

EV Battery End-Of-Life Repurposing



Executive Summary

Tech Cost

Automation added \$0.04/unit vs. manual at a production volume of 50,000 batteries/year

Willingness to Pay

+ \$32 for used → new battery
+ \$42 for a range increase of 40 miles
+ \$14 for 1 hour reduction in charging time

Viability

Outperforms market with -\$95 price premium
\$3.75B–\$4.5B profit potential.

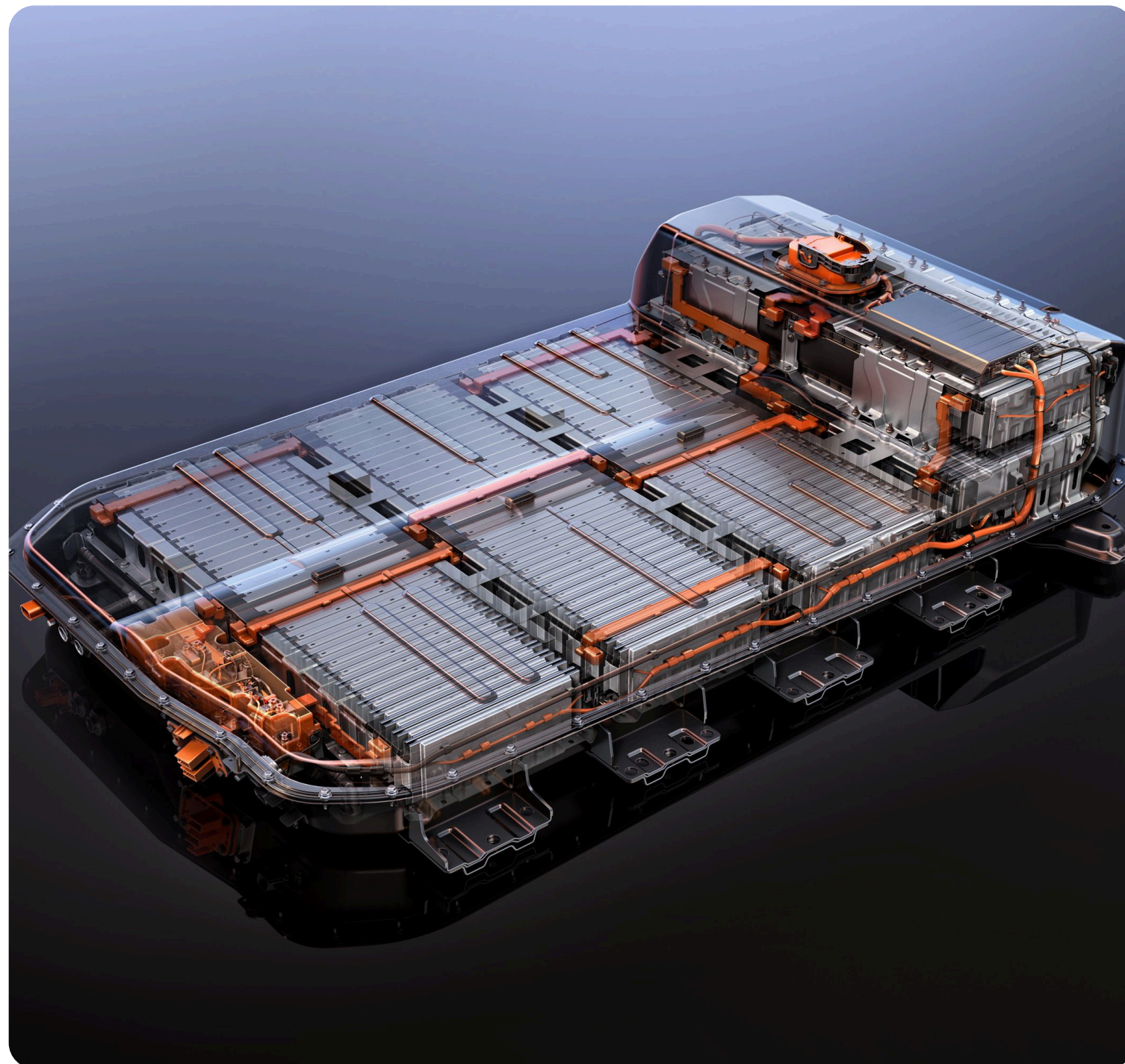
Recommendations

- Leverage robotics to cut disassembly costs
 - Automate safety checks
- Target high-performance scooter consumers
 - Align charge & range with new battery
 - Scale past 100 k EV units/yr

Introduction

Raw Material

Chevrolet Bolt Battery Pack



<https://www.caranddriver.com/news/a37552121/chevy-bolt-battery-recall-deep-dive-details/>

Automation

Reduce cost and increase scale



<https://www.par.com/capabilities/advanced-manufacturing/automated-fastening/>
<https://www.iotinsider.com/iot-insights/robotic-battery-disassembly-a-key-to-the-uks-net-zero-future/>

Final Product

Repurposed EV Cell



<https://minimotorsusa.com/products/dualtron-new-storm-electric-scooter>

Agenda

Production Analysis Part 1

Process Flow	05
Unit Cost	06-07
Recommendations	05-07

Market Analysis Part 2

Willingness to Pay	09
Market Simulation	10-11

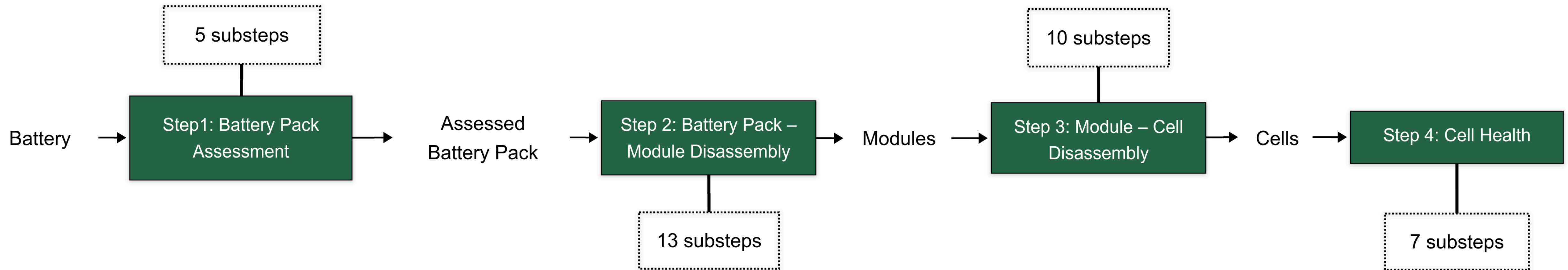
Integrated Analysis Part 3

Profitability Potential	12
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Conclusions and Recommendations Part 4

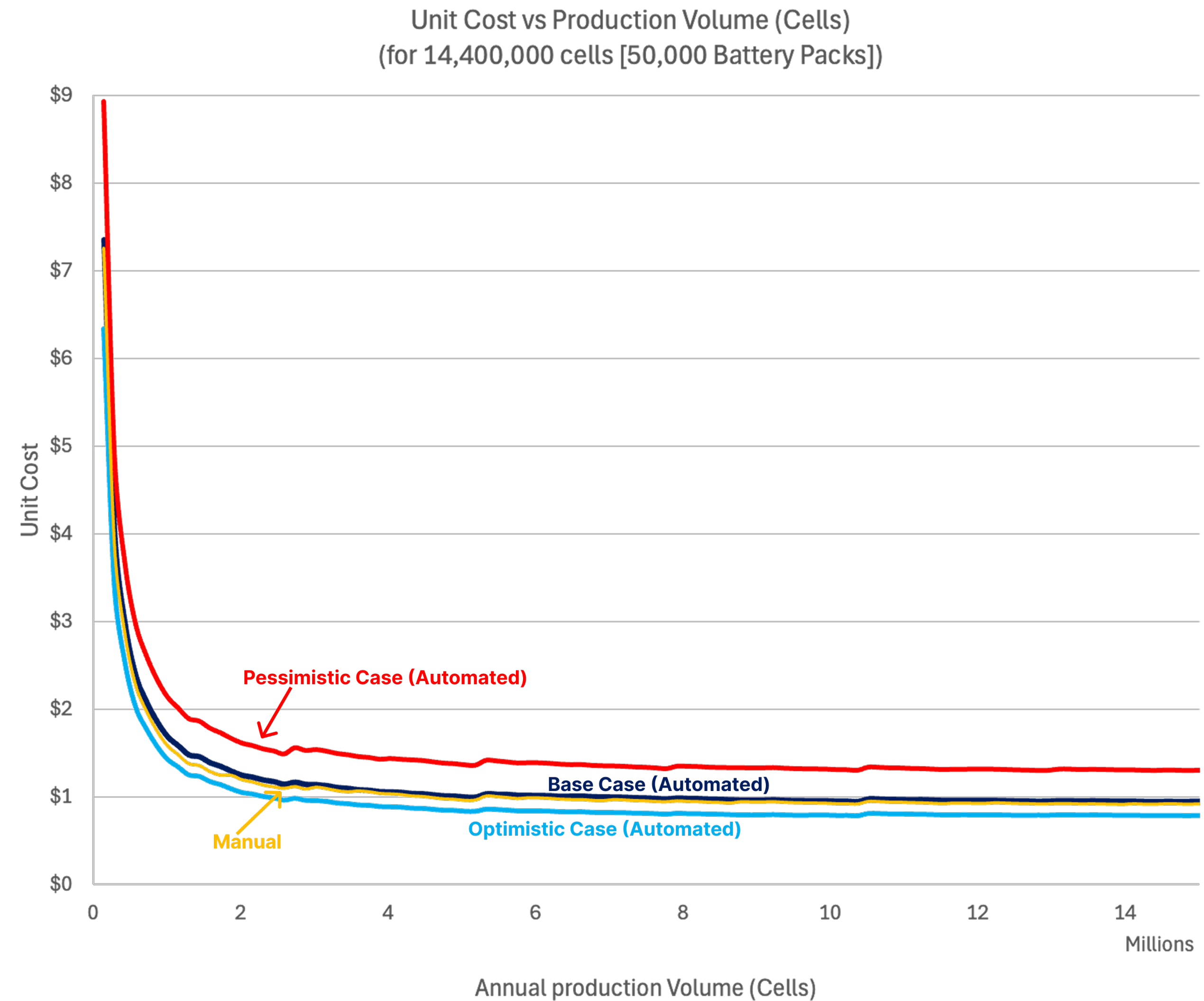


Production Process



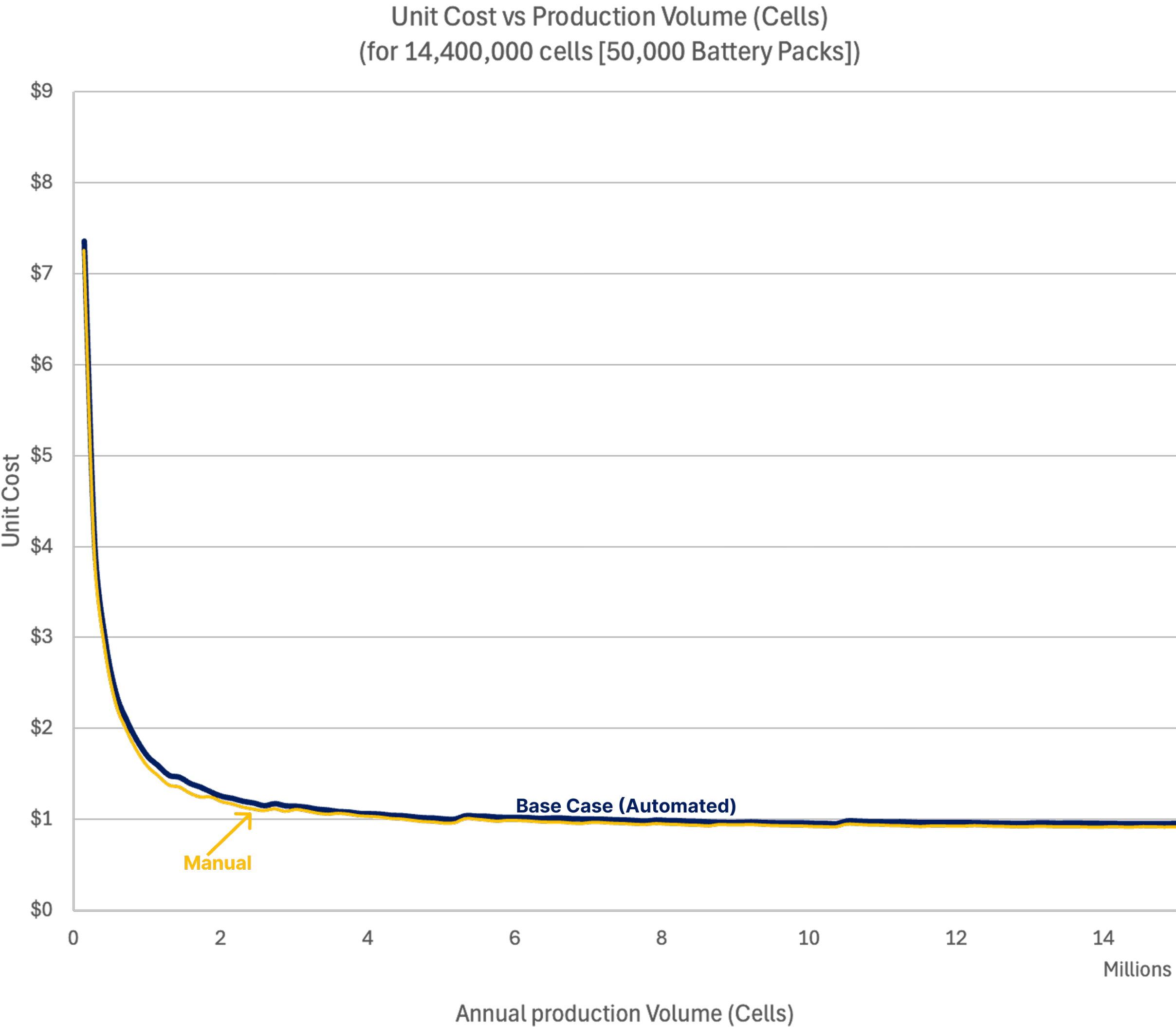
Unit Cost

Manual Disassembly
is 4 cents cheaper
than Base Case
Automation



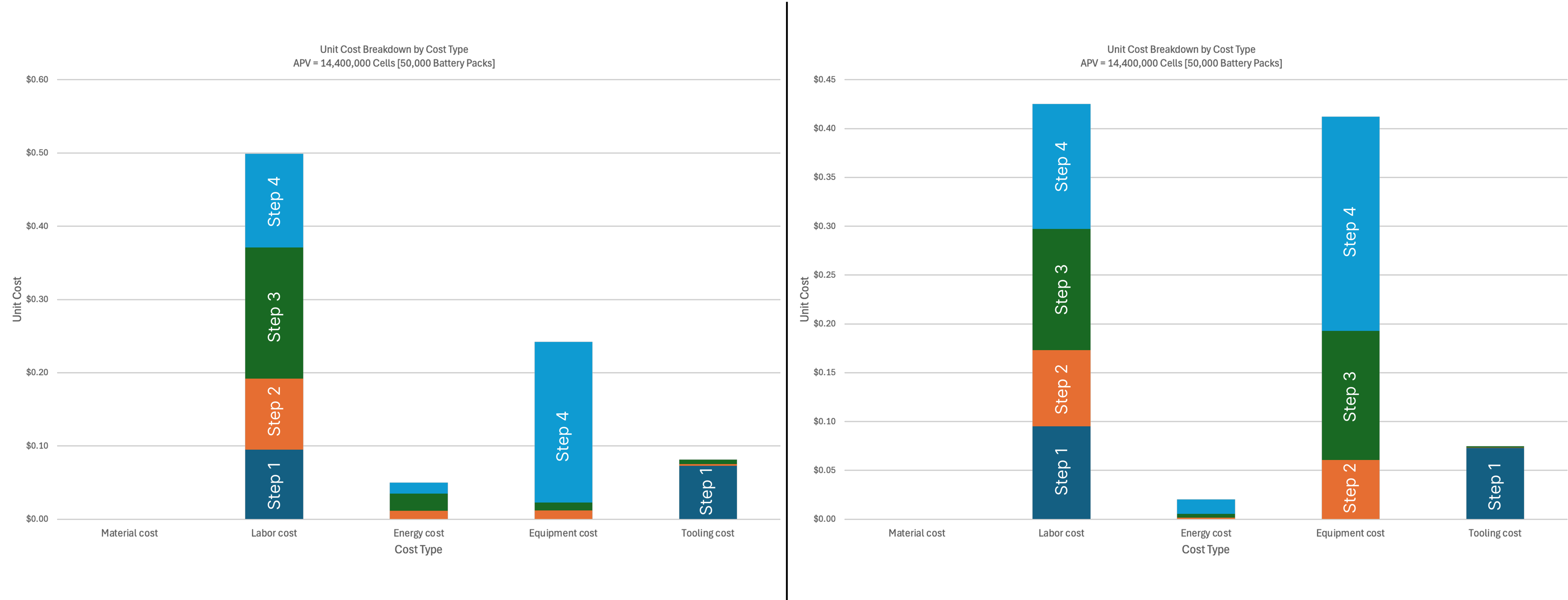
Unit Cost

Manual Disassembly
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Automation



Cost Drivers

Labor and Equipment are the largest drivers of cost



Market Analysis



Example Survey Question

Suppose the 4 electric scooters detailed below are the only products available for purchase, which would you choose?

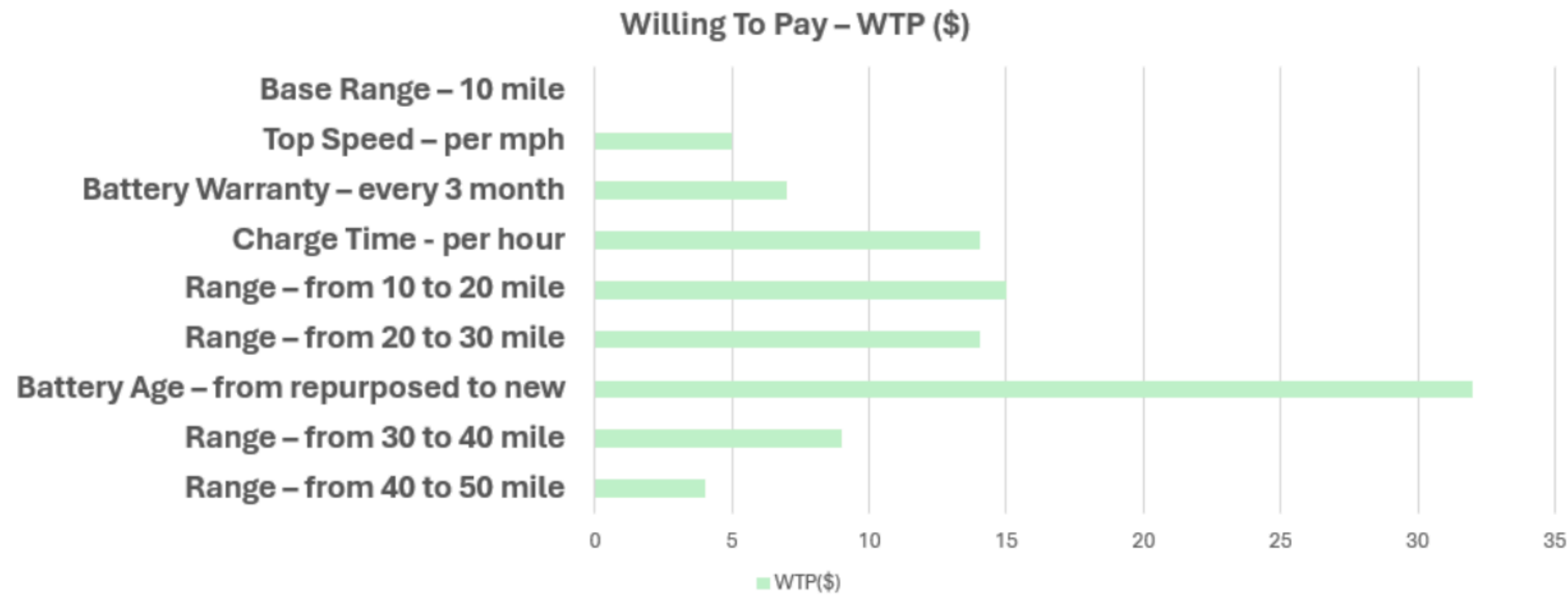


TASK 1/13

Price	\$150	\$1000	\$750	\$250
Battery Warranty	18 months	12 months	3 months	15 months
Battery Age	New	New	Repurposed	New
Charge Time	10 hours	1 hour	8 hours	2 hours
Top Speed	25 mph / 40.23 kmph	15 mph / 24.14 kmph	30 mph / 48.28 kmph	20 mph / 32.19 kmph
Range	30 mile range	50 mile range	20 mile range	40 mile range
	Select	Select	Select	Select

None, I wouldn't choose any of these.

Select



Choice Model & Willingness to Pay

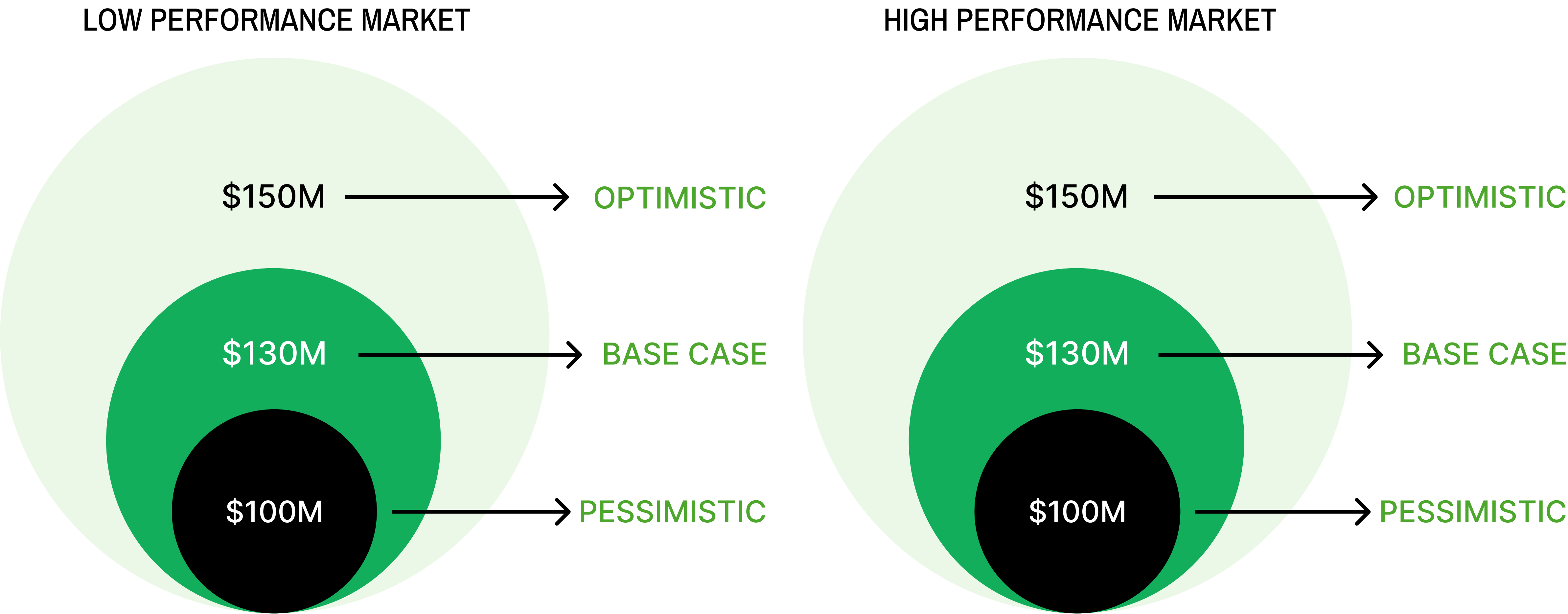
Mixed Model is used: Battery Age and Range is nonlinear, used part-worth; all other attributes used linear model

Integrated Analysis



Market Group

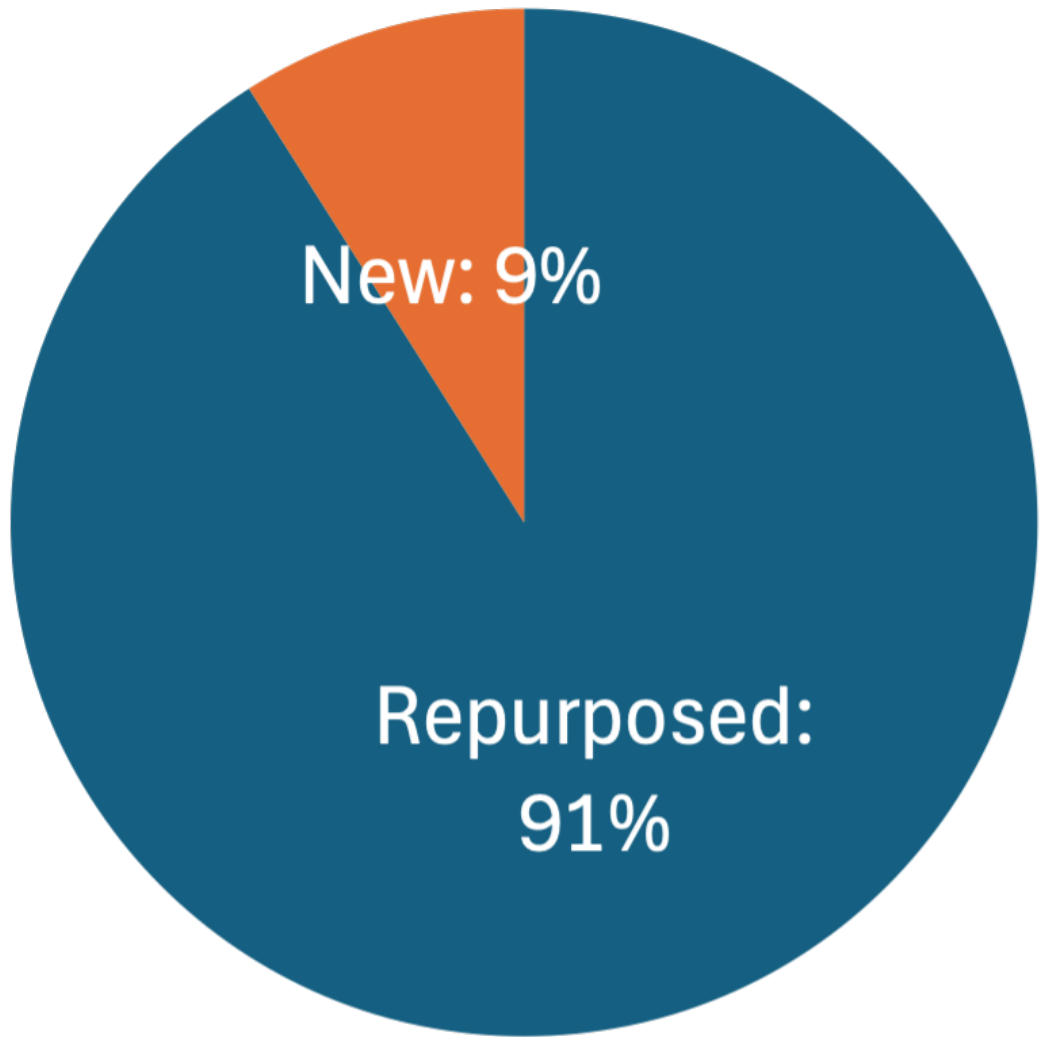
Electric Scooter’s Low-Performance Market is 3 times larger than the high-performance market.



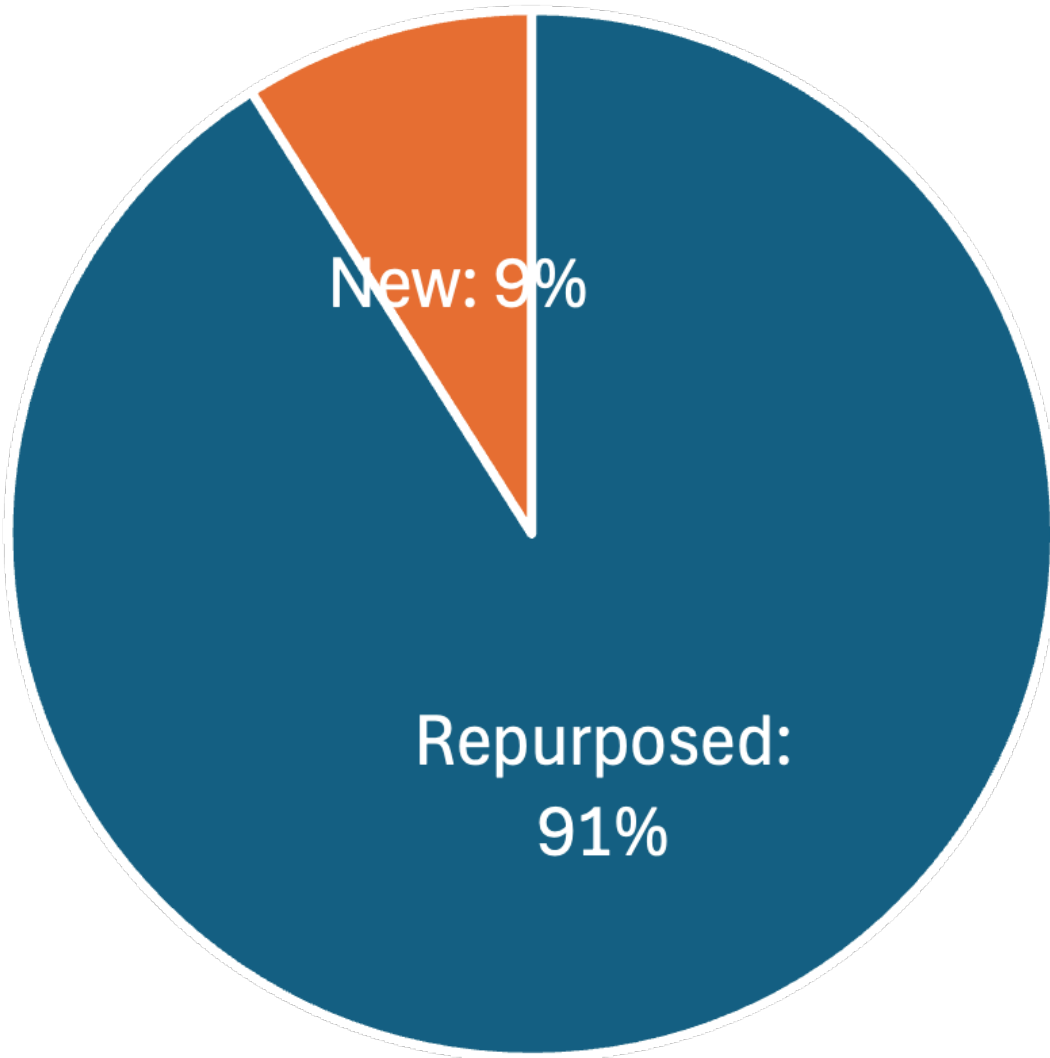
Simulated Market Share

Low-Performance vs High Performance Market

Simulated Market Share Apollo Go

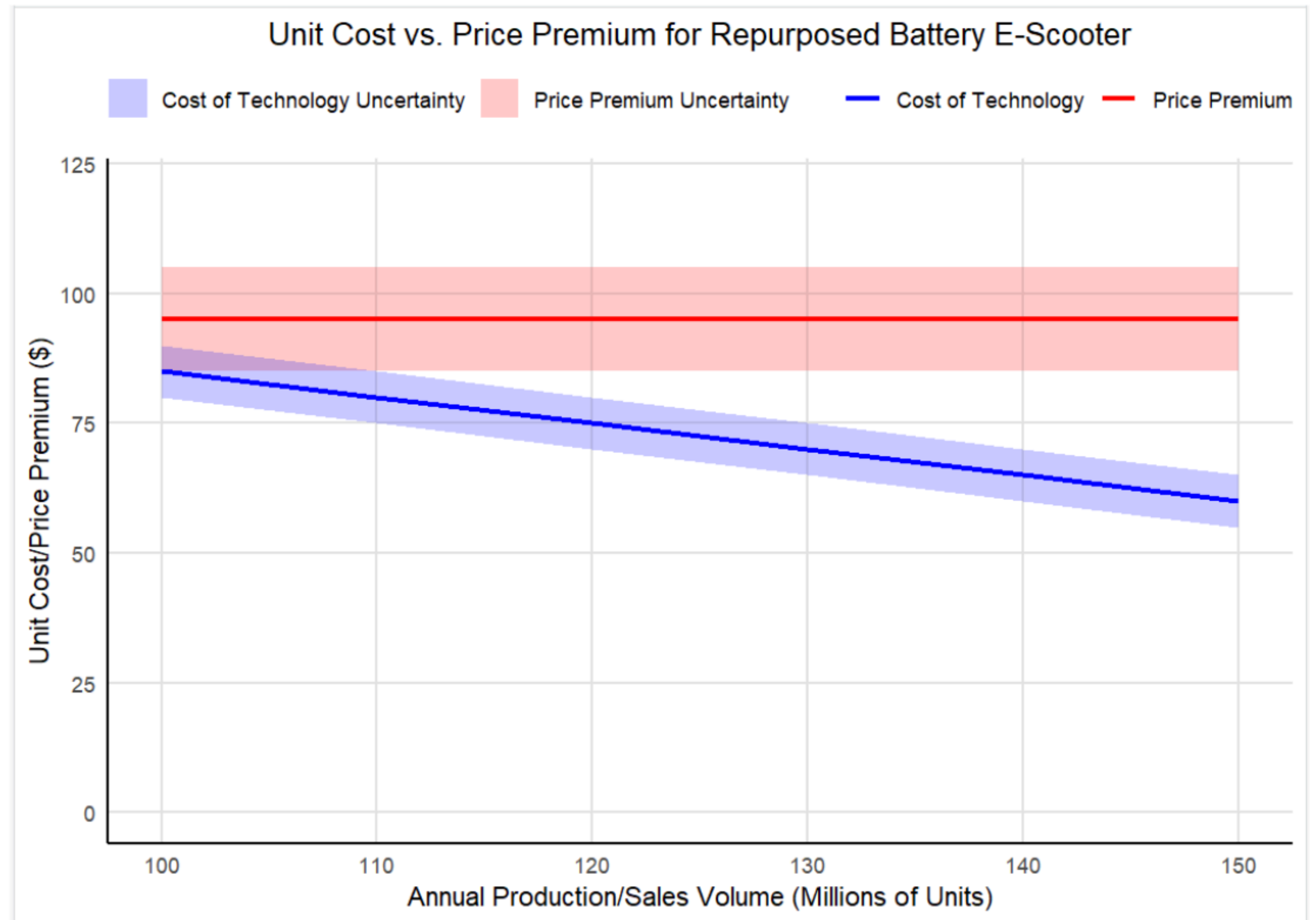


Simulated Market Share Apollo Go



Profitability

- Profitable at low volume (4,000 units)
- Higher volume (10,000 units) increases per-unit profit
- Stable customer value allows confident pricing (not volume-dependent)



Conclusions & Recommendations



Conclusion

1

STRATEGY

Model out-of-scope factors

2

MARKET

Refine target market segment to align with highest Willingness To Pay

3

PRODUCT

Target performance improvements by using advanced cell-sorting techniques.

4

PILOT

Launch a trial period to confirm end-to-end costs and study customer attitude.

Our integrated analysis of the Production and Market factors suggest the product is economically viable when scaled to >4000 units/year with moderate-high confidence, assuming no major unforeseen costs.

Limitations

Technical Factors

- Automation technology: detailed production costs
- Battery collection & transportation logistics
- Quality control costs (consistent performance)

Market Factors

- Distribution costs & margins
- Marketing: consumer education (product & repurposed battery benefits)
- Competitive responses (established manufacturers)
- Regulatory compliance & policy changes

Additional Considerations

- Long-term warranty costs (battery sensitivity)
- Product liability (repurposed batteries)
- Environmental impact & regulatory credits
- Consistent year-one revenue assumed
- Automated process assumed from start

Q&A

Appendix

Process Flow Substeps

