## Alternative Power Source To Draw Underground Water

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Team 01

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# Overview

- **Problem Statement Recapitulation**
- Constraints
- Simulink Simulation
- Solar Model
- Wind Model
- Generator/Gearbox Model
- Controller Model
- **Next Steps**
- Gantt Chart

#### **Problem Statement**

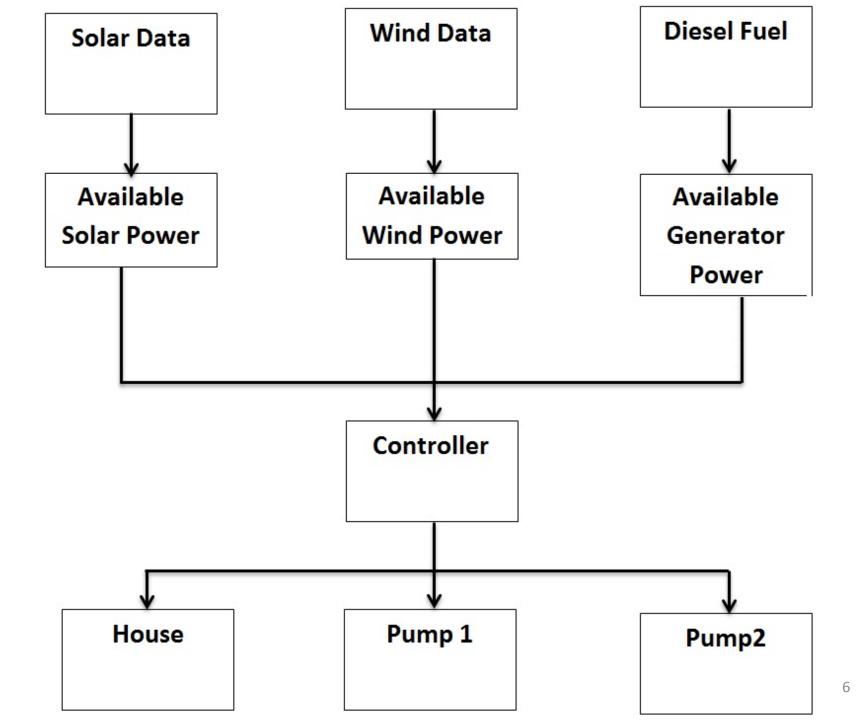
 The Client requests an alternative energy solution that will draw water from the Cedar Ranch well. The system must meet water demands while reducing the average annual cost of operation over a five to seven year span.

#### Constraints

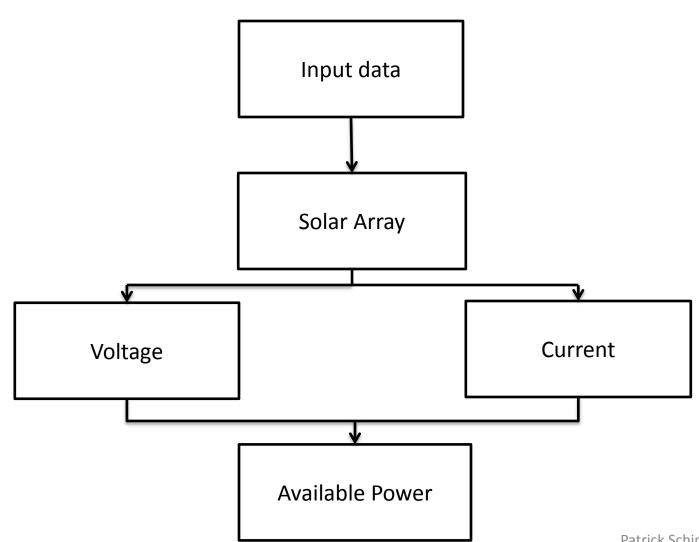
- Well depths from 200-600 feet
- Flow rate varies 2-12 gallons per minute
- Alternative energy must be 80%-100% of total energy used

### **Simulink Simulation**

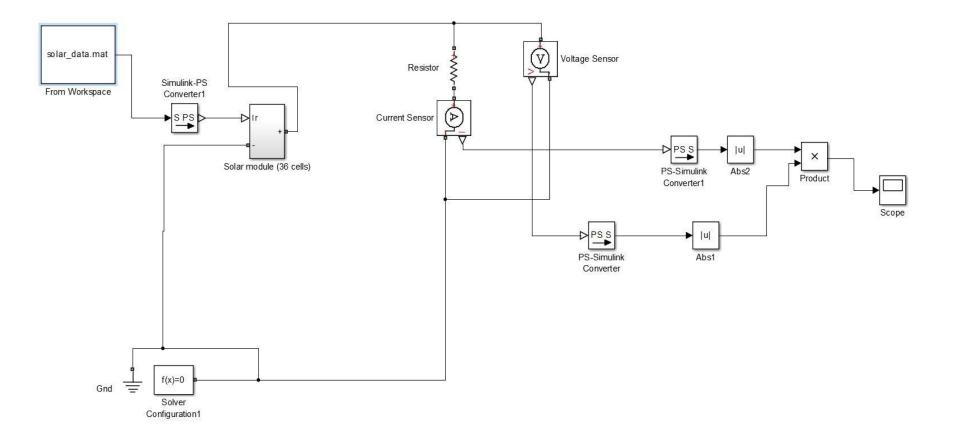
- Input wind and solar data
- Simulate real time operation of system
  - Solar Model
  - Wind Model
  - Generator/Gearbox Model
  - Controller Model



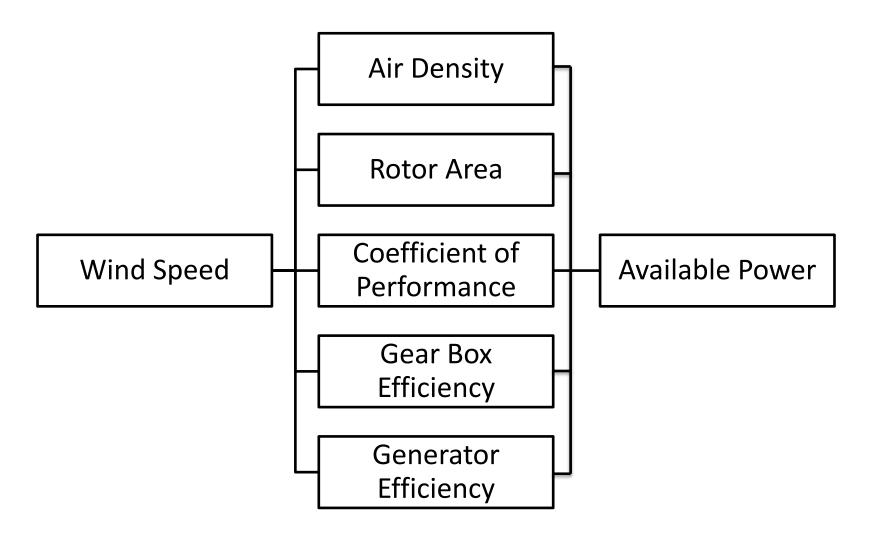
#### Solar Model



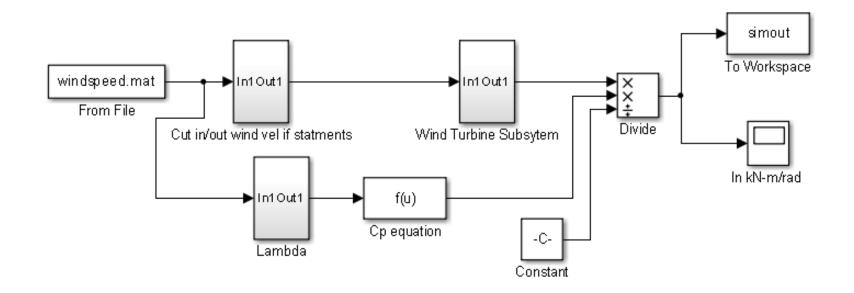
#### Solar Model



#### Wind Turbine Model



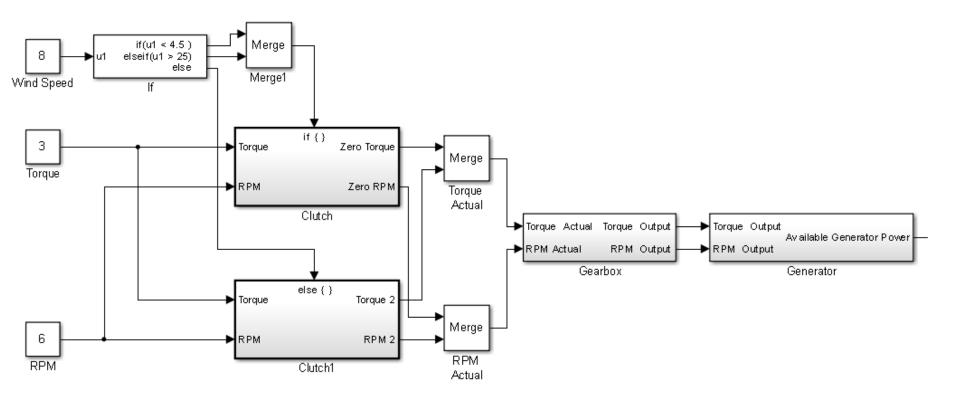
#### Wind Turbine Model



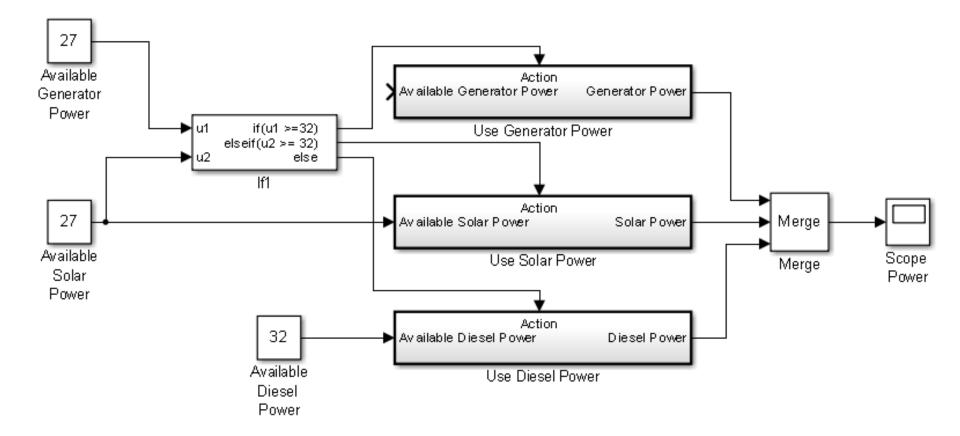
#### Generator/Gearbox Model



#### Generator/Gearbox Model



#### **Controller Model**



#### Next steps

- Site visit
- Meet with pump specialist
- Finalize real time simulations using location specific solar and wind data

#### Gantt Chart

Task Name	Start	Finish									March				April				May	
			1/6	1/1	3 1/20	1/27	2/3	2/10	2/17	2/24	4 3/3	3/10	3/17	3/24	3/31	4/7	4/14	4/21	4/28	5/
Redefine Strategy	Mon 1/14/13	Tue 1/29/13																		
Contact Mr. Cardasco	Wed 1/16/13	Wed 1/16/13		•	1/16															
Meet Mr. Cardasco	Thu 1/24/13	Thu 1/24/13			•	1/24														
Progress Report Presentat	Tue 1/29/13	Tue 1/29/13				•	/29													
Progress Report	Fri 2/1/13	Fri 2/1/13					2/1													
Contact Ranch Manager	Tue 1/29/13	Fri 2/1/13																		
Site Visit	Fri 2/8/13	Fri 2/15/13																		
Prepare Simulation Tool	Tue 2/5/13	Fri 3/15/13								_			<b>B</b> -1							
Sim Tool: Adjust Variables	Mon 3/18/13	Fri 4/26/13											1		-					
Midpoint Review Pres.	Tue 2/26/13	Tue 2/26/13								•	2/26									
Midpoint Review Report	Fri 3/1/13	Fri 3/1/13									3/1									
Hardware Review 1	Tue 3/12/13	Tue 3/12/13										٠	3/12							
Meet Ranch Manager	Thu 3/14/13	Fri 3/22/13																		
Poster Design	Mon 3/4/13	Tue 4/23/13																		
Hardware Review 2	Tue 4/9/13	Tue 4/9/13														<b>♦</b> 4	/9			
Walk through Presentation	Tue 4/16/13	Tue 4/16/13															♦ 4/	16		
Final Report Due	Fri 4/19/13	Fri 4/19/13															•	4/19		
Poster Due	Tue 4/23/13	Tue 4/23/13																♦ 4/2	23	
Final Presentation	Fri 4/26/13	Fri 4/26/13																•	4/26	

#### References

Bill Cardasco – Babbitt Ranches www.windustry.org/ www.wind-estimate.org solarenergy.advanced-energy.com www.wind-sun.com www.solarworld-usa.com www.generac.com/en082011

#### Questions?