Alternative Power Source To Draw Underground Water

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Team 01

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Overview

Project Description

Current Problem

Needs Statement

Problem Statement

Objectives

Constraints

Test Environment

Project Description

- Babbitt Ranches
 - 730000 acres of land



- Cemex
 - Mining pit on Babbitt Ranches



Pump 75 gallons/minute from 1700 feet

Current Problem

- 800 ft. max for alt. energy pumping systems
- Alternative energy companies shy away
- Running costs too high
- Emission penalties

Needs Statement

The client is unsatisfied with the cost of fuel as well as the emission penalties required to draw 75 gallons of water per minute from 1700 feet below the surface.

Goals

- Identify the obstacles associated with pumping from below 800 ft.
- Design an alternative energy source
 - Draw water from wells at 1700 feet
 - Reduce the client's current operating expenses

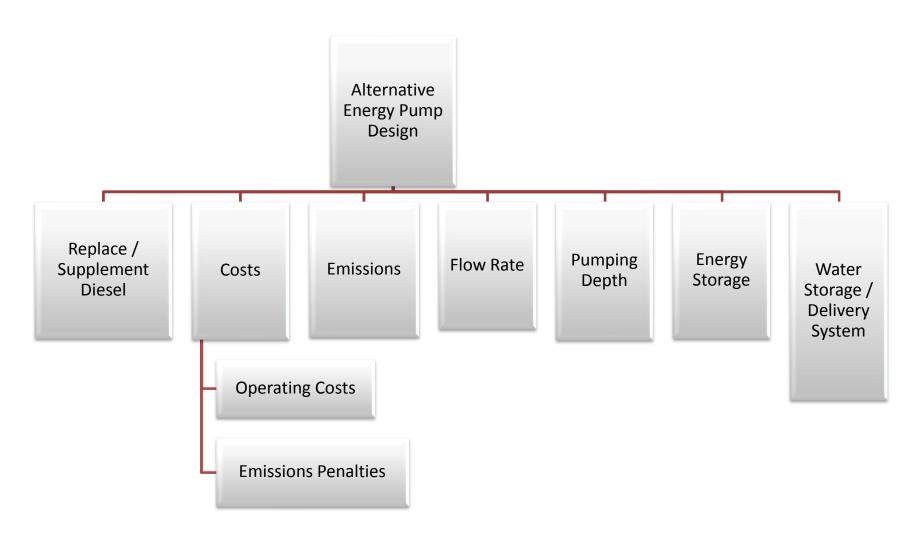
Objectives

Objective	Basis of Measurement	Units
Depth	How deep water is being pumped from	feet
Reduce Costs	Operating/Maintenace costs of diesel engines	\$
Maintain Flow Rates	Flow rates of current system	gallons/min
Maximize Alternative Engery	Amount of energy from alternative sources	hp
Decrease CO ₂	Carbon emissions of diesel engines	lb CO2/year

Constraints

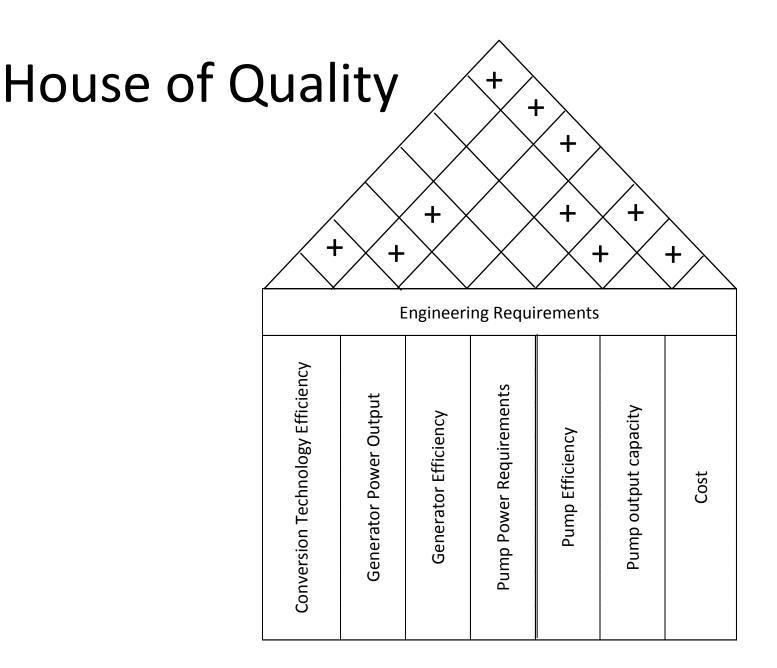
- 1200 feet to at least 1700 feet
- 75 gallons per minute

Criteria Tree



Quality Functional Deployment

		Engineering Requirements						
		Conversion Technology Efficiency	Generator Power Output	Generator Efficiency	Pump Power Requirements	Pump Efficiency	Pump output capacity	Cost
nts	Reliable							Χ
eme	Sufficient gallons/min				Χ	Χ	Χ	
Customer Requirements	Pump water from 1700 ft depth		Χ	Χ	Χ			
	Utilizes alternative energy source	Χ						
	Emission Reduction							Х
	Low running cost	Χ						Х
	Units	%	hp	%	hp	%	gal/ min	\$



Gantt Chart

Task Name	Duration	Start	Finish		vember 1 November 21
Develop Initial Project Strate	11 days	Sun 9/30/12	Wed 10/10/12	9/30 10/7 10/14 10/21 10/28 11/4	11/11 11/10 11/25 12/2
Meet with Contact	1 day?	Thu 10/11/12	Thu 10/11/12		
Report/Presentation 1	12 days	Thu 10/4/12	Mon 10/15/12		
Report 1 Due	O daγs	Mon 10/15/12	Mon 10/15/12	♦ 10/15	
Presentation 1 Due	O days	Mon 10/15/12	Mon 10/15/12	♦ 10/15	
Prepare Secondary Question	2 days	Fri 10/12/12	Sat 10/13/12		
Meet Doug Stevens CEMEX	3 days?	Wed 10/17/12	Fri 10/19/12		
Meet Professor Acker	1 day?	Fri 10/12/12	Fri 10/12/12		
Concept Generation	15 days?	Fri 10/12/12	Fri 10/26/12		
Research	40 days?	Mon 10/1/12	Fri 11/9/12		
Report/Presentation 2	12 days	Mon 10/15/12	Fri 10/26/12		
Report 2	O days	Fri 10/26/12	Fri 10/26/12	♦ 10/26	
Presentation 2	O days	Mon 10/22/12	Mon 10/22/12	♦ 10/22	
Meet Bill Meyers	5 days?	Mon 10/29/12	Fri 11/2/12		
Meet Bill Cardasco	5 days?	Mon 10/29/12	Fri 11/2/12		
Meet Doug Stevens	5 days?	Mon 10/29/12	Fri 11/2/12		
Meet Shaum Electric	5 days?	Mon 10/29/12	Fri 11/2/12		
Site Visit	5 days?	Mon 10/29/12	Fri 11/2/12		
Engineering Analysis	19 days?	Mon 10/22/12	Fri 11/9/12		
Report/Presentation 3	15 days?	Fri 10/26/12	Fri 11/9/12		
Report 3 Due	O days	Fri 11/9/12	Fri 11/9/12		↑ 11/9
Presentation 3 Due	O days	Mon 11/5/12	Mon 11/5/12	♦ 11	/5
Meet with Clients	5 days?	Mon 11/12/12	Fri 11/16/12		
Final Design Review	22 days?	Fri 11/9/12	Fri 11/30/12		1
Report/Presentation 4	19 days?	Mon 11/12/12	Fri 11/30/12		
Report 4 Due	O days	Fri 11/30/12	Fri 11/30/12		→ 11/30
Presentation 4 Due	O days	Mon 11/26/12	Mon 11/26/12		♦ 11/26
Meet with Clients	5 days?	Mon 12/3/12	Fri 12/7/12		

Questions?