

A wireframe illustration of a bicycle, showing the frame, wheels, handlebars, and pedals. The bicycle is positioned diagonally across the top half of the page, with the front wheel on the right and the handlebars on the left. The background is black, and the wireframe is white.

# NATIONAL LAND TRANSPORT PROGRAMME INNOVATION FUND - HOE KI ANGITŪ

## FINAL REPORT

*CHRISTCHURCH E-BIKE SUBSCRIPTION SERVICE PILOT PROJECT*

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FOR

**Waka Kotahi New Zealand Transport Agency**

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## EXECUTIVE SUMMARY

Shutl, a pioneer in mobility solutions, is on a mission to reshape New Zealand's urban transportation landscape by championing sustainable alternatives. Shutl received \$297,000 to test and trial an e-bike subscription service in Christchurch. The project was in response to Challenge 1 of Hoe ki angitū, the NZTA Innovation Fund: Integrating low emission first and last mile travel solutions. With the backing of the Hoe ki angitū- Innovation Fund, Shutl introduced an e-bike subscription service in Christchurch. The primary objective was to make cycling more accessible, especially to those who hadn't previously considered it as a commuting option, while also crafting a sustainable and economically viable business model for e-bike subscription services.

The Christchurch trial was designed to offer participants a firsthand experience of e-bikes, with the aim of gathering insights on user preferences and behaviours. In collaboration with international suppliers, Shutl developed an e-bike that met user needs while ensuring cost-efficiency in manufacturing and maintenance. Participants were charged a nominal trial fee of \$15/week, making the service accessible to a broad audience.

The outcomes of the trial were both promising and revealing. A significant 80% of the 75 participants had never experienced an e-bike ride before the trial. Over its 8-week span, the fleet covered an impressive 16,758kms, underscoring the e-bike's potential as a preferred mode of transport in New Zealand. Moreover, 70% of the participants expressed an inclination to adopt e-bike commuting in the foreseeable future.

The project's media coverage, notably on platforms like 1 News, magnified its influence within New Zealand, emphasizing e-bikes' potential to transform urban commuting. However, while the trial aimed for a significant transition to subscriptions, only 13% wanted to continue with the service. Most preferred buying their own e-bikes. This inclination, combined with the challenges of high labour costs for tailored experiences and maintaining competitive pricing, questioned the commercial viability of the subscription model. Given these financial challenges, there's a clear direction towards collaboration with the public sector. Aligning with local councils and government agencies not only offers financial stability but also supports New Zealand's broader sustainable transportation goals.

Shutl's future strategic vision includes the Bike Loan Scheme, which provides no-obligation access to e-bikes. Leveraging the success of the Christchurch pilot, Shutl plans to expand this scheme nationwide, partnering with local councils and operators. Preliminary data indicates that a 4-week trial would cost approximately \$300 per participant, with an anticipated mode shift conversion rate of 60-70%. Shutl is poised to support these partnerships, ensuring the scheme's success in various regions. Another initiative is Levgestics, targeting the gig delivery economy within New Zealand. This on-demand rental platform for light electric vehicles aims to reduce the environmental impact of deliveries, offering a sustainable alternative for delivery drivers.

## INTRODUCTION & OBJECTIVES

Shutl is at the forefront of urban transportation in New Zealand, offering an innovative "bikes as a service" model. By seamlessly integrating electric bike technology with a user-centric approach, Shutl provides individuals, businesses, and government entities with a hassle-free gateway to e-bikes, aiming to foster a shift from cars to more sustainable modes of transportation.

Understanding the barriers many face, such as the initial commitment and cost of adopting cycling, Shutl introduced a subscription-access model for e-bikes. While this model has seen success in European cities, leading to increased bike usage and reduced car dependency, the Waka Kotahi innovation project aimed to validate its effectiveness and appeal within the unique context of New Zealand.

Over an 8-week community trial in Christchurch, Shutl provided e-bikes to a diverse group of participants. The project's success was gauged through key metrics: the conversion of non-cyclists to regular cyclists, the Net Promoter Score (NPS) indicating overall satisfaction, and the retention rate of subscribers post-trial. The NPS, a widely used metric ranging from -100 to 100, measures customer satisfaction and loyalty by asking customers how likely they are to recommend a service or product. An NPS of 70, as achieved by Shutl, is considered excellent and indicates a high level of customer advocacy and satisfaction. In tandem, Shutl collaborated with international suppliers to design a utilitarian yet cost-effective e-bike, aiming to ensure the financial viability of the subscription model.

In summary, Shutl's objectives were threefold: to champion a shift towards sustainable transportation in New Zealand, to assess the potential of a subscription-based e-bike model, and to lay the foundation for a sustainable and adaptable business model.



*Connor Read (Co-founder, Shutl) & Aidan Smith (Co-founder, Shutl) outside the Shutl depot in Christchurch.*

# PROJECT APPROACH

Shutl's bike subscription service project was structured into two primary phases: the validation and community trial, followed by hardware sample development.

## Validation and Community Trial Phase

During this initial phase, 75 electric bikes were procured and assembled, equipped with branding, security features, and low-power tracking mechanisms. Initial collaboration with the Christchurch City Council's mobility team aimed to source potential riders through door-knocking and research studies, but this method yielded only four participants. Responding swiftly, Shutl leveraged its network for promotion and secured 75 participants within two days, demonstrating the strong appeal and enthusiasm on social media channels. Prior to the trial, a survey was administered to gauge the commuting habits and motivations of potential riders. Throughout the eight-week trial, participants were provided with a comprehensive subscription service that included repairs, servicing, and theft coverage. Upon conclusion, participants could choose to continue with the subscription. Data on kilometers ridden was collected along with qualitative feedback during the e-bike return process. The bikes used were sourced from local distributors; while they were the best-suited options available locally, they did not meet the ideal performance specifications for Shutl's long-term operational needs.

## Hardware Development Phase

Transitioning to hardware sample development, a systematic technology development methodology was employed, focusing on creating a proprietary e-bike that would meet specific operational demands not addressed by standard consumer models. Initial efforts included extensive supplier research targeting prominent bike manufacturers in Taiwan and China. A detailed cost analysis of various components was conducted, and suppliers were evaluated based on their customization capabilities, scalability, value, and product range. This was vital as Shutl's requirements were fundamentally different, optimizing for total lifecycle value rather than immediate sale value. Such an approach necessitated the development of durable, low-maintenance bikes capable of enduring frequent use over extended periods, thereby reducing long-term operational costs.

These bespoke requirements arose from operational needs unique to a bike subscription service—such as high durability, easy maintenance, and user comfort—which are not typically priorities in consumer bike manufacturing. Inspired by international subscription services like Swapfiets, Dance, and Zoomo, which developed robust, proprietary hardware optimized for their models, Shutl aimed to replicate the success of international models, drawing key insights from subscription services like Swapfiets, Dance, and Zoomo. These companies have demonstrated that custom specifications tailored to the unique demands of a subscription service are fundamental to their business models. Specifically, they focused on enhanced durability and simplified maintenance procedures, which are crucial elements not just for operational efficiency but also for cost management.

- **Enhanced Durability:** By prioritizing enhanced durability in bike design, these services reduce the frequency of repairs needed over the bike's lifecycle. This design philosophy minimizes the wear and tear from daily use in various weather conditions and terrain, which are typical challenges in urban commuting. Durable components such as reinforced frames, high-quality brake systems, and puncture-resistant tires are selected to withstand frequent use and minimize the likelihood of failure.
- **Simplified Maintenance Procedures:** Simplifying maintenance procedures is another strategic focus. The design of the bike considers ease of access to key components, modular part designs, and the use of standard tools for repair work. This not only speeds up the maintenance process but also reduces the need for specialized training or equipment. By standardizing these elements, subscription services

can maintain a smaller, more efficient technical workforce and reduce the downtime of bikes, ensuring higher availability for customers.

- **Reducing Labor Costs:** A significant advantage of these custom specifications is the reduction in labor costs. Labor is often one of the highest expenses in a subscription model, especially when frequent maintenance and repairs are necessary. By developing bikes that require less frequent and less complex maintenance, Shutl can significantly reduce the hours spent on servicing. This not only helps in keeping operational costs low but also improves the overall profitability and scalability of the service. Less labor-intensive maintenance also allows for quicker turnaround times in bike servicing, enhancing customer satisfaction by ensuring that bikes are readily available and in optimal condition.
- **Long-term Sustainability:** Ultimately, the adoption of enhanced durability and simplified maintenance not only supports immediate operational efficiencies but also contributes to the long-term sustainability of the subscription model. These improvements in bike design reduce the total cost of ownership and operational risks associated with equipment failure, aligning with Shutl's strategic goal of providing a reliable and economically viable service.

By incorporating these principles into the design of its proprietary e-bikes, Shutl is positioned to optimize its resource allocation and enhance service reliability, directly addressing the economic challenges typical of high-engagement subscription models.

After shortlisting top-tier suppliers, collaborations were initiated to finalize bike specifications tailored to Shutl's unique needs. Subsequent negotiations focused on pricing, quantities, and shipping terms. Site visits to supplier factories were conducted to ensure quality control and strengthen supplier relationships. The development phase culminated in the crafting of two prototypes based on the selected suppliers' private-label designs, which were then adapted to incorporate Shutl's branding and additional electric elements. Before being shipped to New Zealand, the prototypes underwent thorough testing with the suppliers ensuring their quality and safety. Upon arrival, select users trialed the bikes, providing feedback on user experience, comfort, and usability. Long-term testing is currently underway, with initial results indicating areas for improvement, particularly in e-bike stability.

This dual-phased approach not only validated the market demand for such a service but also set the foundation for a tailored hardware solution that aligns with Shutl's strategic objectives of sustainability, cost-effectiveness, and customer satisfaction.



*Connor Read (Co-founder, Shutl) inspecting a bike in Taiwan, and preparing an e-bike pre-summer trial.*

## SUMMER PILOT STEPS

Shutl's pilot trial was underpinned by a methodical approach, tailored to the unique demands of a subscription-based e-bike service. This section outlines the key steps we undertook, from fleet preparation to rider feedback, ensuring that our model was both user-centric and operationally sound. Before launching the pilot, Shutl consulted with the public to determine an optimal weekly "trial rate." The goal was to strike a balance: the rate needed to be high enough to instill a sense of responsibility for the e-bike among users, yet affordable enough to not deter potential participants. After careful consideration, Shutl established a promotional rate of \$15/week for the trial duration. For those who chose to continue with the service post-trial, the subscription would then adjust to the standard rate of \$35/week. This approach was designed to both incentivize trial participation and ensure sustainability for the service in the long run.

### 1. Sourcing and Preparing the Fleet

Before the pilot's commencement, we embarked on a process of sourcing e-bikes that would align with our business model's objectives. We opted for a unisex step-thru model, ensuring inclusivity for all potential riders regardless of age or physical ability.

- **Selection Criteria:** The e-bikes were chosen based on durability, ease of maintenance, and user-friendliness from New Zealand-based distributors.
- **Workshop Setup:** A dedicated workshop was established, equipped with all necessary tools and machinery for assembling and maintaining the e-bikes.
- **Storage:** A secure storage facility ensured the fleet's safety, especially crucial during the pre-launch phase.
- **Tracking Systems:** Each e-bike was fitted with a tracking system, allowing for real-time location monitoring and theft prevention.
- **Asset Registration:** Every e-bike was logged into our asset register, detailing specifications, unique identifiers, and tracking system details.

### 2. Marketing and Software Infrastructure

- **Online Support:** An exhaustive FAQ and support database were developed, enabling riders to troubleshoot common issues independently.
- **Direct Support:** A dedicated support channel was established, allowing riders to directly contact a Shutl team member for more complex issues.
- **Booking Portal:** Our online portal streamlined the process of scheduling deliveries, pickups, and maintenance sessions, ensuring seamless coordination between Shutl and the trialists.
- **Promotion:** Engaging promotional materials highlighted the unique selling points of the 8-week trial. Leveraging business and council networks ensured rapid uptake, with all trial slots being filled in three days.

### 3. Trialist Onboarding

- **Personalized Delivery:** A Shutl representative personally delivered the e-bike to each trialist's residence, ensuring a touch of personalization and trust.



- **Training:** Comprehensive on-site training ensured that every trialist was well-versed in safe riding practices, both in terms of the e-bike's operation and road safety.
- **Starter Kit:** Along with the e-bike, trialists received a starter kit containing essential items like locks, helmets, chargers, and keys, ensuring they had everything needed to begin their cycling journey.

#### 4. Operating the Trial

- **Service Excellence:** Throughout the trial, Shutl's commitment to service was unwavering. A 7-day service offering ensured that any mechanical issues were addressed within 24 hours of being reported.
- **Data Collection:** Every service callout was logged, capturing details like the nature of the issue, resolution time, and associated costs. This data was invaluable for refining our financial model.
- **Conversion Communication:** As the trial neared its conclusion, Shutl initiated conversations with trialists about transitioning to a full-fledged subscription, aiming to gauge and enhance conversion rates.

#### 5. Ride Return

- **Feedback Collection:** Every trialist was encouraged to complete a comprehensive survey, capturing insights about their experience, any changes in commuting habits, and their future intentions regarding the service.
- **Return Sessions:** Organized and efficient return sessions were held at the Shutl depot. These sessions were not just about collecting the e-bikes but also served as a platform for direct feedback and interaction with the trialists.

#### Optimizing Operational Costs in the Shutl Pilot:

Throughout the course of the Shutl pilot, continuous assessment and feedback allowed us to identify potential areas for cost optimization. By refining our operational strategies, we aim to enhance efficiency without compromising on the quality of service provided to our riders. Here are three key suggestions that emerged from our pilot, which could significantly reduce the operating costs of Shutl:

1. **Centralized Ride Collection:** Transitioning to a model where trialists collect their e-bikes from a central depot can significantly reduce logistical complexities and associated costs. This approach not only streamlines the distribution process but also fosters a sense of community among riders.
2. **Batched Repair Sessions:** By grouping repairs, we can ensure that our maintenance team addresses multiple issues in a single session. This method optimizes their time and resources, reducing transportation costs and ensuring focused, high-quality service during dedicated repair windows.
3. **Digital Onboarding:** Shifting to a digital onboarding process can lead to substantial labor cost savings. Comprehensive, interactive digital content ensures consistent training and information for riders, reducing the need for extensive in-person sessions and standardizing the onboarding experience.

## TECHNOLOGY DEVELOPMENT STEPS

In the realm of e-bike subscription services, Shutl's unique operational needs demand a bespoke technological approach. Our technology development process, outlined below, is a testament to our commitment to creating a product that seamlessly integrates with our subscription model, ensuring durability, user-friendliness, and efficient fleet management.

### 1. Market Research (Technology, Supplier, rider Requirements):

**Objective:** Understand the landscape of e-bike technology, potential suppliers, and rider needs.

**Activities:**

- Conducted comprehensive research into international e-bike suppliers, focusing on potential OEM partners in Taiwan.
- Engaged with various suppliers in Taipei and Taichung, including Fairly, Sturmy Archer, and Rybit among others.

**Outcome:** Achieved a deep understanding of the Taiwanese supply network, verified testing facilities, and established initial relationships with potential suppliers.

### 2. Performance Specification Generation:

**Objective:** Define the technical and functional requirements for the e-bike.

**Activities:**

- Reviewed customer requirements, feedback, and market trends.
- Developed a detailed specification for the Shutl Commuter, focusing on performance, durability, and user experience.
- Engaged with potential suppliers to ensure alignment with the specification.

**Outcome:** A comprehensive performance specification ready for prototype development.

### 3. Supplier Shortlist and Scoping (Quoting and Visit):

**Objective:** Finalize potential suppliers and understand their capabilities.

**Activities:**

- Evaluated various supply methods, including direct OEM, OEM with trading houses, ODM with NZ exclusive rights, and importing existing brands.
- Based on strategic decisions, shortlisted suppliers for electric bike hardware and IOT hardware.
- Conducted further visits and negotiations to finalize terms, costs, and timelines.

**Outcome:** Identified preferred suppliers and established a clear path forward for prototype development.

#### 4. Prototype Co-development with Suppliers:

**Objective:** Collaborate with suppliers to develop the e-bike prototype.

**Activities:**

- Engaged with shortlisted suppliers to initiate the development of sample vehicles.
- Worked closely with suppliers on design iterations, ensuring alignment with the Shutl Commuter specification.
- Reviewed and tested various IOT solutions, focusing on GPS & BLE connectivity, cloud server integration, and dashboard compatibility.
- Developed a central dashboard platform to capture and present fleet data.

**Outcome:** A functional prototype ready for comprehensive testing.

#### 5. Prototype Testing (Durability and Rider Feedback):

**Objective:** Validate the prototype's performance, durability, and user experience.

**Activities:**

- Conducted user acceptance sessions with diverse riders, gathering feedback on design, ride quality, and features.
- Undertook extensive hardware tests, including battery discharge, range testing, lighting system evaluation, and rough riding tests.
- Transformed the initial 2D sketch into a tangible prototype, using advanced manufacturing techniques and high-quality materials.
- Performed rigorous load and cyclic testing, assessing the bike's endurance, resilience, and longevity.

**Outcome:** A refined and validated prototype, incorporating user feedback and meeting performance specifications, ready for mass production and real-world application.

This structured process provides a comprehensive overview of the steps taken by Shutl in the technology development phase, ensuring a thorough and methodical approach to creating a top-tier e-bike for the market.

## BACKGROUND - BUSINESS MODEL

Shutl operates at the intersection of urban mobility and environmental sustainability, offering a subscription-based e-bike service tailored for the modern urban commuter. At its core, Shutl functions as an equipment rental business, echoing successful models like Swapfiets. As we navigate the intricacies of this business model, it's imperative to validate the assumptions underpinning our financial projections. This includes dissecting metrics like equipment ROI, CAC, and LTV. Throughout this project, we've assessed the balance between customer lifetime value and acquisition costs, ensuring a robust return on the capital invested in our e-bike fleet

**1. Return on Investment (ROI) on Equipment** - Every e-bike that Shutl invests in represents a significant capital outlay. The ROI on these assets is influenced by:

- **Depreciation:** E-bikes, like all assets, depreciate over time. Accurate estimation of this rate ensures sustainable profit margins.
- **Maintenance & Repair:** Regular upkeep ensures the e-bikes remain in optimal condition. Maintenance costs, especially unexpected repairs, can erode ROI.
- **Residual Value:** At the end of a lease term, the e-bike still holds value. This residual value, either through resale or renewed lease, can be a revenue source.
- **Cost of Capital:** If Shutl finances the purchase of e-bikes, the interest and other finance costs must be factored into the ROI. Efficient financing strategies can enhance profitability.
- **Cleaning and Refurbishing:** Once a subscription ends, the e-bike needs to be prepared for the next rider. Cleaning, refurbishing, and any customization costs must be considered as they impact the ROI.
- **Operational Life of the Ride:** The lifespan of each e-bike directly impacts ROI. A longer operational life means extended revenue generation from a single unit, while frequent replacements or repairs can erode profit margins.

**2. Customer Acquisition Cost (CAC)** - The process of attracting new riders to Shutl's service involves costs:

- **Marketing & Advertising:** Expenses related to promotional campaigns and digital marketing strategies.
- **Sales Team:** Salaries, commissions, and other expenses of the team responsible for onboarding new riders.
- **Onboarding Costs:** Initial setup or customization for new riders, ensuring the e-bike suits their preferences.

**3. Lifetime Value (LTV) of a rider**- LTV represents the total revenue Shutl expects from a rider over their relationship duration:

- **Subscription Fees:** Regular fees from leasing the e-bikes.
- **Duration of Lease:** Strategies that encourage longer lease terms or renewals can enhance LTV.
- **Additional Services:** Supplementary services or products, like maintenance packages or premium features.

## Shutl initial financial model metrics

The table presents key metrics shaping Shutl's e-bike subscription financial model. It combines empirical data and estimates, outlining pricing, maintenance costs, e-bike lifespan, and anticipated fleet damage rates. Operational metrics, such as bikes managed per employee and rider churn, reflect efficiency and retention strategies. The model also captures initial costs for new city expansions. Essentially, this table is Shutl's financial and operational compass, guiding strategic decisions.

Inputs		Commentary
Weekly Charge (INCL GST) (Annual)	\$35.00	Enterprise and individual feedback
Weekly Charge (EXCL GST) (Annual)	\$30.43	Calculated
Monthly Charge Base rate	\$131.88	Calculated
Annual bike insurance cost	\$75.00	Insurance quote for trial (Future ability to reduce)
Monthly bike insurance	\$6.25	Calculated
Bike wear allowance	\$200.00	Estimated in seperate document
Monthly wear allowance	\$16.67	Calculated
Onboarding costs	\$50.00	Estimate items associated with each new rider & labour
Bike cost (Landed)	\$1,000.00	Purchase cost of new ebike when ordering at scale (NZD)
Bike life (Years)	6	Design bike life, with a goal to increase higher
Bike Life (Months)	72	Calculated
Bike Sale Price @ end of life (Excl GST)	\$400.00	Sale of bike at end of operational life (Residual value)
Annual depreciation (SL) (Bikes)	\$166.67	Calculated
Montly depreciation (SL) (Bikes)	\$13.89	Calculated
Annual Mortality	10.00%	Estimated to lose 10% of our fleet each year
Monthly Mortality	0.83%	Calculated
% Of fleet being used (On annual rate)	90.00%	Allowance for fleet down time (Further allowances made)
% of stock as spares	5.00%	Advice from initial supplier
Average CAC	\$50.00	Estimate (Marketing)
#Bikes per FTE operations staff	250	Estimated through servicing and onboarding req
Rider annual churn	50.00%	Estimating an average rider life of 2 years
Site est - Fitout	\$10,000	Equipment required to setup depot in new city
Site est - Tools	\$5,000.00	Tools required to service and repair bikes in new city
Site est - Delivery vehicle	\$10,000	Purchase of light electric delivery vehicle in new city
Site est - Total	\$25,000	Calculated
Company Tax Rate	28.00%	National
% of fleet capex funded through debt	30.00%	Debt currently set to zero (Asset financing could be used)
Interest rate	8.00%	Estimated

## KEY FINDINGS

The innovation project has identified several key findings, which uncover fantastic opportunities for Shutl, and the wider community, to fast track the decarbonization of last-mile commutes.

- 1. Providing obligation-free access to electric bikes is an effective strategy to activate new cyclists.**
  - a. **80%** riders had never ridden an e-bike before the trial, indicating that there is significant potential to activate new cyclists through this model.
  - b. Over the 8-week trial, **16,758kms** was travelled across the whole fleet, and one rider tallied up 680kms on their e-bike. The average commute length for the trialists was 7.9km; the average ebike travelled 223km equivalent to 14 average round trips. The trial was completed over the Christmas period, including for most 6 working weeks. If we assume the ebike had been used solely for commuting, this would account for nearly 50% of the trialist's working days.
  - c. **70%** of trialists expressed that they plan to or are very likely to commute via an e-bike in the future, indicating a transformative result for non-cyclists just eight weeks prior.
- 2. Riders choose to use Shutl to trial an ebike before purchasing their own. Shutl needs a new funding pathway, an option is to partner with central government funding the provision to the public in the form of a “bike loan” with the purpose of raising cycling awareness.**
  - a. Once consumers understand how an electric bike suits their lifestyle, their preference is often to purchase a private electric bike that perfectly suits their needs. 50% of trialists intended to purchase their own ride, while 60% expressed interest in a rent-to-own scheme. In contrast, 13% continued a subscription with Shutl, and 18% showed future interest in subscription.
  - b. Subscription best serves the community by acting as a transitional service to activate new riders, in this sense Shutl will partner with councils to provide short term subscription to riders in order to activate new riders.
- 3. Councils around New Zealand are initiating discussions about launching a replica of the Christchurch Pilot, Shutl is best suited to provide the technology for local operators to launch the service.**
  - a. Following the success of the Christchurch pilot, councils including; Wellington, Auckland, Dunedin, and Napier have reached out to understand how they could implement a free “Bike-Library” style community engagement program funded out of regional budget.
  - b. Shutl is able to provide the necessary tools to local partners to facilitate the engagement schemes including; booking, selfhelp, logistics, and hardware platform.
- 4. New Zealand needs a platform where would-be riders are able to access transparent and agnostic information about the ebike that best suits their requirements.**
  - a. Qualitative feedback, captured from the 70% of trialist planning on commuting using a bike, indicated that the next barrier to adoption was the opacity of the LEV market.
  - b. Would-be riders were uncertain about hardware longevity, choosing the right model, and knowing a reasonable purchase price for a robust and durable bike suitable for their needs.
  - c. Trialists looking to purchase hardware felt that bike shops were motivated to upsell them when instore, rather than aid in selecting the correct ride within their budget.
  - d. Cost was the biggest barrier to cycling for 55% of respondents, while only 15% cited safety/infrastructure as a barrier.
- 5. An opportunity exists to provide light electric vehicles to the growing gig-economy delivery workers.**
  - a. Across the summer trial period Shutl received enquiries from Gig-economy delivery workers looking to have casual access to an ebike for their food deliveries.
  - b. Market research indicates that upwards of 5,000 gig workers are already delivering across New Zealand using private cars, suggesting a huge opportunity to reduce emissions.
- 6. Revision of Expected Trial Outcomes Due to Seasonal Variations**

- a. **Success Criteria vs. Actual Measurements:** Initial success criteria anticipated higher usage rates, with an expected average of 60 trips and 600km per bike. However, actual measurements recorded significantly lower figures, averaging only 10 trips and 217km per bike.
- b. **Impact of Seasonal Variations:** The trial's overlap with the Christmas holiday period likely influenced these results, as participants had altered commuting patterns and reduced personal commuting requirements due to holiday engagements.
- c. **Adjustments for Future Trials:** Future trials will take into account seasonal variations and potential disruptions to ensure more accurate predictions. This will involve revising the trial timing or extending the duration to avoid major holiday seasons.
- d. **Refinement of Maintenance and Cost Models:** The observed discrepancies will also prompt a recalibration of maintenance schedules and cost models to reflect actual usage more closely. This will help in more accurately predicting the lifetime costs of hardware based on reduced wear and tear.

## BROADER PROJECT FINDINGS

### 1. BUSINESS METRICS

The pilot trial of Shutl provided a wealth of insights, particularly concerning the financial viability of the business model. Here's a detailed breakdown of our findings:

**Subscription Revenue Insufficiency** - Our initial hypothesis was that the subscription income from riders would be the primary revenue stream for Shutl. However, the trial revealed that relying solely on this income would not sustain the business in the long run due to the perceived misalignment in the rider's perspective between the value provided, and the cost of providing that service.

**Underestimated Operational Costs** - Several costs were notably higher than our initial projections. The Customer Acquisition Cost (CAC) exceeded our estimates, and maintenance and labor costs were also significantly higher. Furthermore, the e-bikes showed signs of wear and tear faster than anticipated, leading us to reconsider our initial assumption of a 6-year operational life.

**Higher Equipment Costs** - Our technology investigation revealed that the e-bike suitable for our needs would have a landed cost of approximately \$1500 NZD. This was a staggering 50% more than our initial budget. Compounding this challenge was the supplier's requirement for a bulk order, with a minimum order quantity (MOQ) of 200 units. This translated to an upfront cost of \$300k, coupled with a lengthy 9-month lead time from order placement to delivery.

**Revised Subscription Charges** - Taking into account the actual costs incurred during the trial and the technology development phase, our calculations indicated that to break even, the weekly subscription charge would need to be set at a minimum of \$75. This rate, however, did not address the financial challenges posed by the need to order bikes in bulk.

**Contractual Adjustments** - An alternative solution to the high weekly charge was to lock riders into longer-term contracts. Our analysis suggested that a minimum 12-month commitment would help alleviate some of the financial pressures. However, this approach contradicted the flexibility that was a key part of our value proposition.

**Value Proposition Dilemma** - The combination of a higher charge rate and the potential requirement for a fixed-term contract diminished Shutl's value proposition. Many trial participants expressed that at the revised rates and terms, they would find better value in financing and purchasing an e-bike directly from a retailer. This feedback was a significant concern, as it indicated that our model might not offer a compelling alternative to traditional bike ownership for many potential riders.

In summary, while the Shutl model aimed to provide a flexible and cost-effective solution for urban commuters, the trial highlighted several financial and operational challenges that would need to be addressed for the business to be viable in the long term.

## 2. PILOT METRICS

Within this section, we present a detailed analysis of the Shutl e-bike pilot project, focusing on the 75 trialists' travel behaviors, preferences, and feedback. The data offers a comprehensive view of participants' experiences and the potential of e-bikes in reshaping urban commuting habits. Dive into the metrics and insights to understand the project's impact and the future implications for e-bike adoption in New Zealand.

### 1. Travel Metrics:

- Median Travel per Rider: 200 km
- Average Travel per Rider: 223 km
- Total Distance Covered by Fleet: 16,758 km

### 2. Rider Profile:

Gender Distribution:

- Male: 41 riders
- Female: 35 riders

Normal Commute Distance Breakdown:

- 0-2 km: 20.00%
- 2-5 km: 15.00%
- 5-10 km: 27.00%
- 10-15 km: 21.00%
- 15+ km: 17.00%

### 3. Pre-Trial Commute Modes:

- Car: 56.4% (43 riders)
- Bus: 3.6% (3 riders)
- Bike: 29.1% (22 riders)
- Scooter: 0.0%
- Walk: 10.9% (8 riders)
- Not working: 0.0%



#### 4. Rider Intentions Post-Trial:

Likelihood to Use an E-Bike:

- **Main Mode / Very Likely:** 72.4% (55 riders)
- **Not Likely:** 17.2% (13 riders)
- **Dependent on Day:** 10.3% (8 riders)

New Cyclists Generated - From the riders who were very likely to use an e-bike as their main mode, 33 were non-cyclists before the trial. This is calculated by subtracting the existing cyclists (22) from the total number of riders who indicated they are very likely to use an e-bike (55).

Likelihood of a previous Non-Cyclists Using a Bike for Commuting:

- **Main Mode / Very Likely:** 61.9% (33 riders)
- **Not Likely:** 23.8% (13 riders)
- **Dependent on Day:** 14.3% (8 riders)

#### 5. Rider Preferences Post-Trial:

What model would trialist be interested to use in the future?

- Ownership (Own my e-bike): 49%
- Rent-2-own (2-year subscription, then own): 60%
- Subscription (Paying weekly without ownership): 18%

Continue with the Shutl's Subscription Service:

- Yes: 13%
- Maybe in the future: 34%
- No: 53%

#### 6. Customer Feedback - "Why try the Shutl trial?":

- "I wanted to see whether I would use the bike a lot and if it would work where I live."
- "Wanted to help contribute to reducing carbon and adopt a healthier lifestyle."
- "Had stopped biking to work as I have moved up the hill. The e-bike got me back to biking."
- "I have been interested in getting an e-bike and this was an easy and affordable way to see if I would use one."
- "To see if an e-bike was an option for me, as I live up a hill and am not able to pedal up it on a normal bike."
- "Awesome opportunity to trial an e-bike and work out time and energy saved for my commute."
- "I'm keen to drive less, use less petrol, and take another car off the road!"
- "The price for the summer trial was really good. At 15 dollars a week it seemed too good to pass up."

## 7. Summary and Insights:

The pilot project successfully activated a significant number of new cyclists, with 43% of the total participants (33 out of 75) transitioning from non-cyclists to potential regular e-bike users. The primary mode of commute before the trial was cars, followed by bikes and walking. Post-trial, a majority of participants expressed a high likelihood of adopting e-bikes as their primary mode of transport.

While the subscription model showed promise, there's a clear indication that many riders prefer to purchase their own e-bikes after experiencing the benefits during the trial. This suggests that the subscription model serves as an excellent introduction to e-biking, but long-term adoption may require different strategies or partnerships with e-bike retailers. The data also highlights the importance of addressing cost barriers and providing transparent information about e-bikes to potential riders. The majority of participants felt overwhelmed by the e-bike market, indicating a need for more accessible and unbiased information sources.

An outcome of the pilot was the opportunity for each trialist to retain their e-bike at the conclusion of the 8-week period. A large portion of participants accepted this option, transitioning to ownership of the bikes. The success of this model demonstrates its potential as a strategic approach that could be replicated in future bike library programs or similar initiatives aimed at promoting sustainable commuting habits. The adoption of bikes by former trialists not only underscores the pilot's effectiveness in reducing initial hesitancy about e-bike usage but also illustrates how a trial-to-ownership process can serve as a powerful tool for encouraging long-term changes in transportation choices.

## 3. TECHNOLOGY METRICS

### 1. Hardware Cost and Durability Metrics:

The technology development phase for Shutl's e-bike initiative has seen significant progress. The unit cost, after collaboration with technology partners, was finalized at \$1000 USD, aligning with the target, though it was noted that this might necessitate a subscription fee adjustment. Lifetime costs remain consistent with the forecast, but further testing is required to refine these projections.

### 2. Hardware Qualitative Feedback:

Feedback from trialists highlighted the e-bike's speed, comfort, and design. While many appreciated features like the larger tires for better grip and the adjustable handlebars for comfort, some expressed desires for front suspension and noted differences in riding positions compared to their personal bikes. The step-through design was particularly noted for its convenience, though some riders missed the traditional bike stance at stops.

Feedback from trialists provided valuable insights, as a snapshot:

- A 55-year-old female rider mentioned, "The e-bike's top speed of 32 km/h was quite fast. However, I would have preferred front suspension for a smoother ride."
- A 60-year-old male noted, "The larger tires on the e-bike felt grippy, providing good traction. I also appreciated the adjustable handlebars that allowed me to find a comfortable riding position."
- A confident 25-year-old male rider observed, "The step-through design of the e-bike was convenient, but I missed being able to hold the bike between my legs at traffic lights."

### 3. Next Steps on Hardware Samples:

Long-term testing has revealed areas for improvement, particularly concerning the motor controller and batteries' stability. Given these findings, Shutl recommends partnering with an established hardware manufacturer with a proven market product. Entities like Lime, Uber, Swapfiets, and Ubike have evolved robust platforms suitable for large-scale community engagement programs. However, partnering with these major manufacturers would necessitate a significant minimum order quantity, likely around 500 units. Given this scale, collaboration with government entities would be advisable to meet the capital requirements.

### 4. REVISED BUSINESS METRICS

The Christchurch summer pilot provided a valuable platform to closely track key metrics that significantly influence our financial model. The subsequent table presents a concise summary of the input metrics, used in the setup and evaluation of the pilot. These figures, along with other data points, have been instrumental in determining our breakeven threshold.

Trial Element	Value
Ebike cost (Average Per unit)	\$1,450.00 (inc parts)
Weekly trial rate (Charged to rider)	\$15/Week (8 week trial)
Average Onboarding (Labor)	1.5 hours (Co-ordinate, delivery, train)
Average Support cost (Mechanical/Help)	\$55 (Average across fleet over 8 weeks)

The table below delineates the original and updated metrics utilized in Shutl's financial model. Upon revising these metrics, the breakeven weekly rate escalated to \$75/week. This adjustment, in light of our interactions with riders, considerably exceeds the perceived value they associated with weekly e-bike usage, particularly when juxtaposed with the costs of financing their own e-bike purchase.

- **Ride Cost:** Despite our initial projections, the scaled ride cost remained higher. The necessity for a robust ride, combined with elevated shipping expenses, resulted in a ride cost that was 50% more than our original estimate.
- **Wear Allowance:** The pilot highlighted a greater-than-anticipated cost to cater to riders' servicing needs. This observation, especially on new bikes, raised concerns about potential escalating costs over the bikes' lifespan.
- **Onboarding Cost:** The expenses associated with individual rider delivery and onboarding surpassed our expectations. Such costs are likely to amplify in larger cities with increased congestion.
- **Ride Useful Life:** The trial revealed significant wear and tear on the e-bikes. Coupled with feedback from manufacturers, this led us to revise downwards the expected useful life of the rides.
- **Rider Churn:** Our initial estimate was a 6-month average customer lifespan, based on European service providers' data. However, our trial and existing customer base indicated a much shorter average lifespan, closer to 8 weeks.
- **Capital Interest Rate:** In evaluating debt financing for expanding our Shutl fleet, we found higher capital costs due to increased risks and limited collateral. We used Interest.co.nz to benchmark interest rates, aligning our needs with standard car loan rates. Initially aiming to engage first-tier

lenders, the risk profile of our venture led us to start with private lenders. According to Interest.co.nz, first-tier rates range from 10% to 16%, while finance company rates vary from 10% to 30%. Following discussions, we established that a realistic rate for our initial loans would be around 20%. This rate reflects our current risk profile and will be reassessed as we aim to secure more favorable terms with growth.

Model Metric	Original	Revised
Required Rate (Breakeven)	<b>\$35/week</b>	<b>\$75/week</b>
Ride cost (Factory Direct)	\$1,000 NZD	Circa \$1,500 (Exchange dependant)
Wear allowance (Annual)	\$200	\$357 (Extrapolating from trial data)
Onboarding Cost	\$50	\$150 (Inc labour & components)
Ride useful life	6 years	4 years (Feedback from suppliers)
Rider annual churn	50%	600% (Rider intention to use for trial)
Capital interest rate	8%	20% (Rate for private asset based lending)

## PROJECT CHALLENGES

During the Shutl project, several challenges were faced that required the team to be agile and adaptable. One of the main challenges was sourcing and deploying reliable hardware for a high-value experience due to supply chain constraints, limited available stock, and delays of up to 3 months. Despite these challenges, the team ensured that all electric bikes were of the same specification, had similar battery capacity, and were of an equitable style (step-through) to allow for the range of riders on the trial.

One of the significant challenges encountered during the Shutl project was managing the geographical spread of the trialists, which initially demanded a highly personalised onboarding and training process for each participant. This approach, while effective in delivering a tailored experience, was associated with substantial labor costs that posed challenges for scalability. In response to this, we are refining our onboarding strategy to strike a balance between personal attention and operational efficiency.

Moving forward, the team could implement a hybrid onboarding model. Centralised training sessions could be held where trialists can gather to collect their e-bikes and participate in group training sessions. These sessions could be structured to cater to small groups, allowing for interaction and personalised support while maintaining efficiency. This group setting could also foster a sense of community among new e-bike users, encouraging peer learning and support.

To further enhance the onboarding experience, we could incorporate digital training tools. Prior to attending the in-person training, trialists could have access to digital resources, including instructional videos and interactive modules. These resources could be designed to introduce the basic functionalities and safety features of the e-bikes, preparing trialists for their hands-on training and reducing the time required for initial onboarding.

Recognizing the diverse needs of our trialists, especially those new to e-biking or with specific mobility challenges, we could offer additional one-on-one sessions. These sessions will be available upon request to ensure that all participants, regardless of their prior experience or confidence levels, can receive the personalised guidance they need.

Moreover, we could exploring partnerships with local retailers, community advocates, cycling coaches, and council transport members to further support our onboarding process. These partnerships will leverage existing cycling infrastructure and expertise, reducing our operational expenditures and integrating our efforts with the broader cycling community. Such collaborations will not only provide logistical support but also enrich the training content with local insights and expertise, enhancing the overall rider experience.

By adapting our onboarding approach in these ways, we aim to address the labour cost concerns while still providing a comprehensive and accessible introduction to e-biking. This strategy ensures that all trialists, regardless of their starting point, are well-equipped to enjoy and succeed in their transition to e-bike commuting.

Lead time and development constraints also posed a challenge during the project, as the technology development of the sample electric bike hardware was delayed significantly during Covid-related factory shutdowns. However, the team worked with manufacturing partners that were up to their QA standards and methodically worked through the specification to ensure a sample product representative of the ideal vision.

Managing rider expectations and experience proved challenging as well. While the team aimed to provide a high-value, tailored experience to each rider, this led to a high level of customer service that proved difficult to scale for a larger number of trialists. The team had to balance the need for a personalized approach with the resources and manpower available to deliver it effectively.

Finally, the limited timeframe for the trial meant that long-term data on the bikes and rider experience was not captured, which could have provided valuable insights for future development. To address this challenge in future trials, the team plans to extend the testing period and gather more data on the long-term use of the bikes.



*Shuttl depot after the arrival of fresh e-bikes pre-summer trial.*

## DELIVERABLES & MILESTONES

The following tables summarise the deliverables of the project and the success criteria for each phase:

Deliverable	Status
An e-bike subscription service offering rider bikes along with maintenance and protection from theft and damage	<b>Completed</b> Community trial completed. Normal Shutl operation undertaken.
A booking and communication system, including a minimum viable product of an app developed and trialled with riders.	<b>Completed</b> Self-Service & ticketing help desk web-app developed, deployed and has been extremely beneficial for riders.
A publicity campaign to promote the service and recruit riders	<b>Completed</b> <b>Output</b> - 400+ Riders of a Community trial waitlist.  Paid media - Shutl used a combination of printed and digital media to engage with potential customers. Digital marketing centred around the use of social media.  Earned media - Across the course of the project, Shutl was featured in multiple mainstream media articles helping raise awareness of the project. Including a feature on OneNews
A survey of riders to deliver insights on the subscription service's deployment	<b>Completed</b> Community trial survey carried out and summary in appendix.
<b>Report: Provision to Waka Kotahi of a report on the trial that includes:</b>	
Measured data against success criteria	<b>Completed</b> - Results discussed in report
Investigation data and findings	<b>Completed</b> - Results discussed in report
Feedback from users through the trial period	<b>Completed.</b>
Business operating metrics	<b>Completed</b> - Results discussed in report
Recommendations for business model alteration prior to a NZ launch	<b>Completed</b> - Results discussed in report

## Community Trial Phase - 'Success criteria'

Variable	Success Target	Status	Insight
Users onboarded	100 Individuals onboarded for a 6 week trial.	<b>Failed</b> 75 Individuals for a 8-week trial	75 Individuals for an 8-week trial, a reduced number of trialists was selected due to financial constraints.
Trips completed	60 Trips completed on each bike during the trial.	<b>Failed</b> Average of 10 trips per bike	The total number of trips on average per trialist was significantly less than what was predicted. This data will be used as input into our predicted lifetime cost model for the hardware, as it would result in reduced component wear per rider.
Total distance cycled	600km cycled on each bike during the trial.	<b>Failed</b> Average of 217kms per bike.	As per the above point, we will consider this reduction of kms in our model when calculating wear rate on bikes.
Retention post trial	50% of users want to continue using the Shutl subscription post trial.	<b>Failed</b> 13% conversion Post trial recorded.	13% of trialists wanted to carry on their subscription post-trial. The majority of other activated cyclists wanted to purchase their own e-bike. During the return of the trial bikes, many riders stated that they felt overwhelmed by the vast amount of e-bikes available for purchase and the lack of transparency on pricing vs value at bike shops.
User experience	Net Promoter (NPS) Score of 24 from 100 user trials.	<b>Completed</b> NPS of 70 - Post trial.	Trialists loved their experience with Shutl this was reflected in a world class NPS score. Many trialists shared their e-bikes with family and friends during this period, causing a positive wide-spread effect.
Usage growth	Week-on-week usage of ebikes increased across duration of trial.	<b>Failed</b> Survey data was only collected at initialization and conclusion of the trial. Survey data collected - 70% mode shift intention.	Constraints on technology and engagement with riders resulted in Shutl transitioning to a strategy of surveying at the beginning and end of trial.  A large proportion of riders shared the intention of continuing a mode shift post-trial.
Multimodal Transport	Bikes are used in multimodal chains with Buses and Ferries.	<b>Completed</b> Anecdotally cases of this happening with buses.	Scope to increase the intermodal effect in future trials by creating partnerships with metro systems.
Mechanical Service	Bike downtime is always below 48 hours.	<b>Completed</b> Less than 10 call outs over the trial period. All reached within 48 hours.	Having a reactive service to faults and issues enabled users to have peace of mind if an issue arose. The majority of these call outs were simple fixes, like a puncture or quick tune. However, discussions are underway with a large nationwide on-call service provider to be able to facilitate this service when at scale with each council.

## Shutl future hardware Development Phase - 'Success criteria'

Variable	Success Target	Status	Insight
Unit cost	Landed unit cost of \$1000 USD	<b>Completed</b> Sample Cost only known. Scaled order costs on target for \$1000 USD.	The final specification that Shutl developed with technology partners resulted in a higher unit cost than anticipated. As a result, the subscription fee would need to increase.  While the unit price was achieved it was determined through testing that the prototype assemblies were below the required level of quality for the application. Future iteration may require higher specification to reduce the overall lifetime cost when considering servicing.
Lifetime cost	Total cost over life forecast at \$3000 NZD	<b>Completed</b> Predicted forecast unchanged.	Projected lifetime cost will be determined through testing of the sample hardware to more accurately understand wear rates and component replacement intervals. This information is critical for deployment of a nationwide bike-loan scheme.
Hardware design life	Frame - 8 year fatigue design life Motor - 50,000km design life Battery - 300 cycle life at 80% charge (4 years)	<b>Completed</b> Specification completed. Sample sourced. Testing completed. Hardware verified.	Testing undertaken by the manufacturer for the frame. PASS - OK. Motors (Bafang) historic data communicated with Shutl for design life. Motor verified and meets specification Battery module and design is using existing design which has proven to exceed stated success target.
Development roadmap	Technology development milestones for 24 months agreed with the supplier.	<b>Completed</b> Roadmap defined and shared.	Development of a hardware platform that is unique and developed specifically for an application takes time. The development road map has been worked through with the final two manufacturing partners prior to samples arriving.  Based on insights from the development project, Shutl considers that a prudent strategy moving forward would be to deploy a private label for any future fleet application. This approach could be used where Shutl works with nationwide bike libraries.



Variable	Success Target	Status	Insight
Charging time	3 hour charge to 0-100%	<b>Failed</b> Testing undertaken. Results captured. Outcomes communicated.	Testing completed, battery was fully discharged 5 times through normal riding, and the charging cycle was timed. An average charge time of 3 hours and 23 minutes was recorded.
Supply lead time	3 Month lead time to land bikes in New Zealand	<b>Completed</b> Testing undertaken. Results captured. Outcomes communicated.	A one off prototype arrived within 3 months of commissioning. When manufacturing at scale this timeline is likely to be closer to 5 months from confirmation of order through to landing containers of e-bikes in New Zealand.
Physical Durability (Load cycles)	8 years of rider loading applied to sample frame in test facility	<b>Completed</b> Testing undertaken at the factory. Results captured. Outcomes communicated.	Testing was completed on Manufacturers site as part of the certification process. This is a requirement for standards to be undertaken on an approved test rig, using approved test methodology.  PASS - OK
Electrical Durability (Load cycle)	1500 hours of cycle loading completed (life testing)	<b>Completed</b> Testing undertaken at the factory. Results captured. Outcomes communicated.	Testing was completed on Manufacturers site as part of the certification process. This is a requirement for standards to be undertaken on an approved test rig, using approved test methodology.  PASS - OK



*Render of our developed subscription optimised hardware platform.*



*Photo of our developed Shuti one e-bike optimised hardware platform.*



*Additional photos of the Shutil one - Ebike prototype.*

*Additional photos of the Shutil one - Ebike prototype.*



*Post testing strip down #1 - Assessment on some key components and interfaces.*

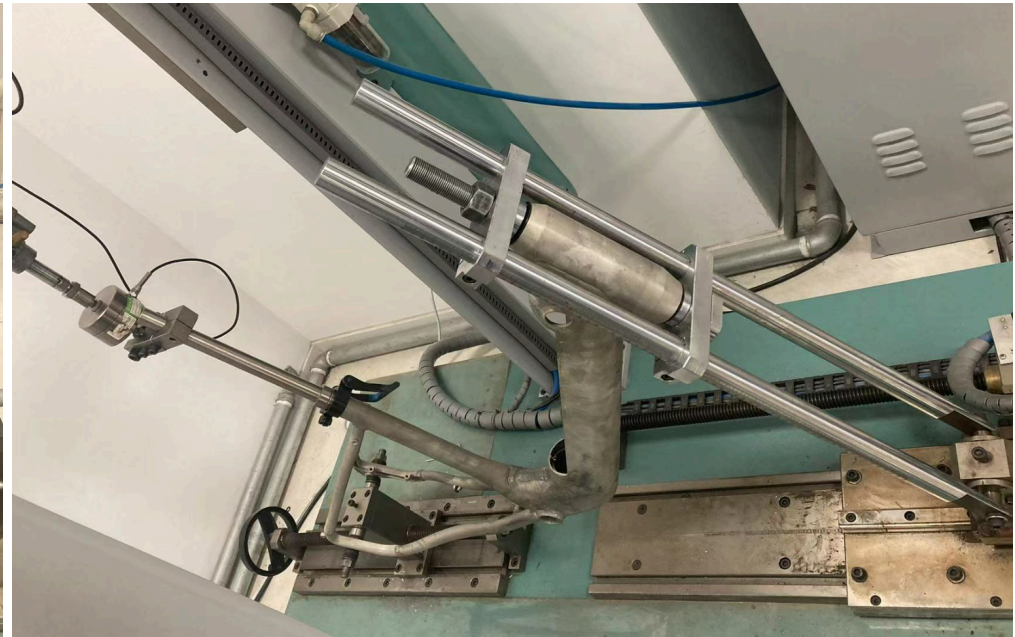


## Hardware Qualitative Feedback - Examples of some of the feedback received.

Date	Riders Persona / Demographic / Ability	Qualitative comments - summarised for clarity.
9th May 2023	Female - Shorter rider - normal fitness - 55 years old - entry level ability.	The e-bike's top speed of 32 km/h was quite fast. However, I would have preferred front suspension for a smoother ride.
9th May 2023	Male - Average height - normal fitness - 60 years old - moderate ability..	The larger tires on the e-bike felt grippy, providing good traction. I also appreciated the adjustable handlebars that allowed me to find a comfortable riding position. Great bike to get to and from the shops, paved surfaces only.
9th May 2023	Male - Average height - normal fitness - 25 years old. - Confident ability.	The step-through design of the e-bike was convenient, but I missed being able to hold the bike between my legs at traffic lights. Riding position is a lot different from my mountain bike.  On the bright side, the larger tires provided good grip and a smoother ride.
12th May 2023	Female - Short/Average height - High level of fitness - 30 years old - Confident ability.	The e-bike had a nice responsive feel when I started pedalling. Throttle was great at the lights. The top speed of 32 km/h was quick enough around town, however I would want it faster if I was travelling home.
12th May 2023	Male - Average height - normal fitness - 35 years old - Doesn't ride regularly.	Getting on the e-bike was easy, the geared hub seemed simple but took a bit of a knack to get used to. The seat was really comfy with the added suspension in the seat post. Bars felt comfy to ride. Interesting/upright riding position.
15th May 2023	Male - Average height - normal fitness - young/comfortable on bikes.	The step-through design was convenient, but I would have liked the option of front suspension for added comfort on off-road trails, but I know this is designed for the road so is OK.
15th May 2023	Male - Shorter height - normal fitness - Confident ability.	Tried pedalling up Dyers pass and did okay. Cruised up that nicely. Was a very relaxed riding position, very different to my road bike. Would be perfect for around town, and for the majority of the population.
16th May 2023	Male - Tall - High level of fitness - Confident ability.	Brakes felt strong, very upright seating position. Felt a little small for me (6 foot 4), even when the seat was at the highest position. Catered for entry level e-biker who don't know what they want, it felt like a solid platform.



*Photo of our Shutl one e-bike frame during testing..*



*Photo of our Shutl one e-bike frame during testing..*

## Support Phase - 'Success criteria'

Variable	Success Target	Status	Insight
L1 Service Documentation	Self service content completed allowing Shutl users to troubleshoot minor issues on hardware. Content shared via app and website.	<b>Completed</b> Developed and deployed self service web-app.	Riders found having an online self-access resource as a great place to start if there was an issue or they had a simple question that needed to be answered. Also positive feedback on the ability to access with a unique QR code on their bike.
L2 Service Documentation	Internal SOP completed for rider callouts regarding more involved mechanical assistance requiring in depth mechanical knowledge. Booking and communication system in place.	<b>Completed</b> Communication platform + ticket logging including ability for feedback from users developed and deployed.	rider and operational flow determined and refined throughout the trial. Continuous improvement with these processes with a customer-centric approach will result in a SOP that is best suited.
User Application	MVP of application developed and trialed with riders. <ol style="list-style-type: none"> <li>1. Communication</li> <li>2. Booking capacity</li> <li>3. Subscription changes</li> </ol>	<b>Completed</b> Onboarding and booking platform developed and deployed for trial. Subscription changes accessed through self-help web-app.	Our web-app allowed the rider to be able to quickly get in touch if they couldn't find the answer to their problem on our online knowledge base. Once the issue was logged they were able to book a time for on-site service or ask for further advice. This web-app also enabled secure access for the rider to update their payment details through our online payment provider.
External funding	External funding was secured to scale the Shutl fleet to 900 bikes nationwide.	<b>Failed</b> Business model refinement. Pivoting from knowledge gained.	The pilot identified that Shutl in its current business model is not financially sustainable or scalable, an alternative revenue stream needs to be identified. Discussions are underway with councils on the best path to launch these initiatives.
Educational resource	Educational resources captured on Shutl website: <ol style="list-style-type: none"> <li>1. How to navigate safely on roads.</li> <li>2. How to maintain a Shutl bike.</li> <li>3. ABC on riding an electric bike.</li> </ol>	<b>Completed</b> <ol style="list-style-type: none"> <li>1. Self-help service desk and blog.</li> <li>2. Printed media supplied to riders.</li> </ol>	Having a central depository for education around riding is important for new cyclists. A lot of our trialists had not rode a bike for decades, let alone an e-bike so having reading material that they could read up on provided value to these individuals.
Community engagement	Audience of 100,000 engaged to raise awareness of Shutl and electric bikes.	<b>Completed</b> See appendix. Nationwide reach on mainstream media and 1 News appearance.	With this coverage from mainstream media, there is significant demand from the public to jump on board a community e-bike trial. Shutl captured over 400 registrations of interest from the public in Christchurch for future trials.

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How can we help you?

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**Getting Started**

- Responsible riding with Shuttl
- Pre-ride checklist
- Helmet fitment guide
- How to turn on your e-bike?
- How do I charge my Shuttl e-bike?

[See all 6](#)

**Something wrong?**

- Contact a Shuttl Crew member!
- How to book in a repair or Shuttl swap?
- My e-bike isn't turning on?
- I have a flat tyre, what do I do?
- My Shuttl e-bike has been Stolen!

[See all 6](#)

**FAQs**

- How do I update my payment details or change subscription?
- How does Shuttl subscription work?
- Why Subscribe?
- What is an electric bike?
- Do I have to charge my e-bike battery?

[See all 10](#)

**Self-Help Guides**

- How to adjust your seat height?

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How can we help you?

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Home → Getting Started

## Helmet fitment guide

It is important that when you are riding your Shuttl e-bike you always have a correctly fitted helmet on. An easy to follow guide can be seen below.



**Step 1**  
Place the helmet on your head. It should be level so that it sits just above your eyebrows and covers your forehead. Then unlock the strap dividers.

*Example of our self-help web-app including educational information and issue ticketing*



## WHAT WORKED WELL?

Several aspects of this project were successful, contributing to a positive outcome. Firstly, the online portals proved to be an effective method of communicating important information to trialists, allowing for easy onboarding, booking and reminder notifications, and a self-help ticket-raising service desk.

Additionally, the timing of the trial launch was well aligned with the summer season, which provided ideal weather conditions for people to try out e-bike commuting and see if it suited their lifestyle. The commitment free engagement approach allowed every trialist to have an opportunity to ride an e-bike for a sizeable length of time, without having to spend a significant amount of money to purchase a mid-level e-bike.

The multi-purpose electric bike form factor was another success, as it was equitable to all riding styles, ages, and abilities. The step-through form allowed any rider to work with it and adjust it to best suit their desired position, while the rear rack provided the ability to attach a range of equipment pieces such as a pannier bag or a basket. This feature enabled trialists to realise that the majority of urban journeys can be facilitated with an e-bike.

Furthermore, the security, locks, and tracking system ensured a 100% return rate from the trial, with no stolen bikes and only positive comments around the integrated frame and chain lock.

In regards to the Hardware development, organising an onsite visit in Taiwan enabled the team to build a valuable relationship with manufacturing partners, as well as carrying quality assurance for a number of component suppliers.



*Summer Trialists stoked with her new set of wheels for an 8-week trial.*

## WHAT DIDN'T WORK WELL?

### GENERAL

During the pilot phase, Shutl's bike subscription service experienced several successes, but also faced significant challenges and gleaned important lessons. A primary challenge was the high labour costs required to provide a customised experience to commuters. This included not only the costs of on-site visits to address minor issues but also the significant transport costs involved when staff needed to travel to meet participants. These expenses contributed to making the pilot a costly endeavour. Additionally, the provision of bikes and training at the trialists' homes encountered hurdles due to the varying suitability of test ride areas, which led to further inefficiencies in labour and transportation. The diverse skill levels and base understanding of the trialists necessitated varying degrees of coaching. With participants ranging widely in age and ability, a customised coaching approach was essential, further adding to the program's costs.

Additionally, while the hardware platform used to carry out the community trial provided a great rider experience for urban commuters, it also showed that some riders desired e-bikes for recreational riding, such as on river tracks and rail trails. The requirements of providing a hardware platform that could facilitate these journeys are completely different and would dramatically increase supply costs and operational costs. Some riders during the trial also took the bikes outside of their intended operating conditions, causing noticeably higher rates of wear on the bike, even over a short 8-week period.

The high value offering and tailored approach were appreciated by trialists, but it was also one of the reasons why the business model did not prove to be commercially viable without continued external financial support from local councils and the government. This suggests that the cost structure of the bike subscription service needs to be revisited to make it more sustainable and scalable.

### FINANCIAL VIABILITY

#### 1. Impact of Cost Metrics on Viability:

The financial viability of Shutl's e-bike initiative was significantly influenced by the unit cost metrics. The collaboration with technology partners led to a unit cost of \$1000 USD, which was higher than initially anticipated. This increase in cost would necessitate a rise in the subscription fee, making it challenging for Shutl to maintain competitive pricing and attract a broad rider base.

#### 2. Rider Intentions and Shutl's Role:

Feedback from the survey revealed a crucial insight into rider intentions. A significant portion of the trialists viewed Shutl as a stepping stone, a low-risk way to test out e-bikes before committing to a purchase. This commitment-free approach, while beneficial for consumers, means that Shutl's role is transient in the rider's e-bike journey. Instead of being a long-term solution, it serves as an intermediary, allowing riders to make informed decisions about e-bike ownership.

#### 3. Financial Challenges and Customer Acquisition Cost (CAC):

To ensure Shutl's sustainability, the business model would require a subscription fee of around \$75/week. This figure starkly contrasts with the rider's willingness to pay. Previous studies indicated that nearly 90% of potential subscribers aimed for a fee of \$35 or less. This disparity between the required fee and the customer's budget makes it challenging to maintain a positive customer acquisition cost (CAC) and ensure profitability.

#### 4. Shutl's Role in a Broader Context:

Given the financial constraints and customer intentions, operating Shutl as a standalone, profit-driven business seems untenable. However, when viewed from a broader societal perspective, there's potential. As a

mode-shift transition tool, Shutl could be invaluable for government agencies or councils aiming to promote sustainable transportation and reduce carbon footprints.

### 5. Business Case for Council or Government-Run Community Engagement Scheme:

A council or government agency could leverage Shutl's model for community engagement schemes. At a subscription cost of \$75 per week per rider, these entities could offer e-bike trials, promoting sustainable commuting options. By reducing the trial period to 4 weeks, the cost per rider drops to \$300. Based on Shutl's trial results, this approach could potentially convert 40+% of trialists from car commuting to more frequent e-bike usage.

Considering the broader benefits – reduced traffic congestion, lower carbon emissions, improved public health, and decreased reliance on fossil fuels – the investment makes sense. While the direct financial returns might be limited, the societal and environmental benefits are substantial. Moreover, by promoting e-bike usage, councils and government agencies can foster a culture of sustainable commuting, aligning with global trends and environmental commitments.

In conclusion, while Shutl might face challenges as a standalone business, its model, insights, and infrastructure offer a valuable blueprint for government entities aiming to promote sustainable transportation. With the right support and vision, the initiative can drive significant positive change in urban commuting patterns.



*Connor Read (Co-founder, Shutl) preparing an e-bike pre-summer trial.*

## PROTOTYPE DEVELOPMENT

The development journey of Shutl's bike prototypes revealed critical insights into the complexities of producing a commercially viable e-bike tailored for subscription services. Engaging with multiple manufacturing partners illuminated the significant time and resource investments required to achieve a stable and robust bike model. This rigorous process of testing, shakedown, and iteration is often described in the industry as reaching "Stability." Typically, even large, established companies spend several years perfecting their models before launching them into the market.

A pivotal learning from this phase was the advantage of employing a Private Label strategy for future bike development. This approach allows for customization of specific features to meet consumer demands without the complexities and costs associated with ground-up design changes. Private Label bikes are purchased directly from manufacturers who can adjust specifications like gear systems, braking components, and frame materials while keeping the underlying design constant.

Looking ahead, when considering expanding a fleet or establishing bike libraries, the recommendation is to collaborate with a major vendor. This partnership would utilize an existing Private Label model, which could then be customized to meet the specific needs of Shutl's diverse customer base. By selecting a reliable model that can be adjusted for different urban and recreational uses, Shutl can streamline its supply chain, reduce development costs, and ensure that the bikes are perfectly suited for the intended applications.

## WHAT WOULD YOU DO DIFFERENTLY NEXT TIME?

Based on the results of this community trial, we have identified areas for improvement to achieve our objective of activating cyclists and creating mode shift. One approach that we would consider is transitioning to a bike-loan scheme funded in partnership with the local council and government, which would have a significant impact and further complement the existing bike shop and service network.

To make this transition successful, we would modify our operating model to remove labour costs and streamline training and onboarding to a central location, removing delivery and aligning it to a central bike loan shop. We would also investigate using hardware technology developed for specific high wear/usage applications to reduce operational expenses. Additionally, we would have multiple smaller fleets that are scheduled and rotated through the waitlist to reduce and optimize labour costs for deploying, servicing, and training for maximum impact.

While we explored partnerships with local businesses to subsidize trial periods, it became evident that they couldn't contribute significantly towards the actual costs of running the trial. For Shutl to operate profitably, riders would need to shoulder a higher weekly subscription fee. However, if our core mission is to drive a mode shift across New Zealand, it's imperative to secure alternative funding sources, ensuring the trial remains affordable for potential users.



*Three Summer Trialists from the same workplace ready to ride on the 8-week trial.*

## HOW DID WAKA KOTAHI'S SUPPORT LEAD TO FURTHER OPPORTUNITIES?

The funding from Waka Kotahi has significantly impacted Shutl's growth, creating new opportunities and enhancing its mission to promote sustainable transportation. As a result of this funding, Shutl has catalyzed the development of regional bike-loan schemes, gained media exposure, and identified opportunities to shift commercial journeys for gig workers in last-mile delivery.

The pilot project, funded by Waka Kotahi, was a collaborative effort with Christchurch City Council (CCC) to demonstrate the tangible benefits of a community engagement bike trial program. This initiative not only highlighted the potential of bike-loan schemes but also fostered a deeper engagement with the Urban Mobility Team and local councils. Having collected and shared real-world data with CCC, Shutl's efforts have piqued the interest of several other councils across New Zealand. These councils are now exploring the possibility of launching their own local engagement programs, funded from their respective budgets. It's worth noting that the initial funding from Waka Kotahi was instrumental in getting this project off the ground. Such a trial would have been a challenging proposition for any council to fund initially, given the substantial capital investment and associated risks. However, with the successful completion of this pilot, a significant portion of that risk has been mitigated, making the concept more palatable for future endeavors.

Media exposure through TVNZ, Stuff, and LinkedIn brought Shutl to the forefront of the "mode shift discussion," which led to tangential opportunities such as hotel fleet bikes and corporate fleet bikes. Lastly, Shutl identified an opportunity to shift commercial journeys for gig workers in last-mile delivery through organic outreach. This revealed a vast potential to mode shift last-mile delivery using a shared platform, further promoting the adoption of bikes as a sustainable and cost-effective alternative.

In the wake of these achievements, Workride emerged as a direct offshoot of Shutl. During the course of the project funded by Waka Kotahi, the Shutl team passionately campaigned for changes in the FBT rules around employer-provided e-bikes. Nine months after this campaign, the legislation underwent a transformation. This pivotal change led the original Shutl team to introduce Workride, a groundbreaking benefit program. Through Workride, any employee across New Zealand can now reduce nearly half the cost of procuring a ride via their employer. This innovative approach to commuting in New Zealand would not have materialized without the foundational support and funding from Waka Kotahi for the original Shutl project.



*Aidan on the Shutl one prototype An e-bike that has been optimised for subscription or a bike-loan scheme.*

## PROJECT HIGHLIGHTS

This project has had some incredible highlights that we're excited to share. Firstly, we received amazing feedback from trialists who discovered a newfound ability or passion for e-biking. It was incredible to see the impact that this project had on people's lives, with some participants riding for the first time in over 20 years. We were blown away by the journeys and experiences that people shared, including exploring the red zone, the CBD, and the Sumner esplanade.

Over the 8-week trial period, the aggregate kilometres travelled totalled 16,758 km, this was despite many trialists being away for a week or having limited use over the Christmas and New Year's period. It was fantastic to see so many Shutl e-bikes out in the community, with multiple trialists sending in photos of bikes parked up in the same spot unintentionally. This created a sense of community and a feeling of being part of a riding revolution.

Additionally, to see the mode shift through facilitating a community trial was incredible. A whopping 70% of riders now see e-biking as a real means of commuting and plan to, or are very likely to commute via e-bike in the near future. This really highlights the transformative power of e-bikes and how creating a low barrier to entry to try this is an extremely effective way to activate new riders.

Lastly, being featured on 1 News was a huge validation of the project's impact and potential. We believe that with adequate resources, support, and an appropriate business model, we can positively change the way people move around cities.



*Connor Read (Co-founder, Shutl) discussing the transformative powers of e-bikes to 1 News.*

## HOW WOULD WE ACCELERATE OUR INNOVATION FROM HERE?

Findings from the Shutl sprint cycles have identified 3 channels in which we are going to accelerate mode shift in New Zealand; Council engagement to partner for nationwide bike loan schemes, Workride, a platform that facilitates employers in offering tax-beneficial cycling schemes to their employees, and Levgistices, an on-demand rental of LEVs for the gig delivery economy.

To accelerate the nationwide bike-loan scheme across New Zealand, Shutl will collaborate closely with councils and local operators to expand the program's reach and impact. This could involve leveraging the success of the Christchurch pilot to initiate conversations and drive engagement with councils across the country. Shutl can also provide technology and logistical support to local operators, including booking and self-help tools, logistics support, and hardware platforms.

Workride aims to accelerate its growth over the next period by partnering with employers across New Zealand, ensuring they have the tools and knowledge to offer this beneficial scheme to their employees. The team is also focused on establishing partnerships with retailers to expand the reach of the platform and improve the user experience. Workride plans to invest in developing and scaling up its platform to handle a growing number of employers and employees. The team is also committed to promoting the benefits of active transportation and raising awareness of road safety to encourage more commuters to use bikes, e-bikes, and scooters. This platform will also work hand in hand in enabling the CycleToWork Tax Benefit that employers will be interested in facilitating for the benefit of their staff.

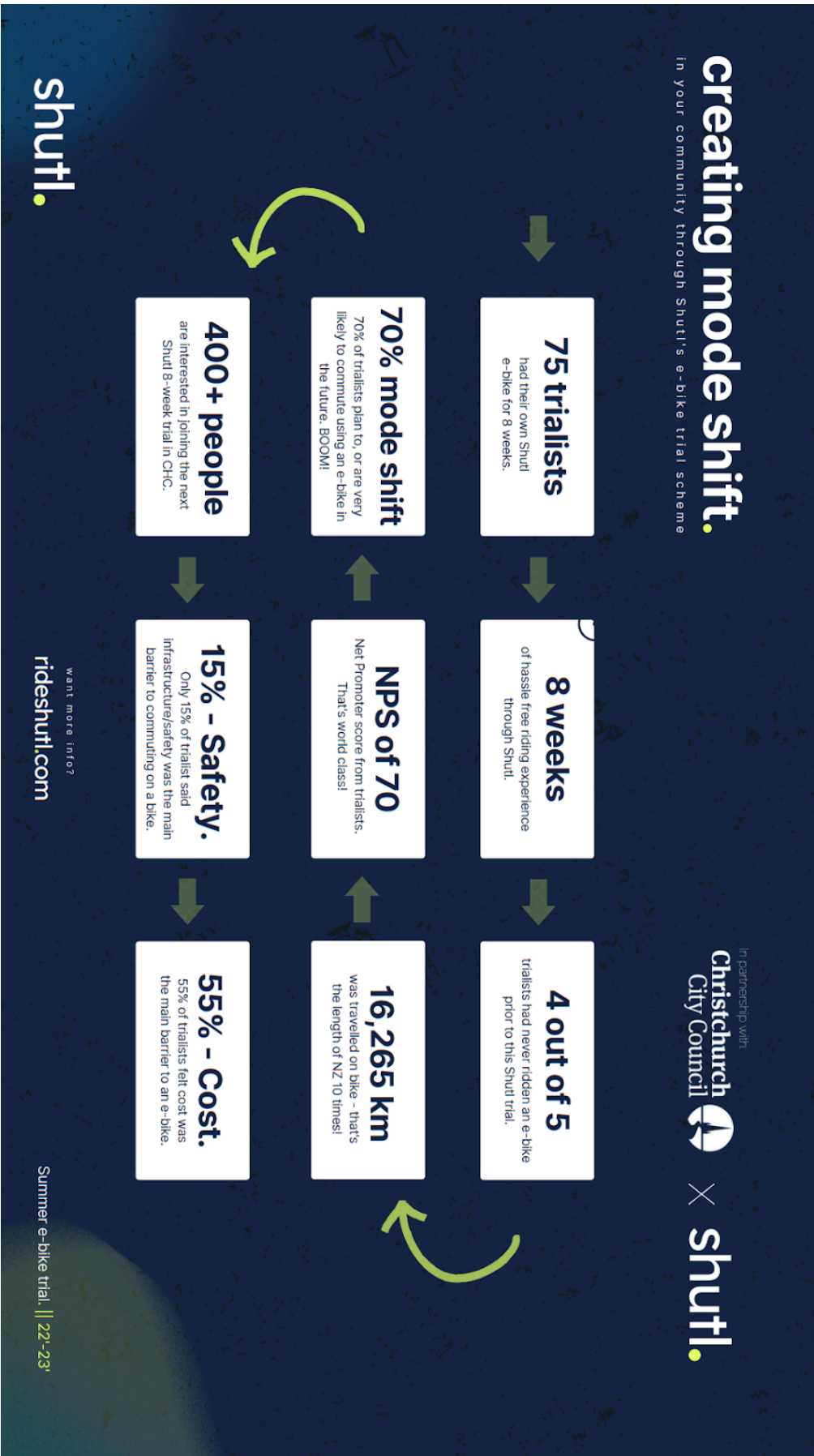
**Levgistics (Light electric vehicle logistics)** will accelerate its growth through a combination of refining its business model, strengthening partnerships, and attracting investment. Key initiatives include incorporating insights from the successful summer trial in Christchurch to enhance the platform's effectiveness and user experience. The team will actively engage with nationwide partners to expand its reach, while developing a compelling pitch document showcasing the project's value and potential. By diligently preparing for investor meetings and addressing legal and compliance aspects, Levgistices aims to secure funding and foster collaborative relationships, ultimately driving rapid expansion and adoption of its innovative urban freight solution.

We are excited about the potential of these initiatives to transform the way our cities move, and we are committed to ensuring that our innovation creates a positive impact on our communities.



*Commercial light-electric-vehicle hub vision to supercharge NZ's gig economy and urban freight networks.*

# APPENDIX: COMMUNITY TRIAL SUMMARY





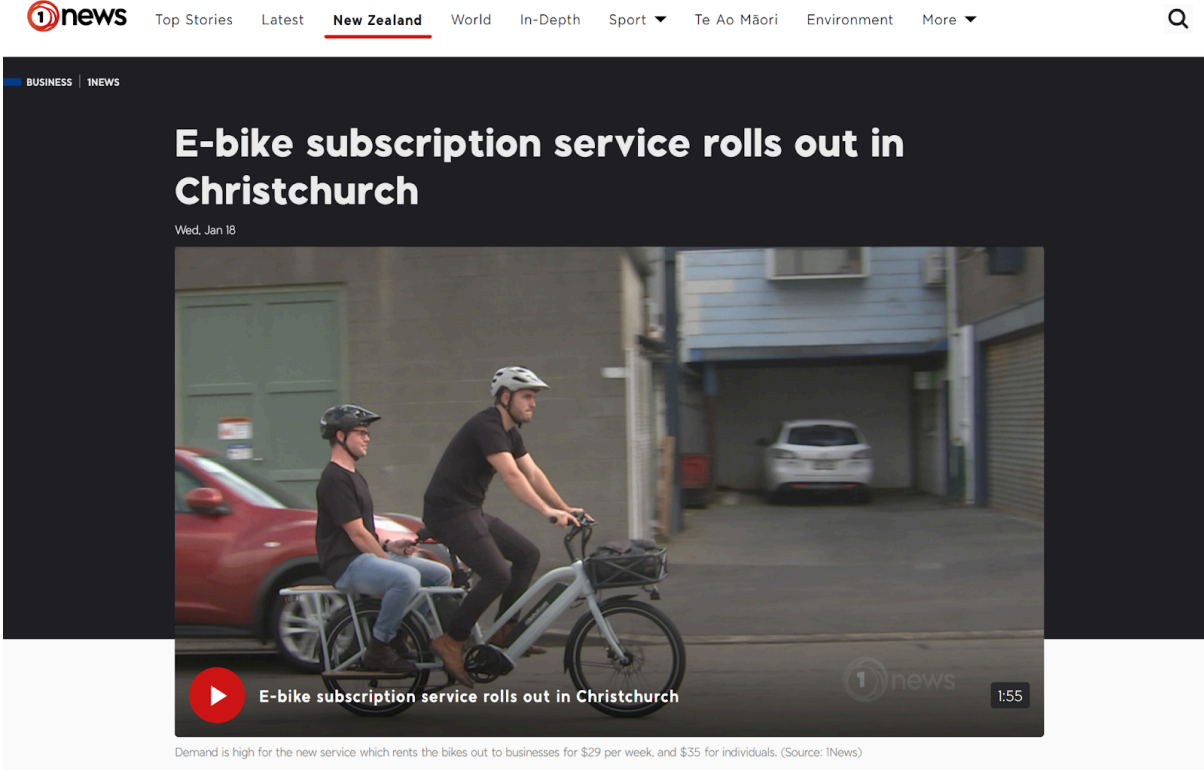
## APPENDIX: MAINSTREAM MEDIA

### E-bike subscription service rolls out in Christchurch

**ESTIMATED REACH: 650,000 (TV 1) - 35,000 Online**

1 News - Wednesday, 18th January 2023

Link: <https://www.1news.co.nz/2023/01/18/e-bike-subscription-service-rolls-out-in-christchurch/>



The screenshot shows a news article from 1 News. The navigation bar includes '1 news', 'Top Stories', 'Latest', 'New Zealand' (highlighted), 'World', 'In-Depth', 'Sport', 'Te Ao Māori', 'Environment', and 'More'. The article title is 'E-bike subscription service rolls out in Christchurch' with a sub-headline 'ESTIMATED REACH: 650,000 (TV 1) - 35,000 Online' and a date of 'Wed, Jan 18'. Below the text is a video player showing two men riding e-bikes on a city street. The video player has a play button, a title 'E-bike subscription service rolls out in Christchurch', the 1 News logo, and a duration of 1:55. A caption below the video reads: 'Demand is high for the new service which rents the bikes out to businesses for \$29 per week, and \$35 for individuals. (Source: 1News)'. The video player also shows 'BUSINESS | 1NEWS' in the top left corner.

Tax on ebikes is 64%, tax on car parks is 0%

**ESTIMATED REACH: 35,000 Online**

Stuff.co.nz - From Will Harvie Posted 09:42, Oct 28 2022

Link: <https://www.stuff.co.nz/business/130268612/tax-on-ebikes-is-64-tax-on-car-parks-is-0>

Stuff 

business

# Tax on ebikes is 64%, tax on car parks is 0%

Will Harvie · 09:42, Oct 28 2022



SUPPLIED

Shuti co-founders Connor Read, left, and Aidan Smith. Their start-up is hampered by high taxes on ebikes.

**E-bike subscription service wins \$300k from government transport innovation fund**

**ESTIMATED REACH: 120,000 (RNZ Live) - 10,000 Online**

**RNZ** - From Morning Report, Posted 7:48 am on 4 November 2022

Link:

<https://www.rnz.co.nz/national/programmes/morningreport/audio/2018865455/e-bike-subscription-service-wins-dollar300k-from-government-transport-innovation-fund>

TRANSPORT / CLIMATE

# E-bike subscription service wins \$300k from government transport innovation fund

From Morning Report, 7:48 am on 4 November 2022

Share this



Listen 3'18"


[Add to playlist](#) | [Download](#)

## E-bike subscription service wins \$300k from government transport innovation fund

REACH: 11,000 (LinkedIn)

LinkedIn - From Aidan Smith

<https://www.linkedin.com/feed/update/urn:li:activity:6994028785448747009/>



**Aidan Smith** • You  
Co-founder at Shutl | Electrifying urban journeys in NZ.  
4mo • Edited • 🌐

Remember how I said this summer was going to be electric... ⚡

Excited to share that **Shutl** has been awarded almost \$300k from **Waka Kotahi NZ Transport Agency's** Hoe ki angitū – Innovation Fund!


This provides the funding to verify our e-bike subscription business model and carry out our first wave of e-bike technology development before launching nationwide mid-next year.

**Connor** chats to **Corin** from **RNZ** about it below!  
<https://lnkd.in/gz3Sg4nj>

Want to join our riding revolution? 🚲 ⚡  
Go to [www.rideshutl.com](http://www.rideshutl.com)


Phase One Ventures - The Prince's Trust New Zealand - Ministry of Awesome - Founder Catalyst Incubation Programme - Christchurch City Council - ChristchurchNZ - Waka Kotahi NZ Transport Agency - Auckland Transport - Stantec - Orion NZ Ltd - Scenic Hotel Group  
#RideShutl #Micromobility #LiveableCities #transport #climatechange

**shutl. awarded \$300k from Waka Kotahi's innovation fund.**



**WAKA KOTAHI**  
NZ TRANSPORT AGENCY

**shutl.**  
ELECTRIC BIKE SUBSCRIPTION

 Dylan Waghorn and 232 others

67 comments • 5 reposts

## Boom! 5-days. 75 new Shutl riders. Christchurch's riding revolution is on!!

**REACH: 6,000 (LinkedIn)**

LinkedIn - From Aidan Smith

<https://www.linkedin.com/feed/update/urn:li:activity:7006829119942406144/>



Aidan Smith • You

Co-founder at Shutl | Electrifying urban journeys in NZ.

3mo • Edited •

Boom! 5-days. 76 new **Shutl** riders. Christchurch's riding revolution is on!! ⚡⚡⚡

The last 5-days have been mega for the team at **Shutl**... and we are not stopping here.

5-months ago **Shutl** onboarded its first rider... now 76 in one week.

Keep your eye's peeled for our Shutl riders this summer making their commutes awesome on the streets.

A big thanks go to **Waka Kotahi NZ Transport Agency** for providing the innovation funding to grow the Shutl fleet for the summer of 2022 to verify our subscription e-bike business model.

We can't wait to take **Shutl** nationwide next year, so stay tuned.

**Shutl** is excited to be spearheading a riding revolution in NZ, so sign up for our waitlist to jump aboard and feel the benefits of a worry-free riding experience.

Want to join our riding revolution? 🚲⚡

Go to [www.rideshutl.com](http://www.rideshutl.com)

Phase One Ventures - The Prince's Trust New Zealand - Ministry of Awesome - Founder Catalyst NZ Incubator - Christchurch City Council - ChristchurchNZ - Waka Kotahi NZ Transport Agency - Auckland Transport  
#RideShutl #Micromobility #LiveableCities #transport #climatechange

