

ICETEK

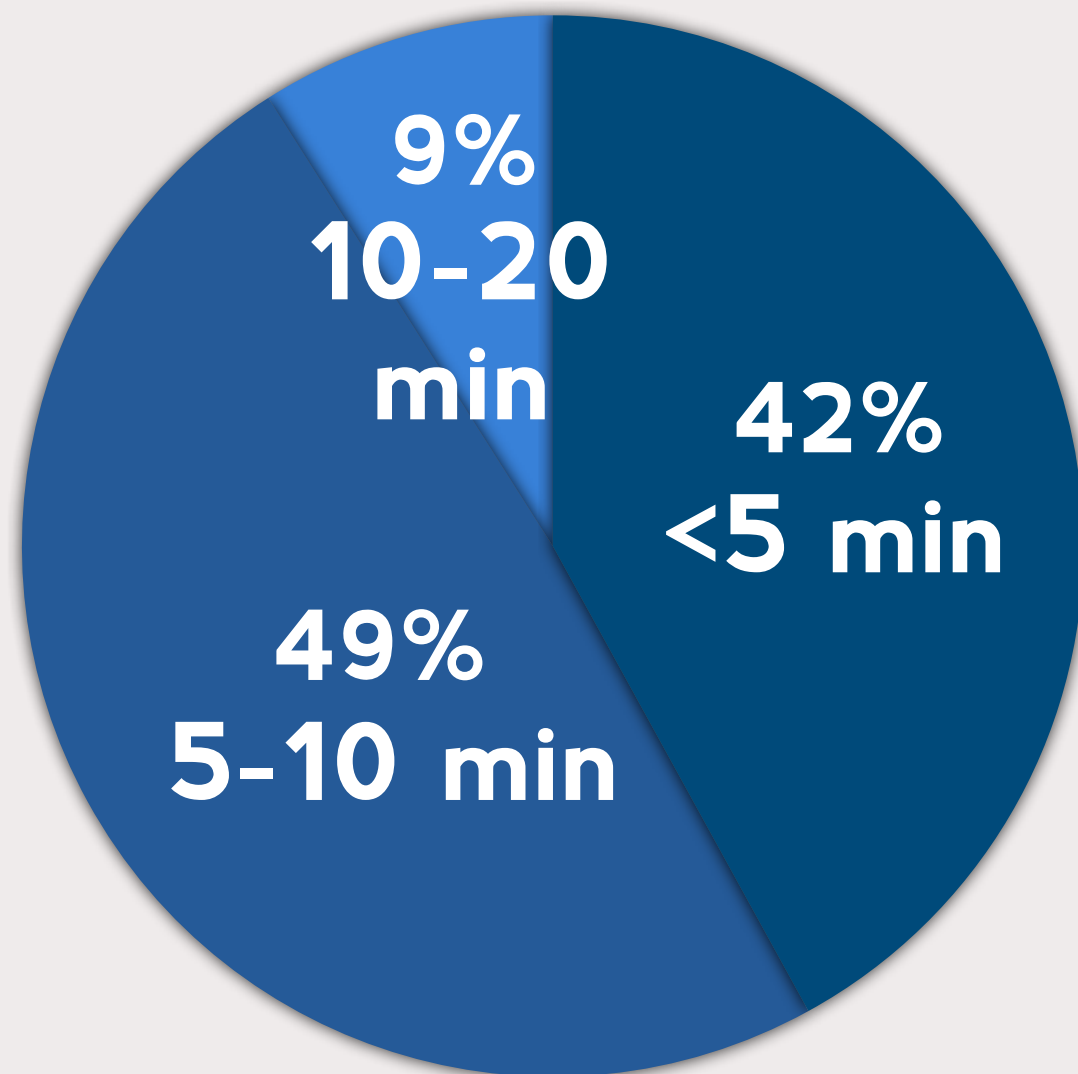


Team Silver
2.009 Final Presentation
December 7, 2009

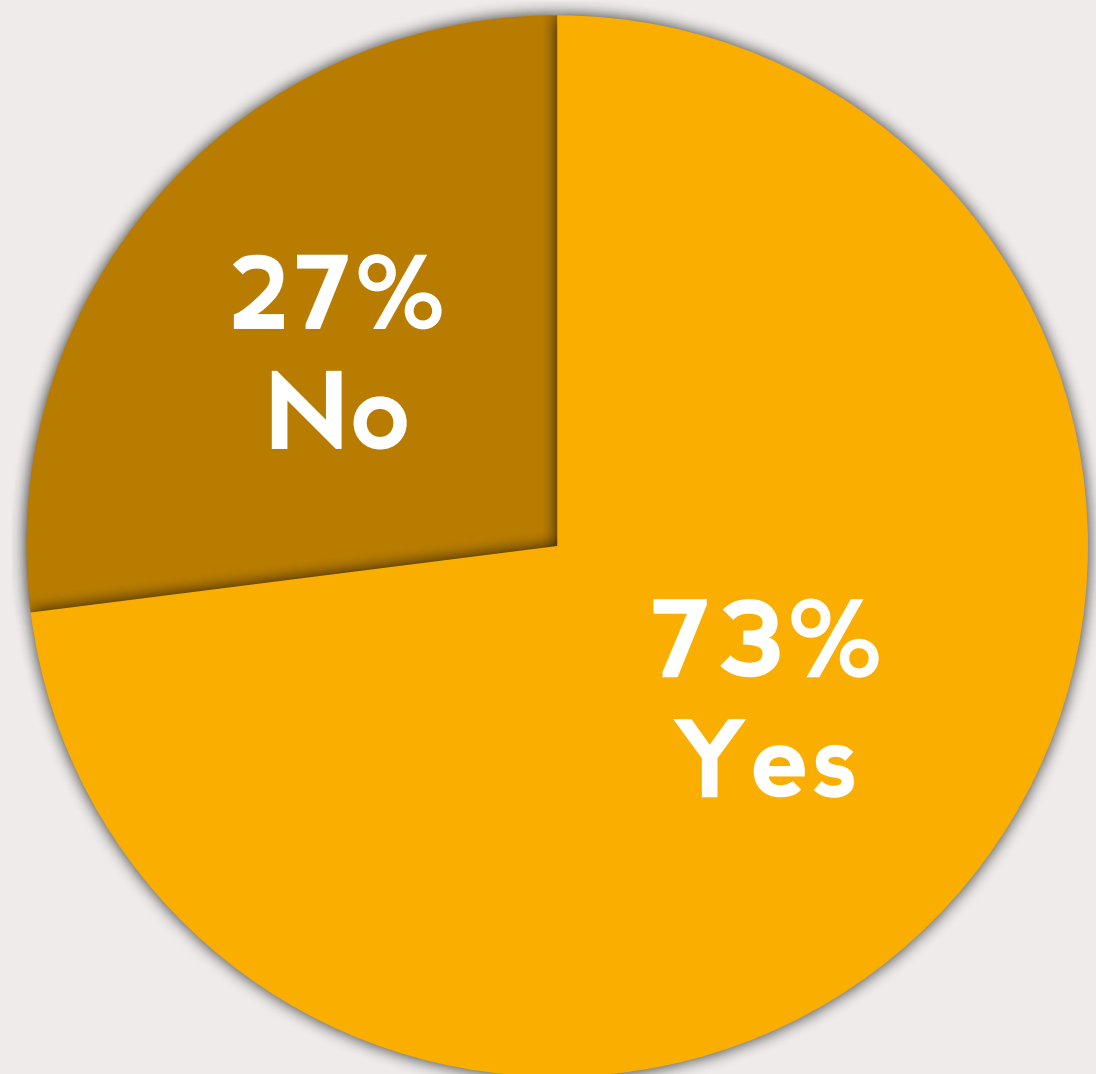
Motivation

Data collected
through online
survey of 400
drivers over 18

Time to clear ice



Driven car without removing all ice?



Design Targets

User Need	Performance Goals	Technical Challenge
Efficient	Clear windshield in less than 5 min	Effective ice chipping mechanism
	Minimal applied force at grips	
Comfortable	Handle diameter and length	Ergonomics and compact design
	Reach distance over 2 feet	
	Lightweight (less than 5 lbs)	
Durable	Functional in cold weather	Electronics and friction
	Minimal component wear	

Slow Motion Video

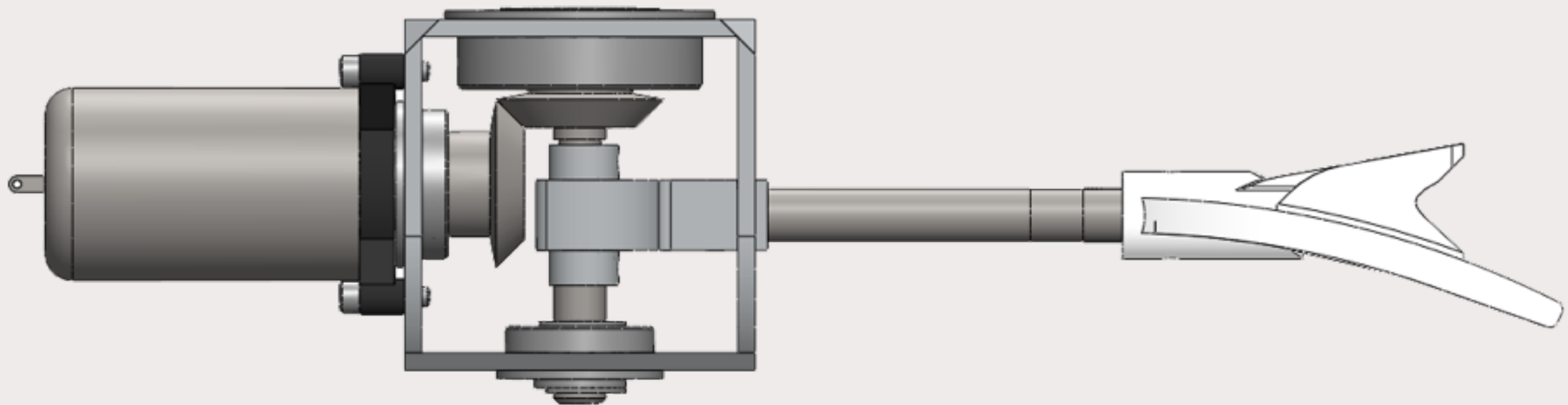
Blade in Action

Slow Motion Video

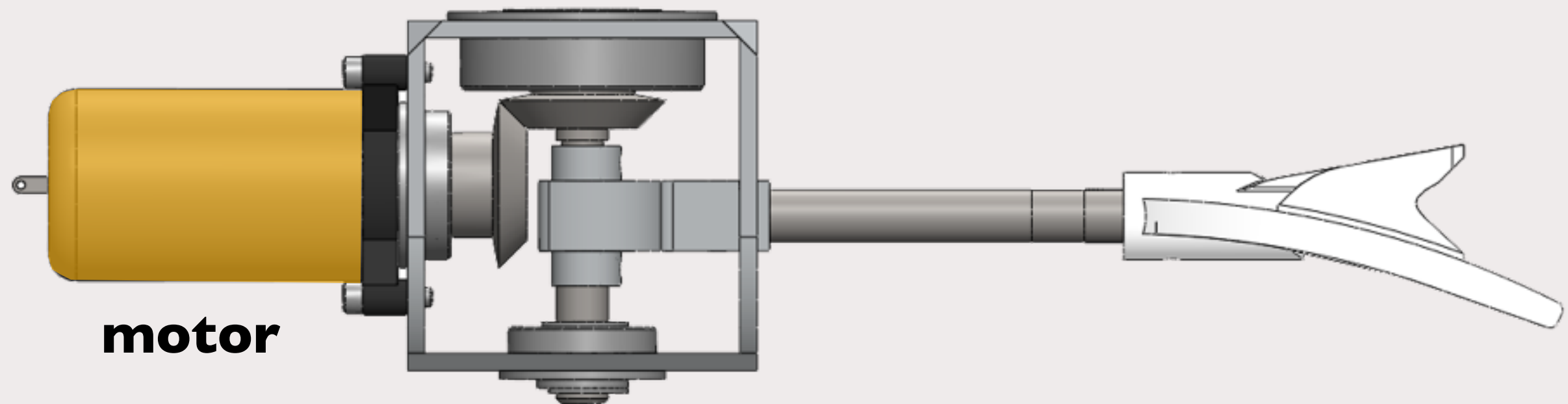
Blade in Action



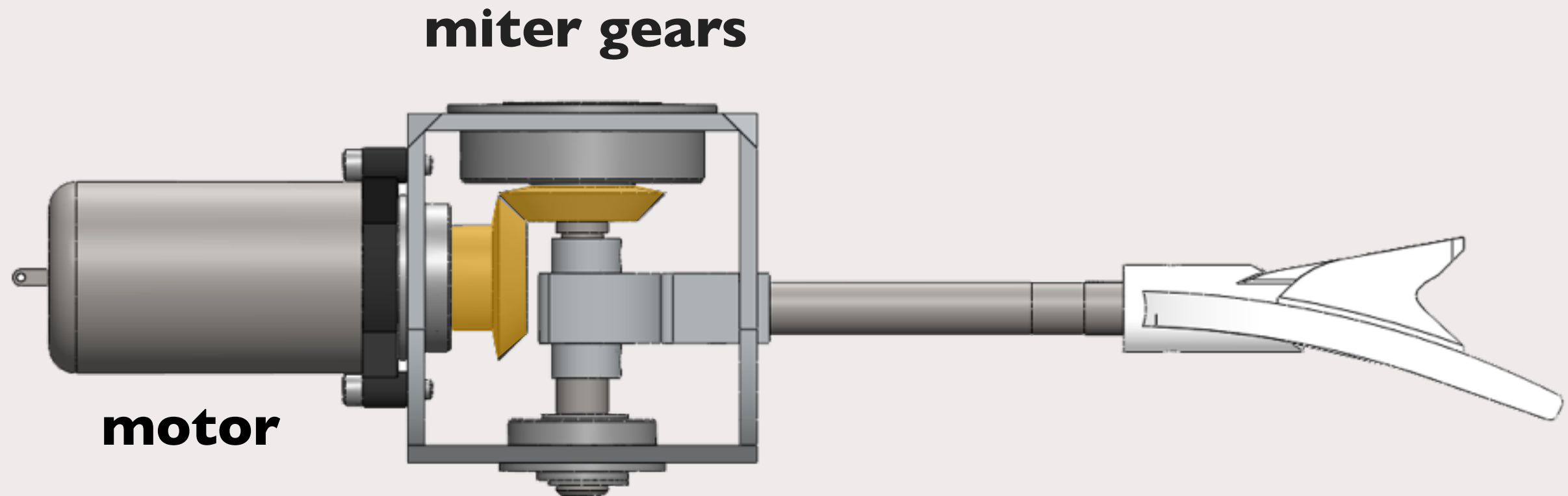
Eccentric Drive



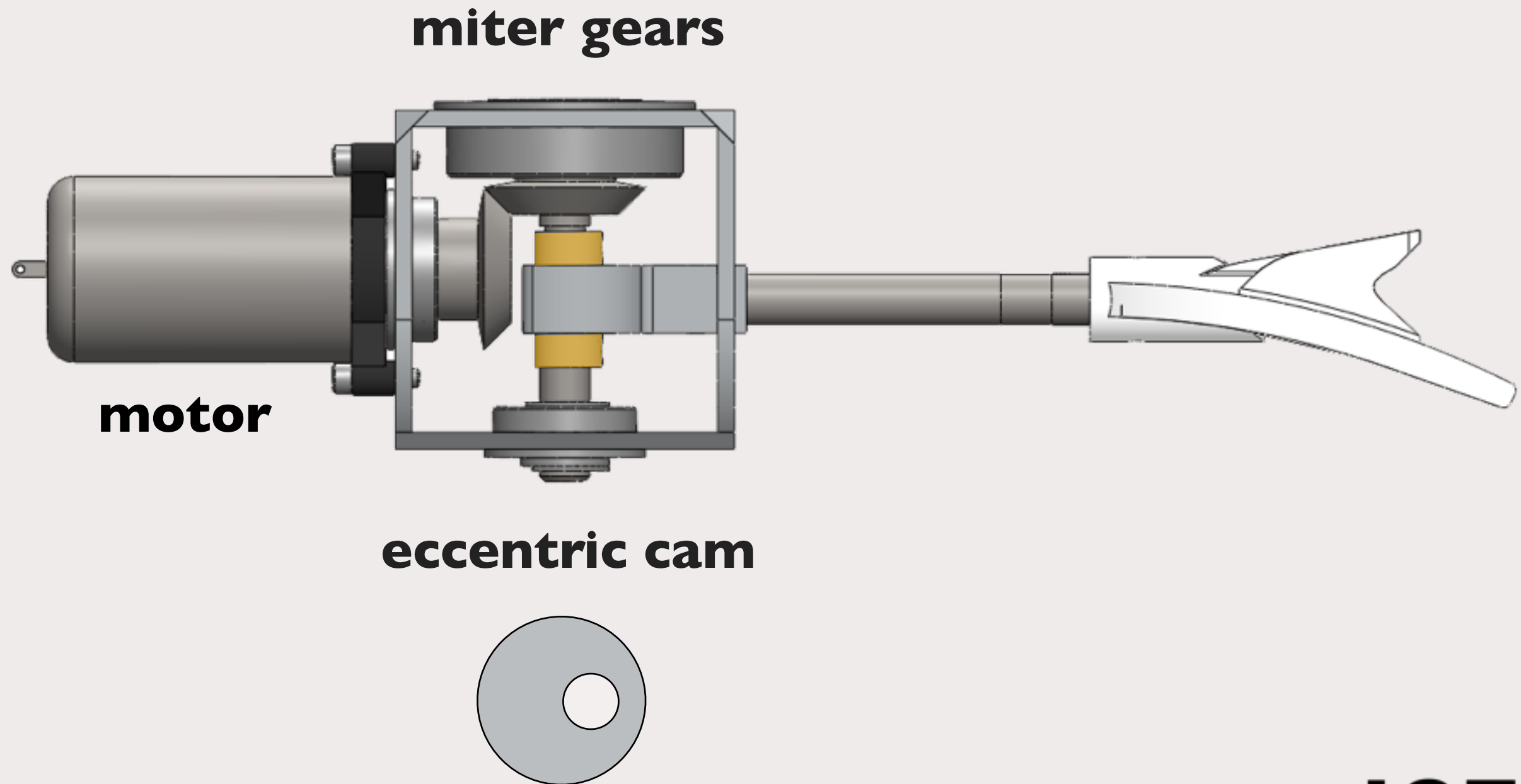
Eccentric Drive



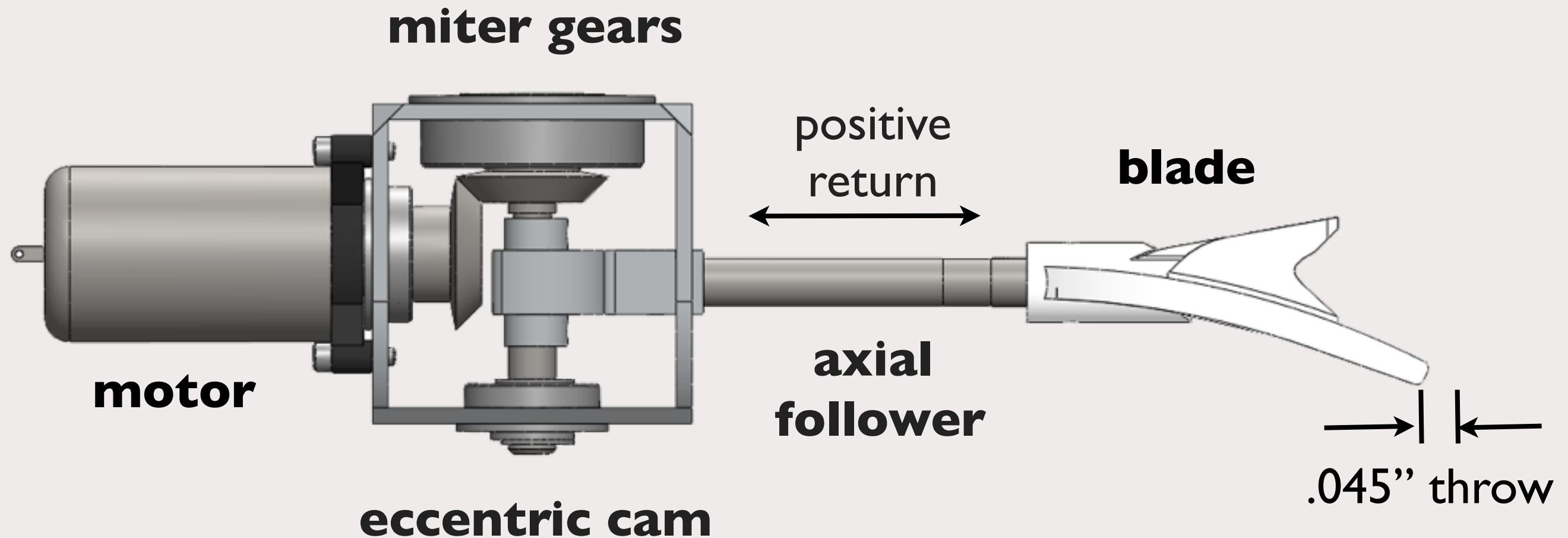
Eccentric Drive



Eccentric Drive

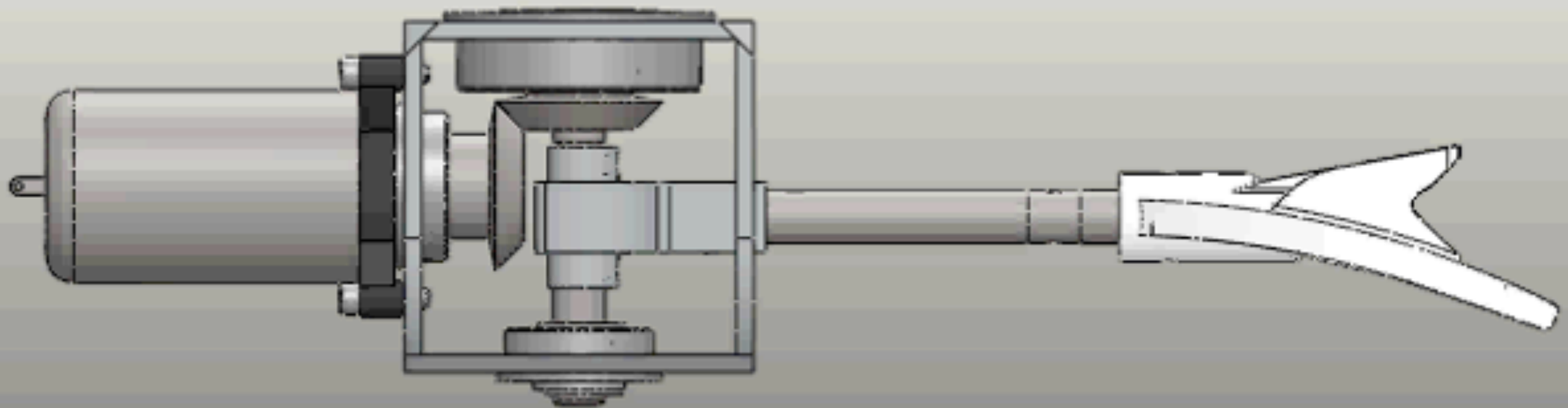


Eccentric Drive



Actuation Simulation

Actuation Simulation



Powering IceTek

Lithium NanoPhosphate Chemistry

Excellent cold weather performance

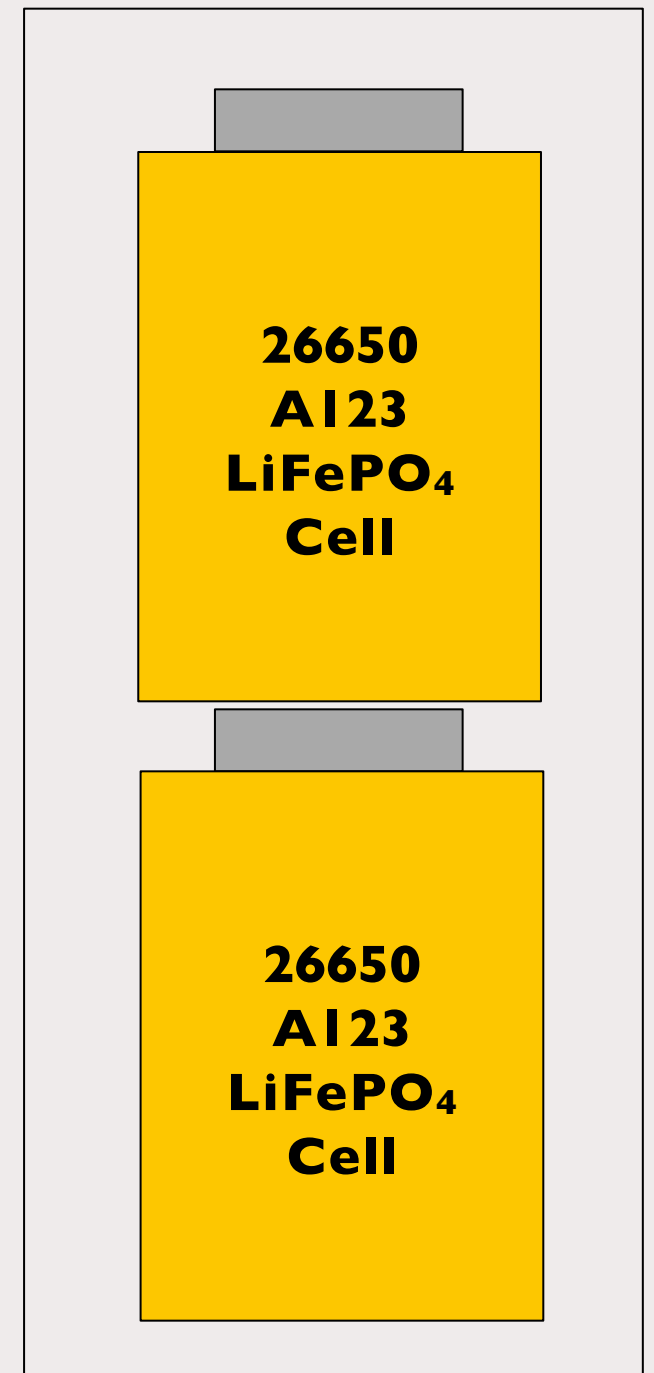
High energy density: 20 minutes of use

Safe, eco-friendly

Lightweight

Tradeoff: cost

Batteries



Powering IceTek

Lithium NanoPhosphate Chemistry

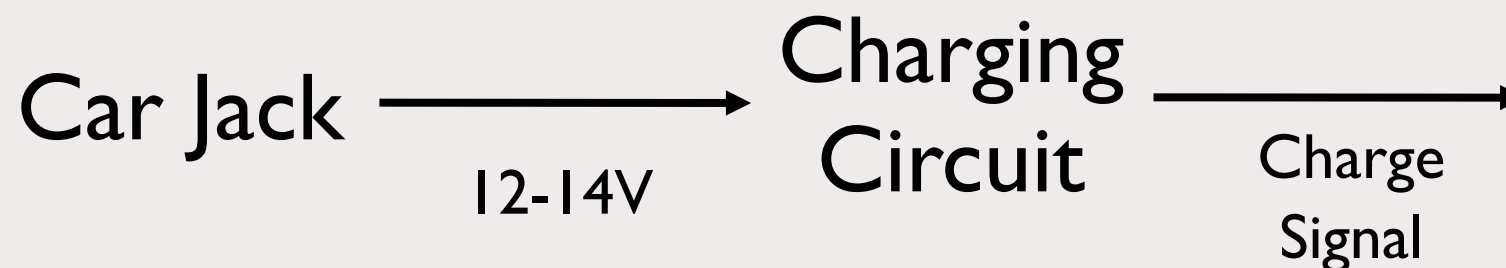
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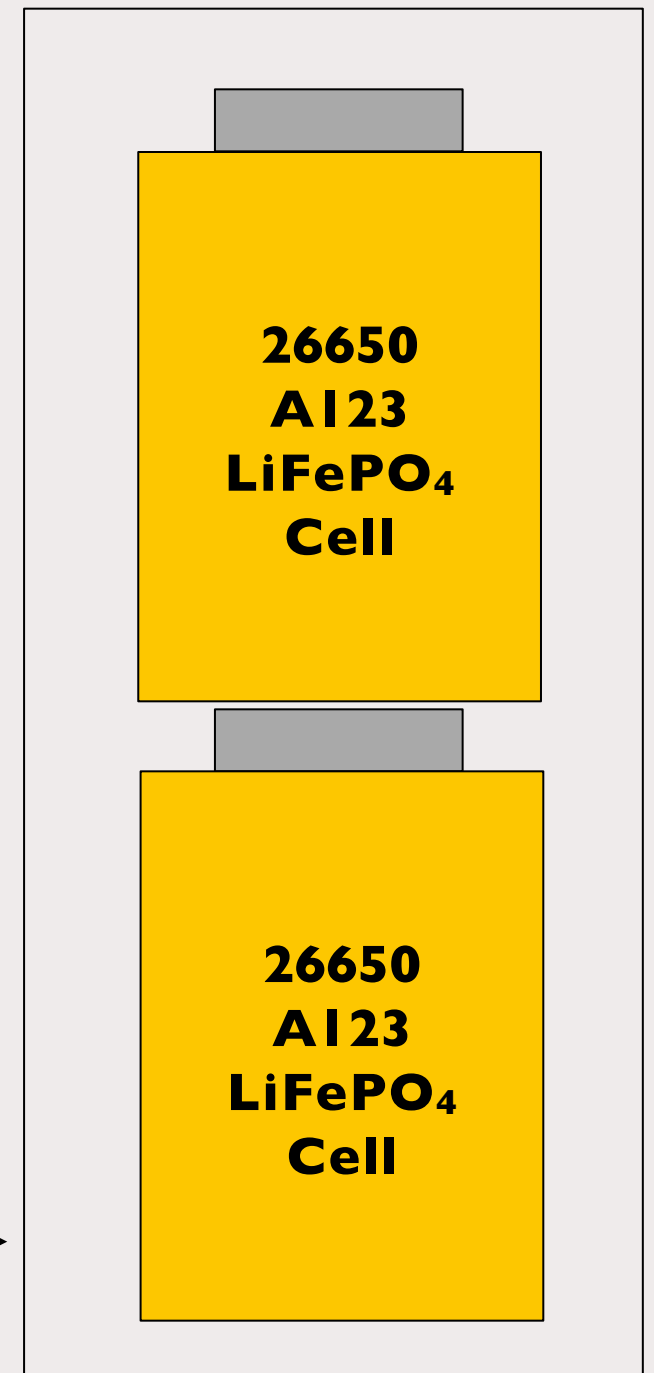
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Batteries



Form Development

Form Development

Anthropometric database
NASA

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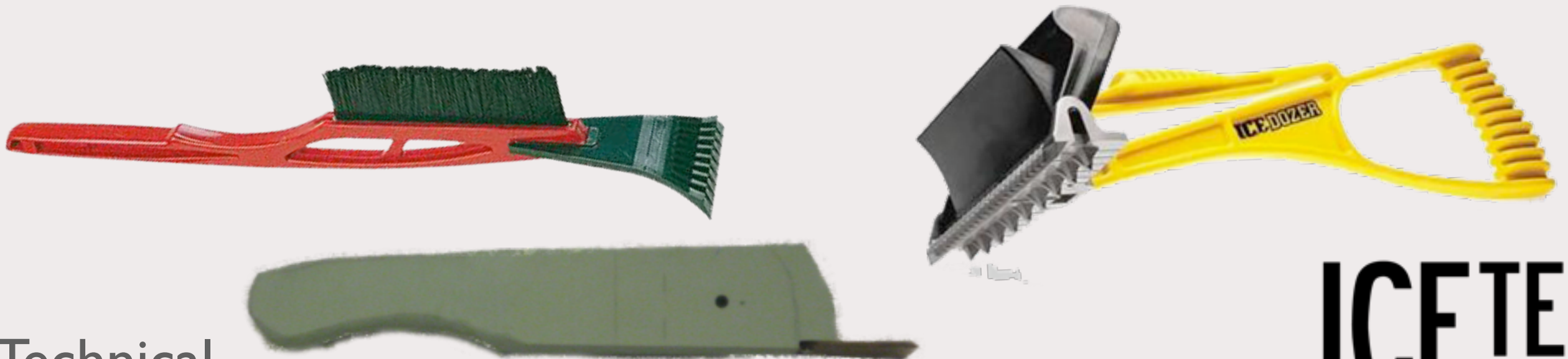
Hand tool ergonomics
Canadian Centre for Occupational Health and
Safety

Form Development

Anthropometric database
NASA

Hand tool ergonomics
Canadian Centre for Occupational Health and
Safety

User testing
Foam models & Popular scrapers on the market



Technical

ICETEK

Ergonomic User Needs



User-Defined Needs	Implementation
High end aesthetic	Sleek contours
Freedom of grip	Integrated smooth profile
Increased reach	2.5 feet from blade to end grip
Grip sized for all user groups	Handle diameter is 1.25 in
Straight forward user interface	Toggle button switch

Blade



Ice Scoring Head

Brass Blade

Final Design



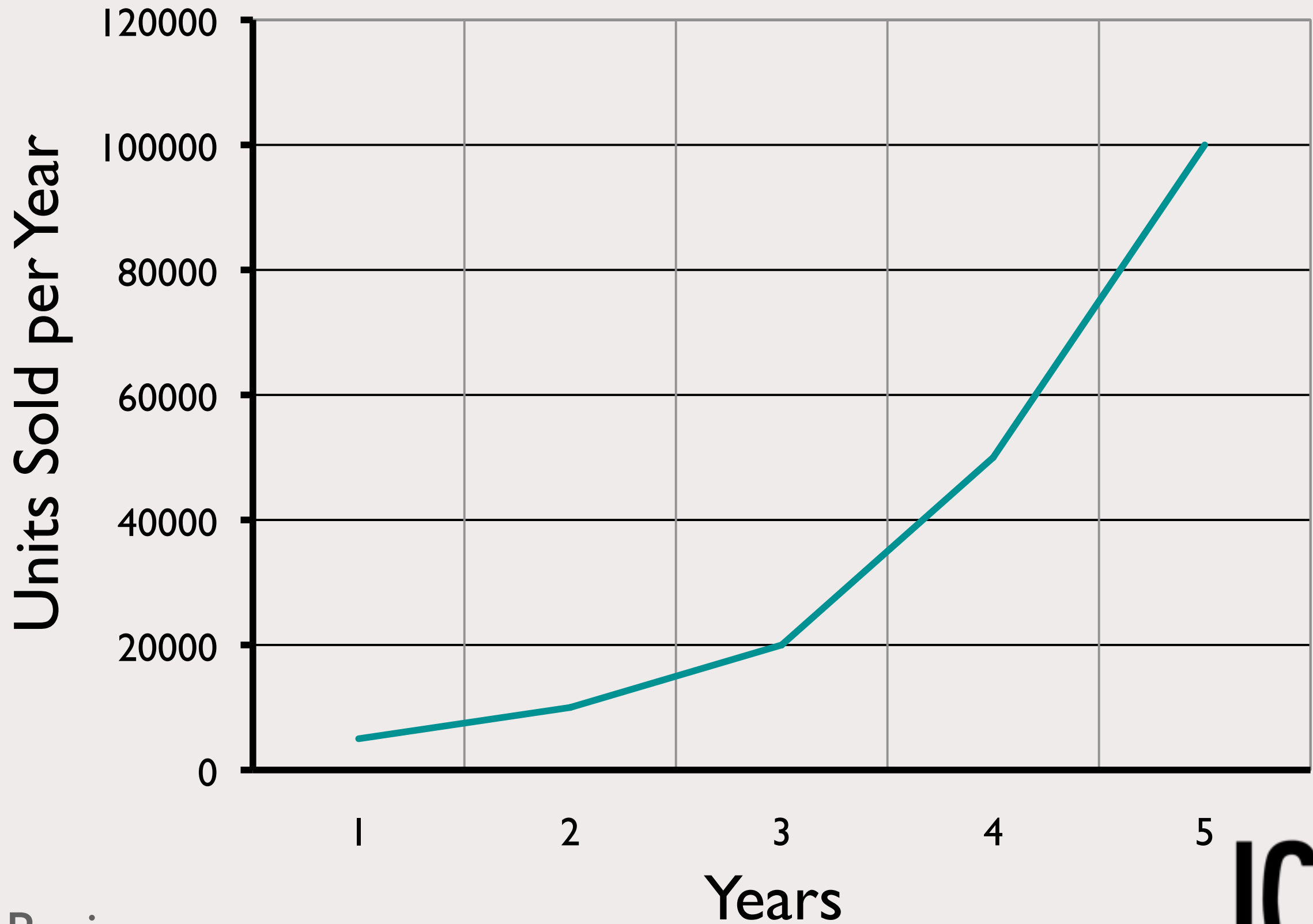
Market Data

Power tool market: \$10.3 billion

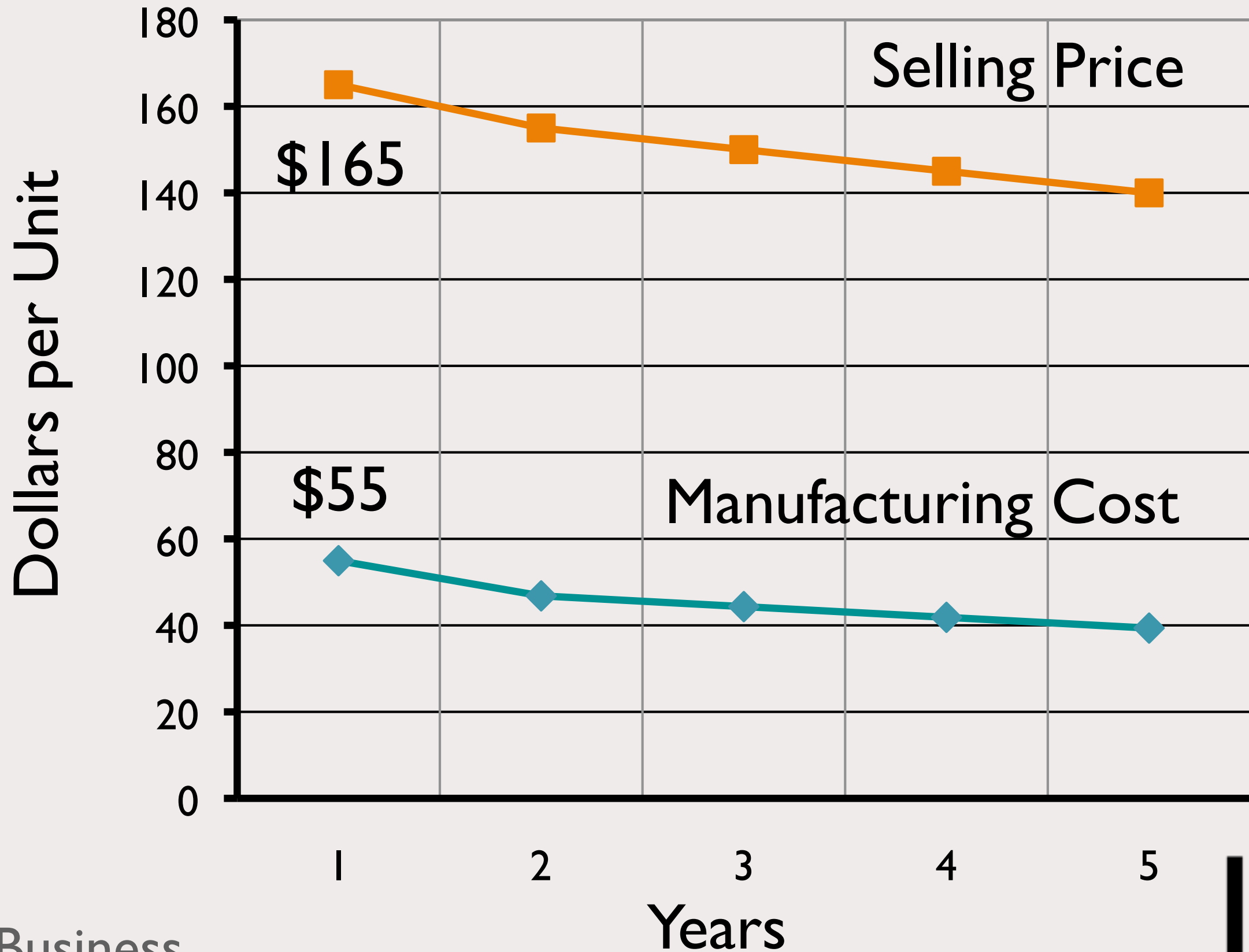
Snow & ice tool market: \$70 million
14 million tools sold annually

Our market: **1,000,000 customers**

Annual Sales



Price & Costs



The Bottom Line

Sales Price: \$165

NPV: \$1.3 million

Investment: \$350,000

ROI: 80%

IceTek:

The Next Generation

Reduce the size of gearbox (form factor)

Revise design based on mass production

Establish easier assembly methods

Acknowledgements

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Justin Coutu, *R&D Technologies*

Dick Fenner

Joe Cronin

Steve Haberek

Jim Dudley

Bob Nuttal

Fred Cote

400 User Survey Respondents

Back up

Power Decisions

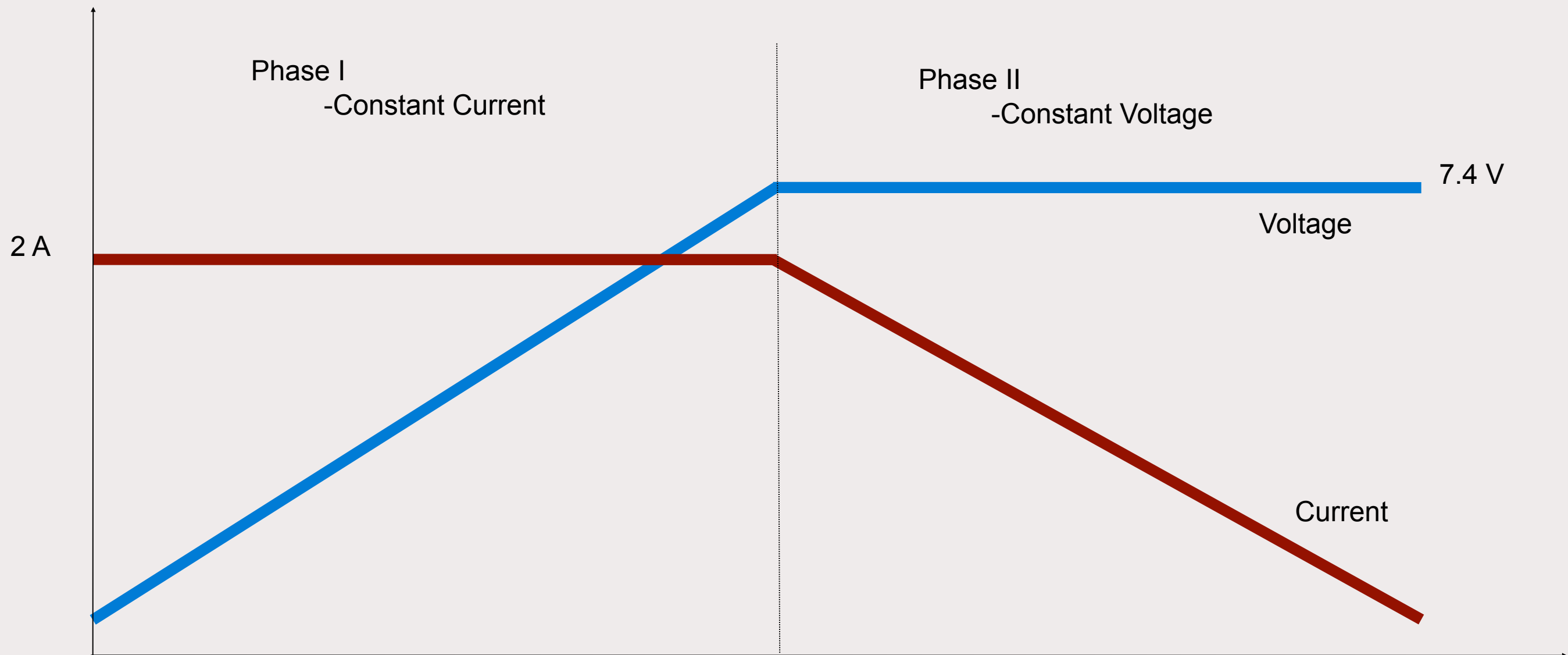
Cord

- Always Ready
- Long Life
- Prohibitively Unwieldy

Cordless

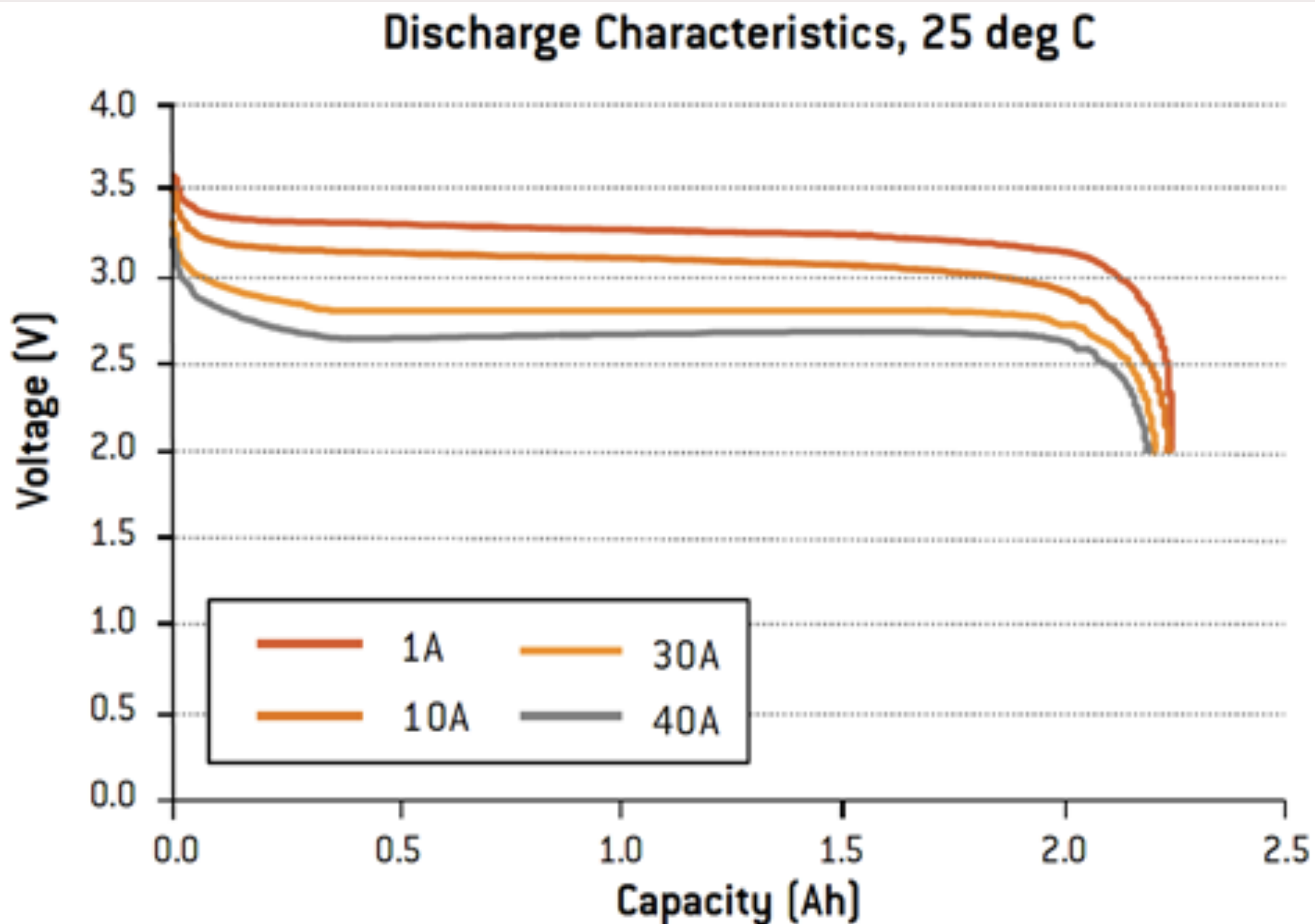
- Charging Required
- Limited Battery Life
- Maneuverable

Charging



- Built in Car Charger Circuit
- Charging Procedure:

Charging



Charging

