Sustainable Energy in the Galapagos

Sean Dove

ABSTRACT

As the global population continues to grow, so does the dependency and need for energy. For decades, the solution to satisfy the world's demand has been the use of cheap, abundant, and inefficient sources such as coal and oil, but these sources are contributing to massive amounts of environmental degradation and the emission of greenhouse gases. The Galapagos Islands have pledged to do away with fossil fuels in an innovative "Zero Fuels Initiative" in order to help combat environmental damage to its own pristine habitats that make Galapagos one of the most sought out destinations in the world for scientific research and eco-tourism. This paper serves as a summary of the initiative as well as other projects that by 2020 will reduce the use of unsustainable energy in boats, cars, and generators and replace them with sustainable means such as wind turbines, solar panels, and bio-fuel, making Galapagos a completely sustainable archipelago.

Introduction

The world is now facing one of the most complex and difficult issues of modern history; trying to find a way to balance uncontrolled population growth and the demands for resources without damaging the environment. According to the United Nations (UN), 1.4 billion people in the world are without electricity while another 1 billion people only have periodic access (UNF, 2013). A total of 2.5 billion people must burn wood for cooking and heating (UNF, 2013). The burning of wood not only produces large amounts of carbon dioxide, a known greenhouse gas and contributor to climate change, but it also promotes deforestation for the harvesting of wood for fuel (UNF, 2013). In order to reduce poverty and obtain a more sustainable living standard governments across the globe are exploring new solutions to provide energy alternatives to coal and oil (DESA, 2013).

Oil, which was first used only for heat and light, is now used across the globe as fuel for cars, boats, planes, and diesel generators for electricity (David Suzuki Foundation). Ninety percent of the world's transportation relies on oil and the increasing trend in its use and raise in demand has caused the prices of oil to skyrocket (Kirby, 2004). Other problems stemming from the extraction, transportation, and use of oil is the increase in the frequency of oil spills (Kirby, 2004). Crude oil is naturally pushed to the earth's surface because it is a naturally occurring substance, but in amounts that cannot compare to some of the anthropogenic spills (Mitchell et al., 1970). Oil, which is toxic to both animals and humans, can cause large-scale death events in animals, as well as extreme changes in animal behavior. It can also be damaging to the environment and wildlife in ecologically sensitive places (Mitchell et al., 1970). Countless oil spills have destroyed entire habitats, and with them, people's livelihoods that depend on a healthy environment and healthy wildlife.

Finding solutions to a global energy crisis will not necessarily come from finding a new type of fuel, nor will it happen overnight, but it will come from people who are willing to invest in using energy that already exists in nature. By using bio-fuels, hydroelectric plants, solar panels, thermal plants, and wind turbines, many countries can cut back on the harmful use of coal, wood, and oil and replace these inefficient sources of energy with more sustainable, renewable sources that benefit the well-being of the earth and its inhabitants.

Small countries like Ecuador have struggled to carry out projects in sustainable energy. It was not until President Rafael Correa took office in 2007 that energy and sustainable projects were a priority for the government of Ecuador. The Ecuadorian government has spent nearly $5 billion in the energy sector since

the time that President Correa has taken office (Alvaro, 2013). These types of projects have been difficult to fund and develop due to a lack of knowledge and technical assistance. Ecuador's main energy source is oil and unlike many other countries in Latin America, Ecuador has large amounts of oil located under its Amazonian basin. Ecuador exports large portions of this oil and earns a profit of $14 billion per year. To put this in perspective, Ecuador's exports earned a total of $24 billion per year; thus, oil accounts for 58% of the money earned from its exports (OPEC, 2013). Ecuador's main issue is that it is living under the myth that countries that export oil will experience a rise in economic growth, a rise in job growth rates, and that exporting oil will reduce poverty, but this is simply not true (Karl, 2004). Studies show that countries that go through oil-led development will often "have slower than expected growth, barriers to economic diversification, poor social welfare indicators, and high levels of poverty, inequality, and unemployment" (Karl, 2004). These countries are also susceptible to corruption that leads to poor governance and detrimental damage to the health of the economy, the people, and the environment (Karl, 2004). According to the Heritage Foundation, Ecuador falls under the category of "repressed" in terms of economic and investment freedom, which is cited as being caused by "political instability and corruption" within the country (The Heritage Foundation, 2014). During periods of political instability and a corrupt regime, Ecuador's natural resources are being exploited at the cost of the lives of people and the many flora and fauna that are unique to this region.

The purpose of this article is to better understand the reasoning of the current and future improvements to the energy infrastructure of the Galapagos Islands despite the deficiency of similar sustainable initiatives in the Ecuadorian Amazon rainforest. It is hypothesized that the Ecuadorian government recognizes the potential of long term revenue generated from eco-tourism in the Galapagos Islands, but favors economic development through the exploitation of natural resources in the Amazon due to the sheer magnitude of revenue that results from exporting oil.

Can the Galapagos eliminate fossil fuels?

Damage to the environment from oil that threatens the Amazon and the Galapagos is the main driving force in convincing people and the government to explore new sources of renewable energy. Movements in sustainable programs and projects that deviate from reliance on oil have sprouted across the country, and there is also a worldwide movement to see sustainability in the islands of the Galapagos due to its cultural and scientific significance to the world (GalapagosIslands.com, 2012). The Galapagos Islands are located 1000 kilometers to the west of Ecuador in the Pacific Ocean and the archipelago is made up of 19 main islands and over a 100 smaller islets and rocks (National Geographic, 2013). The United Nations Educational, Scientific, and Cultural Organization (UNESCO) declared the Galapagos archipelago a World Heritage Site in 1978 because of its cultural and scientific importance to Ecuador and the rest of the world (National Geographic, 2013). Five of the main islands are inhabited and have a total population of 26,000 people (National Geographic, 2013). These people rely heavily on diesel fuel to power cars, boats, and electric generators for basic energy needs and transportation. Nearly 78% of their energy needs are satisfied by diesel and such high usage of oil comes with many risks (Pablo Carvajal, 2012).

Diesel fuel is extremely dangerous to transport across the ocean because of how difficult it is to clean up if spilled. In 2001 the oil tanker Jessica ran aground, spilling 180,000 gallons of its 240,000-gallon cargo of diesel and intermediate fuel (Charles Darwin Foundation, 2012). A response team made up of members of the Ecuadorian navy, local fishermen, and the United States Coast Guard removed the remaining 60,000 gallons (Charles Darwin Foundation, 2012). A study carried out by the Charles Darwin Foundation found that the oil had covered a large area of the water inside the marine reserve and that hundreds of the charismatic species such as the marine iguanas, sea lions, and marine birds were harmed (Charles Darwin Foundation, 2012). Many fish and marine invertebrates were negatively affected in the spill, but exact numbers could not be specified. In a place like the Galapagos, where the health of the environment should be a priority and the number of endemic species is unlike anywhere else on the

world, there should be no need to put a rare ecological hotspot under extreme risk by having to transport such inefficient and dangerous energy sources.

The Galapagos has become a battleground for capitalism and the government's responsibility to "Buen Vivir." "Buen Vivir," translated as the "good life" in English, refers to a section of the Ecuadorian Constitution that gives definitive rights to nature and claims that Ecuador should be developed and maintained through an ecologically balanced and culturally sensitive manner with an emphasis on community collectiveness (Branch, 2013). Ecuador's struggle with resources, particularly the drilling for oil in the Amazon, has drawn criticism because of the way it conflicts with the ideals of "Buen Vivir." The plan to drill in the Amazon, presented by President Correa, was approved by Ecuador's parliament in October 2013 after the Yasuní-ITT Initiative plan failed. The Yasuní-ITT Initiative relied on outside sources of funding such as governments, NGOs, and private donations to prevent drilling in a block of the national park that has been deemed the most biodiverse place on the planet in terms of animal species (Valencia, 2013). President Correa stated that this type of drilling will be "environmentally friendly exploitation," but the indigenous people who live in the Amazon are not convinced that such a methodology of drilling actually exists (Fox News Latino, 2013). The Amazon is a place of extraordinary species diversity and density in which 1 hectare of rain forest can support 100,000 species of insects, more species than all of North America (Vidal, 2011). If this is the fate of such an ecologically important and culturally significant region, what hope is there for the Galapagos? Are the Galapagos Islands Ecuador's last chance at redemption for living up to the ideology of "Buen Vivir"?

The Galapagos Islands attempt to live up to the ideals of "Buen Vivir," which is immediately apparent as soon as a person steps out of the plane on Baltra Island. The words "sustainable energy" are some of the first words passengers will now read when arriving at the Seymour Airport (Morgan, 2013). The Ecuadorian government, with the help and funding of Corporate America, has created the first "green airport" to run solely on sustainable forms of energy. One-fourth of the energy comes from thermal energy in the form of solar panels located on the island and the roof of the terminal (Morgan, 2013). The terminal has been redesigned to have more efficient climate control without the use of energy by being conveniently located in the direction of the prevailing winds to naturally lower the interior temperature. Airport hours have been adjusted for daytime operations only to reduce the necessity of electricity to power lights at night (Morgan, 2013). The airport is built completely of natural materials such as wood and stone shipped from the mainland of Ecuador. The terminal has been outfitted with a small desalination plant that is used to provide sink water while recycled rainwater is used for the toilets (Morgan, 2013). This airport is monumental not only because it is the first of its kind in running solely on sustainable energy, but also because of what it symbolizes for the 170,000 passengers that arrive every year to experience the beauty of the Galapagos. This airport is a prime example that "Buen Vivir" has not been completely abandoned and is still a part of Ecuadorian culture in the Galapagos.

In 2007 the Ministry of Electricity and Renewable Energy put forth a plan for sustainable energy in the Galapagos known as the "Galapagos Islands Zero Fossil Fuel Initiative." This plan is built upon three pillars:

- Eliminate diesel use and replace with solar energy, wind energy, and biofuels.
- Gradually convert diesel engines to biofuel engines and only use hybrid vehicles on the islands.
- The gradual conversion of fishing and tourist boat engines to use biofuel (Carvajal, 2012).

The above goals would be accomplished through these projects that are currently in the planning and building process:

- San Cristobal's Wind Farm (1,800 KW)
- Baltra Island Wind Park (2.25 MW)
- Baltra Island Photovoltaic Plant (0.2 MW + energy storage)
- Puerto Ayora Photovoltaic Plant (1.5 MW) on Santa Cruz Island

- Interconnection system Baltra with Santa Cruz
- Isabela Island Hybrid System (1.0 MW + energy storage + thermal plant 1.320 MW)
- Substitution of inefficient appliances
- Substitution of conventional street lighting system with energy efficient lights (Estrella et al., 2011).

The results would be a massive reduction in greenhouse gas emissions and a greater reduction in environmental risk of fuel transportation. By 2020, wind energy would create double the energy it currently creates, from 21% to 44%, biofuels would make up nearly 50%, and solar would make up 8%. Biofuel, which made up less than 2% of energy in 2012, would be the primary fueling source for vehicles and electricity (Carvajal, 2012). Many contributors who acknowledge the importance of the Galapagos and the difficulties of funding such a comprehensive project have stepped up to provide funding and technical expertise. Energy companies from the United States, Canada, France, Italy, Germany, Russia, Japan, and the UK (e8) have provided their expertise and money from the e8 Fund for Sustainable Development (Global Sustainable, 2008).

The main biofuel being used as a clean, safe substitution for diesel engines and generators is Jatropha oil. Jatropha comes from the region of Manabí located on the mainland part of Ecuador. It is a native plant that is normally used as a "living fence" and is not sold for profit (Carvajal, 2012). Jatropha is not a threat to food security and researchers are not concerned that it will become an invasive species (Carvajal, 2012). The locals from this region are experienced in growing Jatropha and will have no trouble meeting the new demands for its use as a biofuel (Carvajal, 2012). The new demand would help create jobs in 40 different communities at 52 different gathering points. The money earned would go to 240 different families on the mainland and positively affect 2,000 indirect persons by giving them guaranteed work (Carvajal, 2012). On the mainland, the Jatropha would be harvested and taken to a community-gathering center where it would be processed and then transferred across the Pacific in cargo ships where it will be used for power generation (Carvajal, 2012).

German scientists and engineers have researched how to make Jatropha oil more efficient in running electric generators and how to properly adapt engines to this type of biofuel in the boats of fishermen and tourist operators (Estrella et al., 2011). Because Jatropha oil does not have the same chemical properties as diesel fuel and because it burns at a different temperature, all generators and engines have to be specially fitted for the Jatropha oil. If the engines are not outfitted to handle Jatropha oil they will not run efficiently, thus receiving no sustainable benefits. This will have to be a gradual process because of the time and technology needed to do the modifications (Estrella et al., 2011). On both islands, Floreana and Isabela, there are generators that currently run on Jatropha oil, but this only makes up 1.2% of energy on the Galapagos Islands (Estrella et al., 2011). It will take years of hard work, innovation and perseverance by the people of the Galapagos and scientists to increase biofuel energy to 48%, but the end result will be unprecedented and unmatched by any island in the world.

In 2007, a wind farm was completed on the island of San Cristobal, the eastern most island of the archipelago. The wind turbines stand at the forefront of sustainable energy in the Galapagos by providing clean, renewable energy and reducing thermoelectricity on the island to 50% (Global Sustainable, 2008) Alecksey Mosquera, the minister of Electricity and Renewable Energy, is quoted in the final report on the wind farm as saying that "petroleum is becoming a more expensive and scarce natural resource" and that "sustainability promotes two challenges, promoting the use of renewable energy resources and efficiently using the energy that is already available" (Global Sustainable, 2008). He then addresses the fact that wind energy, which is readily available across Ecuador, is widely underused (Global Sustainable, 2008). The wind farm is the most visible form of sustainable energy used in the Galapagos. The project was funded with the help of the United Nations Foundation, the United Nations Development Programme

(UNDP), the Ecuadorian taxpayers, and the Ecuadorian government. The success of the wind farm is not only shared by people of the Galapagos and all those involved in the project, but also for people around the planet because of the message it conveys and the conservation efforts it rewards.

Conclusion

Developing nations have been placed in an extremely difficult position and are often criticized by the developed world for disregarding the environment for the sake of economic development. Much of this criticism is coming from countries like the United States and many of the European nations who have spent the last few hundred years developing, polluting, destroying, and burning through natural resources at unregulated and undocumented rates. Understandably, it is the twenty-first century and the global normative has changed drastically, and there is a much higher sense of accountability for actions like polluting and the burning of fossil fuels, which directly or indirectly affects the well-being of every person. It is clear that Ecuador is making an effort to help further the global sustainable effort, but in terms of the undertaking of initiatives in the Galapagos Islands and the Amazon, these two regions are hardly comparable. The Galapagos Island are naturally superior for the use of renewable energies, especially solar and wind, which cannot be utilized in the rainforest. The focus of the Amazon should be narrowed on the prevention of drilling for oil and the building up of the eco-tourist market. The Ecuadorian government must perceive the Amazon as they do the Galapagos, in that it is far more valuable in the long term kept in a natural state than destroyed forever for a short-term gain. This change in perception is certainly not going to take place overnight, but it will start with the work being done in the Galapagos. The islands are already an international hot spot for tourists and thus it is important to educate these tourists not only how to take care of the Galapagos, but to inform them of the conservation efforts and opportunities for seeing unique wildlife in the Amazon.

The "Galapagos Islands Zero Fossil-Fuel Initiative" should stand out not only as a beacon of hope for conservation methods and as a laboratory for scientific research, but also as an example that nature and people are not two separate entities—they can live in harmony, benefiting from one another. In 1978 when the Galapagos Islands became a World Heritage Site, the care and protection of this reserve became not only the responsibility of the Ecuadorian government, but everyone around the world. The environment relies on the protection and care of people who are well informed and who understand the importance of delicate systems like those found in the Galapagos. The first steps to properly protecting and meeting the goals of "Buen Vivir" will certainly start with the elimination of diesel fuels from the islands. This environmental movement eliminates a large demand for oil within the borders of Ecuador, the transportation of oil across 1000km of ocean, and the delivery of a toxic substance to an archipelago that boasts over 50 endemic species. The title of World Heritage Site has teetered on the edge of being revoked numerous times because of the damage that unsustainable living has caused the islands. With a growing number of people moving to live on the islands and a record number of tourists visiting each year, it may be added to the "in danger" list unless there is a major change.

There is a special relationship between the Galapagos and people all over the world. With only a mention of its name it sparks curiosity and wonder. Is it because the archipelago is known as a "natural laboratory," due to the Galapagos's role in the theory of evolution by Charles Darwin that it receives such a reaction (Quiroga, 2009)? There is still much to be learned from human interaction and how people can positively interact with the environment without causing environmental degradation and harmful exploitation of natural resources. It has been a difficult process for the Ecuadorian government. The Galapagos finds itself in what has been termed the "Galapagos paradox" because it is trying to be used by the Ecuadorian government as a major source of income by appealing to tourists as a "pristine, people-free natural laboratory," but the government is permitting more and more people to live on the islands and allowing even more tourists each year (Quiroga, 2009). Conservation efforts have become dependent on tourism revenue, creating a cycle that needs more money from more tourists in order to preserve the

environment (Quiroga, 2009). Recent criticisms of the management plans in the Galapagos have caused government officials to tighten rules and regulations in order to protect the environment. In 2010, UNESCO chose to remove Galapagos from the World Heritage danger list because of the steps the Ecuadorian government has taken towards strengthening conservation strategies that have helped remove invasive species and reduce damage from tourism (UNESCO, 2010).

There is a common theme among those who have taken interest in the Galapagos. The conservationists, NGOs, scientists, government officials, local residents, and tourists all rely on the health of the wildlife and the pristine state of the environment. But with so many actors involved in policy making, it has become troublesome to meet the wants and needs of these actors (Quiroga, 2009). Nonetheless, the first step in protecting the islands, but still allowing it be a "living museum and showcase of evolution," will undoubtedly start with the widespread use of sustainable energy (UNESCO, 2010). The "Galapagos Islands Zero Fossil-Fuel Initiative" will not solve all of the complex problems of the Galapagos. The islands are still in danger from a rising number of tourists, a rising number of immigrants, invasive plant and animal species, and the exploitation of marine resource, but complete sustainability in energy needs can help conservationists and scientists get a proper footing to better meet the other challenges in the Galapagos.

Future Recommendations

The significance of the Zero Fossil Fuel Initiative is that this management plan is completely applicable to island nations all across the globe. The elimination of fossil fuels from an island that supports approximately 30,000 residents and 170,000 visitors every year is a marvel in terms of the utilization of sustainable energy practices and every island in the world should look to model energy plans very similar to this to conserve the environment. After the completion of this initiative, I would hope leaders all over the world would not only applaud Ecuador for accomplishing such a feat, but also propose similar plans and create models based on the data found in the Galapagos to help other small island nations achieve cleaner energy. The global ramifications would be an overall lower dependence of fossil fuels, a strengthening of international ties in the energy and environmental communities, and a huge success for living up to the ideals of "Buen Vivir." This concept is the duty of the government that many Ecuadorians wish to see better implemented to preserve and protect the health of the people and the environment. An increase in media attention could have further implications that may prevent the drilling in the Amazon by drawing international attention from conservationists and governments to Ecuador. The benefits of sustainable initiatives at any location in the world will help the Ecuadorian rainforest breathe a little easier, but it is up to the international citizenry to call for change.

The incentives for Ecuador to protect the Galapagos are apparent, including the international funding it receives to help keep its status as a UNESCO World Heritage Site. If the Amazon rainforest's status as a UNESCO Biosphere Reserve was enlarged and upgraded to a UNESCO World Heritage Site, then this could lead to substantial international funding that could prevent resource exploitation. Kelly Swing, a U.S. biologist and the director of the Tiputini Biodiversity Station, argues that the Ecuadorian government currently lacks the farsightedness to properly plan and use the rainforests as an eco-tourist destination. Swing is well aware that the government plans to make $18 billion dollars by drilling in the Yasuní National Park, but with proper management this area could potentially mirror the revenue from similar regions in Latin America and bring in nearly $500 million, making this region and the Galapagos a billion dollar industry (Steffen and Onecko, 2013).

The funding to save unique regions of the world is available; for example, in Brazil the Norwegian government has pledged $1 billion dollars to conserve the Amazon and help initiate management plans (Norwegian Ministry of Foreign Affairs). Ecuador has similar potential for this type of funding from other European nations like Germany and the Netherlands who have voiced their outrage and

denouncement of President Correa's plan to drill and the cancelation of a $50 million jointly funded project through the United Nations Reducing Emissions and Deforestation and Degradation program. Ecuador has the chance to set a new paradigm for successful environmental conscious development by abiding to the ideology of "Buen Vivir" and demonstrating that economic development does not have to result in the ruin of the environment and infringement of the rights of the indigenous people.

References

Alvaro, M. (2013, January 30). Ecuador picks 17 companies to build renewable energy plants. *The Wall Street Journal.* Retrieved from http://online.wsj.com/article/BT-CO-20130130-716270.html.

Branch, O. (2013, February 4). Buen vivir: The social philosophy inspiring movements in South America. *The Guardian*. Retrieved from http://www.theguardian.com/sustainable-business/blog/buen-vivir-philosophy-south-america-eduardo-gudynas.

Carvajal, P. (2012). Galapagos Islands Zero Fossil Fuel Initiative. *Ministry of Electricity and Renewable Energy-Ecuador*. Retrieved from http://www.irena.org/DocumentDownloads/events/Malta September2012/Pablo_Carvajal.pdf.

Charles Darwin Foundation. (2002, January). Biological impacts of the Jessica oil spill on the Galapagos environment. Retrieved from http://w.birdrescue.org/pdfs/Impacts_of_Jessica_ver1.2.pdf.

David Suzuki Foundation. (2013). A brief history of oil. Retrieved from http://www.davidsuzuki.org/issues/climate-change/science/energy/oil/.

Department of Economic and Social Affairs. (2013). Renewable energy. Retrieved from http://www.un.org/en/development/desa/climate-change/renewable-energy.shtml.

Global Sustainable Energy Partnership. (2008). The San Cristobal wind and solar projects. Energy in Action. Retrieved from http://www.globalelectricity.org/en/index.jsp?p=121&f=124.

Estrella, R., Strauss, P., Braun, M., Karres, S., Klaus, W., Rodriguez, I., . . . Manzano, L. (2011). PV-battery-biofuel hybrid system for zero fossil fuel electricity generation on the Galapagos Islands.

Fox News Latino. (2013, Aug 16). Ecuador's president abandons no-drilling plan, approves oil exploration in Amazon. Retrieved from http://latino.foxnews.com/latino/money/2013/08/16/ecuador-president-gives-ok-to-drill-for-oil-in-amazon-rainforest-abandons-no/.

Galapagos Island News. Galapagos leads the way in alternative energies. Retrieved from http://www.galapagosislands.com/newsletter/archive/galapagos-alternative-energies.html.

Heritage Foundation, The. (2014). Index of economic freedom. Retrieved from http://www.heritage.org/index/country/ecuador.

Karl, T. L. (2004). Oil-led development: Social, political, and economic consequences. *Encyclopedia of Energy*, vol. 4. Retrieved from https://politicalscience.stanford.edu/sites/default/files/documents/KarlEoE.pdf.

Kirby, A. (2004, April 19). When the last oil well runs dry. *British Broadcasting Corporation.* Retrieved from http://news.bbc.co.uk/2/hi/science/nature/3623549.stm.

Mitchell, T., Anderson, K., Jones, L., & North, W. (1970). What oil does to ecology. *Journal-Water Pollution Control Federation, 42*(5): 812-818.

Morgan, D. (2013). World's first "green" airport fully operational at Baltra, Galapagos. Retrieved from http://yourescapetoecuador.com/news/worlds-first-green-airport-fully-operational-at-baltra-galapagos-islands/.

National Geographic. (2014). Galapagos Islands. Retrieved from http://travel.nationalgeographic.com/travel/world-heritage/galapagos-islands/?rptregcta=reg_free_np&rptregcampaign=20131016_rw_membership_r1p_us_se_w#register.

Norwegian Ministry of Foreign Affairs. (2008). Norway offers up to 1 billion to save rainforest. Retrieved from http://www.norway-un.org/NorwayandUN/Selected_Topics/Climate_Change/160908_AmazonFund/#.U2IhTHzwJMY.

Organization of the Petroleum Exporting Countries. (2013). Ecuador facts and figures. Retrieved from http://www.opec.org/opec_web/en/about_us/148.htm.

Quiroga, D. (2009). Crafting nature: The Galapagos and the making and unmaking of a "natural laboratory." *Journal of Political Ecology*. *16*: 123-140.

Steffen, S., Oneko, S. (2013, Aug 22). Oil drilling in Yasuni creates tension between Germany and Ecuador. *Deutsche Welle.* Retrieved from http://www.dw.de/oil-drilling-in-yasuni-creates-tension-between-germany-and-ecuador/a-17039142.

United Nations Educational, Scientific, and Cultural Organization. (2013, July 29). List of World Heritage in danger: World Heritage Committee inscribes the tombs of Buganda kings (Uganda) and removes Galapagos Islands (Ecuador). Retrieved from http://whc.unesco.org/en/news/636.

United Nations Foundation. (2013). Achieving universal energy access. Retrieved from http://www.unfoundation.org/what-we-do/issues/energy-and-climate/clean-energy-development.html.

Valencia, A. (2013, October 3). Amazon oil drilling project approved by Ecuadorian parliament. *The Huffington Post*. Retrieved from http://www.huffingtonpost.com/2013/10/04/amazon-oil-ecuador-congress-yasuni-basin_n_4040861.html.

Vidal, J. (2011). Ecuador: Four months to save the world's last great wilderness from 'oil curse.' *The Guardian.* Retrieved from http://www.theguardian.com/environment/2011/aug/14/ecuador-oil-yasuni-national-park.

Author

Sean Dove is in his senior year at Coastal Carolina University, studying for a bachelor's degree in political science with a minor in marine science. He recently stepped down as the President of the Coastal Men's Soccer Club after serving for two years. With the assistance of Dr. Pamela Martin he spent the spring semester of 2013 studying marine science at the Universidad San Francisco de Quito in Ecuador and at the Galapagos Institute for the Arts and Sciences on the Island of San Cristóbal in the Galapagos Islands.

Adviser

Pamela Martin is a Professor of Politics at Coastal Carolina University in Conway, South Carolina, where she teaches courses in International Relations and Environmental Politics. Martin was a 2009 Fulbright Scholar in Ecuador and has published on environmental governance of the Amazon. Her works include, *Oil in the Soil: The Politics of Paying to Preserve the Amazon*, by Rowman and Littlefield 2011; "Global Environmental Governance from the Amazon," in *Global Environmental Politics,* November 2011; and a forthcoming book entitled *Ending the Fossil Fuel Era* by MIT Press. Martin just returned from a semester of research in the Amazon and Galapagos on sustainable development, energy, and international environmental law. She plans to apply her work in South America to local sustainability policy as well.