

Breakin' Wind in Sub-Saharan Africa – Part II*ES 2501: Introduction to Static Systems*Leslie Dodson, Glenn Gaudette, Sarah Wodin-Schwartz, Curtis Abel
M & T April 10-11, 2017**Stakeholder Analysis - Agenda****PLA's: Post on Canvas**

1. Re-post 1st page of Breakin' Wind in Sub-Saharan Africa- Have students review the balloon turbine activity and re-read the background story for that project.
2. Re-post list of who's who on the 10 teams of 5: Teams 1-5 and Teams 6-10
3. Post stakeholder list. Have students review
4. Post: Reminder that class will be held in ProtoFoisie. Library opens at 7:50. Don't be late.

Bring: Projector and large screen (CA)
2 Balloons and weight (CA)
Big post-it pads (Elyse)
Individual SA worksheets (LLD)

Set-Up: 10 tables with 5 chairs each (CA)
5 Stakeholder Bios at each table (PLAs)

- Big post-its with headings labeled
- Individual SA worksheets
- Markers
- Label each table with Team # 1-10

AGENDA

8:00-8:02	WARM-UP: SHAKE-SHAKE & LION'S BREATH (LLD) <ul style="list-style-type: none">- Move into teams at tables- Late friends get a cheer (CA)	(2 min)
8:02-8:05	Stakeholder Theatre (All)	(3 min)
8:05-8:15	Stakeholder Analysis Explanation (LLD)	(10 min)
8:15-8:35	Teams Create a Rapid Team Stakeholder Analysis Poster (All) <ul style="list-style-type: none">- Teams include a free-body diagram on their posters	(20 min)
8:35-8:37	Gallery Walk (CA) <ul style="list-style-type: none">- Post Team Stakeholder Analysis on wall- Each team-member should look at 2 other SAs near your table	(2 min)
8:37-50	Debrief (CA & LLD)	(13 min)

Breakin' Wind in Sub-Saharan Africa – Part II Stakeholder Analysis

ES 2501: Introduction to Static Systems

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Stakeholders Bios

1. **Oil and gas driller**: there are potential pockets of oil and gas beneath the land that has been designated for wind power stations. The oil and gas driller believes that oil and gas extraction is the best and highest use of the land
2. **Rhinoceros Animal Advocate Organization**: the wind power system is set in the middle of habitat for endangered rhinos. The wind towers are in their breeding and migration zone
3. **School – PTA**: local parents and teachers are distressed at the lack of school facilities in the area. They want to use the land to build a school block for 100 children
4. **Religious leader**: the proposed wind power facility is on/near an important cultural site and a religious burial ground
5. **CEO of Altaeros Energies**: the chief executive of the company that developed the hot air balloon wind turbine power generation system needs to make this big sale. If she loses this sale, the company will go bankrupt
6. **Landowner**: the land where the wind turbines will be placed is private land. The owner currently uses that land to grow enough food to feed his family. A portion of the site is swampland.
7. **World Health Organization**: the land where the wind turbines will be placed is part swamp-land. The global health organization wants to reduce mosquito breeding zones in the area in order to reduce the incidence of malaria.
8. **Local government official**: local officials want to provide electricity in rural areas in order to generate small-scale industry and improve health (currently people rely on indoor fires to provide light, which cause lung ailments). This kind of community development not only improves lives, it helps politician win votes and stay in power
9. **The World Bank**: this major public funding agency provides millions of dollars in funding for innovative and large-scale infrastructure projects in the developing world
10. **Vocational school**: unemployment is very high in this area, particularly for young people aged 16-26. This local VoTech provides training and job placement in new technologies and alternative energies. The school can expand its offerings by partnering with the Altaeros company to use the wind site as a training facility
11. **Climate scientists**: the swampland where the wind project site is located, as well as the surrounding area is an important climate-control zone. Developing the land for the alternative wind energy project (i.e. paving it for the wind power facility) would eliminate the swamp and all trees and vegetation that currently absorb 20 kTonnes of CO₂/year.

Breakin' Wind in Sub Saharan Africa

ES 2501 Intro to Static Systems - 3D Particle Equilibrium Project

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Currently 2 out of 3 people in sub Saharan Africa lack access to electricity.¹ Adding electricity to a community will save people from house fires associated with using candle light, add medical infrastructure to help fight sickness and disease, improve access to education, power water filtration systems, and will provide many other benefits.

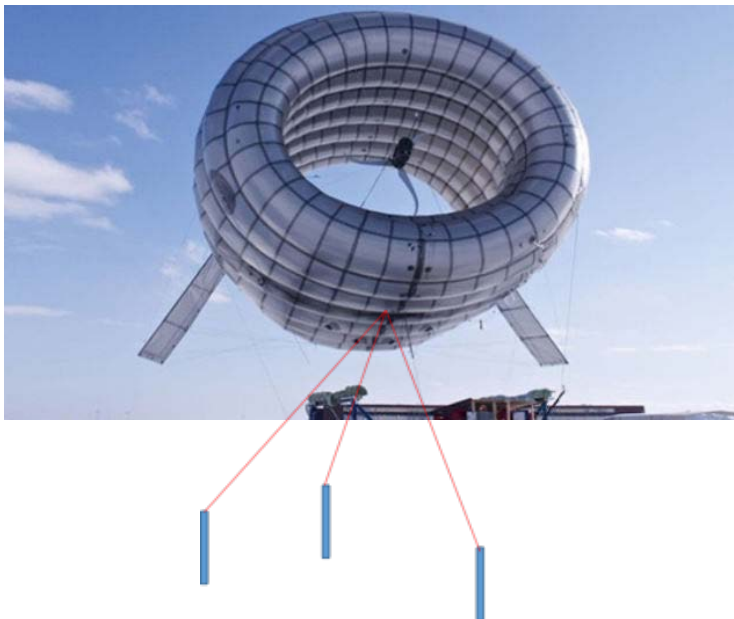
One method of bringing power to remote locations is through the use of dispersed wind power systems. A hot air balloon wind turbine by Altaeros Energies could be installed in a remote community and provide the electricity to meet some or all of the community requirements. To anchor the turbine in this community, you and your team need to design a cable system that holds the turbine in a given spot shown on the map with a star. The balloon will provide a force of $\mathbf{F}_b = \{-100\mathbf{i} + 200\mathbf{j} + 1000\mathbf{k}\}\text{N}$ based on lift and wind. Three cables will be used to hold the balloon in place (equilibrium). The cables can support a maximum tension of 1000 N. The maximum balloon altitude is 100 meters.

You and your team need to determine the payback time, in years, for the community so they can decide if they should purchase the turbine. Payback time = total cost of materials (cables + balloon) and construction based on the locations chosen/power generation revenue.

Balloon Cost: \$125,000

Cable Cost: \$75/meter

Power generation revenue: \$5/day/meter of altitude (the higher the balloon, the more wind)



¹ <https://www.usaid.gov/powerafrica>

Sub Saharan Africa – Stakeholder Analysis in Action – ProtoFoisie Studio

Students Role-Play to Help Team Create Stakeholder Analysis & Free Body Diagram



Stakeholder	Interest	Perspective	Assets	Constraints
Oil + Gas Diller	will win oil and gas	not interested in doing to see the oil	power consumer buying	oil is not for energy
Religious Leader	not to support oil and gas but to support the world	working and land	knows the more people	oil is not for energy
World Religion Organization	not to support oil and gas but to support the world	positive and not negative of the world	energy power knowledge	work should not harm the world with oil and gas
World Bank	not to support oil and gas but to support the world	not ready to support oil and gas	energy power knowledge	make the world not depend on oil and gas
Vocational School	not to support oil and gas but to support the world	not ready to support oil and gas	energy power knowledge	work should not harm the world with oil and gas

Team #3

Stakeholder	Interest	Perspective	Assets	Constraints
CEO	Go bankrupt!	Make \$\$\$	Deposits \$\$\$ \$\$\$ \$\$\$	Bad assets Bad site - Press - my investment
World Bank	- Investment - Funding a development	- Risk on investment - unreliable act	\$\$\$ \$\$\$ \$\$\$	Compromises Lots of people want the oil
Rhino	- Kill Rhinos	- Stop project - more site	- Media - WUP - protectors - Incom	Compromises Lots of people want the oil
Climate Scientist	- Non Renewable Energy	- Destroy the environment - Contaminating the air and "clean energy"	- Innovation - \$\$\$ - \$\$\$ - \$\$\$	Compromises Lots of people want the oil
Religious Leader	- on cultural site & burial ground	- destroy history - culture	- Public Opinion - \$\$\$ - \$\$\$ - \$\$\$	- \$\$\$ - \$\$\$ - \$\$\$