

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

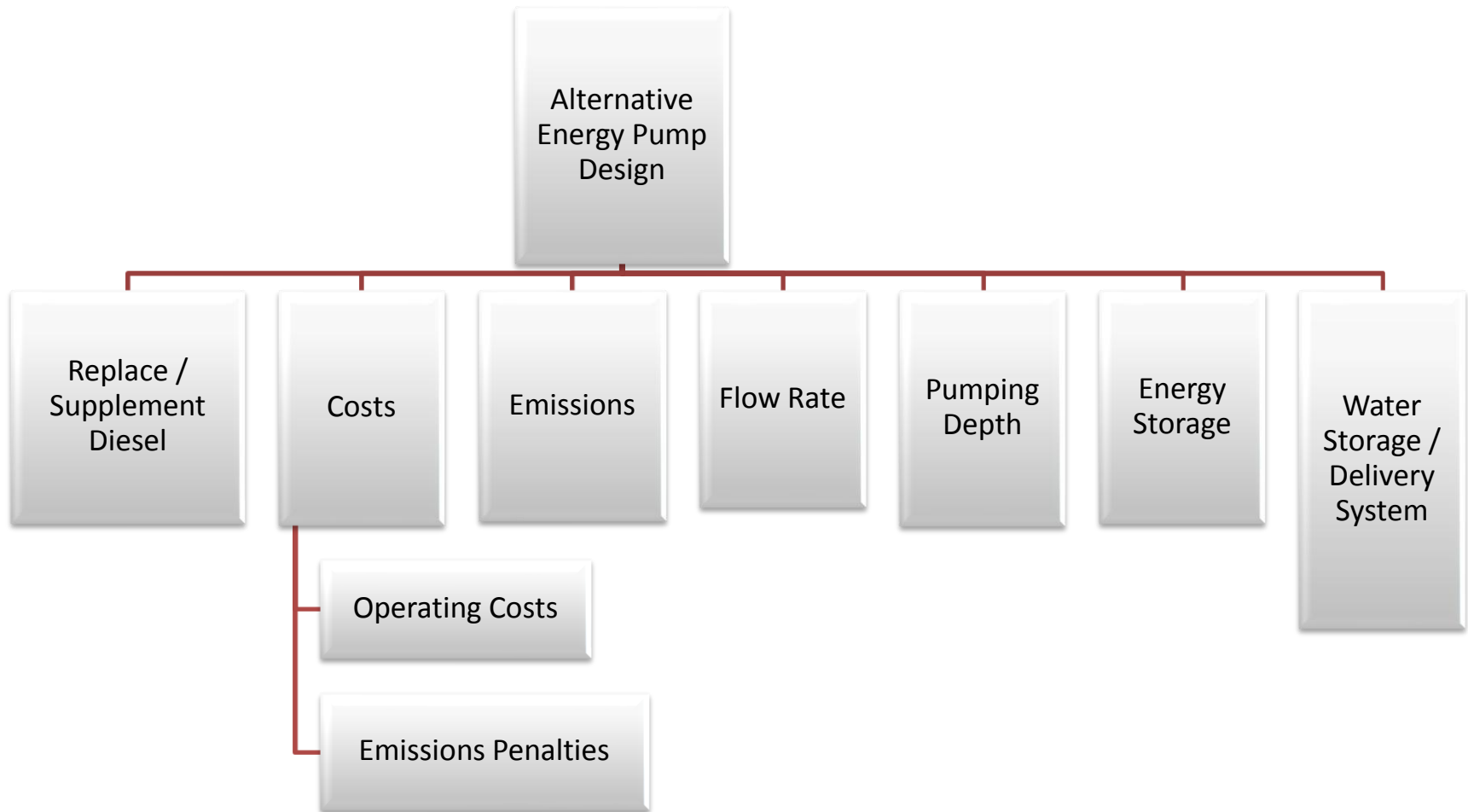
Objectives

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 CO ₂ /year

Constraints

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

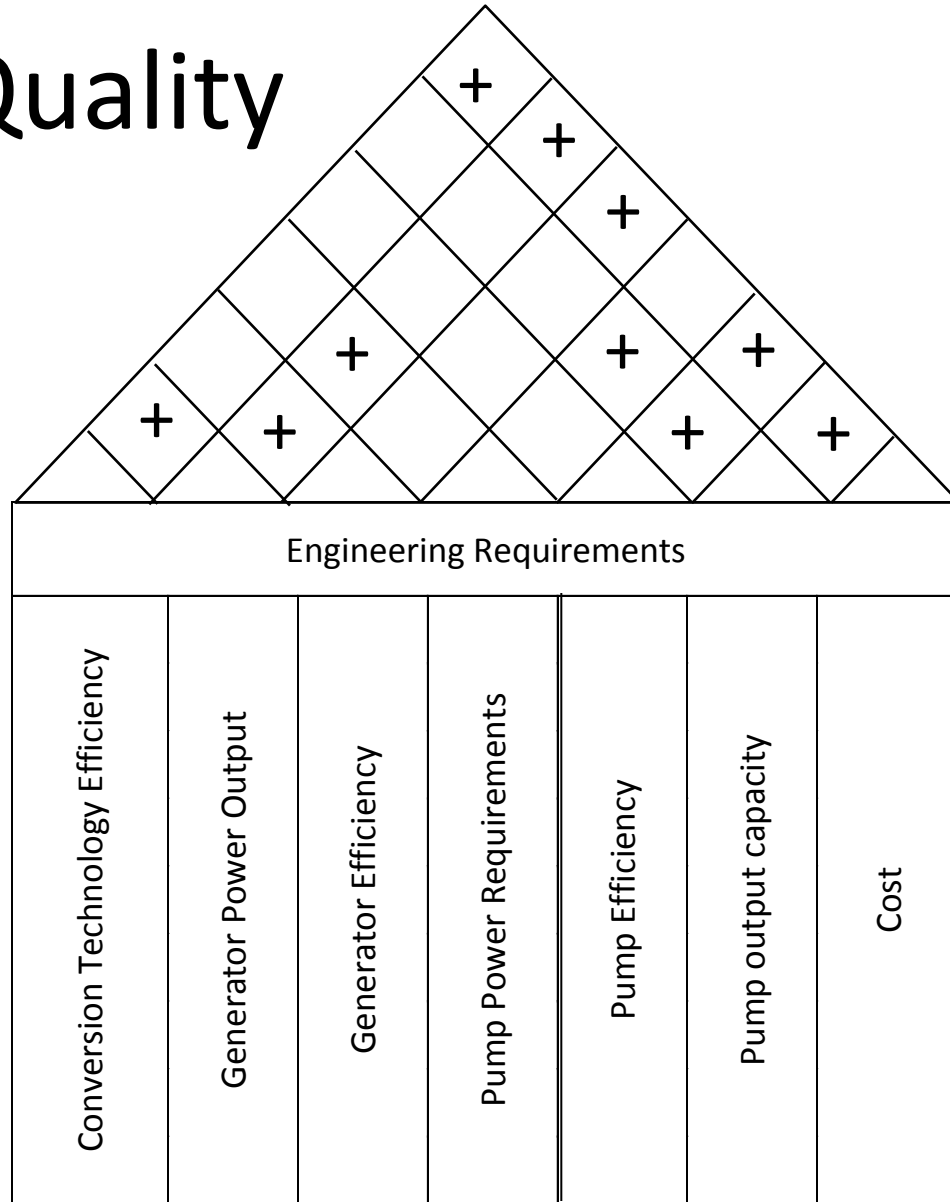
Criteria Tree



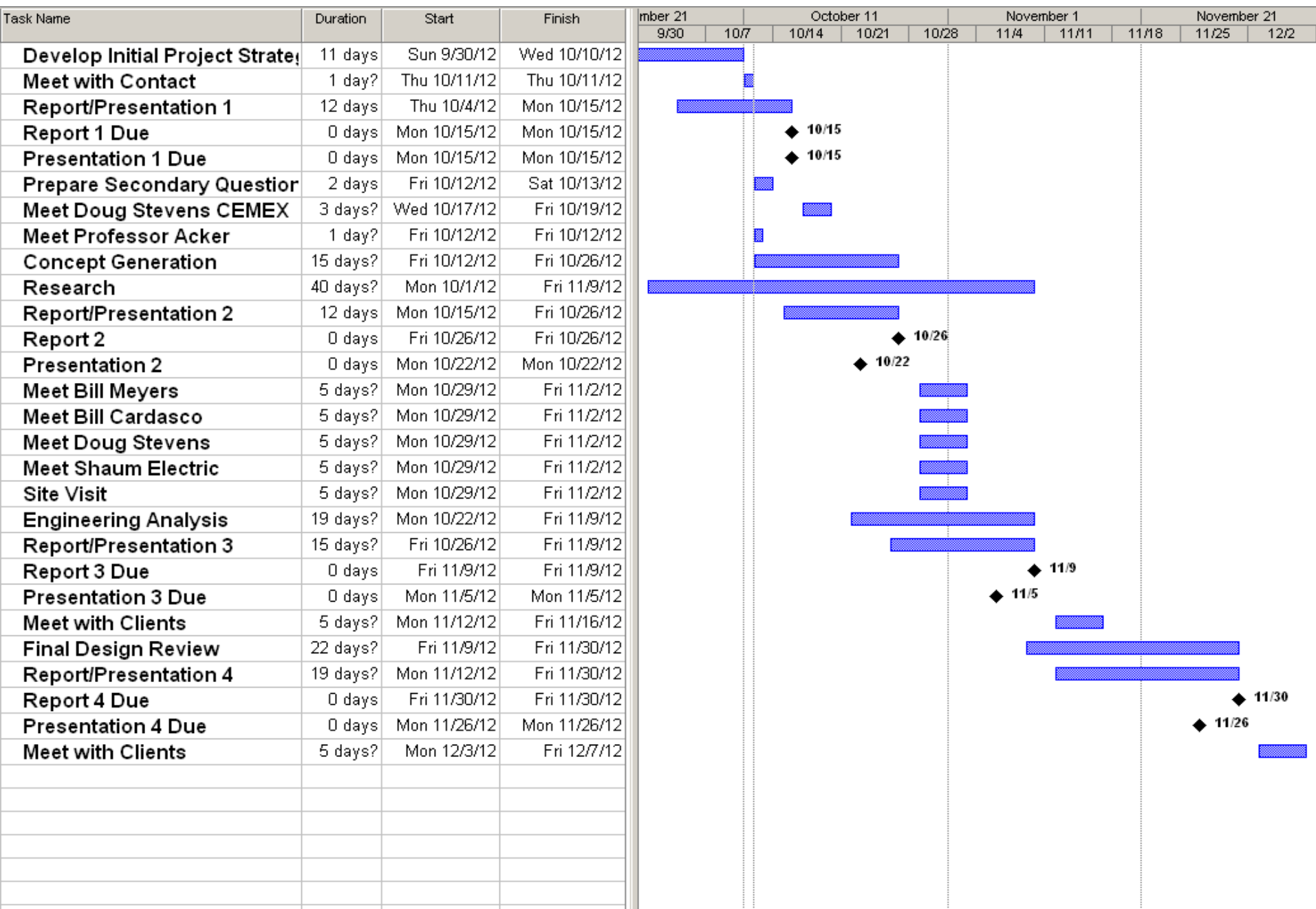
Quality Functional Deployment

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

House of Quality



Gantt Chart



Questions?