DRINKIFY

Soda Dispenser

Capstone II Design Project
Final Presentation

Meet Our Team

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PROBLEM

Current soda dispensers are expensive, bulky, and inaccessible for use in homes and small businesses.

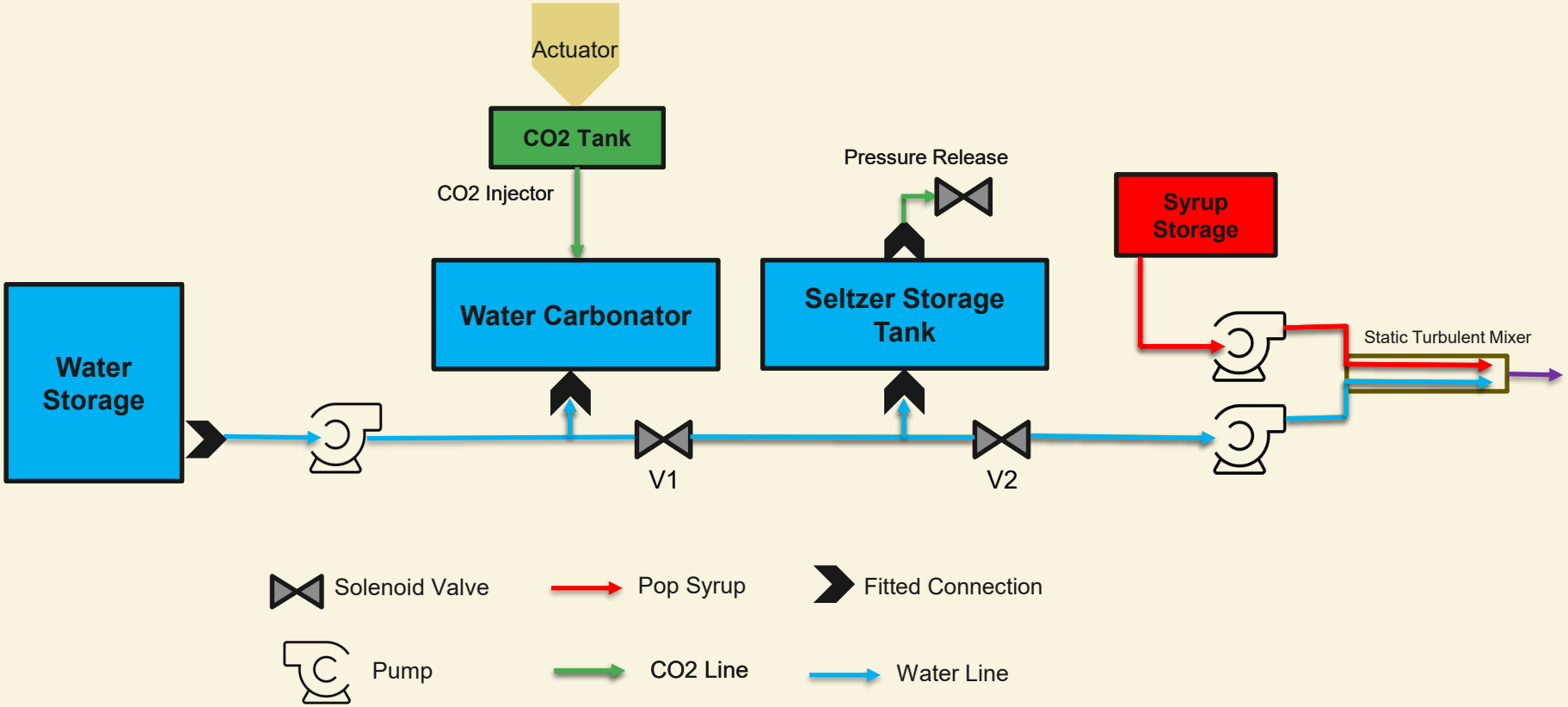
SOLUTION

A cost effective, space efficient, modular soda dispensing machine that can be used in homes or small businesses.

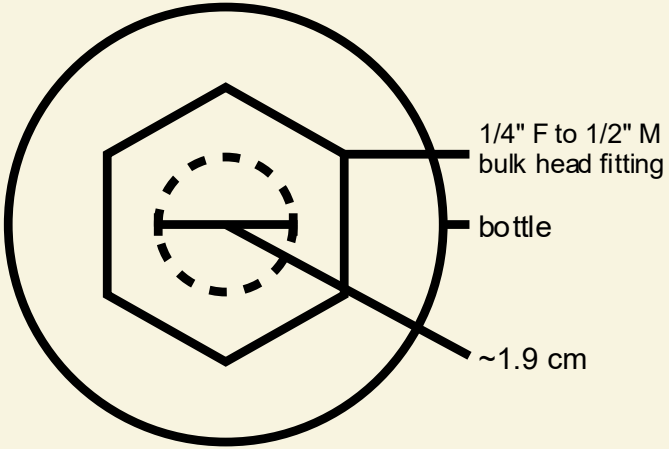
Pairwise Chart

Criteria	Cost Effectiveness	Size Efficiency	Intuitive User Experience	Modular & Scalable Design	Maintainability	Total
Cost Effectiveness	*	1	1	1	1	4
Size Efficiency	0	*	1	1	1	3
Intuitive User Experience	0	0	*	0.5	0.5	1
Modular & Scalable Design	0	0	0.5	*	0.5	1
Maintainability	0	0	0.5	0.5	*	1

Overall System

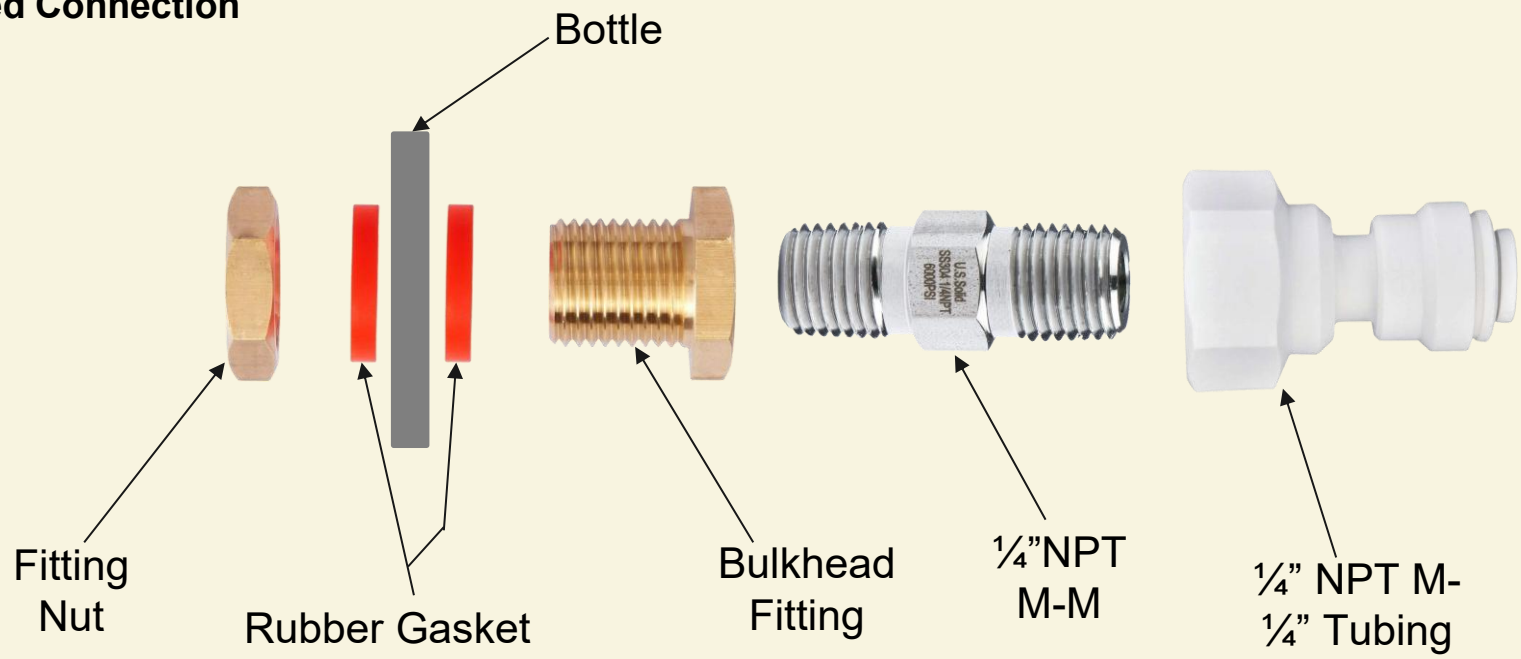


Bottle Modifications

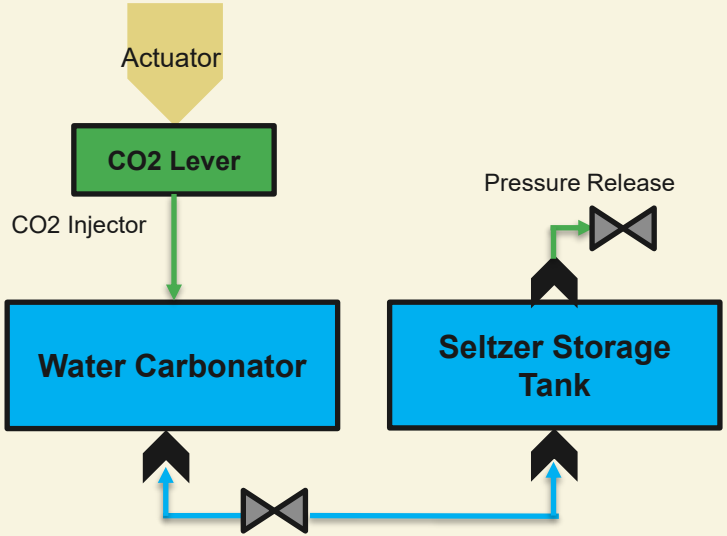


Bottle Modifications

Fitted Connection

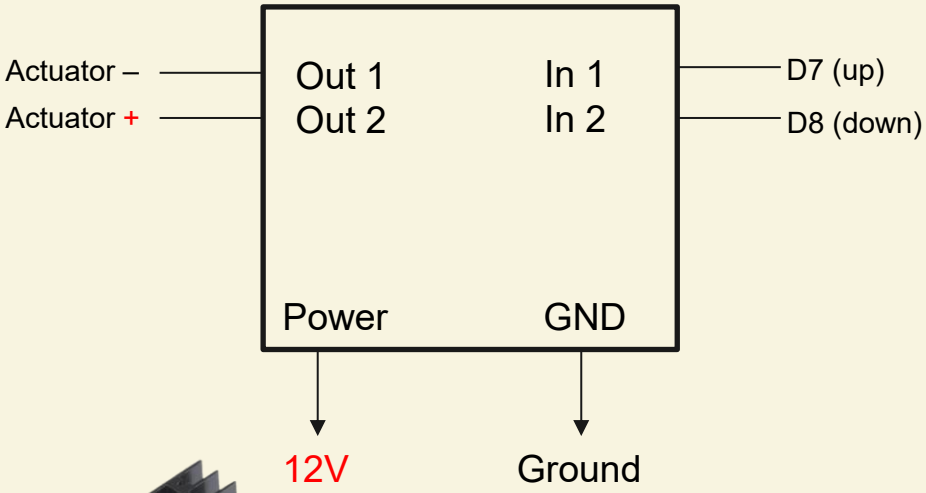


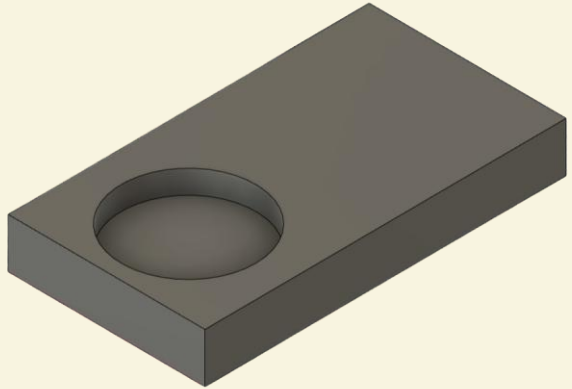
Carbonator and Storage



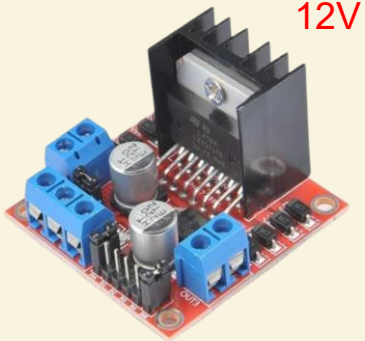
Pressure equalization causes carbonator to drain to storage

Actuator and H-Bridge

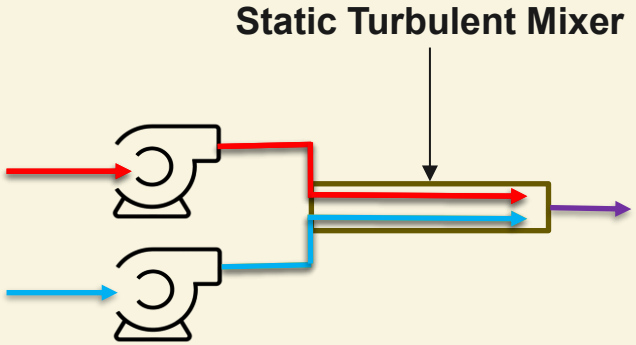


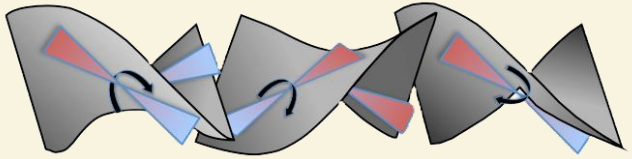


Press-fit attachment for SodaStream lever to make it easier for actuator to press down



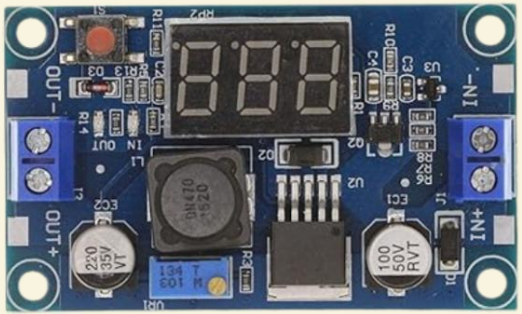
Syrup Mixing





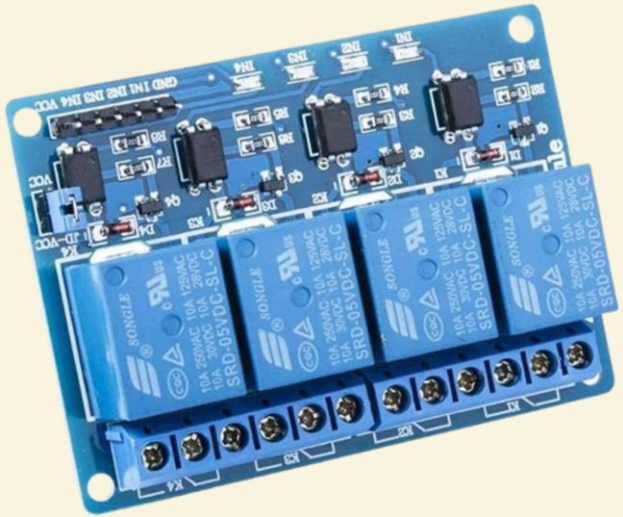
Turbulent Flow causing Radial Mixing

3D printed static mixer insert

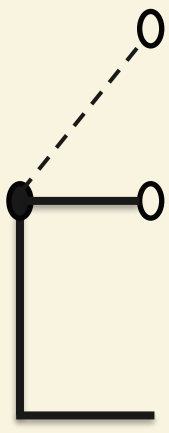


Voltage Regulator

Relay Wiring



D10 → Signal pin 1

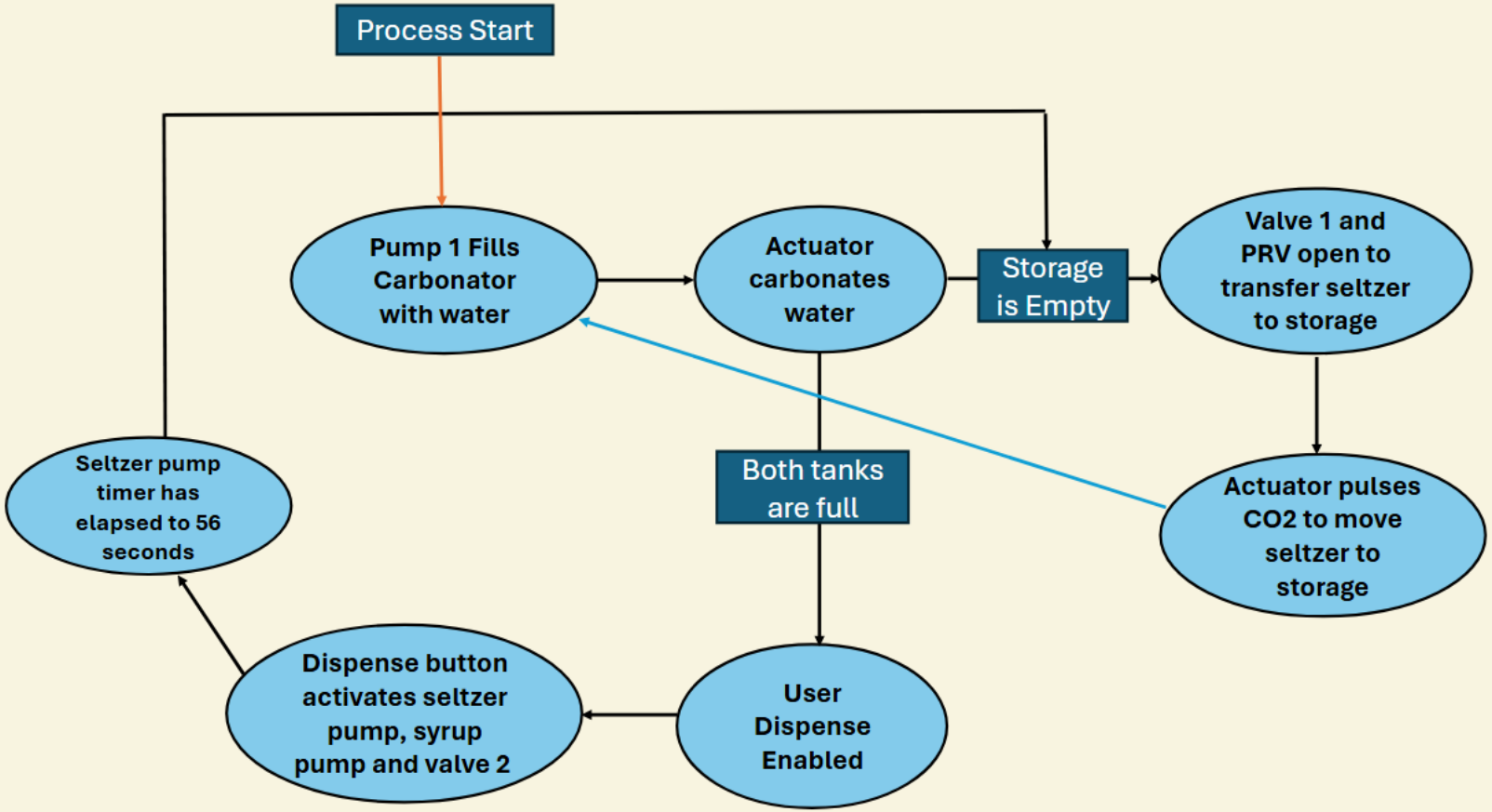


+12V

Pump V+ Terminal

Arduino is able to control
12V components using relay

Process Flow



Video Demo

Challenges Faced

Preventing Leaks in Threaded Connections:

- All threaded joints were sealed with Teflon tape to prevent any leaks during carbonation.

Excess Pressure / Water Shooting Out

- Tuned carbonation timing to avoid over pressurizing the system
- Added a relief tube connected to a secondary bottle to safely collect excess water

Finding the Correct Carbonation Duration

- Different carbonation timings produced inconsistent results because the actuator moved and didn't press consistently
- Mechanically stabilized and locked down the actuator to ensure repeatable presses
- Performed multiple tests to determine the optimal carbonation time

High Current Draw

- Estimated maximum current draw was 8 amps

12V 20A PSU

In the Future

Sensors for Smart Monitoring

- Integrate flowrate sensors
- Integrate level sensors

Improved User Interface

- HMI
- Dispenser Housing

Full IoT Integration

- Remote Monitoring
- Alarms
- Self-Diagnostics

Replace Linear Actuator

- Have more accurate and controllable process for CO_2 injection

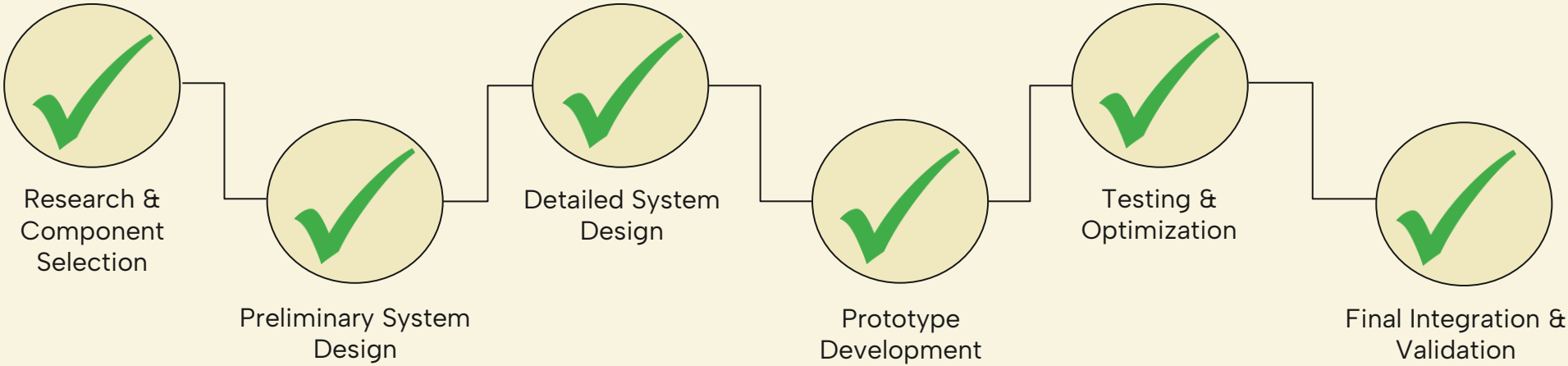
Cost Analysis

Initial Budget Goal = $600
Actual Spending ≈ $620.61

Breakdown of Key Cost Drivers

- **Pumps (Water + Syrup)** – Higher-quality 12V pumps increased reliability but exceeded expected cost
- **Trial-and-Error Additions** – Some components were purchased based on initial assumptions, while others were added later as needs emerged, contributing to extra costs.
- **Electronics & Relays** – Additional relays, wiring, and protection components increased cost slightly
- **Mechanical Components** – Structural materials such as wood, metal legs, and mounting hardware contributed to higher overall costs

PROJECT TIMELINE



Thank You

Questions?

Your feedback would
be appreciated!