry find that the unique visibility of their operation drives their business by word-of-mouth (Appendix A). WRRAP would also feature the e-bike prominently on social media, as well as support any additional media coverage.

In our eyes, there are very few additional considerations for this idea beyond the simple purchase. The main consideration is where this vehicle will be stored and charged. A few charging stations exist on campus, and we currently use the ones at Facilities Maintenance.

Due to the relatively simple nature of this idea, we recommend and request a speedy timeline to ensure WRRAP services do not become further hindered during the wait. The simple purchase of the e-bike is all we request, perhaps adding another simple purchase of a trailer for additional capacity. Recommended models of e-bikes and trailers can be found in the Appendix. We believe the selection of models to purchase and charging/storing considerations should be completed by no later than the end of the Fall 2019 semester.

This e-bike could serve as a pilot program for other department transportation needs.

Need Statement

The Campus Recycling Program (CRP), which morphed into the Waste Reduction & Resource Awareness Program (WRRAP), originally used the Eco-Cycle—a tandem recumbent bicycle that had been used as part of a Kinetic sculpture—to collect recycling and move compost on campus. The Eco-cycle spurred excitement in the student body when seen on campus, providing an outreach and advertising tool as well as a mode of transport. When WRRAP Compost formed, the group had the “Compost Cart,” a gas-powered golf cart to help transport materials. In 2011-12 the compost cart broke down and was irreparable, following which WRRAP Compost was allowed to borrow a Facilities Management electric vehicle to collect compost and transport materials. Over the years, use of the electric vehicles has become

problematic —Compost can only use the vehicles when not already in use by Facilities, and the electric vehicles routinely break down. To relieve WRRAP’s dependency on borrowing aging electric vehicles from Facilities Management, we propose to purchase an electric assist utility cargo bike for WRRAP for use in compost collections and to transport other materials for the student organization.

The current method of borrowing Facilities Management electric carts has led to delays and cancellations in our compost service due to the unreliability of the carts. Delayed compost pickup can mean overfull, smelly compost, which produces a poor reputation of our program. Worse, it discourages participation in this voluntary sustainable practice. Additionally, other WRRAP departments must limit the scope and location of waste-reducing activities because materials must be manually moved. For example, when planning a clothing swap this year, a partnership with the people and location of CCAT was proposed to increase the turnout of our event. However, we had to decline and instead host it in a tucked away room on the north half of campus because all of the clothing had to be manually pulled on carts.

Outcomes

We believe this project helps HEIF meet all of its five primary goals by being strongly integrated with a student-run program, directly supporting the faculty who carry out curriculum, including easily attainable metrics, and especially helping disseminate information and publicity. This e-bike could be an exciting, new fixture on campus, grabbing attention, sparking conversations, and making sustainability look cool. Further...

- Compost operations will gain reliable transportation, allowing for regular, successful operation, fostering more participation, reducing complaints from delayed service, and gaining self sufficiency as a student-led program
- WRRAP activities would no longer be limited in scope and location due to lack of transportation.
- The time and effort of WRRAP activities across campus would be greatly reduced—potentially allowing for more activities in a semester and/or helping other student programs transport materials on days like Club Day
- The BLC mechanics and educators will gain experience and be able to share knowledge about e-bikes with students.
- The service and publicity of the BLC would be increased, allowing it to offer “pop-up bike shops” anywhere on campus with mobile tool stations.
- The BLC would become better integrated into WRRAP (having been absorbed WRRAP just last semester), increasing the likelihood of success of both

Partners

Waste Reduction and Resource Awareness Program (WRRAP), Bicycle Learning Center (BLC), Office of Sustainability, Facilities Management, Associated Students

Appendix

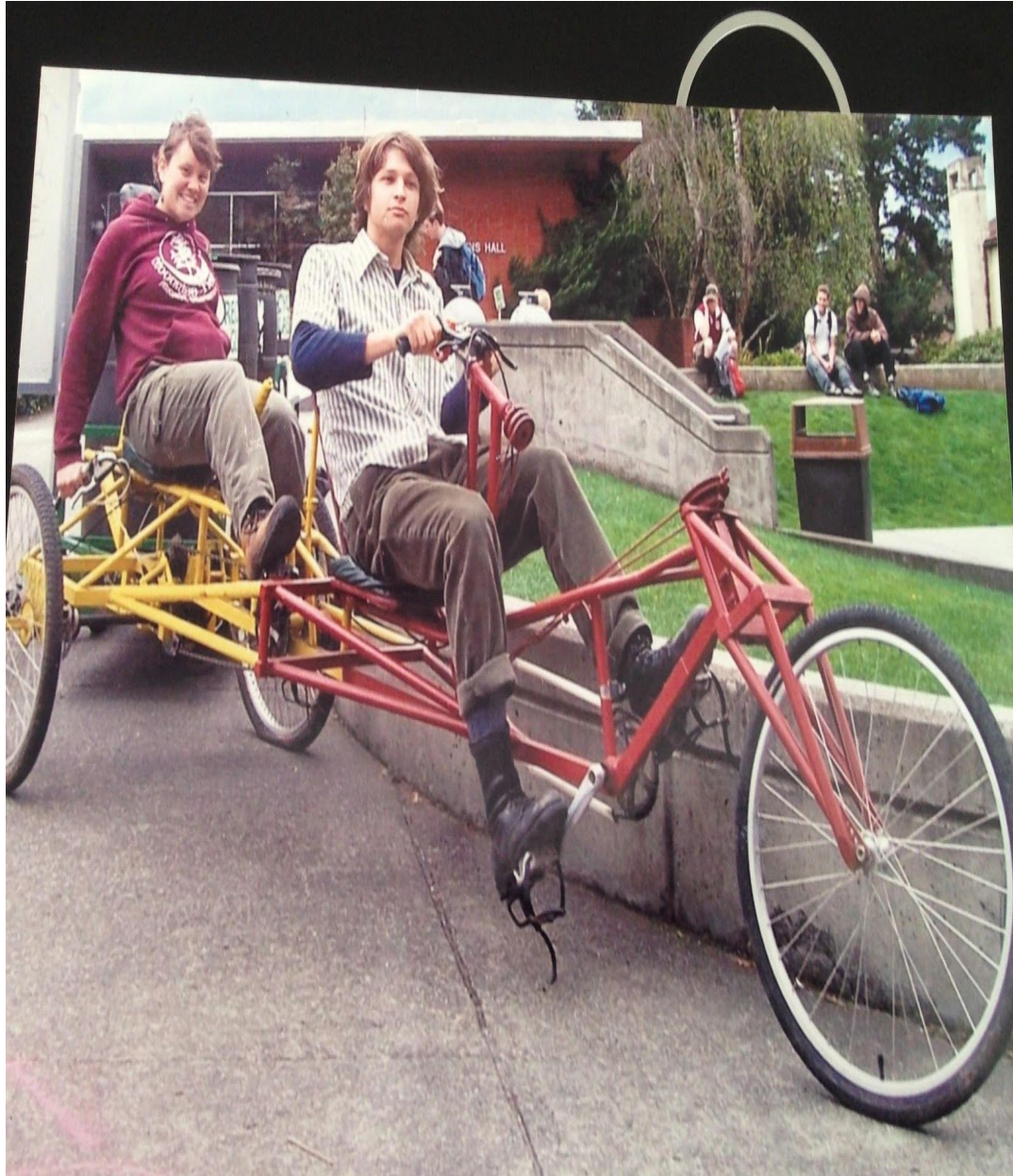
A. Proof of Concept: “Bike-Powered Food Scrap Collection — Spotlight on Equipment”
<https://ilsr.org/webinar-bike-equipment-december-2018/>

The Institute for Local Self-Reliance hosted a 1.5-hr webinar on the equipment used by some of the 18 bicycle-based composting businesses in the U.S., plus many more in Europe.

B. Proof of Concept: The original Eco Cycle that collected compost at Humboldt State University



Eco-cycle operated by Campus Recycling Program employees, circa 1997



Eco-cycle operated by Campus Recycling Program volunteers, circa 2006

C. E-bike Model Choices

1. Truck Trike



<http://www.trucktrike.com/options>

\$9,000 - 16,000

400 - 600 lb. payload

2. Organic Transit ELF Solo

<https://organictransit.com/product/elf-solo/>



\$8,895 - 9,795

Solar panel charges itself in 7 hours!

Would require trailer

3. Urban Arrow Tender



<https://www.urbanarrow.com/en/tender>

Based in Amsterdam, contact for price
300 kg payload

4. Main Street Mobility Delivery Trike

<http://www.mainstreetmobility.com/delivery-trike/>

\$4,750 plus motor



D. Trailer Model Choices

1. Bikes at Work 64AD



<https://www.bikesatwork.com/store/product/64ad-bicycle-trailer>

\$1350

2. Tony's Trailers



<http://www.tonystrailers.com/>

Custom-built

E. Statement of Support from Bicycle Learning Center

“While it is not in our expertise to maintain large electric bicycles, the BLC would maintain it if possible. Regardless, the BLC will be able to diagnose issues, and direct work to a professional. Additionally, the BLC will use the Cargo E-bike for educational purposes, including workshops on alternate forms of transportation, demonstration, and advertisement. The BLC plans to extend its reach beyond its small location on campus. The Cargo E-Bike will be very useful for this, as a portable stand, tools, supplies, and advertisement material can be transported on the E-Bike to locations away from the shop.” -Bicycle Learning Center

F. Electric Bike vs. Car Cost Savings Chart



