Presentation 1: Project Need Identification

Design Team 03:
Margo Dufek, Andrew McCarthy, Leanne Willey, Katherine Carroll

Oct 2, 2012

Presentation Objective:

To provide a brief overview of our design project's need, specifications, and plan.

Presentation Overview

Discuss the following:

- Customer Need
- Preliminary Design Questions
- Problem Statement, goal, test environment, constraints etc.
- Design Criteria
- Project Timeline

Customer Need

- Harnessing Wind Energy From Recyclable Materials
  - 0.5 kWh per day
  - Cost not exceeding $50.00
  - Easily assembled and moved
  - Intended for use in third world countries
  - Durable design for high wind speeds
  - Made from easily available (recycled) materials

Preliminary Design Questions

- Expand on what is meant by “Recyclable” Materials vs. “Materials readily available in a junk yard or local store.”?
  - *Your project will consist of reusable materials that you will be able to find in a junkyard.*
- The United States junkyards contain more technological advanced products then most third world countries. What regional constraint for products should we follow?
  - *You will need to be able to find the same items in rural places.. try to find out generic objects. “Want to make something out of junk that is useful.”*
- What are a few main locations were this product may be used?
  - *A rural country that is limited by technology and supply.*
- In what location will our research take place?
  - *You must first calculate the wind speed required to produced the amount of electricity needed. Once you have done that, you can test your turbine here in flagstaff or another local area that produces the necessary wind speeds.*

Preliminary Design Questions (cont.)

- Does this project include just the device or the energy storage system as well?
  - *This will include an energy storage system as well, like a battery.*
- Do you have any geometric, weight or size specifications?
  - *Two people must be able to dissemble it and move it without any help from a vehicle.*
- Do we have a constraint to which axes the turbine will be built? Horizontal or Vertical
  - *No, which ever you prefer.*
- Define “easily assembled, deployable, and dissembled”?
  - *Again, two people need to be able to move it and care it around, so not to big to where it needs to be moved by a car.*
- Can we only harness energy from wind?
  - *Yes, other forms of renewable energy are not readily available like wind is in most 3rd world countries.*

Goal

- Design an inexpensive, portable wind turbine system.

Objectives & Constraints

Objective	Basis for Measurement	Units
Portable	Total weight	kg
Portable	Total volume when disassembled	m^3
Easy to assemble and disassemble	Time required to assemble and disassemble	min
Withstand high wind speeds	Stress on turbine at 100 mph	MPa

Constraints:

- Total budget must not exceed $50.
- Weight should not exceed 100 lbs.
- Must generate and store at least 0.5 kWh per day.

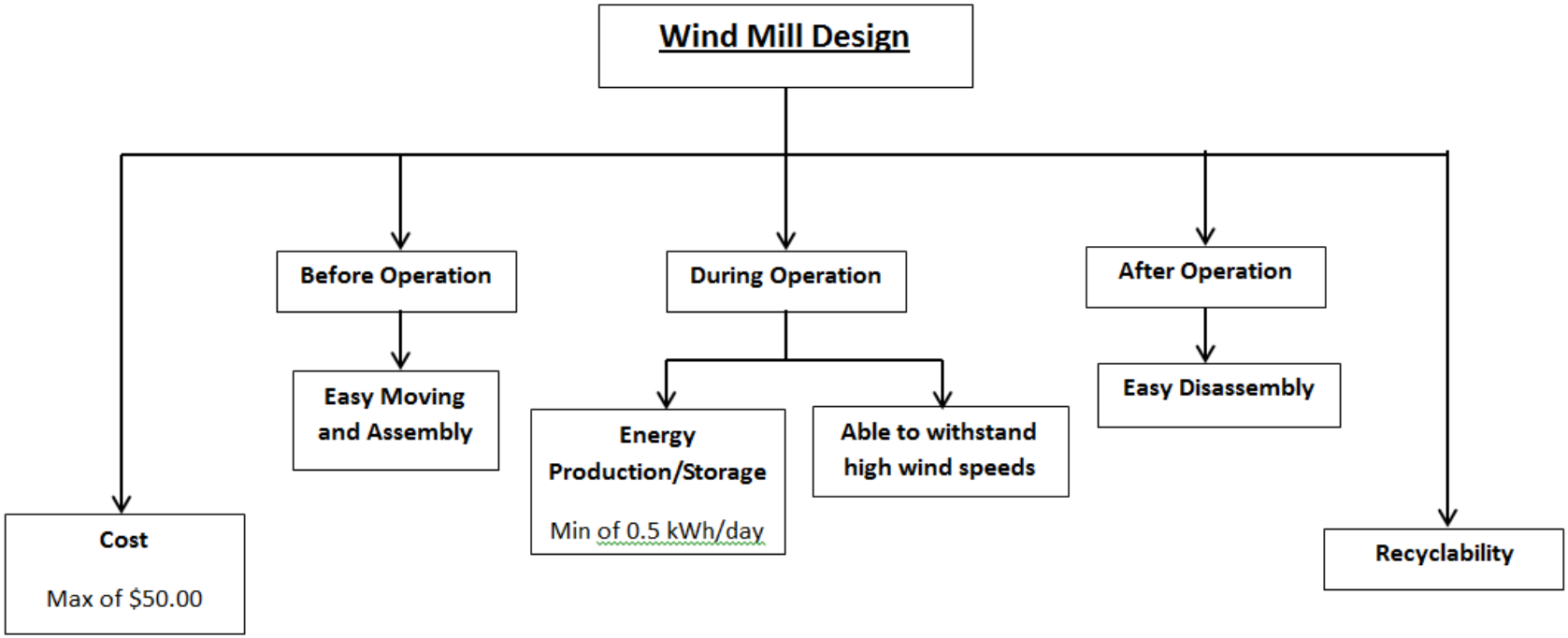
Test Environment

- Tested in or near Flagstaff, AZ.
- Range of wind speeds.

Criteria

Objective	Quantified Objective	Criteria
Inexpensive	Maximum cost of $50.00	• Cost
Recyclable	Available from local junkyards/stores	• Recyclability • Material availability
Energy Storage	0.5kWh per day stored	• Electrical storage capability
Easily assembled, disassembled, moved		• Physical construction • Materials • Set-up
Able to withstand high wind speeds		• Materials • Design strength

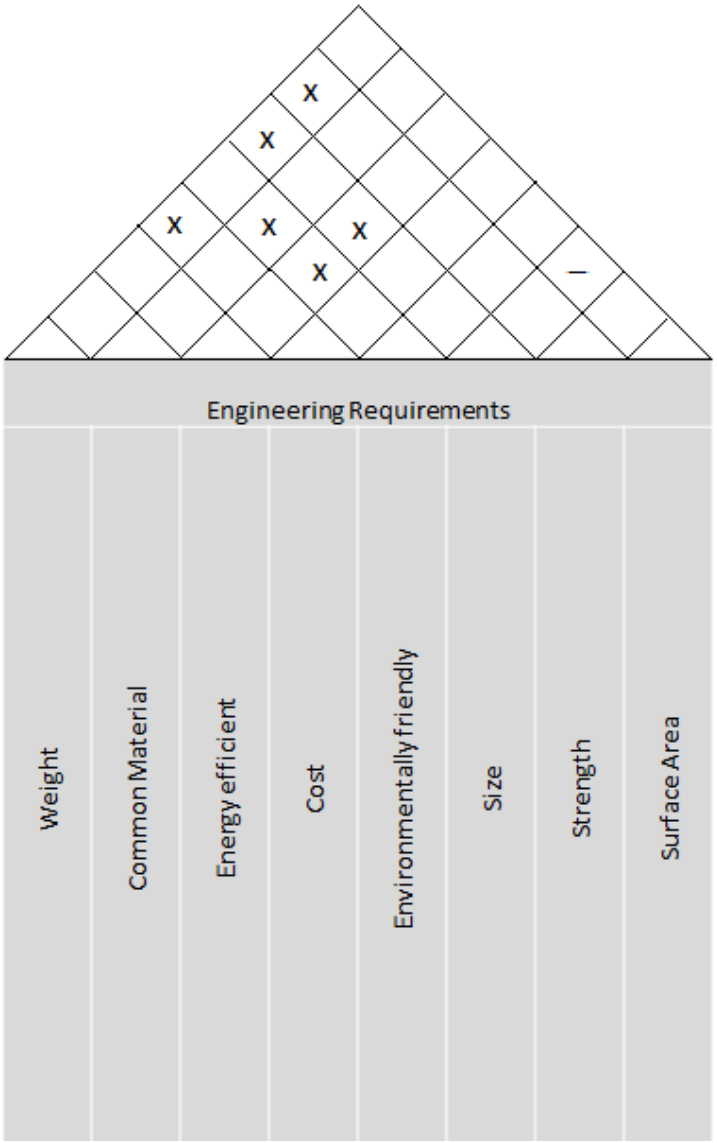
Functional Diagram



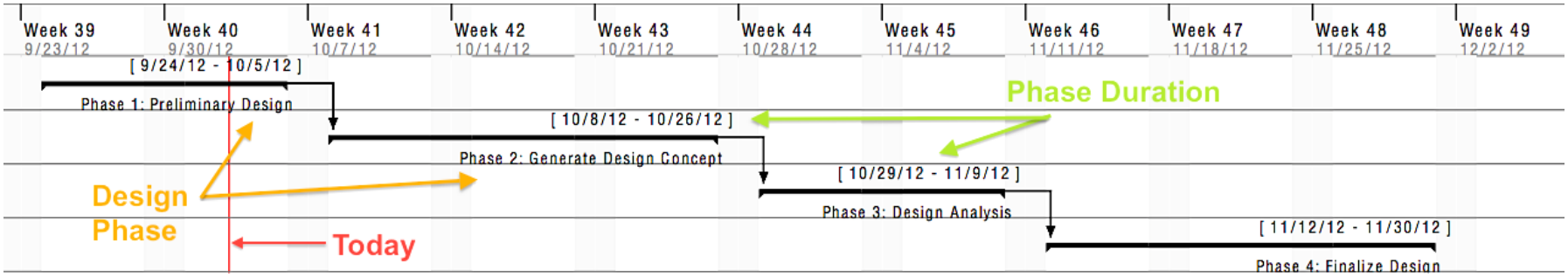
Quality Function Deployment

		Engineering Requirements							
		Weight	Common Material	Energy efficient	Cost	Environmentally friendly	Size	Strength	Surface Area
Customer Requirements	Easy to move	X					X		
	Produces 0.5 kWh			X					X
	Durable	X						X	
	Easy to assemble						X		
	Recycled Material		X	X		X			X
	Inexpensive	X	X		X				
	Units	lb	NA	W	$	NA	ft^2	psi	in^2
		Engineering Targets							

House of Quality

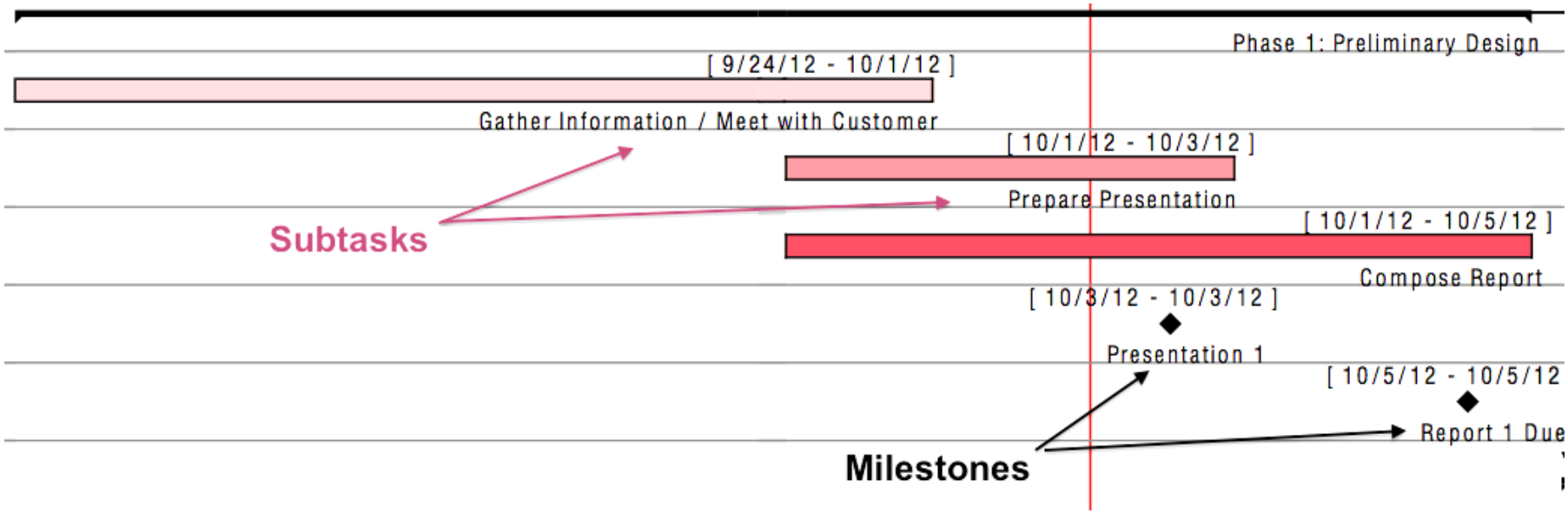


Project Timeline: Entire Fall Semester



- Break each design phase into subtasks and milestones

Preliminary Design Phase: broken into subtasks and milestones.



Questions?