CZAR CAR

Revolutionizing

the Way

You

Drive

Presented by: Galina Shpuntova
Chinonso Enwerem
Ryan Oblenida

Electric Cars

- Pros
  - Efficient
  - Clean
  - Quiet

- Cons
  - Recharge time
  - Range

What is CZAR Car…

Refuleable

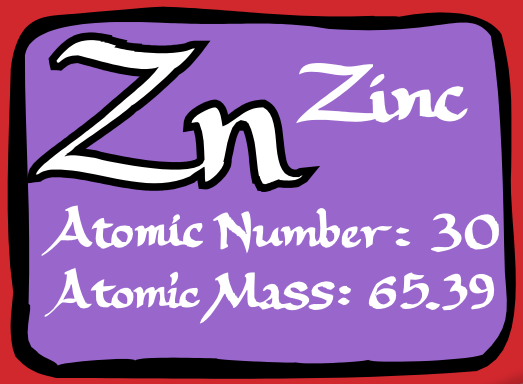
Clean

Zinc

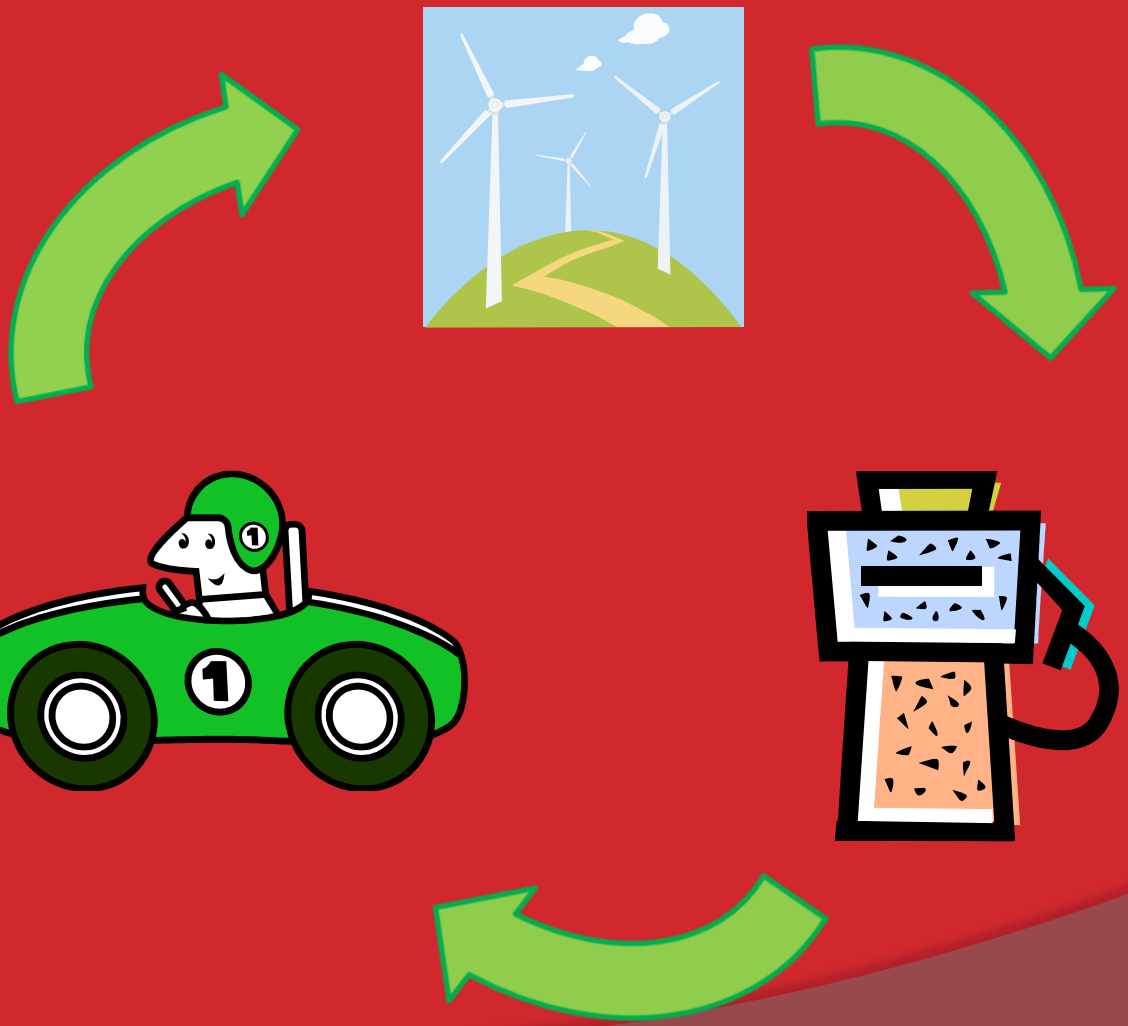
Air

Zinc

- Abundance
- Renewability
- Cost



The Zinc Economy

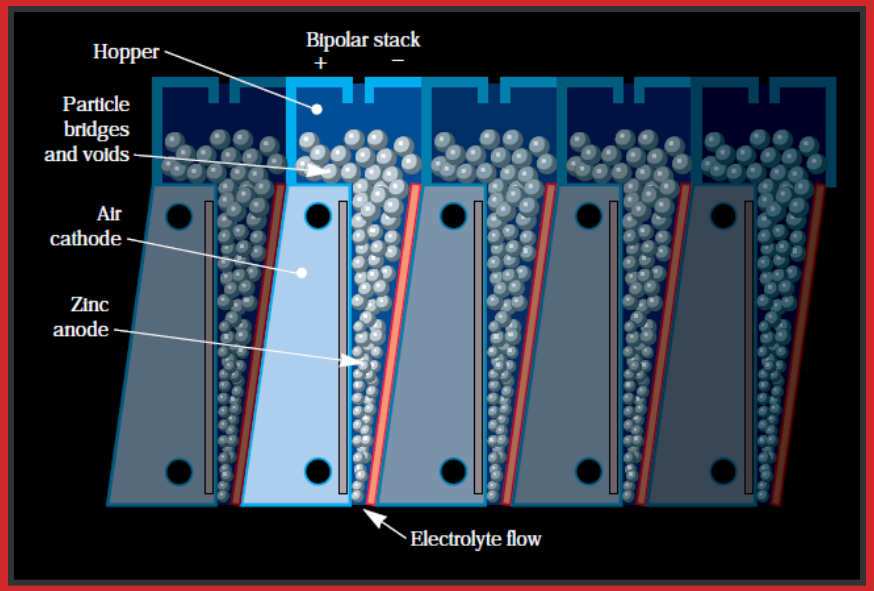


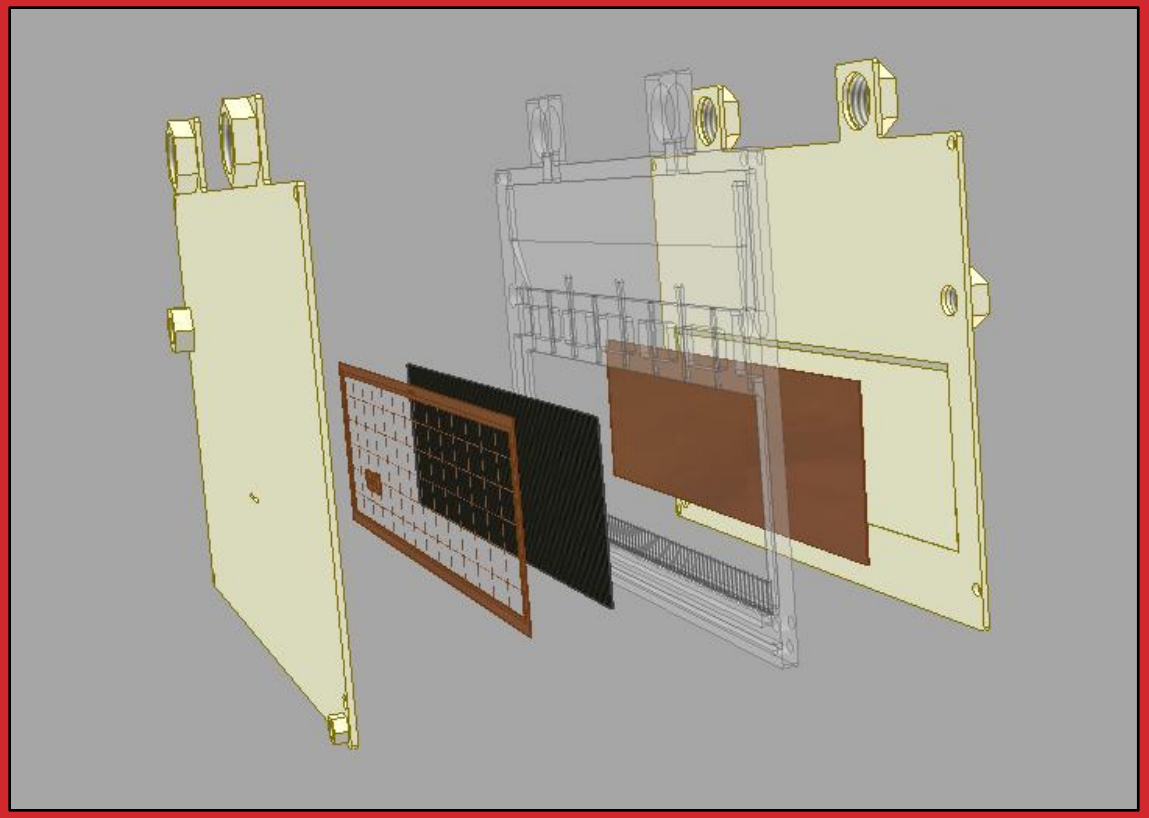
Group Dynamics

- Battery Team
  - Zinc-air battery design
- Car Team
  - Conversion of truck
- Promotion Team
  - Proposal writing

Battery

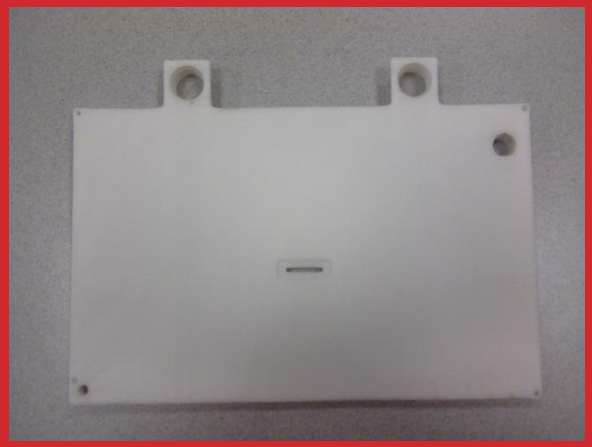
- Zinc-Air battery
  - Cooper
- Design
- Prototype

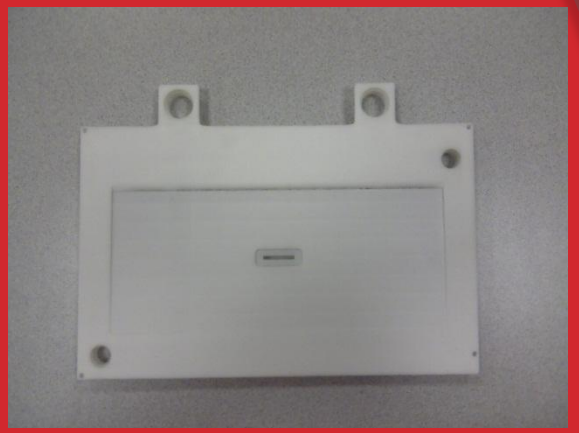




Prototype Design

Manufacture





Assembly

Testing

Zinc

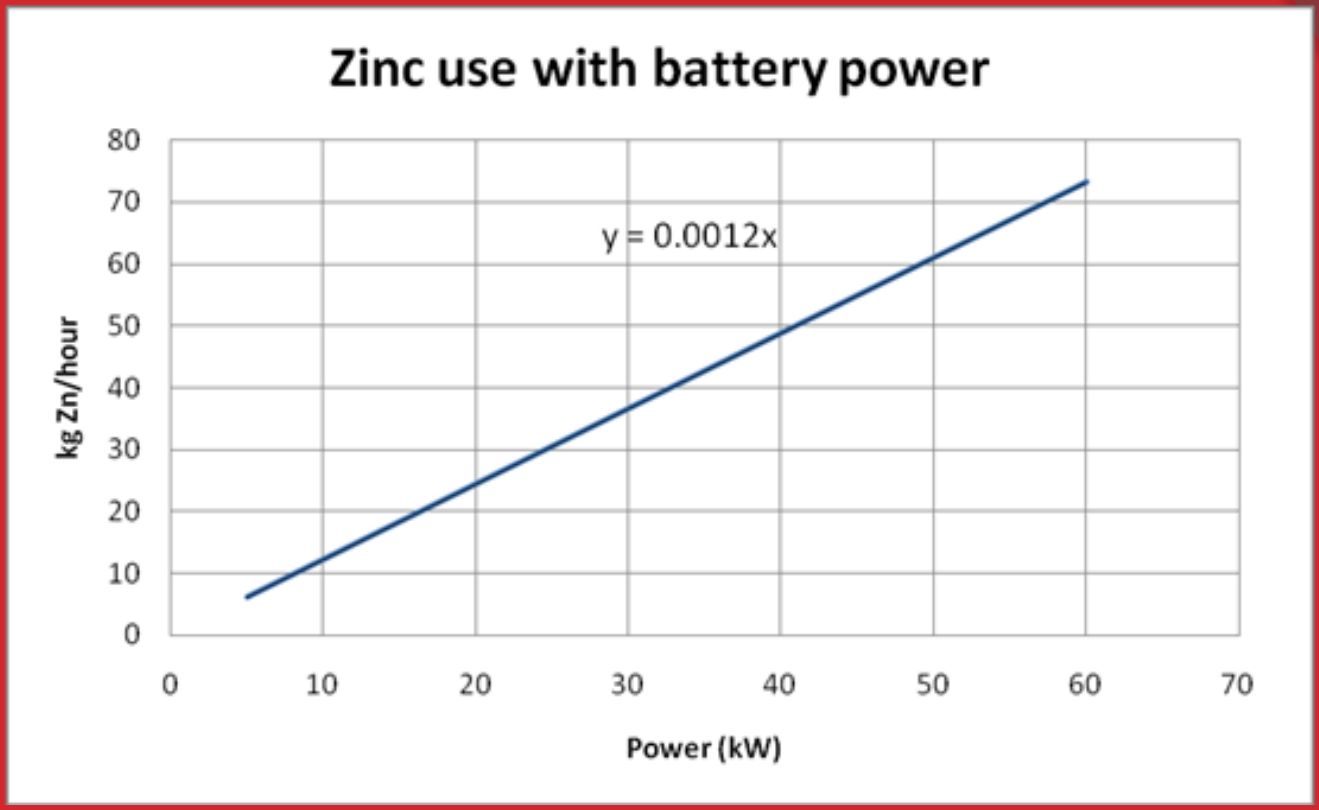
Volts (voltage)

Zinc Oxide

Assembled Battery

Connected Battery

milliAmps (current)

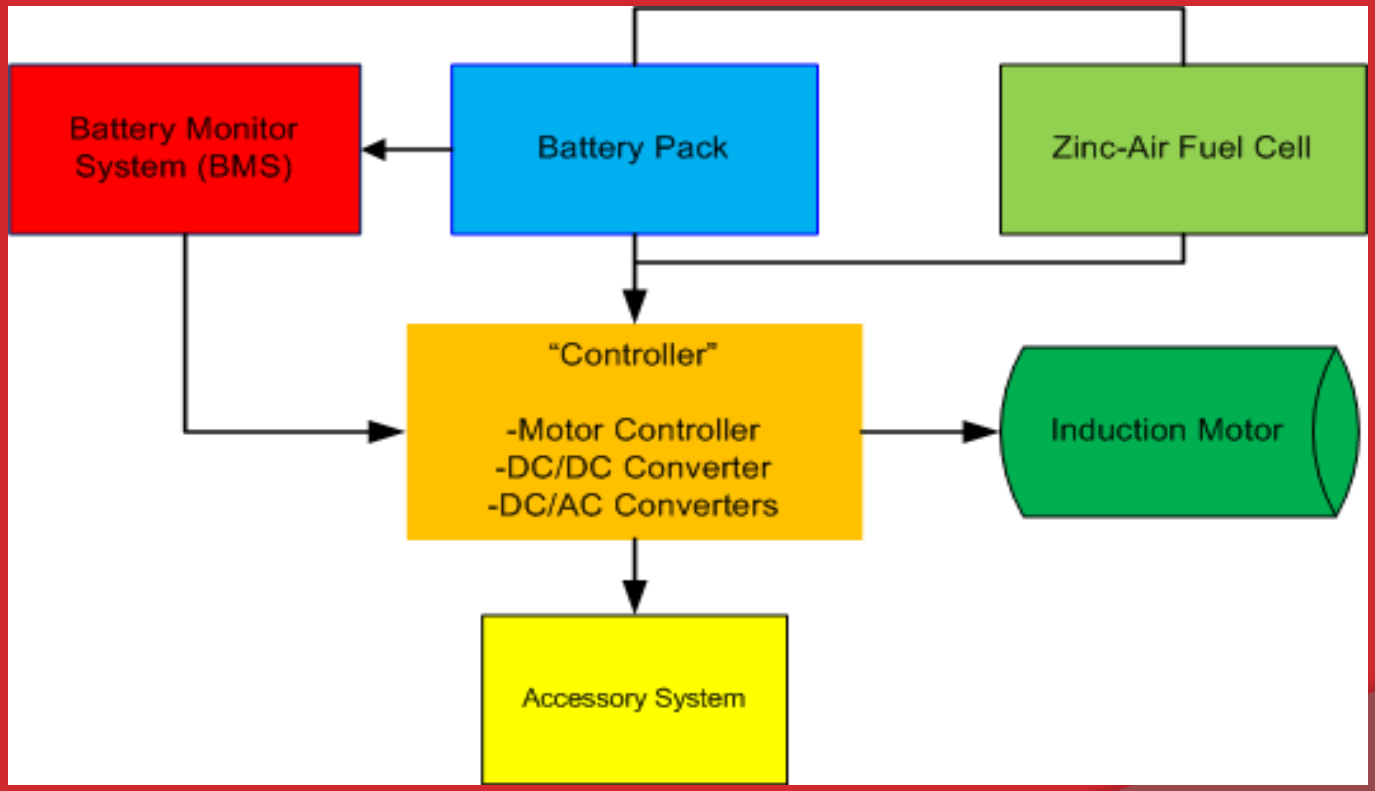


Performance Specs, 150 V Stack			Per Cell	Per Stack	
Power (kW)	Voltage (V)	Current (A)	g Zn/hr	kg Zn/hr	L Zn/hr
45	150	300	366	55	7.7
15	150	100	122	18	2.6
20	150	133	163	24	3.4

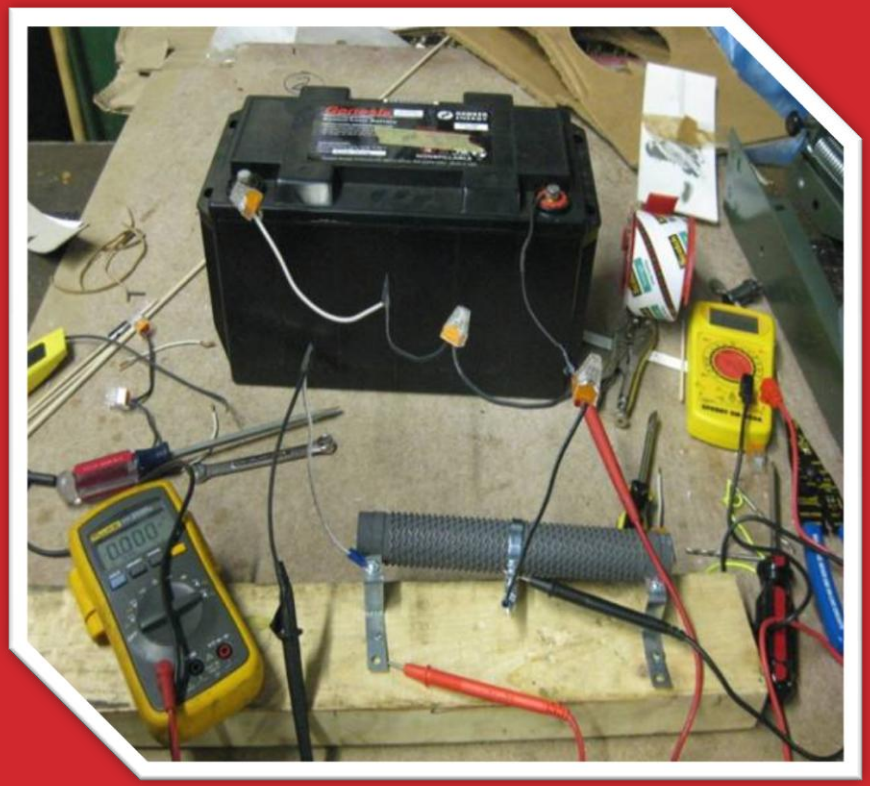
Vehicle Team

- 2 Chevrolet S-10s
  - Donated by Argonne Laboratories
  - Conversions by Enova Systems
    - No Documentation
  - 3-Phase AC Induction Motor
  - 300V Battery Pack
- Assistance
  - Pioneer Conversions

Overall Operation

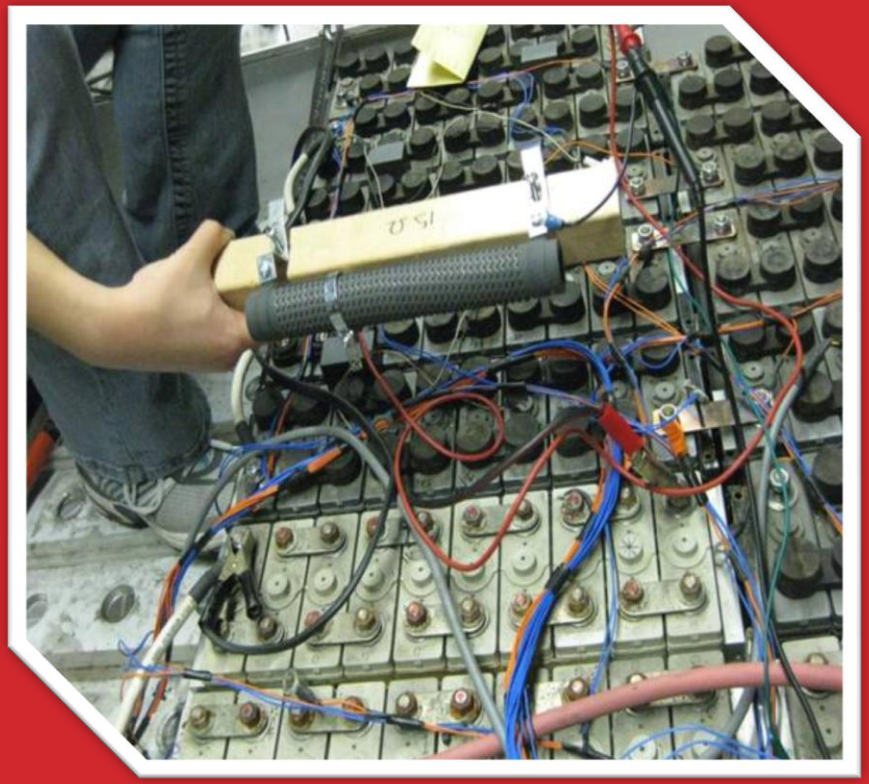


Secondary Battery



Lead-Acid Batteries

- Pros
  - Relatively Cheap
  - Low self-discharge
  - Low maintenance requirements
- Cons
  - Low energy density (Heavy)
  - Environmentally unfriendly

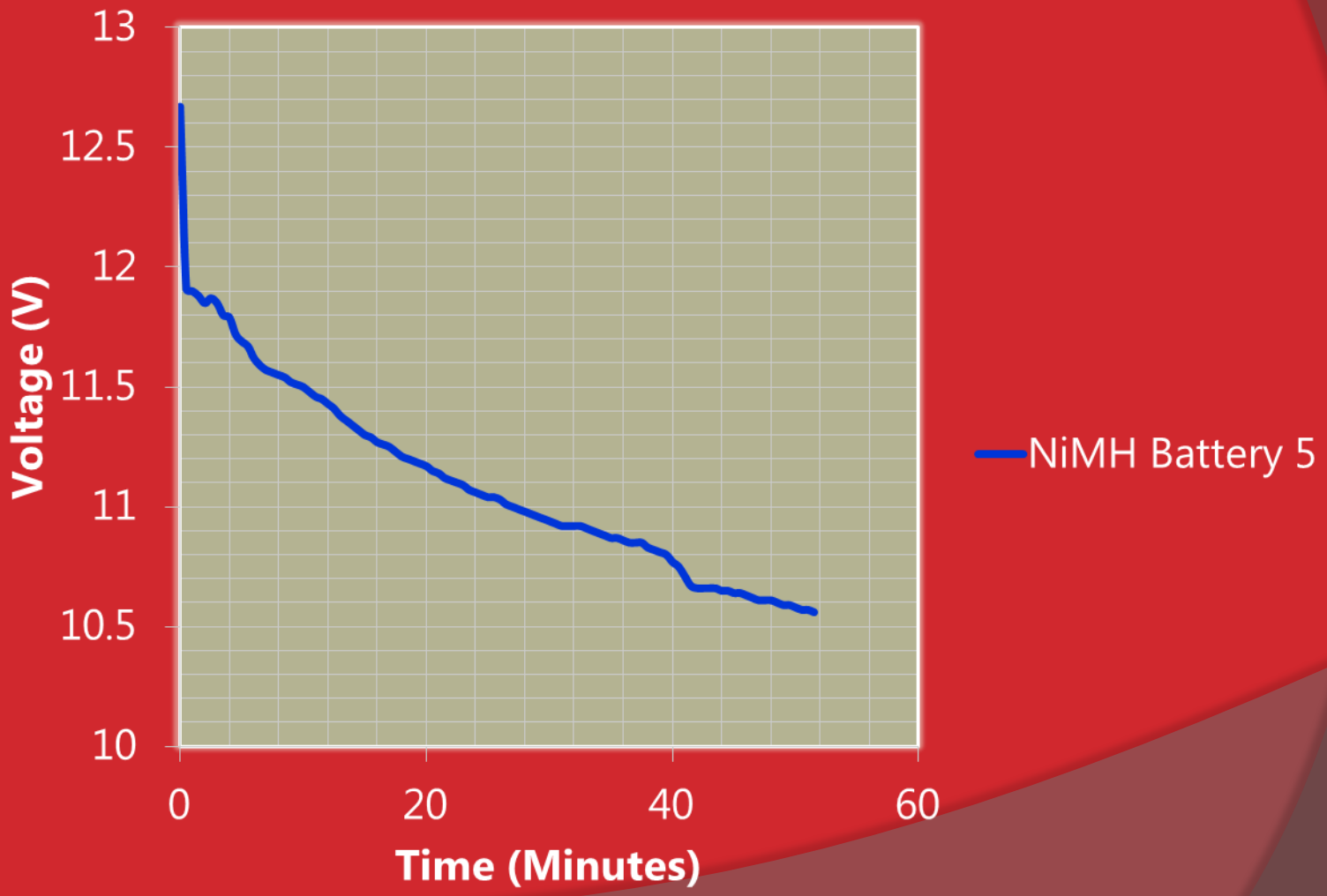


NiMH Batteries

- Pros
  - Environmentally friendly
  - Relatively higher energy density
- Cons
  - Higher self discharge
  - Expensive
  - Requires high maintenance
  - Complex charging procedure

NiMH Battery

Graph showing Discharge of NiMH on the Good Battery



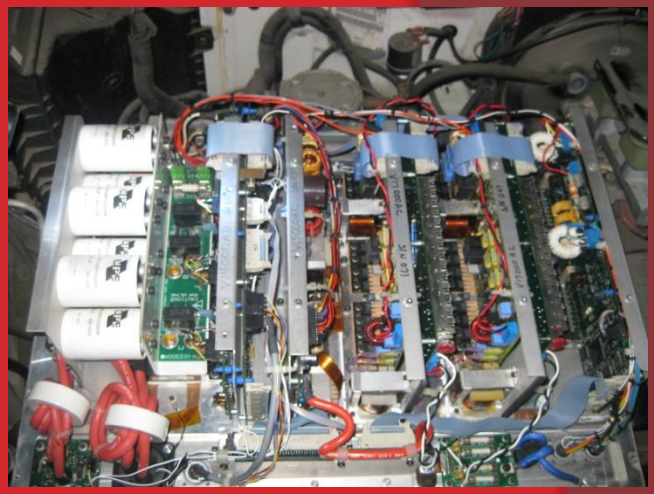
Battery Monitoring System

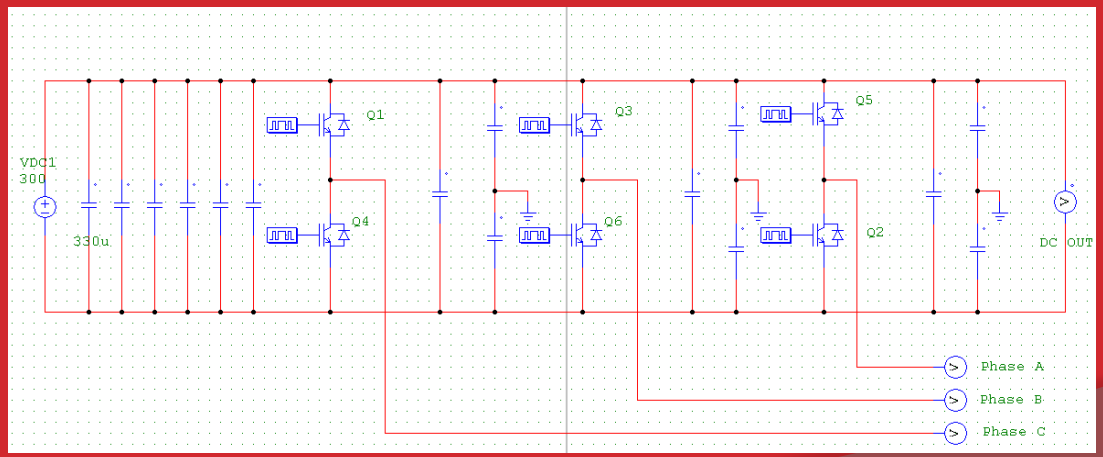
- Prevents battery from going out of limits (Upper and lower)

- Faulty, thus preventing controller from working.

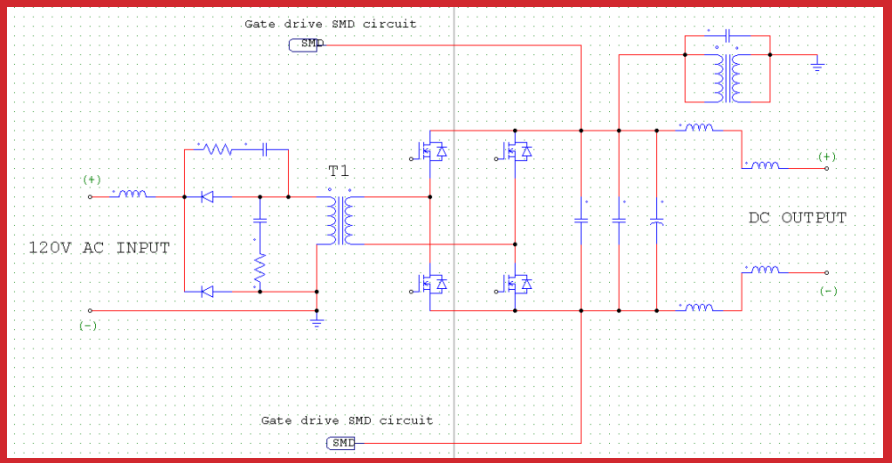
Controller Analysis

- Motor Controller
  - DC/AC Inverter
  - Restricted by BMS





- Battery Charging Circuit
  - On-Board Charger(?)
- Accessory System
  - DC/DC Converter (12V Acessories)
  - DC/AC Inverter (Vacuum Pump)



Plans for Next Semester

- System Redesign with Pioneer Conversions
  - Simplicity, Safety, and Support
  - DC System at about 144V
  - Motor, Controller, Monitoring Systems

Re-Fueling Concept

- Location
- Pumping Methods
- Station to vehicle specifics

Fund Raising

- Recent proposals
  - NCIIA- $30,000
  - NCIIA\ASME - $10,000
- Secured
  - Exelon- $15,000
  - WISER- $ 12,000
  - Argonne- $ 12,000
    (donated vehicles)

Budget

Item	Unit Price	Units	Item Total
Vehicle			
Vehicle Purchase[1]	$6,000.00	2	$12,000.00
Secondary Battery	$19.00	180	$3,420.00
Miscellaneous Parts	$1,580.00	1	$1,580.00
Electronics and Control System	$1,000.00	1	$1,000.00
Performance Testing	$1,000.00	5	$5,000.00
Group Total:			$23,000.00
Zinc-Air Battery			
Refueling System (Design & Build)	$8,600.00	1	$8,600.00
Current Collector	$100.75	26	$2,619.50
Air Cathode[2]	$500.12	26	$13,003.12
Plastic Frame	$368.13	26	$9,571.38
Zinc	$46.79	26	$1,216.54
KOH	$70.00	26	$1,820.00
Assembly Parts & Equipment	$295.00	1	$295.00
Group Total:			$ 37,125.54
Promotion			
Miscellaneous Promotional Expenses	$500.00	1	$500.00
Group Total:			$500.00
Total Projected Expenses:			**$ 61,625.54**

Questions?